MASSACHUSETTS
watershed·based plans

WATERSHED-BASED PLAN

East Branch of the Housatonic River

September 2024

Prepared By:

Berkshire Regional Planning Commission
2 Fenn Street
Pittsfield, MA 01201
Contact: Courteny Morehouse, Senior Planner (cmorehouse@berkshireplanning.org)

Prepared For:

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

Contents

Executive Summary

The East Branch of the Housatonic River Watershed extends 42,679 acres and is a sub-watershed in the upper Housatonic River watershed in Berkshire County, western Massachusetts. The watershed includes portions of the City of Pittsfield and the Towns of Dalton, Hinsdale, Peru, Washington and Windsor. There are several lakes including public drinking water supply reservoirs. Two key recreational lakes are Ashmere Lake (294 acres) located both in Hinsdale and Peru and Plunkett Reservoir (73 acres) located in Hinsdale. Neither lake is a designated Massachusetts "Great Pond".[1] The City of Pittsfield and the Town of Dalton are designated MS4 communities (Municipal Separate Storm Sewer System) and are regulated by the Massachusetts MS4 NPDES General Permit under the Clean Water Act (CWA).

There are four waterbodies in the East Branch of the Housatonic River watershed that are designated as impaired in the *2022 Integrated List of Impaired Waters* (MassDEP, 2023)[2]. The main impairment is on the East Branch of the Housatonic River (EB) which has an eight (8) mile segment from Center Pond to the confluence with the Housatonic River main stem listed as a Category 5 water requiring a TMDL. It is impaired with *E. coli,* Fecal Coliform and PCBs. As of July 2024, a state-wide total maximum daily load (TMDL) for pathogens is in draft form. The Housatonic watershed is included in the Long Island Sound TMDL for nitrogen Impairments and requires a 10% nitrogen reduction. The impairments for both Ashmere and Plunkett Lakes include the invasive plant, Eurasian water milfoil, *Myriophyllum spicatum*. As Category 4(c) waters, a Total Maximum Daily Load (TMDL) is not required for these impairments. The full list of waterbody impairments is provided in **Table A-13**. Berkshire Regional Planning Commission (BRPC) developed the East Branch of the Housatonic River Watershed Based Plan (EB WBP) with funding from the Massachusetts Department of Environmental Protection (MassDEP) CWA Section 319 Implementation Grant program through a Regional Coordinator Program grant. The EB WBP includes conceptual design plans for several Best Management Practices (BMPs) developed by UNH Stormwater Center, Kleinfelder, Comprehensive Environmental Inc. (CEI) and BRPC. Meetings with stakeholders including city and town officials and representatives of the Upside413 and Pittsfield Housing Authority, and Berkshire Environmental Action Team (BEAT) helped identify potential locations for stormwater BMPs, both structural and non-structural, to begin to address the identified impairments. To the extent possible, we have incorporated knowledge of existing BMPs and completed projects. This plan does not include BMP considerations specific to Ashmere and Plunkett Lakes. The focus for this plan is on the urbanized areas of the East Branch of the Housatonic River watershed in Pittsfield and Dalton. A revision of this plan could incorporate these lake watersheds or separate plans could be completed.

A draft EB WBP was shared with key stakeholders and their comments have been integrated into this final plan. For more information, questions, or to provide input, please contact Courteny Morehouse, Energy & Environmental Senior Planner at Berkshire Regional Planning Commission at cmorehouse@berkshireplanning.org.

[1] https://www.mass.gov/doc/massachusetts-great-ponds-list/download
[2] https://www.mass.gov/doc/final-massachusetts-integrated-list-of-waters-for-the-clean-water-act-2022-reporting-cycle/download

Introduction

What is a Watershed-Based Plan?

Purpose & Need

The purpose of a Massachusetts Watershed-Based Plan (WBP) is to organize information about Massachusetts' watersheds and present the information in a format that will enhance the development and implementation of projects that will restore water quality and beneficial uses in the Commonwealth. The Massachusetts WBP follows the United States Environmental Protection Agency's (EPA's) recommended format for "nine-element" watershed plans, as described below.

All states are required to develop WBPs, but not all states have taken the same approach. Most states develop WBPs only for selected watersheds. Massachusetts Department of Environmental Protection's (MassDEP's) approach has been to develop a tool to support statewide development of WBPs so **that good projects in all areas of the state may be eligible for federal watershed implementation grant funds** under Section 319 of the Clean Water Act.

EPA guidelines promote the use of Section 319 funding for developing and implementing WBPs. WBPs are required for all projects implemented with Section 319 funds and are recommended for all watershed projects, whether they are designed to protect unimpaired waters, restore impaired waters, or both.

Watershed-Based Plan Outline

This WBP includes nine elements (a through i) in accordance with EPA Guidelines:

a) An **identification of the causes and sources** or groups of similar sources that will need to be controlled to achieve the load reductions estimated in this WBP and to achieve any other watershed goals identified in the WBP, as discussed in item (b) immediately below.

b) An **estimate of the load reductions** expected for the management measures described under paragraph (c) below, recognizing the natural variability and the difficulty in precisely predicting the performance of management measures over time.

c) A **description of the nonpoint source (NPS) management measures** needed to achieve the load reductions estimated under paragraph (b) above as well as to achieve other watershed goals identified in this WBP and an identification (using a map or a description) of the critical areas in which those measures will be needed to implement this plan.

d) An **estimate of the amounts of technical and financial assistance needed**, associated costs, and/or the sources and authorities that will be relied upon, to implement this plan. As sources of funding, States should consider the use of their Section 319 programs, State Revolving Funds, United States Department of Agriculture's (USDA's) Environmental Quality Incentives Program and Conservation Reserve Program, and other relevant federal, state, local, and private funds that may be available to assist in implementing this plan.

e) An **information/education component** that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the NPS management measures that will be implemented.

f) A **schedule for implementing the NPS management measures** identified in this plan that is reasonably expeditious.

g) A description of **interim, measurable milestones** for determining whether NPS management measures or other control actions are being implemented.

h) A set of **criteria to determine if loading reductions are being achieved** over time and substantial progress is being made toward attaining water quality standards and, if not, the criteria for determining whether this WBP needs to be revised or, if a NPS total maximum daily load (TMDL) has been established, whether the TMDL needs to be revised.

i) A **monitoring component** to evaluate the effectiveness of the implementation efforts over time measured against the criteria established under item (h) immediately above.

Project Partners and Stakeholder Input

This plan would not have been possible without the funding support of the MassDEP Clean Water Act 319 Regional Coordinator Program.

The preparation of the East Branch of the Housatonic River Watershed Based Plan (EB WBP) is the compilation of various projects, conversations and meetings already conducted that have resulted in the development of conceptual designs for the key municipalities: the City of Pittsfield and the Town of Dalton. In addition, BRPC met with additional stakeholders including Berkshire Environmental Action Team (BEAT), Pittsfield Housing Authority (PHA), Upside 413 (formerly known as Berkshire County Regional Housing Authority), Central Berkshire Habitat for Humanity, and the Gray to Green Coalition – a collection of community-based organizations whose focus is to promote and support improvement projects in the environmental justice communities of Pittsfield led by BRPC.

The Town of Dalton's *Green Infrastructure Report* (2022) developed by Berkshire Regional Planning Commission (BRPC) worked with the Town of Dalton and engineering consultants, Comprehensive Environmental Incorporated (CEI) and University of New Hampshire Stormwater Center to explore areas where green infrastructure best management practices (BMPs) could be installed both within the Walker Brook watershed, sub-watershed of the East Branch, as well as throughout developed areas town-wide. Outreach through educational flyer mailings and public presentations kept residents and community members notified about study details. The goal was to help Dalton better prepare for the growing likelihood of flood events due to a changing climate and increased precipitation while at the same time mitigate water quality issues caused by municipal stormwater within the MS4 area, particularly nitrogen. The conceptual designs that were included in this report have been incorporated into this watershed-based plan.

Data Sources

- This WBP was developed using the framework and data sources provided by MassDEP's WBP Tool.[3]

[3] http://prj.geosyntec.com/MassDEPWBP

- Project areas for high-priority structural stormwater BMPs were identified through a variety of projects:
  - The City of Pittsfield *Nitrogen and Phosphorous Identification Report* prepared for the City of Pittsfield by Kleinfelder provided BMP recommendations for several city-owned parcels.
  - Conceptual designs prepared for the Town of Dalton and City of Pittsfield by the University of New Hampshire (UNH) Stormwater Center for the Massachusetts Department of Environmental Protection (MassDEP) *Technical and Planning Support for the Implementation of Pathogen and Total Nitrogen Pollution Reduction in the Housatonic River Watershed* project.
  - Funding from the Massachusetts Executive Office of Energy & Environmental Affairs and the Town of Dalton's MS4 funds supported the development of conceptual designs by Comprehensive Environmental Incorporated (CEI) which are included in the Town of Dalton's *Green Infrastructure Report* Comprehensive Environmental (CEI), Inc.
- Additional water quality data was provided by Housatonic Valley Association (HVA) – the watershed-based organization for the Housatonic.
- Resources used to support BRPC's development of stormwater BMP conceptual designs include the Massachusetts Stormwater Handbook Volume 2 and the New England Stormwater Retrofit Manual (July 2022)[45]

Summary of Ongoing Projects and Completed Work

Structural BMPs

Table 1 provides a summary of the known stormwater BMPs in the East Branch of the Housatonic River watershed. Most of these projects were constructed on private properties, both commercial and residential. The review of the existing BMP locations indicated some maintenance and functionality issues which are outlined below:

Rice Silk Mill Dry Detention Basin, Pittsfield (42.456337, -73.242709)– Vegetation is taking over the basin and trash was observed. Review with the property owners the maintenance of this dry detention basin and figure a path forward for future ongoing maintenance. Consider the potential for retrofitting into a pollinator garden.

Gordon Street Habitat Development Rain Gardens, Pittsfield (42.44469, -73.24551) Proposed retrofits are provided in Element C. The original engineering plans are provided in Appendix B. The stormwater BMPs installed at this site do not function properly as explained below:

(1) The two sediment forebays are holding water for longer than 48 hours and likely have become mosquito breeding grounds.
(2) There are no inlets to the forebays from the street and it is not apparent how the water moves from the forebays to the rain gardens which are very shallow.
(3) The rain gardens do not seem to be receiving stormwater and are very shallow.
(4) Residents have to trim the planted vegetation to help maintain a line of sight for drivers exiting Gordon Street and entering Deming Street.

[4] https://www.mass.gov/doc/massachusetts-stormwater-handbook-vol-2-ch-2-stormwater-best-management-practices/download
[5] https://www3.epa.gov/region1/npdes/stormwater/tools/snep-stormwater-retrofit-manual-july-2022-508.pdf

Frederick Drive Bioinfiltration Basin, Dalton (42.459364, -73.1793023) – Just west of the Frederick Drive/Barton Brook road-stream crossing is a bioretention basin, located on private property (90 Frederick Drive) that detains stormwater runoff from Frederick Drive discharging from a plastic outfall pipe, identified as BaB160 on the stormwater map for Dalton. Overflow from this basin discharges to a smaller second basin. Japanese knotweed (*Reynoutria japonica*). and discarded yard waste was observed to fill the main basin. It is recommended that the Operation and Maintenance plan for this development be reviewed and initiated. The property owners of 90 Frederick Drive and adjacent residents should be educated about the purpose and maintenance of this BMP. Town of Dalton assistance in ongoing maintenance may be necessary.

Table 1: Existing Stormwater BMPs in the East Branch of the Housatonic River Watershed

Ownership	Location / Project	BMP	Installation Date
Private (Pittsfield Silk LLC)	Rice Silk Mill	Dry Detention Basin	Approx. 2015
City of Pittsfield	Berkshire Innovation Center, 45 Woodlawn Avenue, Pittsfield	Stormwater infiltrated onsite with multiple BMPs including dry retention basins	2020
Private/Central Berkshire Habitat for Humanity	52 - 62 Gordon Street, Pittsfield	Sediment Forebays with Bioinfiltration Basins/Rain Gardens	2020
Central Berkshire Regional School District	Wahconah Regional High School, Dalton	Stormwater infiltrated onsite with multiple BMPs including Bioinfiltration Basins	2021
Town of Dalton	East Housatonic Street, Dalton	Dry Retention Basin	2016
City of Pittsfield	Crane Avenue	Fourteen catch basins and leaching structures	2010
Private (Halkeen Management)	Oak Hill Apartments, 433 Crane Avenue, Pittsfield	BMPs installed in a series: 1 Sediment Forebay, 1 Dry Detention Pond, 1 Constructed Wetland and one Stone Filter Berm	2011
Town of Hinsdale	Ashmere Road, Henry Drive and Charles Street, Hinsdale	Multiple deep-sump catch basins and grassed swales	2003
Private/ Town Managed	90 Frederick Drive, Dalton	Bioinfiltration Basin	unknown
MassDOT	660 Merrill Road (north of)	Dry Retention Basin	unknown

East Housatonic Street Bioinfiltration Basin, Dalton (42.4671945, -73.142521): - Installed in approximately 2019, this bioinfiltration basin is fully vegetated with Japanese knotweed (*Reynoutria japonica*). The outfall pipe (EAB840) discharges to this basin. While the knotweed may not impede stormwater infiltration, it can make it difficult to maintain the basin. Also, as it is an invasive plant, it is recommended that the invasive knotweed is dug out using a bobcat and the basin be reseeded with grass. After one year, revisit the site and dig out the roots of any regrowth, then plant with pollinator plants and mow the basin once a year in late fall or reseed with grass regular mowing schedule.

Non-Structural BMPs – Ongoing

Outreach and Engagement

MS4 Education: Both the City of Pittsfield and Town of Dalton are MS4 Communities governed by the EPA under the Clean Water Act National Pollution Detection and Elimination System (NPDES). The MS4 regulated area includes. The municipalities, with support from stakeholders such as HVA and BRPC, provide annual messaging to residents and businesses that include:

1. Proper disposal of pet waste (City of Pittsfield and Town of Lanesborough have pet waste laws)
2. Proper operation and maintenance of septic systems
3. Proper management of grass clippings and leaves
4. Minimize fertilizer usage and never before storms.

Town of Dalton Stormwater Management Commission provides stormwater information on their website https://dalton-ma.gov/dalton-stormwater-commission. In the City of Pittsfield, information is provided on the public utilities website: https://cms2.revize.com/revize/pittsfieldma/city_hall/public_works_and_utilities/uploads/Pittsfield%20MA_Inflow%20Ph4_Inflow%20Webpage%20Draft_5.27.22.pdf

Street Sweeping Protocols

City of Pittsfield

The entire City is swept at least 2 times a year, once in the fall and once in the spring. Main streets and parking lots are swept at a higher frequency (1-2 times a month). The city has increased street sweeping frequency of all municipal owned streets and parking lots which have potential for high pollutant loads. The city's website provides a street sweeping map that indicates which streets are regularly swept.[6] (City of Pittsfield's MS4 2022 Report)

Town of Dalton

Street Sweeping is contracted out and is conducted in the spring and fall on all streets.

Catch Basin Cleaning Protocols

City of Pittsfield

The City of Pittsfield has established catch basin cleaning protocols in accordance with the MS4 regulations. The City prioritizes inspection and maintenance of the catch basins located in the East Branch of the Housatonic River watershed, to ensure that no sump shall be more than 50 percent full. Cleaning of catch basins is completed more frequently, if inspection and maintenance activities indicate excessive sediment or debris loadings. In 2021, 25 catch basins in Pittsfield were anecdotally identified as historically having sumps fill to and past 50% full. These catch basins were cleaned and rebuilt by the

6 https://cms2.revize.com/revize/pittsfieldma/city_hall/public_works_and_utilities/docs/CityStreetSweepingMap_20210601.pdf

Highway Department. The city has a list of low-lying catch basins that are prone to flooding. These catch basins are more routinely inspected and maintained to ensure proper drainage.

Town of Dalton

Dalton contracts out catch basin cleaning which occurs once a year in the spring. Catch basins with excessive debris (over 50% full) are investigated and the source of debris is fixed when possible.

Stormwater Regulations

The following stormwater regulations in the City of Pittsfield and Town of Dalton support the implementation of stormwater BMPs and encourage residents to pick up their dog's waste.

- City of Pittsfield Stormwater Management Ordinance: https://ecode360.com/30744151
- City of Pittsfield Pet Waste Ordinance: https://ecode360.com/15966545
- Town of Dalton Stormwater Management and Erosion Control: Chapter 280 https://ecode360.com/9537082

No pet waste by-law was found for the Town of Dalton.

Completed Projects

MassDEP Upper Housatonic TMDL Project (2022)

In collaboration with local stakeholders including the municipalities of Pittsfield, Dalton, and Lanesborough, BEAT, HVA, BRPC, MassDEP conducted the Upper Housatonic TMDL project to support the reduction of stormwater pollution in the upper Housatonic River Watershed. The conceptual designs developed for any East Branch watershed locations have been included in this plan.

The project was designed to: (1) Build capacity for integrating green infrastructure and other stormwater controls into municipal decision making. (2) Provide tools that can be used as part of watershed planning to prioritize stormwater controls going forward. (3) Achieve innovative and cost-effective management of stormwater to help meet MS4 requirements while realizing other co-benefits. MassDEP and the UNH Stormwater Center worked with the stakeholders to complete the following tasks:

1. Develop an approach for using EPA's Opti-Tool to prioritize and rank watersheds for implementing stormwater controls.[7]
2. Conduct a stormwater management assessment to inform cost-effective opportunities within the built landscape with a focus on reducing pathogen and total nitrogen pollution.
3. Work with local partners to identify stormwater controls, conduct site visits to evaluate opportunities, and develop conceptual stormwater management designs.

Lenox MVP Regional Action Grant (2022 – 2023)

The City of Pittsfield was one of the partners in this grant project which was funded by EOEEA's MVP program. The project provided the City with a Road Stream Crossing Plan that includes an inventory of all the road-stream crossings and prioritizes their replacement based on aquatic connectivity, flood risk

[7] https://www.epa.gov/tmdl/opti-tool-epa-region-1s-stormwater-management-optimization-tool

and condition of the crossing. In addition, the crew assessing the culverts completed a nature-based observations data form to help inform nature-based solutions for each sub-watershed. Trout Unlimited completed the report of the nature-based findings and identified segments of streams on Unkamet and Brattle Brooks that could benefit from restoration projects that would reduce bank erosion and improve climate resiliency. Knotweed (*Reynoutria japonica*). is an invasive plant that is proliferating in the Housatonic watershed including the East Branch of the Housatonic River watershed.

Dry Weather Screening of Stormwater Outfalls in MS4 designated areas (2022)

The City of Pittsfield is in the process of completing and the Town of Dalton has completed the dry weather screening of the stormwater outfalls in the East Branch of the Housatonic River watershed. Outfalls observed discharging in dry weather (defined as more than 0.1 inches of precipitation in 24 hours) are sampled for multiple parameters including Total Nitrogen and *E. coli*. Additional information is provided in Element A under *Dry Weather Stormwater Outfall Sampling.*

Water Chestnut Removal was conducted at Center Pond (2022)

In 2022, HVA staff and interns discovered water chestnut (*Trapa natans*) growing in the impounded segment of the East Branch of the Housatonic River known as Center Pond. With permission granted from the Conservation Commission, HVA's Berkshire Watershed Manager, Alison Dixon, coordinated hand-removal of the water chestnut with many hours contributed by the summer interns and volunteers. All of the visible water chestnut plants were removed prior to seed drop. Unfortunately, additional removal events were not coordinated in 2023 or 2024. This should be revisited, and volunteers coordinated to hand-pull the water chestnut in 2025. A fact sheet about this invasive plant is provided by the Massachusetts Department of Conservation and Recreation. [8]

Educational Outreach Materials

a. *River Smart brochure*: HVA worked with Pittsfield and Dalton to develop a brochure to educate and inform residents about stormwater and provide suggestions for minimizing stormwater impacts. For Pittsfield, the brochure was printed in both English and Spanish. The brochures were distributed at multiple public places and tabling events.
b. *Educational Yard and Pet Waste messaging***:** The City of Pittsfield included inserts in the utility bills to inform residents about proper management of yard and pet waste. In addition, HVA created slides that were included in the advertisements shown at the local cinema on North Street, Pittsfield.
c. *Tri-fold stormwater display* developed by HVA for use at tabling events in the City of Pittsfield shared the message about the impacts of stormwater and tips for people to reduce their impact.
d. *Dalton Get River Smart Educational Program* included a tri-fold display developed by HVA for use at tabling events in the Town of Dalton and shared the message about the impacts of stormwater and tips for people to reduce their impact. Slides promoting best management practices for homeowners were shown on the local cable TV station, Dalton Community Television.

[8] https://www.mass.gov/doc/water-chestnut-0/download

Storm Drain Stenciling – City of Pittsfield & Town of Dalton

HVA has worked with Pittsfield and Dalton to glue decals adjacent to storm drains to inform people not to dump anything down the storm drain. In both municipalities, the focus was to decal neighborhoods where they are most visible. These decals need to be replaced every 1 – 3 years. In Pittsfield, many need replacing. Boy Scout groups and students from elementary and high schools assisted with decaling.

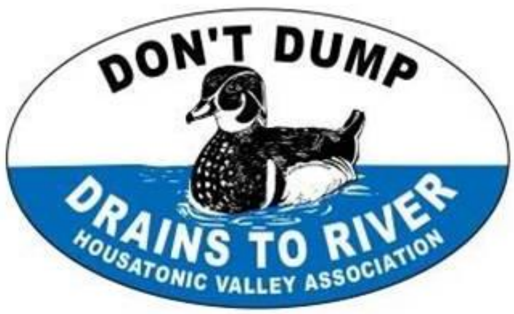


Figure 1: HVA's Storm Drain Decal

Fifth Grade Watershed Education – Hinsdale, Dalton and Pittsfield (2020 – 2023)

From 2020 - 2023, HVA and Mass Audubon provided watershed focused education programs to fifth grade classes in the East Branch of the Housatonic River watershed including Craneville Elementary School, Dalton, Kittredge Elementary School, Hinsdale and Pittsfield's Egremont Elementary School and Morningside Community School (Elementary). Fifth grade students learned about the water cycle, water quality, the impact of polluted stormwater, green infrastructure, and nature-based solutions in multiple hands-on engaging programs. These school programs were primarily funded by the Natural Resources Damages Fund for the Housatonic River.

Documenting Bacterial Contamination Improvements in the Hoosic and Housatonic River Watersheds (Clean Water Act [CWA] Project #: 2016-02/604)

This project funded water quality monitoring on Wahconah Falls Brook (in addition to the Southwest Branch) in the Housatonic watershed to document current *E. coli* levels. The intent was to provide water quality sampling information that would allow MassDEP to consider delist water bodies from the state's impairment list. The water body in the East Branch watershed that was sampled under this project was Wahconah Falls Brook which is no longer on the impaired list.

East Branch Stream Assessments (2014 and 2000)

Completed by HVA with support of volunteers, the East Branch Stream Assessment Report and Recommended Action Plan completed in 2014 updated the stream assessment completed in 2000. Included in the list of recommendations is implementation of green infrastructure and education programs to improve awareness of water quality issues, foster appreciation for the East Branch of the Housatonic River and information about ways to support and improve water quality including yard debris and pet waste management. Completed project highlights are provided below:

Crane & Company's Berkshire Dam was removed in 2001. HVA assisted in this effort. Working with Massachusetts Riverways (MA DER), HVA inventoried and conducted an initial investigation on a series of dams on the East Branch that may be a candidate for removal. The old C.J. Kittredge & Sons Mill dam in downtown Hinsdale blew out in 2008. A recommendation by the selectman was made to repair the dam. HVA and several local residents persuaded the town to leave the dam breached.

From 2001 to 2007, HVA operated a volunteer chemical water quality monitoring program with an approved Quality Assurance Project Plan (QAPP). Eventually, 30 river sites were included in this monitoring program. Unfortunately, due to a lack of funding, the project ended. HVA collected valuable river data, including 5 sites where raw sewage was flowing out of storm drains directly into the river. These sites were reported to the appropriate municipality. All sites were remediated. We specifically monitored for any impact from the Wahconah Country Club to the river. Due to the comprehensive integrated pest and fertilizer management program implemented by the golf course managers, little impact was observed.

East Branch Housatonic Watershed Assessment Project (CWA Project Number 02-05/604)

Project conducted from July 2002 to June 2005 by BRPC. The primary goal of this project was to comprehensively assess the extent of known and suspected nonpoint source pollution problems in the East Branch subwatershed. BRPC and the HVA partnered to conduct this project. BRPC and HVA utilized a combination of monitoring, surveying, design, planning, and educational activities which were built on previous projects and partnerships conducted over the past several years in the Housatonic Watershed. The assessment activities conducted under this project surveyed and monitored potential nonpoint source pollution problems and identified actions to be taken by the municipalities, water suppliers, and volunteers. This assessment led to a comprehensive strategy for addressing nonpoint source pollution in this watershed, which included conceptual designs for the implementation of best management practices. Planning and educational activities conducted under this project led to significant achievements in the ability of two municipalities (Dalton & Hinsdale) to meet the requirements of NPDES Phase II Final Rule and adopt water quality protection measures. *(Final report located with BRPC: "I:\Archive Pre 2020\Environment\EastBranch 604\Final Report")*

Implementing a Stormwater Remediation Strategy at Ashmere Lake (CWA Project #: 01-15/319 conducted 2002 – 2005)

This project continued to improve water quality at Ashmere Lake through a comprehensive stormwater and nonpoint source pollution management strategy. The following objectives were accomplished:

- Multiple BMPs were designed (including catch basins and grassed swales) permitted and installed on Ashmere Road, Henry Drive and Charles Street, unpaved roads adjacent to Ashmere Lake. An Operation and Maintenance plan was prepared.
- Signage was installed to help control the spread of non-native weed species;
- In-lake treatment of herbicides was done to help manage non-native invasive species;
- A comprehensive Diagnostic / Feasibility study for management of Ashmere Lake was prepared;
- An outreach and education program for municipal officials and homeowners was conducted during the design, permitting and installation of the BMPs.

- Students at the Hinsdale elementary school were educated about stormwater runoff and glued decals adjacent to storm drains with "Don't Dump, Drains to River" decals.

Oak Hill Tributary Improvement Projects (CWA Project # 06-04/319)

- Installation of fourteen (14) deep sump leaching catch basins located on Crane Avenue, Pittsfield between Unkamet Park Drive and Oak Hill Road.
- Two detention basins installed at 433 Crane Avenue (Oak Hill Apartments) that work in series for pollutant removal as follows: Detention Basin No. 1 accepts all flows from collection systems. Water will be routed through a forebay first for sediment removal, followed by treatment in the basin. Much of the first flush will be infiltrated into the ground, while the clarified discharge water will flow from Detention Basin No. 1 to Detention Basin No. 2. Detention Basin No. 2 was constructed as a wetlands treatment area.

Element A: Identify Causes of Impairment & Pollution Sources

Element A: Identify the causes and sources or groups of similar sources that need to be controlled to achieve the necessary pollutant load reductions estimated in the watershed based plan (WBP).

General Watershed Information

The East Branch of the Housatonic River watershed, which covers 42,679 acres, is a sub-watershed of the Housatonic watershed located in Berkshire County, western Massachusetts. The municipalities in the watershed include portions of Pittsfield (population 43,461), Dalton (population 6,330), Hinsdale (population 1,919), Peru (population 814) and Windsor (population 831).[9] The most developed municipalities in the watershed are the City of Pittsfield and the Town of Dalton with 18% of the East Branch watershed subject to the NPDES General MS4 Stormwater Permit (USEPA 2016). The East Branch Housatonic River (MA21-02) drains an area of 71 square miles, of which 5 square miles (7%) is impervious and 3 square miles (4%) is directly connected impervious area (DCIA). Most of Hinsdale, Dalton, and Pittsfield, is served by public sewer all of which is treated at the Pittsfield Wastewater Treatment Plant located outside of the watershed. The remaining residents have private septic systems.

The main stem of the East Branch watershed begins at Muddy Pond (Washington and Hinsdale) in the Hinsdale Area of Critical Concern and flows through the center of Hinsdale which includes small businesses (restaurant, automotive services), town offices and residential areas, through the Wahconah Country Club golf course (Dalton) and through medium density mixed residential and commercial areas in downtown Dalton, then a commercial district with expansive parking lots near the MA-9/MA-8 intersection in Pittsfield. The downstream portions of the segment flow through areas of dense residential development, open recreational fields, and additional commercial districts in Pittsfield. Numerous tributaries feed the mainstem with the key tributaries being Anthony, Barton, Brattle, Cleveland, Unkamet, Wahconah Falls, and Walker Brooks. Named lakes and ponds within the watershed include Ashmere Lake, the Cleveland Brook Reservoir, Plunkett Reservoir, Muddy Pond, Belmont Reservoir, Fernwood Reservoir, and Windsor Reservoir.

Key landmarks in the watershed include the town centers of Hinsdale, Dalton, and Pittsfield, the Allendale Shopping Center, and residential neighborhoods of Pittsfield between Elm Street and Pomeroy Avenue. There are several golf courses in the watershed including Bas Ridge (Hinsdale), Wahconah Country Club (Dalton), Berkshire Hills Country Club (Pittsfield) and even a portion of the GEAA course (Pittsfield).

[9] https://www.census.gov/en.html

The East Branch of the Housatonic River watershed is predominantly forested (71% of land use) with any developed areas (14%) concentrated around the main stem. In the East Branch of the Housatonic River watershed, under the Natural Heritage and Endangered Species Program, there are 2,686 acres (6%) of Priority Habitats of Rare Species and 279 acres (1%) of Priority Natural Vegetation Communities. There are 10,436 acres (23%) under Public Water Supply protection and 14,057 acres (31%) within the Hinsdale Flats Watershed Area of Critical Environmental Concern (ACEC).[10]

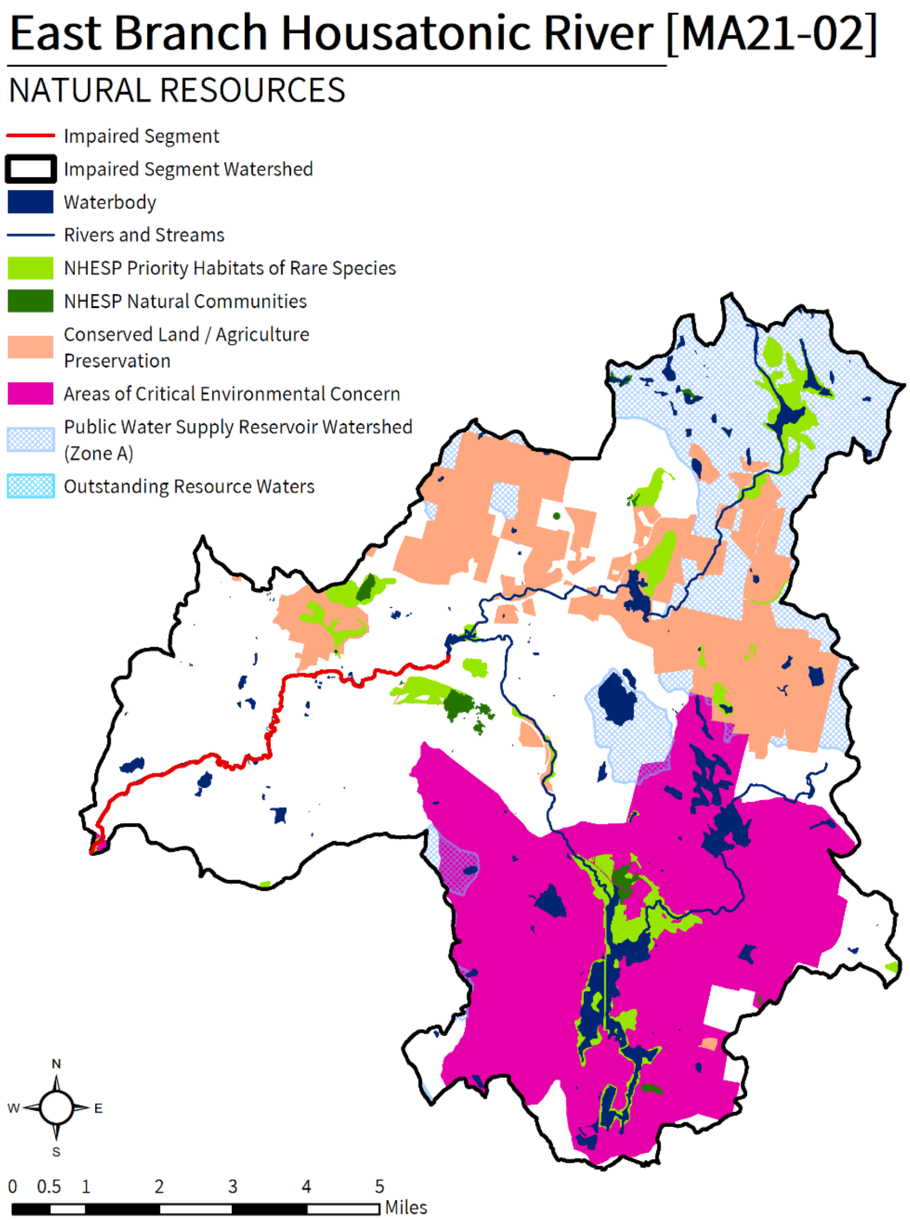


Figure A – 1: Natural Resources of the East Branch Watershed[11]

---

[10] https://www.mass.gov/doc/appendix-b-housatonic-river-basin/download

[11] As above

The Hinsdale Flats Watershed ACEC is located at the headwaters of the East Branch of the Housatonic River and covers parts of Hinsdale, Washington, Peru, and Dalton. The ACEC is generally defined by several watershed sub-basins that contribute to the northward-flowing headwaters of the East Branch of the Housatonic River above the Old Grist Mill Dam in the town of Hinsdale.

Beginning in the town of Washington, the East Branch flows through extensive wetlands and floodplains known as the Hinsdale Flats. Tributary streams flow into the Flats and East Branch from higher elevations and ridges to the east, west, and south. The excellent water quality of the upper portion of the East Branch and its tributaries, the wetlands and floodplains of the Hinsdale Flats, and the surrounding uplands support an outstanding variety of natural communities and wildlife, including six state-listed rare species. Several summer camps, vacation homes, and public recreation areas (including the Hinsdale Flats Wildlife Management Area, Ashmere Lake, and Plunkett Reservoir) benefit from the natural beauty and resources of the area. Surface and ground water provide drinking water for residents of the area, and the headwaters contribute to important water supplies downstream.[12]

It was the excellent water quality of the East Branch that attracted the founding of Crane & Company in 1801 by Zenas Crane and partners on the banks of the East Branch in Dalton. Still operational today as Crane it continues to manufacture paper for the United States' currency. An existing dam for one of the mill buildings has created the Center Pond impoundment. A NPDES permit authorized for Crane & Company's wastewater treatment plant discharges to the East Branch.

In the East Branch Watershed, the only impaired water that will require a TMDL is a segment of the East Branch of the Housatonic River from the outlet of the Center Pond (Dalton) to the confluence with the Housatonic River mainstem (Pittsfield). This segment of the East Branch is impaired for *E. coli,* Fecal coliform and PCBs in fish tissue. A statewide TMDL for pathogens is currently in draft form and will likely be finalized by 2025.

Both Ashmere Lake (294 acres) and Plunkett Lake (73 acres) are Category 4 waters that will not require a TMDL. These recreational lakes are impaired with invasive vegetation including Eurasian Water Milfoil (*Myriophyllum spicatum*) and Plunkett Reservoir has an additional plant invasive Brittle Naiad (*Najas minor*). The Hinsdale Lake Management Committee works to preserve and protect Lake Ashmere and Plunkett Reservoir from environmental harm on behalf of present and future generations of Hinsdale residents, while respecting the interests of property owners and the public at large. More information, minutes and agendas for the Committee are available at https://www.hinsdalemass.com/lake-management-committee . Windsor Brook, impaired for dewatering, is also a Category 4(c) water.[13]

From 1932 through 1977, General Electric manufactured and serviced electrical transformers containing polychlorinatedbiphenyls (PCBs). Years of PCB and industrial chemical use, and improper disposal, led to extensive contamination of a segment of the East Branch of the Housatonic River in Pittsfield. Remediation of

[12] https://www.mass.gov/info-details/hinsdale-flats-watershed-acec

[13] Windsor Brook segment is from the headwaters, southeast of Fobes Hill (west of Savoy Hollow Road), Windsor to the mouth at inlet Windsor Reservoir, Hinsdale.

the “Upper ½-Mile Reach,” was completed first in 2002 and addressed the contaminated riverbanks and sediments of the East Branch of the Housatonic River from the Newell Street Bridge to the Lyman Street Bridge. Remediation of the “1½ Mile Reach” was completed in 2006 and addressed the contaminated riverbanks and sediments from the Lyman Street Bridge to the confluence of the East and West Branches of the Housatonic River. Additional sites in the East Branch Watershed that have been or are in the process of being remediated for PCBs include the Allendale Elementary School, Silver Lake, the GE Plant area and Unkamet Brook. Additional information about the remediation of PCBs in the East Branch and the entire Housatonic watershed is available at https://www.epa.gov/ge-housatonic.

Table A- 1: General Watershed Information

Watershed Name (Assessment Unit ID):	Anthony Brook (MA21-10) ; Barton Brook (MA21-60) ; Bennett Brook ; Brattle Brook (MA21-59) ; Cady Brook (MA21-12) ; Cleveland Brook (MA21-08) ; East Branch Housatonic River (MA21-01) ; East Branch Housatonic River (MA21-02) ; Frisell Brook ; Kilburn Brook ; Russo Brook ; Tracy Brook ; Tyler Brook (MA21-32) ; Unkamet Brook ; Unnamed Tributary (MA21-62) ; Wahconah Falls Brook (MA21-11) ; Walker Brook ; Welch Brook (MA21-33) ; Welsh Brook ; Weston Brook (MA21-61) ; Windsor Brook (MA21-09)
Major Basin:	Housatonic River
Watershed Area (within MA):	42679.2 (ac)

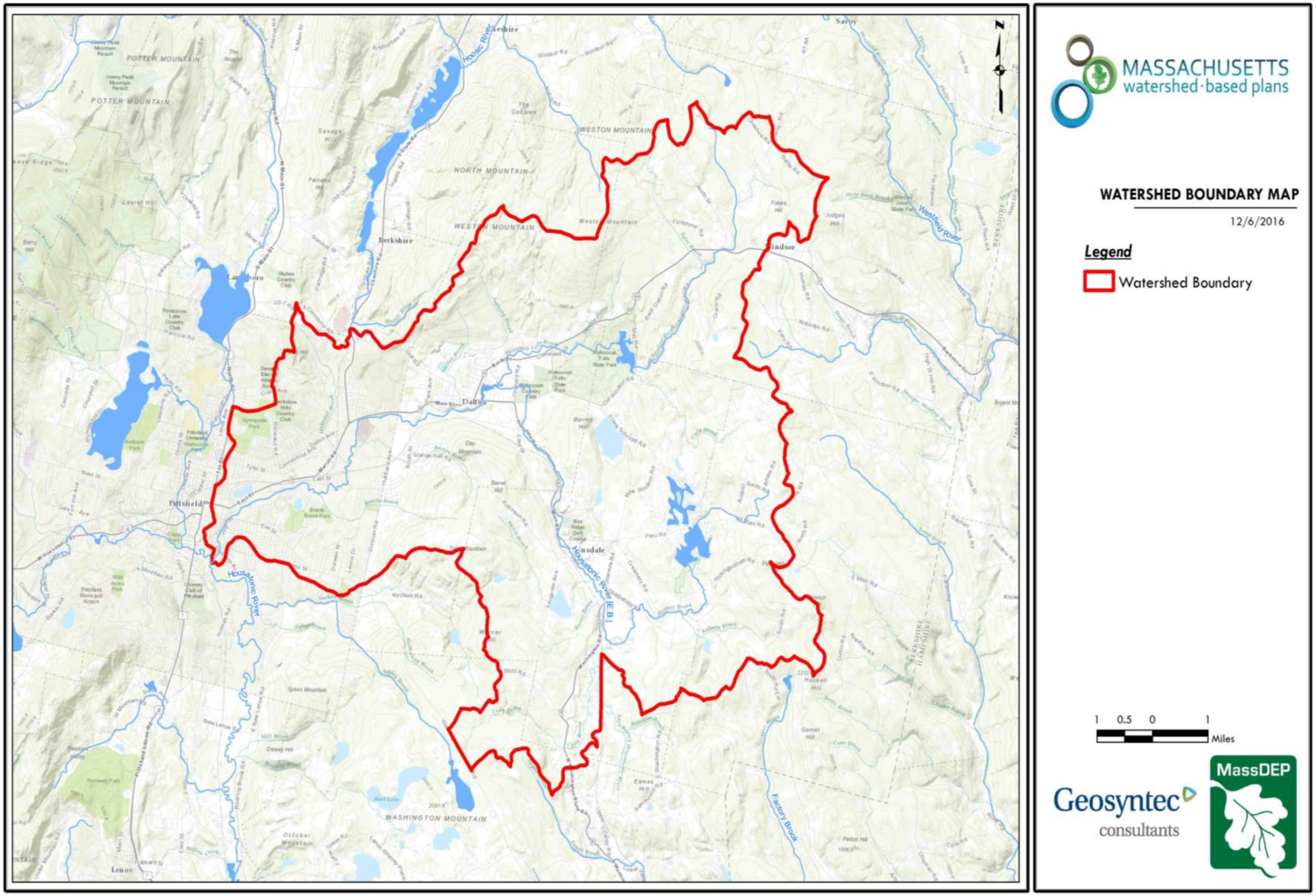


Figure A-2: Watershed Boundary Map (MassGIS, 2007; MassGIS, 1999; MassGIS, 2001; USGS, 2016)

Ctrl + Click on the map to view a full-sized image in your web browser.

Additional Watershed Reports

Additional reports and studies that helped inform this watershed-based plan are summarized in **Table A-2**. Links are provided where available. For information or a digital copy of other reports, please contact BRPC.

Table A-2: Additional East Branch Watershed Reports

Year	Title	Prepared by	Description	Link
2002	Water Quality Report for the East, West and Southwest Branches of the Housatonic River	HVA	Report includes results and summary for 16 sites monitored on the East Branch	https://hvatoday.org/wp-content/uploads/2018/04/2002WQReport.pdf
2003	Diagnostic Feasibility Study of Ashmere Lake	ESS Group	Provided a comprehensive assessment of and management recommendations for Ashmere Lake	https://www.hinsdalemass.com/sites/g/files/vyhlif7501/f/uploads/ashmere_lake_study_2003_2.pdf
2005	Implementing a Stormwater Remediation Strategy at Ashmere Lake (CWA Project #: 01-15/319)	BRPC for the Town of Hinsdale	to improve water quality at Ashmere Lake through a comprehensive stormwater and nonpoint source pollution management strategy. Catch basins and grassed swales were installed on Ashmere Road, Henry Drive and Charles Street, unpaved roads adjacent to Ashmere Lake. A Diagnostic Feasibility Study of Ashmere Lake completed. Outreach and Education conducted. Project conducted 2002 – 2005	Contact BRPC for a digital copy. This report is not available on the internet.
2005	East Branch Housatonic Watershed Assessment Project (CWA Project #: 02-05/604)	BRPC & HVA	Provided a comprehensive assessment of known and suspected nonpoint source pollution problems in the East Branch subwatershed. Project conducted 2002-2005.	Contact BRPC for a digital copy. This report is not available on the internet.

Table A-2: Additional East Branch Watershed Reports

Year	Title	Prepared by	Description	Link
2007	Oak Hill Tributary Improvement Projects	City of Pittsfield with BRPC support	Reduce pollutant load to Unkamet Brook with the installation of multiple BMPs on Crane Avenue and at Oak Hill Apartments, Pittsfield. Project conducted 2007 - 2011.	Contact BRPC for a digital copy. This report is not available on the internet.
2009	City of Pittsfield's Master Plan	City of Pittsfield	Describes a vision of Pittsfield's growing and revitalized future	https://www.cityofpittsfield.org/city_hall/community_development/planning_and_development/master_plan.php
2014	East Branch Assessment Report & Recommended Action Plan	HVA	Conducted by HVA, this assessment provides a summary of observations and recommendations for the East Branch of the Housatonic River.	Contact BRPC for a digital copy.
2016	Town of Dalton Master Plan	The Dalton Master Plan Steering Committee & The Berkshire Regional Planning Commission (BRPC)	The Master Plan has the goal to improve the economy and the well-being of its residents through various means.	https://dalton-ma.gov/wp-content/uploads/2022/04/Final_Dalton_Master_Plan_160720_Compressed.pdf
2018	Dalton Multi-Hazard Mitigation Plan Update	Dalton Emergency Management Advisory Council with Technical Assistance provided by BRPC	This plan is part of an ongoing effort to reduce the negative impacts and costs from damage associated with natural hazards, such as nor'easters, floods, and hurricanes. (To be updated every 5 years)	https://dalton-ma.gov/wp-content/uploads/2022/04/Dalton-MA-Multi-Hazard-Plan-Adopted.pdf
2019	Dalton MVP Plan	Town of Dalton with BRPC support	A climate resilience study and action plan	https://dalton-ma.gov/wp-content/uploads/2022/04/Dalton-MVP-Community-Resilience-Building-Workshop-Summary-of-Findings.pdf
2019	Town of Dalton's Stormwater Management Plan	Town of Dalton with BRPC support	Required of MS4 regulated communities, this outlines how the town is and will meet the requirements of the MS4 NPDES General Permit requirements.	https://dalton-ma.gov/wp-content/uploads/2022/09/Dalton-Final-2019-SWMP_updated09-15-2022.pdf

Table A-2: Additional East Branch Watershed Reports

Year	Title	Prepared by	Description	Link
2019	City of Pittsfield Hazard Mitigation Update	Jamie Caplan Consulting, LLC	This plan is part of an ongoing effort to reduce the negative impacts and costs from damage associated with natural hazards, such as nor'easters, floods, and hurricanes. (To be updated every 5 years)	Link to Pittsfield's Hazard Mitigation plan is available at this website: https://www.cityofpittsfield.org/departments/community_development/mvp.php
2019	City of Pittsfield Municipal Vulnerability Preparedness Plan	Fuss & O'Neill	A climate resilience study and action plan	Link to Pittsfield's Hazard Mitigation plan is available at this website: https://www.cityofpittsfield.org/departments/community_development/mvp.php
2021	Town of Dalton MS4 Annual Report	Town of Dalton	Provides information and updates about the City's stormwater management tasks completed to be in compliance with the Clean Water Act Small MS4 requirements	https://www3.epa.gov/region1/npdes/stormwater/ma/reports/2021/DALTON_MA_AR21.pdf
2021	City of Pittsfield MS4 Annual Report	Kleinfelder for the City of Pittsfield	Provides information and updates about the City's stormwater management tasks completed to be in compliance with the Clean Water Act Small MS4 requirements	https://www.epa.gov/npdes-permits/regulated-ms4-massachusetts-communities
2022	Dalton Green Infrastructure Report	BRPC	Provides Recommendations and Conceptual Designs for Stormwater Management Measures for town-owned properties.	https://dalton-ma.gov/wp-content/uploads/2022/09/Dalton-Green-Infrastructure-Report-_2022.pdf
2022	City of Pittsfield's Stormwater Management Plan	Kleinfelder with the City of Pittsfield	Required of MS4 regulated communities, this outlines how the city is and will meet the requirements of the MS4 NPDES General Permit requirements.	https://cms2.revize.com/revize/pittsfieldma/city_hall/public_works_and_utilities/docs/Pittsfield%20MS4%20SWMP%20Compiled%20Report_DRAFT_2022.06.21.pdf

Table A-2: Additional East Branch Watershed Reports

Year	Title	Prepared by	Description	Link
2022	Berkshire County Water Quality Monitoring Coalition Summary Report	HVA	Summarizes the water quality monitoring completed in 2022 in both the Housatonic and Hoosic watersheds	https://hvatoday.sharepoint.com/:b:/s/test_sharepoint/ETCXeMvU_ORPlsz2bxlEu-kBq3xsunwhJSesX2Nz90nNzA?e=4feIRL
2022	Dalton Stormwater Outfall Dry Weather Screening Report	HVA	Summarizes the results of the dry weather sampling of stormwater outfalls	Contact BRPC for a digital copy. This report is not available on the internet.
2023	City of Pittsfield Road Stream Crossing Management Plan	HVA and Trout Unlimited	Includes an inventory of public and private road-stream crossings and prioritization of culvert replacement projects based on condition, climate resilience and aquatic connectivity.	Contact BRPC for a digital copy.
2023	City of Pittsfield's Nitrogen and Phosphorous Identification Report	Kleinfelder	Identifies and provides conceptual designs of BMPs for city owned properties within the MS4 designated area based on the phosphorous and nitrogen loading catchment area analysis	Contact BRPC for a digital copy.
2024	Draft Massachusetts Statewide Total Maximum Daily Load for Pathogen-Impaired Waterbodies	Watershed Planning Program Division of Watershed Management, Bureau of Water Resources Massachusetts Department of Environmental Protection	Provides a framework to address bacterial and other pathogenic pollutants in the impaired waterbodies of Massachusetts including the Housatonic watershed	https://www.mass.gov/lists/total-maximum-daily-loads-by-watershed

MassDEP Water Quality Assessment Report and TMDL Review

The following reports are available:

- Housatonic River Watershed 2002 Water Quality Assessment Report

The section below summarizes the findings of any available Water Quality Assessment Report and/or TMDL that relate to water quality and water quality impairments. Select excerpts from these documents relating to the water quality in the watershed are included below (note: relevant information is included directly from these documents for informational purposes and has not been modified).

Housatonic River Watershed 2002 Water Quality Assessment Report (MA21-02 - EAST BRANCH HOUSATONIC RIVER)
AQUATIC LIFE USE Habitat and Flow Crane & Co. maintains five dams for their mill along this segment of the East Branch Housatonic River. Crane & Co. made repairs to the Center Pond dam in October 2006. Center Pond has been dewatered in order to carry out repair work (Noel 2006). Byron Weston Dam #2 was temporarily by-passed while repair work was carried out, but it is now back to normal level. The Old Berkshire Mill Dam (formerly dam #3) breach was completed in November 2000. The process of removing the dam began in 1999 as a collaboration between Crane & Company and the Department of Fish and Game's Riverways Program. The dam, an historic timber-crib structure and concrete dam, had stood on the East Branch Housatonic River for 200 years (Riverways 2000). Crane & Co. also owns and operates three additional dams that are located along this segment downstream from the Old Berkshire Mill Dam. From upstream to downstream the dams are: Pioneer Mill Dam, Baystate Mill Dam, and Government Mill Dam. There are no fish passage facilities at these three dams. DWM also performed a habitat assessment on the East Branch Housatonic River at Station EB02A (B0502) on 10 Sept. 2002 (Appendix C). The sampling reach, described below, received an overall score of 156 out of 200 due to a lack of in-stream fish cover, channel alteration, riparian vegetative zone width. Aquatic macrophytes (mosses) were present in 20% of the reach. Green filamentous and mat algae covered 50% of the rock substrates (Appendix G). The dominant algal genera were Vaucheria sp. and Melosira sp. The United State Geological Survey (USGS) maintains one streamflow monitoring gage on this segment of the East Branch Housatonic River. USGS Gage #01197000 on the East Branch Housatonic River at Coltsville, MA, is located on the right bank 250 ft downstream from Hubbard Avenue Bridge in Pittsfield. Data are available from 1936 to the present (prior to 1945 data were published as the Housatonic River at Coltsville). The drainage area at the gage is 57.6 mi2 and the average annual discharge over the period of record is 107 cfs. According to USGS flows are regulated by power plants upstream and, since 1949, for the diversion of water upstream from Cleveland Brook Reservoir for the municipal supply of Pittsfield (Socolow et al. 2004). The estimated 7-day, 10-year low flow (7Q10) is 12.1 cfs (USGS 1998). Biology DWM also conducted benthic macroinvertebrate sampling on the East Branch Housatonic River at Station EB02A upstream from the Hubbard Avenue Bridge in Pittsfield, MA, on 10 Sept. 2002 (Appendix C). RBP III analysis of the benthos at Station EB02A indicated a non-impacted community when compared to the upstream reference station. However, DWM biologists point out that biotic index, EPT/ Chironomidae Ratio, and Scraper/Filterer Ratio all indicated nutrient loading at this station. DWM conducted fish population sampling upstream from the Hubbard Avenue Bridge in Pittsfield at Station 680 on 20 August 2002 (Appendix F). A total of 64 fish were collected including: 21 longnose dace, 20 rock bass, six fallfish, five creek chub, three white sucker, three brown trout (196-425mm), two pumpkinseed, two common shiner, and two blacknose dace. The assemblage in this reach was dominated by moderately pollution tolerant fluvial specialist/dependent species. Toxicity Ambient The Crane and Company WWTF staff collected water from this segment of the East Branch Housatonic River approximately

1,350 feet upstream of the WWTF Outfall # 001 at the trestle next to the Bay State Mill where a pipeline enters the WWTF (Noel 2005). This collected river water is used as dilution water in the facility's whole effluent toxicity tests. Between May 1999 and January 2006 (n=25), survival of C. dubia exposed (7-day) to the river water ranged from 80 to 100% (TOXTD database).

Effluent
A total of 20 modified acute and chronic whole effluent toxicity tests were conducted on the Crane and Company effluent between May 1999 and January 2006 (n=27) using C. dubia. The effluent did not exhibit any acute toxicity (LC50s were all >100% effluent). The C-NOEC results for the 26 valid tests ranged from 25 to 100% effluent with only two tests (May 1999 and July 2004) failing to meet the C-NOEC limit of 63% effluent (TOXTD database).

The effluent toxicity tests from GE Company in Pittsfield are conducted on composite samples (flow weighted) from various outfalls (Appendix J) that actually discharge into three different water bodies (Unkamet Brook, Silver Lake, and the East Branch Housatonic River). Since these tests represent combined outfalls they are not summarized here.

Chemistry-water
DWM sampled the water quality of the East Branch Housatonic River at two stations in 2002. Station 02A was located upstream from the Hubbard Ave. Bridge in Pittsfield and Station 02B was located ~600 feet downstream from Pomeroy Avenue in Pittsfield. In-situ sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected from Station 02A only and analyzed for total suspended solids, nitrate-nitrogen, ammonia-nitrogen, and total phosphorus (low-level).

HVA conducted monthly water quality sampling downstream from Hubbard Avenue in Pittsfield between June and October 2002; April and October 2003; and May and October 2004 (HVA 2002b, 2003c, and 2004b). HVA also sampled this site in 2001, but data from 2001 are not summarized below, since their QAPP was not approved until 2002. Parameters measured included dissolved oxygen, pH, temperature, alkalinity, total phosphorus, and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions.

USGS also collected discrete water samples at their gage on the East Branch Housatonic on 21 August 2003 near Hubbard Avenue (USGS 2006a).

All water quality data collected by DWM, HVA, and USGS in the river near Hubbard Avenue met criteria except for elevated levels of total phosphorous. The two total phosphorous measurements taken by DWM in 2002 were 0.1 and 0.2 mg/L. The 17 total phosphorus measurements recorded by HVA between 2002 and 2004 ranged from <0.01 to 0.574 and 3 measurements exceeded 0.05 mg/L. USGS reported 0.026 mg/L (USGS 2006a). All in-situ measurements taken by DWM in the river near Pomeroy Avenue met standards.

The Aquatic Life Use is assessed as support for the upper six mile reach of this segment of the East Branch Housatonic River based primarily on the non-impacted benthic community, the good survival of test organisms exposed to the river water, and the generally good water quality conditions. However, this use is identified with an Alert Status downstream from the Crane and Company WWTP discharge because of elevated phosphorous concentrations and some evidence of nutrient enrichment in the benthic community attributes. The Aquatic Life Use will not be not assessed for the lower two mile reach (downstream from GE site) until water quality monitoring is conducted post remediation of the PCB contaminated sediments.

FISH CONSUMPTION
In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. The MA DPH advisory recommends: "The general public should not consume any fish, frogs, or turtles from Housatonic River in the towns of Dalton, Pittsfield, Lenox, Lee, Stockbridge, Great Barrington, and Sheffield". Since it is the East Branch Housatonic River that flows through Dalton and past the GE plant in Pittsfield, the MA DPH advisory for the Housatonic River is assumed to cover this area of the East Branch of the Housatonic River. In 1995 MA DPH updated their advisory to include a recommendation that fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.

Due to the MA DPH site-specific fish consumption advisory issued in 1982 (see previous segment), the Fish Consumption Use is assessed as impaired due to PCBs.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS
HVA collected monthly bacteria samples at their Hubbard Avenue water quality station in 2002, 2003, and 2004 (HVA 2002b,

2003c, and 2004b).

DWM collected fecal coliform bacteria and E. coli samples from the East Branch Housatonic River approximately 600 feet downstream from Pomeroy Avenue in Pittsfield (Station 02B) between May and September 2002 (Appendix B).

Fecal coliform counts from sampling conducted by DWM and HVA ranged from 20 to 1400 cfu/100mL (n=25). Bacteria counts collected at DWM Station 02B (the farthest downstream) had a geometric mean of 234 cfu/100mL. Elevated bacteria, particularly during wet-weather sampling events, were documented by HVA in 2002 and 2003.

In 1999 HVA volunteers conducted a shoreline survey of the East Branch Housatonic River between the Center Pond Dam and the Government Mill Dam in Pittsfield. Improper disposal of pet waste into the storm drains was reported near Depot Street in Dalton (HVA initiated a Storm Drain Awareness Program in 2001). Isolated areas of trash were noted. However, after the removal of the Berkshire Mill Dam in 2001, HVA conducted a river cleanup and removed the trash. Numerous pipes were noted and their locations have been mapped and entered into HVA's Geographic Information System for future action. It is important to note that HVA and Berkshire Regional Planning Commission are working on several projects to measure the impact of storm drains on the East Branch Housatonic River (HVA 2004a). Overall this segment was generally free from odor, oil and grease, color and turbidity, floating matter, and nuisance organisms.

