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NOTICE OF INTENT APPLICATION

Stormwater Management & Drainage Improvement 15 & 25 Cedar Street Amesbury, Massachusetts

July 14, 2025

File No. 03.0035466.00



PREPARED FOR:

The Lofts at Clarks Pond Homeowner Association
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Boston, MA 02110

GZA GeoEnvironmental, Inc.

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July 14, 2025
File No. 03.003354466.00

Ms. Amanda Armington
Amesbury Conservation Commission
39 South Hunt Road
Amesbury, MA 01913

Re: Notice of Intent Application - Stormwater Management & Drainage Improvement
15 & 25 Cedar Street
Amesbury, Massachusetts

Dear Ms. Armington:

On behalf of the Lofts at Clarks Pond Homeowner Association (Applicant and Owner), GZA GeoEnvironmental Inc. (GZA) is pleased to submit this Notice of Intent (NOI) for the proposed Stormwater Management and Drainage Improvement (the "Project") located at the existing Lofts at Clarks Pond residential units in Amesbury, Massachusetts. GZA has prepared this Notice of Intent per the requirements of the Massachusetts Wetlands Protection Act (WPA; M.G.L. Chapter 131, Section 40), its associated Regulations (310 CMR 10.00), and the City of Amesbury Wetlands Protection Ordinance (Article 15), and per the Determination of Applicability made by the Conservation Commission on June 11, 2025.

The Applicant is requesting an Order of Conditions to allow for the proposed design to proceed to mitigate stormwater related flooding impacting the exterior and interior of the western building (building #2) located at 15 Cedar Street, and to mitigate flooding within the parking area associated with building #2. GZA has prepared a Stormwater Management Report that accompanies this NOI filing.

Enclosed is a WPA Form 3-Notice of Intent application and supporting documentation for your review and anticipated approval. If you have any questions, please feel free to contact Jackie Kaehler. 401.427.2749 or jaclyn.kaehler@gza.com.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Jaclyn Kaehler, P.E.
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Anders, B. Bjarngard, P.E.
Principal-in-Charge
CC: MassDEP – Northeast Regional Office



**Stormwater Management & Drainage Improvement
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1.0 INTRODUCTION

On behalf of The Lofts at Clarks Pond Homeowner Association (Applicant), GZA GeoEnvironmental, Inc. (GZA) has prepared this Notice of Intent for the proposed Stormwater Management and Drainage Improvement (Project) located at 15 & 25 Cedar Street, Amesbury, Massachusetts. The project involves work activities to mitigate stormwater related flooding impacting the exterior and interior of the western building (building #2) located at 15 Cedar Street. A USGS Locus Map and an existing conditions plan depicting the Site is provided in **Appendix A**.

The portions of the proposed work are located within the 100-200 foot outer riparian zone of Riverfront Area and Bordering Land Subject to Flooding resources areas, and is subject to review by the Amesbury Conservation Commission (Commission) pursuant to the Massachusetts Wetlands Protection Act (WPA; M.G.L. c. 131 § 40), its companion regulations 310 CMR 10.00, and the Amesbury Wetlands Protection Ordinance (Article 15) (Ordinance). A WPA Form 3 – Notice of Intent application is provided in **Appendix B**.

1.1 PROJECT PURPOSE AND NEED

Building #2 (the “building”) experiences non-fluvial flooding at the north entrance that has caused interior damage to the first floor of the building consisting of six residential units, a storage room, and an elevator. The Applicant has indicated that significant flooding occurred on August 18, 2023, and September 13, 2023, when those storms produced approximately 3.7-inches and 2.3-inches, respectively, as reported by the National Oceanic and Atmospheric Administration (NOAA). During these storm events, the stormwater flowing down Cedar Street and “R” Street ponded along the roadway curbing and overtopped onto the facility’s landscaped areas in the northwest corner of the Site and ultimately flowed to a low area at the building #2 north door and flooded the building. The building roof drains have also been observed to become overwhelmed and discharge stormwater into this area. The areas outside of the building become inundated with water during storm events, and ice forms in the winter creating a hazardous condition for pedestrians and vehicles traveling in the walkway and parking area.

2.0 EXISTING CONDITIONS

The Lofts at Clarks Pond is a condominium complex located at 15 & 25 Cedar Street in Amesbury, Massachusetts and designated by the City of Amesbury Assessor as Map 40, Lots 236, 237, and 238. The complex consists of two residential buildings, multiple paved parking areas, and multiple landscaped areas. Cedar Street is located to the north of the site and “R” Street is located to the west of the Site. The Back River is located to the south of the Site and Clarks Pond is located to the southeast of the Site.

2.1 JURISDICTIONAL WETLAND RESOURCE AREAS

A GZA wetland scientist completed a wetland delineation in the vicinity of the Site on July 1, 2025 consistent with the *Massachusetts Handbook for Delineating Bordering Vegetated Wetlands*, Second Edition, Jackson, S.D, D.J. Henson, D. Hilgeman, M. McHugh, and L. Rhodes, 2022, Boston, MA., Massachusetts Department of Environmental Protection, Bureau of Water Resources, Wetlands Program; and *Corps of Engineers Wetland Delineation Manual, Environmental Laboratory. Technical Report Y-87-1*. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS; 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, ed. J.S. Wakely, R.W. Lichvar, and C. C. Noble; *ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center (Version 2.0)* and the definitions provided in 310 CMR 10.00, and the Amesbury Wetlands Protection Ordinance.



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The desk-top evaluation and delineation identified Bank, Bordering Land Subject to Flooding and Riverfront Area resource area as defined at 310 CMR 10.54(2), 10.55(2), 10.57(2) and 10.58(2), respectively. The Wetland Delineation Report (**Appendix C**) depicts the delineated resource areas and associated 100-foot Buffer Zone. Wetland determination data forms are also included in **Appendix C**.

2.1.1 Bank and Mean Annual High Water Line (MAHWL)

GZA performed a field review and completed wetland delineation on Site within the limits of the proposed project. GZA delineated the Bank and MAHWL of the two perennial streams observed on the Site. GZA understands that the delineated Bank resource areas include a 100-foot jurisdictional Buffer Zone that extends landward from the delineated boundaries. A 200-foot Riverfront Area resource area also extends into the Site from the delineated Bank/MAHWL of the Back River. The resource areas and their 100-foot Buffer Zones are jurisdictional under the WPA and its companion regulations, and the Amesbury Wetlands Protection Ordinance. The resources identified on Site are presumed to qualify as Waters of the U.S. and if confirmed would be regulated by the Corps under Section 404 of the Federal Clean Water Act.

There is no proposed activity that will impact Inland Bank nor directly impact the Back River or MAHWL.

2.1.2 Bordering Land Subject to Flooding

The Federal Emergency Management Agency (FEMA) recently updated the Flood Insurance Rate Maps (FIRM) for the City of Amesbury effective July 8, 2025 (Panel No. 25009C0106G). There are two distinct areas of Zone A that are mapped on portions of the Site – one includes Bordering Land Subject to Flooding (BLSF) parallel to the Back River, and the second is an isolated depression of Zone A overlapping the parking area in the central portion of the Site (see **Figure 1** below). The FEMA FIRM does not provide an elevation for these Zone A areas.



Figure 1: Zone A 100-year Floodplain, Back River

Source: FEMA, FIRM 2025

2.1.3 Riverfront Area

For the purposes of this NOI, we have assumed that the Back River is perennial and has an associated 200-foot regulated Riverfront Area, per Section II of the Amesbury Wetlands Protection Ordinance. The 200-foot Riverfront Area extends onto the Site as measured from the Bank/MAHWL of the Back River. A majority of the inner riparian zone of the Riverfront



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Area (0-100 feet) on-site consists of vegetation and mature trees nearer to the Back River and maintained lawn. The outer riparian of the Riverfront Area (100-200 feet) consists largely of asphalt parking areas, buildings and landscaped areas.

2.1.4 Bordering Vegetated Wetlands

GZA delineated one Bordering Vegetated Wetland that is associated with a stormwater outfall that flows into the Back River. GZA evaluated this area to determine if it is indeed a regulated wetland resource area. For the purposes of this NOI filing, GZA conservatively flagged this area as a BVW, although it may also qualify as “stormwater management feature” per the regulations because it functions as a “system for conveying, collecting, storing, discharging, recharging or treating stormwater on-site including stormwater best management practices, and any pipes and outlets intended to transport and discharge stormwater ...”. This stormwater management system is a component of the Site’s overall drainage system that is inspected, operated and maintained by the landowner. This BVW has an associated 100-foot Buffer Zone.

2.1.5 100-Foot Buffer Zone

According to the WPA and regulations, the 100-foot buffer zone per 310 CMR 10.02(2)(b) is regulated and any activity other than minor activities identified in the regulations proposed or undertaken within 100 feet of an area specified in the regulations, which in the judgement of the issuing authority, will alter an area subject to protection, and in the case of this Project, the resource areas includes Inland Bank.

There is no proposed activity located within the 100-foot Buffer Zone to Bank resource area.

2.2 OTHER RESOURCE AREAS

GZA reviewed MassGIS (<https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html>) to assess other wetland related resources present on the Site. The findings are summarized in the table below in Table 1.

Table 1: Summary of On-site Natural Resources

Resource	Present
Areas of Critical Environmental Concern (ACEC)	No
Outstanding Resource Waters (ORWs)	No
Priority Habitat for Rare and Endangered Species	No
Certified Vernal Pools	No
FEMA Floodplains	Yes

3.0 PROPOSED PROJECT

The Project involves the installation and replacement of roof drainage pipes along building #2 to then be connected into the existing stormwater management system. The existing roof is a non-metal roof surface which is presumed to generate clean runoff during precipitation events. The existing stormwater management system includes a perforated pipe being discharged into the municipality stormwater system via catch basin located on “R” Street. The existing perforated pipes located on the north and west side of building #2 will either be fully replaced with new PVC pipes or be removed (**see Stormwater Management Report, Site Plans, Appendix D**). Additionally, existing drainage pipes will be replaced with larger PVC pipes with new pipe inverts to prevent flooding of the existing catch basins and lawn drains. These proposed drainage pipes will collect stormwater runoff from building #2 roof top and direct it into the existing catch basins in the



parking lot, which travels through the previously installed Vortex water quality treatment units and ultimately discharge to the Back River via an 18-inch RCP outlet.

