DRAINAGE REPORT

For

DMG Investments, LLC

PROPOSED

West Ayer Village
Mixed Use Residential Development

201 West Main Street
Town of Ayer, Massachusetts
Middlesex County

Prepared by:

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June 7, 2023
#MAA220121.00

BOHLER

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I. EXECUTIVE SUMMARY

This report examines the changes in drainage that can be expected as the result of the development of a proposed mixed-use residential development located on West Main Street in the Town of Ayer, Massachusetts. The site which contains approximately 4.67 acres of land, contains an existing compacted gravel and paved parking areas and a two-story office building. The remaining portion of the site is undeveloped and consisting of wooded areas and a wetland resource area.

The proposed project includes the construction of a new 53,541± sf, four-story freestanding residential building with ground floor mixed-use retail, along with new paved parking areas, landscaping, storm water management components and associated utilities. This report addresses a comparative analysis of the pre- and post-development site runoff conditions. Additionally, this report provides calculations documenting the design of the proposed stormwater conveyance/management system as illustrated within the accompanying Site Development Plans prepared by Bohler. The project will also provide erosion and sedimentation controls during the demolition and construction periods, as well as long term stabilization of the site.

For the purposes of this analysis the pre- and post-development drainage conditions were analyzed at three (3) “design points” where stormwater runoff currently drains to under existing conditions. These design points are described in further detail in **Section II** below. A summary of the existing and proposed conditions peak runoff rates and volumes for the 2-, 10-, 25-, and 100-year storms can be found in **Table 1.1** below. In addition, the project has been designed to meet or exceed the Stormwater Management Standards as detailed herein.

Table 1.1: Design Point Peak Runoff Rate Summary

Point of Analysis	2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	3.40	0.13	**-3.27**	7.27	1.16	**-6.11**	9.70	2.22	**-7.48**	13.49	4.50	**-8.99**
DP-2	0.49	0.27	**-0.22**	0.73	0.42	**-0.31**	0.86	0.50	**-0.36**	1.06	0.63	**-0.43**
DP-3	0.50	0.08	**-0.42**	0.73	0.17	**-0.56**	0.86	0.23	**-0.63**	1.06	0.33	**-0.73**

**Flows are represented in cubic feet per second (cfs)*

II. EXISTING SITE CONDITIONS

Existing Site Description

The site consists of approximately 4.67 acres of land located along the northwesterly side of West Main Street in the Town of Ayer, Massachusetts. The southeastern portion of the site contains existing compacted gravel and paved parking areas and a two-story office building. The remaining portion of the site is undeveloped consisting of wooded areas and a wetland resource area.

On-Site Soil Information

Soils within the analyzed area consist of the following as classified by the Natural Resource Conservation Service (NRCS):

Table 2.1: Existing Soil Information

Soil Unit Symbol	Soil Name / Description	Hydrologic Soil Group (HSG)
53A	Freetown muck	B/D
32B	Wareham loamy fine sand	A/D
626B	Merrimac-Urban land complex	A

Onsite soil borings were performed by Geotechnical Partnership, Inc. on November 28th, 2022. Refer to **Appendix C** for additional information.

Existing Collection and Conveyance

The northern and western portions of the site drain northwest towards the wetland resource area. The southern portion of the site drains towards the abutter to the southwest, and the eastern portion of the site drains into West Main Street and into municipal drainage system. Slopes on the site range 1%-60% with onsite elevations ranging from 229 along West Main Street to 209 adjacent to the wetland resource area.

Existing Watersheds and Design Point Information

For the purposes of this analysis, the pre- and post-development drainage conditions were analyzed at three (3) “design points” as described below where stormwater runoff currently drains to under existing conditions. The existing site was subdivided into three (3) separate sub

catchments, as described below, to analyze existing and proposed flow rates at each design point. The minimum time of concentration for all proposed areas is calculated as 6 minutes (0.1 hr).

Design Point #1 (DP-1) is the wetland resource area. Under existing conditions, this design point receives stormwater flows from approximately 4.17 acres of land, designated as watershed "E-1". Refer to Table 2.1 below for additional detail.

Design Point #2 (DP-2) is the existing roadway. Under existing conditions, this design point receives stormwater flows from approximately 0.17 acres of land, designated as watershed "E-2". Refer to Table 2.1 below for additional detail.

Design Point #3 (DP-3) is the abutter to the southwest. Under existing conditions, this design point receives stormwater flows from approximately 0.17 acres of land, designated as watershed "E-3". Refer to Table 2.1 below for additional detail.

Table 2.2: Existing Sub-Catchment Summary

Sub-catchment Name	Total Area (acres)	Cover Description	Curve Number (CN)	Time of Concentration (Tc, minutes)
E-1	4.17±	Rooftops, paved parking, gravel, woods	74	14.4
E-2	0.17±	Paved parking, gravel	97	6.0
E-3	0.17±	Paved parking, gravel	98	6.0

Refer to **Table 1.1 and 6.1** for the existing conditions peak rates of runoff. Refer to **Appendix D** and the Drainage Area Maps in the appendices of this report for a graphical representation of the existing drainage areas.

III. PROPOSED SITE CONDITIONS

Proposed Development Description

The proposed project consists of the construction of a new 53,541± sf, four-story freestanding residential building with ground floor mixed-use retail including paved parking areas, landscaping, associated utilities, and a new stormwater management system. The site, including the proposed parking areas, has been designed to drain to deep-sump, hooded catch basins. The catch basins will capture and convey stormwater runoff, via an underground pipe system, to a proposed underground infiltration basin. Pretreatment of stormwater runoff will be provided by a combination of the deep-sump, hooded catch basins and an isolator row of chambers prior to discharge into the proposed infiltration basins. Rooftop runoff has been designed to flow to the basin as well.

Proposed Development Collection and Conveyance

Deep sump hooded catch basins are proposed to collect and route runoff from the paved parking areas to the proposed underground infiltration basin. Pipes have been designed for the 25-year storm using the Rational Method. Pipe, inlet, and outlet protection sizing calculations are included in **Appendix F**.

The best management practices (BMPs) incorporated into the proposed stormwater management system have been designed to meets, or exceeds, the standards set forth in the Massachusetts Department of Environmental Protection Stormwater Handbook standards. Refer to **Section V** for additional information.

Proposed Watersheds and Design Point Information

The project has been designed to maintain existing drainage watersheds to the greatest extent possible, with the same design points described in **Section II** above. The site was subdivided into five (5) separate sub catchments for the proposed conditions as described below. The minimum time of concentration for all proposed areas is calculated as 6 minutes (0.1 hr).

Under proposed conditions DP-1 receives stormwater flows from approximately 4.32 acres of land, designated as watershed “P-1.1” thru “P-1.3”. Refer to Table 3.1 below for additional detail.

Under proposed conditions DP-2 receives stormwater flows from approximately 0.11 acres of land, designated as watershed “P-2”. Refer to Table 3.1 below for additional detail.

Under proposed conditions DP-3 receives stormwater flows from approximately 0.08 acres of land, designated as watershed "P-3". Refer to Table 3.1 below for additional detail.

Table 3.1: Proposed Sub-catchment Summary

Sub-catchment Name	Total Area (acres)	Cover Description	Curve Number (CN)	Time of Concentration (Tc, minutes)	Hydrologic Routing
P-1.1	1.23±	Rooftops	98	6.0	UGS-1 / DP-1
P-1.2	0.66±	Paved parking	98	6.0	UGS-1 / DP-1
P-1.3	2.44±	Paved parking, grass, gravel, woods	53	6.0	DP-1
P-2	0.10±	Paved parking, grass	92	6.0	DP-2
P-3	0.05±	Paved parking, grass	73	6.0	DP-3

Refer to **Table 1.1 and 6.1** for the calculated proposed conditions peak rates of runoff. For additional hydrologic information, refer to **Appendix D** and the Drainage Area Maps in the appendices of this report for a graphical representation of the proposed drainage areas.

IV. METHODOLOGY

Peak Flow Calculations

Methodology utilized to design the proposed stormwater management system includes compliance with the guidelines set forth in the latest edition of the Massachusetts DEP Stormwater Handbook. The pre- and post-development runoff rates being discharged from the site were computed using the HydroCAD computer program. The drainage area and outlet information were entered into the program, which routes storm flows based on NRCS TR-20 and TR-55 methods. The other components of the model were determined following standard NRCS procedures for Curve Numbers (CNs) and times of concentrations documented in the appendices of this report. The rainfall data utilized and listed below in table 4.1 below for stormwater calculations is based on Technical Paper-40. Refer to **Appendix F** for more information.

Table 4.1: Middlesex County Rainfall Intensities

Frequency	2 year	10 year	25 year	100 year
Rainfall* (inches)	3.10	4.50	5.30	6.50

*Values derived from Hydrology Handbook for Conservation Commissioners prepared by Mass DEP (TP-40 Maps)

The proposed stormwater management as designed will provide a decrease in peak rates of runoff from the proposed facility for the 2-, 10-, 25- and 100-year design storm events. Additionally, the proposed project meets, or exceeds, the MADEP Stormwater Management standards. Compliance with these standards is described further below.

V. STORMWATER MANAGEMENT STANDARDS

Standard #1: No New Untreated Discharges

The project has been designed so that proposed impervious areas (including the building roof and paved parking/driveway areas) shall be collected and passed through the proposed drainage system for treatment prior to discharge.

Standard #2: Peak Rate Attenuation

As outlined in **Table 1.1** and **Table 6.1**, the development of the site and the proposed stormwater management system, have been designed so that post-development peak rates of runoff are below pre-development conditions for the 2-, 10-, 25- and 100-year storm events at all design points.

Standard #3: Recharge

The stormwater runoff from the project will be collected and diverted to a proposed infiltration basin. The project as proposed will involve the creation of 84,036 square feet of new impervious area and is required to infiltrate 5,500 cubic feet of stormwater as defined in Stormwater Standard 3. The proposed infiltration basin will provide 18,611 cubic feet of volume below the lowest outlet for groundwater recharge. Refer to **Appendix F** of this report for calculations documenting required and provided recharge volumes.

The DEP Stormwater Standards require that the infiltration BMP drains completely within 72 hours of the end of the storm event. Calculations showing that the proposed infiltration basin will drain within 19.3 hours are included in **Appendix F** of this report.

A four (4) foot separation to estimated seasonal high groundwater is provided and a groundwater mounding analysis is not required.

Standard #4: Water Quality

Water quality treatment is provided via deep sump catch basins, and isolator row of chambers, and an underground infiltration basin. TSS removal calculations are included in **Appendix F** of this report. The project as proposed will involve the creation of 84,036 square feet of new impervious area and is required to treat 8,974 cubic feet of water quality volume as defined in Stormwater Standard 4. The proposed infiltration basin provides 18,611 cubic feet of water quality

volume below the lowest outlet for water quality treatment. Refer to **Appendix F** of this report for calculations documenting required and provided water quality volumes.

Standard #5: Land Use with Higher Potential Pollutant Loads

Not Applicable for this project.

Standard #6: Critical Areas

Not Applicable for this project.

Standard #7: Redevelopment

Not Applicable for this project.

Standard #8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

The proposed project will provide construction period erosion and sedimentation controls as indicated within the site plan set provided for this project. This includes a proposed construction exit, protection for stormwater inlets, protection around temporary material stock piles and various other techniques as outlined on the erosion and sediment control sheets. Additionally, the project is required to file a Notice of Intent with the US EPA and implement a Stormwater Pollution Prevention Plan (SWPPP) during the construction period. The SWPPP will be prepared prior to the start of construction and will be implemented by the site contractor under the guidance and responsibility of the project's proponent. Refer to **Appendix H**.

Standard #9: Operation and Maintenance Plan (O&M Plan)

An Operation and Maintenance (O&M) Plan for this site has been prepared and is included in **Appendix G** of this report. The O&M Plan outlines procedures and time tables for the long term operation and maintenance of the proposed site stormwater management system, including initial inspections upon completion of construction, and periodic monitoring of the system components, in accordance with established practices and the manufacturer's recommendations. The O&M Plan includes a list of responsible parties and an estimated budget for inspections and maintenance.

Standard #10: Prohibition of Illicit Discharges

The proposed stormwater system will only convey allowable non-stormwater discharges (firefighting waters, irrigation, air conditioning condensates, etc.) and will not contain any illicit

discharges from prohibited sources. An Illicit Discharge Statement is included in **Appendix G** of this report.

VI. SUMMARY

In summary, the proposed stormwater management system illustrated on the drawings prepared by Bohler results in a reduction in peak rates of runoff from the subject site when compared to pre-development conditions for the 2-, 10-, 25- and 100-year storm frequencies. In addition, the proposed best management practices will result in an effective removal of total suspended solids from the post-development runoff. The pre-development versus post-development stormwater discharge comparisons are contained in **Table 6.1** below:

Table 6.1: Design Point Peak Runoff Rate Summary

Point of Analysis	2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	3.40	0.13	**-3.27**	7.27	1.16	**-6.11**	9.70	2.22	**-7.48**	13.49	4.50	**-8.99**
DP-2	0.49	0.27	**-0.22**	0.73	0.42	**-0.31**	0.86	0.50	**-0.36**	1.06	0.63	**-0.43**
DP-3	0.50	0.08	**-0.42**	0.73	0.17	**-0.56**	0.86	0.23	**-0.63**	1.06	0.33	**-0.73**

**Flows are represented in cubic feet per second (cfs)*

As outlined in the table above, the proposed stormwater management system as designed will provide a decrease in peak rates of runoff from the proposed facility for the 2-, 10-, 25- and 100-year storm events. Additionally, the project meets or exceeds the MADEP Stormwater Management Standards as described further herein.

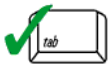
APPENDIX A: MASSACHUSETTS STORMWATER MANAGEMENT CHECKLIST

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

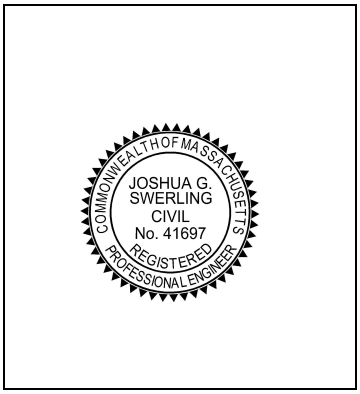
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



June 7, 2023

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☒ Other (describe): Underground infiltration system

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☒ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

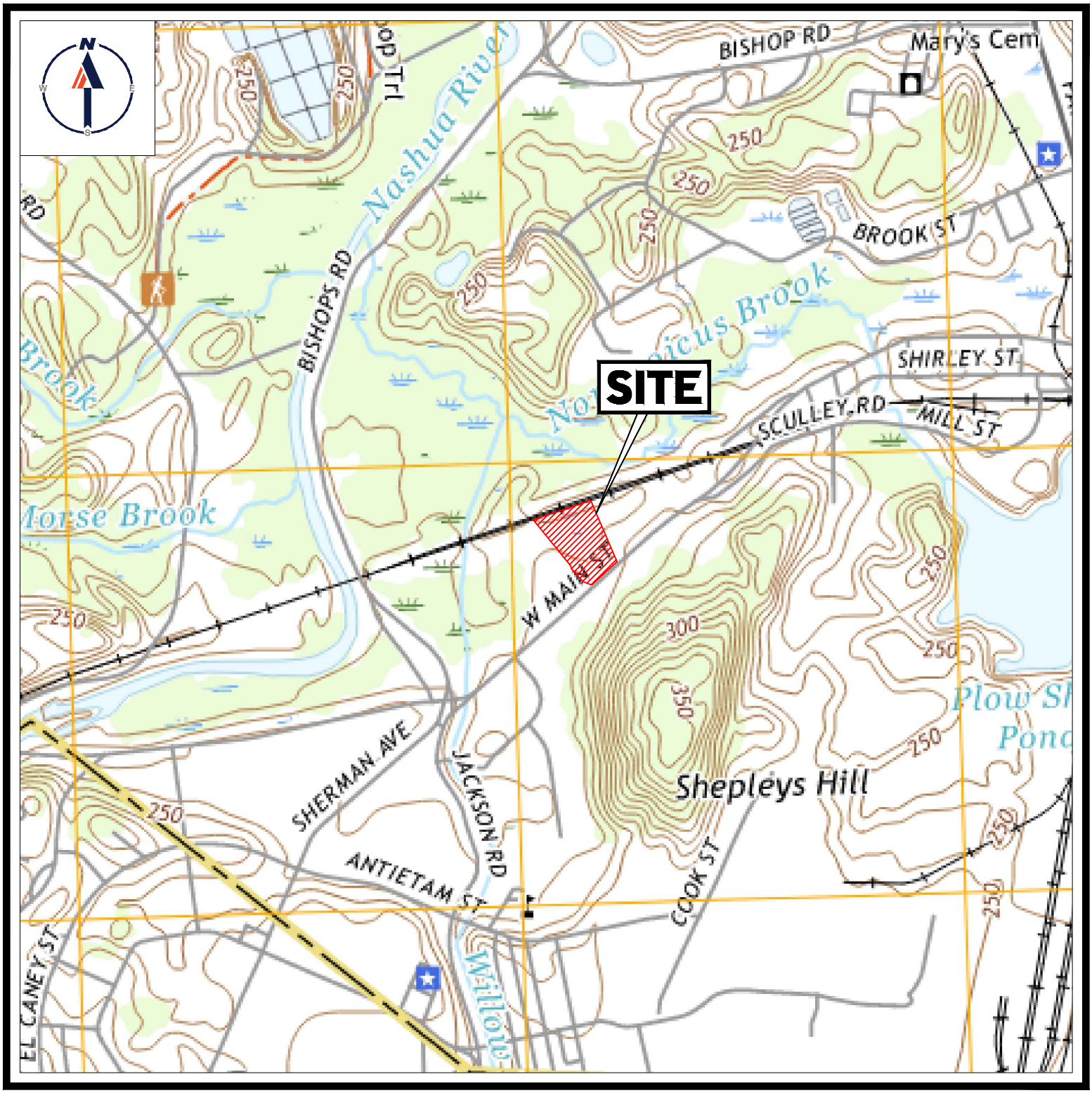
☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX B: PROJECT LOCATION MAPS

