

# **Millbury Downtown Improvement through Low Impact Development and Green Infrastructure: Summary Findings Report of Community-Led Workshops**

**Submitted:  
June 15, 2016**

**Prepared by Mass Audubon**



## Introduction

The Town of Millbury was chosen as one of five communities to receive technical assistance from the Central Massachusetts Regional Planning Commission (CMRPC), Mass Audubon, the Horsley Witten Group, and the Blackstone River Coalition. The Town of Millbury requested this project, which was approved by Town Manager Robert Spain, Jr. to include mapping of current land use as well as four facilitated workshops. These public engagement sessions were open to the public to encourage participation in creating a plan for revitalizing downtown Millbury through the implementation of Low Impact Development (LID) and Green Infrastructure (GI) features.



*1. Millbury's Main Common Area*

This program was funded by an agreement (CE96184201) awarded by the Environmental Protection Agency to the New England Interstate Water Pollution Control Commission on behalf of the Narragansett Bay Estuary Program to provide technical assistance within the Blackstone watershed of the Central Massachusetts Regional Planning Commission's (CMRPC) service area. This project worked to enhance municipal capacity in the adoption of innovative land-use techniques that support growth and economic development, but also protect local and regional waterways from harmful pollutants and nutrients from stormwater runoff, reduce flood risks, and minimize local infrastructure and regulatory compliance costs.

## Working Group

The Director of Millbury's Department of Public Works, Rob McNeil, as well as the Director of Planning and Development, Laurie Connors, assisted this project from the municipal side. Stefanie Covino of Mass Audubon, Jon Ford, P.E. of Horsley Witten Group, and Danielle Mucciarone of CMRPC represented the project partners. The Town of Millbury also hired the engineering firm Weston & Sampson to assist in the process and they were involved throughout the public engagement sessions.

## Technical Assistance Offerings

The Town of Millbury received the following technical assistance during this project:

- Green Infrastructure Mapping: The town was provided with two GIS maps: One depicted natural green infrastructure such as forests and floodplains, as well as impervious surfaces such as rooftops, roadways, and parking lots. These are also shown in relation to water resources in the community to show where water running off of impervious surfaces may impact local waterways. The second map depicted an aggregated version of the natural green infrastructure

features of the first map along with local and regional priority protection areas (PPAs) and priority development areas (PDAs),<sup>1</sup> protected open space, and local zoning districts.

- **Public Engagement:** Four facilitated workshops were held monthly on December 10, January 21, February 25, and March 24. These meetings helped us identify downtown greening and LID measures that would improve both stormwater treatment characteristics and the attractiveness of the downtown area.

## Overview

Millbury had historically been an urban oasis that balanced a vibrant downtown with numerous street trees and green spaces.<sup>2</sup> Over time, most of those trees were lost, but Millbury residents have identified beautification and revegetating their downtown as a priority. This project helped residents identify strategic locations of green spaces and street trees to enhance both stormwater management and local community character.

The downtown of Millbury was chosen as a manageably sized study area, defined by the intersections of N Main and Church St to the North, S Main and School St to the South, Elm St and Waters St to the West and 81 Elm St to the East. This region was studied to review potential implementation of LID practices due to the density in the downtown, existence of known stormwater issues, and proximity of drainage into the Blackstone River. The center of the project area – the intersection of Main St and Elm St – is a mere 500 feet from the Blackstone River. Previous studies by the town had identified infrastructure improvements in this area that could reduce flow of stormwater and other pollutants such as illicit connections<sup>3</sup> into the river. Additionally, after the project was completed, a community member discovered images from a 2001 study redesigning the Town Commons area, highlighting that this need has existed for some time.<sup>4</sup>



2. Main Street in Millbury, 1874. Courtesy of the Millbury Historical Society

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<sup>1</sup> For more information on PPAs and PDAs, please see Mass Audubon's website at <http://www.massaudubon.org/our-conservation-work/advocacy/shaping-the-future-sustainable-planning/resources-publications/preservation-development-toolkit>

<sup>2</sup> For more images of historic Millbury, see Appendix D.

<sup>3</sup> Illicit connections include homes or businesses that connect their sewer lines to the stormwater system instead of sewer system. This allows nutrient rich waste to flow directly into waterways without treatment. Identifying and removing illicit discharges is part of the EPA's Municipal Separate Storm Sewer System (MS4) permit that the town is required to meet.

<sup>4</sup> This 2001 study also recommended additional sidewalks, street trees, and improved connections from the municipal parking area. This reaffirmed the current sentiments of community members and the need for such improvements to be made. For more information, see Appendix C.