Roof runoff from the north and south areas of building #2 have separate conveyance systems. The south portion of building #2 roof runoff will be captured by five existing roof drains, then be directed into catch basin “H” located within the existing parking lot via a proposed 6-inch PVC pipe. The southern drainage system will include the cut and capping of the pipe being discharged into the catch basin on “R” Street. Similarly, the north portion of building #2 roof runoff will be captured by six existing roof drains, which will then be directed into catch basin “I” located within the existing parking lot via 12-inch PVC pipe. Both proposed drainage systems will connect into existing 18-inch RCP stormwater system, which will go through the existing vortex water quality treatment units then discharged into the Back River via the bell outlet. It should be noted that vortex catch basins are utilized to capture and retain trash, debris and sediment, and improve the quality of water being discharged to the receiving water.

The work activities consist of the following limited drainage system improvements:

- Selective removal and replacement of brick pavers on the northwest side of building #2.
- Removal of the existing roof drainage PVC pipes associated building #2.
- Trench excavation with the parking areas and landscape areas to prepare for the installation of new subsurface piping.
- Installation of either 6 or 12-inch diameter drainage pipe to replace the piping associated with the existing roof drainage system.
- Drainage connection to the existing stormwater manhole structures.
- Capping of the existing drainage pipe that discharged to “R” Street.

A summary of wetland resource area impacts in square feet (SF) or linear feet (LF) is included below in **Table 2**.

Table 2: Summary of Resource Area Impacts

Resource Area	Temporary Impact	Impact Area	Description
Buffer Zone	Temporary	145 sf	Temporary trenching and installation of subsurface piping
	Permanent	0	None proposed
Bank	Temporary	0	No proposed work on Inland Bank nor MAHWL
	Permanent	0	No proposed work on Inland Bank nor MAHWL
BLSF	Temporary	~1,142 sf	Trenching, excavation, installation of subsurface piping
	Permanent	0	No permanent impact nor fill within BLSF
0-100-ft Riverfront Area	Temporary	0	No temporary impacts proposed within the Riverfront Area
	Permanent	0	No permanent impacts proposed within Riverfront Area
100-200-ft Riverfront Area	Temporary	~4,715 sf	Trenching, excavation, installation of subsurface piping and repaving
	Permanent	0	The proposed piping will be buried and will not result in a permanent impact to Riverfront Area



3.1 ANTICIPATED CONSTRUCTION SCHEDULE

The Applicant has targeted late-Summer and early-Fall of 2025 to commence with the proposed Site improvements. However, the exact time of construction is pending having permits in hand. Regardless of the start date, the Project work is intended to be completed in in 2025 or latest Spring of 2026.

4.0 REGULATORY COMPLIANCE

4.1 WETLANDS PROTECTION ACT AND REGULATIONS

The WPA regulations outline general performance standards for each wetland resource area that may be affected by a project. For the purposes of this Project, Bordering Land Subject to Flooding and Riverfront Area will be temporarily impacted by proposed Project activities. The general performance standards for Bordering Land Subject to Flooding and Riverfront Area are described in 310 CMR 10.57(4) and 310 CMR 10.58(4), respectively. Compliance with these performance standards is demonstrated in **Tables 3** and **4** below.

4.1.1 100-foot Buffer Zone

Work activities proposed within the 100-foot Buffer Zone consist of trenching and installation of subsurface piping. The WPA regulations and the Amesbury Wetlands Protection Ordinance outline the importance of the Buffer Zone to protect Wetland Resource Areas from adverse impacts. The WPA regulations at 310 CMR 10.02(2)(b)(1) list the factors to consider when measuring the potential for adverse impacts to resource areas to include the extent of the work, the proximity to the resource area, the need for erosion controls, and the measures employed to prevent adverse impacts to resource areas during and following the work. The Amesbury Wetlands Protection Ordinance at Section V.(D) states that buffer zones are important to the protection of other resource areas and adverse impacts from construction can include erosion, siltation, loss of groundwater recharge, poor water quality, and loss of wildlife habitat.

Based on the limited work activities proposed and the pre-existing conditions within the Buffer Zone, the implementation of Best Management Practices (BMPs) during construction, will serve to avoid any anticipated adverse impacts related to erosion, accumulation of silt or sediment, loss of groundwater recharge, effects to water quality or loss of wildlife habitat. Further the mitigation measures outlined in Section 5 of this NOI will contribute to the avoidance and minimization of impacts, if any.

4.1.2 Bordering Land Subject to Flooding (BLSF)

Select work activities are proposed within the isolated area of Zone A 100-year Floodplain (*aka* BLSF) shown in the FEMA figure above. The work is limited to temporary trenching within the existing landscape and walkway areas, removal of existing piping, installation of buried pipeline, backfill and repaving. There is no new fill or loss of flood storage volume proposed and the surface elevation will be returned to pre-construction conditions.

Table 3: Compliance with Performance Standards for Work in BLSF, 310 CMR 10.57(4)

WPA Reference	Performance Standard	Compliance	Proposed Project
310 CMR 10.57(4)(a)(1)	Compensatory storage shall be provided for all flood	N/A	The Project will not result in the loss of flood storage volume within BLSF and therefore no compensatory flood storage volume is proposed.



WPA Reference	Performance Standard	Compliance	Proposed Project
	storage volume that will be lost;		
310 CMR 10.57(4)(a)(2)	Provide compensatory storage that shall not restrict flows so as to cause an increase in flood stage or velocity;	N/A	No compensatory flood storage is required and no restriction of flow is proposed therefore there will be no increase in flood stage or velocity resulting from the temporary activities proposed within BLSF.
310 CMR 10.57(4)(a)(3)	Shall not impair the BLSF capacity to provide important wildlife habitat functions including vernal pool habitat;	Yes	The portion of BLSF where the work is proposed consists of a brick paver walkway and landscaped islands. No important wildlife habitat functions will be impaired within BLSF.

4.1.3 Riverfront Area

The proposed Project qualifies for review under 310 CMR 10.58(5), *Redevelopment within Previously Developed Riverfront Areas* based on the presence of previous development, buildings and asphalt parking areas, which represent degraded impervious cover within the Riverfront Area that existed on or before August 7, 1996, according to historic aerial imagery available from MassGIS (**Figure 2**). Similar to BLSF resource area, select work activities are proposed within the outer riparian zone of Riverfront Area. The Riverfront Area where work is proposed consists of brick paver walkway areas and landscaped islands. The work is limited to temporary trenching within the walkways, removal of existing piping, installation of underground drainage piping, backfill and site restoration.

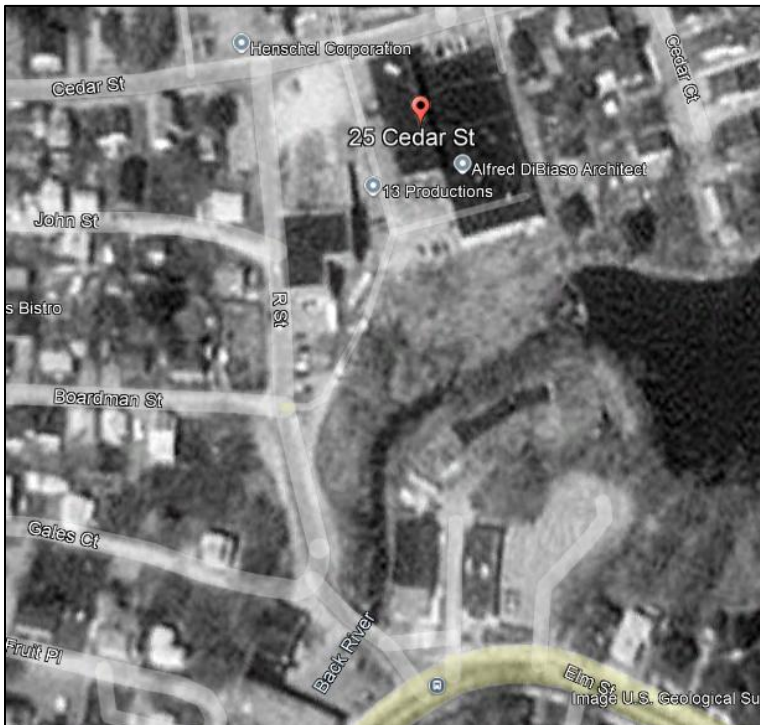


Figure 2: MassGIS 1992 Aerial Photograph, Amesbury, MA

Source: MassGIS, 2025

**Stormwater Management & Drainage Improvement
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GZA prepared a Stormwater Management Report that demonstrates compliance with the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards (see Appendix D). The proposed stormwater management system to convey roof runoff has been designed to implement stormwater best management practices (BMPs) to convey stormwater runoff in accordance with the Massachusetts Stormwater Handbook, revised 2008 (Design Manual) and the current edition of Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Area (Erosion Control Handbook), revised 2003.

The proposed design includes no increase of impervious surfaces and reduces runoff being directed into the municipality's stormwater system. Drainage paths have been slightly altered with the improvements to the conveyance system, however ultimately the stormwater in the existing and proposed condition discharges to the Back River, as is the current condition. GZA explored the possibility of on-site infiltration to alleviate the inundation and flooding, however, the soils and subsurface conditions are not suitable.

Please refer to **Section 4.2.1.2** for an expanded discussion on the consideration of on-site infiltration.

The MassDEP Design Manual, Volume 1, Chapter 1, entitled: "Storm Water Management Standards" requires that stormwater management systems associated with proposed redevelopment projects meet certain stormwater management performance standards. The GZA Stormwater Management Report (see **Appendix D**) summarizes the applicability of each stormwater management performance standard and describes how the Project meets each standard that applies.