- *USGS MAP*
- *FEMA FIRMETTE*

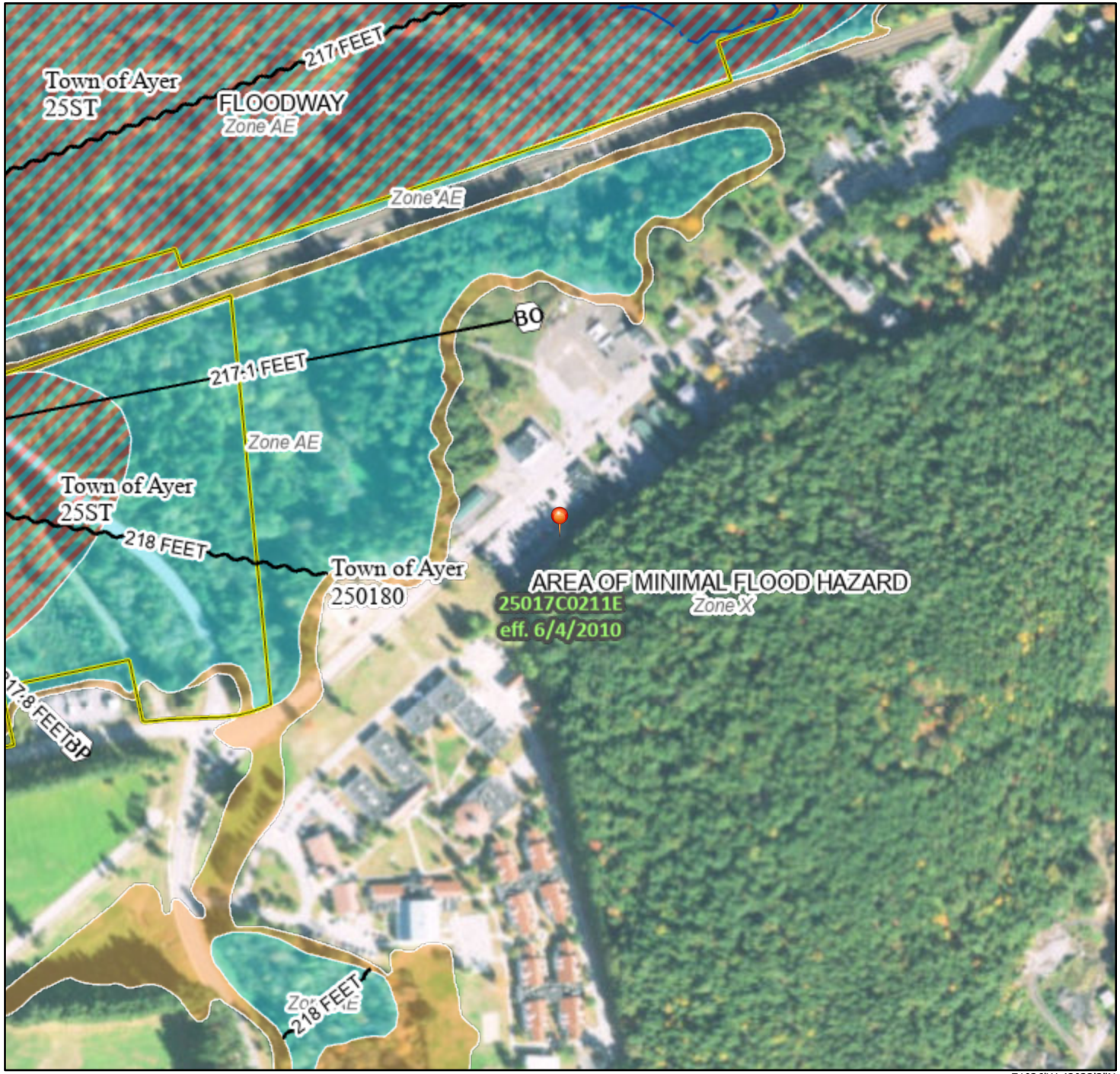


USGS MAP

SCALE: 1" = 1,000'
SOURCE: AYER MASSACHUSETTS
USGS QUADRANGLE

National Flood Hazard Layer FIRMette

71°36'38"W 42°33'29"N



71°36'W 42°33'2"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

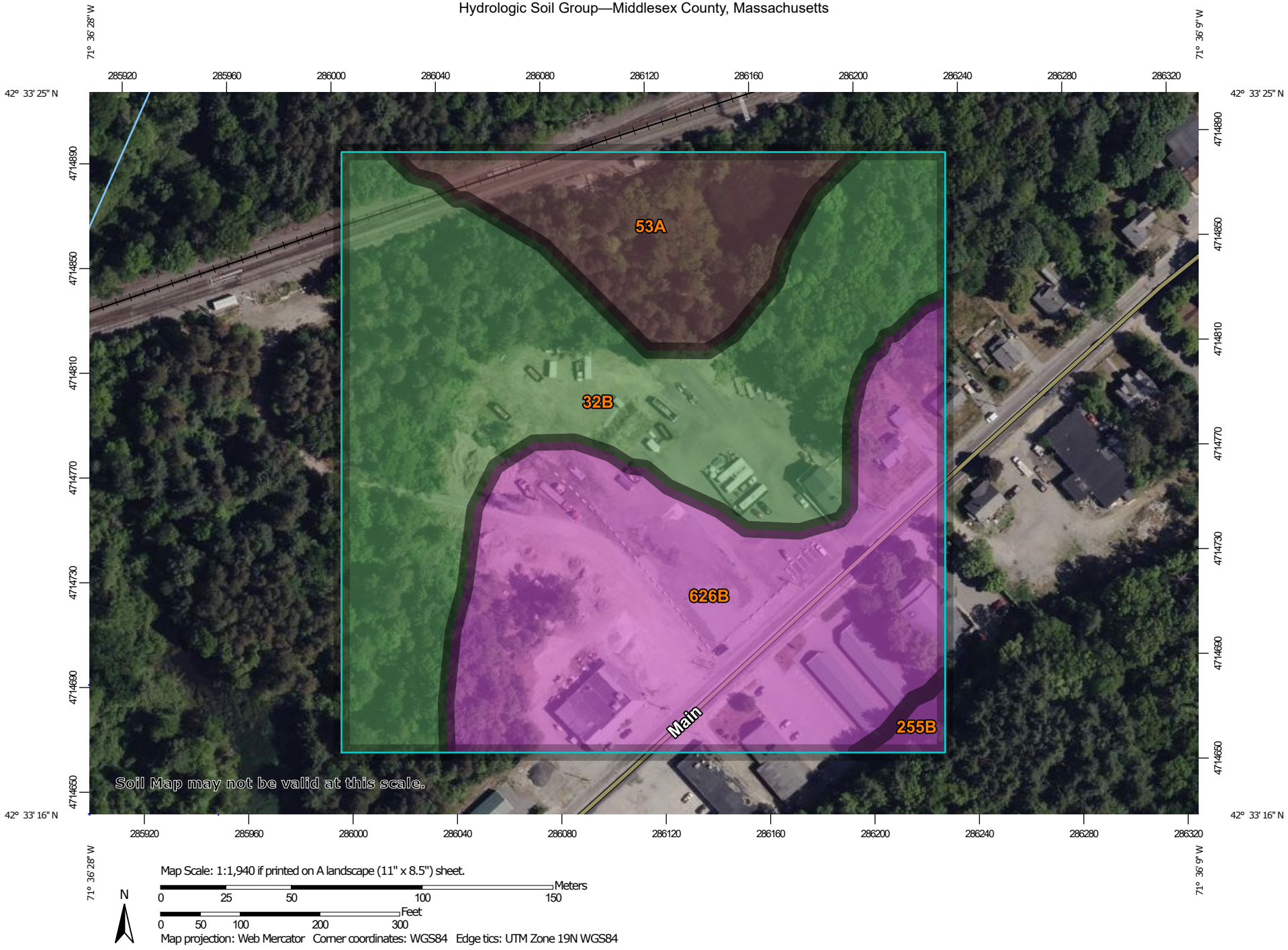
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/6/2022 at 1:50 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX C: SOIL AND WETLAND INFORMATION

- *NCRS CUSTOM SOIL RESOURCE REPORT*
- *REPORT OF GEOTECHNICAL INVESTIGATION*
- *WETLAND BORDER REPORT*



Map Scale: 1:1,940 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 22, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
32B	Wareham loamy fine sand, 0 to 5 percent slopes	A/D	6.1	46.5%
53A	Freetown muck, ponded, 0 to 1 percent slopes	B/D	1.8	13.9%
255B	Windsor loamy sand, 3 to 8 percent slopes	A	0.1	0.9%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	5.1	38.7%
Totals for Area of Interest			**13.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

- Test Borings:
  - Drilling for this review was performed by us: seven (7) structural test borings (designated B1 through B7) were drilled on-site during 28-29 November 2022.
  - Refer to *Figure 2: Subsurface Explorations* for the approximate as-drilled test boring locations.
    - A tripod mounted drop hammer drill-rig equipped with NW casing and split spoon samplers drilled and sampled soils within the borings below grade.
    - Soil samples were taken in 2-foot increments. The borings were drilled to 17 ft. depth below existing grade:
      - With nearly continuous 2-foot interval sampling to 9 foot depth
      - Generally, in 5 foot increments thereafter up to the 17 ft. depth drilled.

- Digital Boring Logs:
  - Recovered test boring soil samples were digitally logged by the geotechnical engineer in accordance with *ASTM D-5434-97: Standard Guide for Logging of Subsurface Explorations of Soil and Rock*.
  - Boring logs prepared by the engineer are presented in soil boring log sheets in *Appendix A.* Logs detail soil type, soil boundary elevation or depth, density, consistency, thickness, coloration, moisture and composition.
  - Note: boring B4A (*Figure 2*) was not drilled as it was likely located within a buffer zone.

Figure 2: Subsurface Explorations

III. Geotechnical Testing:

Field Testing Performed:

- Standard Penetration Tests (SPT) (N_{60} in blows/foot)

- Field Gradation Tests

APPENDIX A: Logs of Structural Test Borings B1 through B7

201-205 Main Street
Ayer, Massachusetts

Geotechnical Partnership, Inc.
Fitchburg, MA
File No. 2229

Test Boring No. B-1

(1 of 1)

Geotechnical Partnership, Inc.
Fitchburg, MA
Geotechnical Services

PROJECT: New Construction
201-205 Main Street
Ayer, Massachusetts

CLIENT: Bergmeyer Boston, MA

File No. 2229

Date Drilled	: 28-29 November 2022
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Cosmo Drilling
	: Ocean Bluffs, MA
Driller	: E. Sviokla
Rock Core	: ---
GPI Field Engineer	: F. Sviokla
Elevation and Datum	: El. 228 ft.+/- (unknown)
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Drive & Wash

Drill Rig Type	: Tripod Mounted
Hammer Type	: Drop
Cat-Head or Winch	: Cat-Head
Soil Casing Type	: 6 in. NW;
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	REMARKS
0	228					Groundwater= not encountered
1	227	Brown, medium to fine SAND, some coarse to fine gravel (sub-angular), trace silt, (loose, moist), occasional glass, asphalt & crushed stone	AR	1	8 6 4 3	Well Set: 17 ft. Dry after 36 hr. SS-1: 1' - 3' R=17 N=9
2	226	2.5 ft -GRANULAR FILL-				
3	225	Dark-brown, silt LOAM -TOP SOIL-	SO			
4	224	Light brown, fine SAND, some silt, (loose, moist), occasional root fibers	SM	2	4 4 4 11	SS-2: 3' - 5' R=17 N=8
5	223	4.5 ft. -OUTWASH-		3	16 20 16 13	SS-3: 5' - 7' R=14 N=36
6	222	Light brown, coarse to fine SAND, some coarse to fine gravel (angular to sub-rounded), trace silt, (dense, dry)				
7	221			4	14 13 12 12	SS-4: 7' - 9' R=17 N=25
8	220	Light brown, coarse to fine SAND, little fine gravel (sub-rounded), trace silt, (medium dense, dry to moist)				
9	219					
10	218			5	13 12 13 22	SS-5: 10' - 12' R=16 N=25
11	217	Light brown, coarse to fine SAND, little fine gravel (sub-angular to sub-rounded), trace silt, (medium dense, moist)	SP			
12	216					
13	215					
14	214					
15	213			6	20 17 12 14	SS-6: 15' - 17' R=19 N=29
16	212	Brown, coarse to fine SAND, some coarse to fine gravel (sub-angular), (medium dense, moist)				P=Penetrometer
17	211	17.0 ft. -OUTWASH-				
		Bottom of Exploration at 17 feet Depth				
18	210	Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%				
19						

Blow Count Graph: 10 50

Average qu-Field (TSF): 0 1 2 3 4

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels		COHESIVE SOILS: (CONSISTENCY)
0-6	Very Loose	0-2 Very Soft (<0.25 TSF)
6-10	Loose	2-4 Soft (0.25-0.5 TSF)
11-30	Med-Dense	4-8 Med. Stiff (0.5-1.0 TSF)
>30	Dense	9-20 Stiff (1.0-4.0 TSF)
	Very Dense	>20 Hard (>4.0 TSF)
0-8		
8-15		
16-40		
41-50		
>50		

Test Boring No. B-1

(1 of 1)

11-30-2022 C:\Users\User\Documents\M-Tech\samples\2229 B1-22.bor

Geotechnical Partnership, Inc. Fitchburg, MA Geotechnical Services	Date Drilled : 28 November 2022 Boring Location : Refer to Report Figure 2 Drilling Contractor : Cosmo Drilling : Ocean Bluffs, MA Driller : E. Sviokla Rock Core : --- GPI Field Engineer : F. Sviokla Elevation and Datum : El. 225 ft.+/- (unknown) Drilling Mud Utilized : Not necessary Constant Water Head : Drive & Wash	**Test Boring No. B-2** (1 of 1) Drill Rig Type : Tripod Mounted Hammer Type : Drop Cat-Head or Winch : Cat-Head Soil Casing Type : 6 in. NW; Sampler Type : SS - 1.375 in. I.D.; unlined Sampler Hammer Fall : 140 lbs. / 30 in.

PROJECT: New Construction
201-205 Main Street
Ayer, Massachusetts

CLIENT: Bergmeyer Boston, MA

File No. 2229

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	REMARKS
0	225	Brown & black, coarse to fine SAND, some coarse to fine gravel (angular), trace silt, (medium dense, moist), occasional concrete fragments	AR	1	8 7 8 8	Groundwater= not encountered Well Set: no SS-1: 1' - 3' R=20 N=15
3	222	3.0 ft -GRANULAR FILL-				
4	221	Brown, fine SAND, little to some silt, trace fine gravel (sub-rounded), (loose, moist)	SM	2	4 3 3 6	SS-2: 3' - 5' R=20 N=6
5	220	5.0 ft. -OUTWASH-				SS-3: 5' - 7' R=18 N=21
6	219	Light brown, fine SAND, trace fine gravel (rounded), trace silt, (medium dense, dry to moist)		3	9 10 11 12	
7	218					
8	217	Brown, coarse to fine SAND, few fine gravel (angular), trace silt, (medium dense, moist)		4	9 16 12 12	SS-4: 7' - 9' R=14 N=28
9	216					
10	215					SS-5: 10' - 12' R=17 N=26
11	214	Dark brown, coarse to fine SAND, some fine gravel (sub-angular to sub-rounded), trace silt (medium dense, moist)	SP	5	14 14 12 13	
12	213					
13	212					
14	211					
15	210					SS-6: 15' - 17' R=15 N=35
16	209	Brown, coarse to fine SAND, little coarse to fine gravel (sub-angular), trace silt, (dense, moist)		6	12 23 12 15	P=Penetrometer
17	208	17.0 ft. -OUTWASH-				
		Bottom of Exploration at 17 feet Depth				
18	207	Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%				
19						

Blow Count Graph: 10 50

Average qu-Field (TSF): 0 1 2 3 4

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels		COHESIVE SOILS: (CONSISTENCY)
0-6	Very Loose	0-2 Very Soft (<0.25 TSF)
6-10	Loose	2-4 Soft (0.25-0.5 TSF)
11-30	Med-Dense	4-8 Med. Stiff (0.5-1.0 TSF)
>30	Dense	9-20 Stiff (1.0-4.0 TSF)
0-8	8-15 16-40 41-50 >50	>20 Hard (>4.0 TSF)

Test Boring No. B-2
(1 of 1)

Geotechnical Partnership, Inc. Fitchburg, MA Geotechnical Services	Date Drilled : 28 November 2022 Boring Location : Refer to Report Figure 2 Drilling Contractor : Cosmo Drilling : Ocean Bluffs, MA Driller : E. Sviokla Rock Core : --- GPI Field Engineer : F. Sviokla Elevation and Datum : El. 224 ft.+/- (unknown) Drilling Mud Utilized : Not necessary Constant Water Head : Drive & Wash	**Test Boring No. B-3** (1 of 1) Drill Rig Type : Tripod Mounted Hammer Type : Drop Cat-Head or Winch : Cat-Head Soil Casing Type : 6 in. NW; Sampler Type : SS - 1.375 in. I.D.; unlined Sampler Hammer Fall : 140 lbs. / 30 in.