From there, the working group brainstormed potential solutions to present to the public. At the first meeting, local water quality and stormwater management issues were discussed as well as broader opportunities to improve the beautification and economic vitality of the community. Each subsequent meeting further refined these ideas until the final concept was presented in March.

## Activities

Before the meeting, working group members from the town of Millbury, Horsley Witten, Weston & Sampson, and Mass Audubon walked through the study area and identified assets and potential opportunities throughout. Many of these ideas were reflected by the community in the following meeting as well.

The first meeting on December 10<sup>th</sup>, 2015 saw full participation from 20 community members, representing a variety of boards and groups, including the Board of Selectmen, Beautification Committee, Planning Board, Town Arborist, Historical Society, Disability Commission, and others.

After a brief presentation on LID and GI and the co-benefits that the practices offer<sup>5</sup>, the room was split into four groups and each was given a map of downtown with the study area noted. Community members took post it notes and markers to these maps to signify what they liked about downtown, which areas needed the most changes, and what sort of vision they had for the future of their community.

Each small group shared their findings with everyone and themes quickly appeared within the dialogue. Community members identified a number of key issues that were loosely categorized under either Beautification/Open Space or Mobility as follows:<sup>6</sup>

### Beautification/Open Space

1. Maintain Existing Open Space
2. Create New Open Space
3. Lighting

### Mobility

1. Bike Path
2. Pedestrian
3. Parking
4. Bump Outs



*3. Millbury Stakeholders Discuss the Project at the First Community Meeting*

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<sup>5</sup> For more information on the benefits of Low Impact Development and Green Infrastructure, see Appendix A or Mass Audubon's website at [www.massaudubon.org/lidcost](http://www.massaudubon.org/lidcost)

<sup>6</sup> For more complete notes from each meeting, see Appendix B.



The next meeting, held on January 21<sup>st</sup>, 2016, was run in a very similar format and identified many similar initiatives as discussed in the first meeting such as beautification, the importance of improved mobility for pedestrians, the importance of parking in town, and the need to incorporate a variety of LID techniques.

However, participants honed on each of these topics to suggest specific practices they'd like to see. Additionally, a central theme of connectivity and cohesion between the main and lower commons was identified as a crucial focus of the project.



*4. Local Residents Review Maps of Millbury*

Key LID practices identified included stormwater planters, rainwater barrels and/or cisterns, the potential for a green roof to offer a recreational area in town, rain gardens, planted bump outs, and permeable concrete/pavement. Additional community projects were also identified such as potential for community murals, historical statues, and more.

Significant community outreach occurred between each meeting, including reaching out to local businesses and property owners.<sup>7</sup> There was very

little response from this outreach, but a couple of area businesses attended our third meeting on February 25, 2016.

Participants again focused on identifying LID best practices and efforts to make the common areas feel more cohesive. Key features discussed included the need to balance aesthetics and GI benefits with parking needs for local businesses and bringing added community character and visibility to the area between existing, underused municipal parking and desirable downtown locations. Bump outs were also identified as a key tool to improve pedestrian safety, improve traffic calming, and offer additional stormwater infiltration.

## Stormwater Issues and Opportunities

Through previous work and studies, Millbury DPW has identified numerous subsurface improvements that are needed in the Millbury downtown. These actions offer the opportunity to work simultaneously on the proposed LID/GI improvements in the project area and as well as address an existing, identified need. These actions include:

- Perform inflow/infiltration improvements to the sewer system
- Identify and remove illicit connections, including the need to disconnect known roof drains and sump pumps from the sewer main
- Replace sewer main and sewer manholes along South Main Street to the Blackstone River (within the project limits)
- Address drainage capacity improvements to the stormwater system

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<sup>7</sup> For an example of letters sent to local businesses, see Appendix E.

- Replace the entire stormwater drain system along South Main Street (within the project limits) to provide capacity for roof drains and sump pumps as well as street and sidewalk runoff

## Overview of Recommended Features

After the core community meetings as well as several internal partner group meetings, the working group presented the final proposal of community-led plans. These included strategically placed LID and GI designs such as expanding significant green spaces, adding bump outs, increasing street trees, and implementing other bioretention measures such as stormwater planters to have a total annual stormwater runoff reduction potential of 200,000+ gallons.

An opportunity to divert and store additional stormwater was identified through the current vault under the main common. This area was thought to be used previously for water storage, but was filled in with leaves and street sweeping material to prevent future potential collapse. However, if this vault was cleaned out, it would provide an exemplary location for storing excess stormwater that is not able to be diverted and infiltrated into other bioretention areas. This water could then be used as “fertigation” for the common areas – combining the needs for both irrigation as well as fertilization through the naturally occurring phosphorus and nitrogen found in stormwater runoff.

