

Stormwater Technical Assistance for Environmental Justice Communities in the Pioneer Valley

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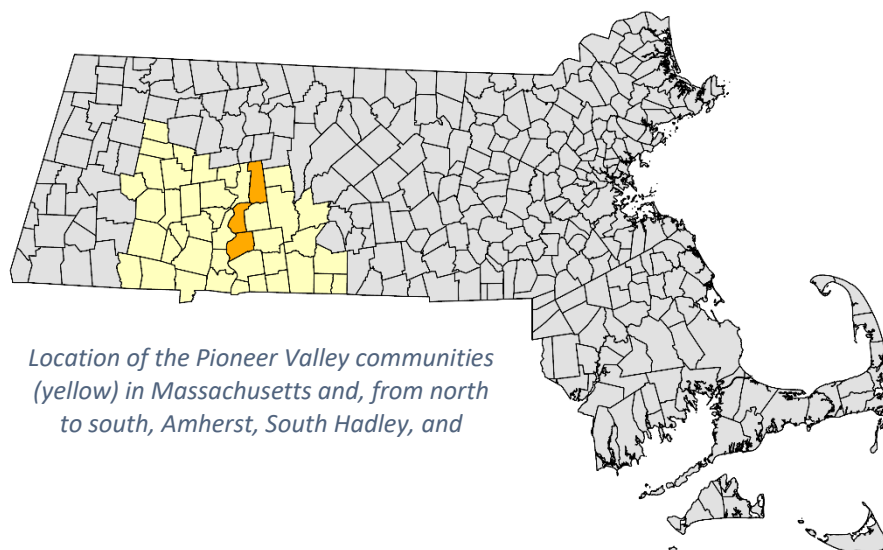
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1 Project Overview

The purpose of this project was to strengthen the capacity of three environmental justice (EJ) communities, selected by the US Environmental Protection Agency, Region 1 (EPA), to manage stormwater and implement small-scale green stormwater infrastructure (GSI) practices. The project aimed to provide the communities with the tools and expertise needed to effectively address stormwater runoff to improve surface water quality and climate resilience.

This project builds on a previous technical assistance program in the Mystic River Watershed. In 2018-2019, EPA engaged with two municipalities to learn about their challenges and goals for stormwater management and to advance stormwater management best practices. Over a series of group meetings, federal and state regulatory agencies and consultants worked with the towns to create stormwater action plans tailored to their specific needs. The consultant team produced stormwater bylaw recommendations and site-specific stormwater management designs for each community.

In 2023, EPA sought to replicate the success of the previous project, this time focused on providing technical assistance to EJ communities in the Pioneer Valley, a region in western Massachusetts within the Connecticut River basin. EPA worked with the Pioneer Valley Planning Commission (PVPC) to solicit letters of interest from EJ communities, and selected Amherst, South Hadley, and Chicopee to participate in the program. EPA contracted with Horsley Witten Group (HW) and FB Environmental Associates (FBE) as the consultant team (collectively, HW/FBE), with HW as the lead technical consultant and FBE as the lead facilitator.



Location of the Pioneer Valley communities (yellow) in Massachusetts and, from north to south, Amherst, South Hadley, and

This report provides an overview of the project participants, community needs, technical assistance provided to meet those needs, and ideas for future technical assistance. Workshop materials and technical assistance deliverables are provided in Appendices A-D.

1.1 COMMUNITY AND ENVIRONMENTAL CONTEXT

As EJ communities, Amherst, Chicopee, and South Hadley face disproportionate burdens and competing demands for limited municipal resources. In Amherst, 19 of 22 census blocks are designated as EJ communities, according to the [Massachusetts 2020 Environmental Justice Populations mapper](#). All 19 blocks have high minority populations, and 8 blocks also have low-income households. Chicopee has 34 EJ census blocks, including areas with high minority population, low income, and English isolation. South Hadley has two EJ census blocks, with one low-income neighborhood and one neighborhood with a high minority population.

Amherst, Chicopee, and South Hadley are covered by the Massachusetts General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4 Permit). The MS4 Permit establishes minimum control measures for all MS4 permittees and additional requirements for permittees discharging to impaired waters and/or within Total Maximum Daily Load (TMDL) watersheds. As Connecticut River basin

communities, Amherst, Chicopee, and South Hadley are subject to MS4 Permit requirements for the Long Island Sound Nitrogen TMDL. These communities must implement enhanced best management practices (BMPs), complete a Nitrogen Source Identification Report (NSID), and install structural BMPs that reduce nitrogen. Amherst must also develop a Lake Phosphorus Control Plan for the Mill River subwatershed, in accordance with MS4 Permit requirements for the Lake Warner Phosphorus TMDL. All three communities also have receiving waters that are listed as impaired for bacteria.

1.2 TECHNICAL ASSISTANCE OVERVIEW

HW/FBE provided technical assistance along two parallel tracks over a period of 9 months (January-September 2024). One track comprised four collaborative workshops, at which representatives from all three communities convened with EPA, PVPC, and HW/FBE to collectively learn and share resources on topics of mutual interest. The second track comprised three virtual meetings between HW/FBE and individual communities, and a technical assistance deliverable for each community.

The collaborative workshops were designed to promote interdepartmental communication and encourage participants to network and share best practices and resources. Community participants included staff and directors of planning, conservation, public works, and engineering departments. EPA and PVPC staff participated in the meetings to provide information, resources, and input. HW/FBE facilitated the workshops, presented on stormwater technical content, and provided take-home resources.

At the individual community meetings, participants discussed their community's stormwater management challenges and priorities for technical assistance, and then guided the individual community technical assistance projects. The projects, selected by each community, were as follows:

- Amherst: Draft stormwater management regulations.
- Chicopee: Revised stormwater management ordinance and a comparison of stormwater requirements across Department of Public Works (DPW), Planning, and Conservation regulations.
- South Hadley: Geographic information system (GIS) mapping analysis and site visits to evaluate opportunities for GSI retrofits, and conceptual designs for GSI at three locations in South Hadley.

1.3 BARRIERS AND SOLUTIONS

At the first collaborative workshop and individual community meetings, HW/FBE learned about the communities' barriers to stormwater management and GSI implementation, unique strengths and assets, and interests in topics to learn more about. The communities face many common issues related to stormwater management, including localized flooding, poor surface water quality, lack of administrative capacity for MS4 Permit compliance, and challenges in accessing funding for stormwater projects. The communities expressed interest in learning more about stormwater management topics, including GSI design and maintenance, and nitrogen TMDL and related MS4 Permit requirements.

Table 1 summarizes how these challenges and topics were addressed either during collaborative workshops or individual community technical assistance.

Table 1. Stormwater Management Challenges and Technical Assistance Provided

	Amherst	Chicopee	South Hadley
Funding & Staffing			
Challenges & Barriers	- Inadequate funding from sewer enterprise and capital funds. - Interested in stormwater utility. - Aging infrastructure.	- Sewer separation and wastewater treatment plant (WWTP) upgrades are higher priority for funding than stormwater management. - No full-time MS4 coordinator.	- Difficulty identifying financially feasible GSI projects. - Limited DPW administrative and operations and maintenance (O&M) capacity (staff and resource constraints).
Individual TA	Not requested.	Not requested.	Not requested.
Workshop Topics & Activities	Collaborative Workshop #3: (a) Community share-out on funding successes and best practices, (b) Handouts prepared by HW/FBE with information on grant programs, and (c) Discussion on creative approaches to funding.		
GSI Practices & Siting Constraints			
Challenges & Barriers	- The Planning Dept. is developing Downtown Design Standards, including streetscape standards. Hope to integrate GSI into streetscape standards. - Concerned about space constraints and maintenance for GSI in downtown streetscapes.	- The Planning Dept. is working on the downtown streetscape redesign. - Many brownfield sites (difficult to implement GSI). - Must design with existing levee/drainage system in mind. - Retrofit inventory (MS4 requirement) not done, but some sites listed in MS4 FY23 AR and Integrated Plan.	- Streetscapes/road projects. - Development projects are small. - Old infrastructure. - It is difficult to retrofit an old community.
Individual TA	Not requested.	Not requested.	Concept designs for GSI practices in typical streetscapes in BATTERY BROOK subwatershed. Focus on N reduction in high N-load catchments, GSI practices that DPW can install and maintain, with potential to replicate in similar settings.
Workshop Topics & Activities	Collaborative Workshop #2: (a) GSI primer presentation, (b) GSI maintenance presentation and walkthrough, (c) Discussion on creative approaches to GSI maintenance, (d) Presentation on downtown streetscape GSI practices, and (e) GSI streetscape design exercise.		
Nitrogen TMDL Requirements			
Challenges & Barriers	N/A	- NSID report not done. - Implementation planning for nitrogen reduction structural BMPs not done.	Completed NSID report but unsure of next steps for implementation.
Individual TA	Not requested.	Not requested.	Not requested.
Workshop Topics & Activities	Collaborative Workshop #3: (a) Nitrogen and Long Island Sound TMDL presentation and (b) MS4 requirements for the nitrogen TMDL.		

	Amherst	Chicopee	South Hadley
Regulations			
Challenges & Barriers	In the process of updating stormwater and wetlands bylaws but need help ensuring draft aligns with MS4 requirements and best practices.	- Stormwater ordinance and zoning code/planning regulations have outdated elements and need to be modernized for stormwater requirements. - Street and Parking Lot Design Standards assessment not completed. - GSI code assessment not completed.	N/A
Individual TA	Draft stormwater regulations and review of existing stormwater bylaw for recommended future changes.	Draft update to stormwater ordinance for MS4 Permit compliance. Recommended future revisions to stormwater, site plan, subdivision, and wetland regulations.	Not requested.
Workshop Topics & Activities	- Collaborative Workshop #2: (a) GSI primer presentation. - Collaborative Workshop #3: (a) Nitrogen and Long Island Sound TMDL presentation and (b) MS4 requirements for the nitrogen TMDL.		
Maintenance			
Challenges & Barriers	N/A	- Limited skills/expertise for GSI maintenance - Need to contract out Szot Park maintenance.	Limited staffing, skills, and equipment for GSI maintenance.
Individual TA	Not requested.	Not requested.	Not requested.
Workshop Topics & Activities	Collaborative Workshop #2: (a) GSI primer presentation, (b) GSI maintenance presentation and walkthrough, (c) Discussion on creative approaches to GSI maintenance.		
Communications			
Challenges & Barriers	- Divergent priorities for different departments, boards and committees (stormwater low on the list for most). - Need for better communication.	N/A	N/A
Individual TA	Process for developing technical assistance products was interdepartmental and allowed Town staff to discuss needs, priorities, and processes and identifies opportunities to increase efficiencies.	Process for developing technical assistance products was interdepartmental and allowed City staff to discuss needs, priorities, and processes and identifies opportunities to increase efficiencies.	Process for developing technical assistance products was interdepartmental and allowed Town staff to discuss needs, priorities, and processes and identifies opportunities to increase efficiencies.
Workshop Topics & Activities	All Collaborative Workshops convened City and Town staff from across departments, allowing for interdepartmental collaboration and learning.		

1.4 OUTCOMES AND REMAINING NEEDS

HW/FBE distributed an online feedback form to community participants to solicit their perspectives on the technical assistance program and ideas for future technical assistance. Participants also provided feedback during Workshop 4. Feedback was positive, with all respondents agreeing that the workshops were educational and the technical assistance deliverables will alleviate stormwater management challenges in their community. **Table 2** summarizes the feedback received through the online feedback form and during Workshop 4.

Table 2. Summary of Participant Feedback

	Positive Outcomes	Suggestions for Improvements
Overall	- Improved interdepartmental communication. - Useful information and guidance that moved our community forward. - Learned creative ways to handle everyday stormwater issues.	
Workshops	- Appreciated the mix of presentations, interactive discussions, and break-out group activities. - Helpful to learn from and create connections with other communities. - Helpful to hear where other communities are in completing their MS4 tasks, what's working for them, and what's not. - Break-out groups were useful for digging into community- and site-specific applications.	- Allow more time for communities to ask each other questions. - In break-out groups, combine participants from different communities (instead of only grouping by community) - Add field trips to visit GSI facilities. - Get maintenance workers involved for education and training purposes. - Further discussion of maintenance successes.
Individual Community Deliverables	- Increased knowledge and level of comfort with GSI. Site visits were helpful. Provided useful tools for implementing site-specific GSI projects and promoting GSI during permitting and future planning efforts. - Advanced and improved stormwater regulations.	

One goal of the workshops was to provide participants with take-home resources that community participants could use for future efforts. **Table 3** summarizes the resources provided and/or discussed during workshops.

Table 3. Resources

Topic	Description
GSI Selection & Design	- Massachusetts Stormwater Handbook (update expected in 2025): https://www.mass.gov/guides/massachusetts-stormwater-handbook-and-stormwater-standards - PVPC Green Infrastructure Design Standards and Performance Templates: https://thinkblueconnecticutriver.org/wp-content/uploads/2023/05/PVPC-GI-Design-Standards_FINAL-2023.04.25.pdf
GSI Maintenance	- Baystate Roads: https://www.umasstransportationcenter.org/umtc/Baystate_Roads.asp - Portland, Oregon Green Street Stewards program: https://www.portland.gov/bes/green-street-stewards - Local schools and volunteer groups - Regional contracting through PVPC and Franklin Regional Council of Governments
Nutrient Load Reduction & Tracking	- Massachusetts MS4 Permit, Appendix F, Attachment 3 - BMP Tracking and Accounting Tool (BATT): https://www.epa.gov/npdes-permits/stormwater-tools-new-england
Funding	Grant handouts provided at workshop (see Appendix A)

During workshop discussions and in the feedback form, community participants raised ideas for further technical assistance and support. **Table 4** summarizes ideas for future assistance to help Amherst, South Hadley, and Chicopee overcome challenges and build capacity for stormwater management.

Table 4. Future Technical Assistance Ideas

Topic	Description
GSI Maintenance	• Train DPW personnel on GSI long-term operation and maintenance (O&M). • Create templates for O&M documents (checklists, schedules, logs, etc.). • Develop a Pioneer Valley “Adopt-a-Rain-Garden” Guide (or similar program) that can be tailored for individual communities.
Nutrient Load Reduction & Tracking	• Provide technical support and funding for MS4 Permit requirements for Long Island Sound Nitrogen TMDL. • Discuss the implications of Long Island Sound issues and US Geological Survey nutrient testing results on the Connecticut River. • Create a nitrogen-removal tracking spreadsheet for each community. • Identify retrofit projects for nutrient reduction and prepare cost estimates.
Funding	• Provide funding for GSI maintenance. • Assist communities with accessing Long Island Sound restoration funds for GSI design and maintenance. • Explore options for support with grant administration, such as through the MA Office of Grants and Research.
Other	• Assist with stormwater ordinance and regulation review and revisions. • Discuss and share resources for data management of MS4 data. How different towns are doing it, what software they’re using, and GIS options for mapping and storing data. • Facilitate discussions with MA Department of Transportation (MassDOT) about stormwater impacts and GSI opportunities on state roads.

2 Collaborative Workshop Summaries

2.1 WORKSHOP PLANNING

HW/FBE designed the collaborative workshops with a mix of presentations, facilitated discussions, and small group activities. Facilitated discussions were led by FBE, which allowed HW to listen, ask questions, and have open-ended discussions with participants. Having facilitators with expertise in water resources and GSI was useful for directing productive discussions, knowing which questions to ask, and creating useful activities.

Hands-on workshop activities were structured as community breakout groups, each joined by staff from HW/FBE, EPA, and PVPC. HW/FBE provided worksheets, handouts, maps, and writing instruments to facilitate the activities. After each workshop activity, participants reconvened as a whole group to share their reactions and lessons learned. Workshop materials were emailed to participants after each workshop for their use.

Before each workshop, HW/FBE, EPA, and PVPC met to review and refine the workshop agenda and activities. Patty Gambarini, Chief Environmental Planner for PVPC, was integral to workshop planning as the local liaison; her feedback and ideas helped ensure all workshop topics and materials were tailored to the communities. Debrief meetings between HW/FBE, EPA, and PVPC were held after each collaborative workshop to reflect on the workshop outcomes and brainstorm topics for the following workshop.

2.2 WORKSHOP #1

2.2.1 Overview

The first Collaborative Workshop was held on January 25, 2024, and focused on introducing the technical assistance project and learning about each community's stormwater context, strengths, and challenges. The workshop culminated in a breakout group exercise exploring each community's stormwater management and technical assistance priorities.

2.2.2 Stormwater Management in EPA Region 1

EPA provided an overview of stormwater management and its importance. Topics of discussion included:

- How stormwater impacts water resources (e.g., access, inability to recreate).
- Shifting perceptions of and approaches to stormwater management, including “next-generation” strategies focused on small-scale GSI.
- Components of a robust stormwater management program (e.g., public engagement, IDDE program, municipal standards, operations and maintenance, and infrastructure).

2.2.3 Stormwater Impacts in the Pioneer Valley

PVPC provided an overview of stormwater impacts in the Pioneer Valley, as well as opportunities for funding and remediation. Topics of discussion included:

- PVPC's stormwater programs and resources.
- Impaired waterbodies, including the challenge of addressing nonpoint source pollution in the Connecticut River basin due to the significant investment needed to improve nitrogen treatment in WWTPs.
- Public perceptions about water quality and difficulty fostering local stewardship of Long Island Sound.

2.2.4 Technical Assistance Project Overview

HW presented the scope and timeline for technical assistance. Participants discussed the types of support offered to meet each community's needs, assets, and environmental conditions.

2.2.5 Community Overviews of Stormwater Management

Each community provided an overview of stormwater management and GSI in their municipality:

- Amherst: Discussed their current stormwater program, including MS4 compliance, mapping catch basins, IDDE, and completing the NSID report. They have some GSI with rain gardens in parks, and are interested in funding, cross-departmental communication, and incorporating GSI into downtown streetscapes.
- Chicopee: Discussed stormwater in their area, including the long-term success of the stormwater utility fee and challenges with combined sewer overflows (CSOs), MS4 compliance, stormwater ordinance, staffing, and flooding. They struggle with funding GSI projects and would like to update their ordinances and regulations and incorporate GSI into downtown streetscapes.
- South Hadley: Discussed their current stormwater program, including MS4 compliance, funding, infrastructure, development patterns, and environmental priorities. They are interested in learning which areas have GSI opportunities, with a focus on Titus Pond, Black Stevens Pond, and Buttery Brook.

2.2.6 Technical Assistance Inspiration

HW discussed possible opportunities for the consultant team to support the communities, including mapping, codes and regulations, site walks, fact sheets, road project and BMP guidance, MS4 and NSID report compliance, streetscape standards, and funding acquisition assistance.

2.2.7 Stormwater Priorities Exercise

The breakout exercise prompted each community to think about stormwater management changes they would like to see in the future, steps needed to achieve those changes, and potential barriers. Each community breakout group responded to questions about their community's stormwater program, priorities, and next steps. HW/FBE provided maps as a visual aid, which helped identify geographic priority or problem areas.

The Amherst group discussed improving interdepartmental communication, acquiring more funding, creating a BMP toolbox, developing GIS capacity to help with asset management, upgrading aging infrastructure, updating regulations, and incorporating GSI into downtown streetscape standards.

The Chicopee group's priorities were MS4 Permit compliance, climate resiliency, updating codes and regulations, and incorporating GSI into downtown streetscapes. Challenges included staffing and funding. The Chicopee staff aim to use an ordinance framework to achieve their goals.

The South Hadley group's priorities were MS4 compliance, improving O&M, understanding funding options, identifying suitable BMPs, mapping constraints and opportunities for GSI, and improving EJ outcomes.

2.2.8 Facilitated Discussion

After reconvening, the whole group discussed the following common themes identified in the breakout groups, which were recorded as potential topics for future workshops:

- Streetscape standards
- Maintenance
- Funding, including stormwater enterprise funds, loans, and grants
- Next steps in NSID reports, including BMPs and requirements
- EJ considerations
- GIS, including understanding how to use GIS tools to improve asset management and MS4 compliance
- Communicating across boards and departments

2.3 WORKSHOP #2

2.3.1 Overview

The second Collaborative Workshop was held on March 28, 2024, and focused on GSI practices, maintenance, and downtown streetscape applications. The breakout group exercise walked the communities through selecting and siting GSI practices in downtown streetscapes.

2.3.2 Updates on Technical Assistance for Each Community

Each community provided an overview of their technical assistance priorities and projects.

2.3.3 Green Stormwater Infrastructure Primer

HW gave an introductory presentation and facilitated a discussion on GSI principles, practices, and applications. The presentation included examples of GSI co-benefits (e.g., heat mitigation, traffic calming, localized flood mitigation, beautification, amenities, and education). Questions that were raised by participants included:

- Administrative ease in determining a GSI facility's stormwater capacity. HW noted there are well-accepted models that are typically used to make capacity determinations.
- Considerations for selecting plant species (e.g., long-term growth, water needs).
- Best practices for bottoms/underdrains of GSI facilities.
- Concerns about ground freezing and designing GSI facilities that operate well under such conditions.

2.3.4 Green Stormwater Infrastructure Maintenance

HW gave an overview of GSI maintenance best practices and facilitated a discussion. Discussion topics included:

- Challenges related to a lack of knowledge/training on appropriate maintenance, and potential solutions. Solutions included weed and plant guides, user-friendly maintenance schedules and step-by-step maintenance checklists, and designing/constructing GSI facilities with maintenance in mind.
- Best practices for construction to ensure infiltration areas are not compacted.

2.3.5 Creative Approaches to Maintenance

FBE facilitated a discussion on creative approaches to maintenance, focusing on GSI maintenance best practices and potential solutions to the communities' self-identified challenges. Participants discussed ideas to ease O&M and create effective management plans. Discussion topics included:

- Maintenance reference documents, including those usable by volunteer groups. These included weed and plant guides, maintenance checklists and schedules, and planting plans.
- Possible partners, such as local schools and colleges and community groups, and models of volunteer stewardship programs such as "Adopt A Rain Garden" and "Green Street Stewards".
- Contracting out for maintenance, including at a regional scale to reduce costs.

2.3.6 Green Stormwater Infrastructure for Downtown Streetscapes

HW presented typical streetscape GSI practices and walked through the process for evaluating GSI suitability, with a focus on site conditions and constraints.

2.3.7 Streetscape Design Exercise

During the breakout group exercise, each community was asked to consider users, maintenance, and stormwater management needs in a streetscape focus area and to select and site appropriate GSI practices. Each community group "designed" a downtown streetscape of their choice using photos, aerials, and section views created by HW in advance. Groups were given a toolbox of streetscape GSI practices with varying siting criteria, aesthetics, and maintenance requirements and a worksheet prompting participants to identify users, priorities, and constraints.

The Amherst group focused on a section of North Pleasant Street in downtown Amherst. The group proposed making outdoor dining bump-outs a permanent feature, adding planter beds, and enlarging tree wells. They also suggested incorporating GSI at Town-owned properties, including de-paving, pervious pavers, and drainage reconfiguration. The group discussed partnering with the Business Improvement District and local garden club for maintenance.

The Chicopee group focused on Exchange Street, Cabot Street, and Perkins Street in Chicopee Center. The group proposed reducing excessively wide roads, removing the one-way traffic loop, and installing stormwater planters with street trees. The group also proposed stormwater bump-outs on Exchange Street to calm traffic and improve pedestrian safety at crosswalks.

The South Hadley group focused on Main Street at Town Hall (between Bridge Street and Lamb Street), part of a MassDOT transportation design project. The group proposed a bioretention facility at Town Hall (doubling as public education), an underground infiltration system, a pocket park at a highly impervious intersection, and street trees where feasible.



Community breakout groups

2.4 WORKSHOP #3

2.4.1 Overview

The third Collaborative Workshop was held on May 23, 2024, and focused on nitrogen, the Long Island Sound, and funding solutions for stormwater management needs. The workshop culminated in a group discussion about funding and acquiring/administering grants.

2.4.2 Nitrogen and Long Island Sound TMDL Primer

FBE provided an overview of nitrogen sources in urban stormwater runoff, the impacts of excess nitrogen loading on inland and estuarine ecosystems, and the Long Island Sound nitrogen TMDL.

2.4.3 Overview of MS4 Requirements for the Nitrogen TMDL

HW provided an overview of and facilitated a discussion about MS4 Permit requirements, including:

- Enhanced BMPs required by the MS4 Permit, including public outreach and education, good housekeeping, and stormwater regulations.
- Optimizing GSI for nitrogen removal.
- Tracking and accounting for nitrogen removal in existing and future BMPs.

2.4.4 Funding Presentations and Discussion

Each community provided an overview of their current grants, grant administration, and the grant process:

- Amherst: Culvert replacement design, permitting, and implementation has been funded by Municipal Vulnerability Preparedness (MVP) grants. Drainage improvements tend to be accomplished under roads and sidewalks funding. Other grants include Community Development Block Grants (CDBG), Housing First, MassWorks Infrastructure Program, parks-related grants and conservation fund grants.
- Chicopee: MVP grant applications for maintenance and training have been unsuccessful. Other funding includes the Dam and Seawall program, MA Department of Ecological Restoration (DER) grants for culvert

replacement, MassWorks, Brownfields, conservation-related funding, legislative earmarks, EPA grants, and the Clean Water State Revolving Fund.

- South Hadley: Successful funding acquisitions include MVP, DER grants for culvert replacements, MassWorks, and Transportation Improvement Program.

2.4.5 Creative Approaches to Funding

HW/FBE provided a handout listing grant programs. Discussion topics included:

- The communities have limited capacity for grant management, reporting, and administration. Because they do not struggle with writing grant applications, additional support from PVPC would not be an effective remedy to their funding issues. South Hadley noted that not having a Town Engineer makes it difficult to write some technical elements of grant applications.
- There is a new MA Office of Grants and Research that may be an emerging resource for the communities.

2.5 WORKSHOP #4

2.5.1 Overview

The fourth and final Collaborative Workshop was held virtually on September 12, 2024.

2.5.2 Overview of Initial Barriers to Stormwater Management

FBE provided a brief recap of the common issues and concerns related to stormwater management identified by the communities at the outset of the project, including localized flooding, water quality, recreation, and environmental justice. Common barriers to implementing GSI were also noted: funding and staffing, site constraints, O&M, regulations, and communications.

2.5.3 Overview of the Collaborative Workshops

HW provided a summary of the two technical workshops (Workshops #2 and #3). The communities offered several updates and questions during this summary:

- Amherst reported that work on its Downtown Design Guidelines is ongoing, and it will be hosting walking tours soon as part of the public outreach and engagement process. GSI and stormwater management are part of the conversation.
- Chicopee is doing an extensive traffic study and redesign of its downtown, which presents opportunities to integrate stormwater management strategies. While other infrastructure needs and associated costs may affect the City's capacity to integrate stormwater management practices, streetscape redesigns are being reviewed from a holistic perspective. The City has spoken with PVPC and is using PVPC's BMP Library as a resource.
- South Hadley is interested in more fully incorporating GSI into the plans for Main Street, which is a MassDOT project. The Town is actively talking to involved parties about opportunities for GSI.
- Related to MS4 Permit requirements and implementation challenges, the communities engaged in an active discussion about working with other MS4-permitted entities within municipal boundaries. The communities shared their best practices about engaging other MS4-permitted entities and sharing data.

2.5.4 Report Out of Results of Individual Technical Assistance

2.5.4.1 Amherst: Finalizing Draft Stormwater Regulations

Amherst now has newly revised draft stormwater regulations. Town staff reported that the detailed discussions during its individual community meetings were very educational and emphasized that the technical assistance provided an opportunity for interdepartmental communication and collaboration. The Town intends to move forward with an internal review and go to public comment this year. Town staff anticipate minimal pushback, as

residents generally understand that stormwater is a recurring issue. The Town is happy with how well integrated the regulations are with wetlands permitting and other development requirements and anticipate that outreach to the development community will help minimize pushback. PVPC recommended that Amherst, given the success of its interdepartmental collaboration, consider creating an interdepartmental stormwater committee.

2.5.4.2 Chicopee: MS4 Permit Compliance

Chicopee reported that it has finished its internal legal review of the updated stormwater ordinance and anticipates presenting the ordinance to City Council in the immediate future. Pending adoption and compliance with the MS4 Permit requirements, Chicopee will use the other technical assistance products (additional redlined edits to ordinance language, audit framework for updating other regulations) to align its stormwater ordinance with other City regulations and eventually move its stormwater requirements from the ordinance to regulations. City staff noted that technical assistance was valuable to helping with MS4 Permit compliance, as the City's focus has historically been on other priorities, including its aging WWTP and CSOs. City staff and EPA also discussed getting nitrogen reduction credits for combined sewer separation, which could help free up funding in the future.

2.5.4.3 South Hadley: GSI Concept Designs

South Hadley reported that it is already thinking of opportunities to use the concept designs as pilot projects. The Town reported it recently received a state MVP program grant, which will include targeted community engagement in residential areas within the Buttery Brook subwatershed about stormwater management and water quality. The Town anticipates that the community engagement will be a good opportunity to identify potential sites for pilot projects (using the Grandview Street/Hillside Avenue concept design). The Town notes that having the concept designs makes it easier for its DPW to implement as pilot projects, with the accompanying cost estimates also making budget planning easier.

2.5.5 Next Steps and Resources

All workshop attendees reemphasized the value of technical assistance and expressed hope that there would be future technical assistance opportunities to continue advancing this work. PVPC is actively working to identify additional grant opportunities for Pioneer Valley communities. EPA emphasized that community feedback has been valuable and looks forward for future opportunities to fund more technical assistance projects. EPA also emphasized other resources such as the University of New Hampshire Stormwater Center and the Long Island Sound programs that may be able to fund Pioneer Valley projects.

3 Individual Community Technical Assistance

3.1 INTRODUCTION

The individual technical assistance products were selected by each community's project team and refined through conversations with HW. The selected technical assistance topics address various barriers to effective stormwater management (e.g., outdated stormwater regulations) and needs (e.g., identification of suitable GSI).

3.2 AMHERST

During its March 1, 2024, scoping meeting with HW/FBE, Amherst identified finalizing its draft stormwater regulations as the highest priority for technical assistance. The Town's Stormwater Management Bylaw (May 4, 2021) states that separate stormwater regulations shall be promulgated to establish stormwater management criteria. While the Town has had draft stormwater regulations for several years, they have not been formally reviewed or adopted. During the scoping meeting, the Town and HW/FBE discussed various challenges of implementing stormwater requirements and overseeing development in the community, including interdepartmental communication between different development review bodies, parallel stormwater and wetlands permitting processes, and MS4 Permit compliance. Finalizing the draft stormwater regulations will allow the Town to achieve efficiencies in development review and permitting processes, increase staff understanding of how review bodies and processes operate vis-à-vis other Town departments, boards, and commissions, and incorporate best practices for MS4 Permit compliance.

Technical assistance was delivered in two iterative rounds of regulatory revisions and comments.

3.2.1 Phase 1

HW completed an audit of the draft stormwater regulations to determine its compliance with the MS4 Permit requirements. HW also identified areas where other Town priorities (e.g., coordinating different review processes, integrating best practices for climate resilience) could be addressed.

HW and the Town met on May 15, 2024, to review initial edits. Prior to the meeting, HW sent a redlined version of the regulations and accompanying comments for discussion. The Town reviewed and provided initial questions, comments, and priority items for discussion. Major topics discussed during the May virtual meeting included:

- **Soliciting and considering public input:** How do other communities meet the MS4 Permit requirement to consider public input as part of the stormwater permit and review process? What is the process for abutter notifications?
- **Internal review processes:** Which departments, boards, and commissions participate in the review process, and how are those reviews and approvals sequenced? What other permitting and development review processes occur in parallel for projects that meet the Stormwater Bylaw applicability thresholds, and how might they affect the stormwater review?
- **Off-site mitigation:** Is it feasible for Amherst to implement off-site mitigation and in-lieu fee provisions?
- **Exemptions:** What exemptions are allowed under the MS4 Permit requirements?
- **Language and formatting:** How can the regulations be reorganized to make them easier to use and implement?

3.2.2 Phase 2

Following the May review meeting, the Town provided additional comments and edits on the redlined draft of the stormwater regulations. HW updated the draft stormwater regulations per the May review meeting discussion and the Town's edits. HW and the Town met on August 13, 2024, for a second virtual meeting to review major edits and

discuss any outstanding questions. Prior to the meeting, HW sent a redlined and annotated version of the regulations to the Town. Major topics discussed during the August virtual meeting included:

- **Permit applications and review procedures:** Where is it feasible to allow stormwater permit application components to satisfy other permit application components and vice versa? For example, can proof of notification through another Commission or Board's abutter notification process satisfy abutter notification requirements under the stormwater regulations? Are recording requirements for different stormwater management plan components (i.e., as-builts, Operations & Maintenance Plan) onerous when considering other likely permit requirements, and are there opportunities to simplify requirements or streamline parallel processes?
- **Administrative capacity and capabilities:** How will the stormwater permitting process (including soliciting public input) be integrated with the Town's OpenGov platform or another online platform?

3.2.3 Next Steps

HW provided the Town with the final technical assistance deliverable, a redlined and clean version of the draft stormwater regulations (provided in Appendix B), on August 13, 2024. The final technical assistance deliverable incorporates all edits and comments as discussed during the previous review meetings with the Town.

Next steps for the Town are to complete a final review of the draft stormwater regulations, including all items that HW flagged for additional review pending internal Town discussions. These include sections related to internal procedures for how and where permit applications and public input will be tracked (e.g., via the OpenGov portal or on the Town's website) and design standards that may become obsolete or unnecessary once the updated Massachusetts Stormwater Handbook is released.

Relatedly, the Town will also need to pursue updates to its Stormwater Management Bylaw at a later date to ensure that the bylaw and regulations are consistent. To facilitate a future bylaw update, HW also identified inconsistencies (e.g., differences in definitions) between the draft stormwater regulations and the bylaw in the final technical assistance deliverable.

3.3 CHICOPEE

During Workshop #1, Chicopee identified its top priority as updating the City's stormwater ordinance. At the February 26, 2024, scoping meeting with HW, Chicopee asked to focus the first round of updates on MS4 Permit compliance, in response to an EPA Order for Compliance received in early February. Per the Order for Compliance, Chicopee was ordered to "enact a post-construction stormwater management ordinance, by-law, or other regulatory mechanism that contains provisions that are at least as stringent as the requirements set forth in Part 2.3.6.a.ii of the 2016 MS4 Permit" by June 30, 2024.

While the technical assistance provided through this project will help Chicopee address immediate deficiencies in its MS4 Permit compliance, it will also move the City forward as it begins discussions of how to update its development-related ordinances and regulations and implement the City's first ever comprehensive plan. The City adopted its comprehensive plan, *Envision Our Chicopee: 2040*, in 2024, establishing a shared vision for Chicopee's future. As part of the comprehensive planning process, the City identified future priorities for regulatory revisions and goals, such as encouraging redevelopment and infill development.

Technical assistance was delivered in two phases, with Phase 1 focusing on Stormwater Management Ordinance revisions for MS4 Permit compliance and Phase 2 focusing on creating a framework for future revisions for stormwater management best practices and consistency across City ordinances and regulations.

3.3.1 Phase 1

Following the February scoping meeting, HW completed an audit of Chicopee's Stormwater Management Ordinance to determine revisions necessary to ensure compliance with the MS4 Permit. HW also highlighted potential future revisions that were not strictly necessary per the MS4 Permit requirements.

HW met with Chicopee's DPW Superintendent, Planning Director, and MS4 manager on April 24, 2024, to review the audit and initial edits. Prior to the meeting, HW sent a redlined version of the ordinance and accompanying comments for discussion. Major topics discussed during the April review meeting included:

- **Internal review processes:** Confirmed internal procedures for different development project types.
- **Performance standards:** Reviewed non-compliant language and proposed revisions, including related to new development and redevelopment pollutant removal standards, optimizing BMPs for nitrogen removal, and construction-site stormwater management.

Following the April review meeting, HW integrated comments and edits from the City and provided a revised updated draft of the Stormwater Management Ordinance on April 29, 2024. The redlined draft noted potential revisions that are not required for MS4 Permit compliance and could be pursued in the future as needed. The City reviewed and had no further edits or comments. The City initiated an internal review in preparation for discussion and adoption by the City Council.

3.3.2 Phase 2

HW next focused on creating a framework for updating and aligning stormwater standards. The framework identifies conflicting stormwater requirements across the City's codes and regulations, offering initial ideas of how to remedy the inconsistencies, and identifies areas where efficiencies could be achieved in the development permitting and review process. HW audited the City's Subdivision and Site Plan Review Regulations and its wetlands ordinance and regulation, comparing them to the draft amended Stormwater Management Ordinance. The audit focused on eight topics that, based on HW's professional experience, are often inconsistent and/or inefficient across different codes and regulations:

- | | |
|---|---|
| • Applicability | • As-built plans |
| • Post-construction stormwater management | • Recording |
| • Construction-site stormwater management, erosion and sediment control | • Review process, public comment |
| • Long-term O&M | • Low impact development, environmentally sensitive site design |

HW and the City met on August 22, 2024, to review the first draft of the audit framework. Chicopee confirmed that the audit framework approach was helpful and requested that HW provide best practices from other communities as available. During the virtual meeting, the City also provided an update on the Stormwater Management Ordinance, noting that the City requested an extension from EPA to allow for a thorough review and adoption process. The City anticipates that it will adopt its revised Stormwater Management Ordinance in Fall 2024.

3.3.3 Next Steps

HW provided the City with the final technical assistance deliverables, the redlined and clean version of the draft Stormwater Management Ordinance updates and the stormwater code audit framework (Appendix C), on April 29 and September 4, 2024, respectively. Next steps for the City are to adopt its Stormwater Management Ordinance revisions (anticipated Fall 2024) and begin additional code and regulation revisions related to stormwater and green infrastructure. The City also anticipates promulgating separate stormwater regulations (using much of the amended language currently included in the Stormwater Management Ordinance) in the future, which will enable the City to administratively update its detailed stormwater requirements as new state standards and best practices are introduced.

3.4 SOUTH HADLEY

During South Hadley's February 26, 2024, scoping meeting with HW, Town staff requested technical assistance to create concept designs for "typical" GSI opportunities within the Buttery Brook subwatershed. The Buttery Brook subwatershed is located adjacent to the Connecticut River and includes one of the community's EJ populations. The subwatershed also includes several catchments with high nitrogen loading (based on South Hadley's NSID report). The Town hoped that concept designs would help staff more easily incorporate GSI into Town projects and increase understanding of GSI strategies well-suited for typical site constraints found in the community.

Technical assistance was delivered in two phases, with the first phase focused identifying areas of concern and opportunities for GSI and the second phase focused on developing site-specific GSI concept designs.

3.4.1 Phase 1

HW created a web-based (ArcGIS Online) map depicting existing conditions in the Buttery Brook subwatershed, including land use, roads, soils, topography, parcels, wetland resource areas, and drainage and sewer infrastructure. HW added to the map data provided by PVPC with outfall catchment delineations, nitrogen loading ranks (high, medium, or low), and scoring of municipal and state properties for stormwater BMP opportunities. Using this information, along with input from South Hadley, HW plotted "points of interest" on the map for locations with known stormwater impacts and/or potential opportunities for GSI retrofits.

HW and South Hadley conducted site visits within the Buttery Brook subwatershed area on May 23, 2024, focusing on a few representative locations that were selected from the pre-identified points of interest. The following sites were visited:

- **Grandview Street at Hillside Avenue:** This site features an oversized intersection common within the residential neighborhood in the Buttery Brook watershed.
- **Route 33 at Taylor Drive:** This site is along a busy arterial and the Town's Buttery Brook Park.
- **New Ludlow Road:** This site is in a commercial/industrial area that lacks closed drainage and experiences localized flooding.



Grandview Street at Hillside Avenue

At each site, HW and South Hadley discussed possible GSI retrofits that would improve stormwater management and be feasible for the Town to implement and maintain.

3.4.2 Phase 2

Following the site visits, HW developed 10% conceptual designs for GSI at the selected sites. The conceptual designs include drainage area delineation, sketches, typical details, example photos, suggested steps for advancing the design, and conceptual-level calculations for sizing, treatment volume, and nitrogen load reduction. HW met virtually with South Hadley staff on August 21, 2024, to review the designs together. Following the meeting, HW finalized the conceptual designs and developed planning-level cost estimates.

3.4.3 Next Steps

HW gave the Town the final technical assistance deliverables on September 4, 2024 (Appendix D). The Town has indicated that it hopes to implement the Grandview Ave design first, as a pilot project. They also expressed appreciation for the cost estimates, which they intend to use for grant applications.

APPENDIX A: WORKSHOP MATERIALS



MEETING AGENDA

RE: Collaborative Workshop #1: Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley

Date: 10 am to 2 pm, January 25, 2024

Location: Community Room, South Hadley Public Library

Invitees: South Hadley: John Broderick, Anne Capra, Rebekah Cornell, Melissa Labonte
Amherst: Beth Willson, Jason Skeels, Paul Dethier, Stephanie Ciccarello, Erin Jacque
Chicopee: Quinn Lonczak, Lee Pouliot
PVPC: Patty Gambarini
EPA: Michelle Vuto, Ray Cody, Danielle Gaito
Consultants: Lori Kennedy, Rich Claytor, Ellie Baker (Horsley Witten); Bina Skordas, Evan Ma (FB Environmental)

Meeting Objectives:

- Establish a baseline understanding of stormwater management in each community.
- Set the foundation for collaborating with and learning from each other.
- Share stormwater management challenges, needs, and opportunities in each community.
- Define technical assistance goals and meaningful deliverables (products/processes).

Morning Agenda (10 am – 11:30 am):

1. Overview of meeting objectives and agenda (~5 minutes)
2. Introductions (~15 minutes)
3. Stormwater management in EPA Region 1 (Danielle Gaito ~10 minutes)
4. Stormwater impacts and opportunities in the Pioneer Valley (Patty Gambarini ~10 minutes)
5. Technical assistance project overview (Lori Kennedy ~10 minutes)
6. Stormwater management and green infrastructure in your community (~30 minutes; 10 min presentation by each community)
7. Discussion (~10 minutes)

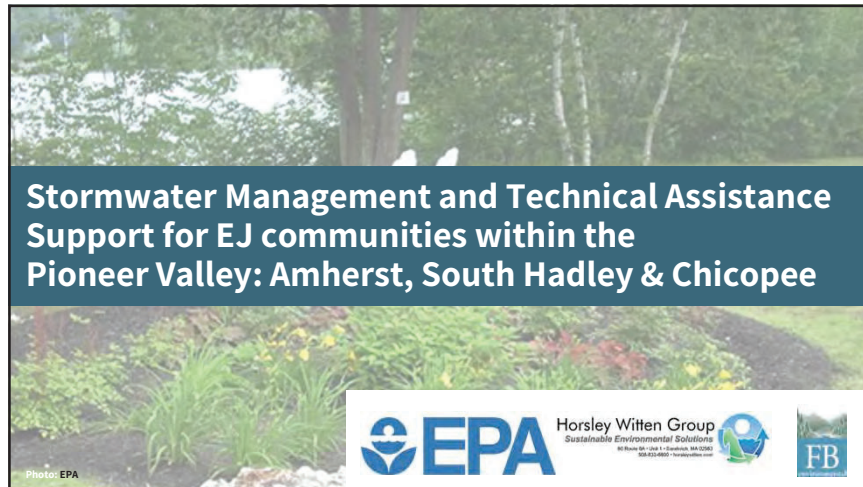
Lunch (11:30 am – 12:00 pm)

Afternoon Agenda (12:00 pm – 2:00 pm)

8. Technical assistance inspiration: What we can offer your community (~15 minutes)
9. Breakout group discussions (three groups, by community) (~30 minutes)
10. Report-out from breakout group discussions (~15 minutes)

Break (~5 minutes)

11. Facilitated discussion of potential technical assistance efforts for each community and across communities (~40 minutes)
12. Final thoughts & next steps (~15 minutes)



1

TOPIC
Overview of meeting objectives and goals
Introductions
Overview stormwater management in EPA Region 1
Stormwater impacts and opportunities in Pioneer Valley
Technical assistance project overview
Overview of stormwater management and green infrastructure in each community
Discussion
Technical assistance inspiration: What can we offer your community?
Breakout Group Discussions
Report out from group discussion
COFFEE BREAK (5 minutes)
Facilitated discussion of potential technical assistance efforts
Final thoughts and next steps

2

Meeting Objectives

- Establish a baseline understanding of why stormwater management matters
- Set the foundation for collaborating with and learning from each other
- Share stormwater management needs and opportunities in each community
- Define technical assistance goals and meaningful deliverables (products/processes)

3

Introductions: Name, Role, Town, How You Interact With Stormwater in Your Position

EPA Horsley Witten Group
Sustainable Environmental Solutions
80 Route 80 • Unit 1 • Chicopee, MA 01020
508.452.4000 | hwsolutions.com

FB

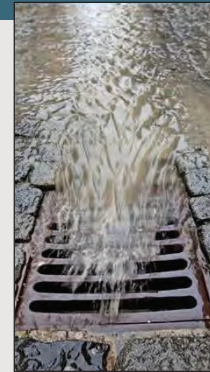
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Stormwater Management in EPA Region 1

Danielle Gaito, EPA Region 1

5

Elements of a Successful Stormwater Program



- Education & Public Engagement
- Robust IDDE Program
- New and Re-development Stormwater Standards
- Routine Operation & Maintenance Practices
- Systemic Incorporation of Green Infrastructure & Low Impact Development Practices
- Good Communication Among Municipal Departments
- Organization & Recordkeeping
- Thorough Knowledge of Infrastructure & Local Water Resources

6

Next-Generation Stormwater Management

Traditional

- Contractor driven
- Conventional sizing requirements – costly modeling & design
- Emphasizes single-solution BMPs on large parcels
- Optimizes placement of BMPs for maximum gain
- Performance monitoring

Next-Generation

- Municipality engaged throughout process
- Opportunistic implementation (e.g., during routine infrastructure upgrades)
- Flexible suite of small-scale controls (as little as 10% of the traditional water quality volume)
- Long-term operations & maintenance planning
- Shift toward comprehensive and affordable strategies for achieving water resource goals



7

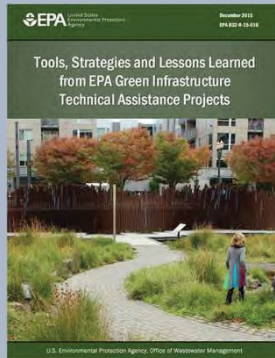
Small-Scale Green Infrastructure Design Guidance



8

Water Quality & Resiliency Benefits of Next-Generation Stormwater Management

- Reduced pollutant loads in stormwater runoff to surface waters
- Increased recharge to groundwater
- Reduce frequency & severity of combined sewer overflows caused by stormwater runoff
- Reduce localized flooding
- Reduce stream and habitat damage caused by high-velocity runoff
- Mitigation of summer heat impacts from impervious cover
- Lower energy costs for heating and cooling nearby buildings
- Improved air quality



9

Stormwater Management Technical Assistance

- Assist municipalities in exploring opportunities to implement next-generation stormwater management with an emphasis on benefits for communities with environmental justice concerns
- Facilitate collaboration among municipalities facing similar challenges in stormwater management

- Staffing challenges
- Funding challenges
- Limited experience
- Erosion Problems
- Flooding Issues



10

Stormwater Impacts and Opportunities in the Pioneer Valley

Patty Gambarini, PVPC

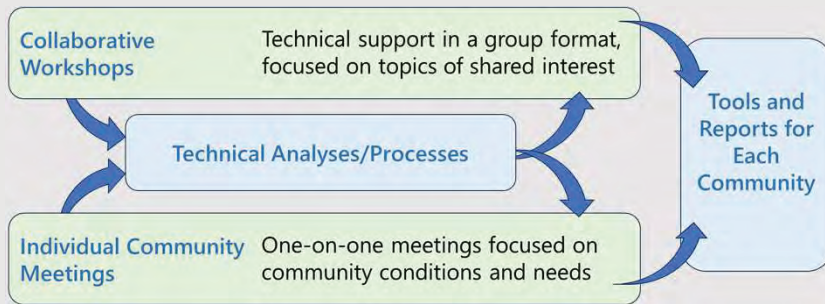
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Technical Assistance Project Overview

Lori Kennedy, HWG

12

Scope Overview



13

Collaborative Workshops

- **Focus on...**
 - Topics of shared interest
 - Opportunities for mutual learning and assistance
 - Solutions that extend beyond municipal boundaries
- **Participants**
 - Three communities, EPA, PVPC, and consulting team
 - Hoping for consistent participation

14

Individual Community Meetings

- **Focus on...**
 - Community assets, challenges, needs, and environmental conditions
 - Community-specific technical assistance deliverables
- **Participants**
 - Municipal staff (for individual community) and consultant team

15

Schedule

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Collaborative Workshops	★		★		★			★	→
	4 workshops – 3 in person, 1 virtual								
Tech Assistance to Individual Communities		★		★		★			→
	3 virtual meetings with each community								
Project Reports									→
★ Meetings									

16

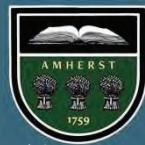
Overview of stormwater management in each community

Reasons for applying for this project

Overview of stormwater management infrastructure, programs, and regulations

Successes, resources, assets in your community

Your team's experience with green infrastructure



Town of Amherst



Wikipedia



Wikipedia

LUNCH BREAK

17

18

Technical Assistance Inspiration

Lori Kennedy, HWG

19

General Topics

1. Introduction to green stormwater infrastructure (GSI)
2. Codes and regulations
3. Preferred GSI practices for municipal projects
4. Maintenance
5. Maximizing co-benefits of GSI
6. Implementing GSI for nutrient removal
7. Funding



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Ideas for Technical Assistance

- Mapping analyses of constraints and opportunities
- Prioritized locations for GSI retrofits
- Walk through the process of integrating GSI into a municipal road project



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Ideas for Technical Assistance

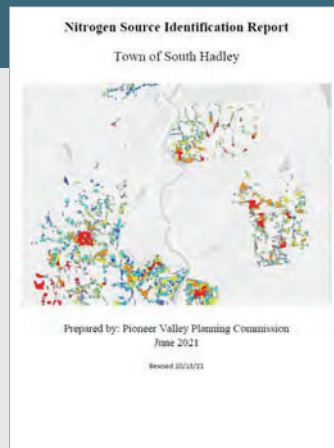
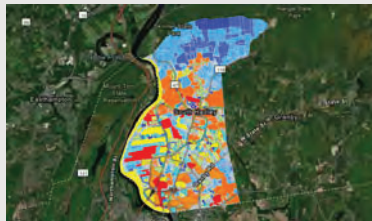
- Adapt and walk through application of PVPC's GI BMP Design Templates for each community



22

Ideas for Technical Assistance

- Guidance on implementing next steps of nutrient control plans
 - Nitrogen-reduction BMPs at priority sites
 - Tracking and accounting



23

Ideas for Technical Assistance

- Fact sheets for preferred GSI practices
- Recommendations for integrating GSI into regulations and design standards
- Information on grant and loan programs



24

Breakout Group Discussion

Where would you like to see your community's stormwater program in 3-5 years?

