Planning Board
AGENDA

Thursday, October 10, 2024 - 6:00 PM

Regular Meeting
Agawam Senior Center
954 Main Street
Agawam, MA 01001

A. Planning Board

1) SITE PLAN-404 Silver Street-Silver Street Energy Storage, LLC c/o New Leard Energy, Inc

2) SITE PLAN-195 South Westfield Street-Aljanabi

3) SITE PLAN-1422-1444 Main Street

4) APPROVAL OF MINUTES-October 3, 2024

5) Correspondences

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Site Plan Review Application

October 2024

AGAWAM ENERGY STORAGE SYSTEM DEVELOPMENT

404 SILVER STREET, AGAWAM, MA

PREPARED FOR: SILVER STREET ENERGY STORAGE, LLC
C/O NEW LEAF ENERGY, INC.

SUBMITTED TO: TOWN OF AGAWAM PLANNING BOARD

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

October 1, 2024

Pam Kerr
Planning Board Director
Town of Agawam
36 Main Street
Agawam, MA 01001

Re: Site Plan Review Application
Agawam Battery Energy Storage Development
404 Silver Street, Agawam, MA 01001

Dear Ms. Kerr:

Weston & Sampson Engineers, Inc. (Weston & Sampson) is submitting this package which includes a Site Plan Review Application, and related appendices to be filed with the Town of Agawam Planning Board for the above-mentioned project on behalf of Silver Street Energy Storage, LLC, c/o New Leaf Energy, Inc. (the Applicant). The Applicant proposes to develop the project, an approximately 5 megawatt (MW), 20 megawatt hour (MWh) battery energy storage system (BESS) at the site located at 404 Silver Street (Map H8, Block 3, Lot 37).

The project will consist of battery containers, transformers, inverters, and associated equipment pads. The electrical equipment will be surrounded by a combination of 7 ft tall chain link fence and 10 ft sound barrier wall as detailed in the attached site plans. The BESS equipment will connect to an existing utility pole on Silver Street via underground conduit and proposed pole mounted interconnection equipment. This application package includes the following attachments:

- Appendix A – Site Plan Review Application Form
- Appendix B – Project Narrative
- Appendix C – Site Plans
- Appendix D – Zoning Determination
- Appendix E – Stormwater Report

If you have any further questions or require any additional information, please feel free to contact me by phone at (978) 532-1900 or by email at costello.melinda@wseinc.com.

Sincerely,
WESTON & SAMPSON ENGINEERS, INC.

Melinda Costello

Melinda Costello, P.E.
Project Manager

cc: William Peregoy, Civil Project Engineer II, Silver Street Energy Storage, LLC, c/o New Leaf Energy, Inc.

Appendix A - Application Form

TOWN OF AGAWAM, MASSACHUSETTS

FORM D

Application for Site Plan Approval

Please complete the following form and electronically submit with site plans, completed Zoning Determination and Storm Water Management Report to: siteplan@agawam.ma.us in addition to sending four (4) hard copies of the Site Plan and one (1) hard copy of the Storm Water Management Report and completed Zoning Determination to:

Agawam Planning Department

36 Main Street

Agawam, MA 01001

October 1, 2024

1. Name of Business Silver Street Energy Storage, LLC c/o New Leaf Energy, Inc. (Applicant)

   Address 55 Technology Drive #102, Lowell, MA 01851

   Phone # (978) 995-3054 email wperegoy@newleafenergy.com

2. Name of Applicant/Owner Robert and Deborah Pelley

   Address 404 Silver Street, Agawam, MA 01001

   Phone # (413) 530-6102 email _____

3. Name of Engineer/Architect Weston & Sampson Engineers, Inc.

   Address 55 Walkers Brook Drive, Suite 100

   Phone # (978) 532-1900 email costello.melinda@wseinc.com

4. Please give a brief description of the proposed project:

   The proposed project is a battery energy storage system (BESS) with a capacity of approximately 5 megawatts (MW) and 20 megawatt hours (MWh). Associated electrical equipment, including battery containers, transformers, and inverters, will sit on concrete pads enclosed by a combined 7 ft tall chain link fence with an access gate and 10 ft sound barrier wall. Improvements to an existing gravel road are proposed for access to the BESS. Underground conduit is proposed to connect the BESS equipment to proposed pole mounted equipment. Interconnection will be to an existing utility pole on Silver Street. Also associated with this project is a subdivision to divide the parcel into Lot A, containing the existing residence, and Lot B, containing the BESS equipment.

Appendix B - Project Narrative

Introduction

Silver Street Energy Storage, LLC, c/o New Leaf Energy, Inc. (the Applicant) proposes construction of a battery energy storage system (BESS) encompassing approximately 0.98 acres of the approximately 5.7-acre property, located at 404 Silver Street, Agawam, MA (Map H8, Block 3, Lot 37). The property currently contains a residence along the southern portion of the site, and an existing gravel road, dirt piles, and woodland toward the northern portion of the site.

An application for Zoning Determination was submitted to the Inspection Services, Building Department on September 5, 2024. According to the direction outlined in the Zoning Determination by the Town Building Official dated September 6, 2024, a Site Plan Review application is required to submit to the Planning Board in accordance with Section 180-152, of the Zoning Ordinance section of the Town of Agawam Code (the Ordinance). The following narrative and documentation are hereby submitted to the Planning Board in accordance with Section 180-13 of the Zoning Ordinance, relating to site plan reviews.

This application package includes a Site Plan Review Application and related appendices. The application was submitted electronically to the email: siteplan@agawam.ma.us. Two hard copies have been mailed to the Town Planner.

Proposed Project

The proposed BESS site will be accessed from Silver Street. The parcel is owned by Robert and Deborah Pelley, with whom Silver Street Energy Storage, LLC, c/o New Leaf Energy, Inc. has a lease agreement. A medium-scale solar energy system is a permitted use within the agricultural zoning district via a Site Plan Review by the Planning Board.

As part of this project, a subdivision of the existing lot is proposed. The existing residence will remain on Lot A, and the BESS project will be on Lot B. Lot A will be in the Business A Zone and Lot B will be located in the Agricultural Zone.

As currently designed, the proposed BESS has a capacity of 5.0 megawatts (MW) and 20 megawatt hours (MWh) . The associated battery containers, transfmormers, and inverters will sit on concrete pads that will be enclosed by a combined 10 ft tall sound barrier wall and 7 ft tall chain link fence with an access gate. The existing gravel road at the property is proposed to be improved to a 20 ft wide gravel road to allow access to the BESS. Interconnection will be in accordnace with utility requirements and will connect an existing power pole on Silver Street to proposed pole mounted equipment adjacent to the gravel access road near Silver Street. Underground conduit is proposed to connect the BESS equipment to the pole mounted equipment.

The name of the Project Applicant is:

Silver Street Energy Storage, LLC
c/o New Leaf Energy, Inc.
55 Technology Drive, Suite 102
Lowell, MA 01851
Contact: William Peregoy
Email: wperegoy@newleafenergy.com

The name and contact information of the Engineer authorized to represent the Project Applicant:

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
Contact: Robert Bukowski P.E.
Phone: (978) 532-1900
e-mail: Bukowski.Rob@wseinc.com

Compliance with Bylaws

On behalf of the Applicant, Weston & Sampson has developed a set of plans (Appendix C) that are intended to meet requirements set forth in the Ordinance for the Agricultural District in which the project is proposed. The Residence A-2 District is the nearest residence district. Below is a summary of the dimensional aspects of the project:

Table 1 Dimensional and Density Regulations:

Requirements	Required[1]	Proposed[2]
Minimum Front Yard Setback[1]	100 ft	573 ft (min)
Minimum Rear Yard Setback	20 ft	540 ft (min)
Minimum Side Yard Setback	15 ft	57 ft (min)
Maximum Structure Height [3]	15 ft	<15 ft

1. Setbacks listed in Section 180-39 of the Ordinance.
2. Proposed setbacks measured from the property line to the nearest side of the BESS equipment pad.
3. Height of a medium-scale solar energy system shall not exceed 15 feet as outlined in Ordinance Section 180-512.

Provisions of the Ordinance relative to the project, followed by an analysis of the project's compliance with applicable provisions (in underlined font), are listed below. The outlined regulations represent an analysis primarily applicable to Article XXI, Solar Energy Systems and Article I, Section 180-13, Site Plans, of the Ordinance.

Article XXI. Solar Energy Systems
180-149. Definitions.

Solar Energy System, Medium-Scale – An active solar energy system that occupies more than 1,750 square feet of surface area but less than one acre of surface area (equivalent to a rated nameplate capacity of about 10 to 250 kW DC).

<u>The proposed project occupies approximately 0.98 acres of surface area and, therefore, qualifies as medium-scale.</u>

180-152. Solar Energy Systems, Medium-Scale.

All medium-scale solar energy system installations shall undergo site plan review as outlined in § 180-13 of the Code of the Town of Agawam prior to construction, installation or modification of the facility. The total area of medium-scale solar energy structures shall include the total of all areas where the solar panels are installed, all appurtenant and accessory buildings, access roads, landscaping, fencing and visual screening elements. The height of a medium-scale solar energy system shall not exceed 15 feet.

<u>Acknowledged. This narrative is a part of the site plan review submitted to Planning Board. All areas where BESS equipment, roads, landscaping, and fencing are included in the calculation of total area. The height of the BESS does not exceed 15 feet.</u>

180-13. Site Plans.

A. Site plans prepared and approved in accordance with this section shall be required to assist the Inspector of Buildings in the review of certain applications for building permits and to assure compliance with all applicable requirements of this chapter.

Acknowledged.

B. A site plan shall be required and shall be submitted in each of the following situations:

(1) Any proposed residential, business, industrial, institutional or other use of a new or renovated structure or of a parcel of land, or any change in any such use, structure or parcel, except for one-family detached dwellings and duplexes on separate lots; provided, however, that, upon application, the Inspector of Buildings may waive the site plan review and approval requirement for proposals involving a) a change in use only, b) construction or alteration of nonresidential structures not to exceed 2,000 square feet of additional gross floor area, or c) construction or alteration of structures that are accessory to a nonresidential structure. For the purposes of computing gross floor area, the Inspector of Buildings must aggregate all alterations or construction completed within the immediately preceding five years. [Amended 9-5-2018 by TOR 2018-11]

(2) Any nonresidential use of a one-family dwelling.

(3) Any use requiring a special permit from the Board of Appeals. For this section, residences which are to be used solely for residential purposes are exempt. [Amended 1-21-2003 by TOR-2002-8]

(4) Any major change in any condition or feature which is not in conformance with any feature of a previously app

Acknowledged. A site plan is required for the proposed BESS.

C. Procedure.

(1) An applicant for site plan review under this section shall file an electronic copy of an application and a site plan, plus four hard copies of the site plan, and an electronic copy of the stormwater management plan, plus one hard copy of the stormwater plan and an electronic copy of the pre- and post-development stormwater calculations when applicable with the Building Department. The site plan shall be prepared by an engineer, architect or landscape architect unless otherwise specified by the Planning Board. [Amended 10-7-2019 by Ord. No. TOR-2019-9]

Acknowledged. An electronic copy of the application, site plan, stormwater management plan, and pre- and post-development stormwater calculations have been submitted. Four hard copies of the site plan and a hard copy of the stormwater plan have been submitted to the Town.

(2) The Inspector of Buildings shall, within five days of receipt, transmit to the Planning Board four copies of the application and site plan and an electronic copy of the stormwater management plan. [Amended 12-6-2021 by Ord. No. TOR-2021-4]

Acknowledged.

(3) All site plans shall be prepared to scale on standard sheets of 24 inches by 36 inches to show with reasonable accuracy the following information, in addition to that required in § 180-4:

(a) A title block, containing the street address, applicant's name and address, date, scale and the name of the preparer of the plan.

The site plans, included in Appendix C, include a title block detailing the street address, applicant's name and address, date, scale, and name of the plan preparer on each sheet.

(b) A site layout at a scale of no smaller than one inch equals 50 feet.

The Layout and Materials Plan (Sheet C-3.0), included in Appendix C, contain the proposed site layout at a scale of 1" = 40'.

(c) Topography of the site and adjacent lands.

The Grading and Erosion Control Plan (Sheet C-4.0), included in Appendix C, illustrates the topography of the site and adjacent lands.

(d) Provision for the handling of vehicular traffic flow. All curb cuts must be clearly defined with widths and radii noted on the plan. Radii shall meet Town standards. Parking lot and site traffic flow must be clearly noted with signs or other methods if it is to be maintained as one-way.

No public roads are proposed for this project. Layout and Materials Plan (Sheet C-3.0), included in Appendix C, illustrates the dimensions of the proposed gravel access road. A 25 foot long paved apron is proposed at the site entrance from Silver Street to the Property.

(e) Parking areas and loading areas.

Not applicable. There are no parking or loading areas proposed for this project.

(f) Drainage. The plan must be submitted to the Department of Public Works for input prior to Planning Board review.

Connection to public water or drainage features is not proposed with this project as shown on the Layout and Materials Plan (Sheet C-3.0), included in Appendix C. A stormwater Management Report and associated watershed drainage figures is included in Appendix E which summarizes the stormwater runoff patterns of the project pre- and post-development.

(g) All public utilities (sewer, water, gas, electric).

The Layout and Materials Plan (Sheet C-3.0), included in Appendix C, illustrates all existing public utilities and proposed interconnection to the existing power pole on Silver Street.

(h) Landscaping. All landscaped areas are to be designated on the plan. These areas are to specify species type and size.

The Tree Clearing Plan (Sheet C-2.0), and Grading and Erosion Control Plan (Sheet C-4.0), included in Appendix C, illustrate all landscaped areas within the proposed limit of work. Existing vegetation will remain outside the proposed limit of work.

(i) Sign location only.

Required signage will be posted on the perimeter fence. Refer to Detail Sheet C-5.0 in the site plans included in Appendix C.

(j) Exterior lighting.

Not applicable. There is no exterior lighting proposed for this project.

(k) Rendering or elevations, including all mechanical facility support items originating from or terminating on the building exterior, or both.

Detail Sheet C-5.1, included in Appendix C, illustrates the elevations of the BESS system.

(l) The location and characteristics of any proposed screening, fencing or other buffers.

The Layout and Materials Plan (Sheet C-3.0), and Grading and Erosion Control Plan (Sheet C-4.0, included in Appendix C, illustrate the location of the proposed fencing. Detail of proposed fencing and sound barrier walls are included on Detail Sheets C-5.0 and C-5.1.

(m) The location of any wetlands, streams, drainage swales and areas subject to flooding.

The Existing Conditions Plan (Sheet C-1.0), included in Appendix C, illustrates the location of existing wetlands.

(n) Storm drain permit requirements pursuant to Chapter 175, §§ 175-22 to 175-30, inclusive, of the Code of the Town of Agawam, when applicable. [Added 10-7-2019 by Ord. No. TOR-2019-9]

Not applicable. No storm drain permit is needed for the proposed project.

(o) Stormwater management plan requirements pursuant to Chapter 175, § 175-35 of the Code of the Town of Agawam, when applicable. [Added 10-7-2019 by Ord. No. TOR-2019-9]

The stormwater management report is included in Appendix E, and is in accordance with Section 175-35 of the Code of the Town of Agawam.

Appendix C - Site Plans

SITE USE PERMIT SET

404 SILVER ST - AGAWAM
404 SILVER ST, AGAWAM, MA 01001
BATTERY STORAGE SYSTEM

GENERAL NOTES

1. AS CONTAINED HEREIN, "CONTRACTOR" IS ASSUMED TO BE THE EPC PROVIDER HIRED BY THE SYSTEM/PROJECT OWNER.
2. WHEN THERE IS A CONFLICT BETWEEN THESE GENERAL NOTES AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
3. ALL WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE FOLLOWING: LOCAL BUILDING CODE, LOCAL ELECTRICAL CODE, ANY OTHER REGULATING AGENCIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK AND THOSE CODES AND STANDARDS LISTED IN THESE DRAWINGS.
4. THESE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING A CONSTRUCTION LEVEL DESIGN AND ASSOCIATED DRAWINGS AND DETAILS.
5. COORDINATE THESE DRAWINGS WITH SPECIFICATIONS AND MANUFACTURER INSTALLATION AND OPERATION MANUALS.
6. UNLESS OTHERWISE NOTED, THE DESIGN REPRESENTED ON THESE PLANS IS BASED ON THE INFORMATION AND CRITERIA LISTED IN THE "BASIS OF DESIGN" SECTION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY SUCH INFORMATION IN PREPARATION OF THE CONSTRUCTION DESIGN.
7. THE EXISTING CONDITIONS REPRESENTED ON THESE PLANS ARE BASED ON PUBLICLY AVAILABLE INFORMATION AND THE SITE DISCOVERY SUMMARIZED IN THESE DRAWINGS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACCURACY OF SUCH INFORMATION AND SUPPLEMENT WITH ANY ADDITIONAL REQUIRED INFORMATION.
8. UNLESS INDICATED AS EXISTING (E), ALL PROPOSED MATERIALS AND EQUIPMENT SHALL BE CONSIDERED TO BE NEW.
9. ALL EQUIPMENT AND COMPONENTS SHALL BE MOUNTED IN COMPLIANCE WITH THE MANUFACTURER'S REQUIREMENTS, CONSTRUCTION DETAILS, AND/OR PRUDENT INDUSTRY STANDARDS.
10. TO THE EXTENT THAT TREES AND OTHER FEATURES AFFECT THE SYSTEM'S PRODUCTION, SUCH PRODUCTION MODELING IS BASED ON THE EXISTING APPROXIMATE HEIGHTS AND LOCATIONS RELATIVE TO THE SYSTEM AND MAY BE IMPACTED AS TREES GROW AND OTHER FEATURES CHANGE.

PROJECT SCOPE

THIS PROJECT CONSISTS OF THE INSTALLATION OF BATTERY ENERGY STORAGE EQUIPMENT, PER THE SYSTEM DESCRIPTION BELOW. THE ENERGY STORAGE MODULES WILL BE INSTALLED IN PURPOSE BUILT ENCLOSURES WITH INTEGRATED FIRE SUPPRESSION AND COOLING SYSTEMS. THE ENERGY STORAGE MODULES WILL BE WIRED IN SERIES AND PARALLEL TO ACCOMMODATE THE POWER REQUIREMENTS OF THE POWER CONVERSION SYSTEM OR DC-DC CONVERTER (DEPENDENT ON PROJECT REQUIREMENTS). THE COMBINED POWER WILL BE CONNECTED TO CERTIFIED POWER CONVERSION SYSTEMS THAT CONVERT AC/DC AND DC/AC FOR CHARGE/DISCHARGE CAPABILITIES. DC-DC CONVERTERS WILL BE USED IN DC COUPLED PROJECTS WITH ONLY CERTIFIED INVERTERS (DC/AC) DISCHARGING ENERGY TO THE GRID.

ENERGY STORAGE SYSTEM DESCRIPTION

SYSTEM POWER CAPACITY (kWAC)	4990
SYSTEM ENERGY CAPACITY (kWH)	19960
POWER CONVERSION SYSTEM / INVERTER	(2) HITHIUM GEN 2

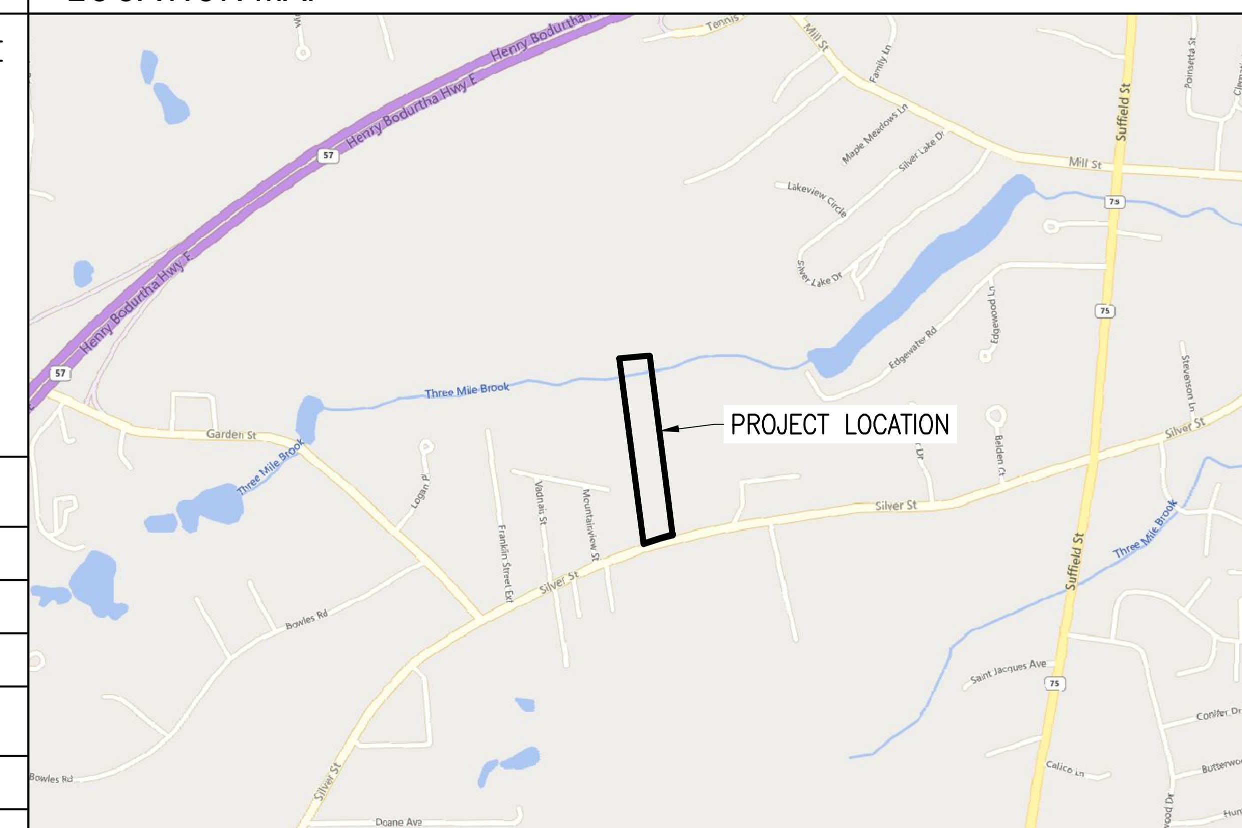
TOTAL SYSTEM DESCRIPTION

TOTAL STORAGE POWER CAPACITY (kWAC)	4990
MAXIMUM EXPORT TO UTILITY	4 HOURS AT RATED CAPACITY
STORAGE CHARGING MODE	GRID ONLY

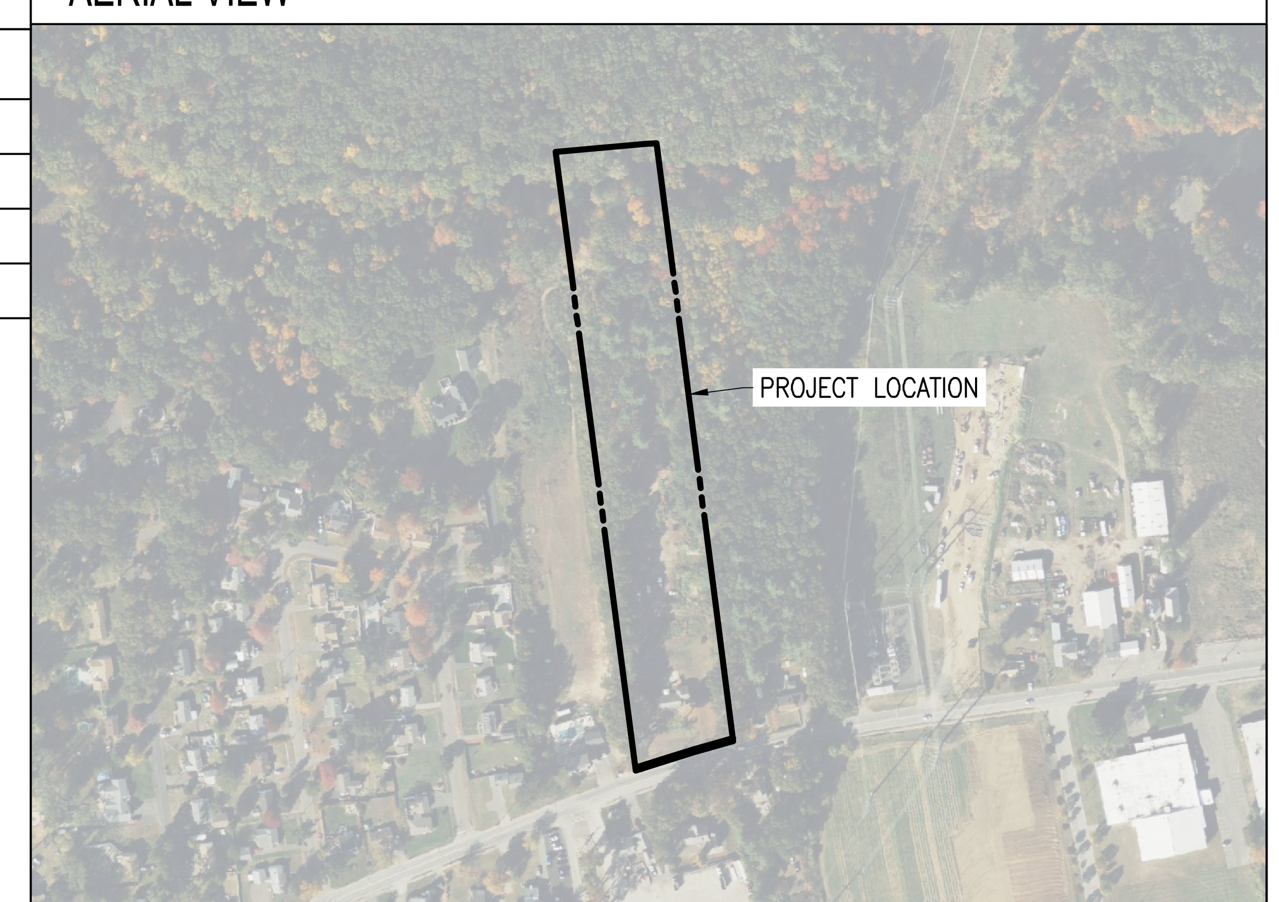
SPECIAL INSPECTIONS

GENERAL CONSTRUCTION SPECIAL INSPECTIONS	CODE/SECTION
1. FIRE RESISTANT PENETRATIONS AND JOINTS	BC 1704.27
2. ENERGY CODE COMPLIANCE INSPECTIONS	BC 110.3.5
FINAL	

LOCATION MAP



AERIAL VIEW



DRAWING LIST

Sheet Number	Sheet Title
T-1.0	TITLE PAGE
CIVIL	
C-0.0	CIVIL NOTES
C-1.0	EXISTING CONDITIONS PLAN
C-2.0	TREE CLEARING PLAN
C-3.0	LAYOUT AND MATERIALS PLAN
C-4.0	GRADING AND EROSION CONTROL PLAN
C-5.0	CIVIL DETAILS
C-5.1	CIVIL DETAILS
C-6.0	FIRE TRUCK TURNING PLAN

APPLICABLE CODES AND STANDARDS

2020 MASSACHUSETTS ELECTRICAL CODE 527 CMR12.00
MASSACHUSETTS BUILDING CODE 9TH EDITION

UL-1642 – STANDARD FOR LITHIUM BATTERIES
UL-1741 – INVERTERS, COMBINER BOXES
UL-1973 – STANDARD FOR BATTERIES FOR USE IN LIGHT ELECTRIC RAIL (LER) APPLICATIONS AND STATIONARY APPLICATIONS
UL-9540 – STANDARD FOR ENERGY STORAGE SYSTEM AND EQUIPMENT

PROJECT DIRECTORY

PROJECT OWNER
(PROJECT LLC NAME)
(ADDRESS)

LAND OWNER / HOST
(HOST NAME)
(CONTACT PHONE)
(ADDRESS)

AUTHORITY HAVING JURISDICTION
TOWN OF AGAWAM PLANNING BOARD
36 MAIN STREET
AGAWAM, MA 01001

UTILITY
EVERSOURCE

CIVIL ENGINEER
FIRM: WESTON & SAMPSON ENGINEERS, INC.
CONTACT: ROBERT J. BUKOWSKI, PE
PHONE: (978) 532-1900

DESIGN ENGINEER
FIRM: NEW LEAF ENERGY, INC.
CONTACT: BUILD YOUR OWN
PHONE: (XXX) XXX-XXXX

ELECTRICAL ENGINEER
FIRM: NEW LEAF ENERGY, INC.
CONTACT: BUILD YOUR OWN
PHONE: (XXX) XXX-XXXX

GENERAL ABBREVIATIONS

(E)	EXISTING
AHJ	AUTHORITY HAVING JURISDICTION
AL	ALUMINUM
APPROX	APPROXIMATE
ARY	ARRAY
BLDG	BUILDING
NLE	NEW LEAF ENERGY
CL	CENTERLINE
DAS	DATA ACQUISITION SYSTEM
DIA	DIAMETER
DO	DITTO
EW	EAST-WEST
ESS	ENERGY STORAGE SYSTEM
ESU	ENERGY STORAGE UNIT
FBO	FURNISHED BY OTHERS
FF	FORWARD FACING
GALV	GALVANIZED
HDG	HOT DIP GALVANIZED
HVAC	HEATING VENTILATION AND AIR CONDITIONING
ID	INSIDE DIAMETER
MFR	MANUFACTURER
MOD	SOLAR MODULE
NS	NORTH-SOUTH
NTS	NOT TO SCALE
OAE	OR APPROVED EQUAL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
PCS	POWER CONVERSION SYSTEM
PV	PHOTOVOLTAIC
PVC	POLY VINYL CHLORIDE
SCH	SCHEDULE
SS	STAINLESS STEEL
SSS	SOLAR SUPPORT STRUCTURE
STC	STANDARD TEST CONDITIONS
TBD	TO BE DETERMINED
TP	TAMPER PROOF
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
VIF	VERIFY IN FIELD
WP	WEATHER PROOF

REV 1.0

BASIS OF DESIGN

LIMITED ALTA/NSPS LAND TITLE SURVEY:
NORTHEAST SURVEY CONSULTANTS
FEBRUARY 2022

WETLAND STREAM AND DELINEATION REPORT:
WESTON & SAMPSON ENGINEERS, INC.
AUGUST 2024

THIS DOCUMENT IS PROVIDED BY NEW LEAF ENERGY, INC. TO FACILITATE THE SALE OF THE RENEWABLE ENERGY PROJECT REPRESENTED HEREIN. REPRODUCTION, RELEASE OR UTILIZATION FOR ANY OTHER PURPOSE, WITHOUT PRIOR WRITTEN CONSENT IS STRICTLY PROHIBITED.

new leaf energy
55 TECHNOLOGY DRIVE, SUITE 102
LOWELL, MA 01851
PHONE: (800) 818-5249
FAX: (888) 678-8991
WWW.NEWLEAFENERGY.COM

COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41492
REGISTERED PROFESSIONAL ENGINEER
10/1/24

NOT FOR CONSTRUCTION

Weston & Sampson
WESTON & SAMPSON ENGINEERS, INC.
55 WALKERS BROOK DRIVE, SUITE 100
READING, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

IT IS A VIOLATION OF LAW FOR ANY PERSON TO ALTER ANY DOCUMENT WHICH BEARS THE SEAL OF A PROFESSIONAL ENGINEER, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER.

SITE USE PERMIT SET
404 SILVER ST
AGAWAM, MA 01001

PROJECT NUMBER:
120-0339

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
0	10/01/24	RWG	MRC	SITE USE PERMIT SET

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

T-1.0

TITLE PAGE

GENERAL CIVIL NOTES

GENERAL NOTES

1. AS CONTAINED HEREIN, "CONTRACTOR" IS ASSUMED TO BE THE EPC PROVIDER HIRED BY THE SYSTEM OWNER. "SUBCONTRACTOR" IS THE EPC PROVIDER'S INSTALLATION SUBCONTRACTORS (INCLUDING SITE WORK SUBCONTRACTOR) AND CIVIL ENGINEER OF RECORD (CEOR) IS THE EPC PROVIDER'S DESIGNATED CIVIL ENGINEER.
2. EXISTING CONDITIONS SURVEY INFORMATION WAS PREPARED BY NORTHEAST SURVEY CONSULTANTS PERFORMED ON 2/1/2022. HORIZONTAL DATUM IS REFERENCED TO THE MASSACHUSETTS COORDINATE SYSTEM NORTH AMERICAN DATUM 1983. VERTICAL DATUM IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM 1988.
3. THERE IS NO GUARANTEE THAT ALL THE EXISTING UTILITIES, WHETHER FUNCTIONAL OR ABANDONED WITHIN THE PROJECT LIMITS ARE ON THIS DRAWING. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE STARTING WORK AND SHALL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM THIS WORK. A DIG SAFE TICKET NUMBER INDICATING ALL EXISTING UTILITIES HAVE BEEN LOCATED AND MARKED SHALL BE OBTAINED PRIOR TO COMMENCING WORK. CONTACT "DIG SAFE SYSTEM, INC." AT 1-888-344-7233 AND PROVIDE 72 HOURS NOTICE TO RECEIVE A TICKET NUMBER.
4. THE LOCATION, SIZE, DEPTH, AND SPECIFICATIONS FOR CONSTRUCTION OF PRIVATE UTILITY SERVICES SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS PROVIDED BY, AND APPROVED BY, THE RESPECTIVE ELECTRIC UTILITY COMPANY. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE UTILITY CONNECTIONS WITH THE RESPECTIVE COMPANIES PRIOR TO ANY UTILITY CONSTRUCTION.
5. TOWN APPROVALS SHALL BE KEPT ON SITE AT ALL TIMES.
6. PRIOR TO CONSTRUCTING THE SITE ENTRANCE ONTO SILVER STREET, THE CONTRACTOR SHALL OBTAIN A HIGHWAY/DRIVEWAY PERMIT FROM THE APPLICABLE AHJ.
7. SUBCONTRACTOR(S) SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL CONSTRUCTION DOCUMENTS, SPECIFICATIONS, AND SITE CONDITIONS PRIOR TO BIDDING AND PRIOR TO CONSTRUCTION.
8. ANY DISCREPANCIES BETWEEN DRAWINGS, SPECIFICATIONS, AND SITE CONDITIONS SHALL BE REPORTED IMMEDIATELY TO THE CONTRACTOR/CEOR FOR CLARIFICATION AND RESOLUTION PRIOR TO BIDDING OR CONSTRUCTION.
9. AREAS USED AS FOR PARKING DURING CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS INCLUDING, BUT NOT LIMITED TO, REGRADING, LOAMING AND SEEDING. IN NO CASE SHALL PARKING AREAS, LAYDOWN AREAS, CONSTRUCTION TRAILERS, AND PORTABLE TOILETS BE LOCATED WITHIN A WETLAND RESOURCE AREA AND/OR ANY BUFFER ZONES.

SITE PREPARATION NOTES

1. AREAS DESIGNATED FOR TREE CUTTING SHALL BE CUT ONLY. NO GRUBBING OR STRIPPING OF TOPSOIL IS NECESSARY UNLESS SPECIFICALLY SHOWN OTHERWISE AND APPROVAL HAS BEEN GIVEN BY THE CONTRACTOR.
2. TREE CLEARING AND STUMP REMOVAL SHALL BE IN ACCORDANCE WITH APPROVED LOCAL, STATE, AND FEDERAL PERMITS. TREES TO BE REMOVED SHALL BE MARKED BY THE CONTRACTOR'S PROJECT MANAGER OR SITE SUPERINTENDENT PRIOR TO COMMENCEMENT OF WORK ON-SITE.
3. SEASONAL TREE CLEARING RESTRICTIONS MAY BE REQUIRED FOR ENDANGERED SPECIES PROTECTION. THE CONTRACTOR SHALL REFER TO THE TREE CLEARING PLAN FOR ANY RESTRICTIONS.
4. THE SUBCONTRACTOR(S) IS/ARE RESPONSIBLE FOR ANY DAMAGE TO EXISTING SITE CONDITIONS TO REMAIN THAT ARE DUE TO SUBCONTRACTOR(S) OPERATIONS.
5. ITEMS TO BE REMOVED THAT ARE NOT STOCKPILED FOR LATER REUSE ON THE PROJECT OR DELIVERED TO THE OWNER SHALL BE LEGALLY DISPOSED OF OFF SITE BY THE SUBCONTRACTOR(S).
6. THE SUBCONTRACTOR(S) SHALL BE RESPONSIBLE FOR COORDINATING THEIR EFFORTS WITH ALL TRADES.
7. THE SUBCONTRACTOR(S) SHALL COORDINATE ALL ADJUSTMENT OR ABANDONMENT OF UTILITIES WITH THE RESPECTIVE UTILITY COMPANY.
8. TEMPORARY CONSTRUCTION HAUL ROADS SHALL BE USED DURING CONSTRUCTION IF DEEMED NECESSARY BY THE CONTRACTOR. THE USE OF SEPARATION FABRICS SHALL BE USED TO FACILITATE FUTURE REMOVAL AND RECOVERY OF GRANULAR MATERIALS. HAUL ROADS SHALL BE MAINTAINED DURING CONSTRUCTION WITH APPROPRIATE EROSION CONTROL AND STORMWATER REDUCTION MEASURES. ONCE REMOVED, THE SUB-BASE AREA SHOULD BE DECOMPACTED, LOAM REPLACED, AND RESEEDED.
9. THE SITE ACCESS ROADS ARE DESIGNED TO MEET STATE FIRE CODE FOR FIRE TRUCK ACCESS. MEANS AND METHODS FOR ACCOMMODATING LARGER CONSTRUCTION DELIVERY VEHICLES MUST BE DETERMINED BY THE CONTRACTOR.
10. THE PROPOSED ROAD DESIGN SHOWN IN THESE PLANS SHALL BE CONSIDERED THE FINAL DESIGN CONDITION. ADDITIONAL MEANS AND METHODS OF CONSTRUCTION DEEMED NECESSARY BY THE OWNER OR CONTRACTOR SHALL BE DESIGNED BY OTHERS AND INCLUDED IN THE INITIAL EPC BID PRICE (INCLUDING, BUT NOT LIMITED TO: TEMPORARY HAUL ROADS, WIDENED OR LENGTHENED ROADS AND TURN OUT AREAS FOR LARGER CONSTRUCTION AND DELIVERY VEHICLES, TEMPORARY PARKING AND LAYDOWN AREAS, MODIFIED GRADING TO SUPPORT CONSTRUCTION AND DELIVERY VEHICLES, ETC.).

EROSION AND SEDIMENT CONTROL MEASURES

1. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY SITE EXCAVATION OR DISTURBANCE AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME.
2. SEDIMENT BARRIERS SHALL BE INSPECTED AND APPROVED BY THE TOWN OF AGAWAM OR THEIR REPRESENTATIVE AND THE CONTRACTOR/CEOR BEFORE CONSTRUCTION BEGINS.
3. STRAW BALES AND MULCH SHALL BE MOWINGS OF ACCEPTABLE HERBACEOUS GROWTH, FREE OF NOXIOUS WEEDS OR WOODY STEMS, AND SHALL BE DRY WHEN INSTALLED.
4. DISTURBED AREAS SHALL BE BLANKETED OR SEEDED AND MULCHED AS SOON AS PRACTICAL AFTER CONSTRUCTION ACTIVITIES IN THAT AREA HAVE CONCLUDED. ALL ERODABLE/BARE AREAS SHALL BE BLANKETED OR SEEDED AND MULCHED WITHIN 7 DAYS WITH TEMPORARY EROSION CONTROL SEEDING.
5. PRIOR TO SEEDING, ACCESS AISLES, TEMPORARY STAGING, STORAGE, AND PARKING AREAS ARE TO BE DE-COMPACTED AND RESTORED PER THE SWPPP.
6. STABILIZE SLOPES GREATER THAN 3:1 (HORIZONTAL: VERTICAL) WITH SEED, SECURED GEOTEXTILE FABRIC, SPRAYED COMPOST BLANKET, OR RIP-RAP AS REQUIRED TO PREVENT EROSION DURING CONSTRUCTION.
7. SEDIMENT BARRIERS SHALL BE CONSTRUCTED AROUND ALL SOIL STOCKPILE AREAS.
8. CLEAN OUT PROJECT DRAINAGE FEATURES AND STRUCTURES (I.E. CULVERTS, BASINS, SWALES, ETC.) AFTER COMPLETION OF CONSTRUCTION.
9. SEDIMENT COLLECTED DURING CONSTRUCTION BY THE VARIOUS EROSION CONTROL SYSTEMS SHALL BE DISPOSED OF ON THE SITE ON A REGULAR BASIS. SEDIMENT SHALL BE REMOVED FROM EROSION CONTROL SYSTEMS WHEN THE HEIGHT OF THE SEDIMENT EXCEEDS ONE-HALF OF THE HEIGHT OF THE SEDIMENT CONTROL MEASURE.
10. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE SUBCONTRACTOR(S) SHALL REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AT THE CONTRACTOR/CEOR DIRECTION.
11. AFTER THE REMOVAL OF TEMPORARY EROSION CONTROL MEASURES, THE SUBCONTRACTOR(S) SHALL GRADE AND SEED AREA OF TEMPORARY EROSION CONTROL MEASURE.
12. DAMAGED OR DETERIORATED EROSION AND SEDIMENT CONTROL ITEMS WILL BE REPAIRED IMMEDIATELY AFTER IDENTIFICATION OR AS DIRECTED BY THE CONTRACTOR/CEOR.
13. THE CONTRACTOR'S SITE SUPERINTENDENT IS RESPONSIBLE FOR DAILY INSPECTIONS, MAINTENANCE, AND DIRECTING REPAIR ACTIVITIES. THE CONTRACTOR SHALL INSPECT EROSION CONTROL MEASURES ONCE EVERY SEVEN (7) CALENDAR DAYS OR ONCE EVERY FOURTEEN (14) DAYS AND WITHIN 24 HOURS OF ANY STORM EXCEEDING 1/2 INCH PRECIPITATION, IN ACCORDANCE WITH THE NPDES REQUIREMENTS. DAMAGED AND INEFFECTIVE EROSION CONTROL MEASURES SHALL BE REPAIRED OR REPLACED WITHIN 48 HOURS.
14. WATER PUMPED OR OTHERWISE DISCHARGED FROM THE SITE DURING CONSTRUCTION DEWATERING, IF REQUIRED, SHALL BE FILTERED.
15. WHEN TEMPORARY DRAINAGE IS ESTABLISHED, EROSION/SEDIMENTATION CONTROL MEASURES MAY BE REQUIRED BY CONTRACTOR/CEOR.
16. GRAVEL ROADS, ACCESS DRIVES, PARKING AREAS OF SUFFICIENT WIDTH AND LENGTH, AND VEHICLE WASH DOWN FACILITIES, SHALL BE PROVIDED TO PREVENT SOIL FROM BEING TRACKED ONTO PUBLIC OR PRIVATE ROADWAYS. ANY SOIL REACHING A PUBLIC OR PRIVATE ROADWAY SHALL BE REMOVED BEFORE THE END OF EACH WORKDAY.
17. NECESSARY MEASURES SHALL BE TAKEN TO CONTAIN ANY FUEL OR POLLUTION RUNOFF. NO RE-FUELING SHALL OCCUR WITHIN 100 FEET OF ANY WETLAND RESOURCE AREA AND 200 FEET FROM RIVERFRONT. LEAKING EQUIPMENT OR SUPPLIES SHALL BE IMMEDIATELY REPAIRED OR REMOVED FROM THE SITE.
18. THE COST OF REPAIRING EROSION CONTROL MEASURES OR REMOVING SEDIMENT FROM EROSION CONTROL SYSTEMS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR THE APPLICABLE EROSION CONTROL ITEM.
19. EROSION CONTROL MEASURES SHALL BE KEPT OPERATIONAL AND MAINTAINED CONTINUOUSLY THROUGHOUT THE PERIOD OF LAND DISTURBANCE UNTIL PERMANENT SEDIMENT AND EROSION CONTROL MEASURES ARE OPERATIONAL.
20. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DUST FROM FORMING.
21. EROSION CONTROL MEASURES AS SHOWN ON THESE DRAWINGS IS INTENDED TO CONVEY MINIMUM REQUIREMENTS. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES AS NECESSARY TO PREVENT SOIL EROSION AND TO COMPLY WITH THE PROJECT'S NPDES PERMIT STORMWATER POLLUTION PREVENTION PLAN.

LAYOUT AND MATERIAL NOTES

1. THE CONTRACTOR SHALL HAVE PERIMETER FENCE, ELECTRICAL TRENCHES, AND PAD LIMITS STAKED OUT BY A LICENSED LAND SURVEYOR PRIOR TO ANY INSTALLATION OF EQUIPMENT PADS OR TRENCHES.
2. EXCESS TRENCH MATERIAL SHALL BE PLACED ON THE SIDES OF THE TRENCH AND PLACED AT OR NEAR THE SAME LOCATION AS WHERE EXCAVATED. TOPSOIL REMOVED SHALL BE PLACED ON TOP AND LIGHTLY COMPACTED.
3. SUBCONTRACTOR SHALL INSTALL CONDUITS FOR ALL ELECTRIC CONDUIT CROSSINGS PRIOR TO INSTALLATION OF THE GEOGRID MATERIAL. THE GEOGRID SHALL NOT BE HORIZONTALLY CUT ONCE INSTALLED.

GRADING NOTES

1. WHERE PROPOSED GRADES MEET EXISTING GRADES, SUBCONTRACTOR(S) SHALL BLEND GRADES TO PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING AND NEW WORK. PONDING AT TRANSITION AREAS WILL NOT BE ALLOWED.
2. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING FOUNDATIONS, STRUCTURES, PUBLIC ROADWAYS, AND ELECTRICAL EQUIPMENT AREAS.

ABBREVIATIONS

BIT	BITUMINOUS
BMP	BEST MANAGEMENT PRACTICE
BVW	BORDERING VEGETATED WETLANDS
CB	CONCRETE BOUND
CONC	CONCRETE
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED PLASTIC PIPE
DH	DRILL HOLE
DIP	DUCTILE IRON PIPE
DMH	DRAIN MANHOLE
ECB	EROSION CONTROL BARRIER
FES	FLARED END SECTION
FH	FIRE HYDRANT
FND	FOUND
GG	GAS GATE
HDPE	HIGH-DENSITY POLYETHYLENE
HW	HEADWALL
ILSF	ISOLATED LANDS SUBJECT TO FLOODING
IP	IRON PIPE
ISW	ISOLATED WETLANDS (FEDERAL JURISDICTION)
LA	LANDSCAPED AREA
LOW	LIMIT OF WORK
N/F	NOW OR FORMERLY
NTS	NOT TO SCALE
OCS	OUTLET CONTROL STRUCTURE
OHW	OVERHEAD WIRE
RCP	REINFORCED CONCRETE PIPE
RET	RETAINING
ROW	RIGHT-OF-WAY
SB	STONE BOUND
TEL	TELEPHONE CABLE
TYP	TYPICAL
UP	UTILITY POLE
WG	WATER GATE

REV 1.1

LEGEND

	ROAD (GRAVEL)
x x x	FENCE LINE
	PROPERTY LINE
	FLOW DIRECTION
WF	BANK LINE/FLAG
WF	WETLAND LINE/FLAG
100	(E) MAJOR CONTOUR
-99-	(E) MINOR CONTOUR
100	PROPOSED MAJOR CONTOUR
99	PROPOSED MINOR CONTOUR
WTB	WETLAND BUFFER ZONE
RFA	RIVERFRONT AREA
FHA	100-YEAR FLOOD HAZARD AREA
	TREELINE
SF	SILT FENCE
	SILT SOCK
STM	STORM PIPE
E	ELECTRICAL TRENCH
E	OVERHEAD ELECTRIC
SAN SAN	SEWER LINE
W W	WATER LINE
G G	GAS MAIN
23-23A	ASSESSORS MAP-LOT
	SIGN
	UTILITY POLE (WITH GUY ANCHOR)
	HYDRANT
	WATER VALVE
	INDIVIDUAL TREE
FOUND REBAR	PROPERTY MARKERS

NOTE: ITALIC FONTS INDICATE EXISTING CONDITIONS.
STANDARD FONTS INDICATE PROPOSED CONDITIONS.

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C-0.0

CIVIL NOTES

EXISTING CONDITIONS PLAN

SCALE: 1" = 40'

0 40' 80'

NOTE:

1. EXISTING CONDITIONS PLAN SHOWN SHALL NOT BE CONSIDERED A BOUNDARY SURVEY. REFER TO "LIMITED ALTA/NSPS LAND TITLE SURVEY OF LAND IN AGAWAM, MA", PREPARED BY NORTHEAST SURVEY CONSULTANTS DATED 2/1/2022 FOR FURTHER INFORMATION.

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EXISTING CONDITIONS PLAN

TREE CLEARING PLAN

SCALE: 1" = 40'

0 40' 80'

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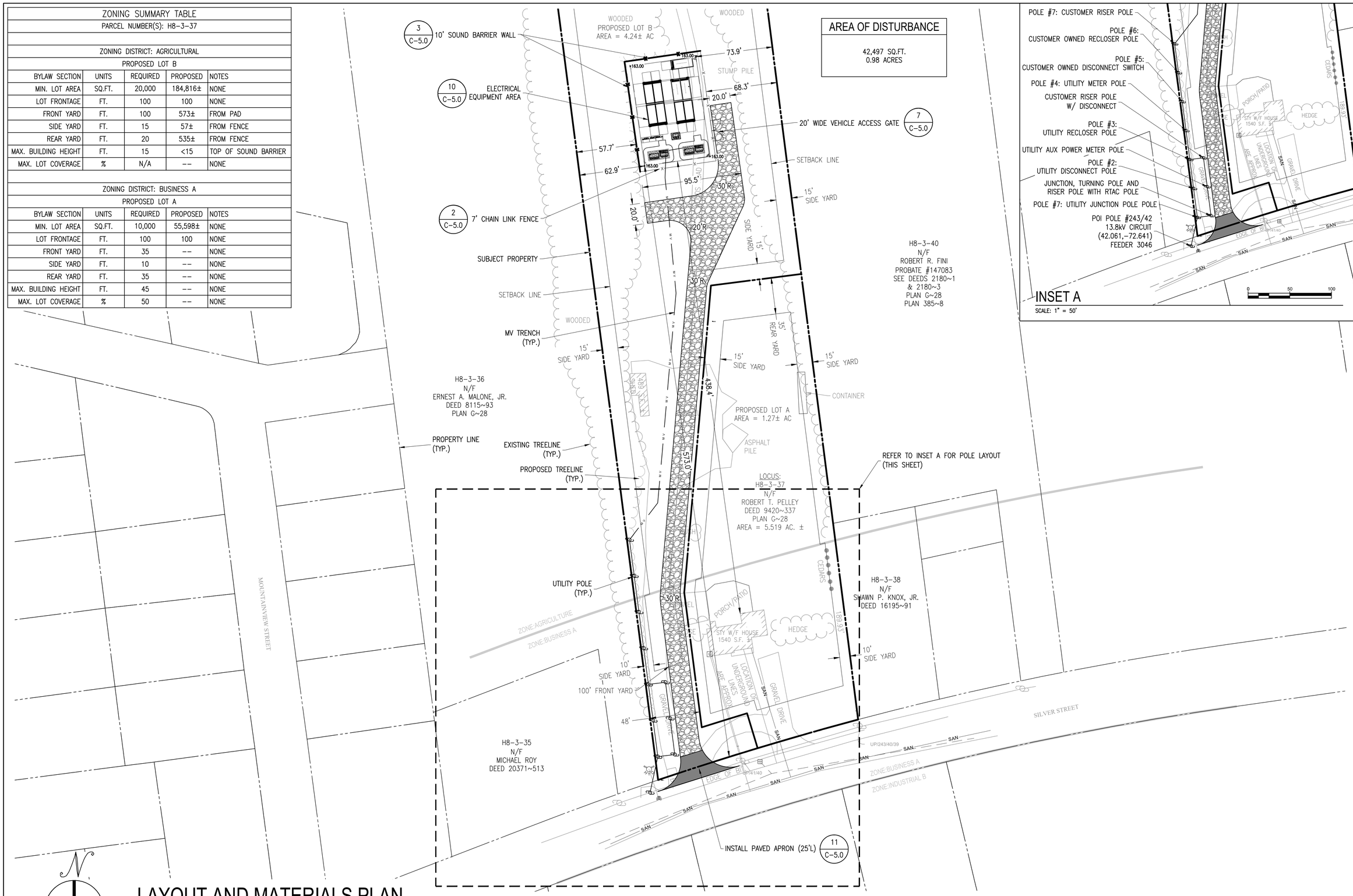
C-2.0

TREE CLEARING PLAN

ZONING SUMMARY TABLE				
PARCEL NUMBER(S): H8-3-37				
ZONING DISTRICT: AGRICULTURAL				
PROPOSED LOT B				
BYLAW SECTION	UNITS	REQUIRED	PROPOSED	NOTES
MIN. LOT AREA	SQ.FT.	20,000	184,816±	NONE
LOT FRONTAGE	FT.	100	100	NONE
FRONT YARD	FT.	100	573±	FROM PAD
SIDE YARD	FT.	15	57±	FROM FENCE
REAR YARD	FT.	20	535±	FROM FENCE
MAX. BUILDING HEIGHT	FT.	15	<15	TOP OF SOUND BARRIER
MAX. LOT COVERAGE	%	N/A	--	NONE
ZONING DISTRICT: BUSINESS A				
PROPOSED LOT A				
BYLAW SECTION	UNITS	REQUIRED	PROPOSED	NOTES
MIN. LOT AREA	SQ.FT.	10,000	55,598±	NONE
LOT FRONTAGE	FT.	100	100	NONE
FRONT YARD	FT.	35	--	NONE
SIDE YARD	FT.	10	--	NONE
REAR YARD	FT.	35	--	NONE
MAX. BUILDING HEIGHT	FT.	45	--	NONE
MAX. LOT COVERAGE	%	50	--	NONE



LAYOUT AND MATERIALS PLAN

SCALE: 1" = 40'

0 40' 80'

NOTE:
1. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.

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C-3.0
LAYOUT AND MATERIALS PLAN

GRADING AND EROSION CONTROL PLAN

SCALE: 1" = 40'

0 40' 80'

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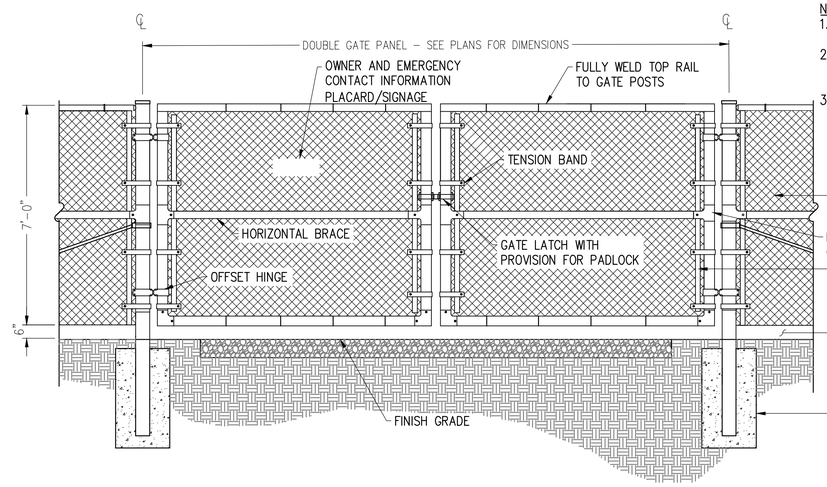
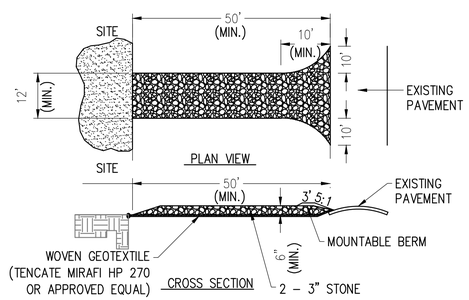
GRADING AND EROSION CONTROL PLAN



NOTES:
1. FABRIC SHALL BE GALVANIZED UNLESS OTHERWISE NOTED. REFER TO PLANS.
2. KNOX BOX SHALL BE INSTALLED AT VEHICLE GATE WITH ACCESS GIVEN TO AGAWAM FIRE DEPARTMENT.
3. DETAIL SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. FINAL FOUNDATION DESIGN TO BE PERFORMED PRIOR TO CONSTRUCTION.

7 VEHICLE GATE WITH WILDLIFE GAP

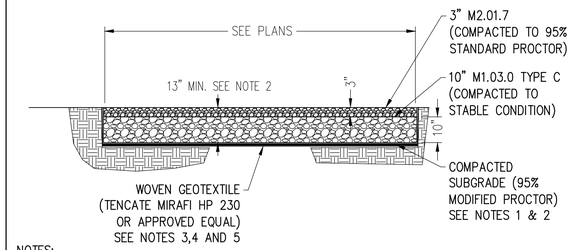
SCALE: NTS



NOTES:
1. ENTRANCE SHALL BE NO LESS THAN THIRTY–TWO (32) FEET WIDE WHERE IT MEETS EXISTING PAVEMENT. ENTRANCE SHALL BE WIDENED IF NEEDED TO ACCOMMODATE ALL POINTS WHERE INGRESS OR EGRESS OCCURS.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.

4 STABILIZED CONSTRUCTION EXIT

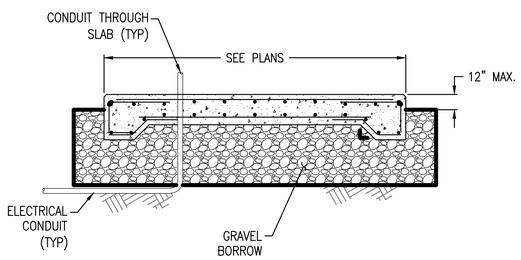
SCALE: NTS



NOTES:
1. SUBCONTRACTOR SHALL EXCAVATE TO SUITABLE MATERIAL FOR SUBGRADE.
2. SUBCONTRACTOR SHALL COMPACT SUBGRADE TO PROVIDE SUITABLE SURFACE TO PLACE ROAD. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPERATION CRITERIA.
3. SUBCONTRACTOR SHALL FOLLOW MANUFACTURER INSTALLATION PROCEDURES.
4. WHERE OVERLAPPING OF GEOTEXTILE FABRIC IS REQUIRED, SUBCONTRACTOR SHALL OVERLAP A MINIMUM OF 24".
5. SUBCONTRACTOR SHALL REMOVE TEMPORARY CONSTRUCTION ACCESS ROADS, AND RESTORE TO PRE–CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE CEOR AND THE GOVERNING AGENCIES.
6. SUBCONTRACTOR SHALL INSTALL CONDUITS FOR ALL ELECTRICAL CONDUIT CROSSINGS PRIOR TO INSTALLATION OF THE GEOGRID MATERIAL. THE GEOGRID SHALL NOT BE HORIZONTALLY CUT ONCE INSTALLED.

1 GRAVEL ACCESS ROAD

SCALE: NTS

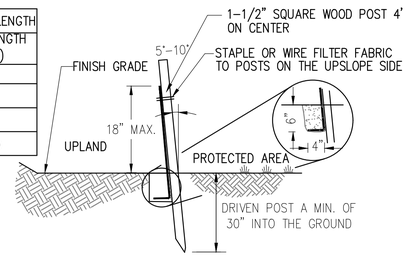


NOTE:
1. DETAIL IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. FINAL FOUNDATION DESIGN TO BE PROVIDED BY OTHERS.

10 EQUIPMENT PAD

SCALE: N.T.S.

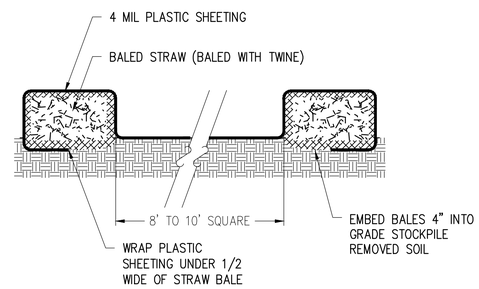
MAX ALLOWABLE SLOPE LENGTH	
STEEPNESS	MAX LENGTH (FT.)
2:1	25
3:1	50
4:1	75
5+:1	100



NOTES:
1. MAX DRAINAGE AREA FOR OVERLAND FLOW SHALL NOT EXCEED 1/4 ACRE–FOOT PER 100 FEET OF FENCE.
2. FILTER FABRIC TO BE FASTENED SECURELY TO FENCE POST WITH WIRE TIES OR STAPLES. POST SHALL BE STEEL EITHER "T" OR "U" SHAPED OR HARDWOOD.
3. FILTER CLOTH SHALL BE FASTENED SECURELY WITH TIES SPACED EVERY 24" AT TOP AND MID–SECTION.
4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 6 INCHES AND FOLDED. FILTER CLOTH SHALL BE FILTER X, MIRAFI 100X, STABILENKA T140N, OR APPROVED EQUAL.
5. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SEDIMENT FENCE.

8 SILT FENCE

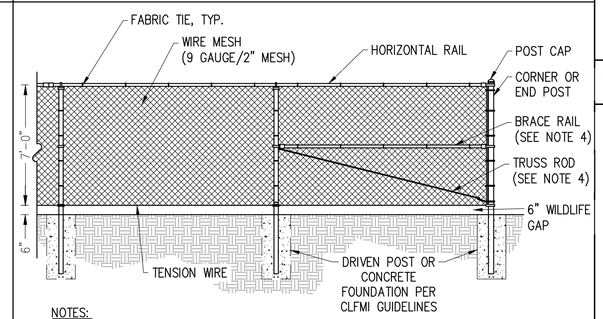
SCALE: NTS



NOTE:
1. PLASTIC SHEETING SHALL BE FREE OF TEARS OR HOLES. AFTER BASIN IS USED, WASHWATER FROM WASHOUT BASIN SHALL EVAPORATE OR BE VACUUMED OUT. REMOVE REMAINING HARDENED SOLIDS. REPLACE PLASTIC SHEETING AND STRAWBALES AS REQUIRED.

5 CONCRETE WASHOUT BASINS

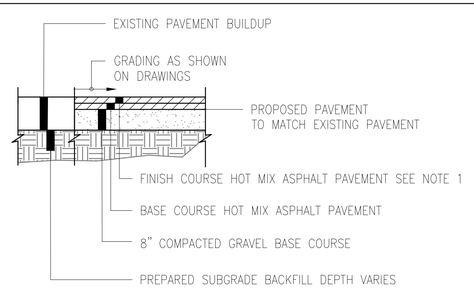
SCALE: NTS



NOTES:
1. THE FENCE SHALL MEET OR EXCEED THE CHAIN LINK FENCE MANUFACTURER INSTITUTE (CLFMI) GUIDELINES AND RELATED FEDERAL SPECIFICATIONS FOR SECURITY CHAIN LINK FENCE MATERIALS AND INSTALLATION.
2. FENCE MATERIAL AND COMPONENTS SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
3. THIS DETAIL NOT APPLICABLE FOR PRIVACY FENCE OR FENCE WITH SLATS.
4. ADJUSTABLE TRUSS ROD AND BRACE RAIL AT CORNER OR END POSTS ONLY, IF REQUIRED BY CLFMI GUIDELINES.
5. EQUIPMENT PADS SHALL BE SURROUNDED BY A 7FT CHAIN LINK FENCE, OR SOUND BARRIER WALL AS REQUIRED FOR THE PROJECT AND SHOWN ON THE PLANS.
6. FENCE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY, FINAL DESIGN SHALL BE PROVIDED PRIOR TO CONSTRUCTION.

2 CHAIN LINK FENCE WITH WILDLIFE GAP

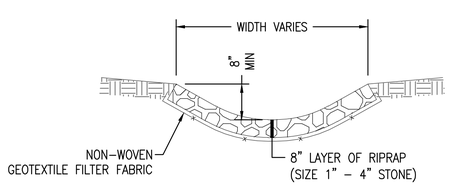
SCALE: NTS



NOTES:
1. ACCESS SHALL BE SURFACED IN TWO (2) COURSES WITH HOT MIX ASPHALT PAVEMENT TO A MINIMUM DEPTH AFTER ROLLING OF THREE AND ONE HALF (3 1/2") TO THE LIMIT AS SHOWN ON THE PLANS.
2. ACCESS SHALL HAVE AN EIGHT INCH (8") FOUNDATION OF COMPACTED GRAVEL AND SHALL BUTT AND NOT OVERLAP THE EXISTING EDGE OF THE HARDENED SURFACE.
3. THE EXISTING GUTTER GRADE AND LINE SHALL NOT BE CHANGED.
4. THE PUBLIC RIGHT OF WAY SURFACE SHALL NOT BE DISTURBED.
5. THE AREA ON EACH SIDE OF THE ACCESS SHALL BE RESTORED TO MATCH EXISTING CONDITIONS.

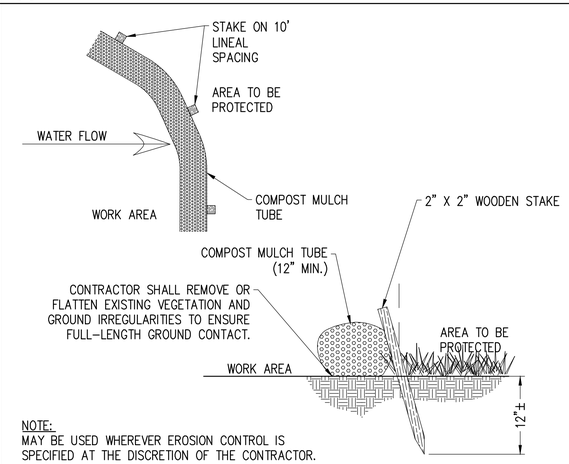
11 PAVEMENT SECTION

SCALE: N.T.S.



9 RIPRAP SWALE

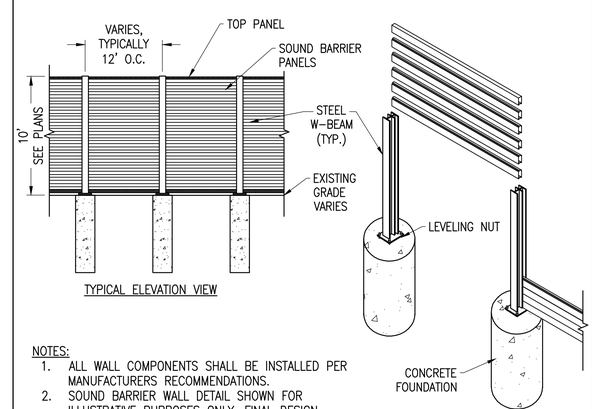
SCALE: N.T.S.



NOTE:
MAY BE USED WHEREVER EROSION CONTROL IS SPECIFIED AT THE DISCRETION OF THE CONTRACTOR.

6 MULCH TUBE

SCALE: NTS



NOTES:
1. ALL WALL COMPONENTS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
2. SOUND BARRIER WALL DETAIL SHOWN FOR ILLUSTRATIVE PURPOSES ONLY, FINAL DESIGN, INCLUDING FOUNDATION DESIGN, TO BE PROVIDED BY OTHERS PRIOR TO CONSTRUCTION.

3 SOUND BARRIER WALL

SCALE: NTS

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new leaf energy
55 TECHNOLOGY DRIVE, SUITE 102
LOWELL, MA 01851
PHONE: (800) 818–5249
FAX: (888) 678–8991
WWW.NEWLEAFENERGY.COM

COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41492
REGISTERED PROFESSIONAL ENGINEER
10/11/24

NOT FOR CONSTRUCTION

Weston & Sampson
WESTON & SAMPSON ENGINEERS, INC.
55 WALKERS BROOK DRIVE, SUITE 100
READING, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

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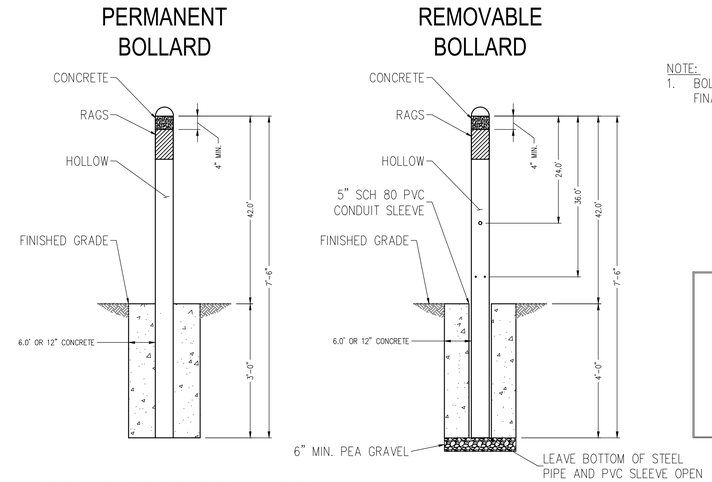
SITE USE PERMIT SET
404 SILVER ST
AGAWAM, MA 01001

PROJECT NUMBER: 120–0339

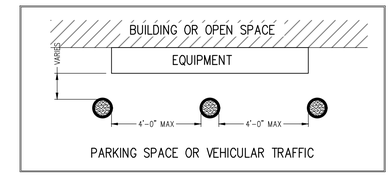
REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
0	10/01/24	RWG	MRC	SITE USE PERMIT SET

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-5.0
CIVIL DETAILS

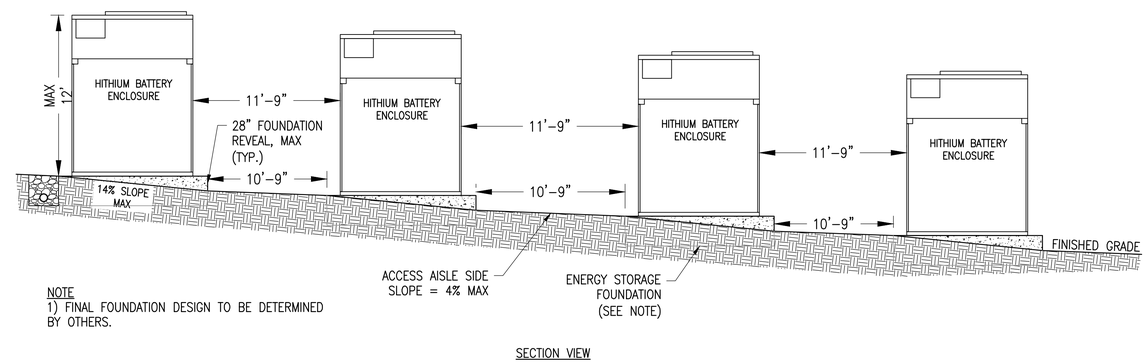


NOTE:
1. BOLLARDS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY, FINAL DESIGN SHALL BE PROVIDED PRIOR TO CONSTRUCTION.



1 EQUIPMENT BOLLARD

SCALE: N.T.S.



NOTE
1) FINAL FOUNDATION DESIGN TO BE DETERMINED BY OTHERS.

SECTION VIEW

2 ENERGY STORAGE CROSS SECTION

SCALE: NTS

2023-12-07

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SITE USE PERMIT SET
404 SILVER ST
AGAWAM, MA 01001

PROJECT NUMBER: 120-0339

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
0	10/01/24	RWG	MRC	SITE USE PERMIT SET

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

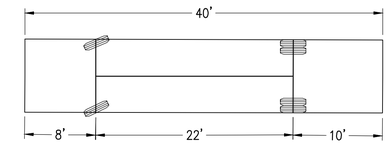
C-5.1

CIVIL DETAILS

FIRE TRUCK TURNING PLAN

SCALE: 1" = 40'

0 40' 80'



NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM DESIGN VEHICLE (TYPICAL AERIAL LADDER OR PUMPER)	
OVERALL LENGTH	40'
OVERALL WIDTH	8'-2"
TRACK WIDTH	8'-2"
WHEELBASE	20'
MAX WHEEL ANGLE	45.0°

1 DESIGN VEHICLE DETAIL

SCALE: NTS

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SCOPE OF WORK:	ALT-CO
INSTALLATION OF BATTERY ENERGY STORAGE SYSTEMS (BESS), CONCRETE PADS, AND RELATED EQUIPMENT AT GRADE.	
BLOCK:	0000
LOT:	1500
BIN:	0000000
COMMUNITY BOARD:	503
ZONING DISTRICT	M1-1.2RD
ZONING MAP:	00A
OCCUPANCY GROUP:	F1
CONSTRUCTION CL.:	TYPE IIB
USE GROUP:	QA

NOT FOR CONSTRUCTION

Weston & Sampson

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SITE USE PERMIT SET
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AGAWAM, MA 01001

PROJECT NUMBER:
120-0339

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
0	10/01/24	RWG	MRC	SITE USE PERMIT SET

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-6.0

FIRE TRUCK TURNING PLAN

LEGEND:

H8-3-37	ASSESSOR'S ID		LOCUS PROPERTY LINE
N/F	NOW OR FORMERLY		ADJOINERS LINE (±)
	CALCULATED POINT		SETBACK LINE
IPF	IRON PIPE FOUND		CONTOUR LINE
IRF	IRON ROD FOUND		WETLAND DELINEATION
CIRF	CAPPED ROD FOUND	OHW	OVERHEAD WIRES
	UTILITY POLE		TREELINE
	GUY WIRE ANCHOR	W	WATER LINE
	HYDRANT	S	SEWER LINE
	WATER GATE VALVE	G	GAS LINE
	TREE	D	DRAIN LINE
	CATCH BASIN		GAS METER

SURVEY NOTES:

1: Gross land area of locus parcel = 5.519 acres ±

2: Field survey by RTK GPS & EDM total station.

3: The horizontal datum of this plan is the Massachusetts Coordinate System North American Datum 1983, the vertical datum is North American Vertical Datum 1988, both are based on RTK GPS observations taken on site.

4: According to Federal Emergency Management Agency maps, the proposed facilities are located in areas designated as "Zone X" (areas of minimal flooding, no shading).
Community Panel No. 25013C 0384 E & 25013C 0392 E – Effective Date: July 16, 2013.

5: A zoning report or letter was not provided to the surveyor. All zoning information given hereon is taken from the City of Agawam's website. locus parcel is located within the City of Agawam Business A and Agricultural zoning districts.

6: The location of utility structures shown hereon are from observed field evidence & record plans only, this plan may not depict the exact location of underground utilities & does not show all of the utilities which exist within the premises surveyed. please contact dig-safe at 1-888-344-7233 before excavation.

7: At the time of the ALTA survey there was no observed evidence active earth moving work. At the time of the ALTA survey there was no observed evidence of building construction or building additions.

8: As allowed under Section 3.Ev and 6.B of the 2021 ALTA/NSPS Minimum Standard Detail Requirements, this survey exceeds the maximum allowable Relative Positional Precision due to the size and configuration of the surveyed property, and the relief, vegetation and improvements on the surveyed property.

9: Wetlands shown hereon were taken from digital data provided by Borrego Solar Systems, Inc.

10: Distance to nearest intersecting street (Mountainview Street) is 340'±.