The final plans emphasized enhancing the connections between downtown and municipal parking to encourage increased use of common areas, including improved signage and adding an archway over some of the municipal parking entrances to improve visibility and pedestrian-friendly walkways. Additionally, a pavilion within the main common area as well as the incorporation of statues would draw visitors to the common and enhance visitor experience.

Art projects were identified as important additions to the downtown that would draw on the community’s history as well as its future. Millbury has an existing initiative to create statues or silhouettes of mill workers, recalling the community’s history as a mill town. Community members were also interested in partnering with local artists to create murals that could give a fresh look to some of the more tired buildings and create a welcoming landscape.

Transportation was highlighted as a key concern – both in terms of parking, pedestrian mobility, and overall safety. The final design enhances and increases overall parking by maximizing efficiency and design. A potential future plan to move the Millbury firehouse was incorporated into this plan for better future planning. With that move and expanded municipal parking, the number of spaces would be increased by 52. Without the firehouse moving, there is still an overall increase in 13 parking spaces throughout the project area.<sup>8</sup> Added bike lanes on School Street, enhanced and increased crosswalks, and traffic-calming measures were all incorporated as well to address community concerns.

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<sup>8</sup> This includes an addition of four street parking spaces. Without the firehouse moving, there would also be an increase of 9 parking lot spaces. With the firehouse moving, there would be an increase of 48 parking lot spaces.

## Review of Recommended LID Best Management Practices

A primary environmental/infrastructural goal of proposed green infrastructure retrofit within the downtown is to naturally filter and infiltrate rainfall as close to where it falls as possible, approximating natural conditions using streetscape design principles and simple stormwater management best management practices (BMPs) consistent with the scale and character of the downtown. As a first step, strategic parking consolidation and access control improvements to Elm Street will replace extraneous pavement with planted area, thus reducing stormwater runoff quantity generated in the first place while also providing aesthetic and safety benefits.

Water quality BMPs identified as appropriate include:

- Bioretention systems, or rain gardens – slightly depressed landscape areas designed to filter and infiltrate runoff
- Tree box filters – an adaption to bioretention using in-ground containers with street trees
- Flow-through planters – usually next to buildings, waterproof structures filled with gravel and planting soil to temporarily store and filter runoff, with excess water drained via a perforated underdrain
- Tree planting – with thirsty root systems functioning as stormwater management machines, urban trees also provide a host of other health, happiness, and value benefits
- Selective application of permeable paving surfaces – potentially including permeable bituminous, porous concrete, pavers, bricks, and other surfaces designed to allow infiltration

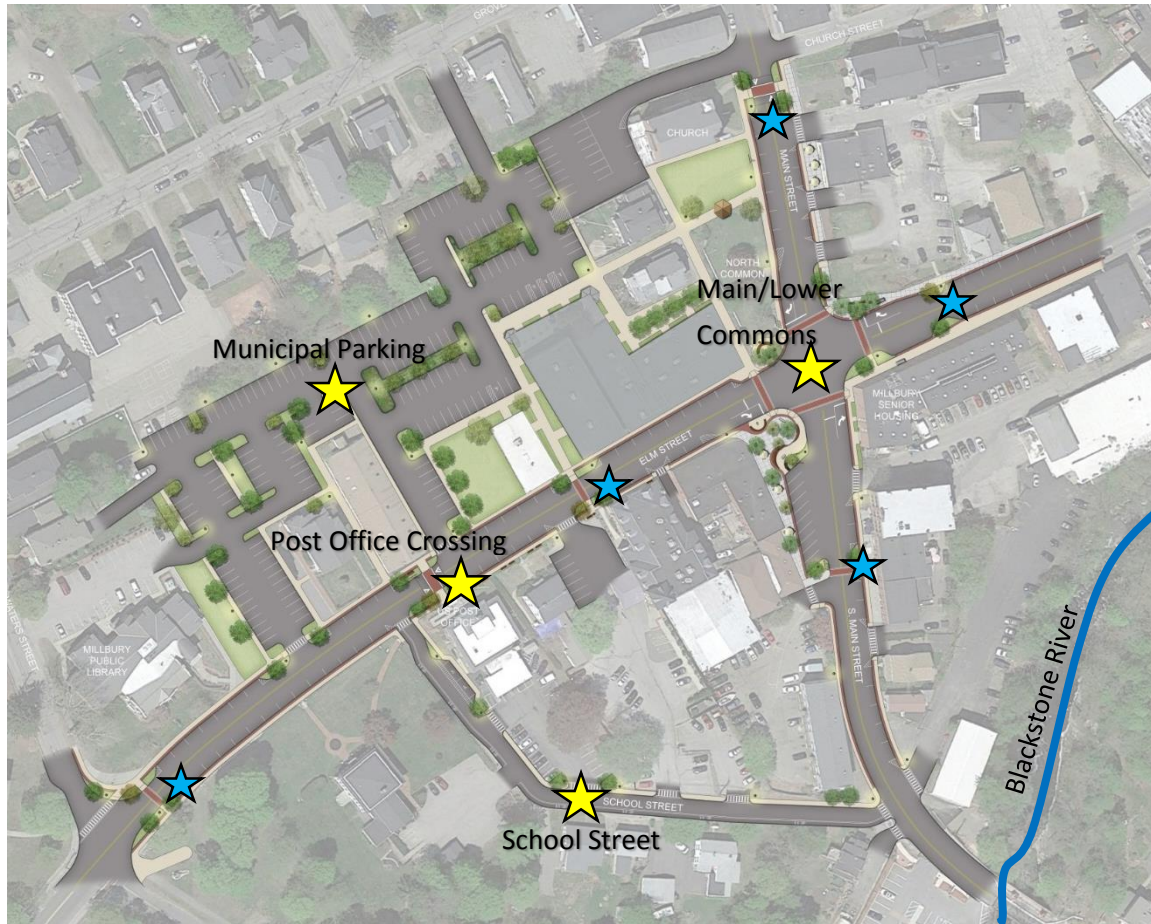
Several conceptual streetscape designs demonstrate application of bioretention systems and tree planting within the proposed public parking lot reconfiguration as well as street right-of-way. Bioretention systems are typically designed to filter and infiltrate the 1-inch storm event (comprises over 90% of annual runoff volume) with piped overflow to the municipal system during larger storm events. Properly designed and maintained bioretention and tree box filter BMPs will provide 80-90% removal efficiency filtering for total suspended solids (TSS), 70% removal efficiency for bacteria, and 30% removal efficiency for total phosphorus.<sup>9</sup> Bioretention design must be coordinated in more detail with existing topography, soil conditions, above and below-grade infrastructure, and proposed parking reconfiguration. Even in areas of poorly draining soils, bioretention systems designed with impermeable liners and an underdrain can provide significant water quality filtering benefit.