DWM biologists noted the water at Station EB02A was "rust" colored and had a paper effluent odor (Mitchell 2005). DWM biologists also noted slight turbidity to the water but no oils or objectionable deposits (MassDEP 2002b). DWM personnel also made visual observations at this station during water quality surveys. At Station 02A trash was noted on two occasions (5/21/02 and 7/21/02) while on eight other occasions no objectionable deposits were noted (MassDEP 2002a). On 21 May 2002 no indication of the extent of deposits was noted, but on 21 July 2002 it was noted that the trash/garbage was "light, (a) few bottles". With the exception of 24 September 2002 when white foam was noted, no scums were noted. A musky water odor and a "rotting vegetable" water odor were noted on two different occasions, respectively. All other occasions no odor was noted. Water clarity was noted as clear on four occasions, slightly turbid on four other occasions and murky once. At Station 02B no objectionable deposits or scums were noted. A musky water odor was noted on one occasion, a septic water odor was noted twice, and sewage water odor was noted once. On the remaining six occasions no water odor was noted but of these occasions a sewer smell in the air was noted three times. Water clarity was generally noted as clear, and on only a few occasions it was rated as slightly turbid.

Similar to the upper East Branch Housatonic River segment, the Primary Contact Recreational Use is assessed as impaired because of elevated fecal coliform bacteria counts, noted particularly during wet weather. The Secondary Contact and Aesthetics uses are assessed as support based upon the acceptable bacteria counts and the generally acceptable aesthetic conditions noted by HVA volunteers and DWM personnel. However, these uses are identified with an Alert Status due to occasional septic/sewage odors and issues with turbidity.

OTHER
General Electric Company, Pittsfield (http://www.epa.gov/region01/ge/).
It is important to note that the upper ½ mile and 1½ mile sections of the GE/EPA PCB Housatonic River cleanup project are located along the lower 2 miles of this segment. See EPA website above for more details. The upper ½ mile reach cleanup was completed in September 2002. Cleanup of the 1½ mile reach is ongoing.

Report Recommendations:
Continued monitoring of the aquatic conditions (both chemical and biological) is recommended to monitor the status of the resident biotic communities.

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in Dalton and Pittsfield and to assess the status of the Primary and Secondary Contact Recreational uses. Conduct bacteria source tracking as needed to identify undocumented sources.

It is currently being investigated by EPA as part of their Ecological Risk Assessment whether or not the biota in the East Branch Housatonic River upstream from the Crane & Co., Inc. dams (which pose a barrier to fish migration) are contaminated by PCBs. The MA DPH should review the results of this investigation and adjust the fish consumption advisory as needed.

Housatonic River Watershed 2002 Water Quality Assessment Report (MA21-12 - CADY BROOK)

AQUATIC LIFE USE
Habitat and Flow
DWM performed a habitat assessment of Cady Brook upstream from New Windsor Road in Hinsdale on 20 August 2002 as part of the fish population survey. This sampling reach received a habitat score of 169 out of 200. The habitat was limited most by the marginal bank stability -- likely the result of the flashy nature of this stream (Appendix F).

Cady Brook is diverted for the municipal supply of drinking water for the city of Pittsfield and the town of Dalton approximately 0.5 miles upstream from the inlet to Windsor Reservoir. The diverted water is sent to Cleveland Brook Reservoir. It is unknown what effects, if any, this practice has on the habitat quality of the lower 0.5 miles of this segment.

Biology
DWM and MA DFG conducted fish population sampling in Cady Brook as described above. Over one hundred eighty fish were collected represented by two species (blacknose dace and brook trout). Both species are fluvial specialist/dependants. The blacknose dace are classified as pollution tolerant, and the brook trout are classified as pollution intolerant. Multiple age classes of brook trout were present (52-180 mm in length) (Appendix F and Richards 2006).

The Aquatic Life Use is assessed as support based on the fish community data and best professional judgment for the upper 3.0 mile reach of this segment. The presence of multiple year age classes of reproducing brook trout is indicative of high quality cold water and excellent habitat. This use is not assessed in the lower 0.5 mile reach because potential impacts associated with the water supply diversion.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS
No objectionable deposits, odors, turbidity or other conditions were noted by DWM biologists in the stream reach sampled in Cady Brook (Mitchell 2006).

The Aesthetics Use is assessed as support based on the lack of objectionable conditions. The Primary and Secondary Contact Recreational uses are not assessed due to the lack of recent quality-assured bacteria data.

Much of the upper portion of this segment is located within the Hinsdale Flats ACEC.
The MassDEP Drinking Water Program maintains current drinking water supply data.

Report Recommendations:
Conduct water quality monitoring to evaluate designated uses. Develop and implement a flow management plan to protect in-stream biota in Cady Brook downstream from the aqueduct diversion.

Housatonic River Watershed 2002 Water Quality Assessment Report (MA21-08 - CLEVELAND BROOK)

AQUATIC LIFE USE
Habitat and Flow
DWM performed a habitat assessment of Cleveland Brook upstream from Old Windsor Road in Hinsdale on 20 August 2002 as part of the fish population survey. This sampling reach received a habitat score of 147 out of 200. Habitat was limited most by the low channel flow status and the limited riparian zone width adjacent to the road (Appendix F). Water from Cleveland Brook Reservoir is utilized for the municipal supply for the city of Pittsfield and the town of Dalton. It is unknown if minimum flows are required at the outlet of Cleveland Brook Reservoir for the protection of aquatic life.

Biology
DWM conducted fish population sampling in Cleveland Brook as described above. Seventy-five brook trout (multiple age classes), eight blacknose dace, three brown trout and one white sucker were collected (87 fish total) (Appendix F). The assemblage was dominated by pollution intolerant, fluvial dependent species indicative of excellent water quality.

The Aquatic Life Use is assessed as support based on the fish community data and best professional judgment. The presence of multiple year age classes of reproducing brook trout is indicative of high quality cold water.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS
DWM biologists noted no deposits, odors, turbidity or other objectionable conditions (Mitchell 2006).

The Aesthetics Use is assessed as support based on the lack of objectionable conditions. The Primary and Secondary Contact Recreational uses are not assessed due to the lack of recent quality-assured bacteria data.

Report Recommendations:
Conduct water quality monitoring to evaluate designated uses. Develop and implement a flow management plan to protect in-stream biota in Cleveland Brook.

Housatonic River Watershed 2002 Water Quality Assessment Report (MA21-11 - WAHCONAH FALLS BROOK)

AQUATIC LIFE USE
Habitat and Flow
DWM performed a habitat assessment of Wahconah Falls Brook as part of the benthic macroinvertebrate sampling at Station WF01A (B0501), upstream from Holiday Cottage Road in Dalton, on 10 September 2002. This sampling reach received a habitat score of 149 out of 200 (Appendix C). The habitat at this station, similar to others throughout the watershed, was affected by drought conditions (decreased channel flow status). Additionally, the riparian zone width scored in the poor category. There were no aquatic macrophytes within the reach, but green filamentous and thin film algae covered 80% of the rocks in the riffles. Canopy cover was estimated at 60% (Appendix C).

Biology
MA DFG conducted fish population sampling at stations 618 and 622 on Wahconah Falls Brook on 18 July 2002. At station 618, Cleveland Road Crossing, a total of 252 fish, representing 10 species, were collected including 132 blacknose dace, 32 brook trout (59-177 mm), 26 slimy sculpin, 20 creek chub, 17 longnose dace, 17 white sucker, four brown trout (65-193 mm), two common shiner, one largemouth bass, and one pumpkinseed (Richards 2006).

DWM sampled the benthic macroinvertebrate community at Station WF01A (upstream from Holiday Cottage Road in Dalton) in 2002. The RBP III analysis indicated this station was slightly impacted when compared to the reference station on Windsor Brook. DWM biologists collected periphyton samples from Station WF01A in September of 2002. Canopy cover at this station was reported as 60%, algal cover was 80%, and the dominant algal genera were Synedra sp. and Fragilaria sp. (Appendix G).

At Station 622, the most downstream station located upstream from the Route 9 crossing in Dalton, a total of 359 fish were collected. Eleven species were represented, including: 196 blacknose dace, 47 white sucker, 44 creek chub, 39 longnose dace, 17 common shiner, five brown trout (59-66 mm), four pumpkinseed, three brook trout (46- 62 mm), two slimy sculpin, one brown bullhead, and one rainbow trout (Richards 2006).

Chemistry-water
HVA conducted monthly water quality sampling at three sites along Wahconah Falls Brook between June and October 2002; April and October 2003; and May and October 2004 (HVA 2002b, 2003c, and 2004b). The three HVA stations were: State Park, Cleveland Road, and Route 9 crossing. HVA also sampled many of these sites in 2001; data from 2001 is not summarized below, as their QAPP was not approved until 2002. Parameters measured included dissolved oxygen, pH, temperature, alkalinity, total phosphorus, and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions. All water quality measurements from these three stations during the years 2002-2004 met standards and were indicative of good water quality.

The Aquatic Life Use is assessed as support for Wahconah Falls Brook based on the RBP III analysis and the good water quality. However, there appears to be a slight shift in the fish community structure at the downstream sampling station, where reduced numbers of brook trout and slimy sculpin (both pollution intolerant cold water species) were noted. Agricultural land use activities in close proximity to the brook may be contributing to this shift, so the Aquatic Life Use is identified as support with an Alert Status in the lower reach of this segment.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS
HVA conducted fecal coliform and E. coli bacteria sampling at the water quality stations described above (HVA 2002b, 2003c, and 2004b). Fecal coliform bacteria counts from all three stations across all three years ranged from <10 to a high of 920 cfu/100 mL (n=59). Six counts exceeded 400 cfu/100mL (10%). Four of these high counts (n=20, 20%) were recorded at the Route 9 sampling location, which is the most downstream station.

In 1999 HVA volunteers performed a shoreline survey of Wahconah Falls Brook. No aesthetic degradation was noted (i.e., no trash, odors, scums, nuisance vegetation). In fact, this stream flows through Wahconah Falls State Park, falling 312 feet over its course for a vertical drop of 92 feet/mile and creating Wahconah Falls. Of concern to the volunteers was stormwater runoff from unpaved roads resulting in siltation of the brook (HVA 2004a).

DWM field biologists made field observations at Station WF01A (B0501) on September 10, 2006. DWM biologists did not note any objectionable conditions. Water clarity was noted to be clear and no water odors, oils or objectionable deposits (trash, etc.) were noted (MassDEP 2002b).

The Primary Contact Recreational Use is assessed as support in the upper 1.3 mile reach from the outlet of Windsor Reservoir downstream to Cleveland Street. The Primary Contact Recreational Use is assessed as impaired for the lower 2.1 mile reach from Cleveland Street to the confluence with East Branch Housatonic because of elevated fecal coliform bacteria counts. The Secondary Contact Recreation and Aesthetics uses are assessed as support for this segment due to the acceptable bacteria counts and lack of objectionable conditions.

Report Recommendations:
Habitat conditions would benefit from increased shading and adoption of agricultural BMPs. This may best be achieved by the planting of more trees within the riparian zone. Also, increased late-summer flows (in terms of both frequency and volume) from Windsor Reservoir would also improve the condition of this stream.

Continue to evaluate water quality conditions. Evaluate potential impacts associated with agricultural activities adjacent to the brook.

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in the town of Dalton and to assess the status of the Primary and Secondary Contact Recreational uses. Conduct bacteria source tracking as needed to identify undocumented sources.

Reduce sediment contributions to the brook due to stormwater runoff from unpaved roads.

Housatonic River Watershed 2002 Water Quality Assessment Report (MA21-09 - WINDSOR BROOK)

AQUATIC LIFE USE
Habitat and Flow
DWM performed a habitat assessment of Windsor Brook as part of the fish population survey conducted on 20 August 2002 upstream from Old Windsor Road, Hinsdale. The fish sampling reach received a habitat score of 166 out of 200.

On 10 September 2002 DWM performed a habitat assessment of Windsor Brook at Station WB01 as part of the benthic macroinvertebrate sampling (Appendix C). The sampling reach received a habitat score of 164 out of 200. Habitat was limited most by low channel flow status (associated with natural drought conditions) and a reduced riparian vegetated zone width.

Windsor Brook downstream from the aqueduct was observed to be dry during field reconnaissance in 2002 (Mitchell 2006).

Biology

MA DFG conducted fish population sampling at one site (Site 677) along Windsor Brook (~785 meters upstream from Windsor Reservoir) on 20 August 2002 (Richards 2006). Only two species (n=54) of fish were collected: 25 blacknose dace and 29 brook trout ranging in length from 67 to 203 mm.

DWM conducted fish population sampling upstream from the Old Windsor Road Bridge, Hinsdale, on 29 August 2002 (Appendix F). A total of 102 fish were collected, but only two species were present: 73 blacknose dace and 29 brook trout (multiple age classes). The dace are classified as pollution tolerant fluvial specialists, while the trout are pollution intolerant fluvial specialists.

DWM conducted benthic macroinvertebrate sampling in Windsor Brook at Station WB01 (B0291), approximately 150 meters upstream from the Cleveland Brook Reservoir Aqueduct at Old Windsor Road in Hinsdale. This station was a reference station representative of a healthy community and least impacted conditions (Appendix C).

DWM biologists collected periphyton samples from two habitat types at Station WB01 in September of 2002 (Appendix G). Canopy cover within rock/riffle habitat at this station was reported as 90%, algal cover was 60%, and the dominant algal genera was Lyngbya sp. Canopy cover within pool habitat at this station was reported as 90%, algal cover was 60%, and the dominant algal genera were Spirogyra sp. and Melosira sp.

Chemistry-water
DWM conducted monthly in situ, pre-dawn water quality sampling in Windsor Brook upstream from Windsor Road in Hinsdale (Station 09A) between May and September 2002 (Appendix B). All in-situ measurements met water quality standards.

With the exception of the lower 0.2 mile reach below the aqueduct, which is dewatered, the upper 5.9 miles of Windsor Brook are assessed as support for the Aquatic Life Use. This assessment is based primarily on the biological data. The benthic community was deemed to be a suitable reference station indicative of excellent water quality conditions. The fish community was comprised of multiple age classes of brook trout, a pollution intolerant fluvial species. All water chemistry parameters met standards.

AESTHETICS
DWM field biologists made field observations at Station WB01 on 10 September 2002 and did not note any objectionable conditions. Water clarity was noted to be clear and no water odors, oils or objectionable deposits (trash etc.) were noted (MassDEP 2002b). DWM personnel also made field observations during the surveys conducted between May and September 2002. With the exception of one occasion when white foam was noted, no water odors, scums or objectionable deposits were noted (Station 09A) (MassDEP 2002a). The Aesthetics Use is assessed as support.

The MassDEP Drinking Water Program maintains current drinking water supply data.

Report Recommendations:
Conduct water quality monitoring to evaluate designated uses. Develop and implement a flow management plan in order to protect in-stream biota in Windsor Brook downstream from the aqueduct diversion.

Housatonic River Watershed 2002 Water Quality Assessment Report (MA21-01 - EAST BRANCH HOUSATONIC RIVER)

AQUATIC LIFE USE
Habitat and Flow
In 1999, Housatonic Valley Association (HVA) volunteers conducted a shoreline survey of the East Branch Housatonic River from Muddy Pond to Hubbard Ave. in Pittsfield, which includes this entire segment. Potential in-stream sedimentation from road runoff was a concern along most of the area covered (HVA 2004a).

DWM performed a habitat assessment on the East Branch Housatonic River near Jericho Road in Hinsdale (Station EB01B) in September 2002. The sampling reach received an overall score of 176 out of 200. Habitat was limited most by the low flow conditions and some deposition of fine sediment on the substrates (Appendix C). DWM biologists collected periphyton samples from Station EB01B in September of 2002 (Appendix G). Canopy cover at this site was reported as 70%, algal cover was <1%, and the dominant algal genera was Cladophera sp.

Center Pond was dewatered during 2005 and 2006 in order to carry out repair work at downstream dams (Noel 2005).

Biology
MA DFG conducted fish population sampling (Site 636) along the East Branch of the Housatonic River near Jericho Road, Hinsdale) on 11 July 2002 (Richards 2006). A total of 109 fish, representing 7 species, were collected including 41 blacknose dace, 41 longnose dace, 22 brown trout (56-197 mm), two white sucker, one pumpkinseed, one fallfish, and one brook trout (51mm). The fish assemblage is dominated by fluvial specialist species. Multiple age classes of brown trout and a young of the year brook trout represented pollution intolerant species.

DWM conducted benthic macroinvertebrate sampling on the East Branch Housatonic River at Station EB01B (B0502), near Jericho Road in Hinsdale in September 2002. This station was used as a reference station representative of a healthy community and least impacted conditions (Appendix C).

Toxicity
Ambient
General Electric Company dilution and control water is collected from the East Branch of the Housatonic River upstream at Old Dalton Road Bridge in Hinsdale for use as dilution water in the GE Pittsfield facility's whole effluent toxicity testing. Between July 2000 and September 2005 (n=18), survival of Ceriodaphnia dubia exposed (7-day) to the river water ranged from 90 to 100% (TOXTD database). Between January 2000 and March 2006 (n=73), survival of Daphnia pulex exposed (48-hour) ranged from 88 to 100%.

Chemistry-water
HVA conducted monthly water quality sampling at eight sites along this segment between June and October 2002; April and October 2003; and May and October 2004 (HVA 2002b, 2003c, and 2004b). The sites were labeled from upstream to downstream as: Bullard's Crossing, Home Club, Metal Bridge, Carmel House, Partridgefield, High School, Orchard St., and Center Pond Bridge. HVA also sampled many of these sites in 2001; data from 2001 is not summarized below, since their QAPP was not approved until 2002. Parameters measured included: dissolved oxygen, pH, temperature, alkalinity, total phosphorus, nitrate and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions. Low DO measurements were reported at sampling stations upstream from Hinsdale center. These conditions are considered to be naturally occurring as this section of the river flows through a large wetland and the stream gradient is low. Water temperatures were slightly elevated; seven of the eight stations had at least one temperature measurement of greater than 20°C (n= 90, 11 >20°C). Total phosphorous concentrations were also slightly elevated, ranging from <0.01 to 0.09 mg/L (n=98, 13 > 0.05 mg/L). Though seven of the eight stations had at least one phosphorous measurement of 0.05 mg/L, the highest measurements were most frequently observed at the most upstream station. Total suspended solid measurements were typically low, but three measurements did exceed 25 mg/L (n=82).

The Aquatic Life Use is assessed as support. This assessment is based primarily on the biological data and the excellent survival of test organisms exposed to river water. The benthic community was deemed to be a suitable reference station indicative of excellent water quality conditions. The fish community was comprised of multiple age classes of brown trout, a pollution intolerant fluvial species. Habitat quality was excellent. Water temperatures did exceed 20°C, however thermal problems did not appear to be extended or severe. The slightly elevated total phosphorous levels could also be naturally influenced by the wetlands in the upper portion of this segment.

FISH CONSUMPTION
In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. The MA DPH advisory recommends: "The general public should not consume any fish, frogs, or turtles from Housatonic River in the towns of Dalton, Pittsfield, Lenox, Lee, Stockbridge, Great Barrington, and Sheffield". Since it is the East Branch Housatonic River that flows through Dalton and past the GE plant in Pittsfield, the MA DPH advisory for the Housatonic River is assumed to cover this area of the East Branch of the Housatonic River. In 1995 MA DPH updated their advisory to include a recommendation that fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.

Due to the MA DPH site-specific fish consumption advisory, the Fish Consumption Use is assessed as impaired for this segment from the Dalton/Hinsdale town line to the outlet of Center Pond (lower 3.3 miles) because of PCB contamination. The upper 8.0 miles are currently not assessed for the Fish Consumption Use.

PRIMARY AND SECONDARY CONTACT RECREATION AND AESTHETICS

HVA conducted bacteria monitoring at the eight water quality sites listed above (HVA 2002b, 2003c, and 2004b). Fecal coliform counts ranged from <10 to 3,900 cfu/100mL (n=114). The highest three-year fecal coliform count at all but one of the eight sites came from one wet-weather sampling event in May of 2002. During another wet-weather sampling event in August 2003 five of the six stations had bacteria counts greater than 400 cfu/100mL. Excluding these two wet-weather sampling events, only 7 of 100 dry weather samples, or 7% were greater than 400 cfu/100mL. The geometric mean of the fecal coliform bacteria counts exceeded 200 cfu/100mL, and/or 10% exceeded 400 cfu/100mL at almost all stations sampled.

DWM biologists noted slight turbidity at Station EB01B in September 2002, however no other objectionable conditions were noted (e.g., oils, water odors, or other deposits).

In 1999 HVA volunteers conducted a shoreline survey of this segment of the East Branch Housatonic River. Trash was reported, but HVA volunteers conducted a cleanup at Bullard's Crossing Road in Hinsdale so it is no longer considered a problem. Overall this segment was described as generally aesthetically pleasing with a few areas specifically described as scenic and a potential location for a greenway (HVA 2004a).

The Primary Contact Recreational Use is assessed as impaired because of elevated fecal coliform bacteria counts, noted particularly during wet weather. However, the Secondary Contact Recreation and Aesthetics uses are assessed as support based upon bacteria counts that are acceptable for secondary contact and the lack of objectionable conditions.

The upper portion of this segment is located within the Hinsdale Flats ACEC.
East Branch Housatonic Watershed Assessment Grant Project (Project #02-05/604b) 2005 grant description: The Berkshire Regional Planning Commission (BRPC) and Housatonic Valley Association will conduct targeted water quality sampling of suspected problem areas and will pilot an effort to include volunteer water quality monitoring into a municipal stormwater management plan. This project will assess the extent of known and suspected nonpoint source pollution problems in the East Branch subwatershed of the Housatonic River. Additional efforts, if needed, will be directed towards waters on the 303d List. BRPC will assist the two communities in the subwatershed in meeting their stormwater management goals and will recommend remediation of identified erosion and sedimentation problems in two surface water supply watersheds.

Report Recommendations:
Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution in Dalton and Hinsdale to control activities and to assess the status of the Primary and Secondary Contact Recreational uses. Conduct bacteria source tracking as needed to identify undocumented sources.

Housatonic River Watershed 2002 Water Quality Assessment Report (MA21-01 - Center Pond)

NA
THIS WATERBODY IS NO LONGER BEING ASSESSED AS A LAKE SEGMENT. It is a run-of-river impoundment (river segment MA21-01).

Report Recommendations:
NA

Housatonic River Watershed 2002 Water Quality Assessment Report (MA21-10 - ANTHONY BROOK)

No recent quality-assured data are available for Anthony Brook.

Report Recommendations:
Conduct water quality monitoring to evaluate designated uses.

Develop and implement a water use/withdrawal plan that will minimize low flow periods and negative impacts to in-stream biota.

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in Dalton and to assess the status of the Primary and Secondary Contact Recreational uses. Conduct bacteria source tracking as needed to identify undocumented sources.

Historical and current Technical Memoranda (TM) produced by the MassDEP Watershed Planning Program are available here: Water Quality Technical Memoranda | Mass.gov and are organized my major watersheds in Massachusetts. Most of these TMs present the water chemistry and biological sampling results of WPP monitoring surveys. The TMs pertaining primarily to biological information (e.g., benthic macroinvertebrates, periphyton, fish populations) contain biological data and metrics that are currently not reported elsewhere. The data contained in the water quality TMs are also provided on the "Data" page (Water Quality Monitoring Program Data | Mass.gov). Many of these TMs have helped inform Clean Water Act 305(b) assessment and 303(d) listing decisions.

TMDL Review

The impaired segment of the East Branch of the Housatonic River requires a TMDL for pathogens. The state has drafted a state-wide TMDL for Pathogens and this is expected to be finalized by the end of 2024.

The East Branch of the Housatonic watershed is subject to the Long Island Sound TMDL for Total Nitrogen which requires a 10% pollutant load reduction.

Additional Water Quality Assessment Information

Table A-3 provides a summary of the water quality monitoring programs conducted in the East Branch of the Housatonic River Watershed by stakeholders.

Table A-3: Summary of Water Quality Monitoring Programs

**Sampling completed under a MassDEP approved Quality Assurance Project Plan*

Year	Program Description	Site Locations	Program Coordinator	Funding / Protocols /Results
2019-2023	**E. coli* surface water sampling in the Upper Housatonic Watershed	Sampling sites included East Branch, Anthony, Wahconah Falls and Walker Brook	HVA	Partially funded by a MassDEP Water Quality Grant/From June through September, sites were sampled every other week six to eight times in wet and dry weather under a state approved QAPP. See **Table A-6** for a results summary and Appendix C for complete results.
2021-22	Stormwater outfall dry weather sampling	Approximately 300 outfalls in the East Branch watershed 44 outfalls have been analyzed for dry weather discharge	City of Pittsfield and BRPC & HVA for Town of Dalton	MS4 requirement funded by the City of Pittsfield and Town of Dalton/Dry weather discharge from stormwater were analyzed for *E. coli*, Total Nitrogen, Surfactants, etc./ Results indicated elevated levels of *E. coli* or Total Nitrogen at 9 outfalls. (See **Tables A-10 and A-11**)
2006	*Surface water sampling in the East Branch Watershed (Fecal Coliform, Nitrogen, pH, & Temperature)	5 sample sites on the East Branch 4 on Walker Brook and 3 on Wahconah Falls Brook and 2 on an Unnamed Tributary	HVA	Various funding sources / Sampling conducted once a month from May – September under a state approved QAPP. Samples analyzed by certified lab/ Fecal coliform results were very high in July 2006 at the Walker Brook sample sites and on the East Branch following at least 0.2 inches of rain. (Appendix C HVA Water Quality Data)
2002 – 2004	Surface Water Quality Monitoring of Walker Brook, Dalton	4 sites on Walker Brook which is a buried stream and 2 sites on East Branch: (1) upstream of the Walker Brook and East Branch confluence (2) Hubbard Avenue Bridge	HVA	Funded by Section 604(b) grant/ Sampling conducted approximately once a month from April – October for 3 seasons under a state approved QAPP/ Fecal coliform results indicated high nitrate and Fecal coliform levels where Walker Brook daylights before the confluence with the East Branch. High bacteria levels in East Branch when sampling after a rain event. (Appendix C HVA Water Quality Data)

Surface Water Sampling

HVA has conducted water quality monitoring in the East Branch watershed for several seasons during the period 2001 -2023 primarily measuring *E. coli* in the East Branch and several tributaries. HVA conducted the sampling using volunteers and under approved MassDEP Quality Assurance Project Plans. A summary of water quality sampling locations is provided in Appendix C. The water quality data results by year are provided in Appendices D - G. **Table A-4** below summarizes HVA's sampling site information and **Figure A-3** provides an overview of the locations in a map.

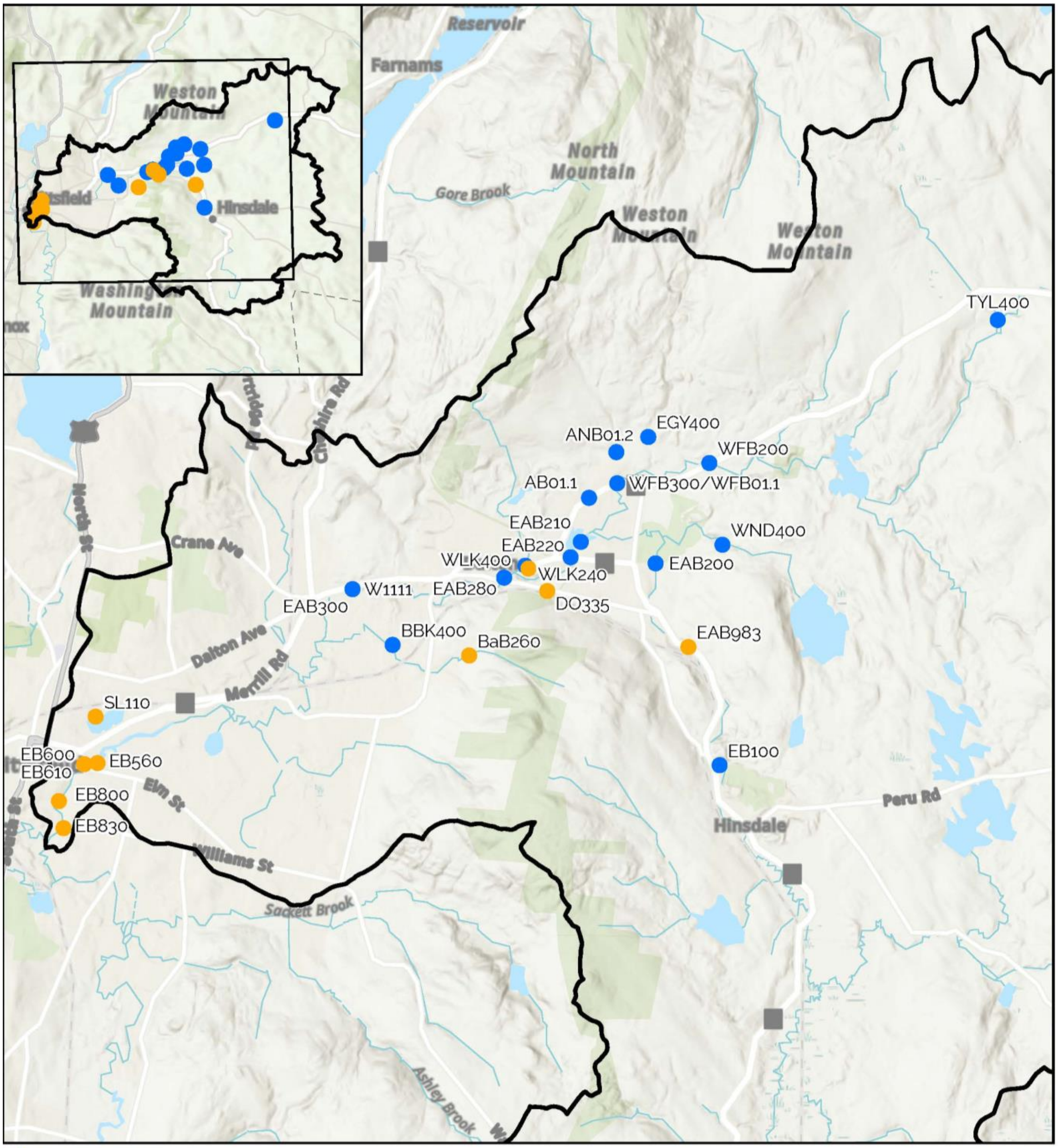
Table A-4: HVA's East Branch Water Quality Monitoring Sample Site Information

Site ID	Waterbody	Description	Town	Latitude	Longitude	Years Sampled
ANB01.2	Anthony Brook	Upstream of the North Mountain Road	Dalton	42.48855	-73.14873	2022
AB01.1	Anthony Brook	Just upstream of the Rte 9 bridge	Dalton	42.48233	-73.15353	2019
BBK200	Barton Brook	Downstream of Sleepy Hollow Drive Bridge	Dalton	42.4604597	-73.1767807	2020
BBK400	Barton Brook	Upstream of the Hubbard Avenue Bridge	Dalton	42.4620411	-73.1886675	2020
EAB 100	East Branch of the Housatonic River	Downstream of the Old Dalton Road Bridge. Access from the Old Mill Trail	Hinsdale	42.44833	-73.13101	2019
EAB200	East Branch of the Housatonic River	Downstream of the Old Windsor Road bridge	Dalton	42.4736964	-73.14121	2019, 2020
EAB210	East Branch of the Housatonic River	Just before the confluence with Center Pond, end of Riverview Drive	Dalton	42.476391	-73.15487	2020, 2022
EAB220	East Branch of the Housatonic River	Upstream of Rte 8/Main Street bridge, Center Pond Outlet	Dalton	42.4742966	-73.1566588	2020
"East Branch Above Walker Brook"	East Branch of the Housatonic River	Upstream of the confluence with Walker Brook	Dalton	42.471959	-73.166704	2004
EAB280	East Branch of the Housatonic River	Upstream of West Housatonic Street	Dalton	42.4713739	-73.1686657	2020
EAB300	East Branch of the Housatonic River	Upstream of the Hubbard Avenue bridge	Dalton	42.4694279	-73.1961482	2002, 2003, 2004 2019
EAB500	East Branch of the Housatonic River	Upstream of the Elm Street Bridge	Pittsfield	42.4451181	-73.2440525	2020
EGY400	Egypt Brook	Upstream of Holiday Cottage Road Culvert	Dalton	42.4906701	-73.1429834	2020
TYL400	Tyler Brook	Upstream of the Main Dalton Road bridge	Windsor	42.5072865	-73.0799065	2020

Table A-4: HVA's East Branch Water Quality Monitoring Sample Site Information

Site ID	Waterbody	Description	Town	Latitude	Longitude	Years Sampled
WFB200	Wahconah Falls Brook	Upstream of the Route 9 Bridge (furthest upstream)	Dalton	42.4873207	-73.1318022	2020
WFB300/WFB01.2	Wahconah Falls Brook	Upstream of the Route 9 Bridge (downstream bridge) (formerly WFB01.2)	Dalton	42.4843668	-73.1484531	2017, 2019, 2020
WFB 05.3	Wahconah Falls Brook	Wahconah Falls State Park~ 200 yards downstream of falls, north side of river.	Dalton	42.48833	-73.1161	2017
WFB 03.4	Wahconah Falls Brook	Cleveland Rd. 25' Downstream of bridge, south side of road.	Dalton	42.48597	-73.12794	2017
WFB 01	Wahconah Falls Brook	E. Deming Street. Behind VFW field, 0.04 miles upstream of confluence with East Branch. North side of river.	Dalton	42.47823	-73.15202	2017
"High Street"	Walker Brook	Upstream of the culvert at High Street	Dalton	42.4776832	-73.1663416	2004, sampled when sufficient flow
"Below Sewer Line"	Walker Brook	Approx. 20 feet downstream of WLK400 (downstream of a sewer pipe crossing)	Dalton	42.4727617	-73.1646605	2002, 2003, 2004, sampled when sufficient flow
"Walker Brook Outflow"	Walker Brook	At the confluence with the East Branch	Dalton	42.4721703	-73.1670223	2002, 2003, 2004, sampled when sufficient flow
WLK400/WLK240/ "Post Office"	Walker Brook	Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	Dalton	42.472823	-73.16462	2002, 2003, 2004, 2022, 2023
WND400	Windsor Brook	Upstream of the Old Windsor Road Bridge	Dalton	42.4763668	-73.1291392	2020

Figure A-3: East Branch Water Quality Monitoring Sites



BRPC
Berkshire Regional Planning Commission

This map was created by the Berkshire Regional Planning Commission and is intended for general planning purposes only. This map shall not be used for engineering, survey, legal, or regulatory purposes. MassGIS, MassDOT, or BRPC may have supplied portions of this data.

Surface Water
Outfalls
East Branch Watershed

0 0.42 0.85 1.7 Miles

N

HVA Water Quality Summary prior to 2007

HVA conducted water quality monitoring in the East Branch from 2002 – 4 and in 2006 and 2007. All sampling was conducted under a MassDEP approved QAPP. The sampling results showed that Walker Brook, a buried tributary, had significantly high *E. coli* levels, the source of which was undetermined. High *E. coli* levels were also noted in the East Branch, especially after a rain event. A report providing the results and analysis for 2002-2004 data is provided in Appendices D (2001-03), E (2002-04), F (2006).

HVA Water Quality Summary 2017 & 2018

Water Quality monitoring completed under a MassDEP approved QAPP and conducted only in dry weather (less than 0.1 inches in the 72 hours prior to sampling). Results are summarized in **Tables A-5 and A-6.**

Table A-5: *E. coli* Sampling on Wahconah Falls Brook (2017)[14]

SITE ID	SITE NAME	13-Jun	1-Aug	30-Aug	12-Sep	26-Sep	4-Oct	GEO MEAN
		colony forming units/100 millileters (*cfu/100ml*)						
WFB 05.3	State Park	5.2	16.1	172.3	27.9	16.1	20.1	22.51
WFB 03.4	Cleveland Rd	30.9	90.6	57.6	12.1	18.7	24	30.93
WFB 01.2	Rt. 9	122.3	162.4	31.3	56.3	**325.5**	81.6	98.79
WFB 01.0	E. Demming St	88.4	101.9	**461.1**	108.1	**240**	73.3	**141.12**

Table A-6: *E. coli* Sampling on Wahconah Falls and Anthony Brooks (2018)

SITE ID	Location Description	6/7/2018 (cfu/100ml)	7/5/2018 (cfu/100ml)
WFB 010	Upstream of Rt 9 bridge on west side of river	not tested	105
WFB 01.2	30 feet downstream of Rt. 9 bridge, West side of river, Rt. 9	307.2	178.5
WFB 02	10' upstream of Anthony Brook Confluence on WFB	201.4	298.7
WFB AB 01	On Anthony Brook, 10' upstream of confluence & downed tree in water	344.8	365.4
WFB AB 04	On Anthony Brook, middle branch **-(**42.478867, -73.15040**)**	not tested	461.1
WFB 01	E. Demming St (0.4 miles upstream of confluence with East Branch of the Housatonic	365.4	866.4
WFB 03	Downstream of outflow pipe (10 feet downstream of Site WFB 01)	307.6	920.8

[14] As defined by the Massachusetts Department of Public Health in 105 CMR 445.010: the geometric mean of all E. coli samples taken within the most recent six months (until 10/15) shall not exceed 126 colonies per 100 millileter typically based on a minimum of five samples and no single sample shall exceed 235 colonies per 100 millileter.

HVA Water Quality Summary 2019

HVA continued to sample a few sites in the East Branch watershed. Sampling sites chosen included one site on Anthony Brook (upstream of Route 9), one site on Wahconah Falls Brook and three sites on the East Branch, above the impaired segment and two sites below the impaired segment. Sites were sampled six times during the season (June – September) and sampling was completed in dry weather (less than 0.1 inches within 72 hours of sampling) under a MassDEP approved QAPP. Results are summarized in **Table A-7** and the water quality results data are provided in Appendix G**.**

Table A-7. 2019 Summary of HVA's Water Quality Monitoring Results

Waterbody	SITE ID	Results Summarized (state standard =126 cfu/100ml)
Anthony Brook	ANB 01.1	This site became stagnant during the sampling season. While the first three samples were all below the state standard, the last three samples all exceeded state standards: 344.8, 579.4 and 365.4 cfu/100ml.
East Branch of Housatonic River	EAB100	This was the most upstream site sampled and it met the state standard with results ranging from 30 – 52 cfu/100ml. The two results that did not meet state standards were 172.3 cfu/100 ml (June 25) and 150 cfu/100 ml (August 5)
East Branch of Housatonic River	EAB200	This site is upstream in the unimpaired segment of the East Branch and upstream of Center Pond in a fast-flowing stretch of the river adjacent to the high school. It met the state standards for all sampling events except on July 11 results were 365.4 cfu/100 ml.
East Branch of Housatonic River	EAB300	This site is upstream of Hubbard Avenue bridge within the impaired segment in Dalton and within the commercialized area of the East Branch. 50% of the samples met state standards, and of the remaining samples, all were below 235 cfu/100 ml (191.8 cfu/100ml; 162.4 cfu/100ml 135.4 cfu/100ml)
Wahconah Falls Brook	WFB 01.2	50% of the sampling events met state standards. The remaining 50% were 127.4, 166.4 and 325.5 cfu/100ml.

HVA Water Quality Summary 2020[15]

Nine sites within the East Branch of the Housatonic River watershed were sampled on eight separate dates for *E. coli* under a MassDEP approved QAPP. Four sites were located on the East Branch of the Housatonic River. In addition, tributaries of the East Branch were sampled including Anthony, Wahconah and Windsor Brooks (sample sites located in Dalton) and Tyler and Egypt Brooks (sample sites located in Windsor). Results are summarized in **Table A-8** and the water quality monitoring data are provided in Appendix G**.**.

While the geometric mean of all the sampling results indicated that the East Branch sites within this impaired segment (EAB 280 and EAB 300) did not meet standards, the results were generally only above state standards

[15] Extracted from HVA's Bacteria Monitoring in the Upper Housatonic Watershed 2020 report.

following a significant precipitation event. The sample site EAB 220 located upstream of the outlet of Center Pond (upstream of the impaired segment) did not meet state standards for all of the sampling events with *E. coli* results >200 cfu/100ml. The results of the site further upstream on the East Branch, and not in the impaired segment (EAB200) located at Old Windsor Road bridge also appear to be impacted primarily by precipitation events and did not meet state standards of 126 cfu/100ml.

The site on Center Pond (EAB220) consistently did not meet state standards despite the level of precipitation prior to the sampling date. To be significant, 0.1 or more inches of precipitation must have been recorded in the previous 48 hours and is likely to result in stormwater runoff. Polluted stormwater runoff often is bacteria laden and will result in higher *E. coli* readings in urban or semi-urban areas. Upstream of the sampling site on Center Pond are numerous residencies, including apartment buildings that border the northern edge of the pond. Further investigation to determine potential sources such as a leaking sewer pipe is advisable.

The highest *E. coli* readings for the season occurred following the most significant rain. In the 24 hours prior to sampling on June 30, 2020, 0.86 inches of rain were recorded at the Pittsfield Municipal airport. Anthony Brook's sampling site results were 920.8 MPN. Even the smaller tributaries Egypt and Tyler Brooks, that are primarily forested at the sampling site and upstream, while still meeting state standards, had their highest *E. coli* results on this date. Stormwater runoff is the most likely reason for the increased readings across all of the sampling sites. Excluding sample sites on Tyler and Egypt Brooks, the *E. coli* results for June 30th ranged from 488 – 1203 MPN (most probable number of bacteria colonies – comparable to colony forming units/100 millileter, cfu/100ml).

Table A-8. 2020 Summary of HVA's Water Quality Monitoring Results

Waterbody	# of Sites Sampled	Notes *MPN = Most Probable Number of bacteria colonies
Anthony Brook	1	Meets the state standards for the geometric mean of <126 MPN. One high *E. coli* reading of 920MPN occurred after a rainstorm (0.86 inches – 24 hours prior to sampling)
East Branch of Housatonic River	4	Failed to meet the state standards at all four sites. The site that failed whether samples were collected during dry or wet weather was Center Pond. The other three sites had high readings, primarily following precipitation events.
Egypt Brook	1	Met state standards. Sampling results were always less than 50MPN with 5 sampling events less than 20 MPN
Tyler Brook	1	Met state standards with all samples less than 126 MPN; 6/8 samples were less than 30 MPN
Wahconah Falls Brook	1	3/8 sampling events had high results occurring after precipitation events, otherwise the brook met state standards.

Windsor Brook	1	Meets the state standards for the geometric mean of <126 MPN. One high *E. coli* reading of 488 MPN occurred after a rain storm (0.86 inches – 24 hours prior to sampling)

**MPN is considered equivalent to cfu/100ml.*

HVA Water Quality Summary 2022[16]

Three sampling sites were monitored in the East Branch of the Housatonic River watershed. Eight sampling events were scheduled and occurred every other week from June to September. Sampling was conducted in wet and dry weather. The water quality monitoring data is provided in Appendix G**.**

The sampling site on the East Branch (EAB210), was located upstream of the impaired segment at the end of Riverview Drive. This site met the state standards for 0/8 sampling events. Most of the summer this site's bacteria results were >410 cfu/100ml with the results substantially increasing after significant rainfall events. Most notable event was on September 22nd in which 0.74 inches of rain was recorded 24 hours to sampling and as a result the bacteria readings were >2419.6 cfu/100ml. Several roads have a dead end at the East Branch and stormwater is directed via pipes and swales including at the end of Riverview Drive. These locations should be considered for stormwater improvements.

Anthony Brook overall met state standards with a Geomean of <50 MPN. One sampling event was high following 0.74 inches of rain prior to sampling. High readings following a rain event have occurred in previous years on Anthony Brook, and a leaking septic system may be the cause. Further investigation with the support of the Dalton Board of Health is recommended.

Walker Brook (WLK400) was sampled where this buried stream daylights at Main Street. Again, the flow was mostly only a trickle, and dry upstream at High Street where it initially buries, but there was sufficient flow to collect a sample. Every sampling event had an upper limit reading of >2419MPN. For four of the sampling events the lab did a 10% dilution of the sample to obtain an estimated *E. coli* result and obtained the following results:

- On June 30, the 10% diluted sample result was 4590MPN.
- On July 28, the 10% diluted sample result was 10,190MPN
- On August 11, the 10% diluted sample result was 3,990MPN
- On September 22, the 10% diluted sample result was 3,310 MPN

HVA Water Quality Summary 2023

The only sampling site on the East Branch in 2023 was Walker Brook, Site ID WLK400 downstream of where the brook daylights at Main Street, Dalton. This site was sampled eight (8) times for *E. coli.* The results compared to previous years were not as alarming but still had two significantly elevated *E. coli* readings, one after over 0.5 inches of rain within 48 hours **(Table A-9).** However, the sampling results do not seem to correlate with precipitation. As noted in previous years, Walker Brook is a buried stream with very little flow. Often where it initially is buried at High Street the stream bed is observed to be dry and yet downstream where it daylights at Main Street, Dalton, generally a minor flow allows for sample collection. This indicates that groundwater and probably stormwater are feeding the tributary along the buried segment. The Town of Dalton has reportedly explored the culvert with a robotic camera and recorded evidence of beaver inhabiting the culvert in the form of beaver dams. The volume of contaminated flow is so low that it is unlikely to significantly contribute to the

[16] Extracted from the 2022 Berkshire County Water Quality Monitoring Coalition Summary Report

impairment of the East Branch. If the Town of Dalton pursues daylighting the brook, the expectation is that the source of bacteria will be uncovered and resolved. The water quality monitoring data is provided in Appendix G.

Table A-9: Walker Brook (WLK400) Sampling Results in 2023

Site ID	Station Description	Latitude	Longitude	Sample Date	*E. coli* Results (MPN)	Precipitation
WLK400	Downstream of where the brook daylights	42.472823	-73.16462	06/15/2023	128.1	Precipitation: 24hr 1.13"; 48 hr 1.13"; 72hr 1.35"
WLK400	Downstream of where the brook daylights	42.472823	-73.16462	07/06/2023	38.1	Precipitation: 24hr 0.0"; 48 hr 0.19"; 72hr 0.37"
WLK400	Downstream of where the brook daylights	42.472823	-73.16462	07/13/2023	86	Precipitation: 24hr 0.16"; 48 hr 0.16"; 72hr 1.3"
WLK400	Downstream of where the brook daylights	42.472823	-73.16462	07/27/2023	547.5	Precipitation: 24hr 0.04"; 48 hr 0.04"; 72hr 0.04"
WLK400	Downstream of where the brook daylights	42.472823	-73.16462	08/09/2023	1986.3	Precipitation: 24hr 0.38"; 48 hr 0.62"; 72hr 0.62"
WLK400	Downstream of where the brook daylights	42.472823	-73.16462	08/24/2023	6.1	Precipitation: 24hr 0"; 48 hr 0"; 72hr 0"
WLK400	Downstream of where the brook daylights	42.472823	-73.16462	09/07/2023	53.6	Precipitation: 24hr 0"; 48 hr 0"; 72hr 0"
WLK400	Downstream of where the brook daylights	42.472823	-73.16462	09/20/2023	133.3	Precipitation: 24hr 0.1"; 48 hr 0.7"; 72hr 0.72"

Dry Weather Stormwater Outfall Sampling

In the East Branch watershed existing storm drain outfalls are located in Pittsfield, Dalton and Hinsdale. In accordance with EPA's MS4 permit requirements, any outfalls observed with dry weather discharge (less than 0.1" of rainfall in 24 hours) are sampled and the sample analyzed for *E. coli*, ammonia, total nitrogen (TN) and phosphates. Hinsdale was exempted from the permit requirements. Under the MS4 requirements, Pittsfield and Dalton has mapped approximately 300 stormwater outfalls in the East Branch watershed. An on-line map of the Pittsfield and Dalton stormwater outfalls which includes information about the outfall including the latest sampling results is available at this link:
https://berkshire.maps.arcgis.com/apps/webappviewer/index.html?id=ded45f5daaee412db24afc34500cd0c6

City of Pittsfield: has identified about 200 stormwater outfalls in the East Branch with many discharging into the East Branch of the Housatonic River. At the time of this report, not all the outfalls had been screened for dry weather discharge. Of the 58 outfalls screened, 17 were observed to have discharge in dry weather and were sampled. Of these outfalls sampled, six outfalls which discharge to the East Branch (5 outfalls) and Silver Lake (1 outfall), have been designated as "high priority" (1 outfall) or "problem" (5 outfalls) outfalls due to the sampling results, provided in **Table A-10.** The discharge from these outfalls contributes to the East Branch impairments. All of the outfalls of concern had TN levels greater than the EPA threshold of 2 milligrams/liter (mg/l). Five outfalls had *E. coli* levels above 600 cfu/100ml and two outfalls (EB560 and EB600) had *E. coli* levels greater than the upper measurable limit (>2419.6 cfu/100 ml). The City of Pittsfield is in the process of investigating problem outfalls for illicit connections and resolving issues found.

Table A-10: East Branch Watershed Outfalls (Pittsfield) Exceeding EPA Thresholds

Outfall ID	Waterbody	Latitude	Longitude	Ammonia	Chlorine	Surfactants	*E. coli*	Total Nitrogen	Fecal Coliform	Priority Ranking
			EPA Thresholds	**0.5 mg/l**	**0.02 mg/l**	**0.25 mg /l**	**410 MPN/100 ml for non-recreation waters)**	**2mg/l**	**200 *MPN/100ml**	
EB600	East Branch Housatonic River	42.445175	-73.244191	Over detection limit	0.115	0.5	>2419.5	13	3.1	Problem
EB560	East Branch Housatonic River	42.445356	-73.241804	Under Detection Limit	0.933	0.25	>2419.5	2.18	>2419.5	High
EB610	East Branch Housatonic River	42.445161	-73.244226	0.068	0.07	0.5	1299.7	3.46	<1	High
SL110	Silver Lake	42.451587	-73.242323	0.063	0.083	0.25	1046.2	2.15	770.1	High
EB830	East Branch Housatonic River	42.436505	-73.247725	0.05	0.047	0.25	686.7	2.06	<1	High
EB800	East Branch Housatonic River	42.44014	-73.24866	0.038	0.046	0.25	27.8	2.73	18.5	High

Town of Dalton: In 2021, HVA was contracted to complete the dry weather discharge sampling for the town of Dalton. The mapped outfalls are located within the East Branch of the Housatonic Watershed. HVA conducted site visits to 113 mapped outfalls and identified twenty-seven (27) stormwater outfalls to have dry weather discharge. The discharge from each of the outfalls was tested for multiple. Results from the outfalls that exceeded EPA's thresholds are shown in **Table A-11.**

Table A-11: East Branch Watershed Outfalls (Dalton) that Exceeded EPA Thresholds

Outfall ID	WATERBODY	Parameters (EPA Thresholds)				
		Ammonia	Chlorine	Surfactants	*E. coli* (n)	Fecal Coliform
	EPA Thresholds	0.5 mg/l	0.02 mg/l	0.25 mg /l	410 MPN/100 ml for non-recreation waters	200 *MPN/100ml
EAB983	East Branch				313	206
EAB840	East Branch		0.06			
EAB580	East Branch			0.28		
EAB510	East Branch			0.48		
EAB1002	East Branch		0.13			
BaB140	Barton Brook		0.03			
BaB180	Barton Brook		0.06			
BaB190	Barton Brook		0.32			
BaB200	Barton Brook		0.07			
BaB260	Barton Brook		0.05		1203.3	
BR215	Brattle Brook		0.03			
DO240	Unnamed Tributary		0.34			
DO290	Unnamed Tributary		0.06			
DO310	Unnamed Tributary	1.16	0.04			
DO335	Unnamed Tributary				410.6	

*MPN = Most Probable Number which is comparable to cfu/100ml

WLK240	Walker Brook				>2419.6	

Water Quality Impairments

Known water quality impairments, as documented in the Massachusetts Department of Environmental Protection (MassDEP) 2018/2020 Massachusetts Integrated List of Waters (MassDEP, 2021), are listed below. Impairment categories from the Integrated List are as follows:

Table A-12: 2018/2020 MA Integrated List of Waters Categories

Integrated List Category	Description
1	Unimpaired and not threatened for all designated uses.
2	Unimpaired for some uses and not assessed for others.
3	Insufficient information to make assessments for any uses.
4	Impaired or threatened for one or more uses, but not requiring calculation of a Total Maximum Daily Load (TMDL), including: 4a: TMDL is completed 4b: Impairment controlled by alternative pollution control requirements 4c: Impairment not caused by a pollutant - TMDL not required
5	Impaired or threatened for one or more uses and requiring preparation of a TMDL.

Table A-13: Water Quality Impairments (MassDEP 2021)

Assessment Unit ID	Waterbody	Integrated List Category	Designated Use	Impairment Cause	Impairment Source
MA21-02	**East Branch Housatonic River**	**5**	Fish Consumption	PCBs In Fish Tissue	Illegal Dumps Or Other Inappropriate Waste Disposal
MA21-02	**East Branch Housatonic River**	**5**	Primary Contact Recreation	Escherichia Coli (*E. coli*)	Discharges From Municipal Separate Storm Sewer Systems (MS4)
MA21-02	**East Branch Housatonic River**	**5**	Primary Contact Recreation	Escherichia Coli (*E. coli*)	Source Unknown
MA21-02	**East Branch Housatonic River**	**5**	Primary Contact Recreation	Fecal Coliform	Discharges From Municipal Separate Storm Sewer Systems (ms4)
MA21-02	**East Branch Housatonic River**	**5**	Primary Contact Recreation	Fecal Coliform	Source Unknown
MA21-09	**Windsor Brook**	**4C**	Fish, other Aquatic Life and Wildlife	Dewatering	Water Diversions

Water Quality Goals

Water quality goals may be established for a variety of purposes, including the following:

a.) For **water bodies with known impairments**, a Total Maximum Daily Load (TMDL) is established by MassDEP and the United States Environmental Protection Agency (USEPA) as the maximum amount of the target pollutant that the waterbody can receive and still safely meet water quality standards. If the waterbody has a TMDL for total phosphorus (TP) or total nitrogen (TN), or total suspended solids (TSS), that information is provided below and included as a water quality goal.[17]

b.) For **water bodies without a TMDL for total phosphorus** (TP), a default water quality goal for TP is based on target concentrations established in the Quality Criteria for Water (USEPA, 1986) (also known as the "Gold Book"). The Gold Book states that TP should not exceed 50 ug/L in any stream at the point where it enters any lake or reservoir, nor 25 ug/L within a lake or reservoir. For the purposes of developing WBPs, MassDEP has adopted 50 ug/L as the TP target for all streams at their downstream discharge point, regardless of which type of water body the stream discharges to.

c.) Massachusetts Surface Water Quality Standards (314 CMR 4.00, 2022) prescribe the minimum water quality criteria required to sustain a waterbody's designated uses. This watershed is a Class 'B' waterbody. The water quality goal for fecal coliform bacteria is based on the Massachusetts Surface Water Quality Standards.[18]

Table A-14: Surface Water Quality Classification by Assessment Unit

Assessment Unit ID	Waterbody	Class
MA21-01	East Branch Housatonic River	B
MA21-02	East Branch Housatonic River	B
MA21-08	Cleveland Brook	B
MA21-09	Windsor Brook	A
MA21-10	Anthony Brook	B
MA21-11	Wahconah Falls Brook	B
MA21-12	Cady Brook	A
MA21-32	Tyler Brook	A
MA21-33	Welch Brook	B
MA21-59	Brattle Brook	B
MA21-60	Barton Brook	B
MA21-61	Weston Brook	B
MA21-62	Unnamed Tributary	B

[17] https://www.mass.gov/total-maximum-daily-loads-tmdls
[18] https://www.mass.gov/regulations/314-CMR-400-massachusetts-surface-water-quality-standards

d.) **Other water quality goals set by the community** (e.g., protection of high-quality waters, in-lake phosphorus concentration goal to reduce recurrence of cyanobacteria blooms, etc.).