TITLE EXCEPTIONS:

The following exceptions are derived from a title report prepared by Joel A. Stein, file #T104163, effective date 11-22-2021:

1. Mortgage from Robert T. Pelley and Deborah A. Pelley to Mortgage Electronic Registration Systems, Inc., dated August 26, 2004, recorded with said Deeds, Book 14453, Page 453, as assigned to Bank of America, National Association, as Trustee, dated April 17, 2009, recorded with said Deeds, Book 17858, Page 270, as further affected by an Assignment from Mortgage Electronic Registration Systems, Inc. to U.S. Bank, National Association, as Trustee, dated October 13, 2011, recorded with said Deeds, Book 18962, Page 117, as further affected by a Gap Assignment by Bank of America, N.A., as Trustee to Mortgage Electronic Registration Systems, Inc., dated May 21, 2020, recorded with said Deeds, Book 23350, Page 554, as further assigned by U.S. Bank, National Association, as Trustee to Wilmington Savings Fund Society FSB d/b/a Christiana Trust, dated June 3, 2020, recorded with said Deeds, Book 23350, Page 556, as further assigned to U.S. Bank Trust, National Association, as Trustee of the Bungalow Series III Trust, dated April 16, 2020, recorded with said Deeds, Book 23350, Page 558. NOTE: The Assignments recorded with said Deeds, Book 23350, Pages 556 and 558 reference Powers of Attorney which are recorded out of state. **(not a survey matter)**

2. Execution by Unifund CCR as Assignee for America Online-Platinum, made May 5, 2005, recorded with said Deeds, Book 14987, Page 218, as affected by an Extension, recorded with said Deeds, Book 18669, Page 37 and an Extension, recorded with said Deeds, Book 21538, Page 584. **(not a survey matter)**

3. Execution by Karen F. Neiman d/b/a Collection Plus/Discover Card, recorded with said Deeds, Book 15091, Page 406, as affected by Extensions, recorded with said Deeds, Book 18798, Page 111 and Book 21705, Page 385. **(not a survey matter)**

4. Taking by the Town of Agawam for the layout and alteration of Silver Street by instrument dated April 8, 1988, recorded with said Deeds, Book 7014, Page 255. See Plan Book 261, Pages 35-38. **(the sidelines of Silver Street are shown per said taking)**

5. Order by the Town of Agawam for the layout and construction of a sanitary sewer in Silver Street, recorded with said Deeds, Book 2727, Page 164 and shown on Plan Book 74, Pages 27 and 28. **(said sewer line is approximately shown hereon per said plan and lies within the Silver Street ROW)**

SIGNIFICANT OBSERVATIONS

None found.

CERTIFICATION:

To: Borrego Solar Systems, Inc.

This is to certify that this map of plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes items 2, 3, 4, 5, 6a, 6b, 7a, 7b1, 8, 11a, 13, 14, 16 & 17 of Table A thereof. The fieldwork was completed on 1/27/2022.

2-1-2022
Date of map or plat

Daniel F. Stasz PLS #47160
dan@northeastsurvey.com

COMMONWEALTH OF MASSACHUSETTS
DANIEL F. STASZ
No. 47160
REGISTERED PROFESSIONAL LAND SURVEYOR

ZONING INFORMATION	
JURISDICTION:	TOWN OF AGAWAM, MA
ZONING DISTRICT TYPE:	AGRICULTURE
SINGLE FAMILY DIMENSION REQUIREMENTS:	
MINIMUM LOT AREA:	20,000 S.F.
MINIMUM LOT FRONTAGE:	120'
FRONT YARD SETBACK:	35'
SIDE YARD SETBACK:	15'
REAR YARD SETBACK:	20'
MAX. BUILDING HEIGHT:	35'
MAX. LOT COVERAGE:	N/A
ZONING DISTRICT TYPE:	BUSINESS A
SINGLE FAMILY DIMENSION REQUIREMENTS:	
MINIMUM LOT AREA:	10,000
MINIMUM LOT FRONTAGE:	100'
FRONT YARD SETBACK:	35'
SIDE YARD SETBACK:	10'
REAR YARD SETBACK:	35'
MAX. BUILDING HEIGHT:	45'
MAX. LOT COVERAGE:	50%

SHEET NO. 1 OF 1

LIMITED ALTA/NSPS LAND TITLE SURVEY OF LAND IN AGAWAM, MA

PREPARED FOR

BORREGO SOLAR

SURVEYOR:	DFS	ENGINEER:	–
DRAFTING:	JDG	DESIGN:	–
FIELD WORK:	CRC KMB	HORZ. SCALE:	1"=40'
PROJECT NUMBER:	21-240.1	VERT. SCALE:	–
DRAWING NAME:	21-240.1.DWG	DATE:	2-1-2022

404 SILVER STREET

NORTHEAST SURVEY CONSULTANTS
3 FERRY STREET
STUDIO I EAST
EASTHAMPTON, MA 01027
(413) 203-5144

Appendix D - Zoning Determination

The Commonwealth of Massachusetts

Town of Agawam

Inspection Services - Building Department

1000 Suffield Street, Agawam MA 01001 – (413) 821-0632

OFFICE ONLY
Date Filed:
RECEIVED BY INSPECTION SERVICES
SEP 05 2024
TOWN OF AGAWAM

Application for Zoning Determination

FILING INSTRUCTIONS: Deliver this form (no fee required) to Inspection Services.
For digital submissions, please confirm receipt. A *complete* application will be processed within 30 days.
The applicant must pick-up, or arrange for the receipt of, this processed form.

1) PROPERTY INFORMATION

a. Street Address	404 Silver Street	**b. Zoning District**	Business A Front 200', Rest Ag
c. Assessor's Map	H8	**d. Lot(s)**	3 and 37
e. Registry of Deeds Book	9420	**f. Page**	337
g. Overlay Districts	☐Historic Preservation ☐ Mixed-Use Business C		
h. Previous Special Permits, Site Plan Approvals, Findings or Variances Issued for this Site			

2) APPLICANT & OWNER INFORMATION

a. Applicant Name	Silver Street Energy Storage, LLC	**b. Applicant Phone**	978-995-3054
c. Applicant Email	wperegoy@newleafenergy.com		
d. Applicant Mailing Address	55 Technology Dr Suite 102 Lowell, MA 01851		
e. Applicant Relationship to Property	☐Owner ☐ Agent ☒Other:	Applicant has lease on property to develop project.	
f. Representative Name *(if any)*	William Peregoy	**g. Rep. Phone**	978-995-3054
h. Rep. Email	wperegoy@newleafenergy.com		
i. Owner Mailing Address			
j. Owner Name *(if different)*	Robert and Deborah Pelley	**k. Owner Phone**	413-530-6102
l. Owner Email			
m.Owner Mailing Address	404 Silver Street, Agawam, MA 01001		

3) PROJECT & SITE DETAILS

NOTE: Any omission of requested information may result in an INCOMPLETE determination

	Existing		*Proposed* ☐ *No changes to building, site or lot*		-FOR BUILDING DEPT. REVIEW- REQUIRED / NCU	
a. Lot Size	240,407 SF		184778 SF		LOT SIZE	☐
b. Frontage	**200** FT		100 FT		FRONTAGE	☐
c. Front Lot Line	**200** FT		100 FT		FRONT SB	☐
d. Side Lot Line (Left/Right)	L: FT **1230**	R: 1189 FT	L: 1189 FT	R: 1189 FT	SIDE SB	☐
e. Rear Lot Line	200 FT		200 FT		REAR SB	☐
f. Building Height	15 FT		15 FT		BLDG HT	☐
g. Total BLDG/Res Area	3144 SF	1103 SF	1500 SF	0 SF	AREA LIM	☐
h. BLDG Coverage (Footprint)	2104 SF	0.8 % of lot	6120 SF	3.3 % of lot	LOT COVER	☐
i. Impervious Coverage	2593 SF	1.1 % of lot	9000 SF	4.9 % of lot	IMPERVIOUS	☐
j. Parking/Loading Spaces	P: **0**	L: **0**	P: **0**	L: 0	PARKING	☐
k. Bicycle/EV Charge Spaces	B: **0**	EV: **0**	B: **0**	EV: 0	BIKE/EV	☐
l. Signs (Size & Type)	0 x 0	T: **0**	x 0	T: 0	SIGNS	☐
m. Fence (Size & Type)	0 LIN FT	T: **N/A**	500 LIN FT	T: Chain Link		
n. Wetland Area	22313 SF		22313 SF			
o. Utility Services	☒ Town Water	☒ Town Sewer	☒ Town Water	☒ Town Sewer	NON-CONFORMING USE	☐

p. Current Use of Property	Residence
q. Proposed Use of Property	Split lot - Residence to remain in Business A Zone and Battery Energy Storage System in Ag Zone.

r. Project Description

The proposed project is for a 5 MW, 20 MWh battery energy storage system (BESS) located at 404 Silver Street. The battery Containers will set on concrete foundation pads. The batteries will charge/discharge via transformers and inverters that will sit on the concrete pads as well. The electrical equipment will be enclosed by a 7' tall chain link fence, and will be serviced by a 20' wide gravel access road with ample turn around space. There will be pole mounted interconnection equipment adjacent to the gravel access road that connects into an existing power pole on Silver Street adjacent to the parcel. The pole mounted interconnection equipment will be connected to the BESS equipment via underground conduit. See attached preliminary site plan for project location. Also see attached Exhibit A that shows the proposed subdivision of the lot. Proposed Lot A will have the existing residence stay in the Business A Zone with required 100' frontage, and Proposed Lot B have the BESS project in the Agricultural Zone and will also have 100' Frontage on Silver Street.

s. I have attached additional narrative, plans or supporting materials *(any oversize plans should also be included in an 8.5 x 11" format)*	☒ Yes ☐ No
t. Work is proposed in or within 100' of a wetland or 200' of a stream/river, or construction will occur within the Floodplain district. *If so, CONSERVATION COMMISSION review is required.*	☐ Yes ☒ No ☐ Unsure
u. The following projects shall be required to comply with the requirements of a STORM DRAIN PERMIT: **[1] Any alteration to sites on parcels of one acre or greater.** **[2] Any alteration to individual lots less than one acre, but which are contiguous or are deemed part of a common project which is one acre or greater.**	☐ Yes ☐ No ☒ Unsure
v. The project will affect at least one of the following; additional gross floor area by 2,000 square feet, any change of use, changes to parking and/ or curb cuts.	☒ Yes ☐ No

4) CERTIFICATION

This determination is based only on the information provided, which I represent as accurate. The issuance of a Zoning Determination does not relieve the Applicant of the responsibility to obtain other zoning or non-zoning permits, as may be required, and this determination is based on the zoning in effect at the issue date and grants no protection from any pending or future zoning changes. Additional information may be requested and required to properly process this form. Any non-zoning related comments provided are cursory in nature; Applicants should follow-up with appropriate Town Departments. ***Sec. 1-7 of the Town of Agawam's General Ordinances authorizes the denial of a license or permit where an outstanding debt or obligation to the Town exists.***

Signature	*William Peregoy*	**Date**	9/5/2024

☐ Applicant ☒ Applicant's Representative

boxSIGN 1787Q534-4Q5W8V6X

ZONING DETERMINATION - OFFICE USE ONLY

☐ Approved ☐ Denied: ☐ The proposed use is not permitted in the subject zoning district
☐ Only permissible with variance relief from the Zoning Board of Appeals

☒ Approved ***Pending additional approval:***

Per Zoning Ordinance Section(s)	Required Permit(s)	Approval Required	Permitting Authority
§ 180-152 - S.P.R.	☒ Building Permit(s)	☐ Special Permit(s)	☒ Planning Board
*ANR to divide the parcels	☒ Electrical Permit(s)	☒ Site Plan Review	☐ Board of Appeals
	☐ Plumbing/Gas Permit(s)	☐ Variance	☐ City Council

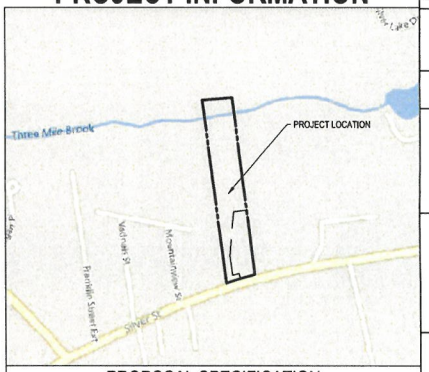
Town Building Official	[signature]	**Issue Date**	9/6/2024

This determination may be appealable to the Zoning Board of Appeals under the provisions of MGL Ch. 40A Sec. 8.
Revised 09/08/2022

EXHIBIT A - PROPOSED SUBDIVISION

EXHIBIT A - PROPOSED SUBDIVISION

PROJECT INFORMATION



PROPOSAL SPECIFICATION	
SYSTEM POWER CAPACITY (KW)	4990
SYSTEM ENERGY CAPACITY (KWH)	19960
POWER CONVERSION SYSTEM INFORMATION	HITHIUM GEN 2
TRANSFORMER INFORMATION	(2) 2500
INTERCONNECTION VOLTAGE	13.8 KV
UTILITY	EVERSOURCE

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WESTBORO, MA 01581
PHONE: (855) 616-5346
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SITE USE PERMIT SET
404 SILVER ST
AGAWAM, MA 01001

PROJECT NUMBER: 120-0339

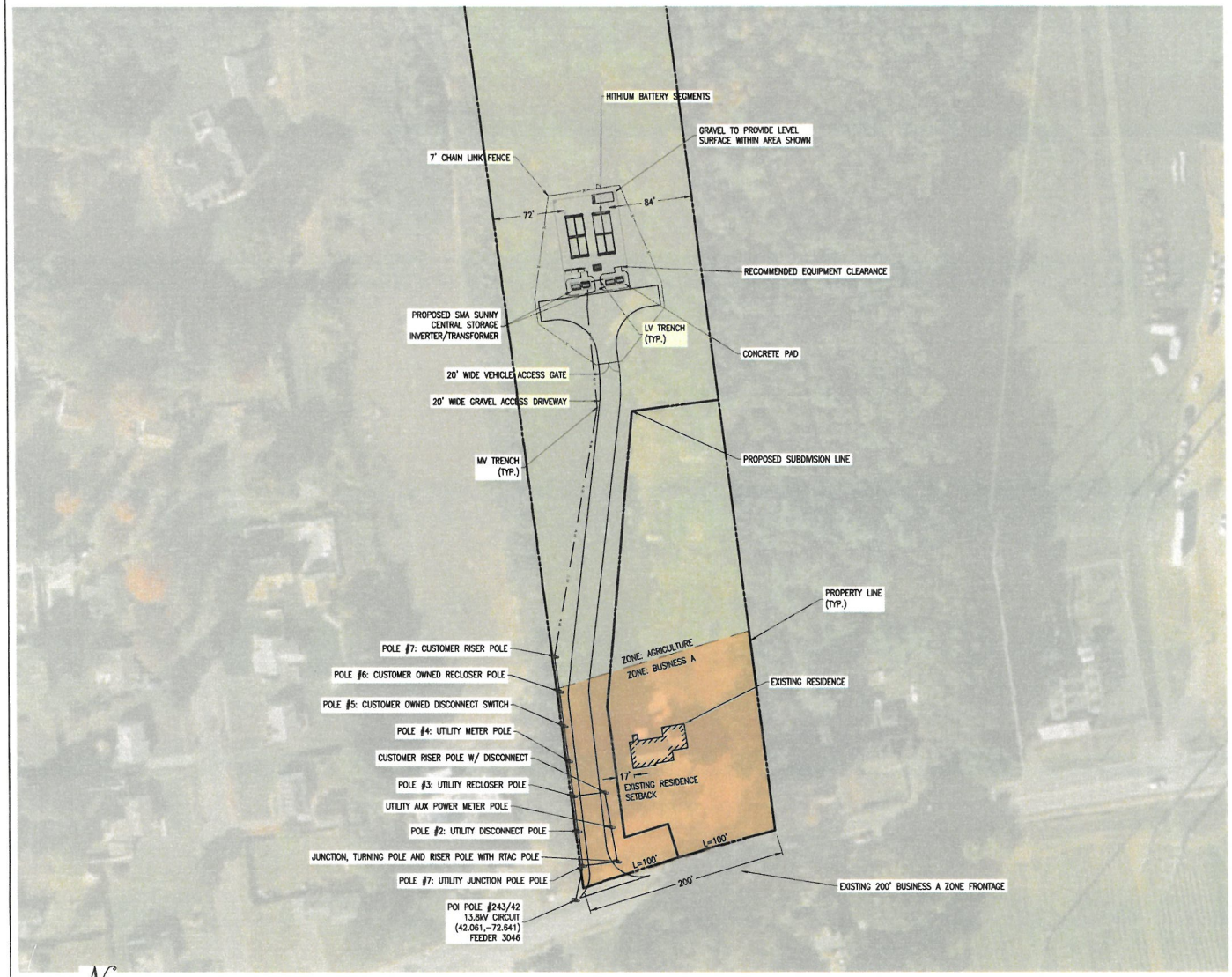
REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
0	08/23/24	AMM		SUP SET

SCALES SHOWN ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" x 36"

PL-1.0

PROPOSAL LAYOUT

404 SILVER ST - AGAWAM - 4990 KWAC - ESS PROJECT

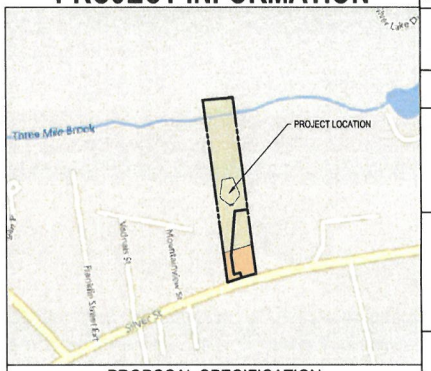


PROPOSAL LAYOUT

SCALE: 1" = 50'

0 50' 100'

PROJECT INFORMATION



PROPOSAL SPECIFICATION	
SYSTEM POWER CAPACITY (KW)	4990
SYSTEM ENERGY CAPACITY (KWH)	19960
POWER CONVERSION SYSTEM INFORMATION	HITHIUM GEN 2
TRANSFORMER INFORMATION	(2) 2500
INTERCONNECTION VOLTAGE	13.8 KV
UTILITY	EVERSOURCE

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SITE USE PERMIT SET
404 SILVER ST
AGAWAM, MA 01001

PROJECT NUMBER: 120-0339

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
0	08/23/24	AMM		SUP SET

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PL-1.0

PROPOSAL LAYOUT

Appendix E - Stormwater Report

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

REPORT

October 2024

Silver Street Energy Storage, LLC
c/o New Leaf Energy, Inc.

Battery Energy Storage System

404 Silver Street,
Agawam, Massachusetts 01001

Stormwater Report

Applicant/Project Name: Silver Street Energy Storage, LLC
c/o New Leaf Energy, Inc.
Proposed Battery Energy Storage System

Project Location: 404 Silver Street (Map H8, Block 3, Lot 37)
Agawam, MA 01001

Application Prepared by:
Firm: Weston & Sampson Engineers, Inc.
Registered PE: Robert J. Bukowski, P.E.

Below is a summary of the existing site conditions, proposed site design, and an explanation describing the Provisions of the Water & Sewer Ordinance section of the Town of Agawam Code (The Ordinance) as they apply to the battery energy storage system (BESS) project located 404 Silver Street (Map H8, Block 3, Lot 37) Agawam, MA 01001:

General

The proposed project is located at 404 Silver Street in Agawam, Massachusetts and is owned by Robert and Deborah Pelley. The site is bounded by Silver Street to the south, undeveloped woodland and residential properties to the east and west, and undeveloped woodland to the north. The site includes a residence, gravel road, undeveloped woodland, and wetlands on the northern portion of the site. A subdivision is proposed to divide the approximately 5.7-acre property into two parcels, one parcel with the existing residence and the second parcel including the remainder of the undeveloped parcel. A Locus Map is included in **Attachment A**.

The majority of the site slopes uniformly to the northeast, with a high point at the southwest corner of the site. The northern portion of the site contains a wetland, to which the northern edge of the site slopes toward. The area directly south of the wetland slopes north toward the wetland.

Weston & Sampson wetland scientists conducted field wetland delineations on August 8, 2024. Wetland resource areas were observed at the site. Wetland resource areas including three bordering vegetated wetlands (BVW), one perennial stream, one intermittent stream, and land under waterbodies and waterways (LUW) were identified on the property. These identified wetlands are located in the northern portion of the site. In accordance with the Massachusetts Department of Environmental Protection (MA DEP) 310 CMR 10.00: Wetlands Protection Act (WPA) Regulations, there is a 100 foot buffer zone associated with the onsite wetlands, and a 200 foot riverfront area associated with the onsite perennial stream.

The proposed project is for the installation a battery energy storage system (BESS) with a capacity of 5 megawatts (MW) and 20 megawatt hours (MWh). The system will consist of batteries, transformers, and inverters that will sit on concrete pads. This BESS equipment will be surrounded by a combination of a 7 foot tall chain link fence with a gate for access and 10 foot tall sound barrier wall. Pole-mounted interconnection equipment will allow interconnection to an existing power pole on Silver Street and will connect to the BESS by means of underground conduit. The total limit of work area is approximate 0.98 acres consisting of the battery storage equipment, fence, improved gravel access road, tree clearing, and overhead wire poles.

Minimal site grading is proposed for the implementation of the improved 20 foot wide gravel access road and the equipment pads. Tree clearing is proposed for the proposed power pole installation, gravel access road, and equipment pads. Outside of the areas of grading and tree clearing, the ground cover is expected to remain.

According to the United States Department of Agriculture Natural Resource Conservation Service (USDA NRCS) soil mapping data, the site is primarily comprised of hydrologic soil group (HSG) A soils, with HSG B

and B/D soils in the northern part of the site. NRCS Web Soil Survey maps and reports for hydrologic soil group, depth to water table, and depth to bedrock are included as Attachment B.

The site is not located within any FEMA flood hazard zones. The FEMA FIRMette map for the project site is included in Attachment B.

Rainfall data is referenced from NOAA Atlas 14, Volume 10, Version 3 for Agawam, Massachusetts and is included in Attachment B.

Stormwater Analysis:

The proposed project, as designed, will not result in an increase in peak runoff rates from pre- to post-development conditions. Existing and proposed peak design flows were assessed using the National Resources Conservation Service (NRCS) Technical Release 20 (TR-20) methodology. HydroCAD® version 10.10-3a stormwater modeling software was used to analyze and compare pre- and post- development stormwater conditions for the 2-, 10-, and 100-year 24-hour storm events. HydroCAD® is a comprehensive hydrodynamic modeling program which analyzes and designs site hydrology, surface drainage systems, and storm drains. It can manage a variety of flow situations such as overland flow, drainage swales, ponds, and piping systems.

A summary of the analysis is provided below, the full stormwater reports for pre- and post- development conditions with associated hydrologic maps are included in Attachment C.

Existing Hydrology:

The stormwater analysis for this project was modeled using the property line as the general limit of the drainage area boundary.

Figure 1 of Attachment C displays the limits of the drainage area, time of concentration flow paths, and existing ground cover. Below is a summary of the existing drainage area:

- Drainage Area 1 (E1) – Residential building, existing gravel road, grassed areas, wooded areas, dirt piles, and wetlands.

One point of analysis (POA) has been determined to analyze the stormwater impacts of the post-development conditions compared to the pre-development conditions.

Proposed Hydrology:

Compared to pre-development conditions, the proposed development will have an increase in impervious area due to the proposed equipment pads and an increase in gravel due to the proposed access road.

Figure 2 of Attachment C displays the limits of the proposed drainage area, time of concentration flow paths, and proposed ground cover. Below is a summary of the proposed drainage area:

- Drainage Area 1 (P1) – Residential building, existing gravel road, grassed areas, wooded areas, dirt piles, wetlands, proposed BESS equipment, proposed equipment pads, and proposed access road.

A riprap swale is proposed to the west of the electrical equipment to collect runoff from the equipment pad area.

Provisions of the Water & Sewer Ordinance section of the Town of Agawam Code (The Ordinance) relative to the project, followed by an analysis of the project's compliance with applicable provisions (in underlined font), are listed below. The outlined regulations represent an analysis primarily applicable to Article IV, Sanitary Sewers, Storm Drains, and Connections, Section 175-35, Stormwater Management Plan, of the Ordinance.

Article IV. Sanitary Sewers, Storm Drains, and Connections
175-35. Stormwater Management Plan.
The stormwater management plan shall demonstrate a comprehensive plan intended to address changes in runoff characteristics due to a proposed construction project. Both short-term and long-term alterations in flow paths, runoff volume, and runoff characteristics must be addressed. The protection of regulated water resources is required. The use of natural preexisting vegetation and/or the planting of native species to provide runoff mitigation is strongly encouraged.

Alterations in flow paths, runoff volume, and runoff characteristics are addressed in the hydrology maps and HydroCAD calculations in Attachment C.

A. Stormwater management performance standards. The Superintendent of the Department of Public Works may alter the stormwater management performance standards at his discretion. These standards do not relieve the applicant from complying with all state and federal regulations.

Acknowledged.

B. Construction erosion and sediment controls. Temporary control measures to keep disturbed soils on the construction site, prevent erosion and control and remove sedimentation due the construction process. The Department of Public Works shall develop design guidelines for this purpose. They shall be based upon Massachusetts Department of Environmental Protection Erosion and Sediment Control Policies. The erosion and sediment control plan shall be prepared by a registered professional engineer.

Proposed construction erosion and sediment controls are shown on the Post-Development Hydrology Map (Figure 2), included in Attachment C. A construction period pollution and prevention and erosion and sedimentation control plan is included in Attachment F.

C. Permanent measures; runoff quality and quantity best management practices.

(1) New Development. New commercial, industrial, and residential sites, unless exempted in § 175-22B, must comply with the stormwater management performance standards.

Acknowledged, the BESS is a new development and must comply with the stormwater management performance standards.

(a) Stormwater management measures shall be required to satisfy the control requirements and shall be implemented in the following order of preference:

[1] Flow attenuation and pollutant removal of runoff on site to existing areas with grass, trees, and similar vegetation and through the use of open vegetated swales and natural depressions with appropriate stabilization measures to ensure long-term operation.

Pre- and post-development peak flows are to remain the same, see Attachment D for table depicting peak flows.

[2] Stormwater detention pond for the temporary storage of runoff, which is designed so as not to create a permanent pool of water.

Not applicable. There are no detention ponds proposed for this project.

[3] Stormwater retention structures for the permanent storage of runoff by means of a permanent pool of water. This type of system will not be allowed for subdivisions.

Not applicable. There are no retention structures proposed for this project.

[4] Retention and evaporation of stormwater on rooftops or in parking lots. This type of system will not be allowed for subdivisions.

Not applicable. There are no rooftops or parking lots proposed for this project.

(b) Peak flow rates. Peak flow rates for the post-construction conditions must not exceed the peak flow rates for the preconstruction condition for one-hundred-year twenty-four-hour design storm events. The two-year twenty-four-hour, ten-year twenty-four-hour post-construction peak flow rate must be mitigated to the maximum extent practicable.

Peak flow rates for the post-construction conditions do not exceed the peak flow rates for the preconstruction conditions, A summary of the pre- and post-development peak flow rates is included in Attachment D.

(c) Minimize pollutants. Best management practices shall be employed to minimize pollutants in stormwater runoff prior to discharge into a separate storm drainage system or water body. Runoff from parking lots over two acres shall be treated by oil and water separators or other controls to remove oil and sediment.

A riprap swale is proposed to the west of the equipment pad area to collect runoff, the swale is shown on the Post-Development Watershed Plan included in Attachment C.

(d) Projects involving the storage or use of hazardous chemicals or petroleum products shall incorporate handling and storage best management practices that prevent such chemicals from contaminating runoff from the site into infiltration systems, receiving water bodies, or the MS4, and shall include a list of such chemicals in the application.

Not applicable, storage of hazardous chemicals or petroleum products is not proposed.

(e) Connection to MS4. If the destination for the outlet of a detention system is the MS4, the applicant must evaluate the existing capacity and condition of that system. If there are existing deficiencies or extra capacity is not available to accept additional flows from the project site, the applicant will be required to design and construct improvements or reduce the outlet flow rate based on existing capacity.

Not applicable. Connection to MS4 is not proposed.

(f) Emergency overflow. All detention ponds shall be designed to provide an emergency overflow system, and incorporate measures to provide a nonerosive velocity to flow along its length and at any outfall.

Not applicable. There are no detention ponds proposed for this project.

(h) Centralized detention facilities. Certain industrial areas have centralized detention facilities. The following describes the allowed percent of impervious area before on-site detention is required.

Not applicable. Proposed project is not a centralized detention facility.

(i) Detention ponds. The Department of Public Works shall develop design guidelines for this purpose. These standards may be updated from time to time. Public safety shall be considered in the design of any stormwater facilities. Detention ponds on private sites are encouraged to utilize the DPW design guidelines; at the DPW's discretion certain design standards may not apply to private sites. Detention ponds within easements to the Town must follow all design standards as directed by the DPW Superintendent.

Not applicable. There are no detention ponds proposed for this project.

(l) Detention pond maintenance requirements. Detention ponds within easements to the Town
of Agawam require minor maintenance to be performed by the property owner on a regular basis.

Not applicable. There are no detention ponds proposed for this project.

(m) Calculation submittals for review by the DPW shall include the following components.

[1] Locus map.

A locus map is included in Attachment A.

[2] Site plan. This plan must include all relevant information for the hydrologic modeling of the site. Information shall include preconstruction and post-construction conditions at the same scale, which is appropriate for complexity and size of the project.

Hydrologic maps for pre- and post-construction conditions are included in Attachment C.

[3] Existing conditions and proposed impact mitigation; description/investigation of both up-gradient conditions which release runoff to the site and down-gradient areas which are the destination of the runoff from the site in question. The extent of this investigation must be such that the project designer and the DPW reviewer can have a good understanding of existing conditions, including flow paths, flooding
conditions, flow-limiting structures, wetlands or other water resources' ability to withstand current runoff flow rates and volumes. Proposed structures and improvements must be such that they extend far enough down stream to mitigate the proposed development and increases in impervious areas.

Minimal runoff flows to the site from areas west of the southern portion of the parcel and north of the northern portion of the parcel. Runoff from the site releases downgradient to an area east of the parcel. Runoff from upgradient areas to the west and north, runoff from the site, and runoff to

the downgradient area to the east have flow pats leading to a stream, which flows through the northern portion of the parcel. A riprap swale is proposed to the west of the equipment pad area to mitigate the grading and added impervious area.

[4] Soil survey information; copy of Hampden County Soil Survey Map with site clearly outlined at the scale of the map. Copy must be clear such that soil type and hydrologic soil group can be determined. Also, list the soil types, and relevant characteristics for the purpose of modeling the project's runoff.

A copy of the NRCS Hydrologic Soils Group map for the project area is included in Attachment B.

[5] Hydrologic modeling data. All areas shall be modeled utilizing the TR 55 or TR 20 method of drainage calculation as appropriate. Submittals shall include the following information. Submittals will not be reviewed until complete information is given in an easy-to-follow format. The use of tables, summaries, and accompanying back-up data is strongly encouraged.

[a] Drainage subarea designations and outline locations for pre- and post-construction condition.

Drainage subarea designations and outline locations for pre-and post-construction conditions are included in the drawings in Attachment C.

[b] Time of concentration path location, path length, surface grade, soil type boundary location for pre- and post-construction condition.

Time of concentration path location, path length, surface grade, and soil type boundary location for pre- and post-construction conditions are included in the drawings in Attachment C.

[c] Modeling method description.

National Resources Conservation Service (NRCS) Technical Release 20 (TR-20) methodology. HydroCAD® version 10.10-3a stormwater modeling software was used to analyze and compare pre- and post- development stormwater conditions for the 2-, 10-, and 100-year 24-hour storm events. HydroCAD outputs are included in Attachment C.

[d] Model data for pre- and post-construction conditions, including model of all proposed flow rate control structures.

Model data for pre- and post-construction conditions is included in Attachment C.

[e] Model output for pre- and post-construction conditions, including model of all proposed flow rate control structures.

Model output for pre- and post-construction conditions is included in **Attachment C.**

[f] Preconstruction peak flow rate and post-construction peak flow rate at all design points for the site.
Pre- and post-construction condition peak flow rates are included in **Attachment D.**

D. Operation and maintenance, Long-Term.

(1) An operation and maintenance manual shall be developed by the project designer for the owner's use once construction on the proposed system is complete. The manual will include a description of each component of the drainage system, inspections, maintenance, and the frequency of each for continued operation of the system.

An operation and maintenance manual for upkeep of the proposed riprap swale is included in **Attachment E.**

(2) See § 175-30B(5) for reporting requirements.

Acknowledged.

E. Owner/contractor certification statement; performance; and certificate of completion.

(1) Certification. The owner or authorized representative and all contractors and subcontractors shall sign certification statements as part of the permit application and the stormwater management plan. In signing the plan, the authorized representative certifies that the information is true and assumes liability for the plan. Official signatures provide a basis for an enforcement action to be taken against the person signing the document.

(a) The owner certification statement shall read:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

An authorization statement by the landowner and a certification statement by Silver Street Energy Storage, LLC, c/o New Leaf Energy, Inc. is included in **Attachment G.**

(b) Contractors and subcontractors certification statement.

[1] Contractors and subcontractors certification statement shall read:

"I certify under penalty of law that I understand the terms and conditions of the Storm Drain Permit that authorizes stormwater discharges associated with industrial activity from the construction site identified as part of this certification."

[2] The storm drain permit application shall list all contractors and subcontractors who will implement the measures identified in the stormwater management plan.

Not applicable. There is no storm drain permit associated with the proposed project.

Attachment A - Locus Map

Legend

Site Location

FIGURE 1
404 SILVER STREET
AGAWAM, MASSACHUSETTS
SILVER STREET ENERGY STORAGE, LLC

LOCUS MAP

1,500 0 1,500

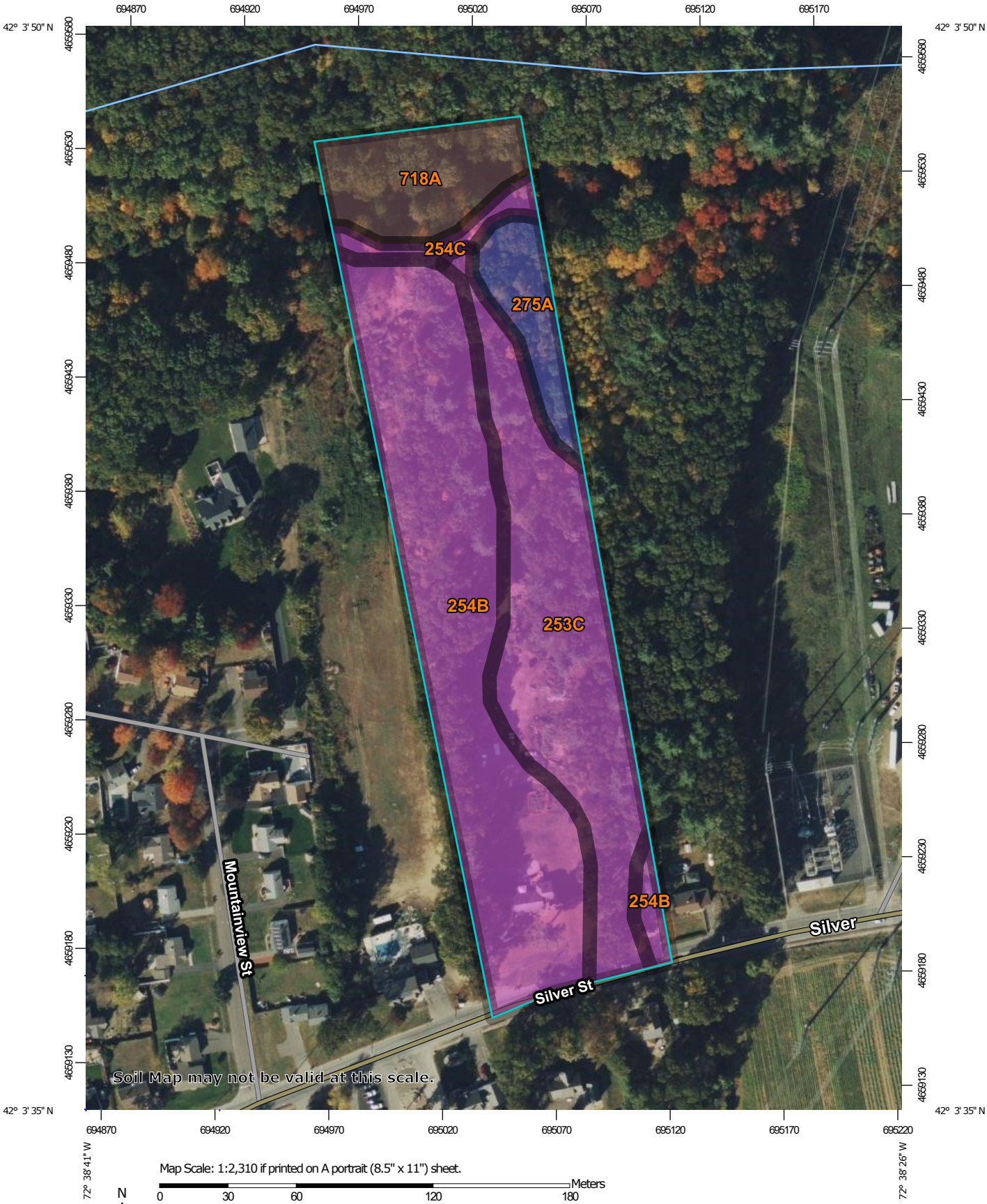
Scale In Feet

Weston & Sampson

Path: P:\Private\New Leaf Energy\Agawam\Permitting\Entitlement_404 Silver Street Agawam\Stormwater Design\Stormwater Report\Attachment A - Locus\Agawam Locus Map.mxd **User:** Garani.Tara **Saved:** 9/23/2024 9:11:04 AM **Opened:** 9/23/2024 9:11:14 AM

Attachment B - NRCS Web Soil Survey Maps & Reports:
Hydrologic Soils Group, Depth to Water Table, Depth to Bedrock,
FEMA FIRMette,
NOAA Atlas 14 Rainfall Data

Hydrologic Soil Group—Hampden County, Massachusetts, Central Part
(404 Silver St Agawam)



Map Scale: 1:2,310 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N 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 1:15,800.

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: Hampden County, Massachusetts, Central Part
Survey Area Data: Version 17, Sep 10, 2023

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

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

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
253C	Hinckley loamy sand, 8 to 15 percent slopes	A	2.6	31.6%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	3.9	47.3%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	A	0.2	2.8%
275A	Agawam fine sandy loam, 0 to 3 percent slopes	B	0.6	6.8%
718A	Saco Variant silt loam, frequently ponded, 0 to 2 percent slopes, frequently flooded	B/D	0.9	11.5%
Totals for Area of Interest			**8.2**	**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.

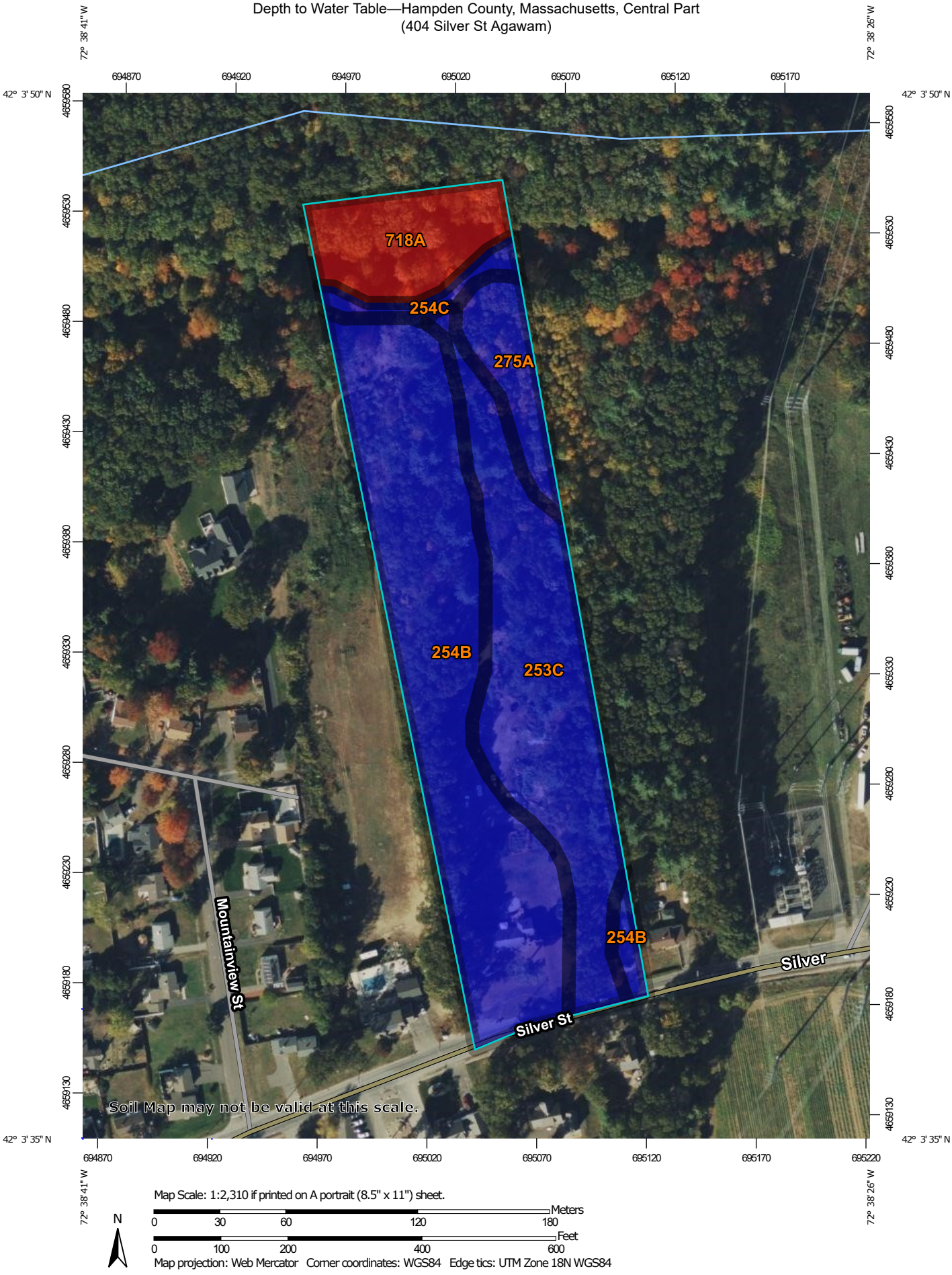
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Depth to Water Table—Hampden County, Massachusetts, Central Part
(404 Silver St Agawam)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- 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 1:15,800.

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: Hampden County, Massachusetts, Central Part
Survey Area Data: Version 17, Sep 10, 2023

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

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

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.

Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
253C	Hinckley loamy sand, 8 to 15 percent slopes	>200	2.6	31.6%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	>200	3.9	47.3%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	>200	0.2	2.8%
275A	Agawam fine sandy loam, 0 to 3 percent slopes	>200	0.6	6.8%
718A	Saco Variant silt loam, frequently ponded, 0 to 2 percent slopes, frequently flooded	0	0.9	11.5%
Totals for Area of Interest			**8.2**	**100.0%**

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

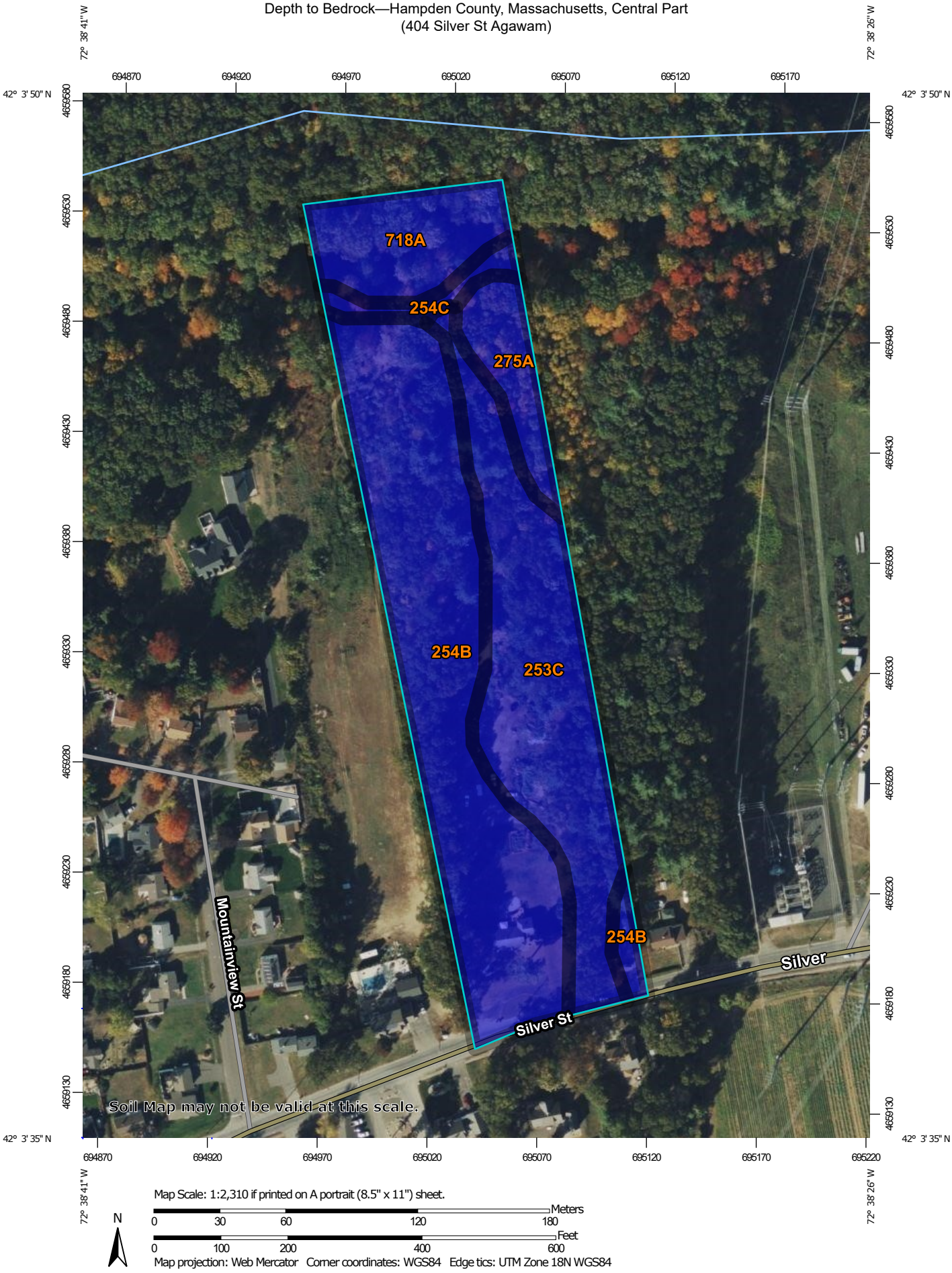
Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Depth to Bedrock—Hampden County, Massachusetts, Central Part
(404 Silver St Agawam)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- 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 1:15,800.

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: Hampden County, Massachusetts, Central Part
Survey Area Data: Version 17, Sep 10, 2023

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

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

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.

Depth to Bedrock

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
253C	Hinckley loamy sand, 8 to 15 percent slopes	>200	2.6	31.6%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	>200	3.9	47.3%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	>200	0.2	2.8%
275A	Agawam fine sandy loam, 0 to 3 percent slopes	>200	0.6	6.8%
718A	Saco Variant silt loam, frequently ponded, 0 to 2 percent slopes, frequently flooded	>200	0.9	11.5%
Totals for Area of Interest			**8.2**	**100.0%**

Description

The term bedrock in soil survey refers to a continuous root and water restrictive layer of rock that occurs within the soil profile.

There are many types of restrictions that can occur within the soil profile but this theme only includes the three restrictions that use the term bedrock. These are:

1) Lithic Bedrock

2) Paralithic Bedrock

3) Densic Bedrock

Lithic bedrock and paralithic bedrock are comprised of igneous, metamorphic, and sedimentary rocks, which are coherent and consolidated into rock through pressure, heat, cementation, or fusion. Lithic bedrock represents the hardest type of bedrock, with a hardness of strongly coherent to indurated. Paralithic bedrock has a hardness of extremely weakly coherent to moderately coherent. It can occur as a thin layer of weathered bedrock above harder lithic bedrock. Paralithic bedrock can also be much thicker, extending well below the soil profile.

Densic bedrock represents a unique kind of bedrock recognized within the soil survey. It is non-coherent and consolidated, dense root restrictive material, formed by pressure, heat, and dewatering of earth materials or sediments. Densic bedrock differs from densic materials, which formed under the compaction of glaciers, mudflows, and or human-caused compaction.

If more than one type of bedrock is described for an individual soil type, the depth to the shallowest one is given. If no bedrock is described in a map unit, it is represented by the "greater than 200" depth class.

Depth to bedrock is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

National Flood Hazard Layer FIRMette

FEMA

72°38'52"W 42°3'52"N

72°38'15"W 42°3'25"N

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

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

- B 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- 8 Coastal Transect
- 513 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 9/21/2024 at 3:06 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.

NOAA Atlas 14, Volume 10, Version 3
Location name: Agawam, Massachusetts, USA*
Latitude: 42.0607°, Longitude: -72.6426°
Elevation: 173 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.340 (0.263-0.438)	0.409 (0.315-0.527)	0.522 (0.401-0.673)	0.615 (0.470-0.800)	0.743 (0.551-1.01)	0.840 (0.611-1.17)	0.941 (0.665-1.36)	1.05 (0.708-1.57)	1.21 (0.784-1.87)	1.34 (0.848-2.12)
10-min	0.482 (0.372-0.620)	0.580 (0.447-0.746)	0.739 (0.568-0.956)	0.871 (0.666-1.13)	1.05 (0.780-1.44)	1.19 (0.865-1.66)	1.33 (0.942-1.93)	1.49 (1.00-2.22)	1.72 (1.11-2.65)	1.90 (1.20-3.00)
15-min	0.567 (0.438-0.730)	0.682 (0.526-0.878)	0.870 (0.668-1.12)	1.02 (0.783-1.33)	1.24 (0.918-1.69)	1.40 (1.02-1.95)	1.57 (1.11-2.27)	1.76 (1.18-2.61)	2.02 (1.31-3.12)	2.23 (1.41-3.53)
30-min	0.766 (0.591-0.985)	0.923 (0.712-1.19)	1.18 (0.906-1.52)	1.39 (1.06-1.81)	1.68 (1.25-2.30)	1.91 (1.38-2.66)	2.14 (1.51-3.09)	2.39 (1.60-3.56)	2.75 (1.78-4.25)	3.04 (1.93-4.81)
60-min	0.965 (0.745-1.24)	1.16 (0.897-1.50)	1.49 (1.14-1.92)	1.76 (1.34-2.29)	2.13 (1.58-2.90)	2.41 (1.75-3.36)	2.70 (1.91-3.92)	3.03 (2.03-4.51)	3.48 (2.25-5.38)	3.85 (2.44-6.09)
2-hr	1.24 (0.960-1.58)	1.48 (1.15-1.90)	1.89 (1.46-2.43)	2.22 (1.71-2.88)	2.69 (2.01-3.65)	3.03 (2.22-4.22)	3.40 (2.43-4.94)	3.83 (2.58-5.68)	4.47 (2.90-6.88)	5.00 (3.18-7.87)
3-hr	1.42 (1.11-1.81)	1.71 (1.33-2.17)	2.17 (1.69-2.78)	2.56 (1.98-3.30)	3.10 (2.32-4.20)	3.50 (2.58-4.86)	3.92 (2.82-5.71)	4.44 (3.00-6.56)	5.23 (3.40-8.02)	5.90 (3.75-9.25)
6-hr	1.78 (1.39-2.24)	2.16 (1.69-2.73)	2.78 (2.17-3.53)	3.30 (2.56-4.22)	4.01 (3.03-5.42)	4.53 (3.37-6.29)	5.10 (3.71-7.44)	5.82 (3.95-8.57)	6.95 (4.54-10.6)	7.94 (5.06-12.4)
12-hr	2.17 (1.72-2.73)	2.69 (2.12-3.38)	3.53 (2.78-4.46)	4.23 (3.31-5.37)	5.19 (3.95-6.99)	5.89 (4.41-8.16)	6.67 (4.89-9.72)	7.67 (5.22-11.2)	9.26 (6.06-14.1)	10.7 (6.83-16.6)
24-hr	2.55 (2.03-3.18)	3.21 (2.55-4.00)	4.28 (3.39-5.37)	5.17 (4.07-6.53)	6.40 (4.91-8.59)	7.29 (5.50-10.1)	8.29 (6.13-12.1)	9.60 (6.55-14.0)	11.7 (7.69-17.7)	13.6 (8.73-21.0)
2-day	2.89 (2.31-3.58)	3.67 (2.94-4.55)	4.95 (3.94-6.16)	6.01 (4.76-7.53)	7.46 (5.76-9.98)	8.52 (6.48-11.7)	9.71 (7.25-14.1)	11.3 (7.74-16.4)	13.9 (9.18-21.0)	16.3 (10.5-25.1)
3-day	3.16 (2.54-3.90)	4.01 (3.22-4.96)	5.41 (4.33-6.71)	6.56 (5.22-8.20)	8.16 (6.33-10.9)	9.31 (7.10-12.8)	10.6 (7.95-15.4)	12.4 (8.49-17.9)	15.3 (10.1-23.0)	17.9 (11.6-27.5)
4-day	3.40 (2.74-4.18)	4.31 (3.47-5.31)	5.80 (4.65-7.17)	7.03 (5.61-8.75)	8.73 (6.79-11.6)	9.96 (7.62-13.7)	11.4 (8.52-16.4)	13.2 (9.09-19.1)	16.3 (10.8-24.5)	19.1 (12.4-29.3)
7-day	4.07 (3.30-4.98)	5.10 (4.13-6.24)	6.78 (5.46-8.33)	8.17 (6.55-10.1)	10.1 (7.87-13.3)	11.5 (8.80-15.6)	13.0 (9.80-18.7)	15.1 (10.4-21.7)	18.5 (12.3-27.7)	21.6 (14.0-32.9)
10-day	4.73 (3.85-5.77)	5.82 (4.73-7.10)	7.60 (6.15-9.31)	9.08 (7.30-11.2)	11.1 (8.68-14.6)	12.6 (9.66-17.0)	14.2 (10.7-20.3)	16.4 (11.3-23.5)	19.9 (13.2-29.6)	23.0 (14.9-35.0)
20-day	6.81 (5.58-8.24)	7.96 (6.51-9.64)	9.84 (8.01-12.0)	11.4 (9.22-14.0)	13.5 (10.6-17.5)	15.1 (11.6-20.1)	16.8 (12.6-23.5)	19.0 (13.2-26.9)	22.2 (14.8-32.9)	25.1 (16.3-37.9)
30-day	8.56 (7.04-10.3)	9.73 (7.99-11.7)	11.7 (9.53-14.1)	13.2 (10.8-16.2)	15.4 (12.1-19.8)	17.1 (13.1-22.5)	18.8 (14.0-25.9)	20.8 (14.6-29.4)	23.8 (15.9-35.0)	26.2 (17.1-39.6)
45-day	10.7 (8.86-12.9)	12.0 (9.85-14.4)	13.9 (11.4-16.8)	15.6 (12.7-19.0)	17.9 (14.0-22.7)	19.6 (15.0-25.5)	21.4 (15.8-28.9)	23.2 (16.3-32.7)	25.8 (17.3-37.8)	27.8 (18.1-41.8)
60-day	12.6 (10.4-15.0)	13.8 (11.4-16.6)	15.9 (13.1-19.1)	17.6 (14.4-21.4)	20.0 (15.7-25.2)	21.8 (16.7-28.2)	23.6 (17.4-31.6)	25.4 (17.9-35.6)	27.6 (18.6-40.3)	29.2 (19.1-43.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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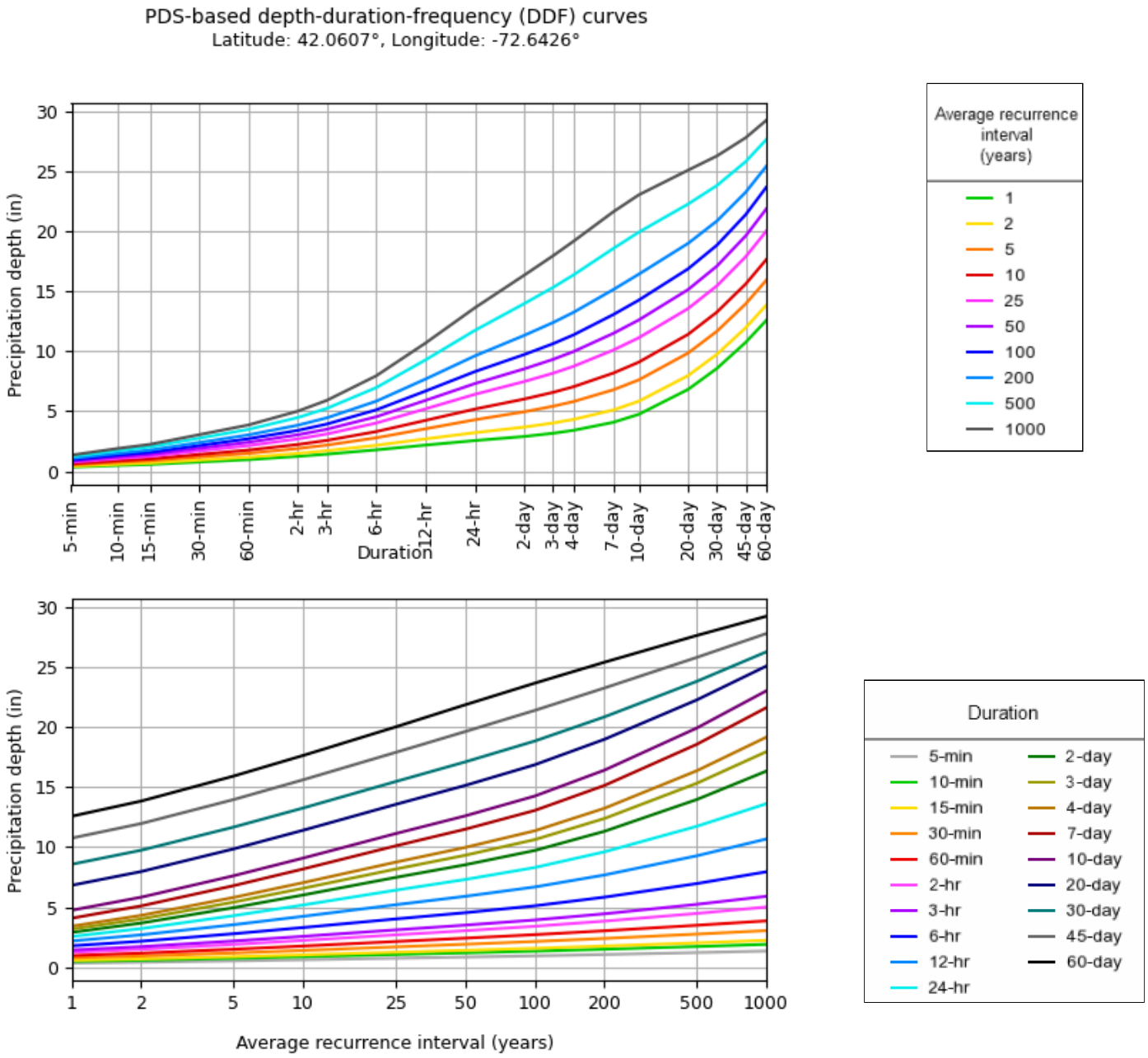
PF graphical



NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Thu Sep 19 21:31:56 2024

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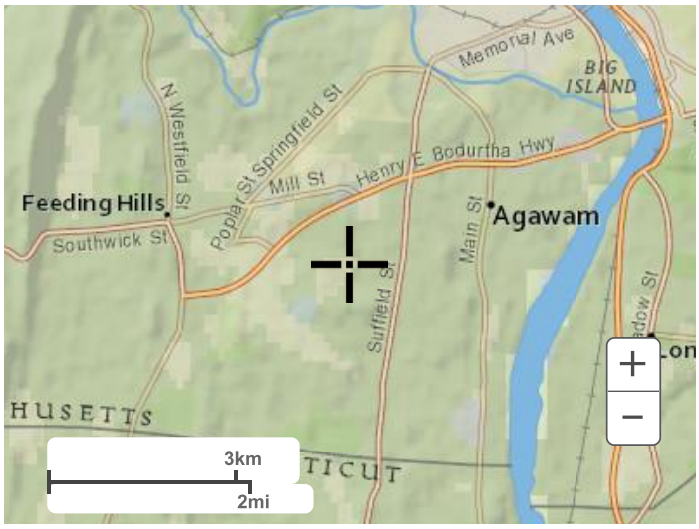
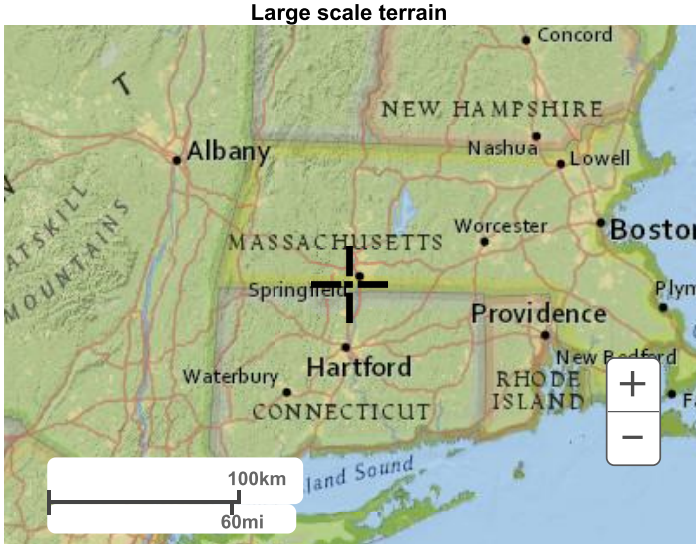
Maps & aerials

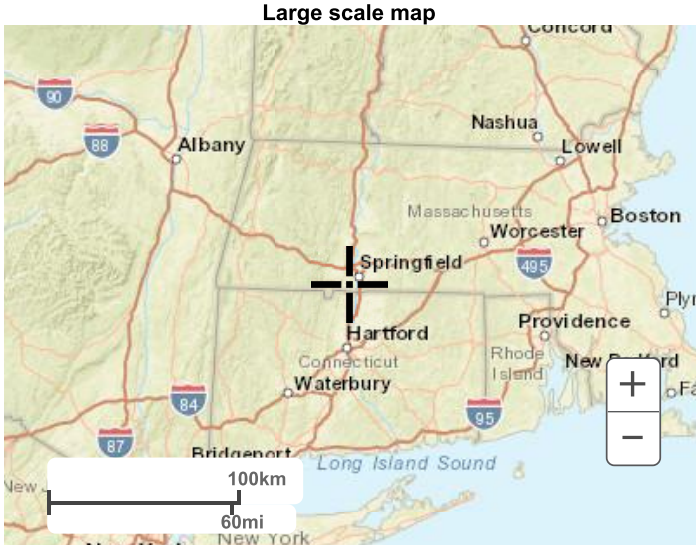
Small scale terrain



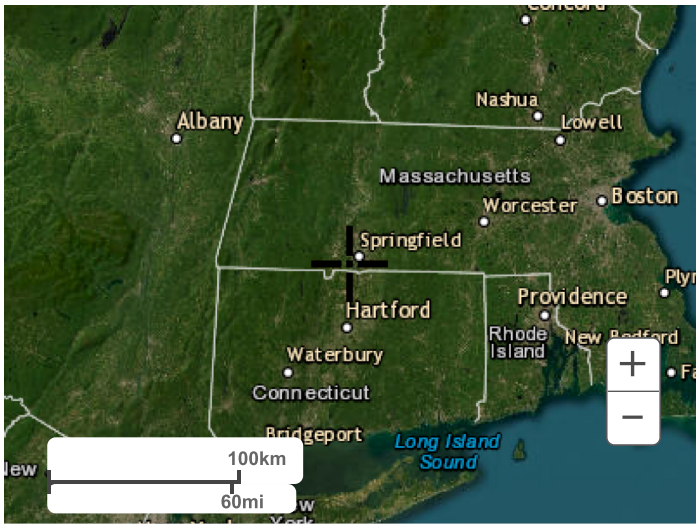
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Attachment C - Hydrologic Maps & HydroCAD Reports

LEGEND

- ROAD (GRAVEL)
- FENCE LINE
- PROPERTY LINE
- FLOW DIRECTION
- BANK LINE/FLAG
- WETLAND LINE/FLAG
- (E) MAJOR CONTOUR
- (E) MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- WETLAND BUFFER ZONE
- RIVERFRONT AREA
- 100–YEAR FLOOD HAZARD AREA
- TREELINE
- SILT FENCE
- SILT SOCK
- STORM PIPE
- ELECTRICAL TRENCH
- OVERHEAD ELECTRIC
- SEWER LINE
- WATER LINE
- GAS MAIN
- 23–23A ASSESSORS MAP–LOT
- SIGN
- UTILITY POLE (WITH GUY ANCHOR)
- HYDRANT
- WATER VALVE
- INDIVIDUAL TREE
- FOUND REBAR PROPERTY MARKERS

NOTE: ITALIC FONTS INDICATE EXISTING CONDITIONS.
STANDARD FONTS INDICATE PROPOSED CONDITIONS.