PROJECT: New Construction
201-205 Main Street
Ayer, Massachusetts

CLIENT: Bergmeyer Boston, MA

File No. 2229

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0	224								Groundwater= not encountered Well Set: no
1	223	Brown & black, coarse to fine SAND, some coarse to fine gravel (sub-angular), few silt, (dense, moist), occasional glass fragments; included thin topsoil zones	AR	1	16 24 31 51				SS-1: 1' - 3' R=11 N=55
2	222								
3	221	3.0 ft -COMMON FILL- Light brown, coarse to fine SAND, some fine gravel (sub-angular to rounded), trace silt, (dense, moist)	SP	2	21 24 17 18				SS-2: 3' - 5' R=17 N=41
4	220								
5	219	5.0 ft. -OUTWASH-		3	20 25 27 19				SS-3: 5' - 7' R=16 N=52
6	218	Brown, coarse to fine GRAVEL (angular to sub-angular), some coarse to fine sand, trace silt (very dense, moist)							
7	217			4	21 34 20 19				SS-4: 7' - 9' R=18 N=54
8	216	Brown, coarse to fine GRAVEL (angular to sub-rounded), little coarse to fine sand, few silt, (very dense, moist)							
9	215								
10	214			5	9 11 18 17				SS-5: 10' - 12' R=19 N=29
11	213	Dark brown, fine GRAVEL (angular to sub-rounded), little coarse to fine sand, trace silt, (medium dense, moist)	GP						
12	212								
13	211								
14	210								
15	209			6	32 46 30 21				SS-6: 15' - 17' R=14 N=76
16	208	Dark brown, coarse to fine GRAVEL (angular to sub-rounded), some coarse to fine sand, trace silt, (very dense, moist)							P=Penetrometer
17	207	17.0 ft. -OUTWASH- Bottom of Exploration at 17 feet Depth							
18	206								
19		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%							

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels				COHESIVE SOILS: (CONSISTENCY)	
0-6	Very Loose	0-8		0-2	Very Soft (<0.25 TSF)
6-10	Loose	8-15		2-4	Soft (0.25-0.5 TSF)
11-30	Med-Dense	16-40		4-8	Med. Stiff (0.5-1.0 TSF)
>30	Dense	41-50		9-20	Stiff (1.0-4.0 TSF)
	Very Dense	>50		>20	Hard (>4.0 TSF)

Test Boring No. B-3
(1 of 1)

Geotechnical Partnership, Inc. Fitchburg, MA Geotechnical Services	Date Drilled : 29 November 2022 Boring Location : Refer to Report Figure 2 Drilling Contractor : Cosmo Drilling : Ocean Bluffs, MA Driller : E. Sviokla Rock Core : --- GPI Field Engineer : F. Sviokla Elevation and Datum : El. 223 ft.+/- (unknown) Drilling Mud Utilized : Not necessary Constant Water Head : Drive & Wash	**Test Boring No. B-4** (1 of 1) Drill Rig Type : Tripod Mounted Hammer Type : Drop Cat-Head or Winch : Cat-Head Soil Casing Type : 6 in. NW; Sampler Type : SS - 1.375 in. I.D.; unlined Sampler Hammer Fall : 140 lbs. / 30 in.

PROJECT: New Construction
201-205 Main Street
Ayer, Massachusetts

CLIENT: Bergmeyer Boston, MA

File No. 2229

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0	223								Groundwater= not encountered Well Set: no
1	222								
2	221	Brown, fine SAND, few silt, (medium dense, moist)	SP	1	7 6 9 10				SS-1: 1' - 3' R=17 N=14
3	220	3.0 ft -OUTWASH- Dark brown, coarse to fine GRAVEL (angular to sub-rounded), some coarse to fine sand, few silt, (medium dense, moist)		2	9 13 17 19				SS-2: 3' - 5' R=14 N=30
4	219								
5	218		GP	3	9 22 18 11				SS-3: 5' - 7' R=12 N=40
6	217	Dark brown, coarse to fine GRAVEL (sub-angular to rounded), little coarse to fine sand, trace silt, (medium dense, moist)							
7	216	7.0 ft. -OUTWASH- Brown, coarse to fine SAND, little fine gravel (sub-angular), trace silt, (medium dense, moist)		4	7 8 9 12				SS-4: 7' - 9' R=16 N=17
8	215								
9	214								
10	213		SP	5	10 13 12 15				SS-5: 10' - 12' R=16 N=25
11	212	Brown, coarse to fine SAND, some fine gravel (sub-angular), trace silt, (medium dense, moist)							
12	211								
13	210								
14	209	14.0 ft. -OUTWASH-							
15	208								
16	207	Dark brown, coarse to fine GRAVEL (angular), little coarse to fine sand, trace silt, (dense, moist)	GP	6	22 24 20 29				SS-6: 15' - 17' R=11 N=44 P=Penetrometer
17	206	17.0 ft. -OUTWASH- Bottom of Exploration at 17 feet Depth							
18	205								
19		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%							

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels		COHESIVE SOILS: (CONSISTENCY)	
0-6	Very Loose	0-2	Very Soft (<0.25 TSF)
6-10	Loose	2-4	Soft (0.25-0.5 TSF)
11-30	Med-Dense	4-8	Med. Stiff (0.5-1.0 TSF)
>30	Dense	9-20	Stiff (1.0-4.0 TSF)
	Very Dense	>20	Hard (>4.0 TSF)

Test Boring No. B-4
(1 of 1)

Geotechnical Partnership, Inc. Fitchburg, MA Geotechnical Services	Date Drilled : 29 November 2022 Boring Location : Refer to Report Figure 2 Drilling Contractor : Cosmo Drilling : Ocean Bluffs, MA Driller : E. Sviokla Rock Core : --- GPI Field Engineer : F. Sviokla Elevation and Datum : El. 224 ft.+/- (unknown) Drilling Mud Utilized : Not necessary Constant Water Head : Drive & Wash	**Test Boring No. B-5** (1 of 1) Drill Rig Type : Tripod Mounted Hammer Type : Drop Cat-Head or Winch : Cat-Head Soil Casing Type : 6 in. NW; Sampler Type : SS - 1.375 in. I.D.; unlined Sampler Hammer Fall : 140 lbs. / 30 in.
PROJECT: New Construction 201-205 Main Street Ayer, Massachusetts CLIENT: Bergmeyer Boston, MA File No. 2229		

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0	224								Groundwater= not encountered Well Set: no
1	223	Dark brown, coarse to fine SAND, little coarse to fine gravel (angular), (medium dense, moist), frequent wood fragments, occasional red brick	AR	1	10 14 14 3				SS-1: 1' - 3' R=18 N=28
2	222								
3	221	3.0 ft -COMMON FILL-							SS-2: 3' - 5' R=18 N=26
4	220	Brown, coarse to fine SAND, some coarse to fine gravel (angular to sub-angular), trace silt, (medium dense, moist)	SP	2	10 11 15 16				
5	219	5.0 ft. -OUTWASH-							SS-3: 5' - 7' R=16 N=26
6	218	Dark brown, coarse to fine GRAVEL (angular), some coarse to fine sand, trace silt, (medium dense, moist)	GP	3	20 15 11 11				
7	217	7.0 ft. -OUTWASH-							SS-4: 7' - 9' R=14 N=22
8	216	Brown, coarse to fine SAND, trace silt, (medium dense, moist)		4	9 10 12 14				
9	215								
10	214								SS-5: 10' - 12' R=14 N=26
11	213	Brown, coarse to fine SAND, some fine gravel (angular), few silt, (medium dense, moist)		5	10 13 13 14				
12	212		SP						
13	211								
14	210								
15	209								SS-6: 15' - 17' R=16 N=23
16	208	Brown, fine SAND, few silt, (medium dense, dry to moist)		6	11 11 12 12				P=Penetrometer
17	207	17.0 ft. -OUTWASH-							
		Bottom of Exploration at 17 feet Depth							
18	206	Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%							
19									

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels	0-6 Very Loose 0-8 6-10 Loose 8-15 11-30 Med-Dense 16-40 >30 Dense 41-50 Very Dense >50	COHESIVE SOILS: (CONSISTENCY) 0-2 Very Soft (<0.25 TSF) 2-4 Soft (0.25-0.5 TSF) 4-8 Med. Stiff (0.5-1.0 TSF) 9-20 Stiff (1.0-4.0 TSF) >20 Hard (>4.0 TSF)

Test Boring No. B-5
(1 of 1)

Test Boring No. B-6

(1 of 1)

Geotechnical Partnership, Inc.
Fitchburg, MA
Geotechnical Services

PROJECT: New Construction
201-205 Main Street
Ayer, Massachusetts

CLIENT: Bergmeyer Boston, MA

File No. 2229

Date Drilled	: 29 November 2022
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Cosmo Drilling
	: Ocean Bluffs, MA
Driller	: E. Sviokla
Rock Core	: ---
GPI Field Engineer	: F. Sviokla
Elevation and Datum	: El. 220 ft.+/- (unknown)
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Drive & Wash

Drill Rig Type	: Tripod Mounted
Hammer Type	: Drop
Cat-Head or Winch	: Cat-Head
Soil Casing Type	: 6 in. NW;
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	REMARKS
0	220	Black, coarse to fine SAND, little fine gravel (sub-angular), trace silt, (dense, moist), occasional asphalt fragments	AR			Groundwater= not encountered
1	219	1.5 ft -GRANULAR FILL-		1	14 13 20 16	Well Set: no
2	218	Brown, coarse to fine SAND, little to some coarse to fine gravel (angular to sub-angular), trace silt (dense, moist)				SS-1: 1' - 3' R=18 N=33
3	217			2	8 8 10 10	SS-2: 3' - 5' R=14 N=18
4	216	Brown, coarse to fine SAND, little coarse to fine gravel (angular to sub-angular), trace silt, (medium dense, moist)				
5	215			3	9 16 18 21	SS-3: 5' - 7' R=16 N=34
6	214	Brown, coarse to fine SAND, some fine gravel (angular to sub-rounded), few silt, (dense, moist)				
7	213		SP	4	29 22 16 16	SS-4: 7' - 9' R=12 N=38
8	212	Brown, fine SAND, some coarse gravel (angular), few silt, (dense, moist)				
9	211					
10	210			5	14 16 15 19	SS-5: 10' - 12' R=14 N=31
11	209	Brown, coarse to fine SAND, few fine gravel (sub-angular), trace silt, (dense, moist)				
12	208					
13	207	13.0 ft. -OUTWASH-				
14	206					
15	205		SP	6	13 15 23 26	SS-6: 15' - 17' R=17 N=38
16	204	Brown, fine SAND, few silt, (dense, moist)				P=Penetrometer
17	203	17.0 ft. -OUTWASH-				
18	202	Bottom of Exploration at 17 feet Depth				
19		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%				

Blow Count Graph: 10 50

Average qu-Field (TSF): 0 1 2 3 4

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels				COHESIVE SOILS: (CONSISTENCY)	
0-6	Very Loose	0-8		0-2	Very Soft (<0.25 TSF)
6-10	Loose	8-15		2-4	Soft (0.25-0.5 TSF)
11-30	Med-Dense	16-40		4-8	Med. Stiff (0.5-1.0 TSF)
>30	Dense	41-50		9-20	Stiff (1.0-4.0 TSF)
	Very Dense	>50		>20	Hard (>4.0 TSF)

Test Boring No. B-6

(1 of 1)

11-30-2022 C:\Users\User\Documents\M-Tech\samples\2229 B6-22.bor

Geotechnical Partnership, Inc.
Fitchburg, MA

Geotechnical Services

PROJECT: New Construction
201-205 Main Street
Ayer, Massachusetts

CLIENT: Bergmeyer Boston, MA

File No. 2229

Date Drilled	: 28 November 2022
Boring Location	: Refer to Report Figure 2
Drilling Contractor	: Cosmo Drilling
	: Ocean Bluffs, MA
Driller	: E. Sviokla
Rock Core	: ---
GPI Field Engineer	: F. Sviokla
Elevation and Datum	: El. 227 ft.+/- (unknown)
Drilling Mud Utilized	: Not necessary
Constant Water Head	: Drive & Wash

Test Boring No. B-7
(1 of 1)

Drill Rig Type	: Tripod Mounted
Hammer Type	: Drop
Cat-Head or Winch	: Cat-Head
Soil Casing Type	: 6 in. NW;
Sampler Type	: SS - 1.375 in. I.D.; unlined
Sampler Hammer Fall	: 140 lbs. / 30 in.

Depth in Feet	Elev. in Feet	DESCRIPTIONS	USCS	Sample No.	Blow Count	Blow Count Graph (10 50)	Average qu-Field	Average qu-Field (TSF) (0 1 2 3 4)	REMARKS
0	227								Groundwater= not encountered Well Set: no
1	226		AR	1	3				
2	225	Black, coarse to fine SAND, some silt, few fine gravel (angular), (loose, moist)			3				SS-1: 1' - 3' R=17 N=6
3	224	3.0 ft -COMMON FILL-			4				
4	223	Light brown, fine SAND, some silt, (loose, moist)	SM	2	3				SS-2: 3' - 5' R=20 N=4
5	222				2				
6	221	6.0 ft. -OUTWASH-		3	2				SS-3: 5' - 7' R=16 N=25
7	220	Brown, coarse to fine SAND, some coarse to fine gravel (sub-angular), trace silt, (medium dense, moist)	SP		5				
8	219	7.0 ft. -OUTWASH-			6				
9	218	Dark brown, coarse to fine GRAVEL (angular), some coarse to fine sand, few silt, (dense, dry)	GP	4	20				SS-4: 7' - 9' R=13 N=49
10	217	10.0 ft. -OUTWASH-			18				
11	216	Light brown, fine SAND, little silt, (medium dense, moist)	SM	5	17				SS-5: 10' - 12' R=18 N=20
12	215				26				
13	214				23				
14	213				24				
15	212				12				
16	211	Light brown, fine SAND, little silt, (medium dense, moist)		6	10				SS-6: 15' - 17' R=19 N=22
17	210	17.0 ft. -OUTWASH-			10				P=Penetrometer
18	209	Bottom of Exploration at 17 feet Depth			11				
19		Particle Size: trace: <5%; few: 5-10%; little: 15-20%; some 30-45%; mostly: 50-100%							

COHESIONLESS SOILS: (DENSITY) L: Sands; R: Gravels	0-6 Very Loose	0-8	COHESIVE SOILS: (CONSISTENCY) 0-2 Very Soft (<0.25 TSF)
	6-10 Loose	8-15	2-4 Soft (0.25-0.5 TSF)
	11-30 Med-Dense	16-40	4-8 Med. Stiff (0.5-1.0 TSF)
	>30 Dense	41-50	9-20 Stiff (1.0-4.0 TSF)
	Very Dense	>50	>20 Hard (>4.0 TSF)

Test Boring No. B-7
(1 of 1)

Lauren Sagasser
Bohler Engineering
325 Turnpike Road
Southborough, MA 01772

September 9, 2022

Re: Wetland Border Report
201, 203 & 205 West Main Street, Ayer

Dear Lauren,

Introduction

On August 11, 2022, the wetland resources were delineated on land located on or near the above-listed site (refer to enclosed locus maps). The wetland border was flagged using the criteria in the most recent edition of MA Wetland Protection Act (WPA) and Regulations 310 CMR 10.00 et al and the local wetland bylaw. Hydric soil indicators, vegetation changes, hydrological indicators, and topography were all considered for delineation purposes.

One Bordering Vegetated Wetland was delineated in the field with series GC-W100 to GC-W108. The W-series wetland is dominant in red maple, gray birch, and glossy buckthorn. Adjacent upland was dominant in white pines, red oak, red maple, gray birch, and glossy buckthorn. Department of Environmental Protection BVW field data forms were documented at wetland flag GC W103 (see attached forms). The wetlands are protected under the MA Wetlands Protection Act and the local bylaw.

According to the Mass GIS data layers for NHESP, this site is located within Estimated and/or Priority Habitat of Rare Wildlife. The site is located both in an Area of Critical Environmental Concern (ACEC) and regulated FEMA flood zone.

The titles of attached documents are as follows:

- DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form
- FEMA Flood Map accessed 9/6/22, data refreshed 10/2020
- NRCS Soil Map of Norfolk and Suffolk Counties, Massachusetts, accessed 9/6/22
- *Orthophoto View of Locus Site,* Goddard Consulting, LLC, 8/29/2022
- *USGS of Locus Site*, Goddard Consulting, LLC, 8/29/2022

Section 1. Regulatory Framework, Implications, and Delineation Methodology

1.1 Wetlands Protection Act (WPA)

Inland resource areas were delineated in accordance with relevant federal, state, and local regulations. As stated in 310 CMR (2)(a), "Bordering Vegetated Wetlands are freshwater wetlands which border on creeks, rivers, streams, ponds and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps and bogs. Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. The

ground and surface water regime and the vegetation community which occur in each type of freshwater wetland are specified in M.G.L. c 131 sec. 40."

The methodology used to delineate Bordering Vegetated Wetlands is detailed in: (1) the BVW Policy "BVW: Bordering Vegetated Wetlands Delineation Criteria and Methodology," issued March 1, 1995; and (2) "Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook," produced by the Massachusetts Department of Environmental Protection, dated March 1995.

1.2 Bylaw

Federal, state, and local authorities regulate wetland jurisdiction. This bylaw is intended to use the Home Rule authority of the Town of Ayer to protect additional resource areas, interests and values to a greater degree than the Wetlands Protection Act (G.L. c. 131, §40, the "Act") and to implement, through local regulations and permits, additional standards and procedures stricter than those in the Act and its regulations (310 CMR 10.00 et seq.).

Section 2. Description of Regulated Inland Resource Area

- ☐ Bank
- ☐ Land Under Water Bodies and Waterways
- ☐ Riverfront Area
- ☒ Buffer Zone
- ☒ Vernal Pool (Certified and/or Potential)
- ☒ Bordering Vegetated Wetland (BVW)
- ☒ Land Subject to Flooding
- ☐ Isolated Vegetated Wetlands
- ☐ Estimated Habitats of Rare Wildlife
- ☒ Priority Habitats of Rare Species

The table below provides the Flag Numbers, Flag Type, and Wetland Types and Locations for the BVW resources delineated.

Resource Area	**Regulatory Buffer Zone**	**Flag Numbers**	**Wetland Types and Locations**
BVW	100-ft (buffer zone not flagged in field)	GC-W100 to GC-W108	Boundary of BVW located to the northeast of the site.
NHESP Priority Habitat of Rare Species			Located within he forested areas on the western parcel. The wetland is also designated as a Potential Vernal Pool by MA NHESP.