What are your priorities for the types of assistance we can provide as part of this project?

What are the biggest challenges for stormwater management & green infrastructure in your community?

What specific processes, tools, or products would help move you toward your goals?

25

BREAK (5 MINUTES)

26

Facilitated Discussion!

Would any of the ideas from other towns be particularly helpful in your town?

Which elements discussed by other communities do you find applicable to your own or would be beneficial to learn about?

27

Final Thoughts and Next Steps

Next Meeting: ~March 2024

Thank You!

Lori Kennedy, lkennedy@horsleywitten.com

Bina Skordas, binas@fbenvironmental.com

Ellie Baker, ebaker@horsleywitten.com



Horsley Witten Group
Sustainable Environmental Solutions
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Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley Workshop #1 Meeting Notes

RE: Collaborative Workshop #1: Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley

Date: 10 am to 2 pm, January 25, 2024

Location: Community Room, South Hadley Public Library

Attendees: South Hadley: John Broderick, Anne Capra, Rebekah Cornell, Melissa Labonte
Amherst: Beth Willson, Jason Skeels, Paul Dethier
Chicopee: Quinn Lonczak, Lee Pouliot
PVPC: Patty Gambarini
EPA: Michelle Vuto, Ray Cody, Danielle Gaito
Consultants: Lori Kennedy, Rich Claytor, Ellie Baker (Horsley Witten); Bina Skordas, Evan Ma (FB Environmental)

OVERVIEW

The purpose of this technical assistance project is to strengthen the capacity of Amherst, Chicopee, and South Hadley to manage stormwater and implement small-scale green infrastructure (GI) practices. Our first collaborative workshop, held on January 25, 2024, served as an introduction for participants to begin to understand the stormwater issues in each community and the resources available to remedy them.

Each community faces unique stormwater challenges, though there are commonalities between them. All three municipalities cited limited funding and staffing as challenges for MS4 Permit compliance. Other common challenges and opportunities included streetscape standards, implementation of GI in urban spaces, next steps with Nitrogen Source Identification Reports, effective communication across municipal departments and with the public, environmental justice, and GIS mapping and data management. The communities identified GIS support, MS4 and Nitrogen Source Identification Report assistance, fact sheet creation, technical review of streetscape standards, updating codes and regulations, and urban/streetscape GI implementation as priorities for this technical assistance project.

DISCUSSION TOPICS

1. Overview of meeting objectives and agenda

Bina Skordas gave an overview of the workshop objectives:

- Establish a baseline understanding of stormwater management in each community.
- Set the foundation for collaborating with and learning from each other.
- Share stormwater management challenges, needs, and opportunities in each community.
- Define technical assistance goals and meaningful deliverables (products/processes).

2. Introductions

Attendees introduced themselves and discussed how they interact with stormwater management in their position.

3. Stormwater management in EPA Region 1

Danielle Gaito discussed stormwater management in EPA Region 1, including the impact of stormwater on water resources and elements of a successful stormwater program. She discussed the differences between “traditional” approaches to stormwater management (detention ponds and expensive single solutions) and “next-generation” approaches that incorporate small-scale controls opportunistically, with municipal engagement and planning for long-term operation and maintenance. EPA has supported development of BMP guidance documents, including the Green Infrastructure BMP Design Standards and Performance Templates, and the New England Stormwater Retrofit Manual. These documents aim to help communities maximize the co-benefits of stormwater management, comply with the MS4 Permit, and improve water quality.

4. Stormwater impacts and opportunities in the Pioneer Valley

Patty Gambarini gave an overview of stormwater challenges and successes in the Pioneer Valley. In the region, there are 66 waters (segments) that are listed as impaired on the 2022 303(d) impaired waters list. The Long Island Sound Nitrogen TMDL is a motivating factor behind improving stormwater management. USGS/MassDEP evaluated the Massachusetts section of the Connecticut River, which drains to the Long Island Sound, and found that non-point source pollution is becoming a more substantial portion of the total nitrogen load than point sources. Successes in the region include a GI training program and creation of GI design standards and templates for five easily implementable and low-maintenance stormwater controls.

5. Technical assistance project overview

Lori Kennedy discussed the project scope and timeline. There will be four collaborative workshops (roughly every two months, except for the final meeting in August or September) and three individual meetings with each community (in between collaborative workshops). Collaborative workshops will focus on common issues experienced across communities to inspire collaboration and mutual learning, whereas individual meetings will dig into each community’s assets, challenges, needs, and conditions. The consultant team will produce a technical memorandum for each community by September (end of project timeline).

6. Stormwater management and green infrastructure in your community

Staff from each community provided an overview of their community’s stormwater management systems and programs.

Amherst

- Amherst has a separate sewer system with aging infrastructure.
- As part of its MS4 program, Amherst has mapped outfalls, completed education and outreach, and developed a nitrogen source identification report. Good housekeeping/O&M requirements, such as catch basin cleaning, are a challenge.
- Experience with GI includes rain gardens in parks, as well as BMPs installed as part of road projects. GI maintenance is a challenge. For the Fort River School, the school department and

DPW agreed to share maintenance (school staff responsible for routine O&M, DPW helping when larger equipment is needed).

- The stormwater program is funded by the sewer enterprise and capital funds. There is interest in creating a stormwater utility.
- The Planning Department is working on new Downtown Design Standards, including streetscape standards. They hope to incorporate GI into the standards.

Chicopee

- Chicopee has both combined and separate sewer systems. Combined sewer overflows (CSOs) are subject to a consent decree, and the City's wastewater treatment plant (WWTP) needs upgrades to meet effluent nitrogen limits.
- The City does not have a full-time MS4 coordinator. PVPC provides a lot of assistance. Good housekeeping/O&M is a challenge, especially catch basin cleaning.
- Chicopee created the first stormwater utility in Massachusetts. Funding for stormwater is a challenge though, due to higher priorities for sewer separation and WWTP upgrades.
- The City has a robust stormwater ordinance that needs to be modernized, and excellent site plan review. Now that the City has a comprehensive plan, they are preparing to update codes.
- GI maintenance is a challenge due to limited staffing and expertise.
- The Planning Department is working on a downtown streetscape plan, which will include major utility upgrades and sewer separation.

South Hadley

- As part of its MS4 program, South Hadley has completed regulatory updates and IDDE mapping and dry-weather screening. Good housekeeping/O&M is a challenge due to limited DPW staffing and resources.
- Much of the infrastructure in the town is old. It is difficult to retrofit an old community. There is not a lot of commercial development in South Hadley; mostly small projects.
- Enforcement of long-term O&M requirements on private developments is made difficult by limited funding.
- Black Stevens Pond and Titus Pond (in the Buttery Brook watershed) are priorities for addressing watershed pollutant sources and engaging in productive conversation with MassDOT.

7. Technical assistance inspiration: What we can offer your community

Lori laid out the opportunities for the consultant team to support the communities, including but not limited to mapping, codes and regulations, site walks, fact sheets, road project and BMP guidance, MS4 Nutrient Source Identification Report compliance, streetscape standards, and funding acquisition assistance.

8. Breakout group discussions (three groups, by community)

Each community discussed four questions with HW and EPA, with FBE facilitating the discussion.

1. Where would you like to see your community's stormwater program in 3-5 years?

2. What are the biggest challenges for stormwater management and green infrastructure in your community?
3. What are your priorities for the types of assistance we can provide as part of this project?
4. What specific processes, tools, or products would help move you toward your goals?

9. Report-out from breakout group discussions

South Hadley

- In 3-5 years, would like to see better compliance with the MS4 permit (particularly O&M), new development standards, and new ways to fund stormwater management (e.g., offsite mitigation, funding beyond the sewer enterprise).
- Finding financially feasible projects is a challenge.
- Priorities for technical assistance include assessing constraints and opportunities, GIS analysis to understand existing conditions, demonstration GI practices for rural and urban settings, and environmental justice, particularly in the southern portion of town that also has high nitrogen loading.
- For specific tools/processes, interested in next steps of the Nitrogen Source Identification Report and a GIS layer with BMP opportunities.

Chicopee

- In 3-5 years, would like to see better compliance with the MS4 permit, infrastructure with the capacity for intense storms, updated codes and regulations (including the stormwater ordinance), and a robust downtown streetscape plan.
- Challenges include funding and staffing, timely permitting for a dam removal project, poor public discourse and perception, and redevelopment of brownfield sites.
- Priorities for technical assistance include codes and regulations, GI for brownfields redevelopment, MS4 compliance, nitrogen source identification report, and environmental justice.
- For specific tools/processes, highest priority is developing a framework for improving stormwater/green infrastructure requirements in codes and regulations.

Amherst

- In 3-5 years, would like to see boards and committees coming together for a shared vision of stormwater management, better funding, a standard BMP/GI toolbox used across departments, and a more built-up GIS system to help with asset management.
- Challenges include funding, siloed decision-making, and aging drainage infrastructure.
- Priorities include incorporating GI into downtown streetscape standards, connecting with the Planning Department, and exploring a stormwater utility/enterprise.

- For specific tools/processes, would like GIS support, technical review of streetscape standards, GI fact sheets targeted to the downtown area, and a short sales-pitch to the Town Council on a stormwater enterprise fund.

10. Facilitated discussion of potential technical assistance efforts for each community and across communities

The communities, PVPC, EPA, and the consultant team discussed common themes. Lori summarized the major points into a list which will be refined as we prepare for the next meetings:

1. Streetscape standards.
2. Maintenance.
3. Funding – offsite mitigation/fee-in-lieu, stormwater enterprise, loans, grants.
4. Next steps in Nitrogen Source Identification Reports.
5. Environmental justice.
6. GIS: sharing information about how GIS is set up in different communities related to asset management and MS4. Building off what PVPC is doing and utilizing resources we already have.
7. Communicating across boards and departments – sales pitches and fact sheets.

11. Final thoughts and next steps

Scheduling for the next meetings.

- Collaborative meetings on March 28th and May 23rd from 10-2 at the South Hadley Public Library.
- Individual community meetings will be in between the workshops.
- Last collaborative meeting in August or September.

Lori and Bina will reach out about scheduling a virtual meeting with each community. The meetings will focus on gathering more information and deciding on specific technical assistance for each community.



MEETING AGENDA

RE: Collaborative Workshop #2: Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley

Date: 10 am to 2 pm, March 28, 2024

Location: Community Room, South Hadley Public Library

Invitees: South Hadley: John Broderick, Anne Capra, Rebekah Cornell, Melissa Labonte
Amherst: Beth Willson, Jason Skeels, Paul Dethier, Erin Jacque, Christine Brestrup
Chicopee: Quinn Lonczak, Lee Pouliot
PVPC: Angela Panaccione
EPA: Michelle Vuto, Ray Cody, Danielle Gaito
Consultants: Lori Kennedy, Rich Claytor, Geoff Glover, Kellie King (Horsley Witten); Bina Skordas, Evan Ma (FB Environmental)

Meeting Objectives:

- Share updates on technical assistance for individual communities.
- Learn about green stormwater infrastructure (GSI) practices and maintenance.
- Explore creative approaches to GSI maintenance.
- Identify suitable and preferred GSI practices for downtown streetscapes.

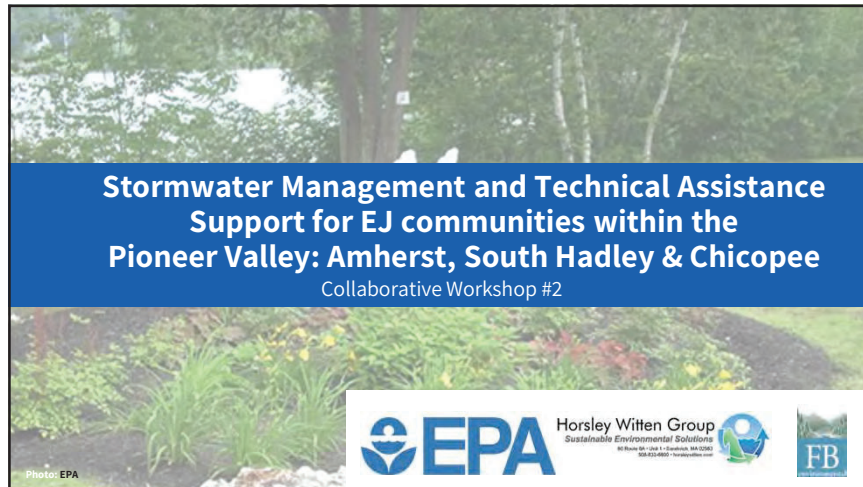
Morning Agenda (10 am – 12 pm):

1. Overview of meeting objectives and agenda (~5 minutes)
2. Introductions (~10 minutes)
3. Updates on technical assistance for each community (~15 minutes)
4. Green stormwater infrastructure primer (~30 minutes)
5. Green stormwater infrastructure maintenance (~20 minutes)
6. Facilitated discussion: Creative approaches to maintenance (~40 minutes)

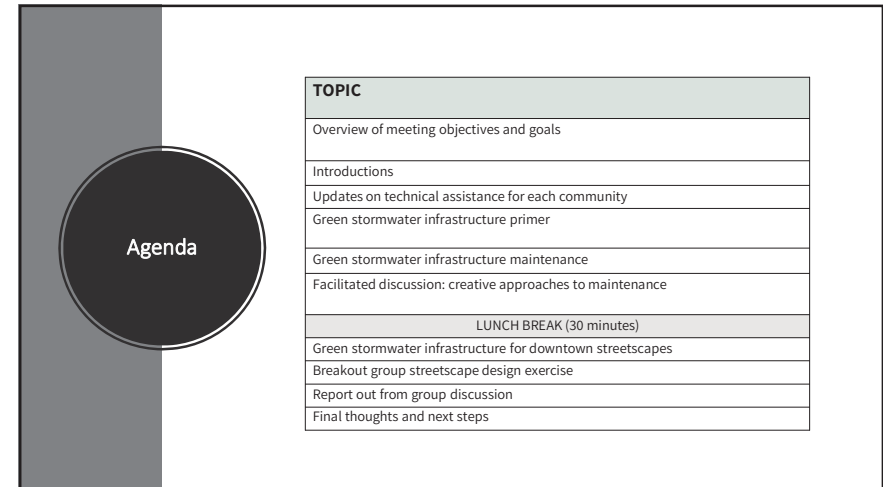
Lunch (12 – 12:30 pm)

Afternoon Agenda (12:30 – 2 pm)

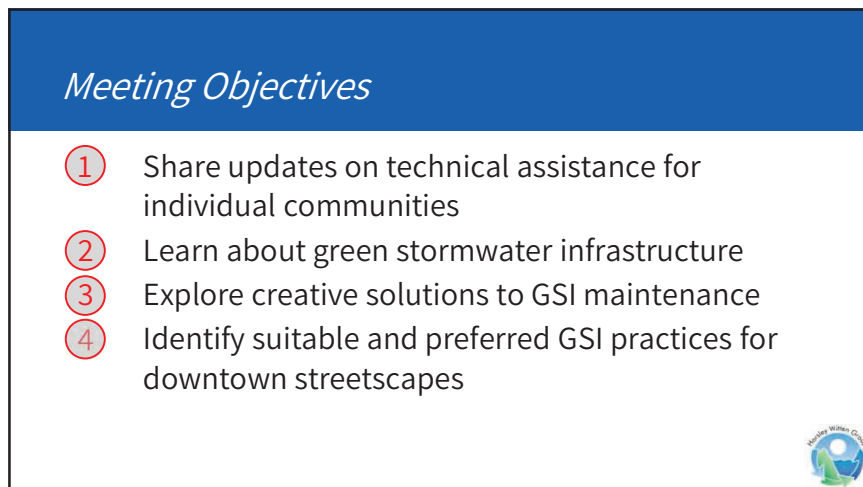
7. Green stormwater infrastructure for downtown streetscapes (~15 minutes)
8. Breakout group streetscape design exercise (three groups, by community) (~50 minutes)
9. Report-out from breakout group discussions (~15 minutes)
10. Final thoughts & next steps (~10 minutes)



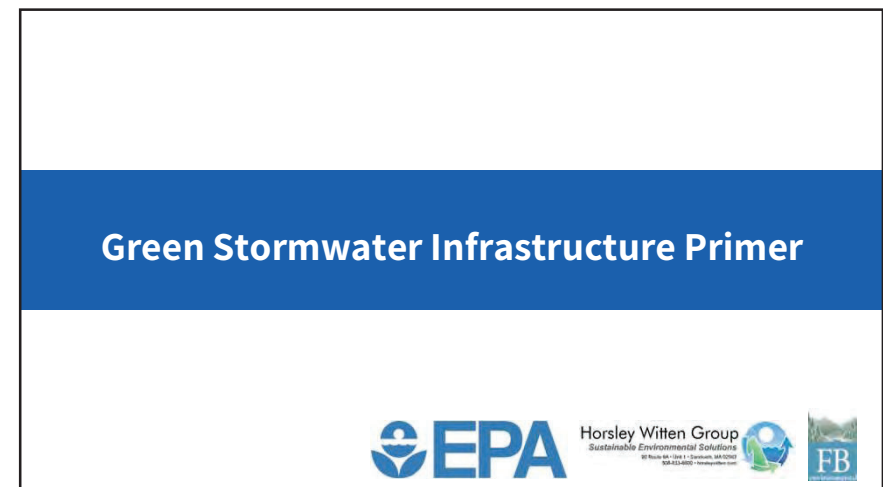
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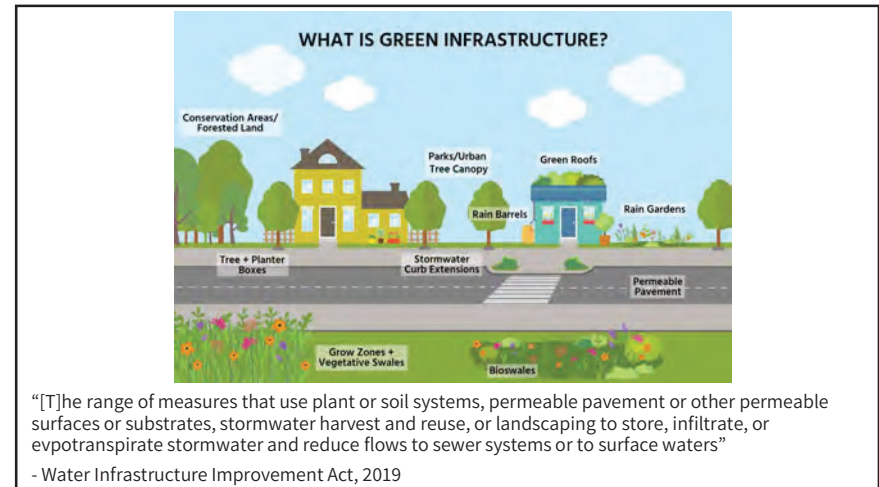
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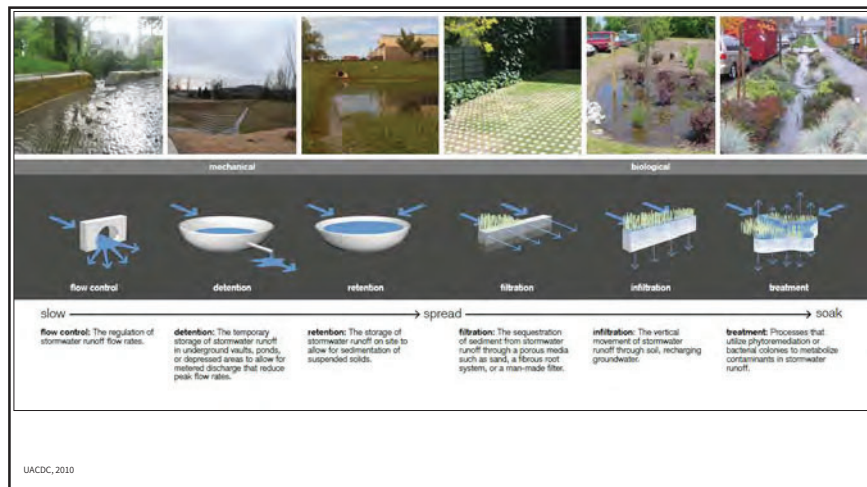
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7



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GSi PRACTICES

Capture
Convey
Filter/Move
Infiltrate
Reuse
Protect



- Bioretentions/
Raingardens
- Permeable/Porous/
Pervious Pavements
- Infiltration Practices
- Swales and Channels
- Constructed Wetlands
- Rainwater Harvesting
- Green and Blue Roofs
- Non-Structural Practices



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Bio Filters

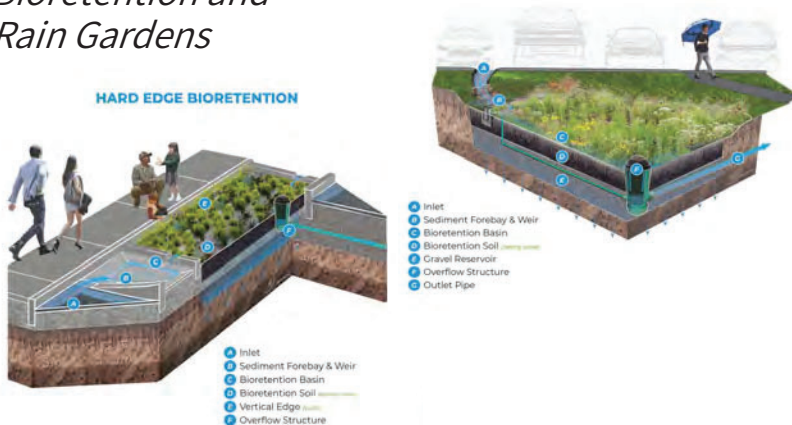
Botanize the urban landscape...

- Vegetation & soil media to filter pollutants
- Integrated with landscaping
- Flowers make people and butterflies happy
- Embrace the shagginess or long-term maintenance
- Help meet tree canopy goals

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Bioretention and Rain Gardens

HARD EDGE BIORETENTION



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Bioretention Retrofit



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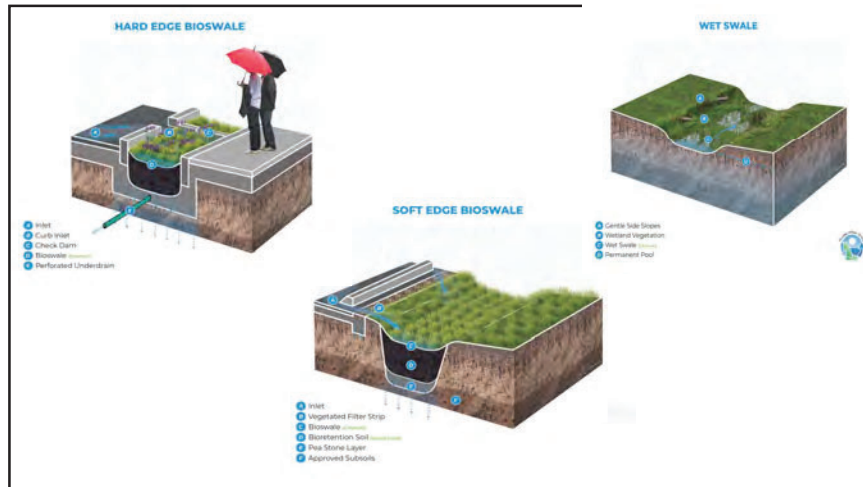
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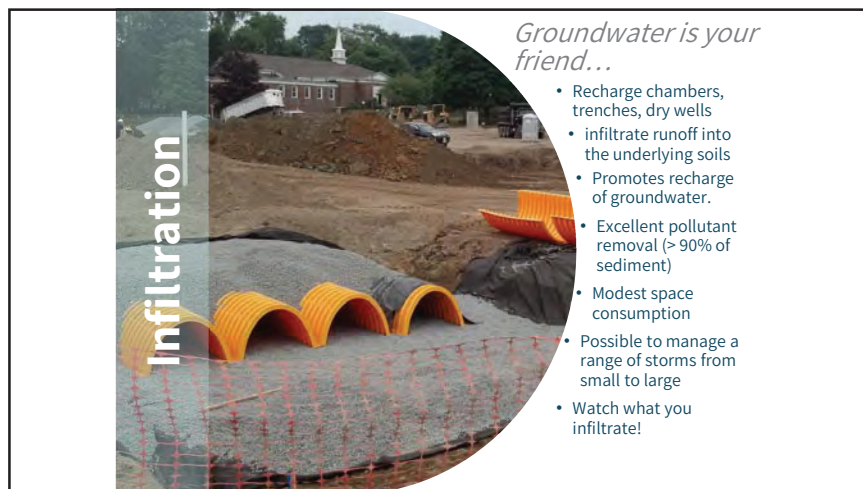
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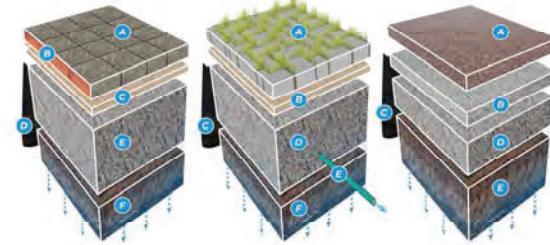
Permeable Pavements

Reduce surface runoff without compromising hardscape...

- Numerous design options
- Runoff reduction, promotes recharge
- Excellent pollutant removal (> 90% of sediment)
- Aesthetics (mostly applies to pavers)
- No additional space consumption
- Reduces need for sand and salt for winter snow/ice management

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Permeable Surfaces



A Pervious Pavers	A Grass Pavers	A Porous Pavement
B Edging	B Bedding Course	B Choker Course
C Bedding Course	C Filter Fabric	C Filter Fabric
D Filter Fabric	D Gravel Reservoir	D Filter Course
E Gravel Reservoir	E Perforated Underdrain	E Approved Subsoil
F Approved Subsoil	F Approved Subsoil	

Presentation title

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Tree Trenches



A Inlet	A Pea Stone Layer
B Deep Sump Catch Basin	B Gravel Reservoir
C Perforated Lateral	C Overflow Pipe
D Mulch	D Filter Fabric
E Planting Soil	

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Tree pits, tree trenches, tree filters



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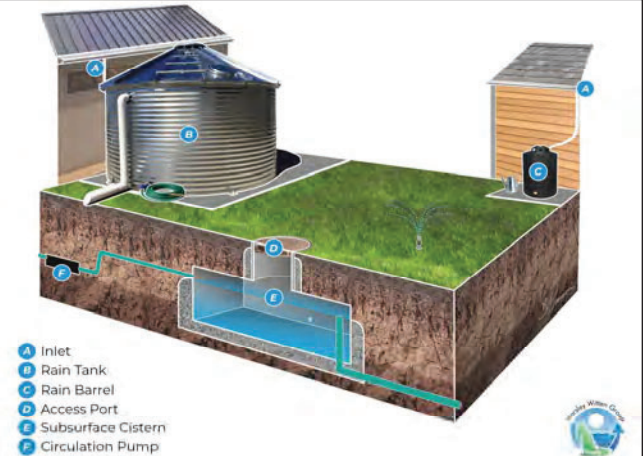
Rainwater Harvesting

Stormwater is a resource...

- Cisterns, rain barrels, rain tanks
- Capture and store runoff for subsequent reuse
- Reduces potable water usage
- Runoff reduction (more with flow-control valves)
- Modest to lower pollutant removal (< 50% of sediment)
- Provides water for irrigation, washing, other uses
- Modest space consumption

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Cisterns



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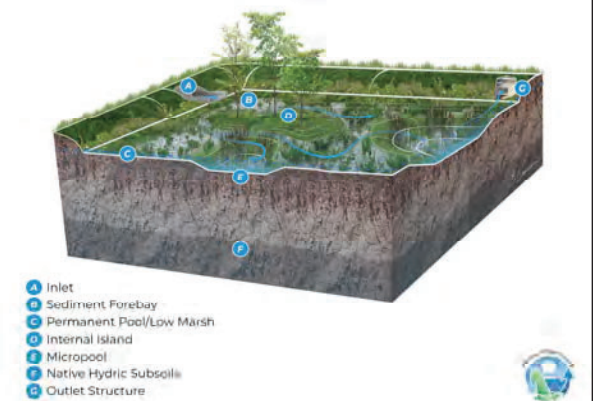
Storage

Co-benefits of Storage...

- Reinvented ponds and wetlands for water quality & flood control
- Require space
- Maximize recreational benefits
- Green roofs to slow volume and other co-benefits

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Constructed Wetland.



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Discussion & Questions Green Stormwater Infrastructure Primer



Horsley Witten Group
Sustainable Environmental Solutions



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GSI Maintenance 101



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GSI Maintenance Components

- ① COLLECT: Drainage Inlets
- ② CAPTURE: Sediment Forebays/Pretreatment
- ③ MOVE: Swales/Pipes/Ditches
- ④ FILTER: Treatment areas
- ⑤ OVERFLOW: Outlet Structures & Spillways
- ⑥ OTHER: Surrounding Area, buffers



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① Collect

- Catch basins
- Diversion structures
- Pipe Inlets
- Trench grates
- Curb cuts
- Paved inlet flumes



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② Capture

- Sumps
- Sediment forebays
- Water quality treatment units



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③ Move

- Grass swales
- Vegetated swales
- Turf reinforced matting (TRM) swales
- Stone-lined swales



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④ Filter

- Raingardens
- Bioretention
- Bioswale
- Sand filter
- Infiltration Basin



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⑤ Overflow

- Overflow/outlet control structures
- Stabilized spillways



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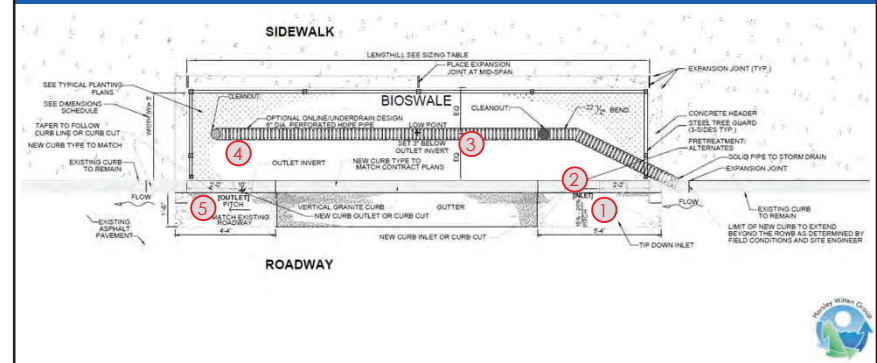
6 Surrounding Area

- Debris removal
 - Remove trash from perimeter areas.
- Pavement sweeping
 - Sweep parking lot at least once per year after spring thaw.
- Drainage network (pipes & structures)
 - Ensure proper operation per design
- Contributing drainage area stabilization
 - e.g. up-gradient disturbed soils



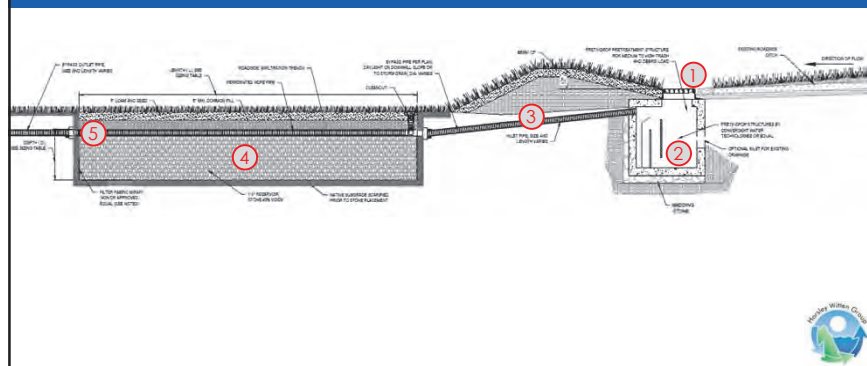
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Urban Bioswale/Tree Planter Online/Offline



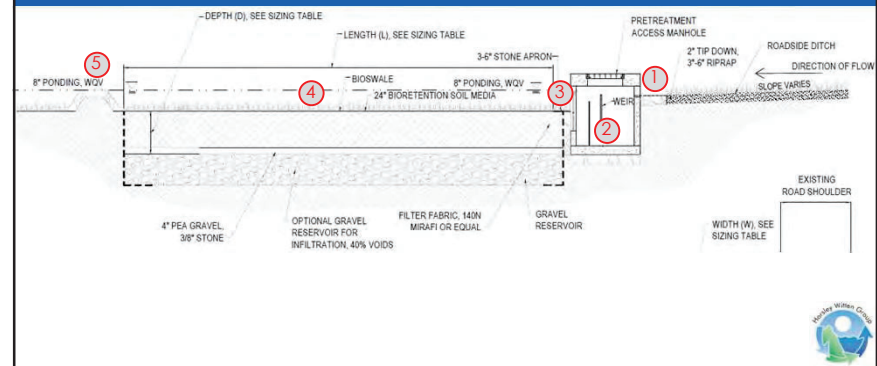
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Right Of Way Infiltration Trench



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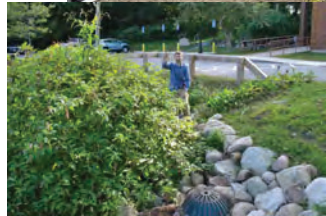
Right Of Way Bioswale



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Inspections

- When to inspect?
 - Spring and fall
 - During establishment
 - After large storm events
 - During other extreme weather events
- What to look for?
 - Debris and sediment accumulation
 - Plant and grass health
 - Invasive plant growth
 - Shrubs or trees on sideslopes
 - Erosion/gully formation
 - Inlet/outlet structure clogging



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Stormwater O&M Plan



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O&M Plan Components

- Stormwater management system(s) owners
- Party or parties responsible for O&M
- Routine and non-routine maintenance tasks and schedule
- Plan showing locations of SCMs and key features
- Description and delineation of public safety features
- Estimated O&M budget



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O&M Plan Considerations

- Remember the intended audience: responsible entity for maintenance
 - Not necessarily a stormwater geek!
- Should be easy to read and follow
- Visuals are helpful – include photos and diagrams
- Include ready-to-use checklists, logs and forms that can be used to follow maintenance steps



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4. STRUCTURAL COMPONENTS: DEEP SUMP CATCH BASINS

Diagram and easy to read explanation of how each SCM works

Deep Sump Catch Basin General Maintenance Schedule												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Task	Frequency & Time of the Year											
Site Inspection			X						X			
Debris & Trash Removal	X	X	X	X	X	X	X	X	X	X	X	X
Sediment Removal	X	X	X	X	X	X	X	X	X	X	X	X

[X] should also be completed after major storm events
 X required inspection
 x as needed

Structural Components

- Collect** Stormwater runoff is directed to catch basin grates.
- Capture Sediment** The deep sumps (typically 4 feet) allow for settling to remove sediment, trash, and other debris. An optional silt sack may be hung from the rim during construction to filter out additional sediment.
- Move Water** The catch basins are piped directly into the existing stormwater system discharging to the underground detention system.
- Treat and Manage** N/A
- Overflow** During extreme rain events, stormwater may pond at the grate. Any ponding will ultimately drain through the catch basin.

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Watershed and Stormwater Plan
Watershed Report
Mendon Town Hall

Date: _____
 Time: _____
 Inspector: _____

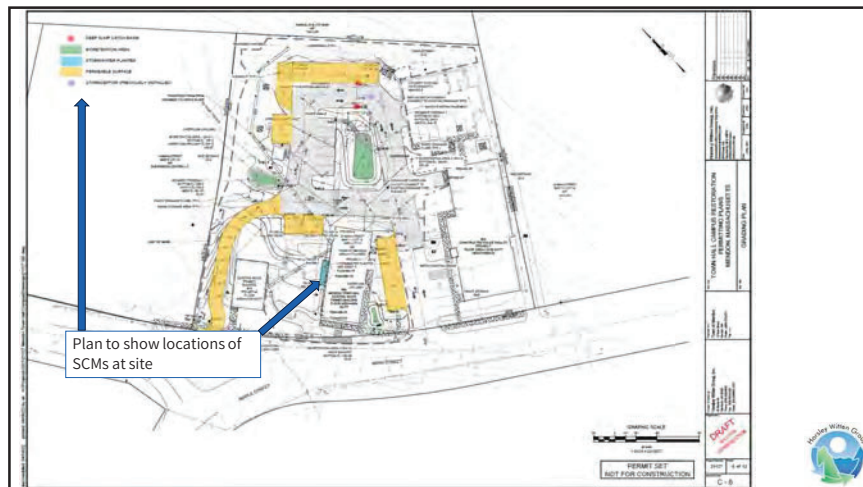
Maintenance Item	Description	Frequency (Yr)
1. COLLECT		
Includes: Catch basins/underground structures		
Frequency: Inspected four times per year during regular park maintenance and after major storm events ("of rain or greater")		
When: March, June, September, November		
Surface Debris Clearing	Remove all trash, mud, and other debris.	
Notes	Check for logging and sediment accumulation that impacts intake, if sedimentation accumulation	
Actions to be taken:		
2. CAPTURE		
Includes: Sediment Ponds		
Frequency: Inspected four times per year and after major storm events the first year, then annually and after major storm events ("of rain or greater")		
When: March, June, September, November		
Debris Clearance	Remove all trash and debris.	
Site Status	Signs of erosion, gulches, surface cracking, overtopping, or failure and observed. Record, as necessary.	
Sediment/Debris Removal	Remove sediment accumulation and properly dispose when accumulation is greater than or equal to 1.5 inches or you identify any erosion.	
Actions to be taken:		
3. S & L MOVES & FILLERS		
Includes: Planting and		
Frequency: Inspected four times per year during regular park maintenance and after major storm events ("of rain or greater")		
When: March, June, September, November		
Debris Clearance	Remove trash and debris from the surface.	
Sediment/Debris Removal	Remove and properly dispose of when build-up is greater than or equal to 1.5 inches.	

Ready to use checklist to log maintenance inspections and tasks

Includes enough information without having to read the whole plan

Place to document maintenance actions

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Case Study: X-Cel Conservation Corps and Boston Public Schools

- Partnering since 2021 to maintain GSI at Boston Public Schools
- Gather a team that shares common goals:
 - X-Cel: expose students to and provide training on a variety of environmental topics beyond wastewater, including stormwater management
 - Boston Public Schools: regularly maintain their GSI
 - Charles River Watershed Association: advocate for the environment and green jobs
 - Horsley Witten Group: project designer that wants to see GSI thrive while working on company DEI goals

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Case Study: *Narraganset Bay Commission Macomber Stadium*

- Completed in 2020, construction of an artificial turf field with underground recharge chambers and several roadside bioswales. Project focused on CSO flow reduction and site remediation within the environmental justice community.
- Partnered with NBC, City of Central Falls, and Design Team
 - NBC: Facilitated project completion with project prioritization, team selection and project funding.
 - City of Central Falls: Provided maintenance equipment and designated staff to perform regular maintenance.
 - Pare Corporation and Stantec: Lead designer, also participated in maintenance days.
 - Horsley Witten Group: Stormwater experts leading O&M training and GSI cleanup days.



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Discussion

Creative Approaches to Maintenance

Your community's
approach

Identifying and
overcoming barriers

Inspiration from
others

What might work for
your community

Volunteer and
college programs

Job-training and
regional contracting

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GSI Maintenance: Supplementing Municipal Resources

- Regional Contracting / Joint Procurement
 - Opt-in services contracted through PVPC, for easier procurement process and lower cost
- Training Programs
 - Baystate Roads, X-Cel Conservation Corps
 - Others?
- School Classes, Clubs, and Community Service
 - UMass Amherst, Amherst College, Mt. Holyoke
 - Local high schools?
- Community Volunteers
 - Civic groups, garden clubs, beautification committee, businesses, watershed associations, friends-of groups, neighbors
 - Lots of examples for Adopt-a-Rain Garden, Green Street Stewards, etc.
 - Possibly coordinated through PVPC?

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Example: Portland, Oregon Green Street Stewards

<https://www.portland.gov/bes/green-street-stewards>

What Green Street Stewards Do

Green Street Stewards adopt a planter and volunteer to:

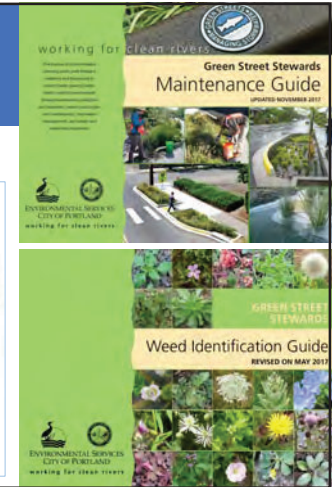
- Pick up trash.
- Remove sediment, leaves, and debris so water can flow.
- Water plants during dry summer weather.

With Environmental Services' approval, Green Street Stewards may also:

- Weed established planters that are at least two years old.
- Add additional plants or flowers.



Green street stewards help keep inlets clear so water can flow from the street into the planter.



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LUNCH BREAK

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Green Stormwater Infrastructure for Downtown Streetscapes



Horsley Witten Group
Sustainable Environmental Solutions
97 North 4th Street, Suite 1100
Portland, ME 04103
508.452.4400 • hws@hws.com



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Typical Downtown Streetscape Uses/Needs



FUNCTIONAL CLASSIFICATION	FRONTAGE ZONE		PEDESTRIAN ZONE ¹		AMENITY ZONE		BIKE	
	WIDTH	MATERIAL	WIDTH	MATERIAL	WIDTH	MATERIAL	WIDTH	MATERIAL
ARTERIAL STREET					≥ 5' (0' min.)			
COLLECTOR STREET	See Land Use Context		≥ 6' (0' min.)	See Land Use Context ²	See Land Use Context		See Land Use Context	
LOCAL STREET			≥ 5' (0' min.)		≥ 2' (0' min.)			
VILLAGE CENTER OR COMMERCIAL	2-2' (0' min.)	Concrete	≥ 10' (5' min.)	See Functional Classification	≥ 6' (0' min.)	Concrete, paver		Gravel, concrete, or asphalt base
RECREATION OR CAMPUS		Concrete or Vegetated	See Functional Classification	See Functional Classification		Vegetated or country drainage	≥ 6'	Gravel, concrete, asphalt base, or no curb (country drainage)
RECREATION OR MICROSITE LANDSCAPE	N/A							

1. Immediately adjacent buildings, walls, or fences reduce the walking zone's usable width by 1' where the frontage zone is eliminated. See Boston Fence Ordinance, no fence taller than 4' may be located along the front property line.
 2. City ordinance requires minimum 5' pedestrian zone, which also satisfies minimum dimensions for accessible routes (Federal and state levels) and Newton's sidewalk, snowing operations for designated sidewalks.
 3. Sawdust concrete preferred for accessibility. Treated joints, where employed, should be ≤ 1/8" wide.
 4. Depending on reveal, wider curbs may be needed where mountable curbs are implemented alongside separated bike lanes.

City of Newton

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North Pleasant Street, Amherst, MA



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Exchange Street, Chicopee, MA



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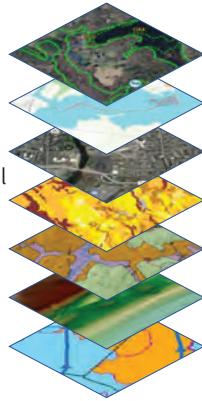
Main Street, South Hadley, MA



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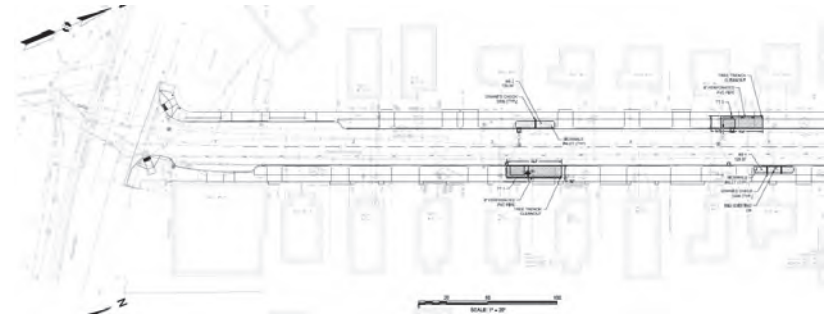
GSI General Selection & Implementation Approach

- Define Priorities/Goals, and Criteria for meeting them
- Assemble Data (typically GIS – driven)
- Select Project Location(s)
- Identify Constraints and opportunities (uses/users, physical limitations, maintenance burden, aesthetics, etc.)
- Choose Preferred GSI Practices (one to multiple factors)
- Map Candidate Locations
- Field Reconnaissance to confirm locations
- Testing (soils, utilities, survey)
- Design, Permitting and Construction Documents
- Construction
- Maintenance



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Edenfield Avenue, Watertown, MA



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Residential – Medium Density, Narrow Lots



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Constraints: Slopes, Walls, Trees, Utilities, Parking, and Soils (maybe)



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Soils – testing at proposed GSI locations



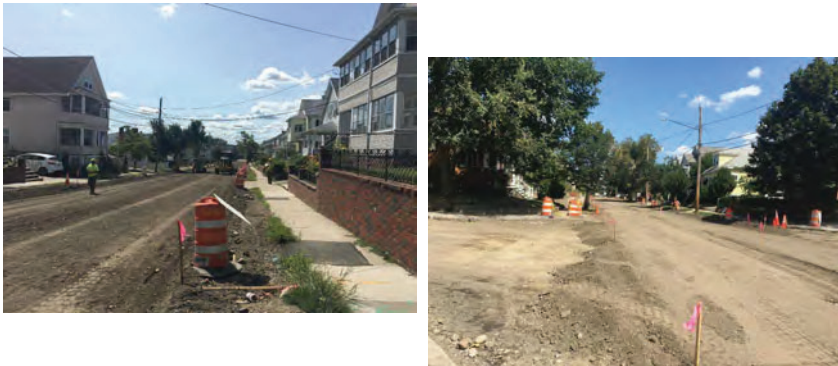
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Tree Trench Construction



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Goals: Water and Sewer Upgrades & Full Depth Pavement Replacement



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Bioswales Recently Planted



72



*Tree Trenches
Recently Planted*



73



*Bioswales at 3rd (L) & 4th
(R) Growing Seasons*



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The Process



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Bioswale in Action during Heavy Rainfall



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Streetscape Design: Breakout Group Exercise



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Final Thoughts and Next Steps

Next Meeting: May 23, 2024

Thank You!