LEGEND DRAINAGE AREA MAP:

HYDROLOGY:

- FLOW PATH / TIME OF CONCENTRATION
- SUBBASIN LABEL
- POINT OF ANALYSIS
- GRASS
- POOR GRASS
- WOODLAND
- DENSE WOODLAND
- GRAVEL
- DIRT PILE
- IMPERVIOUS
- WATERSHED BOUNDARY
- NRCS SOIL BOUNDARY
- HSG X HYDROLOGIC SOIL GROUP CLASSIFICATION
- 253C NRCS SOIL MAP UNIT

Soil Data		
Map Unit	Map Unit Name	HSG Rating
253C	Hinckley loamy sand, 8 to 15 percent slopes	A
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	A
275A	Agawam fine sandy loam, 0 to 3 percent slopes	B
718A	Saco Variant silt loam, frequently ponded, 0 to 2 percent slopes, frequently flooded	B/D

PRE-DEVELOPMENT TC LIST				
DRAINAGE AREA	FLOW TYPE	GROUNDCOVER	LENGTH (FT)	SLOPE
E1	SHEET	WOODS: LIGHT UNDERBRUSH	50	9.22%
	SCF	WOODLAND	67	6.51%
	SCF	UNPAVED	15	0.89%
	SCF	WOODLAND	37	4.99%
	SCF	UNPAVED	12	7.76%
	SCF	WOODLAND	55	1.97%
	SCF	WOODLAND	125	16.26%

PRE-DEVELOPMENT WATERSHED PLAN

SCALE: 1" = 50'

0 50' 100'

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FAX: (888) 678–8991
WWW.NEWLEAFENERGY.COM

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www.westonandsampson.com

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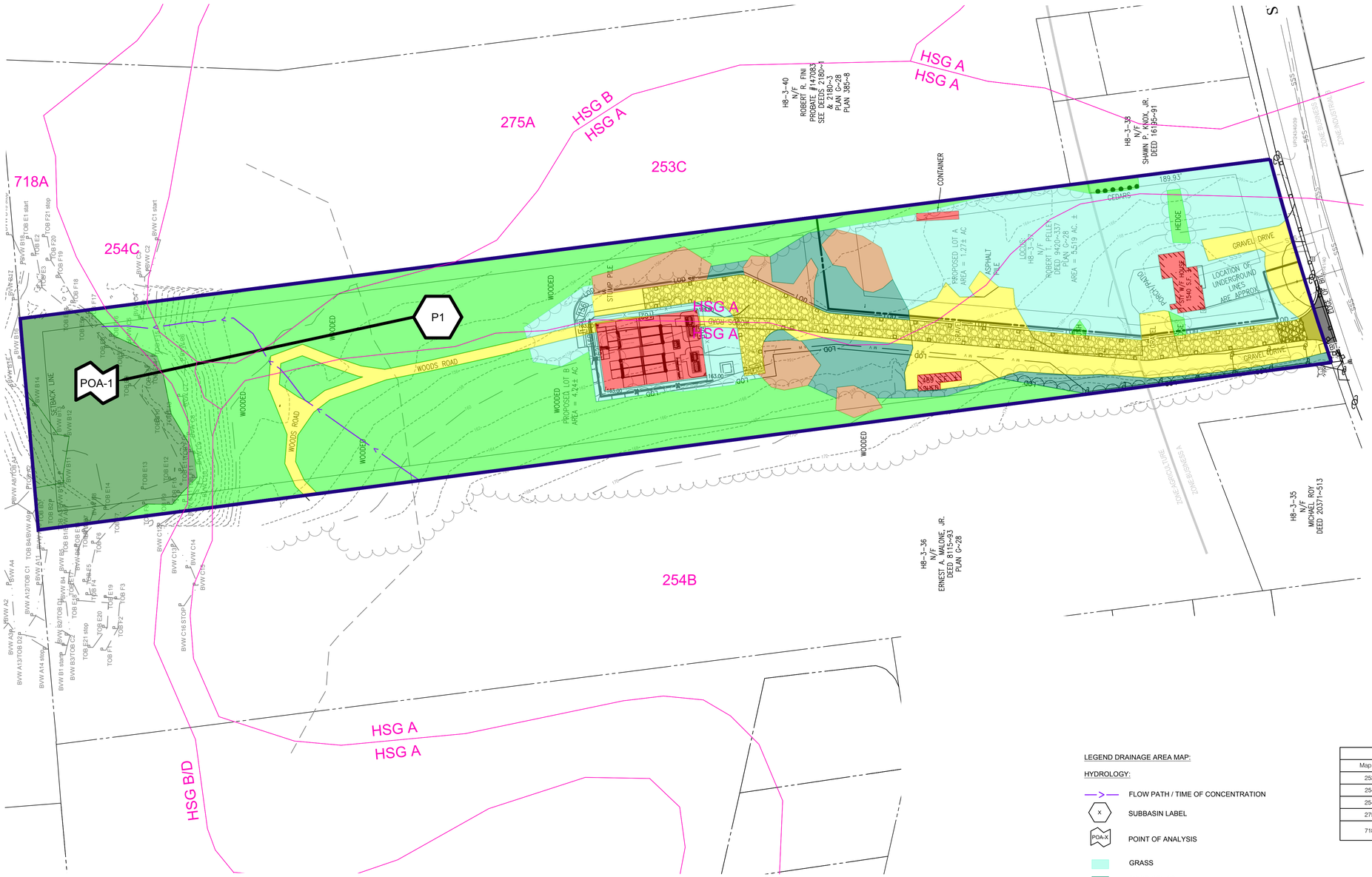
SITE USE PERMIT SET
404 SILVER ST
AGAWAM, MA 01001

PROJECT NUMBER: 120–0339

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
0	10/01/24	RWG	MRC	SITE USE PERMIT SET

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

FIGURE 1
PRE-DEVELOPMENT WATERSHED PLAN



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POST-DEVELOPMENT WATERSHED PLAN

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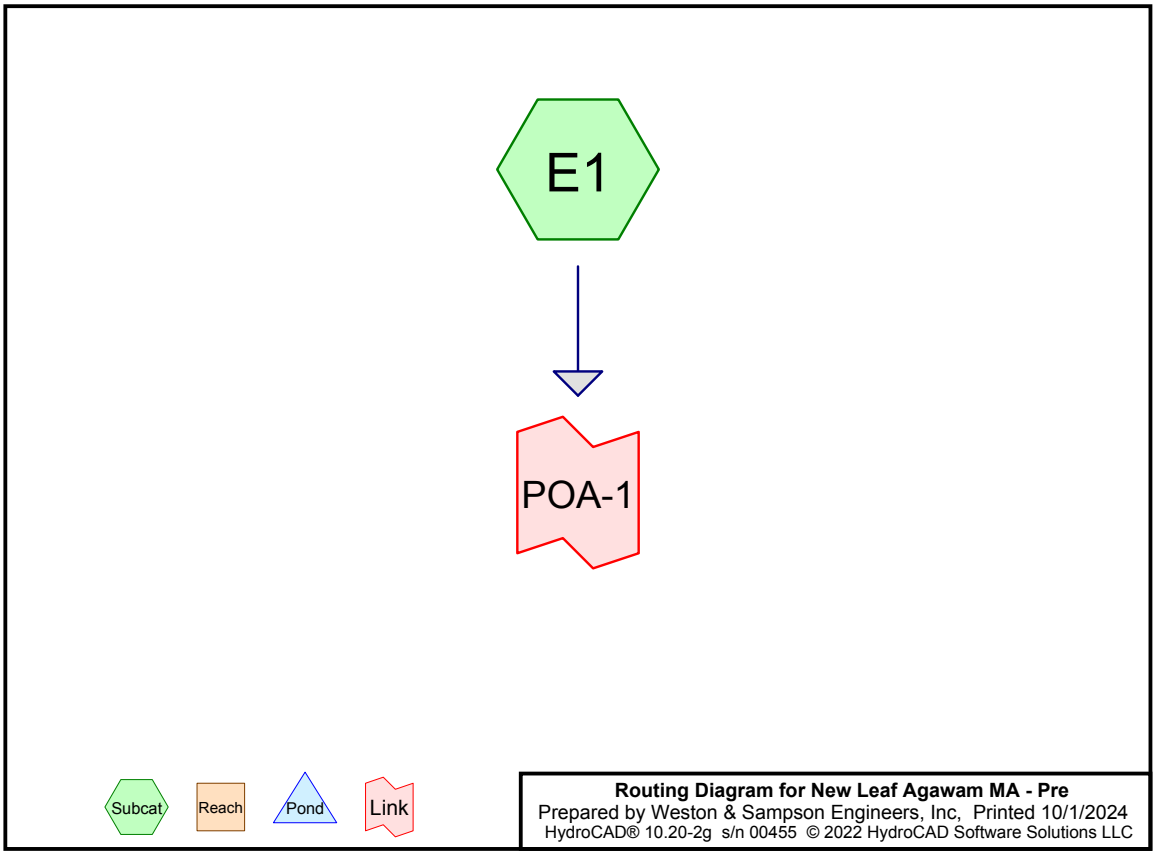
SITE USE PERMIT SET
404 SILVER ST
AGAWAM, MA 01001

PROJECT NUMBER: 120-0339

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
0	10/01/24	RWG	MRC	SITE USE PERMIT SET

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

FIGURE 2
POST-DEVELOPMENT WATERSHED PLAN



Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.21	2
2	10-yr	Type III 24-hr		Default	24.00	1	5.17	2
3	100-yr	Type III 24-hr		Default	24.00	1	8.29	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.960	49	50-75% Grass cover, Fair, HSG A (E1)
0.579	68	<50% Grass cover, Poor, HSG A (E1)
0.263	77	Fallow, bare soil, HSG A (E1)
0.758	76	Gravel roads, HSG A (E1)
0.054	98	Unconnected pavement, HSG A (E1)
2.087	36	Woods, Fair, HSG A (E1)
0.246	60	Woods, Fair, HSG B (E1)
0.008	30	Woods, Good, HSG A (E1)
0.047	55	Woods, Good, HSG B (E1)
0.518	77	Woods, Good, HSG D (E1)
5.519	**55**	**TOTAL AREA**

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Runoff Area=240,415 sf 0.97% Impervious Runoff Depth=0.25"
Flow Length=361' Tc=10.6 min CN=55 Runoff=0.56 cfs 0.117 af

Link POA-1: Inflow=0.56 cfs 0.117 af
Primary=0.56 cfs 0.117 af

Total Runoff Area = 5.519 ac Runoff Volume = 0.117 af Average Runoff Depth = 0.25"
99.03% Pervious = 5.466 ac 0.97% Impervious = 0.054 ac

Summary for Subcatchment E1:

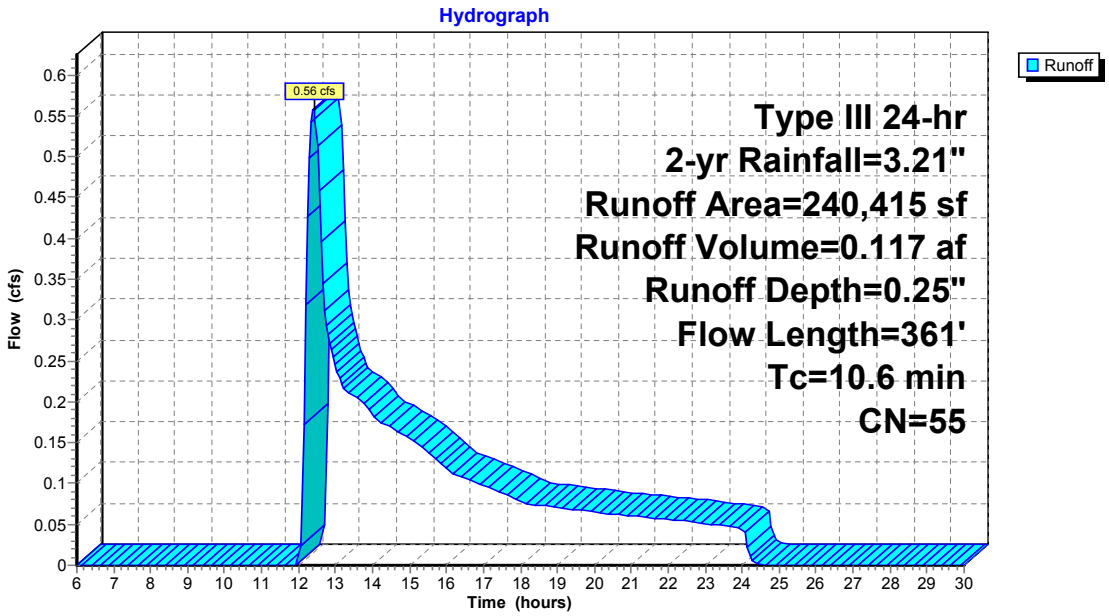
Runoff = 0.56 cfs @ 12.40 hrs, Volume= 0.117 af, Depth= 0.25"
Routed to Link POA-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.21"

Area (sf)	CN	Description
33,033	76	Gravel roads, HSG A
11,450	77	Fallow, bare soil, HSG A
41,811	49	50-75% Grass cover, Fair, HSG A
25,220	68	<50% Grass cover, Poor, HSG A
90,915	36	Woods, Fair, HSG A
337	30	Woods, Good, HSG A
2,333	98	Unconnected pavement, HSG A
10,723	60	Woods, Fair, HSG B
2,033	55	Woods, Good, HSG B
22,560	77	Woods, Good, HSG D
240,415	55	Weighted Average
238,082		99.03% Pervious Area
2,333		0.97% Impervious Area
2,333		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0922	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.21"
0.9	67	0.0651	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	15	0.0651	4.11		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	37	0.0499	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	12	0.0776	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	55	0.0197	0.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	125	0.1626	2.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	361	Total			

Subcatchment E1:

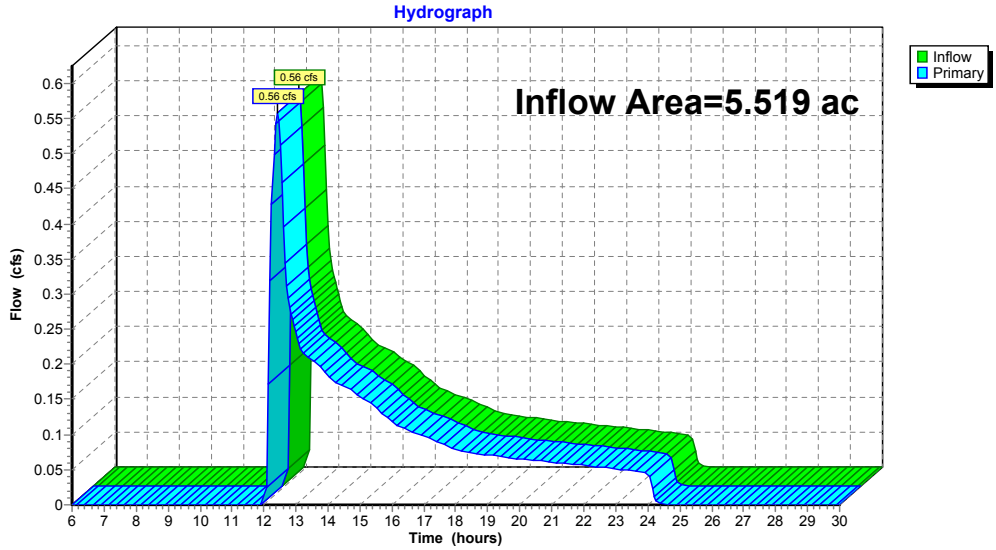


Summary for Link POA-1:

Inflow Area = 5.519 ac, 0.97% Impervious, Inflow Depth = 0.25" for 2-yr event
Inflow = 0.56 cfs @ 12.40 hrs, Volume= 0.117 af
Primary = 0.56 cfs @ 12.40 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Link POA-1:



Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Runoff Area=240,415 sf 0.97% Impervious Runoff Depth=1.07"
Flow Length=361' Tc=10.6 min CN=55 Runoff=4.70 cfs 0.490 af

Link POA-1: Inflow=4.70 cfs 0.490 af
Primary=4.70 cfs 0.490 af

Total Runoff Area = 5.519 ac Runoff Volume = 0.490 af Average Runoff Depth = 1.07"
99.03% Pervious = 5.466 ac 0.97% Impervious = 0.054 ac

Summary for Subcatchment E1:

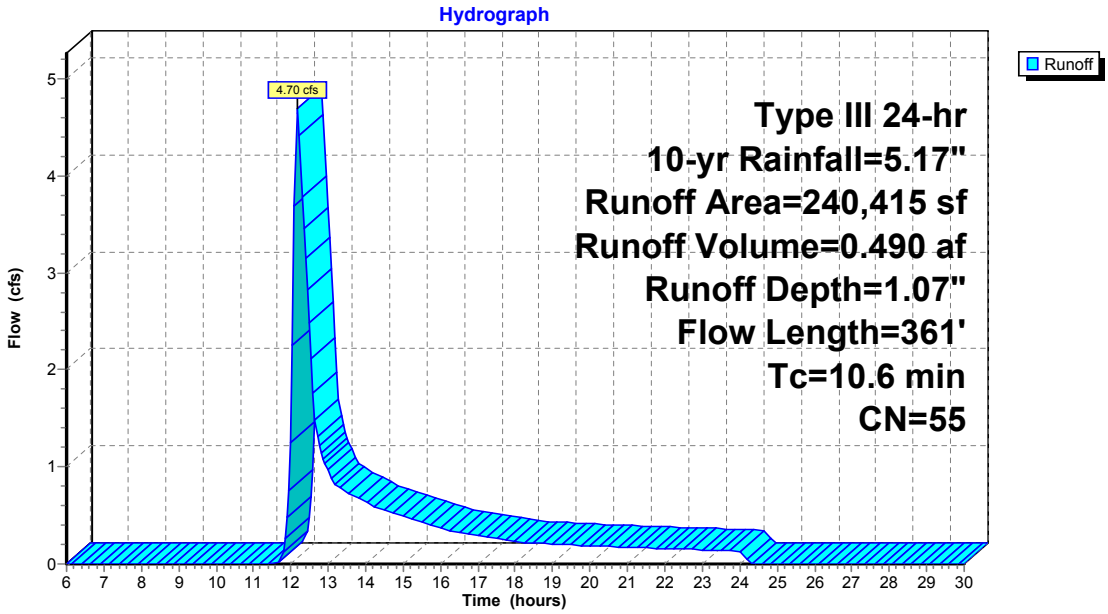
Runoff = 4.70 cfs @ 12.18 hrs, Volume= 0.490 af, Depth= 1.07"
Routed to Link POA-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.17"

Area (sf)	CN	Description
33,033	76	Gravel roads, HSG A
11,450	77	Fallow, bare soil, HSG A
41,811	49	50-75% Grass cover, Fair, HSG A
25,220	68	<50% Grass cover, Poor, HSG A
90,915	36	Woods, Fair, HSG A
337	30	Woods, Good, HSG A
2,333	98	Unconnected pavement, HSG A
10,723	60	Woods, Fair, HSG B
2,033	55	Woods, Good, HSG B
22,560	77	Woods, Good, HSG D
240,415	55	Weighted Average
238,082		99.03% Pervious Area
2,333		0.97% Impervious Area
2,333		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0922	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.21"
0.9	67	0.0651	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	15	0.0651	4.11		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	37	0.0499	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	12	0.0776	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	55	0.0197	0.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	125	0.1626	2.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	361	Total			

Subcatchment E1:

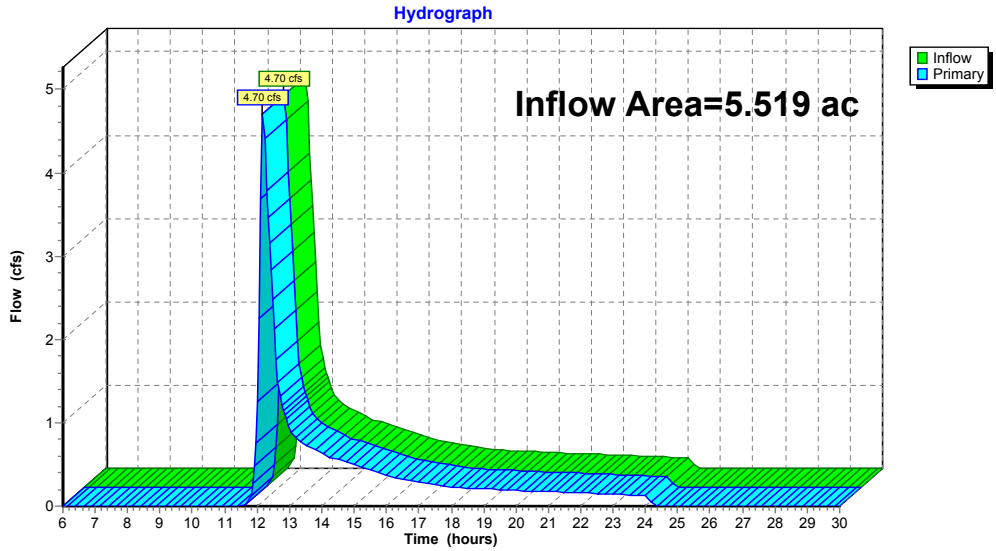


Summary for Link POA-1:

Inflow Area = 5.519 ac, 0.97% Impervious, Inflow Depth = 1.07" for 10-yr event
Inflow = 4.70 cfs @ 12.18 hrs, Volume= 0.490 af
Primary = 4.70 cfs @ 12.18 hrs, Volume= 0.490 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Link POA-1:



Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: Runoff Area=240,415 sf 0.97% Impervious Runoff Depth=2.98"
Flow Length=361' Tc=10.6 min CN=55 Runoff=15.80 cfs 1.372 af

Link POA-1: Inflow=15.80 cfs 1.372 af
Primary=15.80 cfs 1.372 af

Total Runoff Area = 5.519 ac Runoff Volume = 1.372 af Average Runoff Depth = 2.98"
99.03% Pervious = 5.466 ac 0.97% Impervious = 0.054 ac

Summary for Subcatchment E1:

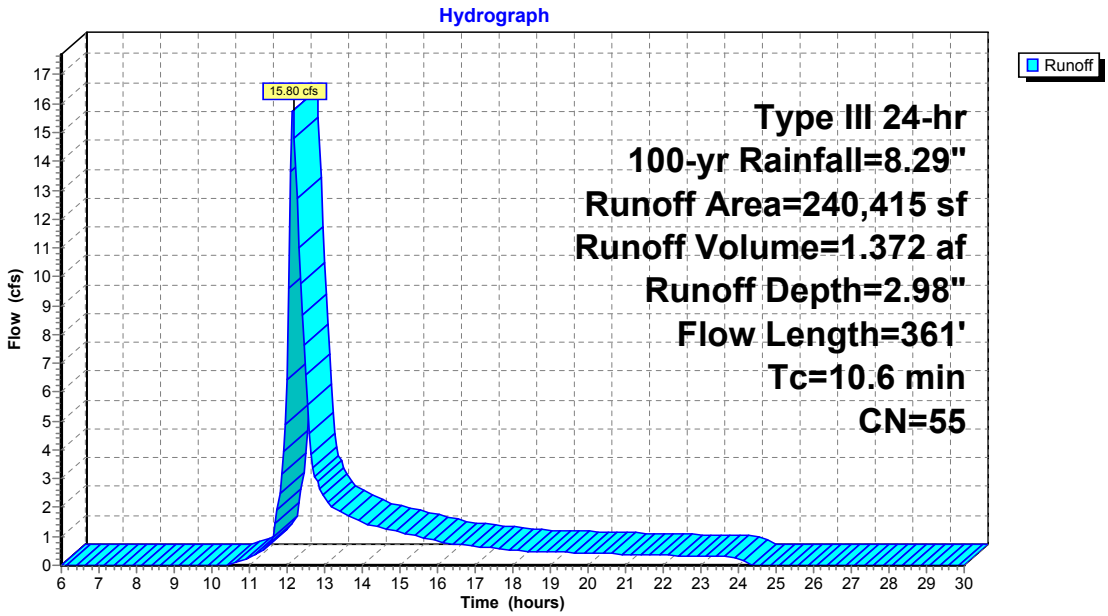
Runoff = 15.80 cfs @ 12.16 hrs, Volume= 1.372 af, Depth= 2.98"
Routed to Link POA-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.29"

Area (sf)	CN	Description
33,033	76	Gravel roads, HSG A
11,450	77	Fallow, bare soil, HSG A
41,811	49	50-75% Grass cover, Fair, HSG A
25,220	68	<50% Grass cover, Poor, HSG A
90,915	36	Woods, Fair, HSG A
337	30	Woods, Good, HSG A
2,333	98	Unconnected pavement, HSG A
10,723	60	Woods, Fair, HSG B
2,033	55	Woods, Good, HSG B
22,560	77	Woods, Good, HSG D
240,415	55	Weighted Average
238,082		99.03% Pervious Area
2,333		0.97% Impervious Area
2,333		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0922	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.21"
0.9	67	0.0651	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	15	0.0651	4.11		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	37	0.0499	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	12	0.0776	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	55	0.0197	0.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	125	0.1626	2.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	361	Total			

Subcatchment E1:

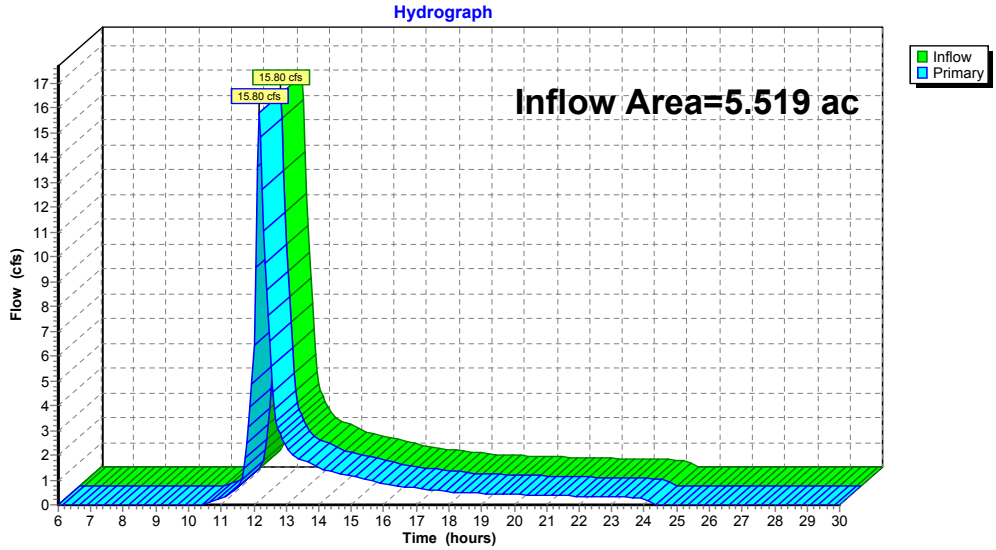


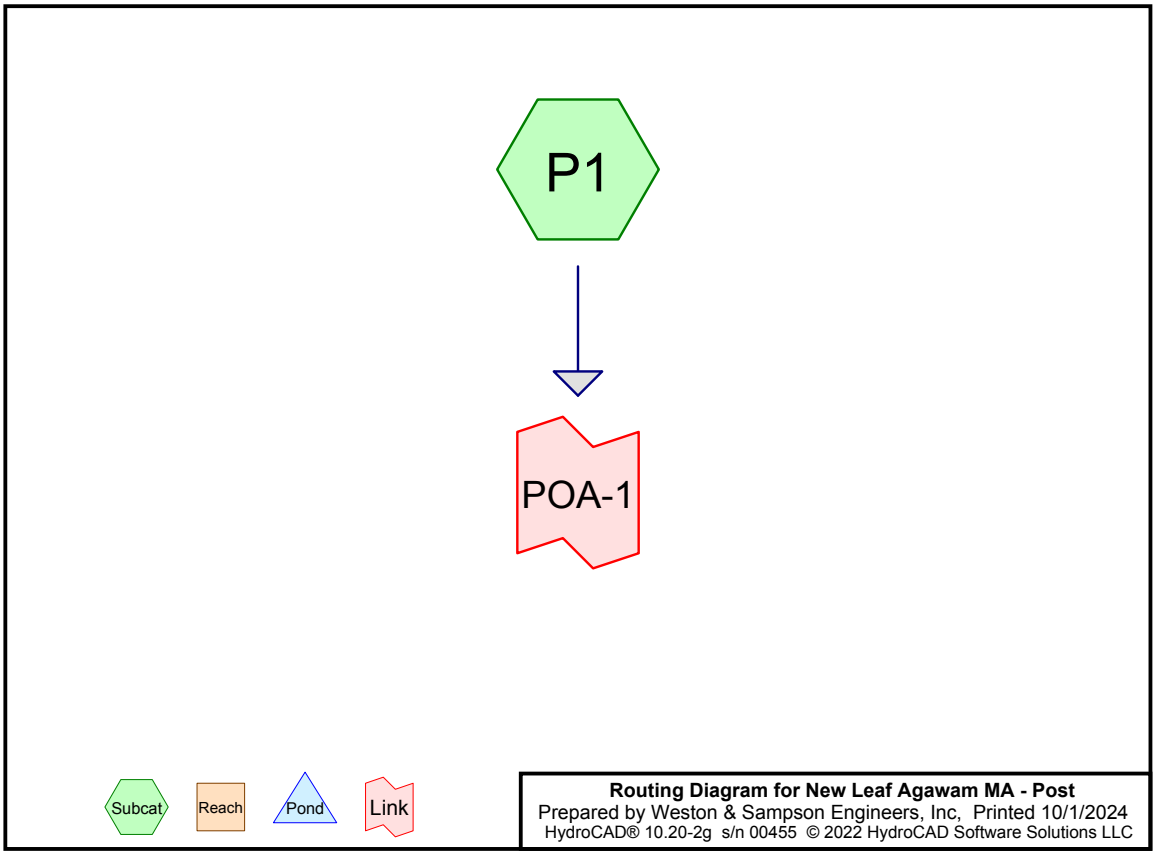
Summary for Link POA-1:

Inflow Area = 5.519 ac, 0.97% Impervious, Inflow Depth = 2.98" for 100-yr event
Inflow = 15.80 cfs @ 12.16 hrs, Volume= 1.372 af
Primary = 15.80 cfs @ 12.16 hrs, Volume= 1.372 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Link POA-1:





Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.21	2
2	10-yr	Type III 24-hr		Default	24.00	1	5.17	2
3	100-yr	Type III 24-hr		Default	24.00	1	8.29	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.113	49	50-75% Grass cover, Fair, HSG A (P1)
0.295	68	<50% Grass cover, Poor, HSG A (P1)
0.217	77	Fallow, bare soil, HSG A (P1)
0.903	76	Gravel roads, HSG A (P1)
0.195	98	Unconnected pavement, HSG A (P1)
1.979	36	Woods, Fair, HSG A (P1)
0.246	60	Woods, Fair, HSG B (P1)
0.008	30	Woods, Good, HSG A (P1)
0.047	55	Woods, Good, HSG B (P1)
0.518	77	Woods, Good, HSG D (P1)
5.519	**56**	**TOTAL AREA**

Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Runoff Area=240,415 sf 3.53% Impervious Runoff Depth=0.25"
Flow Length=361' Tc=10.6 min UI Adjusted CN=55 Runoff=0.56 cfs 0.117 af

Link POA-1: Inflow=0.56 cfs 0.117 af
Primary=0.56 cfs 0.117 af

Total Runoff Area = 5.519 ac Runoff Volume = 0.117 af Average Runoff Depth = 0.25"
96.47% Pervious = 5.325 ac 3.53% Impervious = 0.195 ac

Summary for Subcatchment P1:

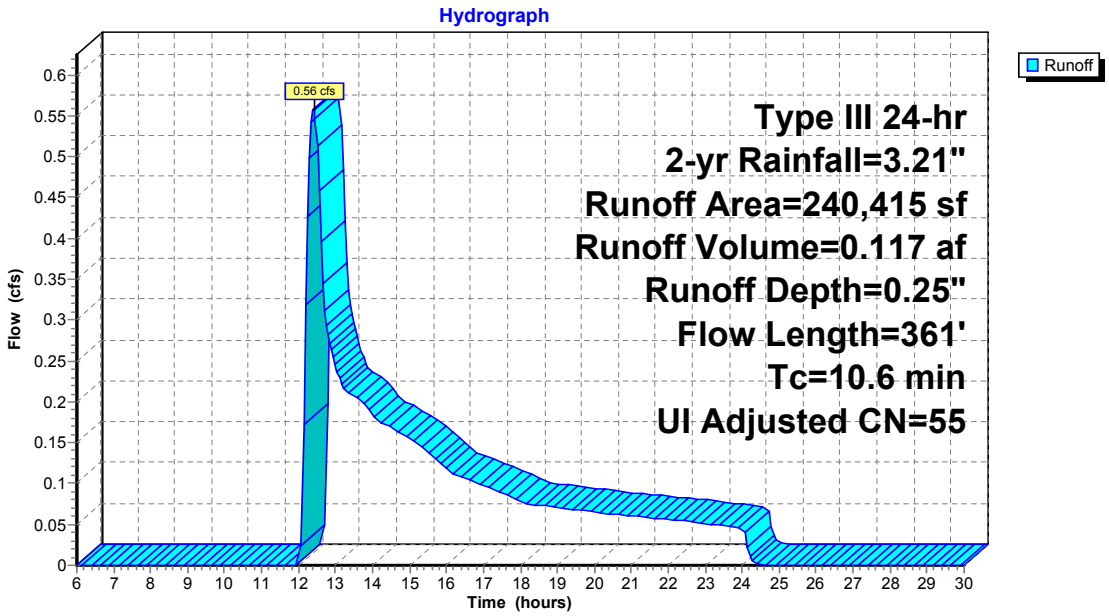
Runoff = 0.56 cfs @ 12.40 hrs, Volume= 0.117 af, Depth= 0.25"
Routed to Link POA-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.21"

Area (sf)	CN	Adj	Description
39,321	76		Gravel roads, HSG A
9,441	77		Fallow, bare soil, HSG A
48,472	49		50-75% Grass cover, Fair, HSG A
12,867	68		<50% Grass cover, Poor, HSG A
86,184	36		Woods, Fair, HSG A
337	30		Woods, Good, HSG A
8,477	98		Unconnected pavement, HSG A
10,723	60		Woods, Fair, HSG B
2,033	55		Woods, Good, HSG B
22,560	77		Woods, Good, HSG D
240,415	56	55	Weighted Average, UI Adjusted
231,938			96.47% Pervious Area
8,477			3.53% Impervious Area
8,477			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0922	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.21"
0.9	67	0.0651	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	15	0.0651	4.11		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	37	0.0499	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	12	0.0776	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	55	0.0197	0.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	125	0.1626	2.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	361	Total			

Subcatchment P1:

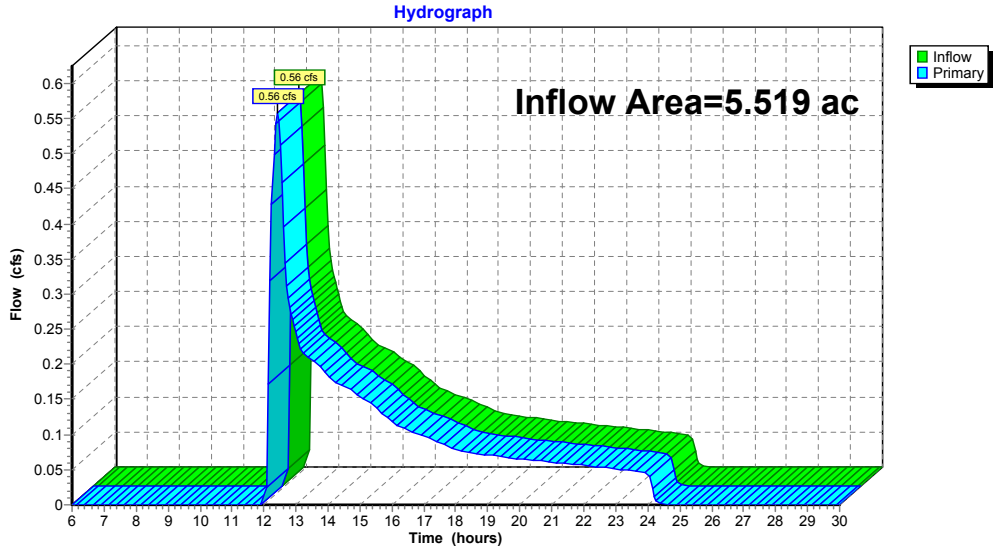


Summary for Link POA-1:

Inflow Area = 5.519 ac, 3.53% Impervious, Inflow Depth = 0.25" for 2-yr event
Inflow = 0.56 cfs @ 12.40 hrs, Volume= 0.117 af
Primary = 0.56 cfs @ 12.40 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Link POA-1:



Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Runoff Area=240,415 sf 3.53% Impervious Runoff Depth=1.07"
Flow Length=361' Tc=10.6 min UI Adjusted CN=55 Runoff=4.70 cfs 0.490 af

Link POA-1: Inflow=4.70 cfs 0.490 af
Primary=4.70 cfs 0.490 af

Total Runoff Area = 5.519 ac Runoff Volume = 0.490 af Average Runoff Depth = 1.07"
96.47% Pervious = 5.325 ac 3.53% Impervious = 0.195 ac

Summary for Subcatchment P1:

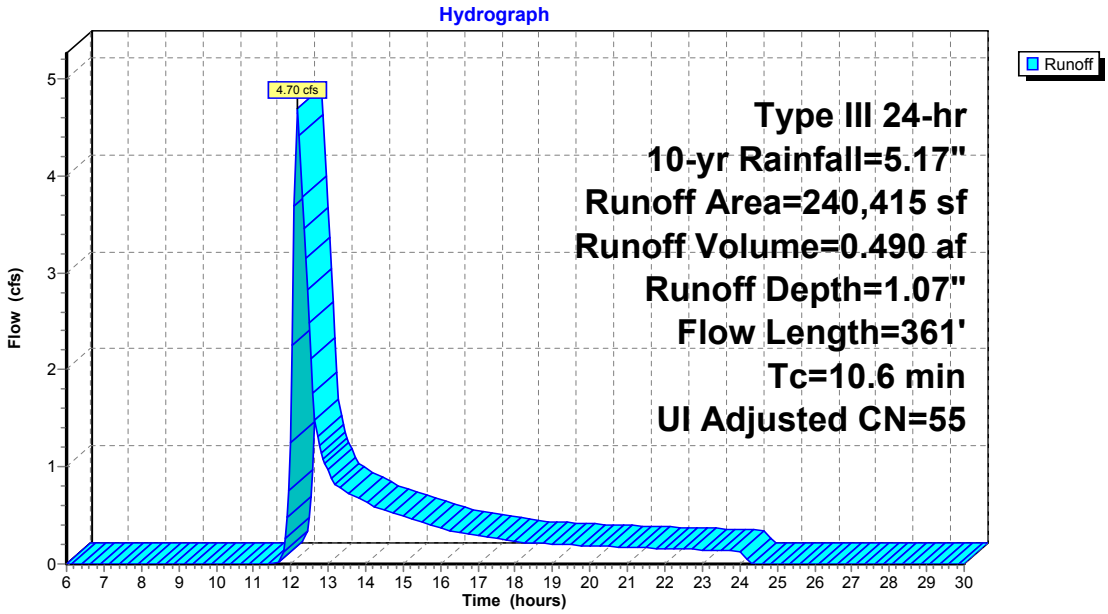
Runoff = 4.70 cfs @ 12.18 hrs, Volume= 0.490 af, Depth= 1.07"
Routed to Link POA-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.17"

Area (sf)	CN	Adj	Description
39,321	76		Gravel roads, HSG A
9,441	77		Fallow, bare soil, HSG A
48,472	49		50-75% Grass cover, Fair, HSG A
12,867	68		<50% Grass cover, Poor, HSG A
86,184	36		Woods, Fair, HSG A
337	30		Woods, Good, HSG A
8,477	98		Unconnected pavement, HSG A
10,723	60		Woods, Fair, HSG B
2,033	55		Woods, Good, HSG B
22,560	77		Woods, Good, HSG D
240,415	56	55	Weighted Average, UI Adjusted
231,938			96.47% Pervious Area
8,477			3.53% Impervious Area
8,477			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0922	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.21"
0.9	67	0.0651	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	15	0.0651	4.11		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	37	0.0499	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	12	0.0776	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	55	0.0197	0.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	125	0.1626	2.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	361	Total			

Subcatchment P1:

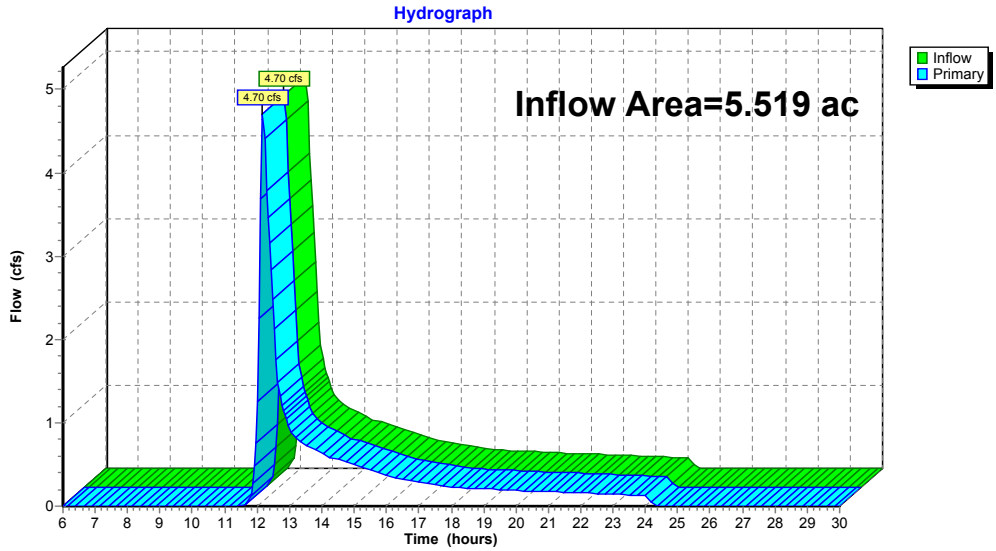


Summary for Link POA-1:

Inflow Area = 5.519 ac, 3.53% Impervious, Inflow Depth = 1.07" for 10-yr event
Inflow = 4.70 cfs @ 12.18 hrs, Volume= 0.490 af
Primary = 4.70 cfs @ 12.18 hrs, Volume= 0.490 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Link POA-1:



Time span=6.00-30.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: Runoff Area=240,415 sf 3.53% Impervious Runoff Depth=2.98"
Flow Length=361' Tc=10.6 min UI Adjusted CN=55 Runoff=15.80 cfs 1.372 af

Link POA-1: Inflow=15.80 cfs 1.372 af
Primary=15.80 cfs 1.372 af

Total Runoff Area = 5.519 ac Runoff Volume = 1.372 af Average Runoff Depth = 2.98"
96.47% Pervious = 5.325 ac 3.53% Impervious = 0.195 ac

Summary for Subcatchment P1:

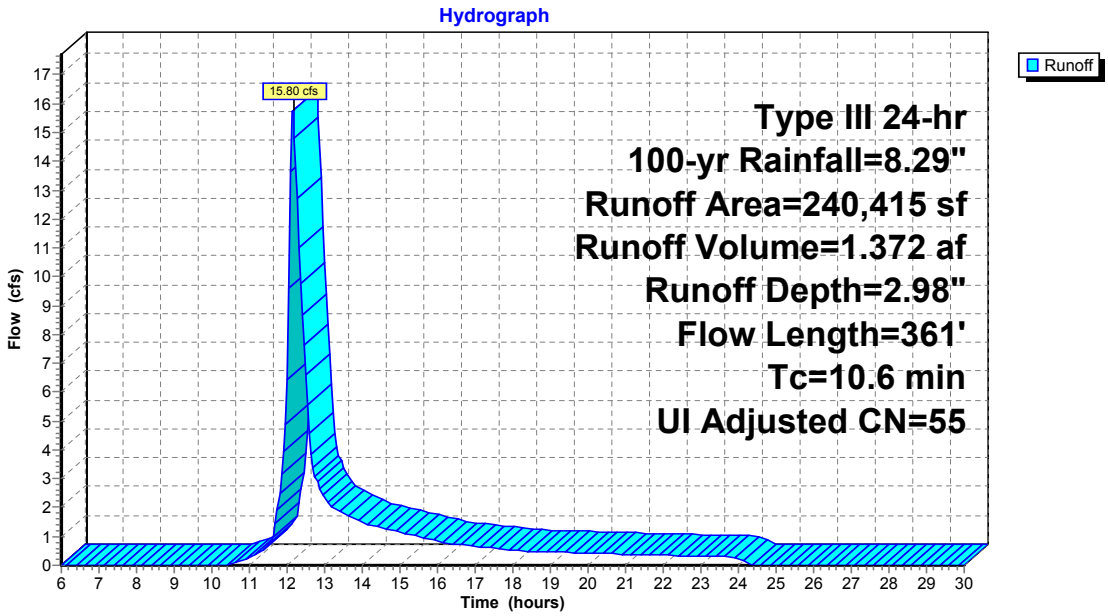
Runoff = 15.80 cfs @ 12.16 hrs, Volume= 1.372 af, Depth= 2.98"
Routed to Link POA-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.29"

Area (sf)	CN	Adj	Description
39,321	76		Gravel roads, HSG A
9,441	77		Fallow, bare soil, HSG A
48,472	49		50-75% Grass cover, Fair, HSG A
12,867	68		<50% Grass cover, Poor, HSG A
86,184	36		Woods, Fair, HSG A
337	30		Woods, Good, HSG A
8,477	98		Unconnected pavement, HSG A
10,723	60		Woods, Fair, HSG B
2,033	55		Woods, Good, HSG B
22,560	77		Woods, Good, HSG D
240,415	56	55	Weighted Average, UI Adjusted
231,938			96.47% Pervious Area
8,477			3.53% Impervious Area
8,477			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0922	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.21"
0.9	67	0.0651	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	15	0.0651	4.11		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	37	0.0499	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	12	0.0776	4.48		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	55	0.0197	0.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	125	0.1626	2.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.6	361	Total			

Subcatchment P1:

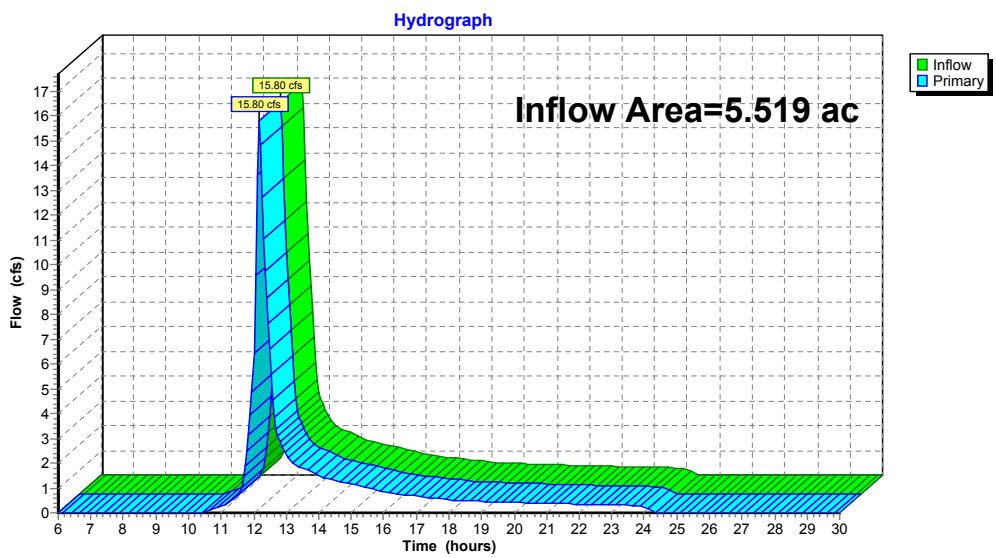


Summary for Link POA-1:

Inflow Area = 5.519 ac, 3.53% Impervious, Inflow Depth = 2.98" for 100-yr event
Inflow = 15.80 cfs @ 12.16 hrs, Volume= 1.372 af
Primary = 15.80 cfs @ 12.16 hrs, Volume= 1.372 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 6.00-30.00 hrs, dt= 0.05 hrs

Link POA-1:



Attachment D - Supporting Calculations

Silver Street Energy Storage, LLC
c/o New Leaf Energy, Inc.
Agawam, MA

Peak Rate Attenuation

OFF-SITE SUMMARY		FLOW			VOLUME		
Point of Analysis	24-hour Storm Event	Existing Peak Runoff (cfs)	Proposed Peak Runoff (cfs)	Difference in Peak Runoff (cfs)	Existing Discharge Volume (af)	Proposed Discharge Volume (af)	Difference in Volume (af)
POA - 1	2	0.6	0.6	0.0			
	10	4.7	4.7	0.0			
	100	15.8	15.8	0.0	1.4	1.4	0.0

Attachment E - Stormwater Operation & Maintenance Plan

1.0 Introduction

The following document has been written to comply with the stormwater guidelines set forth by the Massachusetts Department of Environmental Protection (MassDEP) and the Water & Sewer Ordinance section of the Town of Agawam Code. The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

2.0 Purpose

This Stormwater Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of the BMP installed on the project site. Included in this O&M Plan is a description and an inspection form for the BMP type.

Silver Street Energy Storage, LLC, c/o New Leaf Energy, Inc. is the owner and operator of the system and are responsible for its upkeep and maintenance. This work will be funded on an annual basis through the owner's operating budget.

Owner/Operator:
Silver Street Energy Storage, LLC
c/o New Leaf Energy, Inc.
55 Technology Drive #102
Lowell, MA 01851
(978) 995-3054
wperegoy@newleafenergy.com

3.0 BMP Descriptions and Locations

3.1 Riprap Swale

There is a proposed swale along the western edge of the equipment pads that will collect stormwater runoff from the equipment pad area.

4.0 Inspection, Maintenance Checklist and Schedule

All inspection and maintenance of the stormwater BMP should be in accordance with Volume 2 Chapter 2: Structural BMP Specifications for the Massachusetts Stormwater Handbook.

4.1 Riprap Swale

Riprap Swales are to be inspected once every three months during the first year and semi-annually thereafter. Inspect the side slopes for signs of erosion and formation of rills and gullies. Inspect for sediment buildup and use hand methods when cleaning to minimize disturbance to underlying soils. Remove accumulated trash and debris as necessary, at least once per year.

INSPECTION CHECKLIST SHEET

☐ Riprap Swale

Frequency: Inspect swale once every three months during the first year, and semi-annually thereafter.

Structure No: _____

Inspected By: _____ Date: _____

Observations: _____

_____

_____

Actions Taken: _____

_____

_____

Instructions: Inspect the side slopes for signs of erosion and formation of rills and gullies. Use hand methods when cleaning to minimize disturbance to vegetation and underlying soils. Remove accumulated trash and debris as necessary, at least once per year.

Attachment F - Construction Period Pollution and Erosion and Sedimentation Plan

SECTION 1: Introduction

The project applicant proposes construction of a battery energy storage system (BESS) with associated site improvements located at 404 Silver Street in Agawam, Massachusetts.

As part of this project, this "Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan" has been created to minimize erosion and sedimentation during the implementation of the project.

SECTION 2: Construction Period Pollution Prevention Measures

Best Management Practices (BMPs) will be utilized as Construction Period Pollution Prevention Measures to reduce potential pollutants and prevent any off-site discharge. The objectives of the BMPs for construction activity are to minimize the disturbed areas, stabilize any disturbed areas, control the site perimeter, and retain sediment. Non-stormwater best management measures will be used to minimize site disturbance and ensure compliance with the performance standards of the Wetlands Protection Act and Stormwater Standards. Measures will be taken to minimize the area disturbed by construction activities to reduce the potential for soil erosion and stormwater pollution problems. In addition, good housekeeping measures will be followed for the day-to-day operation of the construction site under the control of the contractor to minimize the impact of construction. This section describes the control practices that will be in place during construction activities. Recommended control practices will comply with the standards set in the MA DEP Stormwater Policy Handbook.

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

To minimize disturbed areas, work will be completed within well-defined work limits. These work limits are shown on the construction plans. The Contractor will not disturb native vegetation in the undisturbed wetland areas. The Contractor will be responsible to make sure that their workers and any subcontractors know the proper work limits and do not extend their work into the undisturbed areas. The protective measures are described in more detail in the following sections.

2.2 Control Stormwater Flowing onto and through the Project

Construction areas adjacent to wetland resources will be lined with silt fence sediment barriers. The barriers will be inspected at least once every 7 calendar days, or every 14 calendar days and within 24 hours of a storm event of 0.25 inches or greater, and accumulated silt will be removed as needed.

2.3 Stabilize Soils

The Contractor should limit the area of land which is exposed and unvegetated during construction. The Contractor should follow the seeding requirements outlined on the plans and will be responsible for maintaining the seeded areas until final acceptance is received. Final acceptance after 90 days following construction, or until the site reaches 70% stabilization, whichever is longer.

2.4 Proper Storage and Cover of Any Stockpiles

The location of the Contractor's storage areas for equipment and/or materials should be upon cleared portions of the job site or areas to be cleared as a part of this project, outside of wetlands and wetland buffer areas.

Adequate measures for erosion and sediment control such as the placement of straw wattle sediment barriers around the downstream perimeter of stockpiles will be employed to protect any downstream areas from siltation.

There will be no storage of equipment or materials in areas designated as wetlands.

2.5 Perimeter Controls and Sediment Barriers

Silt fence (as detailed in the site plans) will be utilized to ensure that sedimentation does not occur outside the perimeter of the work area. Straw wattle (as detailed in the site plans) will be utilized to ensure that sediment does not disperse from stockpile areas.

2.6 Storm Drain Inlet Protection

There are no storm drains in the work area.

2.7 Retain Sediment On-Site

The Contractor will be responsible for monitoring erosion control measures. Whenever necessary, the Contractor will clear sediment from the silt fence sediment barriers that have been silted up during construction. Inspections must be documented using the attached Monitoring Form.

2.8 Material Handling and Waste Management

Materials stored on-site will be stored in a neat, orderly manner in appropriate containers. Materials will be kept in their original containers with the original manufacturer's label. Substances will not be mixed with one another unless recommended by the manufacturer.

Waste materials will be collected and stored in a securely lidded metal container from a licensed management company. The waste and any construction debris from the site will be hauled off-site and disposed of properly. The contractor will be responsible for waste removal. Manufacturer's recommendations for proper use and disposal will be followed for materials. If portable sanitary waste facilities will be used on-site, sanitary waste will be collected from the units a minimum of once a week, by a licensed sanitary waste management contractor.

2.9 Designated Washout Areas

The Contractor shall only perform equipment washout in the designated area shown on the plans.

2.10 Proper Equipment/Vehicle Fueling and Maintenance Practices

On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage. To ensure that leaks from stored equipment do not contaminate the site, oil-absorbing mats will be placed under oil-containing equipment during storage. Regular fueling and service of the equipment may be performed using approved methods and with care taken to minimize chance of spills. Repair of equipment or machinery within the 100' water resources area is not allowed. Any petroleum products will be stored in tightly sealed containers that are clearly labeled with spill control pads/socks placed under/around their perimeters.

2.11 Equipment/Vehicle Washing

The Contractor will be responsible to ensure that no equipment is washed on-site.

SECTION 3: Spill Prevention and Control Plan

The Contractor will be responsible for preventing spills in accordance with the project drawings and applicable federal, state, and local regulations. The Contractor will identify a properly trained site employee, involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted on-site. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

3.1 Spill Control Equipment

Spill control/containment equipment will be kept in the work area. Materials and equipment necessary for spill cleanup will be kept either in the work area or in an otherwise accessible on-site location. Equipment and materials will include, but not be limited to, absorbent booms/mats, brooms, dust pans, mops, rags, gloves, sand, plastic and metal containers specifically for this purpose. It is the responsibility of the Contractor to ensure the inventory will be readily accessible and maintained.

3.2 Notification

Workers will be directed to inform the on-site supervisor of a spill event. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures. Primary notification of a spill should be made to the local Fire Department and Police Departments. Secondary Notification will be to the certified cleanup contractor if deemed necessary by Fire and/or Police personnel. The third level of notification (within 1 hour), if required, is to the DEP or municipality's Licensed Site Professional (LSP) if the spill exceeds the reportable quantity for the material spilt. The specific cleanup contractor to be used will be identified by the Contractor prior to commencement of construction activities.

3.3 Spill Containment and Clean-Up Measures

Spills will be contained with granular sorbent material, sand, sorbent pads, booms or all of the above to prevent spreading. Certified cleanup contractors should complete spill cleanup. The material manufacturer's recommended methods for spill cleanup will be clearly posted and on-site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

3.4 Hazardous Materials Spill Report

The Contractor will report and record any spill. The spill report will present a description of the release, including the quantity and type of material, date of the spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

This document does not relieve the Contractor of the Federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302 and the State requirements specified under the Massachusetts Contingency Plan (M.C.P) relating to spills or other releases of oils or hazardous substances. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a twenty-four (24) hour period, the Contractor is required to comply with the response requirements of the above mentioned regulations. Spills of oil or hazardous material in excess of the reportable quantity will be reported to the National Response Center (NRC).

SECTION 4: Contact Information/Responsible Parties

Owner/Operator:
Silver Street Energy Storage, LLC
c/o New Leaf Energy, Inc.
55 Technology Drive, Suite 102
Lowell, MA 01851
978-995-3054
wperegoy@newleafenergy.com

Engineer:
Rob Bukowski, PE
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978-532-1900
Bukowski.rob@wseinc.com

Site Inspector:
TBD

Contractor:
TBD

SECTION 5: Erosion and Sedimentation Control

Erosion and Sedimentation Control features can be found in the attached project plans which include specifications for installation and monitoring control devices.

SECTION 6: Site Development Plan

The proposed site development plan is included in the attached plans.

SECTION 7: Operation and Maintenance of Erosion Control

The erosion control measures will be installed as detailed in project plans. If there is a failure of the controls, the Contractor is required to stop work until the failure is repaired.

Periodically throughout the work, the sediment that has been deposited against the controls will be removed to ensure that the controls are working properly.

SECTION 8: Inspection Schedule

During construction, the erosion and sedimentation controls will be inspected at least once every 7 calendar days, or once every 14 calendar days and within 24 hours of the end of a storm event of 0.25 inches or greater. Once the Contractor is selected, an on-site inspector will be identified to ensure that erosion and sedimentation controls are in place and working properly. A Monitoring Form is included for use by the on-site inspector.

Monitoring Form

Inspected By:_____ Date: _____Time:_____

YES	NO	DOES NOT APPLY	ITEM
			Do any erosion/siltation control measures require repair or clean out to maintain adequate function?
			Is there any evidence that sediment is leaving the site and entering the wetlands?
			Are any temporary soil stockpiles or construction materials located in non-approved areas?
			Are on-site construction traffic routes, parking, and storage of equipment and supplies located in areas not specifically designed for them?
			Are storage of fuels located outside of resource areas and associated buffer zones? Are fuels stored in proper storage containers?

Specific location, current weather conditions, and action to be taken:

_____

_____

_____

_____

_____

Other Comments:

_____

_____

_____

Pending the actions noted above I certify that the erosion and sedimentation controls at the site are in compliance with the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan.

Signature:_____ Date: _____

Attachment G - Owner Certification Statement

OWNER CERTIFICATION SATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete."

Name: William Peregoy

Signature: William Peregoy

box SIGN 1787Q534-4P7KPY53

Date: Sep 24, 2024

EXHIBIT F

Date: Aug 10, 2024

To Whom It May Concern

New Leaf Energy, Inc. and its employees and affiliates are hereby authorized to act as our agent for submission of applications and related plans and documents, and to appear before boards and other officials, with respect to obtaining approvals for solar installations and/or energy storage systems to be constructed on my property located at 404 Silver Street – Agawam, MA.

Sincerely,

box SIGN 4Q2JZQ2V-1XX2ZKP6

Robert T. Pelley

box SIGN 4Q2JZQ2V-1XX2ZKP6

Deborah A. Pelley

Taryn Egerton

From: Derek Myers
Sent: Wednesday, October 2, 2024 3:29 PM
To: Taryn Egerton
Subject: RE: Site Plan Review - 404 Silver Street

Taryn,
The swept path analysis submitted for this project does not get the fire department access around the entire ESS area. It shows the fire truck making a 3 point turn which is not compliant for a successful swept path. That also being said, we are also getting a new fire truck that has different specifications to this swept path. I will submit them to you as soon as I hear back from the vendor. Thank you

If you have any question please feel free to contact this office at (413)786-0657

Derek Myers
Fire Inspector
Agawam Fire Department
afdinsp@agawam.ma.us
(413)786-0657

From: Taryn Egerton <TEgerton@agawam.ma.us>
Sent: Wednesday, October 2, 2024 3:13 PM
To: All_Engineering Department <All_Eng_Dept@agawam.ma.us>; Brian Machos <BMachos@agawam.ma.us>; Derek Myers <afdinsp@agawam.ma.us>; Kevin Duquette <inspections@agawam.ma.us>
Cc: Pamela Kerr <PKerr@agawam.ma.us>; Stefanie Kesecker <SKesecker@agawam.ma.us>
Subject: Site Plan Review - 404 Silver Street

Hello,
Please review the attached and provide a memo prior to the October 17th Planning Board meeting. The Site Plan starts on page 12 of the PDF.

Thank you.

Taryn Egerton
Assistant Planner and Conservation Officer
Office of Planning and Community Development

413.726.9737 | tegerton@agawam.ma.us

TOWN OF Agawam MASSACHUSETTS

Taryn Egerton

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To: Taryn Egerton
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Thank you.

Taryn Egerton
Assistant Planner and Conservation Officer
Office of Planning and Community Development

413.726.9737 | tegerton@agawam.ma.us

TOWN OF Agawam MASSACHUSETTS

Site Plan Approval Application

Proposed Building Reuse

Project Location:

195 South Westfield Street
Agawam, Massachusetts 01001
(Assessor's Parcel ID: E8-3-10)

Submitted To:

Town of Agawam Planning Board
36 Main Street
Agawam, Massachusetts 01001

Applicant & Property Owner:

Ahmad Aljanabi
133 Upper Beverly Hills
West Springfield, Massachusetts 01089

RLA Project File No. 230917

August 22, 2024

R LEVESQUE ASSOCIATES, INC.

A LAND PLANNING SERVICES COMPANY

40 School Street, Westfield, MA 01085

p 413.568.0985 · f 413.568.0986 · www.rlaland.com

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2. ADMINISTRATIVE FORMS
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   2.2 SITE PLAN APPROVAL APPLICATION – FORM D
3. PROJECT NARRATIVE
4. LOCUS MAP
5. DEED REFERENCE

LIST OF APPENDICES

APPENDICES

APPENDIX A: SITE PLAN

I. COVER LETTER

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

August 22, 2024

Violet Baldwin, Chairperson
Town of Agawam Planning Board
36 Main Street
Agawam, Massachusetts 01001

RE: Site Plan Approval – Proposed Building Reuse
195 South Westfield Street
Agawam, Massachusetts 01001
(Assessor's Parcel ID: E8-3-10)
RLA Project File No. 230917

Dear Chairperson Baldwin and Board Members:

On behalf of the applicant and property owner, Mr. Ahmad Aljanabi, please find the requisite number of copies of a Site Plan Approval application, supporting documentation, and associated site plan set for the above-referenced project. The applicant proposes the reuse of the existing building to be used for office space for a Foster Care facility and an automotive repair garage.

As required, a copy of this Site Plan Approval submission has been submitted electronically via email to the Town of Agawam Planning Department.

We are requesting to be placed on the Planning Board's next available agenda. Should you have any questions or comments regarding this submission, please do not hesitate to contact our office at your earliest convenience.

Sincerely,
R LEVESQUE ASSOCIATES, INC.

Nina Fazio

Nina Fazio
Permitting Coordinator

cc: Ahmad Aljanabi

2. ADMINISTRATIVE FORMS

2.1 ZONING DETERMINATION

2.2 SITE PLAN APPROVAL APPLICATION – FORM D

The Commonwealth of Massachusetts

Town of Agawam

Inspection Services - Building Department

1000 Suffield Street, Agawam MA 01001 – (413) 821-0632

OFFICE ONLY
Date Filed:

RECEIVED BY
INSPECTION SERVICES
MAR - 1 2023
TOWN OF AGAWAM

Application for Zoning Determination

FILING INSTRUCTIONS: Deliver this form (no fee required) to Inspection Services.
For digital submissions, please confirm receipt. A *complete* application will be processed within 30 days.
The applicant must pick-up, or arrange for the receipt of, this processed form.

1) PROPERTY INFORMATION			
a. Street Address	195 S Westfield St	**b. Zoning District**	Bus A
c. Assessor's Map	E8 3-10	**d. Lot(s)**	
e. Registry of Deeds Book		**f. Page**	
g. Overlay Districts	☐Historic Preservation ☐ Mixed-Use Business C		
h. Previous Special Permits, Site Plan Approvals, Findings or Variances Issued for this Site			

2) APPLICANT & OWNER INFORMATION			
a. Applicant Name	Ahmed Aljanabi	**b. Applicant Phone**	413-314-7566
c. Applicant Email			
d. Applicant Mailing Address	133 upper beverly hills 01089		
e. Applicant Relationship to Property	☑Owner ☐ Agent ☐Other:		
f. Representative Name *(if any)*		**g. Rep. Phone**	
h. Rep. Email			
i. Owner Mailing Address			
j. Owner Name *(if different)*		**k. Owner Phone**	
l. Owner Email			
m.Owner Mailing Address			

3) PROJECT & SITE DETAILS
NOTE: Any omission of requested information may result in an INCOMPLETE determination

	Existing		*Proposed* ☑ *No changes to building, site or lot*		-FOR BUILDING DEPT. REVIEW- REQUIRED / NCU	
a. Lot Size	SF		SF		LOT SIZE	☐
b. Frontage	FT		FT		FRONTAGE	☐
c. Front Lot Line	FT		FT		FRONT SB	☐
d. Side Lot Line (Left/Right)	L: FT	R: FT	L: FT	R: FT	SIDE SB	☐
e. Rear Lot Line	FT		*FT*		REAR SB	☐
f. Building Height	FT		FT		BLDG HT	☐
g. Total BLDG/Res Area	SF	SF	SF	SF	AREA LIM	☐
h. BLDG Coverage (Footprint)	SF	% of lot	SF	% of lot	LOT COVER	☐
i. Impervious Coverage	SF	% of lot	SF	% of lot	IMPERVIOUS	☐
j. Parking/Loading Spaces	P:	L:	P:	L:	PARKING	☐
k. Bicycle/EV Charge Spaces	B:	EV:	B:	EV:	BIKE/EV	☐
l. Signs (Size & Type)	x	T:	x	T:	SIGNS	☐
m. Fence (Size & Type)	LIN FT	T:	LIN FT	T:		
n. Wetland Area	SF		SF			
o. Utility Services	☐ Town Water	☐ Town Sewer	☐ Town Water	☐ Town Sewer	NON-CONFORMING USE	☐

p. Current Use of Property	Vacant
q. Proposed Use of Property	Auto repair
r. Project Description	
Auto repair	

s. I have attached additional narrative, plans or supporting materials *(any oversize plans should also be included in an 8.5 x 11" format)*	☐ Yes ☑ No
t. Work is proposed in or within 100' of a wetland or 200' of a stream/river, or construction will occur within the Floodplain district. ***If so, CONSERVATION COMMISSION review is required.***	☐ Yes ☐ No ☑ Unsure
u. The following projects shall be required to comply with the requirements of a STORM DRAIN PERMIT: **[1] Any alteration to sites on parcels of one acre or greater.** **[2] Any alteration to individual lots less than one acre, but which are contiguous or are deemed part of a common project which is one acre or greater.**	☐ Yes ☑ No ☐ Unsure
v. The project will affect at least one of the following; additional gross floor area by 2,000 square feet, any change of use, changes to parking and/ or curb cuts.	☐ Yes ☑ No

4) CERTIFICATION

This determination is based only on the information provided, which I represent as accurate. The issuance of a Zoning Determination does not relieve the Applicant of the responsibility to obtain other zoning or non-zoning permits, as may be required, and this determination is based on the zoning in effect at the issue date and grants no protection from any pending or future zoning changes. Additional information may be requested and required to properly process this form. Any non-zoning related comments provided are cursory in nature; Applicants should follow-up with appropriate Town Departments. ***Sec. 1-7 of the Town of Agawam's General Ordinances authorizes the denial of a license or permit where an outstanding debt or obligation to the Town exists.***

Signature		**Date**	3-1-23

☑ Applicant ☐ Applicant's Representative

ZONING DETERMINATION - OFFICE USE ONLY

☐ Approved ☐ Denied: ☐ The proposed use is not permitted in the subject zoning district
☐ Only permissible with variance relief from the Zoning Board of Appeals

☐ Approved ***Pending additional approval:***

Per Zoning Ordinance Section(s)	Required Permit(s)	Approval Required	Permitting Authority
180-7-C	☐ Building Permit(s)	☐ Special Permit(s)	☑ Planning Board
180-13-B	☐ Electrical Permit(s)	☒ Site Plan Review	☐ Board of Appeals
	☐ Plumbing/Gas Permit(s)	☐ Variance	☐ City Council

Town Building Official		**Issue Date**	3/1/2023

This determination may be appealable to the Zoning Board of Appeals under the provisions of MGL Ch. 40A Sec. 8.
Revised 09/08/2022

TOWN OF AGAWAM, MASSACHUSETTS

FORM D

Application for Site Plan Approval

Please complete the following form and electronically submit with site plans, completed Zoning Determination and Storm Water Management Report to: siteplan@agawam.ma.us in addition to sending four (4) hard copies of the Site Plan and one (1) hard copy of the Storm Water Management Report and completed Zoning Determination to:

Agawam Planning Department

36 Main Street

Agawam, MA 01001

August 22 2024

1. Name of Business _____

   Address _____

   Phone # _____ email _____

2. Name of Applicant/Owner Ahmad Aljanabi

   Address 133 Upper Beverly Hills, West Springfield, MA 01089

   Phone # 413-314-7566 email stonemile174@gmail.com

3. Name of Engineer/Architect R Levesque Associates, Inc.

   Address 40 School Street, Westfield, MA 01085

   Phone # (413) 568-0985 email ninaf@rlaland.com

4. Please give a brief description of the proposed project:

   The applicant proposes the reuse of the existing building for office space and an auotmotive repair garage. Please refer to the attached project narrative and associated site plan for further detail regarding the proposed project.

3. PROJECT NARRATIVE

PROJECT NARRATIVE TO SITE PLAN APPROVAL APPLICATION

For

PROPOSED BUILDING REUSE
195 SOUTH WESTFIELD STREET
AGAWAM, MASSACHUSETTS 01001
(ASSESSOR'S PARCEL ID: E8-3-10)

INTRODUCTION & PROPERTY DESCRIPTION

On behalf of the applicant and property owner, Ahmad Aljanabi, R Levesque Associates, Inc. is providing this project narrative as a supplement to the Site Plan Approval application for the proposed reuse of the existing building at the above-referenced property. The applicant proposes to use the existing building as an office space for a Foster Care facility and an automotive repair garage.

The subject property is located east of South Westfield Street and consists of approximately 0.26 ± acres (hereinafter referred to as the "project site"). The project site is shown on the associated site plan entitled "Existing Conditions/Site Plan", dated June 5, 2024, prepared by R Levesque Associates, Inc. Said property is recorded in the Hampden County Registry of Deeds in Book 24568, Page 307. A copy of the deed reference is included within this application packet under Section 5. The project site lies within the Business A (BA) zoning district according to the Town of Agawam Assessor's Database. A Locus Map is included within this application packet under Section 4.

EXISTING CONDITIONS & SURROUNDING LAND USES

The project site currently consists of an existing, vacant 1-story block building with associated access drives. In general, the topography of the site can be described as generally flat. Please refer to the accompanying existing conditions plan for further detail regarding the existing conditions of the property.

The project site is bound to the north by Residence A-2 zoned parcels, to the east by Business A (BA) zoned parcels, to the south by Shoemaker Lane, and to the west by South Westfield Street.

DETAILED PROJECT DESCRIPTION

The proposed project includes the reuse of the existing building for business uses, as well as associated site improvements, such as proposed parking. There are no proposed changes to the building itself.

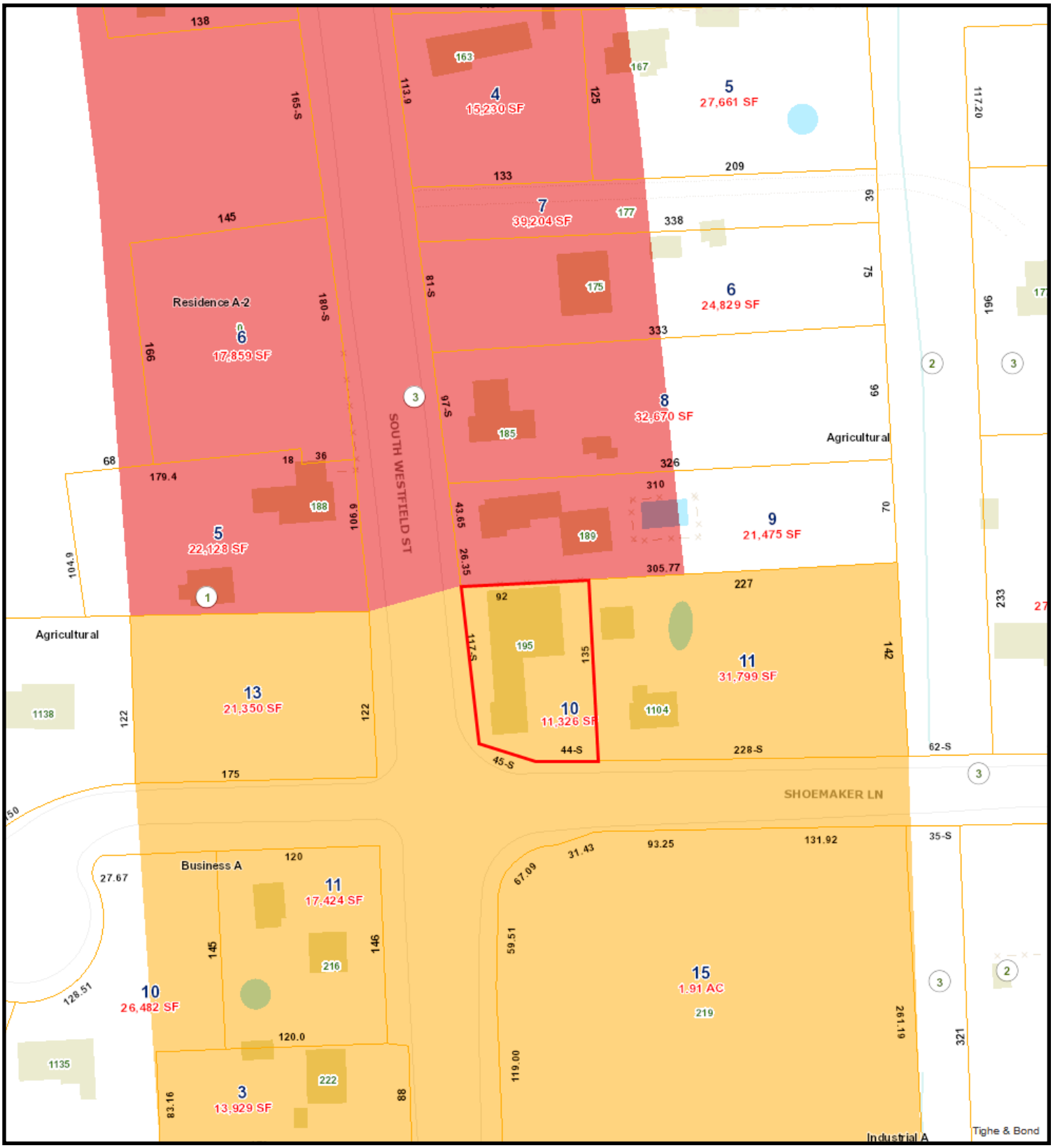
PARKING & SITE CIRCULATION

As part of this project, provisions for a total of three (3) parking spaces are proposed, including one (1) of which is handicap and van accessible, as well as five (5) proposed unstriped vehicle storage spaces. According to the Town of Agawam Parking Guidelines, "Automotive Repair Garage" requires one (1) parking space for each 300 SF of floor area and one (1) parking space for each employee. According to the Town of Agawam Parking Guidelines, "Office" requires one (1) parking space for each 300 SF of floor area. Based on the operations of the proposed uses, the applicant anticipates the proposed parking, as shown, to be sufficient for the operation and utilization of the project site.

The applicant proposes to utilize existing curb cuts along South Westfield Street and Shoemaker Lane to access the project site. Please refer to the associated site plan for greater detail regarding the configuration of parking/drive aisle areas proposed on the project site.

[END OF PROJECT NARRATIVE]

4. LOCUS MAP



Locus Map

8/19/2024 10:35:36 AM

Scale: 1"=100'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

5. DEED REFERENCE

B-24568
P-307
(Locus)

Bk 24568 Pg307 #32501
05-27-2022 @ 02:57p

MASSACHUSETTS STATE EXCISE TAX
HAMPDEN COUNTY REGISTRY OF DEEDS
Date: 05-27-2022 @ 02:57pm
Ctl#: 374 Doc#: 32501
Fee: $775.20 Cons: $170,000.00

195 South Westfield Street, Feeding Hills (Agawam), MA 01030.

QUITCLAIM DEED

I, CAROL A. BARNES, a married woman, of 212 Feeding Hills Road, Southwick, Hampden County, Massachusetts, for consideration paid, and in full consideration of One Hundred Seventy Thousand and No/100 ($170,000.00) Dollars, grant to AHMAD ALJANABI, individually, of 133 Upper Beverly Hills, West Springfield, Hampden County, Massachusetts

with Quitclaim Covenants

the land in that part of Agawam, Hampden County, Massachusetts, known as Feeding Hills, bounded and described as follows:

PARCEL II:

Beginning at the southwesterly corner of land formerly of Agnes S. Holt, now or lately of Alvin L. Rising et ux on the easterly side of said South Westfield Steet; and thence running

Southerly	along said South Westfield Street, about One Hundred Fifty (150) feet to Shoemaker Lane; thence
Easterly	along said Shoemaker Lane, about Ninety-Two (92) feet to a point; thence
Northerly	along land formerly of one Packard now or lately of Bernard, about One Hundred Thirty-Five (135) feet to a corner; thence
Easterly	along last-named land, Two Hundred Six and Thirty-Seven hundredths (206.37) feet to a point, land of The Town of Agawam, shown on plan entitled "Plan of Property in Agawam, Mass. Property Annexation to the 'Clifford M. Granger School'..." dated Aug. 1965, as recorded in the Registry of Deeds for said Hampden County in Book of Plans 112, Page 34; thence
Northerly	along last-named land in a straight line about Fifteen (15) feet to the southeasterly corner of said land now or lately of Rising et ux; and thence
Westerly	along land last referred to, about Three Hundred Twenty-Five (325) feet to said South Westfield Street at the place of beginning.

Subject to restrictions of record if any are in force and applicable.
Excepting out property conveyed in Book 1848, pg 57.
Subject to all real estate taxes and other municipal liens, demands, penalties and interest charges thereon if any.

As per M.G.L., Chapter 188, S. 13, the Grantors and their spouses, under oath and subject to the pains and penalties of perjury, do hereby depose, state and certify that: (i) we release all rights of Homestead in the subject realty, (ii) that no spouse, nonowner spouse, former spouse, or any other person resides in the home, and (iii) at the time of delivery of this deed, no spouse, former spouse, or any one person is entitled to claim the benefit of an existing estate of homestead.

Being a portion of the same premises conveyed to the Grantor herein by deed of Edward J. Austin dated May 2, 1972 and recorded in the Hampden County Registry of Deeds in Book 3687, Page 199.

Witness my hand and seal this 20th day of May 2022,

Abbe W. McLane
Witness

Carol A. Barnes
CAROL A. BARNES

I, as spouse, hereby release all my marital rights and homestead rights pursuant to M.G.L. c. 188 §3 in said property.

EUGENE BARNES

COMMONWEALTH OF MASSACHUSETTS

Hampden, ss

On this 20th day of May, 2022, before me, the undersigned notary public, personally appeared CAROL A. BARNES and EUGENE BARNES, and proved to me through satisfactory evidence of identification, which were valid driver's licenses, to be the persons whose names are signed on the preceding or attached document, and who swore and affirmed to me that the contents of the document are truthful and accurate to the best of their knowledge and belief, and acknowledged to me that they signed it voluntarily for its stated purpose.

ABBE W. MCLANE
Notary Public
Commonwealth of Massachusetts
My Commission Expires
August 1, 2025

Abbe W. McLane
Abbe W. McLane, Notary Public
My Commission Expires: August 1, 2025

CHERYL A. COAKLEY-RIVERA, ESQ.
HAMPDEN COUNTY REGISTRY OF DEEDS

APPENDIX A: SITE PLAN

SITE PLAN ENTITLED "EXISTING CONDITIONS / SITE PLAN"

PREPARED FOR AHMAD ALJANABI

PREPARED BY R LEVESQUE ASSOCIATES, INC.

DATED JUNE 5, 2024

Taryn Egerton

From: Derek Myers
Sent: Thursday, September 5, 2024 10:37 AM
To: Taryn Egerton
Subject: 195 S Westfield St.

Taryn,

I have no comments for the site plan for the existing structure at 190 S Westfield St.

If you have any question please feel free to contact this office at (413)786-0657

Derek Myers
Fire Inspector
Agawam Fire Department
afdinsp@agawam.ma.us
(413)786-0657

Append the message with the disclaimer 'Confidentiality/Public Record Statement. Under Massachusetts Law, any email created or received by an employee of The Town of Agawam is considered a public record. All email correspondence is subject to the requirements of M.G.L. Chapter 66. This email may contain confidential and privileged material for the sole use of the intended recipient. Any review or distribution by others is strictly prohibited. If you are not the intended recipient please contact the sender and delete all copies. '. If the disclaimer can't be applied, attach the message to a new disclaimer message.

Kevin Duquette
Inspector of Buildings
inspections@agawam.ma.us

Town of Agawam

Inspection Services Department

1000 Suffield Street, Agawam, Massachusetts 01001
Telephone - (413) 821-0632

August 29, 2024

To: Office of Planning and Community Development:

Re: Site Plan Review comments for 195 South Westfield Street;

Inspection Services has no zoning issues or concerns for the existing property on the proposed site plan approval for the above referenced address. See below for additional comments.

The original request from the applicant back in 2023 was for a used car dealer's license. At that time the applicant was advised a site plan will be required for this request. The Law Department also advised the applicant at that time the Town was working on an ordinance amendment for dealer license approvals.

Original zoning determination was reflected for a single use occupancy for the building as an auto repair facility. If the applicant choses to have two business entities in the building, this will affect the amount of parking spaces required and allotted for a used dealer's license as the applicant needs to provide sufficient business use parking and allotted vehicle spaces for a dealer's license.

Inspection Services has issued numerous violation notices and fines to this nuisance property for the continuation of exterior storage of unregistered vehicles and exterior storage of junk automotive parts. The collection of the unpaid fines of $450.00 should be paid by the owner prior or conditional to the Board's final approval of a site plan.

Respectfully,

Kevin Duquette
Inspector of Buildings
Town of Agawam

AGAWAM POLICE DEPARTMENT

681 Springfield Street, Feeding Hills, MA 01030
Telephone (413)786-4767 | FAX (413)786-4821
Eric P. Gillis
Chief of Police

To: Planning Board

From: Sergeant Brian Machos- Safety Officer

Date: September 4, 2024

Re: 195 South Westfield Street

I have reviewed the current site plans for the existing building at 195 South Westfield Street. At this time, I do not have any safety issues pertaining to the addition of parking spaces along the rear of the property. The parking spaces located along the front of the property could pose a challenge when trying to exit, given the close proximity to the traffic light at the corner of Shoemaker Lane and South Westfield Street. The location of the handicap parking space could potentially create a line of sight issue for the property owner located to the immediate north on South Westfield Street when trying to exit their driveway.

DPW
1000 Suffield Street
Agawam, MA 01001
Phone: 413-821-0600
Fax: 413-821-0631

Town of Agawam
Department Of Public Works

MEMORANDUM

To: Planning Board
CC: File
From: Engineering Division
Date: September 5, 2024
Subject: SP 666 – Proposed Building Reuse – #195 South Westfield Street

Per your request, we have reviewed the Site Plan Approval application for the Proposed Building Reuse be located at #195 South Westfield Street; Prepared by R Levesque Associates Inc.; Dated: August 22, 2024. Based on our review, we have the following comments:

1. The proposed parallel parking spaces appear to be blocking access to an existing door that is not shown on the site plans. This may result in conflicts with Fire or Building Codes regarding means of egress into/out of the building.

2. Based on the requirements set forth in the Agawam Parking Guidelines, it does not appear that the subject parcel will have enough parking spaces. Engineering requests the Developer specify the amount of building area to be utilized for the auto repair garage and the foster care office as well as the number of anticipated employees within the auto repair garage.

3. Engineering recommends the painted access aisle for the handicapped space be placed on the side closest to the access door of the building.

4. The Developer shall verify that the area where the 5 vehicle storage spaces are proposed will be paved or shall remain as is.

5. It is recommended that bollards or similar barriers be installed around the traffic signal pole to avoid collision with vehicles backing out of the parallel parking spaces.

6. If possible, all catch basins on the subject property shall be fitted with hoods to prevent the discharge of oil, gasoline or other contaminants into the Town storm sewer system.

7. Engineering recommends that a Spill Prevention Plan be developed for the auto repair garage in the event of a potential illicit discharge to the street or stormwater structure.