Table A-15: Water Quality Goals

Pollutant	Goal	Source
Total Phosphorus (TP)	Total phosphorus should not exceed: --50 ug/L in any stream --25 ug/L within any lake or reservoir	Quality Criteria for Water (USEPA, 1986)
Bacteria	**Class A Standards** (3) Inland Water Classes. (a) Class A. 4. Bacteria. b. For protection of primary contact recreation, surface waters shall meet the minimum criteria for bacteria set forth in 314 CMR 4.05(5)(f)1. and 3. 4.05: Classes and Criteria (5) Additional Minimum Criteria Applicable to All Surface Waters. (f) Bacteria. 1. Inland Waters. Concentrations of bacteria in Inland Waters, subject to the reduced interval requirements set forth in 314 CMR 4.05(5)(f)3. as applicable, and except as otherwise provided in the seasonal exception set forth in 314 CMR 4.05(5)(f)4. As applicable, shall, on a year-round basis, satisfy either 314 CMR 4.05(5)(f)1.a. or b: a. for *E. coli*: i. concentrations shall not exceed 126 colony-forming units (cfu) per 100 mL, calculated as the geometric mean of all samples collected within any 90-day or smaller interval; and ii. no more than 10% of all such samples shall exceed 410 cfu per 100 mL (a statistical threshold value); or 3. Reduced Interval Requirements. The geometric mean and statistical threshold value used for calculating the minimum criteria for bacteria set forth in 314 CMR 4.05(5)(f)1. and 2., shall be calculated and assessed, respectively, over a 30-day or smaller interval in *lieu* of any otherwise applicable longer interval, if either of the conditions set forth in 314 CMR 4.05(5)(f)3.a.i. or ii. is met. a. Conditions which require a reduced interval: i. criteria are being applied to waters adjacent to any public or semi-public beach, at a location used for bathing and swimming purposes, and for the dates of operation of any such beach as posted or as otherwise established by the operator pursuant to 105 CMR 445.020: *Operation*; or	Massachusetts Surface Water Quality Standards (314 CMR 4.00, 2022))

	ii. criteria are being applied to segments impacted by CSO-, B(CSO)-, SB(CSO)-, or POTW-discharges.	
Bacteria	<u>**Class B Standards**</u> ***Inland Waters:*** Concentrations of bacteria concentrations for: 1. *E. coli* shall (i) not exceed 126 colony-forming units (cfu) per 100 mL, calculated as the geometric mean of all samples collected within any 90-day or smaller interval; and (ii) no more than 10% of all such samples shall exceed 410 cfu per 100 mL (a statistical threshold value); ***Public Bathing Beaches:*** The geometric mean and statistical threshold value used for calculating the minimum criteria for bacteria set forth as above shall be calculated and assessed, respectively, over a 30-day or smaller interval in *lieu* of any otherwise applicable longer interval	Massachusetts Surface Water Quality Standards (314 CMR 4.00, 2022)
Nitrogen	Total Nitrogen should not exceed 2 mg/l in any stream or river or stormwater outfall	Community goal based on EPA MS4 stormwater threshold
Cyanobacteria	No algal blooms in recreational lakes	Community Goal
Aquatic Non-native Invasive plants	Invasive species coverage reduced and maintained at healthy levels that do not impede recreation.	Community Goal

Note: *There may be more than one water quality goal for bacteria due to different Massachusetts Surface Water Quality Standards Classes for different Assessment Units within the watershed*

Land Use and Impervious Cover Information

Land use information and impervious cover are presented in the tables and figures below. Land use source data is from 2005 and was obtained from MassGIS (2009b)

Watershed Land Uses

Table A-16: Watershed Land Uses

Land Use	Area (acres)	% of Watershed
Forest	32283.25	75.6
High Density Residential	1981.29	4.6
Open Land	1740.67	4.1
Agriculture	1680.75	3.9
Low Density Residential	1450.89	3.4
Industrial	975.9	2.3
Medium Density Residential	886.99	2.1
Water	841.33	2
Commercial	706.98	1.7
Highway	131.1	0.3
TOTAL	**42679.15**	**100**

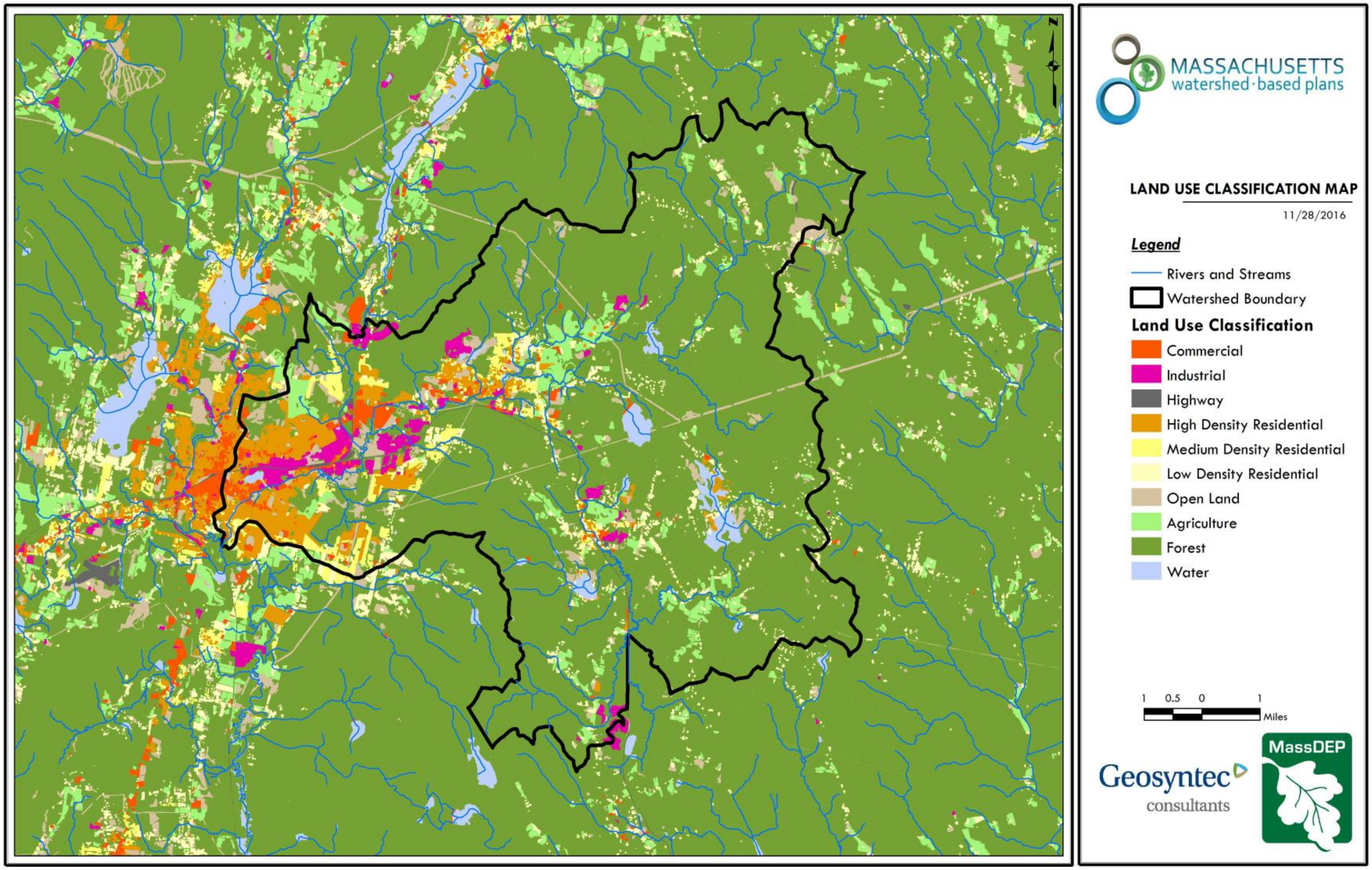


Figure A-4: Watershed Land Use Map (MassGIS, 2007; MassGIS, 2009b; MassGIS, 1999; MassGIS, 2001; USGS, 2016)

Ctrl + Click on the map to view a full-sized image in your web browser.

Watershed Impervious Cover

There is a strong link between impervious land cover and stream water quality. Impervious cover includes land surfaces that prevent the infiltration of water into the ground, such as paved roads and parking lots, roofs, basketball courts, etc.

Impervious areas that are directly connected (DCIA) to receiving waters (via storm sewers, gutters, or other impervious drainage pathways) produce higher runoff volumes and transport stormwater pollutants with greater efficiency than disconnected impervious cover areas which are surrounded by vegetated, pervious land. Runoff volumes from disconnected impervious cover areas are reduced as stormwater infiltrates when it flows across adjacent pervious surfaces.

An estimate of DCIA for the watershed was calculated based on the Sutherland equations. USEPA provides guidance (USEPA, 2010) on the use of the Sutherland equations to predict relative levels of connection and disconnection based on the type of stormwater infrastructure within the **total impervious area (TIA)** of a watershed. Within each subwatershed, the total area of each land use was summed and used to calculate the percent TIA.

Table A-17: TIA and DCIA Values for the Watershed

	Estimated TIA (%)	Estimated DCIA (%)
Watershed	6.5	5.4

The relationship between TIA and water quality can generally be categorized as shown in **Table A-18** (Schueler et al. 2009):

Table A-18: Relationship between Total Impervious Area (TIA) and water quality (Schueler et al. 2009)

% Watershed Impervious Cover	Stream Water Quality
0-10%	Typically, high quality, and typified by stable channels, excellent habitat structure, good to excellent water quality, and diverse communities of both fish and aquatic insects.
11-25%	These streams show clear signs of degradation. Elevated storm flows begin to alter stream geometry, with evident erosion and channel widening. Streams banks become unstable, and physical stream habitat is degraded. Stream water quality shifts into the fair/good category during both storms and dry weather periods. Stream biodiversity declines to fair levels, with most sensitive fish and aquatic insects disappearing from the stream.
26-60%	These streams typically no longer support a diverse stream community. The stream channel becomes highly unstable, and many stream reaches experience severe widening, downcutting, and streambank erosion. Pool and riffle structure needed to sustain fish is diminished or eliminated and the substrate can no longer provide habitat for aquatic insects, or spawning areas for fish. Biological quality is typically poor, dominated by pollution tolerant insects and fish. Water quality is consistently rated as fair to poor, and water recreation is often no longer possible due to the presence of high bacteria levels.
>60%	These streams are typical of “urban drainage”, with most ecological functions greatly impaired or absent, and the stream channel primarily functioning as a conveyance for stormwater flows.

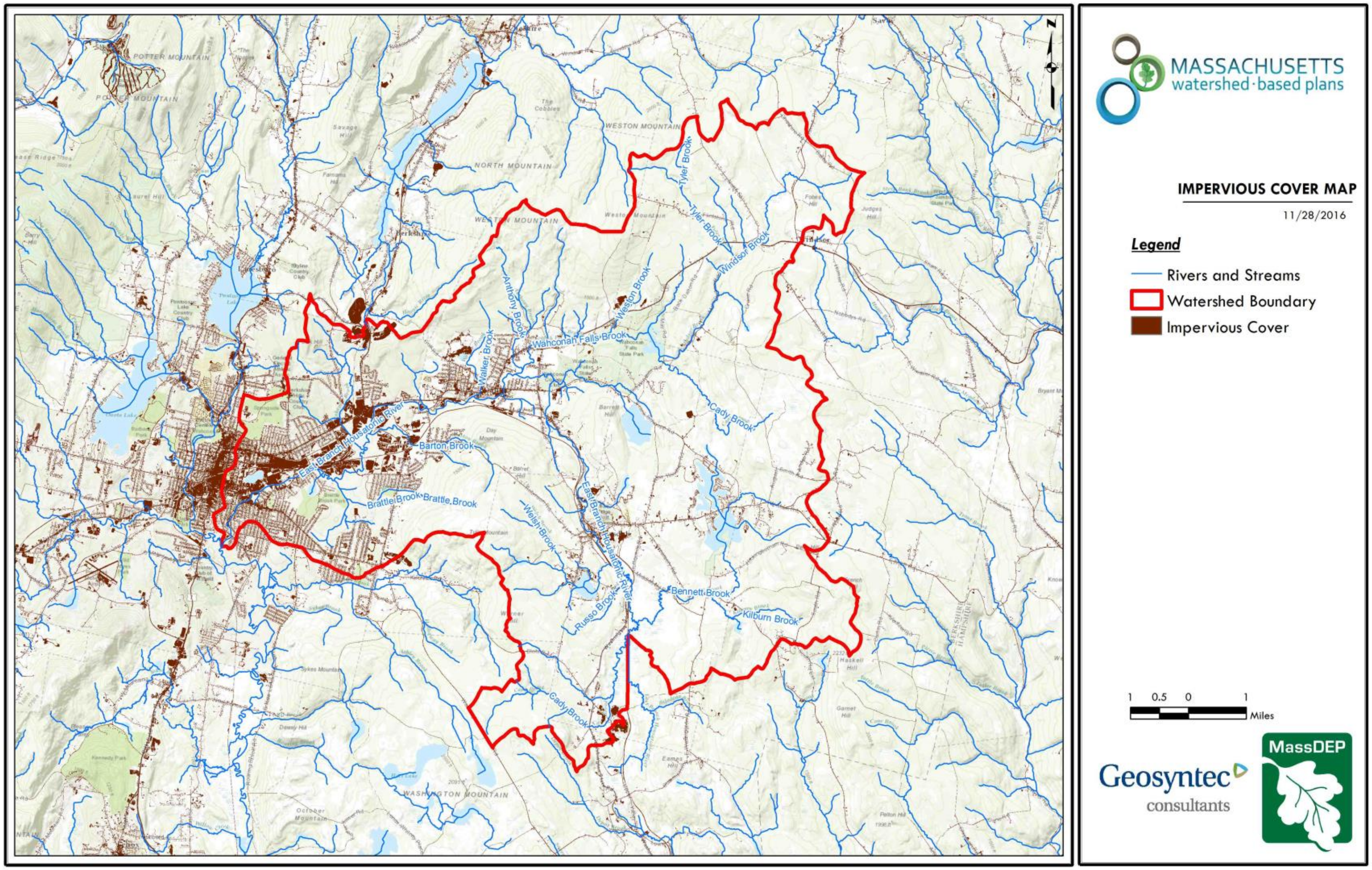


Figure A-5: Watershed Impervious Surface Map (MassGIS, 2007; MassGIS, 2009b; MassGIS, 1999; MassGIS, 2001; USGS, 2016)

Ctrl + Click on the map to view a full-sized image in your web browser

Pollutant Loading

Geographic Information Systems (GIS) was used for the pollutant loading analysis. The land use data (MassGIS, 2009b) was intersected with impervious cover data (MassGIS, 2009a) and United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soils data (USDA NRCS and MassGIS, 2012) to create a combined land use/land cover grid. The grid was used to sum the total area of each unique land use/land cover type.

The amount of DCIA was estimated using the Sutherland equations as described above and any reduction in impervious area due to disconnection (i.e., the area difference between TIA and DCIA) was assigned to the pervious D soil category for that land use to simulate that some infiltration will likely occur after runoff from disconnected impervious surfaces passes over pervious surfaces.

Pollutant loading for key nonpoint source pollutants in the watershed was estimated by multiplying each land use/cover type area by its pollutant load export rate (PLER) as follows:

$$L_n = A_n * P_n$$

Where L_n = Loading of land use/cover type n (lb/yr); A_n = area of land use/cover type n (acres); P_n = pollutant load export rate of land use/cover type n (lb/acre/yr)

The PLERs are an estimate of the annual total pollutant load exported via stormwater from a given unit area of a particular land cover type. The PLER values for TN, TP and TSS were obtained from USEPA (USEPA, 2020; UNHSC, 2018, Tetra Tech, 2015) (see values provided in Appendix A). **Table A-19** presents the estimated land-use based TN, TP and TSS pollutant loading in the watershed.

Pollutant loading information:

Table A-19: Estimated Pollutant Loading for Key Nonpoint Source Pollutants

Land Use Type	Pollutant Loading[1]					
	Total Phosphorus (TP) (lbs/yr)	Total Phosphorus (TP) (%)	Total Nitrogen (TN) (lbs/yr)	Total Nitrogen (TN) (%)	Total Suspended Solids (TSS) (tons/yr)	Total Suspended Solids (TSS) (%)
Forest	4,238	43	21,082	33	1,034.39	62
High Density Residential	1,444	15	9,715	15	144.18	9
Industrial	1,034	11	8,923	14	111.62	7
Commercial	831	9	7,116	11	89.05	5
Agriculture	822	8	4,941	8	53.72	3
Open Land	520	5	4,818	7	86.54	5
Low Density Residential	416	4	4,213	7	56.79	3
Medium Density Residential	320	3	2,703	4	37.92	2
Highway	121	1	987	2	61.21	4
TOTAL	**9,745**	**100**	**64,499**	**100**	**1,675.42**	**100**

[1]These estimates do not consider loads from point sources or septic systems.

Element B: Determine Pollutant Load Reductions Needed to Achieve Water Quality Goals

Element B of your WBP should:

Determine the pollutant load reductions needed to achieve the water quality goals established in Element A. The water quality goals should incorporate Total Maximum Daily Load (TMDL) goals, when applicable. For impaired water bodies, a TMDL establishes pollutant loading limits as needed to attain water quality standards.

Estimated Pollutant Loads

Table B-3 lists estimated pollutant loads for the following primary nonpoint source (NPS) pollutants: total phosphorus (TP), total nitrogen (TN), total suspended solids (TSS). These estimated loads are based on the pollutant loading analysis presented in Section 4 of Element A.

Water Quality Goals

Water quality goals for primary NPS pollutants are listed in **Table B-3** based on the following:

- TMDL water quality goals (if a TMDL exists for the water body).
- For all water bodies, including impaired waters that have a pathogen TMDL, the water quality goal for bacteria is based on the Massachusetts Surface Water Quality Standards (314 CMR 4.00, 2013) that apply to the Water Class of the selected water body.
- If the water body does not have a TMDL for TP, a default target TP concentrations is provided which is based on guidance provided by the USEPA in Quality Criteria for Water (1986), also known as the "Gold Book". Because there are no similar default water quality goals for TN and TSS, goals for these pollutants are provided in **Table B-1** only if a TMDL exists or alternate goal(s) have been optionally established by the WBP author.
- According to the USEPA Gold Book, total phosphorus should not exceed 50 ug/L in any stream at the point where it enters any lake or reservoir. The water quality loading goal was estimated by multiplying this target maximum phosphorus concentration (50 ug/L) by the estimated annual watershed discharge for the selected water body. To estimate the annual watershed discharge, the mean flow was used, which was estimated based on United States Geological Survey (USGS) "Runoff Depth" estimates for Massachusetts (Cohen and Randall, 1998). Cohen and Randall (1998) provide statewide estimates of annual Precipitation (P), Evapotranspiration (ET), and Runoff (R) depths for the northeastern U.S. According to their method, Runoff Depth (R) is defined as all water reaching a discharge point (including surface and groundwater), and is calculated by:

$$P – ET = R$$

A mean Runoff Depth R was determined for the watershed by calculating the average value of R within the watershed boundary. This method includes the following assumptions/limitations:

a. For lakes and ponds, the estimate of annual TP loading is averaged across the entire watershed. However, a given lake or reservoir may have multiple tributary streams, and each stream may drain land with vastly different characteristics. For example, one tributary may drain a highly developed residential area, while a second tributary may drain primarily forested and undeveloped land. In this case, one tributary may exhibit much higher phosphorus concentrations than the average of all streams in the selected watershed.

b. The estimated existing loading value only accounts for phosphorus due to stormwater runoff. Other sources of phosphorus may be relevant, particularly phosphorus from on-site wastewater treatment (septic systems) within close proximity to receiving waters. Phosphorus does not typically travel far within an aquifer, but in watersheds that are primarily unsewered, septic systems and other similar groundwater-related sources may contribute a significant load of phosphorus that is not captured in this analysis. As such, it is important to consider the estimated TP loading as "the expected TP loading from stormwater sources."

c. If the calculated water quality goal is higher than the existing estimated total load; the water quality goal is automatically set equal to the existing estimated total load.

Pollutant Load Reduction Information

The approved *Long Island Sound TMDL* has set a nitrogen reduction goal of 10% for the entire Housatonic watershed including the East Branch. As there is not a specific state or TMDL goal required for Total Phosphorous (TP and Total Suspended Sediment (TSS) reduction, the decision was to reduce TP and TSS by 10% as well in line with Total Nitrogen (TN). (Note, the Opti-Tool calculations conducted by the UNH Stormwater Center for the conceptual designs completed for the Mass TMDL project in 2022 indicated that BMP implementation cost effectiveness significantly decreased at the 20% TN reduction level. Opti-Tool calculations for TP and TSS were not completed as the focus was on nitrogen reduction.)

To calculate the pollutant load reduction goals for TN, TP and TSS using the 10% reduction goal, we followed the following steps for the East Branch watershed.

1. Pre-development pollutant loads were calculated using the pollutant load export rates provided in Appendix A.

Table B-1: Estimated Pre-Development Pollutant Loading

East Branch Land Use	% land use	Total Acres	TP (lbs/acre)	TP (lbs)	TSS (lbs/acre)	TSS (lbs)	TSS (tons)
Forested (HSG A)	95%	40,545	0.12	4865.406	7.14	289491.657	144.7458
Forested (HSG C)	2%	854	0.12	102.4296	59.8	51044.084	25.52204
Open Land (Barren) (HSG-A)	3%	1,280	0.03	38.4111	7.14	9141.8418	4.570921
Totals	100%	42,679	0.27	5006.247	74.08	349677.5828	174.8388

2. Post-development estimated pollutant loads for each land use are provided in **Table B-1.** However, pollutant loading from the forested land use is natural and is not expected to be mitigated in the implemented stormwater BMPs. We calculated a post-development pollutant load without the forest land use value for the watershed.
3. The pre-development and post-development (without forest) pollutant loads were compared and the difference between the two calculated by subtracting post-development from pre-development pollutant load values.
4. Using the values obtained above in #3, the 10% estimated pollutant load reduction goals for TN, TP and TSS were calculated.

Table B-2: Pollutant Load Reduction Goal Calculations

		Estimated Pollutant Loading		
		TP (lbs)	**TSS (tons)**	**TN (lbs)**
A	**Pre-development**	5006	175	21,083
B	**Post-development pollutant loads (including forest land use)**	9,745	1,675	64,499
C	**Post-development Estimated Pollutant loads (minus the forest land use)**	5,516	641	43,917
D	**Difference between Pre- and Post-Development (minus the forest land use) (Row C -Row A)**	510	466	22,834
E	**10% reduction goal (0.1 of Row D values)**	**51**	**47**	**2,283**
	Pollutant load reduction if all proposed BMPs installed	29.3	5.7	232

Table B-3: Pollutant Load Reduction Goals – East Branch

Pollutant	Existing Estimated Total Load (with Forest)	Load Reduction Goals	Required Load Reduction
Total Phosphorus	9,745 lbs/yr	10% reduction of post development pollutant loads (not including PLER from forest land use) **51 lbs/year**	None required
Total Nitrogen	64,499 lbs/yr	10% reduction of post development pollutant loads (without forest) **2,283 lbs/year**	10% of pollutant load (*based on the Long Island TMDL for Total Nitrogen)*
Total Suspended Solids	1,675 ton/yr	10% reduction of post development pollutant loads (without forest) **47 tons/year**	None required
Bacteria	*MSWQS for bacteria are concentration standards (e.g., colonies of fecal coliform bacteria per 100 ml), which are difficult to predict based on estimated annual loading.*	**Class B Standards** ***Inland Waters:*** Concentrations of bacteria concentrations for: 1. *E. coli* shall (i) not exceed 126 colony-forming units (cfu) per 100 mL, calculated as the geometric mean of all samples collected within any 90-day or smaller interval; and (ii) no more than 10% of all such samples shall exceed 410 cfu per 100 mL (a statistical threshold value); 2.*enterococci*: (i) concentrations shall not exceed 35 cfu per 100 mL, calculated as the geometric mean of all samples collected within any 90-day or smaller interval; and (ii) no more than 10% of all such samples shall exceed 130 cfu per 100 mL (the statistical threshold value). ***Public Bathing Beaches:*** The geometric mean and statistical threshold value used for calculating the minimum criteria for bacteria set forth as above. shall be calculated and assessed, respectively, over a 30-day or smaller interval in *lieu* of any otherwise applicable longer interval	DRAFT TMDL load reduction: 62% of the geomean calculated from 2007 MassDEP sampling (Target for *E. coli levels* is 126 cfu/100ml)

TMDL Pollutant Load Criteria

MassDEP has completed a *DRAFT Statewide Pathogen TMDL* with appendices for affected watersheds including the Housatonic Watershed[19]. The impaired segment of the East Branch of the Housatonic River from the Center Pond outlet to the confluence with the main stem will fall under this TMDL. The target reduction for pathogens is 62% with the goal of the East Branch to meet the state standards of *E. coli* which is not to exceed 126 cfu/100ml as presented in **Table B-1**.

[19] https://www.mass.gov/lists/total-maximum-daily-loads-by-watershed#statewide-pathogen-tmdl-

The approved *Long Island Sound TMDL* has set requirements for the Housatonic watershed including a nitrogen reduction goal of 10% for the Housatonic watershed. As MS4 communities, the City of Pittsfield and the Town of Dalton, are required to reduce and track nitrogen pollution. Appendix F and H of the MS4 General Permit (2016) outlines the required public messaging that targets nitrogen as well as phosphorous.[20] [21]

No additional waterbodies in the East Branch require a TMDL.

[20] Mass MS4 General Permit - Appendix F: https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/appendix-f-2016-ma-sms4-gp-mod.pdf
[21] Mass MS4 General Permit - Appendix H: https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/appendix-h-2016-ma-sms4-gp-mod.pdf

Element C: Describe management measures that will be implemented to achieve water quality goals

Element C: A description of the nonpoint source management measures needed to achieve the pollutant load reductions presented in Element B, and a description of the critical areas where those measures will be needed to implement this plan.

BMP Hotspot Map:

The following GIS-based analysis was performed within the watershed to identify high priority parcels for best management practice (BMP) (also referred to as management measure) implementation:

- Each parcel within the watershed was evaluated based on ten different criteria accounting for the parcel ownership, social value, and implementation feasibility (See **Table C-1** for more detail below);
- Each criterion was then given a score from 0 to 5 to represent the priority for BMP implementation based on a metric corresponding to the criterion (e.g., a score of 0 would represent lowest priority for BMP implementation whereas a score of 5 would represent highest priority for BMP implementation);
- A multiplier was also assigned to each criterion, which reflected the weighted importance of the criterion (e.g., a criterion with a multiplier of 3 had greater weight on the overall prioritization of the parcel than a criterion with a multiplier of 1); and
- The weighted scores for all the criteria were then summed for each parcel to calculate a total BMP priority score.

Table C-1 presents the criteria, indicator type, metrics, scores, and multipliers that were used for this analysis. Parcels with total scores above 60 are recommended for further investigation for BMP implementation suitability. **Figure C-1** presents the resulting BMP Hotspot Map for the watershed. The following link includes a Microsoft Excel file with information for all parcels that have a score above 60: hotspot spreadsheet.

This analysis solely evaluated individual parcels for BMP implementation suitability and likelihood for the measures to perform effectively within the parcel's features. This analysis does not quantify the pollutant loading to these parcels from the parcel's upstream catchment. When further evaluating a parcel's BMP implementation suitability and cost-effectiveness of BMP implementation, the existing pollutant loading from the parcel's upstream catchment and potential pollutant load reduction from BMP implementation should be evaluated.

GIS data used for the BMP Hotspot Map analysis included:

- MassGIS (2015a);
- MassGIS (2015b);
- MassGIS (2017a);
- MassGIS (2017b);
- MassGIS (2020);

- MA Department of Revenue Division of Local Services (2016);
- MassGIS (2005);
- ArcGIS (2020);
- MassGIS (2009b);
- MassGIS (2012); and
- ArcGIS (2020b).

Table C-1: Matrix for BMP Hotspot Map GIS-based Analysis

Criteria	Indicator Type	METRICS																											Multiplier	Maximum Potential Score
		Yes or No?		Hydrologic Soil Group				Land Use Type									Water Table Depth				Parcel Area			Parcel Average Slope						
		Yes	No	A or A/D	B or B/D	C or C/D	D	Low and Medium Density Residential	High Density Residential	Commercial	Industrial	Highway	Agriculture	Forest	Open Land	Water	101-200 cm	62-100 cm	31-61 cm	0-30 cm	Greater than 2 acres	Between 1-2 acres	Less than 1 acre	Less than 2%	Between 2% and 15%	Greater than 15%	Less than 50%	Between 51% and 100%		
Is the parcel a school, fire station, police station, town hall or library?	Ownership	5	0																										2	10
Is the parcel's use code in the 900 series (i.e. public property or university)?	Ownership	5	0																										2	10
Is parcel fully or partially in an Environmental Justice Area?	Social	5	0																										2	10
Most favorable Hydrologic Soil Group within Parcel	Implementation Feasibility			5	3	0	0																						2	10
Most favorable Land Use in Parcel	Implementation Feasibility							1	2	4	2	4	5	1	4	X[1]													3	15
Most favorable Water Table Depth (deepest in Parcel)	Implementation Feasibility																5	4	3	0									2	10
Parcel Area	Implementation Feasibility																				5	4	1						3	15
Parcel Average Slope	Implementation Feasibility																							3	5	1			1	5
Percent Impervious Area in Parcel	Implementation Feasibility																										5	2.5	1	5
Within 100 ft buffer of receiving water (stream or lake/pond)?	Implementation Feasibility	5	2																										2	10

Note 1: **X** denotes that parcel is excluded

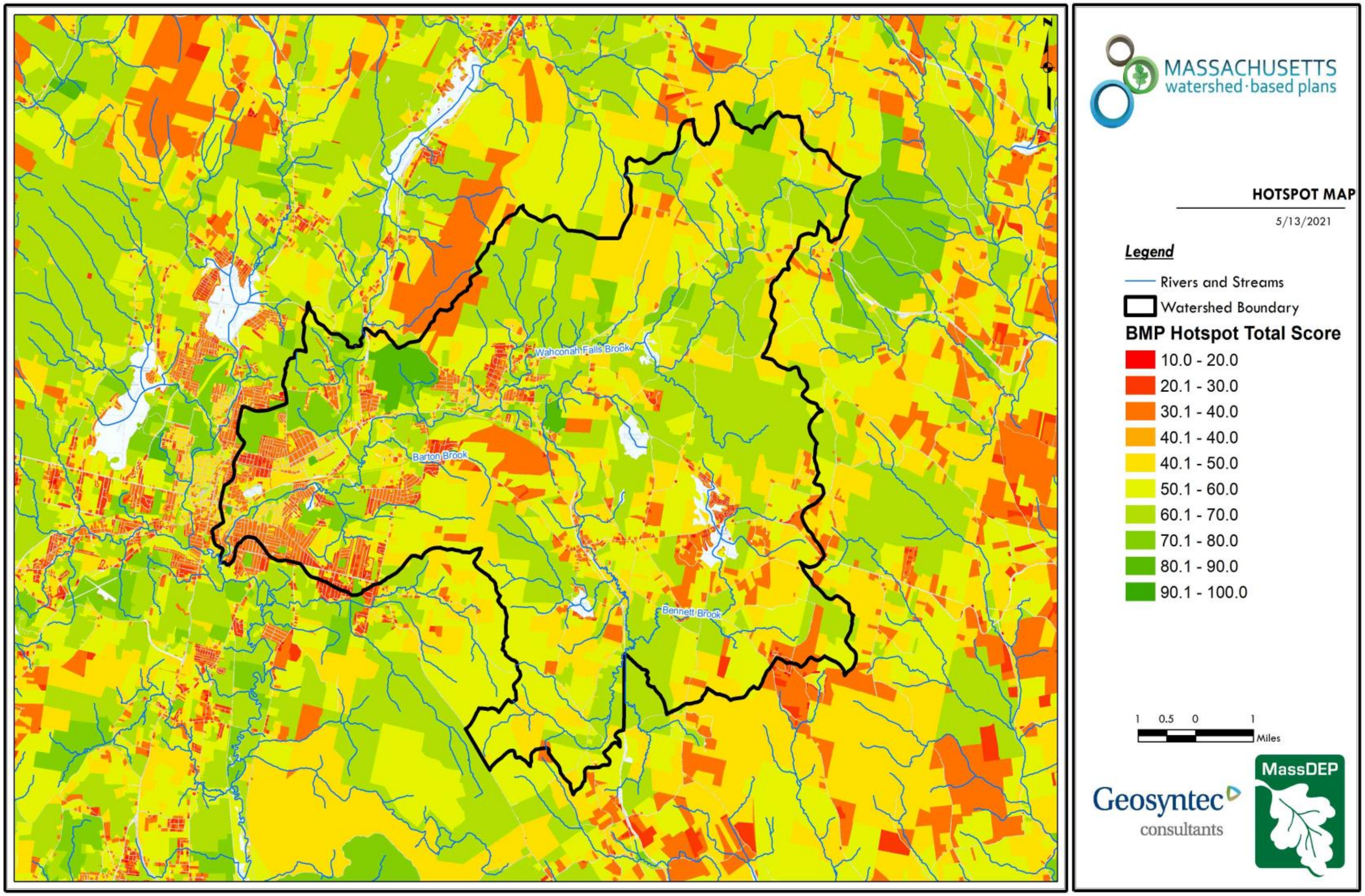


Figure C-1: BMP Hotspot Map (MassGIS (2015a), MassGIS (2015b), MassGIS (2017a), MassGIS (2017b), MassGIS (2020), MA Department of Revenue Division of Local Services (2016), MassGIS (2005), ArcGIS (2020), MassGIS (2009b), MassGIS (2012), ArcGIS (2020b))

Ctrl + Click on the map to view a full sized image in your web browser.

Critical Management Areas:

Figure C-1, the BMP Hotspot map, and the water quality data presented in Element A indicate that the most effective pollutant load reductions will be achieved with management measures implemented in the residential neighborhoods, business areas and, in general, the roads of the East Branch watershed. Many of these projects will require the willingness of private property owners to implement.

Proposed Structural BMP Projects:

Table C-2 presents the proposed structural BMP projects as well as the estimated pollutant load reductions and costs. The planning level cost estimates and pollutant load reduction estimates and estimates of BMP footprint were based off information obtained in the following sources. Costs that were adjusted to 2016 values using the Consumer Price Index (CPI) (United States Bureau of Labor Statistics, 2016) were tripled to reflect the increased engineering and construction costs.

- Geosyntec Consultants, Inc. (2014);
- Geosyntec Consultants, Inc. (2015);
- King and Hagen (2011);
- Leisenring, et al. (2014);
- King and Hagen (2011);
- MassDEP (2016a);
- MassDEP (2016b);
- University of Massachusetts, Amherst (2004);
- USEPA (2020);
- UNHSC (2018);
- Tetra Tech, Inc. (2015);

Table C-2: East Branch Stormwater BMP Summary Table

Site Name	Municipality	Management Measures	Capital Costs	Operation & Maintenance Costs (annual)	Total Nitrogen (lbs/yr)	Total Phosphorous (lbs/yr)	Total Suspended Solids (lbs/yr)	Total Suspended Solids (tons/yr)
Allendale Elementary School	Pittsfield	Bioretention Basins (5) & Subsurface Infiltration/Porous Pavement	375,000-495,000	$3,000	40.6	4.8	1351	0.6755
Egremont Elementary School	Pittsfield	Bioretention Basins (3) & Biocells	120,000-200,000	$3,000	36.7	4.4	1221	0.6105
Morningside Community School	Pittsfield	Bioretention Basin & Biocell; Subsurface Infiltration/Porous Pavement	100,000-160,000	$3,000	11.7	1.4	390	0.195
Pittsfield High School	Pittsfield	Bioretention Basin & Biocell; Subsurface Infiltration/Porous Pavement	510,000-630,000	$3,000	27.6	3.2	1022.5	0.51125
Gordon Street	Pittsfield	Retrofit existing sediment forebays and rain gardens	25,000	$200	8.5	1.3	268	0.134
Craneville Elementary School	Dalton	Grassed Water Quality Swale; Porous pavement; Bioretention Basin	100,000-125,000	$2000	2.4	0.8	217	0.1085
Senior Center and Former Middle School	Dalton	Two Infiltration Basins	200,000-260,000	$500	20.4	2.4	645	0.3225

Table C-2: East Branch Stormwater BMP Summary Table

Site Name	Municipality	Management Measures	Capital Costs	Operation & Maintenance Costs (annual)	Total Nitrogen (lbs/yr)	Total Phosphorous (lbs/yr)	Total Suspended Solids (lbs/yr)	Total Suspended Solids (tons/yr)
Greenridge Park	Dalton	Infiltration Basin/Grassed Swale	90,000-115,000	500	8.6	0.9	268	0.134
Walker Brook Stream Daylighting	Dalton	Stream Daylight	Unknown	Unknown	No info	No info	No info	No value
End of Riverview Drive	Dalton	Gravel wetland	5,000	200	2.1	0.3	140	0.07
Dalton Sewer Department	Dalton	Bioretention Conceptual Design	51,000	200	14.4	1.5	364	0.182
Grange Hall Road	Dalton	Water Quality Swale with Check Dams	17,000-25,000	500	1.55	0.27	300	0.15
		Totals	**1,593,000-2,091,000**	**16,100**	**175**	**21**	**6,187**	**3**

Allendale Elementary School

Location: 42.459145, -73.220741
180 Connecticut Avenue, Pittsfield

Property Ownership: City of Pittsfield

Designs Prepared by: Kleinfelder for the City of Pittsfield's Nitrogen & Phosphorous Identification Report (2023)

Site description: Allendale Elementary School is located in the eastern area of the City of Pittsfield near the former General Electric Plant. The school grounds occupy 10.9 acres of which about 4.7 acres includes buildings and parking areas. The project site is fairly level (0 - 3% slopes) and underlying soils were identifed as hydrologic soils group A which are highly permeable indicating the site is very suitable for bioinfiltration.

Proposed Improvements: Construct five (5) bioretention basins and either a subsurface infiltration system or porous pavement to manage the stormwater from the parking areas.

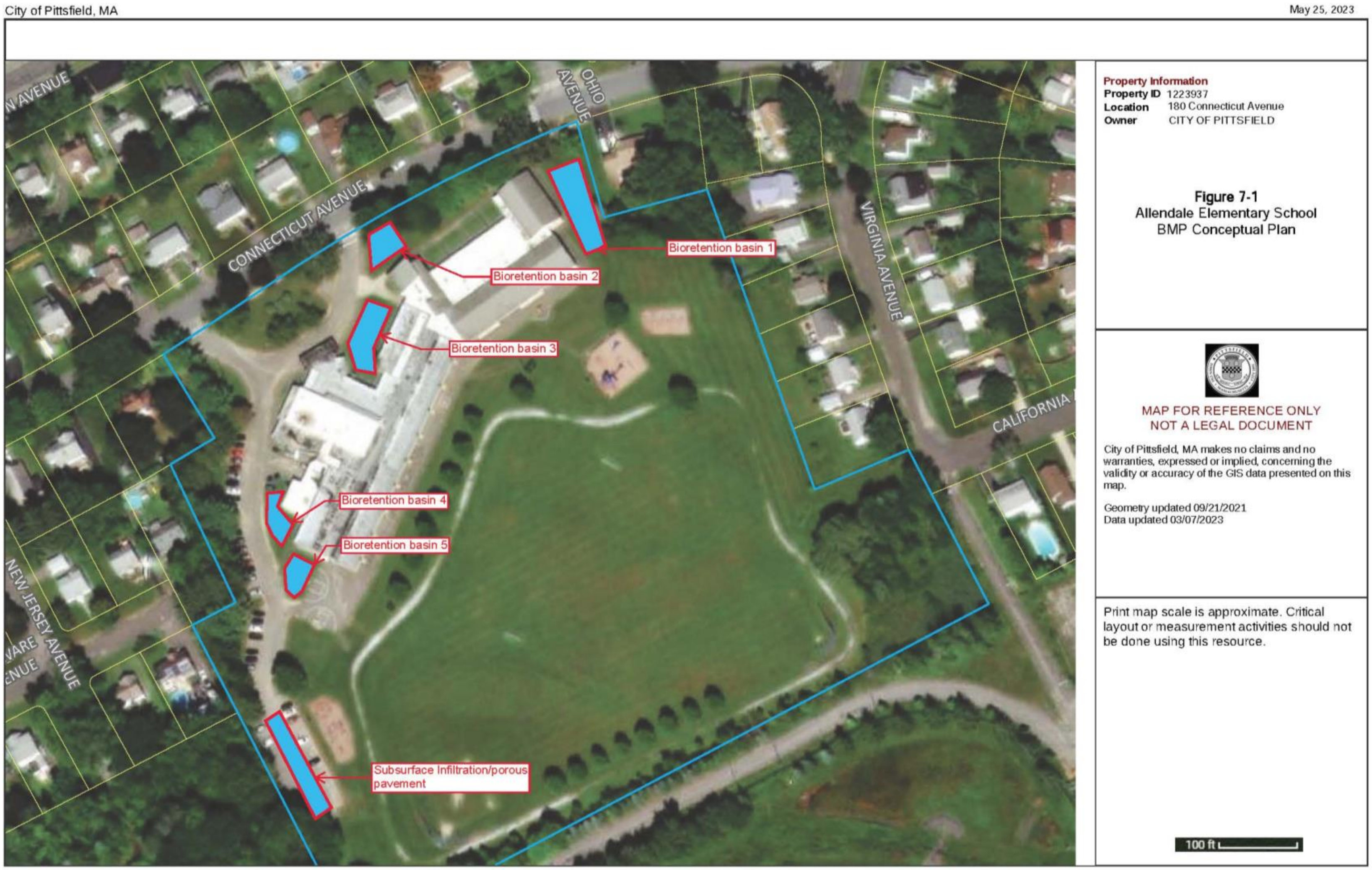
Allendale Elementary School Improvements' Summary

Proposed BMPs: Bioretention Basins (5) & Subsurface Infiltration/Porous Pavement

Estimated Nutrient Load Reduction:

Total Nitrogen:	40.6 lbs/year
Total Phosphorous:	4.8 lbs/year
Total Suspended Solids:	1351 lbs/year
Estimated Cost:	$375,000-495,000
Estimated O & M Costs:	$3,000

Figure C-2: BMP Conceptual Plan for Allendale Elementary School



Egremont Elementary School

Location: 42.4374797, -73.229808
84 Egremont Avenue, Pittsfield

Property Ownership: City of Pittsfield

Designs Prepared by: Kleinfelder for the City of Pittsfield's Nitrogen & Phosphorous Identification Report (2023)

Site description: Egremont Elementary School is located in the southeast quadrant of the City of Pittsfield. The school grounds occupy 10.6 acres of which about 3.8 acres includes buildings and parking areas. The project site is fairly level (0-3% slopes)l with underlying soils identified as hydrologic soils group A which are highly permeable indicating the site is very suitable for bioinfiltration.

Proposed Improvements: Construct three (3) bioretention basins and biocells to manage the stormwater from the school's parking areas. Stormwater from the rear parking area would be directed to bioretention basins via drainage pipe.

Egremont Elementary School Improvements' Summary

Proposed BMPs: Bioretention Basins (3) & Biocells

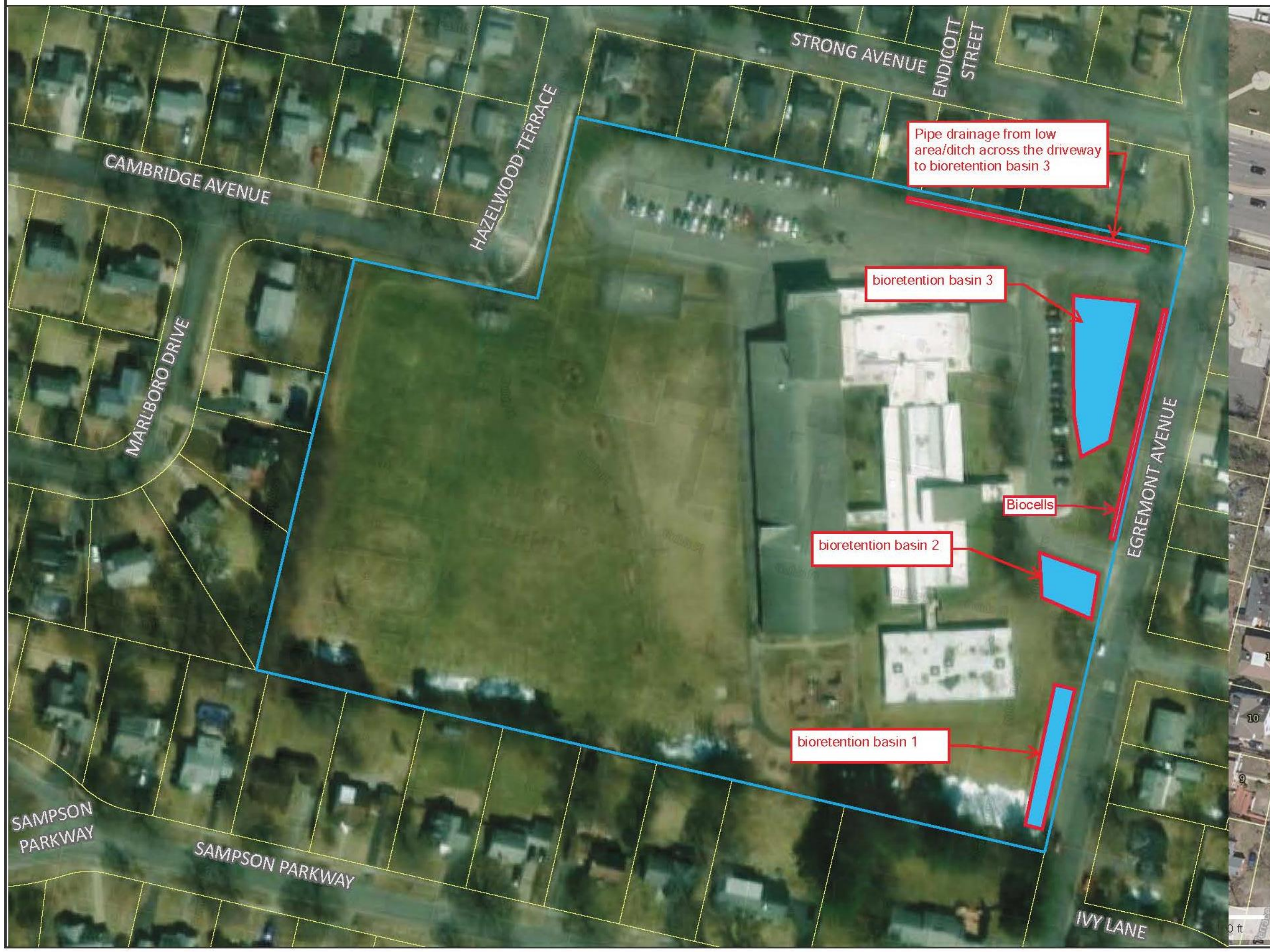
Estimated Nutrient Load Reduction:

Total Nitrogen:	36.7 lbs/year
Total Phosphorous:	4.4 lbs/year
Total Suspended Solids:	1221 lbs/year
Estimated Cost:	$120,000-200,000
Estimated O & M Costs:	$3,000

Figure C-3: BMP Conceptual Plan for Egremont Elementary School

City of Pittsfield, MA

May 25, 2023



Property Information
Property ID 1210365
Location 84 Egremont Avenue
Owner CITY OF PITTSFIELD

Figure 7-2
Egremont Elementary School
BMP Conceptual Plan

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

City of Pittsfield, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 09/21/2021
Data updated 03/07/2023

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

Morningside Community School

Location: 42.4570167, -73.2443937
100 Burbank Street, Pittsfield

Property Ownership: City of Pittsfield

Designs Prepared by: Kleinfelder for the City of Pittsfield's Nitrogen & Phosphorous Identification Report (2023)

Site description: Morningside Community School is an elementary school located in the low-income Morningside neighborhood. The school grounds occupy 5.4 acres of level ground which about 2.6 acres includes buildings and parking areas. The underlying soils were identified as hydrologic soils group C which is less permeable, but the site still offers potential for infiltration.

Proposed Improvements: Construct bioretention basins and either a subsurface infiltration system or porous pavement to manage the stormwater from the school's parking areas.

Morningside Community School Improvements' Summary

Proposed BMPs: Bioretention Basin & Biocell; Subsurface Infiltration/Porous Pavement

Estimated Nutrient Load Reduction:

Total Nitrogen:	11.7 lbs/year
Total Phosphorous:	1.4 lbs/year
Total Suspended Solids:	390 lbs/year
Estimated Cost:	$100,000-160,000
Estimated O & M Costs:	$3,000

Figure C-4: BMP Conceptual Plan for Morningside Community School

Pittsfield High School

Location: 42.446749, -73.247791
300 High Street, Pittsfield

Property Ownership: City of Pittsfield

Designs Prepared by: Kleinfelder for the Dalton Green Infrastructure Report (2022)

Site description: This high school is located in downtown Pittsfield and occupies 8.7 acres of which about 3.7 acres includes buildings and parking areas. The project site is fairly level (0-3% slopes) with underlying soils were identified as hydrologic soils group A which are highly permeable allowing infiltration.

Proposed Improvements: Construct bioretention basins and either a subsurface infiltration system or porous pavement to manage the stormwater from the high school's parking areas.

Pittsfield High School Improvements' Summary

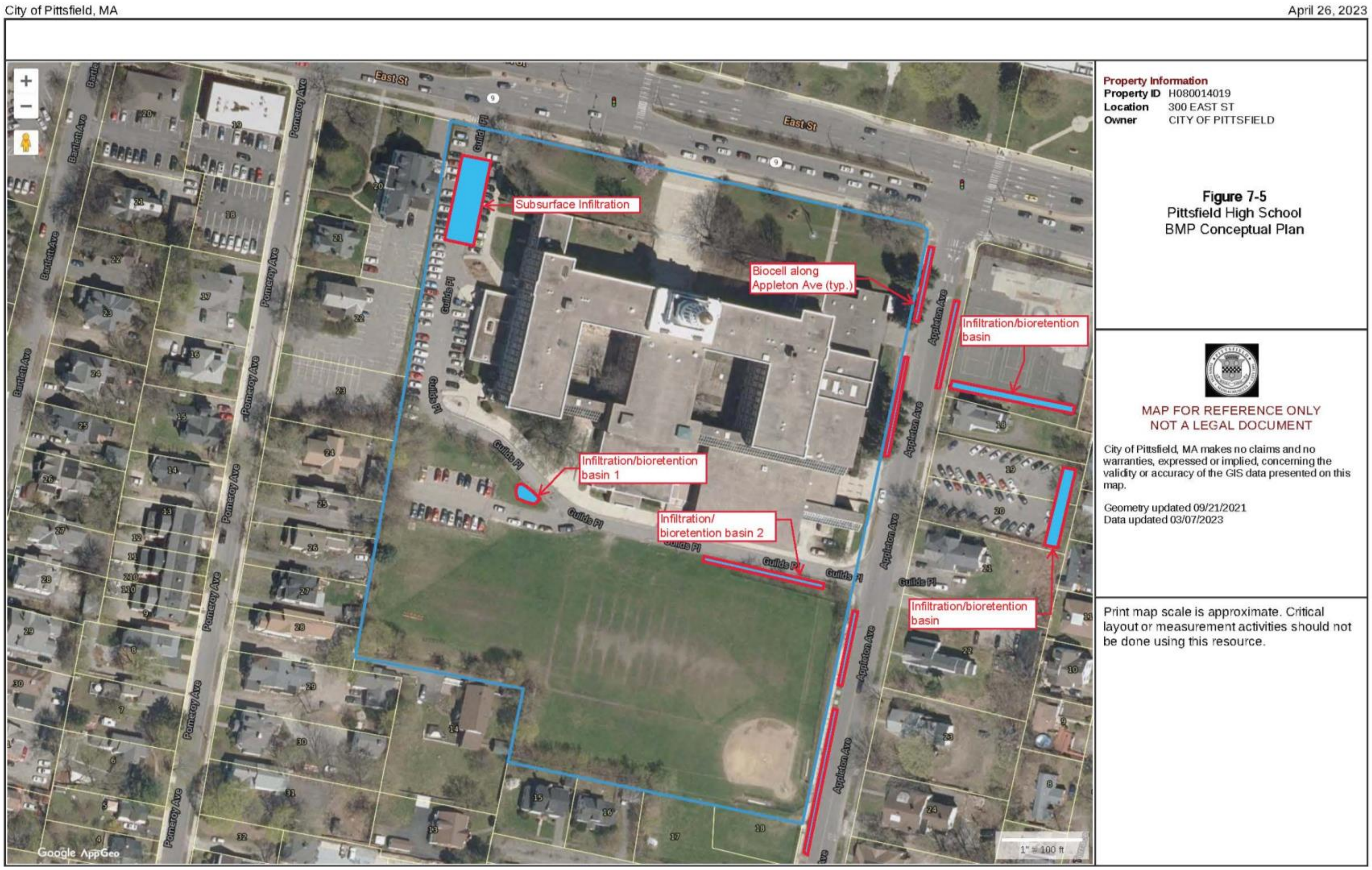
Proposed BMPs: Bioretention Basin & Biocell; Subsurface Infiltration/Porous Pavement

Estimated Nutrient Load Reduction:

Total Nitrogen:	27.6 lbs/year
Total Phosphorous:	3.2 lbs/year
Total Suspended Solids:	1022.5 lbs/year

Estimated Cost:	$510,000-630,000
Estimated O & M Costs:	$3,000

Figure C-5: BMP Conceptual Plan for Pittsfield High Schoool



Gordon Street

Location: 42.44469, -73.24551
52-58 Gordon Street, Pittsfield
Property Ownership: Private / Central Berkshire Habitat for Humanity

Designs Prepared by: BRPC (2024)

Site description: This site was developed in 2020 by the Central Berkshire Habitat for Humanity. Multiple residential housing units were built. The project site is a triangle of communally owned land in front of the housing units. The existing BMPs include two sediment forebays and shallow, 2" depth, rain gardens on two sides of the triangle of land. The sediment forebays are holding water for longer than a day. There is no inlet to these forebays. A retrofit of the existing BMPS is proposed. The stormwater BMPs could be kept on the edge and create a community space in the central area of the triangle. Input from the residents with support of Central Berkshire Habitat for Humanity on what their community vision is will be key to developing a final design of the retrofit. Residents have had to repeatedly trim the native plantings as they obstruct the ability of drivers to see traffic as they leave Gordon and enter Deming Street.

Proposed Improvements: Dig out the sediment forebays and the rain gardens. Conduct an infiltration test and amend the soil as needed. Replant the rain gardens with low growing, easy maintenance perennials such as lilies. Create easy to maintain inlets to the sediment forebays, that can be swept to remove leaves and sediment, such as asphalt or concrete pads and ensure connection from the forebays to the rain gardens. Work with residents to determine how the central area of the triangle is to be used and how proposed resident activities can coexist with the BMPs. Provide training to the residents to maintain the stormwater BMPs. Along the western edge of the triangle, consider installing a filter strip.

Gordon Street Improvements' Summary

Proposed BMPs: Retrofit existing sediment forebays and rain gardens

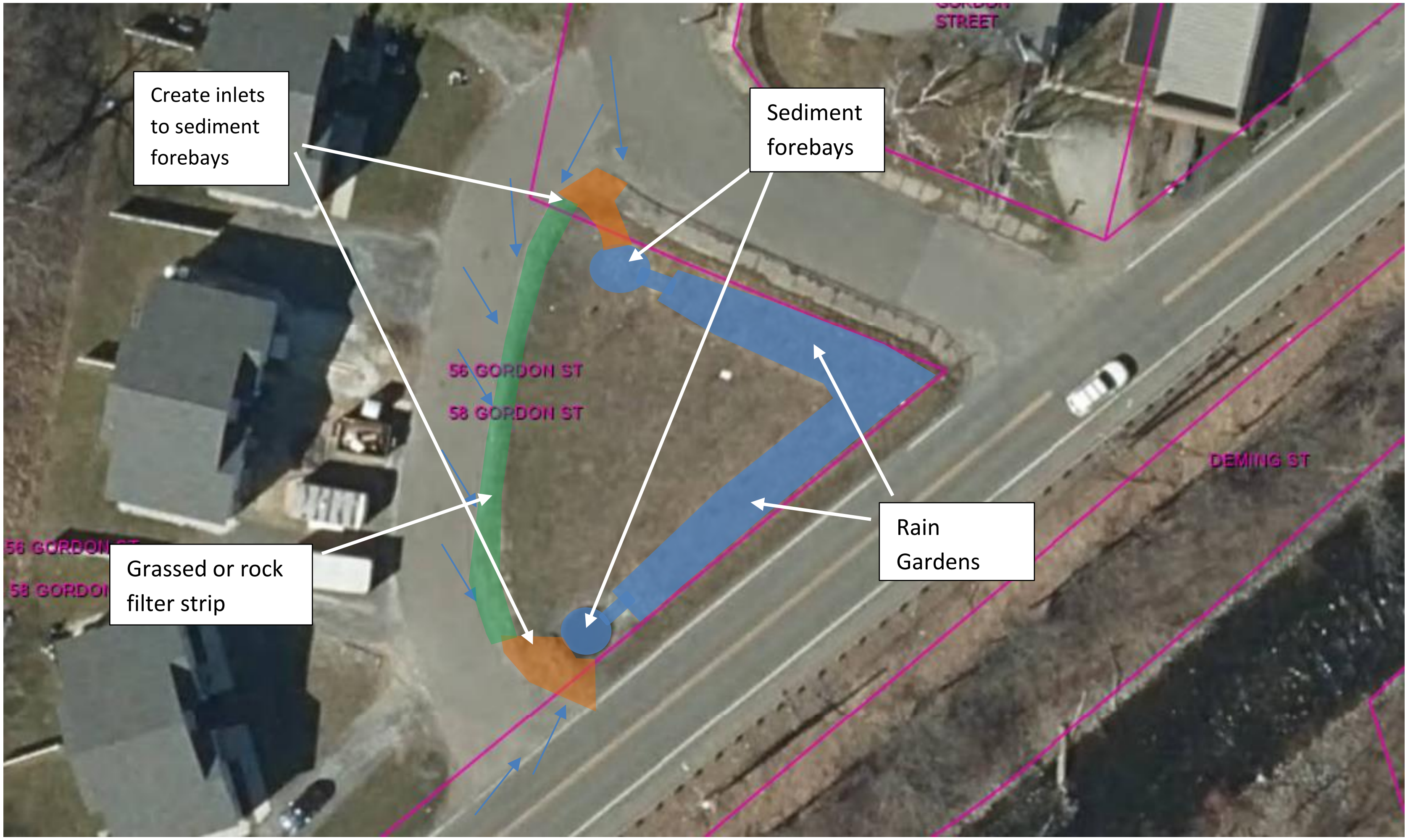
Estimated Nutrient Load Reduction:

Total Nitrogen:	8.5 lbs/year
Total Phosphorous:	1.3 lbs/year
Total Suspended Solids:	268 lbs/year

Estimated Cost: $25,000

Estimated O & M Costs: $200

Figure C-6: BMP Conceptual Plan for Gordon Street



Craneville Elementary School

Location: 42.475963 ,-73.175921
95 Park Avenue, Dalton

Property Ownership: Town of Dalton

Designs Prepared by: Comprehensive Engineering Incorporated (2021) for the Dalton Green Infrastructure Report (2022)

Site description: This site is located around the northern unnamed access road for Craneville Elementary School. Current site characteristics consist of a gravel/dirt parking area south of the roadway currently exhibiting erosion and contributing sediment to downstream catch basins, as well as an eroded channel along the edge of pavement north of the roadway. Two catch basins exist just south of the roadway within Park Avenue and John Street that receive untreated stormwater runoff from both the access roadway and Park Avenue. This site was chosen in part due to the parking area needing improvements.

Proposed Improvements: Porous pavement will replace the gravel/dirt parking area to limit suspended solids in stormwater runoff and providing infiltration during small storm events. Riprap will also be installed to armor the edge of the roadway on the northern side of the school road to minimize erosion; due to the proximity of trees, excavating and creating a new swale is not recommended in this area as it will disturb root systems. Stormwater will be conveyed east toward the proposed bioretention basins where small storm events will infiltrate into the ground, with nutrient uptake also provided via plantings. Outlet control structures will also be installed in both basins and tied into existing adjacent catch basins to safely handle large storm events.