2.1 Site Photos

Figure 1. BVW

Figure 2. Upland Buffer

2.2 Vegetation

The W-series wetland is dominant in red maples and white pines within the tree layer. Dominant shrubs included grey birch, glossy buckthorn, cinnamon fern, sensitive fern, green brier, and Canada mayflower. Adjacent upland was dominant in red maples, white pines, and red oaks within the tree layer. As for shrubs, dominant species were identified to be grey birch, glossy buckthorn, lowbush blueberry, cinnamon fern, green brier and Canada mayflower. The wetland area was dominated by a majority of plants with a Wetland Indicator of Category FACW, though hydrology and soils were still evaluated during delineation.

2.3 Hydrology

The BVW appears to border off site streams that flow north across the rail tracks to other wetland areas.

2.4 Soils

Consistent with the NRCS survey, soils identified on the property include Wareham loamy fine sand. Upgradient of the stream, loamy sand was found from 0-6 inches at soil horizon A with a matrix of 10YR 3/2, and at depths of 6-18 inches horizon Bwg was found to have a matrix of 10YR 5/4 loamy sand. Downgradient of the stream, the A horizon at a depth of 0-10 inches consisted of muck and loamy sand with a 10YR 2/1 matrix, and below that at 10-18 inches the B horizon had a 10YR 5/1 matrix with 20% 5YR 5/6 mottling. More detailed information about soils is included in the attached NCRS soil map.

2.5 Topography

Additional site information about elevation and changes in slope that inform delineation of BVW boundary points can be found in the attached topographic maps provided by the U.S. Geological Survey.

Section 3. Buffer Zone

Buffer Zone is defined in 310 CRM 10.04 as the "area of land extending 100 feet horizontally outward from the boundary of any area specified in 310 CMR 10.02(1)(a)."

Section 4. FEMA Flood Zones

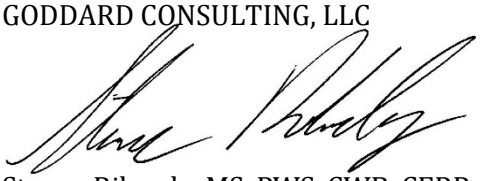
The MassGIS National Flood Hazard Layer provided by the Federal Emergency Management Agency (FEMA) depicts a 1% Annual Chance of Flooding on the Property. This area could be considered Bordering Land Subject to Flooding (BLSF) as defined in 310 CMR 10.57 (2)(a)(1).

Section 5. Findings

Based on these hydric soil indicators, vegetation, hydrological indicators, and topography, Series GC GC 100-108 was found to be the boundary of BVW. Portions of the low-lying areas of the site are also with BLSF. Rare species habitat, is located in the rear of the western parcel. A MA NHESP Info Request

would be needed to determine the species and permitting needed if work would affect this area. The wetland on site is also designated as a Potential Vernal Pool by MA NHESP. The site is also in a designated ACEC (Area of Critical Environmental Concern).

Very truly yours,
GODDARD CONSULTING, LLC



Steven Riberdy, MS, PWS, CWB, CERP, CE, PSS
Senior Manager / Lead Biologist

USGS

201 West Main Street - Ayer, MA

N

Date: 9/1/2022

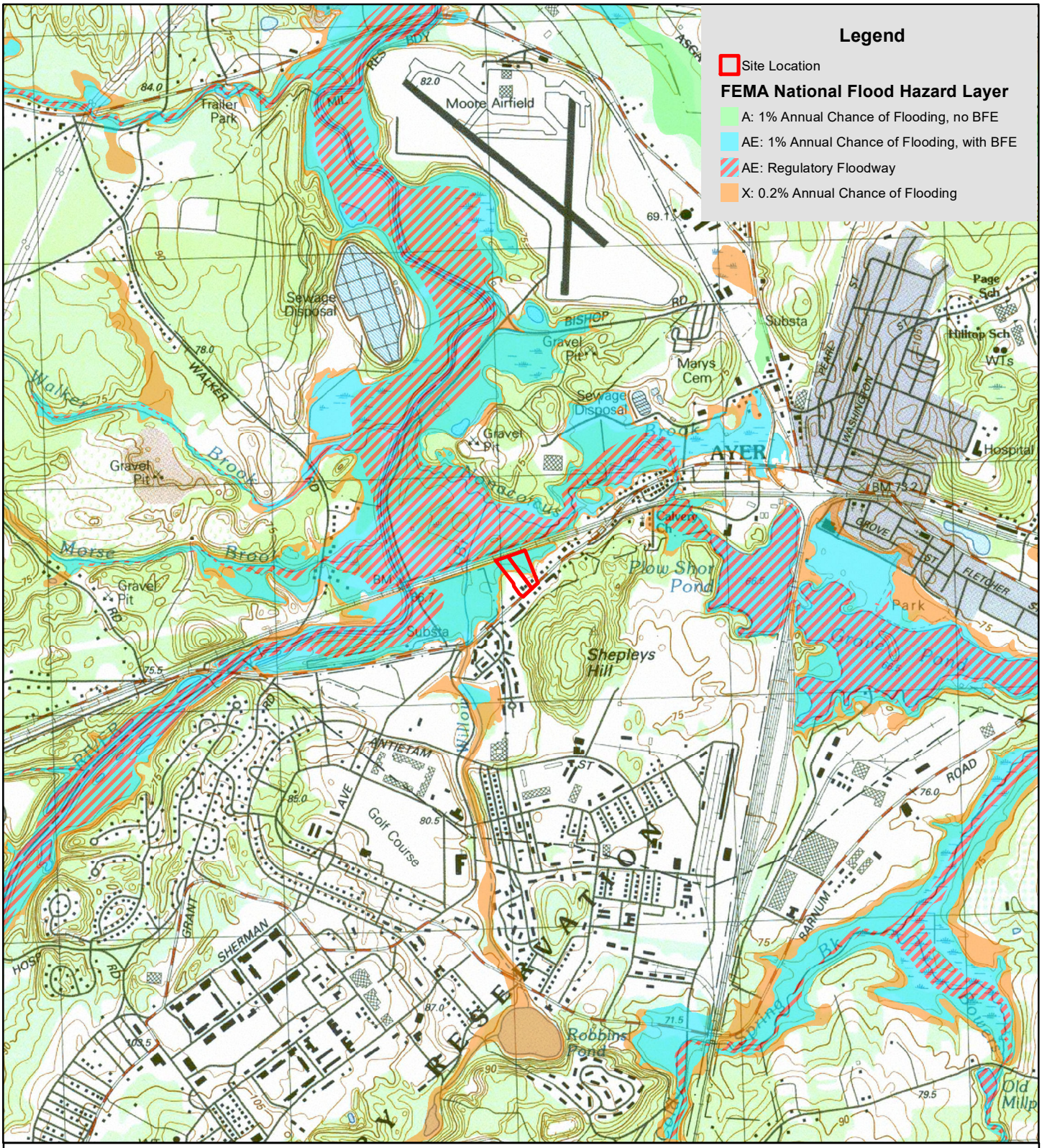
Feet

0 500 1,000 2,000

1 inch = 2,000 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

GODDARD CONSULTING LLC
Strategic Wetland Permitting



FEMA USGS

201 West Main Street - Ayer, MA

N

Date: 9/1/2022

Feet

0 500 1,000 2,000

1 inch = 2,000 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

GODDARD CONSULTING LLC
Strategic Wetland Permitting

NHESP USGS

201 West Main Street - Ayer, MA

N

Date: 9/1/2022

Feet

0 500 1,000 2,000

1 inch = 2,000 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

GODDARD CONSULTING LLC
Strategic Wetland Permitting

Orthophoto

201 West Main Street - Ayer, MA

N

Date: 9/1/2022

Feet

0 50 100 200

1 inch = 200 feet

GIS Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT"

GODDARD CONSULTING LLC
Strategic Wetland Permitting

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: _____ Prepared by: **Goddard Consulting LLC** Project location: **199, 201 & 210 W Main Street, Ayer** DEP File #: _____

Check all that apply:
- ☐ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☑ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ☐ Method other than dominance test used (attach additional information)

Section I. Vegetation Observation Plot Number: Transect Number: **Upgradient** Date of Delineation:

Sample Layer and Plant Species	Scientific name	% Cover	% Dominance	Dominant Plant (yes or no)	Wetland Indicator Category*
Tree Layer					
Red Maple	*Acer rubrum*	38%	33.3%	yes	FAC*
White Pine	*Pinus strobus*	38%	33.3%	yes	FACU
Red Oak	*Quercus rubra*	38%	33.3%	yes	FACU
Sapling Layer					
Shrub Layer					
Gray Birch	*Betula populifolia*	38%	29.7%		FAC*
Glossy Buckthorn	*Frangula alnus*	38%	29.7%		FAC*
Late Lowbush Blueberry	*Vaccinium angustifolium*	21%	16.0%		FACU
Cinnamon Fern	*Osmundastrum cinnamomeum*	11%	8.2%		FACW*
Canada Mayflower	*Maianthemum canadense*	11%	8.2%		FACU
Green brier	*Smilax rotundifolia*	11%	8.2%		FAC*
Climbing Woody Vine					
Ground Cover					

Remarks: * An asterisk after common plant name indicates stunted growth; ** indicates extremely stunted growth

Morphological Adaptations: 0 **Description:**

* An asterisk after indicator status denotes wetlands plants: plants listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; or plants listed as FAC, FACW, or OBL.

Vegetation conclusion:

Number of dominant wetland indicator plants: 1 **Number of dominant non-wetland indicator plants: 2**

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? no

If vegetation alone is presumes adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? ☑ yes ☐ no

title/date: **Interim Soil Survey of Middlesex County - 1991 (Maps - 1989)**

map number:

soil type mapped: **Merrimac-Urban land complex, 0 to 8 percent slopes**

hydric soil inclusions:

Are field observations consistent with soil survey? ☑ yes ☐ no

Remarks:

2. Soil Description

Horizon	Depth (inches)	Matrix Color	Mottles Color or Texture
A	0-6	10YR 3/2	LS
BWG	6-18	10YR 5/4	LS

Remarks:

3. Other:

Conclusion: Is soil hydric? ☐ yes ☑ no

Other Indicators of Hydrology: (check all that apply and describe)

- ☐ Site inundated:
- ☐ Depth to free water in observation hole:
- ☐ Depth to soil saturation in observation hole:
- ☐ Water marks:
- ☐ Drift Lines:
- ☐ Sediment deposits:
- ☐ Drainage patterns in BVW:
- ☐ Oxidized rhizoshperes:
- ☐ Water-stained leaves:
- ☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other):
- ☐ Other:

Vegetation and Hydrology Conclusion for Upgradient of	**yes**	**no**
Number of wetland indicator plants >= number of non-wetland plants		**X**
Wetland hydrology present:		
hydric soils present		**X**
other indicators of hydrology present		**X**
Sample location is in a BVW		**X**

Submit this form with the Request for Determination of Applicability or Notice of Intent

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: _____ Prepared by: **Goddard Consulting LLC** Project location: **199, 201 & 210 W Main Street, Ayer** DEP File #: _____

Check all that apply:
- ☐ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☑ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ☐ Method other than dominance test used (attach additional information)

Section I. Vegetation Observation Plot Number: Transect Number: **Downgradient** Date of Delineation:

Sample Layer and Plant Species	Scientific name	% Cover	% Dominance	Dominant Plant (yes or no)	Wetland Indicator Category*
Tree Layer					
Red Maple	*Acer rubrum*	86%	89.1%	yes	FAC*
White Pine	*Pinus strobus*	11%	10.9%	no	FACU
Sapling Layer					
Shrub Layer					
Gray Birch	*Betula populifolia*	38%	31.5%	yes	FAC*
Glossy Buckthorn	*Frangula alnus*	38%	31.5%	yes	FAC*
Cinnamon Fern	*Osmundastrum cinnamomeum*	11%	8.7%	no	FACW*
Canada Mayflower	*Maianthemum canadense*	3%	2.5%	no	FACU
Green Brier	*Smilax rotundifolia*	11%	8.7%	no	FAC*
Sensitive Fern	*Onoclea sensibilis*	21%	17.0%	yes	FACW*
Climbing Woody Vine					
Ground Cover					

Remarks: * An asterisk after common plant name indicates stunted growth; ** indicates extremely stunted growth

Morphological Adaptations: 0 **Description:**

* An asterisk after indicator status denotes wetlands plants: plants listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; or plants listed as FAC, FACW, or OBL.

Vegetation conclusion:

Number of dominant wetland indicator plants: 4 **Number of dominant non-wetland indicator plants: 0**

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes

If vegetation alone is presumes adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? ☑ yes ☐ no

title/date: **Interim Soil Survey of Middlesex County - 1991 (Maps - 1989)**

map number:

soil type mapped:

hydric soil inclusions:

Are field observations consistent with soil survey? ☑ yes ☐ no

Remarks:

2. Soil Description

Horizon	Depth (inches)	Matrix Color	Mottles Color or Texture
A	0-10	10YR 2/1	Muck, LS
Bg	10-18	10YR 5/1	20% 5YR 5/6

Remarks:

3. Other:

Conclusion: Is soil hydric? ☑ yes ☐ no

Other Indicators of Hydrology: (check all that apply and describe)

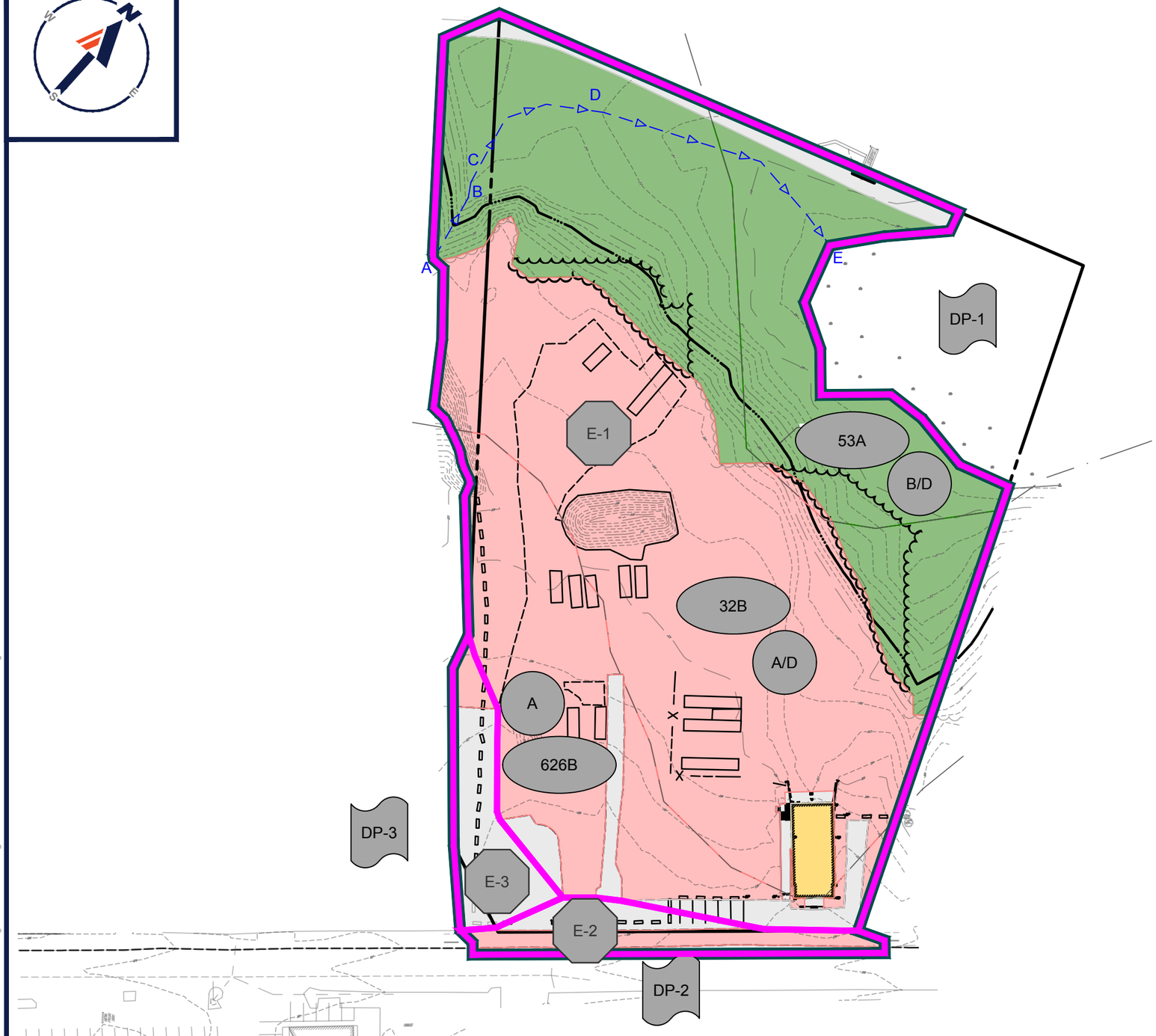
- ☐ Site inundated:
- ☑ Depth to free water in observation hole: 6"
- ☑ Depth to soil saturation in observation hole: 0"
- ☑ Water marks:
- ☐ Drift Lines:
- ☐ Sediment deposits:
- ☐ Drainage patterns in BVW:
- ☐ Oxidized rhizoshperes:
- ☐ Water-stained leaves:
- ☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other):
- ☐ Other:

Vegetation and Hydrology Conclusion for Downgradient of	**yes**	**no**
Number of wetland indicator plants >= number of non-wetland plants	**X**	
Wetland hydrology present:		
hydric soils present	**X**	
other indicators of hydrology present	**X**	
Sample location is in a BVW	**X**	

Submit this form with the Request for Determination of Applicability or Notice of Intent