Within the Elm Street and Main Street rights-of-way, bioretention and tree planting BMPs can be incorporated as part of “bump-outs” – carefully locating and designing systems in concert with proposed traffic calming elements and existing businesses. Green infrastructure elements can also incorporate flow-through planters to filter and soak roof runoff where space is at a premium with zero-setback building frontages. In extremely space-constrained conditions, tree box filters filter and infiltrate stormwater runoff from street and sidewalk hardscape. Many proprietary tree box filter systems utilize a pre-treatment sump to trap sediment for easier maintenance. Several of these designs are shown below as examples.

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<sup>9</sup> MassDEP Stormwater Handbook Volume 1 & 2010 Rhode Island Stormwater Manual.

## Concept Design Visualization



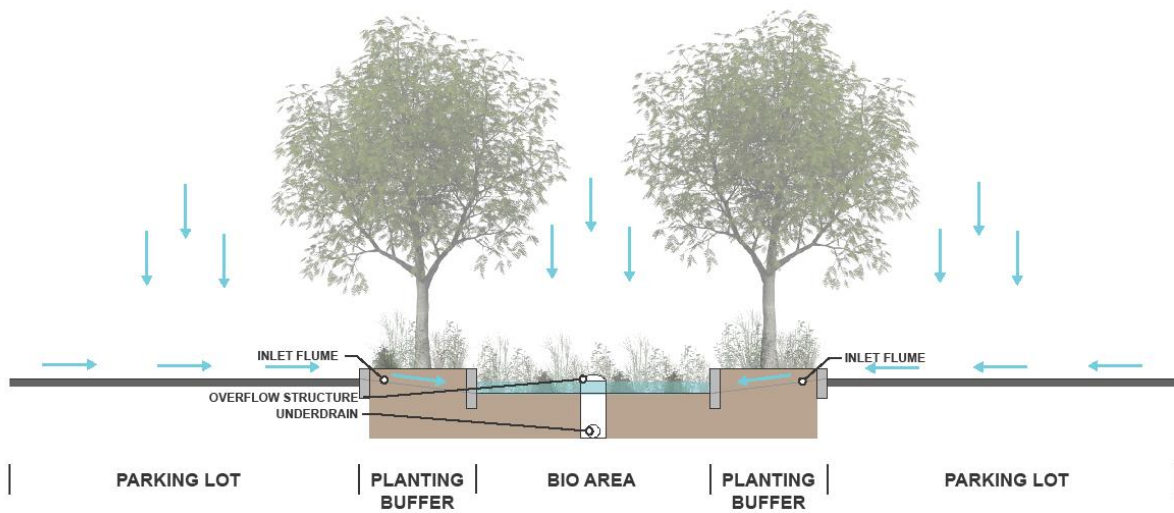
5. Overall Site Plan and Project Area in Relation to Blackstone River –  
Yellow stars represent project areas and blue stars represent additional bump outs and bioretention areas.  
Credit: Weston & Sampson