Lori Kennedy, lkennedy@horsleywitten.com

Bina Skordas, binas@fbenvironmental.com



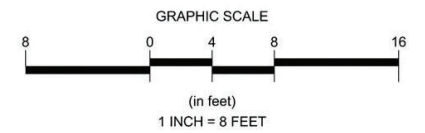
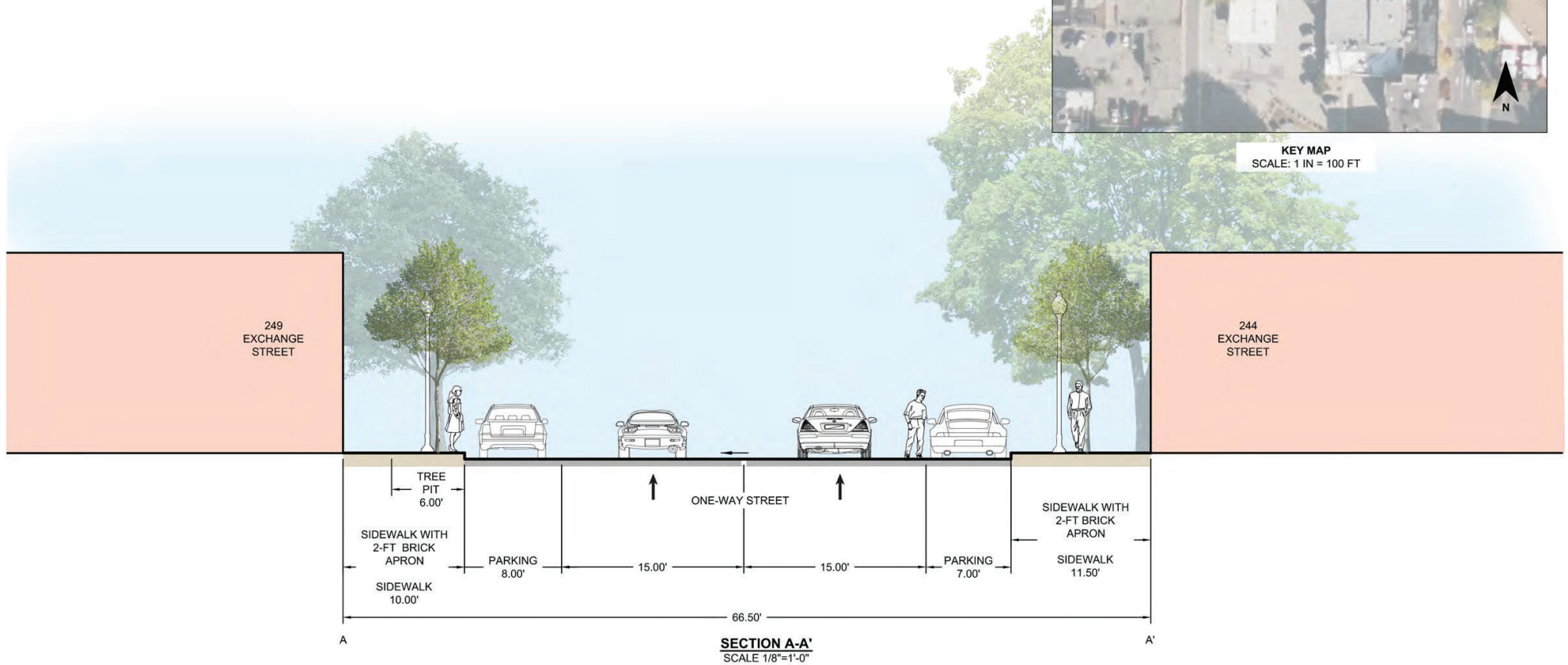
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CHICOPEE: EXCHANGE STREET GREEN STORMWATER INFRASTRUCTURE

EXISTING CONDITION SECTION

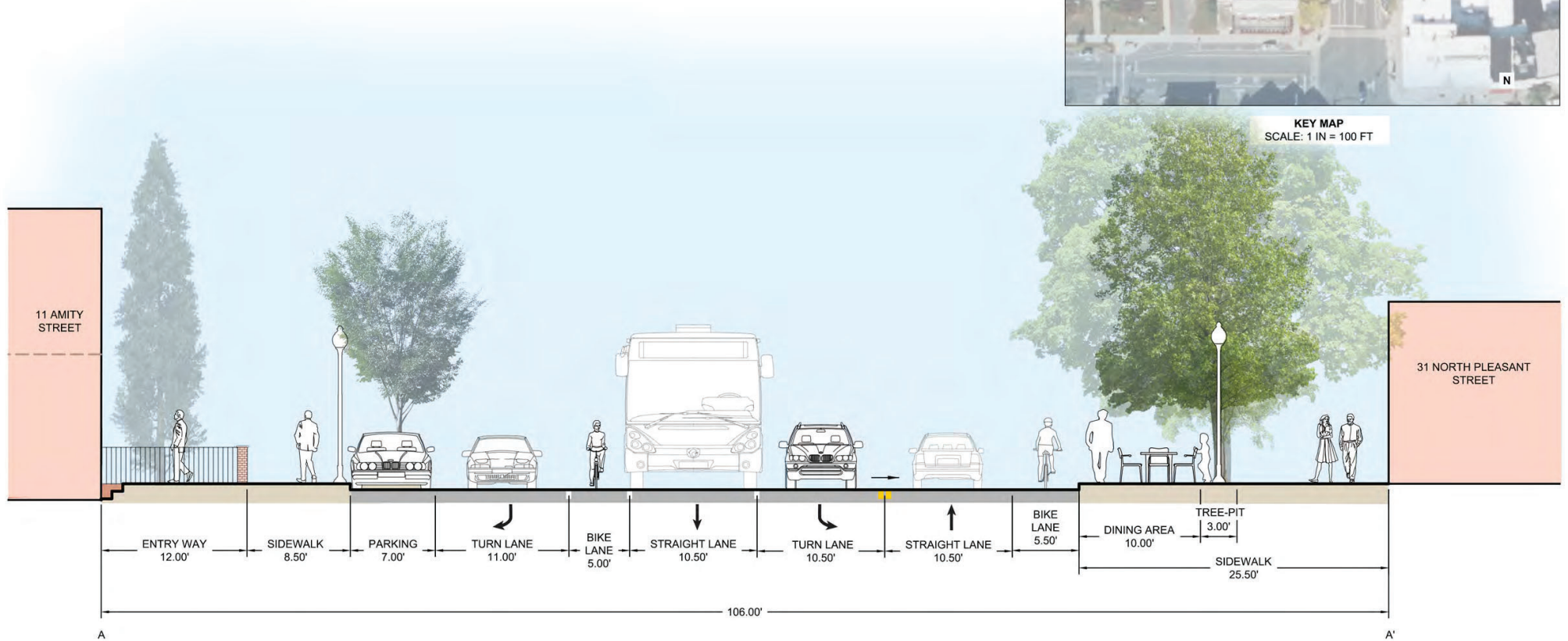


KEY MAP
SCALE: 1 IN = 100 FT



AMHERST: PLEASANT STREET GREEN STORMWATER INFRASTRUCTURE

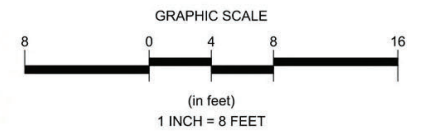
EXISTING CONDITION SECTION



SECTION A-A'
SCALE 1/8"=1'-0"

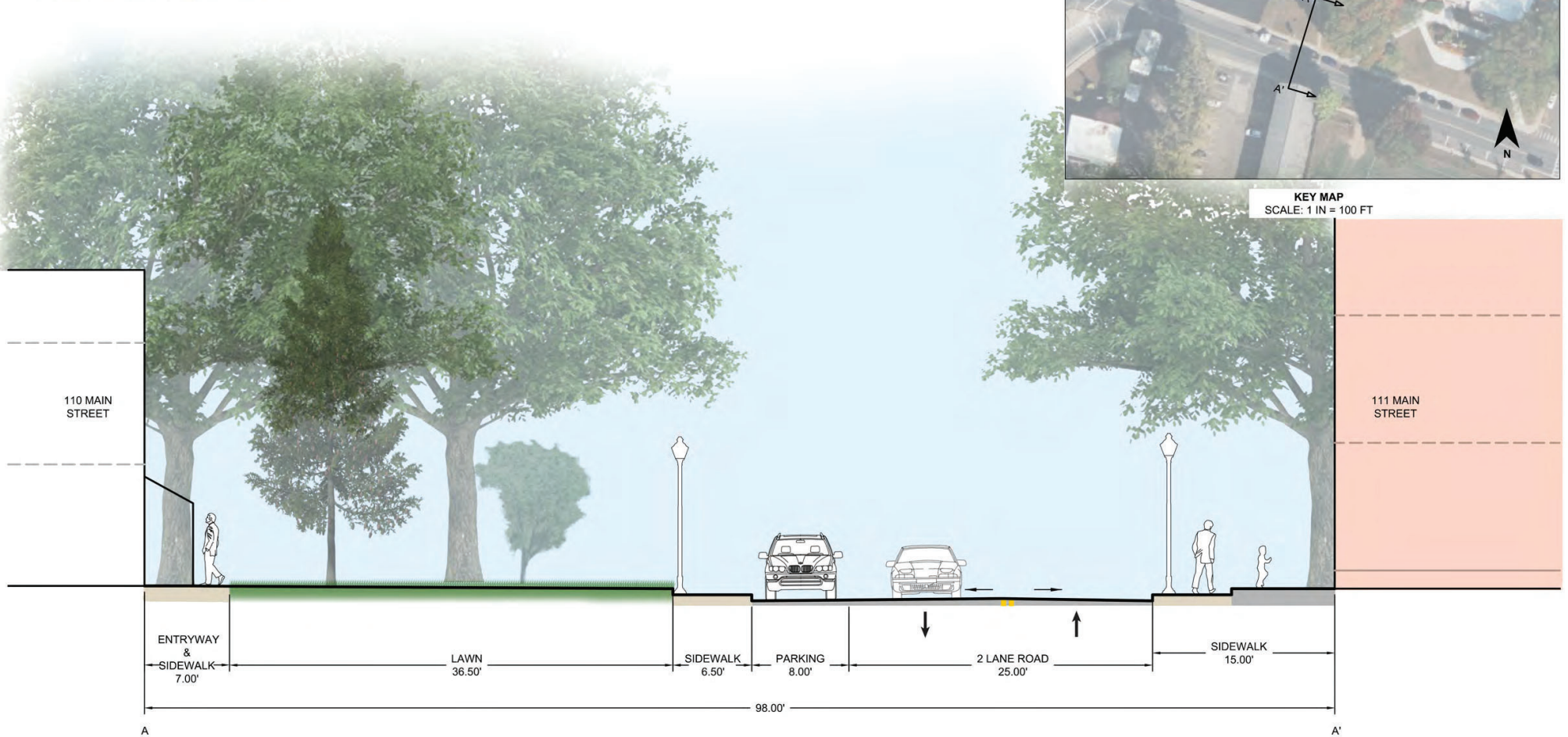


KEY MAP
SCALE: 1 IN = 100 FT



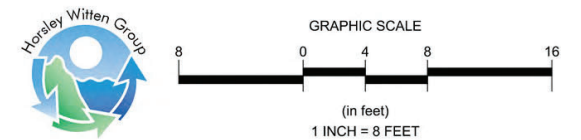
SOUTH HADLEY: MAIN STREET GREEN STORMWATER INFRASTRUCTURE

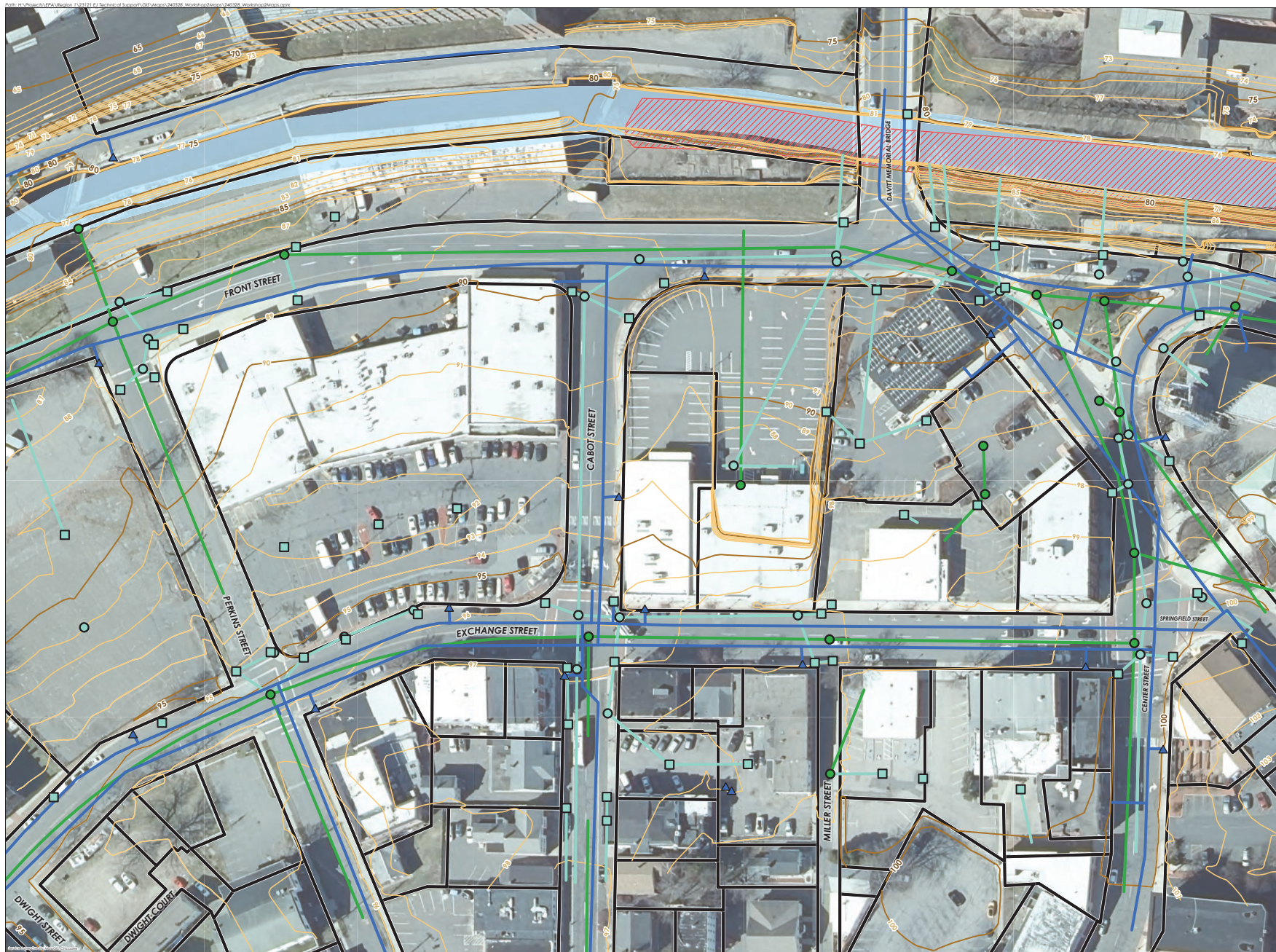
EXISTING CONDITION SECTION



KEY MAP
SCALE: 1 IN = 100 FT

SECTION A-A'
SCALE 1/8"=1'-0"





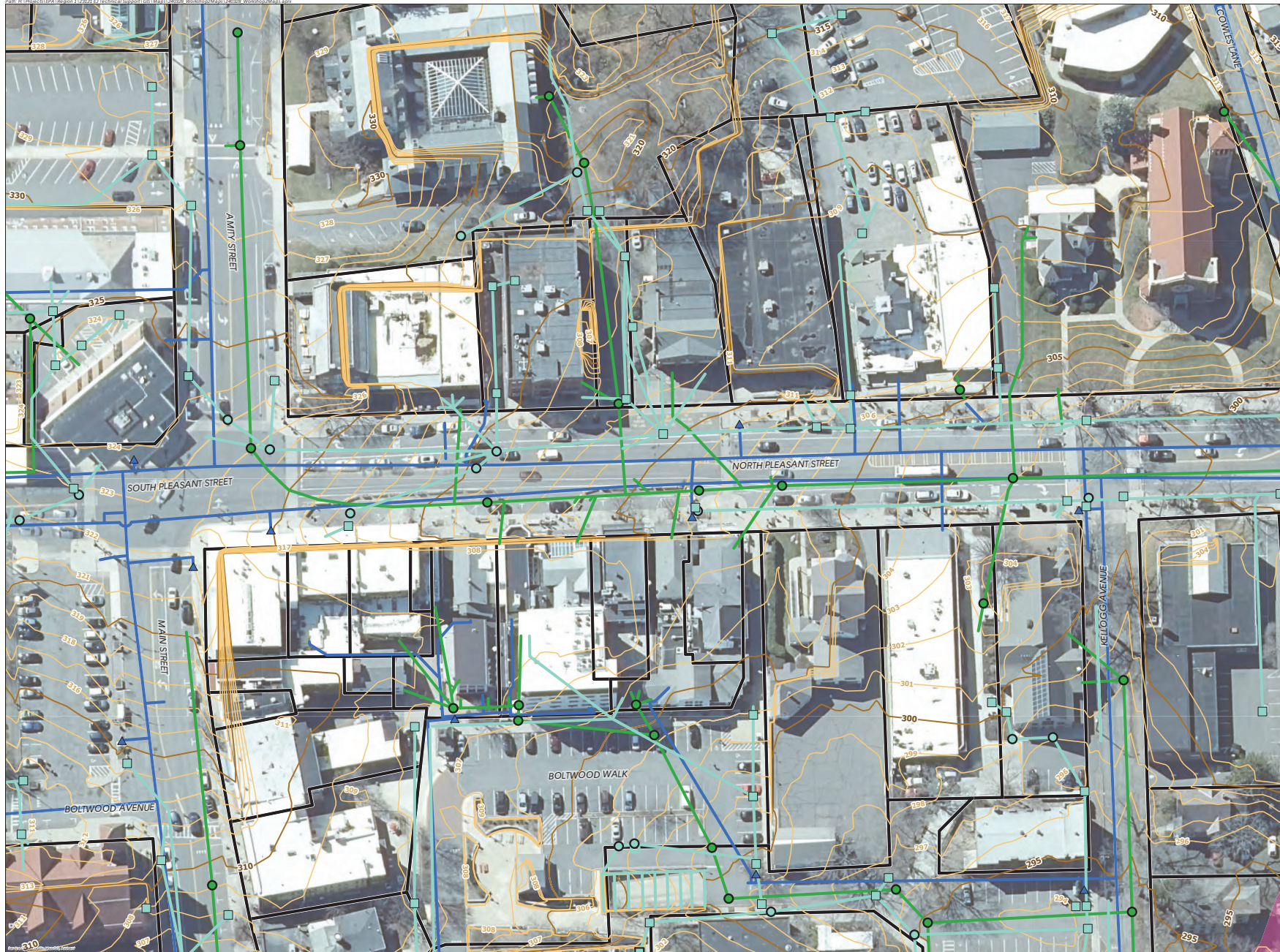
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Data Sources: Bureau of Geographic Information
(MassGIS), ESRI
This map is for informational purposes and may not
be suitable for legal, engineering, or surveying
purposes.

- Tax Parcels
- DEP Wetlands (2005)
- Open Water
- Elevation Contours (1 ft)**
 - 5-ft interval
 - 1-ft interval
- Top 20 Soils: Hydrologic Soil Group**
 - No Data
- Utilities**
 - Stormwater Catch Basins
 - Stormwater Manholes
 - Hydrant
 - Sewer Manholes
 - Water Main
 - Stormwater Main
 - Sewer Main



Pioneer Valley Stormwater
Technical Assistance Program:
Workshop #2

Site Constrains, Front Street & Exchange
Street, Chicopee, MA



- Tax Parcels
- Elevation Contours (1 ft)**
 - 5-ft interval
 - 1-ft interval
- Top 20 Soils: Hydrologic Soil Group**
 - A
- Utilities**
 - Stormwater Catch Basins
 - Stormwater Manholes
 - Sewer Manholes
 - Hydrants
 - Stormwater Lines
 - Sewer Lines
 - Water Lines

Note: Unless otherwise indicated, all soils in interest area are Hydrologic Soil Group C.



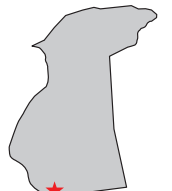
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Date: 3/26/2024
Data Sources: Bureau of Geographic Information (MassGIS), ESRI
This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

- Tax Parcels
- USGS Hydrography (1:100k)
- Rivers and Streams
- EP Wetlands (2005)
- Open Water
- Elevation Contours (3 m)
- 3 m interval
- Utilities
- Stormwater Manholes
- Stormwater Inlet
- Stormwater Main
- Culvert
- Sewer Main

Note: All soils in interest area are Hydrologic Soil Group A.



0 25 50 100
Feet



Pioneer Valley Stormwater
Technical Assistance Program:
Workshop #2

Site Constraints, Main Street, South Main Street, Lamb Street, MA

Stormwater Street Trees

Street trees provide myriad benefits, including intercepting and infiltrating rain. Tree planting areas can provide additional stormwater benefits if designed to receive, filter, and infiltrate runoff.

An infiltration tree trench is a system of trees planted over a stone trench, within which stormwater is distributed through a perforated pipe. Other enhanced tree-well designs incorporate structural soil or soil cells that extend beyond the tree well under adjacent pavement, increasing storage and infiltration, promoting healthy tree roots, and reducing sidewalk heave.

Potential Uses:

- Furnishing zone/planting strip between sidewalk and curb
- Integrated into stormwater planters and bumpouts

Constraints and Considerations:

- Adequate space and visibility
- Steep slopes
- Existing trees
- Soils
- Utilities, laterals, overhead wires



Stormwater Planters

A stormwater planter receives runoff from the road and sidewalk, temporarily storing the runoff while filtering it through plants and bioretention soil. Stormwater planters can be designed to infiltrate into underlying soils or drain filtered stormwater via an underdrain (perforated pipe) to the drainage system. Planters are typically rectangular with vertical side walls and open bottom.

Potential Uses:

- Furnishing zone/planting strip between sidewalk and curb
- Center median

Constraints and Considerations:

- Adequate space and visibility
- Setback 1-2 ft from curb adjacent to parking
- Integrate fence, seating wall, or bench into edge treatment
- Accommodate pedestrian passing at crosswalks and intersections
- Steep slopes
- Existing trees
- Utilities, laterals, overhead wires



Stormwater Bumpouts

A stormwater bumpout is a landscaped curb extension designed to receive and temporarily hold runoff while filtering it through plants and bioretention soil. Stormwater bumpouts can be designed to infiltrate into underlying soil, or to drain filtered stormwater via an underdrain (perforated pipe) into the drainage system.

Potential Uses:

- Intersections, Crosswalks
- Road shoulder and parking lane
- May extend into sidewalk furnishing zone

Constraints and Considerations:

- Adequate space and visibility
- Integrate with traffic calming and pedestrian safety measures
- Accommodate pedestrian passing at crosswalks and intersections
- Steep slopes
- Existing trees
- Utilities, laterals



Bioswales

Bioswales are shallow vegetated open channels that convey runoff while filtering, infiltrating, and slowing velocities. They have sloped sides, bioretention soil mix, and can be designed with mowable grass for easy maintenance.

Potential Uses:

- “Country drainage” conveyance may replace curb/pipe in rural settings
- Narrow hard-edge conveyance systems in village/urban settings
- Bicycle lane buffers

Constraints and Considerations:

- Adequate space and visibility
- Generally fit best in wider spaces
- Slopes (too steep or too flat)
- Shade
- Soils and groundwater level drive selection of swale type (wet or dry, underdrained or not)



Stormwater Technical Assistance for EJ Communities in the Pioneer Valley: Workshop #2

Instructions for Streetscape Green Stormwater Infrastructure Exercise

The purpose of this activity is to familiarize participants with the process of integrating green stormwater infrastructure (GSI) into a streetscape setting. Each community team, along with staff from EPA, HW, and FBE, will step through the following process for evaluating and planning streetscape GSI, using materials prepared by the consultant team for a pre-selected street segment.

- 1) **What is the existing character and feel of this street? How would you like that to change in the future, if at all?**

➔ Look at photos and aerial images

Existing	Future

- 2) **Who uses this street and how?**

➔ Look at photos and aerial images

Users	Activities
Pedestrians	
Motor vehicles	
Cyclists	
Transit	
Businesses	
Residents	
Other	

Stormwater Technical Assistance for EJ Communities in the Pioneer Valley: Workshop #2

Instructions for Streetscape Green Stormwater Infrastructure Exercise

3) What would you like to achieve with stormwater management on this street, including co-benefits?



Improve water quality



Reduce localized flooding



Provide shade and mitigate heat island



Slow traffic



Improve pedestrian safety (e.g., shorter crossing distance, better visibility)



Support tree health



Foster a sense of place, enhance the feel and character



Create and support ecology and natural habitat



Others (specify)

Stormwater Technical Assistance for EJ Communities in the Pioneer Valley: Workshop #2

Instructions for Streetscape Green Stormwater Infrastructure Exercise

4) What are the constraints for GSI within the streetscape, including compatibility with existing/planned uses and physical conditions?

➔ Look at section view (with dimensions) and constraints map. What constraints apply?

Space, accessibility, and safety – What are the constraints? Circle all that apply.	
Accessibility	• Ensure ADA compliance, traversable by all
Sidewalk	• 5-ft width minimum, wider (≥6 ft) for commercial areas • Access to crosswalks, benches, building entrances, etc.
Furnishing zone	• For street trees, benches, bus shelters, trash receptacles, etc.
On-street parking	• Need for step-out zone for parking, and access from vehicles to sidewalk • Are there areas where street parking is prohibited (e.g., crosswalks, hydrants, intersections)? • Are all parking spaces needed? Can you lose any?
Bike lanes	• Separate or shared?
Vehicle lanes	•
Shoulders	•
Islands, medians	•
Driveways	•
Other	• Parklets, bumpouts, bike parking, etc.
Physical Conditions	
Soils	• Are soils here good for infiltration? • Is there high groundwater?
Slope	• How steep is the slope along the road? • Is the road crowned (pitched from centerline toward curbs?)
Trees	• Existing trees to be protected
Utilities	• Water and sewer mains and laterals • Hydrants • Catch basins • Vaults • Utility poles • Overhead wires

5) Identify locations where GSI can be integrated into the streetscape (even if it's not realistic, let's try to fit in as many GSI facilities as possible).

➔ Look at Streetscape GSI Toolbox (1 pagers for select low-maintenance practices)

➔ On the aerial image, draw boxes and circles with labels for GSI practices and variations.



Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley Workshop #2 Meeting Notes

RE: Collaborative Workshop #2: Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley

Date: 10 am to 2 pm, March 28, 2024

Location: Community Room, South Hadley Public Library

Attendees: South Hadley: John Broderick, Anne Capra, Rebekah Cornell, Melissa Labonte
Amherst: Beth Willson, Jason Skeels, Erin Jacque, Christine Brestrup
Chicopee: Lee Pouliot
PVPC: Angela Panaccione
EPA: Michelle Vuto, Ray Cody, Danielle Gaito
Consultants: Lori Kennedy, Rich Claytor, Geoff Glover, Kellie King (Horsley Witten); Bina Skordas, Evan Ma (FB Environmental)

OVERVIEW

The purpose of this technical assistance project is to strengthen the capacity of Amherst, Chicopee, and South Hadley to manage stormwater and implement small-scale green stormwater infrastructure (GSI) practices. Our second collaborative workshop, held on March 28, 2024, focused on GSI practices, maintenance, and streetscape applications. This topic was chosen based on the first workshop and the first individual meetings between the consultants and the towns, in which focus areas were determined. The redevelopment of downtown areas and updating streetscape standards were common goals across communities.

Attendees received educational presentations on GSI practices, GSI maintenance, and GSI as it pertains to downtown streetscapes, followed by facilitated discussions about how to achieve each towns' goals. Each community has different goals for their streetscapes, though common ideas centered around traffic calming, pedestrian safety/friendliness, and mitigating localized flooding. The communities focused on specific areas of their downtowns to visualize where GSI practices may be suitable. Identified practices include street trees, bump-outs, bioretention areas, permeable pavers, and reducing impervious areas. Communities also identified responsible parties for GSI maintenance, where possible, and discussed how GSI aligns with other important goals such as accessibility and traffic calming.

DISCUSSION TOPICS

1. Overview of meeting objectives and agenda

Bina Skordas with FBE provided an overview of the meeting objectives.

→ Share updates on technical assistance for individual communities.

- Learn about GSI practices and maintenance.
- Explore creative approaches to GSI maintenance.
- Identify suitable and preferred GSI practices for downtown streetscapes.

2. *Introductions*

Participants from Amherst, Chicopee, South Hadley, Pioneer Valley Planning Commission (PVPC), EPA Region 1, Horsley Witten Group (HW), and FB Environmental Associates (FBE) introduced themselves.

3. *Updates on technical assistance for each community*

Lori Kennedy (HW), with input from the community members, summarized the outcomes of the individual technical assistance meetings held after the first collaborative workshop, which focused on determining the priorities of each community and the types of assistance that will be most useful. South Hadley chose to focus on identifying low-cost, low-effort GSI opportunities in the Buttery Brook sub-watershed, which is the most urbanized watershed in the town. Amherst will focus on their stormwater management regulations (in draft form), with an emphasis on cross-department collaboration and tailoring the regulations to the environmental conditions in the town. Chicopee will focus on their stormwater management ordinance in a two-step approach by first bringing the ordinance into compliance with MS4 standards, then developing a framework for improving stormwater management requirements across Chicopee's codes and regulations.

4. *Green stormwater infrastructure primer*

Presentation

Rich Claytor (HW) presented an overview of the selection, design, and benefits of GSI practices. He emphasized that maintenance is a key consideration in GSI selection and design. GSI consists of nature-based systems that mimic natural processes and range from mechanical to biological structures. Types of GSI include biofilters (bioretention areas, bump-outs, planters, swales), infiltration practices (chambers, leaching basins, trenches), tree trenches, permeable pavers, rainwater harvesting, and storage (detention pond, constructed wetlands). These practices have benefits such as reducing runoff and flooding, groundwater recharge, urban heat island effect mitigation, energy reduction, climate resiliency, habitat, community character, public awareness, and low cost. Soaking stormwater into the soil is often better for water quality than using detention ponds, but the applicability of each GSI practice depends on site constraints and criteria.

Discussion

Discussion after the presentation answered many questions for the attendees. The measures previously described are all permit compliant, and some are eligible for TSS and nutrient removal credits. There are well-accepted models that can be used to evaluate how much stormwater each GSI facility can handle. HW does not typically recommend lining the bottoms/underdrains of GSI facilities. Underdrains do not require permitting under the Clean Water Act. Ground freezing in GSI is often prevented by the

organic matter in the soil; in cases where the ground freezes, the surface storage and overflow components allow the system to still work as a drainage practice.

5. Green stormwater infrastructure maintenance

Geoff Glover (HW) provided an overview of maintenance needs and methods for different GSI practices. Planning for maintenance requires understanding the way each practice handles stormwater at each step: capture, convey, filter/move, infiltrate, reuse, and protect. Components that collect, capture, and move stormwater need to be regularly cleaned out, because excess sediment moving into other components that filter stormwater or serve as overflow will become clogged and fail. GSI should be inspected in the spring and fall, and after large storm events, by removing unwanted vegetation and sediment accumulation, inspecting for plant health, cleaning forebays, removing invasive plants, and checking for gully formation. Comprehensive yet easy to understand operations and maintenance plans are useful for ensuring maintenance gets done properly. Examples from PVPC's BMP library and other communities were discussed.

6. Facilitated discussion: Creative approaches to maintenance

Discussion around approaches to maintenance surrounded around improving the ease of operations and management plans and taking inspiration from other communities. Suggestions include including logs, checklists, plant and weed identification cards, and other guidance documents. The importance of choosing GSI with attainable maintenance requirements was emphasized, as well as ensuring they are also installed correctly to avoid soil compaction (and thus failure). Partnerships with local schools and colleges were also discussed as a viable option for performing maintenance. "Adopt a Rain Garden," Green Street Stewards, and other locally driven programs were discussed as possibilities. Contracting out the maintenance is also a viable option; this may be done on a regional scale to reduce costs for each town through a single contract. A regional program may be set up through a grant. Funding that may be used to set up these programs would help communities meet the MS4 permit requirements.

7. Green stormwater infrastructure for downtown streetscapes

Rich Claytor (HW) presented applications of GSI practices for downtown streetscapes. The streetscape is a transect of the road (from parcel line to parcel line) where various needs such as utilities, walkability, accessibility, traffic, and aesthetic are important factors to consider when attempting to add GSI. The process for incorporating GSI into streetscape design includes identifying priorities, goals, and criteria, assembling GIS data, selecting candidate locations, identifying constraints, choosing preferred practices, field reconnaissance, soil testing, and design, permitting, and construction. Rich presented the steps taken to implement a streetscape GSI project in a residential neighborhood in Watertown, MA. . Watertown constructed stormwater tree trenches and bioswales, though the bioswales require more maintenance and are less successful in areas where achieving regular maintenance is difficult. GSI is most easily implemented when other reconstruction projects are occurring, such as repaving or installing new water mains.

8. Breakout group streetscape design exercise

The attendees formed breakout groups by community, with the consultant team, EPA, and PVPC splitting evenly between the groups. Groups were given a large, printed map of a pre-selected downtown streetscape in their focus area, with the prompt to design a streetscape with GSI implemented wherever possible. Attendees filled out a worksheet intended to help identify their priorities for the streetscape, consider constraints, and generate discussion around the possibilities.

9. Report-out from breakout group discussions

South Hadley

South Hadley's breakout group looked at a high-traffic area on Main Street near Town Hall and a baseball field. MassDOT is currently redesigning the road to calm traffic and add new street features (bike lane), though the 25% design does not include GSI. The group discussed using a grassy area in front of Town Hall for bioretention (doubles as an educational opportunity), an underground infiltration system, a pocket park at a highly impervious intersection, and potentially street trees. Making the area friendly to walk in, hospitable for those waiting at the bus stop, and calming traffic are priorities for this area. Some GSI implementation here may be difficult due to the shallow hardpan found in the soil.

Amherst

Amherst's breakout group focused on North Pleasant Street and Main Street in downtown Amherst. Participants identified potential GSI locations, including converting a parking lot into green space, adding planter beds, enlarging tree wells, and making outdoor dining bump-outs a permanent feature of the streetscape with GSI incorporated. They also suggested reconfiguring the drainage around the library, using pervious pavers for some town-owned alleyways, and finding a solution for roof runoff. The local garden club maintains some planters. The business improvement district (BID) hires landscapers to maintain planter boxes and it may be worthwhile to contract them for GSI maintenance. Amherst hopes to incorporate GSI into the streetscape design standards that are being developed.

Chicopee

The Chicopee group focused on Exchange Street, Cabot Street, and Perkins Street. Part of the overarching goal here is to redesign the traffic pattern, shifting away from one-way roads. Discussion included reducing road widths (excessively wide on Cabot St and Perkins St), removing the one-way traffic loop, and installing wide stormwater planters with street trees. Stormwater bump-outs may also be used on Exchange St to calm traffic and improve pedestrian safety at crosswalks. Because this area is planned to be redesigned with a new traffic pattern, it is a prime candidate for GSI implementation.

10. Final thoughts & next steps

The next workshop will be May 23rd, 2024, at the South Hadley Public Library Community Room. Individual community meetings will take place before the next collaborative workshop. Please look out for emails from Lori and Bina with next steps for scheduling those meetings.



MEETING AGENDA

RE: Collaborative Workshop #3: Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley

Date: 10 am to 1 pm, May 23, 2024

Location: Community Room, South Hadley Public Library

Invitees: South Hadley: John Broderick, Anne Capra, Rebekah Cornell, Melissa Labonte
Amherst: Beth Willson, Jason Skeels, Paul Dethier, Erin Jacque, Christine Brestrup
Chicopee: Quinn Lonczak, Lee Pouliot
PVPC: Patty Gambarini
EPA: Michelle Vuto, Ray Cody, Danielle Gaito
Consultants: Lori Kennedy, Ellie Baker, Kellie King (Horsley Witten); Bina Skordas, Evan Ma (FB Environmental)

Meeting Objectives:

- Share updates on technical assistance for individual communities.
- Learn about why nitrogen matters and how it impacts water quality.
- Gain understanding of how to best manage nitrogen in stormwater.
- Consider MS4 compliance as it relates to N and stormwater management more broadly.
- Explore practical and creative funding opportunities.

Morning Agenda (10 am – 11:30 pm):

1. Overview of meeting objectives and agenda (~5 minutes)
 2. Introductions (~5 minutes)
 3. Updates on technical assistance for each community (~15 minutes)
 4. Nitrogen Primer, Long Island Sound TMDL (~25 minutes)
 5. High level overview of MS4 requirements for nitrogen TMDL (~10 minutes)
- Facilitated discussion: Best practices and lessons learned. Identify opportunities to integrate nitrogen reduction into planned municipal projects (~25 minutes)

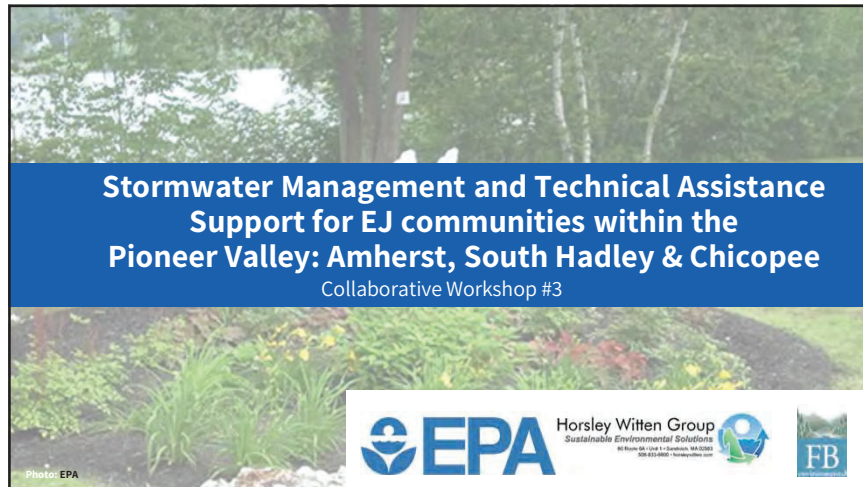
Lunch (11:30 – 12:00 pm)

Afternoon Agenda (12:00 – 1 pm)

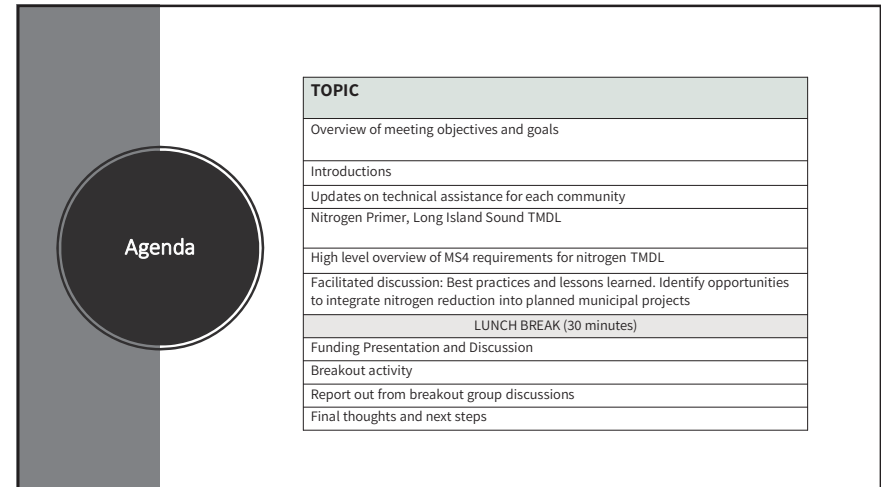
6. Funding Presentations and Discussion (~20 minutes)
7. Breakout activity (~20 minutes)
8. Report-out from breakout group discussions (~10 minutes)
9. Final thoughts & next steps (~5 minutes)

Homework beforehand:

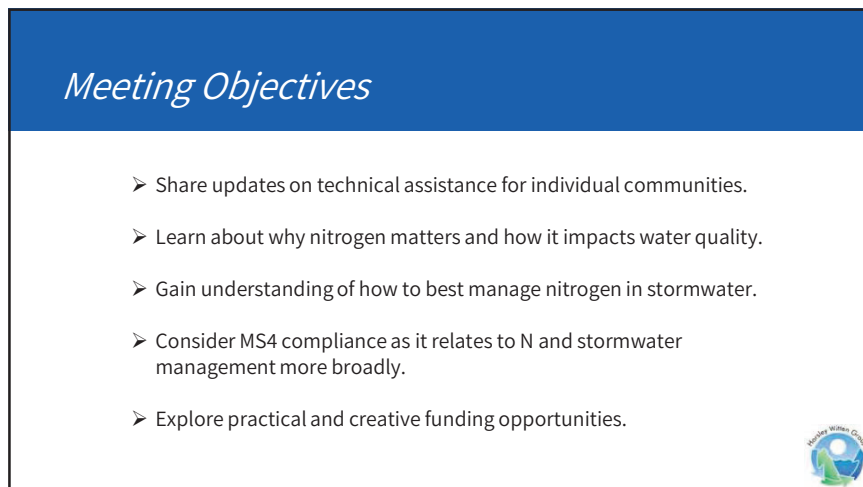
- What are your questions about nitrogen in stormwater and MS4 requirements for stormwater controls to reduce nitrogen? What (if anything) is holding your municipality up from completing the next steps for N source control?
- Please be prepared to provide an overview of your community's current grants, grant administration, and the grant application process. Consider the following: From where has each community found success in acquiring funds? Which grants are most often utilized? Have there been surprises about being able to integrate GSI into another project, including those that received grant funding not focused on stormwater and/or water quality?
- Identify an upcoming municipal project and/or priority wish list project that does or could integrate green stormwater infrastructure into the design. What questions and/or considerations do you have about N reduction or funding green stormwater infrastructure for this specific project site?



1



2



3



4

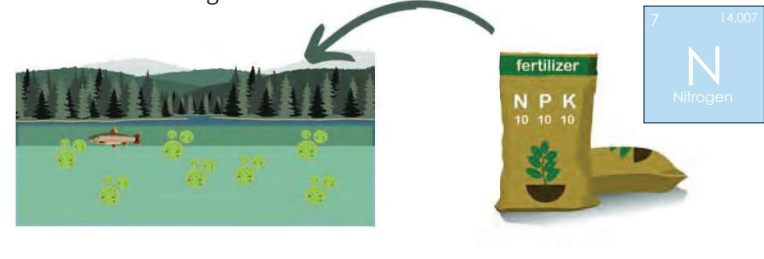
What is Nitrogen?



5

What is Nitrogen?

Excessive nitrogen loading to waterbodies can degrade water quality (**eutrophication**), reduce fish habitat, limit recreation, and lead to unbalanced ecological communities.



6

Impact of Nitrogen on Water Resources



Coastal/Estuarine Ecosystems

(Most Affected by Nitrogen):

- Harmful algal blooms (recreational advisories)
- Reduced dissolved oxygen (dead zones)
- Coastal eutrophication – shifts in biological communities



Lake/Riverine Ecosystems

(Less Affected by Nitrogen):

- Excess nitrogen can affect the severity, toxicity, and type of cyanobacteria blooms
- Reduced dissolved oxygen
- Potential health concerns for drinking water
- **Downstream impacts on coastal ecosystems**



7

Urban Nitrogen Sources

“Urban runoff” or “stormwater” is often considered a nitrogen source.

Where does this nitrogen come from?

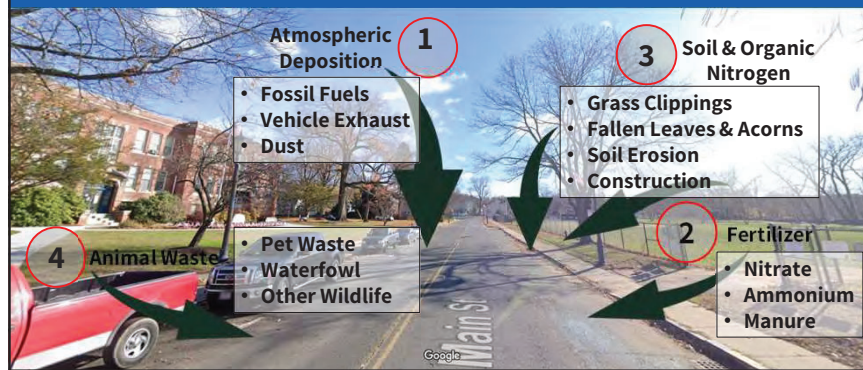


- Nitrogen builds-up on roofs and roads and is washed off and transported during storms
- **Major nitrogen sources:**
 - **Atmospheric Deposition**
 - **Fertilizer**
 - **Soil & Organic Nitrogen**
 - **Animal Waste**
 - **Wastewater**



8

Urban Nitrogen Sources



9

Wastewater and CSOs

- Wastewater is a substantial source of nitrogen to waterbodies
- CSOs are a mixture of urban runoff and raw wastewater
- Wastewater may also enter waterbodies through leaky sewer pipes or septic systems
- Wastewater also contains:
 - Phosphorus, suspended solids, pathogens
 - Emerging contaminants such as trace organic chemicals (pharmaceuticals), PFAS



Credit: EPA



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Why Reduce Nitrogen?

Beyond the adverse effects of nitrogen on waterbodies...

- Nitrogen sources are often also sources of other contaminants, such as **phosphorus, sediment, organic matter, pathogens/bacteria, chloride, etc.**
- Treating nitrogen in stormwater can have the co-benefit of preventing some of these contaminants from reaching the water
- These other contaminants can cause other impairments, due to **low dissolved oxygen, high bacteria counts, high specific conductance, low pH, and high turbidity.**



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Long Island Sound TMDL

A **Total Maximum Daily Load (TMDL)** is a study done on an impaired waterbody to calculate the **maximum amount of a pollutant it can receive without violating water quality standards**

A TMDL outlines the load reductions necessary to meet the goal.

The Long Island Sound has a TMDL for nitrogen with a goal of a **58.5% reduction**.

SEPA
State Environmental Protection Agency

TMDL at Work
in Connecticut and New York

TMDL at a Glance
Long Island Sound Nitrogen TMDL
Issued April 2011

1. Factors requiring improvement
Nitrogen loading into Long Island Sound from Connecticut and New York State's largest wastewater plants and other sources is excessive, impairing the sound's water quality and its ability to support a diverse and healthy ecosystem.

2. Sources contributing to impairment
Long Island Sound's water quality is impaired by nitrogen loading from wastewater treatment plants, agricultural runoff, urban runoff, and atmospheric deposition.

3. Restoration actions
Approx. 42.5 percent reduction in nitrogen loading to Long Island Sound from Connecticut and New York State's largest wastewater plants and other sources is required to meet the sound's water quality standards and to support a diverse and healthy ecosystem.

4. Implementation measures
Long Island Sound TMDL partners, including state and federal agencies, local governments, and the private sector, are working together to implement the TMDL. The TMDL also includes a list of nitrogen loading reduction targets for each source.

5. Status of waterbodies
Long Island Sound's water quality is impaired by nitrogen loading from wastewater treatment plants, agricultural runoff, urban runoff, and atmospheric deposition.

6. Benefits to stakeholders
Reduced nitrogen loading will improve water quality, protect public health, and support a diverse and healthy ecosystem.

Restoring the Long Island Sound While Saving Money
Lessons in Innovation and Collaboration

It is possible to make significant reductions in pollution while saving taxpayer money. Long Island Sound is a prime example of this. The sound is a body of water that is heavily polluted by nitrogen loading from wastewater treatment plants, agricultural runoff, urban runoff, and atmospheric deposition. The sound's water quality is impaired, and its ability to support a diverse and healthy ecosystem is threatened. However, by implementing the TMDL, we can reduce nitrogen loading by 58.5 percent, improve water quality, and support a diverse and healthy ecosystem. The TMDL also includes a list of nitrogen loading reduction targets for each source. By implementing these targets, we can achieve the TMDL's goal of a 58.5 percent reduction in nitrogen loading to Long Island Sound.

How are TMDLs at work in Long Island Sound?
Years of research, monitoring, and modeling helped the TMDL to identify nitrogen sources in the Long Island Sound and to estimate the maximum amount of nitrogen that the sound can receive without violating water quality standards. The TMDL also includes a list of nitrogen loading reduction targets for each source. By implementing these targets, we can achieve the TMDL's goal of a 58.5 percent reduction in nitrogen loading to Long Island Sound.

What is a total maximum daily load (TMDL)?
A TMDL is a study that calculates the maximum amount of a pollutant that a waterbody can receive without violating water quality standards. The TMDL also includes a list of nitrogen loading reduction targets for each source. By implementing these targets, we can achieve the TMDL's goal of a 58.5 percent reduction in nitrogen loading to Long Island Sound.

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Long Island Sound TMDL

The TMDL was written in 2001 because the **low dissolved oxygen** in the sound (caused in part by high nitrogen levels) leads to severe fish kills each year.

Human activity was first noted to be affecting water quality in the **1950s**, with the first fish kills beginning in the **1970s**.

CT and NY met the 58.5% reduction goal in 2016, but fish kills still occur, including in 2022.



Credit: USGS



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Long Island Sound TMDL

The TMDL also requires load reductions within the Connecticut River Basin in MA, NH, and VT.

The TMDL serves as a great opportunity to improve local water quality for the residents of each town.

Local water quality improvements have a downstream benefit on the Long Island Sound and are more marketable to residents.



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Review of MS4 requirements



Horsley Witten Group
Sustainable Environmental Solutions



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Nitrogen TMDL Requirements Appendix F, Part B

Applies to MA MS4 permittees that **discharge to waters that are tributaries to the Long Island Sound.**

Requires:

- Enhanced BMPs
- Nitrogen Source Identification Report
- Structural BMPs

MA MS4 General Permit	
Appendix F	
Requirements for Discharges to Inland Waters within Approved TMDL	
Table of Contents	
A. Requirements for Discharges to Inland Waters with an Approved MS4/MS4P to State TMDL	2
1. Chloride River Watershed Phosphorus TMDL Requirements	2
2. Lake and Pond Phosphorus TMDL Requirements	23
3. Barren and Ponds TMDL Requirements	37
4. Cape Cod Nitrogen TMDL Requirements	44
5. Another River Phosphorus TMDL Requirements	47
B. Requirements for Discharges to Inland Waters with an Approved Out of State TMDL	51
1. Nitrogen TMDL Requirements	51
2. Phosphorus TMDL Requirements	56
3. Barren and Ponds TMDL Requirements	59
4. Another TMDL Requirements	66
C. Requirements for Discharges to Inland Waters with a Regional TMDL	66
1. The Northeast Regional Nitrogen TMDL (2007)	66
Attachments 1 - Method 1 to Calculate the Total Nitrogen Load for Lake and Pond Discharges TMDL (Appendix F to Part B of the MS4/MS4P General Permit)	
2 - Calculation Worksheet for the Nitrogen Load for the Lake and Pond Discharges TMDL	
3 - Phosphorus and Nitrogen Reduction Credits for Selected Sources (2007)	



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Enhanced BMPs

Part 2.3.2: Public education and outreach

Supplement your education and outreach program with specific annual timed messages.

Spring April, May	Summer June, July	Fall Aug, Sep, Oct
- How to use & dispose of grass clippings - Encourage correct use of slow-release fertilizers	Pet waste disposal	How to dispose of leaf litter



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Enhanced BMPs

Part 2.3.6: Stormwater Management in New Development & Redevelopment

Ordinance or other regulatory mechanism must require that new development and redevelopment stormwater management BMPs are optimized for N removal.

Retrofit inventory and priority ranking must include consideration of BMPs to reduce N discharges.



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Enhanced BMPs

Part 2.3.7: Good Housekeeping & Pollution Prevention for Municipal Operations

Establish procedures to limit nitrogen from permittee-owned properties:

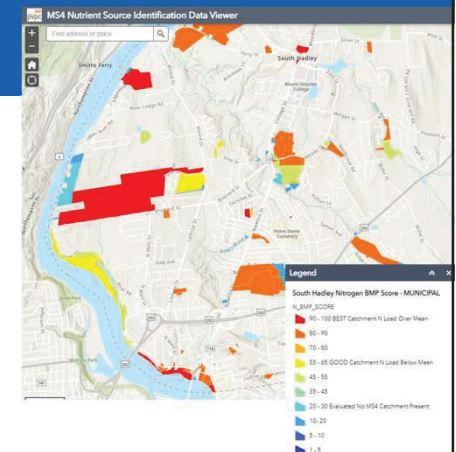
- Slow-release fertilizer at properties already using fertilizer
- Grass cuttings and leaf litter management
- Street sweeping frequency (at least twice annually and once per spring and fall)



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Nitrogen Source Identification Report

- Identify and prioritize outfall catchments with high N loading
- Identify potential retrofit opportunities or areas for structural BMP installation during redevelopment



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Evaluate Opportunities for Structural BMPs

Evaluate all properties identified as retrofit opportunities or areas for structural BMP installation. For each, answer:

- **When** will retrofit or installation opportunity occur?
- **How much** will it cost?
- **Is it feasible** (engineering and regulatory)?