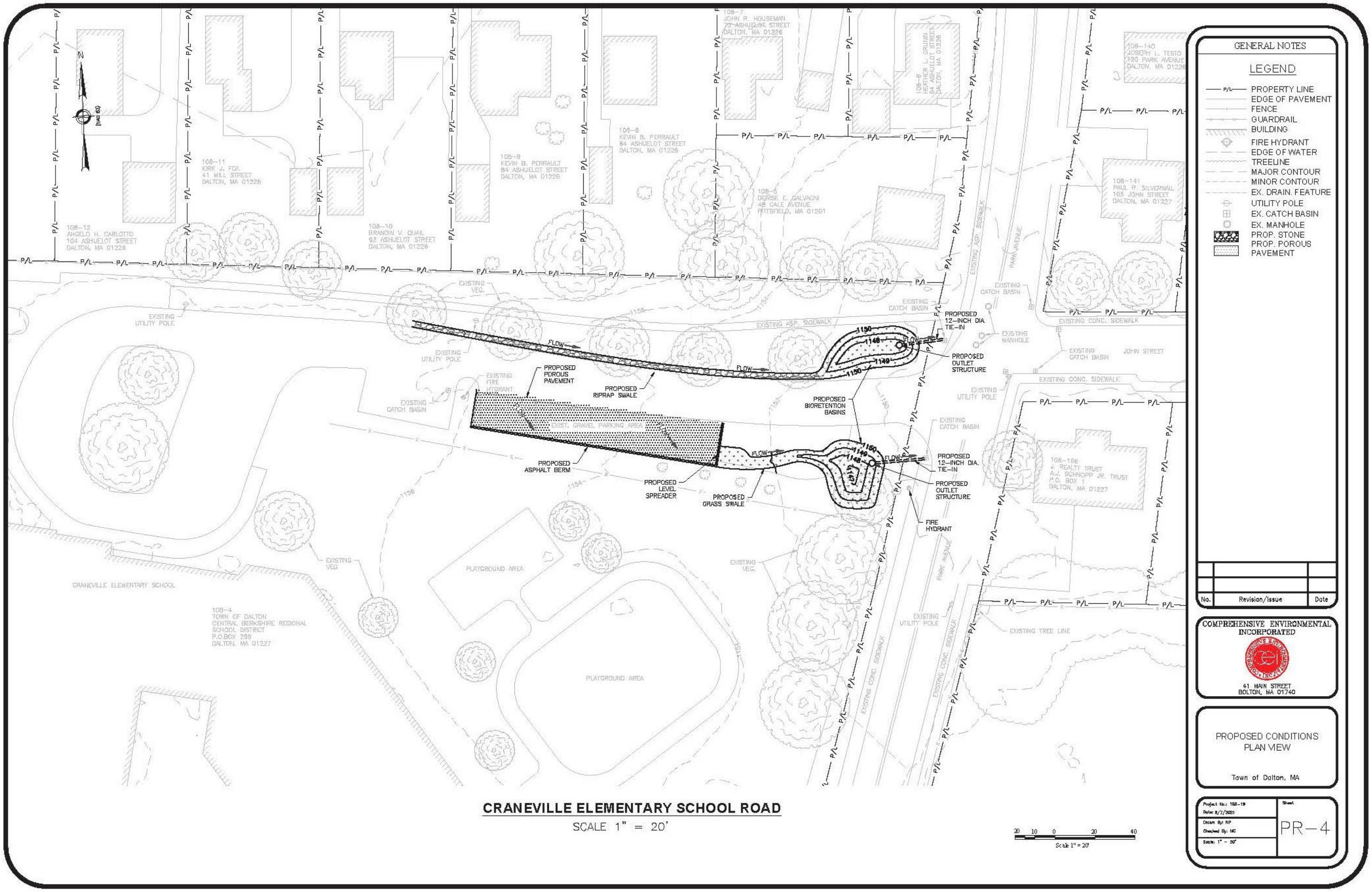
Craneville Elementary School Improvements' Summary

Proposed BMPs: Double Bioretention Basin/Porous Pavement & Bioretention/Grassed Swale

Estimated Nutrient Load Reduction:

Total Nitrogen:	2.8 lbs/year
Total Phosphorous:	0.4 lbs/year
Total Suspended Solids:	217 lbs/year
Estimated Cost:	$100,000-125,000
Estimated O & M Costs:	$2000

Figure C-7: BMP Conceptual Plan for Craneville Elementary School, Dalton



Senior Center and Former Middle School

Location: 42.476158, -73.165811
40 Field Street Extension, Dalton

Property Ownership: Town of Dalton

Designs Prepared by: Comprehensive Engineering Incorporated (2021) for the Dalton Green Infrastructure Report (2022)

Site description: This site is located around the northern unnamed access road for Craneville Elementary School. Current site characteristics consist of a gravel/dirt parking area south of the roadway currently exhibiting erosion and contributing sediment to downstream catch basins, as well as an eroded channel along the edge of pavement north of the roadway. Two catch basins exist just south of the roadway within Park Avenue and John Street that receive untreated stormwater runoff from both the access roadway and Park Avenue. This site was chosen in part due to the parking area needing improvements.

Proposed Improvements: The proposed project includes a large 4-foot-deep infiltration basin and sediment forebay within the grassy area north of the Senior Center. The project also proposes rerouting stormwater flow from the two most eastern catch basins to the infiltration basin via new drainage piping. The area is relatively flat, requiring little grading prior to excavation. This basin also provides an overflow pipe that ties back into the existing culvert in the event that stormwater flows exceed basin capacity. A gravel maintenance access area is proposed to provide easy access to the sediment forebay for cleaning. The project will also include a large infiltration basin and sediment forebay within the grassy area south of the Senior Center. The project also proposes plugging the downgradient pipe exiting the catch basin north of the basin along Field Street Ext and rerouting flow to the infiltration basin. An existing drainage pipe transecting the proposed basin will also be cut and removed, with a new proposed outfall in the sediment forebay. The downgradient section of the existing pipe should be plugged. A new outlet structure at the southern end of the infiltration basin connecting to a proposed drainage structure that ties in with the existing drainage system. A gravel maintenance access area is proposed to provide easy access to the sediment forebay for cleaning.

Senior Center and Former Middle School Improvements' Summary

Proposed BMPs: Two Infiltration Basins

Estimated Nutrient Load Reduction:

Total Nitrogen:	20.4 lbs/year
Total Phosphorous:	2.4 lbs/year
Total Suspended Solids:	645 lbs/year
Estimated Cost:	$200,000-260,000
Estimated O & M Costs:	$500

Figure C-8: BMP Conceptual Plan for Senior Center and Former Middle School, Dalton

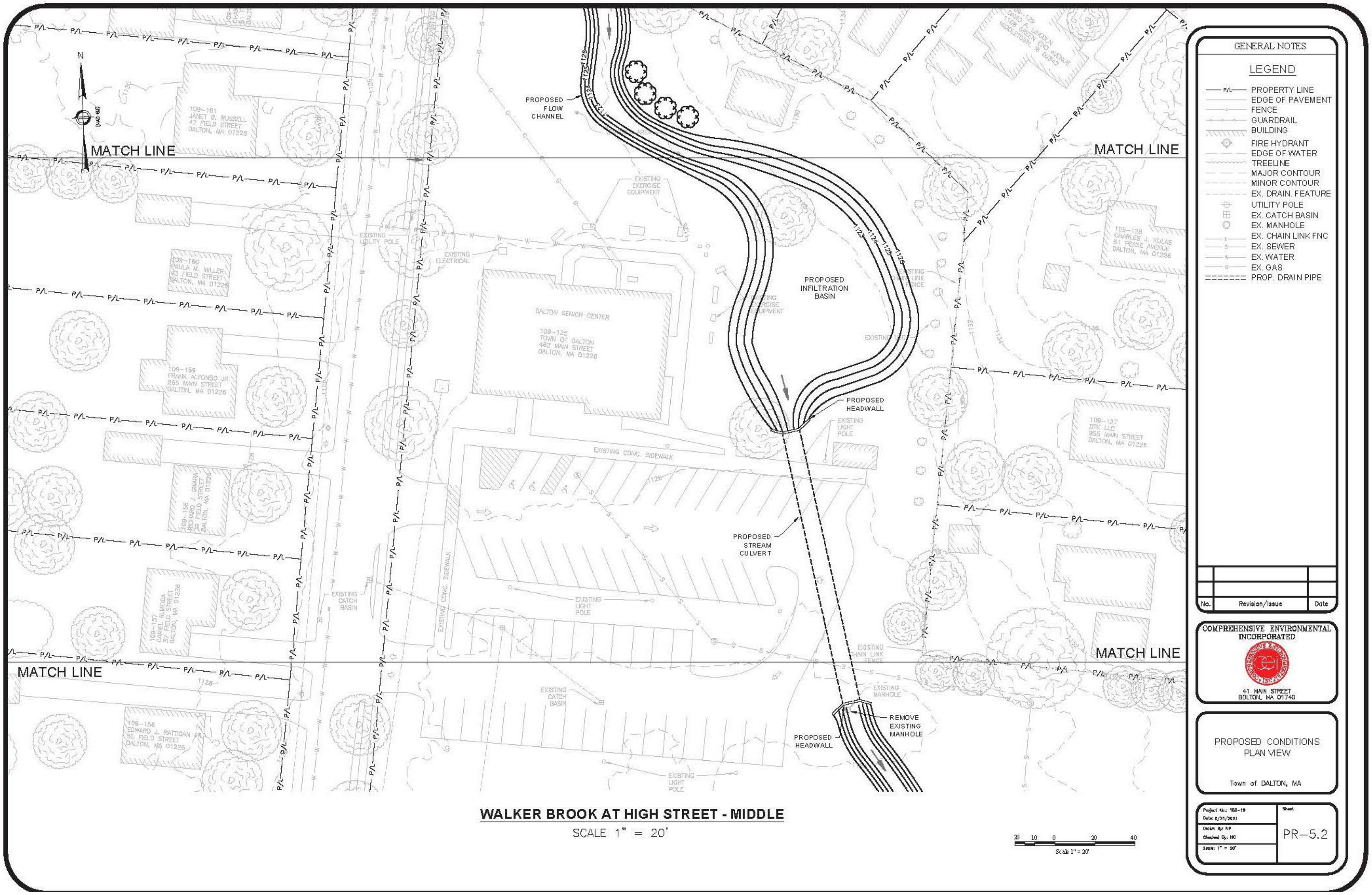
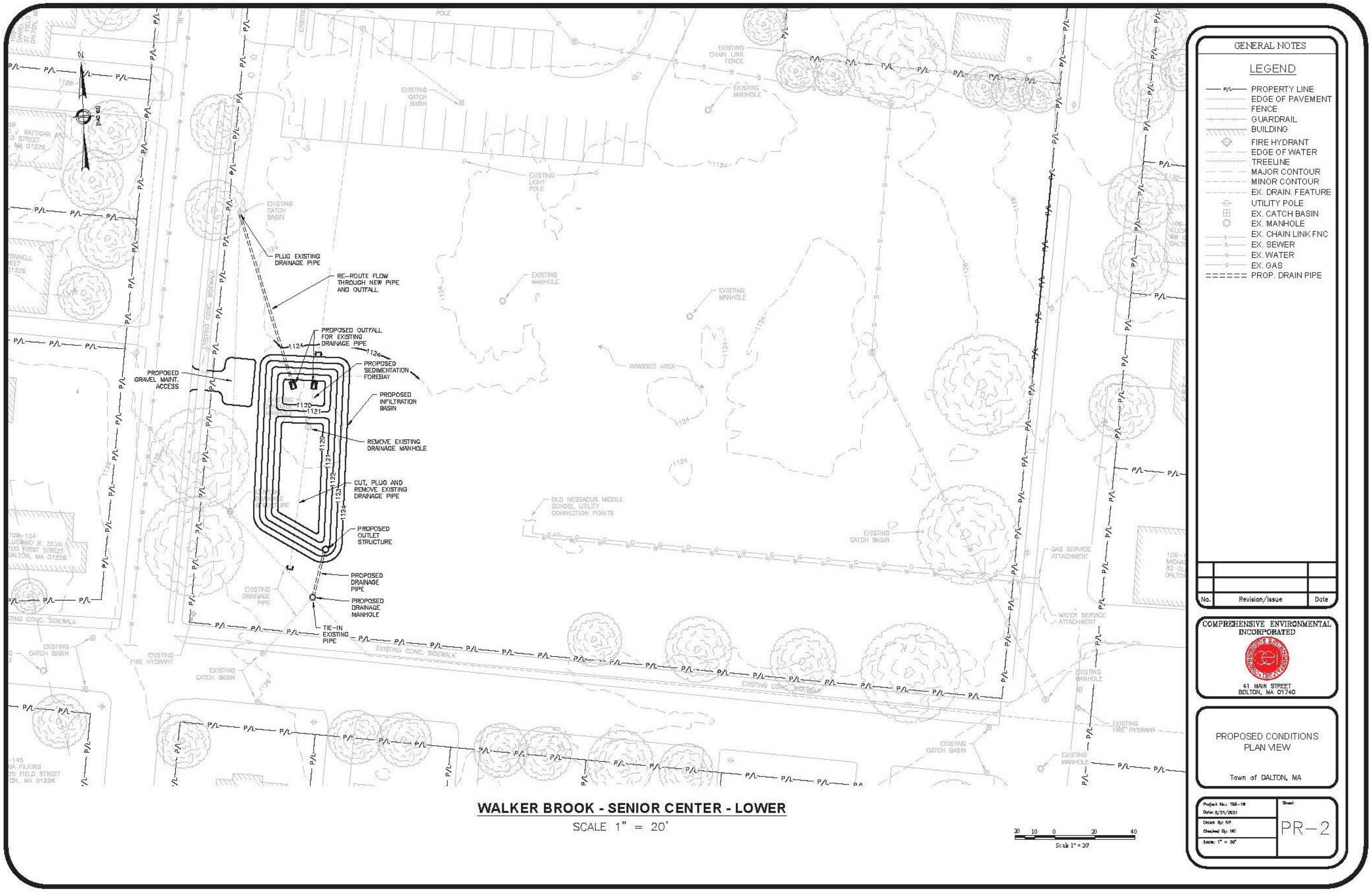


Figure C-9: BMP Conceptual Plan for Senior Center and Former Middle School, Dalton (Lower)



Walker Brook Stream Daylighting

Location: 42.476158, -73.165811
High Street - Main Street, Dalton
Property Ownership: Town of Dalton

Designs Prepared by: Comprehensive Engineering Incorporated (2021) for the Dalton Green Infrastructure Report (2022)

Site description: The Walker Brook watershed is of particular concern as this watershed is relatively steep in nature, with an average slope of 12.7% per USGS StreamStats. The StreamStats Report can be found in Appendix D of the Dalton Green Infrastructure Report.[22] Much of the upper undeveloped area of Walker Brook is even steeper, thus the time of concentration of the stream is relatively short. During large rain events, the stream flows to an existing headwall north of High Street where it enters an undersized culvert that has periodically inundated much of downtown Dalton with several feet of water. An assessment completed in 1981 noted that the culvert is approximately 2,300-feet long with at least a dozen different cross-sectional segments that have been installed over the years. Additionally, the report notes that the culvert flows south down Field Street, however, field investigations completed by CEI indicate that the culvert may turn west up High Street before flowing south behind some of the houses along the west side of Field Street Extension before crossing back over between the houses to flow along 1st Street and then south toward the outlet.

Proposed Improvements: The proposed project includes daylighting a portion of Walker Brook within the extents of the Town of Dalton owned parcel(s) that encompass the Senior Center and former Nessacus Middle/High School. A new headwall will be installed north of High Street would direct flow through an upsized culvert to a settling basin in the northern corner of the grassed field. This basin will in part allow for infiltrating small storm events, which will likely result in pollutant load reductions of total nitrogen and phosphorous and provide for flood storage due to the available storage volume. A meandering channel simulating natural conditions will then convey water behind the senior center and south to an infiltration basin. A second culvert will then connect the infiltration basin to another stretch of designed channel. The designed channel would enter a new headwall near the intersection of 1st Street and Glennon Ave, before being piped within a new culvert to its outfall location south of Main Street.

Note that prior to completing this option, it is highly recommended that the existing Walker Brook culvert between the proposed southerly headwall and the existing daylighting location south of 1st Street be replaced in its entirety with a properly sized culvert capable of conveying large storm events to reduce the potential for flooding.

The Town of Dalton is currently reviewing the next steps for determining the efficacy and necessity of this project.

[22] https://dalton-ma.gov/wp-content/uploads/2022/09/Dalton-Green-Infrastructure-Report-_2022.pdf

Walker Brook Stream Daylighting Improvements' Summary

Proposed BMPs: Stream Daylight

Estimated Nutrient Load Reduction:

Total Nitrogen:	0 lbs/year
Total Phosphorous:	0 lbs/year
Total Suspended Solids:	0 lbs/year
Estimated Cost:	$Unknown
Estimated O & M Costs:	$Unknown

Figure C-10: BMP Conceptual Plan for Daylighting Walker Brook, Dalton

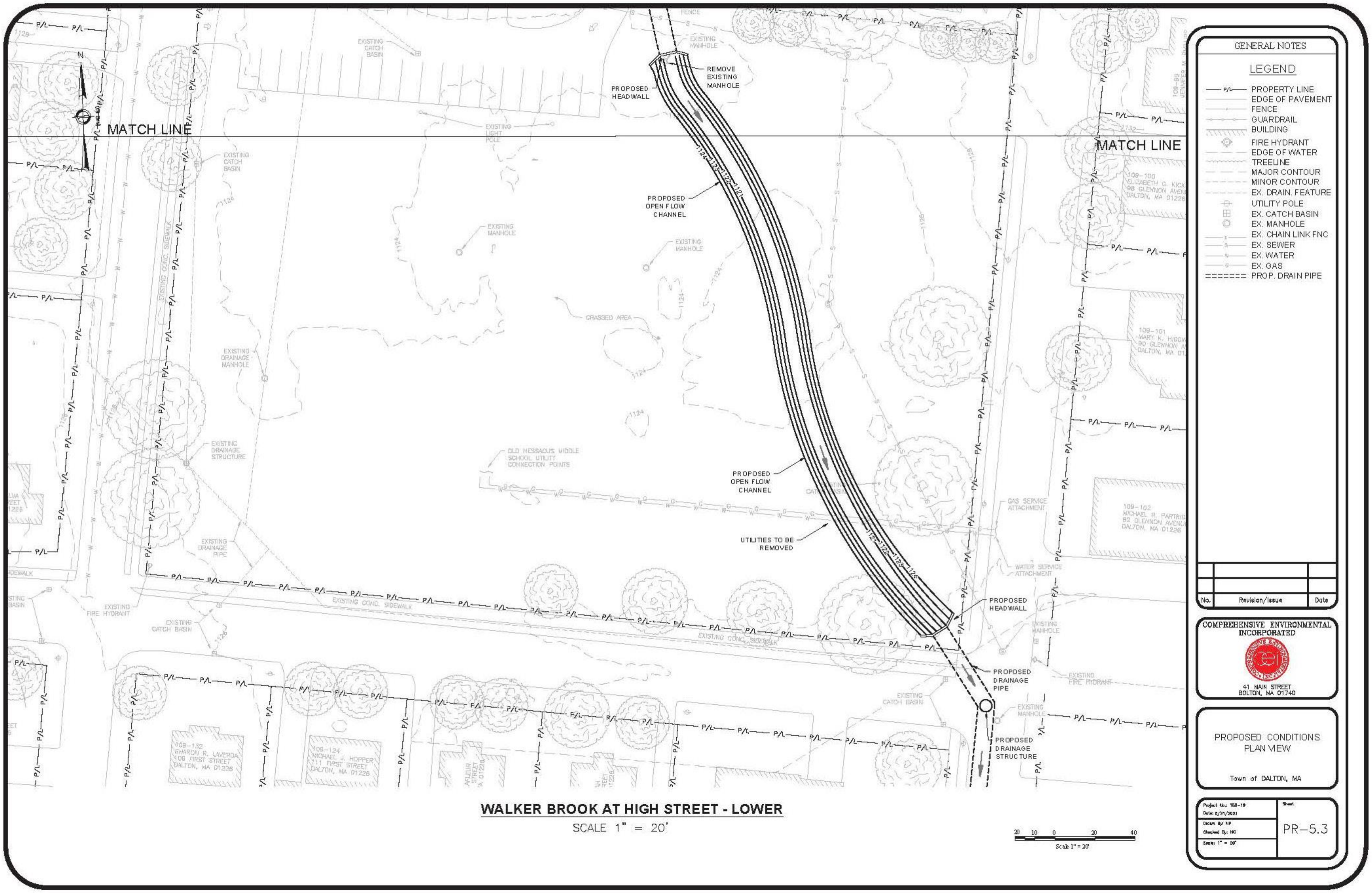
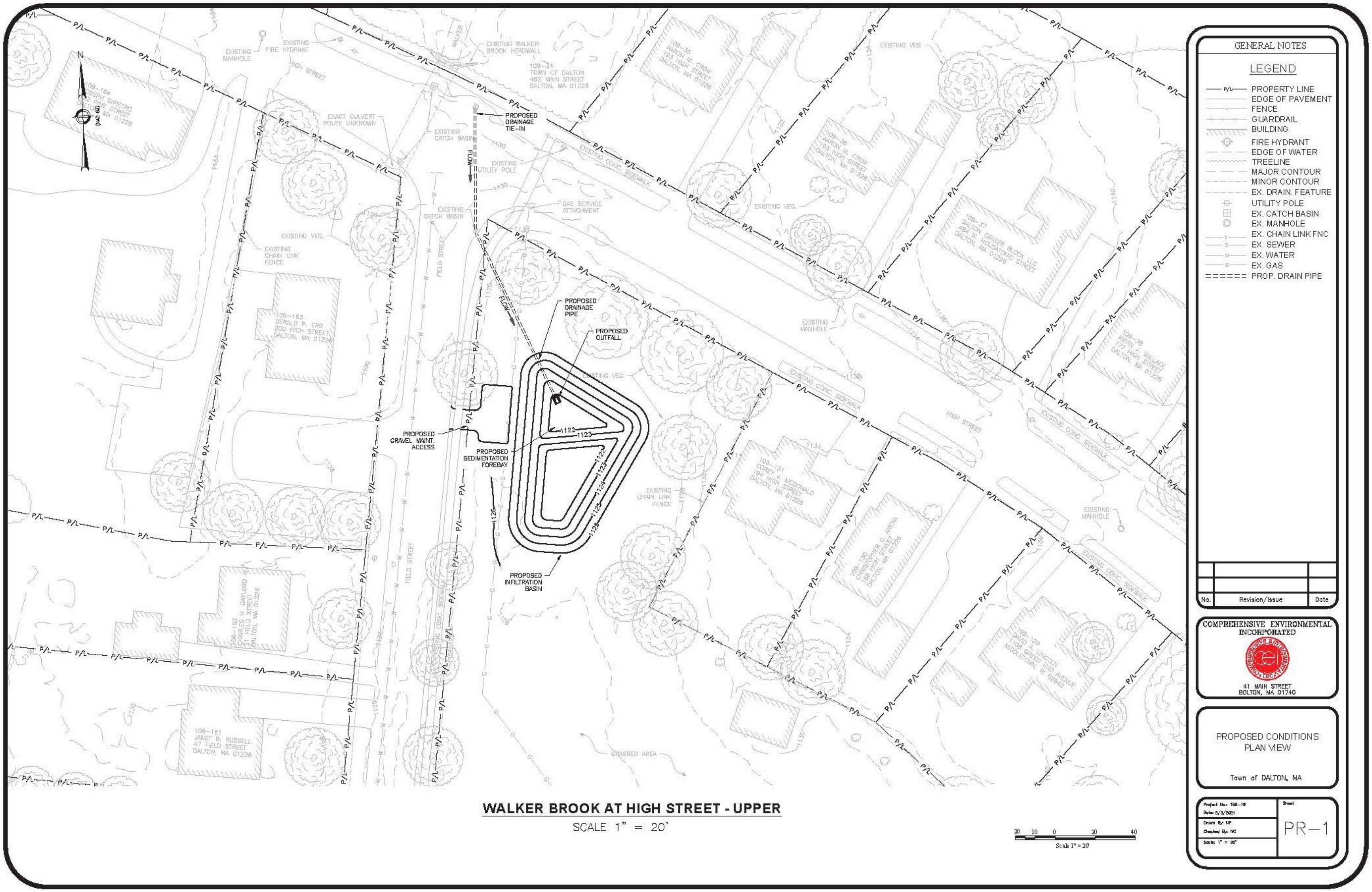


Figure C-11: BMP Conceptual Plan for Daylighting Walker Brook, Dalton



Greenridge Park

Location: 42.452959, -73.186096
996 South Street (adjacent to), Dalton

Property Ownership: Town of Dalton

Designs Prepared by: Comprehensive Engineering Incorporated (2021) for the Dalton Green Infrastructure Report (2022)

Site description: This site consists of the western end of Greenridge Park parking area, a portion of median directly abutting the parking area and South Street, and a small part along the western perimeter of Greenridge Park. Stormwater runoff within the parking area currently flows from northeast to southwest where it is conveyed to one or more catch basins with no treatment. Additionally, stormwater from within part of Greenridge Park itself flows westerly where it is intercepted by an existing paved swale that runs along the western side of the park, discharging untreated to a catch basin adjacent to South Street. Greenridge Park was chosen because it is one of the more quiet parks in Dalton therefore would be less likely to impede on park use. At the same time, BMPs at this location could serve as an educational exemplar and attraction.

Proposed Improvements: The proposed project includes removing part of the existing paved swale and installing a new grassed water quality swale that discharges to a small infiltration basin within the northwestern corner of Greenridge Park where stormwater will infiltrate during small storm events. During large storm events, stormwater will overflow the infiltration basin and flow down the existing paved swale to the existing catch basin. The paved swale will also be stabilized with riprap to reduce stormwater velocity.

The project will also include a subsurface infiltration trench within the western half of the grassed median between the parking lot and South Street. Two new leaching catch basins will be installed to collect the majority of runoff within the parking area via curb cuts. The catch basins will be connected with perforated pipes surrounded with crushed stone to provided additional subsurface infiltration. Large storm events will flow into the existing catch basins located within South Street.

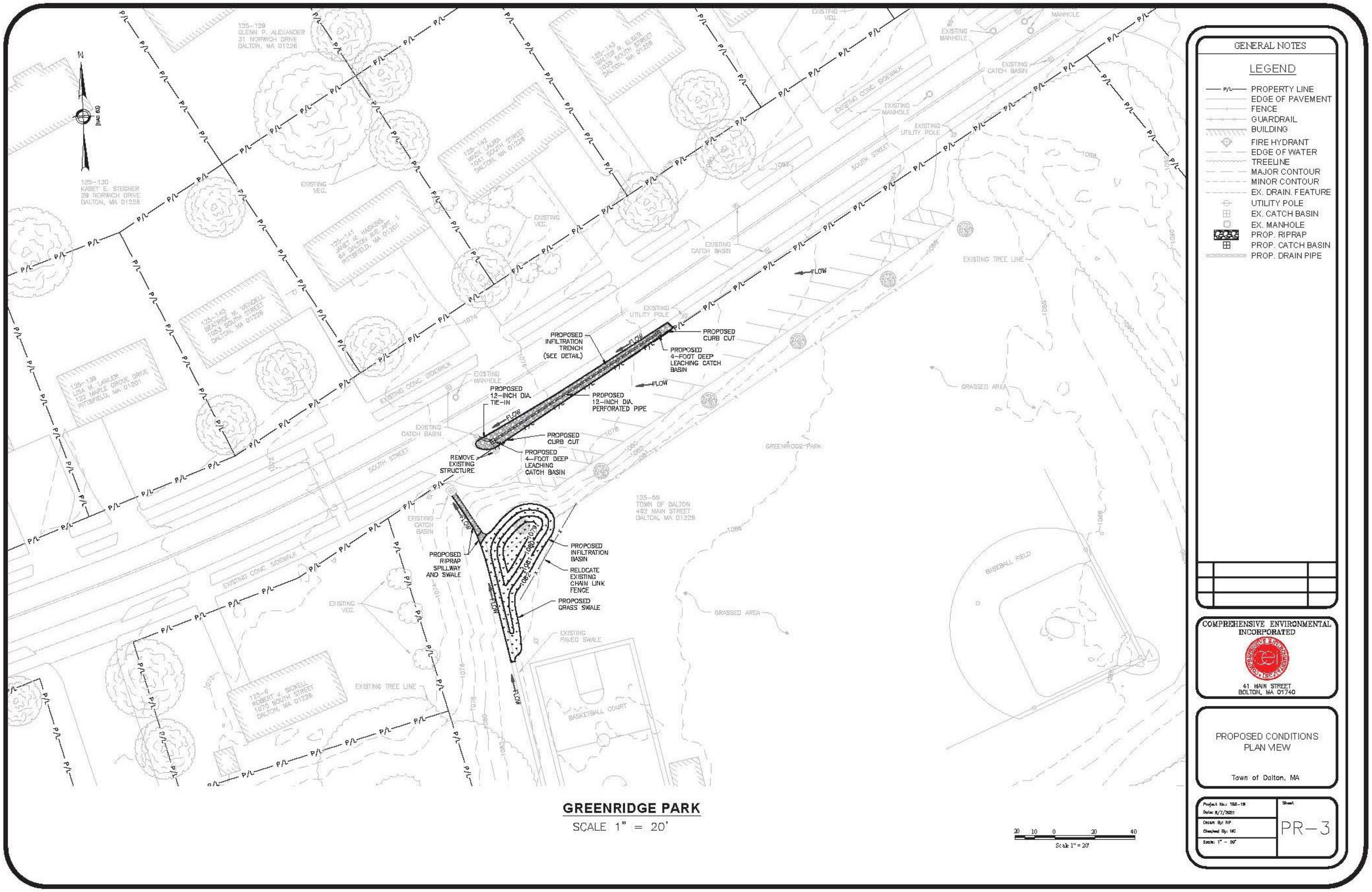
Greenridge Park Improvements' Summary

Proposed BMPs: Infiltration Basin/Grassed Swale

Estimated Nutrient Load Reduction:

Total Nitrogen:	8.6 lbs/year
Total Phosphorous:	0.9 lbs/year
Total Suspended Solids:	268 lbs/year
Estimated Cost:	$90,000-115,000
Estimated O & M Costs:	$500

Figure C-12: BMP Conceptual Plan for Greenridge Park, Dalton



End of Riverview Drive

Location: 42.476244, -73.154761
92 Riverview Drive (adjacent to), Dalton
Property Ownership: Town of Dalton

Designs Prepared by: University of New Hampshire Stormwater Center (2022) for the Dalton Green Infrastructure Report (2022)

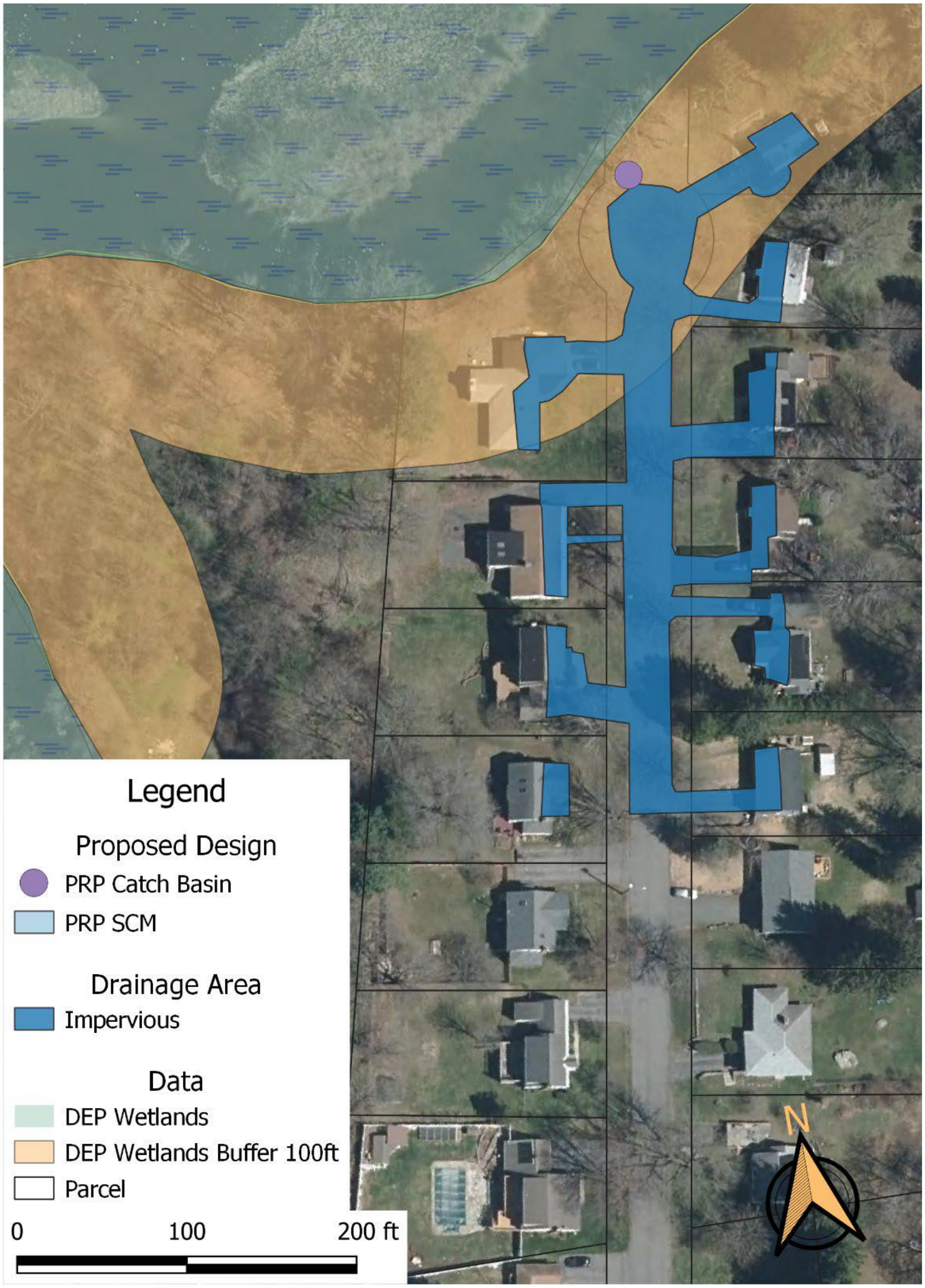
Site description: There is a catch basin and a paved drainage swale that flow directly into the stream untreated (Figure 1). There is undercutting and erosion evident (Figure 2). The untreated stormwater flowing into the stream is the major issue at this site. Stormwater Recommendations. The goal is to design a new catch basin outfall that stabilizes conveyance to the river and provides some treatment and allows for maintenance access along the roadway. Providing maintenance access along the roadway will ensure maintenance effort will be minimal.

Proposed Improvements: To capture stormwater before reaching the East Branch, a modified leaching catchbasin design is proposed. It will include an expanded stone envelope and a small internal storage reservoir or saturated zone that will mimic the function of a subsurface gravel wetland. The inlet will be a grated inlet and the outlet will occur over a stabilized internal clay berm. There is no secondary outlet as excess flow will level spread through the stone over the internal berm.

Photo C-1: End of the road runoff avoids the high catch basin and drains to the paved swale left of the basin.

Photo C-2: Surface runoff is conveyed in the paved swale directly to the East Branch of the Housatonic River.

Figure C-13: Proposed BMPs at Riverview Drive, plan layout



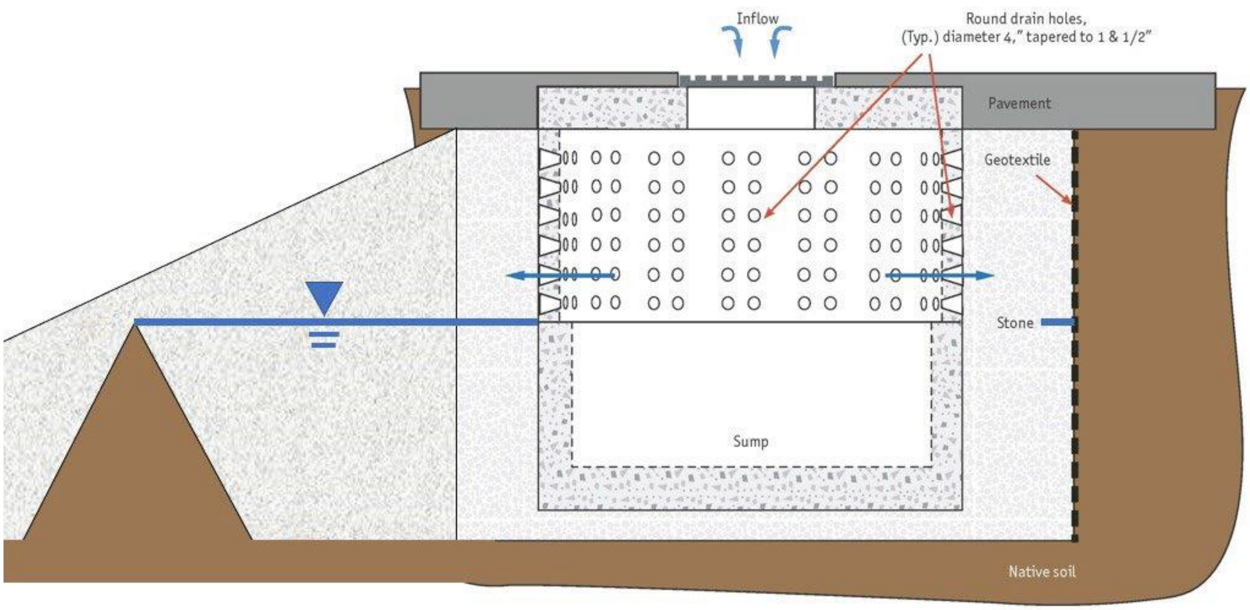


Figure C-14: Typical SCM cross-section (not to scale). Source: New England Stormwater Retrofit Manual (VHB, UNHSC 2022)

End of Riverview Drive Improvements' Summary

Proposed BMPs: Gravel wetland

Estimated Nutrient Load Reduction:

Total Nitrogen:	2.1 lbs/year
Total Phosphorous:	0.3 lbs/year
Total Suspended Solids:	140 lbs/year
Estimated Cost:	$5,000
Estimated O & M Costs:	$200

Dalton Sewer Department

Location: 42.481180, -73.175558
40 Gulf Road, Dalton
Property Ownership: Town of Dalton

Designs Prepared by: University of New Hampshire Stormwater Center (2022) for the Dalton Green Infrastructure Report (2022)

Site description: The DPW garage buildings and yard occupies about 0.9 acres of the 2.8-acre town-owned site. The main catch basin for the site drains half the garage, the lot, and the salt shed. It tends to back up during storms. The outlet of the drainpipe is submerged and drains to a lawn area of an adjacent town-owned lot, that has no outlet. The front of the yard and half of the garage are all impervious surface with no stormwater treatment. Infiltration near the street may be an option.

Proposed Improvements: Install a bioretention system with a precast pretreatment system for the collection of sediment/solids from the high-use DPW yard. The bioretention basin would be located at the existing drain outfall. The drainage pipe would be replaced in the grassed area up to the access road. This is a combined SCM design consisting of a leaching catch basin to intercept the upland drainage area to a lower bioretention system/infiltration in the adjacent town-owned property. The inlet into the leaching catchbasin will be a grated inlet that discharges to the bioretention system. The overflow will be through an armored spillway over the existing grade. The Town of Dalton has been approved for a Community Compact Best Practices Grant to implement this project. Construction will be completed by the DPW staff.

Photo C-3: The main catch basin for the DPW drains half the garage, the lot, and the salt shed. It tends to back up during storms.

Photo C-4: Front of parking lot and half of the garage are all impervious surface with no stormwater treatment. Infiltration near street may be an option.

Photo C-5: The outlet of the DPW stormwater pipe is submerged and drains to a yard with no outlet. The outlet should be daylighted and treated with a BMP such as a bioretention basin (Site B).

Dalton Sewer Department Improvements' Summary

Proposed BMPs: Bioretention Conceptual Design

Estimated Nutrient Load Reduction:

Total Nitrogen:	14.4 lbs/year
Total Phosphorous:	1.5 lbs/year
Total Suspended Solids:	364 lbs/year
Estimated Cost:	$51,000
Estimated O & M Costs:	$200

Figure C-15: Dalton DPW Yard, BMP Plan Layout

Grange Hall Road

Location: 42.460921, -73.1810066
21 Grange Hall Road (adjacent to), Dalton

Property Ownership: Town of Dalton

Designs Prepared by: Comprehensive Engineering Incorporated for the BRPC (2024)

Site description: Runoff from Elmore Drive is collected through a series of catch basins and is outlet via a HDPE pipe to an asphalt swale along Grange Hall Road. The asphalt swale directs runoff to an intermittent stream that is piped across the road. The outlet of the pipe was not found in the field investigation. There are signs of erosion and sediment in the swale. The asphalt swale also accepts runoff from a small portion of Grange Hall Road.

Proposed Improvements:

1. Remove asphalt swale and stabilize the area around the pipe outlet.

2. Install water quality swale with check dams (approx. 1500 SF).

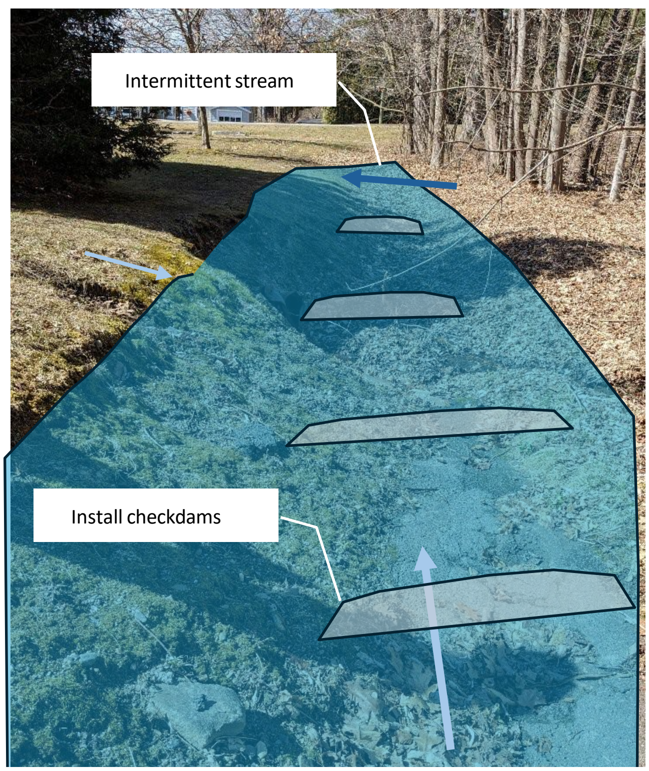
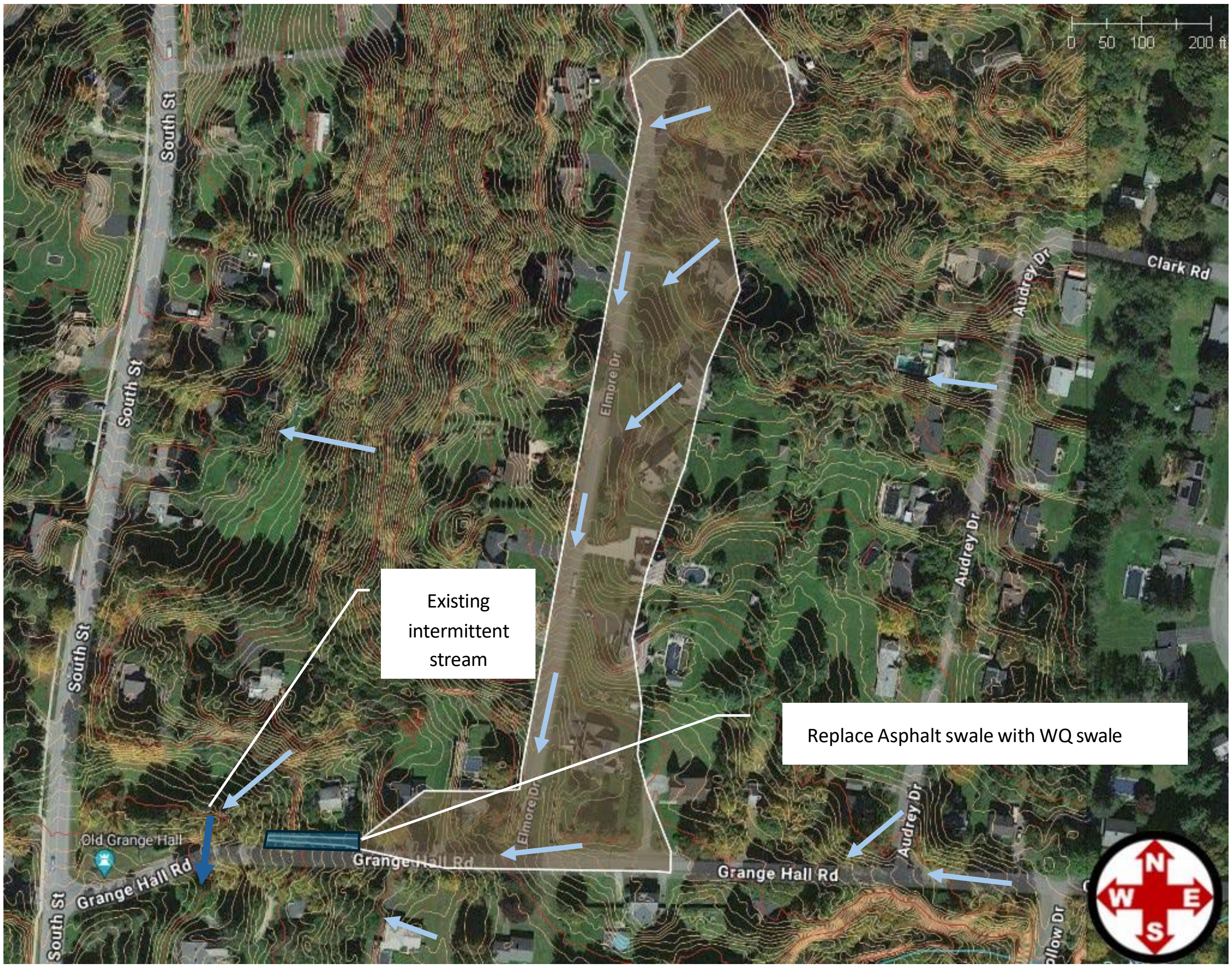


Photo C-6: Asphalt swale leading to intermittent stream along Grange Hall Road.

Photo C-7: Asphalt swale along Grange Hall looking towards pipe outlet.

Figure C-16: Grange Hall Road, BMP Plan Layout



Grange Hall Road Improvements' Summary

Proposed BMPs: Water Quality Swale with Check Dams

Estimated Nutrient Load Reduction:

Total Nitrogen:	1.55 lbs/year
Total Phosphorous:	0.27 lbs/year
Total Suspended Solids:	300 lbs/year
Estimated Cost:	$17,000-25,000
Estimated O & M Costs:	$500

Proposed Non-Structural BMP Projects

Storm Drain Decaling (Estimated Cost: $5,000):

Reinitiate programs in each municipality to decal storm drains that have high public visibility in the City of Pittsfield and Town of Dalton. Existing storm drain decals and glue are currently available to reinitiate the program. Funding is needed to organize storm drain decaling by interns, volunteers or paid staff with the support of a contracted organization such as BEAT, HVA or BRPC. The estimated annual cost of this management measure is for the purchase of any additional supplies and contractor costs.

Develop a Green Infrastructure Workforce Training Program (Estimated Cost: $190,000):

Develop a program that would train youth about watershed health and issues and include training for:

(1) installation and maintenance of structural BMPs such as rain gardens, dry detention basins, rain barrels and cisterns, potentially small areas of porous pavement, if it is possible to find an appropriate vacuum machine.
(2) installation and maintenance of non-structural BMPs such as riparian buffers and storm drain decaling.
(3) water quality sampling of surface waters and outfalls to ensure BMP effectiveness.

This trained GI workforce would provide support to municipalities and even private property owners to complete simple stormwater and the much-needed support with GI maintenance and water quality monitoring. Trained youth would be an asset to the area and provide much needed employment training. Potential partners include Berkshire Community College (BCC), Greenagers, and Mass Hire Berkshire.

This program would serve other watersheds in the Housatonic and beyond. The cost of implementation would be spread across all sub-watersheds that would include Southwest and West Branches of the Housatonic Watershed.

Programs that may be helpful in developing this concept include the California Watershed Stewards Program (WSP) and the Rutgers Cooperative Extension Green Infrastructure Championship Program [23][24] Materials already developed include the *Easthampton Resident's Guide to Stormwater Management* available in English and Spanish.[25]

Water Quality Monitoring in the East Branch (Estimated Cost: $15,000)

Continued surface and stormwater outfall water quality monitoring is recommended to determine how well implemented BMPs are working and to further track down any E coli and Nitrogen inputs to the East Branch of the Housatonic River and its tributaries.

[23] https://ccc.ca.gov/what-we-do/conservation-programs/wsp-watershed-stewards-program/

[24] http://water.rutgers.edu/Projects/GreenInfrastructureChampions/2022%20Sessions/Class_1_01142022.pdf

[25] https://easthamptonma.gov/DocumentCenter/View/3891/Residential-Guide-to-Stormwater-Management---English?bidId=

Additional Potential Management Measures:

Introduction:

While the implementation of the proposed BMPs will reduce pollutant loads, they may not be sufficient to allow the delisting of the impaired waters. The identification and implementation of additional management measures may be necessary to attain delisting. Several additional potential management measures have been identified, for which conceptual plans have not been developed. Watershed stakeholders will continue to identify management measures to address impairments and improve water quality.

Old Mill Trail, Dalton:

This potential BMP project provides an opportunity to infiltrate stormwater from Route 8 in Dalton and reduce the volume of stormwater directly discharged to the East Branch of the Housatonic River. The project site is adjacent to the East Branch of the Housatonic River in Dalton and is located near the Old Mill Trail Route 8 crossing. The Old Mill Trail is managed by the Berkshire Natural Resources Council. Route 8 and the stormwater infrastructure is managed by MassDOT. There is an asphalt swale that directs stormwater from Route 8 to the East Branch. Further south on Route 8 is a curb cut that allows stormwater to enter an informal infiltration basin. The goal would be to remove the existing asphalt swale and instead direct the stormwater to an infiltration basin. The existing informal basin could be formalized and increased in size with multiple inlets created. These inlets may be asphalted or grassed. The basin could be planted with willow adding to the already existing willow shrubs.

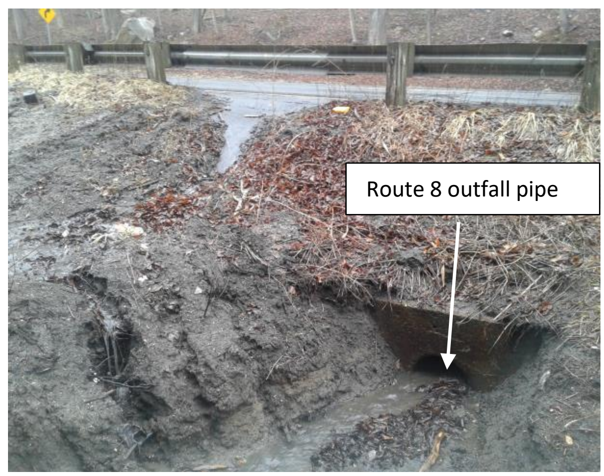


Photo C-8: (above) Curb cut and outfall pipe on Route 8 ROW which leads to an informal stormwater

Photo C-9: (left) Asphalt swale from Route 8 which leads to the East Branch of the Housatonic River.

Photo C-10: View of informal infiltration basin

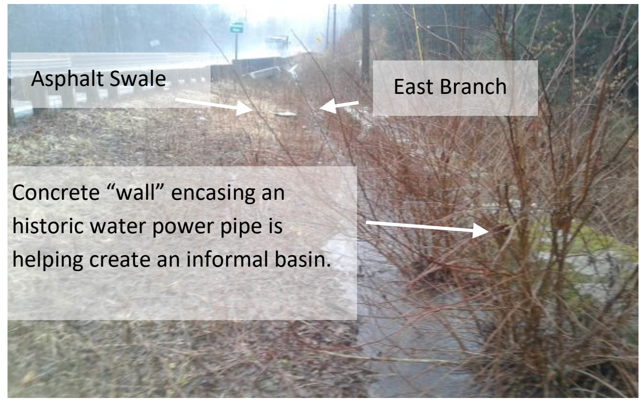


Photo C-11: View towards the East Branch

Town of Dalton Pre-Conceptual Designs:

For Dalton's Green Infrastructure report, the town with support of BRPC and CEI engineering consultants explored multiple locations of town owned properties. Several locations were not selected for the development of conceptual designs for stormwater BMPs but may be an opportunity for future projects. The list of these locations is provided in **Table C-3** and the preconceptual designs are available in Appendix B of Dalton's Green Infrastructure report.

Table C-3: Town of Dalton Pre-Conceptual Design BMP Site Locations

Site #	Lat.	Lon.	Location	Type of BMP
1*	42.475963	-73.175921	Craneville Elementary School Road	Double Bioretention Basin/Porous Pavement
2	42.476793	-73.180954	Ashuelot Street Cemetery Access Road	Bioretention Basin
3	42.475892	-73.180937	Ashuelot Street Cemetery	Grassed Water Quality Swale
4*	42.452959	-73.186096	Greenridge Park	Infiltration Basin/Grassed Swale
5	42.452539	-73.190816	South Street – Hubbard Avenue	Infiltration Basin
6	42.478307	-73.170558	Pine Grove Park – West	Rain Garden
7	42.477115	-73.169388	Pine Grove Park – South	Grassed Water Quality Swale
8	42.477536	-73.168440	Pine Grove Park – East	Grassed Water Quality Swale
9	42.474406	-73.167517	View Street – Stockbridge Avenue	Infiltration Basin

Mitigate Stormwater Outfalls of Concern

The dry weather screening conducted in Pittsfield and Dalton have identified several stormwater outfalls that need further investigation. The stormwater outfalls of concern are listed in **Tables A-9 and A-10**. Further review of these outfalls, including re-testing the discharge of the outfalls, would be the first step. If the results continue to show elevated levels of TN and *E. coli* the source of these pollutants needs to be tracked down and resolved.

The outfall in Dalton that has been a concern (WLK240 also known as WLK400) has been repeatedly tested by HVA in recent years. This outfall is part of the Walker Brook daylighting project. The most recent sampling in

2023 indicated much lower *E. coli* levels except after a rain event. The volume of flow from Walker Brook is so minimal that it poses less concern.

Disconnect Outfalls and Implement BMPs:

There are many outfall pipes that discharge stormwater into the East Branch and its tributaries. Similar to the conceptual design that infiltrates the stormwater at the end of Riverview Drive, there are additional locations where stormwater outfalls where stormwater BMPs implementation could be considered. **Table C-4** provides an initial list of outfall locations for project consideration. While not exhaustive, the list provides outfall locations that are on municipally managed ROWs that could facilitate BMP installation.

In Dalton and Hinsdale there are multiple locations where stormwater is directed to the East Branch via pipes and swales. Many of these discharge high up on the banks of the East Branch and, in the event of precipitation events less than one-inch, the stormwater may not reach the river. Further investigation of these outfalls could identify potential sites where implementing stormwater BMPs would ensure infiltration before reaching the East Branch. These outfalls are managed by MassDOT and would require their willingness and cooperation to implement these projects.

Table C-4: Stormwater Outfall Locations – Potential Sites for Stormwater BMPs

Pipe Size (inches)	Site ID	Waterbody	Municipality	Latitude	Longitude	Location Description
15	EAB530	East Branch	Dalton	42.470555	-73.168390	West Housatonic Street (SE corner of East Branch Bridge)
15	EAB740	East Branch	Dalton	42.476772	-73.1514099	End of Marcella Way
18	EB550	East Branch	Pittsfield	42.4457979	-73.2414356	Behind Patriot Car Wash, Elm Street
24	EB560	East Branch	Pittsfield	42.44535621	-73.241804	Behind Patriot Car Wash, Elm Street
Swale	EB720	East Branch	Dalton	42.47676048	-73.153476	End of Otis Avenue
Swale, asphalt	EB730	East Branch	Dalton	42.4767679	-73.1523186	End of Lake Street
Swale, asphalt	EB795	East Branch	Dalton	42.476328	-73.150168	End of Jennings Avenue
8	EAB802	East Branch	Dalton	42.47716152	-73.1451207	adjacent to the East Branch/Orchard Road stream crossing
Unknown	EAB804	East Branch	Dalton	42.4773228	-73.144783	adjacent to the East Branch/Orchard Road stream crossing
18	ANB250	Anthony Brook	Dalton	42.48843044	-73.1490924	adjacent to the Anthony Brook/North Mountain Road stream crossing
15	ANB260	Anthony Brook	Dalton	42.48812398	-73.1489346	adjacent to the Anthony Brook/North Mountain Road stream crossing
Swale	BaB165	Barton Brook	Dalton	42.45800747	-73.1770862	northern corner where Hemlock Hill and Pine Crest Drive intersect.

Wahconah Country Club, Riparian Buffer

The golf course of the Wahconah Country Club abuts the East Branch of the Housatonic River. The riparian buffer is minimal to none in multiple places and eroded banks were observed during HVA's stream assessment. Determine if the property owners are willing, with support, to improve the riparian buffer along the East Branch.

Integrate Stormwater BMPs into Road-Stream Crossings Replacements

There are numerous road-stream crossings in the East Branch watershed and very often stormwater runoff, laden with sediment and pollutants from the road, is directed to the waterbody at the crossing location. Each crossing when replaced presents an opportunity to include stormwater BMPs in the project design.

In line with the goal of incorporating stormwater BMPs whenever feasible, the City of Pittsfield will consider options and include stormwater BMPs when reviewing and permitting culvert replacement projects, if cost effective and feasible. Priority culvert replacement projects located in the City of Pittsfield portion of the watershed are identified in Pittsfield's Road-Stream Crossing Management Plan prepared by HVA. **Table C-5** provides a list of Pittsfield's priority crossing locations.
Dalton and Hinsdale have not undergone the Road-Stream Crossing Evaluation process recently. However, from 2009 – 2012, HVA and BEAT did evaluate road-stream crossings in Dalton and Hinsdale under the protocol initially developed by Scott Jackson at the University of Massachusetts. The data for these evaluations are mostly available in the North Atlantic Aquatic Connectivity Collaborative (NAACC) database listed under the UMass Stream Continuity Project (2005-2017)[26]. The culverts listed in Table C-6 and C-7 are the crossings in Dalton and Hinsdale identified as significant, severe and moderate barriers with respect to aquatic connectivity. Due to being undersized, these are likely candidates for replacement to improve climate resiliency. No prioritization or climate resiliency evaluation has been conducted on these crossings. It is recommended that stormwater management be a consideration in ***any*** road-stream crossing replacement.