### Updated Municipal Parking Area

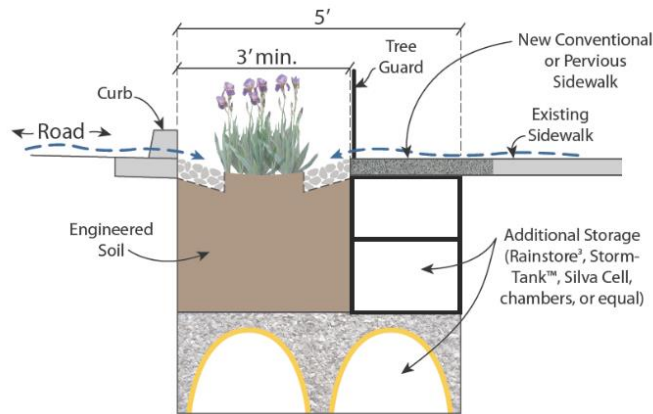
The municipal parking area was redesigned to reduce existing impervious pavement and adding bioretention areas while simultaneously increasing the amount of parking spaces. Several bioretention areas were added to enhance stormwater management and increase infiltration. This has the additional benefit of increasing aesthetics and improving visitor experience.







8. Parking Lot Bioretention Concept - Side View. Credit: Horsley Witten Group Inc.



9. Bioretention With Additional Storage. Credit: Horsley Witten Group Inc.

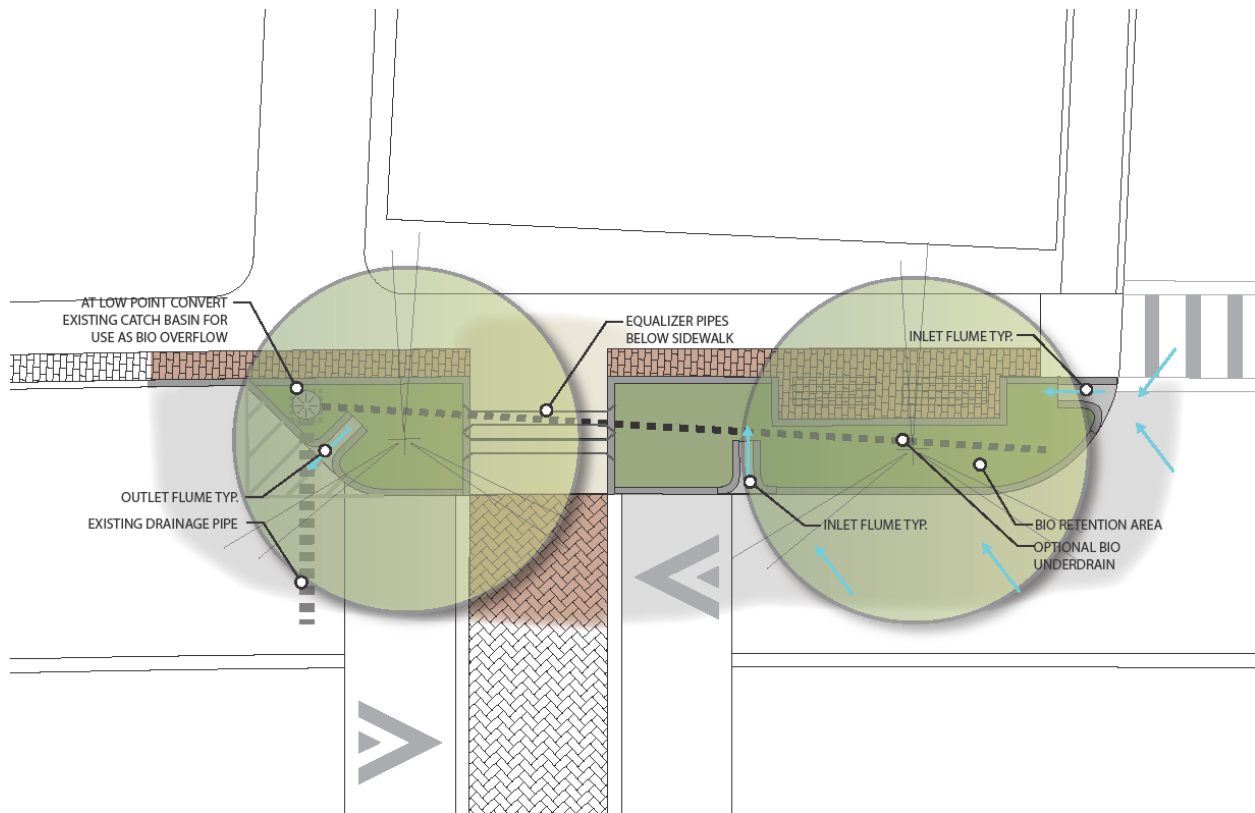
## Post Office Crossing – Pilot Project

The Millbury Post Office was identified as a key location for an additional crosswalk since pedestrians often would like to cross there, but instead have to travel much further down the street to find a safe place to cross. Because this area is anticipated to be heavily used and vehicles often travel quickly on this wide, straight stretch of road, the final design also proposes a bump out on each side of the crosswalk to enhance not only stormwater retention and beautification, but also shorten the crosswalk and increase public safety. A speed table is also proposed at this location to further enhance public safety.

Due to its high visibility and strong community support, this crossing was identified as a primary pilot project for the Town of Millbury to begin its work implementing and introducing the public to these concepts.



10. Example of Bump Out at Crosswalk



11. Proposed Design of Bioretention Bump Out and Speed Table at Post Office Crossing. Credit: Horsley Witten Group Inc.