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Plan, Implement, and Track Structural BMPs

- List of planned structural BMPs and implementation schedule.
- Install at least one by Year 6 (FY24) within high N loading catchment.
- Track and estimate N removal associated with structural BMPs installed by the municipality in the MS4 area.

Stormwater BMP Nitrogen Removal Tracking Tool

Background and Assumptions: (Information and Assumptions based on implementing MS4 Permit, Appendix F)

SITE INFO			BMP INFO		
Site #	Site Name	Receiving Water	BMP Type	BMP Description	BMP Location
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
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Navigation: Back | N Reduction Calculations | 1. N Load Rates | 2. Performance Curves | 3. Periodic Runoff



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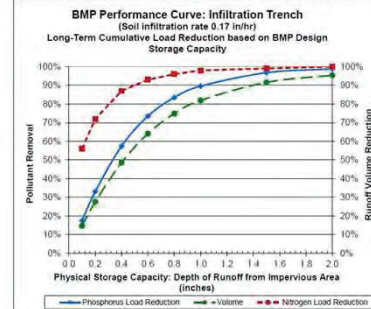
Optimizing for Nitrogen Removal

MS4 Permit Appendix F, Attachment 3

Table 3-6: Infiltration Trench (IR = 0.17 in/hr) BMP Performance Table

Infiltration Trench (IR = 0.17 in/hr) BMP Performance Table: Long-Term Phosphorus & Nitrogen Load Reduction								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	15%	28%	49%	64%	75%	82%	92%	95%
Cumulative Phosphorus Load Reduction	16%	33%	51%	73%	83%	90%	97%	99%
Cumulative Nitrogen Load Reduction	56%	72%	87%	93%	96%	98%	99%	100%

Figure 3-1: BMP Performance Curve, Infiltration Trench (infiltration rate = 0.17 in/hr)



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Table 2-6: Suitability of SCMs to treat TMDL pollutants¹

SCM	Pollutant of Concern ^{1,2,4}				
	TSS	TN	TP	FIB	Metals
Non-Structural SCMs					
Street Cleaning					
ES&D Credits					
Credit 1: General ES&D	Y	Y	Y	Y	Y
Credit 2: Solar ES&D	Y	Y	Y	Y	Y
Credit 3: Roof Runoff to QPA	Y	Y	Y	Y	Y
Credit 4: Road Runoff to QPA	Y	Y	Y	Y	Y
Credit 5: Tree Canopy	Y	Y	Y	Y	Y
Credit 6: Reduce Impervious Area	Y	Y	Y	Y	Y
Credit 7: Buffer Zone Improvement	Y	Y	Y	Y	Y
Structural Treatment SCMs					
Bioretention Area (Exfiltrating) ⁵	Y	Y ⁵	Y	Y	Y
Bioretention Area (Filtering) ⁶	Y	N	N	Y	Y
Constructed Stormwater Wetland	Y	Y	Y	Y	Y
Extended Dry Detention Basin	N	N	N	Y	Y
Gravel Wetland	Y	Y	Y	Y	Y
Proprietary Media Filter ⁷	Y	Y	Y	Y	Y
Sand/Organic Filter	Y	N	N	Y	Y
Tree Box filter (Exfiltrating) ⁸	Y	Y	Y	Y	Y
Tree Box filter (Filtering) ⁸	Y	N	N	Y	Y
Wet Basin	Y	N	N	N	Y
Roof Driftline Filter (Filtering) ⁹	Y	N	N	Y	Y
Roof Driftline Filter (Exfiltrating) ⁹	Y	Y	Y	Y	Y
Structural Conveyance SCMs					
Drainage Channel	N	N	N	N	N
Grass Channel	Y	N	N	N	N
Water Quality Swale	Y	N	N	N	N

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LUNCH BREAK

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Funding



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Creative approaches to funding: Breakout Group Exercise



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Final Thoughts and Next Steps

Next Meeting: TBD

Thank You!

Lori Kennedy, lkennedy@horsleywitten.com

Bina Skordas, binas@fbenvironmental.com



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Available Funding for Stormwater Projects in Massachusetts

This table describes grant and loan programs that fund stormwater and water quality projects.

Funding Source	Funding Agency	Eligible Projects	Eligible Applicants
319 Nonpoint Source Competitive Grants	Massachusetts Department of Environmental Protection (MassDEP)	Stormwater Best Management Practice (BMP) design, BMP construction, stormwater utilities, assessment, education and outreach	Massachusetts public or private organizations
604b Water Quality Management Planning Grants	MassDEP	Water quality assessment and watershed management planning, BMP design, stormwater utilities	Regional planning agencies, counties, conservation districts, municipalities
Buzzards Bay Municipal Grants	Buzzards Bay National Estuary Program	BMP design, boat-waste pumpouts, water quality monitoring/assessment	Municipalities within the Buzzards Bay watershed
Clean Water State Revolving Fund Loans	MassDEP	Stormwater management planning, BMP design, BMP construction, stormwater utilities	Municipalities, water districts, wastewater districts
Coastal Habitat and Water Quality Grants	Massachusetts Office of Coastal Zone Management (CZM)	Stormwater BMP design, BMP construction, water quality monitoring/assessment, education and outreach	Municipalities within the Massachusetts coastal watershed ; also nonprofits, regional planning agencies, and stormwater collaboratives in partnership with the above municipalities
Coastal Pollutant Remediation (CPR) Grants	CZM	BMP design, BMP construction, boat-waste pumpouts, water quality monitoring/assessment	Municipalities within the Massachusetts coastal watershed
Community Development Block Grant Entitlement Program	U.S. Department of Housing and Urban Development	Flooding and drainage improvements, planning and capacity building	Municipalities and counties (eligibility based on U.S. Census population data)
Five Star and Urban Waters Restoration Grants	National Fish and Wildlife Federation (NFWF)	Design and construction of green infrastructure BMPs, water quality monitoring/assessment, outreach and education	Nonprofits, state government agencies, municipal governments, tribes, educational institutions
Hazard Mitigation Grants	Massachusetts Emergency Management Agency, Massachusetts Department of Conservation and Recreation	BMP design, BMP construction (including green infrastructure to reduce flooding hazards)	State agencies, tribes, municipal governments
Healthy Communities Grant Program	U.S. Environmental Protection Agency (EPA)	Education and outreach, assessment, BMP construction	Nonprofits, state government agencies, municipal governments, tribes, educational institutions

Funding Source	Funding Agency	Eligible Projects	Eligible Applicants
Healthy Estuaries Grants	Massachusetts Bays National Estuary Program	Water quality monitoring/assessment, BMP design	Municipalities, nonprofits, regional planning agencies, research and education institutions
Massachusetts Environmental Trust Grants	Massachusetts Executive Office of Energy and Environmental Affairs (EEA)	Water quality monitoring/assessment, outreach, education, research, BMP design, BMP construction	Municipalities, nonprofits
MassWorks Infrastructure Grants	Massachusetts Executive Office of Housing and Economic Development	BMP design, BMP construction	Municipalities
Municipal Vulnerability Preparedness (MVP) Action Grant Program	EEA	Green infrastructure, smart growth/LID, reduction of impervious cover and other nature-based design and construction projects targeting water quality in the context of climate change vulnerability	Municipalities
National Estuary Program Coastal Watersheds Grant	Restore America's Estuaries/EPA	Projects targeting nutrients, loss of habitat, or flooding/coastal erosion within the 28 National Estuary Program watershed geographic areas	State, tribal, and other public or nonprofit agencies, institutions, and organizations
Rural Development Water & Waste Disposal Loans & Grants	U.S. Department of Agriculture	BMP design, BMP construction	State and municipal government, nonprofits, tribes
Southeast New England Coastal Watershed Restoration Program Watershed Implementation Grants	Restore America's Estuaries/EPA	Green infrastructure BMP design, construction, retrofits, and water quality assessment, education and outreach (projects must be located in the Southeast New England Region)	Municipalities, counties, state agencies, tribes, regional planning organizations, nonprofits, academic institutions
Southeast New England Network	EPA	Training and technical assistance to advance stormwater and watershed management, ecological restoration, and climate resilience (the network is funded by EPA's Southeast New England Program)	Municipalities, organizations, and tribes in the Southeast New England Region
Statewide Water Management Act Grants	MassDEP	Water quality assessment, BMP design, BMP construction, stormwater management	Massachusetts public water suppliers, municipalities
Stormwater MS4 Municipal Assistance Grant Program	MassDEP	Efforts to support requirements of the 2016 small MS4 general permit through resource-sharing partnerships	Municipalities or regional planning agencies/nonprofits on behalf of municipalities
Urban Waters Small Grants	EPA	Water quality monitoring/assessment, education, outreach, BMP design, BMP construction	State and municipal government, nonprofits, tribes, educational institutions, interstate agencies
Water Quality Monitoring Grants	MassDEP	Efforts to build or expand capacity for bacteria monitoring data	Nonprofits, federally recognized tribes

See the U.S. Environmental Protection Agency's Water Finance Clearinghouse within the [Clearinghouse for Environmental Finance](#) for more grants and resources.

Additional Potential Stormwater Project Funding Sources

Funding Source	Funding Agency	Eligible Projects	Eligible Applicants
<u>Building Resilient Infrastructure and Communities (BRIC) Grant Program</u>	Federal Emergency Management Agency (FEMA), administered via Massachusetts Emergency Management Agency	Capability and capacity-building activities, hazard mitigation projects, and management costs. <i>Program priorities include incentivizing natural hazard risk reduction activities that mitigate risks to public infrastructure, incorporating nature-based solutions, and enhancing climate resilience and adaptation.</i>	State agencies, local governments/communities, federally-recognized Native American Tribal governments. Must have an approved Hazard Mitigation Plan (HMP).
<u>Community Preservation Act</u>	Locally, as recommended by Community Preservation Committee and approved by the municipality's legislative body	• Acquisition, creation, and preservation of open space • Acquisition, preservation, rehabilitation, and restoration of historic resources • Acquisition, creation, preservation, rehabilitation, and restoration of land for recreational use • Acquisition, creation, preservation, and support of community housing • Rehabilitation or restoration of open space and community housing acquired or created via CPA funding	Public entities, non-public entities
<u>Complete Streets Funding</u>	Massachusetts Department of Transportation (MassDOT)	Construction projects located on municipally owned roadways (intersection redesigns, pedestrian crossing modifications, transit investments, street reconfigurations and traffic calming, pedestrian and bike network connections, environment and streetscape investments) and identified in community's Complete Streets Prioritization Plan. <i>Environment and streetscape investments include stormwater management and street trees/landscaping investments.</i>	Municipalities that have met all Tier 1 (training and policy) and Tier 2 (prioritization plan) Complete Streets Funding Program requirements

Stormwater Project Funding Sources

Funding Source	Funding Agency	Eligible Projects	Eligible Applicants
Culvert Replacement Municipal Assistance Grant	MA Department of Fish and Game Division of Ecological Restoration (DER)	Culvert or bridge replacements located on a public way, owned and maintained by an applying municipality or other eligible applicant, and that cross a natural freshwater, non-tidal river or stream channel.	Municipalities, regional governments, federally recognized and state acknowledged Tribes
Efficiency and Regionalization Grant Program	Community Compact Cabinet	Planning and implementation of regionalization and other efficiency initiatives that support long-term municipal sustainability	Municipalities, regional school districts, school districts considering forming a regional school district or regionalizing services, regional planning agencies and councils of governments
Gateway City Parks Program	MA Executive Office of Energy and Environmental Affairs (EEA) Office of Grants and Technical Assistance	Creates and/or restores parks and recreational facilities in underserved urban neighborhoods.	Gateway Cities
Massachusetts Land and Water Conservation Fund Grant Program	MA Division of Conservation Services	Acquisition of parkland, development of new parks, renovations to existing parks, development of trails in an existing conservation or recreation area, acquisition of conservation land <i>Projects should advance goals/objectives of municipality's Open Space & Recreation Plan (OSRP). Selection process includes evaluating whether project incorporates environmental education components and increases climate resiliency (e.g., permeable surfaces, rain gardens).</i>	Municipalities, Department of Conservation and Recreation, Department of Fish and Game, Massachusetts federally recognized Tribes. Must have an approved OSRP.
Massachusetts Downtown Initiative (MDI)	MA Executive Office of Economic Development (EOED)	Provides funding for technical assistance for downtowns related to district management, revitalization design, economic development issues, economic equity, housing, downtown mobility, small business support/e-commerce, wayfinding/branding and placemaking.	Public entities, non-profit organizations, community development corporations, for-profit organizations

Stormwater Project Funding Sources

Funding Source	Funding Agency	Eligible Projects	Eligible Applicants
MassTrails Grant Program	MA Department of Conservation & Recreation, MassDOT, EEA	Project development, design, engineering, permitting, construction, and maintenance of recreational trails, shared-use pathways, and trailside and trailhead amenities	Municipalities, state or federal agencies, Native nations, other governmental agencies, and non-profit organizations
MassWorks Infrastructure Program	EOED	Public infrastructure projects, including design, construction, building, land acquisition, rehabilitation, repair, and other improvements to publicly-owned infrastructure. Publicly-owned infrastructure may include but is not limited to: streets, roads, parking, and public parks and spaces within urban renewal districts and pedestrian and bicycle ways.	Municipalities, public instrumentalities
Parkland Acquisitions and Renovations for Communities (PARC) Grant Program	Massachusetts Division of Conservation Services	Acquisition of parkland, development of new parks, improvements to existing parks. <i>Projects should advance goals/objectives of municipality's Open Space & Recreation Plan (OSRP). Selection process includes evaluating whether project incorporates climate resiliency components (e.g., increases in pervious surface, stormwater retention).</i>	Municipalities with populations > 35,000, or any municipality with an authorized park/recreation commission. Must have an approved OSRP.
Planning Assistance Grants	EEA	Planning, zoning, conservation, and development projects consistent with Massachusetts' Sustainable Development Principles <i>Suitable tasks include but not limited to:</i> • <i>Zoning that enhanced the regulatory process or built environment such as Smart Parking, a Form Based Code, or Low Impact Development</i> • <i>Feasibility studies, land-use analyses, and other plans necessary for successful redevelopment or other use, such as an urban park, of sites and buildings</i>	Municipalities, regional planning agencies

Stormwater Project Funding Sources

Funding Source	Funding Agency	Eligible Projects	Eligible Applicants
Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Program	U.S. Department of Transportation	Highway, transit, and certain port projects that include resilience planning, strengthening and protecting evacuation routes, enabling communities to address vulnerabilities and increasing the resilience of surface transportation infrastructure from the impacts of sea level rise, flooding, wildfires, extreme weather events, and other natural disasters	State Governments; Local Governments; Federally Recognized Tribes and Affiliated Groups; Planning and Project Organizations; U.S. Territories
Safe Routes to School Infrastructure Project Funding Program	MassDOT	Sidewalk improvements, traffic calming and speed reduction improvements, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, secure bicycle parking facilities, traffic diversion improvements. Must be located within public way or any bicycle, pedestrian pathway, or trail. Must be located within two miles of a K-12 school.	Safe Routes to Schools partner schools in coordination with municipality



**Collaborative Workshop #3: Stormwater Management Technical Assistance
for EJ Communities in the Pioneer Valley**

Facilitated Discussion Handout

1. Identify any upcoming municipal project that you are hoping to tackle soon.
2. How do you intend to fund the project?
3. Does the project include green stormwater infrastructure? If not, is it possible to add a GSI component? Where in the project might it be incorporated?

4. Which grants might you be able to access to fund the project or bring in the GSI component?
5. What other town departments or staff might you collaborate with to seek funding or implement the project?
6. BONUS: Would you be able to achieve any nitrogen reduction in your project?



MEETING SUMMARY

RE: Collaborative Workshop #3: Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley

Date: 10 am to 1 pm, May 23, 2024

Location: Community Room, South Hadley Public Library

Attendees: South Hadley: John Broderick, Rebekah Cornell, Melissa Labonte
Amherst: Beth Willson, Erin Jacque, Christine Brestrup
Chicopee: Quinn Lonczak, Lee Pouliot
PVPC: Patty Gambarini
EPA: Michelle Vuto, Ray Cody
Consultants: Lori Kennedy, Ellie Baker, Kellie King (Horsley Witten); Bina Skordas, Evan Ma (FB Environmental)

Morning Agenda (10:00 am – 11:30 pm):

1. Overview of meeting objectives and agenda
 - Share updates on technical assistance for individual communities.
 - Learn about why nitrogen matters and how it impacts water quality.
 - Gain understanding of how to best manage nitrogen in stormwater.
 - Consider MS4 compliance as it relates to N and stormwater management more broadly.
 - Explore practical and creative funding opportunities.
2. Introductions
3. Updates on technical assistance for each community

Lori provided a brief update on individual technical assistance for each community, and the communities discussed progress made since the last collaborative workshop. Horsley Witten (HW) updated Chicopee's stormwater ordinance to comply with the MS4 permit, and the City is about ready to bring the ordinance changes through the public process. Future efforts to establish regulations and amend other ordinances will build from this effort. For Amherst, HW is updating the Town's draft stormwater management regulations, bringing in ideas from the draft revised Massachusetts Wetlands Protection Act and Stormwater Handbook. The three communities and Patty discussed the public process and methods of collecting public comments for updated regulations. South Hadley planned to conduct a site visit with HW after the workshop. HW has prepared a map with points of interest based on high loading catchments from the nitrogen source identification report (NSID) in the Buttery Brook subwatershed.

4. Short discussion of offsite mitigation

Lori and Patty discussed offsite mitigation. In South Hadley, offsite mitigation is allowed only for redevelopment projects in the riverfront area—these funds are used for natural resources projects in the watershed; offsite mitigation is not encouraged in South Hadley. Patty discussed how a statewide committee discussed offsite mitigation a few years ago and recommended against it; given what she has heard from local conservation commissions, she thinks those ideas could be updated to allow for more widespread uses of offsite mitigation and fees-in-lieu.

5. Nitrogen Primer, Long Island Sound TMDL

Evan presented a primer on urban nitrogen sources and the Long Island Sound TMDL. Excessive nitrogen loading to waterbodies can disrupt ecological communities, limit recreation and fish habitat, and harm downstream coastal ecosystems. In urban areas, nitrogen comes from a variety of sources, some of which may be controlled at the source. Reducing nitrogen sources and removing/disconnecting impervious surfaces are beneficial to water quality; where those load reductions are not possible, installing green stormwater infrastructure (GSI) to treat nitrogen is essential to protecting water resources. The Long Island Sound TMDL regulates nitrogen reductions in the Connecticut River Basin. A USGS and MassDEP study on nitrogen loading in the river has been conducted and is in the vetting process, with an update hopefully coming soon.

6. High level overview of MS4 requirements for nitrogen TMDL

Lori presented on the MS4 requirements for the Long Island Sound nitrogen TMDL. The permit requires enhanced BMPs, such as source control, education and outreach, and structural GSI practices. South Hadley and Amherst have completed their Nitrogen Source Identification Reports, and the next step will focus on evaluating opportunities for structural BMPs, planning, implementing, and tracking them. Lori referred to Appendix F, Attachment 3 of the MS4 permit, which provides performance curves that are referenced in the proposed Standard 11 of the draft Massachusetts Stormwater Handbook. The performance curves can be used for nitrogen reduction tracking. Meeting participants discussed which projects are eligible for tracking under the MS4 permit, who is responsible for tracking, and maintenance. Setting up tracking tools may be accomplished in another phase of technical assistance. Lori emphasized that infiltration BMPs or constructed wetlands/bioretenion with an anoxic zone are optimal for nitrogen removal.

7. Facilitated discussion: Best practices and lessons learned. Identify opportunities to integrate nitrogen reduction into planned municipal projects

The discussion of lessons learned built off the previous presentation and discussion about tracking BMPs. HW recommended contacting consultants who worked on other municipal projects (ex. school redesign) that incorporate GSI and ask for nitrogen reduction calculations. HW emphasized that the communities should take credit for all projects they have done. A major concern of all three communities is lacking the capacity to set up and maintain tracking databases due to limited staff. Ellie mentioned that grant funding typically cannot fund staffing, but a stormwater utility fund can.

Lunch

Afternoon Agenda

8. Funding Presentations and Discussion

Each community presented on the grants they have accessed, successes in integrating GSI, and their goals for future funding.

- Amherst has successfully accessed MVP funds (culvert design/permitting) but has been unsuccessful with DER funding for culvert replacements. They have also accessed CDBG funding for sidewalk/road projects, MassWorks Grants, and Housing Choice grants which have all been successful projects with some kind of drainage improvements made. They also discussed Land and Water Conservation Grants (parking lot conversion) and 319 non-point source grants (floodplain). There has not been pushback on incorporating GSI into these projects, though GSI is the first element to be removed if funding is limited.
- South Hadley has had success with NFWF funding specific for the Long Island Sound, which was used for nitrogen removal at the wastewater plant. NFWF was easy to work with, but it required a 50% match. South Hadley has also been very successful with MVP and DER funding specifically for updating bylaws, road crossing assessments, and culvert replacements in the Buttery Brook subwatershed. They've also used MassWorks grants.
- Chicopee has not been successful with MVP grants, because their proposed projects (long term maintenance, staff training, retrofits) do not score high in the grant process. They have accessed 319 funding and are working on a DER priority project for dam removal and daylighting a stream. They also access MassWorks grants, Brownfields grants, federal and state earmarks, CWSRF, and more.

- A larger conversation between meeting participants focused on the communities' difficulties of working with MassDOT and the disconnect between the state's water quality and stormwater goals and DOT's goals/role. Discussion also focused on the limited capacity of staff to manage grants, funding opportunities for farms through the USDA, and the possibility of facilitating conversations between the communities, MassDOT, and EPA.

9. Discussion / Funding Activity

Ellie provided a grant programs handout and gave a brief overview of available funding sources. The discussion centered on the difficulties surrounding grant management—communities that receive large grants are only able to do so because they have the staff, time, and capacity to manage them. Managing grants is time consuming and sometimes difficult (depending on the grant) for all communities, which limits their capacity to apply for new grants or handle more than one large grant at once. A roadblock for South Hadley is that they lack a town engineer, meaning they need to consult an engineer to help with portions of grant writing. Chicopee is at maximum capacity for grants at the moment, and Amherst struggles with cumbersome grant reporting requirements that take away from their ability to administer the grant and complete their other duties. The communities concluded that additional support through PVPC (such as an additional staff person) would not be helpful for addressing their needs as they tend to struggle with finding time for grant oversight and administration rather than grant writing. The state of Massachusetts has just opened the Office of Grants and Research, which may be a useful resource for the communities.

10. Final thoughts & next steps

The final meeting will be held in September, toward the end of the project period. The consultants will finalize individual technical assistance for each community before the final meeting, which will serve as a conclusion and reflection.



MEETING AGENDA

RE: Collaborative Workshop #4: Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley

Date: 1 pm to 3 pm, September 12, 2024

Location: Microsoft Teams

Invitees: South Hadley: John Broderick, Anne Capra, Rebekah Cornell, Melissa Labonte
Amherst: Beth Willson, Jason Skeels, Paul Dethier, Erin Jacque, Christine Brestrup
Chicopee: Quinn Lonczak, Lee Pouliot
PVPC: Patty Gambarini
EPA: Michelle Vuto, Ray Cody, Danielle Gaito
Consultants: Lori Kennedy, Rich Claytor, Kellie King (Horsley Witten); Bina Skordas, Evan Ma (FB Environmental)

Meeting Objectives:

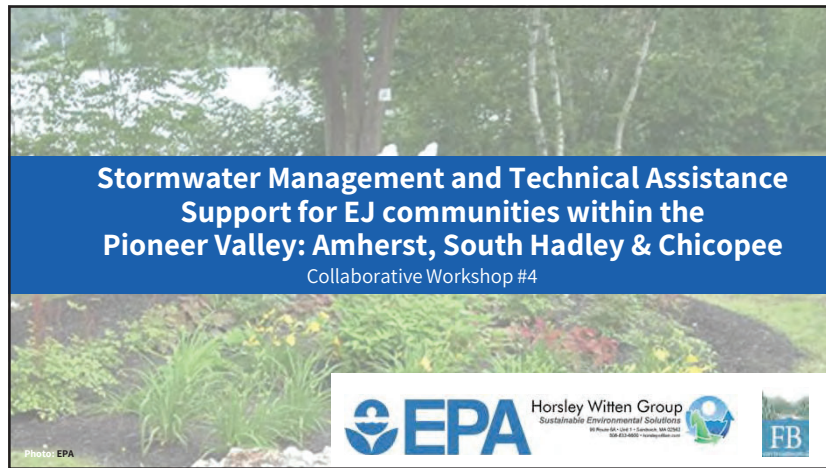
- Discuss the barriers and solutions that were identified and how they were addressed.
- Share the outcomes and next steps for individual technical assistance for each community.
- Review the main takeaways from the previous workshops.
- Discuss next steps and ideas for future technical assistance.

Agenda:

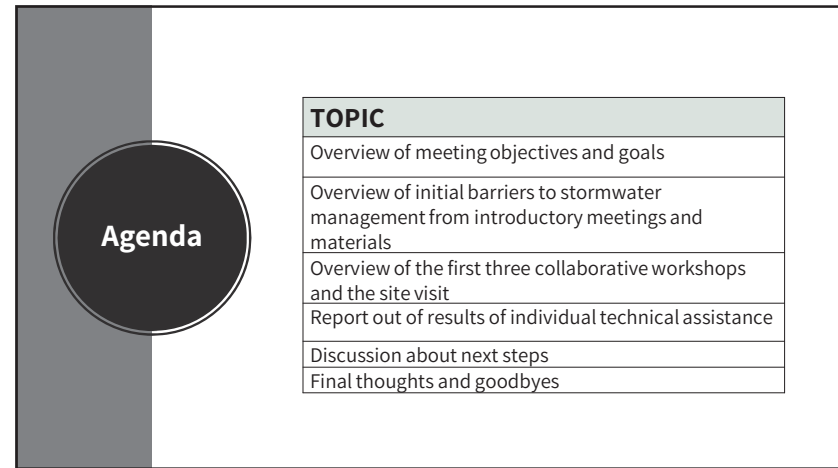
1. Overview of meeting objectives and agenda
2. Overview of initial barriers to stormwater management from introductory materials and meetings
3. Overview of the first three collaborative workshops
4. Report out of results of individual technical assistance
5. Discussion about next steps and resources
6. Final thoughts & goodbyes

Homework beforehand:

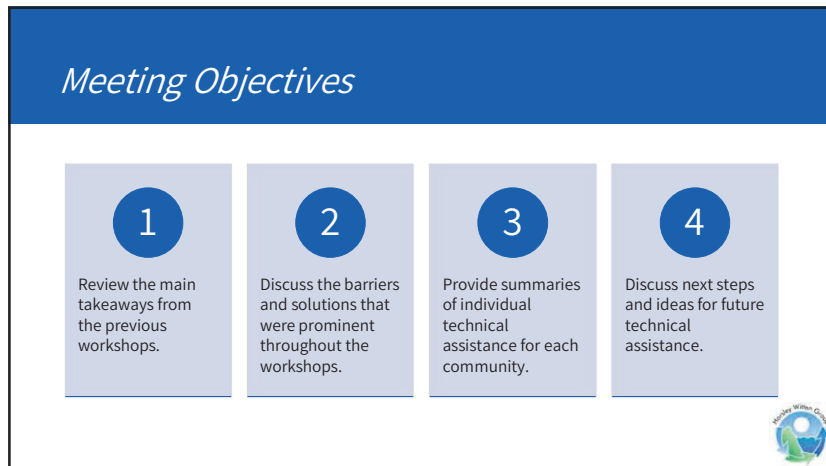
Please fill out the pre-meeting feedback form at the following [link](#).



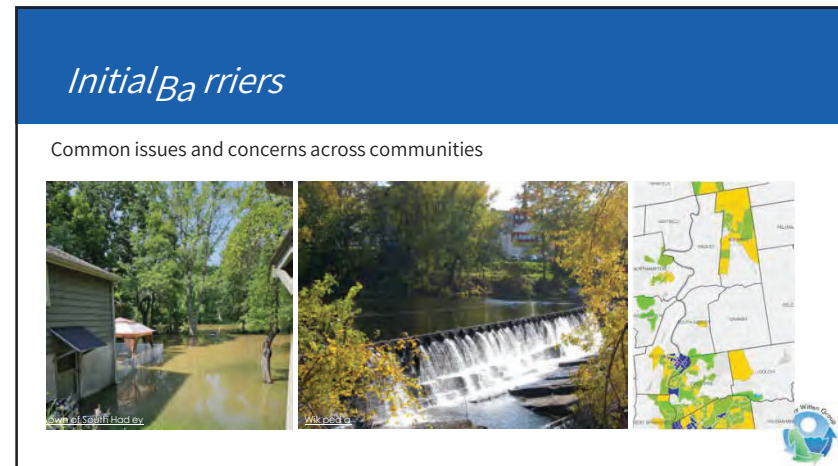
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Initial Barriers

Common Barriers Across Communities:

- Funding & Staffing
- Site constraints, operations & maintenance
- Outdated regulations
- Cross-departmental communication
- MS4 requirements



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Initial Barriers

South Hadley:

- No town engineer
- Less economic development than other communities



Chicopee:

- CSOs
- Shifting roles and vacancies



Amherst:

- Aging infrastructure
- Funding



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Collaborative Workshops 2 & 3



Horsley Witten Group
Sustainable Environmental Solutions



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Workshop #2 Main Takeaways

- Green stormwater infrastructure (GSI) can be selected and designed to suit a range of settings, conditions, & objectives.
- GSI benefits extend beyond stormwater management.
- Maintenance is essential for long-term performance.

What is GSI?



Green Infrastructure Benefits

WATER

- Runoff volume reduction and less flooding
- Natural recharge to groundwater
- Pollutant reduction and cleaner water

ENERGY

- Reduced urban heat island effect
- Less energy used for cooling

RESILIENCY

- Natural systems/plants can adapt to changing conditions (and designers can promote adaptation)

AIR QUALITY

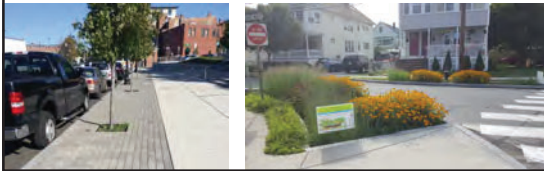
- Natural uptake of pollutants from air



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Workshop #2 Main Takeaways

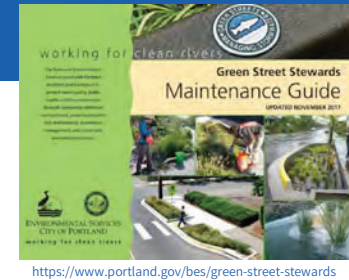
- For streetscape GSI, consider character, uses, objectives, and constraints.
- GSI suitable for streetscapes includes stormwater street trees, bumpouts, and planters.



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Workshop #2 Resources

- GSI Selection and Design
 - MA Stormwater Handbook
 - PVPC's Green Infrastructure Design Standards and Performance Templates
- Maintenance
 - Baystate Roads training
 - Guides from other regions
 - Local schools and volunteer groups
 - Regional contracting



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Workshop #2 Next Steps for Capacity-Building

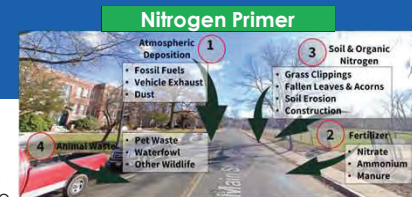
- Continue staff training for GSI maintenance
- Create templates for O&M documents
- Create a Pioneer Valley Adopt-a-Rain-Garden guide (or similar program) that can be tailored for each community



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Workshop #3 Main Takeaways

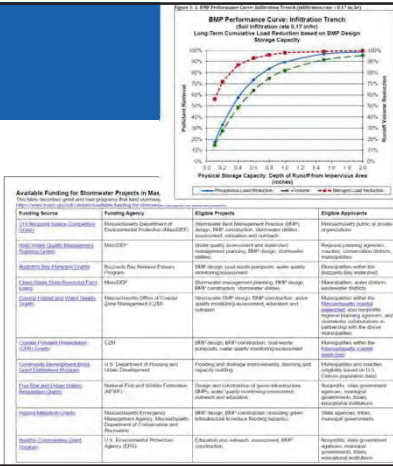
- Nitrogen
 - Stormwater carries nitrogen and impacts the Long Island Sound
 - The MS4 Permit requires enhanced BMPs to reduce nitrogen loading to Long Island Sound
 - Infiltration practices are best for nitrogen removal.
- Funding
 - Many grants will fund stormwater improvements as add-ons to other projects (CDBG, MassWorks, Brownfields).
 - Earmarks!



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Workshop #3 Resources

- BMP Performance Curves
 - MS4 Permit, Appendix F, Attachment 3
 - BMP Tracking and Accounting Tool (BATT)
- Funding Resources Handout



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Workshop #3 Next Steps for Capacity-Building

- Provide/seek technical support and funding for MS4 Permit nitrogen TMDL requirements.
- Create a nitrogen-removal tracking spreadsheet for each community.
- Engage with MassDOT about stormwater impacts and GSI opportunities on state roads.
- Explore options for support with grant administration; talk with MA Office of Grants and Research.



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Report Out Results of Individual Technical Assistance



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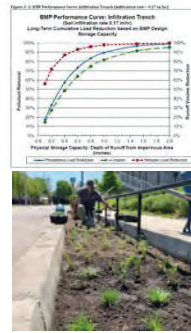
Discussion About Next Steps



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Remaining Barriers

- MS4 compliance
- BMP tracking and accounting (pollutant load calculations)
- Education and training maintenance workers
- Communication with state agencies
- GIS capabilities and asset management



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Final Thoughts and Goodbyes

Thank You! We thoroughly enjoyed working with you :)

Lori Kennedy, lkennedy@horsleywitten.com
Bina Skordas, binas@fbenvironmental.com



Horsley Witten Group
Sustainable Environmental Solutions



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MEETING SUMMARY

RE: Collaborative Workshop #4: Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley

Date: 1 pm to 3 pm, September 12, 2024

Location: Microsoft Teams

Attendees: South Hadley: John Broderick, Rebekah Cornell, Anne Capra
Amherst: Beth Willson, Jason Skeels, Paul Dethier, Erin Jacque, Christine Brestrup
Chicopee: Quinn Lonczak
PVPC: Patty Gambarini
EPA: Michelle Vuto, Ray Cody, Danielle Gaito
Consultants: Lori Kennedy, Rich Claytor, Kellie King (Horsley Witten); Bina Skordas, Evan Ma (FB Environmental)

1. Overview of meeting objectives and agenda

Bina welcomed everyone and reviewed the meeting objectives:

- Discuss the barriers and solutions that were identified and how they were addressed.
- Share the outcomes and next steps for individual technical assistance for each community.
- Review the main takeaways from the previous workshops.
- Discuss next steps and ideas for future technical assistance.

2. Overview of barriers to stormwater management from introductory materials and meetings

Bina discussed common issues and concerns across communities such as localized flooding, water quality, recreation, and environmental justice. Common barriers to implementing green stormwater infrastructure (GSI) include funding, staffing, site constraints, operation and maintenance (O&M), regulations, and communication. Each community also had its own unique challenges. For example, South Hadley does not have a town engineer, Chicopee's wastewater treatment plant and sewer separation projects take up much of the City's resources, and Amherst has aging stormwater infrastructure as well as three colleges/universities within its borders.

3. Overview of the collaborative workshops

Lori reviewed the main takeaways from workshops 2 and 3, along with resources and ideas for next steps or future technical assistance related to workshop topics.

Workshop 2

Workshop 2 focused on GSI principles, practices, maintenance, and streetscape applications. Resources for GSI selection and design include PVPC's green infrastructure design guide and the Massachusetts

Stormwater Handbook. For maintenance, resources include training from Baystate Roads, guides from other regions, local schools and community groups for volunteer maintenance, and regional contracting through PVPC and Franklin Regional Council of Governments. Next steps focus on staff training for GSI maintenance, creating O&M plan templates, and creating a region-specific GSI stewardship program (e.g., Adopt a Rain Garden).

Updates on Downtown Streetscapes for Each Community:

- Amherst reported that work on its Downtown Design Guidelines is ongoing, and it will be hosting walking tours soon as part of the public outreach and engagement process. GSI and stormwater management are part of the conversation.
- Chicopee is doing an extensive traffic study and redesign of its downtown, which presents opportunities to integrate stormwater management strategies. While other infrastructure needs and associated costs may affect the City's capacity to integrate GSI, streetscape redesigns are being reviewed from a holistic perspective. The City has spoken with PVPC and is using PVPC's BMP Library as a resource.
- South Hadley is interested in more fully incorporating GSI into the plans for Main Street, which is a MassDOT project. The Town is actively talking to involved parties about opportunities for GSI.

Workshop 3:

Workshop 3 focused on nitrogen sources, impacts, the Long Island Sound nitrogen TMDL, MS4 Permit requirements, and funding. Resources include nitrogen-reduction tracking tools, and the funding tables handed out during the workshop. Next steps include developing community-specific tracking databases. Patty mentioned that this could be a GIS service that PVPC could offer to the communities that use PVPC's GIS services. Communities discussed that a potential next phase of technical assistance could include facilitating conversations between the communities and other important stakeholders and agencies, such as MassDOT and UMass Amherst. EPA added that all documentation submitted to EPA as part of an MS4 annual report is public record and can be requested.

4. Report out of results of individual technical assistance

Amherst:

Amherst now has newly revised draft stormwater regulations. Town staff reported that the discussions during their individual community meetings were very educational, and they appreciated that the technical assistance provided an opportunity for interdepartmental communication and collaboration. The Town intends to move forward with an internal review and public outreach this year. They anticipate minimal pushback, as residents understand that stormwater is a recurring issue, and they anticipate that outreach to the development community will help minimize pushback. PVPC recommended that Amherst, given the success of its interdepartmental collaboration, consider formalizing an interdepartmental stormwater committee.

South Hadley:

South Hadley staff and HW visited potential GSI retrofit sites in May, and HW developed three GSI conceptual designs with cost estimates and nitrogen load reduction estimates. The South Hadley team reported that they are already thinking of opportunities to use the concept designs as pilot projects. The Town recently received a state MVP grant, which will include targeted community engagement in residential areas within the Buttery Brook subwatershed about stormwater management and water quality. They anticipate that the community engagement will be a good opportunity to identify potential sites for pilot projects (using the Grandview Street/Hillside Avenue concept design).

Chicopee:

Individual technical assistance focused on bringing the City's stormwater ordinance into compliance with the MS4 Permit. After revising the ordinance, HW created a matrix comparing Chicopee's site plan review, wetlands, and subdivision regulations to the updated stormwater ordinance. Quinn reported that the revised ordinance has gone through internal legal review and will be presented to the City Council soon. The next step is to align the stormwater ordinance with the other ordinances and permitting processes. Eventually, they aim to move detailed standards and procedures from stormwater ordinance into regulations. Quinn noted that the technical assistance was valuable for MS4 Permit compliance, as the City's focus has historically been on other priorities, including its WWTP and CSOs. EPA mentioned a recent study regarding nitrogen reduction credits for combined sewer separation, which could help free up funding.

5. Discussion about next steps and resources

Patty discussed that the technical assistance had tremendous value for the three communities, and that she would love to see another round of technical assistance for these three communities and for others in the Pioneer Valley that were unable to apply the first time. The Pioneer Valley is not part of the SNEP network and does not have the same funding mechanisms. Patty is part of the Connecticut River Stormwater Committee and is working to find grant opportunities and bring more assistance to Pioneer Valley communities.

EPA emphasized that they learned a lot through the process. They encouraged participants to comment on the draft MS4 Permit when it is released for public comment. EPA hopes to fund more technical assistance projects. They mentioned other resources such as the UNH Stormwater Center, and the Long Island Sound programs which may be able to fund Pioneer Valley projects.

6. Final thoughts & goodbyes

Thank you for such an enjoyable and fruitful project. We sincerely enjoyed working with you all. HW will send the final report with all workshop materials and resources that were created during the project.

APPENDIX B: AMHERST TECHNICAL ASSISTANCE DELIVERABLE

Town of Amherst

Stormwater Management Regulations

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Section 1. Purpose

The purpose of these Stormwater Regulations is to protect, maintain and enhance public health, safety, environment, and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased runoff, decreased ground water recharge, erosion and sedimentation, and nonpoint source pollution associated with new development and redevelopment of land, pursuant to the Amherst Stormwater Management Bylaw.

Development of land including loss of vegetative cover to create impervious surfaces, regrading, and other land use changes, permanently alter the hydrologic system of local watersheds by decreasing transpiration and infiltration, and increasing stormwater runoff rates and volumes, causing an increase in flooding, stream channel erosion, and sediment transport and deposition, and water quality degradation. This additional runoff contributes to increased nonpoint source pollution and degradation of receiving waters.

Stormwater management systems that are properly designed utilizing low impact design (LID) and green infrastructure (GI) techniques and appropriate best management practices (BMPs) can better simulate the natural hydrologic condition and reduce adverse impacts.

During the construction process, soil is often exposed for periods of time and most vulnerable to erosion by wind and water. The eroded soil endangers water resources by reducing water quality, and causing the siltation of valuable wetland resources including swamps, streams, rivers, lakes and aquatic habitat for fish and other desirable species.

The impacts of construction and post-development stormwater runoff quantity and quality can adversely affect public safety, public and private property, surface water drinking water supplies, groundwater resources including drinking water supplies, recreation, aquatic habitats, fish and other aquatic life, property values and other uses of lands and waters.

These Stormwater Regulations (Regulations) have been developed to provide reasonable guidance for the regulation of project design, construction and post-development stormwater runoff for the purpose of protecting local water resources from degradation. It is in the public interest to regulate construction and post-development stormwater runoff discharges in order to control and minimize increases in stormwater runoff rates and volumes, soil erosion and sedimentation, stream channel erosion, and nonpoint source pollution associated with construction site and post-development stormwater runoff.

Section 2. Definitions

- A. The definitions contained herein apply to the Amherst Stormwater Management Bylaw and the Regulations adopted thereunder. Terms not defined in this section shall be construed according to their customary and usual meaning unless the context indicates a special or technical meaning.
- B. Definitions are provided in Appendix A of these Regulations.

Section 3. Authority and Administration

- A. These Stormwater Management Regulations have been developed by the Town Manager through the Department of Public Works in accordance with the Amherst Stormwater Management Bylaw. The Town Manager through the Department of Public Works shall administer, implement and enforce these Regulations. The Engineering Division of the

Department of Public Works under the direction of the Town Engineer will issue and enforce Stormwater Management Permits.

- B. The Town Manager may periodically amend these regulations pursuant to Section E.2 of the Amherst Stormwater Management Bylaw.
- C. Nothing in these Regulations is intended to replace or be in derogation of the requirements of any other Amherst bylaw or regulation.

Section 4. Applicability

- A. A Stormwater Management Permit is required for the following activities, whether or not stormwater discharge from these activities enter the Town's drainage system (MS4):
 - a. All new development and redevelopment, land disturbance, and any other activity disturbing the drainage characteristics of one acre (43,560 square feet) or more of land, or is part of a common plan of development or construction that will disturb one acre or more of land, unless exempt pursuant to Section 5.B of these regulations;
 - b. Multifamily residential developments involving four or more units;
 - c. Any new development, redevelopment or additions to commercial, industrial, institutional, or mixed-use properties which results in an additional gross floor area of greater than 5,000 square feet or an additional impervious surface greater than 10,000 square feet;
 - d. Activities that affect less than an acre, but could adversely affect the Town's drainage system (MS4), or can reasonably be expected to cause or contribute to a violation of Massachusetts Surface Water Quality Standards 314 CMR 4.00, may also require a permit subject to the discretion of the Superintendent of Public Works or their designee.
- B. Exemptions. Exemptions from these regulations apply to the following activities, provided that a project is solely comprised of any one of these activities:
 - a. Normal maintenance and improvement of land in agricultural or aquacultural use, as defined by the Wetlands Protection Act regulation 310 CMR 10.04 and MGL Chapter 40A Section 3;
 - b. Timber harvesting under an approved forest cutting plan as defined by the Forest Cutting Practices Act regulation 304 CMR 11.00 and MGL Chapter 132 Sections 40-46;
 - c. Activities that are exclusively limited to maintenance and improvement of existing roadways (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects);
 - d. Construction of utilities (gas, water, sanitary sewer, electric, communications), other than drainage, which will not Alter terrain, ground cover, or drainage patterns, so long as Best Management Practices (BMPs) are used to prevent erosion, sedimentation and release of pollutants;

- e. Any emergency activity that poses a threat to public health or safety as determined by the Superintendent of Public Works or their designee;
- f. Maintenance of existing landscaping, gardens or lawn areas;
- g. Construction of any fence that will not alter existing terrain or drainage patterns;
- h. Repairs to any stormwater treatment system deemed necessary by the Department of Public Works;
- i. Any work or projects for which all necessary approvals and permits were issued

Section 5. Stormwater Management Permit and Procedures

- A. Permit required.
 - a. No landowner or land operator shall receive any of the building, grading, or other land development permits required for land disturbance activities, and no landowner shall commence land disturbance activities, without approval of a Stormwater Management Permit from the Department of Public Works and meeting the requirements of these regulations.
- B. Application.
 - a. The Applicant shall file one hard copy and one electronic copy of the Stormwater Management Permit application package to the Department of Public Works.
 - b. The Stormwater Management Permit application package, as further detailed in Appendix B of these Regulations, shall include:
 - i. A completed application form with original signatures of all property owners;
 - ii. A list of names and addresses of abutters located immediately adjacent to the parcel(s) on which the proposed project is located, including property owners in another municipality and on the opposite side of a roadway;
 - iii. Proof of notification of abutters, including a copy of the completed form letter provided for in the Stormwater Management Permit application. Proof of notification through another Commission or Board's abutter notification process is acceptable;
 - iv. Stormwater Management Plan;
 - v. Stormwater Management Report;
 - vi. Operation and Maintenance Plan; and
 - vii. Payment of the application review and inspection fee (see Section 6 Fees).
- C. Information Requests. The Applicant shall submit all additional information requested by the Department of Public Works Engineering Division to issue a decision on the application.
- D. Determination of Completeness. The Town Engineer or their agent shall make a determination as to the completeness of the application and adequacy of the materials

submitted. No review shall take place until the application is determined complete.

- E. Entry. Filing an application for a permit grants the Town Engineer or their agent permission to enter the site to verify the information in the application and to inspect for compliance with an approved Stormwater Management Permit.
- F. Other Boards. The Department of Public Works shall provide one copy of the application package to the Planning Board, Conservation Commission, Zoning Board of Appeals, and Health Department for their review and comment.
- G. Opportunity for Public Comment. Prior to submitting an application, the Applicant shall notify abutters located immediately adjacent to the parcel(s) on which the proposed project is located, using the form letter provided in the Stormwater Management Permit application. The letter notifies abutters about the project, provides information for how to access application documents, and provides information for abutters to contact the Department of Public Works to submit written comments. This requirement may be met by completing abutter notification as required under other Amherst bylaws and regulations provided that the abutter notification includes the Stormwater Management Permit abutter notification form letter. The Department of Public Works will accept written comments and consider those comments during the project review period.
- H. Action by the Department of Public Works. They may:
 - a. Approve the Stormwater Management Permit Application and issue a permit if it finds that the performance standards and requirements set forth herein have been met;
 - b. Approve the Stormwater Management Permit Application and issue a permit with conditions, modifications or restrictions that the Department of Public Works determines are required to ensure that the performance standards and requirements set forth herein are met;
 - c. Disapprove the Stormwater Management Permit Application and deny the permit if it finds that the performance standards and requirements set forth herein have not been met; or
 - d. Disapprove the Stormwater Management Permit Application “without prejudice” where an Applicant fails to provide requested additional information or review fees that in the Department of Public Works opinion are needed to adequately describe or review the proposed project.
 - e. Final action shall be taken upon an application within 45 calendar days of submittal of the application. Failure of the Department of Public Works to take final action on an application within 45 days does not constitute approval of such application. The 45-day period for taking final action may be extended by the Department of Public Works if the application is determined to be incomplete and additional information is requested.
- I. Final Approval. Final approval, if granted, shall be endorsed on the Stormwater Management Permit by the signature of the Town Engineer (or by the signature of the person officially authorized by the Town Engineer).
- J. Project Delay. Work approved under a Stormwater Management Permit must begin within one year after issuance of the permit. If the work does not begin within one year,

and the Department of Public Works finds that the issued permit is inconsistent with the current site conditions, a new permit application must be submitted. The Department of Public Works may grant a permit extension, at its discretion, if current site conditions are consistent with when the permit was issued. Any request for extension shall be submitted in writing no later than thirty (30) business days prior to the expiration of the Stormwater Management Permit. The Department of Public Works may require updates to the project to comply with current regulations and standards as a condition of the permit extension.