In Dalton, there are two undersized culverts on Anthony Brook, a cold-water stream. Several outfall pipes direct stormwater into the brook at these two crossings. Replacing these culverts and pulling back the stormwater outfall pipes and directing the stormwater to infiltration basins instead would capture sediment and associated pollutants. In addition, small crossings were evaluated along a hiking/mountain bike trail that crisscrossed Egypt Brook, a cold-water stream with native brook trout. This trail, while located on privately owned Holiday Farm, may still be used by mountain bikers and hikers. Erosion at the time of the assessment was observed which was causing sedimentation of the brook. Obtaining permission from the property owners to review the crossings and discuss replacing the culverts with pedestrian bridges would be the first step to determining the potential of this project. This could be a suitable project for a youth trail crew such as the one that Greenagers provides.[27] Replacing the crossings with bridges would improve aquatic connectivity and the water quality of the brook.

[26] https://naacc.org/naacc_search_crossing.cfm
[27] https://greenagers.org/

Table C-5: Pittsfield's Priority Road-Stream Crossings

Crossing Code	*Structure Number	*Map Key	Road	Stream	Current Flood Interval at Failure (Years)	Future Flood Interval at Failure (Years)	Notes
xy4247851373233767	77	D3	Clark Road	Unnamed	25	10	Culvert very degraded, flooding occurs. Priority replacement crossing. Preliminary design completed.
xy4247717773214863	75	D3	Partridge Road	Unnamed	2	2	Detention basin built to prevent flooding, but basin may not be functioning if it was not maintained. Culvert clogs with branches. Partridge Road recently paved. *Medium priority.*
xy4246451573211169	126	E3	Dalton Avenue (Route 8)	Unkamet Brook	2	2	Flooding issue. The city is pursuing funding for replacement.
xy4246939873210197	88	E3	Crane Avenue	Unkamet Brook	2	5	Several houses would be isolated if this culvert fails. If replaced, the road would have to be raised. It is difficult to replace because of upstream sediment. No freeboard in culvert. *Higher priority*
*Refers to the structure numbers and map location provided in the Pittsfield Road-Stream Crossing Management Plan							

Table C-6: Dalton Road-stream Crossing Aquatic Connectivity Barriers

NAACC Crossing Code	Road	Stream Name	Crossing Type	Evaluation	Latitude	Longitude
xy4248221373153506	North Street (Rte. 9)	Anthony Brook	Multiple Culvert	Significant barrier	42.48242	-73.15333
xy4244559073192811	Dalton Division Road	Brattle Brook	Multiple Culvert	Significant barrier	42.44853	-73.19172
xy4248832773148939	North Mountain Road	Anthony Brook	Multiple Culvert	Severe barrier	42.48839	-73.14895
xy4246043173176674	Sleepy Hollow Road	Barton Brook	Multiple Culvert	Severe barrier	42.46045	-73.17676
xy4246071773175459	Grange Hall Road	Barton Brook	Multiple Culvert	Severe barrier	42.46073	-73.17576
xy4242432873166533	Kirchner Road	unnamed	Single Culvert	Severe barrier	42.42437	-73.1666
xy4247646073129261	Old Windsor Road	Cleveland Brook	Multiple Culvert	Moderate barrier	42.47638	-73.12935
xy4249026373119382	Wahconah Falls Road	Weston Brook	Multiple Culvert	Moderate barrier	42.49031	-73.11934
xy4249026373119382	Wahconah Falls Road	Weston Brook	Multiple Culvert	Moderate barrier	42.49031	-73.11934
xy4245881473182076	South Street	Barton Brook	Single Culvert	Moderate barrier	42.45886	-73.18213
xy4245944173179050	Frederick Drive	Barton Brook	Multiple Culvert	Moderate barrier	42.45938	-73.17913
xy4246113873188291	Hubbard Avenue	Barton Brook	Single Culvert	Moderate barrier	42.46119	-73.18827
xy4247085973184547	Main Street	unnamed	Multiple Culvert	Moderate barrier	42.47086	-73.18443
xy4249716073135460	Wheeler Road	unnamed	Single Culvert	Moderate barrier	42.49716	-73.13546

Table C-7: Hinsdale Road-Stream Crossing Aquatic Connectivity Barriers

NAACC Crossing Code	Road	Stream Name	Crossing Type	Evaluation	Latitude	Longitude
xy4242108473133280	Plunkett Reservoir	unnamed	Single Culvert	Significant barrier	42.42084	-73.13321
xy4244649773117796	Watson Road	unnamed	Single Culvert	Significant barrier	42.44642	-73.11772
xy4240309273124083	Route 8	unnamed	Single Culvert	Significant barrier	42.40325	-73.12404
xy4239845073091960	East Washington Road	unnamed	Single Culvert	Significant barrier	42.39845	-73.09196
xy4244458473129616	Main Street	unnamed	Bridge	Severe barrier	42.44461	-73.12969
xy4241534473134738	Plunkett Reservoir	Russo Brook	Single Culvert	Severe barrier	42.41535	-73.13488
xy4240754473136510	Plunket Reservoir Road	unnamed	Single Culvert	Severe barrier	42.40785	-73.13682
xy4240786373136704	Plunkett Reservoir Road	unnamed	Single Culvert	Severe barrier	42.40785	-73.13682
xy4241788073134150	Reservoir Road	unnamed	Single Culvert	Severe barrier	42.41788	-73.13415
xy4241276073088060	East Washington Road	unnamed	Single Culvert	Severe barrier	42.41276	-73.08806
xy4241047073088590	East Washington Road	unnamed	Single Culvert	Severe barrier	42.41047	-73.08859
xy4240720273090743	East Washington Road	unnamed	Single Culvert	Severe barrier	42.40717	-73.0904
xy4240422073123290	Route 8	unnamed	Single Culvert	Severe barrier	42.40422	-73.12329
xy4240358673123673	Route 8	unnamed	Single Culvert	Severe barrier	42.40384	-73.12363
xy4239756073091890	East Washington Road	unnamed	Single Culvert	Severe barrier	42.39756	-73.09189
xy4238575073092470	East Washington Road	unnamed	Single Culvert	Severe barrier	42.38575	-73.09247
xy4246518073105300	Stone House Road	unnamed	Single Culvert	Severe barrier	42.46518	-73.1053
xy4245439073080240	Raymond Road	unnamed	Single Culvert	Severe barrier	42.45439	-73.08024

Recommended Solutions for Agricultural Impacts[28]*:*

A watershed-wide initiative to implement farm conservation practices and agricultural BMPs is recommended to reduce the pollutant loading from agricultural land uses which is the third highest land-use after forest in the East Branch of the Housatonic watershed.

Agricultural nonpoint source pollution is less of an issue in the East Branch Watershed compared to the West and Southwest Branch watersheds of the Housatonic River. No dairy farms were identified in the East Branch watershed and water quality monitoring has not indicated agricultural water quality concerns.

A good source of information is the Massachusetts Department of Agricultural Resources which provides a "Best management Practices" website for the various types of farming:[29]

- Backyard Poultry Keepers BMPs
- Cranberry best Management Practices
- Dairy Best Management Practices
- Greenhouse Best Management Practices
- Livestock and Poultry
- MA Beekeepers Association Best Beekeeping Practices
- Maple Best Management Practices
- Nursery Best Management Practices
- Orchard Best Management Practices
- Shellfish Best Management Practices
- Small Fruit Best Management Practices
- Small Livestock Best Management Practices
- Turf Best Management Practices
- Vegetable Best Management Practices

Examples of Agricultural BMPs that could be implemented include[30]:

- **Adopting Nutrient Management Techniques:** Farmers can improve nutrient management practices by applying nutrients (fertilizer and manure) in the right amount, at the right time of year, with the right method and with the right placement.
- **Using Conservation Drainage Practices:** Subsurface tile drainage is an important practice to manage water movement on and through many soils, typically in the Midwest. Drainage water can carry soluble forms of nitrogen and phosphorus. Strategies are needed to reduce nutrient loads while

[28] For hobby farms good resources to encourage best practices to protect water quality are available such as *https://treecanopybmp.org/* which has several web pages focused on BMPs for Hobby farms.

[29] https://www.mass.gov/info-details/agricultural-best-management-practices-bmps

[30] *Source: https://www.epa.gov/nutrientpollution/sources-and-solutions-agriculture*

maintaining adequate drainage for crop production. Conservation drainage describes practices including modifying drainage system design and operation, woodchip bioreactors, saturated buffers, and modifications to the drainage ditch system.

- **Ensuring Year-Round Ground Cover:** Farmers can plant cover crops or perennial species to prevent periods of bare ground on farm fields where the soil and nutrients it contains are most susceptible to erosion and loss into waterways.
- **Planting Field Buffers:** Farmers can plant trees, shrubs, and grasses along the edges of fields; this is especially important for a field that borders water bodies. Planted buffers can help prevent nutrient loss from fields by absorbing or filtering out nutrients before they reach a water body. An added benefit is the added shade to keep streams cool and reduce evaporation.
- **Implementing Conservation Tillage:** Farmers can reduce how often and how intensely the fields are tilled. Doing so can help to improve soil health, and reduce erosion, runoff, and soil compaction, and therefore the chance of nutrients reaching waterways through runoff.
- **Managing Livestock Access to Streams:** Farmers and ranchers can install fences along streams, rivers, and lakes to block access from animals to help restore stream banks and prevent excess nutrients from entering the water.

Another source of information about agricultural BMPs which includes effectiveness, impacts to surface waters, advantages for farms, cost and operation and maintenance considerations, estimated system lifespan, and NRCS Standards that could be used is available at https://extapps.dec.ny.gov/docs/water_pdf/agriculturebmp.pdf

Develop a Rain Barrel /Cistern Program[31]

In urbanized areas, where space is limited and a water source is desirable, especially where there is a community garden or landscaped areas, installing cisterns and rain barrels can reduce the volume of stormwater and, if a first flush device is installed, can be used to irrigate flower and vegetable gardens. Rain barrels may be most appropriate for residential properties while the larger cisterns would be for community garden locations.

a. Similar to the compost bin program, municipalities could provide rain barrels to residents at reduced cost.
b. Install cisterns and rain barrels in the vicinity of community gardens and at downtown locations **(Table C-8).** These cisterns collect roof water which can be used for watering gardens. Adding a first flush diverter will ensure that you can water vegetables as well as pollinator gardens and rain gardens. This is especially useful when there is no other water access available or access to water is difficult.

[31] https://www.mapc.org/wp-content/uploads/2017/11/LID_Fact_Sheet_-_Cisterns_and_Rain_Barrels.pdf

Table C-8: Community Garden Locations for Potential Cistern Installment

SITE NAME	ADDRESS	Town/City	OWNER
Morningside Community School - Community Garden	100 Burbank Street	Pittsfield	City of Pittsfield
Zion Lutheran Church – Community Garden	74 First Street	Pittsfield	Lutheran Church Zion Evangelical
Rice Silk Mill	55 Spring Street	Pittsfield	Pittsfield Silk LLC/Berkshire Housing

Unkamet Brook MVP Project (2024-2026)

The City of Pittsfield has been awarded an MVP Action grant that will replace the Unkamet Brook/Crane Avenue road-stream crossing, restore the channelized segment of the brook between Crane and Dalton Avenue, and replace of the Unkamet Brook / Dalton Avenue crossing.

Element D: Identify Technical and Financial Assistance Needed to Implement Plan

Element D: Estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement this plan.

Table D-1 presents the funding needed to implement the management measures presented in this watershed plan. The table includes costs for structural and non-structural BMPs, operation and maintenance activities, information/education measures, and monitoring/evaluation activities.

Table D-1: Summary of Funding Needed to Implement the Watershed Plan.

Structural BMPs (see Element C)							
Site Name	**Municipality**	**Management Measures**	**Capital Costs ($)**	**Operation & Maintenance Costs ($/yr)**	**Relevant Authorities**	**Technical Assistance Needed**	**Funding Needed**
Allendale Elementary School	Pittsfield	Bioretention Basins (5) & Subsurface Infiltration/Porous Pavement	$375,000-$495,000	$3,000.00	City of Pittsfield	Engineering Consultant	$495,000.00
Egremont Elementary School	Pittsfield	Bioretention Basins (3) & Biocells	$120,000-$200,000	$3,000.00	City of Pittsfield	Engineering Consultant	$200,000.00
Morningside Community School	Pittsfield	Bioretention Basin & Biocell; Subsurface Infiltration/Porous Pavement	$100,000-$160,000	$3,000.00	City of Pittsfield	Engineering Consultant	$160,000.00
Pittsfield High School	Pittsfield	Bioretention Basin & Biocell; Subsurface Infiltration/Porous Pavement	$510,000-$630,000	$3,000.00	City of Pittsfield	Engineering Consultant	$0.00
Gordon Street	Pittsfield	Retrofit existing sediment forebays and rain gardens	$25,000	$200.00	Property owners/Central Berkshire Habitat for Humanity	BRPC &Engineering Consultant	$15,000.00
Craneville Elementary School	Dalton	Grassed Water Quality Swale; Porous pavement; Bioretention Basin	$100,000-$125,000	$2,000.00	Central Berkshire Regional School District	BRPC &Engineering Consultant	$125,000.00
Senior Center and Former Middle School	Dalton	Two Infiltration Basins	$200,000-$260,000	$500.00	Town of Dalton	BRPC &Engineering Consultant	$260,000.00
Greenridge Park	Dalton	Infiltration Basin/Grassed Swale	$90,000-$115,000	$500.00	Town of Dalton	BRPC &Engineering Consultant	$115,000.00
Walker Brook Stream Daylighting	Dalton	Stream Daylight	Unknown	Unknown	Town of Dalton	BRPC &Engineering Consultant	Unknown
End of Riverview Drive	Dalton	Gravel wetland	$5,000	$375,000-H2:H495,000	Town of Dalton	BRPC &Engineering Consultant	$5,000.00
Dalton Sewer Department	Dalton	Bioretention Conceptual Design	$51,000	$200.00	Town of Dalton	BRPC &Engineering Consultant	FUNDED
Grange Hall Road	Dalton	Water Quality Swale with Check Dams	$17,000-$25,000	$500.00	Town of Dalton	BRPC &Engineering Consultant	$25,000.00
			Total Cost for Structural BMPs				**$1,400,000.00**

Table D-1: Summary of Funding Needed to Implement the Watershed Plan.

Location	Municipality	Management Measures	Capital Costs ($)	Operation & Maintenance Costs ($/yr)	Relevant Authorities	Technical Assistance Needed	Funding Needed
Non-Structural BMPs (see Element C)							
Streets with High Visibility	Town of Dalton	Storm Drain Decaling	NA	$5,000.00	Town of Dalton	BRPC, BEAT or HVA	$5,000
Streets with High Visibility	City of Pittsfield	Storm Drain Decaling	NA	$5,000.00	City of Pittsfield	BRPC, BEAT or HVA	$5,000
Various	City of Pittsfield & Town of Dalton	Green Infrastructure Work Force	NA	$190,000.00	Municipalities Involved	Greenagers, BCC MassHire, HVA, BRPC	$190,000
			Total Cost for Non-Structural BMPs				**$200,000.00**
Public Engagement - Information and Education (see Element E)							
Location	**Municipality**	**Management Measures**	**Capital Costs ($)**	**Operation & Maintenance Costs ($/yr)**	**Relevant Authorities**	**Technical Assistance Needed**	**Funding Needed**
Elementary Schools & Middle Schools	Pittsfield, Dalton & Hinsdale	Watershed Education for 5th and 7th Grades	NA	60,000	Central Berkshire & Pittsfield School Districts	Mass Audubon	$60,000
Various	Pittsfield, Dalton & Hinsdale	Signage at BMP locations	Estimated at $1000/sign		Respective Property Owners or Municipality	Graphic Artist, BRPC	$3,000
Watershed Wide	Pittsfield, Dalton & Hinsdale	River Smart - Residential Outreach Program	$8,000	$15,000	Conservation Commissions & City of Pittsfield and Town of Lanesborough	HVA, BRPC, Upside 413, Central Berkshire Habitat for Humanity, BEAT	$23,000
Watershed Wide	Pittsfield, Dalton & Hinsdale	Website Information		$15,000	Municipalities & all stakeholders	BRPC, BEAT, HVA and NGOs	$5,000
Watershed Wide	Pittsfield, Dalton & Hinsdale	MS4 Education		$10,000	City of Pittsfield and Town of Dalton	BRPC, BEAT, HVA and NGOs	$5,000
			Total Cost for Public Engagement				**$96,000.00**

Table D-1: Summary of Funding Needed to Implement the Watershed Plan.

Monitoring and Evaluation (see Element H/I)							
Site Name	**Municipality**	**Management Measures**	**Capital Costs ($)**	**Operation & Maintenance Costs ($/yr)**	**Relevant Authorities**	**Technical Assistance Needed**	**Funding Needed**
Watershed-wide	NA	Water Quality Monitoring (N, P, *E. coli*, DO) East Branch and Tributaries	$2,500	$25,000	HVA, BEAT, Municipalities	MassDEP	$25,000
Watershed-wide	NA	Stormwater Outfall Monitoring	$2,500	$10,000	HVA, BEAT, Municipalities	MassDEP	$10,000
			Total Cost for Monitoring & Evaluation				**$35,000.00**
					Total Funding Required		**$1,731,000.00**

Element E: Public Information and Education

Element E: Information and Education (I/E) component of the watershed plan used to:

1. Enhance public understanding of the project; and
2. Encourage early and continued public participation in selecting, designing, and implementing the NPS management measures that will be implemented.

Step 1: Goals and Objectives

The goals and objectives for the watershed information and education program.

1. Provide information about proposed stormwater improvements and their anticipated water quality benefits.
2. Provide information to promote watershed stewardship including:
   - Proper pet waste removal and disposal
   - Proper yard debris management (for example not raking leaves into the river or washing lawn trimmings down the drain
   - Promote simple stormwater BMP implementation
   - Minimizing use of fertilizers and pesticides and not applying before a rainstorm
   - Storm drain awareness to not dump anything down storm drains and be aware of the issues with nonpoint source pollution.
3. Develop relationships with the farmers to provide education and assistance with improving their crop and livestock waste management.
4. Ensure that stormwater management practices are being properly maintained at commercial businesses. Create avenues to educate staff about stormwater runoff issues and solutions.

Step 2: Target Audience

Target audiences that need to be reached to meet the goals and objectives identified above.

1. All watershed residents.
2. Lakefront/riverfront property owners – especially those with expansive waterfront lawns.
3. Larger businesses within the watershed.
4. Elementary through high school students.
5. Farm operators and owners, both commercial and hobby farmers.
6. Municipal staff, especially highway staff and conservation commission members.
7. Members of environmental non-profit organizations: Berkshire Environmental Action Team, HVA, Mass Audubon, Taconic Chapter of Trout Unlimited.
8. Clients of Service Organizations: 18 Degrees, Central Berkshire Habitat for Humanity, UpSide 413 (formerly Berkshire County Regional Housing).
9. Tenants of residential developments such as Pittsfield and Dalton Housing Authority managed properties.

Step 3: Outreach Products and Distribution

1. **Watershed Education for Fifth and Seventh Grades:** When funding is available, stakeholders such as HVA and Mass Audubon will work with the Central Berkshire Regional School District, which includes Craneville (Dalton) and Kittredge (Hinsdale) Elementary Schools and Nessacus Middle School (Dalton), and the City of Pittsfield School District to present a watershed-based curriculum that aligns with the Massachusetts Curriculum Frameworks and is developed for 5th graders and 7th graders. The series of lessons for 5th grade students focuses on water, water quality, nonpoint source pollution and green infrastructure solutions through stormwater modeling and 7th grade students about climate change impacts and nature-based solutions. Whenever possible, students will visit implemented BMPs.

2. **Signage at BMP locations:** For notably public locations, including the city-owned lands at Pontoosuc Lake, Burbank Park on Lake Onota and the Bill Laston Memorial Park in Lanesborough, interpretive signage explaining the stormwater practices that have been installed will help further educating the public about stormwater and stormwater control measures.

3. **River Smart program**: This program would be designed to reach river-front residents with various messages using multiple avenues and social media platforms.:
    a. Review existing outreach materials such as the ***Pittsfield River Smart*** brochure and the ***Landscaping for Climate Change fact sheet, and the City of Pittsfield's utility inserts*** and develop outreach materials that include practicable suggestions and designs for small stormwater BMPs that property owners can implement on their property as well as climate resilient solutions. These will need to be printed in Spanish as well as English. Work on messaging multiple times a year. Key messages include proper pet waste disposal; proper yard waste management; proper use of fertilizers and encouraging minimal use of fertilizers.
    b. Distribute developed materials:
        i. Work with *Pittsfield Gray to Green* to identify effective methods for distribution of outreach materials.
        ii. Pass out brochures and other materials at public events such as farmers markets and neighborhood block parties to reach people that may not normally receive this information.
        iii. Complete a direct mailing to stream-side property owners.
        iv. Include information notices in utility inserts.
        v. Create or locate existing ad slides or short videos that can be used on websites at the local Beacon Cinema and social media platforms to educate residents.

4. **Agricultural Outreach:** The Housatonic Valley Association has begun an agricultural outreach program with an initial Clean Water Act Section 319 project implementation grant for a Regional Agricultural NonPoint Source Pollution (NPS) Coordinator. While this grant is concluding, HVA has identified working with farmers to reduce nonpoint source pollution as a priority. The active agricultural operations in the East Branch are few compared to other parts of the Housatonic watershed headwaters, therefore these are likely a lower priority. Agricultural Outreach is still important and could be conducted where and when funding allows.

5. **Website Information:** the watershed-plan and water quality improvement efforts will be posted and linked to websites hosted by but not limited to, Lakes and Ponds Association of Western Massachusetts,

HVA, Central Berkshire Habitat for Humanity and the City of Pittsfield's and Town of Dalton's websites when appropriate.

6. **MS4 Education:** Both Pittsfield and Lanesborough are MS4 Communities governed by the EPA under the Clean Water Act NPDES Program. The municipalities, with support from stakeholders such as HVA and BRPC, will continue to provide annual messaging to residents and businesses using outreach methods outlined above. These messages will focus on:
    1. Proper disposal of pet waste
    2. Proper operation and maintenance of septic systems
    3. Proper management of grass clippings and leaves
    4. Minimizing fertilizer usage and not applying before storms

Step 4: Evaluate Information/Education Program

Information and education efforts and how they will be evaluated.

Watershed – Wide:

1. **Watershed Education for Fifth Grades:** Watershed Education: Number of classrooms reached and # of student hours.
2. **Signage at BMP locations:** number of watershed signs installed.
3. **River Smart program:**
    a. Number of brochures distributed at local events.
    b. Number of people who have engaged in River Smart Activities
    c. Number of hits on any social media postings.
    d. Number of property owners who have installed BMPs and are successfully maintaining.
4. **Websites**: number of website visitors to water quality specific pages and information
5. **Create outreach materials supporting structural BMPs:** number of flyers distributed, number of people reached.

Elements F & G: Implementation Schedule and Measurable Milestones

Element F: Schedule for implementing the nonpoint source management measures identified in this plan that is reasonably expeditious.

Element G: A description of interim measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented.

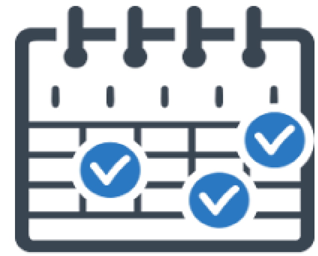


Table FG-1: Implementation Schedule and Interim Measurable Milestones

Structural BMPs				
MANAGEMENT MEASURES	**Interim Milestone #1**	**Interim Milestone #2**	**Interim Milestone #3**	**Interim Milestone #4**
Bioretention Basins (5) & Subsurface Infiltration/Porous Pavement	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Allendale Elementary School, Pittsfield	Within 2 years	Within 4 years	Within 6 years	Ongoing
Bioretention Basins (3) & Biocells	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Egremont Elementary School, Pittsfield	Within 2 years	Within 4 years	Within 6 years	Ongoing
Bioretention Basin & Biocell; Subsurface Infiltration/Porous Pavement	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Morningside Community School, Pittsfield	Within 2 years	Within 4 years	Within 6 years	Ongoing
Bioretention Basin & Biocell; Subsurface Infiltration/Porous Pavement	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance	
Pittsfield High School, Pittsfield	Within 1 year	Within 2 years	Ongoing	
Retrofit existing sediment forebays and rain gardens	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Gordon Street, Pittsfield	Within 1 year	Within 2 years	Within 2 years	Ongoing
Double Bioretention Basin/Porous Pavement & Bioretention/Grassed Swale	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Craneville Elementary School, Dalton	Within 2 years	Within 3 years	Within 5 years	Ongoing

Table FG-1: Implementation Schedule and Interim Measurable Milestones

Structural BMPs				
MANAGEMENT MEASURES	**Interim Milestone #1**	**Interim Milestone #2**	**Interim Milestone #3**	**Interim Milestone #4**
Two Infiltration Basins	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Senior Center and Former Middle School, Dalton	Within 3 years	Within 4 years	Within 6 years	Ongoing
Infiltration Basin/Grassed Swale	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Greenridge Park, Dalton	Within 3 years	Within 4 years	Within 6 years	Ongoing
Daylight Stream	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Walker Brook Stream Daylighting, Dalton	Within 5 years	Within 7 years	Within 10 years	Ongoing
Gravel wetland	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
End of Riverview Drive, Dalton	Within 1 year	Within 2 years	Within 3 years	Ongoing
Bioretention Conceptual Design	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Dalton Sewer Department, Dalton	Within 1 year	Within 2 years	Within 3 years	Ongoing
Water Quality Swale with Check Dams	Apply for Funding, Gather Project Team	Final Engineering and Permitting	Complete Construction, Develop Maintenance Plan	Monitoring and maintenance
Grange Hall Road, Dalton	Within 2 years	Within 3 years	Within 5 years	Ongoing

Table FG-1: Implementation Schedule and Interim Measurable Milestones *(continued)*

Non-Structural BMPs				
MANAGEMENT MEASURES	**Interim Milestone #1**	**Interim Milestone #2**	**Interim Milestone #3**	**Interim Milestone #4**
Storm Drain Decaling	Identify priorities/Assess funding needs	Define & Implement program	Monitoring and maintenance	
Pittsfield	Within 1 year	Within 2 years	Ongoing	
Storm Drain Decaling	Identify priorities/Assess funding needs	Define & Implement program	Monitoring and maintenance	
Dalton	Within 1 year	Within 2 years	Ongoing	
Green Infrastructure Work Force	Develop program framework with partners	Create business plan and budget	Obtain funding	Implement program
Pittsfield & Dalton	2024-25	2024-25	2025-26	2026-27
Public Information & Education				
MANAGEMENT MEASURES	**Interim Milestone #1**	**Interim Milestone #2**	**Interim Milestone #3**	**Interim Milestone #4**
Watershed Education for 5th and 7th Grades	Funding for school programs obtained on a sustainable basis	Programs conducted in Pittsfield and Lanesborough Elementary schools (3 total), and Reid Middle School		
Elementary Schools in Pittsfield, Dalton & Hinsdale	Within 2 years	Annually – Ongoing as funding allows		
Signage at Constructed BMPs	2 signs installed			
Various	within 5 years			
River Smart - Residential Outreach Program	Develop advisory group; Develop program ideas; Solicit funding	Funding received	Implement program	
Watershed-wide	Within 2 years	Within 3 years	Within 3 years	
Website Information	Obtain funding	Develop web page	Stakeholder webpage includes link	Update webpage as necessary
Watershed-wide	2025	2025-26	2026	Ongoing
MS4 Education	Distribute required messaging			
Watershed-wide	Annually – Ongoing			

Table FG-1: Implementation Schedule and Interim Measurable Milestones *(continued)*

Monitoring				
MANAGEMENT MEASURES	**Interim Milestone #1**	**Interim Milestone #2**	**Interim Milestone #3**	**Interim Milestone #4**
Water Quality Monitoring East Branch and Tributaries	Develop program with stakeholders to support BMP implementation	Obtain funding	Implement program and review results	Review and update program at the end of each season
Watershed Wide	2025	2025-26	2026	Annually
Stormwater Outfall Monitoring	Develop program with stakeholders to support BMP implementation	Obtain funding	Implement program and review results	Review and update program at the end of each season
Pittsfield & Dalton	2025	2025-26	2026	Annually

Elements H & I: Progress Evaluation Criteria and Monitoring

Element H: A set of criteria used to determine (1) if loading reductions are being achieved over time and (2) if progress is being made toward attaining water quality goals. Element H asks "**how will you know if you are making progress towards water quality goals?**" The criteria established to track progress can be direct measurements (e.g., E. coli bacteria concentrations) or indirect indicators of load reduction (e.g., number of beach closings related to bacteria).

Element I: A monitoring component to evaluate the effectiveness of implementation efforts over time, as measured against the Element H criteria. Element I asks "**how, when, and where will you conduct monitoring?**"

The water quality target concentration(s) is presented under Element A of this plan. To achieve this target concentration, the annual loading must be reduced to the amount described in Element B. Element C of this plan describes the various management measures that will be implemented to begin to achieve this targeted load reduction. The evaluation criteria and monitoring program described below will be used to measure the effectiveness of the proposed management measures (described in Element C) in improving the water quality of the East Branch of the Housatonic River Watershed.

Indirect Indicators of Load Reduction

Street Sweeping and Catch Basin Cleaning

Potential load reductions from these nonstructural BMPs can be estimated from indirect indicators, such as the number of miles of streets swept or the number of catch basins cleaned. Attachment 2 to Appendix F of the 2016 Massachusetts Small MS4 General Permit provides specific guidance for calculating nitrogen and phosphorus removal from these practices.[32]

It is recommended that ongoing activities, including road salting, be evaluated to determine potential improvements that would help achieve higher pollutant load reductions such as increased maintenance frequency or improved technology.

Beach/Lake Advisories

Reduction in recordings of beach closures due to E. coli, algal bloom advisories and reduction of invasive plants from aquatic plant surveys conducted will serve as an indirect indicator of load reductions.

[32] https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/appendix-f-attach-2-2016-ma-sms4-gp-mod.pdf

Project-Specific Indicators

Water quality monitoring data will provide up-to-date information on the effectiveness of the BMPs installed and the educational efforts towards improving the health of the East Branch. All implemented BMPs will include a planned evaluation and monitoring program where appropriate.

At key sites where stormwater outfall pipes are being "pulled back" and the stormwater infiltrated, such as the project described for Grange Hall Road and Riverview Drive in Dalton the stormwater discharge at the outfall or the surface water nearest the outfall, will be tested 2 – 3 times before and after BMP installation in wet weather to determine their effectiveness. Additional annual monitoring will be conducted, if deemed necessary.

TMDL Criteria

The East Branch of the Housatonic River (MA21-18) is included in the draft "Massachusetts Statewide TMDL for Pathogen-Impaired Inland Freshwater Rivers," which is currently in the public comment period.

Direct Measurements

Direct measurements are generally expected to be performed as described below. Prior to implementing a direct measurement program, the Berkshire County Water Quality Coalition's current quality assurance project plan (QAPP) and/or standard operating procedures (SOPs) will be reviewed and amended as necessary to ensure best practices for sample collection and analysis. Water quality monitoring will be performed through a volunteer training program similar to the one HVA has conducted for many years and which is fashioned after MassDEP's environmental monitoring for volunteers.

Water Quality Monitoring

Sampling is recommended approximately once per month from May through October to understand the water quality in the East Branch of the Housatonic Watershed, including determining sources for pollution and tracking achievements toward water quality goals. At a minimum, parameters tested should include analysis of *E. coli,* TSS and TN. Additional parameters such as TP, dissolved oxygen, temperature, conductivity, pH, and flow rate could provide additional data to support BMP implementation.

The sampling would be focused on the mainstem and key tributaries such as Wahconah and Anthony Brooks. Monitoring locations will be selected following installation of stormwater BMPs based on accessibility and representativeness and shall be appropriate to quantify water quality improvements in the watershed.

Beach Sampling (*E. coli*):

There are six beach locations in the East Branch that are sampled weekly during the summer season. All are located in Hinsdale either on Plunkett Reservoir or Ashmere Lake. Only one exceedance occurred in 2023 at the Plunkett Lake Beach. **(Table HI-1)**

Table HI-1: Freshwater Beach Sampling Data (2023)

Community	Beach Location Name	Waterbody	Testing Frequency	Indicator	Tests	Single Sample Exceedances	Minimum Exceedance (cfu/100mL)	Maximum Exceedance (cfu/100mL)	Days Posted
Hinsdale	Berkshire Lake Camp	Ashmere Lake	Weekly	E. coli	14				0
Hinsdale	Camp Emerson Beach	Plunkett Reservoir	Weekly	E. coli	11				0
Hinsdale	Camp Emerson Marina	Plunkett Reservoir	Weekly	E. coli	10				0
Hinsdale	Camp Romaca	Plunkett Reservoir	Weekly	E. coli	8				0
Hinsdale	Camp Taconic Beach	Ashmere Lake	Weekly	E. coli	13				0
Hinsdale	Plunkett Lake Beach	Plunkett Reservoir	Weekly	E. coli	17	1	307.6	307.6	0

Adaptive Management

The various stakeholders and municipalities will discuss the health of the East Branch, progress of implementation, education and monitoring and develop appropriate actions for the upcoming year. These stakeholders include representatives of Central Berkshire Habitat for Humanity, BEAT, HVA, BRPC, the Town of Dalton and City of Pittsfield.

Consideration will be given to bringing the stakeholders together as an informal coalition led by BRPC to implement the plan. At a minimum, the goal would be to meet annually, develop a work plan to prioritize implementation, develop a tracking mechanism to coordinate implementations by partners, evaluate actions annually to assess progress, adjust plan implementation and add new projects. Until this is in place, and another point organization has been identified, BRPC will serve as the point organization to monitor and track the projects' progress and through regular meetings with the various stakeholders continue to advance the West Branch Watershed Based Plan.

Post-construction testing will give continuous data on whether the BMPs are functioning as intended. If the BMPs are not reducing pollutants as intended, communication about the BMP will help address any issues early on and lead to more constructive and permanent solutions.

The watershed-based plan will be reviewed and updated every three to five years based on monitoring results, additional information, BMP performance and progress toward water quality goals.

References

314 CMR 4.00 (2013). "*Division of Water Pollution Control, Massachusetts Surface Water Quality Standards*"

ArcGIS (2020a). "*USA Soils Hydrologic Group*" Imagery Layer

ArcGIS (2020b). "*USA Soils Water Table Depth*" Imagery Layer

Cohen, A. J.; Randall, A.D. (1998). "*Mean annual runoff, precipitation, and evapotranspiration in the glaciated northeastern United States, 1951-80.*" Prepared for United States Geological Survey, Reston VA.

Geosyntec Consultants, Inc. (2014). "*Least Cost Mix of BMPs Analysis, Evaluation of Stormwater Standards Contract No. EP-C-08-002, Task Order 2010-12.*" Prepared for Jesse W. Pritts, Task Order Manager, U.S. Environmental Protection Agency

Geosyntec Consultants, Inc. (2015). "*Appendix B: Pollutant Load Modeling Report, Water Integration for the Squamscott-Exeter (WISE) River Watershed.*"

King, D. and Hagan, P. (2011). "*Costs of Stormwater Management Practices in Maryland Counties.*" University of Maryland Center for Environmental Science Chesapeake Biological Laboratory. October 11, 2011.

Leisenring, M., Clary, J., and Hobson, P. (2014). "*International Stormwater Best Management Practices (BMP) Database Pollutant Category Statistical Summary Report: Solids, Bacteria, Nutrients and Metals.*" Geosyntec Consultants, Inc. and Wright Water Engineers, Inc. December 2014.

MA Department of Revenue Division of Local Services (2016). "*Property Type Classification Codes, Non-arm's Length Codes and Sales Report Spreadsheet Specifications*" June 2016

MassDEP (2012). "*Massachusetts Year 2012 Integrated List of Waters Final Listing of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act*"

MassDEP (2016a). "*Massachusetts Clean Water Toolkit*"

MassDEP (2016b). "*Massachusetts Stormwater Handbook, Vol. 2, Ch. 2, Stormwater Best Management Practices*"

MassDEP (2021). "*Final Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle*" November 2021.

MassGIS (1999). "*Networked Hydro Centerlines*" Shapefile

MassGIS (2001). "*USGS Topographic Quadrangle Images*" Image

MassGIS (2005). "*Elevation (Topographic) Data (2005)*" Digital Elevation Model

MassGIS (2007). "*Drainage Sub-basins*" Shapefile

MassGIS (2009a). "*Impervious Surface*" Image

MassGIS (2009b). "*Land Use (2005)*" Shapefile

MassGIS (2012). "*2010 U.S. Census Environmental Justice Populations*" Shapefile

MassGIS (2013). "*MassDEP 2012 Integrated List of Waters (305(b)/303(d))*" Shapefile

MassGIS (2015a). "*Fire Stations*" Shapefile

MassGIS (2015b). "*Police Stations*" Shapefile

MassGIS (2017a). "*Town and City Halls*" Layer

MassGIS (2017b). "*Libraries*" Layer

MassGIS (2020). "*Massachusetts Schools (Pre-K through High School)*" Datalayer

MassGIS (2021). "*Standardized Assessors' Parcels*" Mapping Data Set

Schueler, T.R., Fraley-McNeal, L, and K. Cappiella (2009). "*Is impervious cover still important? Review of recent research*" Journal of Hydrologic Engineering 14 (4): 309-315.

Tetra Tech, Inc. (2015). "*Update of long-term runoff time series for various land uses in New England.*" Memorandum in Opti-Tool zip package. 20 November 2015. Available at: Opti-Tool: EPA Region 1's Stormwater Management Optimization Tool | US EPA

United States Bureau of Labor Statistics (2016). "*Consumer Price Index*"

United States Geological Survey (2016). "*National Hydrography Dataset, High Resolution Shapefile*"

University of Massachusetts, Amherst (2004). "*Stormwater Technologies Clearinghouse*"

University of New Hampshire Stormwater Center (UNHSC) (2018). "*Stormwater Control Measure Nomographs with pollutant removal and design cost estimates.*" Available at: Stormwater Tools in New England | US EPA.

USDA NRCS and MassGIS (2012). "*NRCS SSURGO-Certified Soils*" Shapefile

USEPA (1986). "*Quality Criteria for Water (Gold Book)*" EPA 440/5-86-001. Office of Water, Regulations and Standards. Washington, D.C.

USEPA. (2010). "*EPA's Methodology to Calculate Baseline Estimates of Impervious Area (IA) and Directly Connected Impervious Area (DCIA) for Massachusetts Communities.*"

USEPA. (2020). "*General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (as modified); Appendix F – Requirements for MA Small MS4s Subject to Approved TMDLs.*" 7 December 2020.

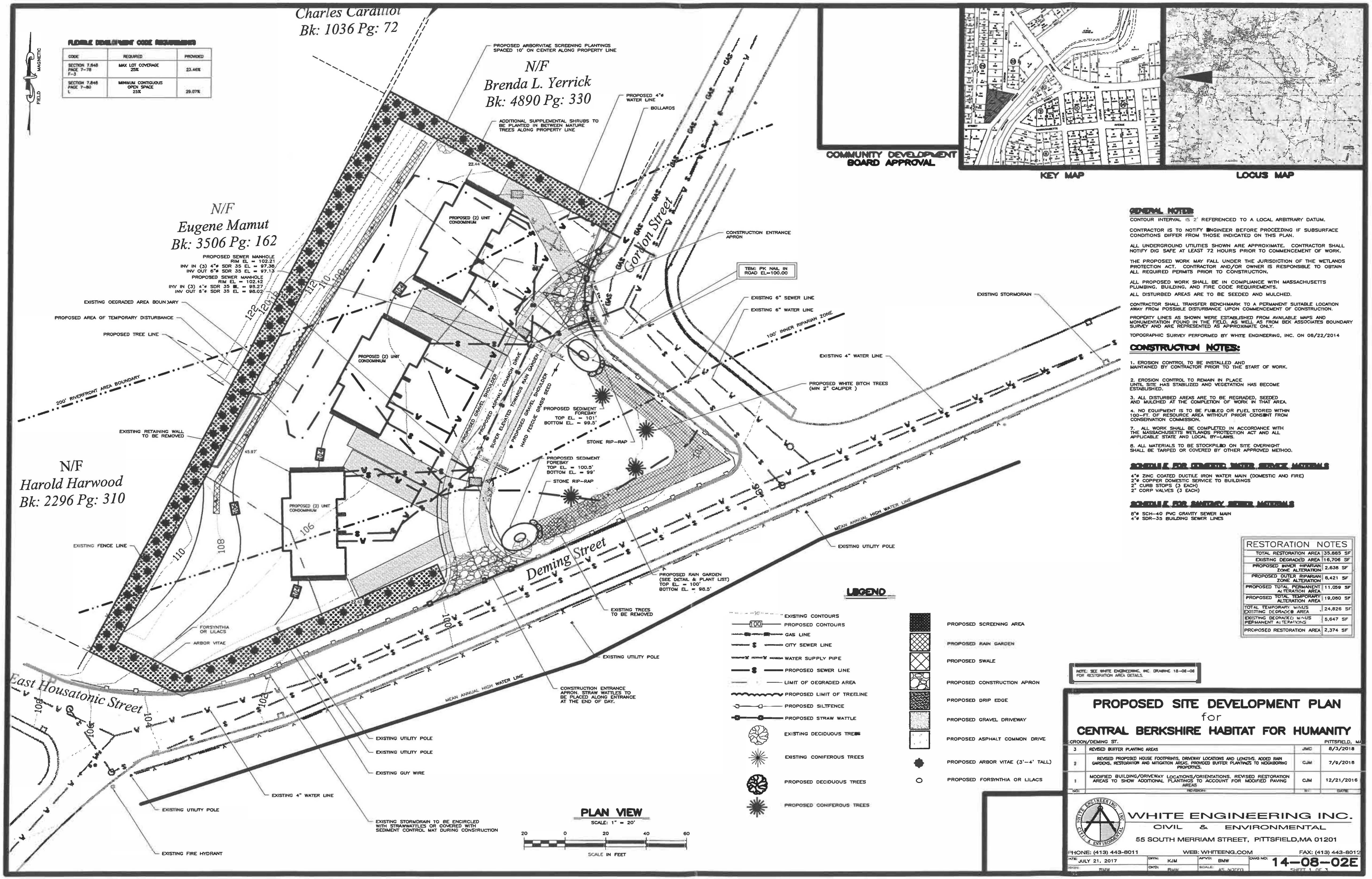
Appendices

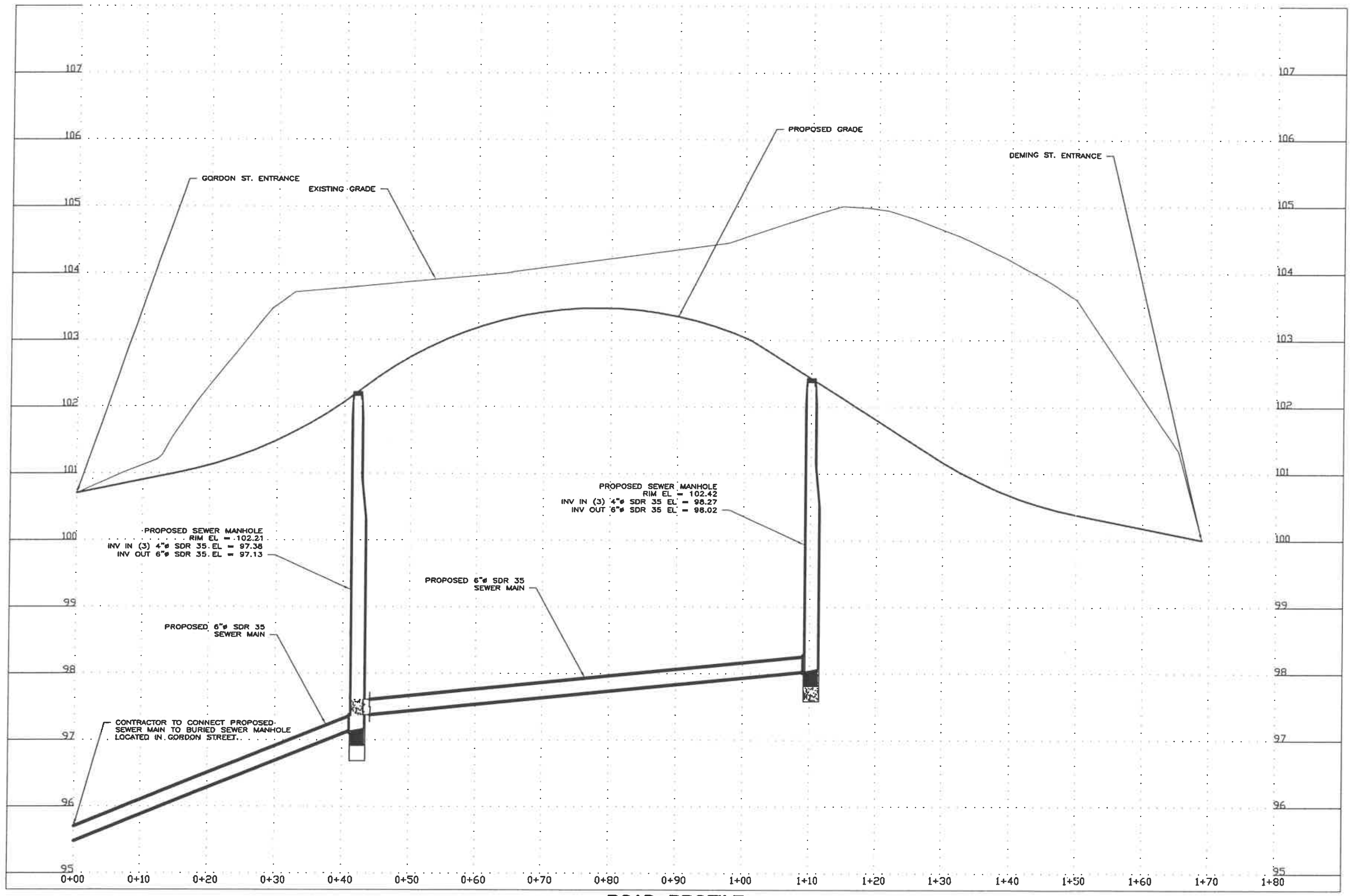
Appendix A – Pollutant Load Export Rates (PLERs)

Land Use & Cover[1]	PLERs (lb/acre/year)		
	(TP)	(TSS)	(TN)
AGRICULTURE, HSG A	0.45	7.14	2.6
AGRICULTURE, HSG B	0.45	29.4	2.6
AGRICULTURE, HSG C	0.45	59.8	2.6
AGRICULTURE, HSG D	0.45	91	2.6
AGRICULTURE, IMPERVIOUS	1.52	650	11.3
COMMERCIAL, HSG A	0.03	7.14	0.3
COMMERCIAL, HSG B	0.12	29.4	1.2
COMMERCIAL, HSG C	0.21	59.8	2.4
COMMERCIAL, HSG D	0.37	91	3.7
COMMERCIAL, IMPERVIOUS	1.78	377	15.1
FOREST, HSG A	0.12	7.14	0.5
FOREST, HSG B	0.12	29.4	0.5
FOREST, HSG C	0.12	59.8	0.5
FOREST, HSG D	0.12	91	0.5
FOREST, HSG IMPERVIOUS	1.52	650	11.3
HIGH DENSITY RESIDENTIAL, HSG A	0.03	7.14	0.3
HIGH DENSITY RESIDENTIAL, HSG B	0.12	29.4	1.2
HIGH DENSITY RESIDENTIAL, HSG C	0.21	59.8	2.4
HIGH DENSITY RESIDENTIAL, HSG D	0.37	91	3.7
HIGH DENSITY RESIDENTIAL, IMPERVIOUS	2.32	439	14.1
HIGHWAY, HSG A	0.03	7.14	0.3
HIGHWAY, HSG B	0.12	29.4	1.2
HIGHWAY, HSG C	0.21	59.8	2.4
HIGHWAY, HSG D	0.37	91	3.7
HIGHWAY, IMPERVIOUS	1.34	1,480	10.5
INDUSTRIAL, HSG A	0.03	7.14	0.3

Land Use & Cover[1]	PLERs (lb/acre/year)		
	(TP)	(TSS)	(TN)
INDUSTRIAL, HSG B	0.12	29.4	1.2
INDUSTRIAL, HSG C	0.21	59.8	2.4
INDUSTRIAL, HSG D	0.37	91	3.7
INDUSTRIAL, IMPERVIOUS	1.78	377	15.1
LOW DENSITY RESIDENTIAL, HSG A	0.03	7.14	0.3
LOW DENSITY RESIDENTIAL, HSG B	0.12	29.4	1.2
LOW DENSITY RESIDENTIAL, HSG C	0.21	59.8	2.4
LOW DENSITY RESIDENTIAL, HSG D	0.37	91	3.7
LOW DENSITY RESIDENTIAL, IMPERVIOUS	1.52	439	14.1
MEDIUM DENSITY RESIDENTIAL, HSG A	0.03	7.14	0.3
MEDIUM DENSITY RESIDENTIAL, HSG B	0.12	29.4	1.2
MEDIUM DENSITY RESIDENTIAL, HSG C	0.21	59.8	2.4
MEDIUM DENSITY RESIDENTIAL, HSG D	0.37	91	3.7
MEDIUM DENSITY RESIDENTIAL, IMPERVIOUS	1.96	439	14.1
OPEN LAND, HSG A	0.03	7.14	0.3
OPEN LAND, HSG B	0.12	29.4	1.2
OPEN LAND, HSG C	0.21	59.8	2.4
OPEN LAND, HSG D	0.37	91	3.7
OPEN LAND, IMPERVIOUS	1.52	650	11.3
[1]HSG = Hydrologic Soil Group			

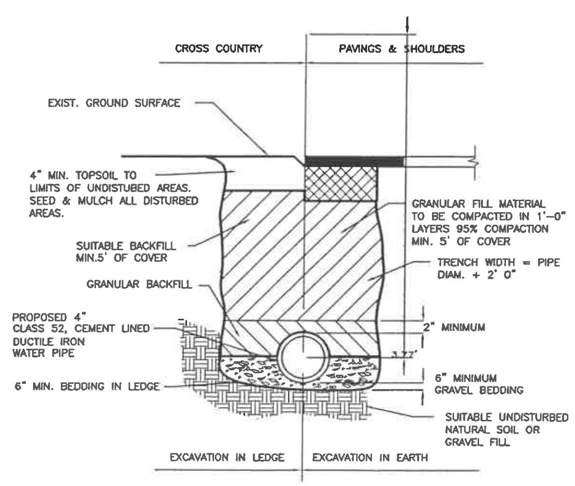
APPENDIX B - GORDON STREET PLANS





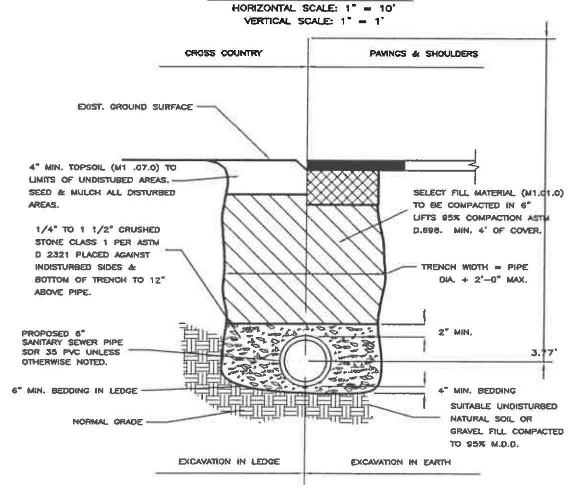
ROAD PROFILE

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 1'



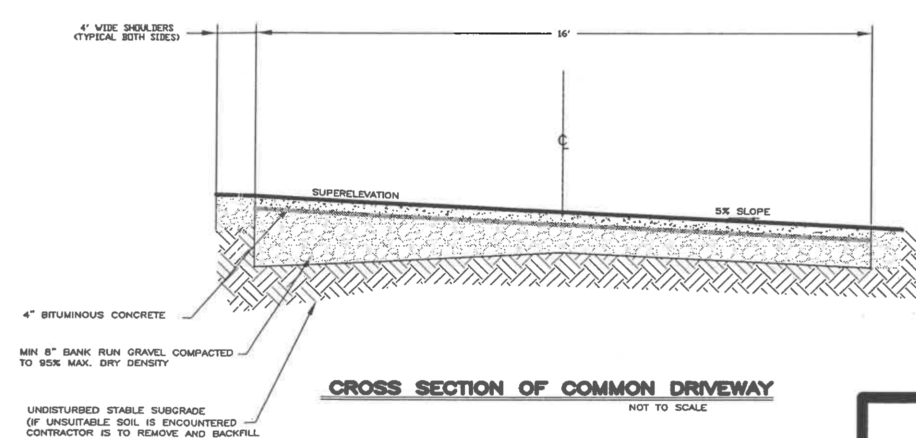
WATER TRENCH DETAIL

N.T.S.



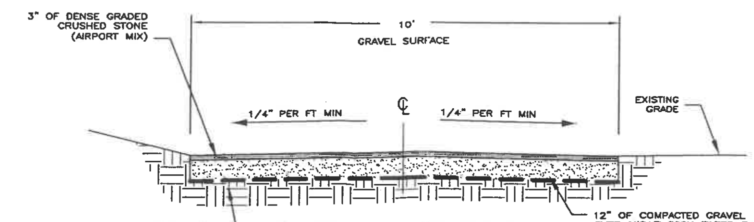
SEWER TRENCH DETAIL

NTS



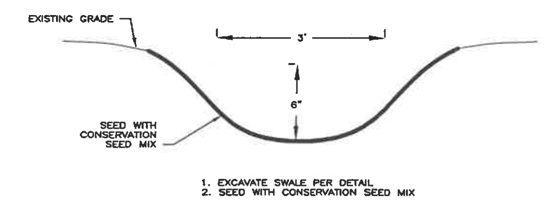
CROSS SECTION OF COMMON DRIVEWAY

NOT TO SCALE



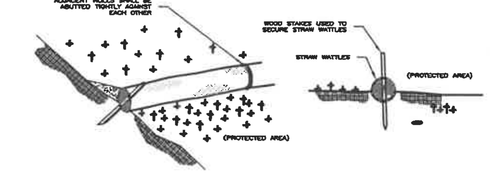
DRIVEWAY CROSS SECTION

N.T.S.



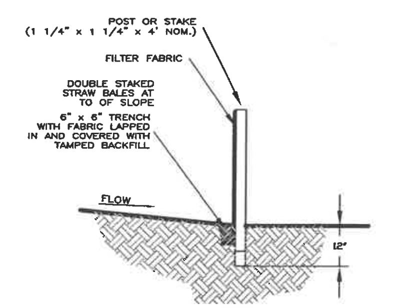
VEGETATED SWALE DETAIL

NTS

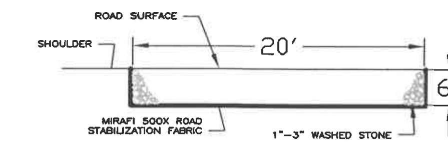


STRAW WATTLE BARRIER DETAIL

N.T.S.

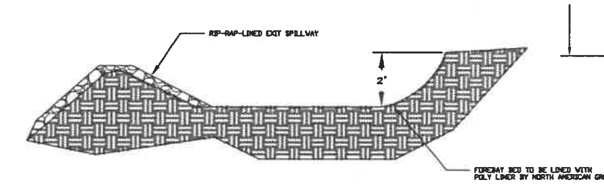


SILT FENCE INSTALLATION DETAIL



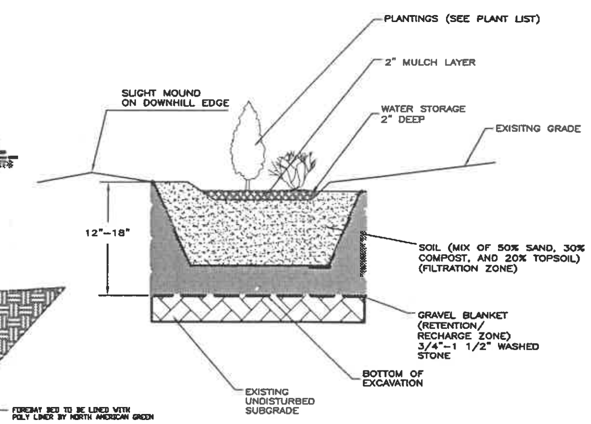
CONSTRUCTION ENTRANCE DETAIL

NTS



SEDIMENT FOREBAY DETAIL

N.T.S.