Table 4: Compliance with Performance Standards for Riverfront Area, 310 CMR 10.58(5)

WPA Reference	Performance Standard	Compliance	Proposed Project
310 CMR 10.58(5)(a)	Proposed work shall result in an improvement over existing conditions of the capacity of the RA to protect the interests of the Act;	Yes	The Project is compliant with the Redevelopment provisions in 310 CMR 10.58(5) and involves temporary construction activities within previous degraded areas within the Riverfront Area. All temporarily disturbed areas within the Riverfront Area will be restored and stabilized.
310 CMR 10.58(5)(b)	Stormwater management is provided according to the standards established by the Department;	Yes	The Project does not introduce a new point source discharge. A Stormwater Management Report is provided in Appendix D.
310 CMR 10.58(5)(c)	Within 200-foot RA, proposed work shall not be located closer to the river than existing conditions or 100 feet, whichever is less; or not closer than existing conditions, except in accordance with 310 CMR 10.58(5)(f) or (g).	Yes	Temporary construction activities are proposed within the outer riparian zone (100-200 ft) of the Riverfront Area, which consist predominantly of asphalt parking lot, buildings and landscaped areas. There are no activities proposed within the inner riparian zone (0-100 ft) of the Riverfront Area.



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WPA Reference	Performance Standard	Compliance	Proposed Project
310 CMR 10.58(5)(d)	Proposed work, including expansion of existing structures, shall be located outside the RA or toward the RA boundary, except in accordance with 310 CMR 10.58(5)(f) or (g);	Yes	There are no new aboveground structures proposed. Subsurface drainage pipes will be removed and replaced, and temporarily disturbed areas within the Riverfront Area will be restored and stabilized.
310 CMR 10.58(5)(e)	The area of proposed work shall not exceed the amount of degraded area, provided that the proposed work may alter up to 10% if the degraded area is less than 10% of the RA, except in accordance with 310 CMR 10.58(5)(f) or (g);	Yes	The Project is compliant with the Redevelopment provisions in 310 CMR 10.58(5). The total amount of Riverfront Area on the Site is ~90,892 sf. The amount of previously degraded (developed) area within the Riverfront Area is ~37,048 sf. This represents ~40% of the existing Riverfront Area on the Site is previously disturbed or degraded. The total amount of temporary disturbance proposed within Riverfront Area is ~4,715 sf. The amount of proposed temporary disturbance does not exceed the amount of degraded area, nor does it approach 10% of the Riverfront Area on the Site.
310 CMR 10.58(5)(f)	When an applicant proposes restoration of degraded RA, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), and (e) at a ratio of 1:1;	N/A	Proposed work does not involve the addition of impervious area within the Riverfront Area, therefore, this performance standard does not apply.
310 CMR 10.58(5)(g)	When an applicant proposes mitigation in the RA, alteration may be allowed notwithstanding the criteria of CMR 10.58(5)(c), (d), and (e) at a ratio of 2:1;	N/A	Proposed work does not involve the addition of impervious area within the Riverfront Area, therefore, this performance standard does not apply.
310 CMR 10.58(5)(h)	A continuing condition prohibiting further alteration within the restoration or mitigation area.	N/A	Proposed work does not include work activities nor impacts that would require restoration or mitigation of Riverfront Area.

4.2 ALTERNATIVES ANALYSIS

4.2.1 Alternatives Analysis for Work Activities within the 200-foot Riverfront Area

The 200-foot Riverfront Area is established from measuring 200-foot horizontally from the MAHML of the Back River. The Project Site Plans (see **Stormwater Management Report, Site Plans, Appendix D**) depict the 200-foot Riverfront Area along with the boundaries of the inner and outer riparian zones.

The purpose of the proposed Project is to refurbish and improve the existing roof drainage system associated with the residential building #2 and to improve stormwater conveyance on-site. The regulations at 310 CMR 10.58(5) allow for the “Redevelopment within Previously Developed Riverfront Areas” for those sites that contain areas degraded prior to August 7, 1996, by impervious surfaces from existing structures or pavement, absence of topsoil, junkyards or abandoned

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dumping grounds - for which this Site qualifies. A review of the Massachusetts Geographic Information System (MassGIS) aerial photography shows that the site was developed pre-1996. MassGIS has a 1992 aerial photograph that depicts existing development, buildings and presumably asphalt parking areas (**see Figure 2**). At the request of the Amesbury Conservation Commission through the issuance of a Determination of Applicability, the Applicant has prepared the below-referenced alternatives analysis.

Under the Riverfront Area general performance standards, the scope of alternatives under consideration shall be commensurate with the type and size of the project. The applicant shall demonstrate that there are no practicable and substantially equivalent economic alternatives, with less adverse effects on the interests identified in the Act. The general performance standards at 310 CMR 10.58(4)(d) state that “If there is not a 100-foot wide area of undisturbed vegetation within the riverfront area, existing vegetative cover shall be preserved or extended to the maximum extent feasible to approximate a 100-foot wide corridor of natural vegetation.”

The Amesbury Wetlands Protection Ordinance further defines practicable alternative as an alternative which is reasonably available and capable of being done after taking into consideration the proposed property used, overall project purpose, logistics, existing technology, costs of the alternatives, and overall projects costs.

4.2.1.1 Alternative 1 – No Action

The no-action alternative would leave the existing roof drainage system in its current condition, not meeting the intended stormwater and associated safety improvements. The current condition after a period of heavy precipitation creates flooding on the exterior and interior of building #2. The areas outside of the building become inundated with water, and during winter conditions, ice forms creating a hazardous condition for pedestrians and vehicles traveling in the parking area. The No Action alternative is not an acceptable alternative for replacing and improving the poorly performing roof drainage system. For these reasons the no-action alternative was dismissed from further consideration.

4.2.1.2 Alternative 2 – Relocate a Portion of the Stormwater Conveyance System

On behalf of the Applicant, GZA performed field investigations to determine if it would be feasible to relocate some elements of the stormwater conveyance system which is to receive roof drainage and to evaluate the possibility of on-site infiltration. GZA performed pipe inspections of the existing stormwater conveyance system, conducted limited topographic survey, and completed soil test pit evaluations. The on-site soils above groundwater consist of udorthents-urban land complex. This soil complex consists of soils that have been disturbed by cutting or filling and contain debris (such as brick, concrete, asphalt, and metal), and areas that are covered by buildings and pavement. The MassDEP Stormwater Handbook does not recommend the use of udorthents-urban land soils for infiltration of roof drainage or other forms of stormwater. Because of the lack of native, unimpacted soils on-Site, infiltration of the roof drainage is not a feasible option and therefore this alternative was dismissed.

4.2.1.3 Alternative 3 – Replace and Refurbish the Existing Stormwater System

The Applicant has considered an alternative that would involve a replacement of the existing stormwater collection and conveyance system on the Site. This alternative would involve participation from the City of Amesbury and possibly other abutting properties because the inundation and flooding on the Site is also caused by contributing off-site run-on to the Site from adjacent public roadways including “R” Street, Boardman Street, John Street and a portion of Cedar Street. Flooding may also be caused by back-water flooding entering the 2x4 foot box culvert and the two 18-inch RCP outlets located at the southern end of the site. Managing and addressing run-on from off-site locations would require input, funding and manpower from the City of Amesbury. The Applicant is willing to meet with the Mayor, City Council and

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Amesbury Public Works to determine if a long-term feasible solution can be identified. However, this alternative will not repair the current need to correct and improve the roof drainage improvements to resolve the flooding and safety concerns, and the monetary costs of continued response to flooding in the residential building #2. For these reasons, this alternative was dismissed from consideration.

4.2.1.4 Alternative 4 – Stormwater Management and Drainage Improvements (Preferred)

The Client is proposing stormwater management and drainage improvements to correct drainage and flooding issues on privately-owned property, which is occupied by two residential units. The Project, in summary, consists of replacing the existing roof drainage system at building #2 and connecting the new roof drainage collection system into the existing and dedicated on-site stormwater conveyance system. The proposed Project improves the on-site drainage and reduces surface inundation on the Site. The proposed Project was determined to be the most economical and time-sensitive solution that met the identified purpose and need.

5.0 MITIGATION**5.1 MITIGATION MEASURES**

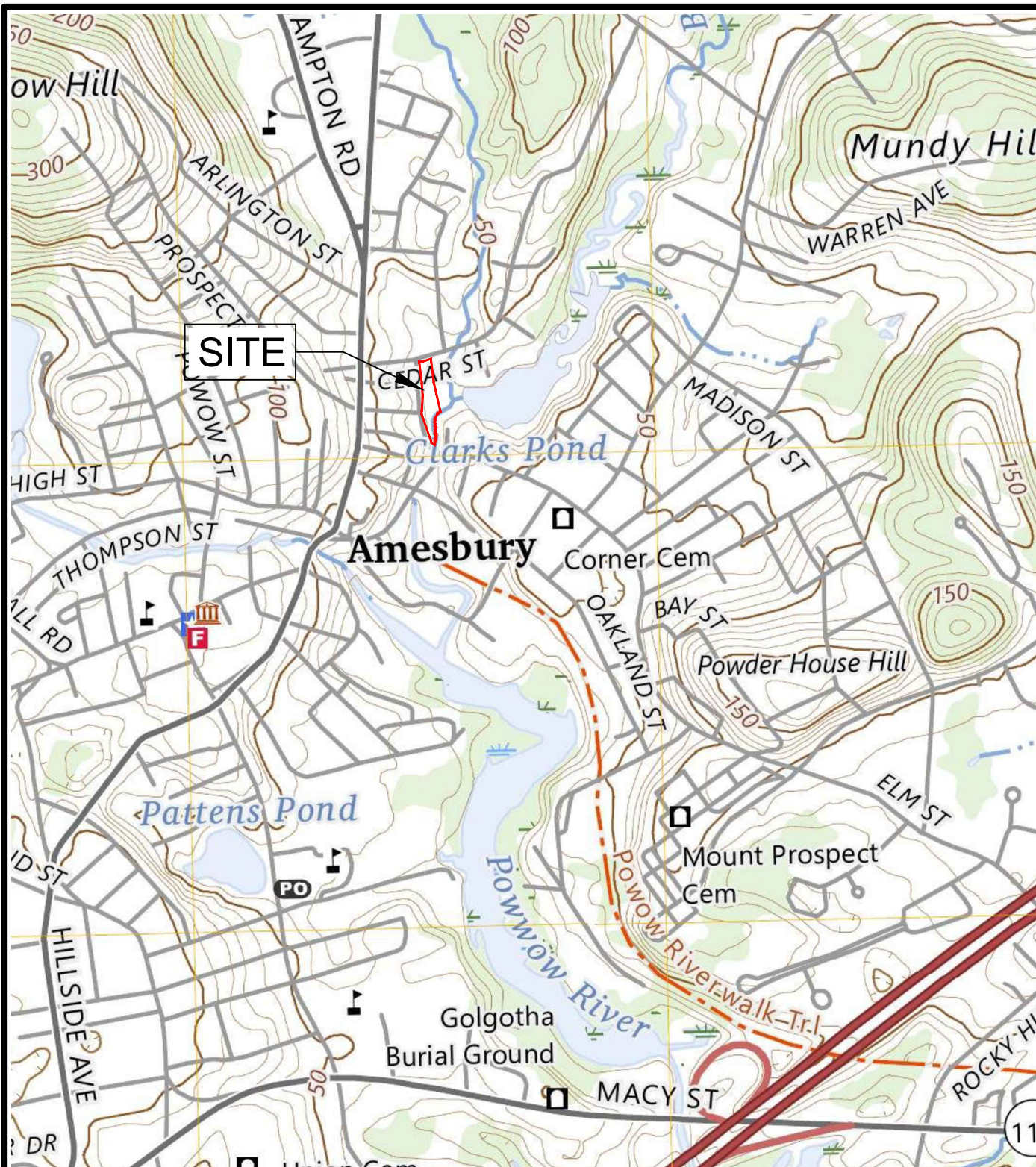
During the construction-phase of the Project, construction best management practices (BMPs) will be implemented to avoid and/ or minimize impacts to adjacent wetland resource areas and receiving waters. The following measures are committed to and will be implemented to avoid adverse impacts:

- Clearly mark the limits of disturbance prior to construction
- Install erosion controls (“filter sock”) on the downgradient sides of proposed trenching and excavation
- Install temporary catch basin inlet protection within the parking area
- Maintain an inventory of oil absorbent socks on-site should any oily sheen or fuel be encountered on the parking areas
- Encompass temporary stockpiled soils with filter socks should the stockpiles remain in-place for a long duration of time
- Implement the MassDEP Stormwater Management Standards to the existing on-site stormwater system
- Remove any excess soils or materials generated from construction off-site and properly dispose in accordance with federal, state and local regulations
- Conduct routine inspections during construction to evaluate the effectiveness of the erosion controls and to assess the condition of the undisturbed portions of the Buffer Zone, Riverfront Area, and the Back River.
- Perform a final inspection of the existing vegetated corridor within the 100-foot Buffer Zone and Riverfront Area to ensure that there is adequate vegetative cover and to confirm that there are no observable signs of erosion or deposition of silt or sediment

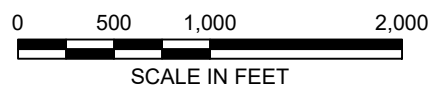


Appendix A

USGS Locus Map and Existing Conditions Plan



NOTE:
1. BASE MAP WAS OBTAINED FROM USGS 7.5-MINUTE
SERIES NEWBURYPORT WEST QUADRANGLE 2024.



UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

LOFT'S AT CLARK'S POND
STORMWATER MANAGEMENT &
DRAINAGE IMPROVEMENT DESIGN
25 CEDAR ST, AMESBURY MA 01913

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
LOFT'S AT CLARK'S POND
HOMEOWNER ASSOCIATION
25 CEDAR STREET
AMESBURY, MA 01913

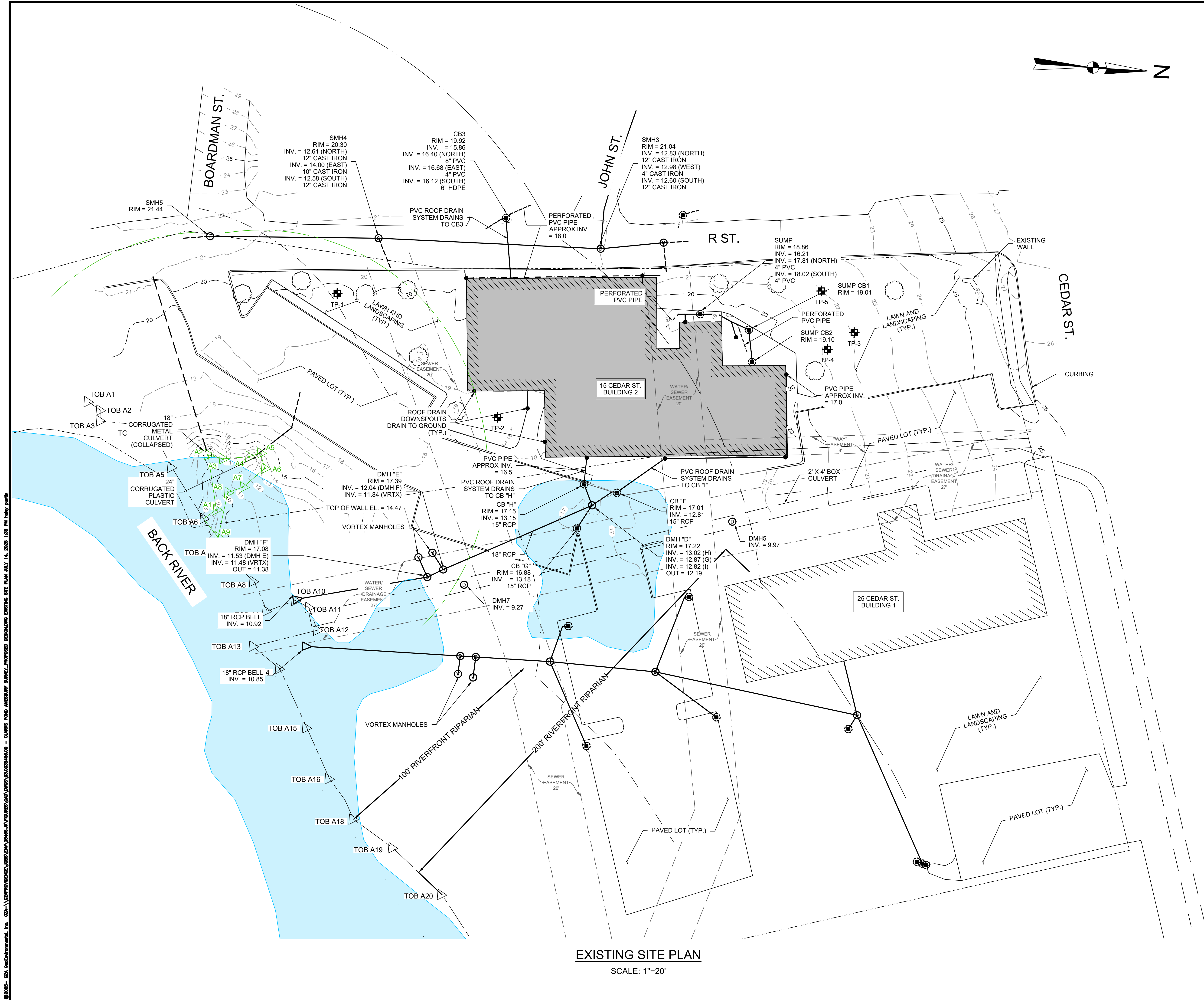
LOCUS PLAN

PROJ MGR: JK	REVIEWED BY: JK
DESIGNED BY: HP	DRAWN BY: HP
DATE: JULY 2025	PROJECT NO. 03.0035466.00

CHECKED BY: TG	SCALE: AS NOTED
REVISION NO. -	

FIGURE 1
SHEET NO.

© 2025 - GZA GeoEnvironmental, Inc. GZA-\\G2APROJECTS\G2A\G2A\PROJECTS\CLARKS_POND\STORMWATER\EXISTING SITE PLAN JULY 14, 2025 1:38 PM hwy.pdw



LEGEND

- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- APPROXIMATE PROPERTY LINE
- ROOF DRAIN SYSTEM PIPING
- ROOF DRAIN SYSTEM PERFORATED PIPING
- TOP OF BANK WITH FLAGS
- 100-FOOT RIVERFRONT AREA
- 200-FOOT RIVERFRONT AREA
- FEMA 100-YEAR FLOOD ZONE (ZONE A)
(BORDERING LAND SUBJECT TO FLOODING)
- WETLAND FLAGS
- 100-FOOT BUFFER ZONE
- EASEMENTS
- EXISTING DRAIN MANHOLE
- EXISTING DRAIN MANHOLE
- EXISTING DRAIN MANHOLE
- EXISTING CATCH BASIN
- ROOF DRAIN DOWNSPOUT
- EXISTING TREE
- TEST PITS

GENERAL NOTES

- HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE NAD83, US FEET.
- ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).
- LIMITED TOPOGRAPHIC SURVEY PERFORMED BY GZA GEOENVIRONMENTAL, INC., ON NOVEMBER 13, 2024 AND REPRESENTS CONDITIONS AT THE TIME OF THE SURVEY.
- APPROXIMATE PROPERTY LINES AND AERIAL IMAGERY DOWNLOADED FROM MASSGIS'S MASSMAPPER ONLINE INTERACTIVE MAP.
- STORMWATER SYSTEM INFORMATION PRODUCED FROM DIGITAL DOCUMENT PRODUCED BY MILLENNIUM ENGINEERING, INC. TITLED "AS-BUILT PLAN" DATED AUGUST 2008.
- DRAWINGS ARE NOT CONSIDERED A LAND SURVEY.
- TEST PITS WERE PERFORMED BY M.T. MAYO CORPORATION ON JULY 1, 2025 AND OBSERVED BY GZA.
- TOP OF BANK DELINEATION WAS PERFORMED BY GZA ON JULY 1, 2025.

0 10 20 40
SCALE IN FEET

NO.			
ISSUE/DESCRIPTION		BY	DATE
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.			
LOFT'S AT CLARKS POND STORMWATER MANAGEMENT & DRAINAGE IMPROVEMENT DESIGN 15 CEDAR ST, AMESBURY MA 01913			
EXISTING SITE PLAN			
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: LOFT'S AT CLARKS POND HOMEOWNER ASSOCIATION 15 CEDAR STREET AMESBURY, MA 01913	
PROJ MGR: JK	REVIEWED BY: JK	CHECKED BY: ABB	DRAWING
DESIGNED BY: JZ	DRAWN BY: EJW	SCALE: AS SHOWN	1
DATE: July 2025	PROJECT NO: 03.0035466.00	REVISION NO:	SHEET NO.