- K. **Project Changes.** The permittee, or their agent, must notify the Department of Public Works in writing of any change or alteration of a land-disturbing activity authorized in a Stormwater Management Permit before any change or alteration occurs. If the Town Engineer or their agent determines that the change or alteration is significant, based on the design requirements listed in Section 7 D and E and accepted construction practices, the Town Engineer or their agent may require that an amended Stormwater Management Permit application be filed. If any change or alteration from the Stormwater Management Permit occurs during any land disturbing activities, Town Engineer or their agent may require the installation of interim erosion and sedimentation control measures before approving the change or alteration.
- L. **Final Reports.** Upon completion of the work, but no later than six (6) months after completion of construction projects, the permittee shall submit a report (including certified as-built construction plans) from a registered Professional Engineer (PE), surveyor, or Certified Professional in Erosion and Sediment Control (CPESC), certifying that all erosion and sediment control devices, and approved changes and modifications, have been completed in accordance with the conditions of the approved permit. The as-built drawings must depict all on site controls, both structural and non-structural, designed to manage the stormwater associated with the completed site (post construction stormwater management). Any discrepancies should be noted in the report.
- M. **Recording.** The permittee shall record the Stormwater Management Permit, As-Built Plans, and Operation and Maintenance Plan with the Hampshire Registry of Deeds prior to issuance of a Stormwater Management Certificate of Compliance by the Department of Public Works.
- N. **Stormwater Management Certificate of Completion.** The Department of Public Works shall issue a letter certifying completion upon receipt and approval of the final reports and/or upon otherwise determining that all work has been conducted in conformance with these regulations and the Stormwater Management Permit conditions.

Section 6. Fees

A. Application review and inspection fees shall be as follows:

Stormwater Management Permitting Fees

PROJECT TYPE	FEES
Residential (1 Unit)	\$100 - 1-5 acres \$100 + \$100/acre >5 acres
Residential Subdivision (2 or more units)	\$500 - <5 acres \$500 + \$100/acre >5 acres
Commercial/Industrial/Institutional/Mixed Use (1 Bldg)	\$500 - <5 acres \$500 + \$100/acre >5 acres
Commercial/Industrial/Institutional/Mixed Use (2 or more Bldgs)	\$500 - <5 acres \$500 + \$100/acre >5 acres
Land Disturbance Only (No change in site use or buildings. May include reconstruction of parking lots, driveways, landscaping)	\$100 - <5 acres \$100 + \$100/acre >5 acres

- B. The Department of Public Works may, at the Applicant's expense, retain a registered Professional Engineer (PE) or other professional consultant to advise the Department of Public Works on any or all aspects of the Application.
- Purpose.** As provided by M.G.L. Ch. 44 §53G and the Stormwater Management Bylaw, the Department of Public Works may impose reasonable fees for the employment of outside consultants, engaged by the Department of Public Works, for specific expert services to assist the Department of Public Works in its review of applications for Stormwater Permits and oversight of permit compliance.
 - Consultant Services.** Specific consultant services may include, but are not limited to, technical or legal review of the permit application and associated information, on-site monitoring during construction, or other services related to the project deemed necessary by the Department of Public Works. The consultant shall be chosen by, and report only to, the Department of Public Works or its staff.
 - Notice.** The Department of Public Works shall give written notice to the Applicant of the selection of an outside consultant. Such notice shall state the identity of the consultant, the amount of the fee to be charged to the Applicant, and a request for payment of said fee in its entirety. Such notice shall be deemed to have been given on the date it is mailed or delivered. No such costs or expenses shall be incurred by the Applicant if the application or request is withdrawn within five (5) business days of the date notice is given.
 - Payment of Fee.** The fee must be received prior to the initiation of consulting services. The Department of Public Works may request additional consultant fees if the review requires a larger expenditure than originally anticipated or new information requires additional consultant services. Failure by the Applicant to pay the consultant fee specified by the Department of Public Works within ten (10) business days of the request for payment, or refusal of payment, shall be cause for the

Department of Public Works to deny the application based on lack of sufficient information to evaluate whether the project meets applicable performance standards. An appeal stops the clock on the above deadline; the countdown resumes on the first business day after the appeal is either denied or upheld.

- e. **Special Account.** Funds received pursuant to these Regulations shall be deposited with the municipal treasurer, who shall establish a special account for this purpose. Expenditures from this special account may be made at the direction of the Department of Public Works without further appropriation as provided in M.G.L. Ch. 44 §53G. Expenditures from this account shall be made only in connection with a specific project or projects for which a consultant fee has been collected from the Applicant. Expenditures of accrued interest may also be made for these purposes.
 - f. **Appeals.** The Applicant may appeal the selection of the outside consultant to the Select Board, who may only disqualify the outside consultant selected on the grounds that the consultant has a conflict of interest or does not possess the minimum required qualifications. The minimum qualifications shall consist of either an educational degree or three or more years of practice in the field at issue or a related field. Such an appeal must be in writing and received by the Select Board and a copy received by the Department of Public Works, so as to be received within ten (10) business days of the date consultant fees were requested by the Department of Public Works. The required time limits for action upon the application shall be extended by the duration of the administrative appeal.
- C. **Return of Unspent Fees.** When the Department of Public Works's review of a permit application and oversight of the permitted project is complete, any balance in the special account attributable to that project shall be returned within thirty (30) business days. The excess amount, including interest, shall be repaid to the Applicant or the Applicant's successor in interest. For the purpose of these Regulations, any person or entity claiming to be an Applicant's successor in interest shall provide the Department of Public Works with appropriate documentation. A final report of said account shall be made available to the Applicant or Applicant's successor in interest.

Section 8. Post-Construction Stormwater Management

- A. **General Performance Standards for All Sites**
 - a. At a minimum, all projects shall comply with the Massachusetts Stormwater Standards and the MS4 Permit, or more stringent standards as specified in these Regulations. The selection, design and construction of all pre-treatment, treatment, and infiltration BMPs shall be in accordance with Massachusetts Stormwater Handbook (as updated or amended).
 - b. Applicants shall evaluate and, unless infeasible, implement Low Impact Development (LID) and Environmentally Sensitive Site Design (ESSD) site planning and design strategies. Guidance on LID and ESSD practices may be found in the Massachusetts Stormwater Handbook. If the Applicant finds that LID/ESSD practices are infeasible, the Applicant shall demonstrate which LID/ESSD practices were evaluated and reasons why those practices were deemed infeasible.

- c. For projects located within the Mill River subwatershed, the post-development annual average TP load shall not exceed the pre-development annual average TP load.
 - d. Selection and design of stormwater BMPs for new development and redevelopment shall be optimized for nitrogen removal.
- B. Performance Standards for New Development.
 - a. Stormwater management systems on new development shall be designed to remove, at a minimum, 90% of the average annual load of Total Suspended Solids (TSS) and 60% of the average annual load of Total Phosphorus (TP) generated from the total post-construction impervious surface area on the site. Average annual pollutant removal requirements shall be achieved through one of the following methods:
 - i. installing stormwater BMPs that meet the pollutant removal percentages required in 8.B.a based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., Massachusetts Stormwater Handbook) may be used to calculate BMP performance; or
 - ii. retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site; or
 - iii. providing a combination of retention and treatment that achieves the above standards.
- C. Performance Standards for Redevelopment Sites.
 - a. Stormwater management systems on redevelopment sites shall be designed to remove, at a minimum, 80% of the average annual load of TSS and 50% of the average annual load of TP generated from the total post-construction impervious surface area on the site. Average annual pollutant removal requirements shall be achieved through one of the following methods:
 - i. installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., Massachusetts Stormwater Handbook) may be used to calculate BMP performance; or
 - ii. retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-construction impervious surface area on the redeveloped site; or
 - iii. providing a combination of retention and treatment that achieves the above standards; or

- iv. utilizing off-site mitigation that meets the above standards within the same USGS HUC12 as the redevelopment site.
 - b. Redevelopment activities that are exclusively limited to maintenance and improvement of existing roadways (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects) shall improve existing conditions unless infeasible and are exempt from the requirements of Section 8.C.a.
- D. Performance Standards for Redevelopment Projects Offsite Mitigation.
- a. For Redevelopment projects where the Applicant proposes to utilize offsite mitigation to meet the average annual pollutant removal requirements of Section 8.C.a., the Applicant shall describe in writing why it is not technically feasible to meet the average annual pollutant removal requirements on-site, including which on-site treatment BMPs were considered and why they were deemed not feasible.
 - b. Offsite mitigation shall be located within Amherst and the same stream reach to the maximum extent feasible. Under no circumstances will offsite mitigation be located outside the same USGS HUC12 subwatershed.
 - c. Offsite mitigation shall conform with the standards and limitations established in the Massachusetts Wetlands Protection Act Regulations, 310 CMR 10.00. The offsite mitigation project shall be designed and constructed in a manner consistent with the requirements of the Amherst Stormwater Management Bylaw and these regulations.
 - d. The Department of Public Works shall, at its discretion, identify priority areas in which offsite mitigation may be completed.
 - e. Offsite mitigation provided at a site not owned by the Town of Amherst requires a separate Stormwater Management Permit covering the offsite mitigation project, the terms and conditions of which, including ongoing operations and maintenance requirements, shall run with the land where the off-site mitigation is located.
 - f. If the proposed offsite mitigation is located on property that is not owned by the Applicant, the Applicant shall submit an agreement signed by the property owner indicating approval of BMP implementation on the property.
 - g. Construction of the offsite mitigation project shall commence within 12 months of Stormwater Management Permit issuance and be completed within 12 months of commencement.
- E. Stormwater Management Design Standards
- a. Projects must be designed to collect and dispose of stormwater runoff from the project site in accordance with Massachusetts Stormwater Management Standards, the 2016 Massachusetts Small MS4 General Permit, recognized engineering methodologies, and these regulations with an emphasis on including LID techniques in the design.
 - b. Projects must manage surface runoff so that no proposed flows are conducted over public ways, nor over land not owned or controlled by the Applicant unless a drainage easement in proper form is obtained permitting such discharge.

- c. Projects must use LID techniques where adequate soil, groundwater and topographic conditions allow. These may include but not be limited to reduction in impervious surfaces, disconnection of impervious surfaces, bioretention (rain gardens) and infiltration systems. The use of one or more LID site design measures by the Applicant may allow for a reduction in the water quality treatment volume required by these regulations. The Applicant may, if approved by the Department of Public Works, take credit for the use of stormwater LID measures to reduce some of the requirements specified in these regulations. The site design practices that qualify for these credits and procedures for applying and calculating credits are identified in the Massachusetts Stormwater Handbook.
- d. Projects must use TR-55 and TR-20 methodologies to calculate peak rate and volume of runoff from pre-development to post-development conditions.
- e. Stormwater management systems shall be designed to avoid disturbance of areas susceptible to erosion and sediment loss, avoiding, to the greatest extent practicable: the damaging of large forest stands; building on steep slopes (15% or greater); and disturbing land in wetland buffer zones and floodplains.
- f. Watershed area for hydrologic analysis and BMP sizing calculations must include at a minimum the site area and all upgradient areas from which stormwater runoff flows onto the site.
- g. For purposes of computing runoff, all pervious lands in the site are assumed prior to Development to be in “good hydrologic condition” regardless of the conditions existing at the time of the computation.
- h. Length of sheet flow used for times of concentration is to be no more than 50 feet.
- i. Drainage analyses and design calculations shall use precipitation depths based on 90% of the NOAA Atlas 14¹ upper confidence interval for the project location, also known as “NOAA Plus”. These “Plus” values are calculated by multiplying the NOAA Atlas 14 upper confidence interval by 0.9.
- j. Soils tests to be conducted by a Registered Professional Engineer or Massachusetts Soil Evaluator, performed at the location of all proposed LID techniques and BMPs, to identify soil descriptions, depth to estimated seasonal high groundwater, depth to bedrock, and soil texture.
- k. The design infiltration rate shall be determined from the on-site soil texture and Rawls rates as published in the Massachusetts Stormwater Handbook or saturated hydraulic conductivity tests.
- l. Size drainage pipes to accommodate the 25-year storm event and maintain velocities between 2.5 and 10 feet per second and provide calculations using the Mannings Equation.
- m. Size drainage swales to accommodate the 25-year storm event and velocities below 4 feet per second.

¹ NOAA Atlas 14 Precipitation Frequency Data Server <https://hdsc.nws.noaa.gov/hdsc/pfds/>

- n. Size culverts to accommodate the 50-year storm event and design adequate erosion protection. Design stream crossing culverts in accordance with the latest addition of the Massachusetts Stream Crossing Handbook.
- o. Size stormwater basins to accommodate the 100-year storm event with a minimum of one foot of freeboard.
- p. All drainage structures are to be able to accommodate HS-20 loading.
- q. Catch basins structures are to be constructed in accordance with Amherst Department of Public Works standards and spaced a maximum of 250 feet apart in roadways.
- r. Catch basins in low points of road and on roads with profile grades greater than 5 percent are to be fitted with double grates (parallel with curb) as required by the Department of Public Works.
- s. All drainpipes are to be reinforced concrete pipe, High Density Polyethylene (HDPE) pipe, or ductile iron pipe, and have a minimum diameter of 12 inches. All drainpipes shall be constructed in accordance with Amherst Department of Public Works standards.
- t. Outfalls are to be designed to prevent erosion of soils, and pipes 24 inches or larger are to be fitted with grates or bars to prevent ingress.
- u. Drainage easements are to provide sufficient access for maintenance and repairs of system components and be at least 10 feet wide.
- v. Minimize permanently dewatering soils by:
 - i. Limiting grading within 4 feet of seasonal high groundwater elevation (SHGWE);
 - ii. Raising roadways to keep roadway section above SHGWE; and
 - iii. Setting bottom floor elevation of building(s) a minimum of 2 feet above SHGWE.

Section 9. Construction-Site Stormwater Management

- A. All projects shall implement practices to control construction-related erosion, sediment, and wastes in accordance with the most recent versions of the Massachusetts Stormwater Handbook, the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, the MS4 Permit, and if applicable, the NPDES General Permit for Storm Water Discharges from Construction Activities, or more stringent standards as specified in these Regulations.
- B. If a project requires a Stormwater Pollution Prevention Plan (SWPPP) per the NPDES General Permit for Storm Water Discharges from Construction Activities (and as amended), then the Applicant shall submit a complete copy of the SWPPP.
- C. All projects shall meet the following performance standards:
 - a. Natural Resource Protection: Before commencing land disturbance activities, the limits of permitted disturbance areas shall be marked with high-visibility flagging, fencing, and/or signage. Areas designated for revegetation and/or infiltration-based

stormwater practices shall be marked with flagging, fencing, and/or signage to restrict use of heavy vehicles and equipment in these areas to avoid soil compaction. Tree protection shall be installed around the dripline for all trees to be preserved. Buffers and other restricted areas shall be maintained as required in a wetlands protection authorization from the Amherst Conservation Commission or MassDEP.

- b. Natural Heritage and Endangered Species: Protect natural resources and prevent significant alteration of habitats mapped by the Massachusetts Natural Heritage & Endangered Species Program as Endangered, Threatened or Of Special Concern, Estimated Habitats of Rare Wildlife and Certified Vernal Pools, and Priority Habitats of Rare Species from the proposed activities.
- c. Area of Disturbance: Clearing and grading shall only be performed within areas needed to build the project, including structures, utilities, roads, recreational amenities, post-construction stormwater management facilities, and related infrastructure. Such areas shall be staked to ensure that the work is completed within the appropriate areas. Construction activities shall be phased to minimize the area of disturbed soil at any one time.
- d. Soil Stabilization: The time that soil is exposed shall be minimized by stabilizing dormant areas as work progresses. Exposed areas shall be vegetated, hydromulched, protected with erosion control blankets, or otherwise stabilized within 14 days after land disturbance activities have permanently ceased or will be temporarily inactive for 14 or more days. Vegetative cover shall be prepared in the fall to ensure that exposed areas have cover before the first freeze.
- e. Stockpiles: Materials shall not be stored or stockpiled near a storm drain or a wetland resource area. Stockpiled materials that will be unused for 14 or more days shall be covered with roof, tarp, or temporary seeding (of soil stockpiles). Perimeter controls shall be installed around stockpile and staging areas.
- f. Perimeter Controls: Perimeter sediment controls, such as silt fencing and filter tubes, shall be installed around downgradient boundaries, along all resource areas, and around stockpile and staging areas. Compost socks and straw bale shall be free of invasive species. Perimeter controls shall not be removed until the drainage areas have been permanently stabilized.
- g. Stabilized Construction Entrance: Track-out controls (e.g., gravel apron) shall be installed at each construction entrance to remove sediment from vehicles and prevent tracking onto public roads. Where sediment has been tracked-out from the site, paved roads, sidewalks, or other paved areas shall be swept or vacuumed at the end of the workday. Sediment shall not be swept, hosed, or otherwise deposited into any stormwater conveyance, storm drain inlet, or waterbody.
- h. Inlet Protection: Filter bags, filter tubes, or other inlet protection controls shall be installed to prevent sediment from entering downgradient storm drains. Inlet controls shall not be removed until the drainage areas have been permanently stabilized.
- i. Runoff Diversion: Runoff shall be intercepted and diverted away from disturbed areas with berms, swales, or pipes toward stabilized outlets. Conveyances shall be

- stabilized with vegetation, erosion control blankets, check dams, or similar practices to slow velocities and prevent erosion.
- j. **Sediment Removal:** Sediment traps and basins shall be used to remove suspended solids from runoff before it discharges from the site. Traps and basins shall be designed to use baffles, multiple cells, and other practices to maximize the flow path and settling time. Sediment controls shall not be removed until the drainage areas have been permanently stabilized.
 - k. **Dewatering:** Dewatering activities shall use tanks, filter bags, or other practices to remove sediment before discharge. Water shall not be discharged in a manner that causes erosion or flooding of the site or receiving waters.
 - l. **Outlet Protection:** Pipe outlets shall have stone aprons, level spreaders, or other energy dissipation practices installed to prevent erosion.
 - m. **Construction Waste Management:** Trash, debris, and sanitary wastes shall be removed from the site on a regular basis. Dumpsters shall be covered at the end of every workday and before rain events. Dumpsters shall not be allowed to leak or otherwise discharge to any stormwater conveyance, storm drain inlet, or waterbody. Concrete mixers shall be washed out only in designated areas with liners. Demolition debris, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes shall not be discharged to the MS4 or surface waters and shall be disposed of in compliance with all local, state, and federal requirements.
 - n. **Post-Construction BMPs:** Stormwater management facilities to be used after construction shall not be used as BMPs during construction unless otherwise approved by the Department of Public Works. Many technologies are not designed to handle the high concentrations of sediments typically found in construction runoff, and thus must be protected from construction-related sediment loadings.
 - o. **Dust Control:** Dust control shall be used during grading operations. Dust control methods may consist of grading fine soils on calm days only or dampening the ground with water.
 - p. **Inspection and Maintenance:** Erosion and sediment controls shall be inspected as needed and at a minimum before and after rain events. Accumulated sediments shall be removed, and erosion and sediment controls shall be repaired or replaced as needed to ensure they perform as intended.
 - q. **Comply with applicable Federal, State and local laws and regulations** including waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control.
 - r. **Incorporate appropriate BMPs designed to comply with the Massachusetts Stormwater Handbook.**

Section 10. Long-Term Operation and Maintenance

- A. A stand-alone Operation and Maintenance Plan is required at the time of application for all projects subject to the Bylaw that include structural and non-structural stormwater BMPs. The Operation and Maintenance Plan shall remain on file with the Department of

Public Works and shall be an ongoing requirement.

- B. The owner(s) of the stormwater management system shall ensure that all components of the proposed stormwater management system are functioning according to manufacturer or design specifications for the life of the system. All components shall be maintained in good condition and promptly repaired, in accordance with the approved Operation and Maintenance Plan. This shall constitute a perpetual condition of any Stormwater Management Permit issued under these Regulations.
- C. The owner(s) shall provide copies of the Operation and Maintenance Plan to all persons responsible for maintenance and repairs.
- D. Stormwater Management Easement(s)
 - a. For public or shared stormwater systems, stormwater management easements shall be provided by the property owner(s) as necessary for:
 - i. Access for facility inspections and maintenance;
 - ii. Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event; and
 - iii. Direct maintenance access by heavy equipment to structures requiring maintenance.
 - b. The purpose of each easement shall be specified in the Maintenance Agreement signed by the property owner.
 - c. Stormwater Management easements are required for all areas used for permanent stormwater control, unless a waiver is granted by the Department of Public Works.
 - d. Easements shall be recorded with the Hampshire Registry of Deeds prior to issuance of a Certificate of Compliance by the Department of Public Works pursuant to Section 14.
- E. Record Keeping
 - a. The owner(s) of the stormwater management system shall keep records of all inspections, maintenance, and repairs and shall retain the records for at least five (5) years. These records shall be made available to the Department of Public Works during inspection of the stormwater management structure or system and at other reasonable times upon request.
 - b. The Department of Public Works may request written records documenting maintenance of the system, including receipts of inspection or cleaning services, and/or may physically inspect the systems to ensure that the proper maintenance has been carried out. Failure of the owner(s) to maintain the stormwater management system in reasonable order and condition, in conformance with the approved Operation and Maintenance Plan, shall be considered a violation of these Regulations and shall be subject to enforcement action in accordance with § G of the Stormwater Management Bylaw.
- F. Changes to Operation and Maintenance Plans

- a. The owner(s) of record of the Stormwater Management system must notify the Department of Public Works of changes in ownership, assignment of Operation and Maintenance responsibilities, or assignment of financial responsibility within 30 days of the change in ownership. The owner of record shall be responsible for Operation and Maintenance activities until a copy of the updated Operation and Maintenance Plan has been furnished to the Department of Public Works signed by the new owner or any new responsible person.
 - b. The maintenance schedule in the Operation and Maintenance Plan may be amended to achieve the purposes of the Amherst Stormwater Management Bylaw by mutual agreement of the Department of Public Works and the Responsible Parties. Amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, and persons with operational and/or maintenance responsibility.
- G. Enforcement. To ensure adequate long-term operation and maintenance of stormwater management practices, Applicants are required to implement one or more of the following procedures, as directed by the Department of Public Works:
 - a. Submission by the Applicant of an annual certification documenting the work that has been done over the last 12 months to properly operate and maintain the stormwater control measures. The certification shall be signed by the person(s) or authorized agent of the person(s) named in the permit as being responsible for ongoing operation and management;
 - b. If the Department of Public Works finds that the Applicant has failed to comply with the Plan, they may require the establishment by the Applicant of a dedicated fund or escrow account in the form of a Bond, Insurance Policy or similar instrumentality, to be maintained for a number of years and for an amount specified by the Department of Public Works, to be used by the Applicant to perform its operation and maintenance responsibilities, or for the Department of Public Works to perform or cause to be performed the required operation and maintenance tasks.

Section 11. Construction Inspection and Site Supervision

- A. Pre-construction Meeting. Prior to starting the clearing, excavation, construction, redevelopment or land disturbing activity, the Applicant, the Applicant's technical representative, the general contractor or any other person with authority to make changes to the project, herein referred to as the Applicant's agent, may be required to meet with the Department of Public Works, to review the approved plans and their proposed implementation. The need for a pre-construction meeting shall be determined by the Department of Public Works based on the project scope.
- B. If a SWPPP is required for the project, construction may not commence until the Applicant has submitted EPA's approval of the Construction General Permit Notice of Intent to the Department of Public Works and the final SWPPP is posted at the site.
- C. The approved Stormwater Management Plan and associated plans for grading, stripping, excavating, and filling work, shall be maintained at the site during the progress of the work.

- D. Department of Public Works Inspections. The Department of Public Works or its designated agent shall make inspections as herein required and shall either approve that portion of the work completed or shall notify the Applicant wherein the work fails to comply with the Erosion and Sediment Control Plan or the Stormwater Management Report as approved.
- a. Inspections will be conducted by a “qualified person” from the Department of Public Works or its designated agent, which could include a third party hired to conduct such inspections. A “qualified person” is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of these Regulations. Inspections may be conducted by the Amherst Wetland Administrator in conjunction with inspection requirements of a permit under the MA Wetlands Protection Act or Town of Amherst Wetland Protection Bylaw.
 - b. In order to obtain inspections, the Applicant shall notify the Department of Public Works at least two (2) working days before each of the following events:
 - i. Erosion and sedimentation control measures are in place and stabilized;
 - ii. Rough Grading has been substantially completed;
 - iii. Excavation for stormwater BMPs has been completed;
 - iv. Subsurface components of stormwater BMPs have been installed, prior to backfilling;
 - v. Stormwater BMP surface features have been substantially completed;
 - vi. Final Grading has been substantially completed;
 - vii. Close of the Construction Season; and,
 - viii. Final Landscaping (permanent stabilization) and project final completion.
- E. Applicant Inspections. The Applicant or the Applicant’s agent shall conduct and document inspections of all control measures no less than weekly or as specified in the permit, and prior to and following anticipated storm events. The purpose of such inspections will be to determine the overall effectiveness of the Erosion and Sediment Control Plan, and the need for maintenance or additional control measures as well as verifying compliance with the Stormwater Management Plan. The Applicant or the Applicant’s agent shall submit monthly reports to the Department of Public Works or designated agent in a format approved by the Department of Public Works.

Section 12. Waivers

- A. The Town Engineer or their agent may waive strict compliance with any requirement of these regulations, if it finds that:
- a. Application of some of the requirements is unnecessary or impracticable because of the size or character of the development activity or because of the natural conditions at the site;

- b. The project is consistent with the purposes and intent of the Stormwater Management Bylaw; and
 - c. The project provides substantially the same level of protection to the public health, safety, environment, and general welfare of the Town as required by the Stormwater Management Bylaw.
- B. Any person seeking a waiver must submit a completed Waiver Application form. Such a request shall be accompanied by an explanation or documentation supporting the waiver request and demonstrating that strict application of these regulations does not further the purposes or objectives of these regulations or the Town of Amherst Stormwater Management Bylaw.
- C. Waiver requests must be submitted before permits and approvals are issued by other Town of Amherst boards, commissions, or departments.
- D. Waiver requests will be made available by the Department of Public Works, upon request, to abutters and other members of the public seeking to review Stormwater Management Permit Applications.
- E. The Department of Public Works will provide a written statement of its findings and the reasons for granting or denying a waiver.

Section 13. Surety

- A. The Department of Public Works may require the permittee to post before the start of land disturbance activity, a surety bond, irrevocable letter of credit, cash, or other acceptable security. The form of the security shall be approved by the Department of Public Works, and shall be in an amount deemed sufficient by the Department of Public Works to ensure that the work will be completed in accordance with the permit. If the project is phased, the Department of Public Works may release part of the security as each phase is completed in compliance with the permit, but the security may not be fully released until the Department of Public Works has received the final report as required by Section 13 and issued a certificate of completion pursuant to Section 14. If the permittee defaults on any obligations imposed by the Stormwater Management Permit, the Department of Public Works may (after notification of the permittee) inform the holder of the security (and the municipal treasurer if the treasurer is not holding the funds) of the default, in which event the Town shall be entitled to the security funds.

Appendix A. Definitions

ABUTTER: The owner(s) of land adjacent to regulated activity.

APPLICANT: Any person, individual, partnership, association, firm, company, corporation, trust, authority, agency, department, or political subdivision, of the Commonwealth or the Federal government, to the extent permitted by law, requesting a Stormwater Management Permit.

AS-BUILT DRAWING: Drawings that completely record and document applicable aspects and features of conditions of a project following construction using Stormwater Management Plans derived from a Stormwater Management Permit.

BEST MANAGEMENT PRACTICE (BMP): Structural, non-structural, and managerial techniques that are recognized to be the most effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and Nonpoint Source Pollution, and promote stormwater quality and protection of the environment. "Structural" BMPs are devices that are engineered and constructed to provide temporary storage and treatment of stormwater Runoff. "Nonstructural" BMPs use natural measures to reduce pollution levels, do not require extensive construction efforts, and/or promote pollutant reduction by eliminating the pollutant source.

STORMWATER MANAGEMENT CERTIFICATE OF COMPLETION (COC): A document issued by the Department of Public Works after all construction activities have been completed, which states that all conditions of an issued Stormwater Management Permit have been met and that a project has been completed in compliance with the conditions set forth in the permit.

CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC): A certified specialist in soil erosion and sediment control. This certification program, sponsored by the Soil and Water Conservation Society in cooperation with the American Society of Agronomy, provides the public with evidence of professional qualifications.

CLEAN WATER ACT: The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) as hereafter amended.

CLEARING: Any activity that removes the vegetative surface cover.

COMMON PLAN OF DEVELOPMENT: A "larger common plan of development or sale" is a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

CONSTRUCTION AND WASTE MATERIALS: Excess or discarded building or site materials, including but not limited to concrete truck washout, chemicals, litter and sanitary waste at a construction site that may adversely impact water quality.

DISCHARGE OF POLLUTANTS: The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the Waters of the United States or Commonwealth from any source.

DRAINAGE EASEMENT: A legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

ENVIRONMENTALLY SENSITIVE SITE DESIGN (ESSD): Designs that incorporate Low

Impact Development techniques or practices to prevent the generation of stormwater and non-point source pollution by reducing impervious surfaces, disconnecting stormwater sheet flow paths and treating stormwater at its source, maximizing open space, minimizing disturbance, protecting natural features and processes, and/or enhancing wildlife habitat.

EROSION: The wearing away of the land surface by natural or artificial forces such as wind, water, ice, gravity, or vehicle traffic and the subsequent detachment and transportation of soil particles.

EROSION AND SEDIMENT CONTROL PLAN: A document containing narrative, drawings and details developed by a registered Professional Engineer (PE) or a Certified Professional in Erosion and Sedimentation Control (CPESC), which includes best management practices, or equivalent measures designed to control surface runoff, erosion and sedimentation during pre-construction and construction related land disturbing activities.

EROSION CONTROL: The prevention or reduction of the movement of soil particles or rock fragments due to stormwater runoff.

GRADING: Changing the level or shape of the ground surface.

GROUNDWATER: Water beneath the surface of the ground.

ILLICIT DISCHARGE: Direct or indirect discharge to the municipal storm drain system that is not composed entirely of stormwater, except as exempted in Section G of the Town of Amherst Illicit Discharge Detection and Elimination Bylaw. The term does not include a discharge in compliance with an NPDES stormwater discharge permit.

IMPERVIOUS SURFACE: Any surface that prevents or significantly impedes the infiltration of water into the underlying soil. This can include but is not limited to: roads, driveways, parking areas and other areas created using nonporous material; buildings, rooftops, solar arrays, structures, artificial turf, and compacted gravel or soil.

INFILTRATION: The act of conveying surface water into the ground to permit groundwater recharge and the reduction of stormwater runoff from a project site.

LAND DISTURBANCE: Any activity that causes a change in the position or location of soil, sand, rock, gravel, or similar earth material; results in an increased amount of runoff or pollutants; measurably changes the ability of a ground surface to absorb waters; involves clearing, grading, or excavating, including grubbing; or results in an alteration of drainage characteristics.

LOW IMPACT DEVELOPMENT (LID): Site planning and design strategies that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product.

MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS: The performance standards as further defined by the Massachusetts Stormwater Handbook, issued by the Department of Environmental Protection, and as amended, that coordinate the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act G.L. c. 131 §. 40 and Massachusetts Clean Waters Act G.L. c. 21, §. 23-56 to

prevent or reduce pollutants from reaching water bodies and control the quantity of runoff from a site.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or MUNICIPAL STORM DRAIN SYSTEM: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the Town of Amherst.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT: A permit issued by the EPA that authorizes the discharge of pollutants to Waters of the United States.

NEW DEVELOPMENT: Any construction activities or land alteration on an area that has not previously been developed to include impervious cover.

NONPOINT SOURCE POLLUTION: Pollution from many diffuse sources caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and man-made pollutants finally depositing them into a water resource area.

OFF-SITE MITIGATION: An approach whereby pollutant removal practices are implemented at redevelopment or retrofit sites at another location in the same HUC12 watershed, as approved by the Department of Public Works.

OPERATION AND MAINTENANCE PLAN: A plan setting up the functional, financial and organizational mechanisms for the ongoing operation and maintenance of a stormwater management system to ensure that it continues to function as designed.

OUTFALL: The point at which stormwater flows out from a point source discernible, confined and discrete conveyance into Waters of the Commonwealth.

OWNER: A person with a legal or equitable interest in property.

PRE-CONSTRUCTION: All activity in preparation for construction.

POLLUTANT: Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, construction wastes and residues including discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes and industrial, municipal and agricultural waste discharged into water.

RECHARGE: The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

REDEVELOPMENT: Development, rehabilitation, expansion, demolition, construction, land alteration, or phased projects that disturb the ground surface, including impervious surfaces, on previously developed sites.

RUNOFF: Rainfall, snowmelt, or irrigation water flowing over the ground surface.

SEDIMENT: Mineral or organic soil material that is transported by wind or water, from its origin to another location; the product of erosion processes.

SEDIMENTATION: The process or act of deposition of sediment.

SITE: The areal extent of land disturbance and construction activities, including but not limited to the creation of new impervious cover and improvement of existing impervious cover.

SLOPE: The incline of a ground surface expressed as a ratio of horizontal distance to vertical distance.

SOIL: Any earth, sand, rock, gravel, or similar material.

STABILIZATION: The use, singly or in combination, of mechanical, structural, or vegetative methods, to prevent or retard erosion.

STORMWATER: Stormwater runoff, snow melt runoff, and surface runoff and drainage.

STORMWATER MANAGEMENT REPORT: A document containing narrative, drawings, details and reporting requirements developed by a registered Professional Engineer (PE), which describes structural and non-structural best management practices designed to control the discharge of pollutants from impervious surfaces and onsite activities as well as the volume and peak rate of surface runoff from a site on an ongoing basis after construction has been completed.

STRIP: Any activity which removes the vegetative ground surface cover, including tree removal, clearing, grubbing, and storage or removal of topsoil.

TIME PERIODS: All time periods of ten days or less specified in the Amherst Stormwater Management Bylaw and these Stormwater Regulations shall be computed using business days only. In the case of a permit or approval, such period shall commence on the first day after the date of issuance and shall end at the close of business on the tenth business day thereafter. All other time periods specified in Amherst Stormwater Management Bylaw and these Stormwater Regulations shall be computed on the basis of calendar days, unless the last day falls on a Saturday, Sunday or legal holiday, in which case the last day shall be the next business day following.

TOTAL PHOSPHORUS (TP): A measure of the total dissolved and particulate forms of phosphorus.

TOTAL SUSPENDED SOLIDS (TSS): A measure of undissolved organic or inorganic particles in water.

WATERCOURSE: A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

WATERS OF THE COMMONWEALTH: All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and groundwater and Waters of the United States as defined under the Federal Clean Water Act (33 U.S.C. § 1251, et seq.) as hereafter amended.

WETLAND RESOURCE AREA: Areas specified in the Massachusetts Wetlands Protection Act G.L. c. 131, § 40 and in the Amherst Wetlands Protection Bylaw.

WETLANDS: Tidal and non-tidal areas characterized by saturated or nearly saturated soils most of the year that are located between terrestrial (land-based) and aquatic (water-based) environments, including freshwater marshes around ponds and channels (rivers and streams), brackish and salt marshes; common names include marshes, swamps and bogs.

Appendix B. Stormwater Management Permit Application Contents

The application for a Stormwater Management Permit shall contain sufficient information for the Town Engineer or their agent to determine that the performance standards have been met, and to evaluate the environmental impact, effectiveness, and acceptability of the site planning process and the measures proposed by the Applicant to reduce adverse impacts from stormwater runoff during and after construction.

The Applicant shall submit one digital copy and one printed copy of the Stormwater Management Permit application package, which shall contain the following minimum components:

1. Complete Application Form with original signatures of the Applicant and all property owners;
2. A list of names and addresses of abutters located immediately adjacent to the parcel(s) on which the proposed project is located, including property owners in another municipality and on the opposite side of a roadway;
3. Proof of notification of abutters, including a copy of the completed form letter provided for in the Stormwater Management Permit application;
4. Stormwater Management Plan;
5. Stormwater Management Report; and
6. Operation and Maintenance Plan.

More information than the minimum required herein may be required by the Town Engineer or their agent, provided that such information is reasonably necessary for the proper evaluation of the Stormwater Management Permit application.

Stormwater Management Plan

The Stormwater Management Plan shall be prepared to fully detail and explain the intentions of the Applicant. Plan sheets shall be prepared at a standard scale (1" = 20', 1" = 40', or 1" = 80', whichever is appropriate to the size of the proposal). All sheets shall include a reasonable numbering system with an appropriate title block, north arrow, signature block, and legend identifying any representative symbols used on the sheet in question. Plans must be stamped and certified by a Professional Engineer (PE) licensed in the Commonwealth of Massachusetts.

The Stormwater Management Plan shall include, at a minimum:

1. Portion of the USGS Map indicating the site locus and properties within a minimum of 500 feet of project property line.
2. Existing conditions and proposed design plans showing:
 - a. Location and description of natural features including:
 - Watercourses and waterbodies.
 - Regulated wetland resource areas within proximity of the site as defined in 310 CMR 10.00 and Wetlands Protection Town of Amherst General Bylaws (Article 3.31) and Regulations, aquifer protection zones, earthwork within 4 feet of seasonal high groundwater elevations, and other sensitive environmental areas;
 - Delineation of the 100-year flood plain based on flood elevations provided

in the most recent effective or preliminary FEMA Flood Insurance Study, or as calculated by a professional engineer for areas not assessed in a flood study.

- Existing vegetation, including tree lines, canopy layer, shrub layer, and ground cover. Within the limit of work and within a 25-foot setback from the limit of work boundary, trees with a caliper twelve (12) inches or larger, noting specimen trees and forest communities.
 - Habitats mapped by the Massachusetts Natural Heritage & Endangered Species Program as Endangered, Threatened or of Special Concern, Estimated Habitats of Rare Wildlife, Certified Vernal Pools, Potential Vernal Pools (as mapped by Massachusetts GIS), and Priority Habitats of Rare Species within five hundred (500) feet of any construction activity.
- b. Lines of existing abutting streets showing drainage and driveway locations and curb cuts.
 - c. Soil mapping and test pit (or geotechnical boring) logs including estimated seasonal high groundwater elevation in areas to be used for stormwater retention, detention, or infiltration.
 - d. Topographical features including existing and proposed contours at intervals no greater than two (2) feet with spot elevations provided when needed, based on ground survey.
 - e. Surveyed property lines showing distances and monument locations, all existing and proposed easements, rights-of-way, and other encumbrances, the size of the entire parcel, and the delineation and number of square feet of the land area to be disturbed (limit of disturbance).
 - f. Existing and proposed buildings and/or structures, including materials, approximate height.
 - g. Existing and proposed utilities, including size, material, and invert data.
 - h. Cross sections of utility structures showing depth to groundwater;
3. Stormwater management design plan(s) and details showing:
 - a. Location, size, material, inverts, and details for proposed stormwater management system components including structures, pipes, swales, detention, retention, and infiltration systems and any other LID techniques or BMPs.
 - b. Profiles of drainage trunk lines.
 - c. Drainage easements.
 4. Erosion and sediment control plan and details showing:
 - a. Drainage patterns and approximate slopes anticipated after major grading activities (Construction Phase Grading Plans).
 - b. Location and details of erosion and sediment control measures, interim grading, and material stockpiling areas.
 - c. Path and mechanism to divert uncontaminated water around disturbed areas, to the maximum extent practicable.

- d. Location of temporary and permanent seeding, vegetative controls, and other stabilization measures.
- e. Location and details of staking, fencing, and other measures to protect trees and natural resources.
- f. If the project is phased, location of different phases.

Stormwater Management Report

1. Contact Information. The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected.
2. Narrative describing:
 - a. Project purpose.
 - b. Methodologies and assumptions.
 - c. Existing zoning and land use at the site.
 - d. Proposed land use at the site.
 - e. Summary of existing site hydrology.
 - f. Estimated total areas of land disturbance and existing and proposed impervious surfaces on the project site.
 - g. Proposed work within proximity of regulated wetland resource area(s), aquifer protection zones, and other sensitive environmental areas.
 - h. Work proposed within proximity of regulated wetland resource areas as defined in 310 CMR 10.00 and Wetlands Protection Town of Amherst General Bylaws (Article 3.31) and Regulations, aquifer protection zones, earthwork within 4 feet of seasonal high groundwater elevations, and other sensitive environmental areas.
 - i. LID and ESSD techniques considered for this project and an explanation as to why they were included or excluded from the project.
 - j. Proposed best management practices.
 - k. The USGS HUC12 subwatershed(s) within which proposed work will occur and the immediate downgradient waterbody(s) that stormwater runoff from the project site discharges to. Applicable TMDL and/or impairment status of the waterbody(s), and the LID practices and BMPs included in the project to address the pollutant(s) of concern.
 - l. Pre- and post-development peak rates and volumes of stormwater runoff demonstrating no adverse impacts to downgradient properties, stormwater management systems and wetland resources.
 - m. Proposed structural and non-structural erosion and sediment control BMPs and how they will be maintained throughout construction.
 - n. Construction sequencing/phasing to prevent soil erosion and sedimentation, any interim grading, and material stockpiling areas.
 - o. Implementation schedule for temporary and permanent seeding, vegetative controls, and other stabilization measures.

- p. Construction and waste materials expected to be stored on-site, including a description of controls to reduce pollutants from these materials, storage practices to minimize exposure of the materials to stormwater, and spill prevention and response.
3. Calculations
- a. Hydrologic analysis to determine pre- and post-development peak rates and volumes of stormwater runoff for 2-, 10-, 25- and 100-year 24-hour storm events.
 - b. Groundwater recharge calculations and BMP drawdown (time to empty).
 - c. Water quality calculations including (if applicable):
 - TSS, TP, and TN percent reduction.
 - For projects located within the Mill River USGS HUC12 subwatershed, estimated pre-development and post-development annual average load of TP and estimated reduction in average annual load (in pounds per year) from the project site, calculated using the methodology provided in the MS4 Permit Appendix F.
 - Specific BMPs utilized in critical areas.
 - Specific BMPs utilized for land uses of higher potential pollutant loads (LUHPPL).
 - d. Hydraulic calculations to size drainage pipes, swales, and culverts.
 - e. Supplemental calculations for sizing BMPs and addressing impairments to waterbodies.
4. Figures illustrating pre- and post-development drainage areas, indicating:
- a. Structures, pavements, surface vegetation and other ground cover materials;
 - b. Topography sufficient to delineate drainage areas;
 - c. Point(s) of analysis;
 - d. Drainage area map showing pre- and post-development watershed boundaries including upgradient areas that contribute stormwater flow onto the project site, labeled to be easily identified in calculations.
 - e. Drainage area and stormwater flow paths for time of concentration (Tc) calculation, including municipal drainage system flow.
 - f. Breakdown summary of land cover and conditions by hydrologic soil group.
5. Soil mapping, test pit or boring logs, and infiltration test or groundwater monitoring well data.
6. Massachusetts Department of Environmental Protection Checklist for Stormwater Report completed, stamped and signed by a Professional Engineer (PE) licensed in the Commonwealth of Massachusetts to certify that the Stormwater Management Plan is in accordance with the criteria established in the Massachusetts Stormwater Management Standards, Town of Amherst Stormwater Management Bylaw and these regulations.
7. Any other information requested by the Town Engineer or their agent.

Operation and Maintenance Plan

1. The name(s) of the owner(s) for all components of the system.
2. A map showing the location of the systems and facilities including all structural and nonstructural stormwater BMPs, catch basins, manholes/access lids, pipes, and other stormwater devices.
3. The names and addresses of the person(s) responsible for operation and maintenance.
4. The person(s) financially responsible for maintenance and emergency repairs.
5. A list of easements with the purpose and location of each.
6. Instructions for routine and long-term operation and maintenance, with sufficient detail for responsible parties to perform necessary maintenance activities and to prevent actions that may adversely affect the performance of each structural and/or nonstructural stormwater BMP.
7. An Inspection and Maintenance Schedule for all stormwater management facilities including routine and non-routine maintenance tasks to be performed. Where applicable, this schedule shall refer to the Maintenance Criteria provided in the Stormwater Handbook or the EPA National Menu of Stormwater Best Management Practices or equivalent.
8. An Inspection and Maintenance Log for maintaining records of date, inspector, findings, and maintenance performed for each inspection and maintenance occurrence.
9. The signature(s) of the owner(s) and all persons responsible for operation and maintenance, financing, and emergency repairs, as defined in the Maintenance Agreement, if maintenance is to be performed by an entity other than the owner.

APPENDIX C: CHICOPEE TECHNICAL ASSISTANCE DELIVERABLE

DRAFT AUGUST 2024**Chapter 231****STORMWATER MANAGEMENT**

§ 231-1.	Purpose and authority.	§ 231-16.	Consent orders.
§ 231-2.	Definitions.	§ 231-17.	Show-cause hearing.
§ 231-3.	Applicability.	§ 231-18.	Administrative order.
§ 231-4.	Stormwater management plans.	§ 231-19.	Injunctive relief.
§ 231-5.	Performance standards.	§ 231-20.	Departmental cost recovery.
§ 231-6.	Maintenance program required.	§ 231-21.	Violations and penalties.
§ 231-7.	Prohibited activities.	§ 231-22.	Performance bonds.
§ 231-8.	Notification of spills.	§ 231-23.	Liability insurance.
§ 231-9.	Stormwater discharge permits.	§ 231-24.	Public nuisances.
§ 231-10.	Suspension of storm drainage system access.	§ 231-25.	Entry upon premises to perform duties.
§ 231-11.	Emergency suspensions.	§ 231-26.	Appeals.
§ 231-12.	Termination of discharge.	§ 231-27.	Remedies not exclusive.
§ 231-13.	Responsibility for administration.	§ 231-28.	Publication of users in significant noncompliance.
§ 231-14.	Enforcement.	§ 231-29.	Severability; repealer; when effective.
§ 231-15.	Notification of violation.		

[HISTORY: Adopted by the Board of Aldermen (now City Council) of the City of Chicopee 3-19-2019 by Ord. No. 19-17¹. Amendments noted where applicable.]

GENERAL REFERENCES

Flood Control Department — See Ch. 37.

Wastewater treatment — See Ch. 266.

Dike system — See Ch. 142.

Water — See Ch. 269.

Sewers — See Ch. 230.

Wetlands — See Ch. 272.

§ 231-1. Purpose and authority.

- A. A stormwater management ordinance is hereby established to manage the storm- and surface water system, maintain a good hydrological balance, prevent property damage, better manage land development, and protect water quality for the safety and enjoyment of citizens and the preservation and enhancement of wildlife habitat. The Stormwater Management Ordinance will provide for the administration and management of the stormwater system that will include construction, and ongoing operations and maintenance responsibilities related to the municipal separate storm sewer system (MS4).

1. Editor's Note: This ordinance also repealed former Ch. 231, Stormwater Management, adopted 10-21-2003 by Ord. No. 03-53.

B. The proper management of stormwater runoff will meet the following objectives:

- (1) Reduce the adverse water quality impacts of stormwater and combined sewer overflow discharges to rivers, lakes, reservoirs and streams in order to attain federal water quality standards.
- (2) Prevent the discharge of pollutants, including hazardous chemicals into stormwater runoff.
- (3) Minimize the volume and rate of stormwater which is discharged to rivers, streams, reservoirs, lakes and combined sewers.
- (4) Prevent erosion and sedimentation from improper land development, and reduce stream channel erosion caused by increased runoff.
- (5) Provide for the recharge of groundwater aquifers and maintain the base flow of streams.
- (6) Provide stormwater facilities that are attractive, maintain the natural integrity of the environment, and are designed to protect public safety.
- (7) Maintain or reduce predevelopment runoff characteristics after development to the extent feasible.
- (8) Minimize damage to public and private property from flooding.
- (9) Prevent pollutants from entering Chicopee's municipal separate storm sewer system (MS4).
- (10) Prohibit illicit connections and unauthorized discharges to the MS4.
- (11) Require the removal of all such illicit connections.
- (12) Comply with state and federal statutes and regulations relating to stormwater discharge to establish the legal authority to ensure compliance with the provisions of this chapter through inspection, monitoring, and enforcement.
- (13) Establish the legal authority to ensure compliance with the provisions of this chapter through inspection, monitoring and enforcement.
- (14) Prevent contamination of drinking water supplies.

~~C.—This Ordinance is adopted under authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule Statutes, and pursuant to the regulations of the federal Clean Water Act found at 40 CFR 122.34. This regulation, for the proper management of stormwater is adopted under the provisions of Law Department, MGL c. 40A, §§ 1 through 22, inclusive.~~

§ 231-2. Definitions.

Unless the context specifically indicates otherwise, the meaning of terms used in this chapter shall be as follows:

ACT or THE ACT — The Federal Water Pollution Control Act, also known as the "Clean Water Act," as amended, 33 U.S.C. § 1251 et seq.

ADVERSE IMPACT — Any deleterious effect on waters or wetlands, including their quality, quantity, surface area, species composition, aesthetics or usefulness for human or natural uses, or effects which are or may potentially be harmful or injurious to human health, welfare, safety or property, to biological productivity, diversity, or stability or which unreasonably interfere with the enjoyment of life or property, including outdoor recreation.

ALTERATION OF DRAINAGE CHARACTERISTICS – Any activity on an area of land that changes the water quality, force, direction, timing, or location of runoff flowing from the area. Such changes include: change from distributed runoff to confined or discrete discharge, change in the volume of runoff from the area; change in the peak rate of runoff from the area; and change in the recharge to groundwater on the area.
APPROVAL AUTHORITY—The administrator of US EPA Region I, or authorized representative.

AUTHORIZED ENFORCEMENT AGENCY — The Department of Public Works, its employees or agents designated to enforce this chapter.

AUTHORIZED REPRESENTATIVE OF THE USER —

A. If the user is a corporation:

- (1) The president, secretary, or a vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decisionmaking functions for the corporation; or
- (2) The manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25,000,000 (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

B. If the user is a partnership or sole proprietorship: a general partner or proprietor, respectively.

C. If the user is a federal, state or local government facility: a director or highest official appointed or designated to oversee the operation and performance of the activities of the government facility, or their designee.

D. The individuals described in Subsections A through C above may designate another authorized representative if authorization is in writing, the authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company, and the written authorization is submitted to the Superintendent.

BEST MANAGEMENT PRACTICES (BMP) — Either structural or nonstructural devices that temporarily store or treat urban stormwater runoff to reduce flooding, remove pollutants, and provide other amenities, or nonstructural practices that reduce pollutants at their source.