RAIN GARDEN DETAIL

NTS

PLANTING PLAN

RAIN GARDEN
12 ELYMUS VIRGINICUS (VIRGINIA WILD RYE)
2" PLUGS
FESTUCA OVINA (HARD FESCUE) IN FILTER STRIP
24 ELYMUS VIRGINICUS (VIRGINIA WILD RYE) 2" PLUGS
20 SPIRAEA LATIFOLIA (MEADOWSWEET) 2-3' PLANTS
12 CORNUS AMOMUM (SILKY DOGWOOD) 2-3' PLANTS
14 ILEX VERTICILLATA (WINTERBERRY HOLLY) 2-3' PLANTS

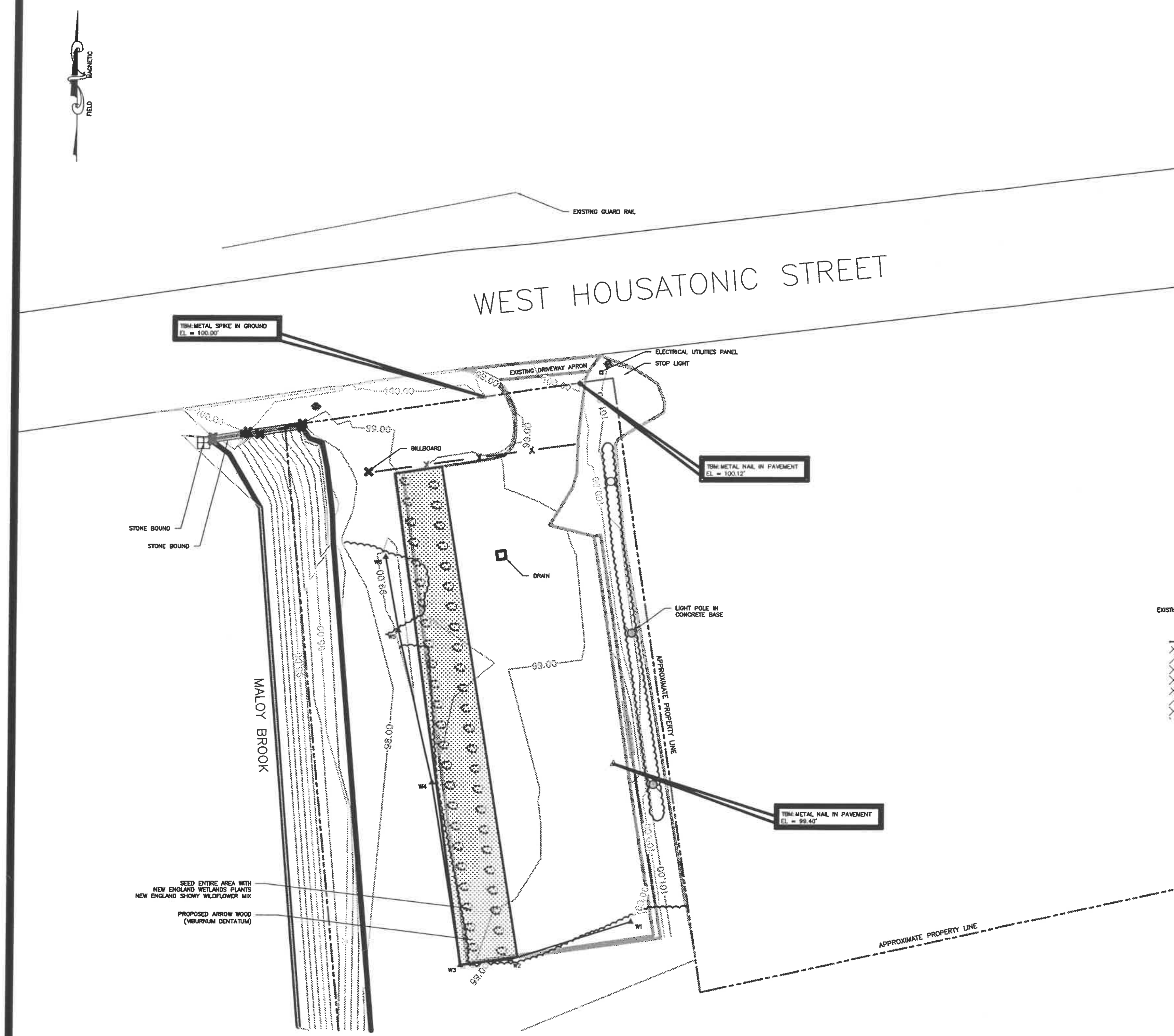
PROPOSED SITE DEVELOPMENT PLAN
for
CENTRAL BERKSHIRE HABITAT FOR HUMANITY

GORDON/DEMING ST. PITTSFIELD, MA

NO.	REVISION	BY	DATE
3	REVISED BUFFER PLANTING AREAS	JMC	8/3/2018
2	REVISED PROPOSED HOUSE FOOTPRINTS, DRIVEWAY LOCATIONS AND LENGTHS. ADDED RAIN GARDENS, RESTORATION AND MITIGATION AREAS. PROVIDED BUFFER PLANTINGS TO NEIGHBORING PROPERTIES.	CJM	7/9/2018
1	MODIFIED BUILDING/DRIVEWAY LOCATIONS/ORIENTATIONS. REVISED RESTORATION AREAS TO SHOW ADDITIONAL PLANTINGS TO ACCOUNT FOR MODIFIED PAVING AREAS	CJM	12/21/2016

WHITE ENGINEERING INC.
CIVIL & ENVIRONMENTAL
55 SOUTH MERRIAM STREET, PITTSFIELD, MA 01201
PHONE: (413) 443-8011 WEB: WHITEENG.COM FAX: (413) 443-8012

DATE: DECEMBER 18, 2014	DRWN: CJM	APVD: BMW	DWG NO: 14-08-02E
DESIGN: BMW	CHKD: BMW	SCALE: AS NOTED	SHEET 2 OF 3

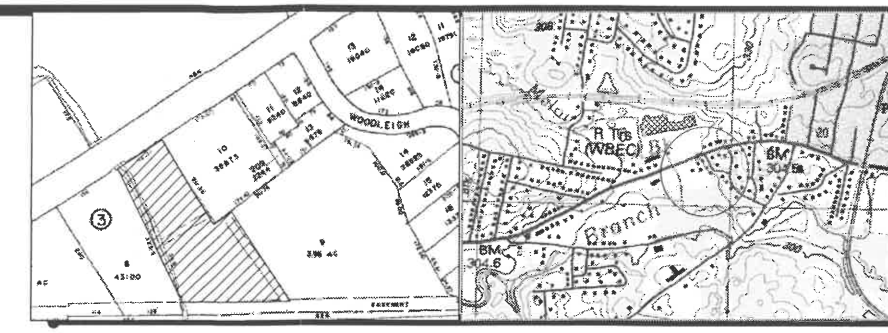


SITE PLAN

SCALE: 1" = 20'

20 0 20 40 60

SCALE IN FEET



KEY MAP **LOCUS MAP**

LEGEND

- EXISTING CONTOURS
- PROPOSED CONTOURS
- APPROXIMATE PROPERTY LINE
- EDGE OF TREELINE(CANOPY)
- EDGE OF PAVED ROAD
- EXISTING STRUCTURES
- STREAM
- STONE BOUND
- TEMPORARY BENCH MARK IN ROOT (TBM)
- TEMPORARY BENCH MARK (TBM)
- WETLAND FLAG
- UTILITY POLE
- LIGHT POLE

GENERAL NOTES:

CONTOUR INTERVAL IS 1' REFERENCED TO A LOCAL ARBITRARY DATUM.

CONTRACTOR IS TO NOTIFY ENGINEER BEFORE PROCEEDING IF SUBSURFACE CONDITIONS DIFFER FROM THOSE INDICATED ON THIS PLAN.

ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL NOTIFY DIG SAFE AT LEAST 72 HOURS PRIOR TO COMMENCEMENT OF WORK.

THE PROPOSED WORK MAY FALL UNDER THE JURISDICTION OF THE WETLANDS PROTECTION ACT. CONTRACTOR AND/OR OWNER IS RESPONSIBLE TO OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.

ALL PROPOSED WORK SHALL BE IN COMPLIANCE WITH MASSACHUSETTS PLUMBING, BUILDING, AND FIRE CODE REQUIREMENTS. LOW VOLUME PLUMBING FIXTURES ARE TO BE USED. NO GARBAGE DISPOSALS ARE ALLOWED. NO BACKWASH OF WATER PURIFICATION OR FILTRATION DEVICES SHALL DISCHARGED INTO THE PROPOSED SYSTEM.

ALL DISTURBED AREAS ARE TO BE SEEDED AND MULCHED.

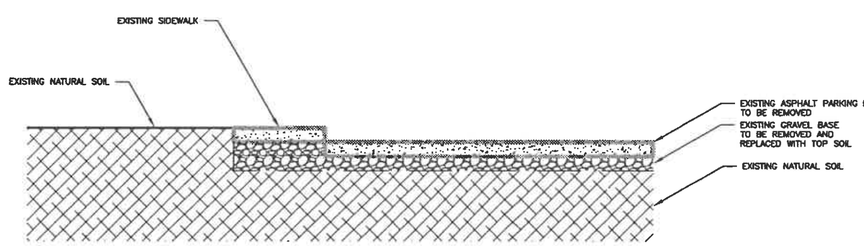
CONTRACTOR SHALL TRANSFER BENCHMARK TO A PERMANENT SUITABLE LOCATION AWAY FROM POSSIBLE DISTURBANCE UPON COMMENCEMENT OF CONSTRUCTION.

PROPERTY LINES AS SHOWN WERE ESTABLISHED FROM AVAILABLE MAPS AND MONUMENTATION FUND IN THE FIELD AND ARE REPRESENTED AS APPROXIMATE ONLY.

TOPOGRAPHIC SURVEY PERFORMED BY WHITE ENGINEERING, INC. ON XXXX XXXX XX, 2018

WETLAND DELINEATION PERFORMED BY WHITE ENGINEERING, INC. ON XXXX XXXX XX, 2018

APPROVAL OF THIS PLAN AND APPLICATION BY A BOARD OF HEALTH DOES NOT IMPLY OR CONSTITUTE APPROVAL BY ANY OTHER BOARD OF AGENCY.



PROPOSED RESTORATION DETAIL

NTS

OFFSITE RESTORATION PLAN
for
CENTRAL BERKSHIRE HABITAT FOR HUMANITY

WEST HOUSATONIC STREET — TAX MAP ID #F070003009 — PITTSFILED, MA

NO.	REVISION:	BY:	DATE:
1	MODIFICATION SEDIMENT FOREBAY, SCREENING PLANTING AND GRASS SEED SPECIFICATION PER COMMUNITY DEVELOPMENT BOARD FEED BACK	RMJ	8/10/2018

WHITE ENGINEERING INC.
CIVIL & ENVIRONMENTAL
55 SOUTH MERRIAM STREET, PITTSFIELD, MA 01201
PHONE: (413) 443-8011 WEB: WHITEENG.COM FAX: (413) 443-8012
LICENSED IN CONNECTICUT, MASSACHUSETTS, NEW YORK AND VERMONT

DATE: APRIL 2, 2018	DRN: JMC/RMJ	APVD: BMW	DWG NO: 14–08–02F
DSGN: BMW	CKD: BMW	SCALE: AS NOTED	SHEET 3 OF 3

Appendix C - East Branch Water Quality Sampling Location Information

STATE ID	Site ID	Waterbody	Description	Town	Latitude	Longitude	YEARS SAMPLED
	"Home Club"	East Branch of the Housatonic River	Just upstream from the downtown area of Hinsdale.	Hinsdale	42.438009	-73.124544	2002, 2003
	"Metal Bridge"	East Branch of the Housatonic River	Green metal bridge behind the Mobil gas station in downtown Hinsdale. Upstream of the old Renfrew Dam	Hinsdale	42.438204	-73.124762	2001, 2002, 2003
	"Carmel House"	East Branch of the Housatonic River	Between Metal Bridge and Partridgefield, downstream from where Route 8 crosses the river in Hinsdale.	Hinsdale	42.443829	-73.129260	2002, 2003
	"Partridgefield"	East Branch of the Housatonic River	Upstream corner of the former store, Partridgefield (Hinsdale Trading Company)	Hinsdale	42.447308	-73.130152	2001, 2002
	EAB 100	East Branch of the Housatonic River	Downstream of the Old Dalton Road Bridge. Access from the Old Mill Trail	Hinsdale	42.44833	-73.13101	2006, 2019
	"Orchard Road"	East Branch of the Housatonic River	At the intersection of Orchard Road (approximate coordinates)	Dalton	42.477262	-73.145075	2001,2002,2003, 2006
W1572	EAB200/"High School"	East Branch of the Housatonic River	Downstream of the Old Windsor Road bridge	Dalton	42.47369635	-73.14121	2001, 2002, 2003, 2019, 2020
	EAB210	East Branch of the Housatonic River	Just before the confluence with Center Pond, end of Riverview Drive	Dalton	42.476391	-73.15487	2020, 2022
W1727	EAB220/"Center Pond Bridge"	East Branch of the Housatonic River	Upstream of Rte 8/Main Street bridge, Center Pond Outlet	Dalton	42.47429663	-73.15665879	2020
	"East Branch Above Walker Brook"	East Branch of the Housatonic River	Upstream of the confluence with Walker Brook	Dalton	42.471959	-73.166704	2004, 2006

Appendix C - East Branch Water Quality Sampling Location Information

STATE ID	Site ID	Waterbody	Description	Town	Latitude	Longitude	YEARS SAMPLED
W1725	EAB280	East Branch of the Housatonic River	Ustream of West Housatonic Street	Dalton	42.47137394	-73.1686657	2020
W1111	EAB300	East Branch of the Housatonic River	Upstream of the Hubbard Avenue bridge	Dalton	42.46942794	-73.1961482	2001, 2002, 2003, 2004, 2006, 2019
	EAB500	East Branch of the Housatonic River	Upstream of the Elm Street Bridge	Pittsfield	42.44511812	-73.24405254	2020
W1576	ANB01.2	Anthony Brook	Upstream of the North Mountain Road	Dalton	42.48855	-73.14873	2022
	AB01.1	Anthony Brook	Just upstream of the Rte 9 bridge	Dalton	42.48233	-73.15353	2019
	BBK200	Barton Brook	Downstream of Sleepy Hollow Drive Bridge	Dalton	42.46045971	-73.17678075	2020
	BBK400	Barton Brook	Upstream of the Hubbard Avenue Bridge	Dalton	42.4620411	-73.1886675	2020
W1603	EGY400	Egypt Brook	Upstream of Holiday Cottage Road Culvert	Dalton	42.49067009	-73.14298338	2020
	TYL400	Tyler Brook	Upstream of the Main Dalton Road bridge	Windsor	42.50728646	-73.07990654	2020
	"260 Old Dalton Brook"	Unnamed Tributary	In front of 260 Old Dalton Road (approximate coordinates)	Hinsdale	42.445513	-73.120216	2006
	"Old Dalton Brook"	Unnamed Tributary	Near the confluence with East Branch (approximate coordinates)	Hinsdale	42.446885	-73.127731	2006
	WFB 05.3/"State Park"	Wahconah Falls Brook	Wahconah Falls State Park~ 200 yards downstream of falls, north side of river.	Dalton	42.48833	-73.1161	2001,2002,2003, 2006, 2017
	WFB 03.4/"Cleveland Road"	Wahconah Falls Brook	Cleveland Rd. 25’ Downstream of bridge, south side of road.	Dalton	42.48597	-73.12794	2002, 2003, 2006, 2017

Appendix C - East Branch Water Quality Sampling Location Information

STATE ID	Site ID	Waterbody	Description	Town	Latitude	Longitude	YEARS SAMPLED
	WFB200	Wahconah Falls Brook	Upstream of the Route 9 Bridge (furthest upstream)	Dalton	42.48732069	-73.13180217	2020
	WFB300/WFB01.2/"WFB at Rte9"	Wahconah Falls Brook	Upstream of the Route 9 Bridge (downstream bridge) (formerly WFB01.2)	Dalton	42.4843668	-73.14845314	2001, 2002, 2003, 2006, 2017, 2019, 2020
	WFB 01	Wahconah Falls Brook	E. Deming Street. Behind VFW field, 0.04 miles upstream of confluence with East Branch. North side of river.	Dalton	42.47823	-73.15202	2017
	"High Street"	Walker Brook	Upstream of the culvert at High Street	Dalton	42.4776832	-73.1663416	2002, 2003, 2004, 2006, sampled when sufficient flow
	"Below Sewer Line"	Walker Brook	Approx. 20 feet downstream of WLK400 (downstream of a sewer pipe crossing)	Dalton	42.4727617	-73.1646605	2002, 2003, 2004, 2006 sampled when sufficient flow
	"Walker Brook Outflow"	Walker Brook	At the confluence with the East Branch	Dalton	42.4721703	-73.1670223	2002, 2003, 2004, 2006, sampled when sufficient flow
	WLK400/WLK240/ "Post Office"	Walker Brook	Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	Dalton	42.472823	-73.16462	2002, 2003, 2004, 2006, 2022, 2023
W1116	WND400	Windsor Brook	Upstream of the Old Windsor Road Bridge	Dalton	42.476367	-73.129139	2020

APPENDIX D

Housatonic River
Water Quality Report,
East Branch 2001 – 2003

The East Branch seen from the Old Mill Trail in Dalton, MA.

HVA

Housatonic River
Water Quality Report,
East Branch 2001 - 2003

Table of Contents

This project and report are made possible by generous grants from:

Massachusetts Executive Office of Environmental Affairs (DEP, and federal funding from EPA under Section 604b of the Clean Water Act), the Massachusetts Environmental Trust, the Berkshire Environmental Fund, the Wharton Trust, the Berkshire Environmental Endowment Fund and the Berkshire Taconic Community Foundation.

And the hard labor of many, caring volunteers!

(Please see page 16 for a list of our water quality monitors.)

MASSACHUSETTS ENVIRONMENTAL TRUST

HOUSATONIC VALLEY ASSOCIATION

Berkshire Office
1383 Route 102, P.O. Box 251
South Lee, MA 01260
Phone: 413-394-9796
Fax: 413-394-9818
E-mail: hvama.carolyn@adelphia.net

Connecticut Office
150 Kent Road, P.O. Box 28
Cornwall Bridge, CT 06754
Phone: 860-672-6678
Fax: 860-672-0162
E-mail: housatonic@snet.net

Website: www.hvatoday.org

I. OVERVIEW

The shoreline survey information collected by the East Branch Stream Team volunteers in 1999 provided preliminary information about this section of river and its watershed. These surveys described the general characteristics of the river and surrounding land use, identified potential areas of negative impacts, and provided a basic overview of the health of the watershed.

We used this information to develop our water quality monitoring program, which we have continued each year since 2001. The data results from month to month and year to year have varied, but they have pointed out areas where there may be some human-caused sources of pollution. Even three years' worth of sampling does not provide concrete data to fully pinpoint causes of water quality impairments, but it is helping us to narrow down the sources.

II. INTRODUCTION

HVA started monitoring eleven sites on the East Branch of the Housatonic River in April, 2001. Some of those sites are still being monitored today, but some have been discontinued, while still others have been added. Sixteen sites were monitored in 2002. Twelve sites were monitored in 2003.

Original speculation that the lakes and ponds in the watershed might be contributing higher levels of phosphorus, nitrogen or bacteria to the river, due to residential development along their shores, has proven to be unfounded. The only impact the lakes seem to have on the river environment is due to the varying flow level, which can be so low that it no longer provides sufficient flow for aquatic organisms. Also, the water temperatures coming out of the impoundments are frequently too high for the organisms that should be able to live there. These "lake sites", Bennett Brook, Frisell Brook, and Center Pond, were monitored in 2001 and 2002 and then discontinued.

Bullard's Crossing is our site closest to the headwaters and it was chosen to act as a reference site since it is located in the Hinsdale Flats Area of Critical Environmental Concern. We believed this pristine location would provide us with excellent water quality against which we could compare our other sites farther down in the watershed. We found, however, that although this location is not impacted by human development, the beaver population in the area is thriving, and having its own impact on the water quality in the river! This site was monitored in 2001 and 2002 but then discontinued due to sporadic high bacteria levels. Water quality in the Wahconah Falls State Park has proven to be consistently good so we now use it as our reference site instead of Bullard's Crossing.

Starting in April and continuing through October 2003, HVA sampled twelve sites on the East Branch of the Housatonic River. This report primarily summarizes the all data we have collected on the sites that we monitored in 2003, whether we have monitored those sites for two years or all three years. Data tables for the sites dropped after the first two years is also included in Appendix B.

Samples are collected monthly for Fecal Coliform bacteria, E-Coli bacteria, Total Phosphorus, Nitrate-Nitrogen, and Total Suspended Solids. These samples are taken to Berkshire Enviro-Labs

(BEL) for analysis. Dissolved oxygen is also measured monthly, but the samples are analyzed at HVA's lab. Water and air temperatures are measured at most of the sites, by the field volunteers. Some sites were added in 2002 to help locate sources of bacteria and nutrients, so only those parameters are measured at those sites. All parameters are analyzed by Berkshire Enviro-Labs except for dissolved oxygen and, of course, the temperatures.

pH and alkalinity are sampled in the spring and the fall, instead of monthly like the other parameters. Previous years' data showed that the pH levels have been staying within their state standards, and although there is no state standard for alkalinity, it is lower in the tributaries in early spring. These samples are also analyzed at Berkshire Enviro-Labs.

This data is providing valuable information about the condition of the Housatonic River and the impacts we are having upon it. Since we sample on only one day per month, it is important that we sample over an extended period of time to be able to see if any trends are forming. One day's bad results, or one day's good results, do not provide enough information to draw any accurate conclusions about the health of the river at that location. Water quality can vary from hour to hour and day to day.

III. PROJECT DESCRIPTION

In 1999 volunteers carried out shoreline surveys of the East Branch of the Housatonic River, starting at Muddy Pond, in Washington and continuing through Hinsdale and Dalton to the town line with Pittsfield. Some of the questions and concerns that arose from the surveys revolved around the possible impacts on the river from land use activities in the watershed, such as the golf courses, farming operations, developed areas, and other human activities. Also in question is whether the water in the lakes and reservoirs has any impact on the river, due to decreased oxygen or elevated temperatures and/or nutrients in the impounded water.

Therefore, our initial sites were chosen above and below a major golf course, above and below some farmland, and below the major lakes/reservoirs. Two sites were also chosen that we thought would represent fairly pristine areas, since they are in the headwaters of the watershed (Bullard's Crossing and Wahconah Falls State Park). These sites were to act as reference sites for the other more developed areas of the watershed. The site farthest downstream is across from the USGS gauging station just below Hubbard Ave. in Pittsfield. This site represents the water quality in the river after it leaves the town of Dalton and enters Pittsfield.

What We Tested:

We test the river for nine basic parameters that measure the health of a river: dissolved oxygen, temperature, pH, alkalinity, nutrients (total phosphorus and nitrate-nitrogen), total suspended solids, E-coli and fecal coliform bacteria. The following information was summarized from the EPA's Volunteer Monitoring Manual.

1) Dissolved Oxygen: Waters that are consistently high in dissolved oxygen are considered to be healthier since they can support many different kinds of aquatic organisms, even those, like trout, that require high amounts of oxygen. Massachusetts' state standards require at least 6 mg/l of oxygen for cold water fisheries, and 5 mg/l for warm water fisheries. Hubbard Ave. is the only site HVA monitors in the East Branch that is classified as a warm water fishery.

2) Water Temperature: Temperature affects the rates of many biological and chemical processes. Every organism has an optimum temperature at which its growth and reproduction occurs most efficiently. Colder water can also hold more oxygen. Massachusetts' state standards require the cold water fisheries in the East Branch to remain below 20 degrees Celsius. Warm water fisheries, including the site at Hubbard Avenue, must not exceed 28.3° C.

3) pH: Measures the concentration of hydrogen ions in a water sample. pH levels can be affected by the surrounding bedrock, by rain and snow deposition from burning fossil fuels, and/or by wastewater discharges. Massachusetts' state standards require the pH remain between 6.5 and 8.3.

4) Alkalinity, or Acid Neutralizing Capacity (ANC): The alkalinity of a river is a measurement of the water's ability to neutralize acids. This shows us how vulnerable the river is to acid rain. Alkalinity is strongly affected by the surrounding bedrock. There are no state standards for alkalinity, but according to the Massachusetts Acid Rain Monitoring Project, if the levels are below 20 mg/l, then that water is considered to be susceptible to acid rain.

5) Total Phosphorus and Nitrate-Nitrogen: These two plant nutrients are both found naturally in the environment, but high levels can also indicate inputs resulting from human activities. High levels of these nutrients can lead to excessive plant growth, which causes an imbalance in the ecosystem, and can impair human recreation in those waters. High levels of phosphorus and nitrogen can be caused by fertilizers. High levels of nitrogen can also indicate insufficient treatment of wastes from septic systems or wastewater treatment plants. There are no state standards for either of these two nutrients, but high levels of nitrates during times of low stream flow are especially indicative of potential pollution sources.

6) Fecal Coliform bacteria and E-Coli bacteria: Fecal coliform and E-Coli bacteria are two kinds of bacteria found in the waste from warm-blooded animals. The presence of E-Coli bacteria correlates to how human health might be affected by swimming in water with this kind of bacteria in it. Potential sources are failing septic systems, wastewater treatment plants, runoff, or animal manure. Massachusetts' state standards require that for safe swimming, known as "primary contact", the fecal coliform bacteria levels must remain below ("the geometric mean of") 200 colonies per 100ml of water. For safe "secondary contact" (i.e. fishing or boating) the levels need to remain below 1000 colonies per 100 ml sample.

7) Total Suspended Solids (TSS):
"Total Suspended Solids" refers to the silt and clay particles, plankton, algae, fine organic debris and other particles suspended in the water that are larger than 2-microns in size. High amounts of solids in the water affect water clarity, decreasing the amount of light that can pass through the water, thereby slowing photosynthesis by aquatic plants. Photosynthesis produces oxygen,

so more suspended solids in the water results in less oxygen available for aquatic plants and animals. Suspended solids can also carry certain toxins that cling to those particles. Water will heat up more rapidly, and hold more heat, when it has higher amounts of solids. This can cause problems for those species, like trout, that require lower temperatures and higher amounts of oxygen. Sources of solids include wastewater discharges, road runoff and soil erosion. State standards do not require specific numerical levels.

Where and When We Tested in 2003:

From April through October of 2003, the sites described below were monitored on the second Tuesday of each month. Some of these sites were monitored in 2001 and 2002 as well. For more details about each of these first two years, please see the water quality reports from 2001 and 2002. CDs with both years' reports are available from the HVA office in South Lee, MA.

2003 Sampling Site Locations:
See Appendix A for a map showing our monitoring sites on the East Branch.

"**Home Club**" is our first site at the top of the watershed, located just upstream from the downtown area of Hinsdale. This site was added in 2002.
"**Metal Bridge**" refers to the green metal bridge behind the Mobil gas station in downtown Hinsdale.
"**Carmel House**" is located between Metal Bridge and Partridgefield, just downstream from where Route 8 crosses the river in Hinsdale. This site was added in 2002.
"**Partridgefield**" is a store on the downstream edge of Hinsdale. This site is at the upstream corner of their property.
"**High School**" refers to the bridge near Wahconah Regional High School in Dalton. This site is just upstream from the golf course.
"**Orchard Road**" in Dalton is just downstream from the golf course. It is also just downstream from where Cleveland Brook joins the East Branch.
"**State Park**" refers to Wahconah Falls State Park. We take our samples just downstream from Windsor Reservoir, by an old stone foundation, upstream from the falls.
"**Cleveland Road**" is shortly downstream from the state park, and upstream from the WFB at Rt. 9 site. This site was added in 2002.
"**WFB at Rt. 9**" is where Wahconah Falls Brook crosses Route 9 in Dalton, *just* upstream from Center Pond, and downstream from Cleveland Rd. and some farms and houses.
"**High Street**" is on Walker Brook, just as the brook enters the culvert at High Street. The brook passes through a residential neighborhood in this culvert before day-lighting again by the post office on Route 9. This site was added in 2002.
"**Walker Brook Outflow (Confluence**)". After exiting from the culvert by the post office, the brook flows a short distance before joining the East Branch by the River Run Apartments. This site was added in 2002.
"Hubbard Avenue" is in Pittsfield, but just downstream from the Dalton town line. We take our samples between Hubbard Avenue and the USGS' Coltsville gauging station.

Quality Assurance Procedures:
HVA wrote a Quality Assurance Project Plan (QAPP) to describe how we collect, transport, and analyze our samples. This is an important component of a monitoring program since it ensures that the results were obtained using standard, approved procedures. This river monitoring QAPP has been approved by the DEP and EPA.

In order to be sure that our results were reliable, at least 10% of the samples we take are quality control samples. Duplicate samples, and/or blank samples and/or split samples are taken every month to be sure our results were falling within an acceptable range of accuracy.

We also participate in the quality control program from the lab at the University of Massachusetts Amherst. Each month they send us samples that have fixed levels of dissolved oxygen. We then analyze those samples in our lab at HVA to see whether our results fall within an acceptable range, which, happily, they always have (if a piece of equipment does not produce acceptable results, it will not used for analyzing samples that day). Results are in Appendix D.

IV. OUR SITES AND THEIR WATER QUALITY RESULTS

Below are descriptions of the sites we monitored in 2003, along with a summary of all the water quality results from each site. Some sites have data from 2001, 2002, and 2003. Some sites only have data from 2002 and 2003. Please see Appendix B for the actual data tables. CDs are available for those who want to see all the tables *and* graphs of data from the last three years.

Home Club: Monitored in 2002 and 2003 by Lynn Roberson and HVA staff.
Description: "Home Club" is the first site you would encounter if you were to float into the town of Hinsdale from the headwaters of the East Branch of the Housatonic River. This site acts as an upstream reference site, measuring the water quality as the river leaves the "Hinsdale Flats' Area of Critical Environmental Concern" (ACEC) and enters the downtown section of Hinsdale. Home Club was not monitored in 2001, the first year HVA monitored the river. Home Club was added in 2002 because in 2001 HVA's water quality monitoring volunteers found high bacteria levels at two sites just downstream from the Home Club ("Metal Bridge" and "Partridgefield").

Bacteria levels at Home Club remained below state standards for safe swimming in 2002 except in May, '02 when it went up to 990 colonies. This occurred during the only substantial rain event that fell on one of our seven monitoring days in 2002. In 2003, Home Club had high enough bacteria levels in August (fecal coliform bacteria reached 1,200 colonies per 100 ml) to make it unsafe for even secondary contact (fishing or boating). In September '03, it was 340 colonies, which is safe for secondary contact (i.e. boating), but it exceeded the 200 colony level required to be safe for primary contact (i.e. swimming).

Levels of nitrates, alkalinity, pH, and phosphorus appear to stay within acceptable levels.

Levels of total suspended solids jump up sometimes, in particular during rain events.

Water temperatures reached or exceeded the state designated standards on 3 of the 6 days we monitored temperature in the summer of 2002. The water reaching this site has been exposed to the sun as it winds through the open and flat area of the Hinsdale Flats.

Conclusions: We recommend continued monitoring at this site since it tests the water quality of the river before being impacted by the downtown section of Hinsdale. Except for warm summer temperatures, and occasional spikes in bacteria and total suspended solids due to rain events, the water quality appears quite healthy.

Metal Bridge: Monitored in 2001 and 2002 by Holly Adams, and in 2003 by Mike Frederick.
Description: This site is located in downtown Hinsdale, just upstream from the Renfrew Mill dam. The slow flow in this area, and upstream from here in the Hinsdale Flats, appears to result in lower oxygen levels (due to a lack of rapids and mixing), higher temperatures (due to more time exposed to the sun), and higher bacteria levels (due to more time for the bacteria to multiply in stagnant spots).

Metal Bridge had fecal coliform levels that exceeded state standards for safe swimming for more than half of the sampling days in 2001 and 2002. Fecal bacteria levels in July, August and September 2003 were too high for swimming but were safe for fishing.

In all three years, the levels of dissolved oxygen were often too low to meet the state standard of 6 mg/l for a cold water fishery.

In 2001 and 2002, the water temperature was above state standards in the summer months. In 2003, water temperatures were too high in July and August to meet its classification as a cold water fishery.

Conclusion: The water quality at this site, with its low oxygen, high temperatures, and occasional high bacteria, may be mostly due to the slow flow in this stretch of the river (it is located just upstream from a dam that backs up the water). Upstream from here, in the Hinsdale Flats, the water is also frequently warm, with low oxygen, and occasional high bacteria levels. We do not recommend continued monitoring of this site in 2004 since the water quality problems seem to be due to the quality of the water flowing into town from the Flats, and due to the slowed flow due to the dam. Although the residential area upstream from the Metal Bridge may be having a negative impact on the water quality in the river, we believe the next site downstream will better reflect water quality impacts from the surrounding land uses (primarily residential).

Carmel House: Monitored in 2002 by Lynn Roberson and in 2003 by HVA staff.
Description: The next site downstream from Metal Bridge is the “Carmel House” site. This site was added in 2002 to help find the source of bacteria and nitrates found periodically downstream at the Partridgefield site. Only bacteria, nutrients, and suspended sediments were tested at this site in 2003 since those are the indicators we are concerned about in this area.

Fecal coliform bacterial levels were too high for the state standard for safe swimming in April, May, and August of 2002. In 2003, bacteria levels at Carmel House tended to be lower than just upstream at the Metal Bridge site. On two occasions in 2003 the bacteria levels exceeded the safe swimming standard, but they were both well beneath the levels required for safe fishing and boating.

In general, nutrient levels at Carmel House are similar to the sites upstream from it.

Levels of total suspended solids were usually slightly lower here than upstream at Metal Bridge.

Water temperatures also exceeded state standards three times in 2002, but were not tested in 2003.

Conclusion: Water quality at this site fluctuates, but has yet to show any distinct problems or trends. In general it tends to be similar to the site upstream from it, Metal Bridge, though perhaps a bit higher in nitrates in dry weather. Nitrate levels, in dry months, are definitely lower here than at the next site downstream, Partridgefield. We will definitely continue monitoring this site as we search for the source of nitrates in this area.

Partridgefield: Monitored in 2001 and 2002 by Holly Adams, and in 2003 by Ed and Mary Jo Barrett.
Description: This last site in Hinsdale is located just upstream from the Partridgefield store. It is located in a primarily residential area, just downstream from two tributaries, and a golf course.

Fecal coliform bacteria were usually lower here than at Metal Bridge in 2001, except in July and August, and safe swimming levels were exceeded on 4 of the 7 days that it was tested in 2001. In 2002, the bacteria levels stayed below the state standard for secondary contact except in May when it reached 1,870 colonies. Bacteria levels were too high for primary contact (swimming) in May, July, and August of '02. In 2003, once again we saw high levels of bacteria in August, when three inches of rain fell on the two days preceding the sampling day. In September 2003, the fecal coliform bacteria reached 200 colonies, making it unsafe for swimming, but most of the year it appeared safe for primary contact (at least on the days that we sampled).

Nitrate levels in July of '01 and '02 were also higher than in the preceding months, and significantly higher than at the next site upstream (Carmel House). In 2003 this pattern occurred again, with the nitrate-nitrogen level jumping from 0.06 mg/l in June to 0.39 mg/l in July, both considered "dry" sampling days.

Water temperature exceeded safe levels for cold water fish in July and August, 2003, but remained below 20ºC in 2001 and 2002.

The total suspended solids (TSS) skyrocketed in August 2003, a rainy day, reaching a high of 32 mg/l instead of the 1-3 mg/l that it usually is.

Phosphorous levels appear fairly low, except in 2003 when they more than doubled from July's dry weather sample to August's wet weather sample.

Conclusion: Bacteria, phosphorus and TSS reach high levels following rain events. Nitrates, however, jump during dry weather, indicating a possible sewage or fertilizer problem upstream. Additional sites need to be added upstream from here to help identify the source of nitrates.

High School and **Orchard Road**: Mike Darroch monitored both sites in 2001 and 2002. In 2003, Mike monitored the Orchard Road site, while Cas Makowski and Tom Doyle monitored the High School site.
Description: These sites are just upstream (High School) and downstream (Orchard Road) of a golf course and the confluence of a tributary (Cleveland Brook). They are the first sites in Dalton downstream from the town line with Hinsdale.

In 2001, both sites had high bacteria levels only once, on a day after a big rain event. For unknown reasons, in 2002 there were quite a few more occurrences of high bacteria levels (above 200 colonies per 100 ml) than there were in 2001. In 2003, bacteria levels at the High School site tended to be even higher than at Partridgefield, except in August when it had rained so heavily. Never did it exceed safe levels for secondary contact, but every month except two it was too high for safe primary contact (swimming). Bacteria levels at Orchard Road tend to be lower than at the High School site, though there is little distance between them. Perhaps this is due to some dilution occurring when Cleveland Brook enters the East Branch inside the golf course boundaries, between the High School and Orchard Road sites.

There is the substantial increase in nitrates at both these sites that occurs in July and/or August (typically a time of dry weather and low flows). Nitrates are often higher upstream at Partridgefield as well and remain high at both High School and Orchard Road. Nitrate levels also increase a bit in as the river winds its way through the golf course and is joined by Cleveland Brook. This increase may be due to nutrient sources along Cleveland Brook, or from within the golf course.

TSS levels also jumped at these two sites in August, 2003 due to the heavy rain.

Water temperatures remained below the state designated standards of 20 degrees Celsius at both sites in 2001 and 2002. In 2003, water temperature at High School (and Partridgefield) exceeded safe levels for cold water fish in July and August (at Orchard it was too high only in August).

Conclusion: The reason for the high nitrates at both these sites is probably either due to fertilizers being applied to lawns bordering the river, or due to failing septic systems nearby. It is not clear whether the higher levels at the High School are originating as far up as the Partridgefield site and being carried down to these sites, or if they are from other sources just upstream from the High School site. The slight increase in nitrate levels between the High School site and the Orchard Road site may be due to the golf course, or from a source on Cleveland Brook. The reason(s) for these increases in bacteria and nitrates is not clear, and therefore will need further investigation to see if it is part of a pattern or not. The water quality at these two sites is usually similar enough that we may not need to monitor them both next year.

State Park (on Wahconah Falls Brook): Monitored by Sam and Denie Smith in 2001, Eric Witzgall in 2002 and 2003, and Holly Adams in 2003.
Description: This site is within the state park, below the Windsor Reservoir dam, but above the falls, by an old stone foundation. We use this site as our benchmark site against which we compare our other sites' water quality. Wahconah Falls Brook is a tributary to the East Branch and it is in a relatively undeveloped area. It is mainly forested, though there are numerous dirt roads upstream from the reservoir in the park. In general, its water quality is very good. (We originally chose Bullard's Crossing as our benchmark since it is in the very headwaters of the Housatonic River, but the population of beavers there is so pronounced there that they are having a significant negative impact on the water quality, in particular the bacteria levels, that we have now dropped that site.)

Bacteria levels never exceeded the state standard for safe swimming of 200 colonies of fecal coliform bacteria per 100 ml in 2001 or 2002. In 2003, heavy rains in August caused bacteria to rise to 410 colonies of Fecal Coliform bacteria and 390 colonies of E-coli bacteria.
Total Suspended Solids (TSS) tended to be the same or almost as high at this site than at the other two sites downstream from it on all our sampling days in 2003. High rains on August 11, 2003 washed out the dirt road along the side of the reservoir (Back Dalton Road) the day before we did our sampling. It appears that sediments in the reservoir can become suspended enough to flow out of the reservoir during large rain events.

Nitrate levels were usually well below 0.1 mg/l in 2001, 2002 and 2003, but went up to 0.16 mg/l in July of 2002 and again in July of 2003. These nitrate-nitrogen levels, sampled in dry weather conditions, are significantly higher than on most of our other sampling days.

Water Temperature has stayed below 17 degrees Celsius in all three years we have monitored here except in August, 2003, when it reached the 20 degree state standard for a cold water fishery. Perhaps this was due in part to the high amount of sediment in the water that day. Air temperatures during the 10 days prior to our sampling day were in the 70s (according to the records kept in Pittsfield at their wastewater treatment plant).

Low alkalinity is a bit of a concern every spring, but the levels do rise throughout the summer months.

The other months and parameters reflect healthy water quality conditions.

Conclusion: The water quality at this site is usually good, if not actually very good. We will continue to monitor it and use it as a benchmark for good water quality.

Cleveland Road (on Wahconah Falls Brook): Monitored in 2002 and 2003 by Kelly Marshall and her sons, Jacob and Caleb.
Description: The next site downstream from the state park is at Cleveland Road. This site was added in 2002 in an effort to pinpoint the sources of some higher levels of bacteria and nitrates found farther downstream in 2001 (at the site where Wahconah Falls Brook crosses Route 9 just before entering Center Pond). There are some houses and a trailer park upstream from this site, as well as a tractor business and farm field (though these are both well removed from the brook).

Bacteria levels were a bit too high for safe swimming in July, 2002 (380 colonies) and September (280 colonies), but were acceptable for the rest of 2002. Bacteria levels in 2003 were actually higher at State Park than at Cleveland Road in the rainy month of August, but all the other months they were higher at Cleveland than at State Park. Even so, it still only reached the fecal coliform standard for swimming twice out of seven sampling events in 2003. E-coli colonies, however, never exceeded 200 per 100ml in 2003.

Nitrate levels were higher at Cleveland Road during the drier months in 2002 than at either the State Park site upstream from it, or at the Rt. 9 site downstream from it. Like the sites both upstream and downstream from it, the nitrate levels rose in July, and stayed elevated for the rest of the 2002 sampling season. In 2003, nitrates jumped from State Park to Cleveland Road, especially in the drier months.

Total suspended solids tended to be very low (usually less than 1 mg/l) at Cleveland Road in 2003, except during the heavy rain in August when it reached 14 mg/l. It was just a little bit higher than the other two sites on Wahconah Falls Brook that day.

In 2003, there was a big jump in alkalinity from State Park (28 mg/l) to Cleveland Road (59 mg/l) on the day we tested in October. In October of 2002 there was a similar jump, from 84 mg/l at the State Park to 116mg/l at Cleveland Road.

Conclusion: The higher levels of nitrates and alkalinity here at Cleveland Road may indicate a problem with failing septic systems between this site and the State Park. Additional testing needs to be done to confirm this.

Wahconah Falls Brook at Rt. 9: Monitored in 2001, 2002, and 2003 by Dicken Crane.
Description: The third site on Wahconah Falls Brook is where the brook crosses under Route 9, just before entering Center Pond. Upstream from this site there are some small family farms comprised primarily of small numbers of livestock, vegetable gardens, some corn fields and pastures. The farms and homes along the brook are all on septic systems until you reach Orchard Road in Dalton.

Bacteria levels at Cleveland Road and this site, however, do not have a consistent pattern showing one site always higher than the other. In 2003, during the heavy rain in August, the levels of both kinds of bacteria were higher at State Park, and at this site, than it was at Cleveland Brook, which is the site in-between them. The fecal bacteria levels here were too high to be safe for swimming on four out of the seven days we sampled, but if you look at the E-coli bacteria levels only, it was safe on all seven of our sampling days (E-coli levels never exceeded 235 colonies per 100 ml). In 2001, the fecal coliform levels were too high for the safe swimming standard on three of the five days we sampled. In 2002, both the fecal coliform and E-coli bacteria counts exceeded safe swimming levels on two of the seven days that we sampled.

Nitrate levels at this site, and upstream of it at the Cleveland Road site, tend to be noticeably higher than in the state park.

TSS levels in 2003 were generally very low, except for the day we sampled in August (the 12th), which was the day after a very heavy rainstorm.

Conclusion: Nitrate and bacteria levels can both be elevated at times at this site. In general, the bacteria levels rise during rain events, and the nitrate levels rise during dry weather. Alkalinity is significantly higher at this site than upstream at the State Park.

Walker Brook's sites at High Street and its Outflow/Confluence with the East Branch:
Both sites monitored in 2002 by Cas Makowski and Tom Doyle, and in 2003 by Carolyn Sibner.
Overall Description: Walker Brook is a tributary to the East Branch of the Housatonic River in Dalton, MA that tends to be dry for most of the year. Its headwaters are above a gravel pit and as the brook nears the gravel pit the water tends to disappear from the streambed. A short distance downstream from the gravel pit, the brook passes through a residential neighborhood. During the late 1940s or early 1950s, the brook was diverted into a culvert to pass through the residential neighborhood before day-lighting again at Rt. 9, near the Dalton Post Office. From there it flows a short distance before joining the East Branch of the Housatonic River.

HVA started monitoring this brook regularly in April, 2002 at both High Street where the brook enters the culvert, and then again downstream, just before the brook's confluence with the East Branch. There is often no flow entering the culvert or exiting it, however by the time the brook joins the East Branch there is usually a small amount of water flowing in the streambed again.

This lower section of the streambed, from the Post Office to the confluence, is made up primarily of large, flat rocks, apparently placed there as part of a channel reconstruction project. As you walk along the stream channel there is usually no water visible between the rocks until you get alongside the River Run Apartments. From there on down more and more water will gradually appear between the rocks until there is a small amount of flow just before the confluence. There are no obvious sources of this water, i.e. pipes or surface runoff. It may be that this water is the groundwater table that is surfacing in the streambed as it nears the East Branch of the Housatonic River.

Surprisingly, there seems to be a problem with the water quality in this small brook just before it joins up with the East Branch. Though there is often no flow exiting the culvert, indicating that there are probably not any illegal hookups contributing to the storm drain system, the levels of contaminants in the small brook as it joins the East Branch have often been surprisingly higher than they should be.

High Street

Description: This brook was completely dry at this site on all the days we sampled in 2002. In 2003, there was flow here only during the spring runoff in April, and the water quality on that day did not indicate any particular problems (please see tables in Appendix B).

Phosphorous levels were higher at both sites in Walker Brook than any of the other sites in April 2003, yet they were still not so high as to indicate a problem.

Conclusion: What is a problem, however, is the consistent absence of water in the brook. When there is water in this brook at this site, it appears fairly healthy, but the consistent lack of water in the brook from year to year indicates something happened to cause the water to stop flowing in its streambed. This merits further investigation, since it is clearly unable to provide aquatic habitat anymore.

Walker Brook Outflow/Confluence:

Description: In 2002, this site was too dry to sample except in May (which was a rainy day) and June. Even in these months the water flow was minimal. In 2003 we had enough flow to take at least partial samples in April, May (wet weather) and August (after three inches of rain). When the flow is too low, the jug used for collecting the nutrient and sediment samples cannot be used due to the large shoulder on the jug. The bottle used for collecting bacteria samples, however, is smaller and flatter and can still be used in lower flows.

Bacteria levels in May of 2002 (a rainy day) were very high (1,900 colonies of fecal coliform and 2,400 of E-coli). In May of 2003 (another rainy day) they were once again exceedingly high (2,000 colonies of fecal bacteria and 1,700 of E-coli) at the outflow, whereas the rest of the sites were near or below the level for safe swimming (200 colonies of fecal coliform bacteria).
The level of nitrates really differs here from all the other sites. In June of 2002, the nitrates were 1.27mg/l at this site, whereas all other sites that month didn't exceed even 0.2 mg/l. April of 2003, the outflow had 0.84 mg/l of nitrate-nitrogen in comparison to the other sites that all had either less than 0.2 or even less than 0.1mg/l. In August, 2003, the nitrate levels were at 1.45 mg/l in comparison to the other sites, none of which had even 0.1 mg/l. (Unfortunately, in July 2003 there was not enough flow to take a sample in Walker Brook, but downstream from it, at Hubbard Avenue, the nitrates were at the all-time high of 2.34 mg/l!).

TSS levels were never a problem in Walker Brook on our sampling days in 2002 or 2003.

Alkalinity appears to be much higher here in comparison to the other sites we test, including in Walker Brook itself at High Street, as well as in the East Branch directly upstream from where Walker Brook joins it. In April 2003, it was 132 mg/l whereas no other site that day exceeded 44mg/l.

pH levels were higher at the outflow than at any other site in the watershed in April 2003. Unfortunately, there was no flow here in April or October 2002 when we tested the other sites in the East Branch for pH and alkalinity.

Phosphorous levels were a bit higher at both sites in Walker Brook than any of the other sites the one time it was tested, in April 2003, yet in August 2003 when it rained, phosphorus at the outflow was as low or lower than anywhere else.

Conclusion: Nitrates are distinctly higher here than at other sites, as is alkalinity. Both these parameters can indicate a source of sewage or other pollutants. Bacteria levels are not consistently high here, however. Though there is no obvious source of these contaminants, like a pipe, there is clearly a problem occurring in this neighborhood. More water quality monitoring, plus dye testing in the surrounding sewer lines, should help pinpoint the source(s) of pollution.

Hubbard Avenue: Monitored since 2001 by Greg Veremko.
Description: This site is the last site in the East Branch watershed and it represents the water quality of the Housatonic River as it leaves Dalton and enters Pittsfield.

Nitrate levels in 2001 and 2002 stayed below 0.43 mg/l. In July 2003, the nitrate levels were higher than usual at all the sites, but at Hubbard for some unknown reason it was an amazingly high level of 2.34 mg/l, though they were usually below 0.2mg/l that year. They were also quite high again in October (0.42mg/l in comparison to 0.16 at Orchard Road, which is the next site upstream from there on the East Branch).

Temperatures are usually cool enough here to meet the cold water state fishery standard of 20 degrees Celsius, even though this site is classified as a warm water fishery and is not required to stay below 20º degrees Celsius. July and August are the two months when the temperature sometimes reaches or exceeds 20 degrees Celsius. Though it is not required, it is better for the cold water species of fish if it stays below 20º, and there are trout living around there that do need the cooler temperatures.

Total suspended solids were high (16 mg/l) in August '03 when it had rained so much the day before, but they are usually at or below 4 mg/l.

Alkalinity seems to jump up on occasion, like September, 2002, when it reached 200mg/l of carbonate, though alkalinity levels tend to increase as one moves farther downstream. Crane's wastewater treatment plant just upstream may be contributing to these levels in part, as is the limestone bedrock in this valley.

On every day we have tested since April, 2001, the dissolved oxygen, pH, and phosphorous levels all tend to be good, and bacteria is usually safe enough even for swimming, *except* after rain events.

Conclusions: The water quality at Hubbard Avenue is surprisingly good, considering its commercial location. The biggest issues facing this site are occasional high nitrates in drier weather, high bacteria counts after rain storms, occasional high alkalinity, as well as temperatures that are a bit too high in the summer for the trout that live there.

V. CONCLUSIONS AND RECOMMENDATIONS

Even three years of testing does not tell you everything about a river's water quality and the impact human activities are having on it. There are some patterns that are showing up, however, that warrant further investigation. HVA will continue to monitor the sites that appear to have a problem, such as Partridgefield, Cleveland Brook, and Walker Brook, in order to confirm the trend, and narrow down the possible sources. Additional sites and sampling will be added as needed.

Due to funding and time constraints, we decreased the monitoring of pH, alkalinity, and phosphorus since these parameters usually did not indicate any problems for the health of the river, nor its ability to meet its state classification as a Class B Cold Water Fishery. pH and alkalinity we monitor in the spring and fall only, but we believe this will still allow us to watch for trends in these indicators. Phosphorus did not appear to indicate any problems in the river whereas other parameters did, so we will no longer monitor phosphorus after 2003.

VI. ACKNOWLEDGEMENTS

We would like to thank all our major funders from these first three years of monitoring for their support, especially the Massachusetts Executive Office of Environmental Affairs (DEP), the Massachusetts Environmental Trust, the Berkshire Environmental Fund, the Wharton Trust, the Berkshire Environmental Endowment Fund and the Berkshire Taconic Community Foundation.

We also want to thank the people and organizations who have given us their help, support and wisdom over the years. These people include: Peter Kerr, Jerry Schoen and Marie-Francoise Walk at the UMassAmherst, as well as Arthur Screpetis and Peter Mitchell at DEP, John Lambert at Berkshire Community College, Holly Adams at Crane & Co., and Bill Enser at Berkshire Enviro-Labs. Thank you all for sharing your experience and expertise with us!

And last but not least, all our volunteers, many of whom have helped us since 2001! You have suffered through picayune training sessions, rainy days, cold water and cold weather, to bring us good quality data about our river. Thank you so much! We couldn't have done this without you!