Engineering reserves the right to make additional comments as new information is submitted. If you have any questions, please do not hesitate to contact this division.

Sincerely,

Michael F. Albro, P.E.
Assistant Town Engineer

Benjamin Ashley, E.I.T.
Civil Engineer II

S:\SP\666 -#195 South Westfield Street\Planning Memo_September 5 2024.doc

Taryn Egerton

From: Derek Myers
Sent: Thursday, September 5, 2024 10:37 AM
To: Taryn Egerton
Subject: 195 S Westfield St.

Taryn,

I have no comments for the site plan for the existing structure at 190 S Westfield St.

If you have any question please feel free to contact this office at (413)786-0657

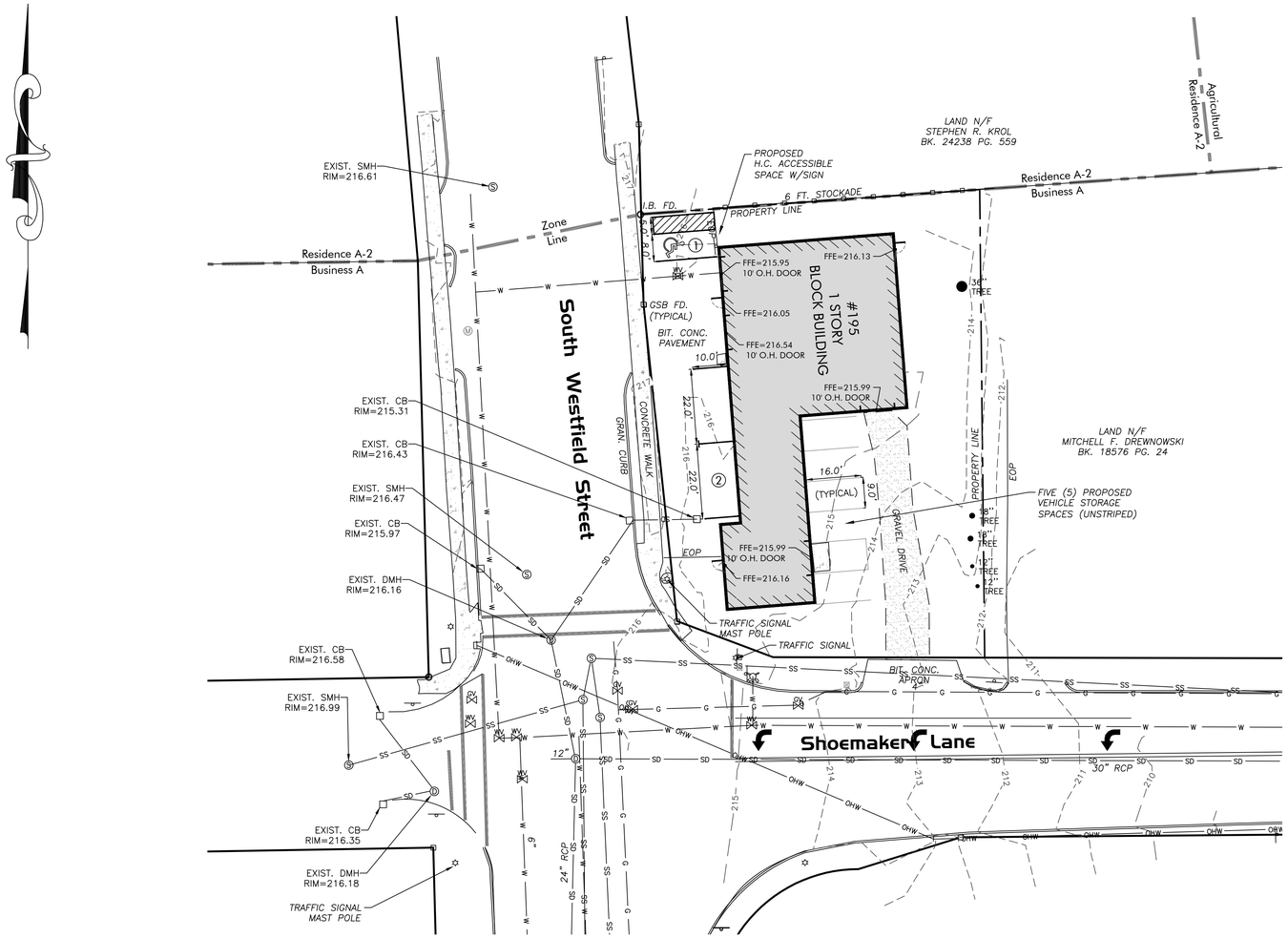
Derek Myers
Fire Inspector
Agawam Fire Department
afdinsp@agawam.ma.us
(413)786-0657

Append the message with the disclaimer 'Confidentiality/Public Record Statement. Under Massachusetts Law, any email created or received by an employee of The Town of Agawam is considered a public record. All email correspondence is subject to the requirements of M.G.L. Chapter 66. This email may contain confidential and privileged material for the sole use of the intended recipient. Any review or distribution by others is strictly prohibited. If you are not the intended recipient please contact the sender and delete all copies. '. If the disclaimer can't be applied, attach the message to a new disclaimer message.

ZONING REVIEW - Business A (BA)

TYPE (MINIMUM)	REQUIRED	PROPOSED
AREA	N.R.	12,543 S.F.
FRONTAGE	N.R.	211.77' (TOTAL)
FRONT YARD	35 FT	21.6'
SIDE YARD	N.R.	10.7'
REAR YARD	25 FT	-
HEIGHT (MAX)	45 FT / 3 STORIES	1 STORY
BUILDING COVERAGE (MAX)	50%	31.7%

N.R. = NO REQUIREMENT



20 0 10 20 40

SCALE: 1"=20'

NOTES

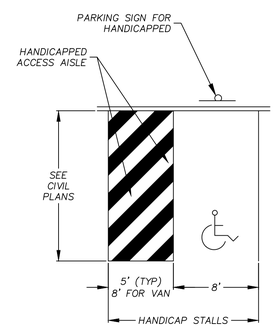
1. THE RECORD OWNER OF THE SUBJECT PARCEL IS AHMAD ALJANABI. SEE HAMPDEN COUNTY REGISTRY OF DEEDS BOOK 24568 PAGE 307.
2. SEE ALSO HAMPDEN COUNTY REGISTRY OF DEEDS:
   - PLAN BOOK 51 PAGE 122
   - PLAN BOOK 112 PAGE 33
   - PLAN BOOK 286 PAGE 4
3. THIS PLAN HAS BEEN PREPARED FOR SITE PLANNING PURPOSES AND SHALL NOT BE USED FOR THE CONVEYANCE OF LAND OR FOR ANY OTHER USE.
4. SUBJECT PARCEL CONTAINS 12,543 S.F.
5. THE SUBJECT PROPERTIES SHOWN HEREON MAY BE SUBJECT TO RIGHTS AND EASEMENTS AS CONTAINED IN THE VARIOUS DEEDS OF RECORD DESCRIBING SAID PROPERTIES. THE LOCATION AND EXTENT OF ANY SUCH RIGHTS AND EASEMENTS IS NOT THE SUBJECT OF THIS PLAN.
6. THE EXISTING CONDITIONS INFORMATION SHOWN IS BASED UPON A TOPOGRAPHIC SURVEY PERFORMED BY R LEVESQUE ASSOCIATES, INC. ON FEBRUARY 15, 2024.
7. THE UNDERGROUND UTILITIES SHOWN HEREON HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION, DIGSAFE MARKINGS AND AVAILABLE RECORD DATA. R LEVESQUE ASSOCIATES, INC. MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. R LEVESQUE ASSOCIATES, INC. FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN HERE ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM AVAILABLE INFORMATION.
8. ADJACENT PROPERTY LINES AND ABUTTERS SHOWN HEREON ARE REFERENCED FROM THE TOWN OF AGAWAM WEB GIS.
9. THE SUBJECT PARCEL IS ZONED BUSINESS A ACCORDING TO THE TOWN ZONING MAP.
10. THE SUBJECT PROPERTY IS NOT LOCATED WITHIN A SPECIAL FLOOD ZONE AREA ACCORDING TO FLOOD INSURANCE RATE MAP NUMBER 25013C0391E – EFFECTIVE DATE: 7/16/2013.
11. THE SUBJECT PROPERTY IS NOT LOCATED WITHIN NATURAL HERITAGE AND ENDANGERED SPECIES (NHESP) PROGRAM JURISDICTION.

SIGNAGE AND PAVEMENT MARKING NOTES

1. STRIPE ALL PARKING AREAS AS SHOWN, INCLUDING PARKING SPACES, STOP BARS, CROSSWALKS, AND ACCESSIBLE ROUTE MARKINGS AND SYMBOLS USING WHITE TRAFFIC PAINT. PAINTED ISLANDS, FIRE LANES, AND TRAVEL WAY CENTERLINES SHALL BE PAINTED USING YELLOW TRAFFIC PAINT. ALL TRAFFIC PAINT SHALL CONFORM TO AASHTO M248 TYPE "N".
2. STOP BARS SHALL BE 12" WIDE (WHITE).
3. ALL PARKING STALL LINES SHALL BE 4" WIDE (WHITE).
4. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", MASSDOT, STATE BUILDING CODE AND ADA REQUIREMENTS, AND AS SHOWN ON THE PLANS & DETAILS.

ACCESSIBILITY NOTES

1. ALL ACCESSIBLE ROUTES, TRANSITIONS, AND ACCESSIBLE PARKING/LOADING AREAS, INCLUDING ALL ENTRANCES TO BUILDING, SHALL ADHERE TO 521 CMR.
2. SHOULD THE ARCHITECT PROVIDE ADDITIONAL ENTRANCES OR MEANS OF EGRESS, ADDITIONAL ACCESSIBLE ROUTES MAY BE REQUIRED.
3. IT IS THE RESPONSIBILITY OF THE ARCHITECT AND CONTRACTOR TO NOTIFY THE ENGINEER AND LANDSCAPE ARCHITECT OF ANY CHANGES TO THE PROPOSED BUILDING THAT WOULD AFFECT THE ACCESSIBILITY REQUIREMENTS OF THE PROPOSED SITE.
4. THE CONTRACTOR SHALL REVIEW IN DETAIL THE REQUIREMENTS OF 521 CMR AND SHALL BE RESPONSIBLE FOR CONFORMANCE WITH SAID REGULATIONS.



NOTES:
1. ALL DIMENSIONS TO CENTER OF 4" PAVEMENT STRIPING.
2. ALL STRIPING SHALL BE 4" SOLID WHITE PAVEMENT MARKING PAINT UNLESS OTHERWISE NOTED.
3. CONTRACTOR TO ENSURE HANDICAP ACCESSIBLE PARKING SPACE SHALL HAVE A SLOPE OF 2% OR LESS IN ALL DIRECTIONS.

HANDICAP PARKING STALL
NO SCALE

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

EXISTING CONDITIONS / SITE PLAN

195 South Westfield Street
Assessors Parcel: E8 3 10
Agawam, Mass.

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

PREPARED FOR:

Mr. Ahmad Aljanabi

195 South Westfield St.
Agawam, MA 01089

ISSUANCE DATE: June 5, 2024

REVISIONS:	DATE:
A. Proposed shed relocated	06/06/24
B. Proposed shed removed	06/07/24

DRAFTED BY: J.W.M.

UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: 1" = 20'

RLA PROJ. NUMBER: 230917

DRAWING#	REV.
SP-1	B

S:\Projects\2023\230917 - Aljanabi - 195 South Westfield Street - Feeding Hills\05 Civil 3D\230917 - Proposed Site Layout - 2024-06-07.dwg

Kevin Duquette
Inspector of Buildings
inspections@agawam.ma.us

Town of Agawam

Inspection Services Department

1000 Suffield Street, Agawam, Massachusetts 01001
Telephone - (413) 821-0632

August 29, 2024

To: Office of Planning and Community Development:

Re: Site Plan Review comments for 195 South Westfield Street;

Inspection Services has no zoning issues or concerns for the existing property on the proposed site plan approval for the above referenced address. See below for additional comments.

The original request from the applicant back in 2023 was for a used car dealer's license. At that time the applicant was advised a site plan will be required for this request. The Law Department also advised the applicant at that time the Town was working on an ordinance amendment for dealer license approvals.

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Respectfully,

Kevin Duquette
Inspector of Buildings
Town of Agawam

Taryn Egerton

From: Derek Myers
Sent: Monday, October 7, 2024 4:24 PM
To: Taryn Egerton
Subject: RE: 1422 Main Street

Taryn,
We are waiting for the new trucks data from the manufacturer. When I get that information I will send it over. I had a call scheduled for 330 pm last Friday with R Levesque Associates to discuss this matter. I never received the call. That being said the swept path report that was submitted to this office is not in compliance. Its showing the fire truck making a three point turn in a parking lot that could be filled with cars. I spoke with the Chief on this matter and he agrees that the current report is not acceptable.

If you have any question please feel free to contact this office at (413)786-0657

Derek Myers
Fire Inspector
Agawam Fire Department
afdinsp@agawam.ma.us
(413)786-0657

From: Taryn Egerton <TEgerton@agawam.ma.us>
Sent: Monday, October 7, 2024 10:56 AM
To: Derek Myers <afdinsp@agawam.ma.us>
Subject: FW: 1422 Main Street

Good morning,
Did you have a chance to look at this? Levesque's office is asking if this should be updated with the new fire truck specs, but I wanted to send over your comments (if any) first so everything can be addressed at once.

Taryn Egerton
Assistant Planner and Conservation Officer
Office of Planning and Community Development

413.726.9737 | tegerton@agawam.ma.us

TOWN OF Agawam MASSACHUSETTS

From: Taryn Egerton
Sent: Wednesday, October 2, 2024 9:30 AM

Site Plan Approval Application

Proposed Hotel

Project Location:

1422 Main Street, Main Street, 1444 Main Street, & Rear Main Street
Agawam, Massachusetts 01001
(Assessor's Map & Parcel: K4-1-7, K4-1-13, K4-1-5 & K4-1-6)

Submitted To:

Town of Agawam Planning Board
36 Main Street
Agawam, Massachusetts 01001

Applicant:

Shield Hotels
c/o Mr. Kenny Patel
63 Myron Street
West Springfield, Massachusetts 01089

Property Owner(s):

1442 Main Street
Renu & Rayonia Rajesh
132 Glendale Road
Agawam, Massachusetts 01001

Main Street, 1444 Main Street, &Rear Main Street
Debra Ann Desmond
10 Garnet Road
Enfield, Connecticut 06082

RLA Project File No. 231007

May 23, 2024; Revised September 26, 2024

R LEVESQUE ASSOCIATES, INC.
A LAND PLANNING SERVICES COMPANY
40 School Street, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

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   2.2 SITE PLAN APPROVAL APPLICATION – FORM D
3. PROJECT NARRATIVE
4. LOCUS MAP
5. DEED REFERENCES

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APPENDICES

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APPENDIX B: STORMWATER DRAINAGE REPORT
APPENDIX C: BUILDING ELEVATIONS

I. COVER LETTER

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

May 23, 2024; Revised September 26, 2024

Violet Baldwin, Chairperson
Town of Agawam Planning Board
36 Main Street
Agawam, Massachusetts 01001

RE: Site Plan Approval – Proposed Hotel
1422 Main Street, Main Street, 1444 Main Street, & Rear Main Street
Agawam, Massachusetts 01001
(Assessor's Map & Parcel: K4-1-7, K4-1-13, K4-1-5 & K4-1-6)
RLA Project File No. 231007

Dear Chairperson Baldwin and Board Members:

On behalf of the applicant, Shield Hotels c/o Mr. Kenny Patel, please find the requisite number of copies of a Site Plan Approval application, supporting documentation, and associated site plan set for the above-referenced project. The applicant proposes the construction of a forty-two (42) unit boutique hotel with associated site improvements to be located at the above-referenced properties in Agawam, Massachusetts within the Business A (BA) zoning district. An Approval Not Required (ANR) application will be filed with the Planning Board for the above-referenced parcels.

As required, a copy of this Site Plan Approval submission has been submitted electronically via email to the Town of Agawam Planning Department.

Should you have any questions or comments regarding this submission, please do not hesitate to contact our office at your earliest convenience.

Sincerely,
R LEVESQUE ASSOCIATES, INC.

Nina Fazio

Nina Fazio
Permitting Coordinator

cc: Kenny Patel

2. ADMINISTRATIVE FORMS

2.1 ZONING DETERMINATION

2.2 SITE PLAN APPROVAL APPLICATION – FORM D

The Commonwealth of Massachusetts

Town of Agawam

Inspection Services - Building Department

1000 Suffield Street, Agawam MA 01001 – (413) 821-0632

OFFICE ONLY
Date Filed:

RECEIVED BY INSPECTION SERVICES
APR 30 2024
TOWN OF AGAWAM

Application for Zoning Determination

FILING INSTRUCTIONS: Deliver this form (no fee required) to Inspection Services.
For digital submissions, please confirm receipt. A *complete* application will be processed within 30 days.
The applicant must pick-up, or arrange for the receipt of, this processed form.

1) PROPERTY INFORMATION			
a. Street Address	1422-1444 Main Street	b. Zoning District	Business A
c. Assessor's Map	K4-1; K4-1; K4-1; K4-1	d. Lot(s)	7; 6; 13; 5
e. Registry of Deeds Book	13612	f. Page	330
g. Overlay Districts	☐Historic Preservation ☐ Mixed-Use Business C		
h. Previous Special Permits, Site Plan Approvals, Findings or Variances Issued for this Site			
Unknown; Zone Change to Business A approved April 2024			

2) APPLICANT & OWNER INFORMATION			
a. Applicant Name	Shields Hotels c/o Mr. Kenny Patel	b. Applicant Phone	413-348-0169
c. Applicant Email	kenny@shieldhotels.com		
d. Applicant Mailing Address	63 Myron Street, West Springfield, MA 01089		
e. Applicant Relationship to Property	☐Owner ☐ Agent ☑Other: Buyer		
f. Representative Name *(if any)*	R Levesque Associates, Inc.	g. Rep. Phone	(413) 568-0985
h. Rep. Email	ninaf@rlaland.com		
i. Owner Mailing Address	132 Glendale Road, Agawam, MA 01001; 10 Garnet Road, Enfield, CT 06082		
j. Owner Name *(if different)*	Renu & Rajesh Rayonia; Debra Ann Desmond	k. Owner Phone	
l. Owner Email			
m.Owner Mailing Address			

3) PROJECT & SITE DETAILS

NOTE: Any omission of requested information may result in an INCOMPLETE determination

	Existing		*Proposed* ☐ *No changes to building, site or lot*		-FOR BUILDING DEPT. REVIEW- REQUIRED / NCU	
a. Lot Size	SF		SF		LOT SIZE	☐
b. Frontage	**Please see attached**	FT	FT		FRONTAGE	☐
c. Front Lot Line	FT		FT		FRONT SB	☐
d. Side Lot Line (Left/Right)	L: FT	R: FT	L: FT	R: FT	SIDE SB	☐
e. Rear Lot Line	FT		*FT*		REAR SB	☐
f. Building Height	FT		FT		BLDG HT	☐
g. Total BLDG/Res Area	SF	SF	SF	SF	AREA LIM	☐
h. BLDG Coverage (Footprint)	SF	% of lot	SF	% of lot	LOT COVER	☐
i. Impervious Coverage	SF	% of lot	SF	% of lot	IMPERVIOUS	☐
j. Parking/Loading Spaces	P:	L:	P:	L:	PARKING	☐
k. Bicycle/EV Charge Spaces	B:	EV:	B:	EV:	BIKE/EV	☐
l. Signs (Size & Type)	x	T:	x	T:	SIGNS	☐
m. Fence (Size & Type)	LIN FT	T:	LIN FT	T:		
n. Wetland Area	SF		SF			
o. Utility Services	☑ Town Water	☑ Town Sewer	☑ Town Water	☑ Town Sewer	NON-CONFORMING USE	☐

p. Current Use of Property	Vacant
q. Proposed Use of Property	Hotel
r. Project Description	
The applicant proposes the construction of a 40 unit boutique hotel with associated site improvements.	
s. I have attached additional narrative, plans or supporting materials *(any oversize plans should also be included in an 8.5 x 11" format)*	☑ Yes ☐ No
t. Work is proposed in or within 100' of a wetland or 200' of a stream/river, or construction will occur within the Floodplain district. ***If so, CONSERVATION COMMISSION review is required.***	☑ Yes ☐ No ☐ Unsure
u. The following projects shall be required to comply with the requirements of a STORM DRAIN PERMIT: **[1] Any alteration to sites on parcels of one acre or greater.** **[2] Any alteration to individual lots less than one acre, but which are contiguous or are deemed part of a common project which is one acre or greater.**	☑ Yes ☐ No ☐ Unsure
v. The project will affect at least one of the following; additional gross floor area by 2,000 square feet, any change of use, changes to parking and/ or curb cuts.	☑ Yes ☐ No

4) CERTIFICATION

This determination is based only on the information provided, which I represent as accurate. The issuance of a Zoning Determination does not relieve the Applicant of the responsibility to obtain other zoning or non-zoning permits, as may be required, and this determination is based on the zoning in effect at the issue date and grants no protection from any pending or future zoning changes. Additional information may be requested and required to properly process this form. Any non-zoning related comments provided are cursory in nature; Applicants should follow-up with appropriate Town Departments. ***Sec. 1-7 of the Town of Agawam's General Ordinances authorizes the denial of a license or permit where an outstanding debt or obligation to the Town exists.***

Signature	Nina Fazio	**Date**	04-30-2024

☐ Applicant ☑ Applicant's Representative

ZONING DETERMINATION - OFFICE USE ONLY

☐ Approved ☐ Denied: ☐ The proposed use is not permitted in the subject zoning district
☐ Only permissible with variance relief from the Zoning Board of Appeals

☑ Approved ***Pending additional approval:***

Per Zoning Ordinance Section(s)	Required Permit(s)	Approval Required	Permitting Authority
180-13-B-1	☑ Building Permit(s)	☐ Special Permit(s)	☑ Planning Board
	☑ Electrical Permit(s)	☑ Site Plan Review	☐ Board of Appeals
	☑ Plumbing/Gas Permit(s)	☐ Variance	☐ City Council

Town Building Official		**Issue Date**	6/4/2024

This determination may be appealable to the Zoning Board of Appeals under the provisions of MGL Ch. 40A Sec. 8.
Revised 09/08/2022

- Revised 5/6/2024 Revised 6/3/2024
- Revised 5/13/2024

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

RECEIVED BY
INSPECTION SERVICES
JUN 04 2024
TOWN OF AGAWAM

RLA

*An Approval Not Required (ANR) application will be submitted to the Town of Agawam Planning Board to create the lots depicted.

	LOT 1		PARCEL A & B		For Building Department Use
	Existing	Proposed	Existing	Proposed	
Lot Size		23,489 SF		152,765 SF	
Frontage		145.93′		355.52′	
Front Lot Line		65.6′		272.9′	
Side Lot Line		44.2′/19.2′		>200′/16.4′	
Rear Lot Line		40.4′		26.0′	
Building Height	2 stories	2 stories		3 stories	
Total BLDG/Res Area	2,687 SF	2,687 SF	0	23,112 SF (7,704 SF/floor)	
BLDG Coverage	2,687 SF	2,687 SF	0	7,704 SF (5%)	
Impervious Coverage	13,625 SF (58%)	13,420 SF (57%)	5,982 SF (4%)	33,380 SF (22%)	
Parking/Loading Spaces	29	23	0	60	
Bicycle/EV Charge Spaces	0	0	0	0	
Signs	N/A	N/A	None	TBD	
Fence	N/A	N/A	None	TBD	
Wetland Area	0 SF	0 SF	9,302 SF	9,302 SF	

TOWN OF AGAWAM, MASSACHUSETTS

FORM D

Application for Site Plan Approval

Please complete the following form and electronically submit with site plans, completed Zoning Determination and Storm Water Management Report to: siteplan@agawam.ma.us in addition to sending four (4) hard copies of the Site Plan and one (1) hard copy of the Storm Water Management Report and completed Zoning Determination to:

Agawam Planning Department

36 Main Street

Agawam, MA 01001

May 23 20 24
Revised September 26, 2024

1. Name of Business Shield Hotels c/o Kenny Patel

   Address 63 Myron Street, West Springfield, MA 01089

   Phone # (413) 348-0169 email kenny@shieldhotels.com

2. Name of Applicant/Owner Shield Hotels c/o Kenny Patel

   Address 63 Myron Street, West Springfield, MA 01089

   Phone # (413) 348-0169 email kenny@shieldhotels.com

3. Name of Engineer/Architect R Levesque Associates, Inc.

   Address 40 School Street, Westfield, MA 01085

   Phone # (413) 568-0985 email ninaf@rlaland.com

4. Please give a brief description of the proposed project:

The applicant proposes the construction of a 42-unit, three (3) story boutique hotel to be located at 1422-1444 Main Street. Please refer to the attached project narrative and associated site plan set for further detail regarding the proposed project.

3. PROJECT NARRATIVE

PROJECT NARRATIVE TO SITE PLAN APPROVAL APPLICATION

For

PROPOSED HOTEL
1422 MAIN STREET, MAIN STREET, 1444 MAIN STREET & REAR MAIN STREET
AGAWAM, MASSACHUSETTS 01001
(ASSESSOR'S MAP & PARCEL: K4-1-7, K4-1-13, K4-1-5 & K4-1-6)

INTRODUCTION & PROPERTY DESCRIPTION

On behalf of the applicant, Shield Hotels c/o Mr. Kenny Patel, R Levesque Associates, Inc. is herein providing this project narrative as a supplement to the Site Plan Approval application for the proposed construction of a forty-two (42) room boutique hotel with associated site improvements to be located at the above-referenced properties. An Approval Not Required (ANR) application will be filed with the Planning Board to combine the land known as Main Street, Rear Main Street, and 1444 Main Street.

The subject properties are located west of Main Street (hereinafter referred to as the "project site"). The project site consists of approximately 4.04 ± acres and is shown on the associated site plan set entitled "Proposed Hotel", dated May 23, 2024, revised through September 23, 2024, prepared by R Levesque Associates, Inc. Said properties are recorded in the Hampden County Registry of Deeds in Book 13162, Page 330 (1422 Main Street) and Book 18614, Page 149 (1444 Main Street, Main Rear & Rear Main Street). The project site lies within the Business A (BA) zoning district according to the Town of Agawam Assessor's Database.

EXISTING CONDITIONS & SURROUNDING LAND USES

The rear of the project site is currently undeveloped vacant land with an existing restaurant located at 1422 Main Street that is proposed to remain. There are on-site bordering vegetated wetlands within the eastern portion of the project site. In general, the topography of the site varies. Within the site, terrain is highest towards the western side of the parcel at 69 feet and drops down to 66 feet west of the high point and 49 feet east of the high point. Please refer to the associated site plan set for further detail regarding the existing conditions of the property.

The project site is bound to the north by Clinical Research Management group, to the east by Main Street, to the south by wooded residentially used property, and to west by Massachusetts Veterans Memorial Cemetery. The surrounding area consists of properties

within the Business A (BA) and Residence A-2 (A2) zoning districts. A Locus Map is included under Section 4 of this application packet.

DETAILED PROJECT DESCRIPTION

The proposed project includes the construction of a forty-two (42) unit boutique hotel and associated site improvements. Associated site improvements include, but are not limited to, access drive aisles, vehicle parking, installation of underground utilities including, water, sanitary sewer, electric, and telecommunication services, the construction of a stormwater management system, landscaped areas, and lighting.

The proposed project work will proceed in the following general sequence:

1. Installation of erosion controls along the permitted limit of work;
2. Clearing, grubbing, and excavation of the project site within the permitted limit of work;
3. Demolition of the existing site improvements including the paved surface areas;
4. Construction of a hotel building;
5. Construction of associated site improvements including access drives and landscaping;
6. Installation of underground utilities including water, sanitary sewer, and electric and telecommunication services;
7. Construction of a stormwater management system;
8. Final site grading, installation of curbing, landscaping, and lighting, and;
9. Removal of erosion controls at the direction of the Town of Agawam.

Please refer to the associated site plan set for greater detail on the exact locations of proposed work.

STORMWATER

The proposed site improvements include a number of stormwater management features to properly meet the requirements set forth by the Town of Agawam Stormwater Management Ordinance as well as the Massachusetts Department of Environmental Protection Stormwater Management Handbook.

Please refer to the accompanying Stormwater Drainage Report for further information regarding the proposed stormwater management system.

PARKING & SITE CIRCULATION

As part of this project, provisions for a total of eighty-five (85) parking spaces are proposed including five (5) of which are handicap and van accessible. The applicant proposes to utilize the existing curb cut along Main Street to access the project site via 1422 Main Street. Please refer to the associated site plan set, Layout and Materials Plan, for greater detail regarding the configuration of parking/drive aisle areas proposed on the project site.

UTILITIES

As part of this project inspection and extension of existing water, sanitary sewer, electric, and telecommunication service connections from Main Street are proposed. Utilities will be run as shown on the accompanying site plan set. All utility connections will be coordinated with the utility provided and are subject to provider specification. Final building utility connections will be coordinated with final architectural/mechanical plans and are subject to modification as necessary. Please refer to the Drainage and Utilities Plan of the associated site plan set for further information regarding proposed location of utilities.

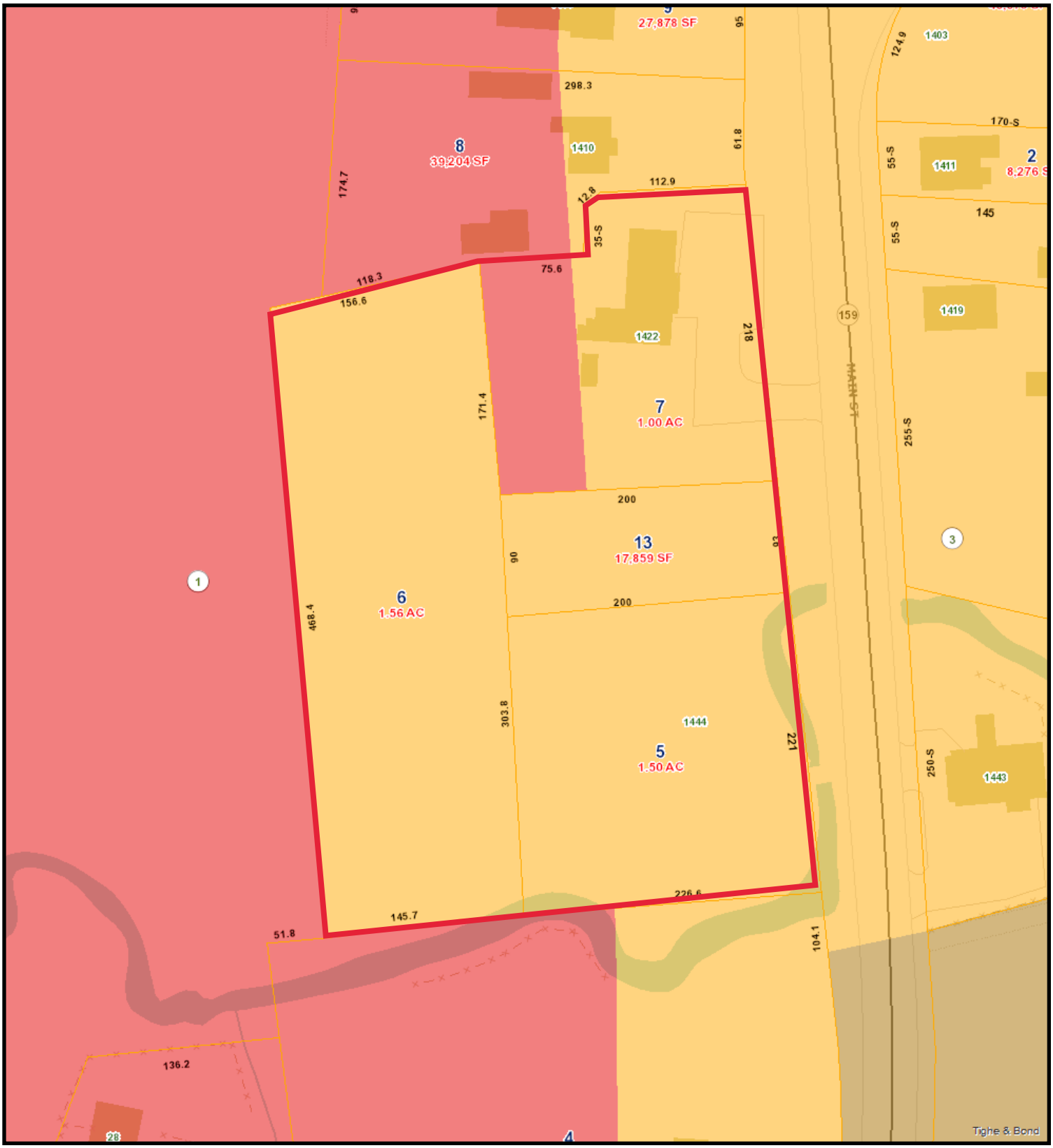
LANDSCAPING & LIGHTING

On-site landscaping will be provided and will be in conformance with municipal regulations. All plantings will be native plants and will be non-invasive. Please refer to the Site Landscaping Plan, which is included as part of the associated site plan set for further information regarding proposed landscaping at the project site.

On-site lighting will be provided and will be in conformance with municipal regulations and in general conformance with the surrounding areas. Please refer to the associated site plan set, Photometric Plan, for further details regarding proposed lighting at the project site.

[END OF PROJECT NARRATIVE]

4. LOCUS MAP



Locus Map

4/30/2024 9:47:49 AM

Scale: 1"=100'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

5. DEED REFERENCES

Bk 13612 Pg330 #105413

09-25-2003 @ 02:15p

1422 MAIN STREET
AGAWAM, MA

QUITCLAIM DEED

I **MARTIN EDELMAN** and **CATHERINE EDELMAN** of 1422 Main Street, Agawam, Hampden Counnty, Massachusetts, for consideration of **TWO HUNDRED AND EIGHTY-FIVE THOUSAND ($285,000.00)** dollars paid, grant to **RENU RAYONIA** and **RAJESH RAYONIA***OF 132 Glendale Road, Agawam, Hampden County, Massachusetts, **QUITCLAIM COVENANTS**, the land with buildings thereon situated in Agawam, Hampden County, Massachusetts, bounded and described as follows:

A certain parcel of land, together with the buildings thereon, situated on the westerly side of Main Street, in the Town of AGAWAM, Hampden County, Massachusetts, and more particularly bounded and described as follows:

BEGINNING at an iron pin, in the westerly line of said Main Street at the northeast corner of land; thence

NORTH 78 02' WEST by land now of said Dalgleish, Two Hundred Thirteen and 75/100 (213.75) feet to an iron pipe on land now or formerly of Harvey E. Porter, the said pipe also marks the northwest corner of land of said Dalgleish; thence

NORTH 9° 47' EAST One Hundred Seventy-one and 40/100 (171.40) feet to an iron pipe; thence

SOUTH 79° 33' EAST Seventy-five and 55/100 (75.55) feet to an iron pipe; thence

NORTH 9° 59' EAST Thirty-five and 35/100 (35.35) feet to an iron pipe; thence

NORTH 70° 06' EAST Twelve and 84/100 (12.84) feet to an iron pipe; thence

SOUTH 78° 28' EAST One Hundred Twelve and 85/100 (112.85) feet to an iron pipe in the westerly line of Main Street; the last five courses are by land now or formerly of Harvey E. Porter; thence by the westerly line of Main Street

SOUTH 5° 13' WEST Two Hundred Eighteen (218) feet to the point of beginning.

***husband and wife, tenants by the entirety,**

BEING the same premises conveyed to the grantors herein by deed of Roger L. Dalgeish recorded at the Hampden County Registry of Deeds Book 8218, Page 203.

Witness my hand and seal this 25 day of September 2003.

MARTIN EDELMAN

CATHERINE EDELMAN

COMMONWEALTH OF MASSACHUSETTS

Hampden, ss. September 25 2003

Then personally appeared the above named **CATHERINE EDELMAN** and acknowledged the foregoing instrument to be his/her free act and deed, before me.

Joseph R. Conway, Notary Public
My commission expires April 3, 2009

SPRINGFIELD
DEEDS REG12
HAMPDEN
09/25/03 1:29PM 01
000000 #3811
FEE $1299.60
CASH $1299.60

DONALD E. ASHE, REGISTER
HAMPDEN COUNTY REGISTRY OF DEEDS

Bk 18614 Pg149 #78728
12-30-2010 @ 11:12a

Address: 1444 Main Street, Agawam, Massachusetts
Assessor's Lots: K04-01-005, K04-01-006, K04-01-0031

MASSACHUSETTS QUIT CLAIM DEED

I, **PAULINE N. DALGLEISH,** of 7 Canal Road, Apatment 248, Suffield, Connecticut, for no consideration paid grant to **DEBRA ANN DESMOND**, of 13 Lakeside Drive, Tolland, Massachusetts, with Quit Claim Covenants, three (3) parcels of land located in the Town of Agawam, Hampden County, Massachusetts, situated on Main Street and being more particularly described as follows:

FIRST PIECE:

Being part of Parcel #3 as shown on a plan of land of Joseph and James Williams, said plan being made by Carey & Ross Engineers, dated May 1925 and recorded in the Hampden County Registry of Deeds, Book of Plans T, page 21 and bound and described as follows:

Beginning at a stake 270 feet southerly from the northwest corner of land now or formerly of James Williams, and running thence southwesterly along a ditch on land now or formerly of one Davis about 480 feet, more or less to a fence post at land now or formerly of one Lane; thence easterly along land now or formerly of said Lane, 464 feet; thence northeasterly along land now or formerly of Roger L. Dalgleish and Pauline N. Dalgleish, 177 feet to an iron pin; thence northerly along land now or formerly of J.W. Wilbur Co., about 588 feet to a stake; thence westerly along land now or formerly of one Hall and one Cook about 75 feet; thence southerly along land now or formerly of James Williams about 240 feet to a stake and nail; thence westerly along land now or formerly of James Williams about 270 feet to a stake at the place of beginning.

Excepting from the above, property conveyed to Joaquim M. Mendes and Mary Mendes by Deed dated November 9, 1974 and recorded in Hampden County Registry of Deeds Book 3875, page 232 as document number 35487.

Being the same premises as described in a Deed dated Sep tember 4, 1980 and recorded in Book 5007, page 361 of the Hampden County Registry of Deeds.

SECOND PIECE:

Being land bounded Easterly by Main Street; Northerly by land now or formerly of Minerva J. Davis; Westerly by land now or formerly of the heirs of Harvey Porter; and Southerly by land now or formerly of one Worthington. Containing two (2) acres, more or less.

Excepting from the above, the parcel deeded to Mabella A. Dalgleish as recorded in Hampden County Registry of Deeds Book 1432, page 133, being described as follows:

Beginning at the Northeast corner of land on Main Street, it being the Southeast corner of land now or formerly of Harvey E. Porter and running southerly along Main Street Eighty-three (83) feet to a stone bound; thence Westerly Two Hundred (200) feet to land now or formerly of the heirs of Harvey Porter; thence Northerly along said land now or formerly of the heirs of Harvey Porter, Ninety (90) feet to land now or formerly of Harvey E. Porter; thence Easterly along land now or formerly of Harvey E. Porter about Two Hundred (200 feet to the place of beginning.

Being the same premises as described in a Deed dated September 2, 1999 and recorded in Book 10916, page 192 of the Hampden County Registry of Deeds.

THIRD PIECE:

Beginning at the Northeast corner of land on Main Street, it being the Southeast corner of land now or formerly of Harvey E. Porter and running southerly along Main Street Eighty-three (83) feet to a stone bound; thence Westerly Two Hundred (200) feet to land now or formerly of the heirs of Harvey Porter; thence Northerly along said land now or formerly of the heirs of Harvey Porter, Ninety (90) feet to land now or formerly of Harvey E. Porter; thence Easterly along land now or formerly of Harvey E. Porter about Two Hundred (200 feet to the place of beginning.

The above 3 pieces of real estate being the same property devised to the Roger L. Dalgleish Revocable Inter Vivos Trust Dated August 27, 1993, by the Estate of Roger L. Dalgleish as set forth in the Probate Docket filed in the Commonwealth of Massachusetts Family Court Department, Hampden Division, Docket No. 04PO615FE1.

WITNESS my hand and seal this 29th day of December, 2010

Deana M. Daley

Timothy A. Daley

PAULINE N. DALGLEISH

STATE OF CONNECTICUT)
) **ss. Suffield** **December 29, 2010**
COUNTY OF HARTFORD)

Personally appeared before me this 29th day of December, 2010, **PAULINE N. DALGLEISH**, signer and sealer of the foregoing document, and acknowledged the same to be her free act and deed.

Tamara B. Bourque, Notary Public
My Commission Expires: 7/31/2011

(seal)

Grantee's Address:
13 Lakeside Drive
Tolland, MA

DONALD E. ASHE, REGISTER
HAMPDEN COUNTY REGISTRY OF DEEDS

APPENDIX A: SITE PLAN SET

SITE PLAN SET ENTITLED “PROPOSED HOTEL”

PREPARED FOR SHIELD HOTELS

PREPARED BY R LEVESQUE ASSOCIATES, INC.

DATED MAY 23, 2024; REVISED SEPTEMBER 23, 2024

APPENDIX B: STORMWATER REPORT

STORMWATER DRAINAGE REPORT

PREPARED FOR SHIELD HOTELS

PREPARED BY R LEVESQUE ASSOCIATES, INC.

DATED MAY 23, 2024; REVISED SEPTEMBER 23, 2024

APPENDIX C: BUILDING ELEVATIONS

Stormwater Drainage Report

Proposed Hotel & Site Improvement Plan

1422-1444 Main Street
Agawam, Massachusetts
(Map K4 Block 1 Parcels 5, 6, 7, & 13)

Applicant/Owner:

Shield Hotels
c/o Kenny Patel
63 Myron Street
West Springfield, MA 01089

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 48376
REGISTERED PROFESSIONAL ENGINEER

9/24/24

RLA Project File: 231007

May 23, 2024

Revised: September 24, 2024

R LEVESQUE ASSOCIATES, INC
A LAND PLANNING SERVICES COMPANY
40 School Street · Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

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APPENDIX B: SOILS INFORMATION

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APPENDIX E: MASSDEP CALCULATIONS

APPENDIX F: CONSTRUCTION PERIOD EROSION CONTROL PLAN

APPENDIX G: LONG-TERM OPERATION AND MAINTENANCE PLAN

APPENDIX H: ILLICIT DISCHARGE COMPLIANCE STATEMENT

APPENDIX I: LOW IMPACT DEVELOPMENT ALTERNATIVES ANALYSIS NARRATIVE

I. INTRODUCTION

The purpose of this report is to present information regarding the technical aspects of the stormwater management system for the proposed project. All work is intended to be in full compliance with Agawam Stormwater Management Ordinance as well as the Massachusetts Department of Environmental Protection Stormwater Management Handbook. The stormwater management system includes approved best management practices (BMPs) to meet the requirements.

The applicant, Shield Hotels, is proposing to construct a new hotel building and various site improvements at 1422-1444 Main Street in Agawam, Massachusetts. The proposed project spans across parcels identified by the Agawam Assessor's office as map K4 Block 1 parcels 5, 6, 7, & 13. For the purposes of this report, reference to the "project site" shall include all of the parcels to be modified. The easterly portion of the project site has been historically developed and cleared of mature vegetation and is the location of a commercial building that is being utilized as a restaurant with associated paved drive aisles and various other improvements which are to remain. The westerly and southerly portions of the site are wooded with various jurisdictional areas. Currently, the only stormwater best management practice being utilized is located on the easterly side of the project site and includes a landscape pond.

The proposed project involves the following:

1. Demolition of the existing site improvements including the paved surface areas;
2. Construction of a hotel building;
3. Construction of associated site improvements including access drives and landscaping;
4. Installation of underground utilities including water, sanitary sewer, and electric and telecommunication services;
5. Construction of a stormwater management system including deep-sump hooded catch basins, proprietary sedimentation devices, bio-retention basins, and a level spreader.

The new drainage infrastructure has been designed utilizing the Agawam Stormwater Management Ordinance as well as the Massachusetts Department of Environmental Protection Stormwater Management Handbook. The proposed development will generally maintain the existing drainage patterns of the site and direct treated stormwater toward the same bordering vegetated wetlands as in pre-development conditions.

2. SITE DESCRIPTION

2.1 Predevelopment Conditions

The properties to be developed are located at 1422-144 Main Street and listed as map K4 Block 1 parcels 5, 6, 7, & 13 by the Town of Agawam's GIS database. The locus parcels are zoned Business A (BA) as referenced from the Town of Agawam's zoning map. The property is bounded to the north and south by split zoned and residentially occupied buildings, to the West by the Massachusetts Veterans Memorial Cemetery, and to the east by Main Street. The total area of the parcels is approximately 4.04 acres in size. Figure 1 – USGS Map illustrates the location of the project.

Portions of the site have been historically developed with various site improvements including a commercially occupied building utilized as a restaurant, outdoor lawn areas, paved access drives, and paved parking areas. In general, the topography of the site can be described in two different sections; an upper wooded terrace and the lower historically developed section directly fronting on Main Street. The upper terrace is at a higher elevation and is gently sloped toward the westerly property line. From the top of slope at the edge of the terrace, the topography is fairly steep and slopes down to the lower area where the existing restaurant building is located. The topography adjacent to the existing building is gently sloped within the paved parking and driving areas. Please refer to the existing conditions plan submitted herewith for more detailed topographical information.

2.2 Resource Areas

Portions of the parcel are located within jurisdictional buffer zone areas associated with on-site bordering vegetated wetlands, bordering land subject to flooding, and riverfront area. Please refer to the Notice of Intent filing for detailed information regarding the jurisdictional areas.

2.2.1 Floodplain

R. Levesque Associates, Inc. performed due diligence research on the property in regard to FEMA flood zone mapping. As demonstrated by the most recent FEMA Flood Insurance Rate Map 25013C0411E, the property is located within a flood hazard area subject to inundation by the 100-year flood event, see Figure 2 – FEMA FIRM Map.

2.2.2 Natural Heritage and Endangered Species Program

R. Levesque Associates, Inc. performed due diligence research on the property in regard to Natural Heritage and Endangered Species Program (NHESP) areas. The properties are not located within areas delineated by NHESP as priority habitats of endangered species, see Figure 3 – NHESP & Zone II Map.

2.2.3 Aquifer Protection District

R. Levesque Associates, Inc. performed due diligence research on the property in regard to wellhead protection overlay districts. The property is not located within an area delineated as a Zone II Wellhead Protection Area, see Figure 3 – NHESP & Zone II Map.

2.3 Soils

R. Levesque Associates, Inc. researched the soils located on site with information available from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Based on a review of the USDA Soil Survey of Hampshire County, Massachusetts, the site is comprised of the following soil types:

Table 2.4: Hydrologic Soil Group Classification

Soil Description	Map Unit Symbol	Hydrologic Soil Group
Swansea Muck	51A	D
Unadilla Very Fine Sandy Loam	230B	C
Unadilla Very Fine Sandy Loam	250C	C
Buxton Variant Silt Loam	729B	C

A series of test pits were conducted by Ryan Nelson, SE#14394 to evaluate the ability of the site to support the stormwater drainage system components. A total of ten (10) test holes were dug on the property in the vicinity of the proposed building and stormwater basin areas. The test pits showed evidence of groundwater at depths ranging from 36-inches to 110-inches. See Appendix B for the United States Department of Agriculture Natural Resources Conservation Service Soil Resource Report (NRCS) and Soil Evaluation log sheets. In general, the soil evaluations confirmed the NRCS mapping.

2.4 Post Development Conditions

The proposed site improvements include a number of stormwater management features to properly meet the requirements set forth by the Town of Agawam Stormwater Management Ordinance as well as the Massachusetts Department of Environmental Protection Stormwater Management Handbook. The proposed stormwater features include:

- Deep-Sump Hooded Catch Basins;

- Proprietary sedimentation devices;
- Bio-retention basins;
- Level Spreader

The developer is proposing to construct a new hotel building and associated site improvements including paved access drives with associated parking areas, sidewalks and stormwater management system. New utilities for the proposed building including water, sewer, gas, and electric services will be brought on-site via the frontage with Main Street.

The proposed stormwater management system will collect runoff from the impervious surfaces via sheet flow and deep sump catch basins strategically located at low points across the site. The stormwater management system has been de-centralized into two separate treatment train paths; the stormwater management system for the upper elevations adjacent to the proposed hotel and the stormwater management system for the lower elevations adjacent to the existing restaurant building. In both scenarios, the treatment trains are the same with the inlet structures collecting and conveying runoff via a network of underground infrastructure toward a proprietary sedimentation device, prior to discharging to a bio-retention basin.

The bio-retention basins were designed to provide the necessary water quality treatment and peak discharge rate attenuation for the proposed site improvements. Each basin has been equipped with an outlet control structure designed to control the discharge of runoff to match or reduce pre-development discharge rates. The proposed site improvements will maintain the general drainage patterns of the site by discharging runoff to the same design points in post-development as pre-development conditions. Each component of the proposed stormwater management systems has been designed to meet the standards set forth by the Town of Agawam Stormwater Management Ordinance as well as the Massachusetts Department of Environmental Protection Stormwater Management Handbook.

3. STORMWATER MANAGEMENT SYSTEM

R. Levesque Associates, Inc. has prepared the following drainage system calculations for the proposed project site. These calculations were performed to document compliance with the guidelines set forth by the Town of Agawam Stormwater Management Permit requirements and the Massachusetts Department of Environmental Protection Stormwater Management Handbook (MassDEP Handbook). A detailed hydrologic analysis of the system was completed in order to evaluate the performance of the stormwater management system components, see Appendix C – Pre- and Post-Development Hydrologic Analysis. The proposed stormwater management system will collect runoff from on-site impervious areas and utilize stormwater best management practices to provide water quality treatment and peak discharge rate attenuation.

3.1 Drainage Calculations

R. Levesque Associates, Inc. utilized the HydroCAD software program, Version 10.10-7c, developed by HydroCAD Software Solutions LLC, in order to create and analyze the site hydrology. The HydroCAD software is based upon the Soil Conservation Service (SCS) "Technical Release 20 – Urban Hydrology for Small Watersheds" and "Technical Release 55 – Urban Hydrology for small Watersheds" which are generally accepted industry standard methodologies. The analysis was conducted in order to establish the peak discharge rates from the project site. This was accomplished to properly evaluate pre- and post-development conditions during various storm events. Contributing drainage areas were identified and soils, surface cover, watershed slope, and flow paths were evaluated to develop the necessary HydroCAD model input parameters.

Drainage calculations were performed for the Pre- and Post-Development conditions for the 24-hour, 2, 10, and 100-year Type III storm events. The total rainfall for each of the storm events was based upon data provided by the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 point precipitation frequency estimates. The total rainfall values used in the hydrologic modeling for each event are shown in the following table:

Table 3.1: Design Rainfall Data		
2-year, 24-hour storm	10-year, 24-hour storm	100-year, 24-hour storm
3.19 inches	5.12 inches	8.19 inches

3.1.1 Design Points

In order to compare the difference between pre- and post-development peak flows, existing and proposed watersheds were delineated. Two Design Points (DP) were established with flow paths representing the longest time of concentration of run-off in each tributary watershed. For this analysis, the design points were determined as follows:

- DP-1 (Offsite to East): This design point represents runoff from the property which is tributary to the bordering vegetated wetlands and perennial stream located on-site. Ultimately, the stream passes through a culvert under Main Street and off-site toward the East;

- DP-2 (Offsite to West): This design point represents runoff from the property which is tributary off-site to the west toward the cemetery property.

3.1.2 Pre-Development Hydrology

The project area under existing conditions was broken down into two (2) sub-catchments discharging to the design points as described above. The sub-catchments were delineated based on the existing topography of the parcel and surrounding areas. The existing watershed areas are shown on the attached Figure 4 entitled "Pre-Development Watershed Plan". Peak discharge rates for the design point are depicted in Table 3.1.4 below.

3.1.3 Post-Development Hydrology

The project area under proposed conditions was broken down into four (4) sub-catchments discharging to the same design points as the existing conditions. The proposed watershed areas are shown on the attached Figure 5 entitled "Post-Development Watershed Plan". Peak discharge rates for the design point are depicted in Table 3.1.4 below.

3.1.4 Peak Discharge Rates

The table below summarizes the Pre- and Post-Development peak discharge rates for each Design Point:

Table 3.1.4 Pre- and Post-Development Peak Discharge Rates						
	2-year storm (cfs)		10-year storm (cfs)		100-year storm (cfs)	
	Pre-	Post-	Pre-	Post-	Pre-	Post-
Design Point 1	1.7	1.6	3.7	3.7	7.2	7.0
Design Point 2	0.7	0.2	2.0	0.6	4.4	1.4

As depicted in the table, the post-development peak discharge rates do not increase over pre-development peak discharge rates for each of the storm events presented. This is accomplished by providing onsite attenuation with the bio-retention basins.

3.2 Hydraulic Analysis

R. Levesque Associates, Inc. utilized the Hydraflow Storm Sewer Extension for AutoCAD Civil 3D 2020 software program, Version 9, developed by Autodesk, Inc., in order to analyze the hydraulic capacity of the proposed underground infrastructure. The analysis was conducted in order to verify that the proposed conveyance piping has sufficient capacity to convey up to and including the 24-hour, 100-year storm event. The data from the analysis was used to properly size the conveyance piping such that there is no or minimal surcharge of stormwater above the rim elevations within the paved areas. As part of the input parameters required for the hydraulic analysis, the tributary inlet areas were delineated based on topography, any additional connected discharges, characteristic land use coverages and flow paths, see Figure 6 – Inlet Area Plan. A minimum Time of Concentration (Tc) of (6) minutes was used in the calculations. Please refer to Appendix D for the hydraulic analysis of the proposed stormwater management system.

3.3 MassDEP Stormwater Management Standards

R. Levesque Associates, Inc. has designed the proposed stormwater management system to be in compliance with the MassDEP Stormwater Management Standards. Chapter 1, Volume 3 of the MassDEP Handbook outlines specific calculations, and other information, that must be submitted with each report to document compliance. The following summary highlights elements of the proposed project and how they apply to each standard.

- *Standard #1 - No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

  The proposed stormwater management system has been designed to provide best management practices to the guidelines of the MassDEP Handbook. Therefore, no new untreated stormwater is discharged.

- *Standard #2 – Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.*

  The proposed stormwater management system has been designed such that the post-development peak discharge rates are less than or equal to the pre-development discharge rates for the 2-year, 10-year, and 100-year 24-hour storms. See Appendix C for the Hydrologic Analysis.

- *Standard #3 - Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater BMPs, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required volume as determined in accordance with the Massachusetts Stormwater Handbook.*

  This standard has been met to the maximum extent practicable. The NRCS mapping of the site shows the entirety of the site comprised of hydrologic soil class "C" and "D" soils. In order to verify the soil conditions of the property, a number of on-site soil evaluations were performed across the property. The soil evaluations corroborated the NRCS mapping where materials similar to the Swansea Muck and Unadilla Very Fine Sandy Loam series were discovered across the site with relatively high groundwater elevations. As such, and as allowed by the MassDEP Stormwater Management Handbook, the proposed stormwater management system was designed utilizing best management practices to meet all other Handbook standards and provide recharge to the maximum extent practicable.

- *Standard #4 – Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of TSS. It is presumed that this standard is met when:*

  a. Suitable practices for source control and pollution prevention are identified in a long term pollution prevention plan, and thereafter are implemented and maintained;

b. *Structural stormwater BMPs practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*

c. *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook*

The stormwater management system has been designed to provide the required total suspended solids pre-treatment prior to discharge to the bio-retention basins. The treatment train for each basin is identical and utilizes pretreatment BMPs which include deep-sump hooded catch basins and proprietary sedimentation devices in addition to the bio-retention basins. See Appendix E for the Water Quality and Total Suspended Solids Removal Calculations.

- *Standard #5 - For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by MassDEP to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

  This standard is not applicable.

- *Standard #6 – Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater BMPs determined by MassDEP to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.*

The perennial stream located on-site is a Cold Water Fishery Resource, which is classified as a critical area. The proposed stormwater management system has been designed to demonstrate compliance with the requirements of Standard 6.

- *Standard #7 – A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural BMPs requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

  This standard is not applicable.

- *Standard #8 – A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention) shall be developed and implemented.*

  A Construction Period Erosion Control Plan has been provided in Appendix F.

- *Standard #9 – A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

  A Long-term Operation & Maintenance Plan has been provided in Appendix G.

- *Standard #10 - All illicit discharges to the stormwater management system are prohibited.*

  An illicit discharge statement will be provided prior to discharge of stormwater to post-construction BMPs. See Appendix H for a copy of the Illicit Discharge Statement.

3.4 Stormwater Best Management Practices

The proposed stormwater management system was designed utilizing stormwater best management practices (BMP) as set forth by the MassDEP Handbook. The BMPs utilized as part of the stormwater management system include deep-sump hooded catch basins, proprietary sedimentation devices, and bio-retention basins. All of the BMPs were designed to meet the requirements of the MassDEP Handbook and will provide water quality treatment and peak rate attenuation in order to mitigate the impacts of the proposed site improvements. See Appendix E – MassDEP Calculations for the calculations required to document compliance. The following section provides a description of the best management practices (BMPs) being utilized on site.

3.4.1 Deep Sump Catch Basins

Deep-sump catch basins equipped with oil/gas hoods are being utilized as structural pretreatment devices within the proposed stormwater management system. The catch basins will be constructed

with a 4′-0″ deep sump to act as a settling chamber and allow for adequate storage of collected sediments. Catch basins are typically first in the line of water quality treatment.

3.4.2 Proprietary Sedimentation Devices

Proprietary sedimentation devices are being utilized on site for the pretreatment of stormwater runoff prior to conveyance to the bio-retention basins. The stormwater management system is utilizing the proprietary treatment devices in order to ensure that the required water quality treatment is being performed prior to discharge to down gradient infrastructure.

3.4.3 Bio-retention Basin

Bio-retention basins are being utilized on site as part of the stormwater management system treatment train process to enhance water runoff quality and attenuate peak-discharge rates. Bio-retention basins utilize soils, plants, and microbes to treat stormwater before discharge. The bio-retention basins associated with this project were designed with an impermeable liner and underdrain. With the installation of an outlet control structure, the basin can retain stormwater over a period of time to allow for peak rate attenuation and water quality treatment. The proposed bio-retention basins have been designed to attenuate flows up to and including the 100-year storm event.

3.5 Protection of Stormwater Best Management Practices during Construction

Protection of the stormwater best management practices during construction will ensure the proper functioning of the stormwater management system and provide protection to the undisturbed areas until the site has been stabilized. Certain specific erosion and sedimentation controls and good practices to be performed by the site contractor have been documented in a Construction Period Erosion Control Plan. See Appendix F – Construction Period Erosion Control Plan.

3.6 Inspection and Maintenance of Stormwater Best Management Practices

Frequent maintenance of the stormwater best management practices is essential to ensuring that the stormwater management system will function properly long-term. The MassDEP provides guidelines for the regular inspection and maintenance of the proposed stormwater best management practices. A Long-Term Stormwater Operation and Maintenance Plan has been prepared which dictates the inspection frequency and maintenance operations for each BMP. See Appendix G – Long-Term Operation and Maintenance Plan.

3.7 Illicit Discharge Compliance Statement

RLA has prepared an Illicit Discharge Compliance Statement to document compliance with the Massachusetts Department of Environmental Protection Stormwater Management Handbook, see Appendix H.

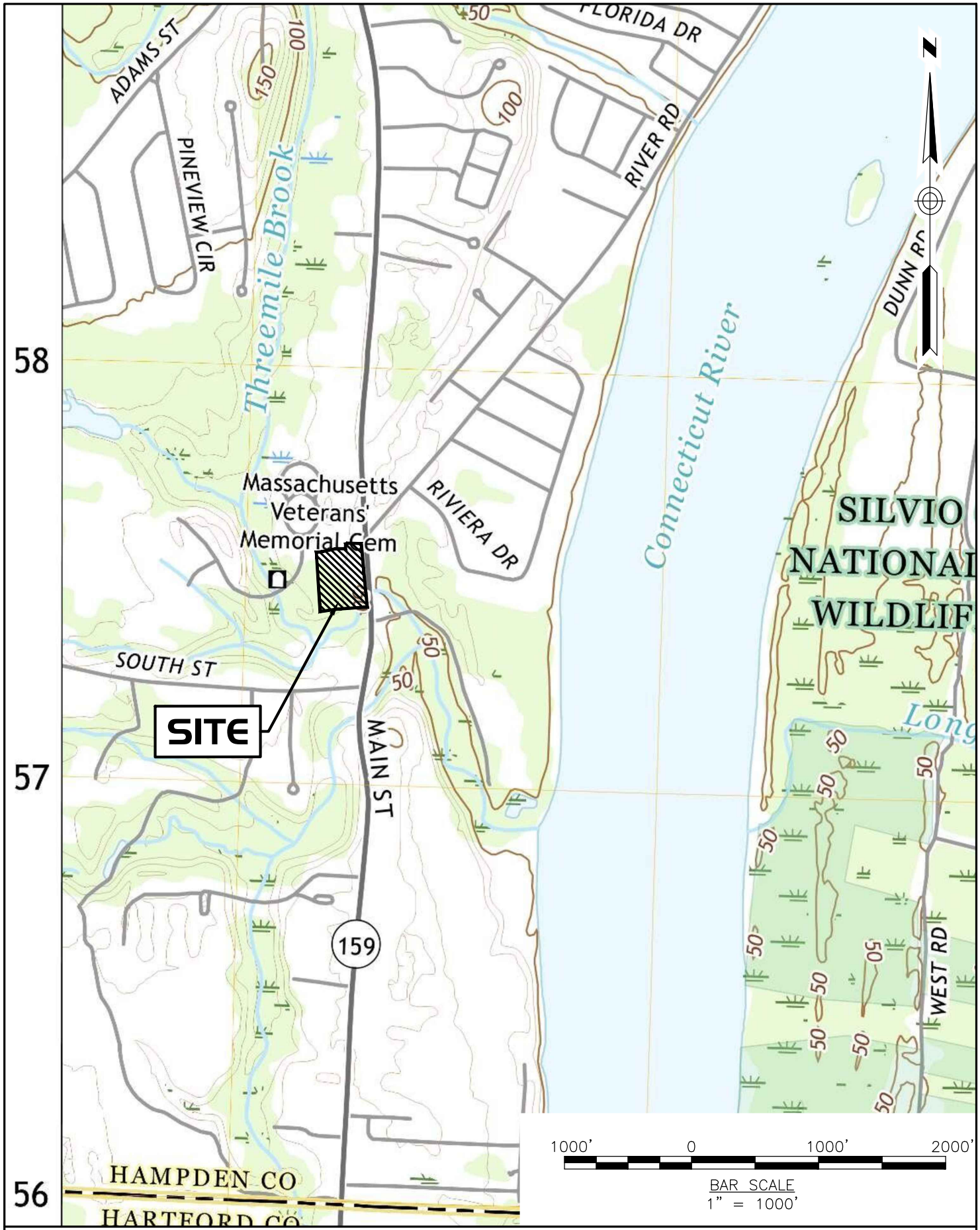
3.8 Low-Impact Development Alternatives Analysis Narrative

RLA has prepared a Low-Impact Development Alternatives Analysis Narrative as part of the Stormwater Drainage Report, see Appendix I.

4. CONCLUSION

The proposed stormwater management system has been designed to mitigate the impacts of the proposed site improvements by providing a control for runoff water quality and water quantity. Since the site is comprised entirely of hydrologic soil group "C" and "D" soils, the Massachusetts Stormwater Management Handbook is applicable only to the maximum extent practicable. As such, the proposed stormwater management system and site design recharges runoff only to the maximum extent practicable due to the on-site soil conditions limiting the ability to infiltrate. The stormwater management system has been designed to meet all other stormwater standards and the only relief needed is from the infiltration requirements. Implementation of stormwater best management practices such as deep-sump hooded catch basins, proprietary sedimentation devices, bio-retentions basins, and a level spreader allow for a stormwater drainage design in compliance with the Agawam Stormwater Management Ordinance as well as the Massachusetts Department of Environmental Protection Stormwater Management Handbook.

Figure 1: Site Locus – USGS Map



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SITE LOCUS
USGS MAP

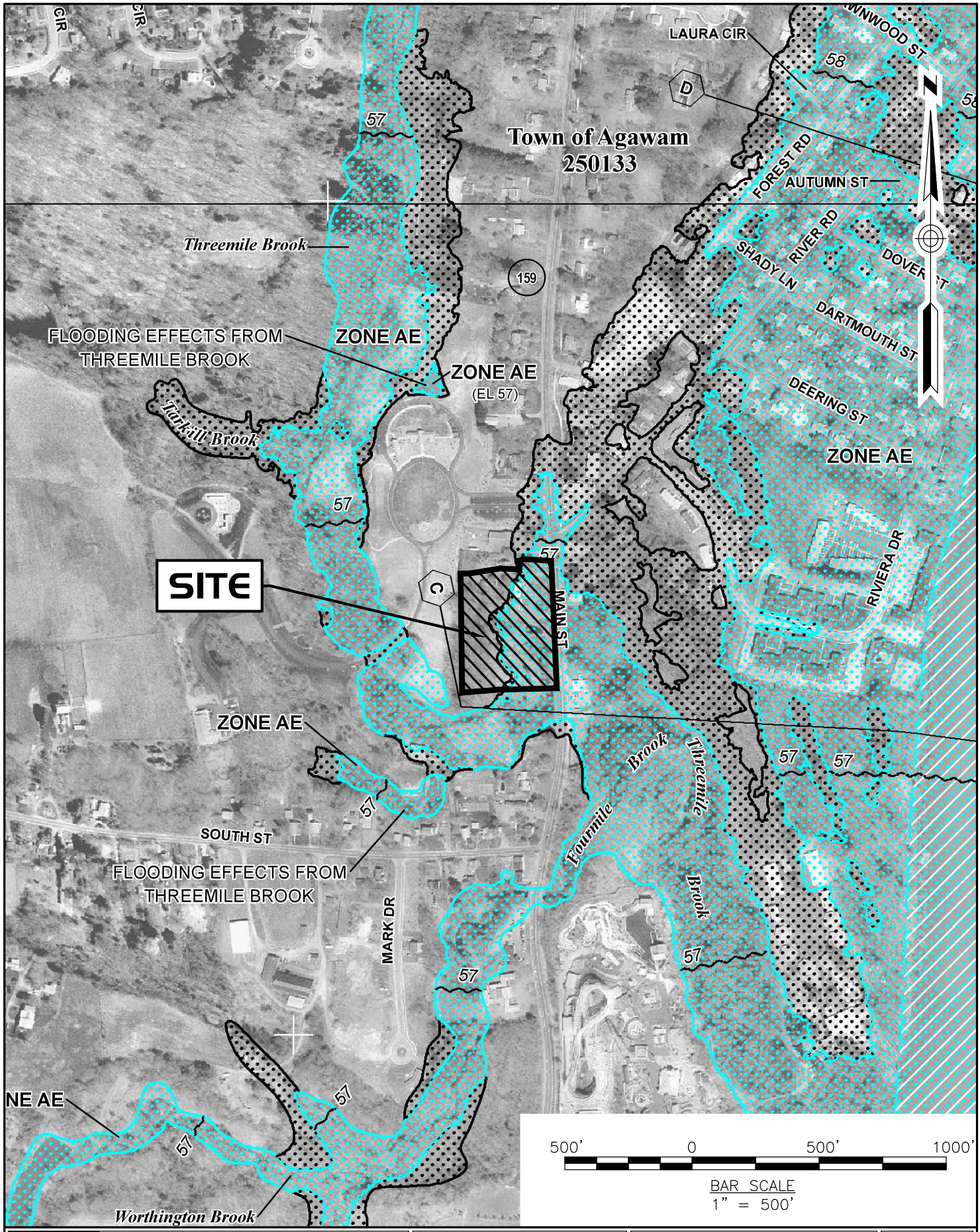
Shield Hotels
63 Myron Street
West Springfield, Massachusetts

Proposed Commercial Development
1422-1444 Main Street
Agawam, Massachusetts

JOB NO: 231007
DATE: 5/23/24
SCALE: AS NOTED

FIG-1

Figure 2: FEMA Flood Map



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FLOOD RATE INSURANCE MAP

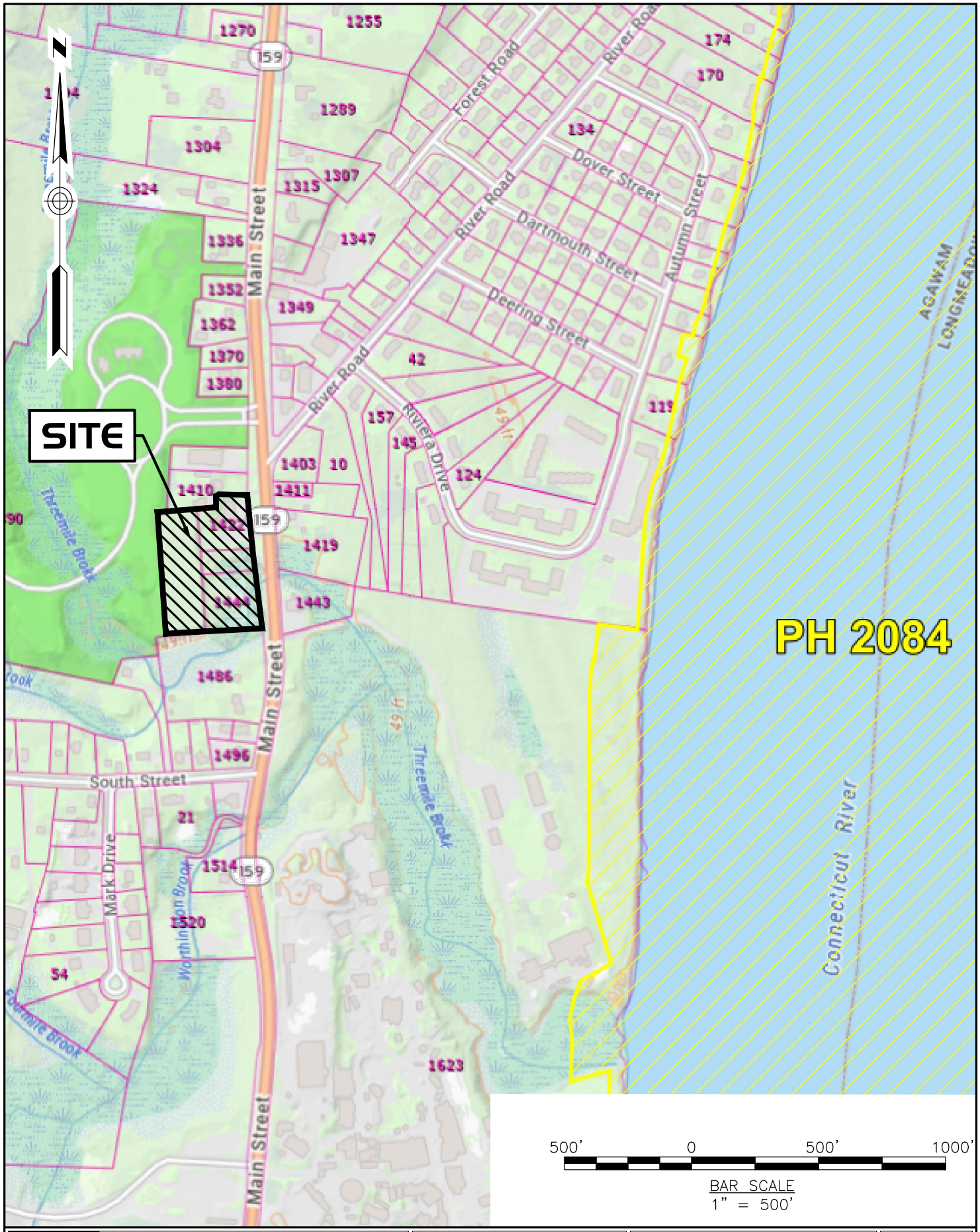
Shield Hotels
63 Myron Street
West Springfield, Massachusetts

Proposed Commercial Development
1422-1444 Main Street
Agawam, Massachusetts

JOB NO: 231007
DATE: 5/23/24
SCALE: AS NOTED

FIG-2

Figure 3: NHESP and Zone II Map



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RLA

NHESP Area Map

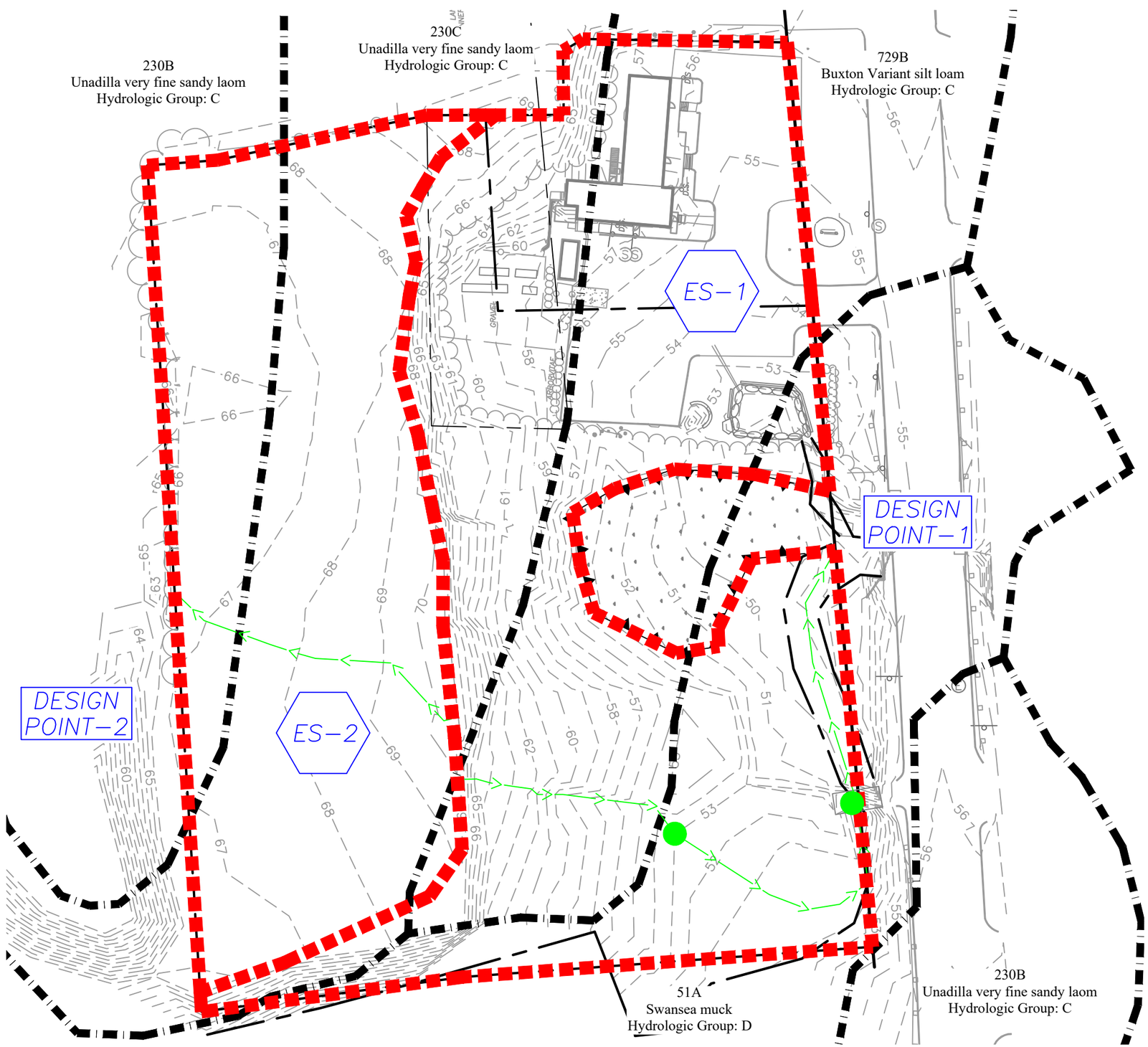
Shield Hotels
63 Myron Street
West Springfield, Massachusetts

Proposed Commercial Development
1422-1444 Main Street
Agawam, Massachusetts

JOB NO: 231007
DATE: 5/23/24
SCALE: AS NOTED

FIG-3

Figure 4: Pre-Development Watershed Plan



LEGEND

- TIME OF CONC. FLOW PATH
- ES-1 SUBCATCHMENT NAME
- SUB WATERSHED
- SOIL BOUNDARY

1" = 60'

30 0 60

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Pre-Development Watershed Plan

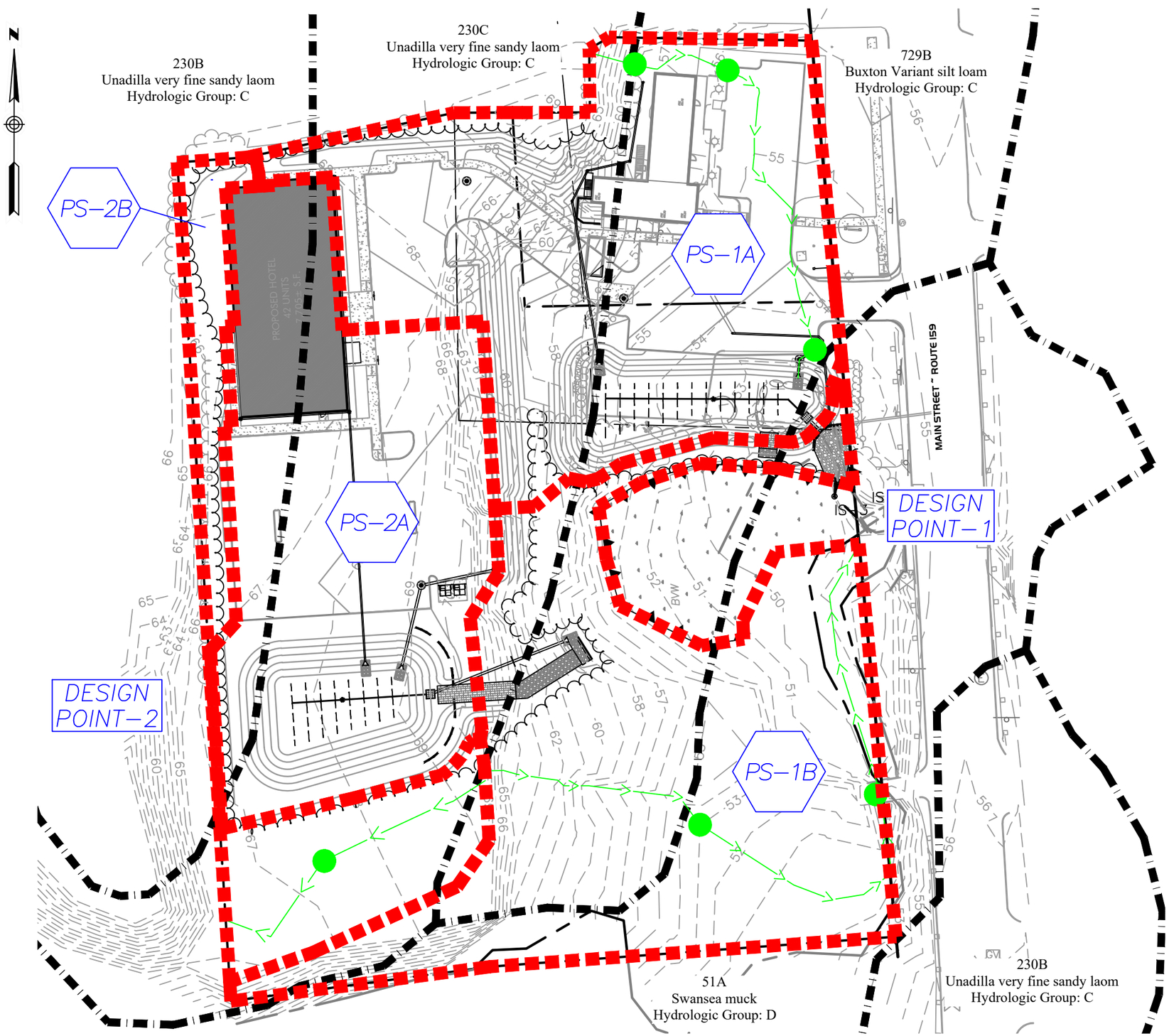
Proposed Boutique Hotel
Main Street
Agawam, Massachusetts

Shields Hotel c/o Mr. Kenny Patel
63 Myron Street
West Springfield, MA 01089

JOB NO.: 231007
DATE: 5/23/24
SCALE: As Noted

FIG-4

Figure 5: Post-Development Watershed Plan



LEGEND

- TIME OF CONC. FLOW PATH
- PS–1 SUBCATCHMENT NAME
- SUB WATERSHED
- SOIL BOUNDARY

1" = 60'

30 0 60

Revised: 9/24/24

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Post-Development Watershed Plan

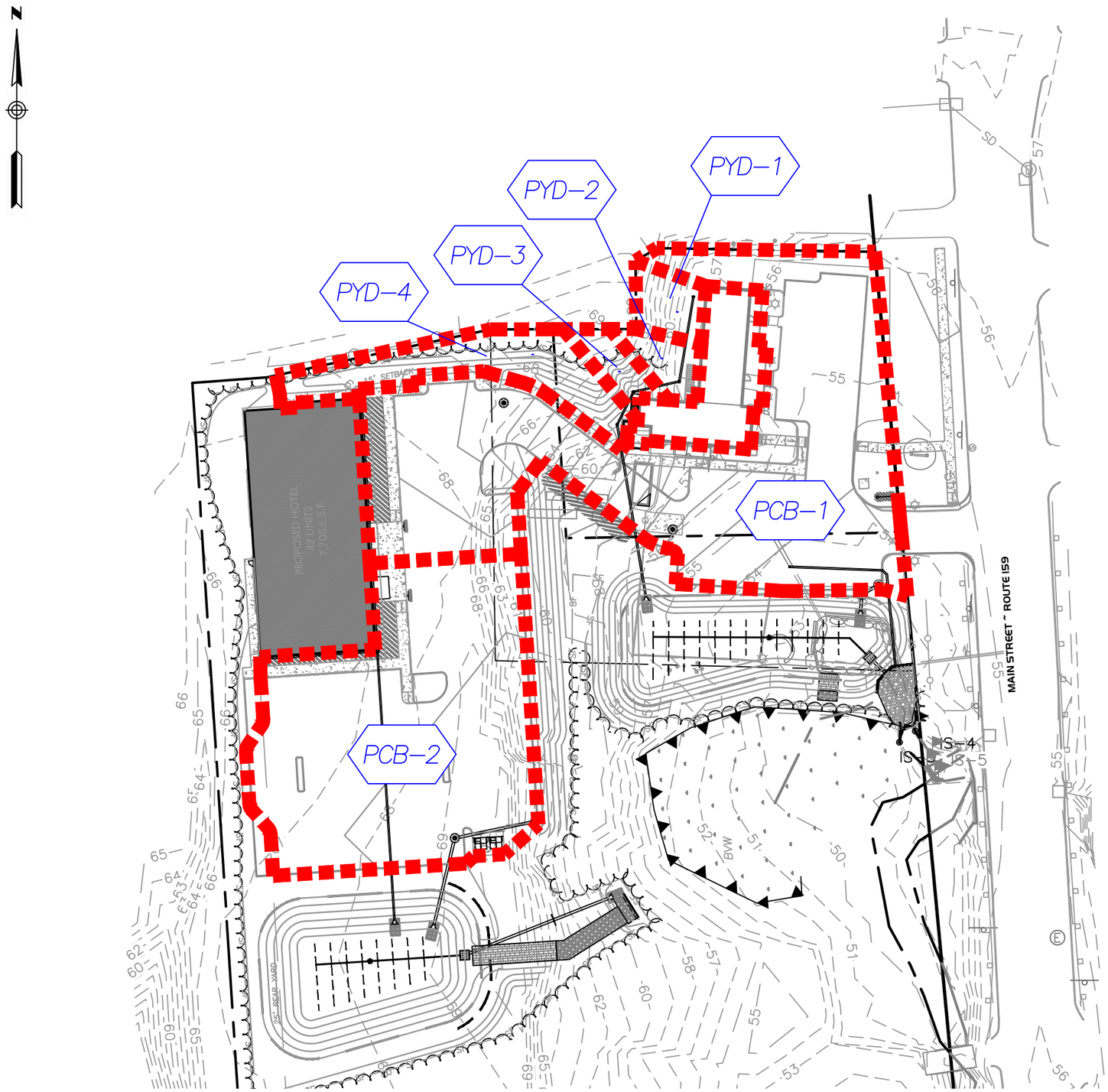
Proposed Boutique Hotel
Main Street
Agawam, Massachusetts

Shields Hotel c/o Mr. Kenny Patel
63 Myron Street
West Springfield, MA 01089

JOB NO.: 231007
DATE: 7/1/24
SCALE: As Noted

FIG-5

Figure 6: Inlet Area Plan



LEGEND

PCB–1 STRUCTURE NAME

SUB WATERSHED

SOIL BOUNDARY

1" = 60'

30 0 60

Revised: 9/24/24

R LEVESQUE ASSOCIATES, INC

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Inlet Area Plan

Proposed Boutique Hotel
Main Street
Agawam, Massachusetts

Shields Hotel c/o Mr. Kenny Patel
63 Myron Street
West Springfield, MA 01089

JOB NO.: 231007

DATE: 5/23/24

SCALE: As Noted

FIG-6

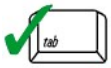
Appendix A: Checklist for Stormwater Report

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.