BIOCHEMICAL OXYGEN DEMAND or BOD — The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures for five days at 20° C., usually expressed as a concentration.

BUILDING DRAIN — That part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer, beginning 10 feet outside the inner face of the building wall.

BUILDING SEWER — The extension from the building drain to the public sewer or other place of disposal (sometimes called "sewer service").

CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC) – A certified specialist in soil erosion and sediment control. This certification program, sponsored by the Soil and Water Conservation Society in cooperation with the American Society of Agronomy, provides the public with evidence of professional qualifications.

CITY or CITY OF CHICOPEE — A municipal corporation in the County of Hampden, Massachusetts.

CLEAN WATER ACT — The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) as hereafter amended.

CLEARING – Any activity that removes the vegetative surface cover.

COMBINED SEWER — A sewer receiving both surface runoff and sewage.

COMMISSION — The Chicopee Water and Sewer Commission.

COMMON PLAN OF DEVELOPMENT — A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

COMPOSITE SAMPLE — For monitoring requirements, a combination of individual samples of equal volume collected at equally spaced intervals (not to exceed one hour) during hours of production (not to exceed a twenty-four-hour period) or proportional according to flow. In the case of a batch discharge of two hours or less, the composite will consist of eight or more volume, flow, or time proportional samples.

CONTROL MANHOLE — A sampling and monitoring station which may be located in a manhole, vault, pit or room within the premises of the user.

CSO — Combined sewer overflow.

DESIGN STORM — A rainfall event of specified size and return frequency that is used to calculate the runoff volume and peak discharge rate.

DETENTION — The temporary storage of stormwater runoff in a BMP, which is used to control the peak discharge rates, and provides gravitational settling of pollutants.

DISCHARGE — The meaning of term(s) "discharge" for use in this chapter is as follows:

- A. DIRECT STORMWATER DISCHARGE — The discharge of treated or untreated stormwater directly to the waters of the Commonwealth of Massachusetts.
- B. DISCHARGE OF POLLUTANTS — The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or commonwealth from any source.
- C. ILLEGAL STORMWATER DISCHARGE — Any direct or indirect non-stormwater discharge to the municipal storm drain system, except as specifically exempted in § 231-7 of this chapter. The term does not include a discharge in compliance with an NPDES stormwater discharge permit.
- D. INDIRECT STORMWATER DISCHARGE — The discharge or flow of treated or untreated stormwater indirectly to the City's MS4 by any means other than a conduit.
- E. STORMWATER DISCHARGE — The discharge of treated or untreated stormwater directly by a conduit to the City's MS4.

DRAINAGE AREA — That area contributing runoff to a single point measured in a horizontal plane, which is enclosed by a ridgeline.

DRYWELL — An approved structure used to infiltrate stormwater.

DWO — Dry weather overflow.

EASEMENT — A grant or reservation by the owner of land for the use of such land by others for a specific purpose or purposes, and which must be included in the conveyance of land affected by such easement.

ENVIRONMENTAL PROTECTION AGENCY or EPA — The United States Environmental Protection Agency or, where appropriate, the Regional Water Management Division Director, or other duly authorized official of said agency.

EXISTING SOURCE or EXISTING USER — Any source of discharge, the construction or operation of which commenced prior to the enactment of this chapter.

FLOW ATTENUATION — Prolonging the flow time (lagging) of runoff to reduce the peak discharge.

GRAB SAMPLE — For monitoring requirements, an individual sample which is taken from a waste stream on a one-time basis with no regard to flow or time.

GROUNDWATER — All water beneath the surface of the ground.

ILLICIT CONNECTION — Any surface or subsurface drain or conveyance which allows an illegal discharge into the municipal storm drain system. Illicit connections include conveyances which allow a non-stormwater discharge to the municipal storm drain system, including sewage, process wastewater or wash water and any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved before the effective date of this chapter.

IMPERVIOUS SURFACE — ~~Any material or structure on or above the ground that prevents water from infiltrating the underlying soil.~~ Any surface that prevents or significantly impedes the infiltration of water into the underlying soil. This can include but is not limited to: roads, driveways, parking areas and other areas created using non-porous material; buildings, rooftops, structures, artificial turf, and compacted gravel or soil.

INDUSTRIAL WASTE — The liquid waste from manufacturing processes, trade, or business, distinct from sanitary sewage.

INFILTRATION — The downward movement of water from the surface to subsurface soils.

INFILTRATION TRENCH — A stormwater management device filled with aggregate, which removes both soluble and particulate pollutants. Trenches are not intended to trap coarse sediments.

LAND DISTURBANCE ACTIVITY – Any activity that causes a change in the position or location of soil, sand, rock, gravel, or similar earth material; results in an increased amount of runoff or pollutants; measurably changes the ability of a ground surface to absorb waters; involves clearing, grading, or excavating, including grubbing; or results in an alteration of drainage characteristics.

LOW IMPACT DEVELOPMENT (LID) – Site planning and design strategies that use or mimic natural processes that result in the infiltration, evapotranspiration, or use of stormwater in order to protect water quality and associated aquatic habitat.

MS4 PERMIT – General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or MUNICIPAL STORM DRAIN SYSTEM — The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the City of Chicopee.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT — A permit issued by the United States Environmental Protection Agency or jointly with the state that authorizes the discharge of pollutants to waters of the United States.

~~**NATURAL OUTLET** — Any outlet into a watercourse, pond, ditch, lake, or other body of surface water or groundwater.~~

NEW DEVELOPMENT- Any construction activities or land alteration on an area that has not previously been developed to include impervious surface.

NEW SOURCE or NEW USER — Any building, structure, facility or installation from which there is proposed (or may be) a discharge of stormwater, the construction of which commenced after the adoption of this chapter.

- A. Construction on a site at which an existing source is located results in redevelopment rather than a new source if the construction does not create a new building, structure, facility, impervious surface or installation.
- B. Construction of a new source as defined under this subsection has commenced if the owner or operator has:
 - (1) Begun, or caused to begin, as part of a continuous on-site construction program, any placement, assembly, or installation of facilities or equipment; or significant site preparation work, including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary

for the placement, assembly, or installation of new source facilities or equipment; or

- (2) Entered into a building contractual obligation for the purchase of facilities or equipment, which are intended to be used in its operation within a reasonable time. Options to purchase or contracts, which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies, do not constitute a contractual obligation under this subsection.

NON-STORMWATER DISCHARGE — Any discharge to the municipal storm drain system not composed entirely of stormwater.

NONCONTACT COOLING WATER — Water used for cooling which does not come into direct contact with any raw material, intermediate product, waste product, or finishing product.

OPERATION AND MAINTENANCE PLAN – A plan setting up the functional, financial, and organizational mechanisms for the ongoing operation and maintenance of a stormwater management system to ensure that it continues to function as designed.

OUTFALL — The terminus of a storm drain or other stormwater structure where stormwater is discharged into a river, stream, lake, pond, wetland, or other Waters of the Commonwealth.

PEAK DISCHARGE — The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm.

PERMEABLE SOILS — Soil materials with a sufficiently rapid infiltration rate so as to greatly reduce or eliminate surface water and stormwater runoff. These soils are generally classified as Soil-Natural Resources Conservation Service hydrologic soil Types-groups A and B.

PERSON — Any individual, partnership, copartnership, firm, company, corporation, association, joint-stock company, trust, estate, governmental entity, or any other legal entity; or their legal representatives, agents, or assigns. This definition includes all federal, state and local governmental entities.

pH — A measure of the acidity or alkalinity of a solution, expressed in standard units.

POLLUTANT — Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter, whether originating at a point or non-point source, that is or may be introduced into any sewage treatment works or waters of the commonwealth. Pollutants shall include but not be limited to:

- A. Paints, varnishes, and solvents;
- B. Oil and other automotive fluids;
- C. Nonhazardous liquid and solid wastes and yard wastes;
- D. Refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, accumulations and floatables;
- E. Pesticides, herbicides, and fertilizers;
- F. Hazardous materials and wastes; sewage, fecal coliform and pathogens;
- G. Dissolved and particulate metals;
- H. Animal wastes;
- I. Rock; sand; salt, soils;
- J. Construction wastes and residues; and
- K. Noxious or offensive matter of any kind.

PRETREATMENT — The reduction of the amount of pollutants, the elimination of pollutants, or the

alteration of the nature of pollutant properties in stormwater prior to, or in lieu of, introducing such pollutants into the POTW or MS4. This reduction or alteration can be obtained by physical, chemical, or biological processes; by process changes; or by other means, except by diluting the concentration of the pollutants unless allowed by an applicable pretreatment standard.

PRETREATMENT REQUIREMENTS — Any substantive or procedural requirement or devices related to pretreatment imposed on a user, other than a pretreatment standard.

PROCESS WASTEWATER — Any water which during manufacturing or processing comes into direct contact with or results from the production or use of any material, intermediate product, finished product, or waste product.

PUBLIC SEWER — A sewer in which all owners of abutting properties have equal rights and that is controlled by the City of Chicopee.

PUBLICLY OWNED TREATMENT WORKS or POTW — A treatment works as defined by Section 212 of the Act (33 U.S.C. § 1292) which is owned by the City of Chicopee. This definition includes any devices or systems used in the collection, storage, treatment, recycling, and reclamation of sewage or industrial wastes of a liquid nature and any conveyances which convey wastewater to a treatment plant.

RECHARGE — The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

REDEVELOPMENT – Development, rehabilitation, expansion, demolition, construction, land alteration, or phased projects that disturb the ground surface, including impervious surfaces, on previously developed sites.

RETENTION — The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

SANITARY SEWER — A conduit that carries sewage and to which storm-, surface and groundwaters are not intentionally added.

SEWAGE — Human excrement and gray water (household showers, dishwashing operations, etc.).

SEWER — A pipe or conduit for carrying sewage.

SIGNIFICANT USER — A user of the MS4 that, in the opinion of the Superintendent, has the capacity to adversely impact:

- A. Public health, safety, and general welfare.
- B. Cause a nuisance.
- C. Wildlife habitat.
- D. Hydrological balance.
- E. Property, public or private.
- F. Operation and maintenance of the MS4.
- G. Water quality.

SITE – The areal extent of land disturbance and construction activities, including but not limited to the creation of new impervious surface and improvement of existing impervious surface.

STANDARD INDUSTRIAL CLASSIFICATION (SIC) — A classification pursuant to the Standard Industrial Classification Manual issued by the Executive Office of the President, Office of Management and Budget, 1972.

STATE — The Commonwealth of Massachusetts.

STORM DRAIN (sometimes termed "storm sewer") — A conduit which carries storm and surface waters and drainage, but excludes sewage and industrial wastes, other than non-contact cooling water.

STORMWATER — Any flow occurring during or following any form of natural precipitation and resulting from such precipitation, including snowmelt.

STORMWATER DISCHARGE PERMIT – A permit issued by the Superintendent after review of an application, plans, calculations, and other supporting documents, in accordance with the provisions of this chapter.

STORMWATER MANAGEMENT PLAN – A plan submitted by the applicant for a Stormwater Discharge Permit that contains supporting computations, drawings, and sufficient information describing the manner, location, and type of proposed measures in which stormwater runoff will be managed from the entire development.

SUPERINTENDENT — The person designated by the City of Chicopee to supervise the Department of Public Works, and who is charged with certain duties and responsibilities by this chapter, or ~~his~~ the person's duly authorized representative.

~~**SUSPENDED SOLIDS** — The total suspended matter that floats on the surface of, or is suspended in, water, wastewater, or other liquid, and which is removable by laboratory filtering.~~

SWALE — A natural depression or wide shallow ditch used to temporarily store, route or filter runoff.

TOTAL MAXIMUM DAILY LOAD (TMDL) – A regulatory plan (authorized by the Clean Water Act) that identifies the amount of a pollutant that a waterbody can assimilate without exceeding its water quality standard for that pollutant.

TOTAL PHOSPHORUS (TP) – A measure of the total dissolved and particulate forms of phosphorus.

TOTAL SUSPENDED SOLIDS (TSS) – A measure of undissolved organic or inorganic particles in water.

TOXIC OR HAZARDOUS MATERIAL OR WASTE — Any material which, because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as toxic or hazardous under MGL c. 21C and c. 21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

TR 55 — Technical Release 55, Urban Hydrology for Small Watersheds, is a hydrologic model developed by the Soil Conservation Service to calculate stormwater runoff and to aid in designing detention basins.

TR-20 — A watershed hydrology model developed by the Soil Conservation Service that is used to route a design storm hydrograph through a pond.

UNCONTAMINATED — Water containing no pollutants.

USER — Any property owner or permittee that has any stormwater discharge, direct stormwater discharge, or indirect stormwater discharge.

WASTEWATER — Any sanitary waste, sludge, or septic tank or cesspool overflow, and water that, during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product or waste product.

WASTEWATER TREATMENT PLANT or TREATMENT PLANT — That portion of the POTW which is designed to provide wastewater treatment.

WATERCOURSES — A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

WATERS OF THE COMMONWEALTH — All waters within the jurisdiction of the ~~C~~eommonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, groundwater, and Waters of the United States as defined under the Federal Clean Water Act as hereafter amended.~~and groundwater.~~

§ 231-3. Applicability.

- A. This chapter shall apply to flows entering the municipally owned storm drainage system (MS4), stormwater discharges, and indirect stormwater discharges.
- B. Prior to the issuance of any stormwater ~~management~~discharge permit for any proposed development listed below, the Superintendent must approve a stormwater management plan or a waiver of the requirement for a stormwater management plan. In addition, the user must submit the required stormwater discharge permit application per § 231-9. No person shall, on or after the effective date of the chapter, initiate any land disturbance, land clearing, ~~land~~ grading, earthmoving or development activities without first complying with this chapter. The following uses shall be required to ~~submit drainage reports, plans, construction drawings, specifications and as built information in conformance~~conform with the requirements of this chapter:
 - (1) Multifamily residential developments involving three or more units.
 - (2) Any new source commercial, industrial, residential and institutional structures under the same ownership, with at least 4,000 gross square feet of impervious surface.
 - (3) Redevelopment or additions to existing commercial, industrial, residential and institutional uses which result in a total impervious surface area of greater than 4,000 gross square feet.
 - (4) Any land disturbance activity that ~~will~~ disturbs one acre or more of land, or smaller land disturbance activities that are part of a larger common plan of development that will disturb one acre or more of land.
 - (5) Any other user, when the Superintendent deems that the application and permitting is required to carry out the intent of this chapter.

§ 231-4. Stormwater management plans.

- A. Submittal of stormwater management plans.
 - (1) A stormwater management plan or an application for waiver shall be submitted to the Superintendent for review and approval for any proposed development specified in § 231-3. The plan shall contain supporting computations, drawings, and sufficient information describing the manner, location, and type of measures in which stormwater runoff will be managed from the entire development. The plan shall serve as the basis for all subsequent construction.
 - ~~(2)~~ The applicant may request, and the Superintendent may grant, a waiver from any information requirements ~~he/she~~that the Superintendent judges to be unnecessary to the review of a particular plan.
 - ~~(2)(3)~~ The Superintendent may receive and consider information and comments submitted by the public regarding the proposed stormwater management plan and/or application for waiver.
- B. Inspections.
 - (1) No plan will be approved without adequate provision for inspection of the property before development activity commences. The applicant shall arrange with the ~~City Engineer~~Superintendent for scheduling the following inspections:
 - (a) Initial inspection: prior to approval of any plan.
 - (b) Erosion control inspection: to ensure erosion control practices are in accord with the plan.
 - (c) Bury inspection: prior to backfilling of any underground drainage or stormwater conveyance structures.
 - (d) Final inspection: when all work, including construction of stormwater management facilities, has been completed.

~~(d)~~ Inspections shall be conducted by a “qualified person” who is knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this chapter.

(2) The Superintendent shall inspect the work and either approve it or notify the applicant in writing in what respects there has been a failure to comply with the requirements of the approved plan. The applicant shall promptly correct any portion of the work which does not comply, or the applicant will be subject to the bonding provisions of § 231-22 or the penalty provisions of § 231-21. The City may conduct random inspections to ensure effective control of erosion and sedimentation during all phases of construction.

C. Contents of the stormwater management plan. The applicant is responsible for submitting a stormwater management plan which meets the ~~design~~ requirements provided by this chapter. The plan shall include sufficient information to evaluate the environmental characteristics of the affected areas, the potential impacts of the proposed development on water resources, and the effectiveness and acceptability of measures proposed for managing stormwater runoff. The applicant shall certify on the drawings that all clearing, grading, drainage, construction, and development shall be conducted in strict accordance with the plan. The minimum information submitted for support of a stormwater management plan shall be as follows:

(1) Site Plan contents.

- (a) Locus map.
- (b) Drainage area map showing pre- and post-construction watershed boundaries, drainage area and stormwater flow paths.
- (c) Location of existing and proposed utilities.
- (d) Topographic survey showing existing and proposed contours (maximum two-foot contour intervals).
- (e) Soils investigation, including borings or test pits, to a depth greater than four feet below estimated seasonal groundwater for areas where construction of infiltration practices will occur.
- (f) Description of all watercourses, impoundments, and wetlands on or adjacent to the site or into which stormwater flows.
- (g) Delineation of 100-year floodplains, if applicable.
- (h) Groundwater levels at the time of probable high groundwater elevation (November to April) in areas to be used for stormwater retention, detention, or infiltration.
- (i) Existing and proposed locations, cross sections, and profiles of all brooks, streams, drainage swales and the method of stabilization.
- (j) Location of existing and proposed easements.
- (k) Proposed improvements, including location of buildings or other structures, impervious surfaces, and storm drainage facilities, if applicable.
- (l) Structural details for all components of the proposed drainage systems and stormwater management facilities.

(m) Timing schedules and sequence of development, including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization.

~~(m)~~(n) Erosion and sediment control plan showing location and details of erosion and sediment control measures, with notes describing the construction sequence/phasing, operation and maintenance for erosion and sediment control measures, temporary stabilization measures, and procedures to store and control discharge of construction and waste materials.

~~(o)~~ Maintenance schedule.

~~(n)~~—

~~(+)~~(p) Notes on drawings specifying materials to be used, construction specifications, and typical.

(2) Stormwater Management Report

(a) Description of project purpose, methodologies and assumptions, existing and proposed uses and conditions, project impacts, and mitigation measures.

(b) Summary of proposed land disturbance area, existing impervious surface area, and proposed impervious surface area.

(c) Identification of immediate downgradient waterbody(s) that stormwater runoff from the project site discharges to, TMDL and/or impairment status of the waterbody(s), and the BMPs included in the project to address the pollutant(s) of concern.

(d) Description of low impact development (LID) planning and design practices proposed to be implemented. If the applicant determines that LID practices are infeasible, a description of which LID practices were evaluated and reasons why those practices were deemed infeasible.

~~(2)~~(e) Computations: pre- and post-development drainage calculations shall be included for storm events with return periods of two-, ten-, twenty-five-, and 100-year, 24-hour storms used as the basis of design. Calculations for:

~~(a)~~• Hydrology.

~~(b)~~• Hydraulics.

~~(c)~~• Structures.

(f) Water quality calculations including Total Suspended Solids (TSS) and Total Phosphorus (TP) percent reduction.

(g) Estimate of stormwater management construction costs.

~~(3)~~(h) Massachusetts Department of Environmental Protection Checklist for Stormwater Report completed, stamped, and signed by a Professional Engineer (PE) licensed in the Commonwealth of Massachusetts to certify that the Stormwater Management Plan is in accordance with the criteria established in the Massachusetts Stormwater Management Standards.

(3) Operation and Maintenance Plan

(a) The name(s) of the owner(s) for all components of the system.

(b) A map showing the location of the systems and facilities including all structural and nonstructural stormwater BMPs, catch basins, manholes/access lids, pipes, and other stormwater devices.

(c) The names and addresses of the person(s) responsible for operation and maintenance.

(d) The person(s) financially responsible for maintenance and emergency repairs.

- (e) An Inspection and Maintenance Schedule for all stormwater management facilities including routine and non-routine maintenance tasks to be performed. Where applicable, this schedule shall refer to the Maintenance Criteria provided in the Stormwater Handbook or the EPA National Menu of Stormwater Best Management Practices or equivalent.
 - (f) Instructions for routine and long-term operation and maintenance shall have sufficient detail for responsible parties to perform necessary maintenance activities and preventative actions that may adversely affect the performance of each structural and/or nonstructural stormwater BMP.
 - (g) A list of easements with the purpose and location of each.
 - (h) The signature(s) of the owner(s) and all persons responsible for operation and maintenance, financing, and emergency repairs, if maintenance is to be performed by an entity other than the owner.
- (4) Other information as required.

§ 231-5. Performance standards.

A. Minimum Requirements

- (1) At a minimum, all projects shall comply with the Massachusetts Stormwater Standards and the MS4 Permit. Design of stormwater management systems shall be consistent with the requirements of the most recent version of the Massachusetts Stormwater Handbook, or more stringent standards as specified in this chapter.

B. Low Impact Development

- (1) Applicants shall evaluate and, unless infeasible, implement LID planning and design strategies. Guidance on LID practices may be found in the Massachusetts Stormwater Handbook. If the applicant determines that LID practices are infeasible, the applicant shall demonstrate which LID practices were evaluated and reasons why those practices were deemed infeasible.

C. Construction-Site Stormwater Management

- (1) All projects shall implement practices to control construction-related erosion, sediment, and wastes in accordance with the latest versions of the Massachusetts Stormwater Handbook, the NPDES Construction General Permit for Stormwater Discharges from Construction Activities, the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, or more stringent standards as specified in this chapter.
- (2) Demolition debris, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes shall not be discharged to the MS4 or Waters of the Commonwealth and shall be disposed of in compliance with all local, state, and federal requirements.

~~A. Minimum control requirements. The minimum stormwater control requirements shall require that all developments provide management measures necessary to maintain the post-development peak discharges for a twenty-four hour, two-year frequency storm event at a level that is equal to or less than the respective, predevelopment peak discharge rates, through stormwater management practices that control the volume, timing, and rate of flows. When the proposed stormwater discharge may have an impact upon a sensitive receptor, including streams, storm sewers, and/or combined sewers, the Superintendent may require an increase in these minimum requirements.~~

B.D. Post-Construction Stormwater Management measures.

- (1) Stormwater management measures shall be required to satisfy the minimum control requirements and shall be according to the following order of preference:

- (a) On-site infiltration, flow attenuation, and pollutant removal of runoff on-site to existing areas with grass, trees, and similar vegetation and through the use of open vegetated swales and natural depressions;
 - (b) Retention and evaporation of stormwater on rooftops or in parking lots;
 - (c) Use of stormwater on-site to replace water used in industrial processes or for irrigation;
 - (d) Stormwater detention structures for the temporary storage of runoff which is designed so as not to create a permanent pool of water; and
 - (e) Stormwater retention structures for the permanent storage of runoff by means of a permanent pool of water.
- (2) Stormwater management measures shall maintain the post-development peak discharges for a twenty-four-hour, two-year frequency storm event at a level that is equal to or less than the respective, predevelopment peak discharge rates, through stormwater management practices that control the volume, timing, and rate of flows. When the proposed stormwater discharge may have an impact upon a sensitive receptor, including streams, storm sewers, and/or combined sewers, the Superintendent may require an increase in these minimum requirements.
- ~~(2)(3)~~ Infiltration practices shall be utilized to reduce runoff volume increases where suitable conditions exist. A combination of successive practices may be used to achieve the applicable minimum control requirements. Justification shall be provided by the applicant for rejecting each practice based on site conditions.
- ~~(3) Best management practices shall be employed to minimize pollutants in stormwater runoff prior to discharge into a combined or separate storm drainage system or water body.~~
- (4) All stormwater management facilities shall be designed to provide an emergency overflow system and incorporate measures to provide a nonerosive velocity of flow along its length and at any outfall.
- (5) The designed release rate of any stormwater structure shall be modified if any increase in flooding or stream channel erosion would result at a downstream dam, highway, structure, or natural point of restricted stream flow or result in increased combined overflow or sewer backups.
- (6) Selection and design of stormwater BMPs shall be optimized for the removal of nitrogen. Guidance on BMP performance for nitrogen removal may be found in the MS4 Permit, Appendix F, Attachment 3.
- (7) Drainage analyses and design calculations shall use precipitation depths based on 90% of the NOAA Atlas 14¹ upper confidence interval for the project location, also known as "NOAA Plus". These "Plus" values are calculated by multiplying the NOAA Atlas 14 upper confidence interval by 0.9.
- (8) BMPs located on commercial or industrial land use areas shall be designed to allow for shutdown and containment to isolate the drainage system in the event of an emergency spill or other unexpected event.
- (9) New Development Pollutant Removal
- (a) Stormwater management systems for new development shall be designed to remove, at a minimum, 90% of the average annual load of Total Suspended Solids (TSS) and 60% of the average annual load of Total Phosphorus (TP) generated from the total post-construction impervious surface area on the site. Average annual pollutant removal

¹ NOAA Atlas 14 Precipitation Frequency Data Server <https://hdsc.nws.noaa.gov/hdsc/pfds/>
Downloaded from <https://ecode360.com/CH1214> on 2024-01-15

requirements may be achieved through one of the following methods:

- i Installing stormwater BMPs that provide the required pollutant removal based on calculations developed using EPA Region 1's BMP Accounting and Tracking Tool (2016), the MS4 Permit Appendix F Attachment 3 methodology, or other BMP performance evaluation tool provided by the Stormwater Authority; or
- ii Retaining the volume of runoff equivalent to, or greater than, 1.0 inch multiplied by the total post-construction impervious surface area on the site; or
- iii Providing a combination of retention and treatment that achieves the above standards.

(10) Redevelopment Pollutant Removal

(a) Stormwater management systems for redevelopment shall be designed to remove, at a minimum, 80% of the average annual load of TSS and 50% of the average annual load of TP generated from the total post-construction impervious surface area on the site. Average annual pollutant removal requirements may be achieved through one of the following methods:

- i Installing stormwater BMPs that provide the required pollutant removal based on calculations developed using EPA Region 1's BMP Accounting and Tracking Tool (2016), the MS4 Permit Appendix F Attachment 3 methodology, or other BMP performance evaluation tool provided by the Stormwater Authority; or
- ii Retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-construction impervious surface area on the site; or
- iii Providing a combination of retention and treatment that achieves the above standards.

(b) Redevelopment activities that are exclusively limited to maintenance and improvement of existing roadways (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects) shall improve existing conditions unless infeasible and are exempt from the requirements of Section 231-5.D.(10)(a).

~~(5)(c)~~

(6) In addition, the Specific Standards and Design Criteria as detailed in MADEP Storm Water Management Volumes One and Two, March 1997 edition, must be included. These standards and design criteria include but are not limited to the following:

- (a) No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the commonwealth.
- (b) Stormwater management systems must be designed so that post-development peak discharge rates do not exceed predevelopment peak discharge rates.
- (c) Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge from the predevelopment or existing site conditions, based on soil types.
- (d) For new development, stormwater management systems must be designed to remove 80% of the average annual load (post-development conditions) of total suspended solids (TSS). It

is presumed that this standard is met when:

- ~~[1] Suitable nonstructural practices for source control and pollution prevention are implemented;~~
- ~~[2] Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and~~
- ~~[3] Stormwater management BMPs are maintained as designed.~~
- ~~(e) Stormwater discharges from areas with higher potential pollution loads require the use of specific stormwater management BMPs. The use of infiltration practices without pretreatment is prohibited.~~
- ~~(f) Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas. Critical areas are outstanding resource waters (ORWs), shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.~~
- ~~(g) Redevelopment of previously developed sites must meet the stormwater management standards to the maximum extent practicable. However, if it is not practicable to meet all the standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.~~
- ~~(h) Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.~~
- ~~(i) All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.~~

C.(11) Specific design criteria.

~~(+)~~(a) Infiltration systems.

- ~~(+)~~i Infiltration systems shall be equipped with clean stone and/or filter fabric adjacent to the soil and have appropriate sediment removal mechanisms;
- ~~(b)~~ii Infiltration systems shall be located at least 20 feet from basement walls;
- ~~(c) Due to the potential for groundwater contamination, infiltration systems shall not be an acceptable method for management of runoff containing pollutants;~~
- ~~(d)~~iii Infiltration systems designed to handle runoff from commercial or industrial impervious parking areas shall be a minimum of 400 feet from any water supply well;
- ~~(e)~~iv Infiltration systems shall not be used as sediment control basins during construction unless specific plans are included to restore or improve the basin surface;
- ~~(f)~~v Infiltration basins shall be constructed with a three-foot minimum separation between the bottom of the structure and the maximum groundwater elevation; and
- ~~(g)~~vi Provisions shall be made for safe overflow passage, in the event of a storm, which exceeds the capacity of an infiltration system.

~~(+)~~(b) Retention and detention ponds shall be designed and constructed in accordance with the criteria of the Soil Conservation Service's "Urban Hydrology for Small Watersheds," Technical Release No. 55, June 1986, unless otherwise approved by the Superintendent.

- ~~(3)(c)~~ The applicant shall give consideration in any plan to incorporating the use of natural topography and land cover, such as natural swales and depressions as they exist prior to development to the degree that they can accommodate the additional flow of water.
- ~~(4)(d)~~ The Superintendent shall give preference to the use of swales in place of the traditional use of curbs and gutters based on a case-by-case review of stormwater management plans by the Department of Public Works.
- ~~(5)(e)~~ The applicant shall consider public safety in the design of any stormwater facilities. The banks of detention, retention, and infiltration basins shall be sloped at appropriate grade into the water as a safeguard against personal injury, to encourage the growth of vegetation and to allow the alternate flooding and exposure of areas along the shore. Basins may require fencing depending on final design. Side slopes must be stabilized and planted with vegetation to prevent erosion and provide pollutant removal. The banks of retention areas shall be designed with sinuous rather than straight shorelines so that the length of the shoreline is maximized, thus offering more space for the growth of vegetation.
- ~~(6)(f)~~ Where a stormwater management plan involves direction of some or all runoff off of the site, it shall be the responsibility of the applicant to obtain from adjacent property owners any easements or other necessary property interests concerning flowage of water. Approval of a stormwater management plan does not create or affect any such rights.
- ~~(7)(g)~~ All applicants for projects which involve the storage or use of hazardous chemicals shall incorporate handling and storage best management practices that prevent such chemicals from contaminating runoff discharged from a site into infiltration systems, receiving water bodies or storm drains.
- ~~(8)(h)~~ Runoff from parking lots shall be treated by oil/water separators or other controls to remove oil and sediment;
- ~~(9)(12)~~ A maintenance program for the basins/swales shall be prepared to ensure long term filtration integrity. All methodology implemented for water quality protection shall follow the standards and guidelines of the following documents: Storm Water Management Volume One: Storm Water Policy Handbook, MADEP, MA CZM, March 1997; Storm Water Management Volume Two: Storm Water Technical Handbook, MADEP, MA CZM, March 1997; Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas Franklin, Hampden, Hampshire Conservation Districts, March 1997, all as revised.

§ 231-6. Long-Term Operation and Maintenance~~program required.~~

A. Maintenance.

- ~~(1)~~ The applicant shall ensure that all components of the proposed stormwater management system are functioning according to manufacturer or design specifications for the life of the system. All components shall be maintained in good condition and promptly repaired, in accordance with the approved Stormwater Management Plan. This shall constitute a perpetual condition of any Stormwater Management Permit issued under this chapter.
- ~~(4)(2)~~ Included in the stormwater discharge permit for which stormwater management is required, the Superintendent shall require the owner and/or permittee to execute an inspection and maintenance program. The permit requirements shall be on all subsequent owners and/or permittees of land served by the private stormwater management facility. The permit shall provide for access to the facility at all reasonable times for regular inspections by the City or its authorized representative and for regular or special assessments of property owners to ensure that the facility is maintained in proper working condition to meet design standards and any provision established.

- ~~(2)(3)~~ The agreement shall also provide that, if after notice by the Superintendent to correct a

violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within 30 days, the Department of Public Works may perform all necessary work to place the facility in proper working condition. The owner(s) of the facility shall be assessed the cost of the work and any penalties.

B. Maintenance responsibilities.

- (1) The owner of the property on which work has been done pursuant to this chapter for private stormwater management facilities, or permittee, shall maintain in good condition and promptly repair and restore all grade surfaces, walls, drains, dams and structures, vegetation, erosion and sediment control measures, and other protective devices. Such repairs or restoration and maintenance shall be in accordance with approved plans.
- (2) A maintenance schedule shall be developed for the life of any stormwater management facility and shall state the maintenance to be completed, the time period for completion, and who shall perform the maintenance. This maintenance schedule shall be included in the stormwater management plan.
- (3) To ensure adequate long-term operation and maintenance of stormwater management practices, the Superintendent may require the permittee to implement one or more of the following procedures, depending on the scale and complexity of the project:
 - (a) Submit an annual certification documenting the work that has been done over the last 12 months to properly operate and maintain the stormwater control measures. The certification shall be signed by the person(s) or authorized agent of the person(s) named in the Stormwater Management Permit as being responsible for ongoing operation and management.
 - (b) Establish a dedicated fund or escrow account in the form of a Bond, Insurance Policy, or similar instrumentality, to be maintained for a number of years and for an amount specified by the Superintendent. Such fund or account may be used by the applicant to perform its operation and maintenance responsibilities or, if the Superintendent finds that the applicant has failed to comply with the Stormwater Management Permit, by the Superintendent to perform or cause to be performed the required operation and maintenance tasks.
 - (c) Pay to the City an amount specified by the Superintendent in compensation for its acceptance of ownership of privately constructed BMPs.
 - (d) Establish a maintenance contract with the Public Works Department whereby the Public Works Department will perform or cause to be performed the required operation and maintenance tasks.
- (4) The owner shall keep records of all inspections, maintenance, and repairs and shall retain the records for at least five (5) years. These records shall be made available to the Superintendent during inspection of the stormwater management structure or system and at other reasonable times upon request. The Superintendent may request written records documenting maintenance of the system, including receipts of inspection or cleaning services, and/or may physically inspect the systems to ensure that the proper maintenance has been carried out.
- (5) The owner shall provide copies of the Operation and Maintenance Plan to all persons responsible for maintenance and repairs
- (6) The owner shall inform prospective new owners of the requirements of the existing Stormwater Management Plan. This shall be an on-going requirement of any Stormwater Management Permit issued.

C. As-Built Plans

(1) Within three (3) months after completion of construction and land disturbance activities, the permittee shall submit certified as-built plans from a registered Professional Engineer (PE), surveyor, or Certified Professional in Erosion and Sediment Control (CPESC). The as-built plans must depict all structural and non-structural stormwater management systems, including subsurface components, and impervious and pervious surface areas on site. Any discrepancies from the approved Stormwater Management Plan should be noted in the cover letter.

D. Recording

(1) The owner shall record the Stormwater Management Permit, As-Built Plans, and Operation and Maintenance Plan with the Hampden County Registry of Deeds.

~~(2)~~

§ 231-7. Prohibited activities.

- A. Illegal discharges. No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into the municipal storm drain system, watercourse, or into the waters of the commonwealth.
- B. Illicit connections. No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection.
- C. Obstruction of municipal storm drain system. No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without written prior approval from the Superintendent or designated agent.
- D. Exemptions. This section shall not apply to any of the following non-stormwater discharges or flows, provided that the source is not a significant contributor of a pollutant to the municipal storm drain system:
 - (1) Waterline flushing;
 - (2) Flows from potable water sources;
 - (3) Springs;
 - (4) Natural flows from riparian habitats and wetlands;
 - (5) Diverted stream flows;
 - (6) Rising groundwater;
 - (7) Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater;
 - (8) Uncontaminated groundwater discharge from a residential sump pump, which existed at the time of adoption of this chapter.
 - (9) Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems, such as dewatering excavations for foundation or pipelines), crawl space pumps, or air-conditioning condensation;
 - (10) Discharges from landscape irrigation or lawn watering;
 - (11) Water from individual residential car washing and temporary fund-raising car wash events;
 - (12) Discharges from dechlorinated swimming pool water (less than one ppm chlorine), provided that it is allowed to stand for one week prior to draining, or tested for chlorine levels with a pool test

kit prior to draining, and the pool is drained in such a way as not to cause a nuisance;

- (13) Discharges from street sweepers of minor amounts of water during operations;
- (14) Discharges or flows resulting from firefighting activities;
- (15) Dye testing, provided that verbal notification is given to the Department of Public Works prior to the time of the test;
- (16) Non-stormwater discharges permitted under an NPDES permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations; and
- (17) Discharges for which advanced written approval is received from the Department of Public Works if necessary to protect public health, safety, welfare or the environment.

§ 231-8. Notification of spills.

Notwithstanding any other requirements of local, state or federal law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials at that facility's operation which is resulting or may result in illegal discharge of pollutants, that person shall take all necessary steps to ensure containment and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and police departments, Department of Public Works and Board of Health. In the event of a release of nonhazardous material, said person shall notify the authorized enforcement agency no later than the next business day. Written confirmation of all telephone, facsimile or in-person notifications shall be provided to the authorized enforcement agency within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain onsite a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

§ 231-9. Stormwater discharge permits.

A. Stormwater discharge permit application requirements.

- (1) Any user as described below must submit information on the nature and characteristics of its stormwater, including the filing of a permit application. The following users are required to file an application for a stormwater discharge permit:
 - (a) Any existing or new user that meets or could meet, in the opinion of the Superintendent, the criteria for significant user but has not yet been classified as such.
 - (b) Any existing significant user proposing to continue to discharge to the MS4 and whose existing permit will expire within 90 days.
 - (c) Any other existing or new user, when the Superintendent deems that the application is necessary to carry out the purposes of this chapter.
 - (d) Any new or existing user whose applicability is included in § 231-3 of this chapter.
- (2) Applying for or obtaining a stormwater ~~management~~ discharge permit does not relieve a user from its obligation to comply with all federal, state and local pretreatment standards or requirements, or any other requirements of federal, state and local law.
- (3) Any new user described in the above must submit a completed application at least 45 days prior to the beginning of stormwater discharge.

B. Stormwater discharge permit application contents.

- (1) All users required to obtain a stormwater discharge permit must submit a permit application. The Superintendent may require all users to submit as part of an application the following information:
 - (a) All information required by § 231-4 of this chapter;
 - (b) Description of activities, facilities, and plant processes on the premises, including a list of all raw materials and chemicals used or stored at the facility which are, or could accidentally or intentionally be, discharged to the MS4;
 - (c) Any other information as may be deemed necessary by the Superintendent to evaluate the stormwater discharge permit application; and
 - (d) A signature of an authorized representative of the user certifying the accuracy.
- (2) Incomplete or inaccurate applications will not be processed and will be returned to the user for revision. The Superintendent will evaluate the data furnished by the user and may require additional information. The Superintendent may deny any application for a stormwater discharge permit as necessary to carry out the purposes of this chapter.

C. Stormwater discharge permit contents.

- (1) A stormwater discharge permit shall include such conditions as are deemed reasonably necessary by the Superintendent to prevent pass-through or interference, protect the quality of the water body receiving the discharge, protect worker health and safety, and protect against damage to the MS4.
- (2) Stormwater discharge permits may contain, but need not be limited to the following:
 - (a) A specific date upon which the permit will expire, not to exceed five years from its effective date. At the discretion of the Superintendent, a permit may be issued for less than five years;
 - (b) A statement that the stormwater discharge permit is nontransferable without prior notification to the Superintendent in accordance with § 231-9D of this chapter, and provisions for furnishing the new owner or operator with a copy of the existing stormwater discharge permit;
 - (c) Applicable standards, including prohibited discharge standards, and local limits;
 - (d) Self monitoring, sampling, reporting, notification, and recordkeeping requirements, including an identification of pollutants to be monitored, sampling location, sampling frequency, and sample type, based on federal, state, and local law;
 - (e) A statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements, and any applicable compliance schedule not to exceed time limits set forth in applicable federal, state and local law;
 - (f) Limits on the average and/or maximum rate of discharge, and/or requirements for flow regulation and equalization;
 - (g) Requirements for the installation and/or maintenance of pretreatment technology, monitoring facilities or equipment, pollution control, or appropriate containment devices designed to reduce, eliminate, or prevent the introduction of pollutants into the MS4;
 - (h) Requirements for the development and implementation of a spill control plan or any plan including management practices necessary to adequately prevent the introduction of pollutants into the MS4;

- (i) A statement that compliance with the stormwater discharge permit does not relieve the permittee of responsibility for compliance with all applicable federal, state and local standards, including those which become effective during the term of the stormwater discharge permit; and
- (j) Any other conditions as deemed appropriate by the Superintendent to ensure compliance with this chapter, and state and federal laws, rules, and regulations.

D. Stormwater discharge permit transfer.

- (1) Stormwater discharge permits may be transferred to a new owner if the permittee gives no less than 60 days' advance notice to the Superintendent, and the Superintendent approves the stormwater discharge permit transfer. The notice to the Superintendent must include a written certification by the new owner which:
 - (a) States that the new owner has no immediate intent to change the facility's stormwater operations and process.
 - (b) Identifies the specific date the transfer is to occur.
 - (c) Acknowledges full responsibility for complying with the existing stormwater discharge permit.
- (2) Failure to provide advance notice of a transfer renders the stormwater discharge permit void as of the date of transfer.

§ 231-10. Suspension of storm drainage system access.

- A. The Superintendent may suspend municipal storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened illegal

discharge that presents or may present imminent risk of harm to the public health, safety, or welfare of the environment. In the event any person fails to comply with an emergency suspension order, the authorized enforcement agency may take all reasonable steps to prevent or minimize harm to the public health, safety, and welfare of the environment.

- B. Any person discharging to a municipal storm drain system in violation of this chapter may have their municipal storm drain system discharge terminated if such termination would abate or reduce an illicit discharge. The Superintendent will notify a violator of the proposed termination of municipal storm drain system access. The violator may petition the Superintendent for reconsideration and hearing. A person commits an offense if the person reinstates municipal storm drain system access to premises terminated pursuant to this section, without prior approval from the Superintendent.

§ 231-11. Emergency suspensions.

- A. The Superintendent may immediately suspend a user's stormwater discharge permit, after informal notice to the user, whenever such suspension is necessary to stop an actual or threatened discharge, which reasonably appears to present or cause an imminent or substantial endangerment to the health or welfare of persons.
- B. The Superintendent may also immediately suspend a user's storm discharge, after notice and opportunity to respond, that threatens to interfere with the operation of the MS4, or which presents, or may present, an endangerment to the environment.
- C. Any user notified of a suspension of its discharge shall immediately stop or eliminate its contribution. In the event of a user's failure to immediately comply voluntarily with the suspension order, the Superintendent may take such steps as deemed necessary, including immediate severance of the sewer or storm drain connection, to prevent or minimize damage to the MS4, its receiving stream, or endangerment to any individuals. The Superintendent may allow the user to recommence its discharge when the user has demonstrated to the satisfaction of the Superintendent that the period of endangerment has passed, unless the termination proceedings in § 231-12 of this chapter are initiated against the user.
- D. A user that is responsible, in whole or in part, for any discharge presenting imminent endangerment shall submit a detailed written statement, describing the causes of the harmful contribution and the measures taken to prevent any future occurrence, to the Superintendent prior to the date of any show cause or termination hearing under § 231-12 of this Code.
- E. Nothing in this section shall be interpreted as requiring a hearing prior to an emergency suspension under this section.

§ 231-12. Termination of discharge.

- A. In addition to the provisions in § 231-9 of this chapter, any user who violates the following conditions is subject to discharge termination:
 - (1) Violation of stormwater discharge permit conditions or discharge limitations;
 - (2) Failure to accurately report the stormwater constituents and characteristics of its discharge;
 - (3) Failure to report significant changes in operations or stormwater volume, constituents, and characteristics prior to discharge; or
 - (4) Refusal of reasonable access to the user's premises for the purpose of inspection, monitoring,

records examination, or sampling.

- B. Such user will be notified of the proposed termination of its discharge and be offered an opportunity to show cause under § 231-17 why the proposed action should not be taken. Exercise of this option by the Superintendent shall not be a bar to, or a prerequisite for, taking any other action against the user.

§ 231-13. Responsibility for administration.

- A. The Superintendent of the Department of Public Works shall administer, implement and enforce this chapter. Any powers granted to or duties imposed upon the Department of Public Works may be delegated in writing by the Superintendent of the Department of Public Works to employees or agents of the Department of Public Works.
- B. The Superintendent may promulgate rules and regulations to effectuate the purposes of this chapter. Failure by the Water and Sewer Commission to promulgate such rules and regulations shall not have the effect of suspending or invalidating this chapter.
- C. Water-Sewer Commission as hearing board.
- (1) Any user who is aggrieved by the actions of the Superintendent may request a hearing before a hearing board, which, for the purposes of this chapter, is deemed to be the City of Chicopee Water and Sewer Commission as defined in § 16-100 of the City Code of Ordinances.
 - (2) The aggrieved person shall file a written request for such a hearing within seven days after the day the Superintendent's order was served or given, in the office of the Water and Sewer Commission. The Water and Sewer Commission shall set a time and place for such hearing, and shall inform the petitioner thereof, in writing.
 - (3) The hearing shall be commenced not later than 30 days after the day on which the written request was filed and shall be concluded within an additional 30 days thereafter. If a petitioner is aggrieved under § 231-12 of this chapter, the hearing must commence within five days of the date on which the written request was filed.
 - (4) At the hearing, the petitioner shall be given an opportunity to be heard and to show why the order or decision of the Superintendent should be modified or withdrawn.
 - (5) After the hearing, the Commission shall sustain, modify or withdraw the order or decision of the Superintendent and shall inform the petitioner and the Superintendent, in writing, of its decision within seven days after the conclusion of the hearing.
 - (6) If a written letter for hearing is not filed in the office of the Water-Sewer Commission within seven working days after an order has been issued or if after a hearing the order has been sustained in any part, each day's failure to comply with the order as issued or modified shall constitute an additional offense.
 - (7) Not fewer than four Commissioners shall constitute a quorum, and a majority of the quorum shall be required in order to sustain, modify, or withdraw an order or decision of the Superintendent.

§ 231-14. Enforcement.

The Department of Public Works or its authorized agent shall enforce this chapter, and the regulations

promulgated hereunder, as well as the terms and conditions of all permits, notices, and orders, and may pursue all civil and criminal remedies for such violations.

- A. Civil relief. If anyone violates the provisions of this chapter, regulations, permit, notice, or order issued hereunder, the Department of Public Works may seek injunctive relief in a court of competent jurisdiction to restrain the person from activities which would create further violations or compelling the person to abate or remediate the violation.
- B. Orders.
 - (1) The Superintendent may issue a written order to enforce the provisions of this chapter or the regulations hereunder, which may include: a) elimination of illicit connections or discharges to the storm drainage system; b) termination of access to the storm drainage system; c) performance of monitoring, analyses, and reporting; d) cessation of unlawful discharges, practices, or operations; and e) remediation of contamination in connection therewith. If the Superintendent determines that abatement or remediation of contamination is required, the order shall set forth a deadline for completion of the abatement or remediation. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the City may, at its option, undertake such work, and expenses thereof shall be charged to the violator or property owner.
 - (2) Within 30 days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the City, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the Superintendent within 30 days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within 30 days following a decision of the Superintendent affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in MGL c. 59, § 57, after the 31st day at which the costs first become due.
 - (3) The remedies provided in this chapter are not exclusive. The Superintendent may take any, all, or any combination of these actions against a noncompliant user. However, the Superintendent may take other action against any user when the circumstances warrant. Further, the Superintendent is empowered to take more than one enforcement action against any noncompliant user.

§ 231-15. Notification of violation.

When the Superintendent finds that a user has violated, or continues to violate, any provision of this chapter, stormwater discharge permit, or any applicable state or federal standard or requirement, the Superintendent may serve upon that user a written notice of violation. Within 15 days receipt of this notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions shall be submitted to the Superintendent. Submission of this plan shall in no way relieve the user of liability for any violations occurring before or after the receipt of the notice of violation. Nothing in this section shall limit the authority of the Superintendent to take any action, including emergency actions or any other enforcement action, without first issuing a notice of violation.

§ 231-16. Consent orders.

The City may enter into consent orders, assurances of voluntary compliance, or other similar documents establishing an agreement with any user responsible for noncompliance. Such documents will include specific action to be taken by the user to correct the noncompliance within a time period specified by the document. Such documents shall have the same force and effect as the administrative orders issued pursuant to § 231-18 of this chapter and shall be judicially enforceable.

§ 231-17. Show-cause hearing.

The Superintendent may order a user that has violated, or continues to violate, any provision of this chapter, a stormwater discharge permit or order issued hereunder, or any other applicable state or federal standard or requirement, to appear before the Superintendent and show cause why the proposed enforcement action should not be taken. Notice shall be served on the user specifying the time and place for the meeting, the proposed enforcement action, the reasons for such action, and a request that the user show cause why the proposed enforcement action should not be taken. The notice of the meeting shall be served personally or by registered or certified mail (return receipt requested) at least 15 days prior to the hearing. Such notice may be served on any authorized representative of the user. A show cause hearing shall not be a bar against, or prerequisite for, taking any other action against the user.

§ 231-18. Administrative order.

- A. When the Superintendent finds that a user has violated, or continues to violate, any provision of this chapter, a stormwater discharge permit or order issued hereunder, or any other applicable state or federal standard or requirement, or that the user's past violations are likely to recur, the Superintendent may issue an administrative order to the user directing it to cease and desist all such violations and to:
 - (1) Immediately comply with all requirements; and
 - (2) Take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation, including halting operations and/or terminating the discharge.
- B. Issuance of an administrative order shall not be a bar against, or a prerequisite for, taking any other action against the user.

§ 231-19. Injunctive relief.

When the Superintendent finds that a user has violated, or continues to violate, any provision of this chapter, a stormwater discharge permit, or order issued hereunder, or any state or federal standard or requirement, the Superintendent may petition the appropriate court through the City Solicitor for the issuance of a temporary or permanent injunction, as appropriate, which restrains or compels the specific performance of the stormwater discharge permit, order, or other requirement imposed by this chapter on activities of the user. The Superintendent may also seek such other action as is appropriate for legal and/or equitable relief, including a requirement for the user to conduct environmental remediation. A petition for injunctive relief shall not be a bar against, or a prerequisite for, taking any other action against a user.