APPENDIX D: EXISTING CONDITIONS HYDROLOGIC ANALYSIS

- *EXISTING CONDITIONS DRAINAGE MAP*
- *EXISTING CONDITIONS HYDROCAD COMPUTATIONS*



LEGEND

- DP# — DESIGN POINT
- EX-# — EXISTING SUBCATCHMENT
- A/B/C/D — HYDROLOGIC SOIL GROUP RATING
- UNIT — NRCS SOIL MAP UNIT
- OVERALL ANALYSIS BOUNDARY
- SUBCATCHMENT BOUNDARY
- NRCS SOIL BOUNDARY
- TIME OF CONCENTRATION
- CONCRETE OR PAVEMENT
- ROOF
- GRASS OR LANDSCAPED AREA
- GRAVEL
- WOODS OR UNDEVELOPED AREA

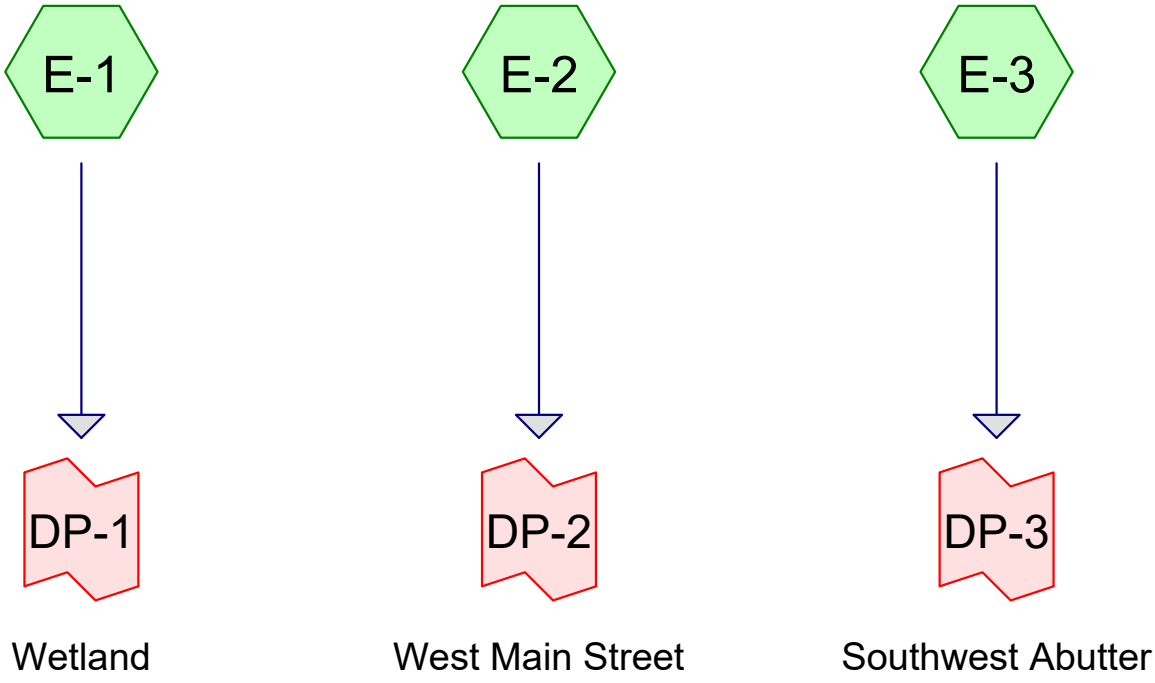
EXISTING CONDITIONS DRAINAGE AREA MAP

201 WEST MAIN STREET
AYER, MASSACHUSETTS

PREPARED BY
BOHLER

SCALE:1"=80' DATE: 06/07/2023

P:\2022\MAA220121.00\CAD\Drawings\Exhibits\Drainage Exhibits\MAA220121.00-DRNE-0a.dwg



Subcat Reach Pond Link

Routing Diagram for MAA220121 - Existing
Prepared by {enter your company name here}, Printed 6/6/2023
HydroCAD® 10.00-25 s/n 08311 © 2019 HydroCAD Software Solutions LLC

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Runoff Area=181,562 sf 7.21% Impervious Runoff Depth=0.97"
Flow Length=376' Tc=14.4 min UI Adjusted CN=74 Runoff=3.40 cfs 0.338 af

Subcatchment E-2: Runoff Area=7,455 sf 54.50% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=97 Runoff=0.49 cfs 0.039 af

Subcatchment E-3: Runoff Area=7,436 sf 87.44% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.50 cfs 0.041 af

Link DP-1: Wetland Inflow=3.40 cfs 0.338 af
Primary=3.40 cfs 0.338 af

Link DP-2: West Main Street Inflow=0.49 cfs 0.039 af
Primary=0.49 cfs 0.039 af

Link DP-3: Southwest Abutter Inflow=0.50 cfs 0.041 af
Primary=0.50 cfs 0.041 af

Total Runoff Area = 4.510 ac Runoff Volume = 0.418 af Average Runoff Depth = 1.11"
87.96% Pervious = 3.967 ac 12.04% Impervious = 0.543 ac

Summary for Subcatchment E-1:

Runoff = 3.40 cfs @ 12.22 hrs, Volume= 0.338 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Adj	Description
2,018	98		Unconnected roofs, HSG A
8,503	98		Paved parking, HSG A
2,564	98		Paved parking, HSG B
99,884	96		Gravel surface, HSG A
396	96		Gravel surface, HSG B
44,335	30		Woods, Good, HSG A
23,862	55		Woods, Good, HSG B
181,562	75	74	Weighted Average, UI Adjusted
168,477			92.79% Pervious Area
13,085			7.21% Impervious Area
2,018			15.42% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.1750	0.17		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.39"
0.1	11	0.0645	1.27		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.5	122	0.0082	0.45		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
4.8	193	0.0176	0.66		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.4	376	Total			

Summary for Subcatchment E-2:

Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
4,063	98	Paved parking, HSG A
3,392	96	Gravel surface, HSG A
7,455	97	Weighted Average
3,392		45.50% Pervious Area
4,063		54.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment E-3:

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
6,502	98	Paved parking, HSG A
934	96	Gravel surface, HSG A
7,436	98	Weighted Average
934		12.56% Pervious Area
6,502		87.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Link DP-1: Wetland

Inflow Area = 4.168 ac, 7.21% Impervious, Inflow Depth = 0.97" for 2-Year event
Inflow = 3.40 cfs @ 12.22 hrs, Volume= 0.338 af
Primary = 3.40 cfs @ 12.22 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Main Street

Inflow Area = 0.171 ac, 54.50% Impervious, Inflow Depth = 2.76" for 2-Year event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 0.039 af
Primary = 0.49 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Southwest Abutter

Inflow Area = 0.171 ac, 87.44% Impervious, Inflow Depth = 2.87" for 2-Year event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.041 af
Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Runoff Area=181,562 sf 7.21% Impervious Runoff Depth=1.97"
Flow Length=376' Tc=14.4 min UI Adjusted CN=74 Runoff=7.27 cfs 0.685 af

Subcatchment E-2: Runoff Area=7,455 sf 54.50% Impervious Runoff Depth=4.15"
Tc=6.0 min CN=97 Runoff=0.73 cfs 0.059 af

Subcatchment E-3: Runoff Area=7,436 sf 87.44% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=0.73 cfs 0.061 af

Link DP-1: Wetland Inflow=7.27 cfs 0.685 af
Primary=7.27 cfs 0.685 af

Link DP-2: West Main Street Inflow=0.73 cfs 0.059 af
Primary=0.73 cfs 0.059 af

Link DP-3: Southwest Abutter Inflow=0.73 cfs 0.061 af
Primary=0.73 cfs 0.061 af

Total Runoff Area = 4.510 ac Runoff Volume = 0.805 af Average Runoff Depth = 2.14"
87.96% Pervious = 3.967 ac 12.04% Impervious = 0.543 ac

Summary for Subcatchment E-1:

Runoff = 7.27 cfs @ 12.21 hrs, Volume= 0.685 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Adj	Description
2,018	98		Unconnected roofs, HSG A
8,503	98		Paved parking, HSG A
2,564	98		Paved parking, HSG B
99,884	96		Gravel surface, HSG A
396	96		Gravel surface, HSG B
44,335	30		Woods, Good, HSG A
23,862	55		Woods, Good, HSG B
181,562	75	74	Weighted Average, UI Adjusted
168,477			92.79% Pervious Area
13,085			7.21% Impervious Area
2,018			15.42% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.1750	0.17		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.39"
0.1	11	0.0645	1.27		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.5	122	0.0082	0.45		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
4.8	193	0.0176	0.66		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.4	376	Total			

Summary for Subcatchment E-2:

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.059 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,063	98	Paved parking, HSG A
3,392	96	Gravel surface, HSG A
7,455	97	Weighted Average
3,392		45.50% Pervious Area
4,063		54.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment E-3:

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
6,502	98	Paved parking, HSG A
934	96	Gravel surface, HSG A
7,436	98	Weighted Average
934		12.56% Pervious Area
6,502		87.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Link DP-1: Wetland

Inflow Area = 4.168 ac, 7.21% Impervious, Inflow Depth = 1.97" for 10-Year event
Inflow = 7.27 cfs @ 12.21 hrs, Volume= 0.685 af
Primary = 7.27 cfs @ 12.21 hrs, Volume= 0.685 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Main Street

Inflow Area = 0.171 ac, 54.50% Impervious, Inflow Depth = 4.15" for 10-Year event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.059 af
Primary = 0.73 cfs @ 12.09 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Southwest Abutter

Inflow Area = 0.171 ac, 87.44% Impervious, Inflow Depth = 4.26" for 10-Year event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.061 af
Primary = 0.73 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Runoff Area=181,562 sf 7.21% Impervious Runoff Depth=2.61"
Flow Length=376' Tc=14.4 min UI Adjusted CN=74 Runoff=9.70 cfs 0.905 af

Subcatchment E-2: Runoff Area=7,455 sf 54.50% Impervious Runoff Depth=4.95"
Tc=6.0 min CN=97 Runoff=0.86 cfs 0.071 af

Subcatchment E-3: Runoff Area=7,436 sf 87.44% Impervious Runoff Depth=5.06"
Tc=6.0 min CN=98 Runoff=0.86 cfs 0.072 af

Link DP-1: Wetland Inflow=9.70 cfs 0.905 af
Primary=9.70 cfs 0.905 af

Link DP-2: West Main Street Inflow=0.86 cfs 0.071 af
Primary=0.86 cfs 0.071 af

Link DP-3: Southwest Abutter Inflow=0.86 cfs 0.072 af
Primary=0.86 cfs 0.072 af

Total Runoff Area = 4.510 ac Runoff Volume = 1.048 af Average Runoff Depth = 2.79"
87.96% Pervious = 3.967 ac 12.04% Impervious = 0.543 ac

Summary for Subcatchment E-1:

Runoff = 9.70 cfs @ 12.20 hrs, Volume= 0.905 af, Depth= 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Adj	Description
2,018	98		Unconnected roofs, HSG A
8,503	98		Paved parking, HSG A
2,564	98		Paved parking, HSG B
99,884	96		Gravel surface, HSG A
396	96		Gravel surface, HSG B
44,335	30		Woods, Good, HSG A
23,862	55		Woods, Good, HSG B
181,562	75	74	Weighted Average, UI Adjusted
168,477			92.79% Pervious Area
13,085			7.21% Impervious Area
2,018			15.42% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.1750	0.17		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.39"
0.1	11	0.0645	1.27		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.5	122	0.0082	0.45		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
4.8	193	0.0176	0.66		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.4	376	Total			

Summary for Subcatchment E-2:

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.071 af, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
4,063	98	Paved parking, HSG A
3,392	96	Gravel surface, HSG A
7,455	97	Weighted Average
3,392		45.50% Pervious Area
4,063		54.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment E-3:

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.072 af, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
6,502	98	Paved parking, HSG A
934	96	Gravel surface, HSG A
7,436	98	Weighted Average
934		12.56% Pervious Area
6,502		87.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Link DP-1: Wetland

Inflow Area = 4.168 ac, 7.21% Impervious, Inflow Depth = 2.61" for 25-Year event
Inflow = 9.70 cfs @ 12.20 hrs, Volume= 0.905 af
Primary = 9.70 cfs @ 12.20 hrs, Volume= 0.905 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Main Street

Inflow Area = 0.171 ac, 54.50% Impervious, Inflow Depth = 4.95" for 25-Year event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.071 af
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Southwest Abutter

Inflow Area = 0.171 ac, 87.44% Impervious, Inflow Depth = 5.06" for 25-Year event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.072 af
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Runoff Area=181,562 sf 7.21% Impervious Runoff Depth=3.61"
Flow Length=376' Tc=14.4 min UI Adjusted CN=74 Runoff=13.49 cfs 1.254 af

Subcatchment E-2: Runoff Area=7,455 sf 54.50% Impervious Runoff Depth=6.14"
Tc=6.0 min CN=97 Runoff=1.06 cfs 0.088 af

Subcatchment E-3: Runoff Area=7,436 sf 87.44% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=98 Runoff=1.06 cfs 0.089 af

Link DP-1: Wetland Inflow=13.49 cfs 1.254 af
Primary=13.49 cfs 1.254 af

Link DP-2: West Main Street Inflow=1.06 cfs 0.088 af
Primary=1.06 cfs 0.088 af

Link DP-3: Southwest Abutter Inflow=1.06 cfs 0.089 af
Primary=1.06 cfs 0.089 af

Total Runoff Area = 4.510 ac Runoff Volume = 1.430 af Average Runoff Depth = 3.81"
87.96% Pervious = 3.967 ac 12.04% Impervious = 0.543 ac

Summary for Subcatchment E-1:

Runoff = 13.49 cfs @ 12.20 hrs, Volume= 1.254 af, Depth= 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Adj	Description
2,018	98		Unconnected roofs, HSG A
8,503	98		Paved parking, HSG A
2,564	98		Paved parking, HSG B
99,884	96		Gravel surface, HSG A
396	96		Gravel surface, HSG B
44,335	30		Woods, Good, HSG A
23,862	55		Woods, Good, HSG B
181,562	75	74	Weighted Average, UI Adjusted
168,477			92.79% Pervious Area
13,085			7.21% Impervious Area
2,018			15.42% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.1750	0.17		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.39"
0.1	11	0.0645	1.27		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.5	122	0.0082	0.45		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
4.8	193	0.0176	0.66		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.4	376	Total			

Summary for Subcatchment E-2:

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.088 af, Depth= 6.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,063	98	Paved parking, HSG A
3,392	96	Gravel surface, HSG A
7,455	97	Weighted Average
3,392		45.50% Pervious Area
4,063		54.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment E-3:

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.089 af, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
6,502	98	Paved parking, HSG A
934	96	Gravel surface, HSG A
7,436	98	Weighted Average
934		12.56% Pervious Area
6,502		87.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Link DP-1: Wetland

Inflow Area = 4.168 ac, 7.21% Impervious, Inflow Depth = 3.61" for 100-Year event
Inflow = 13.49 cfs @ 12.20 hrs, Volume= 1.254 af
Primary = 13.49 cfs @ 12.20 hrs, Volume= 1.254 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Main Street

Inflow Area = 0.171 ac, 54.50% Impervious, Inflow Depth = 6.14" for 100-Year event
Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.088 af
Primary = 1.06 cfs @ 12.09 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

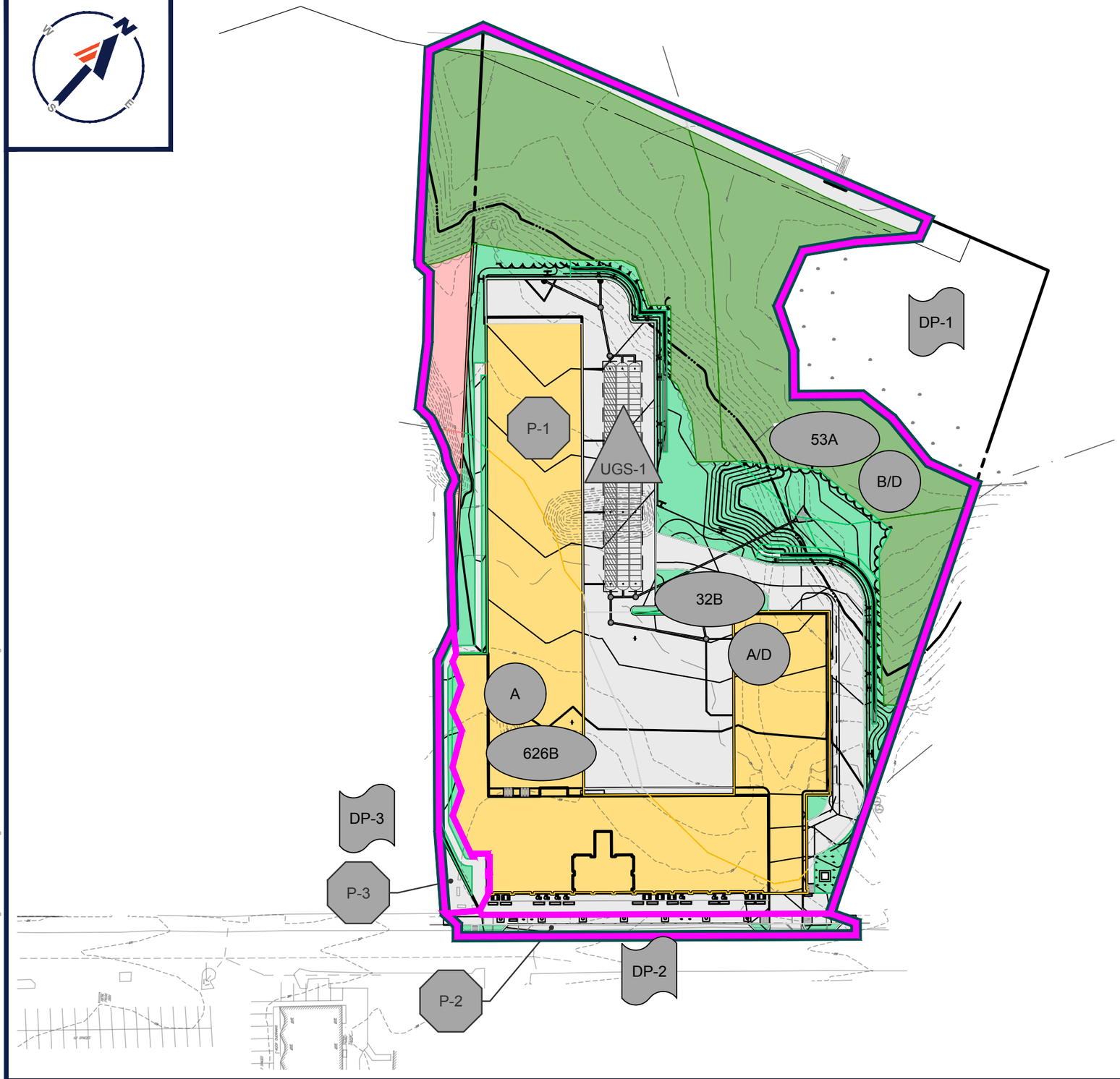
Summary for Link DP-3: Southwest Abutter