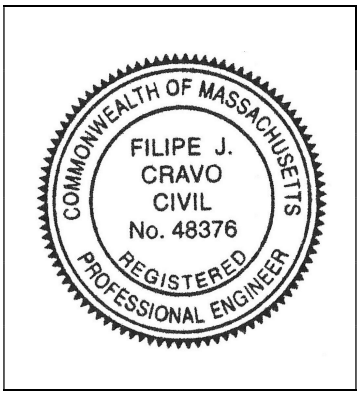
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



9/24/24

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): Proprierary Sedimentation Devices, and Level Spreader

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: Soils Information

- NRCS Soils Report
- Soil Evaluation Logs

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Hampden County, Massachusetts, Central Part

Main Street - Agawam

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 1:15,800.

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: Hampden County, Massachusetts, Central Part
Survey Area Data: Version 17, Sep 10, 2023

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

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
51A	Swansea muck, 0 to 1 percent slopes	0.7	18.2%
230B	Unadilla very fine sandy loam, 3 to 8 percent slopes	0.4	9.8%
230C	Unadilla very fine sandy loam, 8 to 15 percent slopes	1.7	41.0%
729B	Buxton Variant silt loam, 0 to 8 percent slopes	1.3	31.0%
Totals for Area of Interest		**4.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Hampden County, Massachusetts, Central Part

51A—Swansea muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2trl2
Elevation: 0 to 1,140 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Swansea and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swansea

Setting

Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loose sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 34 inches: muck
Cg - 34 to 79 inches: coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 10 percent
Landform: Bogs, swamps

Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

230B—Unadilla very fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 99rn
Elevation: 50 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Unadilla and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Unadilla

Setting

Landform: Lakebeds (relict)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Hard coarse-silty glaciolacustrine deposits

Typical profile

H1 - 0 to 10 inches: very fine sandy loam
H2 - 10 to 23 inches: very fine sandy loam

H3 - 23 to 60 inches: stratified very fine sand to silt

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F144AY024NY - Well Drained Eolian Outwash
Hydric soil rating: No

Minor Components

Belgrade

Percent of map unit: 10 percent
Landform: Lakebeds (relict)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Raynham

Percent of map unit: 10 percent
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

230C—Unadilla very fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 99rp
Elevation: 0 to 1,800 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Unadilla and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Unadilla

Setting

Landform: Lakebeds (relict)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Hard coarse-silty glaciolacustrine deposits

Typical profile

H1 - 0 to 10 inches: very fine sandy loam
H2 - 10 to 23 inches: very fine sandy loam
H3 - 23 to 60 inches: stratified very fine sand to silt

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY024NY - Well Drained Eolian Outwash
Hydric soil rating: No

Minor Components

Belgrade

Percent of map unit: 10 percent
Landform: Lakebeds (relict)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Amostown

Percent of map unit: 10 percent
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread

Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

729B—Buxton Variant silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 99n7
Elevation: 0 to 1,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Buxton variant and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buxton Variant

Setting

Landform: Lakebeds (relict)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Soft coarse-silty glaciolacustrine deposits derived from mica schist over hard clayey glaciolacustrine deposits derived from mica schist

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 24 inches: silt loam
H3 - 24 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 30 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C
Ecological site: F145XY005MA - Moist Lake Plain
Hydric soil rating: No

Minor Components

Belgrade
Percent of map unit: 10 percent
Landform: Lakebeds (relict)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Scantic variant
Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

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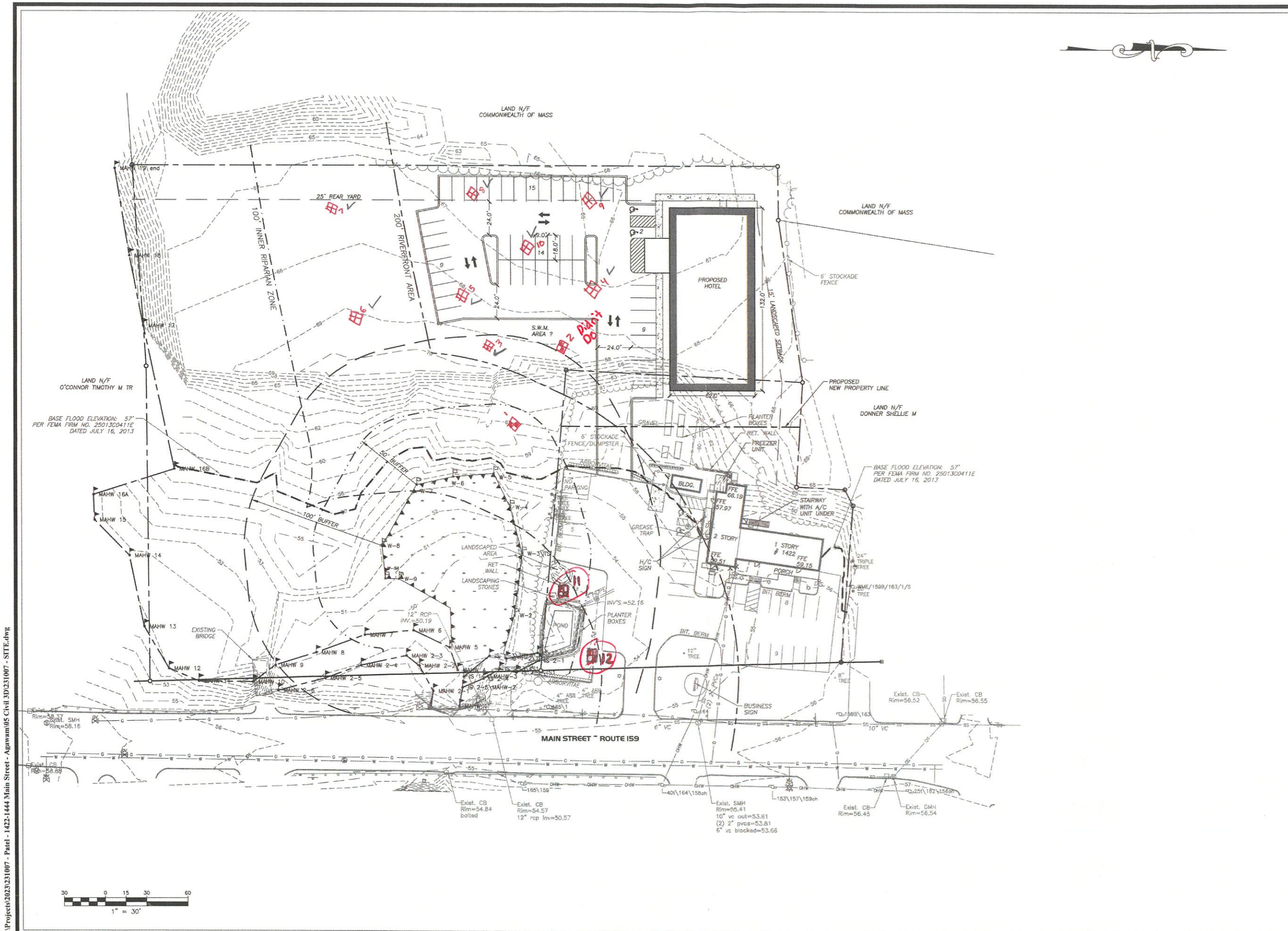

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RLA

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Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants

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Westfield, MA 01085

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GRADING, EROSION & SEDIMENTATION CONTROL PLAN

1422 Main Street
Agawam, MA.

PREPARED FOR:

Kenny Patel
Shield Hotels

63 Myron Street
West Springfield MA.

ISSUANCE DATE: December 13, 2023

REVISIONS:	DATE:

DRAFTED BY: t.a.

UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 231007

DRAWING#	REV.
C-5	-

1422 Main St, Agawam

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 1 (Hole #) | 12-21-23 (Date) | 2:30 pm (Time) | 39°F Clear (Weather) | Latitude | Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | Maple + Cherry (Vegetation) | N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 5-8 (Slope (%))

Description of Location:

2. Soil Parent Material: | Landform | BS (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >50 feet | Drainage Way >50 feet | Wetlands >50 feet | Property Line >50 feet | Drinking Water Well >100 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 116" Depth to Weeping in Hole — Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	A	Sandy loam	10YR 4/4	—	Cnc : Dpl:	—	—	—	G	Friable	
12-120"+	C	Silt loam	2.5Y 5/3	78"	Cnc : 10YR 5/6 Dpl:	20%	—	—	M	"	Smooth Sidewalls Dense
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area*)

Deep Observation Hole Number: 3 (Hole #) | 12-21-23 (Date) | 1:20 pm (Time) | 32°F Clear (Weather) | Latitude | Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | Maple (Vegetation) | N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 1-2 (Slope (%))

Description of Location:

2. Soil Parent Material: | Landform | SH (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >50 feet | Property Line >100 feet | Drinking Water Well >100 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: – Depth to Weeping in Hole – Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features: Depth	Redoximorphic Features: Color	Redoximorphic Features: Percent	Coarse Fragments % by Volume: Gravel	Coarse Fragments % by Volume: Cobbles & Stones	Soil Structure	Soil Consistence (Moist)	Other
0-12	A	Sandy loam	10YR 4/4	–	Cnc : Dpl:	–	–	–	G	Friable	
12-115	C	Silt loam	2.5Y 5/3	–	Cnc : Dpl:	–	–	–	M	"	Smooth sidewalls Dense
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 4 (Hole #) | 12-21-23 (Date) | 9:45 AM (Time) | 30°F Clear (Weather) | Latitude | Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | Vegetation: Maple + Cottonwood | Surface Stones (e.g., cobbles, stones, boulders, etc.): N/A | Slope (%): 2-3

Description of Location:

2. Soil Parent Material: | Landform: | Position on Landscape (SU, SH, BS, FS, TS, Plain): SH

3. Distances from: Open Water Body >100 feet | Drainage Way >100 feet | Wetlands >75 feet | Property Line >50 feet | Drinking Water Well >100 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: – Depth to Weeping in Hole – Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features: Depth	Redoximorphic Features: Color	Redoximorphic Features: Percent	Coarse Fragments % by Volume: Gravel	Coarse Fragments % by Volume: Cobbles & Stones	Soil Structure	Soil Consistence (Moist)	Other
0-10	A	Sandy loam	10YR 4/4	–	Cnc: Dpl:	–	–	–	G	Friable	
10-112"+	C	Silt loam	2.5Y 5/3	–	Cnc: Dpl:	–	–	–	M	"	Smooth Sidewalls Dense
					Cnc: Dpl:						
					Cnc: Dpl:						
					Cnc: Dpl:						
					Cnc: Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 5+8 (Hole #) | 12-21-23 (Date) | 11:15 AM (Time) | 32°F clear (Weather) | Latitude | Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | Maple + Cottonwood (Vegetation) | N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 1-2 (Slope (%))

Description of Location:

2. Soil Parent Material: | Landform | plain (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >100 feet | Wetlands >100 feet | Property Line >10 feet | Drinking Water Well >100 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: – Depth to Weeping in Hole – Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	A	Sandy loam	10YR 4/4	–	Cnc : Dpl:	–	–	–	G	Friable	
12-120"+	C	Silt loam	2.5Y 5/3	–	Cnc : Dpl:	–	–	–	M	"	
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 6 (Hole #) | 12-21-23 (Date) | 11:40 AM (Time) | 35°F Clear (Weather) | Latitude | Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | Maple (Vegetation) | N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 1-2 (Slope (%))

Description of Location:

2. Soil Parent Material: | Landform | SH (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >100 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >100 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: – Depth to Weeping in Hole – Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	A	Sandy loam	10YR 4/4	–	Cnc : Dpl:	–	–	–	G	Friable	
12-115"+	C	Silt loam	2.5Y 5/3	110"	Cnc : 10YR 5/6 Dpl:	15%	–	–	M	"	Smooth Sidewalls Dense
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 7 (Hole #) | 12-21-23 (Date) | 12:30 pm (Time) | 35°F Clear (Weather) | Latitude | Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | Oak + Maple (Vegetation) | N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 1-2 (Slope (%))

Description of Location:

2. Soil Parent Material: | Landform | Plain (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >100 feet | Wetlands >100 feet | Property Line >50 feet | Drinking Water Well >100 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: – Depth to Weeping in Hole – Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	A	Sandy loam	10YR 4/4	–	Cnc: Dpl:	–	–	–	G	Friable	
12-96	C	Silt loam	2.5Y 5/3	–	Cnc: Dpl:	–	–	–	M	"	Smooth sidewalls Dense
96-118+	C_2	Coarse Sand	7.5YR 5/4	–	Cnc: Dpl:	–	–	–	L	Single grain	
					Cnc: Dpl:						
					Cnc: Dpl:						
					Cnc: Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 9 (Hole #) | 12-21-2023 (Date) | 10:30 AM (Time) | 30°F Clear (Weather) | Latitude | Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | Maple + Cottonwood (Vegetation) | N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 1-2 (Slope (%))

Description of Location:

2. Soil Parent Material: | Landform | Plain (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >100 feet | Wetlands >100 feet | Property Line >10 feet | Drinking Water Well >100 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☐ No If yes: – Depth to Weeping in Hole – Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features: Depth	Redoximorphic Features: Color	Redoximorphic Features: Percent	Coarse Fragments % by Volume: Gravel	Coarse Fragments % by Volume: Cobbles & Stones	Soil Structure	Soil Consistence (Moist)	Other
0-12	A	Sandy loam	10YR 4/4	–	Cnc : Dpl:	–	–	–	G	Friable	
12-120"+	C	Silt loam	2.5Y 5/3	110"	Cnc : 10YR 5/6 Dpl:	25%	–	–	M	"	Smooth sidewalls Dense
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 10 (Hole #) | 12-21-23 (Date) | 10:50 AM (Time) | 32°F Clear (Weather) | Latitude | Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | Maple + Cottonwood (Vegetation) | N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 1-2 (Slope (%))

Description of Location:

2. Soil Parent Material: | Landform | Plain (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >100 feet | Wetlands >100 feet | Property Line >50 feet | Drinking Water Well >100 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: – Depth to Weeping in Hole – Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	A	Sandy loam	10YR 4/4	–	Cnc : Dpl:	–	–	–	G	Friable	
12-118"+	C	Silt loam	2.5Y 5/3	–	Cnc : Dpl:	–	–	–	M	"	
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area*)

Deep Observation Hole Number: 11 (Hole #) | 12-21-23 (Date) | 3:45 pm (Time) | 32°F clear (Weather) | Latitude | Longitude

1. Land Use: Lawn / Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) | Grass (Vegetation) | N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 1-2 (Slope (%))

Description of Location:

2. Soil Parent Material: | Landform | FS (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >10 feet | Drainage Way >10 feet | Wetlands >20 feet | Property Line >20 feet | Drinking Water Well ____ feet | Other ____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 32 Depth to Weeping in Hole — Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-6	A	Sandy loam	10YR 4/3	–	Cnc : Dpl:	–	5	–	G	Friable	
6-62	Fill	mostly Silt loam	Varies	–	Cnc : Dpl:	–	5	–	M	"	Various loam, sand, pea stone – Some trash
62-90"+	C	Silt loam	10YR 7/1	62"	Cnc : 10YR 5/6 Dpl: Gleyed	10%	–	–	M	"	
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area*)

Deep Observation Hole Number: 12 (Hole #) 12-21-23 (Date) 3:00 pm (Time) 32°F clear (Weather) ____ (Latitude) ____ (Longitude)

1. Land Use: Lawn / Parking Lot (e.g., woodland, agricultural field, vacant lot, etc.) Grass (Vegetation) N/A (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 1-2 (Slope (%))

Description of Location: ____

2. Soil Parent Material: ____ Landform ____ FS Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body >10 feet; Drainage Way >10 feet; Wetlands >20 feet; Property Line >10 feet; Drinking Water Well >100 feet; Other ____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 72 Depth to Weeping in Hole ____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features: Depth	Redoximorphic Features: Color	Redoximorphic Features: Percent	Coarse Fragments % by Volume: Gravel	Coarse Fragments % by Volume: Cobbles & Stones	Soil Structure	Soil Consistence (Moist)	Other
0-6	A	Sandy loam	10YR 4/3	–	Cnc: ; Dpl:	–	5	–	G	Friable	
6-80"+	Fill	mostly Silt loam	Varies	36"	Cnc: 10YR 5/8; Dpl: 10YR 6/1	15	5	–	M	"	various loam, Sand, Peastone
					Cnc: ; Dpl:						
					Cnc: ; Dpl:						
					Cnc: ; Dpl:						
					Cnc: ; Dpl:						

Additional Notes: Mottling @ 36" hard to distinguish if from fill or native conditions
Solid depleted matrix @ 56"

Appendix C: Pre- and Post- Development Hydrologic Analysis (2, 10 & 100 Year Storm Events)

- NOAA Atlas Report
- Pre-Development Hydrologic Model
- Post-Development Hydrologic Model

NOAA Atlas 14, Volume 10, Version 3
Location name: Agawam, Massachusetts, USA*
Latitude: 42.0452°, Longitude: -72.6167°
Elevation: 58 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.340 (0.262-0.438)	0.409 (0.315-0.528)	0.522 (0.401-0.676)	0.615 (0.470-0.802)	0.744 (0.551-1.02)	0.841 (0.611-1.17)	0.942 (0.665-1.37)	1.05 (0.708-1.57)	1.21 (0.786-1.88)	1.34 (0.850-2.12)
10-min	0.482 (0.371-0.621)	0.579 (0.446-0.748)	0.739 (0.567-0.956)	0.871 (0.666-1.14)	1.05 (0.780-1.44)	1.19 (0.865-1.66)	1.34 (0.943-1.94)	1.49 (1.00-2.22)	1.72 (1.11-2.66)	1.90 (1.20-3.01)
15-min	0.567 (0.437-0.730)	0.681 (0.525-0.880)	0.869 (0.668-1.13)	1.02 (0.783-1.34)	1.24 (0.918-1.69)	1.40 (1.02-1.96)	1.57 (1.11-2.28)	1.76 (1.18-2.62)	2.02 (1.31-3.13)	2.24 (1.42-3.54)
30-min	0.764 (0.589-0.985)	0.921 (0.710-1.19)	1.18 (0.905-1.53)	1.39 (1.06-1.82)	1.68 (1.25-2.30)	1.91 (1.38-2.66)	2.14 (1.51-3.10)	2.39 (1.61-3.56)	2.76 (1.78-4.26)	3.05 (1.93-4.82)
60-min	0.962 (0.742-1.24)	1.16 (0.895-1.50)	1.49 (1.14-1.93)	1.76 (1.34-2.29)	2.13 (1.58-2.91)	2.41 (1.75-3.37)	2.70 (1.91-3.92)	3.03 (2.03-4.51)	3.49 (2.26-5.39)	3.86 (2.44-6.10)
2-hr	1.23 (0.957-1.58)	1.48 (1.15-1.90)	1.89 (1.46-2.43)	2.22 (1.71-2.88)	2.68 (2.00-3.65)	3.03 (2.22-4.22)	3.40 (2.43-4.94)	3.83 (2.58-5.68)	4.47 (2.90-6.88)	5.01 (3.18-7.87)
3-hr	1.42 (1.10-1.81)	1.70 (1.32-2.17)	2.17 (1.68-2.78)	2.56 (1.97-3.30)	3.09 (2.32-4.20)	3.49 (2.57-4.86)	3.92 (2.82-5.70)	4.43 (2.99-6.55)	5.22 (3.39-8.01)	5.89 (3.74-9.23)
6-hr	1.77 (1.39-2.25)	2.15 (1.68-2.73)	2.77 (2.16-3.53)	3.28 (2.55-4.21)	3.99 (3.01-5.40)	4.51 (3.35-6.27)	5.08 (3.69-7.40)	5.79 (3.92-8.53)	6.92 (4.51-10.6)	7.89 (5.03-12.3)
12-hr	2.17 (1.71-2.73)	2.68 (2.11-3.38)	3.51 (2.76-4.44)	4.20 (3.28-5.35)	5.15 (3.92-6.95)	5.85 (4.37-8.11)	6.62 (4.85-9.64)	7.60 (5.16-11.1)	9.17 (6.00-13.9)	10.6 (6.75-16.4)
24-hr	2.54 (2.02-3.18)	3.19 (2.53-4.00)	4.25 (3.36-5.34)	5.12 (4.03-6.48)	6.33 (4.85-8.51)	7.21 (5.43-9.97)	8.19 (6.05-11.9)	9.48 (6.46-13.8)	11.6 (7.58-17.5)	13.4 (8.60-20.7)
2-day	2.88 (2.30-3.57)	3.64 (2.91-4.53)	4.89 (3.89-6.11)	5.93 (4.69-7.46)	7.37 (5.68-9.86)	8.40 (6.38-11.6)	9.57 (7.13-13.9)	11.1 (7.62-16.1)	13.7 (9.02-20.6)	16.0 (10.3-24.6)
3-day	3.14 (2.52-3.89)	3.98 (3.19-4.93)	5.35 (4.27-6.65)	6.48 (5.15-8.12)	8.05 (6.23-10.7)	9.18 (6.99-12.6)	10.5 (7.82-15.2)	12.2 (8.35-17.6)	15.0 (9.91-22.5)	17.6 (11.3-26.9)
4-day	3.38 (2.72-4.17)	4.28 (3.44-5.28)	5.74 (4.59-7.11)	6.95 (5.53-8.67)	8.62 (6.68-11.5)	9.82 (7.50-13.5)	11.2 (8.38-16.2)	13.0 (8.94-18.8)	16.0 (10.6-24.0)	18.8 (12.1-28.7)
7-day	4.05 (3.28-4.97)	5.06 (4.09-6.22)	6.71 (5.40-8.28)	8.08 (6.46-10.0)	9.96 (7.76-13.2)	11.3 (8.67-15.4)	12.9 (9.65-18.5)	14.9 (10.3-21.4)	18.2 (12.1-27.2)	21.2 (13.7-32.2)
10-day	4.71 (3.82-5.76)	5.78 (4.69-7.08)	7.53 (6.08-9.26)	8.98 (7.21-11.1)	11.0 (8.57-14.4)	12.4 (9.53-16.8)	14.1 (10.5-20.0)	16.2 (11.2-23.1)	19.6 (13.0-29.1)	22.6 (14.6-34.3)
20-day	6.78 (5.54-8.23)	7.91 (6.46-9.62)	9.76 (7.94-11.9)	11.3 (9.13-13.9)	13.4 (10.5-17.4)	15.0 (11.5-19.9)	16.7 (12.4-23.2)	18.8 (13.0-26.6)	21.9 (14.6-32.3)	24.6 (16.0-37.2)
30-day	8.52 (6.99-10.3)	9.68 (7.93-11.7)	11.6 (9.45-14.1)	13.2 (10.7-16.1)	15.3 (12.0-19.7)	16.9 (13.0-22.3)	18.7 (13.8-25.6)	20.6 (14.4-29.1)	23.5 (15.7-34.5)	25.8 (16.8-38.8)
45-day	10.7 (8.81-12.9)	11.9 (9.79-14.4)	13.9 (11.4-16.8)	15.5 (12.6-18.9)	17.7 (13.9-22.6)	19.5 (14.9-25.3)	21.2 (15.6-28.7)	23.0 (16.1-32.3)	25.5 (17.1-37.3)	27.4 (17.9-41.0)
60-day	12.5 (10.3-15.0)	13.8 (11.4-16.6)	15.8 (13.0-19.1)	17.5 (14.3-21.3)	19.8 (15.6-25.1)	21.7 (16.6-28.0)	23.4 (17.2-31.4)	25.2 (17.7-35.2)	27.3 (18.4-39.8)	28.9 (18.9-43.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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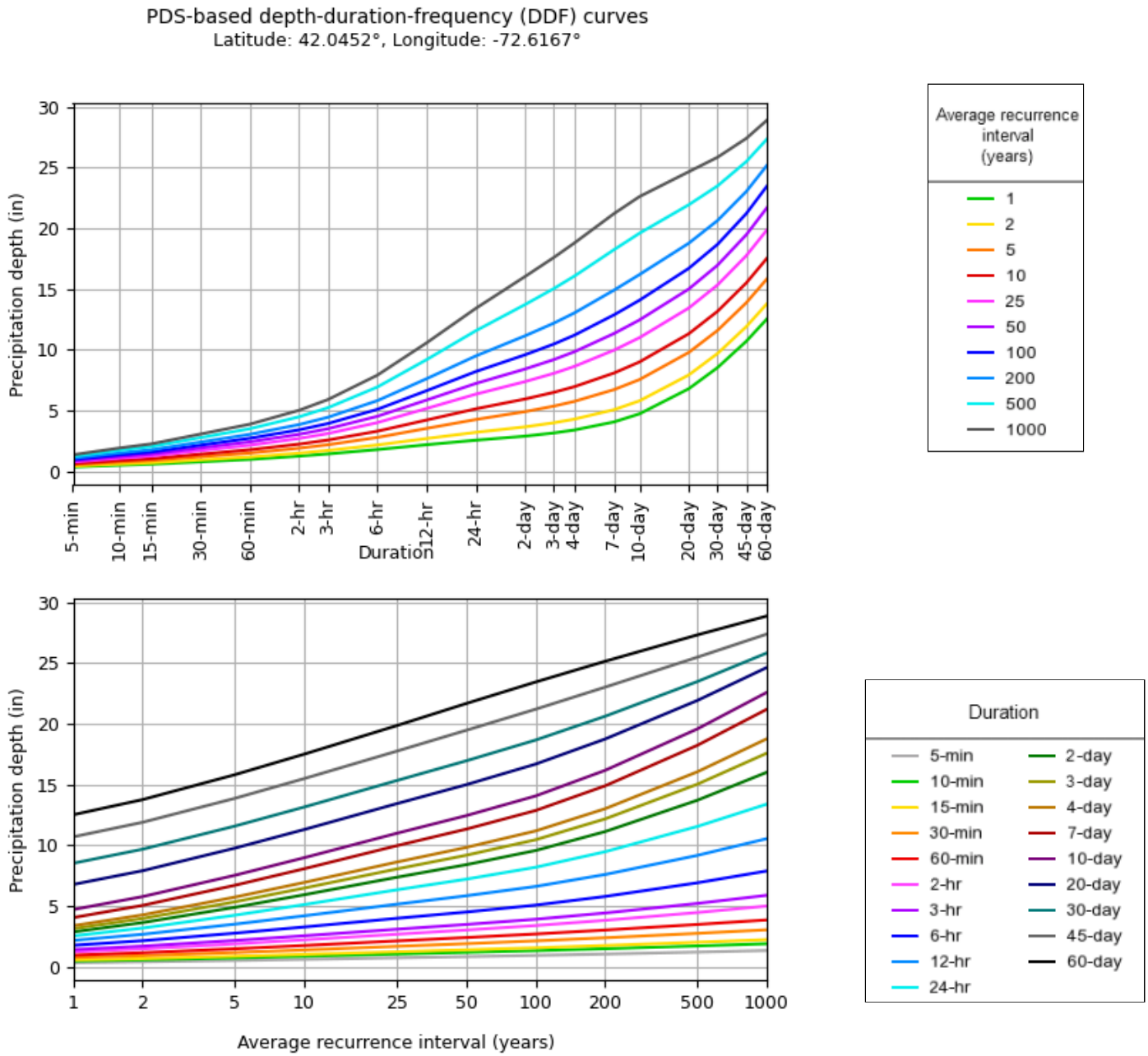
PF graphical



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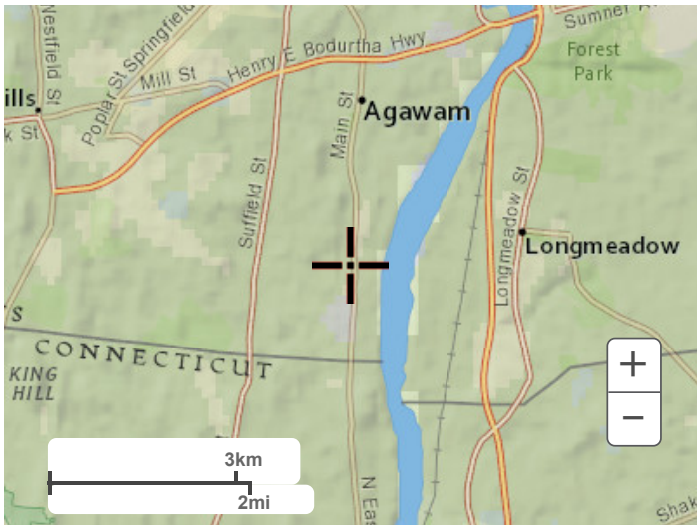
Maps & aerials

Small scale terrain



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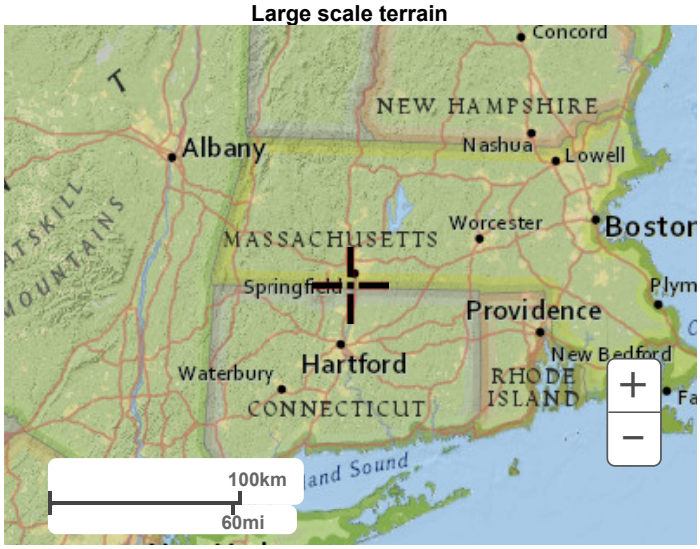

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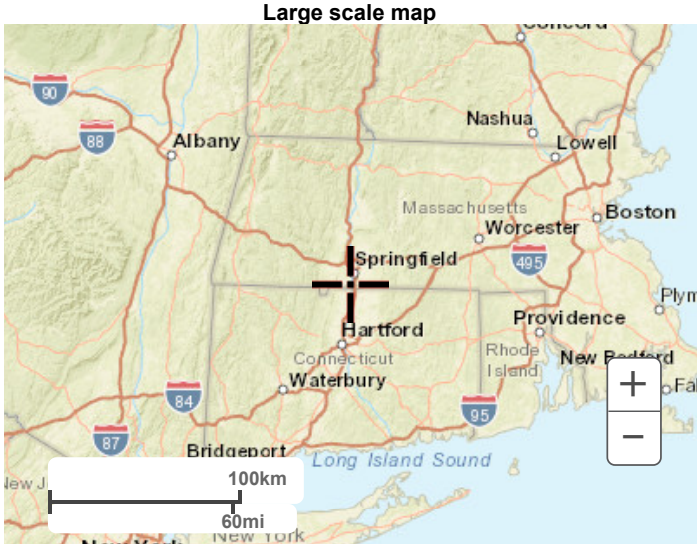

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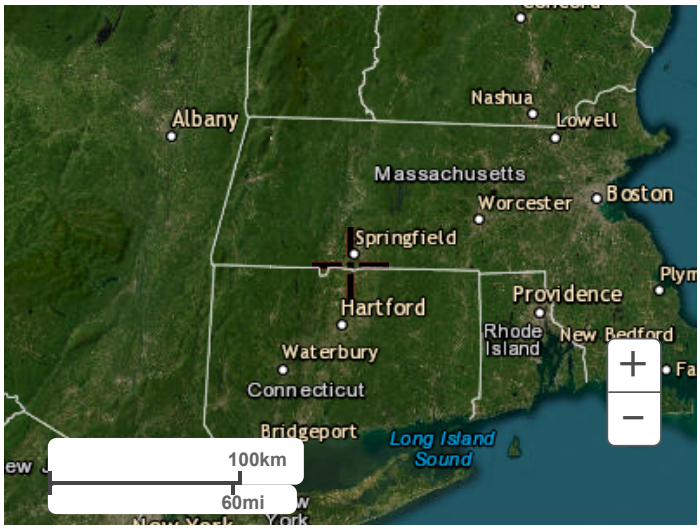

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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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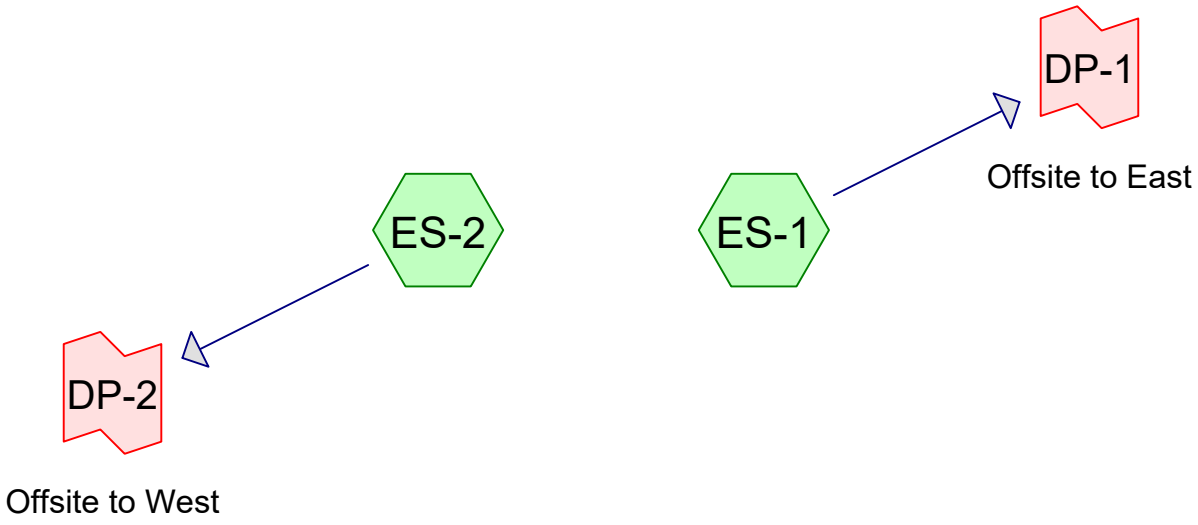
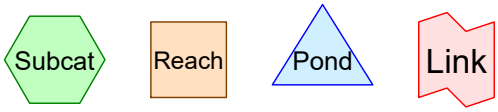




Routing Diagram for 231007 - PRE
Prepared by R Levesque Associates, Printed 6/27/2024
HydroCAD® 10.20-5a s/n 13073 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.19	2
2	10-Year	Type III 24-hr		Default	24.00	1	5.12	2
3	100-Year	Type III 24-hr		Default	24.00	1	8.19	2

Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES-1: Runoff Area=102,579 sf 18.91% Impervious Runoff Depth=1.40"
Flow Length=440' Tc=41.2 min CN=WQ Runoff=1.7 cfs 11,984 cf

Subcatchment ES-2: Runoff Area=64,294 sf 0.00% Impervious Runoff Depth=0.82"
Flow Length=176' Slope=0.0240 '/' Tc=32.4 min CN=70 Runoff=0.7 cfs 4,406 cf

Link DP-1: Offsite to East Inflow=1.7 cfs 11,984 cf
Primary=1.7 cfs 11,984 cf

Link DP-2: Offsite to West Inflow=0.7 cfs 4,406 cf
Primary=0.7 cfs 4,406 cf

Total Runoff Area = 166,872 sf Runoff Volume = 16,390 cf Average Runoff Depth = 1.18"
88.38% Pervious = 147,476 sf 11.62% Impervious = 19,397 sf

Summary for Subcatchment ES-1:

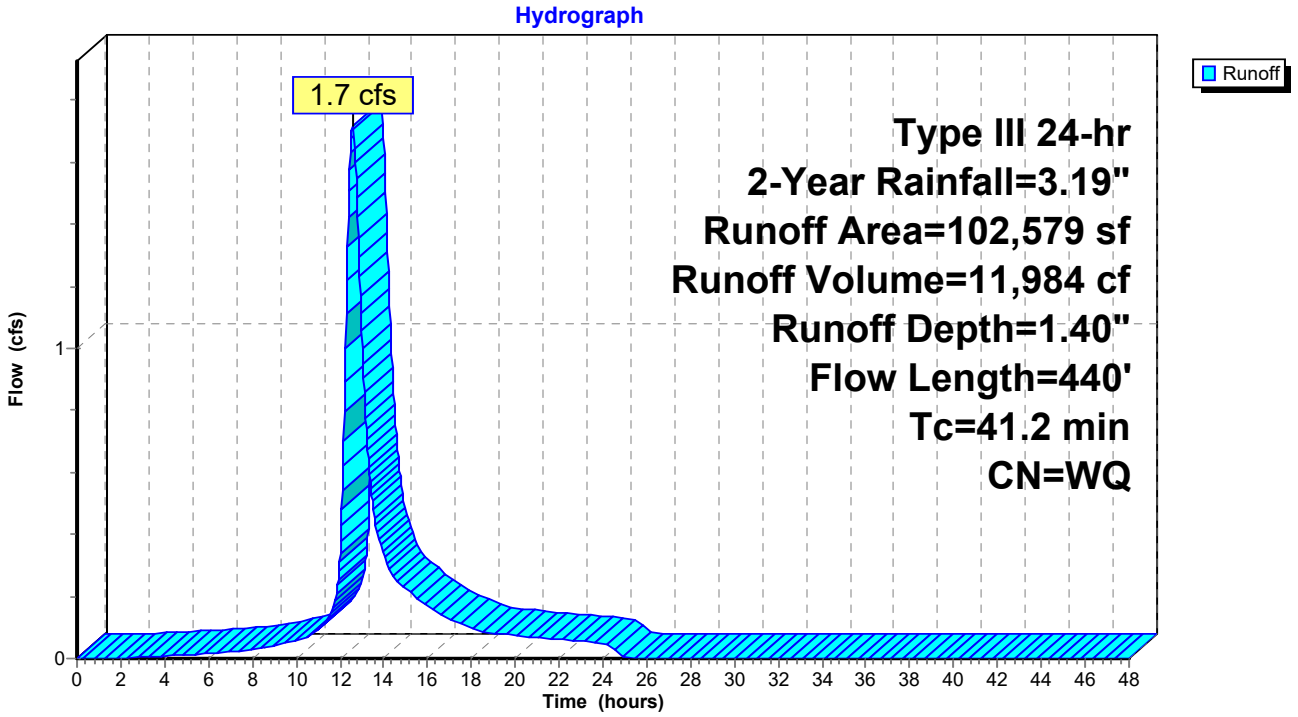
Runoff = 1.7 cfs @ 12.59 hrs, Volume= 11,984 cf, Depth= 1.40"
Routed to Link DP-1 : Offsite to East

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
13,727	74	>75% Grass cover, Good, HSG C
1,165	80	>75% Grass cover, Good, HSG D
2,216	96	Gravel surface, HSG C
15,898	98	Paved parking, HSG C
3,499	98	Roofs, HSG C
39,216	70	Woods, Good, HSG C
26,858	77	Woods, Good, HSG D
102,579		Weighted Average
83,182	74	81.09% Pervious Area
19,397	98	18.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	125	0.1300	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
27.2	168	0.0340	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.5	147	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.2	440	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

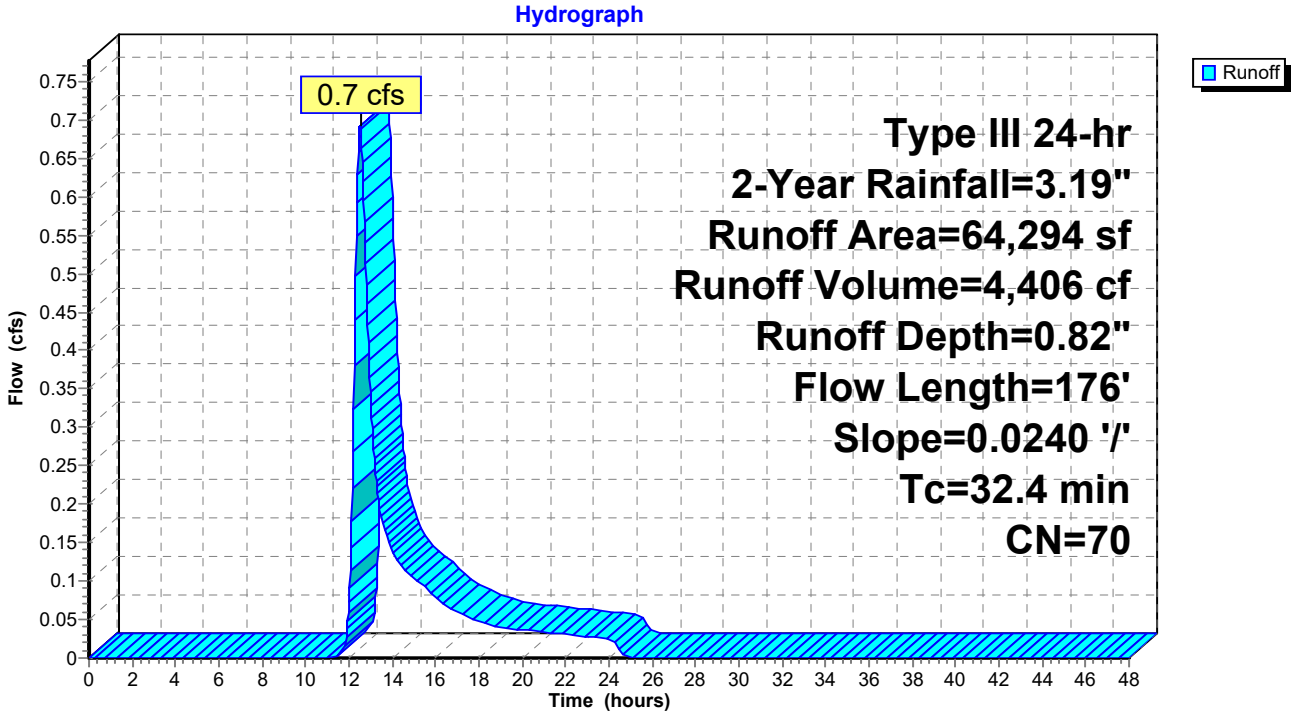
Runoff = 0.7 cfs @ 12.51 hrs, Volume= 4,406 cf, Depth= 0.82"
Routed to Link DP-2 : Offsite to West

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
64,294	70	Woods, Good, HSG C
64,294	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	176	0.0240	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"

Subcatchment ES-2:

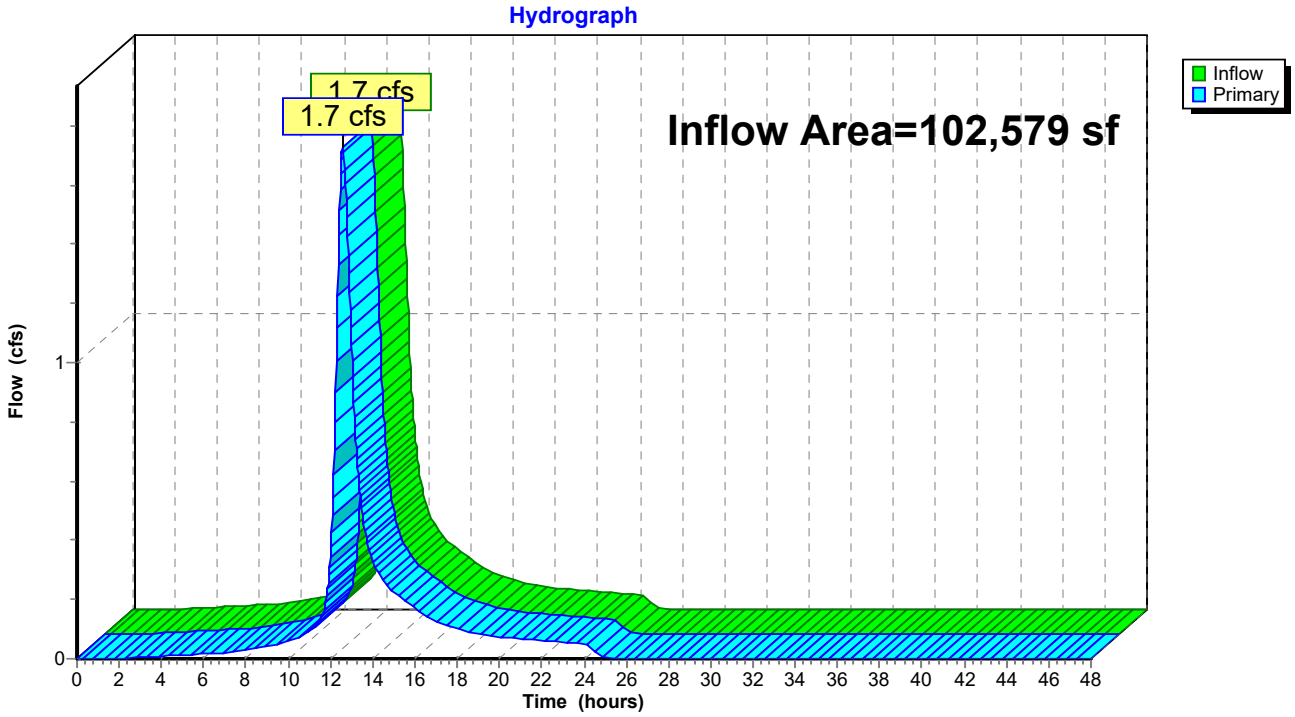


Summary for Link DP-1: Offsite to East

Inflow Area = 102,579 sf, 18.91% Impervious, Inflow Depth = 1.40" for 2-Year event
Inflow = 1.7 cfs @ 12.59 hrs, Volume= 11,984 cf
Primary = 1.7 cfs @ 12.59 hrs, Volume= 11,984 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-1: Offsite to East

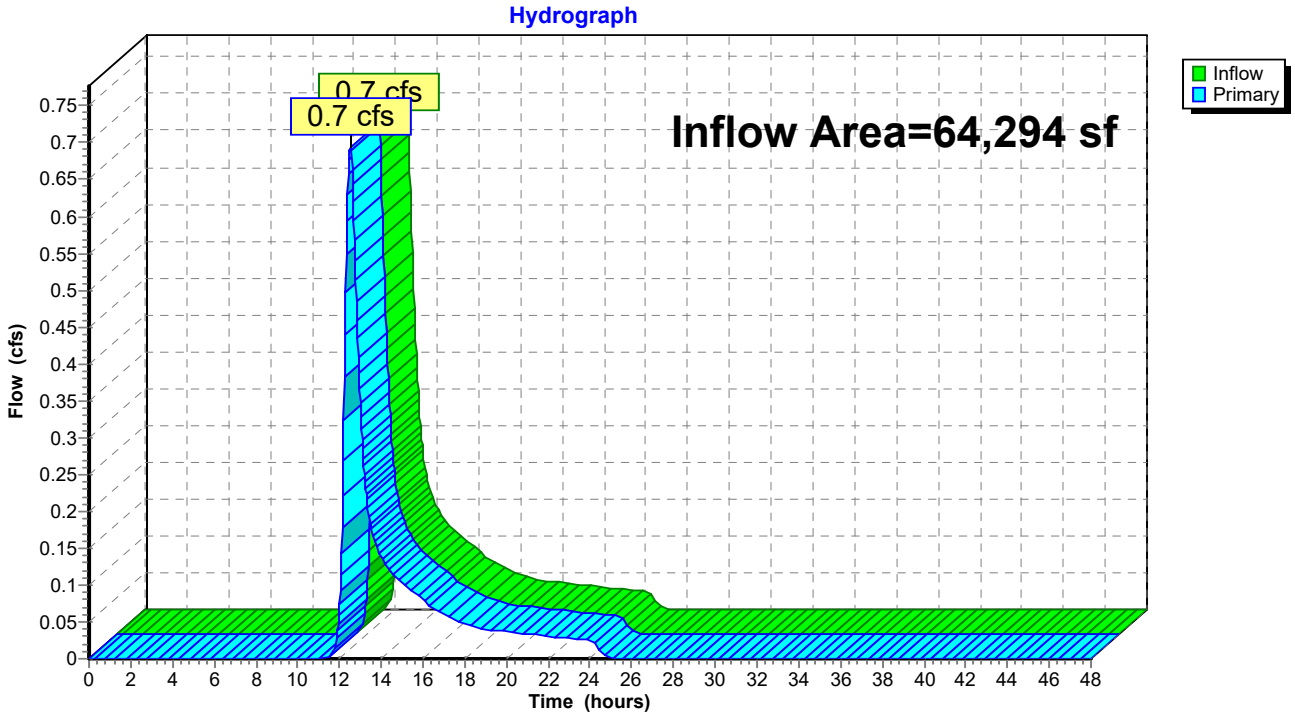


Summary for Link DP-2: Offsite to West

Inflow Area = 64,294 sf, 0.00% Impervious, Inflow Depth = 0.82" for 2-Year event
Inflow = 0.7 cfs @ 12.51 hrs, Volume= 4,406 cf
Primary = 0.7 cfs @ 12.51 hrs, Volume= 4,406 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-2: Offsite to West



Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES-1: Runoff Area=102,579 sf 18.91% Impervious Runoff Depth=2.91"
Flow Length=440' Tc=41.2 min CN=WQ Runoff=3.7 cfs 24,900 cf

Subcatchment ES-2: Runoff Area=64,294 sf 0.00% Impervious Runoff Depth=2.13"
Flow Length=176' Slope=0.0240 '/' Tc=32.4 min CN=70 Runoff=2.0 cfs 11,389 cf

Link DP-1: Offsite to East Inflow=3.7 cfs 24,900 cf
Primary=3.7 cfs 24,900 cf

Link DP-2: Offsite to West Inflow=2.0 cfs 11,389 cf
Primary=2.0 cfs 11,389 cf

Total Runoff Area = 166,872 sf Runoff Volume = 36,289 cf Average Runoff Depth = 2.61"
88.38% Pervious = 147,476 sf 11.62% Impervious = 19,397 sf

Summary for Subcatchment ES-1:

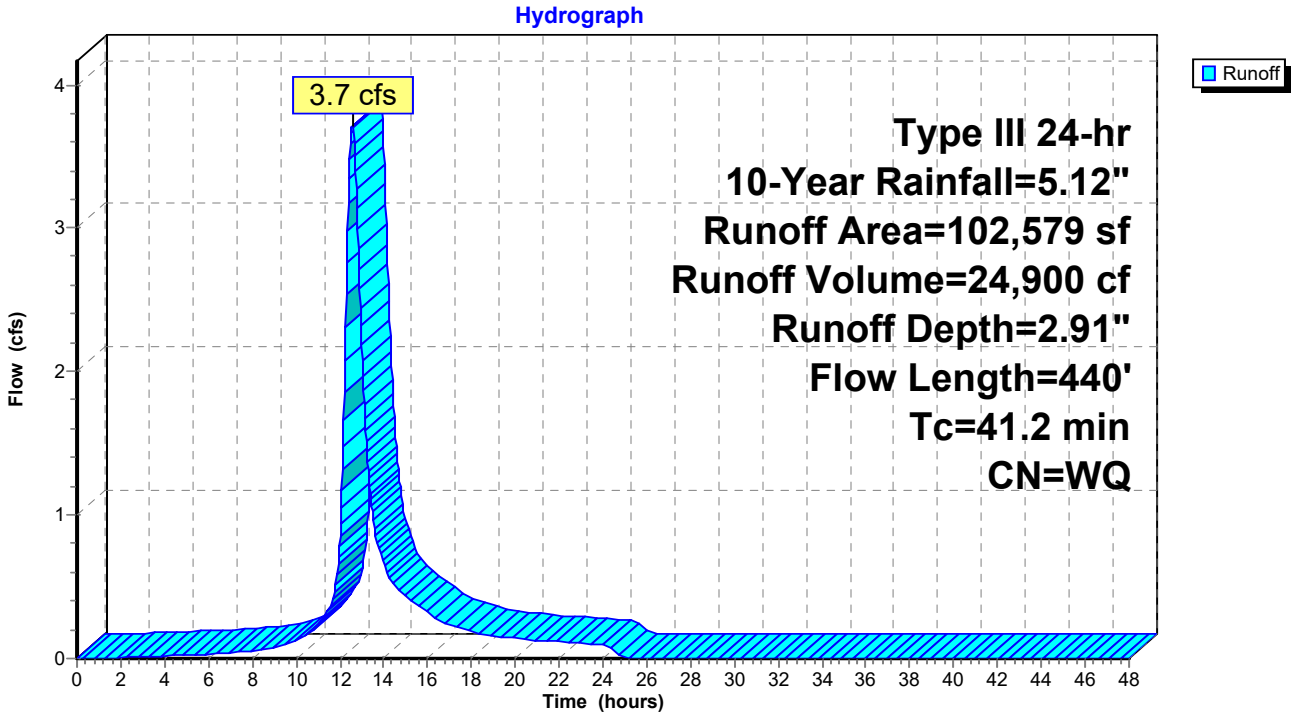
Runoff = 3.7 cfs @ 12.57 hrs, Volume= 24,900 cf, Depth= 2.91"
Routed to Link DP-1 : Offsite to East

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.12"

Area (sf)	CN	Description
13,727	74	>75% Grass cover, Good, HSG C
1,165	80	>75% Grass cover, Good, HSG D
2,216	96	Gravel surface, HSG C
15,898	98	Paved parking, HSG C
3,499	98	Roofs, HSG C
39,216	70	Woods, Good, HSG C
26,858	77	Woods, Good, HSG D
102,579		Weighted Average
83,182	74	81.09% Pervious Area
19,397	98	18.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	125	0.1300	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
27.2	168	0.0340	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.5	147	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.2	440	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

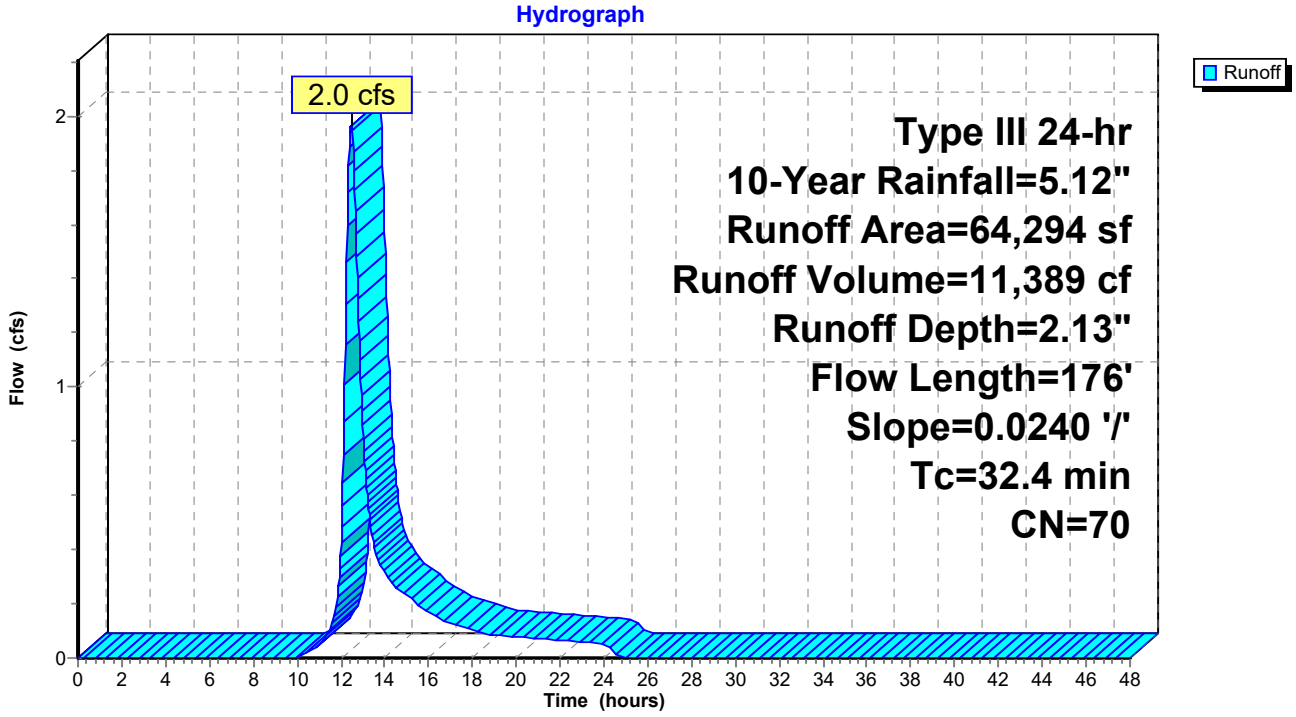
Runoff = 2.0 cfs @ 12.47 hrs, Volume= 11,389 cf, Depth= 2.13"
Routed to Link DP-2 : Offsite to West

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.12"

Area (sf)	CN	Description
64,294	70	Woods, Good, HSG C
64,294	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	176	0.0240	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"

Subcatchment ES-2:

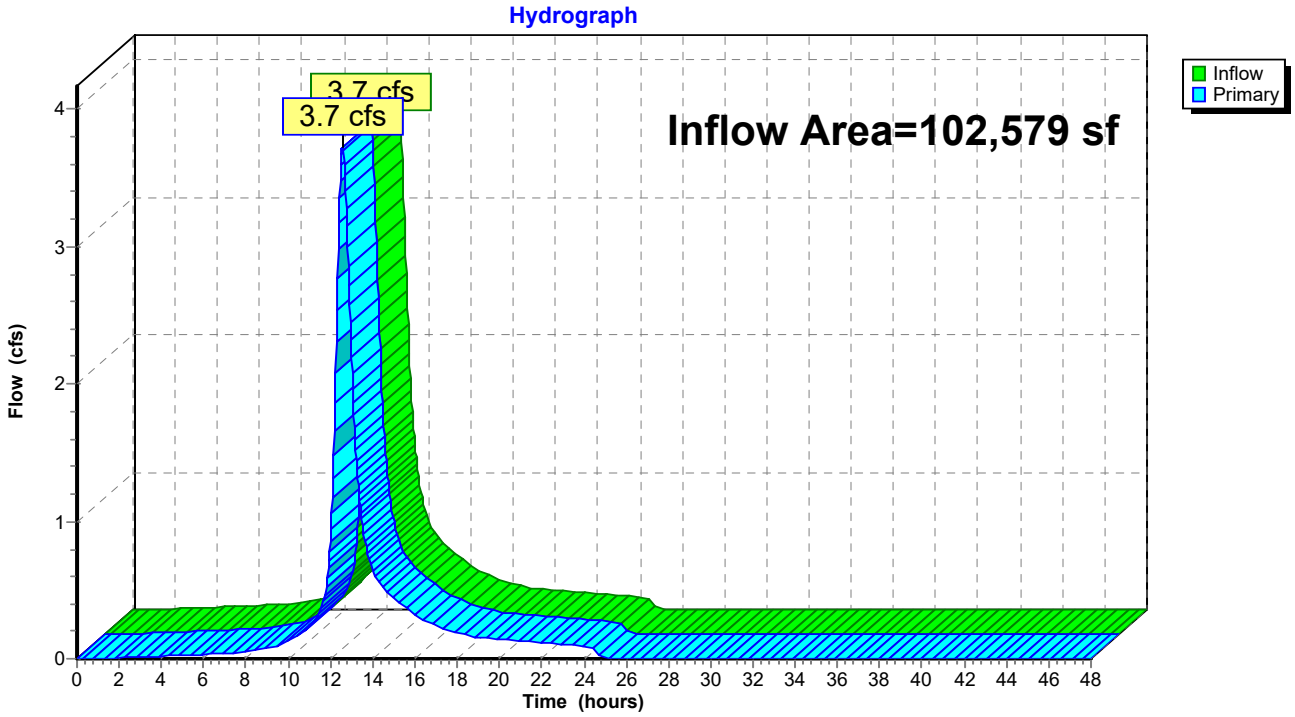


Summary for Link DP-1: Offsite to East

Inflow Area = 102,579 sf, 18.91% Impervious, Inflow Depth = 2.91" for 10-Year event
Inflow = 3.7 cfs @ 12.57 hrs, Volume= 24,900 cf
Primary = 3.7 cfs @ 12.57 hrs, Volume= 24,900 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-1: Offsite to East

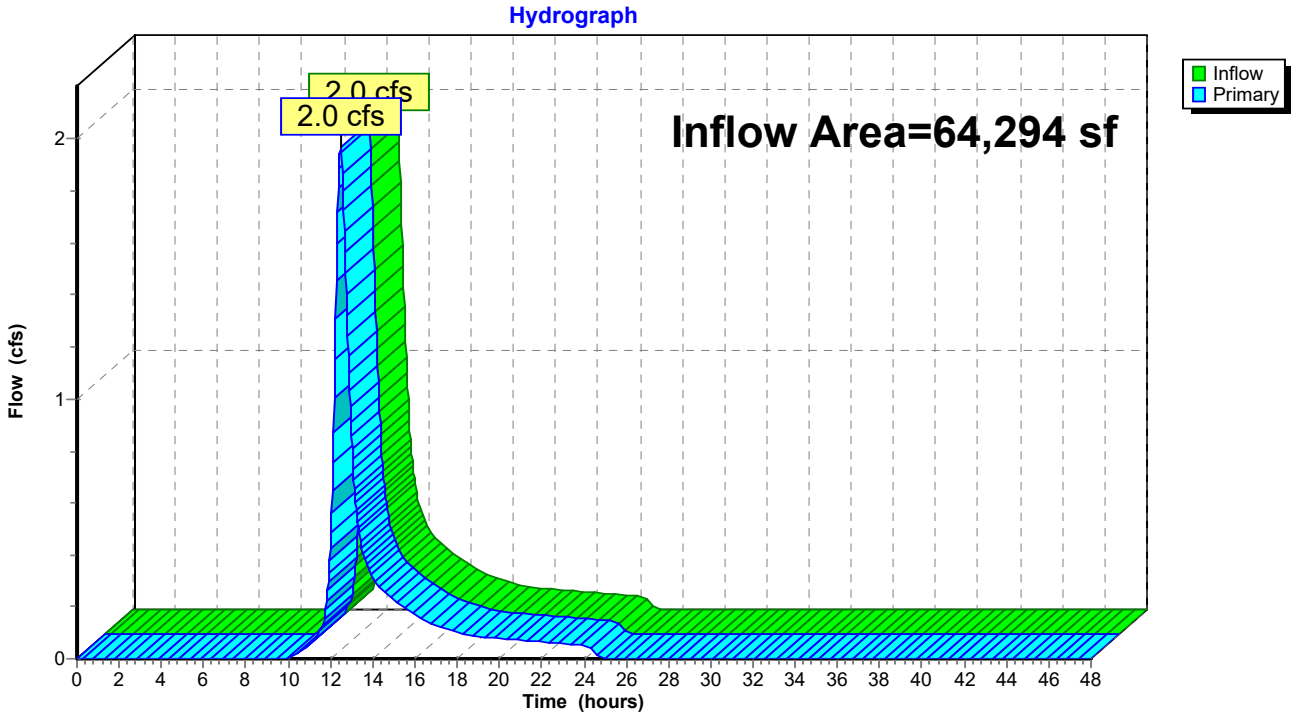


Summary for Link DP-2: Offsite to West

Inflow Area = 64,294 sf, 0.00% Impervious, Inflow Depth = 2.13" for 10-Year event
Inflow = 2.0 cfs @ 12.47 hrs, Volume= 11,389 cf
Primary = 2.0 cfs @ 12.47 hrs, Volume= 11,389 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-2: Offsite to West



Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES-1: Runoff Area=102,579 sf 18.91% Impervious Runoff Depth=5.61"
Flow Length=440' Tc=41.2 min CN=WQ Runoff=7.2 cfs 47,987 cf

Subcatchment ES-2: Runoff Area=64,294 sf 0.00% Impervious Runoff Depth=4.63"
Flow Length=176' Slope=0.0240 '/' Tc=32.4 min CN=70 Runoff=4.4 cfs 24,796 cf

Link DP-1: Offsite to East Inflow=7.2 cfs 47,987 cf
Primary=7.2 cfs 47,987 cf

Link DP-2: Offsite to West Inflow=4.4 cfs 24,796 cf
Primary=4.4 cfs 24,796 cf

Total Runoff Area = 166,872 sf Runoff Volume = 72,783 cf Average Runoff Depth = 5.23"
88.38% Pervious = 147,476 sf 11.62% Impervious = 19,397 sf

Summary for Subcatchment ES-1:

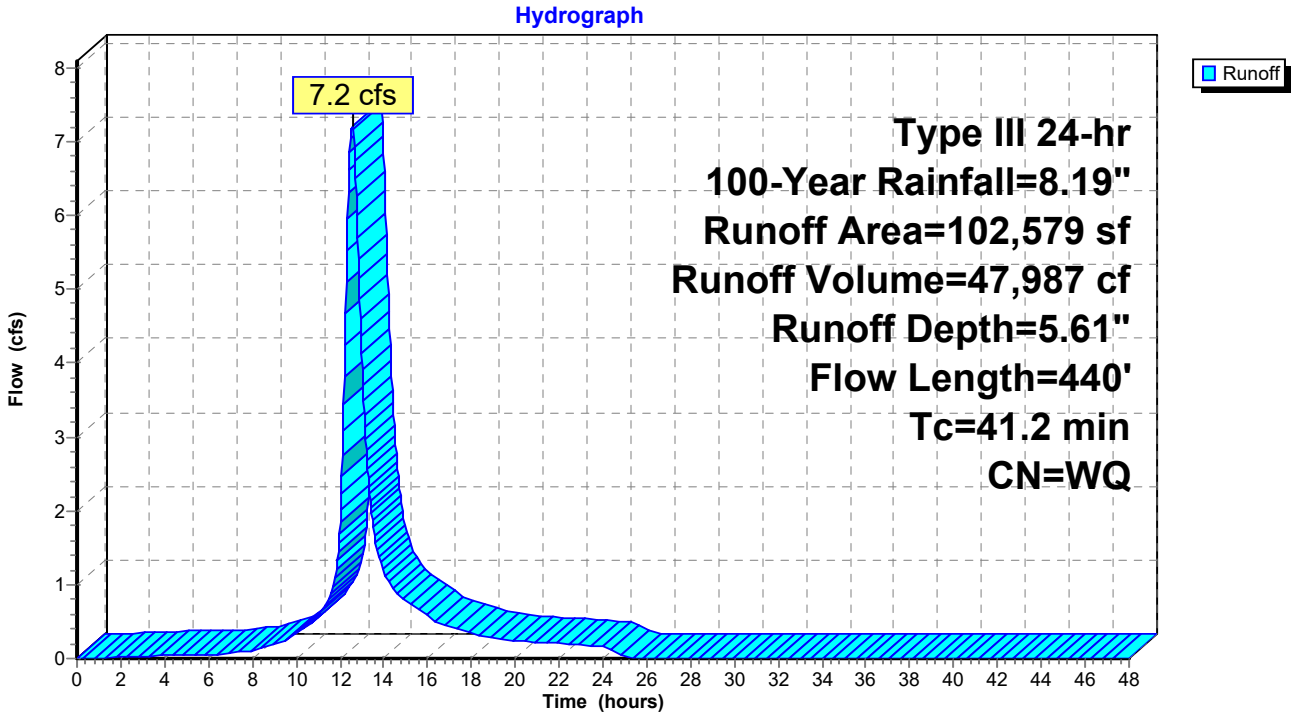
Runoff = 7.2 cfs @ 12.56 hrs, Volume= 47,987 cf, Depth= 5.61"
Routed to Link DP-1 : Offsite to East

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (sf)	CN	Description
13,727	74	>75% Grass cover, Good, HSG C
1,165	80	>75% Grass cover, Good, HSG D
2,216	96	Gravel surface, HSG C
15,898	98	Paved parking, HSG C
3,499	98	Roofs, HSG C
39,216	70	Woods, Good, HSG C
26,858	77	Woods, Good, HSG D
102,579		Weighted Average
83,182	74	81.09% Pervious Area
19,397	98	18.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	125	0.1300	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
27.2	168	0.0340	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.5	147	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.2	440	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

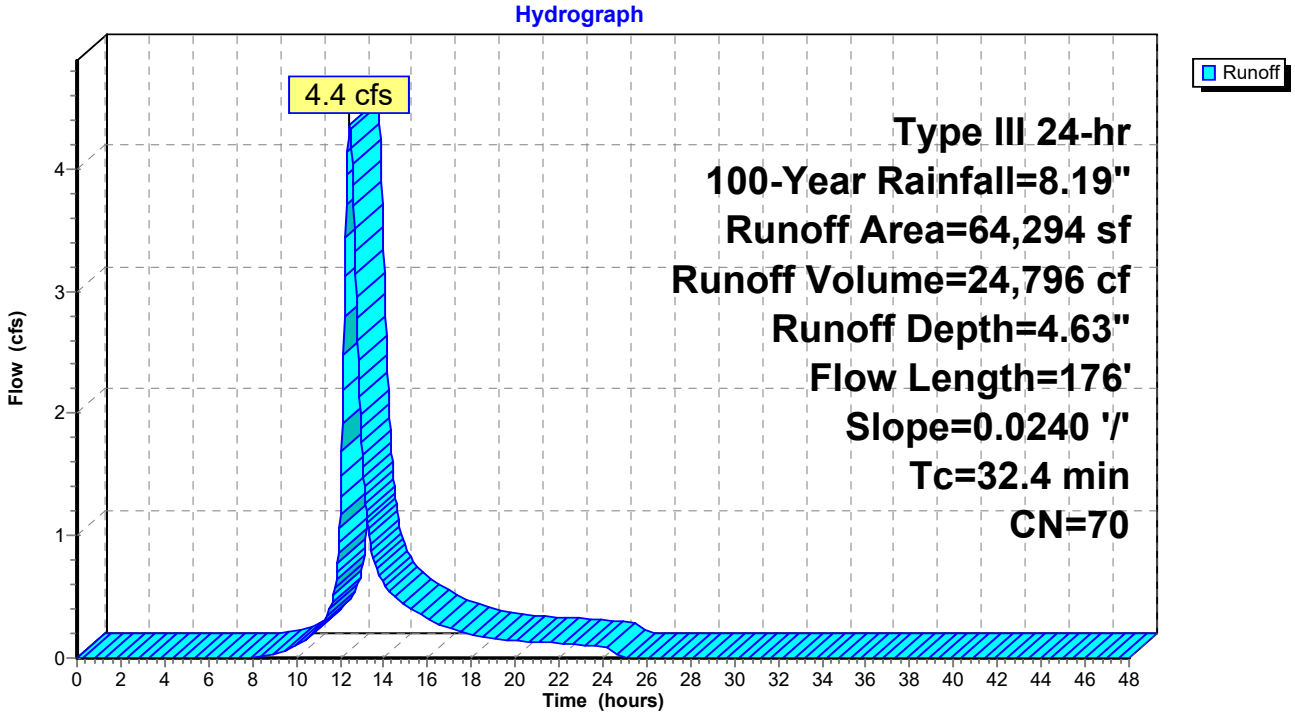
Runoff = 4.4 cfs @ 12.45 hrs, Volume= 24,796 cf, Depth= 4.63"
Routed to Link DP-2 : Offsite to West

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (sf)	CN	Description
64,294	70	Woods, Good, HSG C
64,294	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.4	176	0.0240	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"

Subcatchment ES-2:

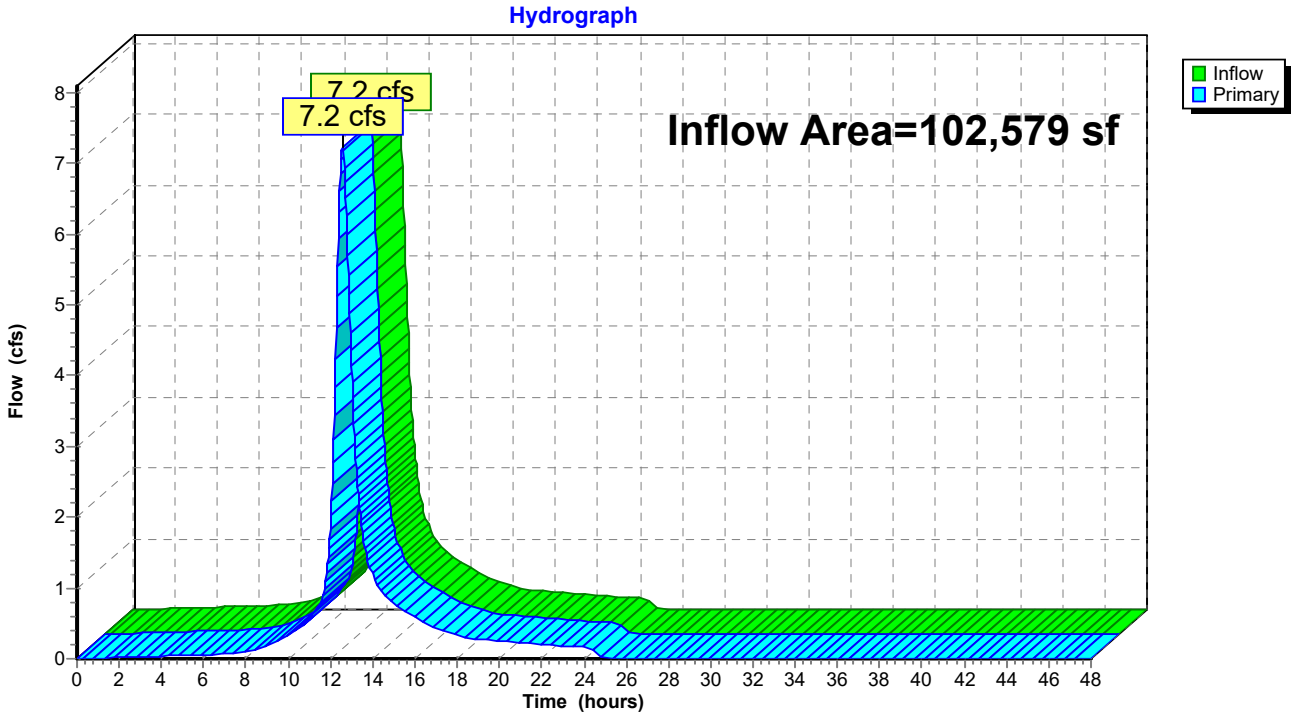


Summary for Link DP-1: Offsite to East

Inflow Area = 102,579 sf, 18.91% Impervious, Inflow Depth = 5.61" for 100-Year event
Inflow = 7.2 cfs @ 12.56 hrs, Volume= 47,987 cf
Primary = 7.2 cfs @ 12.56 hrs, Volume= 47,987 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-1: Offsite to East

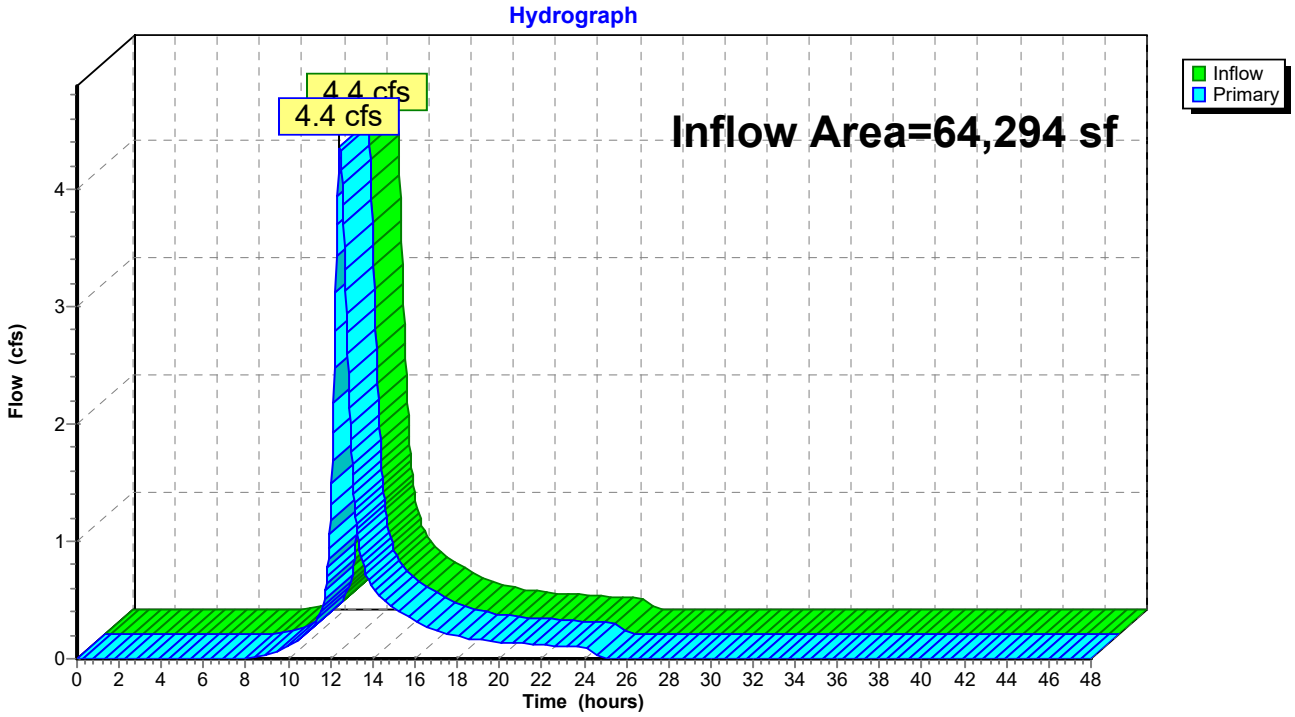


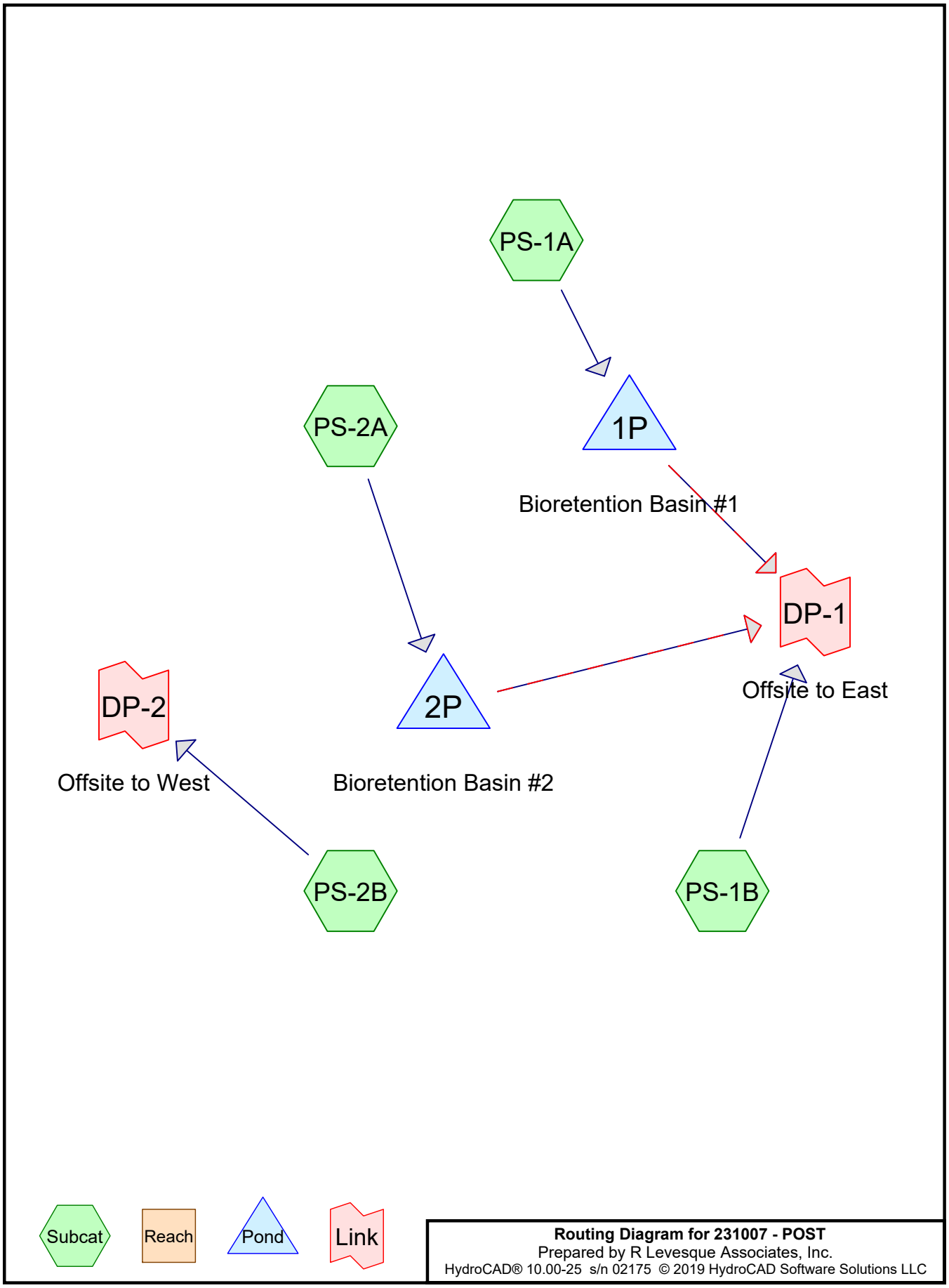
Summary for Link DP-2: Offsite to West

Inflow Area = 64,294 sf, 0.00% Impervious, Inflow Depth = 4.63" for 100-Year event
Inflow = 4.4 cfs @ 12.45 hrs, Volume= 24,796 cf
Primary = 4.4 cfs @ 12.45 hrs, Volume= 24,796 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-2: Offsite to West




PS-1A
1P
Bioretention Basin #1
PS-2A
DP-1
Offsite to East
2P
Bioretention Basin #2
DP-2
Offsite to West
PS-2B
PS-1B
Subcat
Reach
Pond
Link
Routing Diagram for 231007 - POST
Prepared by R Levesque Associates, Inc.
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Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS-1A: Runoff Area=52,584 sf 49.74% Impervious Runoff Depth=1.98"
Flow Length=258' Tc=10.2 min CN=WQ Runoff=2.2 cfs 8,692 cf

Subcatchment PS-1B: Runoff Area=54,570 sf 0.00% Impervious Runoff Depth=1.03"
Flow Length=440' Tc=41.2 min CN=WQ Runoff=0.7 cfs 4,662 cf

Subcatchment PS-2A: Runoff Area=42,787 sf 68.35% Impervious Runoff Depth=2.34"
Tc=6.0 min CN=WQ Runoff=2.4 cfs 8,358 cf

Subcatchment PS-2B: Runoff Area=16,930 sf 0.00% Impervious Runoff Depth=0.87"
Flow Length=179' Tc=21.1 min CN=WQ Runoff=0.2 cfs 1,223 cf

Pond 1P: Bioretention Basin #1 Peak Elev=51.74' Storage=2,824 cf Inflow=2.2 cfs 8,692 cf
Primary=0.4 cfs 8,693 cf Secondary=0.0 cfs 0 cf Outflow=0.4 cfs 8,693 cf

Pond 2P: Bioretention Basin #2 Peak Elev=61.93' Storage=2,898 cf Inflow=2.4 cfs 8,358 cf
Primary=0.5 cfs 8,358 cf Secondary=0.0 cfs 0 cf Outflow=0.5 cfs 8,358 cf

Link DP-1: Offsite to East Inflow=1.6 cfs 21,713 cf
Primary=1.6 cfs 21,713 cf

Link DP-2: Offsite to West Inflow=0.2 cfs 1,223 cf
Primary=0.2 cfs 1,223 cf

Total Runoff Area = 166,871 sf Runoff Volume = 22,935 cf Average Runoff Depth = 1.65"
66.80% Pervious = 111,469 sf 33.20% Impervious = 55,402 sf

Summary for Subcatchment PS-1A:

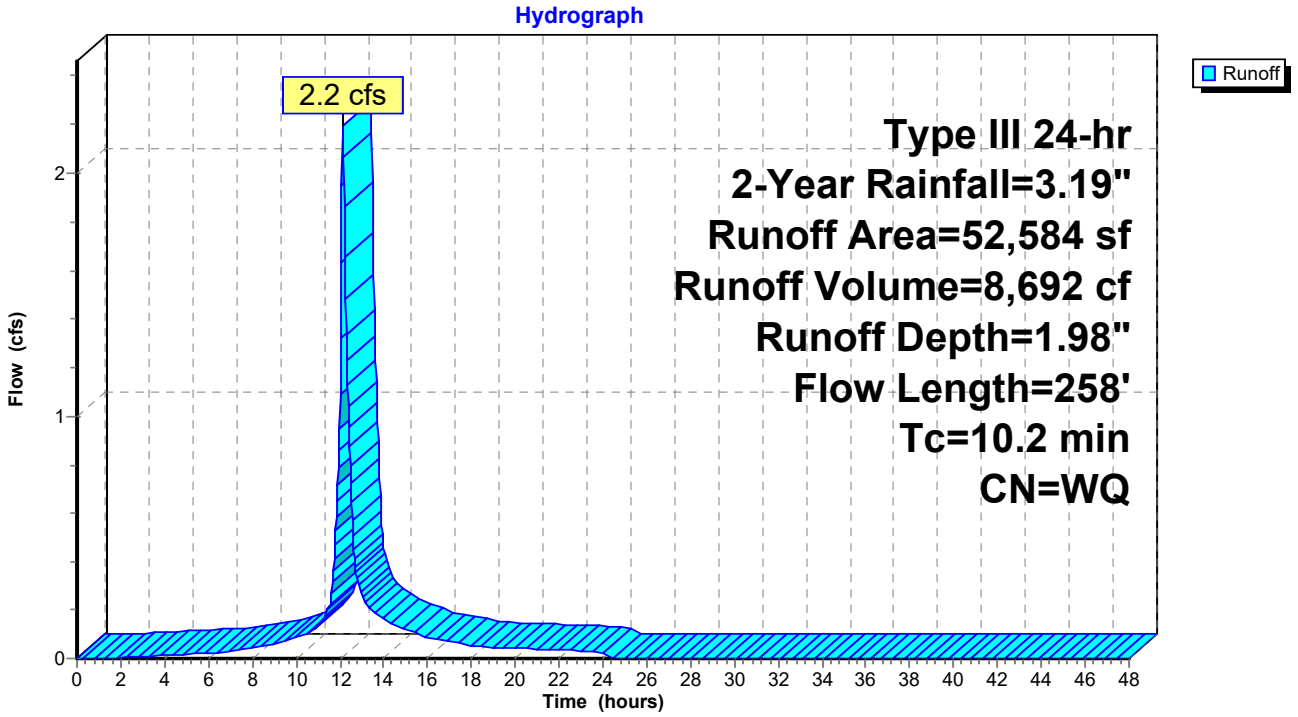
Runoff = 2.2 cfs @ 12.14 hrs, Volume= 8,692 cf, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
23,289	74	>75% Grass cover, Good, HSG C
633	80	>75% Grass cover, Good, HSG D
20,126	98	Paved parking, HSG C
3,279	98	Roofs, HSG C
2,733	98	Water Surface, HSG C
18	98	Water Surface, HSG D
2,506	70	Woods, Good, HSG C
52,584		Weighted Average
26,429	74	50.26% Pervious Area
26,155	98	49.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	28	0.2600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
6.0	54	0.0550	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	176	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	258	Total			

Subcatchment PS-1A:



Summary for Subcatchment PS-1B:

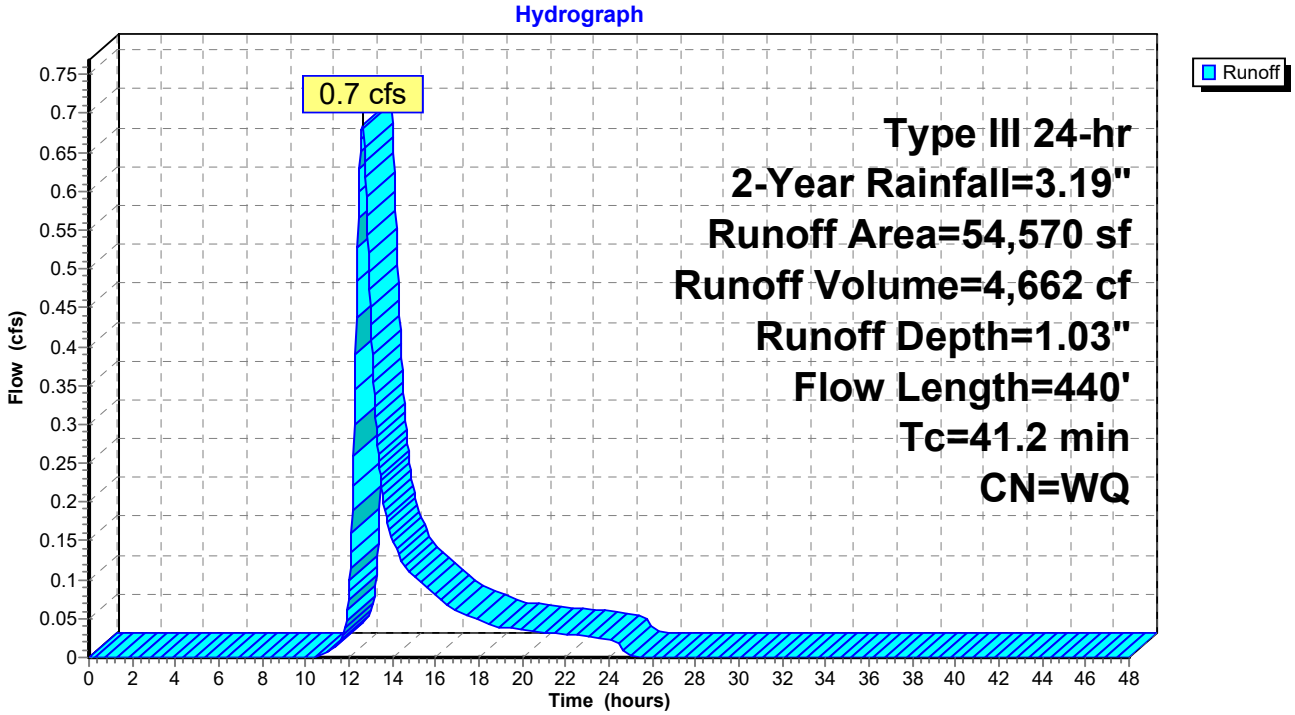
Runoff = 0.7 cfs @ 12.61 hrs, Volume= 4,662 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
2,326	74	>75% Grass cover, Good, HSG C
613	80	>75% Grass cover, Good, HSG D
24,873	70	Woods, Good, HSG C
26,758	77	Woods, Good, HSG D
54,570		Weighted Average
54,570	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	125	0.1300	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
27.2	168	0.0340	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.5	147	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.2	440	Total			

Subcatchment PS-1B:



Summary for Subcatchment PS-2A:

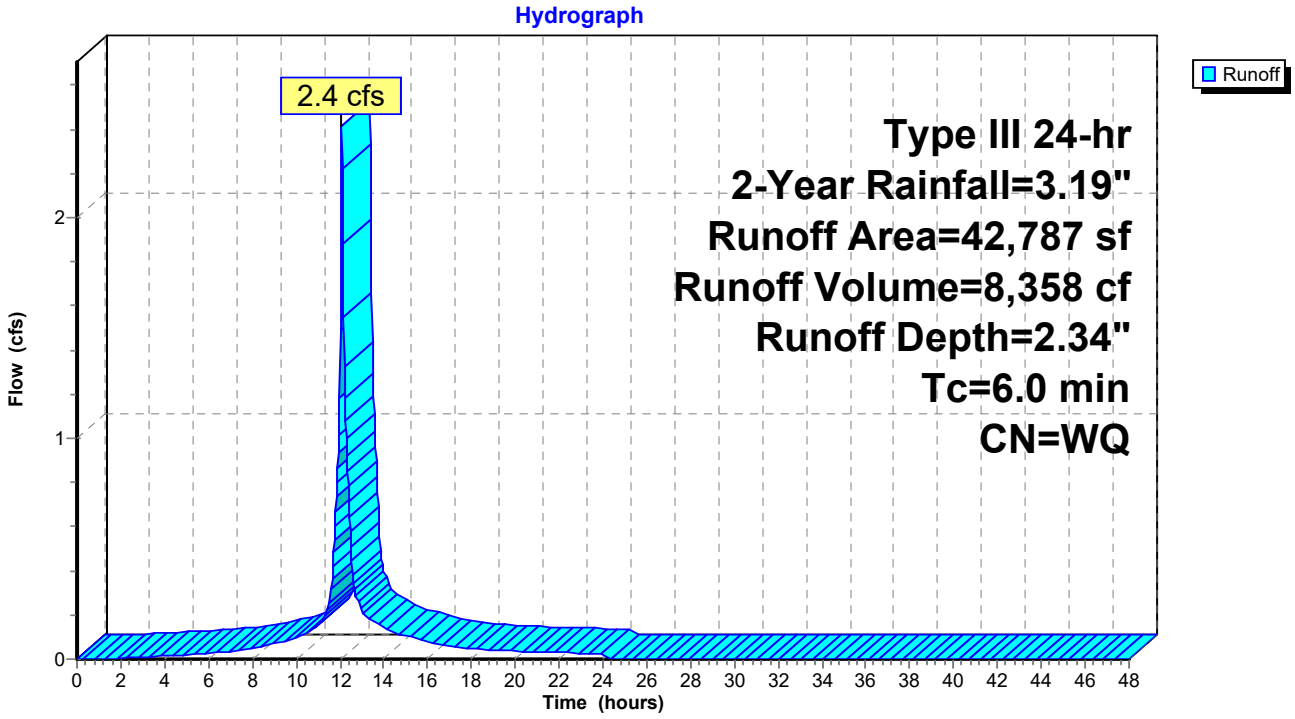
Runoff = 2.4 cfs @ 12.09 hrs, Volume= 8,358 cf, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
12,759	74	>75% Grass cover, Good, HSG C
19,200	98	Paved parking, HSG C
7,704	98	Roofs, HSG C
2,342	98	Water Surface, HSG C
782	70	Woods, Good, HSG C
42,787		Weighted Average
13,541	74	31.65% Pervious Area
29,247	98	68.35% Impervious Area

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

Subcatchment PS-2A:



Summary for Subcatchment PS-2B:

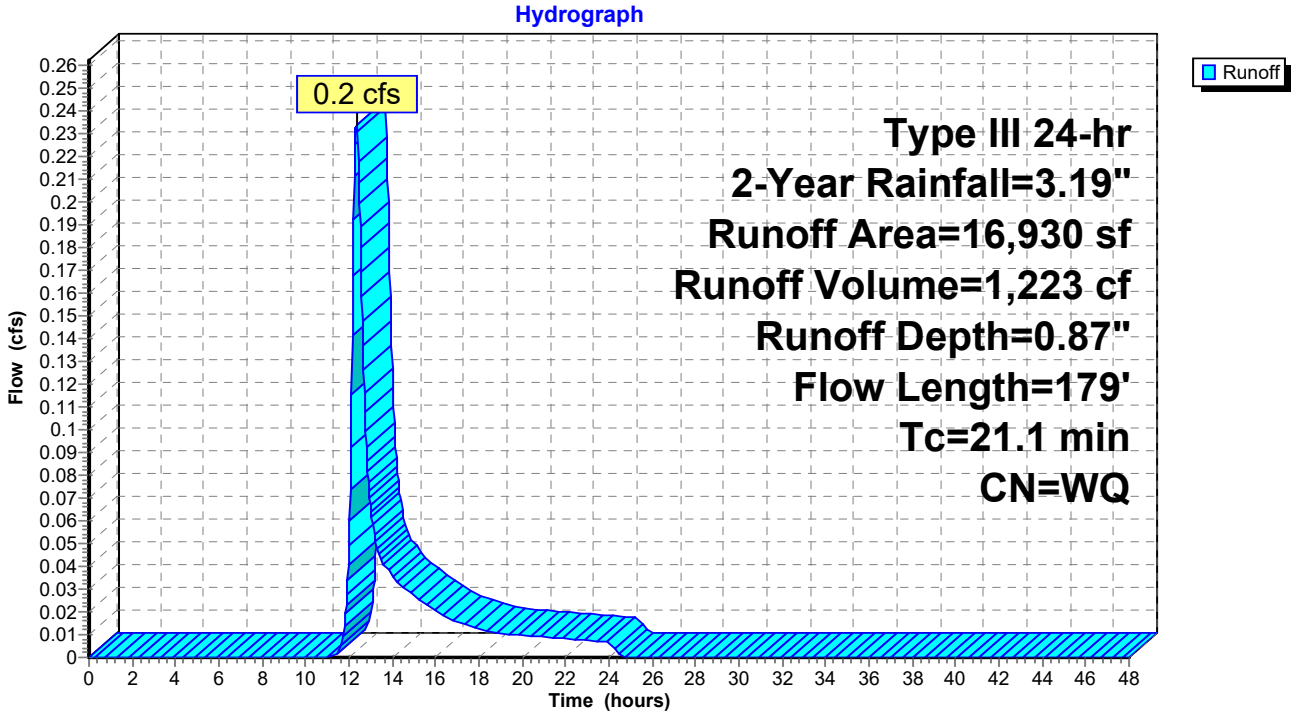
Runoff = 0.2 cfs @ 12.33 hrs, Volume= 1,223 cf, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
3,602	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
13,327	70	Woods, Good, HSG C
16,930		Weighted Average
16,930	71	100.00% Pervious Area
0	98	0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	100	0.0250	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	79	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.1	179	Total			

Subcatchment PS-2B:



Summary for Pond 1P: Bioretention Basin #1

Inflow Area = 52,584 sf, 49.74% Impervious, Inflow Depth = 1.98" for 2-Year event
Inflow = 2.2 cfs @ 12.14 hrs, Volume= 8,692 cf
Outflow = 0.4 cfs @ 12.63 hrs, Volume= 8,693 cf, Atten= 80%, Lag= 29.5 min
Primary = 0.4 cfs @ 12.63 hrs, Volume= 8,693 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 51.74' @ 12.63 hrs Surf.Area= 4,149 sf Storage= 2,824 cf

Plug-Flow detention time= 78.5 min calculated for 8,687 cf (100% of inflow)
Center-of-Mass det. time= 78.5 min (866.3 - 787.8)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	14,362 cf	**Bioretention Area #1 (Irregular)** Listed below (Recalc)

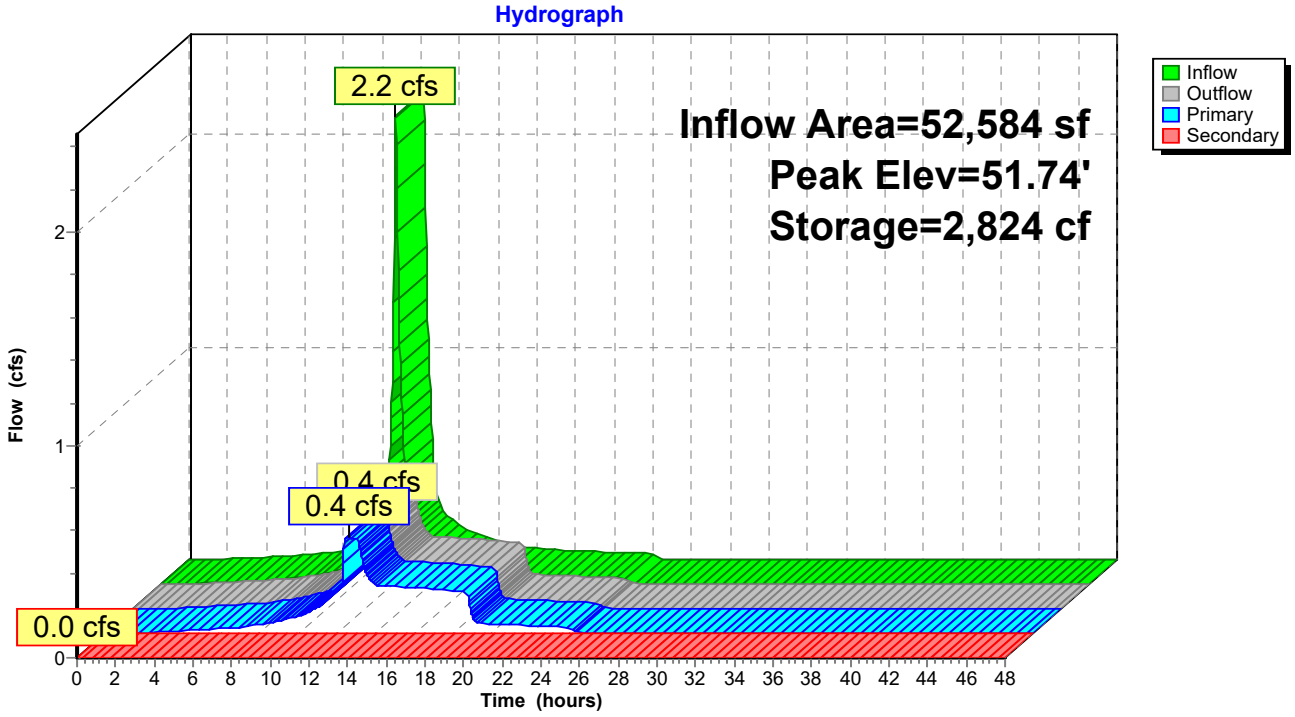
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.00	3,473	298.0	0	0	3,473
52.00	4,398	317.0	3,926	3,926	4,452
53.00	5,559	370.0	4,967	8,894	7,370
54.00	5,379	336.0	5,469	14,362	9,313

Device	Routing	Invert	Outlet Devices
#1	Primary	48.00'	**12.0" Round 12" Outlet Pipe** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 48.00' / 47.80' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	48.00'	**3.0" Vert. 3" Orifice** C= 0.600
#3	Device 1	51.75'	**15.0" W x 4.0" H Vert. 4"x15" Orifice** C= 0.600
#4	Device 1	52.90'	**48.0" x 48.0" Horiz. OCS Rim** C= 0.600 Limited to weir flow at low heads
#5	Device 2	48.00'	**4.0" Round 4" Underdrain** L= 3.0' Ke= 0.500 Inlet / Outlet Invert= 48.00' / 48.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#6	Device 5	51.60'	**12.0" Horiz. Yard drain/WQV** C= 0.600 Limited to weir flow at low heads
#7	Device 5	51.00'	**2.410 in/hr Exfiltration thru media over Surface area** Phase-In= 0.01'
#8	Secondary	53.00'	**10.00' long x 3.00' breadth Emergency Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.4 cfs @ 12.63 hrs HW=51.74' (Free Discharge)
- **1=12" Outlet Pipe** (Passes 0.4 cfs of 8.5 cfs potential flow)
  - **2=3" Orifice** (Orifice Controls 0.4 cfs @ 9.16 fps)
    - **5=4" Underdrain** (Passes 0.4 cfs of 0.8 cfs potential flow)
      - **6=Yard drain/WQV** (Passes < 0.6 cfs potential flow)
      - **7=Exfiltration thru media** (Passes < 0.2 cfs potential flow)
  - **3=4"x15" Orifice** (Controls 0.0 cfs)
  - **4=OCS Rim** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=51.00' (Free Discharge)
- **8=Emergency Overflow** (Controls 0.0 cfs)

Pond 1P: Bioretention Basin #1



Summary for Pond 2P: Bioretention Basin #2

Inflow Area =	42,787 sf, 68.35% Impervious, Inflow Depth = 2.34" for 2-Year event				
Inflow =	2.4 cfs @	12.09 hrs,	Volume=	8,358 cf	
Outflow =	0.5 cfs @	12.53 hrs,	Volume=	8,358 cf,	Atten= 81%, Lag= 26.7 min
Primary =	0.5 cfs @	12.53 hrs,	Volume=	8,358 cf	
Secondary =	0.0 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 61.93' @ 12.53 hrs Surf.Area= 3,545 sf Storage= 2,898 cf

Plug-Flow detention time= 101.5 min calculated for 8,353 cf (100% of inflow)
Center-of-Mass det. time= 101.5 min (872.6 - 771.1)

Volume	Invert	Avail.Storage	Storage Description
#1	61.00'	26,340 cf	**Bioretention Area #2 (Irregular)** Listed below (Recalc)

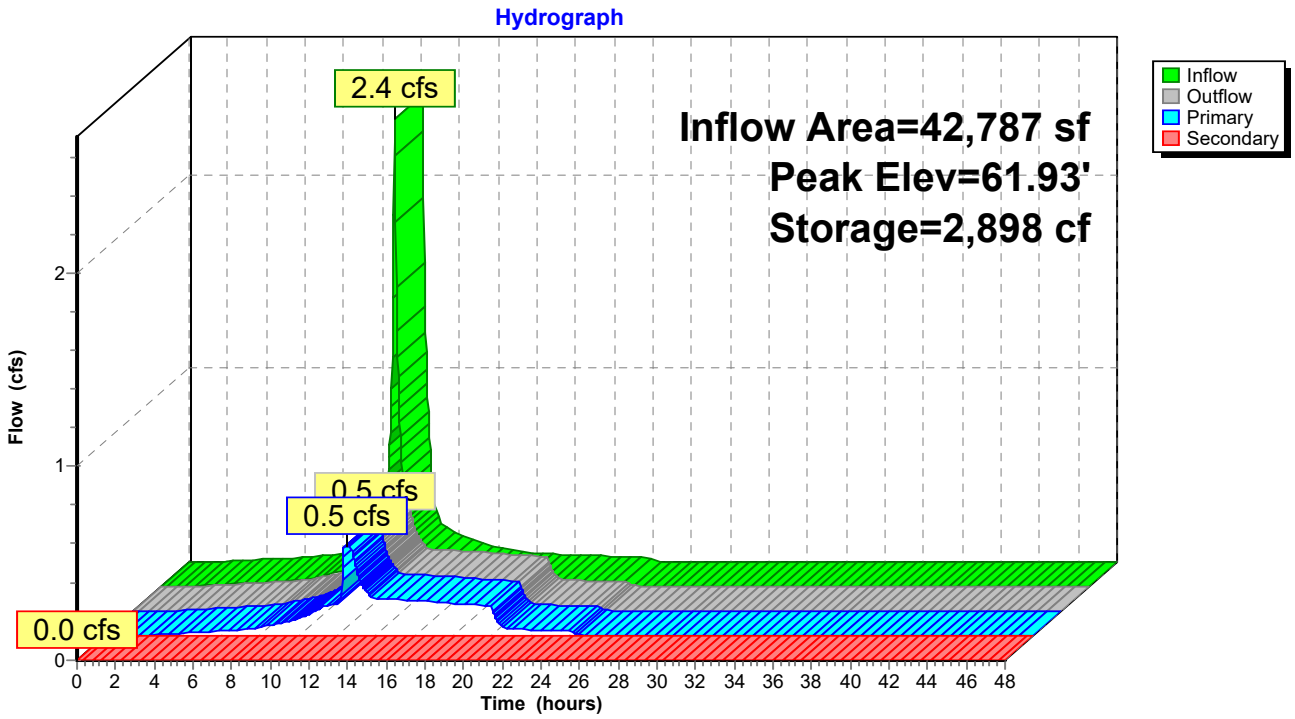
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	2,704	214.0	0	0	2,704
62.00	3,613	239.0	3,148	3,148	3,633
63.00	4,622	264.0	4,107	7,255	4,665
64.00	5,733	290.0	5,168	12,422	5,844
65.00	6,943	315.0	6,328	18,751	7,085
66.00	8,254	340.0	7,589	26,340	8,429

Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	**12.0" Round 12" Outlet Pipe** L= 80.3' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 58.00' / 57.50' S= 0.0062 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	58.00'	**3.0" Vert. 3" Orifice** C= 0.600
#3	Device 1	64.75'	**48.0" x 48.0" Horiz. OCS Rim** C= 0.600 Limited to weir flow at low heads
#4	Device 2	58.00'	**4.0" Round 4" Underdrain** L= 3.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 58.00' / 58.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#5	Device 4	61.80'	**12.0" Horiz. Yard drain/WQV** C= 0.600 Limited to weir flow at low heads
#6	Device 4	61.00'	**2.410 in/hr Exfiltration thru media over Surface area** Phase-In= 0.01'
#7	Secondary	65.00'	**10.00' long x 6.00' breadth Emergency Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.5 cfs @ 12.53 hrs HW=61.93' (Free Discharge)
- **1=12" Outlet Pipe** (Passes 0.5 cfs of 6.1 cfs potential flow)
  - **2=3" Orifice** (Orifice Controls 0.5 cfs @ 9.39 fps)
    - **4=4" Underdrain** (Passes 0.5 cfs of 1.0 cfs potential flow)
      - **5=Yard drain/WQV** (Passes < 0.5 cfs potential flow)
      - **6=Exfiltration thru media** (Passes < 0.2 cfs potential flow)
  - **3=OCS Rim** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=61.00' (Free Discharge)
- **7=Emergency Overflow** (Controls 0.0 cfs)

Pond 2P: Bioretention Basin #2

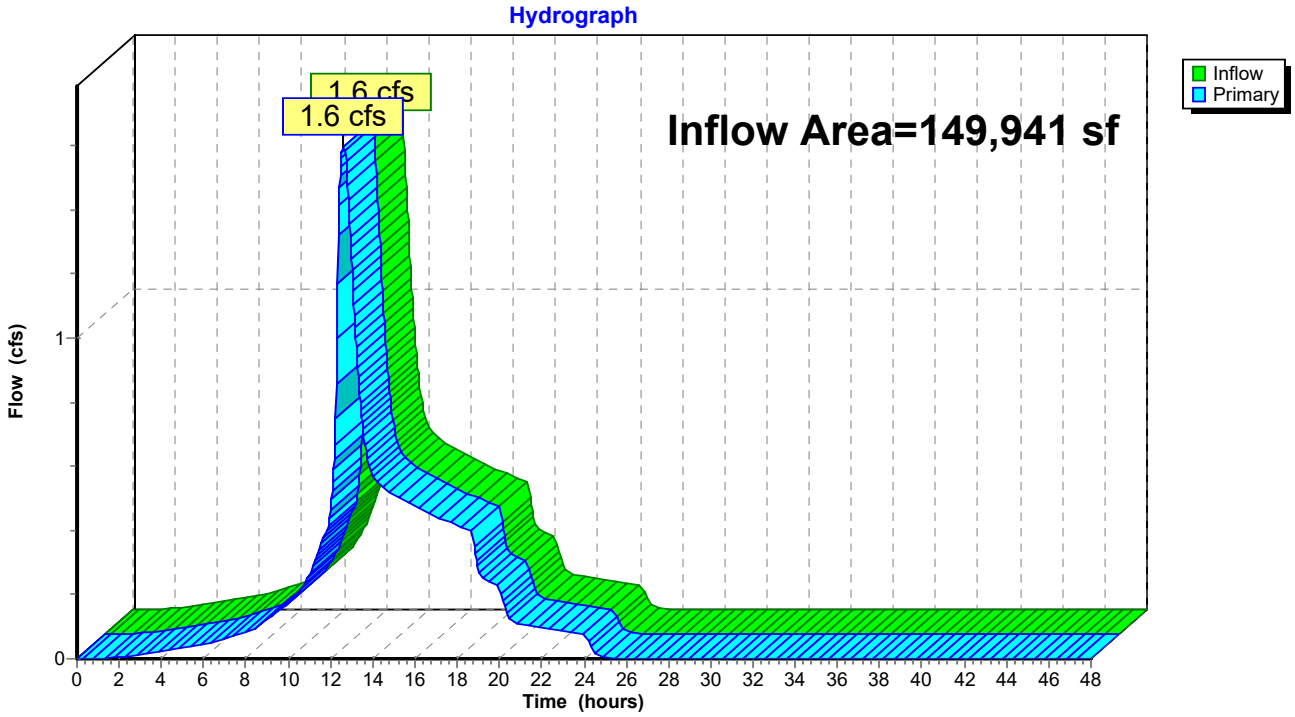


Summary for Link DP-1: Offsite to East

Inflow Area = 149,941 sf, 36.95% Impervious, Inflow Depth = 1.74" for 2-Year event
Inflow = 1.6 cfs @ 12.61 hrs, Volume= 21,713 cf
Primary = 1.6 cfs @ 12.61 hrs, Volume= 21,713 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-1: Offsite to East

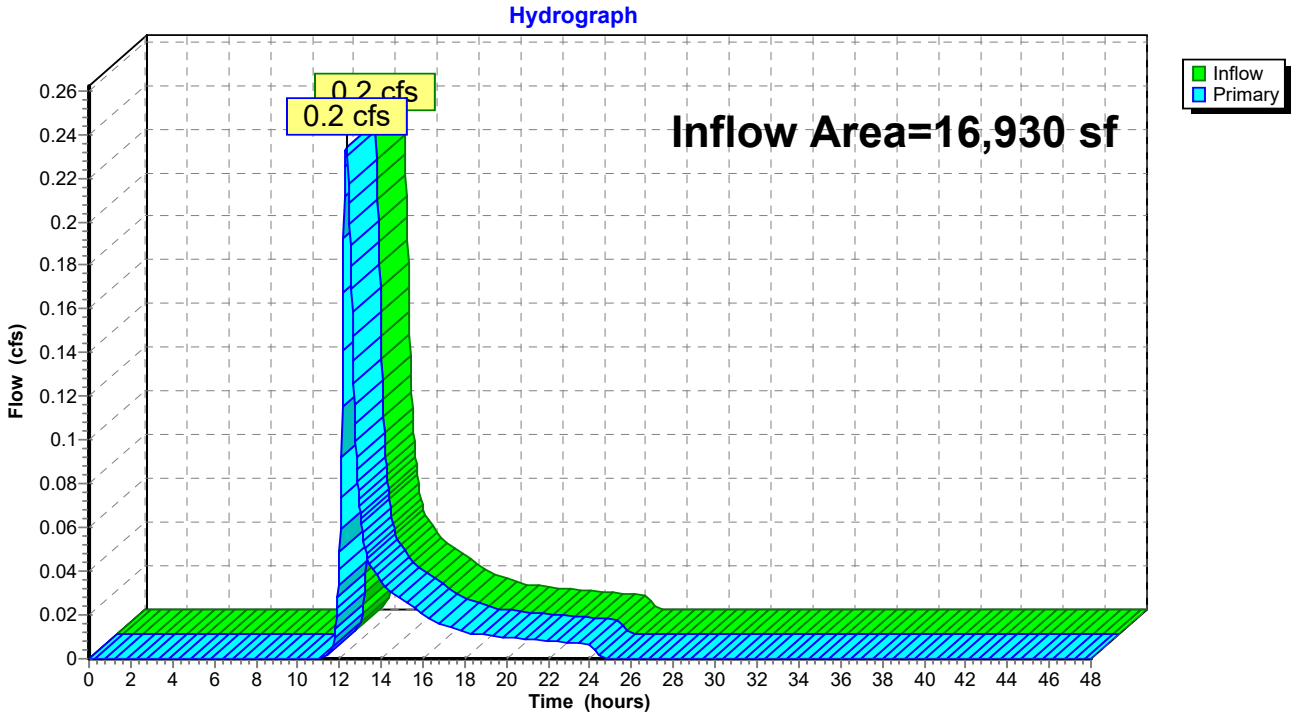


Summary for Link DP-2: Offsite to West

Inflow Area = 16,930 sf, 0.00% Impervious, Inflow Depth = 0.87" for 2-Year event
Inflow = 0.2 cfs @ 12.33 hrs, Volume= 1,223 cf
Primary = 0.2 cfs @ 12.33 hrs, Volume= 1,223 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-2: Offsite to West



Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS-1A: Runoff Area=52,584 sf 49.74% Impervious Runoff Depth=3.66"
Flow Length=258' Tc=10.2 min CN=WQ Runoff=4.1 cfs 16,020 cf

Subcatchment PS-1B: Runoff Area=54,570 sf 0.00% Impervious Runoff Depth=2.44"
Flow Length=440' Tc=41.2 min CN=WQ Runoff=1.7 cfs 11,110 cf

Subcatchment PS-2A: Runoff Area=42,787 sf 68.35% Impervious Runoff Depth=4.11"
Tc=6.0 min CN=WQ Runoff=4.2 cfs 14,655 cf

Subcatchment PS-2B: Runoff Area=16,930 sf 0.00% Impervious Runoff Depth=2.20"
Flow Length=179' Tc=21.1 min CN=WQ Runoff=0.6 cfs 3,099 cf

Pond 1P: Bioretention Basin #1 Peak Elev=52.20' Storage=4,824 cf Inflow=4.1 cfs 16,020 cf
Primary=1.5 cfs 16,021 cf Secondary=0.0 cfs 0 cf Outflow=1.5 cfs 16,021 cf

Pond 2P: Bioretention Basin #2 Peak Elev=62.67' Storage=5,804 cf Inflow=4.2 cfs 14,655 cf
Primary=0.5 cfs 14,655 cf Secondary=0.0 cfs 0 cf Outflow=0.5 cfs 14,655 cf

Link DP-1: Offsite to East Inflow=3.7 cfs 41,785 cf
Primary=3.7 cfs 41,785 cf

Link DP-2: Offsite to West Inflow=0.6 cfs 3,099 cf
Primary=0.6 cfs 3,099 cf

Total Runoff Area = 166,871 sf Runoff Volume = 44,884 cf Average Runoff Depth = 3.23"
66.80% Pervious = 111,469 sf 33.20% Impervious = 55,402 sf

Summary for Subcatchment PS-1A:

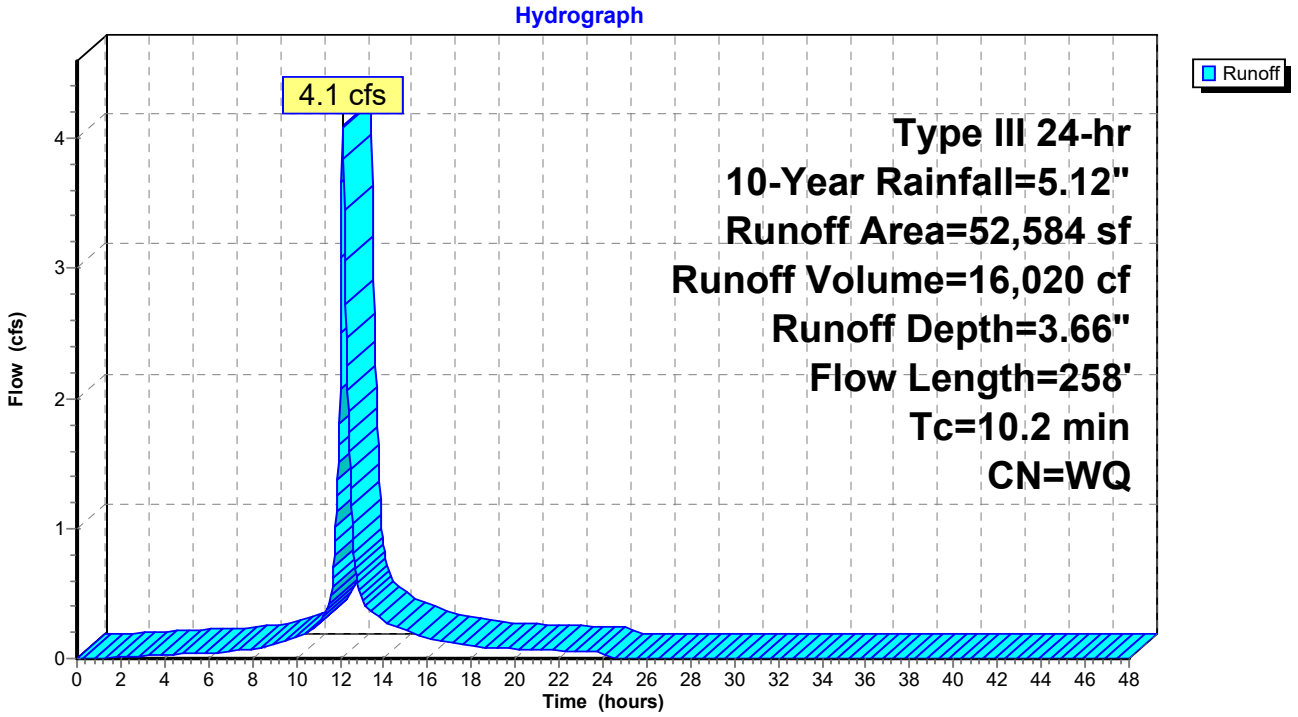
Runoff = 4.1 cfs @ 12.14 hrs, Volume= 16,020 cf, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.12"

Area (sf)	CN	Description
23,289	74	>75% Grass cover, Good, HSG C
633	80	>75% Grass cover, Good, HSG D
20,126	98	Paved parking, HSG C
3,279	98	Roofs, HSG C
2,733	98	Water Surface, HSG C
18	98	Water Surface, HSG D
2,506	70	Woods, Good, HSG C
52,584		Weighted Average
26,429	74	50.26% Pervious Area
26,155	98	49.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	28	0.2600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
6.0	54	0.0550	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	176	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	258	Total			

Subcatchment PS-1A:



Summary for Subcatchment PS-1B:

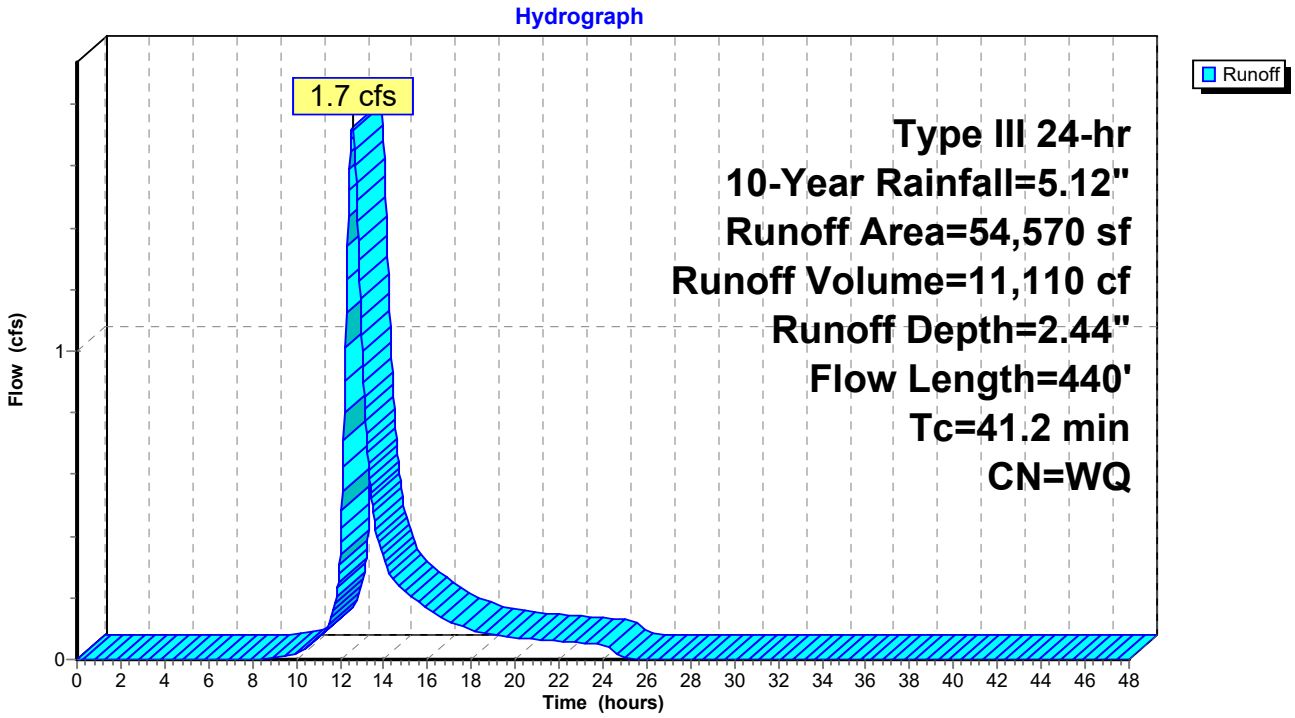
Runoff = 1.7 cfs @ 12.59 hrs, Volume= 11,110 cf, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.12"

Area (sf)	CN	Description
2,326	74	>75% Grass cover, Good, HSG C
613	80	>75% Grass cover, Good, HSG D
24,873	70	Woods, Good, HSG C
26,758	77	Woods, Good, HSG D
54,570		Weighted Average
54,570	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	125	0.1300	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
27.2	168	0.0340	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.5	147	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.2	440	Total			

Subcatchment PS-1B:



Summary for Subcatchment PS-2A:

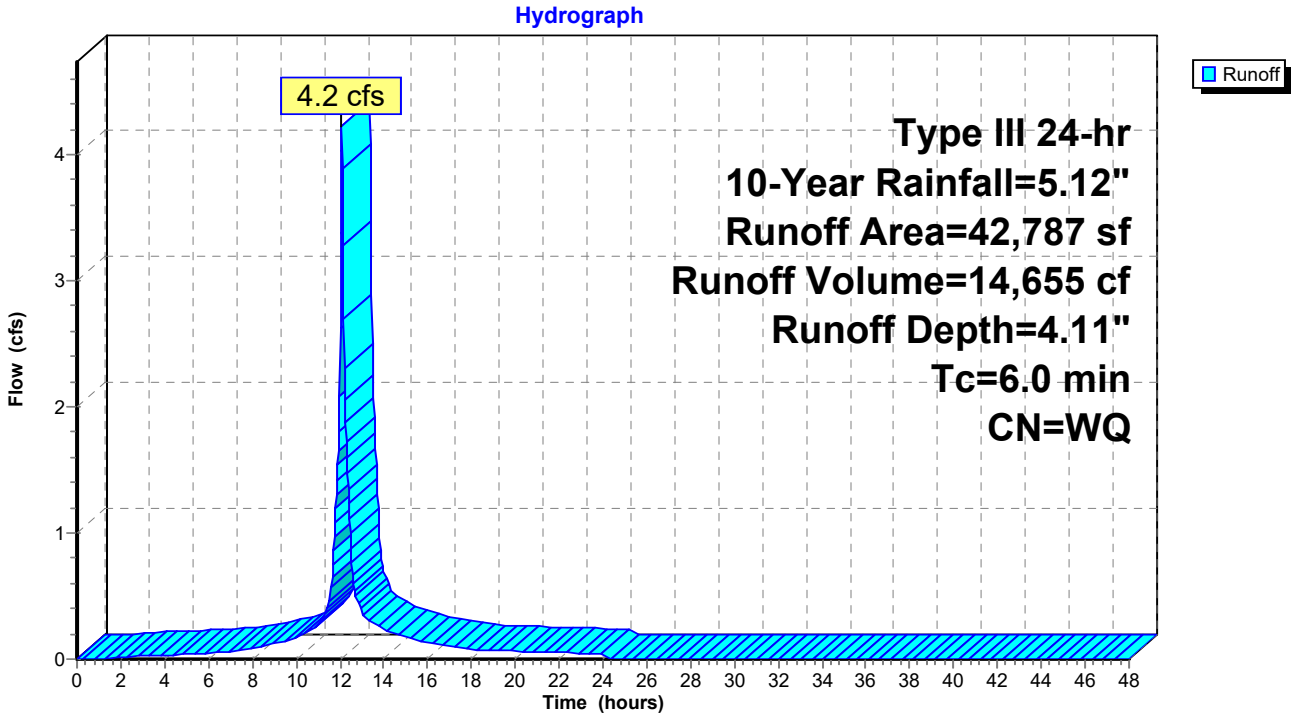
Runoff = 4.2 cfs @ 12.09 hrs, Volume= 14,655 cf, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.12"

Area (sf)	CN	Description
12,759	74	>75% Grass cover, Good, HSG C
19,200	98	Paved parking, HSG C
7,704	98	Roofs, HSG C
2,342	98	Water Surface, HSG C
782	70	Woods, Good, HSG C
42,787		Weighted Average
13,541	74	31.65% Pervious Area
29,247	98	68.35% Impervious Area

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

Subcatchment PS-2A:



Summary for Subcatchment PS-2B:

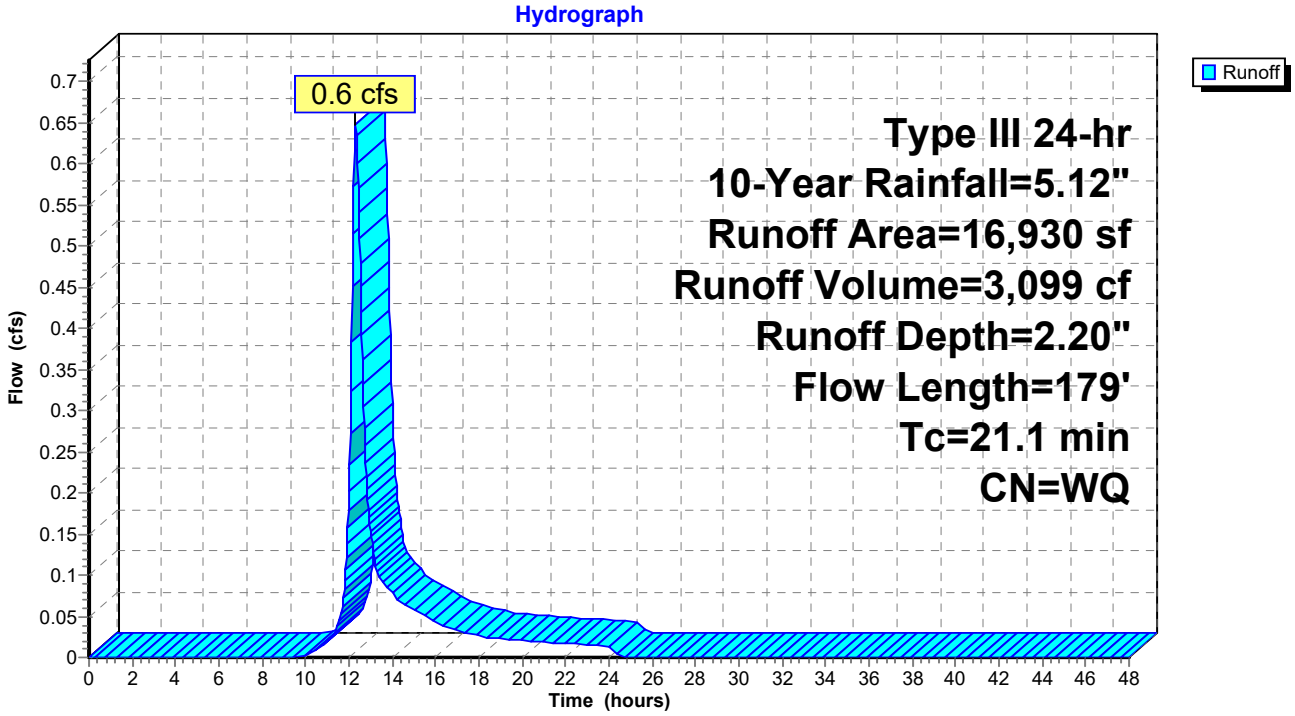
Runoff = 0.6 cfs @ 12.30 hrs, Volume= 3,099 cf, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.12"

Area (sf)	CN	Description
3,602	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
13,327	70	Woods, Good, HSG C
16,930		Weighted Average
16,930	71	100.00% Pervious Area
0	98	0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	100	0.0250	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	79	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.1	179	Total			

Subcatchment PS-2B:



Summary for Pond 1P: Bioretention Basin #1

Inflow Area =	52,584 sf, 49.74% Impervious,	Inflow Depth =	3.66"	for 10-Year event	
Inflow =	4.1 cfs @ 12.14 hrs,	Volume=	16,020 cf		
Outflow =	1.5 cfs @ 12.46 hrs,	Volume=	16,021 cf,	Atten= 63%,	Lag= 19.5 min
Primary =	1.5 cfs @ 12.46 hrs,	Volume=	16,021 cf		
Secondary =	0.0 cfs @ 0.00 hrs,	Volume=	0 cf		

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 52.20' @ 12.46 hrs Surf.Area= 4,618 sf Storage= 4,824 cf

Plug-Flow detention time= 72.2 min calculated for 16,011 cf (100% of inflow)
Center-of-Mass det. time= 72.2 min (853.6 - 781.4)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	14,362 cf	**Bioretention Area #1 (Irregular)** Listed below (Recalc)

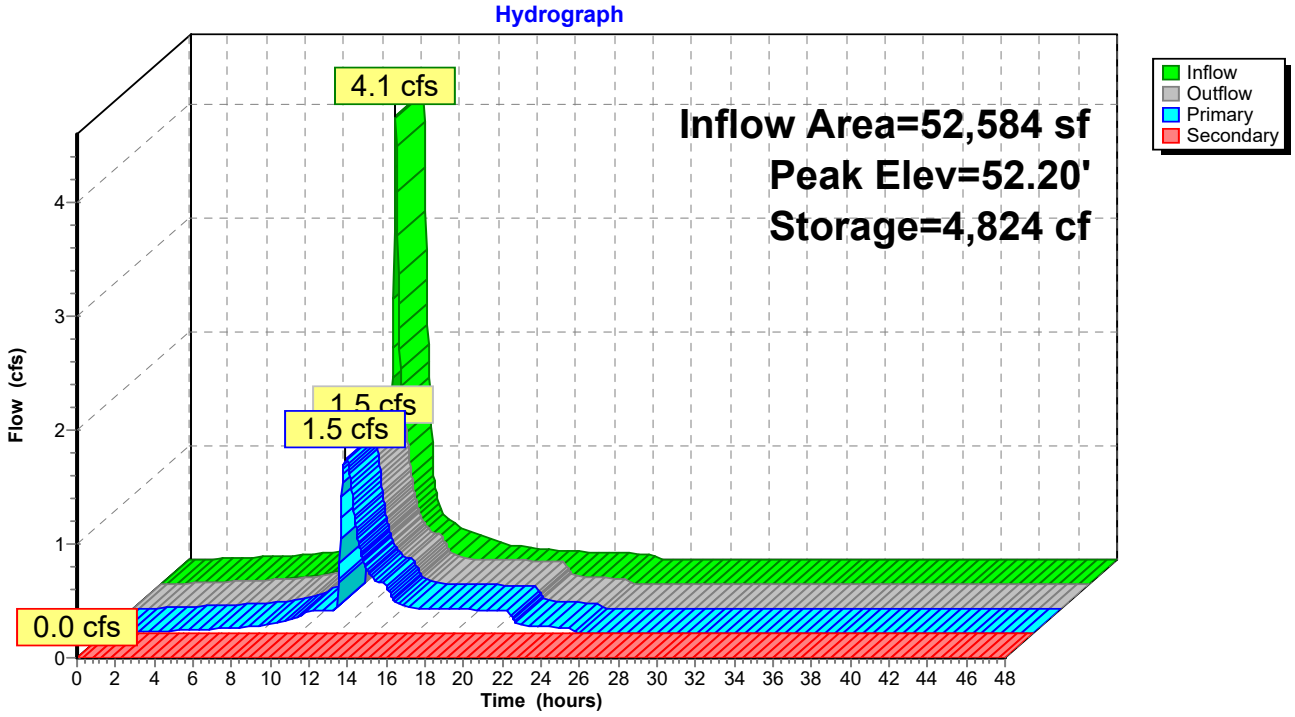
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.00	3,473	298.0	0	0	3,473
52.00	4,398	317.0	3,926	3,926	4,452
53.00	5,559	370.0	4,967	8,894	7,370
54.00	5,379	336.0	5,469	14,362	9,313

Device	Routing	Invert	Outlet Devices
#1	Primary	48.00'	**12.0" Round 12" Outlet Pipe** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 48.00' / 47.80' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	48.00'	**3.0" Vert. 3" Orifice** C= 0.600
#3	Device 1	51.75'	**15.0" W x 4.0" H Vert. 4"x15" Orifice** C= 0.600
#4	Device 1	52.90'	**48.0" x 48.0" Horiz. OCS Rim** C= 0.600 Limited to weir flow at low heads
#5	Device 2	48.00'	**4.0" Round 4" Underdrain** L= 3.0' Ke= 0.500 Inlet / Outlet Invert= 48.00' / 48.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#6	Device 5	51.60'	**12.0" Horiz. Yard drain/WQV** C= 0.600 Limited to weir flow at low heads
#7	Device 5	51.00'	**2.410 in/hr Exfiltration thru media over Surface area** Phase-In= 0.01'
#8	Secondary	53.00'	**10.00' long x 3.00' breadth Emergency Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=1.5 cfs @ 12.46 hrs HW=52.20' (Free Discharge)
- **1=12" Outlet Pipe** (Passes 1.5 cfs of 9.1 cfs potential flow)
  - **2=3" Orifice** (Orifice Controls 0.5 cfs @ 9.72 fps)
    - **5=4" Underdrain** (Passes 0.5 cfs of 0.8 cfs potential flow)
      - **6=Yard drain/WQV** (Passes < 2.9 cfs potential flow)
      - **7=Exfiltration thru media** (Passes < 0.3 cfs potential flow)
  - **3=4"x15" Orifice** (Orifice Controls 1.0 cfs @ 2.52 fps)
  - **4=OCS Rim** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=51.00' (Free Discharge)
- **8=Emergency Overflow** (Controls 0.0 cfs)

Pond 1P: Bioretention Basin #1



Summary for Pond 2P: Bioretention Basin #2

Inflow Area =	42,787 sf, 68.35% Impervious, Inflow Depth = 4.11" for 10-Year event				
Inflow =	4.2 cfs @	12.09 hrs,	Volume=	14,655 cf	
Outflow =	0.5 cfs @	12.70 hrs,	Volume=	14,655 cf,	Atten= 88%, Lag= 36.9 min
Primary =	0.5 cfs @	12.70 hrs,	Volume=	14,655 cf	
Secondary =	0.0 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 62.67' @ 12.70 hrs Surf.Area= 4,279 sf Storage= 5,804 cf

Plug-Flow detention time= 122.1 min calculated for 14,655 cf (100% of inflow)
Center-of-Mass det. time= 122.0 min (886.4 - 764.4)

Volume	Invert	Avail.Storage	Storage Description
#1	61.00'	26,340 cf	**Bioretention Area #2 (Irregular)** Listed below (Recalc)

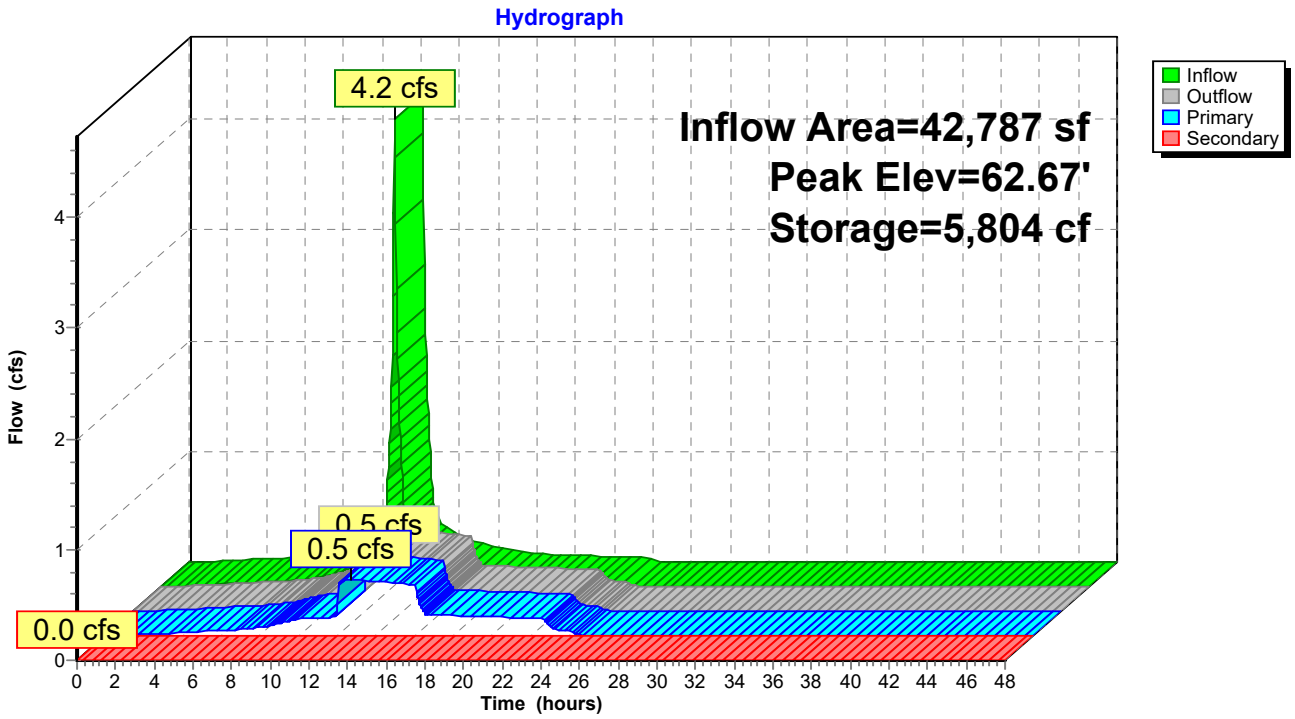
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	2,704	214.0	0	0	2,704
62.00	3,613	239.0	3,148	3,148	3,633
63.00	4,622	264.0	4,107	7,255	4,665
64.00	5,733	290.0	5,168	12,422	5,844
65.00	6,943	315.0	6,328	18,751	7,085
66.00	8,254	340.0	7,589	26,340	8,429

Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	**12.0" Round 12" Outlet Pipe** L= 80.3' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 58.00' / 57.50' S= 0.0062 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	58.00'	**3.0" Vert. 3" Orifice** C= 0.600
#3	Device 1	64.75'	**48.0" x 48.0" Horiz. OCS Rim** C= 0.600 Limited to weir flow at low heads
#4	Device 2	58.00'	**4.0" Round 4" Underdrain** L= 3.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 58.00' / 58.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#5	Device 4	61.80'	**12.0" Horiz. Yard drain/WQV** C= 0.600 Limited to weir flow at low heads
#6	Device 4	61.00'	**2.410 in/hr Exfiltration thru media over Surface area** Phase-In= 0.01'
#7	Secondary	65.00'	**10.00' long x 6.00' breadth Emergency Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.5 cfs @ 12.70 hrs HW=62.67' (Free Discharge)
- **1=12" Outlet Pipe** (Passes 0.5 cfs of 6.7 cfs potential flow)
  - **2=3" Orifice** (Orifice Controls 0.5 cfs @ 10.27 fps)
    - **4=4" Underdrain** (Passes 0.5 cfs of 1.1 cfs potential flow)
      - **5=Yard drain/WQV** (Passes < 3.5 cfs potential flow)
      - **6=Exfiltration thru media** (Passes < 0.2 cfs potential flow)
  - **3=OCS Rim** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=61.00' (Free Discharge)
- **7=Emergency Overflow** (Controls 0.0 cfs)

Pond 2P: Bioretention Basin #2

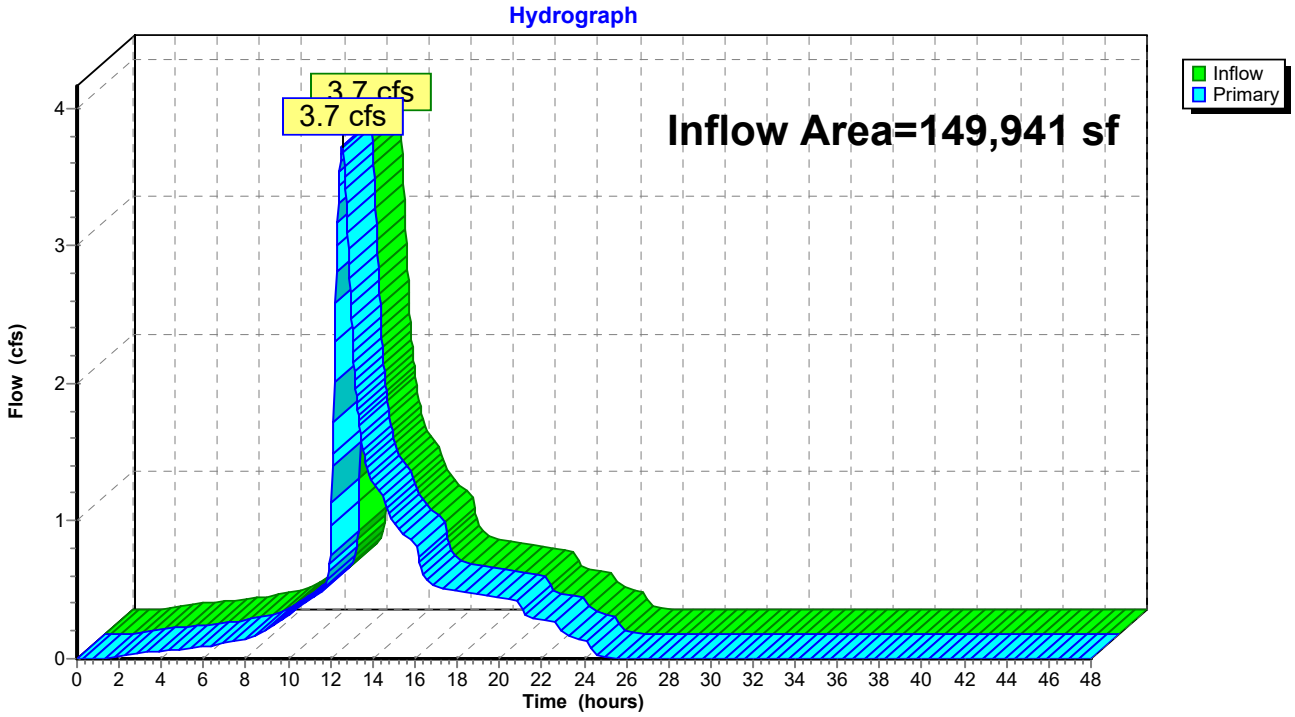


Summary for Link DP-1: Offsite to East

Inflow Area = 149,941 sf, 36.95% Impervious, Inflow Depth = 3.34" for 10-Year event
Inflow = 3.7 cfs @ 12.54 hrs, Volume= 41,785 cf
Primary = 3.7 cfs @ 12.54 hrs, Volume= 41,785 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-1: Offsite to East

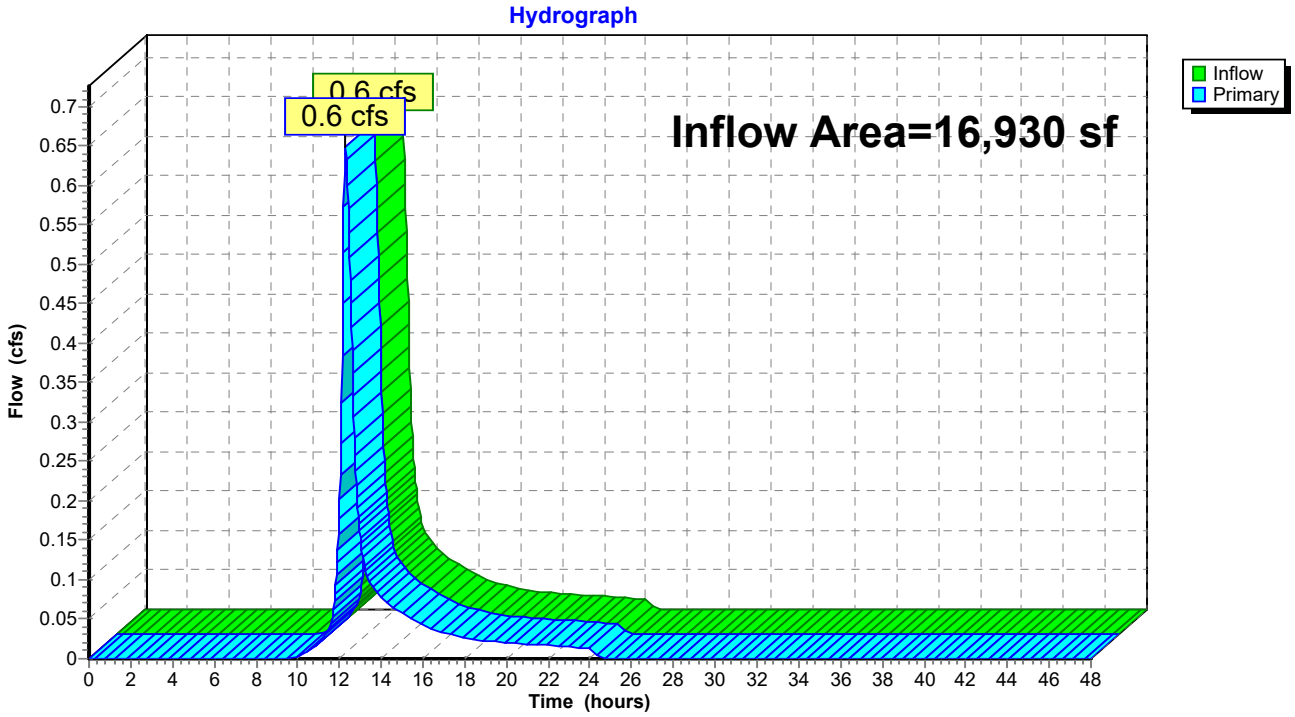


Summary for Link DP-2: Offsite to West

Inflow Area = 16,930 sf, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 0.6 cfs @ 12.30 hrs, Volume= 3,099 cf
Primary = 0.6 cfs @ 12.30 hrs, Volume= 3,099 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-2: Offsite to West



Time span=0.00-48.00 hrs, dt=0.03 hrs, 1601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS-1A: Runoff Area=52,584 sf 49.74% Impervious Runoff Depth=6.50"
Flow Length=258' Tc=10.2 min CN=WQ Runoff=7.3 cfs 28,491 cf

Subcatchment PS-1B: Runoff Area=54,570 sf 0.00% Impervious Runoff Depth=5.06"
Flow Length=440' Tc=41.2 min CN=WQ Runoff=3.6 cfs 23,027 cf

Subcatchment PS-2A: Runoff Area=42,787 sf 68.35% Impervious Runoff Depth=7.04"
Tc=6.0 min CN=WQ Runoff=7.2 cfs 25,096 cf

Subcatchment PS-2B: Runoff Area=16,930 sf 0.00% Impervious Runoff Depth=4.73"
Flow Length=179' Tc=21.1 min CN=WQ Runoff=1.4 cfs 6,670 cf

Pond 1P: Bioretention Basin #1 Peak Elev=52.95' Storage=8,625 cf Inflow=7.3 cfs 28,491 cf
Primary=3.2 cfs 28,489 cf Secondary=0.0 cfs 0 cf Outflow=3.2 cfs 28,489 cf

Pond 2P: Bioretention Basin #2 Peak Elev=63.86' Storage=11,608 cf Inflow=7.2 cfs 25,096 cf
Primary=0.6 cfs 25,096 cf Secondary=0.0 cfs 0 cf Outflow=0.6 cfs 25,096 cf

Link DP-1: Offsite to East Inflow=7.0 cfs 76,612 cf
Primary=7.0 cfs 76,612 cf

Link DP-2: Offsite to West Inflow=1.4 cfs 6,670 cf
Primary=1.4 cfs 6,670 cf

Total Runoff Area = 166,871 sf Runoff Volume = 83,283 cf Average Runoff Depth = 5.99"
66.80% Pervious = 111,469 sf 33.20% Impervious = 55,402 sf

Summary for Subcatchment PS-1A:

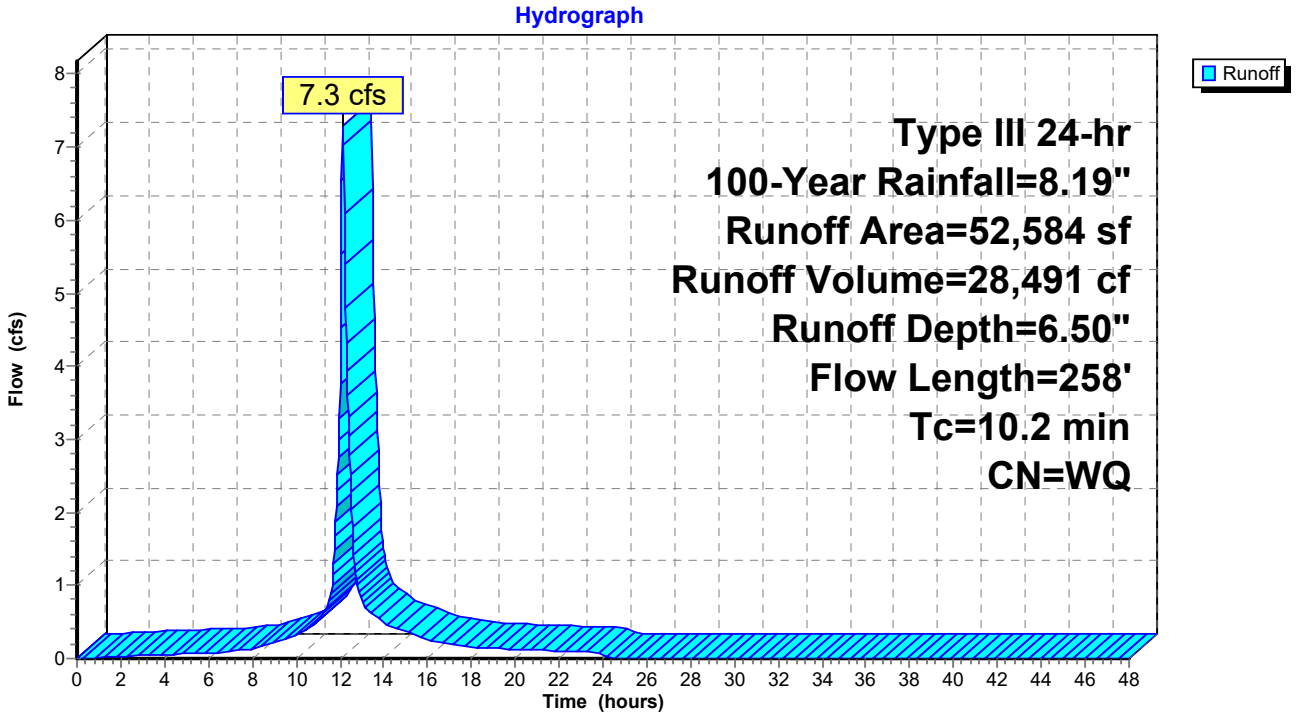
Runoff = 7.3 cfs @ 12.14 hrs, Volume= 28,491 cf, Depth= 6.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (sf)	CN	Description
23,289	74	>75% Grass cover, Good, HSG C
633	80	>75% Grass cover, Good, HSG D
20,126	98	Paved parking, HSG C
3,279	98	Roofs, HSG C
2,733	98	Water Surface, HSG C
18	98	Water Surface, HSG D
2,506	70	Woods, Good, HSG C
52,584		Weighted Average
26,429	74	50.26% Pervious Area
26,155	98	49.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	28	0.2600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
6.0	54	0.0550	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	176	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	258	Total			

Subcatchment PS-1A:



Summary for Subcatchment PS-1B:

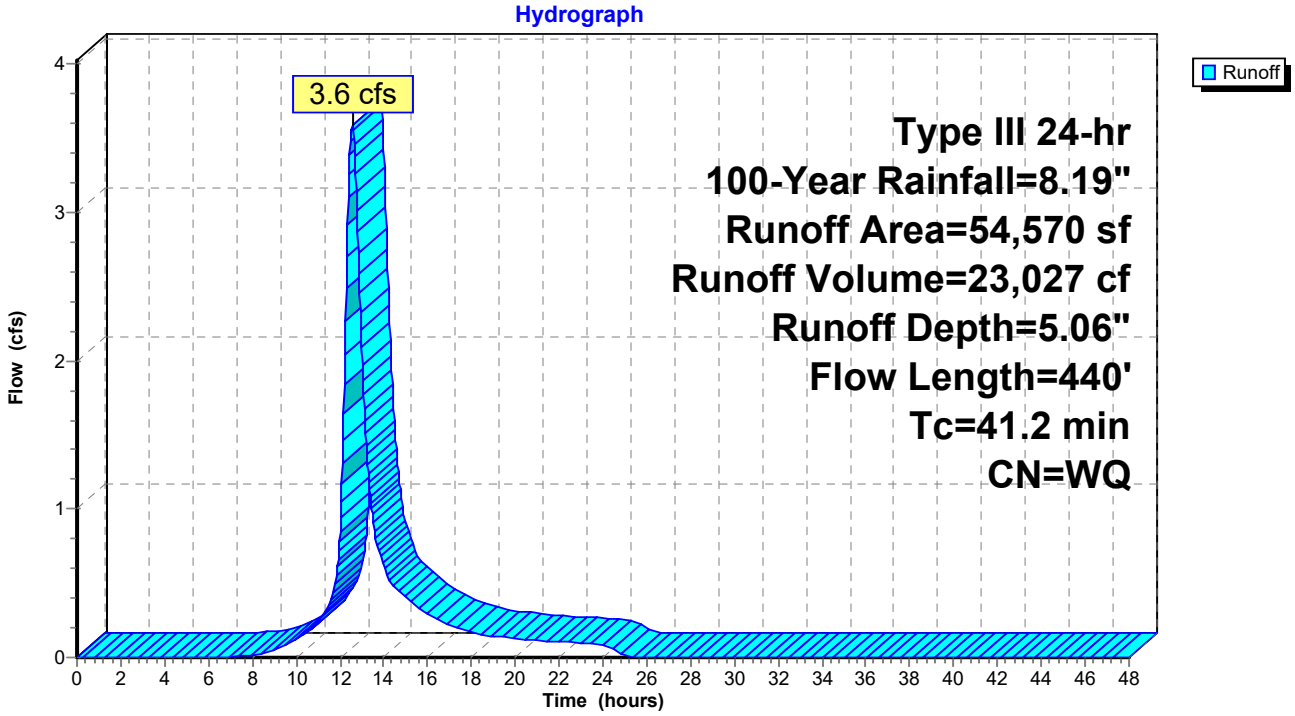
Runoff = 3.6 cfs @ 12.57 hrs, Volume= 23,027 cf, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (sf)	CN	Description
2,326	74	>75% Grass cover, Good, HSG C
613	80	>75% Grass cover, Good, HSG D
24,873	70	Woods, Good, HSG C
26,758	77	Woods, Good, HSG D
54,570		Weighted Average
54,570	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	125	0.1300	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
27.2	168	0.0340	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.5	147	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.2	440	Total			

Subcatchment PS-1B:



Summary for Subcatchment PS-2A:

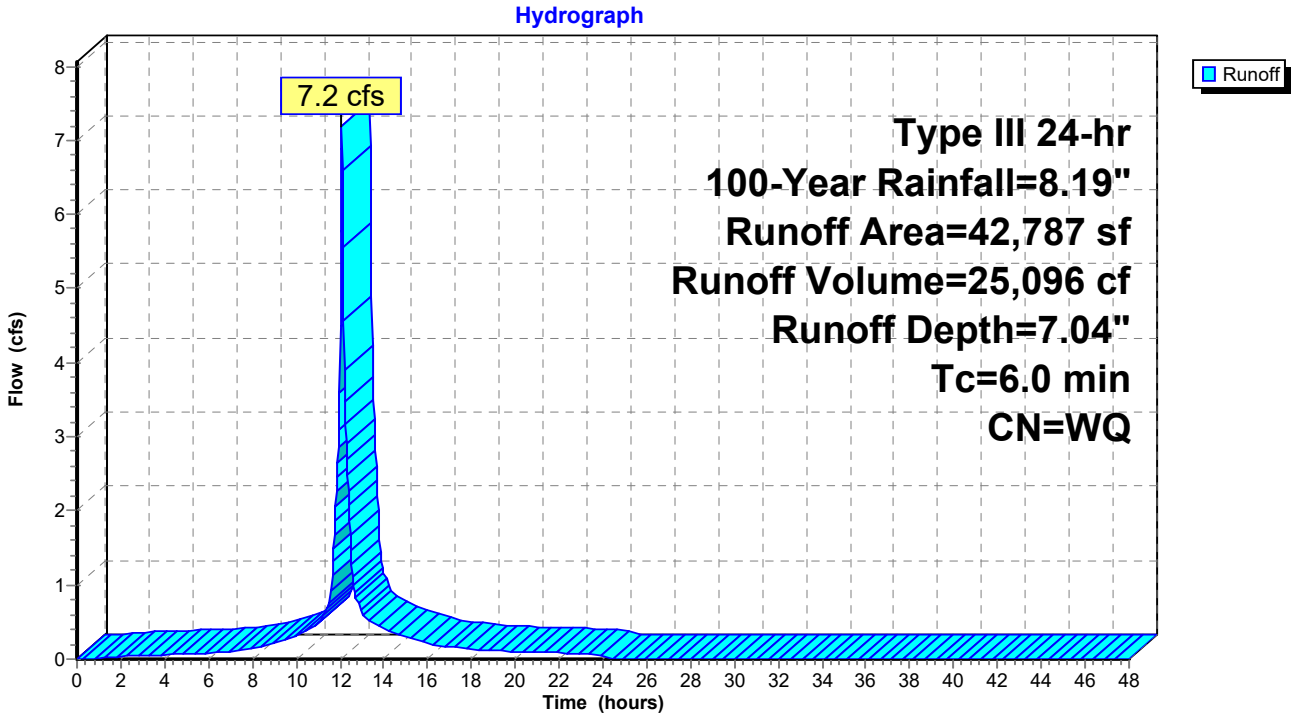
Runoff = 7.2 cfs @ 12.09 hrs, Volume= 25,096 cf, Depth= 7.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (sf)	CN	Description
12,759	74	>75% Grass cover, Good, HSG C
19,200	98	Paved parking, HSG C
7,704	98	Roofs, HSG C
2,342	98	Water Surface, HSG C
782	70	Woods, Good, HSG C
42,787		Weighted Average
13,541	74	31.65% Pervious Area
29,247	98	68.35% Impervious Area

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

Subcatchment PS-2A:



Summary for Subcatchment PS-2B:

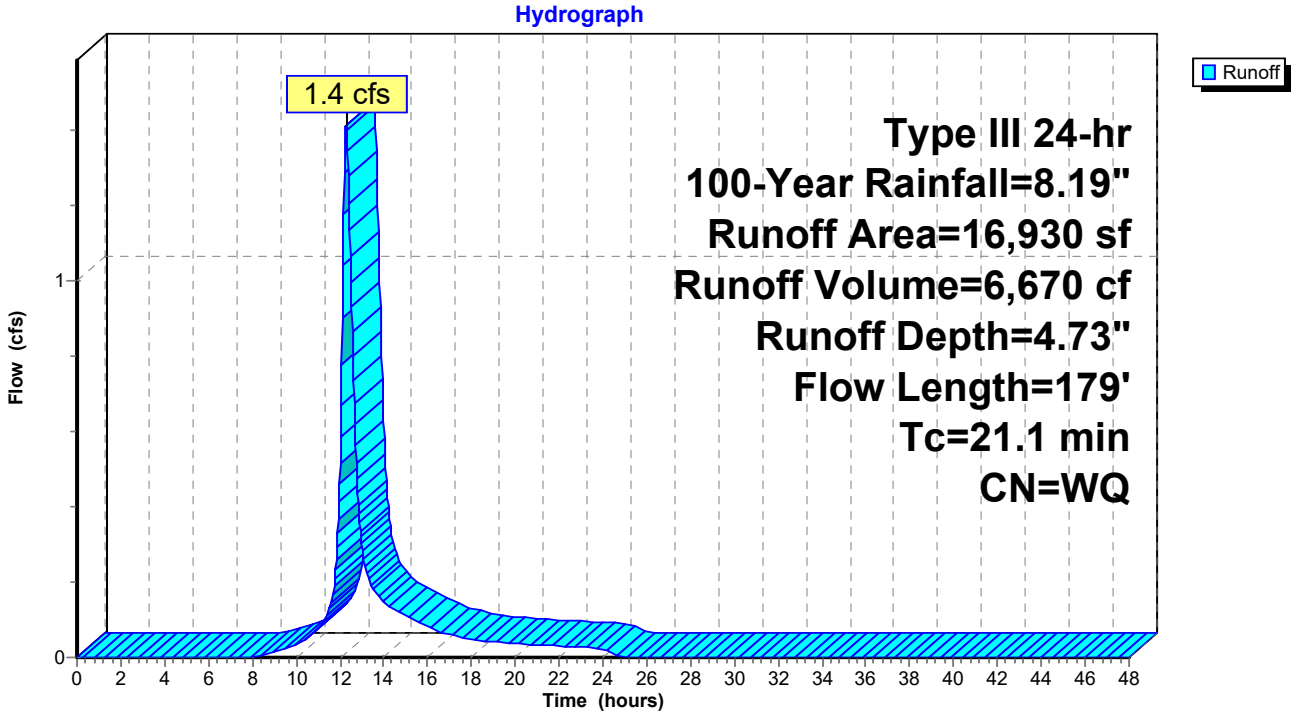
Runoff = 1.4 cfs @ 12.29 hrs, Volume= 6,670 cf, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (sf)	CN	Description
3,602	74	>75% Grass cover, Good, HSG C
0	98	Paved parking, HSG C
13,327	70	Woods, Good, HSG C
16,930		Weighted Average
16,930	71	100.00% Pervious Area
0	98	0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	100	0.0250	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	79	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.1	179	Total			

Subcatchment PS-2B:



Summary for Pond 1P: Bioretention Basin #1

Inflow Area = 52,584 sf, 49.74% Impervious, Inflow Depth = 6.50" for 100-Year event
Inflow = 7.3 cfs @ 12.14 hrs, Volume= 28,491 cf
Outflow = 3.2 cfs @ 12.41 hrs, Volume= 28,489 cf, Atten= 57%, Lag= 16.0 min
Primary = 3.2 cfs @ 12.41 hrs, Volume= 28,489 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 52.95' @ 12.41 hrs Surf.Area= 5,500 sf Storage= 8,625 cf

Plug-Flow detention time= 69.5 min calculated for 28,471 cf (100% of inflow)
Center-of-Mass det. time= 69.4 min (843.5 - 774.1)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	14,362 cf	**Bioretention Area #1 (Irregular)** Listed below (Recalc)

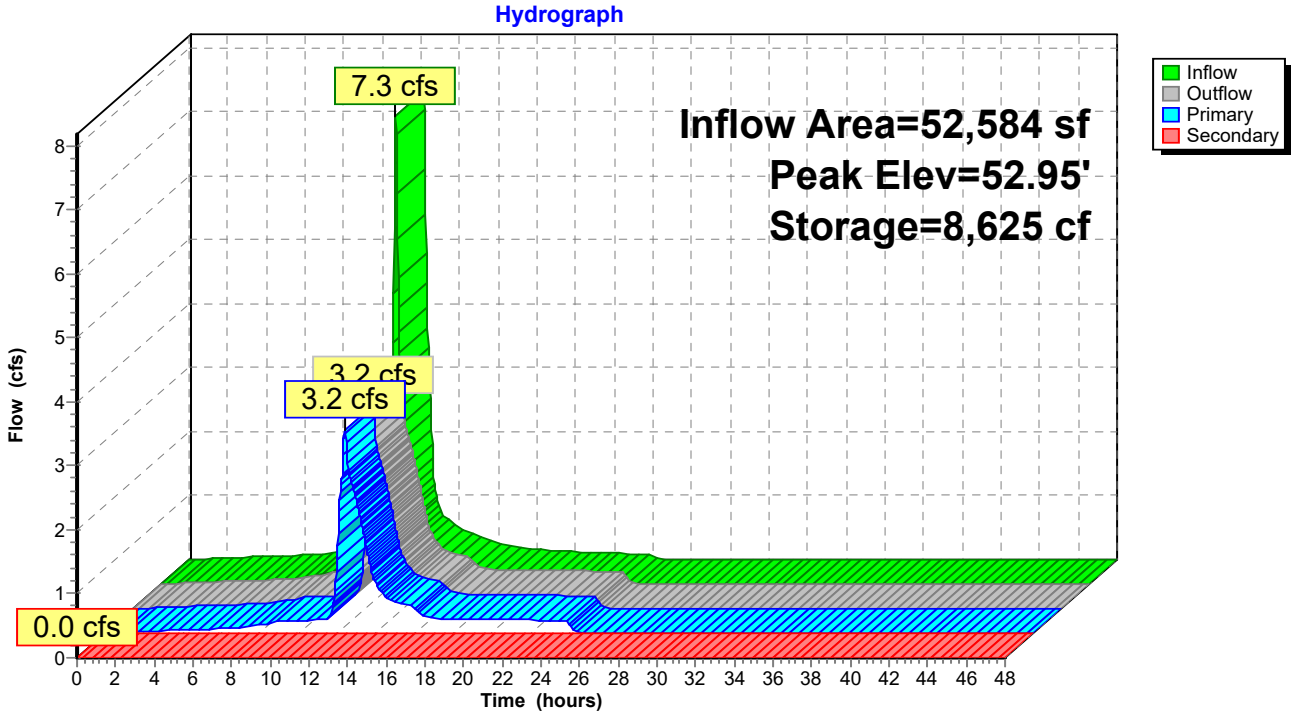
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.00	3,473	298.0	0	0	3,473
52.00	4,398	317.0	3,926	3,926	4,452
53.00	5,559	370.0	4,967	8,894	7,370
54.00	5,379	336.0	5,469	14,362	9,313

Device	Routing	Invert	Outlet Devices
#1	Primary	48.00'	**12.0" Round 12" Outlet Pipe** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 48.00' / 47.80' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	48.00'	**3.0" Vert. 3" Orifice** C= 0.600
#3	Device 1	51.75'	**15.0" W x 4.0" H Vert. 4"x15" Orifice** C= 0.600
#4	Device 1	52.90'	**48.0" x 48.0" Horiz. OCS Rim** C= 0.600 Limited to weir flow at low heads
#5	Device 2	48.00'	**4.0" Round 4" Underdrain** L= 3.0' Ke= 0.500 Inlet / Outlet Invert= 48.00' / 48.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#6	Device 5	51.60'	**12.0" Horiz. Yard drain/WQV** C= 0.600 Limited to weir flow at low heads
#7	Device 5	51.00'	**2.410 in/hr Exfiltration thru media over Surface area** Phase-In= 0.01'
#8	Secondary	53.00'	**10.00' long x 3.00' breadth Emergency Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=3.2 cfs @ 12.41 hrs HW=52.95' (Free Discharge)
- **1=12" Outlet Pipe** (Passes 3.2 cfs of 10.0 cfs potential flow)
  - **2=3" Orifice** (Orifice Controls 0.5 cfs @ 10.58 fps)
    - **5=4" Underdrain** (Passes 0.5 cfs of 0.9 cfs potential flow)
      - **6=Yard drain/WQV** (Passes < 4.4 cfs potential flow)
      - **7=Exfiltration thru media** (Passes < 0.3 cfs potential flow)
  - **3=4"x15" Orifice** (Orifice Controls 2.0 cfs @ 4.89 fps)
  - **4=OCS Rim** (Weir Controls 0.6 cfs @ 0.74 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=51.00' (Free Discharge)
- **8=Emergency Overflow** (Controls 0.0 cfs)

Pond 1P: Bioretention Basin #1



Summary for Pond 2P: Bioretention Basin #2

Inflow Area =	42,787 sf, 68.35% Impervious, Inflow Depth = 7.04" for 100-Year event				
Inflow =	7.2 cfs @	12.09 hrs,	Volume=	25,096 cf	
Outflow =	0.6 cfs @	13.11 hrs,	Volume=	25,096 cf,	Atten= 92%, Lag= 61.5 min
Primary =	0.6 cfs @	13.11 hrs,	Volume=	25,096 cf	
Secondary =	0.0 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 63.86' @ 13.11 hrs Surf.Area= 5,566 sf Storage= 11,608 cf

Plug-Flow detention time= 205.2 min calculated for 25,081 cf (100% of inflow)
Center-of-Mass det. time= 205.2 min (963.2 - 758.0)

Volume	Invert	Avail.Storage	Storage Description
#1	61.00'	26,340 cf	**Bioretention Area #2 (Irregular)** Listed below (Recalc)

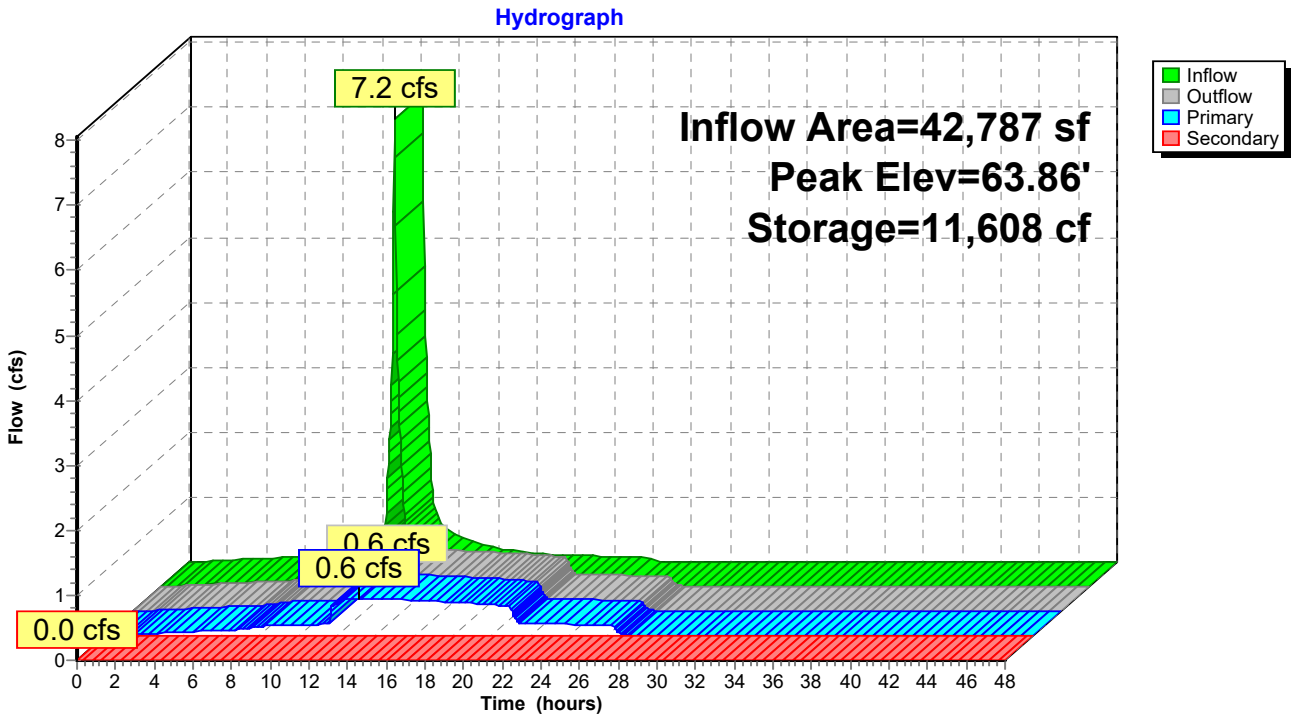
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	2,704	214.0	0	0	2,704
62.00	3,613	239.0	3,148	3,148	3,633
63.00	4,622	264.0	4,107	7,255	4,665
64.00	5,733	290.0	5,168	12,422	5,844
65.00	6,943	315.0	6,328	18,751	7,085
66.00	8,254	340.0	7,589	26,340	8,429

Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	**12.0" Round 12" Outlet Pipe** L= 80.3' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 58.00' / 57.50' S= 0.0062 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	58.00'	**3.0" Vert. 3" Orifice** C= 0.600
#3	Device 1	64.75'	**48.0" x 48.0" Horiz. OCS Rim** C= 0.600 Limited to weir flow at low heads
#4	Device 2	58.00'	**4.0" Round 4" Underdrain** L= 3.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 58.00' / 58.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#5	Device 4	61.80'	**12.0" Horiz. Yard drain/WQV** C= 0.600 Limited to weir flow at low heads
#6	Device 4	61.00'	**2.410 in/hr Exfiltration thru media over Surface area** Phase-In= 0.01'
#7	Secondary	65.00'	**10.00' long x 6.00' breadth Emergency Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.6 cfs @ 13.11 hrs HW=63.86' (Free Discharge)
- **1=12" Outlet Pipe** (Passes 0.6 cfs of 7.6 cfs potential flow)
  - **2=3" Orifice** (Orifice Controls 0.6 cfs @ 11.53 fps)
    - **4=4" Underdrain** (Passes 0.6 cfs of 1.3 cfs potential flow)
      - **5=Yard drain/WQV** (Passes < 5.4 cfs potential flow)
      - **6=Exfiltration thru media** (Passes < 0.3 cfs potential flow)
  - **3=OCS Rim** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=61.00' (Free Discharge)
- **7=Emergency Overflow** (Controls 0.0 cfs)

Pond 2P: Bioretention Basin #2

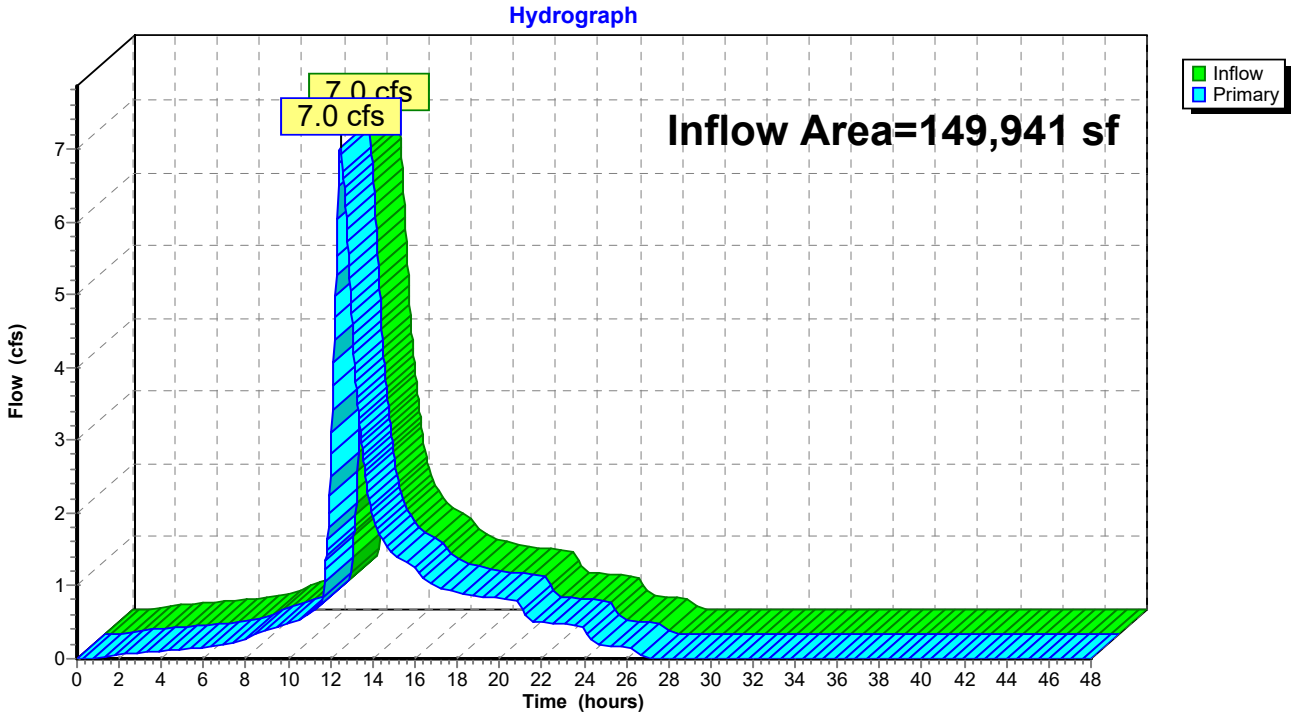


Summary for Link DP-1: Offsite to East

Inflow Area = 149,941 sf, 36.95% Impervious, Inflow Depth = 6.13" for 100-Year event
Inflow = 7.0 cfs @ 12.46 hrs, Volume= 76,612 cf
Primary = 7.0 cfs @ 12.46 hrs, Volume= 76,612 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-1: Offsite to East

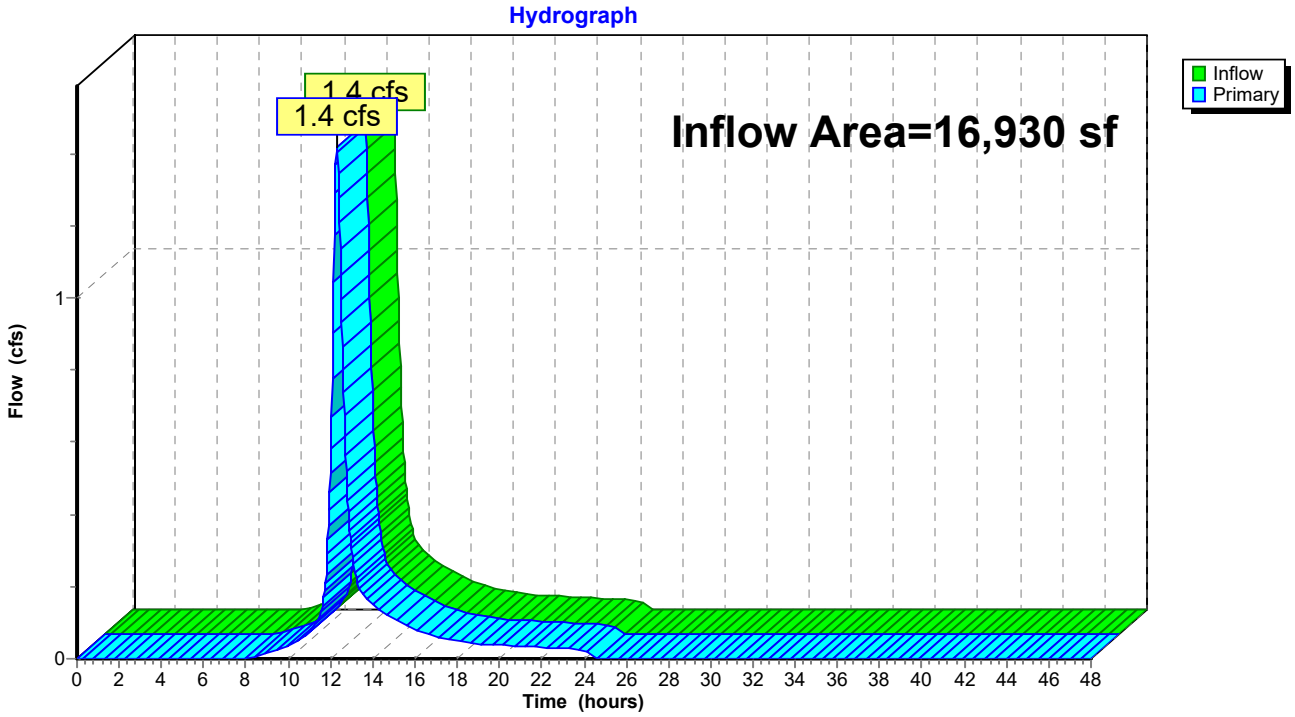


Summary for Link DP-2: Offsite to West

Inflow Area = 16,930 sf, 0.00% Impervious, Inflow Depth = 4.73" for 100-Year event
Inflow = 1.4 cfs @ 12.29 hrs, Volume= 6,670 cf
Primary = 1.4 cfs @ 12.29 hrs, Volume= 6,670 cf, Atten= 0%, Lag= 0.0 min

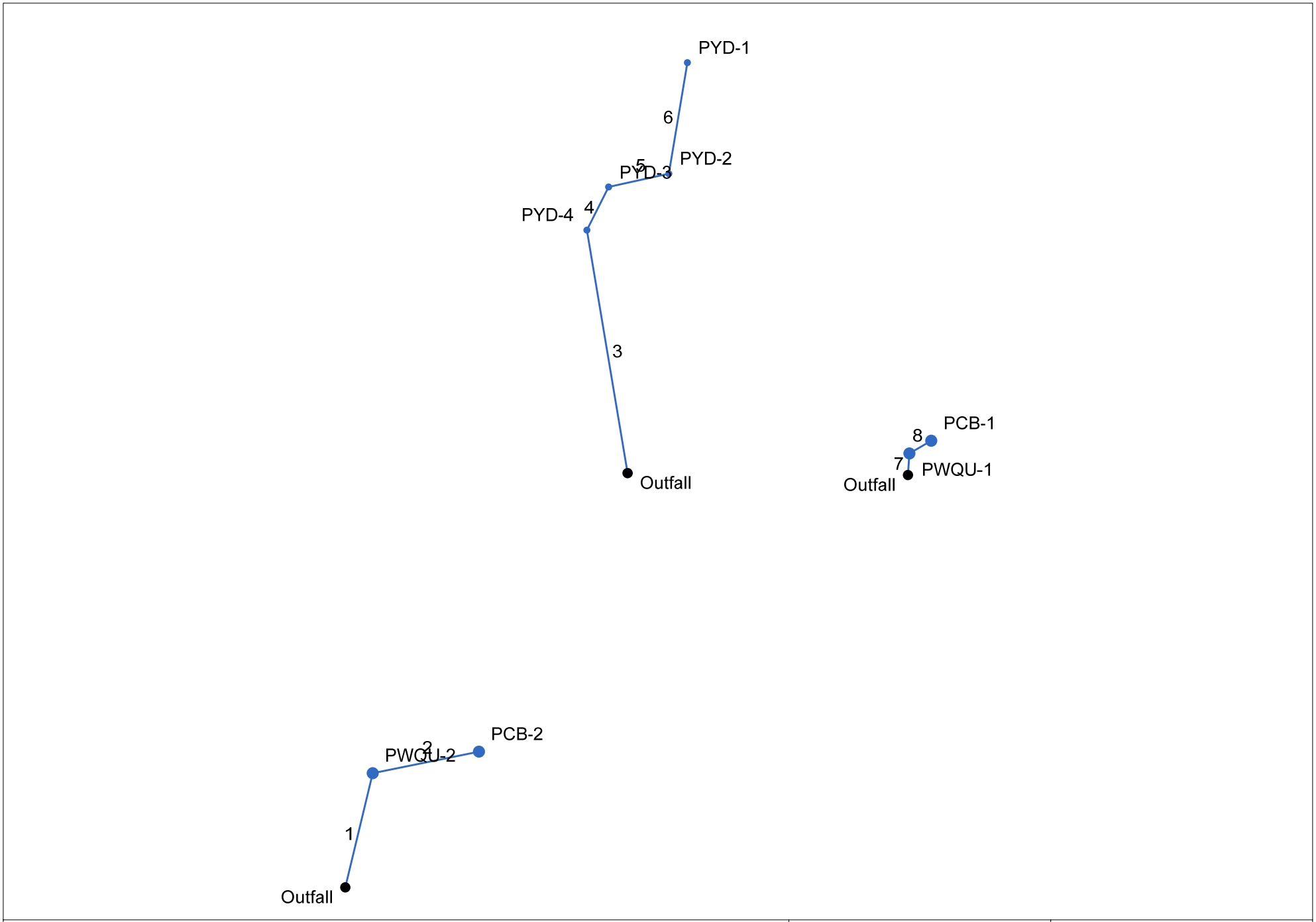
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs

Link DP-2: Offsite to West



Appendix D: Hydraulic Analysis

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 231007 - STORM.stm	Number of lines: 8	Date: 8/30/2024

Storm Sewers v2020.00

Storm Sewer Tabulation

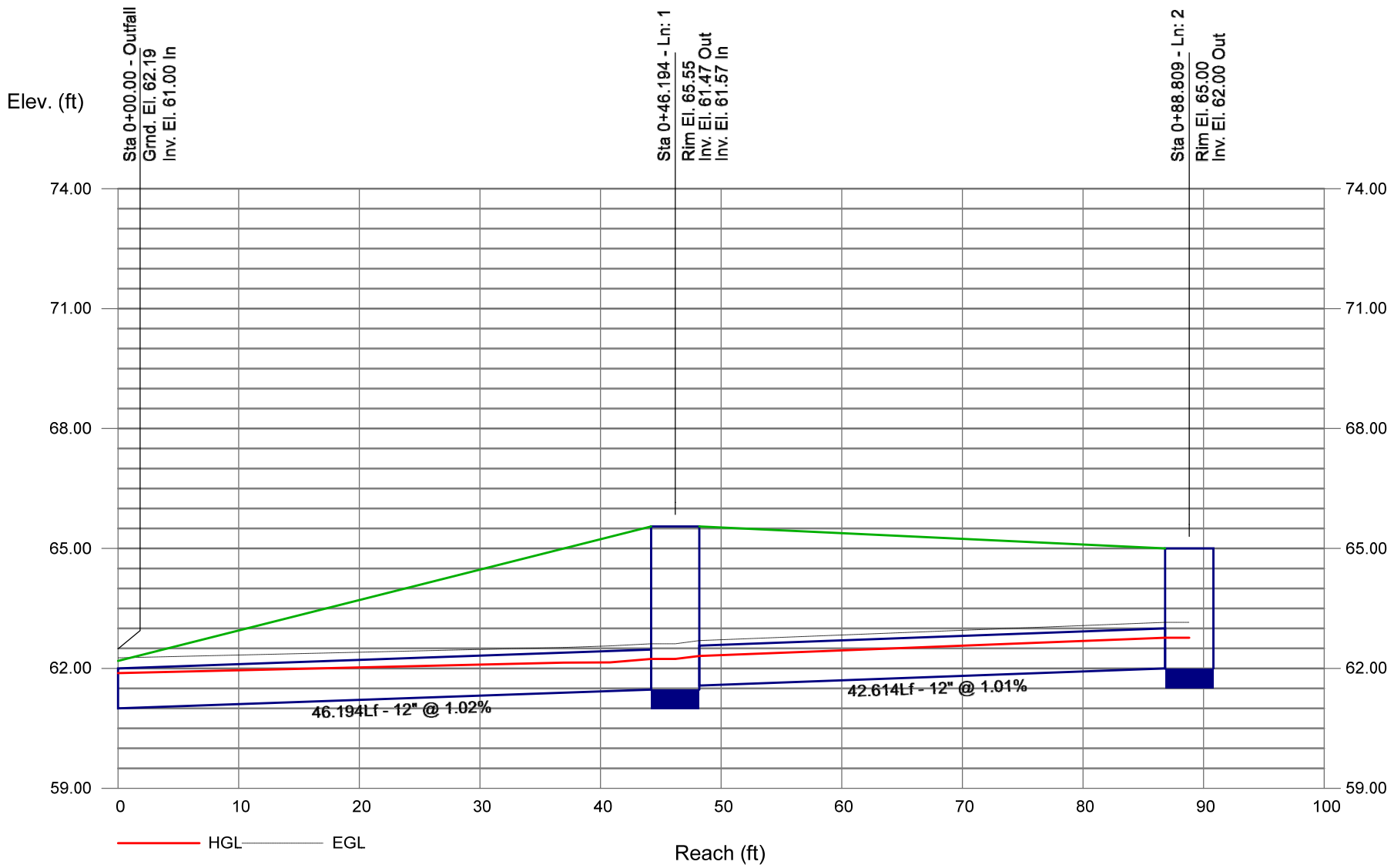
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	46.194	0.00	0.45	0.00	0.00	0.39	0.0	6.2	8.2	3.19	3.59	4.65	12	1.02	61.00	61.47	61.88	62.23	62.19	65.55	P-D-PIPE-(8)
2	1	42.614	0.45	0.45	0.86	0.39	0.39	6.0	6.0	8.3	3.22	3.58	5.06	12	1.01	61.57	62.00	62.31	62.77	65.55	65.00	P-D-PIPE-(4)
3	End	97.173	0.10	0.17	0.24	0.02	0.04	0.0	13.9	6.3	0.24	1.21	1.63	8	1.00	51.00	51.97	51.45	52.19	51.80	59.80	P-D-PIPE-(13)
4	3	18.954	0.02	0.07	0.20	0.00	0.01	0.0	12.9	6.4	0.09	1.64	1.88	8	1.85	52.07	52.42	52.19	52.56	59.80	60.80	P-D-PIPE-(12)
5	4	24.246	0.02	0.05	0.20	0.00	0.01	6.0	11.2	6.8	0.07	1.70	2.00	8	1.98	52.52	53.00	52.61	53.12	60.80	57.70	P-D-PIPE-(11)
6	5	44.381	0.03	0.03	0.20	0.01	0.01	6.0	6.0	8.3	0.05	1.71	1.83	8	2.01	53.11	54.00	53.19	54.10	57.70	57.70	P-D-PIPE-(10)
7	End	8.465	0.00	0.62	0.00	0.00	0.45	0.0	10.0	7.1	3.16	2.74	4.29	12	0.59	51.00	51.05	51.88	51.95	52.19	54.30	P-D-PIPE-(6)
8	7	10.000	0.62	0.62	0.72	0.45	0.45	10.0	10.0	7.1	3.17	2.52	4.04	12	0.50	51.05	51.10	52.19	52.27	54.30	53.60	P-D-PIPE-(5)

Project File: 231007 - STORM.stm | Number of lines: 8 | Run Date: 8/30/2024

NOTES:Intensity = 80.27 / (Inlet time + 12.00) ^ 0.78; Return period =Yrs. 100 ; c = cir e = ellip b = box

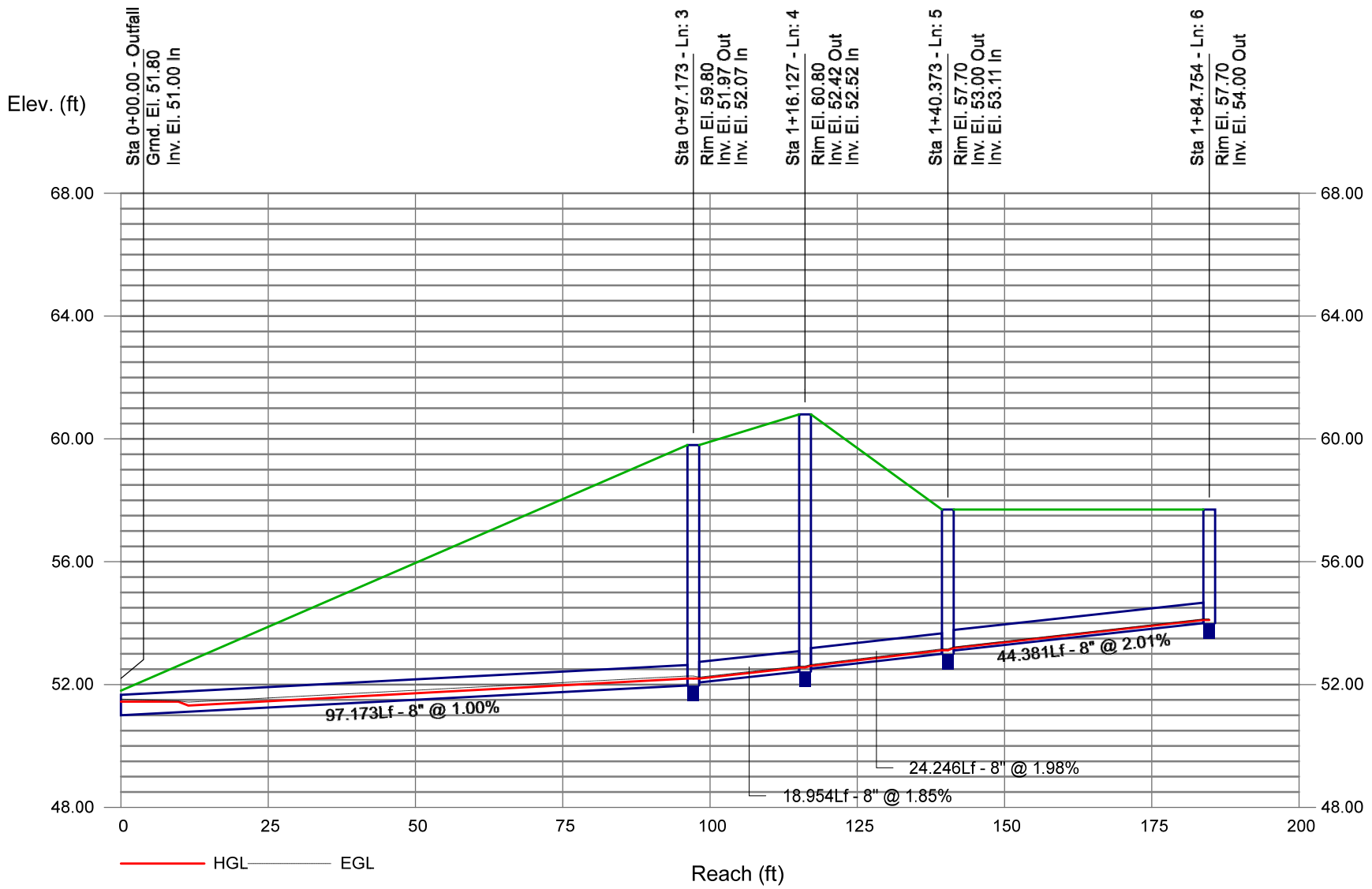
Storm Sewer Profile

Proj. file: 231007 - STORM.stm



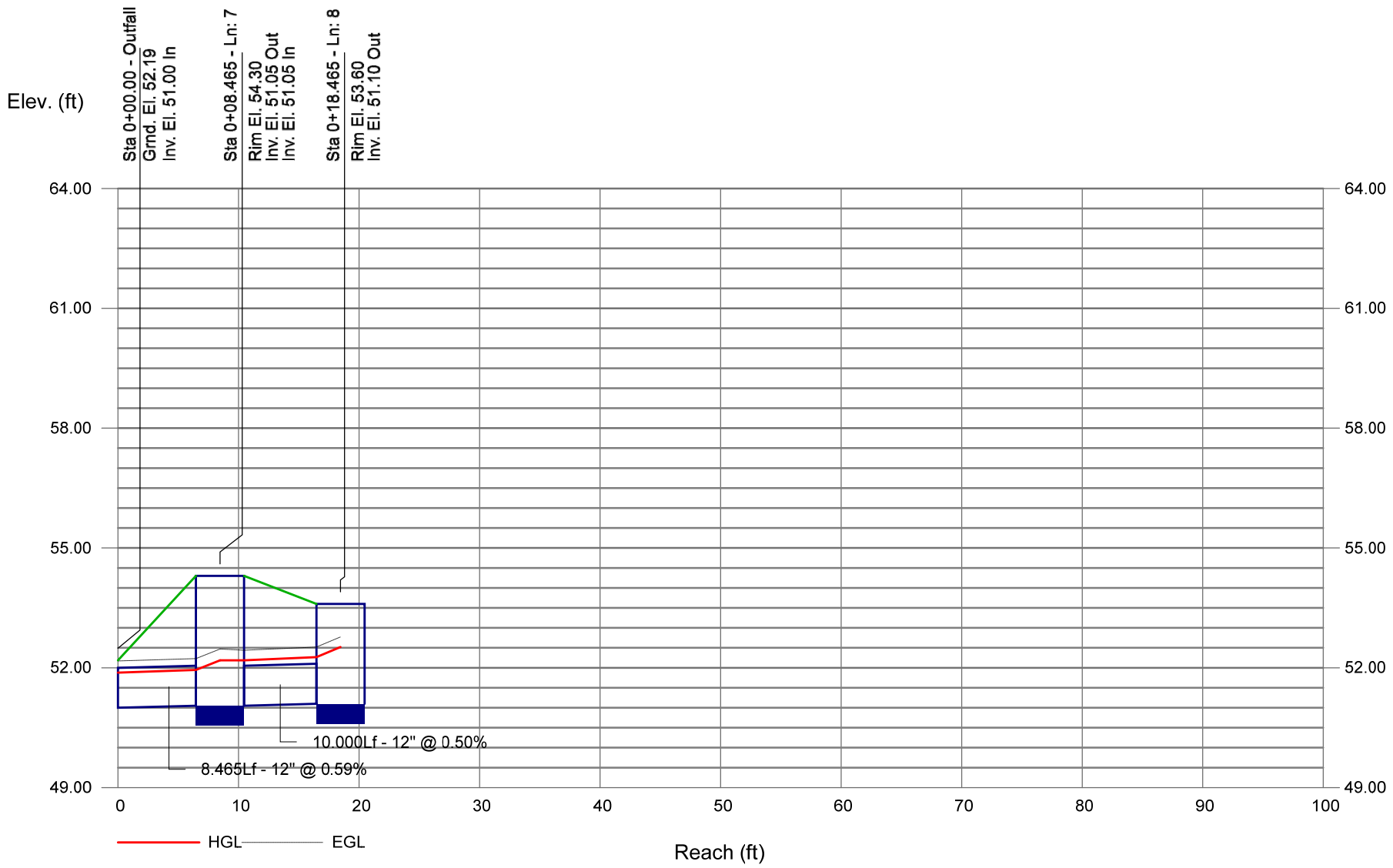
Storm Sewer Profile

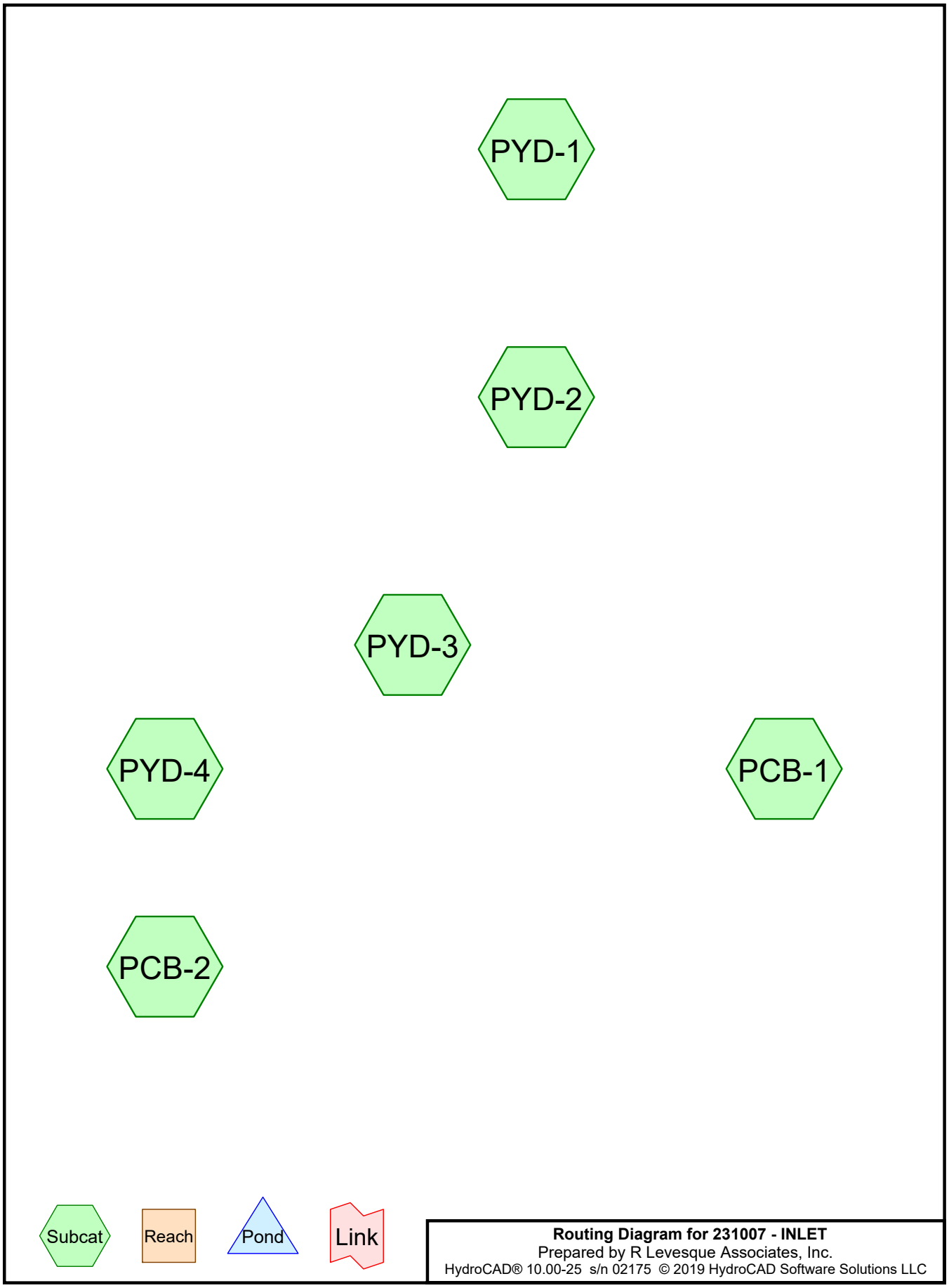
Proj. file: 231007 - STORM.stm



Storm Sewer Profile

Proj. file: 231007 - STORM.stm





Routing Diagram for 231007 - INLET
Prepared by R Levesque Associates, Inc.
HydroCAD® 10.00-25 s/n 02175 © 2019 HydroCAD Software Solutions LLC

Summary for Subcatchment PCB-1:

Runoff = 4.1 cfs @ 12.13 hrs, Volume= 0.372 af, Depth= 7.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (ac)	CN	Description
0.156	74	>75% Grass cover, Good, HSG C
0.001	80	>75% Grass cover, Good, HSG D
0.456	98	Paved parking, HSG C
0.006	70	Woods, Good, HSG C
0.620		Weighted Average
0.164	74	26.45% Pervious Area
0.456	98	73.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment PCB-2:

Runoff = 3.5 cfs @ 12.08 hrs, Volume= 0.290 af, Depth= 7.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (ac)	CN	Description
0.024	74	>75% Grass cover, Good, HSG C
0.422	98	Paved parking, HSG C
0.446		Weighted Average
0.024	74	5.38% Pervious Area
0.422	98	94.62% Impervious Area

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

Summary for Subcatchment PYD-1:

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (ac)	CN	Description
0.008	74	>75% Grass cover, Good, HSG C
0.019	70	Woods, Good, HSG C
0.027		Weighted Average
0.027	71	100.00% Pervious Area

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

Summary for Subcatchment PYD-2:

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (ac)	CN	Description
0.016	74	>75% Grass cover, Good, HSG C
0.008	70	Woods, Good, HSG C
0.024		Weighted Average
0.024	73	100.00% Pervious Area

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

Summary for Subcatchment PYD-3:

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (ac)	CN	Description
0.015	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG C
0.006	70	Woods, Good, HSG C
0.021		Weighted Average
0.021	73	99.04% Pervious Area
0.000	98	0.96% Impervious Area

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

Summary for Subcatchment PYD-4:

Runoff = 0.6 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.19"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.006	98	Paved parking, HSG C
0.019	70	Woods, Good, HSG C
0.097		Weighted Average
0.092	73	94.06% Pervious Area
0.006	98	5.94% Impervious Area

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

Appendix E: MassDEP Calculations

- Impervious Area Calculations
- Water Quality Flow Rate – PWQU-1
- MassDEP Water Quality Conversion Table (1-inch)
- Water Quality Flow Rate – PWQU-2
- MassDEP Water Quality Conversion Table (1-inch)
- Barracuda Selection Sheet
- NJDEP Certification Report
- Barracuda Maintenance Guide
- Water Quality Volume – Bioretention Basin #1
- Stage-storage – Bioretention Basin #1
- Water Quality Volume – Bioretention Basin #2
- Stage-storage – Bioretention Basin #2
- TSS Removal Form

Impervious Area Calculations

Existing Total Impervious Area

	Sub-Catchment	Roof (sf)	Other Impervious (sf)	Sum (sf)
Design Point 1	ES-1	3,499	15,898	19,397
Design Point 2	ES-2	0	0	0
		3,499	15,898	19,397

Proposed Total Impervious Area

	Sub-Catchment	Roof (sf)	Other Impervious (sf)	Sum (sf)	
Design Point 1	PS-1A	3,279	20,126	23,405	Tributary to Basin #1
	PS-1B	0	0	0	
Design Point 2	PS-2A	7,704	19,200	26,904	Tributary to Basin #2
	PS-2B	0	0	0	
		10,983	39,326	50,309	

Summary Table

Total Existing Impervious Area	19,397	SF
Total Proposed Impervious Area	50,309	SF
Total New Impervious Area	30,912	SF

Standard 4: Water Quality - PWQU-I

Water Quality Volume Conversion to Flow Rate

Note: Required water quality volume based on 1.0-inch of runoff

$$Q = (qu)\ (A)\ (WQV)$$

where: Q = peak flow rate associated with water quality event (c.f.s.)

qu = unit peak discharge (csm/in) - value taken from table based on t_c

A = impervious surface drainage area (sq. mi.)

WQV = water quality volume in watershed inches

· Proposed Water Quality Unit (PWQU-1)

t_c =	0.170	hrs	
qu =	700	csm/in	(from table)
A =	0.00084	sq. mi.	
WQV =	1.0	inch	

$Q_{1.0}$ = 0.59 c.f.s

The Baracuda Max Model S3 provides pre-treatment of flows up to 1.65 c.f.s.

* Only inlcudes impervious area tributary to PWQU-1

** Water quality depth shall equal 1-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runof from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4-inhces/hour or greater; 1/2-inch for discharges near to to other areas

Figure 4: for First 1-inch Runoff, Table of qu values for Ia/P Curve = 0.034, listed by tc, for Type III Storm Distribution

Tc (Hours)	qu (csm/in)	Tc (Hours)	qu (csm/in)	Tc (Hours)	qu (csm/in)
0.01	835	2.7	197	7.1	95
0.03	835	2.8	192	7.2	94
0.05	831	2.9	187	7.3	93
0.067	814	3	183	7.4	92
0.083	795	3.1	179	7.5	91
0.1	774	3.2	175	7.6	90
0.116	755	3.3	171	7.7	89
0.133	736	3.4	168	7.8	88
0.15	717	3.5	164	7.9	87
0.167	700	3.6	161	8	86
0.183	685	3.7	158	8.1	85
0.2	669	3.8	155	8.2	84
0.217	654	3.9	152	8.3	84
0.233	641	4	149	8.4	83
0.25	628	4.1	146	8.5	82
0.3	593	4.2	144	8.6	81
0.333	572	4.3	141	8.7	80
0.35	563	4.4	139	8.8	79
0.4	536	4.5	137	8.9	79
0.416	528	4.6	134	9	78
0.5	491	4.7	132	9.1	77
0.583	460	4.8	130	9.2	76
0.6	454	4.9	128	9.3	76
0.667	433	5	126	9.4	75
0.7	424	5.1	124	9.5	74
0.8	398	5.2	122	9.6	74
0.9	376	5.3	120	9.7	73
1	356	5.4	119	9.8	72
1.1	339	5.5	117	9.9	72
1.2	323	5.6	115	10	71
1.3	309	5.7	114		
1.4	296	5.8	112		
1.5	285	5.9	111		
1.6	274	6	109		
1.7	264	6.1	108		
1.8	255	6.2	106		
1.9	247	6.3	105		
2	239	6.4	104		
2.1	232	6.5	102		
2.2	225	6.6	101		
2.3	219	6.7	100		
2.4	213	6.8	99		
2.5	207	6.9	98		
2.6	202	7	96		

Standard 4: Water Quality - PWQU-2

Water Quality Volume Conversion to Flow Rate

Note: Required water quality volume based on 1.0-inch of runoff

$Q = (qu)(A)(WQV)$

where: Q = peak flow rate associated with water quality event (c.f.s.)

qu = unit peak discharge (csm/in) - value taken from table based on t_c

A = impervious surface drainage area (sq. mi.)

WQV = water quality volume in watershed inches

· Proposed Water Quality Unit (PWQU-2)

t_c =	0.100	hrs	
qu =	774	csm/in	(from table)
A =	0.00097	sq. mi.	
WQV =	1.0	inch	

$Q_{1.0}$ = 0.75 c.f.s

The Baracuda Max Model S3 provides pre-treatment of flows up to 1.65 c.f.s.

* Only inlcudes impervious area tributary to PWQU-2

** Water quality depth shall equal 1-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runof from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4-inhces/hour or greater; 1/2-inch for discharges near to to other areas

Figure 4: for First 1-inch Runoff, Table of qu values for Ia/P Curve = 0.034, listed by tc, for Type III Storm Distribution

Tc (Hours)	qu (csm/in)
0.01	835
0.03	835
0.05	831
0.067	814
0.083	795
0.1	774
0.116	755
0.133	736
0.15	717
0.167	700
0.183	685
0.2	669
0.217	654
0.233	641
0.25	628
0.3	593
0.333	572
0.35	563
0.4	536
0.416	528
0.5	491
0.583	460
0.6	454
0.667	433
0.7	424
0.8	398
0.9	376
1	356
1.1	339
1.2	323
1.3	309
1.4	296
1.5	285
1.6	274
1.7	264
1.8	255
1.9	247
2	239
2.1	232
2.2	225
2.3	219
2.4	213
2.5	207
2.6	202

Tc (Hours)	qu (csm/in)
2.7	197
2.8	192
2.9	187
3	183
3.1	179
3.2	175
3.3	171
3.4	168
3.5	164
3.6	161
3.7	158
3.8	155
3.9	152
4	149
4.1	146
4.2	144
4.3	141
4.4	139
4.5	137
4.6	134
4.7	132
4.8	130
4.9	128
5	126
5.1	124
5.2	122
5.3	120
5.4	119
5.5	117
5.6	115
5.7	114
5.8	112
5.9	111
6	109
6.1	108
6.2	106
6.3	105
6.4	104
6.5	102
6.6	101
6.7	100
6.8	99
6.9	98
7	96

Tc (Hours)	qu (csm/in)
7.1	95
7.2	94
7.3	93
7.4	92
7.5	91
7.6	90
7.7	89
7.8	88
7.9	87
8	86
8.1	85
8.2	84
8.3	84
8.4	83
8.5	82
8.6	81
8.7	80
8.8	79
8.9	79
9	78
9.1	77
9.2	76
9.3	76
9.4	75
9.5	74
9.6	74
9.7	73
9.8	72
9.9	72
10	71

Barracuda® Max

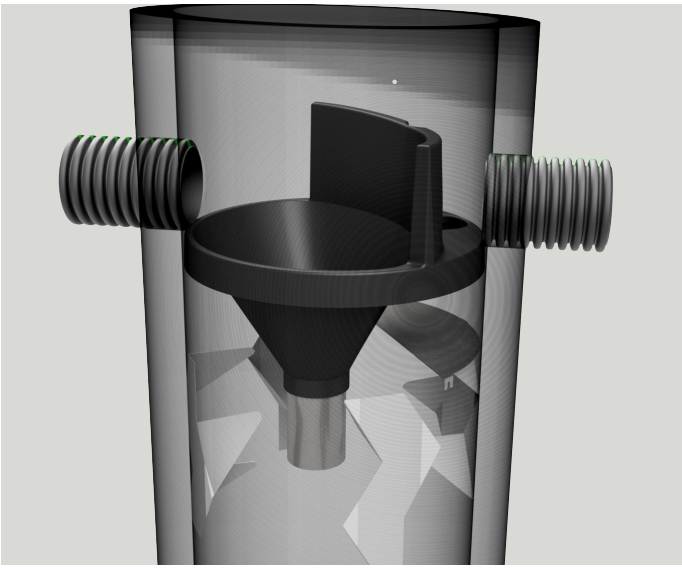
The Barracuda Max is market-changing stormwater quality technology. This high-performance vortex hydrodynamic separator is designed to remove total suspended solids in order to protect our precious receiving waters. The Barracuda Max is also an outstanding value that offers multiple pipe configurations, and quick installation. The “Max” version of the Barracuda is built on the base platform of the original ADS Barracuda with improved removal efficiencies and installation components.

Features

- Single manhole design
- No elevation loss between the inlet and outlet
- Variable inlet/outlet angle configurations (not just 180 degree orientation)
- Internal bypass for inline installation (where applicable)
- Revolutionary, patent pending “teeth” mitigate turbulence in the sump area to prevent resuspension of captured contaminants
- Available with grated drop inlet configuration
- Available with trash and/or oil capture add-ons

Benefits

- Internal components are in stock for quick delivery
- The S3, S4, S6, and S8 can be installed in a standard 36” (900 mm), 48” (1200 m), 72” (1800 m), and 96” (2400 m) precast manhole, respectively
- The S3 & S4 can be provided factory installed within a 36” (900 mm) and 48” (1200 mm) ADS HP manhole and delivered to the jobsite
- The Barracuda Max “teeth” and deflector plate apparatus are fabricated and designed for quick and easy field assembly
- Designed for easy maintenance using a vacuum truck or similar equipment.
- Inspection and maintenance are performed from the surface with no confined space entry



Barrucuda Specification

Materials and Design

- Concrete Structures: Designed for H-20 traffic loading and applicable soil loads or as otherwise determined by a Licensed Professional Engineer. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.
- 36" (900 mm) and 48" (1200 mm) HP Manhole Structures: Made from an impact modified copolymer polypropylene meeting the material requirements of ASTM F2764. The eccentric cone reducer shall be manufactured from polyethylene material meeting ASTM D3350 cell class 213320C. Gaskets shall be made of material meeting the requirements of ASTM F477.
- Separator internals shall be substantially constructed of stainless steel, polyethylene or other thermoplastic material approved by the manufacturer.