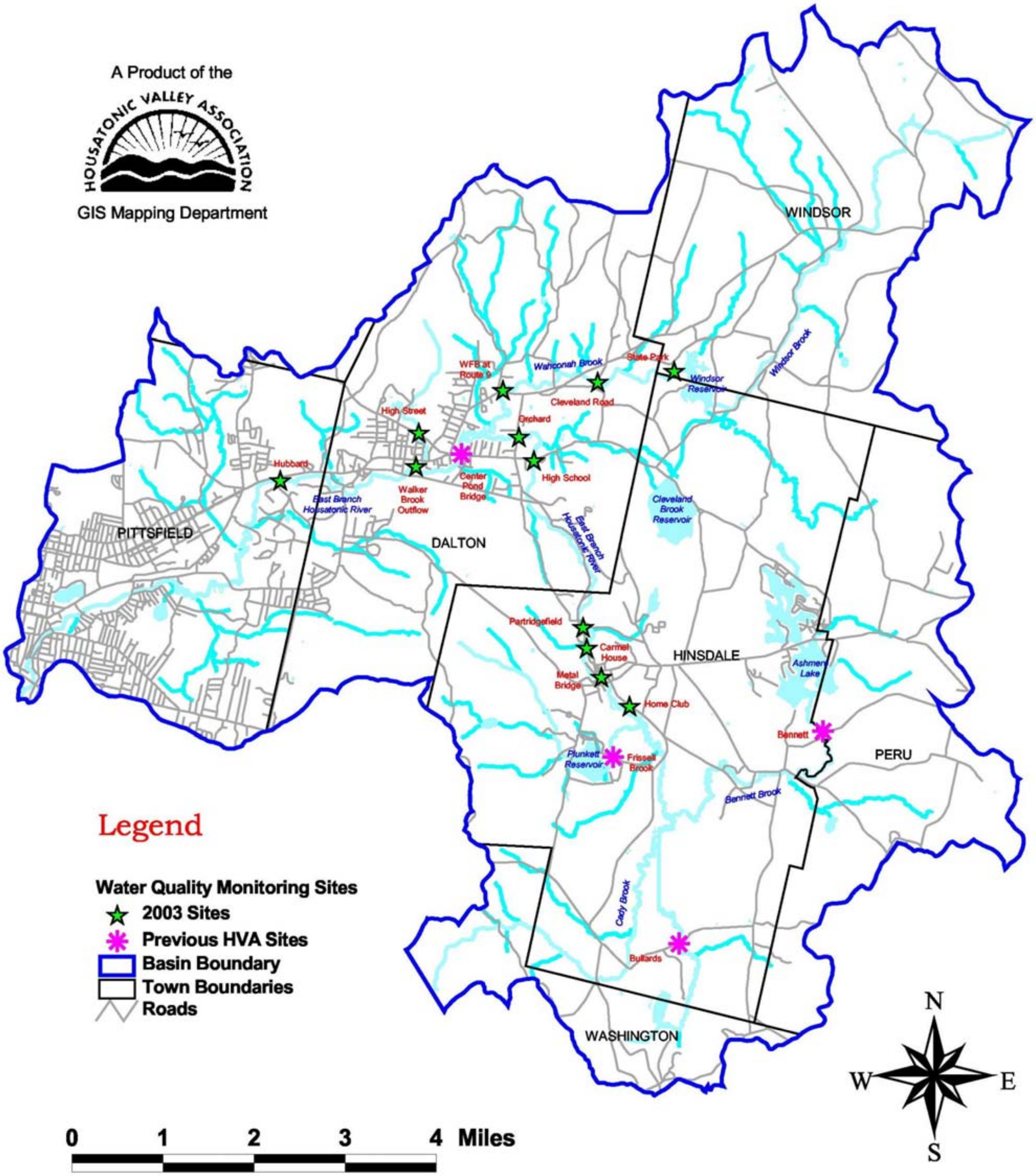
Holly Adams
MaryJo and Ed Barrett
Dicken Crane
Mike Darroch
Tom Doyle
Mike Frederick
Casimir Makowski
Kelly, Jacob, and Caleb Marshall
Lynne Roberson
Sam and Denie Smith
Gregory Veremko
Eric Witzgall

Respectfully Submitted,

Carolyn W. Sibner
Water Quality Coordinator

Appendix A:

Water Quality Monitoring Sites
East Branch Housatonic River



Appendix B:

Water Quality Monitoring Results by Site

East Branch of the Housatonic River

All the Data Collected for Sites Monitored in 2003:

2002 East Branch - Home Club

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l							
pH							7.38
Alkalinity in mg/l carbonate							68.00
Fecal Coliform in colonies/100ml **	20	990	90	110	120	50	80
E-coli in colonies/100 ml **	30	1,410	60	90	110	60	50
Total Phosphorus in mg/l *	0.010	0.02	0.040	0.040	0.020	0.050	0.030
Nitrate-Nitrogen in mg/l *	0.020	0.03	0.020	0.030	0.030	0.020	0.010
Water Temperature in degrees Celsius		7.5	17.5	21.5	22.0	20.0	10.0
Total Suspended Solids in mg/l						4	3
Turbidity in NTU							4

2003 East Branch - Home Club

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l							
pH	7.13						7.13
Alkalinity in mg/l carbonate	28						50
Fecal Coliform in colonies/100ml **	20	120	180	160	1,200	340	130
E-Coli in colonies/100 ml **	10	120	130	110	880	290	90
Total Phosphorus in mg/l *	0.027	0.036	0.033	0.044	0.041	0.030	0.022
Nitrate-Nitrogen in mg/l*	0.040	0.03	0.02	0.03	0.02	0.02	0.02
Water Temperature in degrees Celsius	7.5						
Total Suspended Solids in mg/l ***	1	1	4	1	6	0.9	3

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2001 East Branch - Metal Bridge

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l			5.98	4.78	5.00	5.10	7.96
pH			7.02	7.36	7.56	7.60	7.46
ALKALINITY in mg/l calcium carbonate			38.3	64.4	82.1	67.4	49.8
FECAL COLIFORM in colonies/ 100 ml			230	480	180	2,500	170
NITRATE-NITROGEN in mg/l			0.05	0.08	0.06	0.01	<0.01
TOTAL PHOSPHORUS in mg/l			0.02	0.04	0.04	0.05	0.02
WATER TEMPERATURE in degrees Celsius			15.0	22.5	21.0	18.0	7.0
AIR TEMPERATURE in degrees Celsius			17.5	17.0	15.0		0.0

2002 East Branch - Metal Bridge

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	8.40	8.02	6.32	5.24	5.36	5.94	5.76
pH	7.17						7.17
Alkalinity in mg/l carbonate	42.0						72.00
Fecal Coliform in colonies/100ml **	20	1,500	120	410	280	140	210
E-coli in colonies/100 ml **	60	2,400	180	390	250	120	180
Total Phosphorus in mg/l *	0.020	0.04	0.030	0.050	0.040	0.040	0.030
Nitrate-Nitrogen in mg/l *	0.030	0.02	0.030	0.050	0.060	0.050	0.030
Water Temperature in degrees Celsius	9.0	7.5	18.0	22.0	21.5	18.5	11.0
Total Suspended Solids in mg/l						7	5
Turbidity in NTU							3.8

2003 East Branch - Metal Bridge

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	6.88	4.72	6.92	4.82	3.98	6.50	4.82
pH	7.17						7.10
Alkalinity in mg/l carbonate	30						50
Fecal Coliform in colonies/100ml **	10	150	170	280	690	310	170
E-Coli in colonies/100 ml **	10	140	150	230	560	260	130
Total Phosphorus in mg/l *	0.023	0.058	0.036	0.041	0.041	0.051	0.016
Nitrate-Nitrogen in mg/l *	0.050	0.04	0.02	0.07	0.03	0.03	0.04
Water Temperature in degrees Celsius	8.0	11.0	15.0	23.0	20.0	16.0	10.0
Total Suspended Solids in mg/l ***	1	8	4	3	12	8	3

2002 East Branch - Carmel House

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l							
pH							7.73
Alkalinity in mg/l carbonate							72.00
Fecal Coliform in colonies/100ml **	570	1,820	110	140	1,000	90	90
E-coli in colonies/100 ml **	580	1,730	110	110	930	60	90
Total Phosphorus in mg/l *	0.020	0.04	0.030	0.040	0.030	0.040	0.020
Nitrate-Nitrogen in mg/l *	0.040	0.02	0.040	0.080	<.01	0.090	0.050
Water Temperature in degrees Celsius		7.5	17.5	21.5	20.0	18.0	2
Total Suspended Solids in mg/l						8	2.9

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2003 East Branch - Carmel House

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l							
pH	7.46						7.62
Alkalinity in mg/l carbonate	30						50
Fecal Coliform in colonies/100ml **	10	130	80	60	380	330	60
E-Coli in colonies/100 ml **	10	100	70	60	280	270	50
Total Phosphorus in mg/l *	0.024	0.037	0.028	0.041	0.060	0.029	0.014
Nitrate-Nitrogen in mg/l *	0.060	0.04	0.03	0.12	0.03	0.03	0.04
Water Temperature in degrees Celsius	7.5						
Total Suspended Solids in mg/l ***	2.00	2	2	1	19	3	2

2001 East Branch - Partridgefield

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l	10.58	8.30	8.60	7.40	7.18	7.58	9.90
pH	7.25	7.78	7.66	7.91	7.93	8.01	7.76
ALKALINITY in mg/l calcium carbonate	24.4	83.4	48.9	75.0	102.0	88.2	71.6
FECAL COLIFORM in colonies/ 100 ml	110	240	160	510	240	800	50
NITRATE-NITROGEN in mg/l	0.08	0.35	0.11	0.24	0.30	0.23	0.18
TOTAL PHOSPHORUS in mg/l	<0.01	0.03	0.03	0.05	0.03	0.06	0.01
WATER TEMPERATURE in degrees Celsius	7.5	15.0	15.0	19.0	19.0	16.5	7.0
AIR TEMPERATURE in degrees Celsius	0.0	11.0	17.5	18.5	15.0	12.0	0.0

2002 East Branch - Partridgefield

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	9.98	10.54	8.06	7.10	7.46	7.76	8.98
pH	7.56						7.70
Alkalinity in mg/l carbonate	54.0						98.00
Fecal Coliform in colonies/100ml **	20	1,870	80	250	340	60	70
E-coli in colonies/100 ml **	40	1,990	120	230	310	20	70
Total Phosphorus in mg/l *	0.010	0.01	0.020	0.030	0.010	0.030	0.020
Nitrate-Nitrogen in mg/l *	0.090	0.03	0.010	0.280	0.530	0.390	0.240
Water Temperature in degrees Celsius	9.0	7.5	18.0	19.5	17.5	16.5	11.0
Total Suspended Solids in mg/l						8	2
Turbidity in NTU							2.7

2003 East Branch - Partridgefield

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	10.70	9.66	8.90	7.48	7.20	8.60	9.64
pH	7.52						7.65
Alkalinity in mg/l carbonate	36						64
Fecal Coliform in colonies/100ml **	20	140	80	80	750	200	70
E-Coli in colonies/100 ml **	10	110	40	30	610	170	60
Total Phosphorus in mg/l *	0.021	0.037	0.025	0.033	0.074	0.030	0.019
Nitrate-Nitrogen in mg/l *	0.090	0.06	0.06	0.39	0.03	0.09	0.13
Water Temperature in degrees Celsius	7.5	11.0	15.0	20.0	21.0	15.0	10.0
Total Suspended Solids in mg/l***	2	3	2	1	32	1	2

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2001 East Branch - High School

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l	11.00	8.76	9.12	8.42	7.48	7.88	10.88
pH	7.50	8.01	7.93	8.02	8.17	8.17	7.95
ALKALINITY in mg/l calcium carbonate	28.3	88.8	55.2	83.0	110.3	98.6	74.2
FECAL COLIFORM in colonies/ 100 ml	20	100	140	30	160	1,000	50
NITRATE-NITROGEN in mg/l	0.08	0.36	0.12	0.13	0.31	0.23	0.16
TOTAL PHOSPHORUS in mg/l	<0.01	0.02	0.02	0.03	0.02	0.06	0.01
WATER TEMPERATURE in degrees Celsius	7.0	14.0	14.5	17.5	18.0	16.0	5.5
AIR TEMPERATURE in degrees Celsius	5.0	11.0	15.0	13.5	18.0	11.5	-4.5

2002 East Branch - High School

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	10.70	bottle broken	8.68	8.04	7.78	8.28	10.02
pH	7.76						7.99
Alkalinity in mg/l carbonate	60.0						104.00
Fecal Coliform in colonies/100ml **	20	1,700	60	350	280	160	110
E-coli in colonies/100 ml **	70	1,800	50	220	250	180	70
Total Phosphorus in mg/l *	0.010	0.06	0.020	0.020	<.01	0.020	<.01
Nitrate-Nitrogen in mg/l *	0.100	0.04	0.120	0.240	0.420	0.360	0.220
Water Temperature in degrees Celsius	7.0	7.5	16.0	19.0	18.5	16.5	9.5
Total Suspended Solids in mg/l						7	1
Turbidity in NTU							1.6

2003 East Branch - High School

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	10.98	9.64	9.66	8.90	8.04	10.84	12.74
pH	7.66						7.84
Alkalinity in mg/l carbonate	40						76
Fecal Coliform in colonies/100ml **	20	210	140	300	650	350	200
E-Coli in colonies/100 ml **	10	180	120	220	500	210	150
Total Phosphorus in mg/l *	0.029	0.037	0.022	0.019	0.091	0.030	0.011
Nitrate-Nitrogen in mg/l *	0.110	0.08	0.01	0.32	0.01	0.10	0.12
Water Temperature in degrees Celsius	8.0	11.0	15.0	21.0	20.5	15.5	10.0
Total Suspended Solids in mg/l***	0.9	4	2	0.9	50	3	0.9

2001 East Branch - Orchard Road

PARAMETER	April '01	May '01	June '01	July '01	Aug '01	Sept '01	Oct '01
DISSOLVED OXYGEN in mg/l	6.22	8.32	9.04	8.16	7.20	8.20	10.48
pH	7.54	7.86	7.83	7.95	7.99	7.93	7.89
ALKALINITY in mg/l calcium carbonate	29.2	93.0	53.8	82.5	115.3	99.8	81.8
FECAL COLIFORM in colonies/ 100 ml	20	130	110	100	140	640	20
NITRATE-NITROGEN in mg/l	0.09	0.42	0.13	0.18	0.36	0.26	0.21
TOTAL PHOSPHORUS in mg/l	<0.01	0.02	0.02	0.03	0.02	0.06	<0.01
WATER TEMPERATURE in degrees Celsius	7.0	14.0	14.5	16.5	17.5	15.0	5.5
AIR TEMPERATURE in degrees Celsius	6.0	11.0	15.0	14.0	17.5	11.5	5.5

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2002 East Branch - Orchard Road

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	10.66	10.36	8.38	7.14	6.48	6.94	9.00
pH	7.68						7.87
Alkalinity in mg/l carbonate	60.0						110.00
Fecal Coliform in colonies/100ml **	470	810	90	420	210	290	90
E-coli in colonies/100 ml **	480	790	80	290	210	250	40
Total Phosphorus in mg/l *	0.010	0.08	0.020	0.020	<.01	0.030	<.01
Nitrate-Nitrogen in mg/l *	0.130	0.04	0.140	0.310	0.480	0.450	0.290
Water Temperature in degrees Celsius	7.0	7.5	16.0	18.0	17.5	15.5	9.5
Total Suspended Solids in mg/l						10	1
Turbidity in NTU							1.5

2003 East Branch - Orchard Road

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	10.52	9.66	8.64	7.02	7.52	8.72	9.56
pH	7.66						7.78
Alkalinity in mg/l carbonate	44						78
Fecal Coliform in colonies/100ml **	9	100	80	140	710	200	100
E-Coli in colonies/100 ml **	9	90	70	140	640	160	70
Total Phosphorus in mg/l *	0.019	0.037	0.027	0.022	0.080	0.022	0.009
Nitrate-Nitrogen in mg/l *	0.130	0.08	0.08	0.39	0.01	0.13	0.16
Water Temperature in degrees Celsius	7.5	10.5	15.5	19.0	20.5	15.0	9.5
Total Suspended Solids in mg/l ***	1	4	1	1	39	4	2

2001 East Branch - State Park (Wahconah Falls Brook)

PARAMETER	April '01	May '01	June '01	July '01	Aug '01	Sept '01	Oct '01
DISSOLVED OXYGEN in mg/l	11.54	8.72	8.00	8.32	7.46	8.32	
pH	6.95	7.40	7.33	7.63	7.71	7.86	
ALKALINITY in mg/l calcium carbonate	6.4	27.9	13.6	36.4	46.7	64.6	
FECAL COLIFORM in colonies/ 100 ml	<10	10	90	<10	20	70	
NITRATE-NITROGEN in mg/l	0.07	0.10	<0.01	0.07	0.05	0.12	
TOTAL PHOSPHORUS in mg/l	<0.01	0.01	0.02	0.01	<.01	0.06	
WATER TEMPERATURE in degrees Celsius	5.0	13.0	17.0	16.5	17.0	14.0	
AIR TEMPERATURE in degrees Celsius	8.0	11.0	14.0	12.0	15.0	12.0	

2002 East Branch - State Park (Wahconah Falls Brook)

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	10.34	10.48	8.04	8.34	8.26	8.20	9.62
pH	7.30	7.17					7.71
Alkalinity in mg/l calcium carbonate	20.0	16.0					84.00
Fecal Coliform in colonies/100ml **	9	160	<10	30	<10	40	20
E-coli in colonies/100 ml **	9	180	<10	20	<10	40	20
Total Phosphorus in mg/l*	0.010	0.01	<0.01	0.040	0.010	0.010	0.010
Nitrate-Nitrogen in mg/l *	0.040	0.03	0.010	0.160	0.120	0.100	0.030
Water Temperature in degrees Celsius	9.0	8.0	17.0	15.0	15.0	13.5	7.5
Total Suspended Solids in mg/l ***						6	<1
Turbidity in NTU							0.35

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2003 East Branch - State Park (Wahconah Falls Brook)

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	12.28	9.62	9.08	8.28	7.98	8.70	9.62
pH	7.07						7.41
Alkalinity in mg/l carbonate	14						28
Fecal Coliform in colonies/100ml **	10	100	10	50	410	40	20
E-Coli in colonies/100 ml **	10	90	10	10	390	20	10
Total Phosphorus in mg/l *	0.022	0.027	0.019	0.022	0.027	0.019	0.009
Nitrate-Nitrogen in mg/l *	0.130	0.03	0.01	0.16	0.02	0.05	0.04
Water Temperature in degrees Celsius	3.5	12.0	15.0	6.0	20.0	15.0	10.0
Total Suspended Solids in mg/l ***	1	1	1	1	13	1	3

2002 East Branch - Cleveland Road (Wahconah Falls Brook)

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l							
pH							7.82
Alkalinity in mg/l carbonate							116.00
Fecal Coliform in colonies/100ml **	9	200	160	380	100	280	30
E-coli in colonies/100 ml **	9	190	210	340	90	210	30
Total Phosphorus in mg/l *	0.010	0.01	<0.01	<.01	<.01	0.010	<.01
Nitrate-Nitrogen in mg/l *	0.140	0.05	0.120	0.510	0.610	0.580	0.430
Water Temperature in degrees Celsius							
Total Suspended Solids in mg/l ***						7	<1
Turbidity in NTU							0.29

2003 East Branch - Cleveland Road (Wahconah Falls Brook)

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l							
pH	7.18						7.61
Alkalinity in mg/l carbonate	16						59
Fecal Coliform in colonies/100ml **	20	150	160	210	200	100	80
E-Coli in colonies/100 ml **	10	150	120	180	160	80	60
Total Phosphorus in mg/l *	0.038	0.027	0.017	0.014	0.033	0.032	0.011
Nitrate-Nitrogen in mg/l *	0.150	0.06	0.15	0.63	0.03	0.23	0.28
Water Temperature in degrees Celsius							
Total Suspended Solids in mg/l ***	0.9	0.9	0.9	0.9	14	0.9	2

2001 East Branch - Wahconah Falls Brook at Rt. 9

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l			8.84	8.56	7.00	8.16	9.60
pH			7.35	7.67	7.81	7.70	7.80
ALKALINITY in mg/l calcium carbonate			19.1	62.4	77.5	62.6	82.2
FECAL COLIFORM in colonies/100 ml			180	440	260	720	60
NITRATE-NITROGEN in mg/l			0.09	0.33	0.27	0.21	0.18
TOTAL PHOSPHORUS in mg/l			0.02	0.01	<.01	0.03	<0.01
WATER TEMPERATURE in degrees Celsius			15.5	16.0	17.5	15.0	6.0
AIR TEMPERATURE in degrees Celsius			16.5	15.5	17.0	12.5	-1.0

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2002 East Branch - Wahconah Falls Brook & Route 9

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	11.32	8.58	8.82	7.82	7.16	6.96	8.68
pH	7.52						7.84
Alkalinity in mg/l carbonate	34.0						118.00
Fecal Coliform in colonies/100ml **	20	920	100	360	140	70	50
E-coli in colonies/100 ml **	10	980	90	380	120	50	40
Total Phosphorus in mg/l *	0.009	0.02	<0.01	<.01	<.01	0.010	<.01
Nitrate-Nitrogen in mg/l *	0.170	0.06	0.160	0.390	0.350	0.330	0.200
Water Temperature in degrees Celsius	6.0	8.5	13.0	18.0	18.0	13.0	9.0
Total Suspended Solids in mg/l***						6	<1
Turbidity in NTU							0.4

2003 East Branch - Wahconah Falls Brook at Rt. 9

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	12.28	9.50	9.48	7.46	7.88	8.68	9.68
pH	7.14						7.59
Alkalinity in mg/l carbonate	16						49
Fecal Coliform in colonies/100ml **	30	160	210	250	420	140	240
E-Coli in colonies/100 ml **	30	140	180	180	220	120	190
Total Phosphorus in mg/l *	0.027	0.024	0.011	0.016	0.035	0.013	0.009
Nitrate-Nitrogen in mg/l *	0.170	0.07	0.15	0.43	0.05	0.25	0.27
Water Temperature in degrees Celsius	2.5	10.5	13.0	19.0	19.0	11.5	9.0
Total Suspended Solids in mg/l***	0.9	0.9	0.9	1	13	1	1

2002 East Branch - High Street (Walker Brook)

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
pH	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Alkalinity in mg/l carbonate	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Fecal Coliform in colonies/100ml **	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
E-coli in colonies/100 ml **	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Total Phosphorus in mg/l *	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Nitrate-Nitrogen in mg/l *	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Water Temperature in degrees Celsius	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Total Suspended Solids in mg/l ***	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Turbidity in NTU	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow

2003 East Branch - High Street (Walker Brook)

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	9.90	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
pH	7.43	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Alkalinity in mg/l carbonate	34	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Fecal Coliform in colonies/100ml **	160	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
E-Coli in colonies/100 ml **	80	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Total Phosphorus in mg/l *	0.040	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Nitrate-Nitrogen in mg/l *	0.010	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Water Temperature in degrees Celsius	8.0	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Total Suspended Solids in mg/l ***	2	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow

2002 East Branch - Walker Brook Outflow

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	No Flow	9.60	5.74	No Flow	No Flow	No Flow	No Flow
pH	No Flow			No Flow	No Flow	No Flow	No Flow
Alkalinity in mg/l carbonate	No Flow			No Flow	No Flow	No Flow	No Flow
Fecal Coliform in colonies/100ml **	No Flow	1,900	20	No Flow	No Flow	No Flow	No Flow
E-coli in colonies/100 ml **	No Flow	2,400	20	No Flow	No Flow	No Flow	No Flow
Total Phosphorus in mg/l *	No Flow	0.02	0.020	No Flow	No Flow	No Flow	No Flow
Nitrate-Nitrogen in mg/l *	No Flow	0.32	1.270	No Flow	No Flow	No Flow	No Flow
Water Temperature in degrees Celsius	No Flow	7.5	13.5	No Flow	No Flow	No Flow	No Flow
Total Suspended Solids in mg/l***	No Flow			No Flow	No Flow	No Flow	No Flow
Turbidity in NTU	No Flow			No Flow	No Flow	No Flow	No Flow

2003 East Branch - Walker Brook Outflow

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	10.86	Very Low Flow	No Flow	No Flow	Low Flow	No Flow	No Flow
pH	7.88	Very Low Flow	No Flow	No Flow		No Flow	No Flow
Alkalinity in mg/l carbonate	132	Very Low Flow	No Flow	No Flow		No Flow	No Flow
Fecal Coliform in colonies/100ml **	170	2,000	No Flow	No Flow	650	No Flow	No Flow
E-Coli in colonies/100 ml **	130	1,700	No Flow	No Flow	560	No Flow	No Flow
Total Phosphorus in mg/l *	0.046	Very Low Flow	No Flow	No Flow	0.027	No Flow	No Flow
Nitrate-Nitrogen in mg/l *	0.840	Very Low Flow	No Flow	No Flow	1.45	No Flow	No Flow
Water Temperature in degrees Celsius	6.5	Very Low Flow	No Flow	No Flow		No Flow	No Flow
Total Suspended Solids in mg/l***	1	Very Low Flow	No Flow	No Flow	1	No Flow	No Flow

2001 East Branch - Hubbard Avenue

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l	11.36	9.04	9.58	8.64	7.52	7.16	10.36
pH	7.50	8.03	7.91	8.05	8.16	8.22	8.11
ALKALINITY in mg/l calcium carbonate	28.4	122.6	58.8	91.4	139.5	147.2	114.4
FECAL COLIFORM in colonies/ 100 ml	10	900	280	80	590	320	120
NITRATE-NITROGEN in mg/l	0.12	0.36	<0.01	0.27	0.40	0.34	0.20
TOTAL PHOSPHORUS in mg/l	<0.01	0.02	0.03	0.05	0.02	0.05	0.02
WATER TEMPERATURE in degrees Celsius	6.0	15.0	14.5	19.0	20.0	18.0	8.0
AIR TEMPERATURE in degrees Celsius	9.0	12.0	18.0	17.0	18.0	15.0	0.0

2002 East Branch – Hubbard Avenue

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	12.74	11.02	8.66	7.90	7.02	7.12	9.10
pH	7.83					8.00	8.06
Alkalinity in mg/l carbonate	70.0					200.00	164.00
Fecal Coliform in colonies/100ml	50	1,400	70	130	60	80	110
E-coli in colonies/100 ml	60	1,200	70	110	60	30	110
Total Phosphorus in mg/l	0.020	0.04	0.020	0.020	0.030	0.260	0.030
Nitrate-Nitrogen in mg/l	0.270	0.05	0.130	0.190	0.230	0.260	0.330
Water Temperature in degrees Celsius	9.0	7.5	18.0	21.0	22.5	19.5	12.5
Total Suspended Solids in mg/l***						13	2
Turbidity in NTU							2

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2003 East Branch - Hubbard Ave.

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	11.60	9.84	9.04	7.76	8.50	8.10	9.84
pH	7.61						7.96
Alkalinity in mg/l carbonate	36						88
Fecal Coliform in colonies/100ml **	20	160	70	200	600	150	150
E-Coli in colonies/100 ml **	9	160	60	110	350	140	130
Total Phosphorus in mg/l *	0.040	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-Nitrogen in mg/l *	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Water Temperature in degrees Celsius	5.5	11.0	15.0	21.5	20.5	16.0	11.5
Total Suspended Solids in mg/l***	1	1	4	1	16	2	3

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

Site Tables for Sites Monitored in 2001 and 2002 Only:

Bullard's Crossing - 2001

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l	7.66	4.56	5.76	4.18	2.74	2.60	3.70
pH	7.02	7.25	7.09	7.26	7.22	7.21	7.13
ALKALINITY in mg/l calcium carbonate	33.0	63.8	47.2	78.6	95.9	77.0	80.9
FECAL COLIFORM in colonies/ 100 ml	20	120	110	160	400	1,300	10
NITRATE-NITROGEN in mg/l	0.04	0.05	0.05	0.02	0.01	0.10	<0.01
TOTAL PHOSPHORUS in mg/l	<0.01	0.02	0.02	0.03	0.03	0.05	0.02
WATER TEMPERATURE in degrees Celsius	6	16	14	20	20	6	6.5
AIR TEMPERATURE in degrees Celsius	9.0	12.0	15.5	16.5	15.0	1.0	-3.0

2002 East Branch - Bullard's Crossing

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	5.84	5.72	2.74	0.64	1.68	1.38	1.14
pH	6.88						6.87
Alkalinity in mg/l carbonate	50.0						80.00
Fecal Coliform in colonies/100ml	30	3,900	120	40	100	490	60
E-coli in colonies/100 ml **	20	3,500	300	30	80	480	60
Total Phosphorus in mg/l *	0.010	<.01	0.020	0.090	0.060	0.080	0.060
Nitrate-Nitrogen in mg/l *	0.009	0.01	<0.01	<.01	<.01	<.01	<.01
Water Temperature in degrees Celsius	8	7.0	18	18.5	20.0	17.5	11.0
Total Suspended Solids in mg/l***						11	9
Turbidity in NTUs							4

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

Bennett Brook - 2001

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l	11.12	7.76	6.30	8.34	5.20	5.92	8.68
pH	6.84	6.96	7.06	6.98	7.13	6.94	7.22
ALKALINITY in mg/l calcium carbonate	8.8	19.0	19.3	15.6	31.0	26.9	21.4
FECAL COLIFORM in colonies/ 100 ml	<10	30	<10	<10	40	1,600	<10
NITRATE-NITROGEN in mg/l	0.15	0.06	0.06	0.02	0.04	0.09	<0.01
TOTAL PHOSPHORUS in mg/l	0.02	0.02	0.03	0.02	0.01	0.06	<0.01
WATER TEMPERATURE in degrees Celsius	4.0	7.0	14.0	15.0	15.5	17.0	10.0
AIR TEMPERATURE in degrees Celsius	7.0	11.0	18.0	12.0	17.0	12	-2.0

2002 East Branch - Bennett Brook

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	8.86	9.30	8.06	7.34	5.16	5.84	7.98
pH	6.86	7.33					6.91
Alkalinity in mg/l carbonate	24.0	19.0					28.00
Fecal Coliform in colonies/100ml *	9	20	<10	40	20	50	30
E-coli in colonies/100 ml **	9	10	10	20	20	50	20
Total Phosphorus in mg/l *	0.020	0.01	<0.01	0.040	0.010	0.030	<.01
Nitrate-Nitrogen in mg/l *	0.020	<.01	0.010	0.020	0.050	0.060	0.010
Water Temperature in degrees Celsius	6.0			16.5	18.5	17.0	12.0
Total Suspended Solids in mg/l						6	2
Turbidity in NTUs							1.3

Frisell Brook - 2001

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l			7.60	7.50	6.54	6.66	8.84
pH			7.17	7.45	7.48	7.46	7.51
ALKALINITY in mg/l calium carbonate			31.9	27.4	33.2	40.7	33.6
FECAL COLIFORM in colonies/ 100 ml			10	40	80	20	<10
NITRATE-NITROGEN in mg/l			0.10	0.02	<.01	0.08	0.02
TOTAL PHOSPHORUS in mg/l			0.02	0.02	<.01	0.03	<0.01
WATER TEMPERATURE in degrees Celsius				20.5	21.5	17.0	11.5
AIR TEMPERATURE in degrees Celsius				16.0	17.0	13.0	3.0

2002 East Branch - Frisell Brook

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	8.82	7.14	7.96	7.14	6.88	7.42	7.84
pH	7.36						7.29
Alkalinity in mg/l carbonate	28.0						44.00
Fecal Coliform in colonies/100ml **	9	10	<10	20	30	30	40
E-coli in colonies/100 ml **	9	10	10	10	10	20	20
Total Phosphorus in mg/l *	0.010	<.01	<0.01	0.010	0.020	0.010	<.01
Nitrate-Nitrogen in mg/l *	0.009	0.02	0.010	0.020	0.020	0.020	0.020
Water Temperature in degrees Celsius	10.0	10.0	18.0	22.0	23.0	20.0	10.0
Total Suspended Solids ***						8	<1
Turbidity in NTUs							0.35

Center Pond Bridge - 2001

PARAMETER	April '01	May '01	June '01	July '01	Aug. '01	Sept. '01	Oct. '01
DISSOLVED OXYGEN in mg/l			8.36	7.12	7.20	6.88	9.34
pH			7.52	7.85	7.88	7.77	7.90
ALKALINITY in mg/l calcium carbonate			42.8	75.9	107.2	108.0	79.6
FECAL COLIFORM in colonies/ 100 ml			250	150	280	980	60
NITRATE-NITROGEN in mg/l			0.16	0.16	0.27	0.34	0.16
TOTAL PHOSPHORUS in mg/l			0.02	0.03	0.01	0.06	0.01
WATER TEMPERATURE in degrees Celsius			14.5	20.0	20.5	18.0	8.0
AIR TEMPERATURE in degrees Celsius			15.0	14.0	16.5	14.0	-3.0

2002 East Branch - Center Pond Bridge

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	10.28	10.00	7.68	9.00	8.44	9.48	8.96
pH	7.63						7.98
Alkalinity in mg/l carbonate	54.0						106.00
Fecal Coliform in colonies/100ml **	20	740	110	120	70	180	410
E-coli in colonies/100 ml **	30	980	170	100	60	130	320
Total Phosphorus in mg/l *	0.010	0.04	0.02	<.01	0.010	0.040	0.020
Nitrate-Nitrogen in mg/l *	0.010	0.05	0.130	0.160	0.150	0.110	0.160
Water Temperature in degrees Celsius	7.0	7.5	16.0	21.0	24.0	20.0	11.5
Total Suspended Solids in mg/l***						9	5
Turbidity in NTUs							2.2

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

East Branch Weather on our Sampling Days in 2001

April 26, 2001: 25th = overcast. Has been warm and dry. A lot of snow melt about 10 day ago. 26th = clear. Has been warm and dry.

May 22, 2001: Today was the first day of rain in almost 5 weeks. It started raining last evening.

June 12, 2001: Overcast today. Was dry for a week, then rained yesterday and last evening.

July 10, 2001: Clear. Showers earlier in the week, then dry, until a little rain last night.

August 14, 2001: Has been hot and humid. Rained 2 days ago, heavy at times.

September 11, 2001: It has been warm and dry, but it rained yesterday and last night (heavy at times).

October 9, 2001: Cold and clear. Has been warm and dry but the temperatures dropped over the weekend and there was some rain/hail on Saturday a.m. (our monitoring occurs on Tuesday mornings).

Weather and Notes Regarding the 2002 East Branch Sampling Days:

April 25, 2002: Today is clear to partly cloudy, and cool, with no recent rain. The weather has been variable, with both cold and unseasonably warm weather. Flows are low and we are under a drought watch from the low snow fall amounts this past winter.
A 3 foot long beaver was seen swimming at the Bennett Brook site.
Turbidity was measured at the Partridgefield site with equipment from the Crane Paper company to be <2NTUs. pH was also measured with their meter to be 7.74.
The powder pillow #3 used at Orchard Road seemed more granular and the floc took longer to settle than usual. Within 20 minutes it looked fine.
No flow was found in Walker Brook at High Street, or at the outflow where it joins the East Branch. The only water at the outflow site was in puddles between the rocks.
A dead fry (trout?) was found at the Hubbard site. The water is lower than in April '01.

May 14, 2002: Overcast and drizzling today. Rain, sometimes heavy, in past few days, resulting in very high flows today. Temperatures have been in the 50s and 60s.
The culvert at Bullard's Crossing was 90% plugged by beavers. The river was overflowing the roadway.
The beaver dam at Bennett Brook has apparently been breached.
The water was so high at WFB & Rte.9 that the samples were taken from the bank.
Walker Brook was just a puddle at High Street, and only 4-5 inches deep at the outflow.
At Hubbard, flow was about 2 feet higher this month than last so the samples were taken from the bank here also.

June 11, 2002: Partly cloudy then clearing this morning, with no rain in the past few days. It has been sunny and warm but there was some rain, heavy at times, 4-5 days ago.
Beavers very active at Bullard's Crossing. The thermometer came apart.
The beaver was spotted again at Bennett Brook.
Crayfish and turkey tracks were seen on the shore at Home Club.

Black flies were seen at WFB & Rte. 9.
There was no running water in Walker Brook at High Street. At the outflow, the water was very shallow. There was ~1/2 inch of clear water coming out of the drain under Rt.9 by the Post Office. The storm drains look dry. Rushing water could be heard in the manhole nearby.

July 9, 2002: Dry, and partly cloudy to overcast this morning. It has been clear and hot, with no rain in the past week. Hazy on Sunday from forest fires in Quebec, and still overcast this morning. Water levels very low.
Bullard's Crossing had water running over the road again due to the beaver activity.
A film was seen on top of the water at both Bennett Brook and Center Pond Bridge (both sites have slow moving water). At Center Pond Bridge there were also lots of leaves, twigs, weeds and "junk" on the surface of the water.
The water was about 3 feet lower than last month at the Metal Bridge site.
No flow in Walker Brook today.
Water very low at Hubbard Ave.

August 13, 2002: Clear but hazy this morning. It has been hot and dry and the water levels are very low.
The culvert at Bullard's Crossing is completely blocked.
There is a film on the water at Bennett Brook.
The water at the Metal Bridge site is about 6 feet lower, in fact there is no water up near the dam.
At Partridgfield the water was very low but there were lots of crayfish.
The floc in the DO samples at the High School and Orchard Rd. never really settled, even after 5-10 minutes (we thought about buying new powder pillows but we are still passing our QC samples with these pillows, so we decided they must still be fine). There was an iridescence in the water at the edge of the bank at Orchard Rd, and there was a greenish mat that started at the edge and extended into the stream (nitrates were very high that day, as well as the previous month).
The WFB & Rte 9 the brook was quite low but full of little fish and insects.
Center Pond Bridge had a surface sheen as well as debris and goose droppings floating on the surface.
At Hubbard Ave the waster was so low the sampling had to be done 2/3rds the way across the channel to find water deep enough for sampling. The DO floc was long in forming, and did not form as sharp a line as usual.

September 10, 2002: Clear today, with some morning haze. It has been warm to hot, humid and sunny.
Hinsdale Town crew removed the beaver dam at Bullard's Crossing and cut back the brush around the culvert. Beavers have started to rebuild.
The film on the water at Bennett Brook is now gone.
Algae was noticed along the edge of Wahconah Falls Brook, at Rt. 9, for the first time. Lots of minnows, too.
The water at Hubbard Ave. had an oily feel to it, and was found to have a very high alkalinity level on this day.

October 8, 2002: Clear today. Cool and drizzly yesterday with some light rain. It has been dry for days, until yesterday. Temperatures in the 50s -60s.
The beaver dam at the Bennett Brook site has been breached and the water level is now 4 feet lower.

The floc was slow to settle in the D.O. sample taken at Orchard Road. The air temp reading of 1° C was suspiciously low, probably due to still being wet from being used at the High School site, where the air temp was 4 degrees Celsius. These two sites should be similar.
Samples were taken at the Hubbard site at the same time DEP took samples with its HydroLab meter.

Weather and Notes Regarding the 2003 East Branch Sampling Days:

April 15, 2003: Clear today, and it has been clear this past week, in the 50s-60s, with a couple of inches of snow last week. Snow still on the ground up at the State Park, though none left in town.

- Home Club: Water tea-colored but clear with no odor.
- Carmel House: Water tea-colored but clear with no odor.
- Partridgefield: Clear water with no odor. Snow cover gone, water at spring level.
- High School: Clear water with no odor.
- Orchard: Clear water with no odor.
- State Park: Clear water with no odor. Snow up to the volunteers' knees!
- Cleveland Road: Clear water with no odor.
- WFB at Rt. 9: Clear water with no odor.
- Hubbard: Clear water with no odor.

May 13, 2003: Rained heavily on Sunday, the 11th (2 days ago), with a little more rain yesterday and drizzle this morning. Flow pretty high and fast today.

- Metal Bridge: Water tea-colored but clear with no odor.
- Carmel House: Clear water with no odor.
- Partridgefield: Water tea-colored but clear with no odor. River flowing swiftly.
- Orchard: Clear water with no odor. Lots of sediment in the water. Pretty good, high flow; bank to bank. Ducks just upstream on the lawn. Fishermen at and below the site while sampling. Floc slow to settle.
- State Park: Clear water with no odor.
- Cleveland Road: Clear water with no odor.
- WFB at Rt. 9: Clear water with no odor. Fishy smell in air. Flow pretty high and fast. Some sediment in water. Floc relatively slow to settle.
- High Street: No Flow.
- Walker Brook Outflow: Not enough flow to submerse the larger bottles.
- Hubbard: Water tea-colored to muddy, with no odor. Water felt slightly greasy at the time of sampling. Water up 6" or so.

June 10, 2003:
Rained on Saturday, the 7th. Partly cloudy this morning, though yesterday afternoon was sunny. It has been cloudy, cool and damp lately.

- Home Club: Water tea-colored but clear.
- Metal Bridge: Clear water with no odor.
- Carmel House: Water tea-colored but clear.
- Partridgefield: Clear water with no odor.
- High School: Clear water with no odor. Air almost smells like it does when they're re-paving a road.
- Orchard: Lots of minnows.

State Park: Clear water with no odor. Low flow.
Cleveland Road: Clear water with no odor.
WFB at Rt. 9: Clear water with no odor. Flow is surprisingly low considering all the rain we've had (frequent storms but not a lot of rain).
High Street: No Flow.
Walker Brook Outflow: Flow too shallow to sample. No flow at all coming out of culvert under Rt. 8&9 by the Post Office. A large pile of composted material (grass clippings?!) on the bank at the confluence of Walker Brook.
Hubbard: Water tea-colored but clear with no odor.

July 8, 2003:
Overcast today, but has been hot and humid. No significant rain in more than a week (0.01" on the 6th, and 0.03" on June 30th).
Home Club: Very little flow. Lots of clams, a snail and a dead crayfish.
Metal Bridge: Water brown with musky odor. Water very low.
Carmel House: Murky colored water. Lots of crayfish!
Partridgefield: Water tea-colored but clear with no odor. Water level low. Saw a crayfish and water bugs.
High School: Clear water with no odor.
Orchard: Clear water with no odor.
State Park: Clear water with no odor.
Cleveland Road: Clear water with no odor.
WFB at Rt. 9: Clear water with no odor. Air had garbage smell.
High Street: No Flow.
Walker Brook Outflow: No Flow.
Hubbard: Water tea-colored but clear with no odor.

August 12, 2003:
Three inches of rain fell on the 10th and 11th! It has been very wet, hot and muggy. Periodic rain for the past 10 days. Overcast with some drizzle this morning. According to the Berkshire Eagle, August will have 5.83" of rain, in comparison to the average of 4.46"
Home Club: Water tea-colored but clear. Very high water.
Metal Bridge: Water tea-colored but clear with musky odor.
Carmel House: Water tea-colored but clear with no odor. Very high water.
Partridgefield: Water tea-colored but clear.
High School: Water tea-colored but clear.
Orchard: Water tea-colored with particles and no odor.
State Park:
Cleveland Road: Water is muddy with no odor. Brook is so high it is roaring! Water is over the banks.
WFB at Rt. 9: Water tea-colored but clear. The river is ripping.
High Street: No flow this morning but volunteer Cas Makowski did see it flowing last night after yesterday afternoon's heavy rain. He saw sufficient flow to be able to sample but couldn't due to the lab being closed.
Walker Brook Outflow: Clear water with no odor. Fast flow but shallow. Couldn't fill jug all the way. Backwater washing up into the brook from the main stem due to the water being so high today.

Hubbard: Water dark brown and muddy with no odor. Very high water level. Couldn't wade into the water due to depth.

September 9, 2003:

Clear this morning, around 70 degrees out. As been clear and mild for days. Last rains were on Sept. 2, 3, and 4 (2 inches fell over those 3 days). September will have almost twice the usual precipitation (6.95" instead of the average 3.52"), according to records kept by the Berkshire Eagle.

Metal Bridge: Clear water with no odor.
Partridgefield: Clear water with no odor. Bubbles and ripples on top of water.
High School: Clear water with no odor.
Orchard: Clear water with no odor.
State Park: Clear water with no odor.
Cleveland Road: Clear water with no odor.
WFB at Rt. 9: Water tea-colored but clear with no odor.
High Street: No Flow.
Walker Brook Outflow: Bone dry. Man at River Run apartments spraying an herbicide on the weeds in the parking lot and gutters.
Hubbard: Water tea-colored but clear with no odor.

October 14, 2003:

Clear and warm today, as well as this past week. Two volunteers noticed some light rain two days ago, though the USGS gauging station at Coltsville didn't register any precipitation for the past 7 days. Had a frost last night. The month of October will have 5.25" of rain, in comparison to the average of 3.26" (source: Berkshire Eagle)

Home Club: Water tea-colored but clear. Oily sheen along the river bank.
Metal Bridge: Water tea-colored but clear with no odor.
Carmel House: Water tea-colored but clear with no odor.
Partridgefield: Water clear with no odor. EarthTech (Tyco International Co.) worker was taking samples there too. Usually samples on Mondays, once a month.
High School: Clear water with no odor.
Orchard: Clear water with no odor.
State Park: Clear water with no odor.
Cleveland Road: Clear water with no odor. Water surprisingly high.
WFB at Rt. 9: Clear water with no odor. Flow is relatively high despite a week without rain.
High Street: No Flow.
Walker Brook Outflow: No flow out of culvert under Rt. 8&9. A little flow and water between the rocks at the confluence but not enough to be able to sample. No sign of obvious water source (three storm drain pipes seen but all were dry).
Hubbard: Water tea-colored but clear with no odor.

APPENDIX E

Water Quality Monitoring in Walker Brook, Dalton MA

April 2002 to October 2004

Housatonic Valley Association
Carolyn W. Sibner
March 28, 2005

Table of Contents

"This project has been financed partially with Federal Funds from the Environmental Protection Agency (EPA) to the Massachusetts Department of Environmental Protection (the Department) under Section 604(b) of the Clean Water Act. The contents do not necessarily reflect the views and policies of EPA or of the Department, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use."

HOUSATONIC VALLEY ASSOCIATION

Berkshire Office
1383 Route 102, P.O. Box 251
South Lee, MA 01260
Phone: 413-394-9796
Fax: 413-394-9818
E-mail: hvama.carolyn@adelphia.net

Connecticut Office
150 Kent Road, P.O. Box 28
Cornwall Bridge, CT 06754
Phone: 860-672-6678
Fax: 860-672-0162
E-mail: housatonic@snet.net

Website: www.hvatoday.org

Project Summary:

Walker Brook is a tributary to the East Branch of the Housatonic River in Dalton, MA that tends to be dry for most of the year. Its headwaters are above a gravel pit and as the brook nears the gravel pit the water tends to disappear from the streambed. A short distance downstream from the gravel pit, the brook passes through a residential neighborhood. During the late 1940s or early 1950s, the brook was diverted into a culvert to pass through the residential neighborhood before day-lighting again at Rt. 9, near the Dalton Post Office. From there it flows a short distance before joining the East Branch of the Housatonic River.

HVA started monitoring this brook regularly in April, 2002 at both High Street where the brook enters the culvert, and then again downstream, just before the brook's confluence with the East Branch. There is often no flow entering the culvert or exiting it, however by the time the brook joins the East Branch there is usually a small amount of water flowing in the streambed again.

This lower section of the streambed, from the Post Office to the confluence, is made up of large, flat rocks, apparently placed there as part of a channel reconstruction project. As you walk along the stream channel there is usually no water visible between the rocks until you get alongside the River Run Apartments. From there on down more and more water will gradually appear between the rocks until there is a small amount of flow just before the confluence. There are no obvious sources of this water, i.e. pipes or surface runoff. It may be that this water is the groundwater table that is surfacing in the streambed as it nears the East Branch of the Housatonic River.

Surprisingly, there seems to be a problem with the water quality of this small outflow just above the confluence. Though there is often no flow exiting the culvert, indicating that there are may not be any illegal hookups to the storm drain system, the levels of contaminants in the small flow as it joins the East Branch have often been surprisingly higher than they should be (see data tables below for more detail). Unfortunately, on July 13, 2004, there was flow coming out of the culvert with E-coli bacteria levels that were *very* high, indicating some kind of unhealthy and unnaturally high source of bacteria.

The results below are the draft data from the lab and have not been fully checked for quality control. The final numbers will be placed into the tables when we receive them.

Site Descriptions and Results:

(Please see the attached map, and appendices, starting on page 10, for our monitoring data prior to 2004. The 2004 draft results are included in the body of this report, since the final results have not yet been received from the lab.)

"East Branch Above Walker Brook":

This site is located on the East Branch of the Housatonic River, directly upstream from the confluence of Walker Brook. This site was added in 2004 in order to allow us to better assess the impact on the Housatonic River created by the addition of Walker Brook. We do this by looking at the water quality in the East Branch itself both upstream and downstream from where Walker Brook joins it.

Draft Results **2004 “East Branch Above Walker Brook” Site Data**

Parameter	May 18, ‘04	June 8, ‘04	July 13, ‘04**	Aug. 10, ‘04	Sept. 14, ‘04
Dissolved Oxygen mg/l	8.54	12.02*	7.86	8.16	13.04*
Alkalinity in mg/l	65		103	100	
Fecal Coliform in colonies per 100ml	80	43	70	170	130
E-Coli colonies per 100ml	78	110	30	150	110
Nitrate-Nitrogen in mg/l	0.17	0.14	0.26	0.20	0.15
Water Temperature in degrees C	17	16	19	18.5	15
Total Suspended Solids in mg/l	<1	1	3	3	

* Data believed to be faulty due to a sizable bubble noted in each of the sample bottles.
** July 13, 2004 is considered a first flush sampling event due to it raining on sampling morning (it started around 6 a.m.), following a dry spell of at least three days.

Levels of dissolved oxygen, alkalinity, bacteria, nitrates, temperature, and suspended solids at this site are all usually within state standards or expected levels. From this year’s data, this site does not appear to be negatively impacted by surrounding activities.

Walker Brook’s Sites:
The next four sites, “High Street”, “Post Office”, “Below Sewer Line” and “Walker Brook Outflow/Confluence” are all on Walker Brook itself. All of the sites except the outflow are usually dry, or have such low flow that only the small bottle used to collect bacteria samples can be submerged in the flow. The larger, plastic jug used for collecting alkalinity, nutrient and sediment samples cannot be used when the flow is too low.

High Street:
Walker Brook passes by the gravel operation and enters a culvert at High Street. This brook was completely dry at this site on all the days we sampled in 2002. In 2003, there was flow here only during the spring runoff in April, and the water quality on that day did not indicate any particular problems (please see attached tables). In 2004, there was enough water to sample during the spring runoff in April and May, and there was just enough water to catch a bacteria sample in June. The rest of 2004 it was dry.

***Draft** Results* **2004 East Branch - High Street Site Data**

Parameter	**April 1, '04***	**May 18, '04**	**June 8, '04**	**July 13, '04**	**Aug. 10, '04**	**Sept. 14, '04**
pH	7.51		Not enough flow to sample			
Alkalinity in mg/l	43	114	Not enough flow to sample	Dry	Dry	Dry
Fecal Coliform in colonies per 100ml	9	50	153	Dry	Dry	Dry
E-Coli colonies per 100ml		28	220	Dry	Dry	Dry
Total Phosphorus mg/l	0.024		Not enough flow to sample			
Nitrate-Nitrogen in mg/l	0.2	0.02	Not enough flow to sample	Dry	Dry	Dry
Total Suspended Solids in mg/l		<1	Not enough flow to sample	Dry	Dry	Dry

* The samples collected April 1, 2004 were taken in the morning after approximately ¾ inch of rain had fallen in the prior 24 hours. This was not a regular sampling day.

On the one day in 2003 when there was sufficient flow for sampling, the water quality here did not indicate any particular problems. You can see that the alkalinity was a bit high in 2004, considering what a small, clean tributary it is, and the E-coli bacteria was almost too high for safe swimming (it should remain under 235 colonies per 100 ml to meet state standards for safe swimming). In general, however, the water quality appears fairly normal at this site. What is very abnormal, however, is the lack of water here at all. When there is water in this brook at this site, it appears fairly healthy, but the consistent lack of water in the brook from year to year indicates something happened to cause the water to stop flowing in its streambed. This merits further investigation, since it is clearly unable to provide aquatic habitat anymore.

"Post Office":

In 2004 there were a couple of occasions when there was flow coming out of the culvert under Route 9, across the street from the post office. Since there is often no flow entering the culvert at High Street, and rarely any water flowing out of it, yet usually there *is* water downstream where the brook joins the East Branch, we took samples here in 2004 on only a couple of occasions. Monitoring here at the "post office" site allows us to compare the water quality leaving the culvert with the water quality shortly downstream from it, where the flow is greater as the brook joins with the East Branch.

***Draft Results* 2004 East Branch - "Post Office" Site Data**

Parameter	Apr 1, '04*	May18, '04	June 8, '04	July 13, '04*	Aug. 10,'04	Sept. 14,'04
pH	7.48	No flow	Not enough flow to sample		Dry	Dry
Alkalinity in mg/l	43	"	Not enough flow to sample	38	"	"
Fecal Coliform in colonies/100ml	10	"	387	>5,000	"	"
E-Coli colonies/100ml		"	410	23,500	"	"
Total Phosphorus mg/l	0.033	"	Not enough flow to sample		"	"
Nitrate-Nitrogen in mg/l	0.21	"	Not enough flow to sample	0.69	"	"
Total Suspended Solids in mg/l		"	Not enough flow to sample	18	"	"

* The samples collected April 1, 2004 were taken in the morning after approximately ¾ inch of rain had fallen in the prior 24 hours. This was not a regular sampling day. July 13, 2004 is considered a first flush sampling event due to it raining on sampling morning (it started around 6 a.m.), following a dry spell of at least three days.

As you can see, there were bacteria leaving the culvert under Rt. 9, by the post office, on two of the three days in 2004 when there was enough water flowing out of the culvert to be able to take a sample. On the morning of April 1st, 2004, after ¾ inch of rain had fallen, there was very little bacteria exiting the culvert. In June, 2004, when there was flow entering the culvert at High Street, the bacteria level in the brook was higher as it left the culvert by the post office. In July, 2004 when it was raining, yet there was no flow in the brook at High Street, there was a small amount of water flowing out of the culvert by the post office which had very high bacteria levels. This would indicate bacteria were entering the culvert somewhere between High Street and the post office. Since it was a rainy day, it could be from storm water runoff from the surrounding neighborhoods. These bacteria levels are very high (>5,000 colonies of fecal coliform and 23,500 colonies of E-Coli bacteria!), and are probably indicating a source of wastewater. To be safe to have secondary contact with this water, i.e. to fish or boat in it, the bacteria levels need to remain below 1,000 colonies of fecal coliform bacteria. To be safe for swimming, it would need to be below 200 colonies of fecal coliform. Clearly this water does not meet either use and is indicating a problem.

"Below Sewer Line":

This site is located about 20 feet downstream from where the brook day-lights from the culvert by the post office. There is a sewer line that crosses under the brook at that spot, and there is a layer of cement over the line that covers the bottom of the streambed. The one time this site was sampled, in June of 2004, the samples were taken just a couple of feet downstream from the cement covering. This site is usually dry.

Draft Results **2004 East Branch - "Below Sewer Line" Site Data**

Parameter	May 18, '04	June 8, '04	July 13, '04	Aug. 10,'04	Sept. 14,'04
Alkalinity in mg/l	No flow	116	Flow too low	Dry	Dry
Fecal Coliform in colonies/100ml		579			
E-Coli colonies/100ml		610			
Total *Phosphorus* in mg/l		0.013			

The bacteria levels at this site, just a couple of feet downstream from where the sewer line crosses under the brook, are somewhat higher that just upstream where the brook exits the culvert under Rt. 9. Whether this increase is enough to indicate exfiltration from the sewer line into the surrounding soils and groundwater is uncertain.

Unfortunately, it is not easy to monitor the water quality in the brook here since the brook is so often dry. A groundwater well, and/or some dye testing, may be able to determine whether the sewer line is leaking into the surrounding soils and groundwater.

Walker Brook Outflow (at the Confluence with the East Branch):

In 2002, this site was too dry to sample except in May (which was a rainy day) and June. Even in these months the water flow was minimal. In 2003 we had enough flow to take at least partial samples in April, May (wet weather) and August (also wet weather). In 2004 there was enough flow to monitor every sampling day, from April through October, with July's results being the only ones collected during wet weather. Below are the summaries of the results from the three years of sampling, followed by a table with this year's draft results from Berkshire Enviro-Labs in Lee, MA.

- **Alkalinity** appears to be much higher here in comparison to the other sites we test, including in Walker Brook itself at High Street, as well as in the East Branch directly upstream from where Walker Brook joins it. In April 2003, it was 132 mg/l whereas no other site that day exceeded 44mg/l. In 2004, the East Branch site directly above Walker Brook never had alkalinity levels higher than 103mg/l in comparison to Walker Brook's outflow which was 263mg/l at the same time.

- **Bacteria** levels in May of 2002 (a rainy day) were very high (1,900 colonies of fecal coliform and 2,400 of E-coli). In May of 2003 (another rainy day) they were once again exceedingly high (2,000 colonies of fecal bacteria and 1,700 of E-coli) at the outflow, whereas the rest of the sites were near or below the level for safe swimming (200 colonies of fecal coliform bacteria). In 2004, however, bacteria levels never exceeded safe swimming standards, even when it was raining in July!

- **Phosphorous** levels were a bit higher at both sites in Walker Brook than any of the other sites the one time it was tested, in April 2003.

- **TSS** was never a problem in Walker Brook in 2002, 2003 or 2004.

- The level of **nitrates** really differs here from all the other sites. In June of 2002, the nitrates were 1.27mg/l at this site, whereas all other sites that month didn't exceed even 0.2 mg/l. April of 2003, the outflow had 0.84 mg/l of nitrate-nitrogen in comparison to the other sites that all had either less than 0.2 or even less than 0.1mg/l. In August, 2003, the nitrate levels were at 1.45 mg/l in comparison to the other sites, none of which had even 0.1 mg/l. (Unfortunately, in July 2003 there was not enough flow to take a sample in Walker Brook, but downstream from it, at Hubbard Avenue, the nitrates were at the all-time high of 2.34 mg/l!).

Draft Results **2004 East Branch - Walker Brook Outflow (Confluence) Site Data**

Parameter	Apr 1, '04*	May 18,'04	June 8, '04	July 13, '04*	Aug. 10, '04	Sept. 14,'04
pH	7.56					
Alkalinity in mg/l	45	162		236	232	
Fecal Coliform in colonies per 100ml	10	40	9	80	100	70
E-Coli colonies per 100ml		33	60	80	20	30
Total Phosphorus mg/l	0.35					
Nitrate-Nitrogen in mg/l	0.21	0.61	0.95	1.45	1.95	1.85
Water Temperature in degrees C		5	14.5	13.5	12	11.5
Total Suspended Solids in mg/l		1		3	2	

* The samples collected April 1, 2004 were taken in the morning after approximately ¾ inch of rain had fallen in the prior 24 hours. This was not a regular sampling day. July 13, 2004 is considered a first flush sampling event due to it raining on sampling morning (it started around 6 a.m.), following a dry spell of at least three days.

Nitrates are distinctly higher here than at other sites, as is alkalinity. Both these parameters can indicate a source of sewage or other pollutants. Bacteria levels are not consistently high here, however. Though there is no obvious source of these contaminants, like a pipe, there is clearly a problem occurring in this neighborhood. More water quality monitoring, plus dye testing in the surrounding sewer lines, should help pinpoint the source(s) of pollution.

Hubbard Avenue:
This site is the last site that we monitor in the East Branch of the Housatonic River's watershed. This site represents the water quality of the Housatonic River after Walker Brook has joined it, and as it leaves Dalton and enters Pittsfield. We have monitored this site since April 2001.
Before we added the "East Branch Above Walker Brook" site in 2004, our next site on the East Branch above the confluence with Walker Brook was at Orchard Road.

- On every day we have tested since April, 2001, the **dissolved oxygen**, **pH**, and **phosphorous** levels all tend to be good, and **bacteria** is usually safe enough even for swimming, except after rain events.

- **Alkalinity** seems to jump up on occasion, like September, 2002, when it reached 200mg/l of carbonate, though alkalinity levels tend to increase as one moves farther downstream. Crane's wastewater treatment plant just upstream is probably contributing to these levels in part, as is the limestone bedrock in this valley.

- **Nitrates** in 2001 and 2002 stayed below 0.43 mg/l. In July 2003, the nitrate levels were higher than usual at all the sites, but at Hubbard for some unknown reason it was an amazingly high level of 2.34 mg/l, though they were usually below 0.2mg/l that year. They were also quite high again in October (0.42mg/l in comparison to 0.16 at Orchard Road, which until 2004 was the next site upstream from there on the East Branch). In 2004, nitrates spiked up to 1.45 mg/l on the rainy day we sampled in July.

- **Temperatures** are usually cool enough here to meet the cold water state fishery standard of 20 degrees Celsius, even though this site is classified as a warm water fishery and is not required to stay below 20º degrees Celsius. July and August are the two months when the temperature sometimes reaches or exceeds 20 degrees Celsius. Though it is not required, it is better for the fish if it stays below 20º, and there are trout living around there who do need the cooler temperatures.

- **Total suspended sediments** were high (16 mg/l) in August '03 when it had rained so much the day before, but they are usually at or below 4 mg/l.

Draft Results **2004 East Branch - Hubbard Avenue Site Data**

Parameter	May 18,'04	June 8, '04	July 13, '04*	Aug. 10, '04	Sept. 14, '04
Dissolved Oxygen mg/l	8.20	9.04	7.84	8.14	8.54
Alkalinity in mg/l	102	79	145	156	
Fecal Coliform in colonies/100ml	60	76	130	210	90
E-Coli colonies/100ml	23	150	210	110	50
Total Phosphorus in mg/l		0.575			
Nitrate-Nitrogen in mg/l	0.16		1.45	0.39	0.22
Water Temperature in degrees C	18	16.5	20	18	16.5
Total Suspended Solids in mg/l	1	1	3	4	

* July 13, 2004 is considered a wet weather sampling event due to it raining on sampling morning (it started around 6 a.m.), following a dry spell of at least three days.

The water quality at Hubbard Avenue is surprisingly good, considering its commercial location. The biggest issues facing this site are occasional high nitrates in drier weather, and occasional high alkalinity, as well as temperatures that are a bit too high in the summer for the trout that live there.

Walker Brook Data Summary:

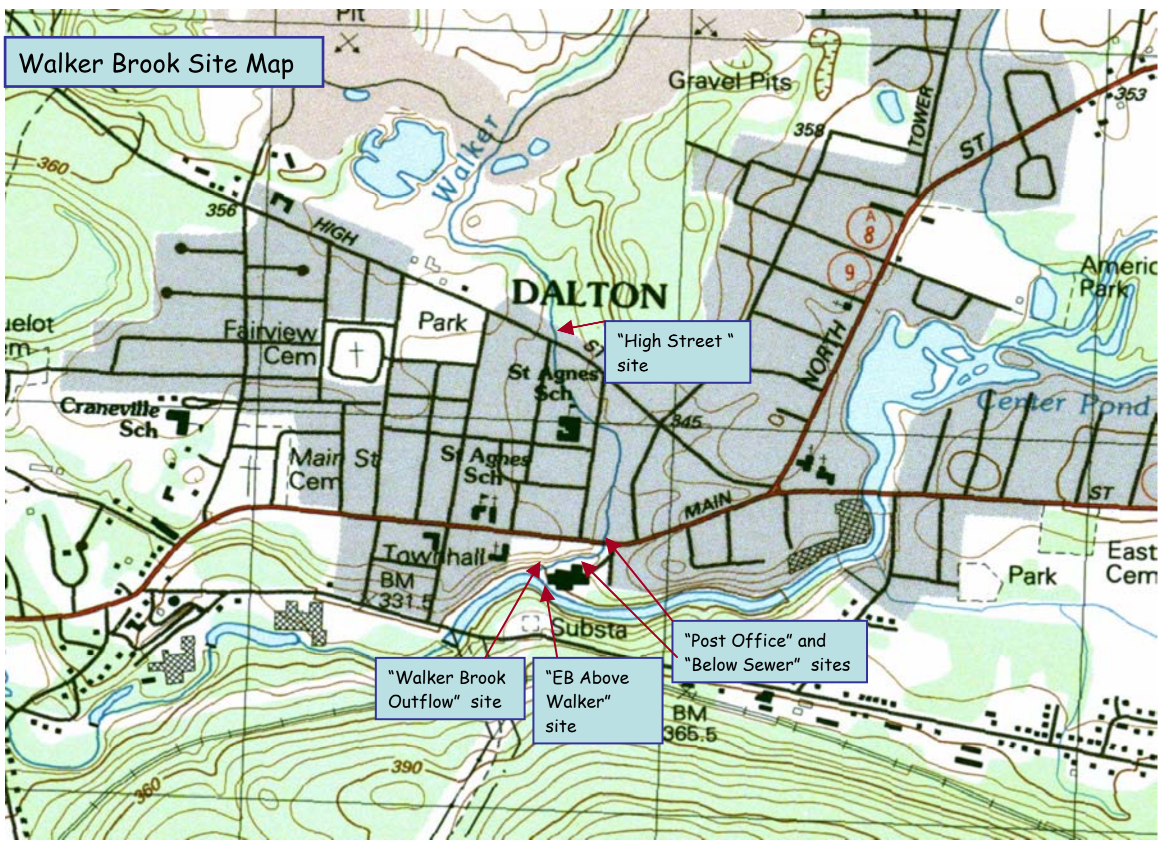
Since there is usually either little or no appreciable flow leaving Walker Brook and entering the East Branch, we do not believe Walker Brook is having a detrimental impact on the water quality in the East Branch of the Housatonic River. Neither is it adding cold, clean water like many other tributaries in this area.

The unusual and sometimes surprising water quality results in Walker Brook, from the "post office" site and downstream, indicate that there is a water quality problem in that area. The water quality coming out of the culvert has been inconsistent; sometimes fine, often dry, and sometimes with high levels of nitrates or bacteria. Just downstream from the culvert is a sewer line that may be leaking contaminants into the surrounding soils and groundwater, which may then be surfacing in the brook as the groundwater table rises up to meet the East Branch's water level at the confluence.

What has been more consistent is that the water quality in Walker Brook just as it joins up with the East Branch is often unusually high in alkalinity and nitrates in comparison to other nearby sites. The bedrock under the tributary may be contributing to the alkalinity, but it would probably be more similar between the High Street entrance to the culvert and the exit from it.