Inflow Area = 0.171 ac, 87.44% Impervious, Inflow Depth = 6.26" for 100-Year event
Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.089 af
Primary = 1.06 cfs @ 12.09 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

APPENDIX E: PROPOSED CONDITIONS HYDROLOGIC ANALYSIS

- *PROPOSED CONDITIONS DRAINAGE MAP*
- *PROPOSED CONDITIONS HYDROCAD CALCULATIONS*



LEGEND

- DP# — DESIGN POINT
- EX-# — EXISTING SUBCATCHMENT
- XX# — BASIN OR MODELED DRAINAGE STRUCTURE
- A/B/C/D — HYDROLOGIC SOIL GROUP RATING
- UNIT — NRCS SOIL MAP UNIT
- OVERALL ANALYSIS BOUNDARY
- SUBCATCHMENT BOUNDARY
- NRCS SOIL BOUNDARY
- TIME OF CONCENTRATION
- CONCRETE OR PAVEMENT
- ROOF
- GRASS OR LANDSCAPED AREA
- GRAVEL
- WOODS OR UNDEVELOPED AREA

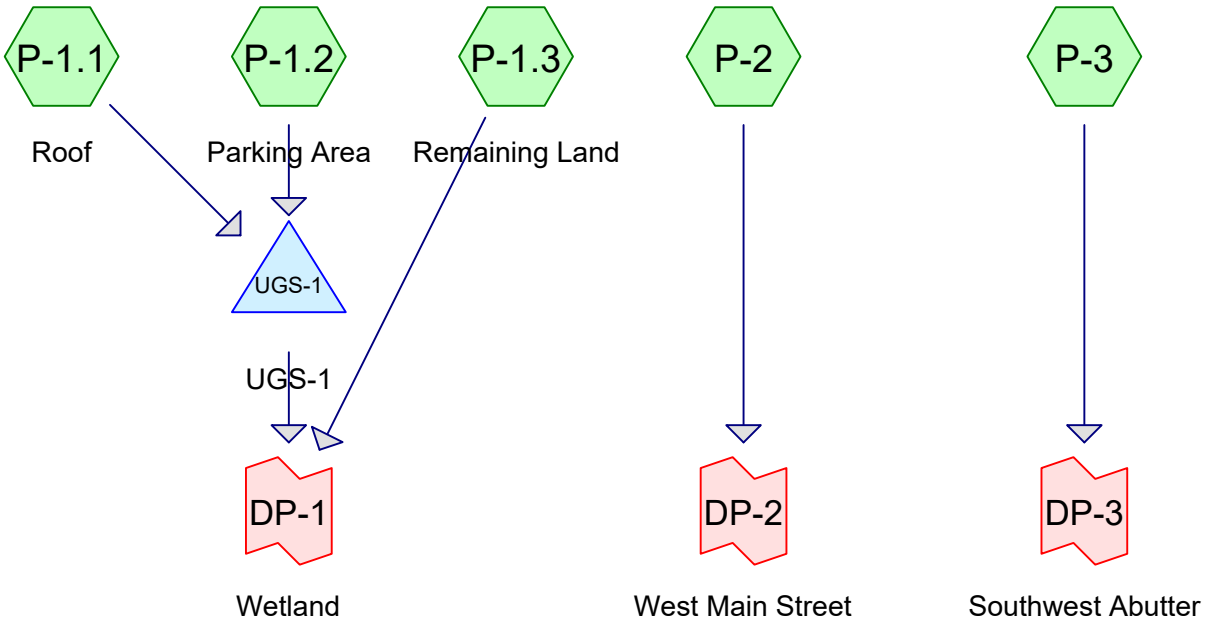
PROPOSED CONDITIONS DRAINAGE AREA MAP

201 WEST MAIN STREET
AYER, MASSACHUSETTS

PREPARED BY
BOHLER

SCALE:1"=80' DATE: 06/07/2023

P:\2022\MAA220121.00\CAD\DrawingsIExhibitsIDrainage ExhibitsIMAA220121.00-DRNE-0a.dwg



Subcat Reach Pond Link

Routing Diagram for MAA220121 - Proposed
Prepared by {enter your company name here}, Printed 6/7/2023
HydroCAD® 10.00-25 s/n 08311 © 2019 HydroCAD Software Solutions LLC

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1.1: Roof Runoff Area=53,541 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=3.61 cfs 0.294 af

Subcatchment P-1.2: Parking Area Runoff Area=28,723 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=1.94 cfs 0.158 af

Subcatchment P-1.3: Remaining Land Runoff Area=106,073 sf 18.11% Impervious Runoff Depth=0.17"
Tc=6.0 min CN=53 Runoff=0.13 cfs 0.035 af

Subcatchment P-2: Runoff Area=4,601 sf 90.65% Impervious Runoff Depth=2.26"
Tc=6.0 min CN=92 Runoff=0.27 cfs 0.020 af

Subcatchment P-3: Runoff Area=3,516 sf 58.16% Impervious Runoff Depth=0.92"
Tc=6.0 min CN=73 Runoff=0.08 cfs 0.006 af

Pond UGS-1: UGS-1 Peak Elev=213.91' Storage=0.209 af Inflow=5.55 cfs 0.451 af
Discarded=0.27 cfs 0.452 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.452 af

Link DP-1: Wetland Inflow=0.13 cfs 0.035 af
Primary=0.13 cfs 0.035 af

Link DP-2: West Main Street Inflow=0.27 cfs 0.020 af
Primary=0.27 cfs 0.020 af

Link DP-3: Southwest Abutter Inflow=0.08 cfs 0.006 af
Primary=0.08 cfs 0.006 af

Total Runoff Area = 4.510 ac Runoff Volume = 0.512 af Average Runoff Depth = 1.36"
45.19% Pervious = 2.038 ac 54.81% Impervious = 2.472 ac

Summary for Subcatchment P-1.1: Roof

Runoff = 3.61 cfs @ 12.09 hrs, Volume= 0.294 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
53,541	98	Unconnected roofs, HSG A
53,541		100.00% Impervious Area
53,541		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-1.2: Parking Area

Runoff = 1.94 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
28,723	98	Paved parking, HSG A
28,723		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-1.3: Remaining Land

Runoff = 0.13 cfs @ 12.40 hrs, Volume= 0.035 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
16,642	98	Paved parking, HSG A
2,564	98	Paved parking, HSG B
4,613	96	Gravel surface, HSG A
36,835	30	Woods, Good, HSG A
22,048	55	Woods, Good, HSG B
21,161	39	>75% Grass cover, Good, HSG A
2,210	61	>75% Grass cover, Good, HSG B
106,073	53	Weighted Average
86,867		81.89% Pervious Area
19,206		18.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-2:

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.020 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
4,171	98	Paved parking, HSG A
430	39	>75% Grass cover, Good, HSG A
4,601	92	Weighted Average
430		9.35% Pervious Area
4,171		90.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-3:

Runoff = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG A
1,471	39	>75% Grass cover, Good, HSG A
3,516	73	Weighted Average
1,471		41.84% Pervious Area
2,045		58.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Pond UGS-1: UGS-1

Inflow Area = 1.889 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-Year event
Inflow = 5.55 cfs @ 12.09 hrs, Volume= 0.451 af
Outflow = 0.27 cfs @ 10.80 hrs, Volume= 0.452 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.27 cfs @ 10.80 hrs, Volume= 0.452 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 213.91' @ 14.39 hrs Surf.Area= 0.110 ac Storage= 0.209 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 284.3 min (1,041.4 - 757.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	211.25'	0.178 af	**28.50'W x 168.12'L x 6.75'H Field A** 0.742 af Overall - 0.298 af Embedded = 0.444 af x 40.0% Voids
#2A	212.00'	0.298 af	**ADS_StormTech MC-4500 +Cap** x 120 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 120 Chambers in 3 Rows Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		0.476 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	211.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	216.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 216.00' / 215.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	216.90'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.27 cfs @ 10.80 hrs HW=211.32' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=211.25' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.00 cfs)
↑—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link DP-1: Wetland

Inflow Area = 4.324 ac, 53.88% Impervious, Inflow Depth = 0.10" for 2-Year event
Inflow = 0.13 cfs @ 12.40 hrs, Volume= 0.035 af
Primary = 0.13 cfs @ 12.40 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Main Street

Inflow Area = 0.106 ac, 90.65% Impervious, Inflow Depth = 2.26" for 2-Year event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.020 af
Primary = 0.27 cfs @ 12.09 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Southwest Abutter

Inflow Area = 0.081 ac, 58.16% Impervious, Inflow Depth = 0.92" for 2-Year event
Inflow = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af
Primary = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1.1: Roof Runoff Area=53,541 sf 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=5.28 cfs 0.437 af

Subcatchment P-1.2: Parking Area Runoff Area=28,723 sf 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=2.83 cfs 0.234 af

Subcatchment P-1.3: Remaining Land Runoff Area=106,073 sf 18.11% Impervious Runoff Depth=0.64"
Tc=6.0 min CN=53 Runoff=1.16 cfs 0.130 af

Subcatchment P-2: Runoff Area=4,601 sf 90.65% Impervious Runoff Depth=3.60"
Tc=6.0 min CN=92 Runoff=0.42 cfs 0.032 af

Subcatchment P-3: Runoff Area=3,516 sf 58.16% Impervious Runoff Depth=1.90"
Tc=6.0 min CN=73 Runoff=0.17 cfs 0.013 af

Pond UGS-1: UGS-1 Peak Elev=215.83' Storage=0.365 af Inflow=8.11 cfs 0.671 af
Discarded=0.27 cfs 0.667 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.667 af

Link DP-1: Wetland Inflow=1.16 cfs 0.130 af
Primary=1.16 cfs 0.130 af

Link DP-2: West Main Street Inflow=0.42 cfs 0.032 af
Primary=0.42 cfs 0.032 af

Link DP-3: Southwest Abutter Inflow=0.17 cfs 0.013 af
Primary=0.17 cfs 0.013 af

Total Runoff Area = 4.510 ac Runoff Volume = 0.846 af Average Runoff Depth = 2.25"
45.19% Pervious = 2.038 ac 54.81% Impervious = 2.472 ac

Summary for Subcatchment P-1.1: Roof

Runoff = 5.28 cfs @ 12.09 hrs, Volume= 0.437 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
53,541	98	Unconnected roofs, HSG A
53,541		100.00% Impervious Area
53,541		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-1.2: Parking Area

Runoff = 2.83 cfs @ 12.09 hrs, Volume= 0.234 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
28,723	98	Paved parking, HSG A
28,723		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-1.3: Remaining Land

Runoff = 1.16 cfs @ 12.12 hrs, Volume= 0.130 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
16,642	98	Paved parking, HSG A
2,564	98	Paved parking, HSG B
4,613	96	Gravel surface, HSG A
36,835	30	Woods, Good, HSG A
22,048	55	Woods, Good, HSG B
21,161	39	>75% Grass cover, Good, HSG A
2,210	61	>75% Grass cover, Good, HSG B
106,073	53	Weighted Average
86,867		81.89% Pervious Area
19,206		18.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-2:

Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.032 af, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,171	98	Paved parking, HSG A
430	39	>75% Grass cover, Good, HSG A
4,601	92	Weighted Average
430		9.35% Pervious Area
4,171		90.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-3:

Runoff = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG A
1,471	39	>75% Grass cover, Good, HSG A
3,516	73	Weighted Average
1,471		41.84% Pervious Area
2,045		58.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Pond UGS-1: UGS-1

Inflow Area = 1.889 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-Year event
Inflow = 8.11 cfs @ 12.09 hrs, Volume= 0.671 af
Outflow = 0.27 cfs @ 9.60 hrs, Volume= 0.667 af, Atten= 97%, Lag= 0.0 min
Discarded = 0.27 cfs @ 9.60 hrs, Volume= 0.667 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 215.83' @ 15.63 hrs Surf.Area= 0.110 ac Storage= 0.365 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 499.8 min (1,249.7 - 749.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	211.25'	0.178 af	**28.50'W x 168.12'L x 6.75'H Field A** 0.742 af Overall - 0.298 af Embedded = 0.444 af x 40.0% Voids
#2A	212.00'	0.298 af	**ADS_StormTech MC-4500 +Cap** x 120 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 120 Chambers in 3 Rows Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		0.476 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	211.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	216.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 216.00' / 215.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	216.90'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.27 cfs @ 9.60 hrs HW=211.32' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=211.25' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Controls 0.00 cfs)
↑**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link DP-1: Wetland

Inflow Area = 4.324 ac, 53.88% Impervious, Inflow Depth = 0.36" for 10-Year event
Inflow = 1.16 cfs @ 12.12 hrs, Volume= 0.130 af
Primary = 1.16 cfs @ 12.12 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Main Street

Inflow Area = 0.106 ac, 90.65% Impervious, Inflow Depth = 3.60" for 10-Year event
Inflow = 0.42 cfs @ 12.09 hrs, Volume= 0.032 af
Primary = 0.42 cfs @ 12.09 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Southwest Abutter

Inflow Area = 0.081 ac, 58.16% Impervious, Inflow Depth = 1.90" for 10-Year event
Inflow = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af
Primary = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1.1: Roof Runoff Area=53,541 sf 100.00% Impervious Runoff Depth=5.06"
Tc=6.0 min CN=98 Runoff=6.23 cfs 0.519 af

Subcatchment P-1.2: Parking Area Runoff Area=28,723 sf 100.00% Impervious Runoff Depth=5.06"
Tc=6.0 min CN=98 Runoff=3.34 cfs 0.278 af

Subcatchment P-1.3: Remaining Land Runoff Area=106,073 sf 18.11% Impervious Runoff Depth=1.00"
Tc=6.0 min CN=53 Runoff=2.22 cfs 0.204 af

Subcatchment P-2: Runoff Area=4,601 sf 90.65% Impervious Runoff Depth=4.38"
Tc=6.0 min CN=92 Runoff=0.50 cfs 0.039 af

Subcatchment P-3: Runoff Area=3,516 sf 58.16% Impervious Runoff Depth=2.52"
Tc=6.0 min CN=73 Runoff=0.23 cfs 0.017 af

Pond UGS-1: UGS-1 Peak Elev=216.98' Storage=0.431 af Inflow=9.57 cfs 0.797 af
Discarded=0.27 cfs 0.682 af Primary=0.29 cfs 0.032 af Outflow=0.56 cfs 0.714 af

Link DP-1: Wetland Inflow=2.22 cfs 0.236 af
Primary=2.22 cfs 0.236 af

Link DP-2: West Main Street Inflow=0.50 cfs 0.039 af
Primary=0.50 cfs 0.039 af

Link DP-3: Southwest Abutter Inflow=0.23 cfs 0.017 af
Primary=0.23 cfs 0.017 af

Total Runoff Area = 4.510 ac Runoff Volume = 1.056 af Average Runoff Depth = 2.81"
45.19% Pervious = 2.038 ac 54.81% Impervious = 2.472 ac

Summary for Subcatchment P-1.1: Roof

Runoff = 6.23 cfs @ 12.09 hrs, Volume= 0.519 af, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
53,541	98	Unconnected roofs, HSG A
53,541		100.00% Impervious Area
53,541		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-1.2: Parking Area

Runoff = 3.34 cfs @ 12.09 hrs, Volume= 0.278 af, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
28,723	98	Paved parking, HSG A
28,723		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-1.3: Remaining Land

Runoff = 2.22 cfs @ 12.11 hrs, Volume= 0.204 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
16,642	98	Paved parking, HSG A
2,564	98	Paved parking, HSG B
4,613	96	Gravel surface, HSG A
36,835	30	Woods, Good, HSG A
22,048	55	Woods, Good, HSG B
21,161	39	>75% Grass cover, Good, HSG A
2,210	61	>75% Grass cover, Good, HSG B
106,073	53	Weighted Average
86,867		81.89% Pervious Area
19,206		18.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-2:

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
4,171	98	Paved parking, HSG A
430	39	>75% Grass cover, Good, HSG A
4,601	92	Weighted Average
430		9.35% Pervious Area
4,171		90.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-3:

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG A
1,471	39	>75% Grass cover, Good, HSG A
3,516	73	Weighted Average
1,471		41.84% Pervious Area
2,045		58.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Pond UGS-1: UGS-1

Inflow Area = 1.889 ac,100.00% Impervious, Inflow Depth = 5.06" for 25-Year event
Inflow = 9.57 cfs @ 12.09 hrs, Volume= 0.797 af
Outflow = 0.56 cfs @ 13.83 hrs, Volume= 0.714 af, Atten= 94%, Lag= 104.5 min
Discarded = 0.27 cfs @ 9.10 hrs, Volume= 0.682 af
Primary = 0.29 cfs @ 13.83 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 216.98' @ 13.83 hrs Surf.Area= 0.110 ac Storage= 0.431 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 466.4 min (1,213.5 - 747.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	211.25'	0.178 af	**28.50'W x 168.12'L x 6.75'H Field A** 0.742 af Overall - 0.298 af Embedded = 0.444 af x 40.0% Voids
#2A	212.00'	0.298 af	**ADS_StormTech MC-4500 +Cap** x 120 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 120 Chambers in 3 Rows Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		0.476 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	211.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	216.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 216.00' / 215.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	216.90'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.27 cfs @ 9.10 hrs HW=211.32' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.29 cfs @ 13.83 hrs HW=216.98' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 0.29 cfs of 2.08 cfs potential flow)
↑—**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.29 cfs @ 0.92 fps)