Performance

- The stormwater treatment unit shall be an inline unit capable of conveying 100% of the design peak flow. If peak flow rates exceed maximum hydraulic rate, the unit shall be installed offline.
- The Barracuda Max unit shall be designed to remove at least 80% of the suspended solids on an annual aggregate removal basis. Said removal shall be based on full-scale third party testing using OK-110 media gradation or equivalent and 300 mg/L influent concentration. Said full scale testing shall have included sediment capture based on actual total mass collected by the stormwater treatment unit.

  - OR -

  The Barracuda Max unit shall be designed to remove at least 50% of TSS using a media mix with d_{50}=75 micron and 200 mg/L influent concentration.

  - OR -

  The Barracuda Max unit shall be designed to remove at least 50% of TSS per current NJDEP/NJCAT HDS protocol.
- The stormwater treatment unit internals shall consist of (1) separator cone assembly, and (1) sump assembly, which includes the "teeth".

Barracuda Max Model	Manhole Diameter	OK-110 (80% removal)	Pretreatment for Infiltration[1]
S3	36" (900 mm)	0.86 CFS (24.1 L/s)	1.65 CFS (46.7 L/s)
S4	48" (1200 mm)	1.52 CFS (43.0 L/s)	2.94 CFS (83.3 L/s)
S6	72" (1800 mm)	3.42 CFS (96.8 L/s)	6.62 CFS (187.5 L/s)
S8	96" (2400 mm)	6.08 CFS (172.2 L/s)	11.76 CFS (333.0 L/s)

* Peak bypass flows are dependent on final design
[1] 50% removal of OK-110.

Installation

Installation of the stormwater treatment unit(s) shall be performed per manufacturer's installation instructions. Such instructions can be obtained by calling Advanced Drainage Systems at 800-821-6710 or by logging on to www.adspipe.com.

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adspipe.com
800-821-6710

Barracuda® Max™ & Barracuda Maintenance Guide

One of Barracuda's advantages is the ease of maintenance. Like any system that collects pollutants, the Barracuda must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes 2 to 4 hours, depending on the system's size, the captured material, and the vacuum truck's capacity.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and then on an annual basis. Typically, the system needs to be cleaned every 1-3 years.

Excessive oils, fuels or sediments may reduce the maintenance cycle. Periodic inspection is important.

Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it contacts the top of the captured sediment and mark that spot on the rod. Then push the probe through to the bottom of the sump and mark that spot to determine sediment depth.

Maintenance should occur when the sediment has reached the levels indicated in the Storage Capacity Chart.

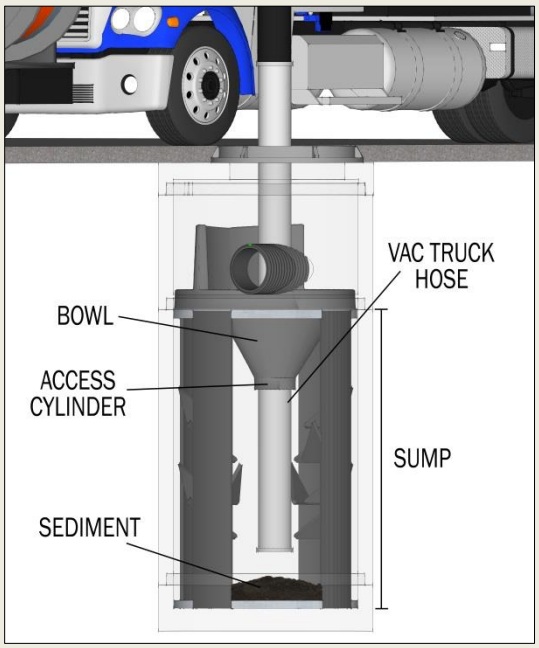
Barracuda Storage Capacities

Model	Manhole Diameter in. (mm)	Total System Volume Gallons (Liters)	Treatment Chamber Capacity Gallons (Liters)	Standard Sediment Capacity (20" depth) Yards^3 (meters^3)	NJDEP Sediment Capacity (50% of standard depth) Yards^3 (meters^3)
S3	36 (900)	264 (999)	212 (803)	0.44 (0.34)	0.22 (0.17)
S4	48 (1200)	665 (2517)	564 (2135)	0.78 (0.60)	0.39 (0.30)
S5	60 (1500)	1040 (3937)	881 (3335)	1.21 (0.93)	0.61 (0.47)
S6	72 (1800)	1497 (5667)	1269 (4804)	1.75 (1.34)	0.88 (0.67)
S8	96 (2400)	4196 (15884)	3835 (14517)	3.10 (2.37)	1.55 (1.19)
S10	120 (3000)	7976 (30192)	7496 (28375)	4.85 (3.71)	2.43 (1.86)

Maintenance Instructions

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. Access this area through the 8" (200 mm), 10" (250 mm), 15" (375 mm) or 20" (500 mm) diameter access cylinder.
2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment. See figure 1.
3. Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
   a. Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
   b. Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
   c. Additional local regulations may apply to the maintenance procedure.

Figure 1



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Maintenance Guide

BaySaver Barracuda™

July 2017

One of the advantages of the BaySaver Barracuda is the ease of maintenance. Like any system that collects pollutants, the BaySaver Barracuda must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes from 2 to 4 hours, depending on the size of the system, the captured material, and the capacity of the vacuum truck.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and thereafter on an annual basis. Typically, the system needs to be cleaned every 1-3 years.

Excessive oils, fuels or sediments may reduce the maintenance cycle. Periodic inspection is important.

Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it contacts the top of the captured sediment and mark that spot on the rod. Then push the probe through to the bottom of the sump and mark that spot to determine sediment depth.

Maintenance should occur when the sediment has reached the levels indicated in the Storage Capacity Chart.

BaySaver Barracuda Storage Capacities

Model	Manhole Diameter	Treatment Chamber Capacity	Standard Sediment Capacity (20” depth)	NJDEP Sediment Capacity (50% of standard depth)
S3	36”	212 gallons	0.44 cubic yards	0.22 cubic yards
S4	48”	564 gallons	0.78 cubic yards	0.39 cubic yards
S5	60”	881 gallons	1.21 cubic yards	0.61 cubic yards
S6	72”	1269 gallons	1.75 cubic yards	0.88 cubic yards
S8	96”	3835 gallons	3.10 cubic yards	1.55 cubic yards
S10	120”	7496 gallons	4.85 cubic yards	2.43 cubic yards

Maintenance Instructions

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. You’ll access this area through the 10” diameter access cylinder.

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2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment. See figure 1.
3. Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
   - Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
   - Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
   - Additional local regulations may apply to the maintenance procedure.

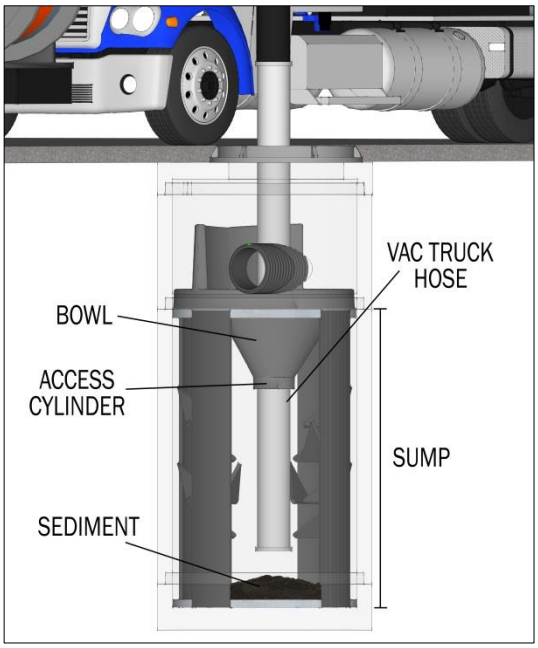

Figure 1

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Standard 4: Water Quality

Water Quality Volume - Bio-Retention Basin #1

V_{WQ} (required) = (D_{WQ} / 12 inches/foot) (A_{IMP} x 43,560 square feet/acre)

where: V_{WQ} = req'd water quality volume (cu. ft.)

D_{WQ} = water quality depth* (inches) = 1.0 inches

A_{IMP} = total impervious area (acres)** = 0.537 acres

V_{WQ} (required) = 1,950 cu. ft.

Storage Volume Provided

Recharge Facility	Volume Provided
Bio-Retention Basin #1	2,244 cu. Ft.***

2,244 cu. ft. > 1,950 cu. ft.

*Water quality depth shall equal 1-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hour or greater;½-inch for discharges near or to other areas

**Only includes impervious area tributary to the surface infiltration basin subject to water quality treatment.

***Volume represents the available storage in Bio-Retention basin below yard drain rim elevation 51.60
Depth of water in basin = 0.60 feet

Stage-Area-Storage for Pond 1P: Bioretention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
51.00	3,473	0
51.05	3,517	175
51.10	3,561	352
51.15	3,605	531
51.20	3,649	712
51.25	3,694	896
51.30	3,739	1,082
51.35	3,784	1,270
51.40	3,830	1,460
51.45	3,876	1,653
51.50	3,922	1,848
51.55	3,968	2,045
51.60	4,015	2,244
51.65	4,062	2,446
51.70	4,109	2,651
51.75	4,157	2,857
51.80	4,204	3,066
51.85	4,252	3,278
51.90	4,301	3,491
51.95	4,349	3,708
52.00	4,398	3,926
52.05	4,453	4,148
52.10	4,508	4,372
52.15	4,563	4,598
52.20	4,619	4,828
52.25	4,676	5,060
52.30	4,732	5,296
52.35	4,789	5,534
52.40	4,846	5,775
52.45	4,904	6,018
52.50	4,962	6,265
52.55	5,020	6,514
52.60	5,078	6,767
52.65	5,137	7,022
52.70	5,196	7,281
52.75	5,256	7,542
52.80	5,316	7,806
52.85	5,376	8,073
52.90	5,437	8,344
52.95	5,498	8,617
53.00	**5,559**	8,894
53.05	5,550	9,171
53.10	5,541	9,449
53.15	5,532	9,725
53.20	5,523	10,002
53.25	5,514	10,278
53.30	5,505	10,553
53.35	5,496	10,828
53.40	5,487	11,103
53.45	5,478	11,377
53.50	5,469	11,650
53.55	5,460	11,924
53.60	5,451	12,196
53.65	5,442	12,469
53.70	5,433	12,741
53.75	5,424	13,012
53.80	5,415	13,283
53.85	5,406	13,553
53.90	5,397	13,824
53.95	5,388	14,093
54.00	5,379	**14,362**

Storage at outlet

Standard 4: Water Quality

Water Quality Volume - Bio-Retention Basin #2

V_{WQ} (required) = (D_{WQ} / 12 inches/foot) (A_{IMP} x 43,560 square feet/acre)

where: V_{WQ} = req'd water quality volume (cu. ft.)

D_{WQ} = water quality depth* (inches) = 1.0 inches

A_{IMP} = total impervious area (acres)** = 0.618 acres

V_{WQ} (required) = 2,242 cu. ft.

Storage Volume Provided

Recharge Facility	Volume Provided
Bio-Retention Basin #1	2,444 cu. Ft.***

2,444 cu. ft. > 2,242 cu. ft.

*Water quality depth shall equal 1-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hour or greater;½-inch for discharges near or to other areas

**Only includes impervious area tributary to the surface infiltration basin subject to water quality treatment.

***Volume represents the available storage in Bio-Retention basin below yard drain rim elevation 61.80
Depth of water in basin = 0.80 feet

Stage-Area-Storage for Pond 2P: Bioretention Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
61.00	2,704	0
61.05	2,746	136
61.10	2,789	275
61.15	2,832	415
61.20	2,875	558
61.25	2,919	703
61.30	2,963	850
61.35	3,007	999
61.40	3,052	1,150
61.45	3,097	1,304
61.50	3,142	1,460
61.55	3,188	1,618
61.60	3,234	1,779
61.65	3,280	1,942
61.70	3,326	2,107
61.75	3,373	2,274
61.80	3,421	2,444
61.85	3,468	2,616
61.90	3,516	2,791
61.95	3,564	2,968
62.00	3,613	3,148
62.05	3,661	3,329
62.10	3,708	3,514
62.15	3,756	3,700
62.20	3,805	3,889
62.25	3,854	4,081
62.30	3,903	4,275
62.35	3,952	4,471
62.40	4,002	4,670
62.45	4,052	4,871
62.50	4,102	5,075
62.55	4,153	5,281
62.60	4,204	5,490
62.65	4,255	5,702
62.70	4,306	5,916
62.75	4,358	6,132
62.80	4,410	6,352
62.85	4,463	6,573
62.90	4,516	6,798
62.95	4,569	7,025
63.00	4,622	7,255
63.05	4,675	7,487
63.10	4,728	7,722
63.15	4,781	7,960
63.20	4,835	8,200
63.25	4,889	8,443
63.30	4,943	8,689
63.35	4,997	8,938
63.40	5,052	9,189
63.45	5,107	9,443
63.50	5,163	9,700
63.55	5,218	9,959
63.60	5,274	10,221
63.65	5,331	10,487
63.70	5,387	10,754
63.75	5,444	11,025
63.80	5,501	11,299
63.85	5,559	11,575
63.90	5,617	11,855
63.95	5,675	12,137
64.00	5,733	12,422
64.05	5,791	12,710
64.10	5,849	13,001
64.15	5,907	13,295
64.20	5,966	13,592
64.25	6,025	13,892
64.30	6,084	14,195
64.35	6,143	14,500
64.40	[illegible]	14,809
64.45	[illegible]	15,120
64.50	6,324	15,435
64.55	6,384	15,753
64.60	6,445	16,074
64.65	6,506	16,397
64.70	6,568	16,724
64.75	6,630	17,054
64.80	6,692	17,387
64.85	6,754	17,723
64.90	6,817	18,063
64.95	6,880	18,405
65.00	6,943	18,751
65.05	7,006	19,099
65.10	7,069	19,451
65.15	7,132	19,806
65.20	7,196	20,164
65.25	7,260	20,526
65.30	7,324	20,890
65.35	7,389	21,258
65.40	7,454	21,629
65.45	7,519	22,004
65.50	7,584	22,381
65.55	7,650	22,762
65.60	7,716	23,146
65.65	7,782	23,534
65.70	7,849	23,924
65.75	7,916	24,319
65.80	7,983	24,716
65.85	8,050	25,117
65.90	8,118	25,521
65.95	8,186	25,929
66.00	**8,254**	**26,340**

Storage at outlet

TSS Removal Form - Bio-Retention Basins #1 & #2

Pre-Treatment

BMP	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep-sump Hooded Catch Basin	0.25	1.00	0.25	0.75
Proprietary Sedimentation Device	0.80	0.75	0.60	0.15

Pre-Treatement TSS Removal = 85%

Total TSS Removal

BMP	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Bio-retention Basin	0.90	1.00	0.90	0.10

Total TSS Removal = 90%

Appendix F: Construction Period Erosion Control Plan

Construction Period Erosion Control Plan

Proposed Hotel

1422-1444 Main Street
Agawam, Massachusetts
(Map K4 Block 1 Parcels 5, 6, 7, & 13)

Applicant/Owner:

Shield Hotels
c/o Kenny Patel
63 Myron Street
West Springfield, MA 01089

RLA Project File: 231007

May 23, 2024

R LEVESQUE ASSOCIATES, INC
A LAND PLANNING SERVICES COMPANY
40 School Street · Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

The project shall implement a construction period erosion control plan. The following provides descriptions and guidelines to ensure that the areas surrounding the project site will be protected from excessive sedimentation and runoff during construction.

1.1 Construction Period Pollution Prevention And Erosion Control Measures

1.1.1 Preconstruction Notifications And Meetings

Prior to the start of construction, the contractor shall call together a pre-construction meeting including a representative from the Town, the design engineer, contractor, and any pertinent persons that should be in attendance. These requirements shall be the responsibility of the Contractor to arrange, attend, and document.

1.1.2 Sediment Barrier And Work Limit

Before installation of the sediment barriers, the location shall be staked in the field for review and approval by the owner or their representative. To facilitate sediment barrier installation, woody vegetation may then be removed and any required trench may be cut by machine, provided all other ground cover is left intact. No excavation, grading, filling, or removal of vegetative ground cover shall begin until sediment barriers have been installed as shown on the plans and have been inspected by the owner or their representative.

1.1.3 Silt Fence

The bottom of the fence shall be trenched into the ground a minimum of 6" and back-filled with compacted soil. Where trenching is not feasible, silt fence skirt shall be covered with compacted soil or crushed stone. The top of the fabric shall be stretched as tightly as is practical, with intermediate stakes added to correct excessive sags. Stakes shall be driven at least 12" into the ground. Splices between sections shall be made by rolling end stakes together one complete turn and driving into the ground together.

1.1.4 Straw Bales

Straw bales may be used as temporary and moveable control measures, temporary check dams, or as reinforcement for silt fence in areas of concentrated runoff or high fills. Bales shall be tightly butted and staked 12" into the ground. Where used without silt fence in front, the bales shall be trenched 4" into the ground, back-filled with compacted soil, and the spaces between bales shall be chinked with loose straw.

1.1.5 Filter Sock (Filtrexx Or Equivalent)

In areas of expected sheet flow, filter sock may be placed directly on the ground without trenching or stakes. In areas of expected concentrated flow, mulch or crushed stone shall be placed along the up-slope face to control and filter underflow. Additional layers of Filter Sock may be required for adequate freeboard. The filter sock shall be staked at 10 feet on-center or in cases where they cannot be staked, utilize heavy concrete blocks to hold in place.

1.1.6 Temporary Sedimentation Basins

Temporary sediment basins may be excavations or bermed stormwater detention structures (depending on grading) that will retain runoff for a sufficient period of time to allow suspended soil particles to settle out prior to discharge. These temporary basins will be located based on construction needs as determined by the contractor and outlet devices will be designed to control velocity and sediment. Points of discharge from sediment basins will be stabilized to minimize erosion. If the temporary basin is to be located within an area of future infiltration as part of the stormwater management system, the excavation shall be limited to one foot above final grade of the infiltration structure.

1.1.7 Stocking Additional Materials

A stock of additional erosion control materials shall be available on the site for emergency repairs and temporary measures. Stock shall be replenished when decreased to 50% of the numbers below. Stock shall include:

Straw Bales – 10 (kept dry) with 20 oak stakes

Or

Silt Fence – 30 Linear feet.

Or

Filter Sock – 4 – 8 foot sections (kept dry)

Washed Stone – One (1) cubic yard, ¾" to 2" diameter

1.1.8 Trench Protection

Open trenches shall be protected from accumulation of surface water or groundwater that could result in erosion of the trench and discharge of sediment. Where feasible, spoil shall be stockpiled on the up-slope side of the trench to prevent entrance of surface runoff. Backfill shall be crowned to allow for settlement and to avoid concentration of runoff on top of the trench.

1.1.9 Site Stabilization – Temporary

Where a portion of the site will not be subject to construction activity for over 14 days, measures shall be taken to provide temporary stabilization of that inactive portion of the site, within 14 days of the cessation of construction activity. Stabilization measures may include seeding for temporary cover, mulching, or other measures to protect exposed soil from erosion and prevent sediment movement.

1.1.10 Site Stabilization – Permanent

Within 14 days of completion of loaming and finish grading on any portion of the site, that area shall be seeded or planted for permanent cover (season permitting) in accordance with USDA NRCS guidelines or equivalent.

1.1.11 Roadway Sweeping

The entrance to the site and affected portions of the access drive or paved project areas shall be swept as needed to control sediment runoff into storm drains or waterways and to control blowing dust.

1.2 Short-Term Erosion Control Maintenance

The following provides short-term erosion control maintenance guidelines and requirements.

1. The contractor or subcontractor will be responsible for implementing each control shown on the sedimentation and erosion control plan.
2. All erosion and sediment control devices shall be properly maintained during all phases of construction until the completion of all construction activities and all disturbed areas have been stabilized. Additional control measures will be installed during construction in order to control erosion and/or off-site sedimentation if deemed necessary by on-site inspection.
3. Effective erosion control measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operations that will disturb the natural protection.
4. All sediment and erosion control devices shall be inspected at least once every seven (7) calendar days and after any storm event greater than 0.5 inches of precipitation during any 24-hour period, and the inspection shall be documented in writing. Damaged or ineffective devices shall be repaired or replaced, as necessary.
5. The contractor shall take all reasonable precautions to avoid excess erosion of the site due to the construction of this project.
6. Silt shall be removed from behind barriers if greater than 6-inches deep or as needed. Sediment that is collected in structures shall be disposed of properly and covered if stored on-site
7. Damaged or deteriorated items will be repaired immediately after identification.
8. All ditches shall be stabilized as soon as is practicable to minimize erosion.
9. The contractor shall maintain all erosion control devices in a good, working state of repair. Upon complete stabilization of any tributary areas, the erosion control devices shall be removed and disposed of so as to cause no off-site siltation.
10. Inspect and maintain construction entrance stone such that sediment does not track onto the street. Any sediment tracked onto the street shall be swept daily.
11. After catch basins have been constructed, the contractor shall protect the inlets by constructing inlet protection as shown on the plans.
12. Once the site has been paved, all catch basin inlets shall receive a silt sack type protection.
13. Erosion control measures shall remain in place until all disturbed earth has been substantially stabilized. After removal of structures, disturbed areas shall be regraded and stabilized as necessary.

Appendix G: Long-Term Operation and Maintenance Plan

- Long-Term Operation & Maintenance Plan
- Barracuda Inspection and Maintenance Guide
- O&M Checklist

Long-Term Operation & Maintenance Plan

Proposed Hotel

1422-1444 Main Street
Agawam, Massachusetts
(Map K4 Block 1 Parcels 5, 6, 7, & 13)

Applicant/Owner:

Shield Hotels
c/o Kenny Patel
63 Myron Street
West Springfield, MA 01089

RLA Project File: 231007

May 23, 2024

Revised: September 24, 2024

R LEVESQUE ASSOCIATES, INC
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I. Long-Term Stormwater Maintenance Program:

This Long-Term Operation and Maintenance Plan (O&M) identifies inspection and maintenance requirements for the proposed stormwater management system. The O&M references guidelines set forth by the Stormwater Management Handbook developed by the Massachusetts Department of Environmental Protection.

Owner/Responsible Party*:
Shield Hotels
c/o Kenny Patel
63 Myron Street
West Springfield, MA 01089

*The party listed shall be responsible for implementation and record keeping of the requirements listed in this operation and maintenance plan. Upon sale of property or any other transition of ownership, the responsible party shall be reinstated as the new owner or any other group created as determined by the owner.

_____ _____
Signature of Responsible Party Representative Date

2. Inspection and Maintenance Program:

Regular inspection and routine maintenance are necessary to ensure that the stormwater management system continues to control and treat runoff. The following lists the inspection schedule and maintenance procedures for the proposed stormwater Best Management Practices:

BMP	Inspection Schedule	Maintenance Schedule	Maintenance Procedures
Bituminous Concrete Pavement	Four times per year	Twice per year	• Roadway to be swept in March or April following snow melt and again in late November or early December to remove fallen leaves and debris
Catch Basins	Four times per year	Four times per year	• Remove sediment once deposits reach one half the depth from the bottom sump to the lowest invert.
Stormwater Piping	Four times per year	Four times per year	• Inspect pipe entrances in catch basins and manholes and remove any blockages
Proprietary Sedimentation Device*	As specified by the manufacturer	As specified by the manufacturer	• Clean the unit using the method specified by the manufacturer. Vactor trucks are typically used to clean these units.
Bio-Retention Areas	Once per month	Twice per year (Spring and Fall)	• Inspect bio-retention areas for sediment build-up, structural damage, and standing water; • Inspect and repair eroded areas monthly; • Re-mulch void areas as needed; • Remove litter and debris monthly; • Treat diseased or distressed vegetation as needed; • Remove and replace dead vegetation twice per year (Spring and Fall); • Remove invasive species as needed; • Replace mulch annually. • Prune shrubs as needed; • Mow grasses as necessary to not less than four inches; • Inspect outlet control structure and remove any obstructions or accumulated sediment.

BMP	Inspection Schedule	Maintenance Schedule	Maintenance Procedures
Flared End Section	Four times per year	As Needed	• Remove any debris or vegetation around the flared end section such that flow out of the structure is not impeded.
Level Spreader	Once per month	As Needed	• Remove sediment from the toe of slope and/or riprap voids. • Repair gullies and reseed bare spots immediately.
Three Mile Brook Culvert	Four times per year	As Needed	• Remove accumulated obstructions from culvert headwall • Repair/Stabilize with riprap any erosion

*See attached Barracuda Max Maintenance Guide

See the attached Long-Term O&M Inspection Checklist for record keeping purposes.

3. Additional Long-Term Operation and Maintenance Items

The following is a list of additional operation and maintenance items to be implemented by the owner/governing group to maintain the features proposed in this project.

A. Proper storage, use, and disposal of hazardous chemicals, including automobile fluids, pesticides, paints, solvents, etc. shall be required. Information should be provided on chemicals of concern, proper use, and disposal options. Recycling programs for used motor oil, antifreeze, and other products should be developed.

B. Vehicle Washing. This management measure involves educating the owner on the water quality impacts of the outdoor washing of vehicles and how to avoid allowing polluted runoff to enter the storm drain system. Outdoor vehicle washing has the potential to result in high loads of nutrients, metals, and hydrocarbons which is conveyed by the detergent-rich water into storm drains.

C. Recycling, spill prevention and response plans, and proper material storage and disposal of potentially hazardous materials shall be implemented. It will be the responsibility of the owner to contain and legally remove any materials that are spilled onsite. The use of dry floor cleaners and absorbent materials and limiting the use of water to clean pavement is encouraged. Care should be taken to avoid accidental disposal of hazardous materials.

D. Provisions for storing trash and waste products shall be implemented. The waste materials shall be collected by the owner and all materials shall be properly disposed of.

E. Requirements for routine inspections and maintenance of stormwater best management practices. Routine inspections shall be performed to ensure the correct functioning of stormwater best management practices. See the specific maintenance criteria for detail regarding inspections and maintenance frequency.

F. Requirements for Storage and Use of Fertilizers, Herbicides, and Pesticides. Fertilizers, pesticides, herbicides, lawn care chemicals, or other leachable materials shall be used in accordance with the Lawn Care Regulations of the Massachusetts Pesticide Board, 33 CMR 10.03 (30,31), as amended, with manufacturer's label instructions and all other necessary precautions to minimize adverse impacts on surface and groundwater. The storage of any such materials shall be within structure designed to prevent the escape of contaminated runoff or leachate.

G. Provisions for prevention of illicit discharges to the stormwater management system shall be implemented. Any illicit discharges to the stormwater management system shall be prohibited. It will be the owner's responsibility to ensure compliance with the legal disposal of all materials and containment/cleanup of any illicit discharges.

H. Training for staff or personnel involved with implementation of the Long-Term Pollution Prevention Plan shall be required. The owner/governing group will be responsible for the implementation of the measures set forth in the Long-Term Pollution Prevention Plan. Documentation that personnel and owners involved with the implementation of the Long-Term Pollution Prevention Plan have been trained to conduct such tasks shall be documented.

4. Winter and Snow Conditions

The following is a list of additional operation and maintenance items to be implemented by the owner during winter and snow conditions.

A. Snowfall shall be stored on the grassed areas surrounding the pavement areas, excluding any areas utilized for stormwater management practices. As needed, any snow that cannot be stored on site shall be trucked off site and disposed of properly.

B. Winter road salt and/or sand use and storage restrictions shall be implemented based on any restrictions issued for the project. Sodium chloride for ice control shall be used at the minimum salt to sand ratio which is consistent with the Massachusetts Department of Environmental Protections guidelines. Sodium chloride, calcium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads/drives shall not be stored on site.

5. Public Safety Features

The proposed site design utilizes the following features which have been incorporated to ensure the safety of the public:

A. Control and collection of stormwater runoff through positive drainage and curbing directing it towards the drainage inlets;

B. Heavy-duty stormwater drain manhole covers and catch basin grates have been designed to withstand H20 loading;

C. Reduction of peak discharge rates from the site in the post-development condition as compared to the pre-developed conditions;

D. Development and implementation of an Operations & Maintenance Plan to ensure the stormwater management system continues to function as designed.

6. Estimated Cost of Maintenance

The following budget was prepared as an estimate of inspection and maintenance costs for the stormwater management system. The budget is an estimate only as the costs may vary depending on the level of sediment accumulation and frequency of maintenance tasks required.

BMP Inspections	Number of Occurrences	Maintenance Cost	Number of Structures	Sum
Catch Basin	4/year	$50	2	$400
Proprietary Sedimentation Device	2/year	$100	2	$400
Level Spreader	12/year	$50	1	$600
Bio-retention Basin	12/year	$50	2	$1,200
Three Mile Brook Culvert	4/year	$100	1	$400
Total Estimated Annual Cost of Inspections				$3,000

BMP Maintenance	Number of Occurrences	Maintenance Cost	Number of Structures	Sum
Catch Basin	2/year	$150	2	$600
Proprietary Sedimentation Device	2/year	$500	2	$2,000
Level Spreader	1/year	$300	1	$300
Bio-retention Basin	2/year	$1,000	2	$4,000
Three Mile Brook Culvert	2/year	$500	1	$1,000
Total Estimated Annual Cost of Maintenance				$7,900

Barracuda® Max & Barracuda Maintenance Guide

One of Barracuda's advantages is the ease of maintenance. Like any system that collects pollutants, the Barracuda must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes 2 to 4 hours, depending on the system's size, the captured material, and the vacuum truck's capacity.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and then on an annual basis. Typically, the system needs to be cleaned every 1-3 years.

Excessive oils, fuels or sediments may reduce the maintenance cycle. Periodic inspection is important.

Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it contacts the top of the captured sediment and mark that spot on the rod. Then push the probe through to the bottom of the sump and mark that spot to determine sediment depth.

Maintenance should occur when the sediment has reached the levels indicated in the Storage Capacity Chart.

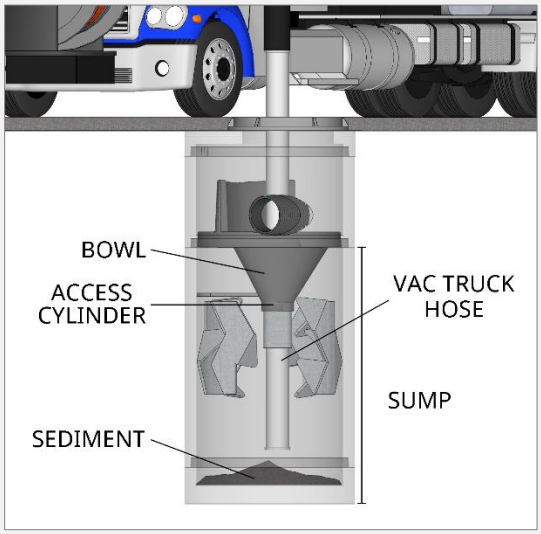
Barracuda Storage Capacities

Model	Manhole Diameter in. (mm)	Total System Volume Gallons (Liters)	Treatment Chamber Capacity Gallons (Liters)	Standard Sediment Capacity (20" depth) Yards^3 (meters^3)	NJDEP Sediment Capacity (50% of standard depth) Yards^3 (meters^3)
S3	36 (900)	264 (999)	212 (803)	0.44 (0.34)	0.22 (0.17)
S4	48 (1200)	665 (2517)	564 (2135)	0.78 (0.60)	0.39 (0.30)
S6	72 (1800)	1497 (5667)	1269 (4804)	1.75 (1.34)	0.88 (0.67)
S8	96 (2400)	4196 (15884)	3835 (14517)	3.10 (2.37)	1.55 (1.19)

Maintenance Instructions

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. Access this area through the 8" (200 mm), 10" (250 mm), 15" (375 mm) or 20" (500 mm) diameter access cylinder.
2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment. See figure 1.
3. Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
   a. Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
   b. Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
   c. Additional local regulations may apply to the maintenance procedure.

Figure 1



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Project: _____ Responsible Party: _____

Address: _____ Date: _____

BPM Name: _____ Page: 1 of 2

Operation & Maintenance Inspection Checklist

BMP Element:	Potential Problem:	Resolution:	Pass	Fail	Recommended Remediation
Bituminous Concrete Roadway	Build-up of sediment over the winter months and collection of leaves during the fall months.	Sweep roadway using a high-efficiency street sweeper.			
Deep-Sump Catch Basins	Sediment has accumulated to a depth greater than the original design depth for sediment storage, approximately 2-feet of sediment.	Remove the sediment and dispose of in accordance with local and state regulations.			
Stormwater Piping	Blockage of inlet/outlet pipes due to debris or sediment accumulation.	Remove any debris and sediment via proper means. Dispose of debris/sediment in accordance with local & state regulations			
Proprietary Treatment Device	Sediment has accumulated to a depth greater than the original design depth for sediment storage.	Remove sediment and disposed of in accordance with local and state regulations.			
Roof Leaders	Downspout connections have been damaged or disconnected.	Repair and reconnect downspout connections.			
Yard Drains	Blockage of inlet grate due to debris or vegetation.	Remove debris from inlet grate and cut back vegetation around frame.			
Flared End Sections	Vegetation has started to grow within the riprap area.	Remove vegetation immediately.			
	Accumulation of sediment/debris at the culvert inlet.	Remove sediment or debris such that the culvert has free flow.			
	Erosion is occuring where riprap has been dislodged.	Remedy scoured area and replace riprap immediately.			

_____ Inspector's Signature

_____ Date

Project: _____ Responsible Party: _____

Address: _____ Date: _____

BPM Name: _____ Page: 2 of 2

Operation & Maintenance Inspection Checklist

BMP Element:	Potential Problem:	Resolution:	Pass	Fail	Recommended Remediation
Bio-Retention Area	Sediment has accumulated over mulched surface.	Remove sediment and mulch mixture and replace mulch.			
	Erosion has occurred at inlets.	Repair any eroded areas and replace with appropriate materials.			
	Areas are devoid of mulch.	Replace mulch as necessary.			
	Litter and/or debris has accumulated in bio-retention area.	Remove litter and/or debris.			
	Vegetation has died or is distressed.	Replace vegetation as necessary.			
Level Spreader	Sediment has accumulated in riprap channel void space.	Remove the sediment and dispose of in accordance with local and state regulations and replace riprap.			
	Down-gradient gullies have formed due to sheet flow concentration.	Fill gullies with native backfill, No. 6 pea-stone, topsoil and errosion control blanket. Sod or re-seed with stabalized errosion control grass mix.			

_____ _____

Inspector's Signature Date

Proprietary Separators

Description: A proprietary separator is a flow-through structure with a settling or separation unit to remove sediments and other pollutants. They typically use the power of swirling or flowing water to separate floatables and coarser sediments, are typically designed and manufactured by private businesses, and come in different sizes to accommodate different design storms and flow conditions. Some rely solely on gravity separation and contain no swirl chamber. Since proprietary separators can be placed in almost any location on a site, they are particularly useful when either site constraints prevent the use of other stormwater techniques or as part of a larger treatment train. The effectiveness of proprietary separators varies greatly by size and design, so make sure that the units are sized correctly for the site's soil conditions and flow profiles, otherwise the unit will not work as designed.

Ability to meet specific standards

Standard	Description
2 - Peak Flow	Provides no peak flow attenuation
3 - Recharge	Provides no groundwater recharge
4 - TSS Removal	Varies by unit. Must be used for pretreatment and be placed first in the treatment train to receive TSS removal credit. Follow procedures described in Chapter 4 to determine TSS credit.
5 - Higher Pollutant Loading	Suitable as pretreatment device.
6 - Discharges near or to Critical Areas	Suitable as pretreatment device or potentially a spill control device
7 - Redevelopment	Suitable as pretreatment device or treatment device if it is not possible to provide other BMPs.

Advantages/Benefits:

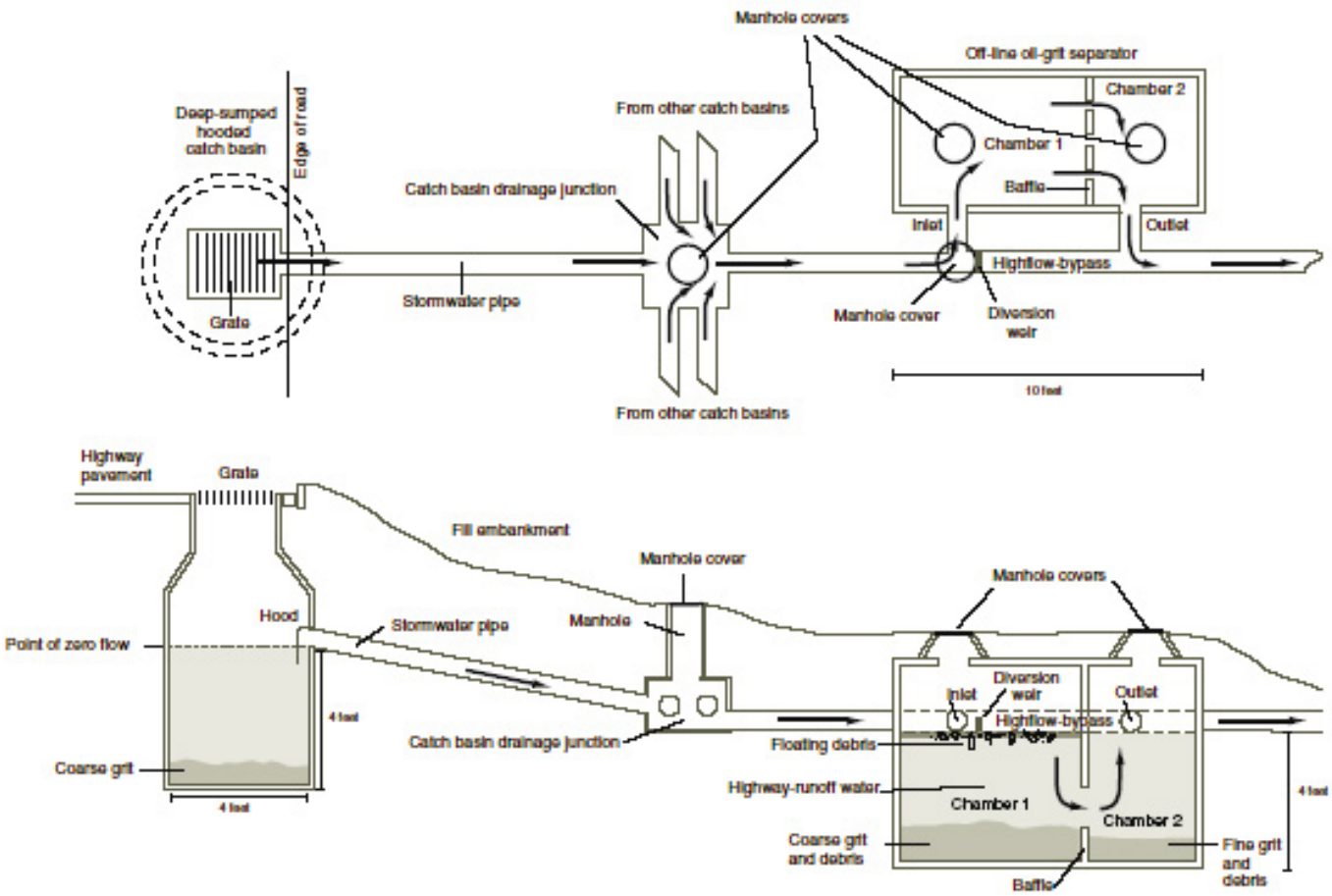
- Removes coarser sediment.
- Useful on constrained sites.
- Can be custom-designed to fit specific needs of a specific site.

Disadvantages/Limitations:

- Removes only coarse sediment fractions
- Provides no recharge to groundwater
- No control of the volume of runoff
- Frequent maintenance is essential

Pollutant Removal Efficiencies

- Total Suspended Solids (TSS) - Varies.
- Nutrients (Nitrogen, phosphorus) - Insufficient data
- Metals (copper, lead, zinc, cadmium) - Insufficient data
- Pathogens (coliform, e coli) - Insufficient data



Schematic section of a deep-sump hooded catch basin and a 1,500-gallon off-line water quality inlet.

adapted from the MassHighway Storm Water Handbook for Highways

Maintenance

Activity	Frequency
Inspect in accordance with manufacturer requirements, but no less than twice a year following installation, and no less than once a year thereafter.	See activity
Remove sediment and other trapped pollutants at frequency or level specified by manufacturer.	See manufacturer information

Special Features

Can be custom-designed to fit specific needs at a specific site.

LID Alternative

Reduce impervious surfaces
Disconnect runoff from non-metal roofs, roadways, and driveways

Proprietary Separators

Applicability

Because they have limited pollutant removal and storage capacity, proprietary separators must be used for pretreatment only. Because they are placed underground, proprietary separators may be the only structural pretreatment BMPs feasible on certain constrained redevelopment sites where space or storage is not available for more effective BMPs. They may be especially useful in ultra-urban settings such as Boston or Worcester. Some proprietary separators may be used for spill control.

Effectiveness

Proprietary separators have a wide range of TSS efficiencies. To assess the ability of proprietary separators to remove TSS and other pollutants, a proponent should follow the procedures set forth in Chapter 4. The specific units proposed for a particular project cannot be effective unless they are sized correctly. Proprietary separators are usually sized based on flow rate. A proprietary separator must be sized to treat the required water quality volume. To be effective at removing TSS and other pollutants the system must be designed, constructed, and maintained in accordance with the manufacturer's specifications and the specifications in this Handbook.

Planning Considerations

To receive TSS removal credit, proprietary separators must be used for pretreatment and placed at the beginning of a stormwater treatment train. They can be configured either in-line or if subject to higher flows, off-line to reduce scouring. They must be sized in accordance with the manufacturer's specifications and the specifications in this Handbook. Proprietary separators used as spill control devices may have to be sized differently than those used for TSS removal.

Design

The design of proprietary separators varies by manufacturer. Units are typically precast concrete, but larger systems may be cast in place. Units may have baffles or other devices to direct incoming water into and through a series of chambers, slowing the water down to allow sediment to drop out into internal storage areas, then directing this pre-treated water to exit to other treatment or infiltration devices. In some cases, flow will be introduced tangentially, to induce swirl or vortex. Units may include skirts or weirs, to keep trapped sediments from becoming re-entrained. Some units combine a catch basin with the treatment function, providing off-line rather than in-line treatment.

Generally they are placed below ground on a gravel or stone base. Make sure all units contain inspection and access ports so that they may be inspected and cleaned. During design, take care to place the inspection and access ports where they will be accessible. Do not place the ports in locations such as travel lanes of roadways/highways and parking stalls.

Construction

Install construction barriers around the excavation area to prevent access by pedestrians. Use diversions and other soil erosion practices up-slope of the proprietary separator to prevent runoff from entering the site before construction of the units is complete. Implement practices to prevent construction period runoff from being discharged to the units until construction is complete and the soil is stabilized. Stabilize all surrounding area and any established outlets. Remove temporary structures after vegetation is established.

Maintenance

Inspect and clean these units in strict accordance with manufacturers' recommendations and requirements. Clean the units using the method specified by the manufacturer. Vactor trucks are typically used to clean these units. Clamshell buckets typically used for cleaning catch basins are almost never allowed by manufacturers. Sometimes it will be necessary to remove sediment manually.

Adapted from:
MassHighway. Storm Water Handbook for Highways and Bridges. May 2004.

Bioretention Areas & Rain Gardens

Description: Bioretention is a technique that uses soils, plants, and microbes to treat stormwater before it is infiltrated and/or discharged. Bioretention cells (also called rain gardens in residential applications) are shallow depressions filled with sandy soil topped with a thick layer of mulch and planted with dense native vegetation. Stormwater runoff is directed into the cell via piped or sheet flow. The runoff percolates through the soil media that acts as a filter.

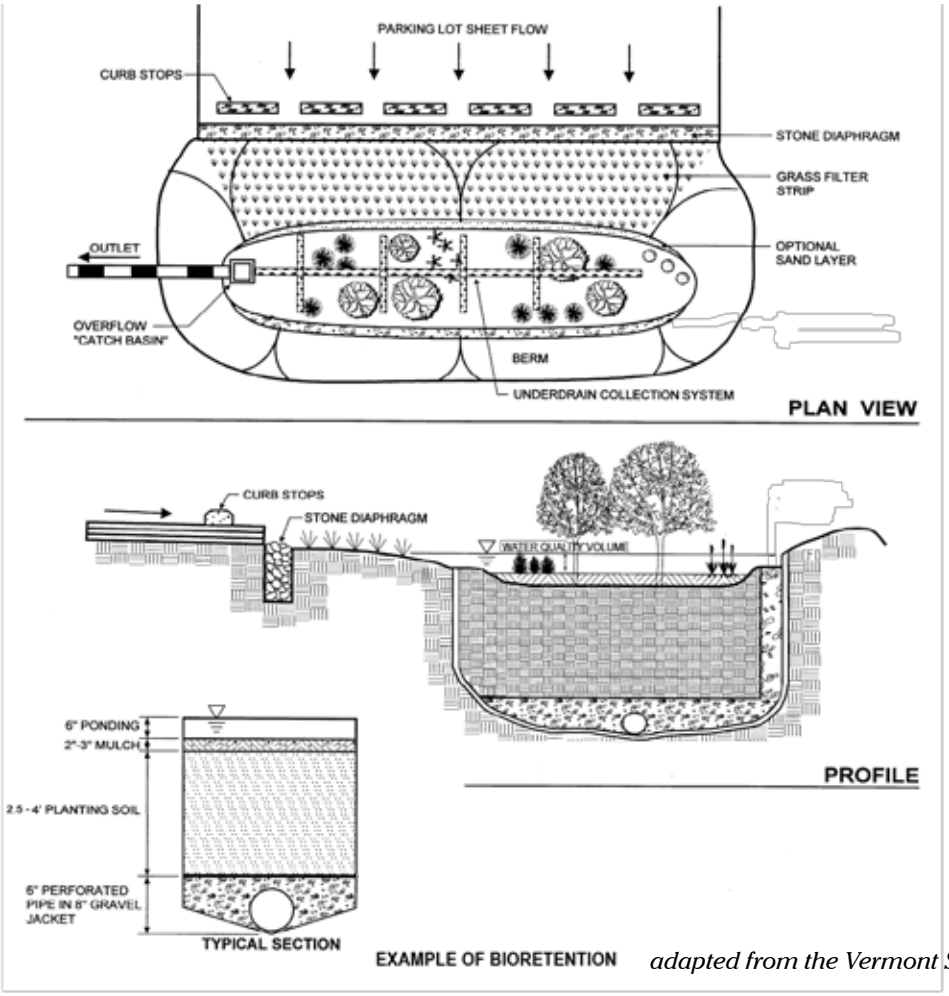
There are two types of bioretention cells: those that are designed solely as an organic filter filtering bioretention areas and those configured to recharge groundwater in addition to acting as a filter exfiltrating bioretention areas. A filtering bioretention area includes an impermeable liner and underdrain that intercepts the runoff before it reaches the water table so that it may be conveyed to a discharge outlet, other best management practices, or the municipal storm drain system. An exfiltrating bioretention area has an underdrain that is designed to enhance exfiltration of runoff into the groundwater.

Ability to meet specific standards

Standard	Description
2 - Peak Flow	N/A
3 - Recharge	An exfiltrating bioretention area provides groundwater recharge.
4 - TSS Removal	90% TSS removal credit with adequate pretreatment
5 - Higher Pollutant Loading	Can be used for certain land uses with higher potential pollutant loads if lined and sealed until adequate pretreatment is provided. Adequate pretreatment must include 44% TSS removal prior to infiltration. For land uses that have the potential to generate runoff with high concentrations of oil and grease such as high intensity use parking lots and gas stations, adequate pretreatment may also include an oil grit separator, sand filter or equivalent. In lieu of an oil grit separator or sand filter, a filtering bioretention area also may be used as a pretreatment device for infiltration practices exfiltrating runoff from land uses with a potential to generate runoff with high concentrations of oil and grease.
6 - Discharges near or to Critical Areas	Good option for discharges near cold-water fisheries. Should not be used near bathing beaches and shellfish growing areas.
7 - Redevelopment	Suitable with appropriate pretreatment

Pollutant Removal Efficiencies

- Total Suspended Solids (TSS) — 90% with vegetated filter strip or equivalent
- Total Nitrogen — 30% to 50% if soil media at least 30 inches
- Total Phosphorus — 30% to 90%
- Metals (copper, lead, zinc, cadmium) — 40% to 90%
- Pathogens (coliform, e coli) — Insufficient data



EXAMPLE OF BIORETENTION *adapted from the Vermont Stormwater Manual*

Special Features:

- Can be lined and sealed to prevent recharge where appropriate
- Adequate pretreatment is essential
- Not recommended in areas with steep slope
- Depth of soil media depends on type of vegetation that is proposed
- Soil media must be 30 inches deep to achieve removal of nitrogen

Advantages/Benefits:

- Can be designed to provide groundwater recharge and preserves the natural water balance of the site
- Can be designed to prevent recharge where appropriate
- Supplies shade, absorbs noise, and provides windbreaks
- Can remove other pollutants besides TSS including phosphorus, nitrogen and metals
- Can be used as a stormwater retrofit by modifying existing landscape or if a parking lot is being resurfaced
- Can be used on small lots with space constraints
- Small rain gardens are mosquito death traps
- Little or no hazard for amphibians or other small animals

Disadvantages/Limitations:

- Requires careful landscaping and maintenance
- Not suitable for large drainage areas

Maintenance

Activity	Frequency
Inspect and remove trash	Monthly
Mow	2 to 12 times per year
Mulch	Annually
Fertilize	Annually
Remove dead vegetation	Annually
Prune	Annually

Bioretention Areas & Rain Gardens

Not all bioretention cells are designed to exfiltrate. Only the infiltration requirements are applicable to bioretention cells intended to exfiltrate.

Applicability

Bioretention areas can provide excellent pollutant removal for the "first flush" of stormwater runoff. Properly designed and maintained cells remove suspended solids, metals, and nutrients, and can infiltrate an inch or more of rainfall. Distributed around a property, vegetated bioretention areas can enhance site aesthetics. In residential developments they are often described as "rain gardens" and marketed as property amenities. Routine maintenance is simple and can be handled by homeowners or conventional landscaping companies, with proper direction.

Bioretention systems can be applied to a wide range of commercial, residential, and industrial developments in many geologic conditions; they work well on small sites and on large sites divided into multiple small drainage areas. Bioretention systems are often well suited for ultra-urban settings where little pervious area exists. Although they require significant space (approximately 5% to 7% of the area that drains to them), they can be integrated into parking lots, parking lot islands, median strips, and traffic islands. Sites can be retrofitted with bioretention areas by replacing existing parking lot islands or by re-configuring a parking lot during resurfacing. On residential sites, they are commonly used for rooftop and driveway runoff.

Effectiveness

Bioretention areas remove pollutants through filtration, microbe activity, and uptake by plants; contact with soil and roots provides water quality treatment better than conventional infiltration structures. Studies indicate that bioretention areas can remove from 80% to 90% of TSS. If properly designed and installed, bioretention areas remove phosphorus, nitrogen, metals, organics, and bacteria to varying degrees.

Bioretention areas help reduce stress in watersheds that experience severe low flows due to excessive impervious cover. Low-tech, decentralized bioretention areas are also less costly to design, install, and maintain than conventional stormwater technologies that treat runoff at the end of the pipe. Decentralized bioretention cells can also reduce the size of storm drain pipes, a major component of stormwater treatment costs. Bioretention areas enhance the landscape in a variety of ways: they improve the appearance of developed sites, provide windbreaks, absorb noise, provide wildlife habitat, and reduce the urban heat island effect.

Planning Considerations

Filtering bioretention areas are designed with an impermeable liner and underdrain so that the stormwater may be transported to additional BMPs for treatment and/or discharge. Exfiltrating bioretention areas are designed so that following treatment by the bioretention area the stormwater may recharge the groundwater.

Both types of bioretention areas may be used to treat runoff from land uses with higher potential pollutant loads. However, exfiltrating bioretention areas may be used to treat runoff from land uses with higher potential pollutant loads, only if pretreatment has been provided to achieve TSS removal of at least 44%. If the land use has the potential to generate runoff with high concentrations of oil and grease, other types of pretreatment, i.e., a deep sump catch basin and oil grit separator or a sand filter, is required prior to discharge of runoff to an exfiltrating bioretention area. A filtering bioretention area may also be used as a pretreatment device for an exfiltrating bioretention area or other infiltration practice that exfiltrates runoff from land uses with a potential to generate runoff with high concentrations of oil and grease.

To receive 90% TSS removal credit, adequate pretreatment must be provided. If the flow is piped to the bioretention area a deep sump catch catch basin and sediment forebay should be used to provide pretreatment. For sheet flow, there are a number or pretreatment options. These options include:

- A vegetated filter strip, grass channel or water quality swale designed in accordance with the specifications set forth in Chapter 2.
- A grass and gravel combination. This should consist of at least 8 inches of gravel followed by 3 to 5 feet of sod. (source: North Carolina Stormwater Manual, 2007, http://h2o.enr.state.nc.us/su/documents/Ch12-Bioretention_001.pdf)
- Pea diaphragm combined with a vegetated filter strip specially designed to provide pretreatment for a bioretention area as set forth in the following table. (source: Georgia Stormwater Manual and Claytor and Schuler 1996)

Dimensions for Filter Strip Designed Specially to Provide Pretreatment for Bioretention Area

Parameter	Impervious Area				Pervious Areas (lawns, etc.)			
Maximum inflow approach length (feet)	35		75		75		100	
Filter strip slope (max=6%)	<2%	>2%	<2%	>2%	<2%	>2%	<2%	>2%
Filter strip minimum length (feet)	10	15	20	25	10	12	15	18

Bioretention areas must not be located on slopes greater than 20%. When the bioretention area is designed to exfiltrate, the design must ensure vertical separation of at least 2 feet from the seasonal high groundwater table to the bottom of the bioretention cell.

For residential rain gardens, pick a low spot on the property, and route water from a downspout or sump pump into it. It is best to choose a location with full sun, but if that is not possible, make sure it gets at least a half-day of sunlight.

Do not excavate an extensive rain garden under large trees. Digging up shallow feeder roots can weaken or kill a tree. If the tree is not a species that prefers moisture, the additional groundwater could damage it. Size the bioretention area using the methodology set forth in Volume 3.

Design

Size the bioretention area to be 5% to 7% of the area draining to it. Determine the infiltrative capacity of the underlying native soil by performing a soil evaluation in accordance with Volume 3. Do not use a standard septic system (i.e., Title 5) percolation test to determine soil permeability.

The depth of the soil media must be between 2 and 4 feet. This range reflects the fact that most of the pollutant removal occurs within the first 2 feet of soil and that excavations deeper than 4 feet become expensive. The depth selected should accommodate the vegetation. If the minimum depth is used, only shallow rooted plants and grasses my be used. If there is a Total Maximum Daily Load that requires nitrogen to be removed from the stormwater dischrges, the bioretention area should have a soil media with a depth of at least 30 inches, because nitrogen removal takes place 30 inches below the ground surface. If trees and shrubs are to be planted, the soil media should be at least 3 feet.

Size the cells (based on void space and ponding area) at a minimum to capture and treat the required water quality volume (the first 0.5 inch or 1 inch of runoff) if intended to be used for water quality treatment (Stormwater Standard No. 4), the required recharge volume if used for recharge (Stormwater Standard No. 3), or the larger of the two volumes if used to achieve compliance with both Stormwater Standards 3 and 4.

Cover the bottom of the excavation with coarse gravel, over pea gravel, over sand. Earlier designs used filter fabric as a bottom blanket, but more recent experiences show that filter fabric is prone to clogging. Consequently, do not use fabric filters or sand curtains. Use the Engineered Soil Mix below.

Engineered Soil Mix for Bioretention Systems Designed to Exfiltrate

- The soil mix for bioretention areas should be a mixture of sand compost and soil.
  - o 40 % sand,
  - o 20-30% topsoil, and
  - o 30-40% compost.

- The soil mix must be uniform, free of stones, stumps, roots or similar objects larger than 2 inches. Clay content should not exceed 5%.
- Soil pH should generally be between 5.5-6.5, a range that is optimal for microbial activity and adsorption of nitrogen, phosphorus, and other pollutants.
- Use soils with 1.5% to 3% organic content and maximum 500-ppm soluble salts.
- The sand component should be gravelly sand that meets ASTM D 422.

Sieve Size	Percent Passing
2-inch	100
¾-inch	70-100
¼-inch	50-80
U.S. No. 40	15-40
U.S. No. 200	0-3

- The topsoil component shall be a sandy loam, loamy sand or loam texture.
- The compost component must be processed from yard waste in accordance with MassDEP Guidelines (see http://www.mass.gov/dep/recycle/reduce/leafguid.doc). The compost shall not contain biosolids.

On-site soil mixing or placement is not allowed if soil is saturated or subject to water within 48 hours. Cover and store soil to prevent wetting or saturation.

Test soil for fertility and micro-nutrients and, only if necessary, amend mixture to create optimum conditions for plant establishment and early growth.

Grade the area to allow a ponding depth of 6 to 8 inches; depending on site conditions, more or less ponding may be appropriate.

Cover the soil with 2 to 3 inches of fine-shredded hardwood mulch.

The planting plan shall include a mix of herbaceous perennials, shrubs, and (if conditions permit) understory trees that can tolerate intermittent ponding, occasional saline conditions due to road salt, and extended dry periods. A list of plants that are suitable for bioretention areas can be found at the end of this section. To avoid a monoculture, it is a good practice to include one tree or shrub per 50 square feet of bioretention area, and at least 3 species each of herbaceous perennials and shrubs. Invasive and exotic species are prohibited. The planting plan should also meet any applicable local landscaping requirements.

All exfiltrating bioretention areas must be designed to drain within 72 hours. However, rain gardens are typically designed to drain water within a day and are thus unlikely to breed mosquitoes.

Bioretention cells, including rain gardens, require pretreatment, such as a vegetated filter strip. A stone or pea gravel diaphragm or, even better, a concrete level spreader upstream of a filter strip will enhance sheet flow and sediment removal.
Bioretention cells can be dosed with sheet flow, a surface inlet, or pipe flow. When using a surface inlet, first direct the flow to a sediment forebay. Alternatively, piped flow may be introduced to the bioretention system via an underdrain.

For bioretention cells dosed via sheet flow or surface inlets, include a ponding area to allow water to pond and be stored temporarily while stormwater is exfiltrating through the cell. Where bioretention areas are adjacent to parking areas, allow three inches of freeboard above the ponding depth to prevent flooding.

Most bioretention cells have an overflow drain that allows ponded water above the selected ponding depth to be dosed to an underdrain. If the bioretention system is designed to exfiltrate, the underdrain is not connected to an outlet, but instead terminates in the bioretention cell. If the bioretention area is not designed to exfiltrate, the underdrain is connected to an outlet for discharge or conveyance to additional best management practices.

Construction

During construction, avoid excessively compacting soils around the bioretention areas and accumulating silt around the drain field. To minimize sediment loading in the treatment area, direct runoff to the bioretention area only from areas that are stabilized; always divert construction runoff elsewhere.

To avoid compaction of the parent material, work from the edge of the area proposed as the location of an exfiltrationg bioretention cell. Never direct runoff to the cell until the cell and the contributing drainage areas are fully stabilized.

Place planting soils in 1-foot to 2-foot lifts and compact them with minimal pressure until the desired elevation is reached. Some engineers suggest flooding the cell between each lift placement in lieu of compaction.

Maintenance

Premature failure of bioretention areas is a significant issue caused by lack of regular maintenance. Ensuring long-term maintenance involves sustained public education and deed restrictions or covenants for privately owned cells. Bioretention areas require careful attention while plants are being established

Bioretention Maintenance Schedule

Activity	*Time of Year*	*Frequency*
Inspect & remove trash	Year round	Monthly
Mulch	Spring	Annually
Remove dead vegetation	Fall or Spring	Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace entire media & all vegetation	Late Spring/early Summer	As needed*

** Paying careful attention to pretreatment and operation & maintenance can extend the life of the soil media*

and seasonal landscaping maintenance thereafter.

In many cases, a landscaping contractor working elsewhere on the site can complete maintenance tasks. Inspect pretreatment devices and bioretention cells regularly for sediment build-up, structural damage, and standing water.

Inspect soil and repair eroded areas monthly. Re-mulch void areas as needed. Remove litter and debris monthly. Treat diseased vegetation as needed. Remove and replace dead vegetation twice per year (spring and fall).

Proper selection of plant species and support during establishment of vegetation should minimize—if not eliminate—the need for fertilizers and pesticides. Remove invasive species as needed to prevent these species from spreading into the bioretention area. Replace mulch every two years, in the early spring. Upon failure, excavate bioretention area, scarify bottom and sides, replace filter fabric and soil, replant, and mulch. A summary of maintenance activities can be found on the previous page.

Because the soil medium filters contaminants from runoff, the cation exchange capacity of the soil media will eventually be exhausted. When the cation exchange capacity of the soil media decreases, change the soil media to prevent contaminants from migrating to the groundwater, or from being discharged via an underdrain outlet. Using small shrubs and plants instead of larger trees will make it easier to replace the media with clean material when needed.

Plant maintenance is critical. Concentrated salts in roadway runoff may kill plants, necessitating removal of dead vegetation each spring and replanting. The operation and maintenance plan must include measures to make sure the plants are maintained. This is particularly true in residential subdivisions, where the operation and maintenance plan may assign each homeowner the legal responsibility to maintain a bioretention cell or rain garden on his or her property. Including the requirement in the property deed for new subdivisions may alert residential property owners to their legal responsibilities regarding the bioretention cells constructed on their lot.

Cold Climate Considerations

Never store snow in bioretention areas. The Operation and Maintenance plan must specify where on-site snow will be stored. All snow dumps must comply with MassDEP's guidance. When bioretention areas are located along roads, care must be taken during plowing operations to prevent snow from being plowed into the bioretention areas. If snow is plowed into the cells, runoff may bypass the cell and drain into downgradient wetlands without first receiving the required water quality treatment, and without recharging the groundwater.

References

Center for Watershed Protection, 2000, Bioretention as a Water Quality Best Management Practice, Article 110 from Watershed Protection Techniques; http://www.cwp.org/Downloads/ELC_PWP110.pdf
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Low Impact Development Center, 2003, Drainage – Bioretention Specification, http://www.lowimpactdevelopment.org/epa03/biospec.htm

Prince Georges County, 2002, Bioretention Manual, http://www.goprincegeorgescounty.com/der/bioretention.asp

Puget Sound Action Team, 2005, Low Impact Development, Pp. 174 - 184 http://www.psat.wa.gov/Publications/LID_tech_manual05/LID_manual2005.pdf

U.S. Environmental Protection Agency, 1999, Stormwater Technology Fact Sheet, Bioretention, EPA 832-F-99-012, http://www.epa.gov/owm/mtb/biortn.pdf

U.S. Environmental Protection Agency, 2005, National Management Measures to Control Nonpoint Source Pollution from Urban Areas, Publication Number EPA 841-B-05-004, Pp. 5-29 http://www.epa.gov/nps/urbanmm/

University of North Carolina, www.bae.ncsu.edu/topic/bioretention
www.bae.ncsu.edu/stormwater/PublicationFiles/DesigningRainGardens2001.pdf

Appendix H: Illicit Discharge Compliance Statement

Illicit Discharge Compliance Statement

The owners of the land/responsible party will be responsible for prohibiting illicit discharges to the stormwater management system during construction and during its life of operation. The stormwater management system is comprised of the components for conveying, treating, and infiltrating stormwater runoff on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. An illicit discharge shall constitute any connection or discharge to the stormwater management system including, but not limited to, wastewater discharges, discharge of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease.

Responsible Party*:

Shield Hotels
c/o Kenny Patel
63 Myron Street
West Springfield, MA 01089

*The party listed shall be responsible for implementation and record keeping of the requirements listed in this operation and maintenance plan. Upon sale of property or any other transition of ownership, the responsible party shall be reinstated as the new owner or any other group created as determined by the owner.

_____ _____
Signature of Responsible Party Representative Date

_____ _____
Signature of Responsible Party Representative** Date

**Required upon transfer of ownership

Appendix I: Low Impact Development Alternatives Analysis Narrative

Low Impact Development Considerations

Proposed Hotel & Site Improvement Plan

1422-1444 Main Street
Agawam, Massachusetts
(Map K4 Block 1 Parcels 5, 6, 7, & 13)

Applicant/Owner:
Shield Hotels
c/o Kenny Patel
63 Myron Street
West Springfield, MA 01089

RLA Project File: 231007

May 23, 2024

Revised: September 9, 2024

R LEVESQUE ASSOCIATES, INC
A LAND PLANNING SERVICES COMPANY
40 School Street · Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

Introduction

Per the Massachusetts Stormwater Handbook, project proponents must consider environmentally sensitive site design and low impact development techniques to effectively manage stormwater. As a part of the proposed project, the proponent has considered a number of environmentally sensitive, low impact development techniques to prevent the generation of stormwater and non-point source pollution.

The following is a detailed description of the considerations for each low impact development measure. For ease of review, RLA has provided the consideration of each measure as detailed in the Massachusetts Stormwater Report Checklist.

Low Impact Development (Lid) Measures

1. Environmentally Sensitive Project Approach
   During the design feasibility effort for the subject property, RLA considered several design scenarios for the development and layout of the proposed project. The different concepts were used to develop a site design that utilizes the upland portions of the site as efficiently as possible while minimizing the impact to jurisdictional area. Ultimately, the layout chosen utilizes the upland portions of the site to construct a new hotel and associated site improvements, including a stormwater management system. In addition to the proposed site design mitigating the impacts of the proposed hotel, the site has also been designed to provide an improvement over existing conditions for the existing commercially utilized building and associated site improvements.

2. No disturbance to any Wetland Resource Areas
   No wetland resource areas are being disturbed as part of the proposed site improvements. All work is located within the associated buffer zones and the stormwater management system has been designed to mitigate the impacts of the proposed site improvements.

3. Site Design Practices (e.g. clustered development, reduced frontage setbacks)
   All of the proposed site improvements have been designed to the minimum functional dimensions for the safe utilization of the site. The proposed site improvements adjacent to the hotel have been designed with minimum widths and the impervious area adjacent to the existing restaurant building are being moved farther away from resource areas.

4. Reduced Impervious Area (Redevelopment Only)
   The proposed project is not part of a redevelopment project. Impervious areas have been reduced to functional minimums required for applicant needs and city requirements.

5. Minimizing disturbance to existing trees and shrubs
   The proposed site improvements have been reduced to the minimums required and allowed by city standards and the applicant's programming for the proposed project. Driveway widths and parking areas have been reduced to the minimum amounts required for functional accessibility and demolition of existing trees and shrubs has been minimized to the extent practicable.

6. LID Site Design Credit Requested
   No LID Site Design Credit is requested for the proposed project.

7. Use of "country drainage" versus curb and gutter conveyance and pipe
   Country drainage conveyance requires a larger footprint than curb and gutter conveyance and creates areas with undulating terrain. Due to pre-existing constraints and limitations of the project site, country drainage was not utilized.

8. Bioretention Cells (includes Rain Gardens)
   Bio-retention basins are being utilized as part of the proposed stormwater management system. In order to provide a treatment train that meets the MassDEP standards, a combination of deep-sump hooded catch basins, water quality units, and bio-retention basins were determined to be the most efficient BMPs capable of maximizing compliance with the standards.

9. Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
   Constructed stormwater wetlands require very specific design scenarios such as large tributary areas to support wetland characteristics and high groundwater elevations among others. The sub-catchment drainage area for this project site is not large enough to incorporate a constructed stormwater wetland.

10. Treebox Filter
    The extensive costs associated with treebox filters, along with the climatic conditions of the area over the winter, present unique circumstances that would only provide a maintenance problem and a potential hazard for the owner. Additionally, the limited pavement width combined with minimization of sidewalks areas create an environmentally sensitive design with limited impervious areas. Due to this design, treebox filters are not an applicable stormwater BMP.

11. Water Quality Swale
    Water quality swales are best management practices that require a greater footprint of development in order to facilitate the grading of the swale. In order to minimize the overall work in jurisdictional area, water quality swales were not utilized.

12. Grass Channel
    Grassed channels are best management practices that require a greater footprint of development in order to facilitate the grading of the swale. In order to minimize the overall work in jurisdictional area, water quality swales were not utilized.

13. Green Roof
    Based on project size and scope, green roofs were not selected as a cost-effective BMP for this project.

14. Other
    Please see the Stormwater Report for more information.

DPW
1000 Suffield Street
Agawam, MA 01001
Phone: 413-821-0600
Fax: 413-821-0631

Town of Agawam
Department Of Public Works

MEMORANDUM

To: Planning Board
CC: File
From: Engineering Division
Date: September 19, 2024
Subject: SP 665 – NOI for Proposed Hotel – #1422-1444 Main Street

Per your request, we have reviewed the revised Site Plans and accompanying documentation for the Proposed Hotel to be located at #1422-1444 Main Street; Prepared by R Levesque Associates Inc.; Revised: September 9, 2024. Based on our review, we have the following comments:

1. An ADA compliant curb ramp should be installed at both ends of the sidewalk leading to the restaurant parking lot and at the end of the sidewalk leading to the Main Street driveway. Each ADA ramp shall include a detectible warning panel. Design of the detectible warning panel shall be in accordance with current MassDOT standard specifications. A detail of the detectible warning panel should be included within the Site Plans.

2. A crosswalk should be painted in the restaurant parking lot to connect the sidewalk ADA ramps and provide a safe pedestrian path.

3. In response to Engineering's comment regarding the existing subsurface drains from the restaurant, R Levesque states that the pipes shall be "rerouted to an upland location such that any discharge will not be tributary to basin #1." Engineering is requesting clarification on exactly where the new pipes will be located. Based on the submitted Grading Plan (Sheet C-5), it appears that any alternate daylighting location for the subsurface drains will discharge the water towards the restaurant or to the parking lot which drains to Bioretention Basin #1.

4. Arrows denoting the flow direction of the roof leaders for the restaurant and hotel buildings should be added to the Site Plans.

5. As per the Massachusetts Stormwater Regulations, the soil media for the proposed bioretention basins must have a minimum depth of 30" in order to properly achieve nitrogen removal.

DPW
1000 Suffield Street
Agawam, MA 01001
Phone: 413-821-0600
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Town of Agawam
Department Of Public Works

6. The proposed grading in the northwestern section of the subject parcel has changed the hydrology of the site. Stormwater runoff in that area previously flowed offsite to the west. Under proposed conditions, that runoff is collected by the drainage system and discharges towards the BVW on the eastern side of the property. With the increase in impervious area, this constitutes a significant increase in stormwater volume to the BVW and perennial stream. Engineering is concerned with potential impacts to the wetland areas, the culvert under Main Street and properties downstream of the project site.

7. The yard drain grates in both bioretention basins do not appear to be set at the proper elevation in order to allow the basins to treat the 1-inch "first flush" of stormwater runoff. The "first flush" refers to the first 1-inch of runoff generated by a storm event multiplied by the total impervious area contributing to the basin. The yard drain grates are set at 0.1 FT above the basin bottom for each bioretention basin which will not provide enough storage volume within the basin to infiltrate the "first flush".

8. The yard drains should be included as outlets for the bioretention basins in the HydroCAD calculations. This could have effects on the available storage and peak water elevations in the basins.

9. As per the Massachusetts Stormwater Regulations, the mulch in the bioretention basin should be replaced annually rather than every 2 years.

Engineering reserves the right to make additional comments as new information is submitted. If you have any questions, please do not hesitate to contact this division.

Sincerely,

Michelle C. Chase, P.E.
Town Engineer

Michael F. Albro, P.E.
Assistant Town Engineer

MEMBERS PRESENT:
Violet Baldwin, Chair
Frank DeStefano
Michael Cleavall
Michael DiLullo

MEMBERS ABSENT:
Charles Elfman

ALSO PRESENT:
Stefanie Kesecker
Pam Kerr

Chairperson Baldwin called the meeting to order at 6:00pm.

1. 6:00PM PUBLIC HEARING-ZONING AMENDMENT-"An Ordinance to Amend Chapter 180 of the Code of the City of Agawam Adding Definitions for Driveway and Driveway-Common/Shared"-Mayor Johnson & City Council President Sandlin

Mayor Johnson and City Council President Sandlin were present for this agenda item. Mayor Johnson gave a brief presentation to the Board. He stated that several contractors have recently approached the Town concerning shared driveways and this amendment will add a definition for driveways and shared driveways into the Town's Zoning Code. He went on to say the current code is silent on driveways and shared driveways and that the Zoning Advisory Committee had been working on the language and definition for several years. The Zoning Advisory Committee is opposed to shared driveways and they tend cause civil and safety issues among homeowners. Mayor Johnson also stated that the Safety Officer Machos had opposed common/shared driveways as well in a memo dated September 17, 2024 in which he stated the Police Department is called to mitigate issues between neighbors with shared driveways, as well as the safety issues for emergency vehicle access.

Chairperson Baldwin opened the public hearing for public comment and there was none.

Ms. Kerr clarified that existing common driveways will be grandfathered in, Mayor Johnson concurred.

Motion was made by Mr. Cleavall and seconded by Mr. DiLullo to close the public hearing.

VOTE 4-0-0

Motion was made by Mr. DiLullo and seconded by Mr. Cleavall to send a Positive Recommendation to the City Council regarding TOR-2024-8.

VOTE 4-0-0

2. SITE PLAN-195 South Westfield Street-Aljanabi

The Planning Board received a request to continue this agenda item to the October 17, 2024 meeting.

Motion was made by Mr. Cleavall and seconded by Mr. DiLullo to continue the SITE PLAN-195 South Westfield Street-Aljanabi-to the October 17, 2024 meeting, as requested.

VOTE 4-0-0

3. SITE PLAN-1422-1444 Main Street-Shields Hotel

The Planning Board received a request to continue this agenda item to the October 17, 2024 meeting.

Motion was made by Mr. DiLullo and seconded by Mr. Cleavall to continue the SITE PLAN-1422-1444 Main Street-Shields Hotel-to the October 17, 2024 meeting, as requested.

VOTE 4-0-0

4. FORM A-3 & 7 Spring Street-Patriot Living, LLC

Ms. Kerr stated this Form A is to subdivide 2 houses on 1 existing lot into 2 new lots. Ms. Baldwin stated the homes were built in the 1800's, before Subdivision Control Law was established and fall under exemption 81L, which allows these lots to be separated. Planning Board members were in agreement that each lot has adequate access.

Motion was made by Mr. DeStefano and seconded by Mr. DiLullo to approve the Plan for 3 & 7 Spring Street under "Subdivision Control Law not Required."

VOTE 4-0-0

5. APPROVAL OF MINUTES-September 19, 2024

Motion was made by Mr. Cleavall and seconded by Mr. DiLullo to approve the September 19, 2024 minutes as written.

VOTE 4-0-0

6. Correspondence

Ms. Kerr informed the members that the current application BoardPaq is being replaced with Civic Exchange and they will receive more information and training.

Motion was made by Ms. DeStefano and seconded by Mr. Cleavall to adjourn the meeting.

VOTE 4-0-0

DRAFT

Meeting adjourned at 6:20pm.

DRAFT