## School Street

School Street is a one-way street traveling South from Elm St to South Main St. This was identified as a crucial thoroughway for pedestrians and cyclists traveling from the municipal parking area on Elm Street down to the Blackstone River. The existing street was wide enough to add a bike lane along its entire length without infrastructure changes, which will allow cyclists to travel from the downtown or municipal parking area to the proposed Blackstone River Bikeway, which will run 11.8 miles from Worcester to Providence.<sup>10</sup>

School Street's existing accessible parking areas were redesigned with additional mobility and safety features, including additional ramps onto the sidewalk and a safety buffer around the parking area.

<sup>10</sup> There are currently 2.5 miles of bike path in existence in Worcester and Millbury, but it has not yet reached the Millbury Downtown.





*12. School Street Improvements, with Accessible Parking Highlighted. Credit: Weston & Sampson*

## **Main and Lower Commons**

The community meetings focused on a need for the common areas to have a cohesive feel. The below design expands the existing common areas and ties them together with bioretention bump outs on each side and new tree plantings. The below image also shows areas that would be well suited to incorporating stormwater planters (green boxes) as well as a redesign of the lower common area to incorporate additional low wall seating and opportunity for outdoor café seating.

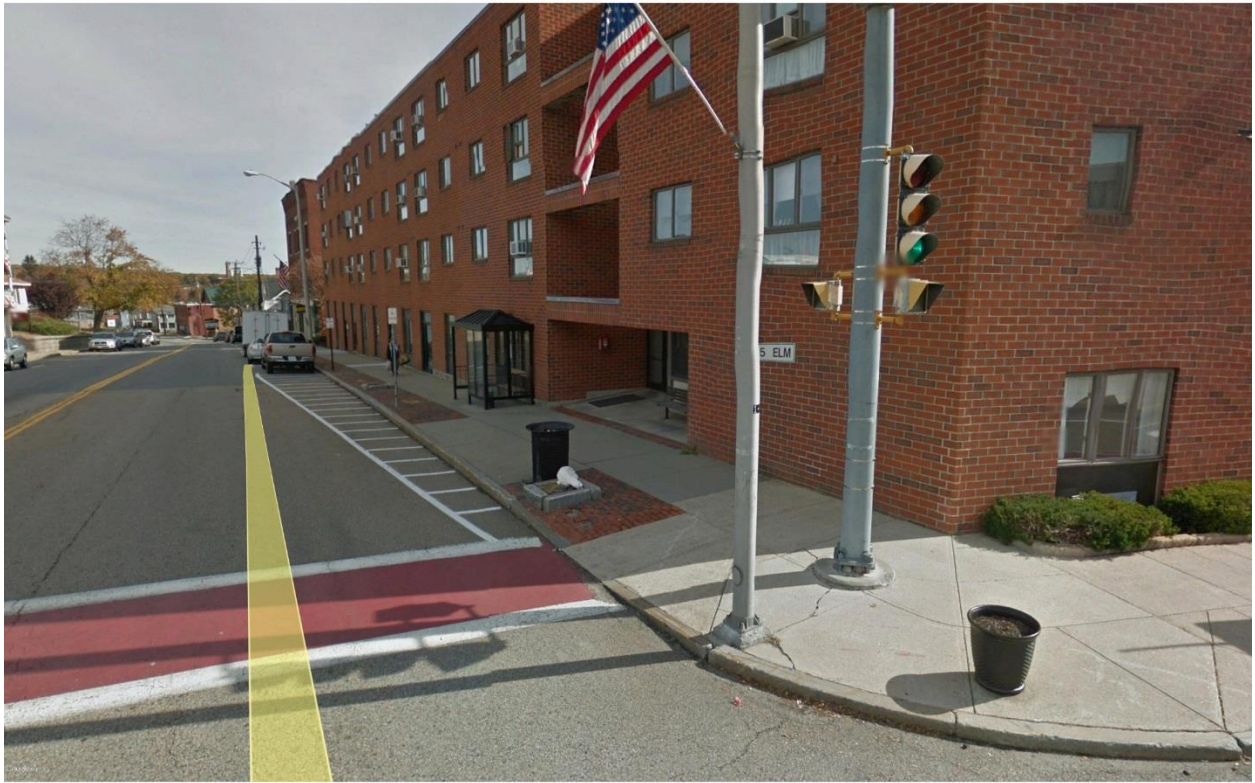
This design also addresses community concerns to enhance pedestrian safety through shorter crosswalks throughout and reconfigured utility placement on the upper common to allow easier mobility around the N Main/W Elm corner.