Appendix B
WPA NOI Form 3



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

Important:

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



Note:
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

15 & 25 Cedar Street

a. Street Address

Amesbury

b. City/Town

01913

c. Zip Code

Latitude and Longitude:

40

f. Assessors Map/Plat Number

42.86071

d. Latitude

-70.92766

e. Longitude

236, 237 & 238

g. Parcel /Lot Number

2. Applicant:

Anne

a. First Name

Verret-Speck, Trustee

b. Last Name

The Lofts at Clarks Pond Homeowner Association

c. Organization

15 Cedar Street

d. Street Address

Amesbury

e. City/Town

MA

f. State

01913

g. Zip Code

978-375-5546

h. Phone Number

i. Fax Number

verretspeck@gmail.com

j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

The Lofts at Clarks Pond Condominium Trust

a. First Name

b. Last Name

c/o Affinity Realty

c. Organization

63 Atlantic Avenue

d. Street Address

Boston

e. City/Town

MA

f. State

02110

g. Zip Code

857-239-8280 ext

670

i. Fax Number

Stephen@affinityrealty.com

j. Email address

4. Representative (if any):

Jaclyn

a. First Name

Kaehler, P.E.

b. Last Name

GZA GeoEnvironmental, Inc.

c. Company

144 Elm Street

d. Street Address

Amesbury

e. City/Town

MA

f. State

01913

g. Zip Code

401.427.2749

h. Phone Number

i. Fax Number

jaclyn.kaehler@gza.com

j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

165

a. Total Fee Paid

70

b. State Fee Paid

95

c. City/Town Fee Paid



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

A. General Information (continued)

6. General Project Description:

Perform stormwater management and drainage improvements at an existing residential facility

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

- | | |
|---|---|
| 1. ☐ Single Family Home | 2. ☐ Residential Subdivision |
| 3. ☐ Commercial/Industrial | 4. ☐ Dock/Pier |
| 5. ☐ Utilities | 6. ☐ Coastal engineering Structure |
| 7. ☐ Agriculture (e.g., cranberries, forestry) | 8. ☐ Transportation |
| 9. ☒ Other | |

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR 10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Essex

a. County

39356 / 40680

c. Book

b. Certificate # (if registered land)

0268 / 0039

d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

- ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☒ Bordering Land Subject to Flooding	1142 1. square feet 0 3. cubic feet of flood storage lost	1142 2. square feet 0 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☒ Riverfront Area	Back River (inland) 1. Name of Waterway (if available) - specify coastal or inland	

2. Width of Riverfront Area (check one):

- ☐ 25 ft. - Designated Densely Developed Areas only
- ☐ 100 ft. - New agricultural projects only
- ☒ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 90892
square feet

4. Proposed alteration of the Riverfront Area:

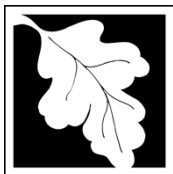
4715 0 4715
a. total square feet b. square feet within 100 ft. c. square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI? ☒ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f.** above.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet	
	2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment
	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet	
	2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☐ Restoration/Enhancement

If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

C. Other Applicable Standards and Requirements

- ☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

a. ☐ Yes ☒ No

If yes, include proof of mailing or hand delivery of NOI to:

Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

August 1, 2021

b. Date of map

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

- c. Submit Supplemental Information for Endangered Species Review*

1. ☐ Percentage/acreage of property to be altered:

(a) within wetland Resource Area

percentage/acreage

(b) outside Resource Area

percentage/acreage

2. ☐ Assessor's Map or right-of-way plan of site

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

(a) ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <https://www.mass.gov/endangered-species-act-mesa-regulatory-review>).

Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

C. Other Applicable Standards and Requirements (cont'd)

- (c) ☐ MESA filing fee (fee information available at <https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review>).

Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

Projects altering 10 or more acres of land, also submit:

- (d) ☐ Vegetation cover type map of site

- (e) ☐ Project plans showing Priority & Estimated Habitat boundaries

- (f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, <https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat>; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing.

a. NHESP Tracking #

b. Date submitted to NHESP

3. ☐ Separate MESA review completed.

Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

- a. ☐ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Bourne to Rhode Island border, and the Cape & Islands:

North Shore - Plymouth to New Hampshire border:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: dmf.envreview-south@mass.gov

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: dmf.envreview-north@mass.gov

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

- c. ☐ Is this an aquaculture project?

- d. ☐ Yes ☐ No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

C. Other Applicable Standards and Requirements (cont'd)

Online Users:

Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
 a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.
 b. ACEC
5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
 a. ☐ Yes ☒ No
6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
 a. ☐ Yes ☒ No
7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
 a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
 1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
 2. ☒ A portion of the site constitutes redevelopment
 3. ☐ Proprietary BMPs are included in the Stormwater Management System.
- b. ☐ No. Check why the project is exempt:
 1. ☐ Single-family house
 2. ☐ Emergency road repair
 3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

- ☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

D. Additional Information (cont'd)

3. ☒ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.
4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

<u>Proposed Site Plan - Lofts at Clarks Pond</u>	
a. Plan Title	
<u>GZA GeoEnvironmental, Inc.</u>	
b. Prepared By	c. Signed and Stamped by
<u></u>	<u></u>
d. Final Revision Date	e. Scale
<u></u>	<u></u>
f. Additional Plan or Document Title	g. Date
<u></u>	<u>July 2025</u>
5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.
6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
8. ☒ Attach NOI Wetland Fee Transmittal Form
9. ☒ Attach Stormwater Report, if needed.

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

On-line payment

2. Municipal Check Number

3. Check date

On-line payment

4. State Check Number

5. Check date

Jaclyn

Kaehler

6. Payor name on check: First Name

7. Payor name on check: Last Name



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant

2. Date

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any)

6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.



Appendix C

Wetland Delineation Report



Known for excellence.
Built on trust.

GEOTECHNICAL

ENVIRONMENTAL

ECOLOGICAL

WATER

CONSTRUCTION
MANAGEMENT

5 Commerce Park North
Suite 201
Bedford, NH 03110
T: 603.623.3600
F: 603.624.9463
www.gza.com



July 7, 2025
File No. 03.0035466.00

The Lofts at Clark's Pond Condominium Trust
c/o Nick Beck, Trustee
15 Cedar Street
Amesbury, Massachusetts 01913

Re: Wetland Delineation Report
Lofts at Clarks Pond Site
25 Cedar Street, Amesbury MA, 01913
Amesbury, Massachusetts

Dear Ms. Verret-Speck:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide this letter report detailing completion of wetland delineation services for the Lofts at Clarks Pond site located at 25 Cedar Street within Tax Map 40, Lots 236-E and 237-P in Amesbury, Massachusetts ("Site"). GZA understands the Lofts at Clarks Pond Homeowners Association is proposing maintenance and upgrades to the existing stormwater management system on the property. The Site currently contains residential housing units and associated parking lots for residents. The Site is bordered by the Back River to the south, with Clarks Pond to the southeast, with residential and commercial properties to the east, north and west (see **Figure 1 – Locus Plan**).

The wetland identification and delineation fieldwork was performed by Mr. Justin Sherman, Wetland Scientist on July 1, 2025. The purpose of the work was to evaluate and mark the boundaries of wetlands in the vicinity of the proposed work on Site. GZA understands that the data from the wetland delineation assessment will be used in permitting submittals. GZA located wetland flags and data points in the field using a Trimble Catalyst DA2 Global Navigational Satellite System (GNSS) Receiver capable of accuracy up to 60 centimeters on July 1, 2025. GZA has provided the attached **Figure 2 – Existing Conditions Plan** documenting the existing Site conditions and wetland flag locations on site. This report is subject to **Appendix A – Limitations**.

The wetland delineation was conducted in accordance with the *Massachusetts Handbook for Delineating Bordering Vegetated Wetlands*, Second Edition, Jackson, S.D, D.J. Henson, D. Hilgeman, M. McHugh, and L. Rhodes, 2022, Boston, MA, Massachusetts Department of Environmental Protection, Bureau of Water resources, Wetlands Program; the *Corps of Engineers Wetland Delineation Manual*, Environmental Laboratory, Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS; the *2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, ed. J.S. Wakely, R.W. Lichvar, and C. C. Noble; ERDC/EL TR-12-1. Vicksburg, MS, U.S. Army Engineer Research and Development Center (Version 2.0), the *2022 National Wetland Plant List*, Version 3.6.; and the *Field Indicators of Hydric Soils in the United States*, Version 9, and the *Field Indicators for Identifying Hydric Soils in New*



England. The wetland resource areas observed on the Site are presumed to be under the jurisdiction of the Massachusetts Wetlands Protection Act (WPA; M.G.L. c. 131, § 40), its companion regulations (310 CMR 10.00), the Amesbury Wetlands Protection Ordinance, and Section 404 of the federal Clean Water Act as administered by the U.S. Army Corps of Engineers (Corps). Wetland boundaries on Site were witnessed with pink and black flagging on vegetation at approximately 50-foot intervals. GZA delineated the wetland resource areas, including Bordering Vegetated Wetland (BVW), Bank/Mean Annual High Water Line (MAHWL) using the following flag series.