§ 231-20. Departmental cost recovery.

- A. The general costs for implementation, management, and enforcement of the City's stormwater management program are borne by all property owners. However, under this section, the City may

assess against any user that violated any provision of this chapter or a stormwater discharge permit issued hereunder charges to recover program actual costs resulting from enforcement action of said violation, including but not limited to:

- (1) Costs for monitoring, inspections and surveillance procedures;
 - (2) Costs for reviewing accidental discharge procedures and construction;
 - (3) Costs for sampling and analysis;
 - (4) Charges to recover the cost of consultant's services required to carry out the review of specific concerns regarding industrial stormwater discharges;
 - (5) Charges to recover legal costs associated with program violations;
 - (6) Other costs as the Superintendent may deem necessary to carry out the requirements contained herein.
- B. These charges relate solely to the matters covered by the stormwater management program, and are separate from all other fees chargeable by the City, such as building permit fees, storm fees, sewer entrance fees, sewer user charge fees, etc.

§ 231-21. Violations and penalties.

- A. Civil penalties.
- (1) A user who has violated, or continues to violate, any provision of this chapter, a stormwater discharge permit, or order issued hereunder, or any other state or federal standard or requirement shall be liable to the City of Chicopee for a civil penalty of up to \$1,000, but not to exceed \$5,000 per violation, per day. In the case of a monthly or long-term average, penalties shall accrue for each day during the period of the violation.
 - (2) The Superintendent may recover reasonable attorneys' fees, court costs, and other expenses associated with enforcement activities, including sampling and monitoring expenses, and the cost of any actual damages incurred by the City of Chicopee.
 - (3) Filing a suit for civil penalties shall not be a bar against, or a prerequisite for, taking any other action against a user.
- B. Criminal penalties. A user who willfully or negligently violates any provision of this chapter, a stormwater discharge permit, or order issued hereunder, or any other applicable state or federal standard or requirement, shall be subject to prosecution as allowed by Massachusetts General Laws.
- C. Noncriminal disposition. As an alternative to criminal prosecution or civil action, the City of Chicopee may elect to utilize the noncriminal disposition procedure set forth in MGL c. 40, § 21D. The Department of Public Works shall be the enforcing entity. The penalty for the first violation shall be up to \$100. The penalty for the second violation shall be up to \$200. The penalty for the third and subsequent violations shall be \$300. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

§ 231-22. Performance bonds.

- A. The Superintendent may decline to issue or reissue a stormwater discharge permit to any user who has failed to comply with any provision of this chapter, a previous stormwater discharge permit, or

order issued hereunder or any other applicable state or federal pretreatment standard or requirement, unless such user first files a satisfactory bond, payable to the City of Chicopee, in a sum not to exceed a value determined by the Superintendent to be necessary to achieve consistent compliance.

- B. The Superintendent may require from the user a surety or cash bond, irrevocable letter of credit, or other means of security acceptable to the Superintendent prior to the issuance of any stormwater discharge permit for the construction of a development requiring a stormwater management facility. The amount of the security shall not be less than the total estimated construction cost of the stormwater management facility. The bond so required in this section shall include provisions relative to forfeiture for failure to complete work specified in the approved stormwater management plan, compliance with all of the provisions of this chapter and other applicable laws and regulations, and any time limitations. The bond shall not be fully released without a final inspection of the completed work by the City Engineer, submission of as-built plans, and certification of completion by the City Engineer of the stormwater management facilities being in compliance with the approved plan and the provisions of this chapter.

§ 231-23. Liability insurance.

The Superintendent may decline to issue or reissue a stormwater discharge permit to any user who has failed to comply with any provision of this chapter, a previous stormwater discharge permit, or order issued hereunder, or any other applicable state or federal standard or requirement, unless the user first submits proof that it has obtained financial assurances sufficient to restore or repair damage to the MS4 caused by its discharge.

§ 231-24. Public nuisances.

A violation of any provision of this chapter, a stormwater discharge permit or order issued hereunder, or any other applicable state or federal standard or requirement, is hereby declared a public nuisance and shall be corrected or abated as directed by the Superintendent. Any person(s) creating a public nuisance shall be subject to the provisions of the Codes of the City of Chicopee governing such nuisances, including reimbursing the City of Chicopee for any costs incurred in removing, abating, or remedying said nuisance.

§ 231-25. Entry upon premises to perform duties.

To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Superintendent, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this chapter and regulations and may make or cause to be made such examinations, surveys or sampling as the Superintendent deems reasonably necessary

§ 231-26. Appeals.

The decisions or orders of the Superintendent and Board of Water-Sewer Commissioners shall be final. Further relief shall be to a court of competent jurisdiction.

§ 231-27. Remedies not exclusive.

The remedies listed in this chapter are not exclusive of any other remedies available under any applicable federal, state or local law.

§ 231-28. Publication of users in significant noncompliance.

The Superintendent shall publish at least annually, in the largest daily newspaper where the MS4 is located, a list of the users that, during the previous 12 months, were in significant noncompliance with applicable stormwater management standards and requirements. The term "significant noncompliance" shall mean:

- A. Any other discharge that the Superintendent believes has caused, alone or in combination with other discharges, interference or pass-through, including endangering the health of DPW personnel or the general public;
- B. Any discharge of pollutants that has caused imminent endangerment to the public or to the environment, or has resulted in the Superintendent's exercise of its emergency authority to halt or prevent such a discharge;
- C. Failure to meet, within 90 days of the scheduled date, a compliance schedule milestone contained in a stormwater discharge permit or enforcement order for starting construction, completing construction, or attaining final compliance;
- D. Failure to provide within 30 days after the due date, any required reports, including monitoring reports, reports on compliance with stormwater management standard deadlines, periodic self- monitoring reports, and reports on compliance with compliance schedules;
- E. Failure to accurately report noncompliance; or
- F. Any other violation(s), which the Superintendent determines will adversely affect the operation or implementation of the local stormwater management program.

§ 231-29. Severability; repealer; when effective.

- A. If any provision, paragraph, sentence, or clause, of this chapter, Code, or any order or permit of the Superintendent shall be held invalid for any reason, all other provisions shall continue in full force and effect.
- B. All parts of this chapter in conflict herewith are hereby repealed.
- C. This chapter will take effect upon passage.

Requirement Category	Stormwater Management Ordinance Ch. 231 Stormwater Management, Draft revisions August 2024	Site Plan Review § 275-6. Site plan review; Chicopee Planning Board Subdivision and Site Plan Review Regulations, Section II, Site Plans	
	Relevant Provisions/Requirements	Relevant Provisions/Requirements	HW Comments
Applicability	§ 231-3. Applicability. (1) Multifamily residential developments involving three or more units. (2) Any new source commercial, industrial, residential and institutional structures under the same ownership, with at least 4,000 gross square feet of impervious surface. (3) Redevelopment or additions to existing commercial, industrial, residential and institutional uses which result in a total impervious surface area of greater than 4,000 gross square feet. (4) Any activity that disturbs one acre or more of land. (5) Any other user, when the Superintendent deems that the application and permitting is required to carry out the intent of this chapter.	§ 275-6.F. Stormwater management. <i>All projects must be in compliance Chicopee City Code Chapter 231.</i> The following projects are required to submit to the Site Plan Review Advisory Committee or Planning Board; Plans must be in accordance with the Site Plan regulations: - Development projects with footprints > 1,000 sf in commercial, business, and industrial zones. - Development projects with footprints > 1,000 sf in residential zones, excluding one-, two- and three-family dwellings and accessory uses on individual lots). - Paving projects that include >4,000 sf of impervious surface in any zone, or <4,000 square feet when added to existing pavement that together totals >4,000 sf of impervious surface in any zone. - All municipal projects, including new construction of > 1,000 sf, new pavement or reconstruction of exiting paved areas.	Clarify whether <u>all</u> projects subject to Site Plan Review must comply with Chapter 231 Stormwater or only those projects that also meet the Chapter 231 applicability thresholds. Many small projects are subject to Site Plan Review but do not meet applicability thresholds for Chapter 231.
Post-Construction Stormwater Management	§ 231-5. Performance standards. <i>A.(1) At a minimum, all projects shall comply with the Massachusetts Stormwater Standards and the MS4 Permit. Design of stormwater management systems shall be consistent with the requirements of the most recent version of the Massachusetts Stormwater Handbook, or more stringent standards as specified in this chapter.</i> § 231-5.D. Post-Construction Stormwater Management. - Establishes preferences for infiltration and vegetated systems. - Detailed design standards and criteria, precipitation depth using NOAA Atlas 14 upper confidence interval, requirement to optimize stormwater BMPs for nitrogen removal. - Requirements for TSS and TP percent reduction for new development and redevelopment.	Section 2-15 Stormwater Management. <i>A drainage system shall be designed and constructed by the developer to provide for the drainage of surface water of the development, and for the drainage area of which it is a part.</i> <i>Please refer to Chicopee City Code Chapter 231.</i>	More explicitly require that stormwater management systems comply with Chapter 231, assuming that was the intent. If all projects subject to Site Plan Review are required to comply with Chapter 231, then this section could instead read: <i>All projects shall comply with Chicopee City Code Chapter 231.</i> As recommended in HW's prior code audit (February 2024), review and coordinate the site plan requirements (format and content) in Chapter 231 and Site Plan Regulations. Where possible, format these application contents as checklists for both applicants and departments/boards to use.
Construction-Site Stormwater Management, Erosion and Sediment Control	§ 231-4. Stormwater management plans. (C)(1) Site Plan contents. - Erosion and sediment control plan required as part of Site Plan. § 231-5. Performance standards, C, Construction-Site Stormwater Management. (1) <i>All projects shall implement practices to control construction-related erosion, sediment, and wastes in accordance with the latest versions of the Massachusetts Stormwater Handbook, the NPDES Construction General Permit for Stormwater Discharges from Construction Activities, the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, or more stringent standards as specified in this chapter.</i> (2) <i>Demolition debris, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes shall not be discharged to the MS4 or Waters of the Commonwealth and shall be disposed of in compliance with all local, state, and federal requirements.</i>	Section 2-16. Erosion and Sediment Control Plan. <i>In the event that any developer shall intend to make changes in the contour of any land proposed to be subdivided, developed, or changed in use by grading, excavating, or the removal or destruction of natural top soil, trees, or other vegetative covering thereon, the same shall only be accomplished after the owner of said land or his agent has submitted to the Planning Board, or its duly authorized representative for approval, a plan for erosion and sedimentation control. (See also Chicopee City Code Chapter 231)</i> <i>Such plans shall contain adequate measures for the control of erosion and siltation. The City Engineer shall review these plans as submitted, and shall take necessary steps to insure compliance by the developer with these plans as finally approved.</i>	Chapter 231 includes site plan requirements and performance standards for erosion and sediment control. If all projects subject to Site Plan Review are required to comply with Chapter 231, then this section could include the provision: <i>All projects shall comply with Chicopee City Code Chapter 231.</i>

Requirement Category	Stormwater Management Ordinance Ch. 231 Stormwater Management, Draft revisions August 2024	Site Plan Review § 275-6. Site plan review; Chicopee Planning Board Subdivision and Site Plan Review Regulations, Section II, Site Plans	
	Relevant Provisions/Requirements	Relevant Provisions/Requirements	HW Comments
Low Impact Development (LID), Environmentally Sensitive Site Design (ESSD)	§ 231-5.B. Low Impact Development <i>(1) Applicants shall evaluate and, unless infeasible, implement LID planning and design strategies. Guidance on LID practices may be found in the Massachusetts Stormwater Handbook. If the applicant determines that LID practices are infeasible, the applicant shall demonstrate which LID practices were evaluated and reasons why those practices were deemed infeasible.</i>	Section 2-23 Landscape Regulations for Land Development Projects. - Establishes tree-planting requirements for parking lots and cul-de-sacs.- Encourages tree preservation and establishes standards for tree protection.	Other than landscaping requirements, the Site Plan Regulations do not mention site design strategies. Chapter 231 requires applicants to describe LID strategies provided, and if not provided to document why. Refer to PVPC's Street Design and Green Infrastructure Code Review Checklist for ideas.
As-Built Plans	§ 231-6.C. As-Built Plans <i>(1) Within three (3) months after completion of construction and land disturbance activities, the permittee shall submit certified as-built plans from a registered Professional Engineer (PE), surveyor, or Certified Professional in Erosion and Sediment Control (CPESC).</i>	Section 2-8 As-Built Plans. <i>As-built plans at 1:20 scale shall be submitted to the Planning Department within 30 days of project sign-off.</i>	Difference in deadlines for submission of as-built plans. Stormwater ordinance = 3 months after completion of construction and land disturbance activities; Site Plan review = 30 days of project sign-off.
Recording	§ 231-6.D. Recording <i>(1) The owner shall record the Stormwater Management Permit, As-Built Plans, and Operation and Maintenance Plan with the Hampden County Registry of Deeds.</i>		Site Plan Review regulations do not require recording.
Long-Term Maintenance	§ 231-6. Long-Term Operation and Maintenance <i>(1) The applicant shall ensure that all components of the proposed stormwater management system are functioning according to manufacturer or design specifications for the life of the system. All components shall be maintained in good condition and promptly repaired, in accordance with the approved Stormwater Management Plan.</i>		Site Plan Review regulations do not require stormwater-system operation and maintenance.
Review Process, Public Comment	§ 231-4. Stormwater management plans. Permitting Authority: DPW Superintendent Review process: Applicants are required to submit a permit application form, stormwater management plan, and/or waiver application to the Superintendent. Permit required before commencing land disturbance/construction activity. Superintendent may receive and consider information and comments from the public regarding the stormwater management plan and/or waiver application.	Section 2-4 Public Hearings. Planning Board hearings are required for a subset of projects meeting certain thresholds: - Development projects with footprints > 1,000 sf in residential zones, excluding one-, two- and three-family dwellings and accessory uses on individual lots). - Development projects with footprints >7,500 sf in commercial, business, and industrial zones. - Development projects with footprints >1,000 sf in commercial, business, and industrial zones where the property abuts or is within 100 ft of any residential zone. Planning Board advertises the hearing and mails the advertisement to abutters within 300 ft of the site boundary.	Consider how the Planning Board hearing can support DPW Superintendent consideration of public input for the stormwater permit application. HW's prior audit of the Site Plan Regulations (February 2024) offered suggestions to strengthen compliance and maintain an efficient review process.

Requirement Category	Stormwater Management Ordinance Ch. 231 Stormwater Management, Draft revisions August 2024	Subdivision Regulations Planning Board Subdivision and Site Plan Review Regulations, Section I, Site Subdivision Regulations	
	Relevant Provisions/Requirements	Relevant Provisions/Requirements	HW Comments
Applicability	§ 231-3. Applicability. (1) Multifamily residential developments involving three or more units. (2) Any new source commercial, industrial, residential and institutional structures under the same ownership, with at least 4,000 gross square feet of impervious surface. (3) Redevelopment or additions to existing commercial, industrial, residential and institutional uses which result in a total impervious surface area of greater than 4,000 gross square feet. (4) Any activity that disturbs one acre or more of land. (5) Any other user, when the Superintendent deems that the application and permitting is required to carry out the intent of this chapter.	Section 1-1 Purpose (...) It is the intent of these regulations that any subdivision plan filed with the Planning Board shall receive the approval of the Planning Board if said plan conforms to the recommendation of the Board of Health and to the rules and regulations of the Planning Board pertaining to subdivision land.. Section 1-32 Subdivision Plan Submission Requirements - Preliminary Plans 1-32 E Grading and Stormwater Management Plan Grading and Stormwater Management Plan must contain the following if applicable: (See Chicopee City Code Chapter 231) (...) Section 1-33 Subdivision Plan Submission Requirements - Definitive Plans 1-33 E Grading and Stormwater Management Plan Grading and Stormwater Management Plan must contain the following if applicable: (See Chicopee City Code Chapter 231) (...)	Clarify whether all projects subject to Site Subdivision Regulations must comply with Chapter 231 Stormwater or only those projects that also meet the Chapter 231 applicability thresholds. Note that the MS4 Permit requires that stormwater management regulations (i.e., Chapter 231) apply to common plans of development that will disturb 1 acre or more. All subdivision plans are common plans of development.
Post-Construction Stormwater Management	§ 231-5. Performance standards. A.(1) At a minimum, all projects shall comply with the Massachusetts Stormwater Standards and the MS4 Permit. Design of stormwater management systems shall be consistent with the requirements of the most recent version of the Massachusetts Stormwater Handbook, or more stringent standards as specified in this chapter. § 231-5.D. Post-Construction Stormwater Management. - Establishes preferences for infiltration and vegetated systems. - Detailed design standards and criteria, precipitation depth using NOAA Atlas 14 upper confidence interval, requirement to optimize stormwater BMPs for nitrogen removal. - Requirements for TSS and TP percent reduction for new development and redevelopment.	Section 1-25 Stormwater Management A drainage system shall be designed and constructed by the developer to provide for the drainage of surface water of the subdivision or development, and for the drainage area of which it is a part. Please refer to Chicopee City Code Chapter 231. Section 1-32E [and 1-33E] Grading and Stormwater Management Plan Grading and Stormwater Management Plan must contain the following if applicable: (See Chicopee City Code Chapter 231) ...	More explicitly require that stormwater management systems comply with Chapter 231 (i.e., "shall comply" instead of "please refer to"), assuming that was the intent. If all subdivisions are required to comply with Chapter 231, then this section could instead read: <i>All subdivision projects shall comply with Chicopee City Code Chapter 231.</i> Review and coordinate the Grading and Stormwater Management Plan requirements (format and content) in Chapter 231 and Subdivision Regulations. Where possible, format these application contents as checklists for both applicants and departments/boards to use.
Construction-Site Stormwater Management, Erosion and Sediment Control	§ 231-4. Stormwater management plans. (C)(1) Site Plan contents. - Erosion and sediment control plan required as part of Site Plan. § 231-5. Performance standards, C, Construction-Site Stormwater Management. (1) All projects shall implement practices to control construction-related erosion, sediment, and wastes in accordance with the latest versions of the Massachusetts Stormwater Handbook, the NPDES Construction General Permit for Stormwater Discharges from Construction Activities, the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, or more stringent standards as specified in this chapter. (2) Demolition debris, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes shall not be discharged to the MS4 or Waters of the Commonwealth and shall be disposed of in compliance with all local, state, and federal requirements.	Section 1-26 Erosion and Sediment Control Plan In the event that any developer shall intend to make changes in the contour of any land proposed to be subdivided, developed, or changed in use by grading, excavating, or the removal or destruction of natural top soil, trees, or other vegetative covering thereon, the same shall only be accomplished after the owner of said land or his agent has submitted to the Planning Board, or its duly authorized representative for approval, a plan for erosion and sedimentation control. (See also Chicopee City Code Chapter 231) Such plans shall contain adequate measures for the control of erosion and siltation. The City Engineer shall review these plans as submitted, and shall take necessary steps to insure compliance by the developer with these plans as finally approved.	Chapter 231 includes site plan requirements and performance standards for erosion and sediment control. If all subdivisions are required to comply with Chapter 231, then this section could include the provision: <i>All subdivision projects shall comply with Chicopee City Code Chapter 231.</i>

Requirement Category	Stormwater Management Ordinance Ch. 231 Stormwater Management, Draft revisions August 2024	Subdivision Regulations Planning Board Subdivision and Site Plan Review Regulations, Section I, Site Subdivision Regulations	
	Relevant Provisions/Requirements	Relevant Provisions/Requirements	HW Comments
Low Impact Development (LID), Environmentally Sensitive Site Design (ESSD)	§ 231-5.B. Low Impact Development <i>(1) Applicants shall evaluate and, unless infeasible, implement LID planning and design strategies. Guidance on LID practices may be found in the Massachusetts Stormwater Handbook. If the applicant determines that LID practices are infeasible, the applicant shall demonstrate which LID practices were evaluated and reasons why those practices were deemed infeasible.</i>	Section 1-30 Landscaping Regulations -Establishes minimum landscaping standards for all land development projects requiring SPR, including Subdivisions.-Establishes tree-planting requirements for street trees, cul-de-sacs-Identifies when trees may be selectively cleared-Establishes landscaping requirements for screening purposes-Encourages tree preservation and establishes standards for tree protection-Identifies reference list of plant materials	Other than landscaping requirements, the Site Subdivision Regulations do not mention site design strategies. Applicants are required to submit a landscape plan. Chapter 231 requires applicants to describe LID strategies provided, and if not provided to document why. We recommend completing a review of Section 1-16 Street Design, 1-17 Street Intersections for opportunities to reduce the creation of impervious cover. Refer to PVPC's Street Design and Green Infrastructure Code Review Checklist for ideas.
As-Built Plans	§ 231-6.C. As-Built Plans <i>(1) Within three (3) months after completion of construction and land disturbance activities, the permittee shall submit certified as-built plans from a registered Professional Engineer (PE), surveyor, or Certified Professional in Erosion and Sediment Control (CPESC).</i>	Section 1-9 As-Built Plans <i>As-built plans at 1:20 scale shall be submitted to the Planning Department within 30 days of project sign-off.</i>	Difference in deadlines for submission of as-built plans. Stormwater ordinance = 3 months after completion of construction and land disturbance activities; Site Subdivision Regulations = 30 days of project sign-off.
Recording	§ 231-6.D. Recording <i>(1) The owner shall record the Stormwater Management Permit, As-Built Plans, and Operation and Maintenance Plan with the Hampden County Registry of Deeds.</i>		Site Subdivision Regulations do not require recording.
Long-Term Maintenance	§ 231-6. Long-Term Operation and Maintenance <i>(1) The applicant shall ensure that all components of the proposed stormwater management system are functioning according to manufacturer or design specifications for the life of the system. All components shall be maintained in good condition and promptly repaired, in accordance with the approved Stormwater Management Plan.</i>		Site Subdivision Regulations do not require stormwater-system operation and maintenance.
Review Process, Public Comment	§ 231-4. Stormwater management plans. Permitting Authority: DPW Superintendent Review process: Applicants are required to submit a permit application form, stormwater management plan, and/or waiver application to the Superintendent. Permit required before commencing land disturbance/construction activity. Superintendent may receive and consider information and comments from the public regarding the stormwater management plan and/or waiver application.	Section 1-5 Public Hearing <i>Prior to approval, modification and approval, or disapproval of the Definitive Plan, the Planning Board shall hold a public hearing, sufficient information to identify the subdivision, shall be given by the Planning Board by advertisement in a newspaper of general circulation in the city, once in each of two successive weeks, the first publication being not less than fourteen days before the day of such hearing. A copy of such advertisement shall be mailed to the applicant and to all abutting land owners of record and owners of land within 300' of the boundary line of the subdivision.</i>	Consider how the Planning Board hearing can support DPW Superintendent consideration of public input for the stormwater permit application.

Requirement Category	Stormwater Management Ordinance Ch. 231 Stormwater Management, Draft revisions August 2024	Wetlands Ordinance and Regulations Chapter 272 Wetlands; Conservation Commission Wetlands Regulations	
	Relevant Provisions/Requirements	Relevant Provisions/Requirements	HW Comments
Applicability	§ 231-3. Applicability. (1) Multifamily residential developments involving three or more units. (2) Any new source commercial, industrial, residential and institutional structures under the same ownership, with at least 4,000 gross square feet of impervious surface. (3) Redevelopment or additions to existing commercial, industrial, residential and institutional uses which result in a total impervious surface area of greater than 4,000 gross square feet. (4) Any activity that disturbs one acre or more of land. (5) Any other user, when the Superintendent deems that the application and permitting is required to carry out the intent of this chapter.	Wetland Regulations Section 10.02 Statement of Jurisdiction. <u>1. Areas Subject to Protection Under the Ordinance</u> <i>The following areas are subject to protection under the Ordinance:</i> A. Any bank; B. Any freshwater wetland; C. Any vegetation wetland... bordering on The ocean Any estuary Any creek Any river Any stream Any pond or any Lake... D. Any Land Subject to Flooding; E. land under any of the water bodies listed above; F. Ephemeral stream; G. Intermittent stream H. Kettle pond; I. Upstream drainage with potential for altering wetlands; J. Vernal Pool; K. Isolated Wetlands; L. 100 Foot Buffer Zone for A through N, above. <u>2. Activities Subject to Regulation</u> - Activities within resource areas listed above, within 100 ft buffer to resource areas, and within areas outside the 100 ft buffer if those activities may alter the resource area. - Upstream Drainage with the Potential of Altering Wetlands (UDPAW) is defined as over-land or surficial flow (runoff), which may originate from natural sources (springs, snow melt, precipitation, etc.) or human development (roads, driveways, slope changes, lawns, drainage swales, drainage outfalls or other human landscape alterations), which carries a sediment load or pollution that may alter a resource area.	Applicability generally mirrors the MA Wetlands Protection Act (WPA) Regulations at 310 CMR 10.02 but does not include Riverfront Area and expands jurisdiction to include ephemeral streams, isolated wetlands, kettle ponds, and upstream drainage. 'Upstream drainage' focuses mostly on limiting impacts from disturbance of Terrace escarpments. Clarify whether exclusions from the MA Stormwater Standards at MA WPA 310 CMR 10.05(6)(l) and (m) apply to Chicopee Wetland Regulations 10.83 Stormwater Management (e.g., single-family house, housing on 4 or fewer lots, multifamily housing with 4 or fewer units). Note a typo at Section 10.02 1.L.: "L. 100 Foot Buffer Zone for A through N, above". It should instead be, "...A through K, above". Formatting of Chicopee's Wetland Regulations 10.02.1 <i>Areas Subject to Protection</i> is difficult to follow. It is not clear that the restrictive clause "bordering on..." is intended to apply to A-C. Formatting of the Wetland Regulations is inconsistent in general, particularly for line offsets. We suggest reformatting the entire document. HW's prior audit of the Chicopee's regulations (February 2024) noted the need to clarify areas of jurisdictions and features included in Resource Areas.
Post-Construction Stormwater Management	§ 231-5. Performance standards. A.(1) At a minimum, all projects shall comply with the Massachusetts Stormwater Standards and the MS4 Permit. Design of stormwater management systems shall be consistent with the requirements of the most recent version of the Massachusetts Stormwater Handbook, or more stringent standards as specified in this chapter. § 231-5.D. Post-Construction Stormwater Management. - Establishes preferences for infiltration and vegetated systems. - Detailed design standards and criteria, precipitation depth using NOAA Atlas 14 upper confidence interval, requirement to optimize stormwater BMPs for nitrogen removal. - Requirements for TSS and TP percent reduction for new development and redevelopment.	Wetland Regulations 10.81 UPSTREAM DRAINAGE WITH THE POTENTIAL FOR ALTERING WETLANDS D. Any alteration proposed for UDPAW shall have no adverse impacts to the interests protected under the ORDINANCE. Any applicant who proposes to alter UDPAW has the burden to demonstrate that no pollutant load, sediment load or other alteration shall enter into or occur within resource areas protected under the ORDINANCE. 10.83 Stormwater Management - Outdated reference to the MA Department of Environmental Protection's Stormwater Management Handbook, Volumes 1 and 2 (March 1997). - Requires compliance with the MA Stormwater Standards, including 80% TSS reduction for new development and Maximum Extent Practicable allowance for redevelopment. - 10.83.D.(11) requires that all stormwater management systems be designed to contain, on-site, the 10-year storm discharge.	For UDPAW performance standards at 10.81, it is unclear what the applicant is required to submit to demonstrate no impact to resource areas. We suggest clarifying. For stormwater management performance standards at 10.83, there are conflicting performance standards between the Wetland Regulations and Chapter 231 Stormwater Ordinance due to divergent requirements of the MA WPA Regulations/Stormwater Standards and the MS4 Permit. These conflicts should be resolved when DEP finalizes the proposed updates to the WPA and Stormwater Handbook (anticipated next year). The Wetland Regulations will need to be updated to reflect those changes. In the meantime, we recommend adding language giving precedence to Chapter 231 for projects that meet Chapter 231 applicability thresholds. Consider requiring all projects subject to 10.83 (including those below Ch 231 thresholds) to meet the more stringent Chapter 231 performance standards. 10.83.D.(11) requires on-site retention of the 10-year event. Chapter 231 does not have the same requirement. Consider adding it to Chapter 231 for consistency. The Wetland Regulations reference an outdated version of the MA Stormwater Handbook (March 1997). Revise to: "most recent version."

Requirement Category	Stormwater Management Ordinance Ch. 231 Stormwater Management, Draft revisions August 2024	Wetlands Ordinance and Regulations Chapter 272 Wetlands; Conservation Commission Wetlands Regulations	
	Relevant Provisions/Requirements	Relevant Provisions/Requirements	HW Comments
Construction-Site Stormwater Management, Erosion and Sediment Control	§ 231-4. Stormwater management plans. (C)(1) Site Plan contents. - Erosion and sediment control plan required as part of Site Plan. § 231-5. Performance standards, C, Construction-Site Stormwater Management. (1) All projects shall implement practices to control construction-related erosion, sediment, and wastes in accordance with the latest versions of the Massachusetts Stormwater Handbook, the NPDES Construction General Permit for Stormwater Discharges from Construction Activities, the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, or more stringent standards as specified in this chapter. (2) Demolition debris, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes shall not be discharged to the MS4 or Waters of the Commonwealth and shall be disposed of in compliance with all local, state, and federal requirements.	Wetland Regulations 10.84 Erosion and Sediment Control (...) <u>D. General Performance Standards</u> Erosion and sediment control measures shall eliminate or reduce impacts to wetland resource areas and their 100-foot buffer zones. Erosion and sediment control shall serve to protect the interests identified in the Ordinance. All plans shall show appropriate erosion control measures. A narrative erosion control plan and construction schedules shall be provided for all areas to be disturbed within a resource area and its 100 foot buffer zone. Specifications shall be provided for both temporary and permanent ground cover. The plan shall describe all methods that will be used to control erosion and sedimentation, in both a temporary and permanent manner. Proposed location of any fill material that will be stockpiled on site must be shown. Perimeter sediment control shall be installed around temporary stockpiles. Temporary erosion control shall generally consist of double-staked trenched hay bales, trenched silt fences and erosion control blankets. Erosion and silt from the permitted activities shall not cause an adverse impact on any wetland resource area cited in these regulations, in either a temporary or permanent manner. Vegetative stabilization methods shall be employed. All areas subject to erosion shall be stabilized with loam, seed, hay, mulch and erosion control blankets immediately following construction activities. During the months of September through March, when seeding and sodding are impractical, erosion control blankets must be used.	Section 10.84 includes general performance standards for erosion and sediment control but does not reference specific guidelines or standards (e.g., MA Stormwater Handbook) that activities must comply with. This section could explicitly require that projects comply with Chapter 231, where applicable (see Chapter 231 size thresholds), including where there are opportunities to use the Erosion and Sediment Control Plan required under Chapter 231 to satisfy the Wetland Regulations requirements for a narrative erosion control plan. Consider adding more specific performance standards to Chapter 231-5.C, to be consistent with the Wetland Regulations.
Low Impact Development (LID), Environmentally Sensitive Site Design (ESSD)	§ 231-5.B. Low Impact Development(1) Applicants shall evaluate and, unless infeasible, implement LID planning and design strategies. Guidance on LID practices may be found in the Massachusetts Stormwater Handbook. If the applicant determines that LID practices are infeasible, the applicant shall demonstrate which LID practices were evaluated and reasons why those practices were deemed infeasible.		LID is not mentioned in the Wetland Regulations. The Regulations include general language for landscaping and vegetation standards for wetlands restoration and replacement (see 10.81 Upstream Drainage with the Potential for Altering Wetlands D. General Performance Standards and 10.85 Wetland Replacement and Restoration B. General Requirements).
As-Built Plans	§ 231-6.C. As-Built Plans (1) Within three (3) months after completion of construction and land disturbance activities, the permittee shall submit certified as-built plans from a registered Professional Engineer (PE), surveyor, or Certified Professional in Erosion and Sediment Control (CPESC).	Wetland Regulations 10.85 Wetland Replacement and Restoration. (...) <u>B. General Requirements: (...)</u> 9. An as built plan of the restoration or replacement area shall be prepared by a registered Land Surveyor and shall be submitted to the Conservation Commission within thirty (30) days after the finish grading.	Projects that include wetland replacement/restoration must provide an as-built plan of the replacement/restoration area only. Difference in deadlines for submission of as-built plans. Stormwater ordinance = 3 months after completion of construction and land disturbance activities; Site Plan review = 30 days of project sign-off; Wetland Regulations = 30 days after finish grading.
Recording	§ 231-6.D. Recording (1) The owner shall record the Stormwater Management Permit, As-Built Plans, and Operation and Maintenance Plan with the Hampden County Registry of Deeds.	Chapter 272 Wetlands § 272-9 Security. For major projects requiring specialized expertise, the Commission may require, as a permit condition, that the performance and observance of other conditions be secured by one or both of the following methods: (...) B. By a conservation restriction, easement or other covenant running with the land, executed and properly recorded (or registered, in the case of registered land).	No requirements for recording permit or plan. Some major projects may be required to record/register a conservation restriction, easement, or other covenant at the discretion of the Conservation Commission as a permit condition.

Requirement Category	Stormwater Management Ordinance Ch. 231 Stormwater Management, Draft revisions August 2024	Wetlands Ordinance and Regulations Chapter 272 Wetlands; Conservation Commission Wetlands Regulations	
	Relevant Provisions/Requirements	Relevant Provisions/Requirements	HW Comments
Long-Term Maintenance	§ 231-6. Long-Term Operation and Maintenance <i>(1) The applicant shall ensure that all components of the proposed stormwater management system are functioning according to manufacturer or design specifications for the life of the system. All components shall be maintained in good condition and promptly repaired, in accordance with the approved Stormwater Management Plan.</i>	Wetland Regulations 10.83 Stormwater Management (...) <u>D. General Performance Standards (...)</u> (9) All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed (...) (12) Detention or retention basins and other structures shall be designed to meet the following standards: a. The applicant shall be responsible for securing by way of a covenant, easement, deed restriction or other legal instrument, a perpetual mechanism and/or fund for the maintenance and repair of the basin or structure by the heirs and assigns of the property on which the basin is located. This may include ownership by the City of Chicopee.	Consistent with the MA Stormwater Standards, applicants are required to have an O&M plan and are responsible for securing a mechanism and/or fund for long-term maintenance of stormwater basin/structure. Projects subject to Chapter 231 will have more specific and stringent requirements to ensure long-term O&M.
Review Process, Public Comment	§ 231-4. Stormwater management plans. Permitting Authority: DPW Superintendent Review process: Applicants are required to submit a permit application form, stormwater management plan, and/or waiver application to the Superintendent. Permit required before commencing land disturbance/construction activity. Superintendent may receive and consider information and comments from the public regarding the stormwater management plan and/or waiver application.	Chapter 272 Wetlands § 272-4 Notice; hearing. Permitting Authority: Conservation Commission Review process: Persons filing NOI or request for determination must provide list of abutters residing within 300 feet of the proposed project. Conservation Commission may request comments from other City boards/commissions and may require the person filing provide copies to the City Council, Planning Board, Board of Appeals, Board of Health, and Building Inspector at its discretion. Conservation Commission conducts public hearing on any application or request for determination. If the project includes a wetland replacement or restoration component, the applicant must submit a complete wetland replacement or restoration plan prior to the close of the public hearing. Public may submit additional information for consideration to the Conservation Commission, which may result in a continuation of the hearing.	Consider whether it is appropriate to allow applicants to use abutter notification for one permit application to satisfy abutter notifications for another permit application/review where applicable (i.e., both Wetlands ordinance and SPR require notifications to abutters within 300 feet).

APPENDIX D: SOUTH HADLEY TECHNICAL ASSISTANCE DELIVERABLE

Date: 9/18/2024
Data Sources: Bureau of Geographic Information (MassGIS), ESRI

This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

Legend

- Municipal Boundaries
- Concept Design Locations
- Points of Interest

Subwatersheds

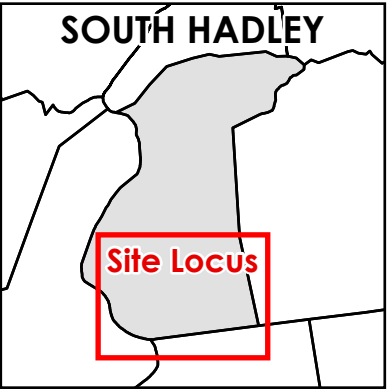
- Buttery Brook Watershed
- All Other Watersheds

MassDOT Roads

- U.S. Highway
- Other Numbered Route
- Major Road
- Minor Road

Mass DEP Wetlands (2005)

- Shoreline
- Hydrologic Connection
- Wetland Limit
- Closure Line
- Marsh/Bog
- Wooded marsh
- Open Water



Miles

0 0.25 0.5

Buttery Brook Watershed

Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley
 South Hadley Green Stormwater Infrastructure – Points of Interest
 Horsley Witten Group, May 2024

Site Name	Address	Notes
Ledges Golf Club	18 Mulligan Dr	NSID high priority parcel. Municipal golf course.
Council on Aging	45 Dayton St	Was on NSID high priority list; now has a new building and green infrastructure.
Hadley Falls Canal Park & South Hadley Public Library	2 Canal St	NSID high priority parcel.
Former Yankee Candle Parcel	Alvord St	NSID high priority parcel
South Hadley Fire District 2	20 Woodbridge St	NSID high priority parcel. Owned by Fire District.
Titus Pond Conservation Area	Newton Street between Queen Circle and Camden Street	Conservation received an MVP Action Grant for the design of replacement culverts on Mountain Avenue and Joffre Street. The Town is interested in looking for other options to reduce flow and remove sediment within the system.
Joffre Ave Culvert for Buttery Brook	Joffre Ave	One of two culvert replacements that the Town received MVP funding for. Need to address upstream flows/sources.
Plains Elementary School	00 Lyman St	Look for opportunity to intercept runoff from Rt 202 before it outlets to Newton Smith Brook.
Rt 202		Stormwater from the state highway enters a 48-inch outfall adjacent to the Plains School and continues down to Newton Street. Impacts Newton-Smith Brook, Black Stevens Pond, and Newton Street.
Black Stevens Pond		Known issues with sedimentation.
Newton Smith Brook		Known issues with erosion, flooding.
Police Department	Main St at Bridge St/Rt 116	High scoring for BMP opportunities per PVPC NSID study.
New Culvert	Rt 116 at Newton Smith Brook	MassDOT just replaced the outlet/culvert for Black Stevens Pond at Newton Smith Brook as part of the Route 116 reconstruction.
Rt 33 at Buttery Brook Park	Rt 33 at Taylor Drive	Town property
Hillside Ave Neighborhood	Hillside Ave at Grandview St	High N loading catchment, residential neighborhood.
Town Hall		Town property

*NSID = Nitrogen Source Identification Report, Town of South Hadley, Prepared by Pioneer Valley Planning Commission, June 2021

Roadside Bioretention: Grandview St at Hillside Ave

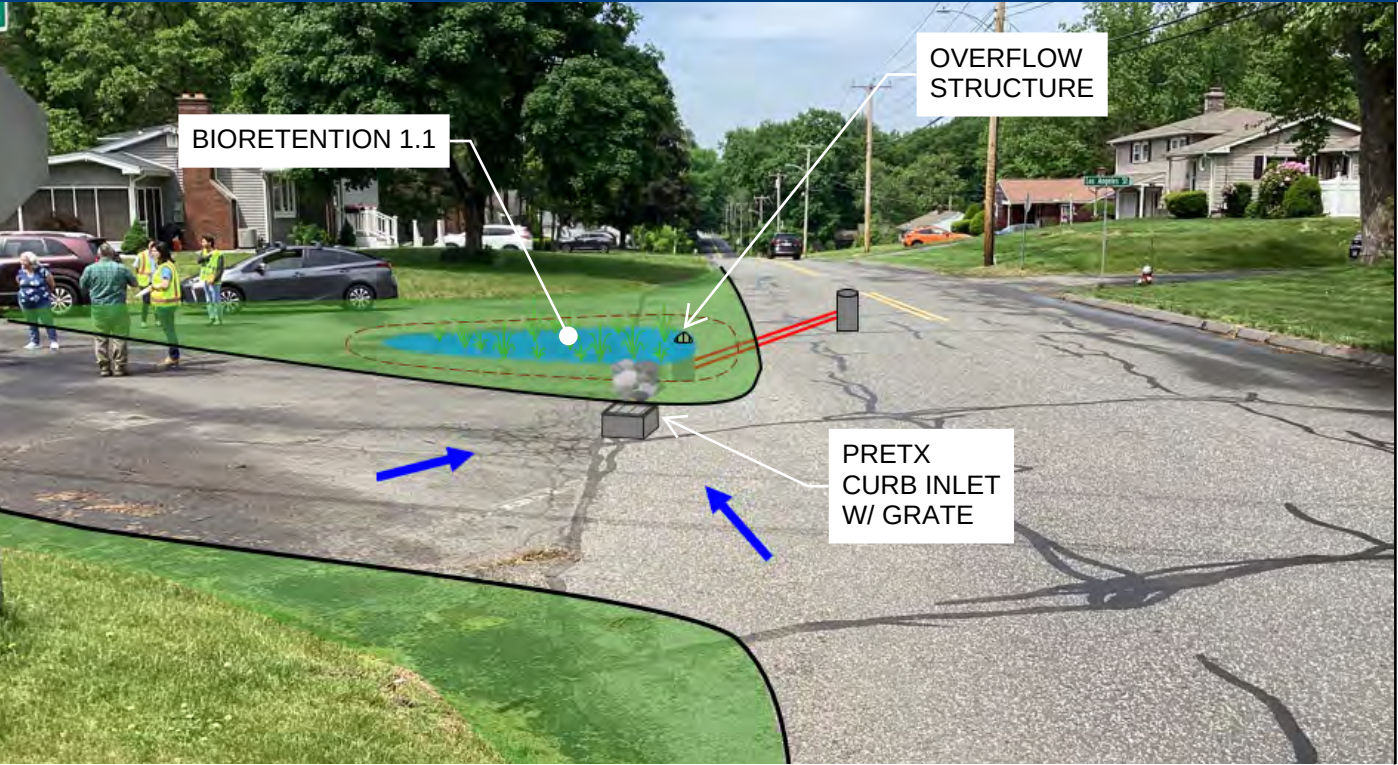
Date: 8/7/2024
Data Sources: Bureau of Geographic Information (MassGIS), ESRI
This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

- Legend**
- Tax Parcels
 - Elevation Contours (3 m lines)
 - Proposed Edge of Pavement
 - Drainage Areas
- Stormwater & Sewer Infrastructure**
- Inlet
 - Storm Drain Manhole
 - Sewer Gravity Main
 - Storm Gravity Main

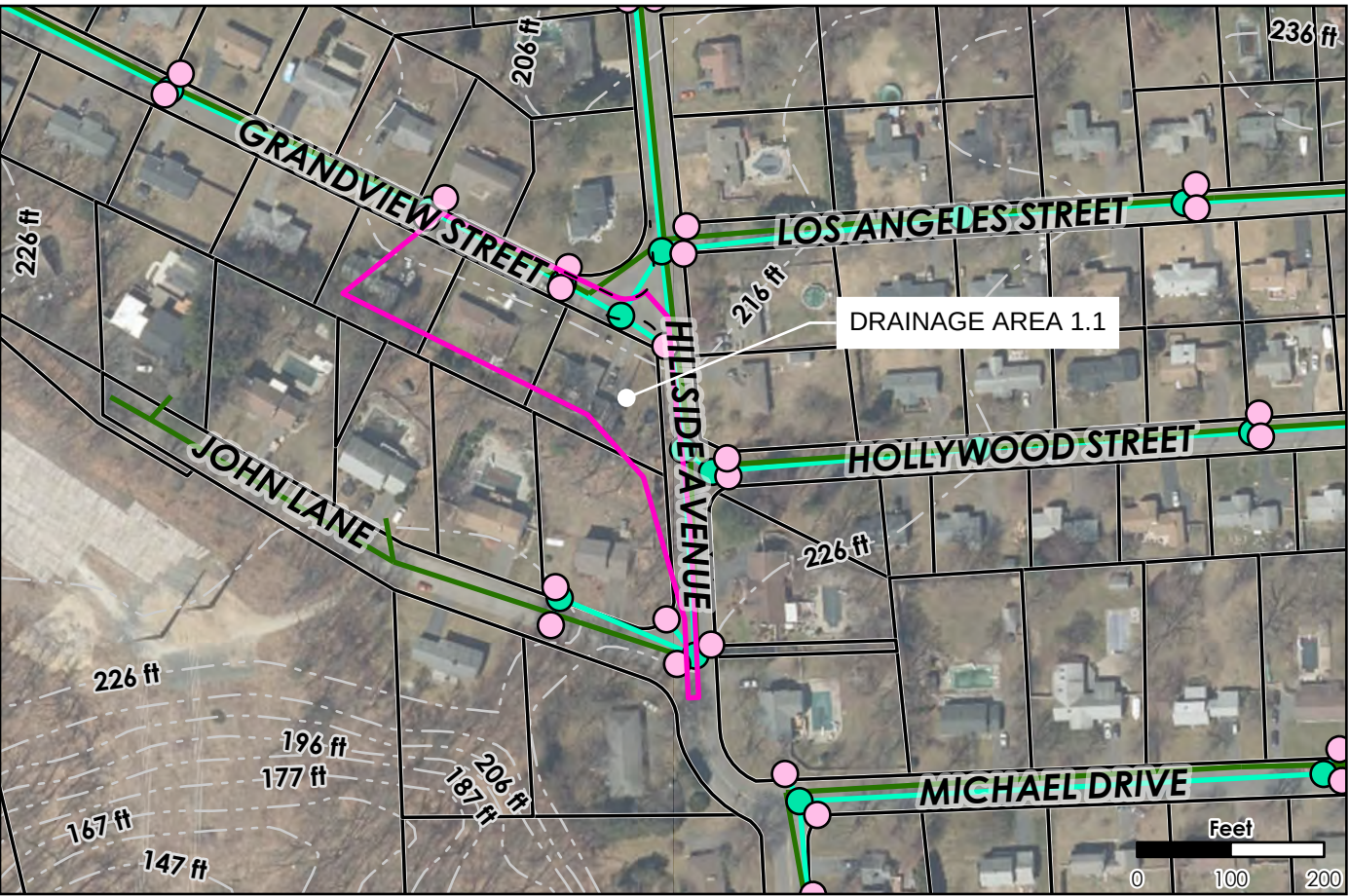


Concept Design Summary

Drainage Area: 1.16 AC
Impervious Area: 0.29 AC
Bioretention Area: 575 SF
Design Storage Volume (depth of runoff from impervious area): 1 inch
Impervious Area Removed: 2,500 SF
Estimated Nitrogen Load Reduction: 4.08 lbs/yr



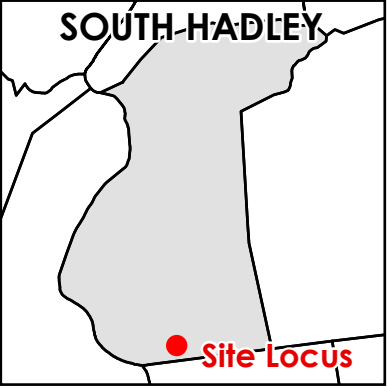
SITE LAYOUT



DRAINAGE AREA MAP

SITE CHARACTERISTICS

Owner: Town road
Subwatershed: Buttery Brook
Land Use: Residential
Soils: HSG A
Assumed Infiltration Rate: 2.41 inch/hour



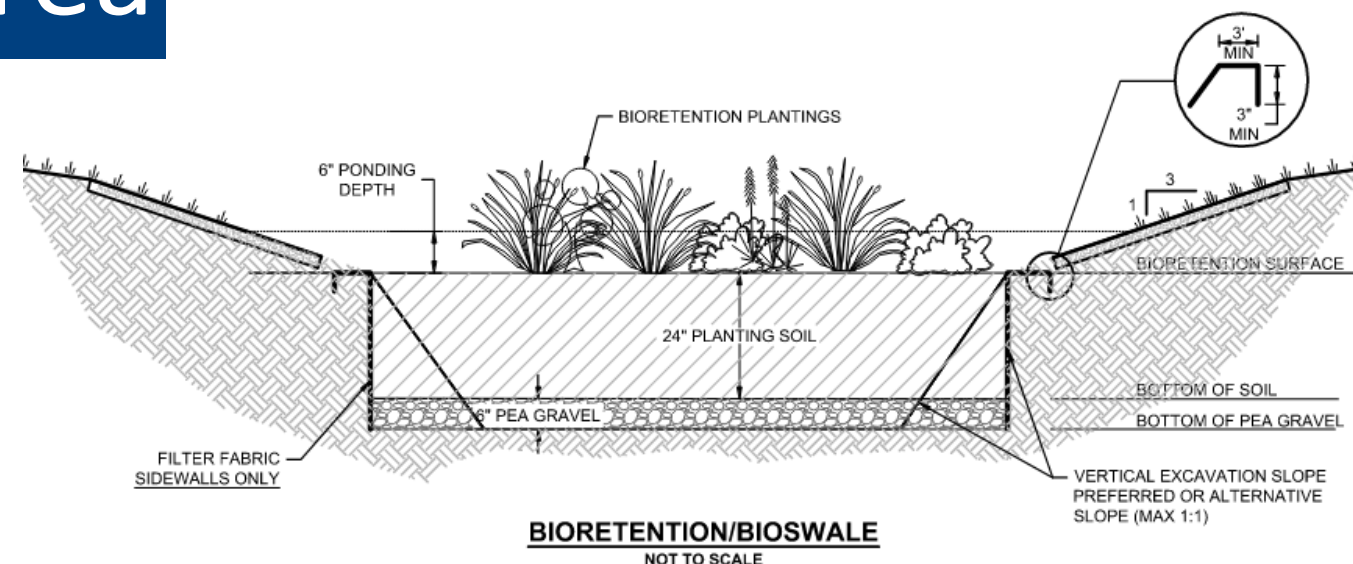
Grandview Street at Hillside Avenue
Pavement Removal & Bioretention

Roadside Bioretention Area

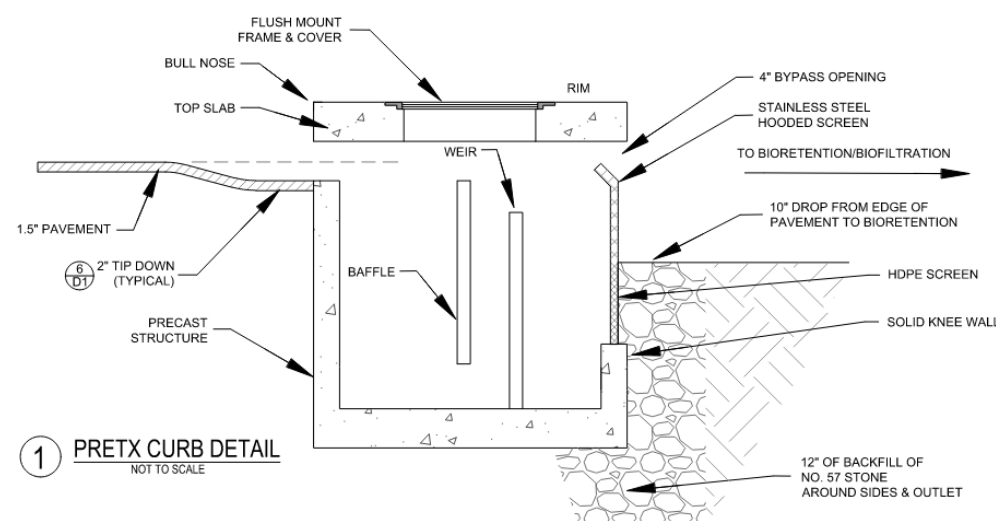
Table 3- 16: Surface Infiltration (2.41 in/hr) BMP Performance Table

Surface Infiltration (2.41 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	32.8%	53.8%	77.8%	88.4%	93.4%	96.0%	98.8%	99.8%
Cumulative Phosphorus Load Reduction	46%	67%	87%	94%	97%	98%	100%	100%
Cumulative Nitrogen Load Reduction	64%	82%	95%	98%	99%	100%	100%	100%

Massachusetts MS4 Permit, Appendix F, Attachment 3

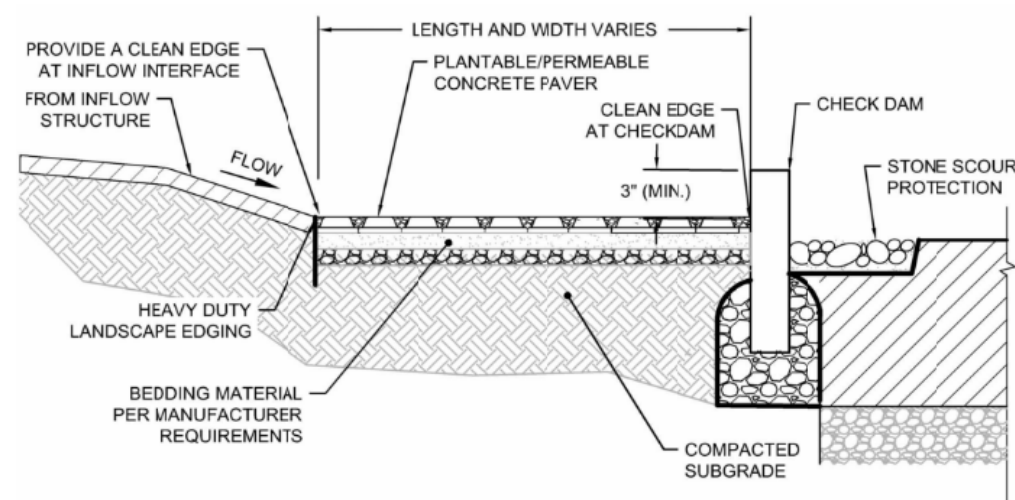


Bioretention Typical Section
(Credit: HW)



Pretreatment (Option 1)
Pretx Curb Inlet

(Credit: PVPC, 2023- See PVPC Guide for additional information)



Pretreatment (Option 2)
Sediment Forebay Typical Section
(Credit: HW)

Date: 8/7/2024
References: PVPC, Waterstone Engineering, & Porter Graphic Design, Green Infrastructure BMP Design Standards and Performance Templates, 2023.