13. Close Up of Elm/Main Intersection, Bump Outs, and Turning Radii. Credit: Weston & Sampson





14. Main/Elm Streets – Before. Credit: Weston & Sampson

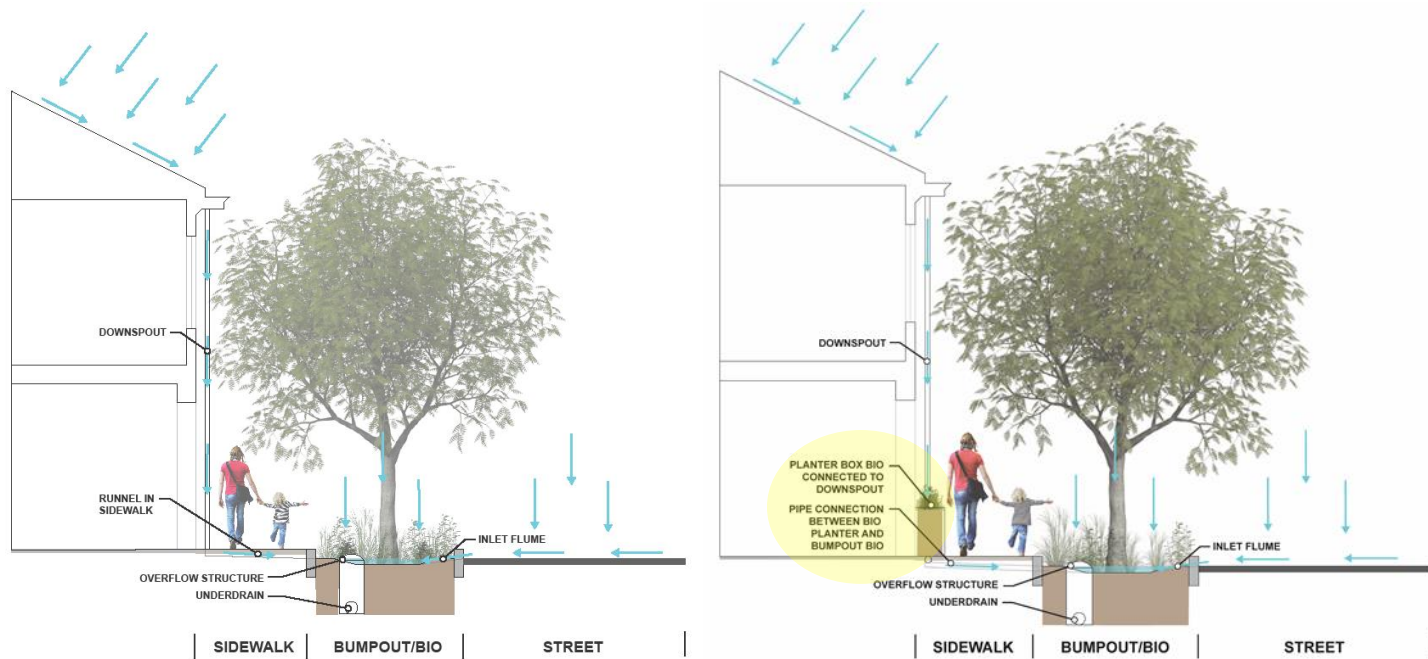


15. Main/Elm Streets - After - with Bump Out and Bioretention (Design). Credit: Weston & Sampson



## Bioretention Designs: Stormwater Planters, Bump Outs, and Rain Gardens

Proposed bioretention bump outs and/or tree filters will filter, slow, and infiltrate runoff from the adjacent sidewalk and street pavement. In this location, green infrastructure provides significant additional benefit for traffic calming and buffering of the pedestrian realm to increase safety and pedestrian comfort. Below are some potential designs that can be incorporated into the downtown study area at key locations identified in Figure 4.