• Wetland A – Flag Series ○ MHW A1 (start open) – MHW A9 ○ MHW A12 – MHW A20 (stop open)
• Wetland B – Flag Series ○ A1 (connect MHW A5) – A2 (connect culvert) ○ A3 (connect culvert) – A5 (connect culvert) ○ A6 (connect culvert) – A9 (connect MHW A7)
• Wetland C – Flag Series ○ MHW A9 – MHW A10 (connect to headwall) ○ MHW A11 (connect to headwall) – MHW A12

The Site contains two riverine wetland systems, identified as Wetland A, and Wetland C, and one BVW identified as Wetland B (see **Table 1 below for details**). Wetland A is classified as a lower-perennial riverine system with an unconsolidated bottom and cobble-gravel substrate (R2UB1). Wetland B is classified as a palustrine, emergent wetland with persistent vegetation that is seasonally flooded/saturated with evidence of excavation (PEM1Ex). Wetland C is classified as an unknown-perennial riverine system with an unconsolidated bottom and cobble-gravel substrate (R5UB1). GZA also identified through a desktop review, the presence of Bordering Land Subject to Flooding (BLSF) and Riverfront Area as defined under the Massachusetts Wetlands Protection Act regulations 310 CMR 10.54(2), 10.55(2), 10.57(2)(a), and 10.58(2), respectively. Based on a desktop review performed by GZA, the Site is partially located within the mapped Federal Emergency Management Agency (FEMA) 100-year floodplain (Zone-A) of the Back River with a base flood elevation of 12 feet (ft.) National Geodetic Vertical Datum of 1929 (NGVD29). The FEMA floodplain mapped within the Site parcels are depicted on the Flood Insurance Rate Map (FIRM) Panel No. 25009C0106G dated July 8, 2025 (see **Appendix B**).

TABLE 1. WETLAND DELINEATION SUMMARY

Wetland Identification	Wetland Classification	Notes
Wetland A	R2UB1	Wetland A contains Back River, a perennial stream associated with Clarks Pond.
Wetland B	PEM1Ex	A stone lined stormwater drainage connected to the Back River.
Wetland C	R5UB1	A perennial stream that has been contained within a concrete box culvert. The system daylights and merges with the Back River on Site.

Key to Classifications:

P = palustrine wetland system

EM = emergent

1 = persistent

E = Seasonally flooded/saturated

R = riverine wetland system

2 = lower perennial

5 = unknown perennial

UB = unconsolidated bottom

1 = cobble-gravel

Modifiers:

x = excavated

Refer to **Appendix C – Wetlands Photo Log** for photographs of the Site and wetlands.



WETLAND A

Wetland A (Back River) borders the Site to the south (see **Figure 2 – Wetland Delineation Sketch**). The Back River is classified as a lower-perennial riverine system with an unconsolidated bottom and cobble-gravel substrate (R2UB1). Dominant vegetation upon the bank of the river includes jewel weed (*Impatiens capensis*), stinging nettle (*Urtica dioica*), Japanese knotweed (*Fallopia japonica*), tall meadow-rue (*Thalictrum pubescens*), oriental bittersweet (*Celastrus orbiculatus*), silky dogwood (*Swida amomum*), tree-of-heaven (*Ailanthus altissima*), and Norway maple (*Acer platanoides*).

As shown on FIRM Panel No. 250075 0002 B dated June 18, 1980, the 100-year floodplain elevation for the Back River is approximately 12-ft. The BLSF on site extend from the delineated MHW line, to the approximate 100-year floodplain elevation of 12-ft. The BLSF was approximated using FEMA's National Flood Hazard Layer to obtain the floodplain elevation.

As per 310 CMR 10.58(2)(a)(1)(a), Back River is a perennial stream with a Riverfront Area extending 200-ft. horizontally from the delineated Bank/MHW line.

WETLAND B

Wetland B contains a stone lined swale originating from two stormwater outfall culverts on site and connecting to the Back River between wetland flags MHW A5 and MHW A7 (see **Figure 2 – Existing Conditions Plan**). The area is lined with rip-rap as part of the original stormwater management design for the site. This feature can qualify as a "stormwater management feature" per the regulations because it functions as a "system for conveying, collecting, storing, discharging, recharging or treating stormwater on-site including stormwater best management practices, and any pipes and outlets intended to transport and discharge stormwater ...". This stormwater management system is a component of the Site's overall drainage system that is inspected, operated and maintained by the landowner. For the purposes of this NOI filing, we conservatively delineated this area as a BVW. The wetland is classified as a palustrine, emergent wetland with persistent vegetation that is seasonally flooded/saturated with evidence of excavation (PEM1Ex). Dominant vegetation observed within the wetland includes, jewel weed, purple stemmed aster (*Symphotrichum puniceum*), creeping buttercup (*Ranunculus repens*), multiflora rose (*Rosa multiflora*) Japanese knotweed (*Fallopia japonica*) and black raspberry (*Rubus occidentalis*). Soils within the wetland were limited to 9-inches, over restrictive stone/rip-rap. Due to the restriction, the soil depth was not sufficient to positively determine a hydric soil indicator, however the soils within the 9-inches exhibit a depleted matrix profile with the potential of meeting hydric soil indicator F3b. Wetland B has an associated 100-foot Buffer Zone.

GZA completed a USACE Wetland Determination Data Sheet within Wetland B (see **Appendix D – USACE Wetland Determination Data Sheets**).

WETLAND C

Wetland C contains a subsurface perennial stream contained within a concrete box culvert. The stream channel is subsurface, with an estimated footprint below the Site; however, it daylights and merges with the Back River between wetland flags MHW A9 and MHW A12 (see **Figure 2 – Existing Conditions Plan**). The stream is classified as an unknown-perennial riverine system with an unconsolidated bottom and cobble-gravel substrate (R5UB1) on Site. Dominant vegetation upon the daylighted banks are similar to the vegetation associated with Wetland A, including jewel weed, stinging nettle, tall meadow-rue, Virginia creeper (*Parthenocissus quinquefolia*), American elm (*Ulmus americana*), silky dogwood, tree-of-heaven, and Norway Maple.



GZA completed a USACE Wetland Determination Data Sheet within the adjacent upland above the bank of Wetland A (see **Appendix D – USACE Wetland Determination Data Sheet**).

Summary of Findings

GZA performed a field review and completed wetland delineation on Site within the limits of the proposed project. GZA delineated the Bank/MAHW of the two perennial streams observed on the Site. GZA observed and delineated one BVW resource connected to the Back River. GZA understands that the delineated Bank/MAHW resource areas include a 100-ft. jurisdictional Buffer Zone that extends landward from the delineated boundaries. A 200-ft. Riverfront Area resource also extends horizontally into the Site beginning from the delineated Bank/MAHW lines of the Back River. The BLSF (not field delineated) is defined by the approximately 12-ft. base flood elevation established by FEMA and the National Flood Insurance Study. The resource areas and their 100-ft. Buffer Zones are jurisdictional under the WPA and its companion regulations. The resources identified on Site are presumed to qualify as Waters of the U.S. and if confirmed would be regulated by the Corps under Section 404 of the Federal Clean Water Act.

Please feel free to contact Joe Rogers at 413-726-2109 or joseph.rogers@gza.com if you have any questions regarding this Wetland Delineation Report.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

A handwritten signature in black ink, appearing to read 'Justin Sherman'.

Justin Sherman, CWS, CESSWI
Wetland Scientist

A handwritten signature in blue ink, appearing to read 'Jackie Kaehler'.

Jackie Kaehler, P.E.
Project Manager

A handwritten signature in blue ink, appearing to read 'Joseph Rogers'.

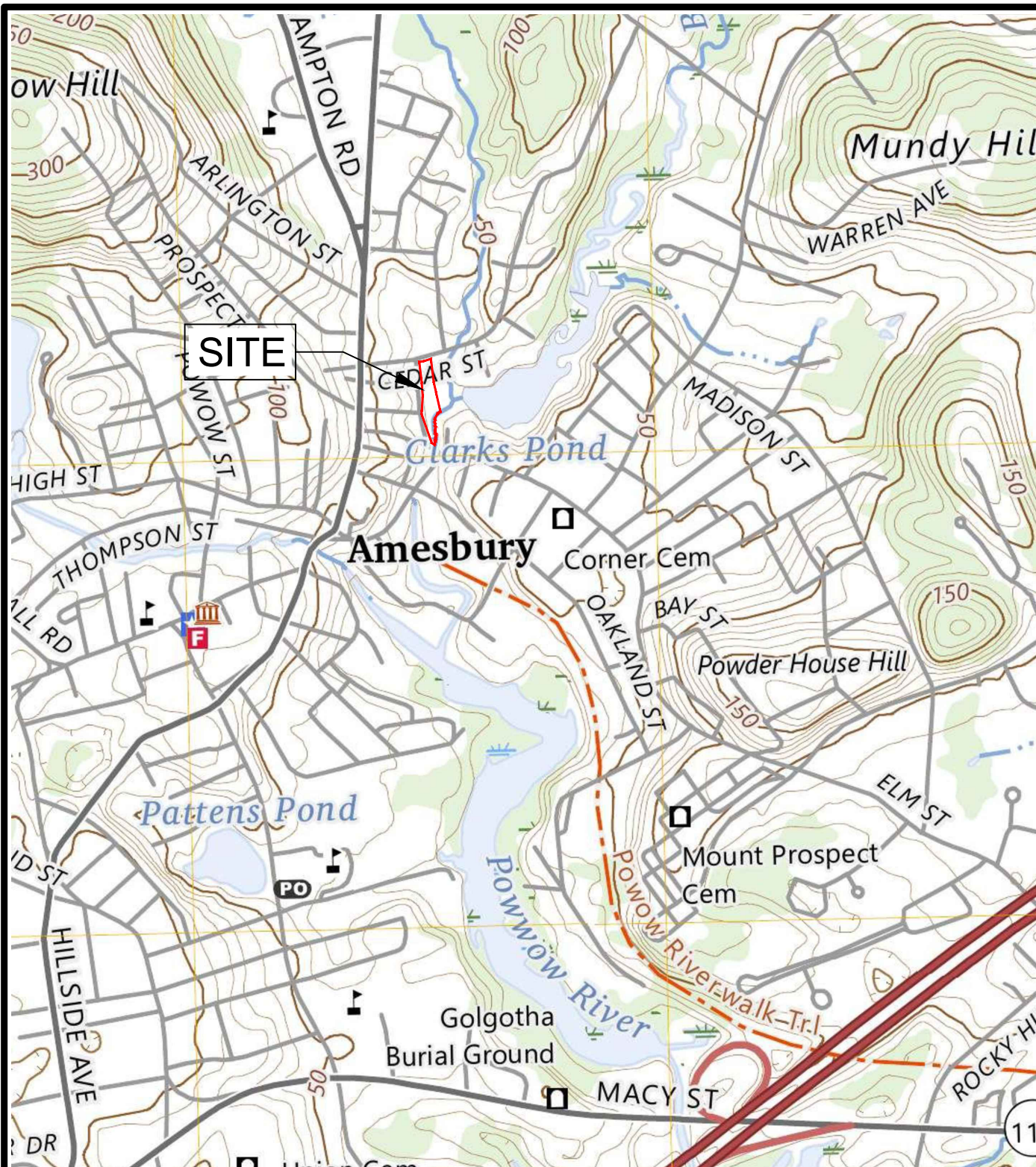
Joseph Rogers, PWS, CESSWI
Consultant Reviewer

JTS/TLT/JK

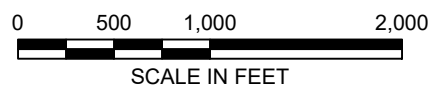
Attachments: Figure 1 – Locus Plan
Figure 2 – Existing Conditions Plan
Appendix A – Natural Resource Limitations
Appendix B – FEMA FIRM Panel
Appendix C – Wetlands Photo Log
Appendix D – USACE Wetland Determination Form



Figure 1 – Locus Plan



NOTE:
1. BASE MAP WAS OBTAINED FROM USGS 7.5-MINUTE
SERIES NEWBURYPORT WEST QUADRANGLE 2024.