Summary for Link DP-1: Wetland

Inflow Area = 4.324 ac, 53.88% Impervious, Inflow Depth = 0.66" for 25-Year event
Inflow = 2.22 cfs @ 12.11 hrs, Volume= 0.236 af
Primary = 2.22 cfs @ 12.11 hrs, Volume= 0.236 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Main Street

Inflow Area = 0.106 ac, 90.65% Impervious, Inflow Depth = 4.38" for 25-Year event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.039 af
Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Southwest Abutter

Inflow Area = 0.081 ac, 58.16% Impervious, Inflow Depth = 2.52" for 25-Year event
Inflow = 0.23 cfs @ 12.09 hrs, Volume= 0.017 af
Primary = 0.23 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1.1: Roof Runoff Area=53,541 sf 100.00% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=98 Runoff=7.65 cfs 0.641 af

Subcatchment P-1.2: Parking Area Runoff Area=28,723 sf 100.00% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=98 Runoff=4.10 cfs 0.344 af

Subcatchment P-1.3: Remaining Land Runoff Area=106,073 sf 18.11% Impervious Runoff Depth=1.64"
Tc=6.0 min CN=53 Runoff=4.11 cfs 0.333 af

Subcatchment P-2: Runoff Area=4,601 sf 90.65% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=92 Runoff=0.63 cfs 0.049 af

Subcatchment P-3: Runoff Area=3,516 sf 58.16% Impervious Runoff Depth=3.51"
Tc=6.0 min CN=73 Runoff=0.33 cfs 0.024 af

Pond UGS-1: UGS-1 Peak Elev=217.34' Storage=0.447 af Inflow=11.75 cfs 0.985 af
Discarded=0.27 cfs 0.701 af Primary=2.74 cfs 0.182 af Outflow=3.01 cfs 0.883 af

Link DP-1: Wetland Inflow=4.50 cfs 0.515 af
Primary=4.50 cfs 0.515 af

Link DP-2: West Main Street Inflow=0.63 cfs 0.049 af
Primary=0.63 cfs 0.049 af

Link DP-3: Southwest Abutter Inflow=0.33 cfs 0.024 af
Primary=0.33 cfs 0.024 af

Total Runoff Area = 4.510 ac Runoff Volume = 1.391 af Average Runoff Depth = 3.70"
45.19% Pervious = 2.038 ac 54.81% Impervious = 2.472 ac

Summary for Subcatchment P-1.1: Roof

Runoff = 7.65 cfs @ 12.09 hrs, Volume= 0.641 af, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
53,541	98	Unconnected roofs, HSG A
53,541		100.00% Impervious Area
53,541		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-1.2: Parking Area

Runoff = 4.10 cfs @ 12.09 hrs, Volume= 0.344 af, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
28,723	98	Paved parking, HSG A
28,723		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-1.3: Remaining Land

Runoff = 4.11 cfs @ 12.10 hrs, Volume= 0.333 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
16,642	98	Paved parking, HSG A
2,564	98	Paved parking, HSG B
4,613	96	Gravel surface, HSG A
36,835	30	Woods, Good, HSG A
22,048	55	Woods, Good, HSG B
21,161	39	>75% Grass cover, Good, HSG A
2,210	61	>75% Grass cover, Good, HSG B
106,073	53	Weighted Average
86,867		81.89% Pervious Area
19,206		18.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-2:

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.049 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,171	98	Paved parking, HSG A
430	39	>75% Grass cover, Good, HSG A
4,601	92	Weighted Average
430		9.35% Pervious Area
4,171		90.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Subcatchment P-3:

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,045	98	Paved parking, HSG A
1,471	39	>75% Grass cover, Good, HSG A
3,516	73	Weighted Average
1,471		41.84% Pervious Area
2,045		58.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6-minute Minimum**

Summary for Pond UGS-1: UGS-1

Inflow Area = 1.889 ac,100.00% Impervious, Inflow Depth = 6.26" for 100-Year event
Inflow = 11.75 cfs @ 12.09 hrs, Volume= 0.985 af
Outflow = 3.01 cfs @ 12.45 hrs, Volume= 0.883 af, Atten= 74%, Lag= 22.0 min
Discarded = 0.27 cfs @ 8.50 hrs, Volume= 0.701 af
Primary = 2.74 cfs @ 12.45 hrs, Volume= 0.182 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 217.34' @ 12.45 hrs Surf.Area= 0.110 ac Storage= 0.447 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 377.0 min (1,121.0 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	211.25'	0.178 af	**28.50'W x 168.12'L x 6.75'H Field A** 0.742 af Overall - 0.298 af Embedded = 0.444 af x 40.0% Voids
#2A	212.00'	0.298 af	**ADS_StormTech MC-4500 +Cap** x 120 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 120 Chambers in 3 Rows Cap Storage= +35.7 cf x 2 x 3 rows = 214.2 cf
		0.476 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	211.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	216.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 216.00' / 215.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	216.90'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.27 cfs @ 8.50 hrs HW=211.32' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=2.74 cfs @ 12.45 hrs HW=217.34' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Inlet Controls 2.74 cfs @ 3.48 fps)
↑—**3=Sharp-Crested Rectangular Weir** (Passes 2.74 cfs of 3.73 cfs potential flow)

Summary for Link DP-1: Wetland

Inflow Area = 4.324 ac, 53.88% Impervious, Inflow Depth = 1.43" for 100-Year event
Inflow = 4.50 cfs @ 12.41 hrs, Volume= 0.515 af
Primary = 4.50 cfs @ 12.41 hrs, Volume= 0.515 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: West Main Street

Inflow Area = 0.106 ac, 90.65% Impervious, Inflow Depth = 5.56" for 100-Year event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.049 af
Primary = 0.63 cfs @ 12.09 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link DP-3: Southwest Abutter

Inflow Area = 0.081 ac, 58.16% Impervious, Inflow Depth = 3.51" for 100-Year event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af
Primary = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

APPENDIX F: STORMWATER CALCULATIONS

- *MA STANDARD #3 – RECHARGE AND DRAWDOWN TIME*
- *MA STANDARD #4 – WATER QUALITY AND TSS REMOVAL*
- *TP40 RAINFALL DATA*
- *COMPENSATORY FLOODPLAIN CALCULATIONS*

West Ayer Village - Proposed Mixed Use Residential Development
201 West Main Street
Ayer, MA
Bohler Job Number: MAA220121.00
June 7, 2023

MA DEP Standard 3: Recharge Volume Calculations

Required Recharge Volume - A Soils (0.60 in.)	
Existing Site Impervious Area (ac)	0.484
Proposed Site Impervious Area (ac)	2.413
Proposed Increase in Site Impervious Area (ac)	1.929
Recharge Volume Required (cf)	**4,202**

Required Recharge Volume - B Soils (0.35 in.)	
Existing Site Impervious Area (ac)	0.059
Proposed Site Impervious Area (ac)	0.059
Proposed Increase in Site Impervious Area (ac)	0.000
Recharge Volume Required (cf)	**0**

Total Recharge Volume Required (cf)	**4,202**

Recharge Volume Adjustment Factor	
Impervious Area Directed to Infiltration BMP (ac)	**1.889**
%Impervious Directed to Infiltration BMP	76%
Adjustment Factor	1.31
Adjusted Total Recharge Volume Required (cf)	**5,500**

Provided Recharge Volume*	
UGS-1	18,611
Total Recharge Volume Provided (cf)	**18,611**

Provided greater than or Equal to Required

*Volume provided below lowest outlet in cubic feet (cf)

Prepared By:
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Southborough, MA 01772
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MA DEP Standard 3: Drawdown Time Calculations

Drawdown Time - UGS-1	
Volume below outlet pipe (Rv) (cf)	18,611
Soil Type	Loamy Sand - A
Infiltration rate (K)*	2.41
Bottom Area (sf)	4,791
Drawdown time (Hours)*	**19.3**

*Infiltration Rates taken from Rawls Table
**Drawdown time = Rv / (K) x (bottom area)

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201 West Main Street
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June 7, 2023

MA DEP Standard 4: Water Quality Volume Calculations

Water Quality Volume Required	
Water Quality Volume runoff (in.)*	1.0
Total Post Development Impervious Area (sf)	107,686
Required Water Quality Volume (cf)	**8,974**
*Water Quality volume runoff is equal to 1.0 inches of runoff times the total impervious area of the post development project site.	

Water Quality Volume Provided*	
UGS-1	18,611
Total Provided Water Quality Volume (cf)	**18,611**

Required Recharge Provided

*Volume provided below lowest outlet pipe in cubic feet (cf)

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201 West Main Street
Ayer, MA
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June 7, 2023

1" Water Quality Volume to Flow Rate Calculation Sheet

Compute Water Quality Flow with the following Equation

WQF = (qu)(A)(WQV)

Site Plan Callout		qu (from 1" - qu Table)	Impervious Area (SF)	Ai (sq/mi)	WQV (inches)		WQF (cfs)
UGS-1 Isolator Row	=	774	107686	0.003863	1	=	**2.99**

Water Quality Flow Rate =	WQF
Water Quality Volume =	WQV*
Unit peak discharge (csm/in) =	qu**
Impervious Area in watershed (square miles) =	Ai

*WQV is expressed in watershed inches (you must use 1.0-inches in all cases with this method and not 0.5-inches)
** calculate the qu based on the time of concentration (see 1" - qu Table)

UGS-1 Isolator row sizing

Maximum treatment flow rate - MC4500 Chamber*	0.277 cfs
Number of chambers in Isolator Row	40
WQF provided by isolator row =	11.08

*Per NJCAT Technology Verifaction, Isolator Row Plus, StormTech, LLC, July 2020

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Ayer, MA
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June 7, 2023

MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: CB-1 to UGS-1

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump, Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Underground Infiltration System with Isolator Row	**0.80**	**0.75**	**0.60**	**0.15**
		Total TSS Removal =	**85%**	

*Equals remaining load from previous BMP (E) which enters BMP

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F-1. Rainfall Data for Massachusetts from *Rainfall Frequency Atlas of the United States* (TP-40)

- Users of this Handbook should note that current MA DEP written guidance (see DEP Waterlines newsletter -- Fall 2000) requires the use of TP-40 Rainfall Data for calculations under the Wetlands Protection Regulations and the Stormwater Management Policy. More stringent design storms may be used under a local bylaw or ordinance. However, DEP will continue to require the use of TP-40 in any case it reviews under the Wetlands Protection Act and Stormwater Management Policy.

Adjusted Technical Paper 40 Design Storms for 24-hour Event by County

County Name	1-yr 24-hr	2-yr 24-hr	5-yr 24-hr	10-yr 24-hr	25-yr 24-hr	50-yr 24-hr	100-yr 24-hr
Barnstable	2.5	3.6	4.5	4.8	5.7	6.4	7.1
Berkshire	2.5	2.9	3.8	4.4	5.1	5.9	6.4
Bristol	2.5	3.4	4.3	4.8	5.6	6.3	7.0
Dukes	2.5	3.6	4.6	4.9	5.8	6.5	7.2
Essex	2.5	3.1	3.9	4.5	5.4	5.9	6.5
Franklin	2.5	2.9	3.8	4.3	5.1	5.8	6.2
Hampden	2.5	3.0	4.0	4.6	5.3	6.0	6.5
Hampshire	2.5	3.0	3.9	4.5	5.2	5.9	6.4
Middlesex	2.5	3.1	4.0	4.5	5.3	5.9	6.5
Nantucket	2.5	3.6	4.6	4.9	5.8	6.5	7.2
Norfolk	2.5	3.2	4.1	4.7	5.5	6.1	6.7
Plymouth	2.5	3.4	4.3	4.7	5.6	6.2	7.0
Suffolk	2.5	3.2	4.0	4.6	5.5	6.0	6.6
Worcester	2.5	3.0	4.0	4.5	5.3	5.9	6.5

West Ayer Village - Proposed Mixed Use Residential Development
Floodplain Analysis Calculations

COMPENSATORY FLOODPLAIN CALCULATIONS

DMG Investments, LLC

201 West Main Street, Ayer, MA

Area #1						
Elevation (FT)	Existing Surface Area (SF)	Existing Volume (CF)	Proposed Surface Area (SF)	Proposed Volume (CF)	Net Volume (CF)	
211	610	788	610	788	0	N/A
212	1,577	1,636	1,556	1,654	18	Increase
213	2,592	3,224	2,640	3,315	91	Increase
214	3,650	4,847	3,610	4,874	27	Increase
215	4,450	7,008	4,821	7,276	268	Increase
216	5,191	9,135	5,291	9,235	100	Increase
217	6,157	11,855	5,916	11,953	99	Increase
217.1	6,261	9,636	5,971	9,693	57	Increase
Total		48,129		48,788	659	Increase

Note:
Flood Zone "AE" at Elevation 217.1 per current FEMA maps.

APPENDIX G: OPERATION AND MAINTENANCE

- *STORMWATER OPERATION AND MAINTENANCE PLAN*
- *INSPECTION REPORT*
- *INSPECTION AND MAINTENANCE LOG FORM*
- *LONG-TERM POLLUTION PREVENTION PLAN*
- *ILLICIT DISCHARGE STATEMENT*
- *SPILL PREVENTION*
- *PROPOSED OPERATION AND MAINTENANCE MAP*

STORMWATER OPERATION AND MAINTENANCE PLAN

West Ayer Village – Proposed Mixed Use Residential Development
201 West Main Street
Ayer, MA

RESPONSIBLE PARTY DURING CONSTRUCTION:

DMG Investments, LLC
100 Wall Street, Suite 1601
New York, NY

RESPONSIBLE PARTY POST CONSTRUCTION:

DMG Investments, LLC
100 Wall Street, Suite 1601
New York, NY

Construction Phase

During the construction phase, all erosion control devices and measures shall be maintained in accordance with the final record plans, local/state approvals and conditions, the EPA Construction General Permit and the Stormwater Pollution Prevention Plan (SWPPP) if applicable. Additionally, the maintenance of all erosion / siltation control measures during construction shall be the responsibility of the general contractor. Contact information of the OWNER and CONTRACTOR shall be listed in the SWPPP for this site. The SWPPP also includes information regarding construction period allowable and illicit discharges, housekeeping and emergency response procedures. Upon proper notice to the property owner, the Town/City or its authorized designee shall be allowed to enter the property at a reasonable time and in a reasonable manner for the purposes of inspection.

Post Development Controls

Once construction is completed, the post development stormwater controls are to be operated and maintained in compliance with the following permanent procedures (note that the continued implementation of these procedures shall be the responsibility of the Owner or its assignee):

1. Parking lots: Sweep at least two (2) times per year and on a more frequent basis depending on sanding operations. Swept areas shall include all parking, drive aisles, and access aisles. All resulting sweepings shall be collected and properly disposed of offsite in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $1,000/year

2. Roadways: Sweep at least two (2) times per year and on a more frequent basis depending on sanding operations. All resulting sweepings shall be collected and properly disposed of off site in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $1,000/year

3. Catch basins, yard drains, trench drains, manholes and piping: Inspect two (2) times per year and at the end of foliage and snow-removal seasons. These features shall be cleaned two (2) times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the catch basin or underground system. Accumulated sediment and hydrocarbons present must be removed and properly disposed of off-site in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $500/year per structure.

4. Riprap apron / Scour Hole: Riprap and scour holes should be checked at least annually and after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for displaced stones, slumping, and erosion at edges, especially downstream or downslope. If the riprap is damaged, it should be repaired before further damage can take place. Note and repair any erosion, stone displacement or low spots in the areas. Woody vegetation should be removed from the riprap annually.

   Approximate Maintenance Budget: $250/year per location.

5. Isolator Row: Follow manufacturer's recommendations (attached).

   Approximate Maintenance Budget: $1,000/year per unit.

6. Underground Infiltration Basins: Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. The outlet of the basin, if any, shall be inspected for erosion and sedimentation, and rip-rap shall be promptly repaired in the case of erosion. Sediment collecting in the bottom of the basin shall be inspected twice annually, and removal shall commence any time the sediment reaches a depth of six inches anywhere in the basin. Any sediment removed shall be disposed of in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: Cleaning - $1,000/year, Inspection - $200/year

All components of the stormwater system will be accessible by the owner or their assignee.

STORMWATER MANAGEMENT SYSTEM

POST-CONSTRUCTION INSPECTION REPORT

LOCATION:

West Ayer Village – Proposed Mixed Use Residential Development
201 West Main Street
Ayer, MA

RESPONSIBLE PARTY:

DMG Investments, LLC
100 Wall Street, Suite 1601
New York, NY

NAME OF INSPECTOR:	INSPECTION DATE:
Note Condition of the Following (sediment depth, debris, standing water, damage, etc.):	
Catch Basins:	
Discharge Points/ Flared End Sections / Rip Rap:	
Infiltration Basin:	
Isolator Row:	
Other:	

Note Recommended Actions to be taken on the Following (sediment and/or debris removal, repairs, etc.):
Catch Basins:
Discharge Points / Flared End Sections / Rip Rap:
Infiltration Basin:
Isolator Row:
Other:
Comments:

STORMWATER INSPECTION AND MAINTENANCE LOG FORM

West Ayer Village – Proposed Mixed Use Residential Development
201 West Main Street – Ayer, MA

Stormwater Management Practice	Responsible Party	Date	Maintenance Activity Performed

LONG-TERM POLLUTION PREVENTION PLAN

West Ayer Village – Proposed Mixed Use Residential Development
201 West Main Street
Ayer, MA

RESPONSIBLE PARTY DURING CONSTRUCTION:

DMG Investments, LLC
100 Wall Street, Suite 1601
New York, NY

RESPONSIBLE PARTY POST CONSTRUCTION:

DMG Investments, LLC
100 Wall Street, Suite 1601
New York, NY

For this site, the Long-Term Pollution Prevention Plan will consist of the following:

- The property owner shall be responsible for "good housekeeping" including proper periodic maintenance of building and pavement areas, curbing, landscaping, etc.
- Proper storage and removal of solid waste (dumpsters).
- Sweeping of parking lots, drive aisles and access aisles a minimum of twice per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.
- Regular inspections and maintenance of Stormwater Management System as noted in the "O&M Plan".
- Snow removal shall be the responsibility of the property owner. Snow shall not be plowed, dumped and/or placed in forebays, infiltration basins or similar stormwater controls. Salting and/or sanding of pavement / walkway areas during winter conditions shall only be done in accordance with all state/local requirements and approvals.
- No outdoor maintenance or washing of vehicles allowed.
- Trash and other debris shall be removed from all areas of the site at least twice yearly.
- Reseed any bare areas as soon as they occur. Erosion control measures shall be installed in these areas to prevent deposits of sediment from entering the drainage system.