Next Steps for Design:

- **Locate existing utilities/drainage** to determine if there are any conflicts with the design.
- **Conduct soil test pits** to determine groundwater elevation and infiltration rate.
- **Confirm drainage areas** through field observations and available topographical information.
- **Engage with neighbors** to solicit feedback on the proposed design, preferences for plant selection, and interest in volunteering to help plant and maintain the bioretention area.
- Refer to Massachusetts Stormwater Handbook and PVPC Green Infrastructure BMP Design Standards and Performance Templates for further design guidance.



- A Inlet
- B Pretreatment
- C Bioretention Basin
- D Bioretention Soil (loamy sand)
- E Gravel Reservoir
- F Overflow Structure
- G Outlet Pipe

Bioretention
(Credit: HW)



Bioretention Basin
(Credit: HW)

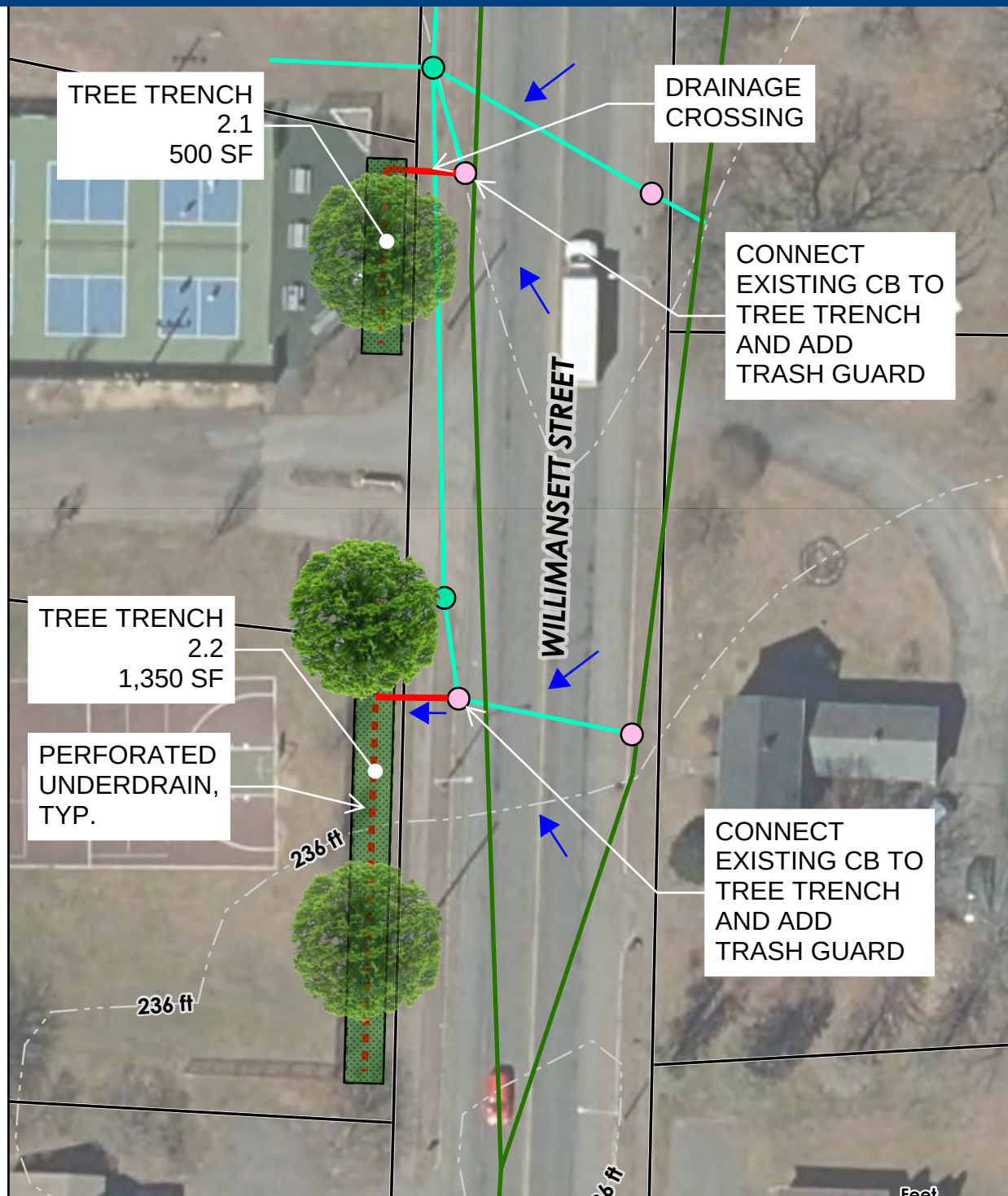


Volunteer Planting Day
(Credit: HW)

Infiltration Tree Trench: Rt 33 at Taylor Dr

Date: 8/7/2024
Data Sources: Bureau of Geographic Information (MassGIS), ESRI
This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

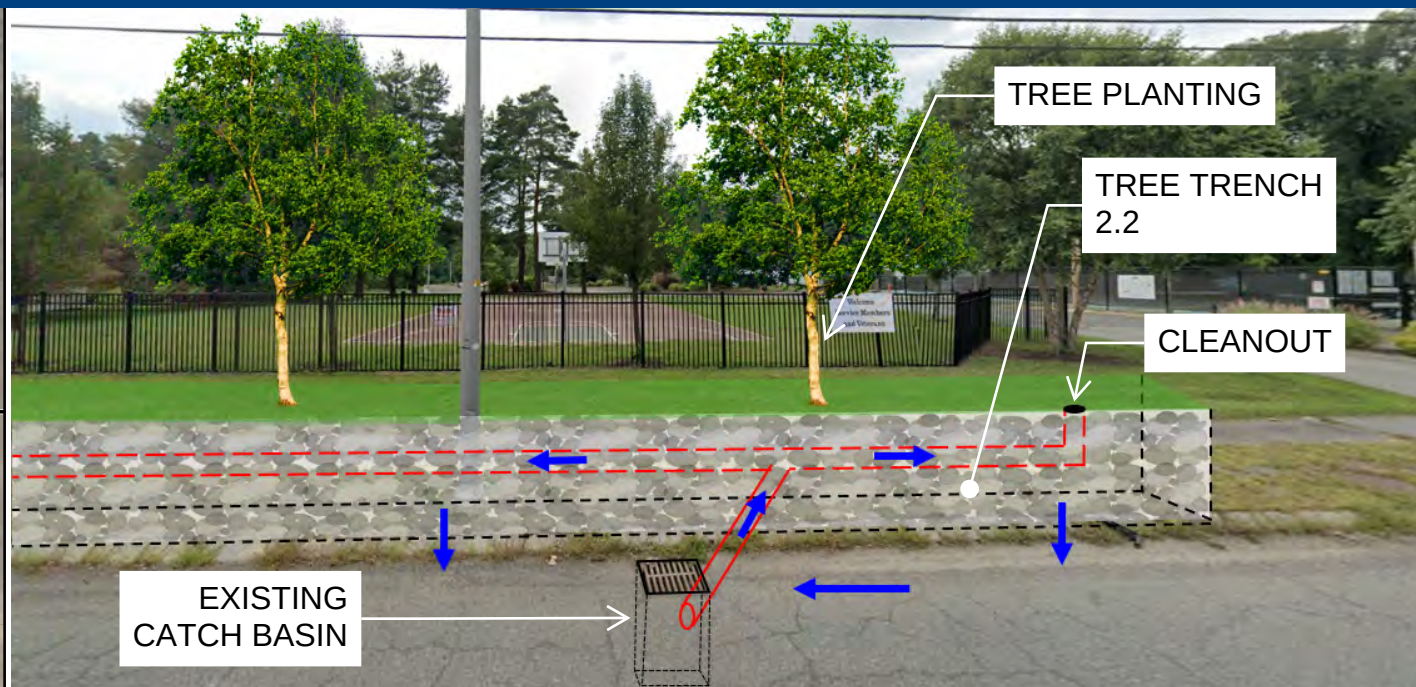
- Legend**
- Tax Parcels
 - Elevation Contours (3 m lines)
 - Drainage Areas
 - Stormwater & Sewer Infrastructure
 - Inlet
 - Outfall
 - Storm Drain Manhole
 - Sewer Gravity Main
 - Storm Gravity Main



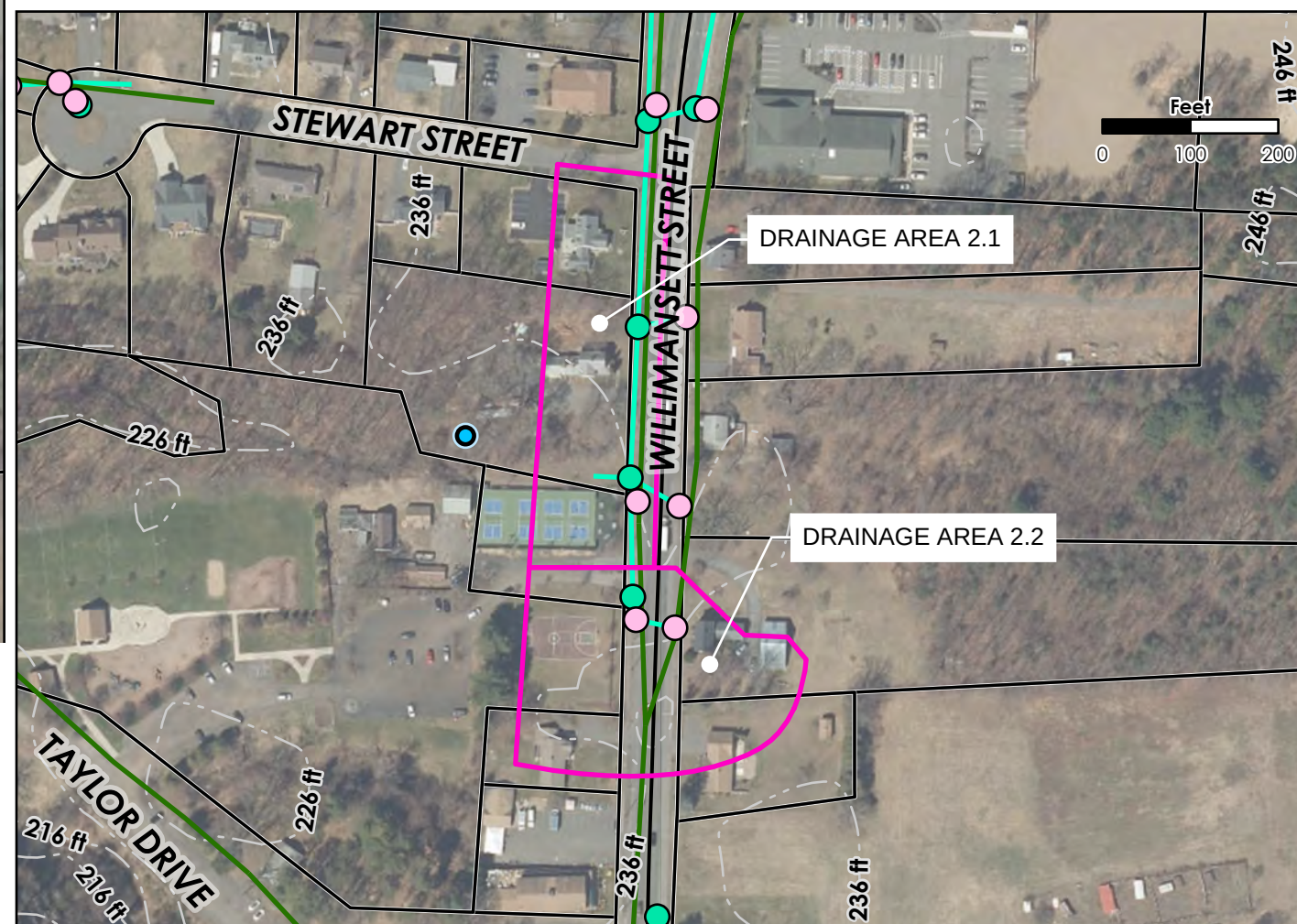
CONCEPT PLAN

CONCEPT DESIGN SUMMARY

TREE TRENCH ID:	2.1	2.2
DRAINAGE AREA:	1.38 AC	1.44 AC
IMPERVIOUS AREA:	0.35 AC	0.58 AC
TREE TRENCH AREA:	500 SF	1,350 SF
Design Storage Volume (depth of runoff from impervious area): 0.55 inch		
Estimated Nitrogen Load Reduction: 10.40 lbs/yr		



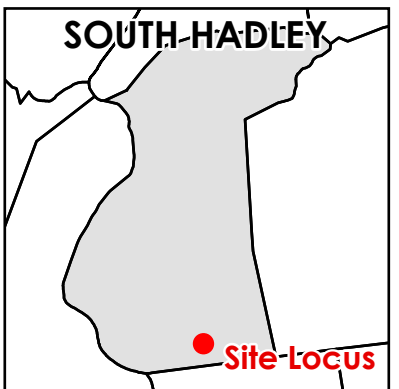
SITE LAYOUT



DRAINAGE AREA MAP

SITE CHARACTERISTICS

Owner: DOT road, Town parcel
Subwatershed: BATTERY BROOK
Land Use: Open Land
Soils: HSG A
Assumed Infiltration Rate: 2.41 inch/hour



Route 33 at
Taylor Drive
Infiltrating Tree
Trenches

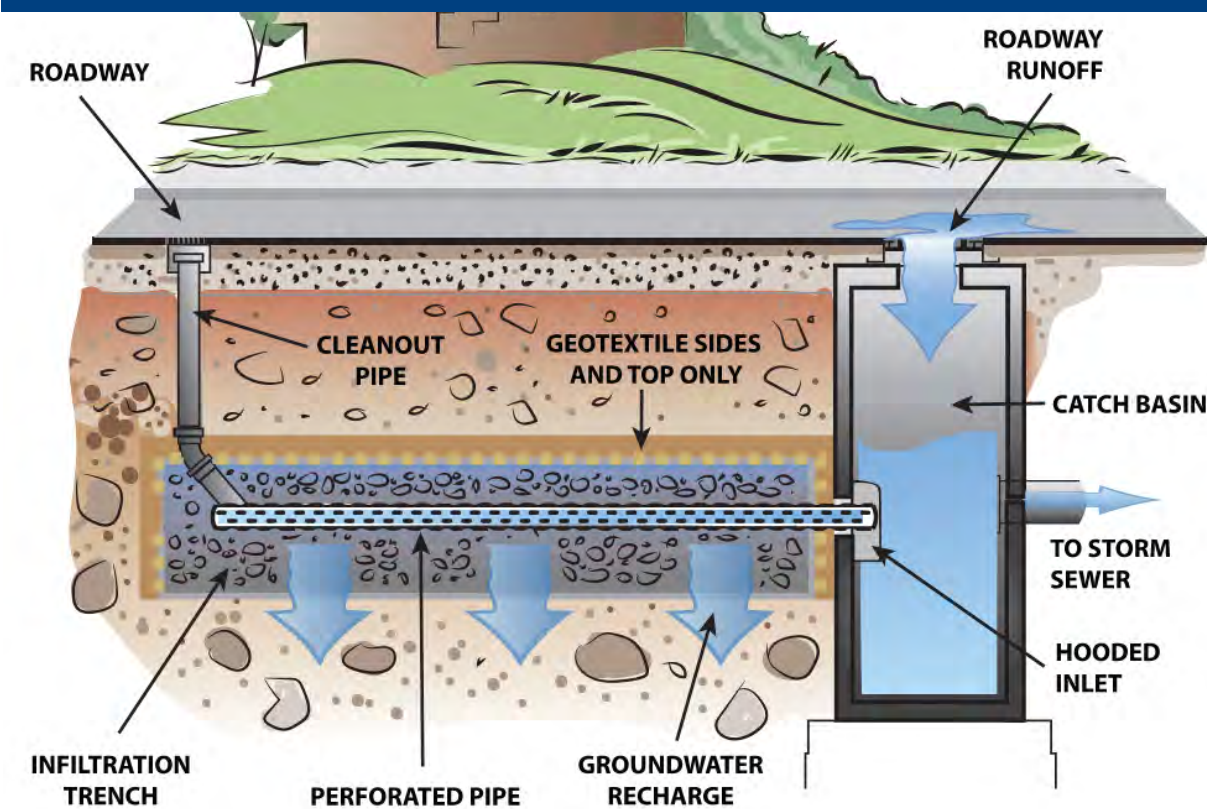


Infiltration Tree Trench

Table 3- 10: Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table

Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	34%	55%	78%	88%	93%	96%	99%	100%
Cumulative Phosphorus Load Reduction	33%	55%	81%	91%	96%	98%	100%	100%
Cumulative Nitrogen Load Reduction	65%	83%	95%	98%	99%	100%	100%	100%

Massachusetts MS4 Permit, Appendix F, Attachment 3



Urban Arlington Infiltration Trench

(Credit: PVPC, Waterstone Engineering, & Porter Graphic Design, 2023)



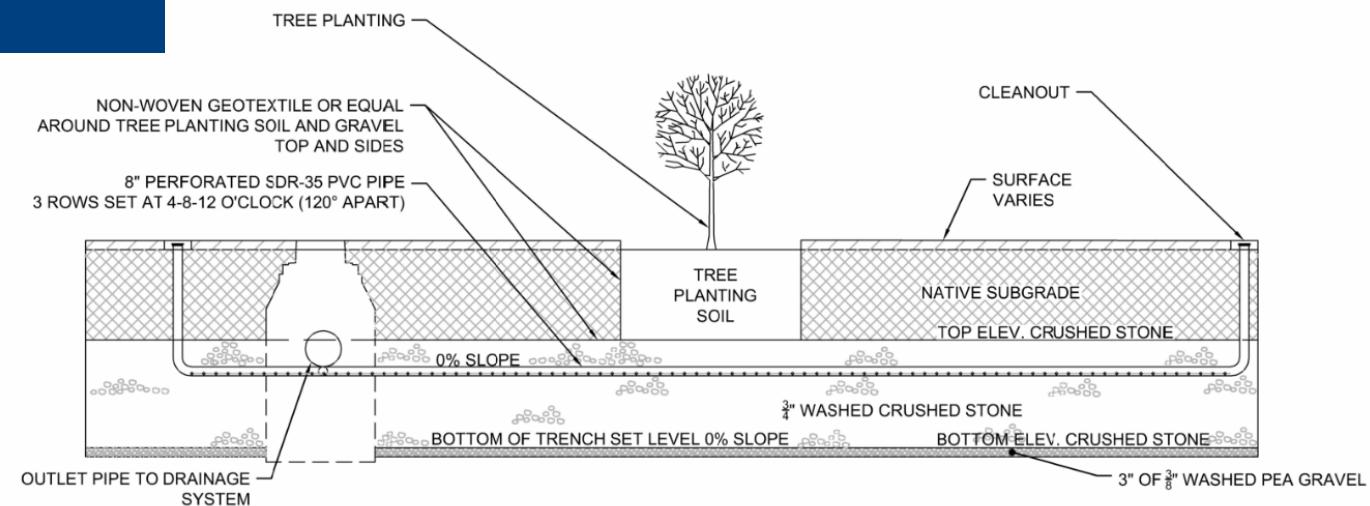
Gravel Reservoir/Underdrain of Tree Trench

(Credit: HW)

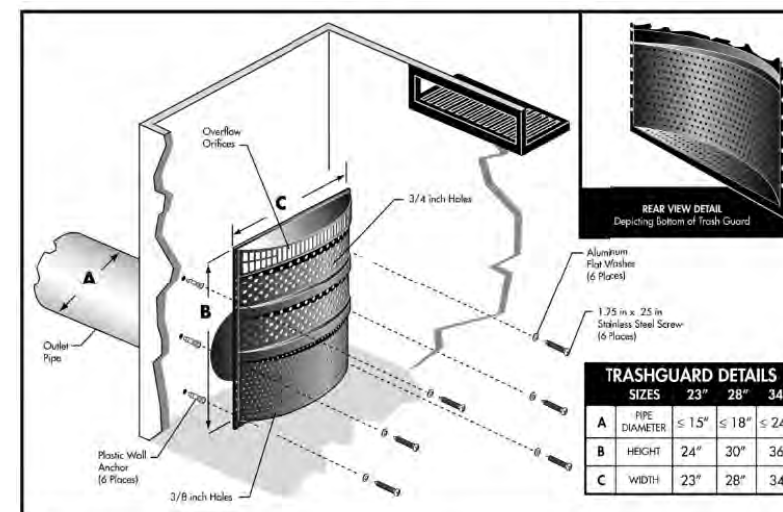
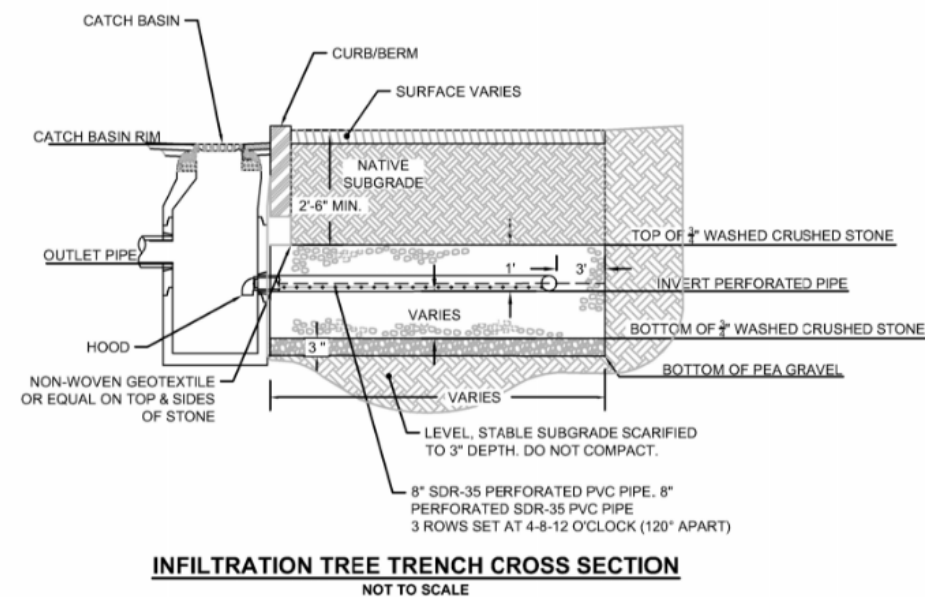


Completed Installation of Tree Trench

(Credit: HW)



Infiltration Trench Typical Sections (Optional Tree) (Credit: HW)



Pretreatment

Trash Guard Plus Catch Basin Insert

(Credit: PVPC, 2023- See PVPC Guide for additional information)

Date: 8/7/2024

References: PVPC, Waterstone Engineering, & Porter Graphic Design, Green Infrastructure BMP Design Standards and Performance Templates, 2023.

Next Steps for Design:

- **Locate existing utilities/drainage** to determine if there are any conflicts with the design.
- **Conduct soil test pits** to determine groundwater elevation and infiltration rate.
- **Confirm drainage areas** through field observations and available topographical information.
- **Consult with MassDOT** about proposed catch basin pretreatment (trash guard) and connections.
- Refer to Massachusetts Stormwater Handbook and PVPC Green Infrastructure BMP Design Standards and Performance Templates for further design guidance.

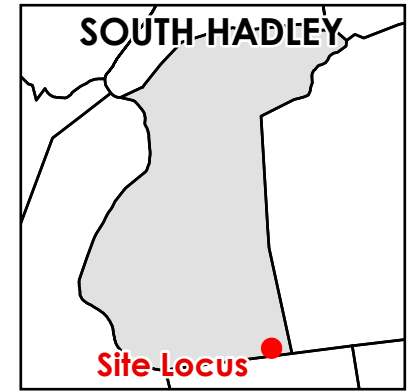
Right of Way Bioswale: New Ludlow Rd

Date: 8/7/2024
Data Sources: Bureau of Geographic Information (MassGIS), ESRI
This map is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

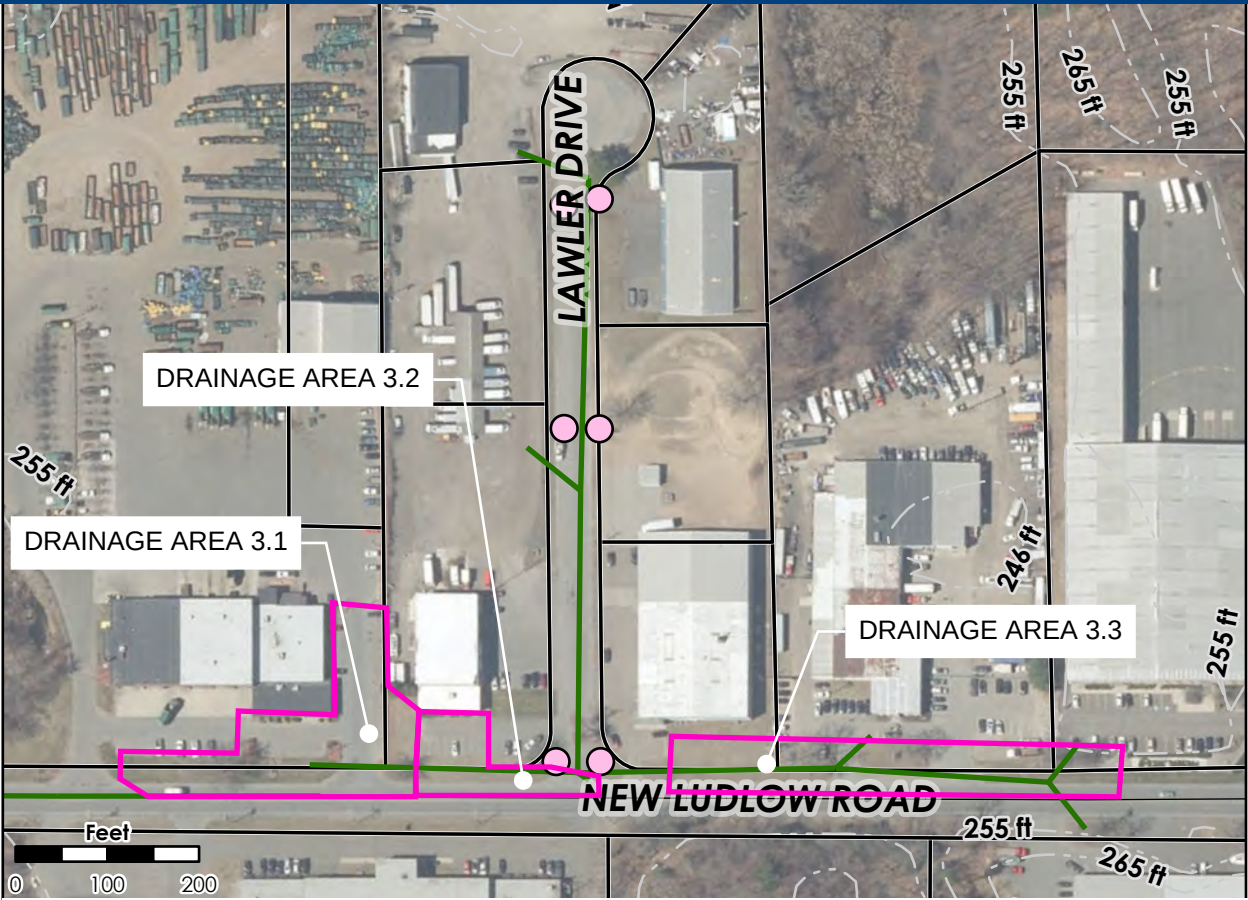
- Legend**
- Tax Parcels
 - Elevation Contours (3 m lines)
 - Drainage Areas
 - Stormwater & Sewer Infrastructure
 - Inlet
 - Sewer Gravity Main

SITE CHARACTERISTICS

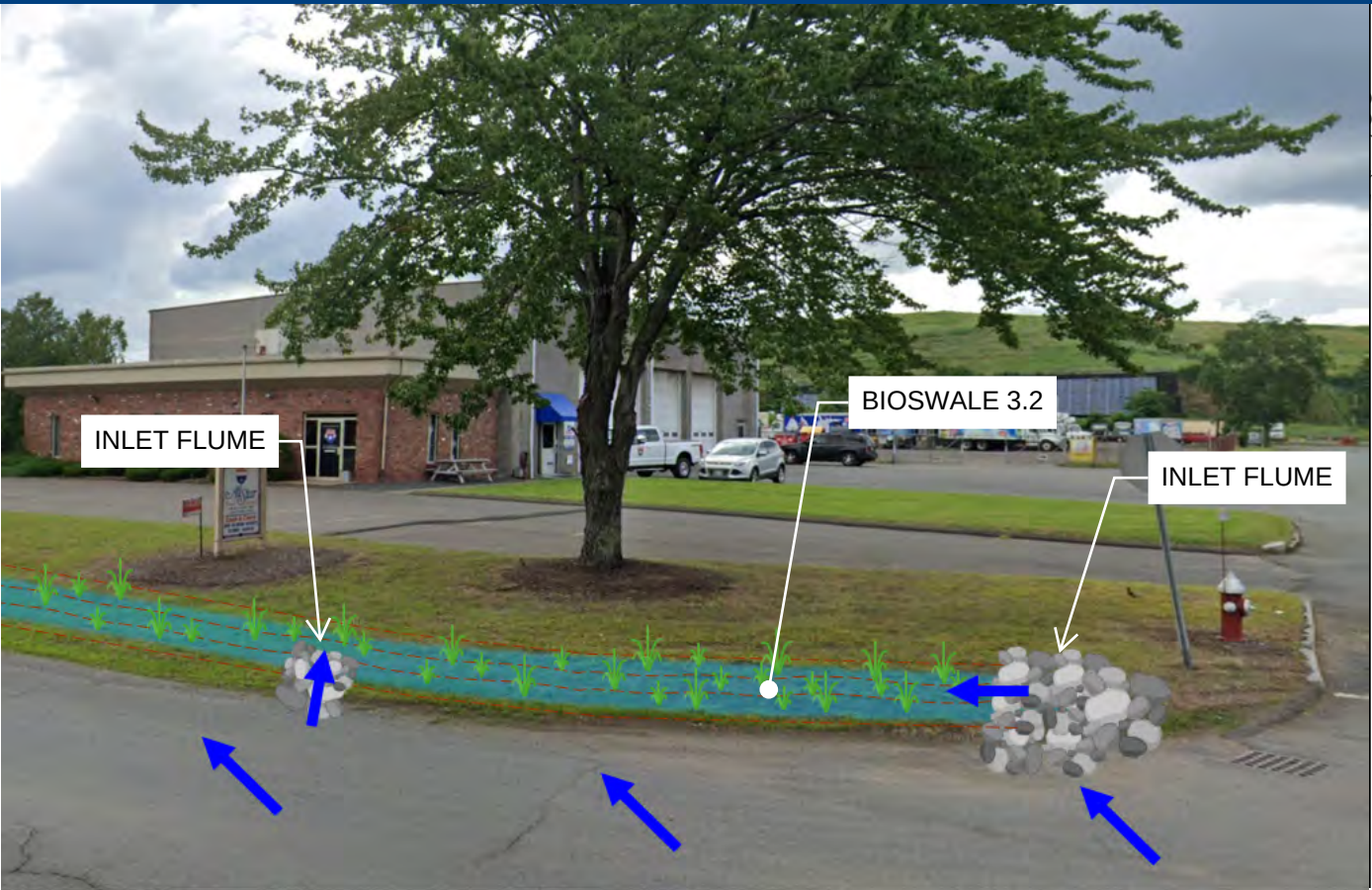
Owner: Town road
Subwatershed: Stony Brook
Land Use: Industrial
Soils: HSG A
Assumed Infiltration Rate: 2.41 inch/hour



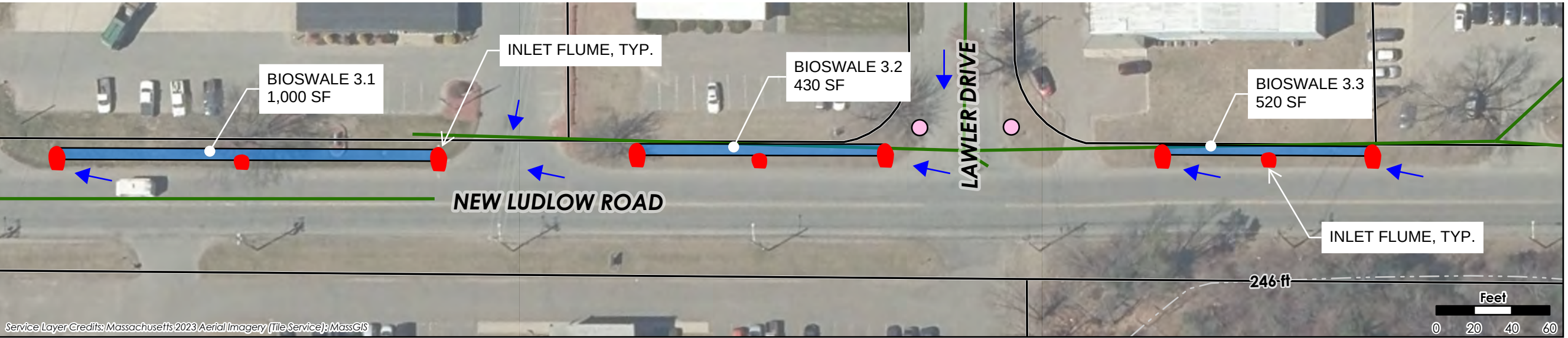
New Ludlow Road
Industrial Zone
Right of Way Bioswales



DRAINAGE AREA MAP



SITE LAYOUT



CONCEPT PLAN

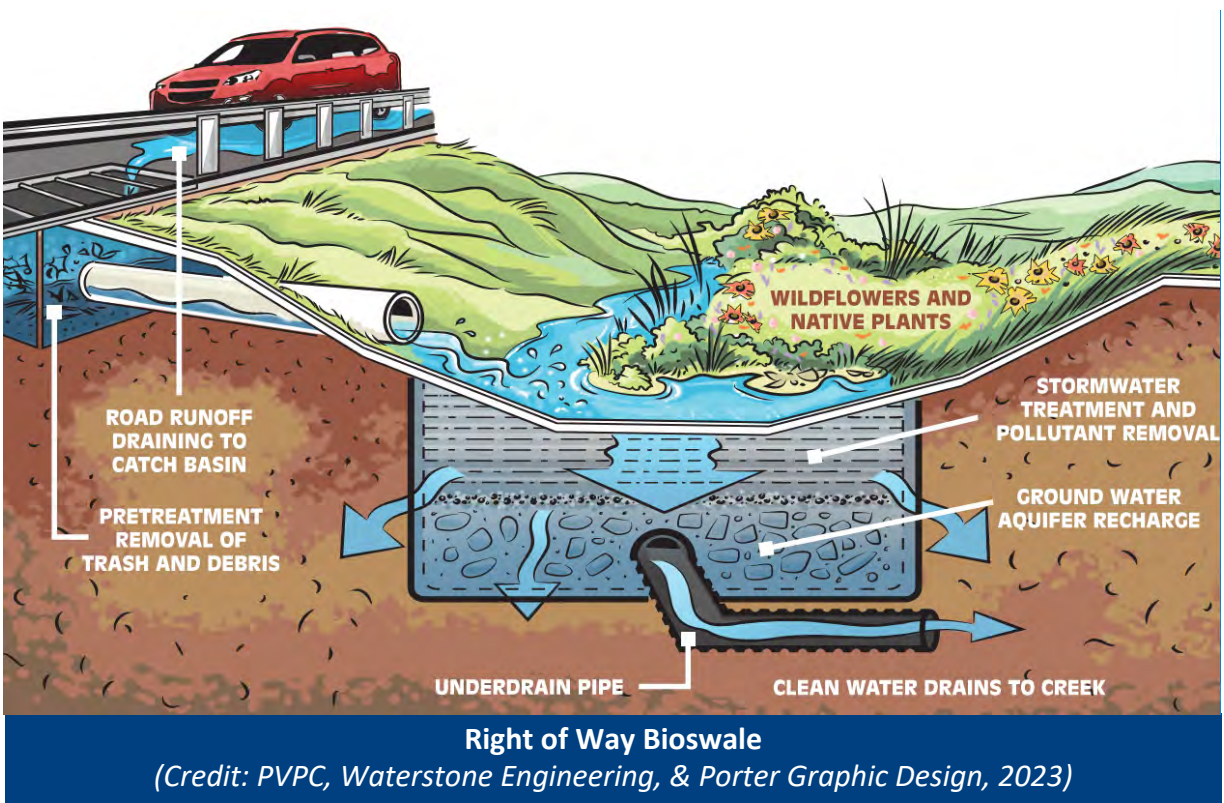
CONCEPT DESIGN SUMMARY			
Bioswale ID:	3.1	3.2	3.3
Drainage Area:	0.64 AC	0.22 AC	0.65 AC
Impervious Area:	0.48 AC	0.22 AC	0.26 AC
Bioswale Area:	1,000 SF	430 SF	520 SF
Design Storage Volume (depth of runoff from impervious area): 1 inch			
Estimated Nitrogen Load Reduction: 14.44 lbs/yr			

Right of Way Bioswale

Table 3- 16: Surface Infiltration (2.41 in/hr) BMP Performance Table

Surface Infiltration (2.41 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	32.8%	53.8%	77.8%	88.4%	93.4%	96.0%	98.8%	99.8%
Cumulative Phosphorus Load Reduction	46%	67%	87%	94%	97%	98%	100%	100%
Cumulative Nitrogen Load Reduction	64%	82%	95%	98%	99%	100%	100%	100%

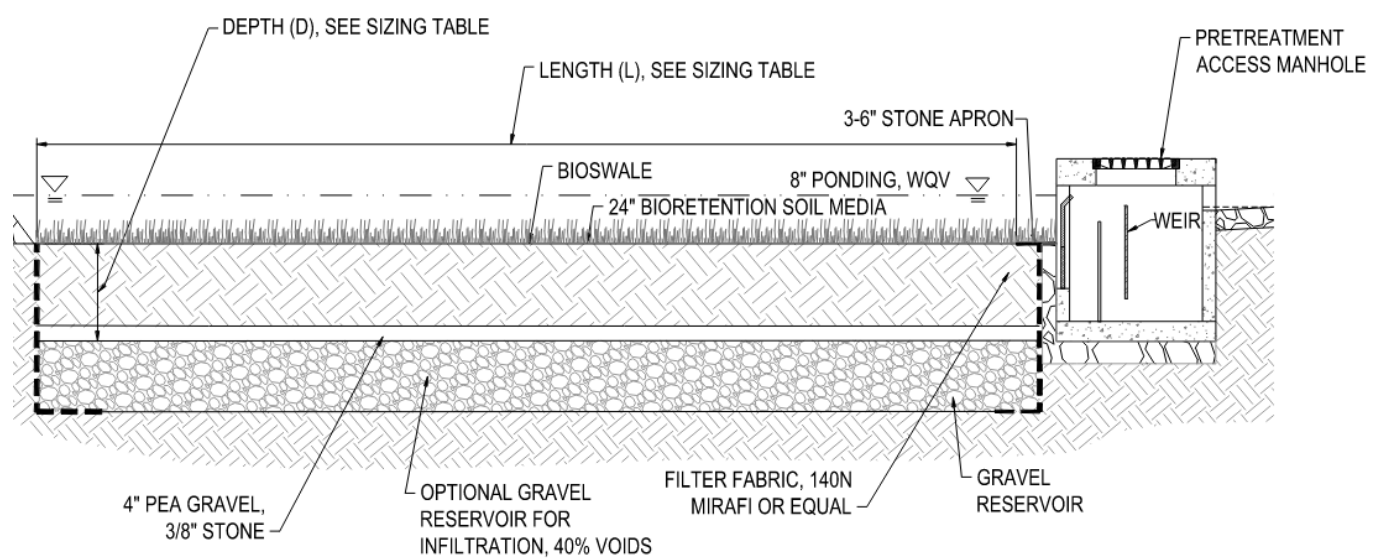
Massachusetts MS4 Permit, Appendix F, Attachment 3



Mowed Dry Swale
(Credit: HW)

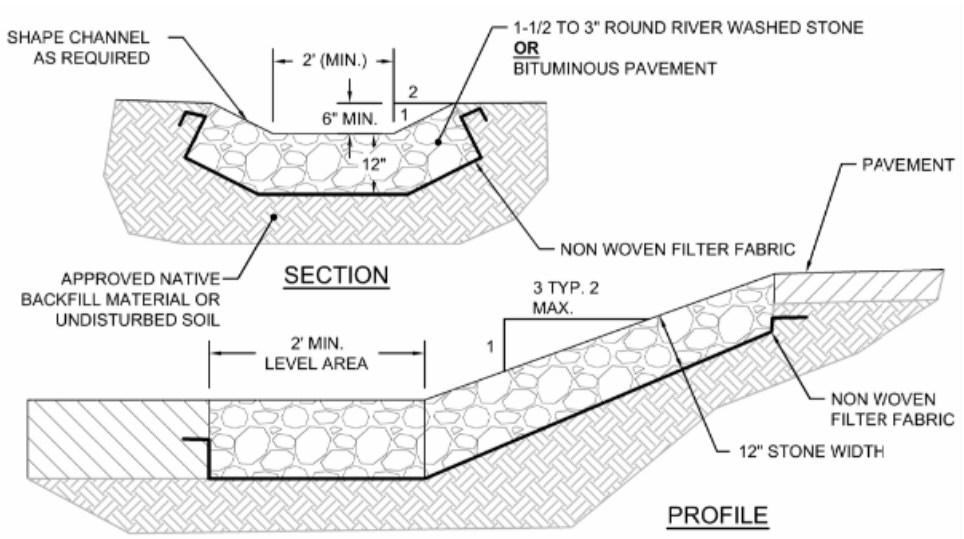
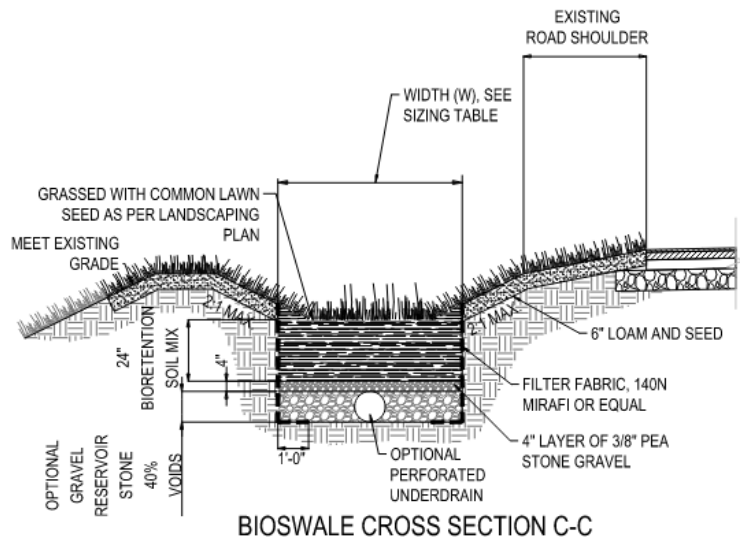


Roadside Swale with Check Dam
(Credit: HW)



Bioswale Typical Sections

(Credit: PVPC, 2023- See PVPC Guide for additional information)



Inlet Flume

(Credit: HW)



Date: 8/7/2024
References: PVPC, Waterstone Engineering, & Porter Graphic Design, Green Infrastructure BMP Design Standards and Performance Templates, 2023.

Next Steps for Design:

- **Locate existing utilities/drainage** to determine if there are any conflicts with the design.
- **Conduct soil test pits** to determine groundwater elevation and infiltration rate.
- **Confirm drainage areas** through field observations and available topographical information.
- Refer to Massachusetts Stormwater Handbook and PVPC Green Infrastructure BMP Design Standards and Performance Templates for further design guidance.

Stormwater Management Technical Assistance for EJ Communities in the Pioneer Valley
South Hadley Green Stormwater Infrastructure 10% Concept Designs
Planning-Level Estimates of Capital Costs
Horsley Witten Group, September 2024

Site Location	Existing Conditions	Proposed Solutions	Stormwater Control Measure (SCM)	Applicable Unit Capital Cost (\$/CF)	Design Storage Volume (CF)	Capital Costs for SCM ³	Additional Costs (repaving, drainage structures, etc.)	Total Capital Costs	Capital Cost Range ⁴
Grandview Street at Hillside Avenue ¹	Intersection with excessive pavement and closed drainage system.	Reconfigure intersection to reduce pavement and add bioretention area with overflow that connects into existing drainage system.	Bioretention area and Pavement Removal	\$60.76	1,050	\$63,800	\$70,000	\$134,000	\$121,000 - \$147,000
Route 33 at Taylor Drive ²	Town owned property along Route 33 with existing catch basins.	Connect existing catch basins to underground infiltrating tree trenches located on Town property at Buttery Brook Park.	Infiltrating Tree Trenches	\$68.97	1,832	\$126,400	\$10,000	\$137,000	\$123,000 - \$151,000
New Ludlow Road at Lawler Dr ¹	Industrial area with no existing drainage infrastructure.	Add inlets and infiltrating bioswales to road shoulder within Right of Way.	Right of Way Bioswales	\$60.76	3,495	\$212,400	\$20,000	\$233,000	\$210,000 - \$256,000

1. Planning-level costs estimated using EPA Region 1 (2016) *Methodology for Developing Cost Estimates for Opti-Tool*.

2. Planning-level costs estimated using unit costs for recently constructed infiltration tree trenches in Watertown, MA.

3. Capital costs are expressed in 2024 dollars and include 35% add-on for design/engineering and contingencies.

4. Cost ranges reflect planning-level estimates based on conceptual (10%) designs. Cost estimates will be refined as designs are advanced.