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LOFT'S AT CLARK'S POND
STORMWATER MANAGEMENT &
DRAINAGE IMPROVEMENT DESIGN
25 CEDAR ST, AMESBURY MA 01913

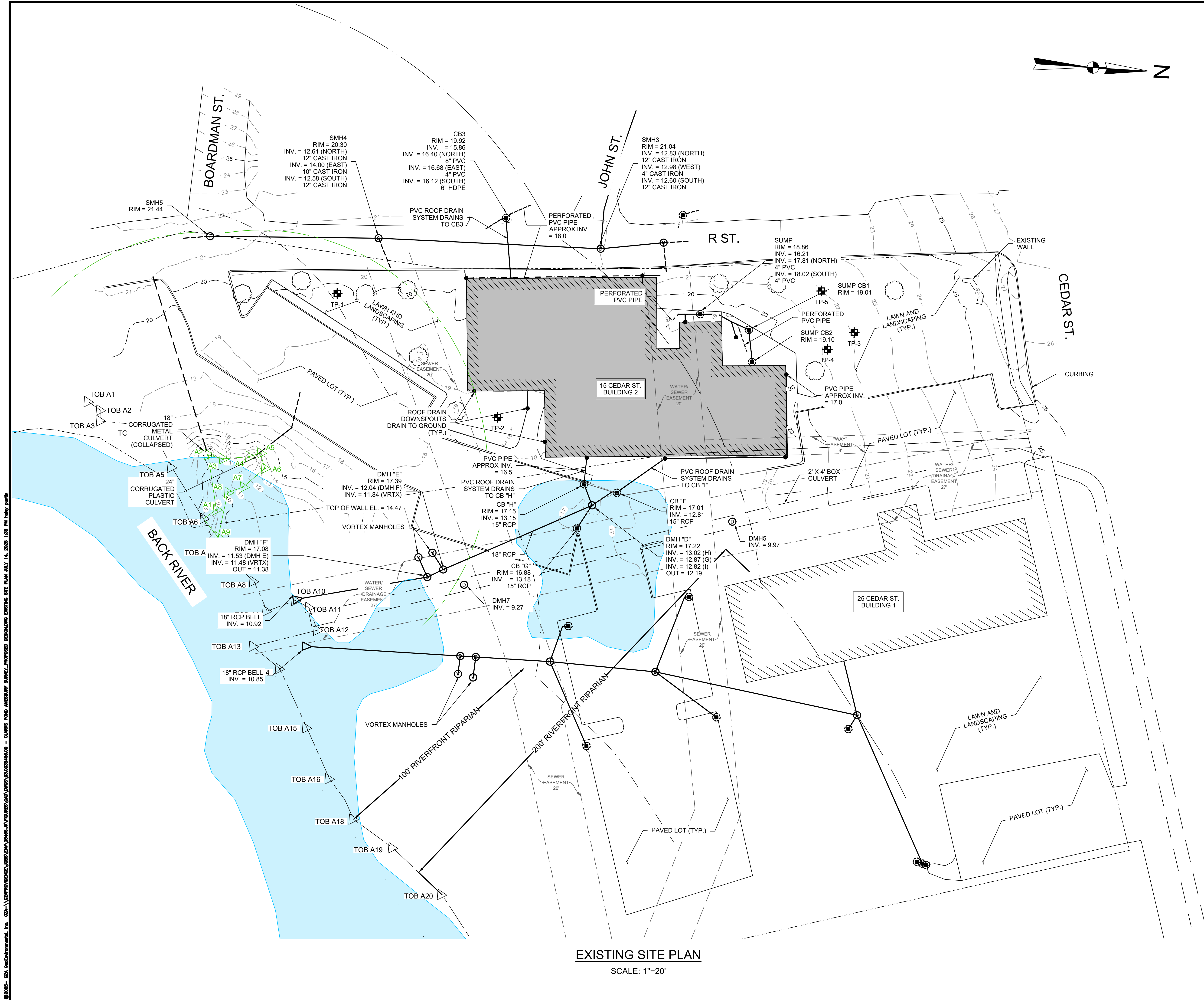
NO.	ISSUE/DESCRIPTION	BY	DATE
PREPARED BY:  GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: LOFT'S AT CLARK'S POND HOMEOWNER ASSOCIATION 25 CEDAR STREET AMESBURY, MA 01913	
PROJ MGR: JK	REVIEWED BY: JK	CHECKED BY: TG	FIGURE 1 SHEET NO.
DESIGNED BY: HP	DRAWN BY: HP	SCALE: AS NOTED	
DATE: JULY 2025	PROJECT NO. 03.0035466.00	REVISION NO. -	

LOCUS PLAN



Figure 2 – Existing Conditions Plan

© 2025 - GZA GeoEnvironmental, Inc. GZA \Users\GEO\Projects\03.0035466.00 - CLARKS POND ACCESSORY SURVEY\PROPOSED EXISTING SITE PLAN JULY 14, 2025 1:28 PM bobby.pauls



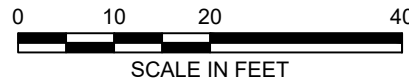
EXISTING SITE PLAN
SCALE: 1"=20'

LEGEND

- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- APPROXIMATE PROPERTY LINE
- ROOF DRAIN SYSTEM PIPING
- ROOF DRAIN SYSTEM PERFORATED PIPING
- TOP OF BANK WITH FLAGS
- 100-FOOT RIVERFRONT AREA
- 200-FOOT RIVERFRONT AREA
- FEMA 100-YEAR FLOOD ZONE (ZONE A)
(BORDERING LAND SUBJECT TO FLOODING)
- WETLAND FLAGS
- 100-FOOT BUFFER ZONE
- EASEMENTS
- EXISTING DRAIN MANHOLE
- EXISTING DRAIN MANHOLE
- EXISTING DRAIN MANHOLE
- EXISTING CATCH BASIN
- ROOF DRAIN DOWNSPOUT
- EXISTING TREE
- TEST PITS

GENERAL NOTES

- HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE NAD83, US FEET.
- ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).
- LIMITED TOPOGRAPHIC SURVEY PERFORMED BY GZA GEOENVIRONMENTAL, INC., ON NOVEMBER 13, 2024 AND REPRESENTS CONDITIONS AT THE TIME OF THE SURVEY.
- APPROXIMATE PROPERTY LINES AND AERIAL IMAGERY DOWNLOADED FROM MASSGIS'S MASSMAPPER ONLINE INTERACTIVE MAP.
- STORMWATER SYSTEM INFORMATION PRODUCED FROM DIGITAL DOCUMENT PRODUCED BY MILLENNIUM ENGINEERING, INC. TITLED "AS-BUILT PLAN" DATED AUGUST 2008.
- DRAWINGS ARE NOT CONSIDERED A LAND SURVEY.
- TEST PITS WERE PERFORMED BY M.T. MAYO CORPORATION ON JULY 1, 2025 AND OBSERVED BY GZA.
- TOP OF BANK DELINEATION WAS PERFORMED BY GZA ON JULY 1, 2025.



NO.	ISSUE/DESCRIPTION	BY	DATE
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LOFT'S AT CLARKS POND STORMWATER MANAGEMENT & DRAINAGE IMPROVEMENT DESIGN 15 CEDAR ST, AMESBURY MA 01913			
EXISTING SITE PLAN			
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: LOFT'S AT CLARKS POND HOMEOWNER ASSOCIATION 15 CEDAR STREET AMESBURY, MA 01913	
PROJ MGR: JK	REVIEWED BY: JK	CHECKED BY: ABB	DRAWING
DESIGNED BY: JZ	DRAWN BY: EJW	SCALE: AS SHOWN	1
DATE: July 2025	PROJECT NO: 03.0035466.00	REVISION NO:	SHEET NO.



Appendix A – Natural Resource Limitations



USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Lofts at Clarks Pond Condominium Trust ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

LIMITS TO OBSERVATIONS

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.
5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.
6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

RELIANCE ON INFORMATION FROM OTHERS

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

COMPLIANCE WITH REGULATIONS AND CODES

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.



NEW INFORMATION

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.