- Grass shall be maintained at a minimum blade height of two to three inches and only 1/3 of the plant height shall be removed at a time. Clippings shall not be disposed of within stormwater management areas or adjacent resource areas.

- Plants shall be pruned as necessary.

- The use of fertilizers will be kept at a level consistent with typical residential use. Fertilizer will be applied a maximum of once to twice per year during the initial planting and stabilization of landscaped areas. Once plants are established and growing well fertilizer will be applied judiciously.

- The use of pesticides will be kept at a level consistent with typical residential use. Where possible mechanical methods (i.e. pest traps) or biological methods (i.e. beneficial insects) of pest control shall be implemented. If pesticides (insecticide, herbicide, and fungicide) are required to be used, a pesticide which poses the lowest risk to public health and the environment shall be used.

- Pet waste shall be disposed of in accordance with local regulations. Pet waste shall not be disposed of in a storm drain or catch basin.

- Snow piles shall be located adjacent to or on pervious surfaces in upland areas. This will allow snow melt water to filter into the soil, leaving behind sand and debris which can be removed in the springtime.

- In no case shall snow be disposed of or stored in resource areas (wetlands, floodplain, streams, or other water bodies).

- In no case shall snow be disposed of or stored in the detention basins, infiltration basins or bioretention areas.

- If necessary, stockpiled snow will be removed from the Site and disposed of at an off-site location in accordance with all local, state and federal regulations.

- The amount of sand and deicing chemicals shall be kept at the minimum amount required to provide safe pedestrian and vehicle travel.

- Deicing chemicals are recommended as a pretreatment to storm events to minimize the amount of applied sand.

- Sand and deicing chemicals should be stockpiled under covered storage facilities that prevent precipitation and adjacent runoff from coming in contact with the deicing materials. Stockpile areas shall be located outside resource areas.

- The primary agents used for deicing at parking lots, sidewalks and the access roads shall consist of salt alternatives such as calcium carbonate (CaCO3) or potassium chloride (KCl) or sodium chloride.

- Deliveries shall be monitored by owner or owner's representative to ensure proper delivery and in the event that a spillage occurs it shall be contained and cleaned up immediately in accordance with the spill prevention program for the project.

- Recycle materials whenever possible. Provide separate containers for recycle materials. Recycling products will be removed by a certified waste hauler.

OPERATON AND MAINTENANCE TRAINING PROGRAM

The Owner will coordinate an annual in-house training session to discuss the Operations and Maintenance Plan, the Long-Term Pollution Prevention Plan, and the Spill Prevention Plan and response procedures. Annual training will include the following:

Discuss the Operations and Maintenance Plan

- Explain the general operations of the stormwater management system and its BMPs
- Identify potential sources of stormwater pollution and measures / methods of reducing or eliminating that pollution
- Emphasize good housekeeping measures

Discuss the Spill Prevention and Response Procedures

- Explain the process in the event of a spill
- Identify potential sources of spills and procedures for cleanup and /or reporting and notification
- Complete a yearly inventory or Materials Safety Data sheets of all tenants and confirm that no potentially harmful chemicals are in use.

ILLICIT DISCHARGE STATEMENT

Certain types of non-stormwater discharges are allowed under the U.S. Environmental Protection Agency Construction General Permit. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come in contact with the water prior to or after its discharge. The control measures which have been outlined previously in this LTPPP will be strictly followed to ensure that no contamination of these non-storm water discharges takes place. Any existing illicit discharges, if discovered during the course of the work, will be reported to MassDEP and the local DPW, as applicable, to be addressed in accordance with their respective policies. No illicit discharges will be allowed in conjunction with the proposed improvements.

Duly Acknowledged:

_____

Name & Title Date

SPILL PREVENTION AND RESPONSE PROCEDURES (POST CONSTRUCTION)

In order to prevent or minimize the potential for a spill of Hazardous Substances or Oil or come into contact with stormwater, the following steps will be implemented:

1. All Hazardous Substances or Oil (such as pesticides, petroleum products, fertilizers, detergents, acids, paints, paint solvents, cleaning solvents, etc.) will be stored in a secure location, with their lids on, preferably under cover, when not in use.

2. The minimum practical quantity of all such materials will be kept on site.

3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided on site.

4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

5. It is the OWNER's responsibility to ensure that all Hazardous Waste on site is disposed of properly by a licensed hazardous material disposal company. The OWNER is responsible for not exceeding Hazardous Waste storage requirements mandated by the EPA or state and local authorities.

In the event of a spill of Hazardous Substances or Oil, the following procedures should be followed:

1. All measures should be taken to contain and abate the spill and to prevent the discharge of the Hazardous Substance or Oil to stormwater or off-site. (The spill area should be kept well ventilated and personnel should wear appropriate protective clothing to prevent injury from contact with the Hazardous Substances.)

2. For spills of less than five (5) gallons of material, proceed with source control and containment, clean-up with absorbent materials or other applicable means unless an imminent hazard or other circumstances dictate that the spill should be treated by a professional emergency response contractor.

3. For spills greater than five (5) gallons of material immediately contact the MADEP at the toll-free 24-hour statewide emergency number: **1-888-304-1133**, the local fire department (**9-1-1**) and an approved emergency response contractor. Provide information on the type of material spilled, the location of the spill, the quantity spilled, and the time of the spill to the emergency response contractor or coordinator, and proceed with prevention, containment and/or clean-up if so desired. (Use the form provided, or similar).

4. If there is a Reportable Quantity (RQ) release, then the National Response Center should be notified immediately at (800) 424-8802; within 14 days a report should be submitted to the EPA regional office describing the release, the date and circumstances of the release and the steps taken to prevent another release. This Pollution Prevention Plan should be updated to reflect any such steps or actions taken and measures to prevent the same from reoccurring.

SPILL PREVENTION CONTROL AND COUNTERMEASURE FORM

West Ayer Village – Proposed Mixed Use Residential Development
201 West Main Street
Ayer, MA

Where a release containing a hazardous substance occurs, the following steps shall be taken by the facility manager and/or supervisor:

1. Immediately notify The Ayer Fire Department (at **9-1-1**)

2. All measures must be taken to contain and abate the spill and to prevent the discharge of the pollutant(s) to off-site locations, receiving waters, wetlands and/or resource areas.

3. Notify the Ayer Board of Health at (978) 772-8220 x145 and the Ayer Conservation Commission at (978) 772-8220 x143.

4. Provide documentation from licensed contractor showing disposal and cleanup procedures were completed as well as details on chemicals that were spilled to the Ayer Board of Health and Conservation Commission.

Date of spill:_____ Time:_____ Reported By:_____

Weather Conditions:_____

Material Spilled	**Location of Spill**	**Approximate Quantity of Spill (in gallons)**	**Agency(s) Notified**	**Date of Notification**

Cause of Spill: _____

_____

Measures Taken to Clean up Spill: _____

_____

Type of equipment: _____ Make: _____ Size: _____

License or S/N: _____

Location and Method of Disposal _____

_____

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring: _____

_____

_____

Additional Contact Numbers:

- DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) EMERGENCY PHONE: 1-888-304-1133
- NATIONAL RESPONSE CENTER PHONE: (800) 424-8802
- U.S. ENVIRONMENTAL PROTECTION AGENCY PHONE: (888) 372-7341

Isolator® Row
O&M Manual

ADS StormTech™

The Isolator® Row

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

The Isolator Row

The Isolator Row is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-7200 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row and passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS geotextile fabric is placed between the stone and the Isolator Row chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the chamber's sidewall. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-7200 models as these chambers do not have perforated side walls.

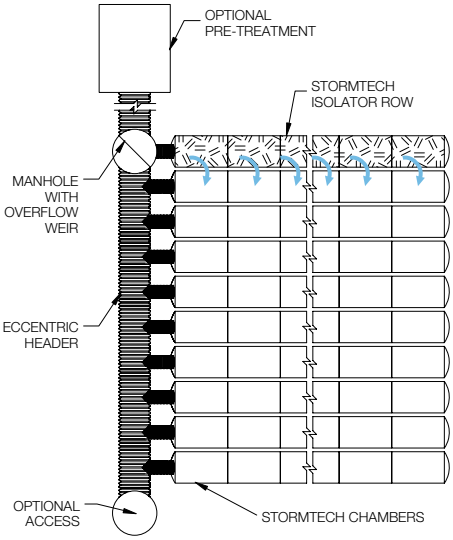
The Isolator Row is designed to capture the "first flush" runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row. After Stormwater flows through the Isolator Row and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.*

Looking down the Isolator Row from the manhole opening, woven geotextile Fabric is shown between the chamber and stone base.

StormTech Isolator Row with Overflow Spillway (*not to scale*)



Isolator Row Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the **actual frequency of inspection and maintenance practices.**

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

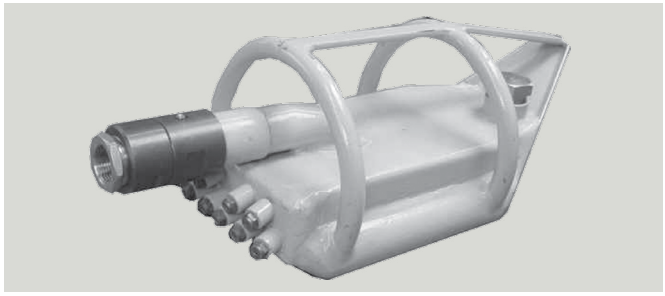
The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

Maintenance

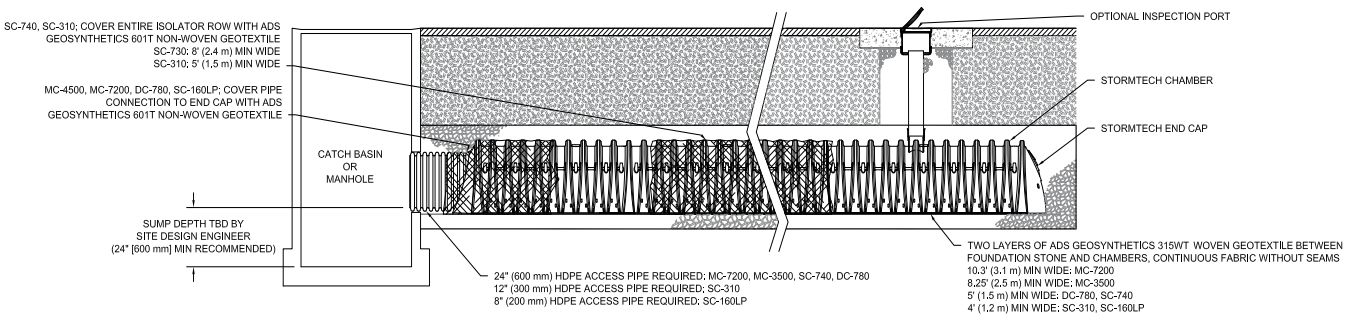
The Isolator Row was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row lengths up to 200" (61 m). **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row (not to scale)

Note: *Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-7200 chamber models and is not required over the entire Isolator Row.*



Isolator Row Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row
   i. Remove cover from manhole at upstream end of Isolator Row
   ii. Using a flashlight, inspect down Isolator Row through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

Step 2

Clean out Isolator Row using the JetVac process.

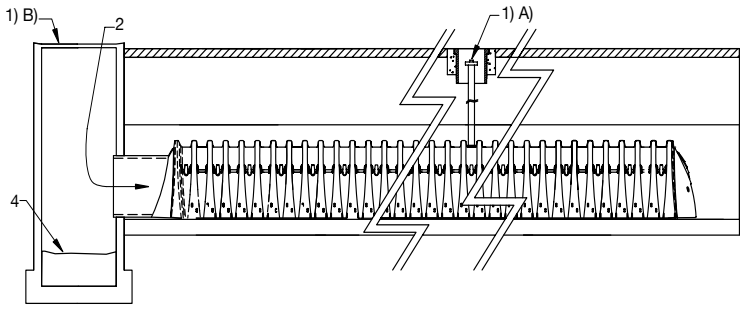
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

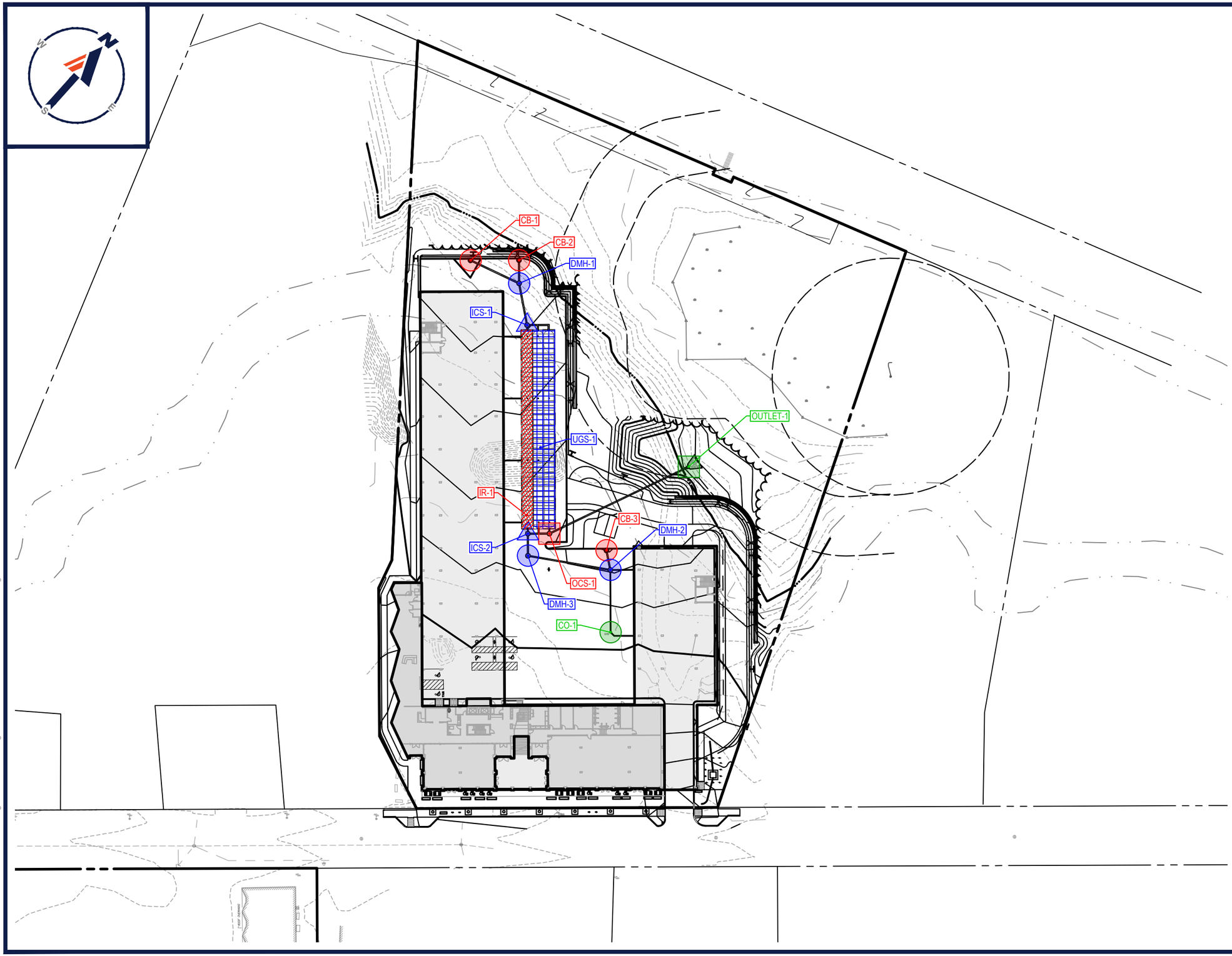
Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sedi-ment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com
800-821-6710



LEGEND

- CATCH BASIN ("PROP. CB") (SINGLE AND DOUBLE)
- OUTLET CONTROL STRUCTURE ("PROP. OCS")
- MANHOLE ("PROP. DMH")
- INLET CONTROL STRUCTURE ("PROP. ICS")
- CLEANOUT ("PROP. CO")
- OUTLET
- UNDERGROUND INFILTRATION BASIN AND ISOLATOR ROW ("UGS-1")
- ISOLATOR ROW OF CHAMBERS

OPERATION AND MAINTENANCE LOCATION MAP

201 WEST MAIN STREET
AYER, MASSACHUSETTS

PREPARED BY

BOHLER

SCALE:1"=80' DATE: 06/07/2023

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APPENDIX H: CONSTRUCTION INSPECTION AND CONTROL

- *STORMWATER INSPECTION REPORT*
- *STORMWATER SEDIMENTATION AND EROSION CONTROL PLANS*
- *STAGNATION PREVENTION AND MOSQUITO CONTROL PLAN*