What *is* consistently wrong with Walker Brook has been its lack of water! The presence of a well established streambed testifies to the fact that Walker Brook has had a considerable amount of flow in the past. When this brook has water upstream of High Street, which is infrequently, the water quality appears to be fairly healthy, but downstream where there usually is water flowing in its streambed, it is often of questionable quality. This merits further investigation, since this brook clearly has problems with both water quality and quantity.

It has been a challenge to locate the sources of these water quality problems when there is such a long time period between when the samples are collected and when the final results are received back from the lab (often 6 months or more). HVA will start requesting the draft results from the lab on a more regular basis in order to better track the changing conditions in the brook.



Appendix A: Weather and Field Notes for All Years, and 2000, 2002, and 2003 Water Quality Data Tables

Weather and Notes Regarding the 2004 East Branch Sampling Days:

April 1, 2004: Heavy to moderate rain was falling during sampling. The rain started the previous day, and approximately ¾ inch had fallen when the samples were collected. It had been dry for at least 3 days prior.

The water at High St., the Post Office, and the Outflow was all clear and odorless.

May 18, 2004: Overcast during sampling. Air temperature at 6:30 a.m. was 17ºC.

High Street: There was a pool of water that looked stagnant at the opening of the culvert at High Street, so the samples were collected upstream from there about 30-40 feet. The brook is very shallow, only about 3 inches deep. The jug could only be filled half-way. This site was completely dry on Saturday, May 15, 2004 (3 days ago).

Walker Outflow: No odor or color to water in brook.

June 8, 2004: Partly cloudy. Air temp. 15ºC at 6:30 a.m.. Mass. Highway is doing major repair work this week to fix the stone sidewall at the outlet of the culvert, across the street from the Post Office. A storm drain leading to the brook was plugged and eventually "blew out" the plug and took part of the sidewall with it, according to Joe (?), who was fixing the wall for the MHD District #1. He said there is also a "natural waterway" that emerges from the rock wall that is weeping. He did not know the source of that water, but was re-creating the wall in such a way to allow the water to continue to weep out from the wall. He also explained that the sewer line that is next to the sidewalk on River Street drops straight down from the big manhole and then passes under the brook. He believes the sewer line is made up of old tile. Cement was once poured over the sewer line and you can see it still covering the bottom of the streambed. Water samples were taken today just a few feet downstream from the sewer line' crossing since there was water in the brook at that site (it is usually dry there).

High Street: There was a pool of water that looked stagnant at the opening of the culvert at High Street, so the samples were collected upstream from there about 30-40 feet. Only slight flow in the brook, so only the bacteria bottle could be filled (the jug's shoulder makes it too big to lower into the water enough to catch a clean sample). No color or odor in the water.

Post Office: Clear water, with a musky odor inside the culvert. Water too shallow at the outlet for the jug.

"Below Sewer Line": Water deep enough here for the jug and bacteria bottle.

Walker Outflow: No odor or color to water in brook.

July 13, 2004: Sunday it was warm and sunny, and yesterday was overcast. It rained last night and early this morning, but at sampling time it was dry and clear. It was dry for at least 3 days until last night.

High Street was dry.

Post Office: The flow was very low but steady coming out of the culvert/tunnel by the post office. The water was clear but full of sediments, with no noticeable odor. A new, green storm drain was flowing into the brook from where the sidewall was recently repaired. Looking up into the culvert you could see sunlight and water dropping down from the catch basin in the street in front of The Clip Shop on Rte. 9. A DPW man working on Glennon Street said that Walker Brook is in its own pipe/culvert that crosses school property at a diagonal and that then runs behind the houses on Glennon Street (not down the street itself). The storm drains in the area do empty into the Walker Brook culvert (he suggested we talk to Jim Gallagher for more info on Walker Brook). There was not enough flow to collect a sample below the sewer line.

Walker Brook at its Outflow (confluence): Light flow and a lot of trash. The volunteers filled both bottles, but in the only place that was deep enough for the jug the water was stagnant (so the bacteria may be higher than it would be if the water was flowing).

August 10, 2004: It has been clear but this morning it was partly cloudy. Air temp was 13 ºC around 6:30 a.m.

High Street was dry.

Post Office: No flow.

Walker Brook at its Outflow (confluence): The water was clear and odorless.

September 14, 2004: The weather has been clear and warm. The air temp was 9 ºC at 6:40 a.m.

High Street: Dry.

Post Office: Dry.

Walker Brook at its Outflow (confluence): There was enough water that even the jug could be filled at least half full..

October 12, 2004: The air temp was 7 ºC at 6:40 a.m.

High Street: Dry.

Post Office: Dry.

Walker Brook at its Outflow (confluence): The water was clear and odorless. There was enough water to fill the jug at least half full.

One preliminary sample was collected from Walker Brook's outflow in June 2000 after our shoreline survey was done the previous December. We started monitoring Walker Brook regularly in 2002.

2000 East Branch - Walker Brook's Outflow

Parameter	June 28, 2000
Total Coliform (MF) / 100ml	>2,000
Fecal Coliform (MF) /100ml	402
Total Phosphorus (as P) in mg/l *	0.04
Nitrite (as N) in mg/l	<0.01
Nitrate (as N) in mg/l *	0.06
Total Kjeldahl (as N) in mg/l	0.22
Total Nitrogen (as N) in mg/l	0.28
Volatile Organics	All Non -Detect
Trace Metals: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver.	All Non-Detect except Barium, which was at the Detection Level of 0.01 mg/l

Weather and Notes Regarding the 2002 East Branch Sampling Days:

April 25, 2002: Today is clear to partly cloudy, and cool, with no recent rain. The weather has been variable, with both cold and unseasonably warm weather. Flows are low and we are under a drought watch from the low snow fall amounts this past winter.

> No flow was found in Walker Brook at High Street, or at the outflow where it joins the East Branch. The only water at the outflow site was in puddles between the rocks.
>
> A dead fry (trout?) was found at the Hubbard site. The water is lower than in April '01.

May 14, 2002: Overcast and drizzling today. Rain, sometimes heavy, in past few days, resulting in very high flows today. Temperatures have been in the 50s and 60s.

> Walker Brook was just a puddle at High Street, and only 4-5 inches deep at the outflow.
>
> At Hubbard, flow was about 2 feet higher this month than last so the samples were taken from the bank here also.

June 11, 2002: Partly cloudy then clearing this morning, with no rain in the past few days. It has been sunny and warm but there was some rain, heavy at times, 4-5 days ago.

> There was no running water in Walker Brook at High Street.
>
> At the outflow, the water was very shallow. There was ~1/2 inch of clear water coming out of the drain under Rt.9 by the Post Office. The storm drains look dry. Rushing water could be heard in the manhole nearby.

July 9, 2002: Dry, and partly cloudy to overcast this morning. It has been clear and hot, with no rain in the past week. Hazy on Sunday from forest fires in Quebec, and still overcast this morning. Water levels are very low.

> No flow in Walker Brook today.
>
> Water very low at Hubbard Ave.

August 13, 2002: Clear but hazy this morning. It has been hot and dry and the water levels are very low.

> At Hubbard Ave the waster was so low the sampling had to be done 2/3rds the way across the channel to find water deep enough for sampling. The DO floc was long in forming, and did not form as sharp a line as usual.

September 10, 2002: Clear today, with some morning haze. It has been warm to hot, humid and sunny.

> The water at Hubbard Ave. had an oily feel to it, and was found to have a very high alkalinity level on this day.

October 8, 2002: Clear today. Cool and drizzly yesterday with some light rain. It has been dry for days, until yesterday. Temperatures in the 50s -60s.

> Samples were taken at the Hubbard site shortly before DEP took similar samples with its HydroLab meter.

2002 East Branch - High Street (Walker Brook)

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
pH	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Alkalinity in mg/l carbonate	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Fecal Coliform in colonies/100ml **	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
E-coli in colonies/100 ml **	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Total Phosphorus in mg/l *	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Nitrate-Nitrogen in mg/l *	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Water Temperature in degrees Celsius	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Total Suspended Solids in mg/l ***	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Turbidity in NTU	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow

2002 East Branch - Walker Brook Outflow

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	No Flow	9.60	5.74	No Flow	No Flow	No Flow	No Flow
pH	No Flow			No Flow	No Flow	No Flow	No Flow
Alkalinity in mg/l carbonate	No Flow			No Flow	No Flow	No Flow	No Flow
Fecal Coliform in colonies/100ml **	No Flow	1,900	20	No Flow	No Flow	No Flow	No Flow
E-coli in colonies/100 ml **	No Flow	2,400	20	No Flow	No Flow	No Flow	No Flow
Total Phosphorus in mg/l *	No Flow	0.02	0.020	No Flow	No Flow	No Flow	No Flow
Nitrate-Nitrogen in mg/l *	No Flow	0.32	1.270	No Flow	No Flow	No Flow	No Flow
Water Temperature in degrees Celsius	No Flow	7.5	13.5	No Flow	No Flow	No Flow	No Flow
Total Suspended Solids in mg/l***	No Flow			No Flow	No Flow	No Flow	No Flow
Turbidity in NTU	No Flow			No Flow	No Flow	No Flow	No Flow

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2002 East Branch – Hubbard Avenue

Parameter	April '02	May '02	June '02	July '02	Aug. '02	Sept. '02	Oct. '02
Dissolved Oxygen in mg/l	12.74	11.02	8.66	7.90	7.02	7.12	9.10
pH	7.83					8.00	8.06
Alkalinity in mg/l carbonate	70.0					200.00	164.00
Fecal Coliform in colonies/100ml	50	1,400	70	130	60	80	110
E-coli in colonies/100 ml	60	1,200	70	110	60	30	110
Total Phosphorus in mg/l	0.020	0.04	0.020	0.020	0.030	0.260	0.030
Nitrate-Nitrogen in mg/l	0.270	0.05	0.130	0.190	0.230	0.260	0.330
Water Temperature in degrees Celsius	9.0	7.5	18.0	21.0	22.5	19.5	12.5
Total Suspended Solids in mg/l***						13	2
Turbidity in NTU							2

Weather and Notes Regarding the 2003 East Branch Sampling Days:

April 15, 2003: Clear today, and it has been clear this past week, in the 50s-60s, with a couple of inches of snow last week. Snow still on the ground up at the State Park, though none left in town.

High Street: Water temp was 8ºC. No odor or color noticed by monitors.
Walker Brook Outflow: Water temp was 6.5ºC. No odor or color noticed by monitors.
Hubbard: Clear water with no odor.

May 13, 2003: Rained heavily on Sunday, the 11th (2 days ago), with a little more rain yesterday and drizzle this morning. Flow pretty high and fast today.

High Street: No Flow.
Walker Brook Outflow: Not enough flow to submerse the larger bottles.
Hubbard: Water tea-colored to muddy, with no odor. Water felt slightly greasy at the time of sampling. Water up 6” or so.

June 10, 2003:
Rained on Saturday, the 7th. Partly cloudy this morning, though yesterday afternoon was sunny. It has been cloudy, cool and damp lately.

High Street: No Flow.
Walker Brook Outflow: Flow too shallow to sample. No flow at all coming out of culvert under Rt. 8&9 by the Post Office. A large pile of composted material (grass clippings?!) on the bank at the confluence of Walker Brook.
Hubbard: Water tea-colored but clear with no odor.

July 8, 2003:
Overcast today, but has been hot and humid. No significant rain in more than a week (0.01" on the 6th, and 0.03" on June 30th).

High Street: No Flow.
Walker Brook Outflow: No Flow.
Hubbard: Water tea-colored but clear with no odor.

August 12, 2003:
Three inches of rain fell on the 10th and 11th! It has been very wet, hot and muggy. Periodic rain for the past 10 days. Overcast with some drizzle this morning. According to the Berkshire Eagle, August will have 5.83" of rain, in comparison to the average of 4.46"

High Street: No flow this morning but volunteer Cas Makowski did see it flowing last night after yesterday afternoon's heavy rain. He saw sufficient flow to be able to sample but couldn't due to the lab being closed.
Walker Brook Outflow: Clear water with no odor. Fast flow but shallow. Couldn't fill jug all the way. Backwater washing up into the brook from the main stem due to the water being so high today.
Hubbard: Water dark brown and muddy with no odor. Very high water level. Couldn't wade into the water due to depth.

September 9, 2003:
Clear this morning, around 70 degrees out. As been clear and mild for days. Last rains were on Sept. 2, 3, and 4 (2 inches fell over those 3 days). September will have almost twice the usual precipitation (6.95" instead of the average 3.52"), according to records kept by the Berkshire Eagle.

High Street: No Flow.
Walker Brook Outflow: Bone dry. Man at River Run apartments spraying an herbicide on the weeds in the parking lot and gutters.
Hubbard: Water tea-colored but clear with no odor.

October 14, 2003:
Clear and warm today, as well as this past week. Two volunteers noticed some light rain two days ago, though the USGS gauging station at Coltsville didn't register any precipitation for the past 7 days. Had a frost last night. The month of October will have 5.25" of rain, in comparison to the average of 3.26" (source: Berkshire Eagle)

High Street: No Flow.
Walker Brook Outflow: No flow out of culvert under Rt. 8&9. A little flow and water between the rocks at the confluence but not enough to be able to sample. No sign of obvious water source (three storm drain pipes seen but all were dry).
Hubbard: Water tea-colored but clear with no odor.

2003 East Branch - High Street (Walker Brook)

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	9.90	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
pH	7.43	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Alkalinity in mg/l carbonate	34	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Fecal Coliform in colonies/100ml **	160	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
E-Coli in colonies/100 ml **	80	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Total Phosphorus in mg/l *	0.040	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Nitrate-Nitrogen in mg/l *	0.010	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Water Temperature in degrees Celsius	8.0	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow
Total Suspended Solids in mg/l ***	2	No Flow	No Flow	No Flow	No Flow	No Flow	No Flow

2003 East Branch - Walker Brook Outflow

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	10.86	Very Low Flow	No Flow	No Flow	Low Flow	No Flow	No Flow
pH	7.88	Very Low Flow	No Flow	No Flow		No Flow	No Flow
Alkalinity in mg/l carbonate	132	Very Low Flow	No Flow	No Flow		No Flow	No Flow
Fecal Coliform in colonies/100ml **	170	2,000	No Flow	No Flow	650	No Flow	No Flow
E-Coli in colonies/100 ml **	130	1,700	No Flow	No Flow	560	No Flow	No Flow
Total Phosphorus in mg/l *	0.046	Very Low Flow	No Flow	No Flow	0.027	No Flow	No Flow
Nitrate-Nitrogen in mg/l *	0.840	Very Low Flow	No Flow	No Flow	1.45	No Flow	No Flow
Water Temperature in degrees Celsius	6.5	Very Low Flow	No Flow	No Flow		No Flow	No Flow
Total Suspended Solids in mg/l***	1	Very Low Flow	No Flow	No Flow	1	No Flow	No Flow

* Values of "0.009" are used to graph those results below the detection limit of 0.01 mg/l.
** Bacteria values of "9" represent those results below the detection limit of 10 colonies.
*** TSS values below the detection limit 1 mg/l are graphed as "0.9" mg/l.

2003 East Branch - Hubbard Ave.

Parameter	April '03	May '03	June '03	July '03	Aug. '03	Sept. '03	Oct. '03
Dissolved Oxygen in mg/l	11.60	9.84	9.04	7.76	8.50	8.10	9.84
pH	7.61						7.96
Alkalinity in mg/l carbonate	36						88
Fecal Coliform in colonies/100ml **	20	160	70	200	600	150	150
E-Coli in colonies/100 ml **	9	160	60	110	350	140	130
Total Phosphorus in mg/l *	0.040	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-Nitrogen in mg/l *	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Water Temperature in degrees Celsius	5.5	11.0	15.0	21.5	20.5	16.0	11.5
Total Suspended Solids in mg/l***	1	1	4	1	16	2	3

Walker Brook as it exits the “culvert”, by the Dalton Post Office

APPENDIX F

HVA East Branch Water Quality Monitoring Results (2006)

2006 East Branch - Nitrate-Nitrogen (mg/l)

SITE	May 9, '06	June 13, '06	July 11, '06	Aug. 9, '06	Sept. 12, '06
CARMEL HOUSE	0.02	0.05	0.05	0.03	0.06
260 "OLD DALTON BROOK" (unnamed tributary)	0.23	0.19	0.31	0.22	0.17
"OLD DALTON BROOK" (unnamed tributary)	1.25	0.86	1.26	1.37	1.33
PARTRIDGEFIELD	0.09	0.11	0.22	0.12	0.25
ORCHARD ROAD	0.13	0.14	0.26	0.15	0.32
STATE PARK (Wahconah Falls Brook)	0.10	0.02	0.28	0.23	0.25
CLEVELAND ROAD (Wahconah Falls Brk)	0.38	0.06	0.11	0.75	0.73
WFB at Rte 9 (Wahconah Falls Brk)	0.38	0.07	0.12	0.59	0.52
EAST BRANCH, Above Walker Brook	0.16	0.13	0.17	0.25	0.35
HIGH STREET (Walker Brk)		<0.01			
POST OFFICE (Walker Brk)		0.01			
BELOW SEWER LINE (Walker Brk)		0.01			
WALKER BROOK OUTFLOW (Walker Brk)	1.69	0.13	1.24	1.73	
HUBBARD AVENUE	0.15	0.13	0.18	0.20	0.32

2006 East Branch - Fecal Coliform Bacteria (colonies per 100 ml)

SITE	May 9, '06	June 13, '06	July 11, '06	Aug. 9, '06	Sept. 12, '06
CARMEL HOUSE	60	20	180	50	30
260 "OLD DALTON BROOK" (unnamed tributary)	<10	<10	110	20	40
"OLD DALTON BROOK" (unnamed tributary)	10	<10	120	10	20
PARTRIDGEFIELD	20	310	150	90	<10
ORCHARD ROAD	10	70	1,250	60	120
STATE PARK (Wahconah Falls Brook)	20	<10	<10	30	30
CLEVELAND ROAD (Wahconah Falls Brk)	420	40	380	10	40
WFB at Rte 9 (Wahconah Falls Brk)	50	490	210	40	30
EAST BRANCH, Above Walker Brook	40	100	580	30	80
HIGH STREET (Walker Brk)		110			
POST OFFICE (Walker Brk)		120	>5,000		
BELOW SEWER LINE (Walker Brk)		300	>5,000		
WALKER BROOK OUTFLOW (Walker Brk)	590	130	>5,000	700	80
HUBBARD AVENUE	40	150	180	80	70

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2023	Walker Brook	WLK400	Downstream of where the brook daylights, adjacent to the River Run Apartments entrance.	42.472823	-73.164620	06/15/2023	Escherichia coli	128.1	(MPN or CFU/100ml)	24hr 1.13"; 48 hr 1.13"; 72hr 1.35"
	Walker Brook	WLK400		42.472823	-73.164620	07/06/2023	Escherichia coli	38.1	(MPN or CFU/100ml)	24hr 0.0"; 48 hr 0.19"; 72hr 0.37"
	Walker Brook	WLK400		42.472823	-73.164620	07/13/2023	Escherichia coli	86	(MPN or CFU/100ml)	24hr 0.16"; 48 hr 0.16"; 72hr 1.3"
	Walker Brook	WLK400		42.472823	-73.164620	07/27/2023	Escherichia coli	547.5	(MPN or CFU/100ml)	24hr 0.04"; 48 hr 0.04"; 72hr 0.04"
	Walker Brook	WLK400		42.472823	-73.164620	08/09/2023	Escherichia coli	1986.3	(MPN or CFU/100ml)	24hr 0.38"; 48 hr 0.62"; 72hr 0.62"
	Walker Brook	WLK400		42.472823	-73.164620	08/24/2023	Escherichia coli	6.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	09/07/2023	Escherichia coli	53.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	09/20/2023	Escherichia coli	133.3	(MPN or CFU/100ml)	24hr 0.1"; 48 hr 0.7"; 72hr 0.72"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Anthony Brook	ANB01.2	Upstream of the North Mountain Road bridge	42.488550	-73.148730	07/07/2022	Ammonia-nitrogen	0.1	ppm	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/14/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/28/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0"; 72hr 0.08"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/11/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/25/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Barton Brook	OF_BaB260-OT	Opposite 222 Grange Hall Road	42.460817	-73.174736	07/14/2022	Ammonia-nitrogen	0.1	ppm	24hr 0"; 48 hr 0"; 72hr 0"
	Barton Brook	OF_BaB260-OT		42.460817	-73.174736	8/11/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive - access the river by the stormwater swale	42.476391	-73.154870	07/07/2022	Ammonia-nitrogen	0.3	ppm	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/14/2022	Ammonia-nitrogen	0.25	ppm	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/28/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0"; 72hr 0.08"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/11/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/25/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0.47"; 72hr 0.47"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	East Branch of the Housatonic River	OF_DO330-OT	Between 460 and 484 West Housatonic Street	42.469685	-73.160783	07/14/2022	Ammonia-nitrogen	0.3	ppm	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	OF_DO330-OT		42.469685	-73.160783	8/11/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400	Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	42.472823	-73.164620	07/07/2022	Ammonia-nitrogen	0.1	ppm	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400		42.472823	-73.164620	07/14/2022	Ammonia-nitrogen	0.3	ppm	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/28/2022	Ammonia-nitrogen	0.05	ppm	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400		42.472823	-73.164620	8/11/2022	Ammonia-nitrogen	0.25	ppm	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400		42.472823	-73.164620	8/25/2022	Ammonia-nitrogen	4.0	ppm	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Anthony Brook	ANB01.2	Upstream of the North Mountain Road bridge	42.488550	-73.148730	07/07/2022	Chlorine	0.28	mg/l	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/14/2022	Chlorine	0.15	mg/l	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/28/2022	Chlorine	0.01	mg/l	24hr 0"; 48 hr 0"; 72hr 0.08"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/11/2022	Chlorine	0.02	mg/l	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/25/2022	Chlorine	0.05	mg/l	24hr 0"; 48 hr 0.47"; 72hr 0.47"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Barton Brook	OF_BaB260-OT	Opposite 222 Grange Hall Road	42.460817	-73.174736	07/14/2022	Chlorine	0.06	mg/l	24hr 0"; 48 hr 0"; 72hr 0"
	Barton Brook	OF_BaB260-OT		42.460817	-73.174736	8/11/2022	Chlorine	0.04	mg/l	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive	42.476391	-73.154870	07/07/2022	Chlorine	0.13	mg/L	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/14/2022	Chlorine	0.05	mg/L	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/28/2022	Chlorine	0.05	mg/L	24hr 0"; 48 hr 0"; 72hr 0.08"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/11/2022	Chlorine	0.11	mg/L	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/25/2022	Chlorine	0.24	mg/L	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	East Branch of the Housatonic River	OF_DO330-OT	Between 460 and 484 West Housatonic Street	42.469685	-73.160783	07/14/2022	Chlorine	0.1	mg/L	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	OF_DO330-OT		42.469685	-73.160783	8/11/2022	Chlorine	0.03	mg/L	24hr 0"; 48 hr 0.07"; 72hr 0.15"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Walker Brook	WLK400	Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	42.472823	-73.164620	07/07/2022	Chlorine	0.01	mg/L	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400		42.472823	-73.164620	07/14/2022	Chlorine	0.05	mg/L	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/28/2022	Chlorine	0.06	mg/L	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400		42.472823	-73.164620	8/11/2022	Chlorine	0.00	mg/L	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400		42.472823	-73.164620	8/25/2022	Chlorine	0.11	mg/L	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Anthony Brook	ANB01.2	Upstream of the North Mountain Road bridge	42.488550	-73.148730	07/07/2022	Conductivity	18.2	µS	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/14/2022	Conductivity	21.8	µS	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/28/2022	Conductivity	23.0	µS	24hr 0"; 48 hr 0"; 72hr 0.08"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/11/2022	Conductivity	26.4	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/25/2022	Conductivity	26.6	µS	24hr 0"; 48 hr 0.47"; 72hr 0.47"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Barton Brook	OF_BaB260-OT	Opposite 222 Grange Hall Road	42.460817	-73.174736	07/14/2022	Conductivity	1162	µS	24hr 0"; 48 hr 0"; 72hr 0"
	Barton Brook	OF_BaB260-OT		42.460817	-73.174736	8/11/2022	Conductivity	2004	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive	42.476391	-73.154870	07/07/2022	Conductivity	263.2	µS	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/14/2022	Conductivity	323.9	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/28/2022	Conductivity	333.7	µS	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/11/2022	Conductivity	348.9	µS	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/25/2022	Conductivity	339.5	µS	24hr 0"; 48 hr 0"; 72hr 0.08"
	East Branch of the Housatonic River	OF_DO330-OT	Between 460 and 484 West Housatonic Street	42.469685	-73.160783	07/14/2022	Conductivity	324.1	µS	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	East Branch of the Housatonic River	OF_DO330-OT		42.469685	-73.160783	8/11/2022	Conductivity	373.2	µS	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400	Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	42.472823	-73.164620	07/07/2022	Conductivity	285.5	µS	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400		42.472823	-73.164620	07/14/2022	Conductivity	243	µS	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/28/2022	Conductivity	233.9	µS	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400		42.472823	-73.164620	8/11/2022	Conductivity	279.3	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400		42.472823	-73.164620	8/25/2022	Conductivity	246.6	µS	24hr 0"; 48 hr 0.47"; 72hr 0.47"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Anthony Brook	ANB01.2	Upstream of the North Mountain Road bridge	42.488550	-73.148730	06/16/2022	Escherichia coli	29	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	06/30/2022	Escherichia coli	0	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.23"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/14/2022	Escherichia coli	14.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/28/2022	Escherichia coli	9.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.08"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/11/2022	Escherichia coli	5.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/25/2022	Escherichia coli	27.5	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Anthony Brook	ANB01.2		42.488550	-73.148730	09/08/2022	Escherichia coli	31.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.2"; 72hr 2.07"
	Anthony Brook	ANB01.2		42.488550	-73.148730	9/22/2022	Escherichia coli	727.0	(MPN or CFU/100ml)	24hr 0.38"; 48 hr 0.38"; 72hr 0.72"
	Barton Brook	OF_BaB260-OT	Opposite 222 Grange Hall Road	42.460817	-73.174736	07/28/2022	Escherichia coli	22.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.08"
	Barton Brook	OF_BaB260-OT		42.460817	-73.174736	8/11/2022	Escherichia coli	38.9	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive	42.476391	-73.154870	06/16/2022	Escherichia coli	307.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	06/30/2022	Escherichia coli	387.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/14/2022	Escherichia coli	1732.9	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/28/2022	Escherichia coli	435.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.07"; 72hr 0.15"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive	42.476391	-73.154870	8/11/2022	Escherichia coli	410.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/25/2022	Escherichia coli	435.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.23"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	09/08/2022	Escherichia coli	461.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	9/22/2022	Escherichia coli	2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.08"
	East Branch of the Housatonic River	OF_DO330-OT	Between 460 and 484 West Housatonic Street	42.469685	-73.160783	07/28/2022	Escherichia coli	23.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.08"
	East Branch of the Housatonic River	OF_DO330-OT		42.469685	-73.160783	8/11/2022	Escherichia coli	7.5	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400	Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	42.472823	-73.164620	06/16/2022	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	06/30/2022	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/14/2022	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/28/2022	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400		42.472823	-73.164620	8/11/2022	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400		42.472823	-73.164620	8/25/2022	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Walker Brook	WLK400		42.472823	-73.164620	09/08/2022	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.2"; 72hr 2.07"
	Walker Brook	WLK400		42.472823	-73.164620	9/22/2022	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0.38"; 48 hr 0.38"; 72hr 0.72"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Walker Brook	WLK400D	10% DILUTION - Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	42.472823	-73.164620	06/30/2022	Escherichia coli	4590	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400D		42.472823	-73.164620	07/28/2022	Escherichia coli	10,190	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400D		42.472823	-73.164620	8/11/2022	Escherichia coli	3990	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400D		42.472823	-73.164620	9/22/2022	Escherichia coli	3310	(MPN or CFU/100ml)	24hr 0.38"; 48 hr 0.38"; 72hr 0.72"
	Anthony Brook	ANB01.2	Upstream of the North Mountain Road bridge	42.488550	-73.148730	07/07/2022	Salinity	0	ppt	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/14/2022	Salinity	0	ppt	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/28/2022	Salinity	0.00	ppt	24hr 0"; 48 hr 0"; 72hr 0.08"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/11/2022	Salinity	0.0	ppt	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/25/2022	Salinity	0.0	ppt	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Barton Brook	OF_BaB260-OT	Opposite 222 Grange Hall Road	42.460817	-73.174736	07/14/2022	Salinity	0.7	ppt	24hr 0"; 48 hr 0"; 72hr 0"
	Barton Brook	OF_BaB260-OT		42.460817	-73.174736	8/11/2022	Salinity	1.2	ppt	24hr 0"; 48 hr 0.07"; 72hr 0.15"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive	42.476391	-73.154870	07/07/2022	Salinity	0.1	ppt	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/14/2022	Salinity	0.2	ppt	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/28/2022	Salinity	0.2	ppt	24hr 0"; 48 hr 0.2"; 72hr 2.07"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/11/2022	Salinity	0.2	ppt	24hr 0.38"; 48 hr 0.38"; 72hr 0.72"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/25/2022	Salinity	0.2	ppt	24hr 0"; 48 hr 0"; 72hr 0.08"
	East Branch of the Housatonic River	OF_DO330-OT	Between 460 and 484 West Housatonic Street	42.469685	-73.160783	07/14/2022	Salinity	0.2	ppt	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	OF_DO330-OT		42.469685	-73.160783	8/11/2022	Salinity	0.2	ppt	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400	Downstream of where brook daylights south side of Main Street (adjacent to River Run Apartment entrance)	42.472823	-73.164620	07/07/2022	Salinity	0.2	ppt	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400		42.472823	-73.164620	07/14/2022	Salinity	0.1	ppt	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/28/2022	Salinity	0.1	ppt	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400		42.472823	-73.164620	8/11/2022	Salinity	0.2	ppt	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400		42.472823	-73.164620	8/25/2022	Salinity	0.1	ppt	24hr 0"; 48 hr 0.47"; 72hr 0.47"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Anthony Brook	ANB01.2	Upstream of the North Mountain Road bridge	42.488550	-73.148730	07/07/2022	Specific conductance	22.5	µS	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/14/2022	Specific conductance	26.2	µS	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/28/2022	Specific conductance	27.4	µS	24hr 0"; 48 hr 0"; 72hr 0.08"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/11/2022	Specific conductance	30.3	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/25/2022	Specific conductance	30.7	µS	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Barton Brook	OF_BaB260-OT	Opposite 222 Grange Hall Road	42.460817	-73.174736	07/14/2022	Specific conductance	1456	µS	24hr 0"; 48 hr 0"; 72hr 0"
	Barton Brook	OF_BaB260-OT		42.460817	-73.174736	8/11/2022	Specific conductance	2386	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive	42.476391	-73.154870	07/07/2022	Specific conductance	306.5	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/14/2022	Specific conductance	358.3	µS	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/28/2022	Specific conductance	376.1	µS	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/11/2022	Specific conductance	378.0	µS	24hr 0"; 48 hr 0"; 72hr 0.08"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/25/2022	Specific conductance	375.4	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	East Branch of the Housatonic River	OF_DO330-OT	Between 460 and 484 West Housatonic Street	42.469685	-73.160783	07/14/2022	Specific conductance	392.7	µS	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	OF_DO330-OT		42.469685	-73.160783	8/11/2022	Specific conductance	407.8	µS	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400	Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	42.472823	-73.164620	07/07/2022	Specific conductance	349.7	µS	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400		42.472823	-73.164620	07/14/2022	Specific conductance	285.5	µS	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/28/2022	Specific conductance	276	µS	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400		42.472823	-73.164620	8/11/2022	Specific conductance	315.7	µS	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400		42.472823	-73.164620	8/25/2022	Specific conductance	272.9	µS	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Anthony Brook	ANB01.2	Upstream of the North Mountain Road bridge	42.488550	-73.148730	07/07/2022	Surfactants, anionic	0.1	mg/L	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/14/2022	Surfactants, anionic	NA	mg/L	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/28/2022	Surfactants, anionic	0.05	mg/L	24hr 0"; 48 hr 0"; 72hr 0.08"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Barton Brook	OF_BaB260-OT	Opposite 222 Grange Hall Road	42.460817	-73.174736	07/14/2022	Surfactants, anionic	0.35	mg/L	24hr 0"; 48 hr 0"; 72hr 0"
	Barton Brook	OF_BaB260-OT		42.460817	-73.174736	8/11/2022	Surfactants, anionic	0.35	mg/L	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	OF_DO330-OT	Between 460 and 484 West Housatonic Street	42.469685	-73.160783	07/14/2022	Surfactants, anionic	2	mg/L	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	OF_DO330-OT		42.469685	-73.160783	8/11/2022	Surfactants, anionic	0.05	mg/L	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive	42.476391	-73.154870	07/07/2022	Surfactants, anionic	0.1	mg/L	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/14/2022	Surfactants, anionic	NA	mg/L	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/28/2022	Surfactants, anionic	0.1	mg/L	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400	Downstream of where brook daylights south side of Main Street (adj to River Run Apartment entrance)	42.472823	-73.164620	07/07/2022	Surfactants, anionic	0.1	mg/L	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400		42.472823	-73.164620	07/14/2022	Surfactants, anionic	0.1	mg/L	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/28/2022	Surfactants, anionic	0.15	mg/L	24hr 0"; 48 hr 0"; 72hr 0.08"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	Anthony Brook	ANB01.2	Upstream of the North Mountain Road bridge	42.488550	-73.148730	07/07/2022	Temperature	15.1	°C	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/14/2022	Temperature	16.1	°C	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.488550	-73.148730	07/28/2022	Temperature	16.7	°C	24hr 0"; 48 hr 0"; 72hr 0.08"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/11/2022	Temperature	18.3	°C	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Anthony Brook	ANB01.2		42.488550	-73.148730	8/25/2022	Temperature	17.8	°C	24hr 0"; 48 hr 0.47"; 72hr 0.47"
	Barton Brook	OF_BaB260-OT	Opposite 222 Grange Hall Road	42.460817	-73.174736	07/14/2022	Temperature	14.4	°C	24hr 0"; 48 hr 0"; 72hr 0"
	Barton Brook	OF_BaB260-OT		42.460817	-73.174736	8/11/2022	Temperature	16.7	°C	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive	42.476391	-73.154870	07/07/2022	Temperature	17	°C	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/14/2022	Temperature	18.6	°C	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	07/28/2022	Temperature	19.0	°C	24hr 0"; 48 hr 0"; 72hr 0.08"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/11/2022	Temperature	21.0	°C	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	East Branch of the Housatonic River	EAB210		42.476391	-73.154870	8/25/2022	Temperature	20.0	°C	24hr 0"; 48 hr 0.47"; 72hr 0.47"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2022	East Branch of the Housatonic River	OF_DO330-OT	Between 460 and 484 West Housatonic Street	42.469685	-73.160783	07/14/2022	Temperature	15.58	°C	24hr 0"; 48 hr 0"; 72hr 0"
	East Branch of the Housatonic River	OF_DO330-OT		42.469685	-73.160783	8/11/2022	Temperature	20.6	°C	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400	Downstream of where brook daylights south side of Main Street (adjacent to River Run Apartment entrance)	42.472823	-73.164620	07/07/2022	Temperature	15.4	°C	24hr 0.16"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400		42.472823	-73.164620	07/14/2022	Temperature	17.2	°C	24hr 0"; 48 hr 0"; 72hr 0"
	Walker Brook	WLK400		42.472823	-73.164620	07/28/2022	Temperature	17.1	°C	24hr 0"; 48 hr 0"; 72hr 0.08"
	Walker Brook	WLK400		42.472823	-73.164620	8/11/2022	Temperature	19.0	°C	24hr 0"; 48 hr 0.07"; 72hr 0.15"
	Walker Brook	WLK400		42.472823	-73.164620	8/25/2022	Temperature	20.0	°C	24hr 0"; 48 hr 0.47"; 72hr 0.47"
2021	Barton Brook	BBK200	Downstream of Sleepy Hollow Drive Bridge	42.46045971	-73.17678075	6/3/2021	Escherichia coli	24.9	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	Barton Brook	BBK200		42.46045971	-73.17678075	6/17/2021	Escherichia coli	16	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	Barton Brook	BBK200		42.46045971	-73.17678075	7/1/2021	Escherichia coli	106.7	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	Barton Brook	BBK200		42.46045971	-73.17678075	7/29/2021	Escherichia coli	48	(MPN or CFU/100ml)	24hr 0"; 48 hr 1.52"; 72hr 1.52"
	Barton Brook	BBK200		42.46045971	-73.17678075	9/1/2021	Escherichia coli	93.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	Barton Brook	BBK200		42.46045971	-73.17678075	9/23/2021	Escherichia coli	5.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2021	Barton Brook	BBK400	Upstream of the Hubbard Avenue Bridge	42.462041100 16265,	-73.1886675	6/3/2021	Escherichia coli	125.9	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	Barton Brook	BBK400		42.462041100 16265,	-73.1886675	7/1/2021	Escherichia coli	866.4	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	Barton Brook	BBK400		42.462041100 16265,	-73.1886675	7/29/2021	Escherichia coli	83.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 1.52"; 72hr 1.52"
	Barton Brook	BBK400	Upstream of the Hubbard Avenue Bridge	42.4620411	-73.1886675	9/1/2021	Escherichia coli	139.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	Barton Brook	BBK400		42.4620411	-73.1886675	9/23/2021	Escherichia coli	29.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"
	East Branch of the Housatonic River	EAB200	Upstream of the Old Windsor Road Bridge	42.473619	-73.14124755	6/3/2021	Escherichia coli	48.8	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	East Branch of the Housatonic River	EAB200		42.473619242 4724,	-73.14124755	6/17/2021	Escherichia coli	206.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	East Branch of the Housatonic River	EAB200		42.47361924	-73.14124755	7/1/2021	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	East Branch of the Housatonic River	EAB200		42.47361924	-73.14124755	7/22/2021	Escherichia coli	88.4	(MPN or CFU/100ml)	24hr 0.18"; 48 hr 0.33"; 72hr 0.33"
	East Branch of the Housatonic River	EAB200		42.47361924	-73.14124755	7/29/2021	Escherichia coli	95.9	(MPN or CFU/100ml)	24hr 0"; 48 hr 1.52"; 72hr 1.52"
	East Branch of the Housatonic River	EAB200		42.47361924	-73.14124755	8/12/2021	Escherichia coli	161.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.0"
	East Branch of the Housatonic River	EAB200		42.47361924	-73.14124755	9/1/2021	Escherichia coli	488.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	East Branch of the Housatonic River	EAB200		42.47361924	-73.14124755	9/23/2021	Escherichia coli	107.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2021	East Branch of the Housatonic River	EAB210	Just before the confluence with Center Pond, end of Riverview Drive - access the river by the stormwater swale	42.47639147	-73.15486813	6/3/2021	Escherichia coli	95.9	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	East Branch of the Housatonic River	EAB210		42.47639147	-73.15486813	6/17/2021	Escherichia coli	249.5	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	East Branch of the Housatonic River	EAB210		42.47639147	-73.15486813	7/1/2021	Escherichia coli	1986.3	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	East Branch of the Housatonic River	EAB210		42.47639147	-73.15486813	7/29/2021	Escherichia coli	121.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 1.52"; 72hr 1.52"
	East Branch of the Housatonic River	EAB210		42.47639147	-73.15486813	8/12/2021	Escherichia coli	344.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.0"
	East Branch of the Housatonic River	EAB210		42.47639147	-73.15486813	9/1/2021	Escherichia coli	488.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	East Branch of the Housatonic River	EAB210		42.47639147	-73.15486813	9/23/2021	Escherichia coli	228.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"
	East Branch of the Housatonic River	EAB220	Upstream of Rte 8/Main Street bridge, Center Pond Outlet	42.47429663	-73.15665879	6/3/2021	Escherichia coli	98.5	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	East Branch of the Housatonic River	EAB220		42.47429663	-73.15665879	6/17/2021	Escherichia coli	360.9	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	East Branch of the Housatonic River	EAB220		42.47429663	-73.15665879	7/1/2021	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	East Branch of the Housatonic River	EAB220		42.47429663	-73.15665879	7/22/2021	Escherichia coli	139.6	(MPN or CFU/100ml)	24hr 0.18"; 48 hr 0.33"; 72hr 0.33"
	East Branch of the Housatonic River	EAB220		42.47429663	-73.15665879	7/29/2021	Escherichia coli	115.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 1.52"; 72hr 1.52"
	East Branch of the Housatonic River	EAB220		42.47429663	-73.15665879	8/12/2021	Escherichia coli	579.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.0"
	East Branch of the Housatonic River	EAB220		42.47429663	-73.15665879	9/1/2021	Escherichia coli	387.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	East Branch of the Housatonic River	EAB220		42.47429663	-73.15665879	9/23/2021	Escherichia coli	162.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2021	East Branch of the Housatonic River	EAB280	Upstream of West Housatonic Street Bridge	42.4711268	-73.16854512	6/3/2021	Escherichia coli	95.9	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	East Branch of the Housatonic River	EAB280		42.471126761 877095,	-73.16854512	6/17/2021	Escherichia coli	204.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	East Branch of the Housatonic River	EAB280		42.471126761 877095,	-73.16854512	7/1/2021	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	East Branch of the Housatonic River	EAB280		42.471126761 877095,	-73.16854512	7/29/2021	Escherichia coli	146.7	(MPN or CFU/100ml)	24hr 0"; 48 hr 1.52"; 72hr 1.52"
	East Branch of the Housatonic River	EAB280		42.471126761 877095,	-73.16854512	8/12/2021	Escherichia coli	275.5	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.0"
	East Branch of the Housatonic River	EAB280		42.471126761 877095,	-73.16854512	9/1/2021	Escherichia coli	461.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	East Branch of the Housatonic River	EAB280		42.471126761 877095,	-73.16854512	9/23/2021	Escherichia coli	113	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"
	East Branch of the Housatonic River	EAB500	Upstream of the Elm Street Bridge	42.44511812	-73.24405254	6/3/2021	Escherichia coli	228.2	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	East Branch of the Housatonic River	EAB500		42.44511812	-73.24405254	6/17/2021	Escherichia coli	238.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	East Branch of the Housatonic River	EAB500		42.44511812	-73.24405254	7/1/2021	Escherichia coli	2419.6	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	East Branch of the Housatonic River	EAB500		42.44511812	-73.24405254	7/29/2021	Escherichia coli	248.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 1.52"; 72hr 1.52"
	East Branch of the Housatonic River	EAB500		42.44511812	-73.24405254	8/12/2021	Escherichia coli	307.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.0"
	East Branch of the Housatonic River	EAB500		42.44511812	-73.24405254	9/1/2021	Escherichia coli	1046.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	East Branch of the Housatonic River	EAB500		42.44511812	-73.24405254	9/23/2021	Escherichia coli	122.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2021	Wahconah Falls Brook	WFB200	Upstream of the Route 9 Bridge (upstream of WFB01.2)	42.48732069	-73.13180217	6/3/2021	Escherichia coli	12.1	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	Wahconah Falls Brook	WFB200		42.48732069	-73.13180217	6/17/2021	Escherichia coli	32.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	Wahconah Falls Brook	WFB200		42.48732069	-73.13180217	7/1/2021	Escherichia coli	156.5	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	Wahconah Falls Brook	WFB200		42.48732069	-73.13180217	8/12/2021	Escherichia coli	224.7	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.0"
	Wahconah Falls Brook	WFB200		42.48732069	-73.13180217	9/1/2021	Escherichia coli	51.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	Wahconah Falls Brook	WFB200		42.48732069	-73.13180217	9/23/2021	Escherichia coli	387.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"
	Wahconah Falls Brook	WFB300	Upstream of the Route 9 Bridge (formerly WFB01.2)	42.4843668	-73.14845314	6/3/2021	Escherichia coli	22.6	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	Wahconah Falls Brook	WFB300		42.4843668	-73.14845314	6/17/2021	Escherichia coli	73.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	Wahconah Falls Brook	WFB300		42.4843668	-73.14845314	7/1/2021	Escherichia coli	224.7	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	Wahconah Falls Brook	WFB300		42.4843668	-73.14845314	8/12/2021	Escherichia coli	88	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.0"
	Wahconah Falls Brook	WFB300		42.4843668	-73.14845314	9/1/2021	Escherichia coli	90.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	Wahconah Falls Brook	WFB300		42.4843668	-73.14845314	9/23/2021	Escherichia coli	117.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2021	Walker Brook	WLK400	Downstream of where brook daylights	42.47282302	-73.16461538	6/3/2021	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 0.08"; 48 hr 0.08"; 72hr 0.13"
	Walker Brook	WLK400		42.47282302	-73.16461538	6/17/2021	Escherichia coli	579.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.16"
	Walker Brook	WLK400		42.47282302	-73.16461538	7/1/2021	Escherichia coli	>2419.6	(MPN or CFU/100ml)	24hr 1.25"; 48 hr 2.64"; 72hr 2.64"
	Walker Brook	WLK400		42.47282302	-73.16461538	7/22/2021	Escherichia coli	101.2	(MPN or CFU/100ml)	24hr 0.18"; 48 hr 0.33"; 72hr 0.33"
	Walker Brook	WLK400		42.47282302	-73.16461538	7/29/2021	Escherichia coli	1203.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 1.52"; 72hr 1.52"
	Walker Brook	WLK400		42.47282302	-73.16461538	8/12/2021	Escherichia coli	1553.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.0"; 72hr 0.0"
	Walker Brook	WLK400		42.47282302	-73.16461538	9/1/2021	Escherichia coli	2419.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.83"; 72hr 0.83"
	Walker Brook	WLK400		42.47282302	-73.16461538	9/23/2021	Escherichia coli	193.5	(MPN or CFU/100ml)	24hr 0"; 48 hr 0.11"; 72hr 0.11"
2020	Anthony Brook	ANB01.2	Upstream of North Mountain Road	42.48854989	-73.14872985	6/15/2020	Escherichia coli	5.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.74"
	Anthony Brook	ANB01.2		42.48854989	-73.14872985	6/23/2020	Escherichia coli	24.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Anthony Brook	ANB01.2		42.48854989	-73.14872985	6/30/2020	Escherichia coli	920.8	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	Anothony Brook	ANB01.2		42.48854989	-73.14872985	7/15/2020	Escherichia coli	17.3	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	Anthony Brook	ANB01.2		42.48854989	-73.14872985	7/29/2020	Escherichia coli	8.6	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	Anothony Brook	ANB01.2		42.48854989	-73.14872985	8/12/2020	Escherichia coli	27.5	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	Anthony Brook	ANB01.2		42.48854989	-73.14872985	8/26/2020	Escherichia coli	18.7	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	Anthony Brook	ANB01.2		42.48854989	-73.14872985	9/9/2020	Escherichia coli	7.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2020	East Banch of Housatonic River	EAB200	Downstream of Old Windsor Road bridge	42.47369635	-73.14121	6/23/2020	Escherichia coli	85.7	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	East Banch of Housatonic River	EAB200		42.47369635	-73.14121	6/30/2020	Escherichia coli	547.5	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	East Banch of Housatonic River	EAB200		42.47369635	-73.14121	7/15/2020	Escherichia coli	49.6	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	East Banch of Housatonic River	EAB200		42.47369635	-73.14121	7/29/2020	Escherichia coli	613.1	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	East Banch of Housatonic River	EAB200		42.47369635	-73.14121	8/12/2020	Escherichia coli	435.2	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	East Banch of Housatonic River	EAB200		42.47369635	-73.14121	8/26/2020	Escherichia coli	101.9	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	East Banch of Housatonic River	EAB200		42.47369635	-73.14121	9/9/2020	Escherichia coli	83.9	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"
	East Banch of Housatonic River	EAB220	Center Pond Outlet (Rte 8 bridge)	42.47429663	-73.15665879	6/15/2020	Escherichia coli	198.9	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.74"
	East Banch of Housatonic River	EAB220		42.47429663	-73.15665879	6/23/2020	Escherichia coli	686.7	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	East Banch of Housatonic River	EAB220		42.47429663	-73.15665879	6/30/2020	Escherichia coli	1986.3	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	East Banch of Housatonic River	EAB220		42.47429663	-73.15665879	7/15/2020	Escherichia coli	275.5	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	East Banch of Housatonic River	EAB220		42.47429663	-73.15665879	7/29/2020	Escherichia coli	435.2	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	East Banch of Housatonic River	EAB220		42.47429663	-73.15665879	8/12/2020	Escherichia coli	686.7	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	East Banch of Housatonic River	EAB220		42.47429663	-73.15665879	8/26/2020	Escherichia coli	488.4	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	East Banch of Housatonic River	EAB220		42.47429663	-73.15665879	9/9/2020	Escherichia coli	435.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2020	East Banch of Housatonic River	EAB280	Upstream of West Housatonic Street	42.47137394	-73.1686657	6/23/2020	Escherichia coli	344.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	East Banch of Housatonic River	EAB280		42.47137394	-73.1686657	6/30/2020	Escherichia coli	1203.3	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	East Banch of Housatonic River	EAB280		42.47137394	-73.1686657	7/15/2020	Escherichia coli	98.5	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	East Banch of Housatonic River	EAB280		42.47137394	-73.1686657	7/29/2020	Escherichia coli	66.3	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	East Banch of Housatonic River	EAB280		42.47137394	-73.1686657	8/12/2020	Escherichia coli	218.7	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	East Banch of Housatonic River	EAB280		42.47137394	-73.1686657	8/26/2020	Escherichia coli	142.1	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	East Banch of Housatonic River	EAB280		42.47137394	-73.1686657	9/9/2020	Escherichia coli	43.7	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"
	East Banch of Housatonic River	EAB300	Upstream of Hubbard Avenue Bridge	42.46942794	-73.1961482	6/23/2020	Escherichia coli	86.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	East Banch of Housatonic River	EAB300		42.46942794	-73.1961482	6/30/2020	Escherichia coli	613.1	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	East Banch of Housatonic River	EAB300		42.46942794	-73.1961482	7/15/2020	Escherichia coli	104.6	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	East Banch of Housatonic River	EAB300		42.46942794	-73.1961482	7/29/2020	Escherichia coli	121.1	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	East Banch of Housatonic River	EAB300		42.46942794	-73.1961482	8/12/2020	Escherichia coli	4106	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	East Banch of Housatonic River	EAB300		42.46942794	-73.1961482	8/26/2020	Escherichia coli	108.1	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	East Banch of Housatonic River	EAB300		42.46942794	-73.1961482	9/9/2020	Escherichia coli	85.7	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2020	Egypt Brook	EGY400	Upstream of Holiday Cottage Rd culvert	42.49067009	-73.14298338	6/23/2020	Escherichia coli	12.2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Egypt Brook	EGY400		42.49067009	-73.14298338	6/30/2020	Escherichia coli	38.9	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	Egypt Brook	EGY400		42.49067009	-73.14298338	7/15/2020	Escherichia coli	7.3	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	Egypt Brook	EGY400		42.49067009	-73.14298338	7/29/2020	Escherichia coli	8.4	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	Egypt Brook	EGY400		42.49067009	-73.14298338	8/12/2020	Escherichia coli	35.9	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	Egypt Brook	EGY400		42.49067009	-73.14298338	8/26/2020	Escherichia coli	18.7	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	Egypt Brook	EGY400		42.49067009	-73.14298338	9/9/2020	Escherichia coli	15.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"
	Tyler Brook	TYL400	Upstream of Main Dalton Road bridge	42.50728646	-73.07990654	6/15/2020	Escherichia coli	15.8	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.74"
	Tyler Brook	TYL400		42.50728646	-73.07990654	6/23/2020	Escherichia coli	11	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Tyler Brook	TYL400		42.50728646	-73.07990654	6/30/2020	Escherichia coli	115.3	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	Tyler Brook	TYL400		42.50728646	-73.07990654	7/15/2020	Escherichia coli	65.7	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	Tyler Brook	TYL400		42.50728646	-73.07990654	7/29/2020	Escherichia coli	5.2	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	Tyler Brook	TYL400		42.50728646	-73.07990654	8/12/2020	Escherichia coli	29.8	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	Tyler Brook	TYL400		42.50728646	-73.07990654	8/26/2020	Escherichia coli	6.3	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	Tyler Brook	TYL400		42.50728646	-73.07990654	9/9/2020	Escherichia coli	2	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2020	Wahconah Falls Brook	WFB01.2	Upstream of the Route 9/8A Bridge	42.48426175	-73.1484485	6/15/2020	Escherichia coli	58.3	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.74"
	Wahconah Falls Brook	WFB01.2		42.48426175	-73.1484485	6/23/2020	Escherichia coli	127.4	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Wahconah Falls Brook	WFB01.2		42.48426175	-73.1484485	6/30/2020	Escherichia coli	816.4	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	Wahconah Falls Brook	WFB01.2		42.48426175	-73.1484485	7/15/2020	Escherichia coli	86	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	Wahconah Falls Brook	WFB01.2		42.48426175	-73.1484485	7/29/2020	Escherichia coli	224.7	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	Wahconah Falls Brook	WFB01.2		42.48426175	-73.1484485	8/12/2020	Escherichia coli	435.2	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	Wahconah Falls Brook	WFB01.2		42.48426175	-73.1484485	8/26/2020	Escherichia coli	104.3	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	Wahconah Falls Brook	WFB01.2		42.48426175	-73.1484485	9/9/2020	Escherichia coli	90.6	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"
	Windsor Brook	WND 400	Upstream of Old Windsor Road Bridge	42.47636679	-73.12913924	6/15/2020	Escherichia coli	9.7	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.74"
	Windsor Brook	WND400		42.47636697	-73.12913924	6/23/2020	Escherichia coli	3.1	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0"
	Windsor Brook	WND400		42.47636679	-73.12913924	6/30/2020	Escherichia coli	488.4	(MPN or CFU/100ml)	24hr 0.86"; 48 hr 1.04"; 72hr 1.04"
	Windsor Brook	WND400		42.47636679	-73.12913924	7/15/2020	Escherichia coli	78.4	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.25"; 72hr 0.33"
	Windsor Brook	WND400		42.47636679	-73.12913924	7/29/2020	Escherichia coli	14.8	(MPN or CFU/100ml)	24hr 0.06"; 48 hr 0.06"; 72hr 0.06"
	Windsor Brook	WND400		42.47636679	-73.12913924	8/12/2020	Escherichia coli	166.4	(MPN or CFU/100ml)	24hr 0.29"; 48 hr 0.29"; 72hr 0.29"
	Windsor Brook	WND400		42.47636679	-73.12913924	8/26/2020	Escherichia coli	4.1	(MPN or CFU/100ml)	24hr 0.05"; 48 hr 0.05"; 72hr 0.05"
	Windsor Brook	WND400		42.47636679	-73.12913924	9/9/2020	Escherichia coli	1	(MPN or CFU/100ml)	24hr 0"; 48 hr 0"; 72hr 0.01"

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2019	Anthony Brook	ANB 01.1	Just upstream of the Rte. 9 bridge	42.48256	-73.1534	6/10/2019	Escherichia coli	95.9	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Anthony Brook	ANB 01.1		42.48256	-73.15344	6/25/2019	Escherichia coli	95.8	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Anthony Brook	ANB 01.1		42.48256	-73.15344	7/11/2019	Escherichia coli	63.1	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Anthony Brook	ANB 01.1		42.48256	-73.15344	08/05/19	Escherichia coli	344.8	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Anthony Brook	ANB 01.1		42.48256	-73.15344	08/13/19	Escherichia coli	579.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Anthony Brook	ANB 01.1		42.48256	-73.15344	09/10/19	Escherichia coli	365.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Branch of Housatonic River	EAB 100	Downstream of the Old Dalton Road Bridge. Access from the Old Mill Trail	42.44833	-73.13101	6/25/2019	Escherichia coli	172.3	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Branch of Housatonic River	EAB 100		42.44833	-73.13101	08/05/19	Escherichia coli	150	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 100		42.44833	-73.13101	6/10/2019	Escherichia coli	32.3	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 100		42.44833	-73.13101	08/13/19	Escherichia coli	47.1	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 100		42.44833	-73.13101	09/10/19	Escherichia coli	36.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Branch of the Housatonic River	EAB 100		42.44833	-73.13101	7/11/2019	Escherichia coli	52.1	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2019	East Banch of Housatonic River	EAB 200	Old Windsor Road - just downstream of bridge	42.4739199	-73.141208	08/13/19	Escherichia coli	69.7	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 200		42.4739199	-73.141208	09/10/19	Escherichia coli	45	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Branch of Housatonic River	EAB 200		42.4739199	-73.141208	6/25/2019	Escherichia coli	90.8	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 200		42.4739199	-73.141208	6/10/2019	Escherichia coli	70.3	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 200		42.4739199	-73.141208	08/05/19	Escherichia coli	35	(MPN or CFU/100ml)	73 hour dry weather
	East Branch of the Housatonic River	EAB 200		42.4739199	-73.141208	7/11/2019	Escherichia coli	365.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Branch of Housatonic River	EAB 300	Just upstream of the Hubbard Avenue Bridge	42.4694279	-73.196148	6/25/2019	Escherichia coli	74.9	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 300		42.4694279	-73.196148	6/10/2019	Escherichia coli	191.8	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 300		42.4694279	-73.196148	08/05/19	Escherichia coli	88.2	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 300		42.4694279	-73.196148	08/13/19	Escherichia coli	162.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Banch of Housatonic River	EAB 300		42.4694279	-73.196148	09/10/19	Escherichia coli	124.6	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	East Branch of the Housatonic River	EAB 300		42.4694279	-73.196148	7/11/2019	Escherichia coli	135.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation

Appendix G - HVA Water Quality Data

	WaterBody	StationID	Station Description	Latitude	Longitude	Sample Date	Analyte	Result	Unit	Precipitation
2019	Wahconah Falls Brook	WFB 01.2	At the most downstream Route 9 crossing	42.4842618	-73.148448	6/10/2019	Escherichia coli	127.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Wahconah Falls Brook	WFB 01.2		42.4842618	-73.148448	6/25/2019	Escherichia coli	59.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Wahconah Falls Brook	WFB 01.2		42.4842618	-73.148448	7/11/2019	Escherichia coli	166.4	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Wahconah Falls Brook	WFB 01.2		42.4842618	-73.148448	08/05/19	Escherichia coli	110.6	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Wahconah Falls Brook	WFB 01.2		42.4842618	-73.148448	08/13/19	Escherichia coli	325.5	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation
	Wahconah Falls Brook	WFB 01.2		42.4842618	-73.148448	09/10/19	Escherichia coli	108.1	(MPN or CFU/100ml)	72 hour dry weather, <0.1 inches precipitation