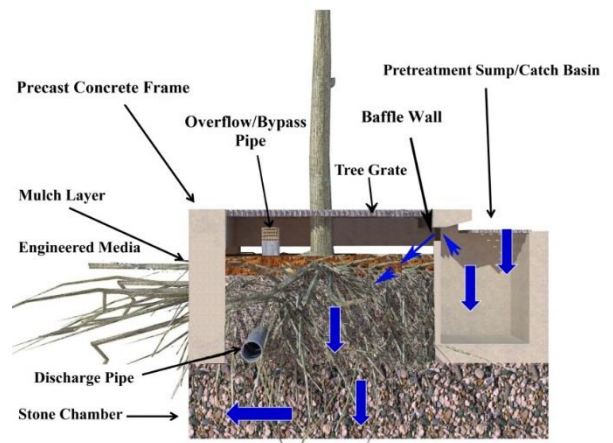


16. Alternative A: Bump Out Only. Credit: Horsley Witten Group

17. Alternative B: Stormwater Planter and Bump Out. Credit: Horsley Witten Group



19. Tree Filter – External View. Credit: Stormtree



18. Tree Filter - Internal View. Credit: Stormtree



20. Flow-In Flow-Out Bioretention. Credit: Horsley Witten Group



21. Example of Stormwater Flow-through Planter

## Implementation and Resources

All project partners recognize that this is a long-term project and this visualization concept is only the beginning. Through increased education and outreach around the project and a plan to phase each strategy, the Town of Millbury can begin to implement the recommended changes. For example, the first projects should be in municipally owned areas, such as the Post Office crosswalk. Highly visible projects such as this can help identify downfalls early on as well as showcase success and bring awareness to the project and community goals.

A baseline study of water quality could be used in documentation of future improvements from BMP implementation, and to leverage potential grant applications. Funding is a significant implementation barrier. However, potential funding mechanisms do exist, including the following:

- Massachusetts Environmental Trust, <http://www.mass.gov/eea/grants-and-tech-assistance/grants-and-loans/mass-enviro-trust/>
- EPA Grants
  - 319 Grants to Address Polluted Runoff, <https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/319-grant-program-states-and-territories>
  - Southeast New England Coastal Watershed Restoration Program, <https://www.epa.gov/snecwrp>
  - Healthy Communities Grant Program, <https://www3.epa.gov/region1/eco/uep/hcgp.html>
  - NOAA and other federal grants, <http://www.grants.gov/>
- Mass Development and Patronicity – Patronicity is a community based crowdfunding platform that is partnering with Mass Development to offer matching grants up to \$50,000. Community involvement and understanding of the project to be funded is key. [www.patronicity.com](http://www.patronicity.com)

Additional technical assistance is available through CMRPC's community development and planning services: <http://www.cmrpc.org/community-development-and-planning-services>.

Mass Audubon's Shaping the Future of Your Community Program is also available for further support in this project through outreach and education. As Millbury prepares to propose these changes at Town Meeting, please let us know how we can assist you.



## Contacts

Mass Audubon and CMRPC are available as continuing resources in the community. For questions regarding this analysis or how to implement recommended changes, please feel free to contact us.

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## Acknowledgements and Disclaimer

Special thanks to Weston & Sampson, who has played a critical role in the development of this project.



This report was prepared by Mass Audubon and its project partners as part of a technical assistance project, *Nutrient Reduction through Innovative Land Use Techniques: Overcoming Municipal Implementation Barriers*. For more information and resources produced through the project, see [www.massaudubon.org/LIDCost](http://www.massaudubon.org/LIDCost).



This project was funded by an agreement (CE96184201) awarded by the Environmental Protection Agency to the New England Interstate Water Pollution Control Commission on behalf of the Narragansett Bay Estuary Program. Although the information in this document has been funded wholly or in part by the United States Environmental Protection Agency under agreement CE96184201 to NEIWPCC, it has not undergone the Agency's publications review process and therefore, may not necessarily reflect the views of the Agency and no official endorsement should be inferred. The viewpoints expressed here do not necessarily represent those of the NBEP, NEIWPCC, or U.S. EPA nor does mention of trade names, commercial products, or causes constitute endorsement or recommendation for use.



## List of Appendices

- A. Benefits of Low Impact Development & Green Infrastructure
- B. Compiled Notes from Public Engagement Sessions
- C. May 2001 Redesign of Millbury Town Commons
- D. Historical Images of Millbury Trees
- E. Letter to Local Building/Businesses Owners



22. Asa Waters Mansion