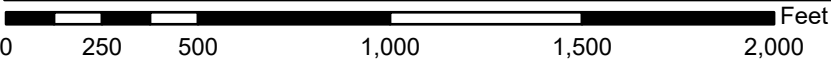
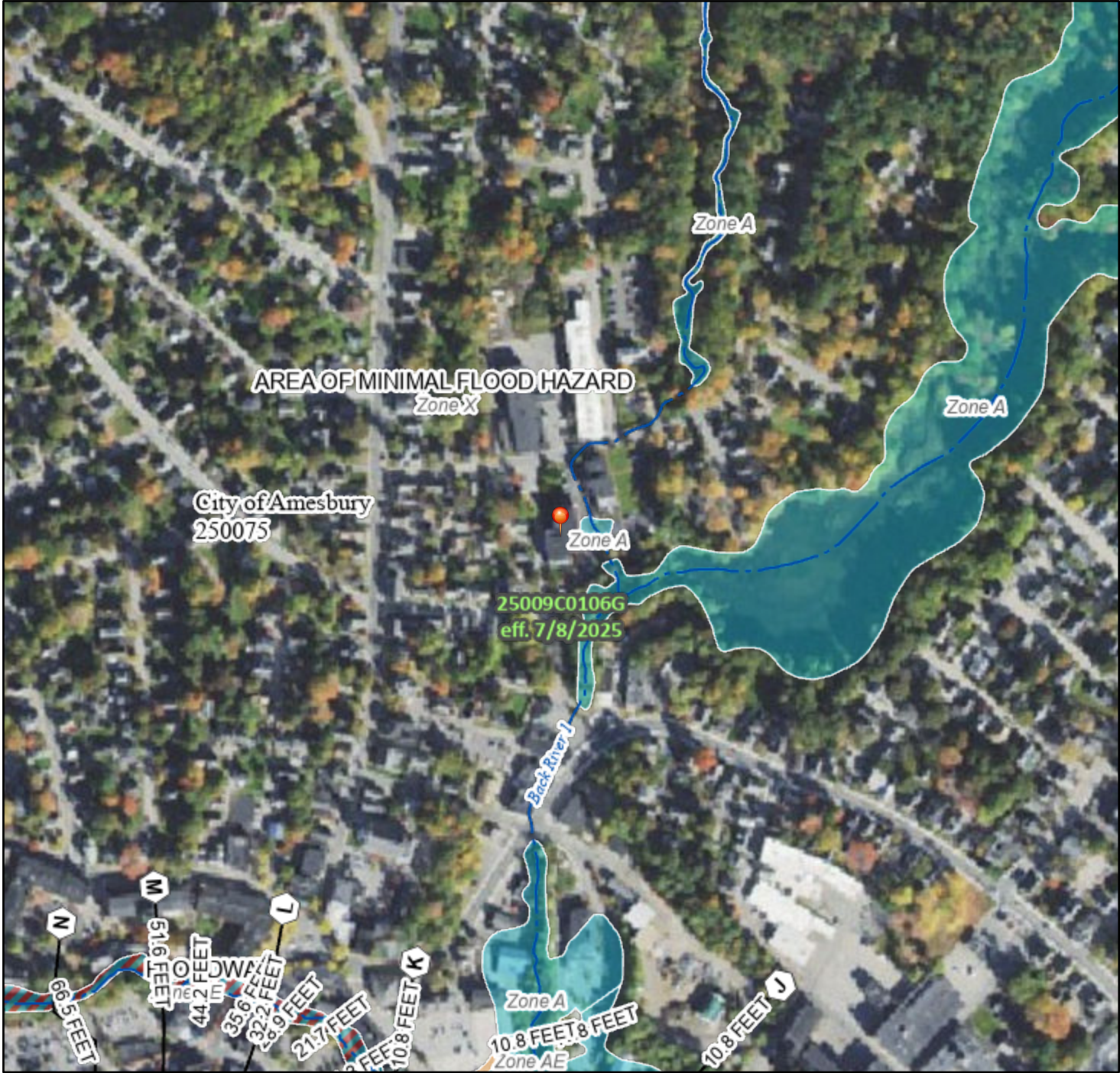


Appendix B – FEMA FIRM Map

National Flood Hazard Layer FIRMMette



70°55'59"W 42°51'52"N



1:6,000

70°55'21"W 42°51'25"N

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
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
OTHER FEATURES		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



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 7/11/2025 at 2:34 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



Appendix C – Wetlands Photo Log

PHOTO LOG
The Lofts at Clarks Pond
Amesbury, Massachusetts
Photos Taken: July 1, 2025



Photograph No. 1: A view looking southwest and downstream at Back River near flag MHW A1.



Photograph No. 2: An easterly view of the bank along Back River near flag TOB A6 and the existing stormwater swale.

PHOTO LOG
The Lofts at Clarks Pond
Amesbury, Massachusetts
Photos Taken: July 1, 2025



Photograph No. 3: A view of the existing culvert within the stormwater swale. Stormwater from the BMPs on Site outlet within the stone lined swale.



Photograph No. 4: A northerly view of the outlet of the subsurface stream (Wetland B) on Site.

PHOTO LOG
The Lofts at Clarks Pond
Amesbury, Massachusetts
Photos Taken: July 1, 2025



Photograph No. 5: A view of the confluence of the unnamed stream (Wetland B) and Back River (Wetland A) at flag TOB A9.



Photograph No. 6: A view looking upstream from flag MHW A16 towards Clarks Pond (off-Site).

PHOTO LOG
The Lofts at Clarks Pond
Amesbury, Massachusetts
Photos Taken: July 1, 2025



Photograph No. 7: A view looking downstream (southwest) within Back River near flag MHW A20



Photograph No. 8: A view looking south towards Back River within the USACE upland data plot location above the bank on Site.



Appendix D – USACE Wetland Determination Forms

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R	OMB Control #: 0710-0024, Exp: 9/30/2027 Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)
--	---

Project/Site: Clarks Pond Stormwater City/County: Amesbury Sampling Date: 7/1/25
Applicant/Owner: _____ State: MA Sampling Point: UPL-A
Investigator(s): JTS Section, Township, Range: _____
Landform (hillside, terrace, etc.): Riverbank terrace Local relief (concave, convex, none): concave Slope %: 0-3
Subregion (LRR or MLRA): LRR R, MLRA 144A Lat: 42.860384 Long: 70.927108 Datum: _____
Soil Map Unit Name: Merrimac fine sandy loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
---	---

Remarks: (Explain alternative procedures here or in a separate report.)
Data plot performed in the upland adjacent to Back River above flag TOB A15.

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <u>Surface Water (A1)</u> <u>Water-Stained Leaves (B9)</u> <u>High Water Table (A2)</u> <u>Aquatic Fauna (B13)</u> <u>Saturation (A3)</u> <u>Marl Deposits (B15)</u> <u>Water Marks (B1)</u> <u>Hydrogen Sulfide Odor (C1)</u> <u>Sediment Deposits (B2)</u> <u>Oxidized Rhizospheres on Living Roots (C3)</u> <u>Drift Deposits (B3)</u> <u>Presence of Reduced Iron (C4)</u> <u>Algal Mat or Crust (B4)</u> <u>Recent Iron Reduction in Tilled Soils (C6)</u> <u>Iron Deposits (B5)</u> <u>Thin Muck Surface (C7)</u> <u>Inundation Visible on Aerial Imagery (B7)</u> <u>Other (Explain in Remarks)</u> <u>Sparsely Vegetated Concave Surface (B8)</u>	<u>Secondary Indicators (minimum of two required)</u> <u>Surface Soil Cracks (B6)</u> <u>Drainage Patterns (B10)</u> <u>Moss Trim Lines (B16)</u> <u>Dry-Season Water Table (C2)</u> <u>Crayfish Burrows (C8)</u> <u>Saturation Visible on Aerial Imagery (C9)</u> <u>Stunted or Stressed Plants (D1)</u> <u>Geomorphic Position (D2)</u> <u>Shallow Aquitard (D3)</u> <u>Microtopographic Relief (D4)</u> <u>FAC-Neutral Test (D5)</u>
--	--

Field Observations: Surface Water Present? Yes _____ No <u>N</u> Depth (inches): _____ Water Table Present? Yes <u>Y</u> No _____ Depth (inches): <u>13</u> Saturation Present? Yes _____ No <u>N</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology is not present, parameter is not met.

VEGETATION – Use scientific names of plants.

 Sampling Point: UPL-A

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Acer platanoides</u>	<u>50</u>	<u>Yes</u>	<u>UPL</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>25.0%</u> (A/B)																
2. <u>Juglans nigra</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>																	
3. <u>Ulmus americana</u>	<u>5</u>	<u>No</u>	<u>FACW</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
		<u>70</u>	=Total Cover	Prevalence Index worksheet: <table style="width: 100%;"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>40</u></td> <td>x 2 = <u>80</u></td> </tr> <tr> <td>FAC species <u>0</u></td> <td>x 3 = <u>0</u></td> </tr> <tr> <td>FACU species <u>91</u></td> <td>x 4 = <u>364</u></td> </tr> <tr> <td>UPL species <u>50</u></td> <td>x 5 = <u>250</u></td> </tr> <tr> <td>Column Totals: <u>181</u> (A)</td> <td><u>694</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>3.83</u></td> </tr> </tbody> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>40</u>	x 2 = <u>80</u>	FAC species <u>0</u>	x 3 = <u>0</u>	FACU species <u>91</u>	x 4 = <u>364</u>	UPL species <u>50</u>	x 5 = <u>250</u>	Column Totals: <u>181</u> (A)	<u>694</u> (B)	Prevalence Index = B/A = <u>3.83</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>40</u>	x 2 = <u>80</u>																			
FAC species <u>0</u>	x 3 = <u>0</u>																			
FACU species <u>91</u>	x 4 = <u>364</u>																			
UPL species <u>50</u>	x 5 = <u>250</u>																			
Column Totals: <u>181</u> (A)	<u>694</u> (B)																			
Prevalence Index = B/A = <u>3.83</u>																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Juglans nigra</u>	<u>3</u>	<u>No</u>	<u>FACU</u>																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
		<u>3</u>	=Total Cover	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Parthenocissus inserta</u>	<u>50</u>	<u>Yes</u>	<u>FACU</u>																	
2. <u>Impatiens capensis</u>	<u>35</u>	<u>Yes</u>	<u>FACW</u>																	
3. <u>Alliaria petiolata</u>	<u>20</u>	<u>No</u>	<u>FACU</u>																	
4. <u>Hesperis matronalis</u>	<u>3</u>	<u>No</u>	<u>FACU</u>																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
12. _____	_____	_____	_____																	
		<u>108</u>	=Total Cover	Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.																
Woody Vine Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
		_____	=Total Cover																	
Hydrophytic Vegetation Present? Yes <u> </u> No <u> X </u>																				

 Remarks: (Include photo numbers here or on a separate sheet.)
 Hydric vegetation is not present, parameter has not been met.

SOIL

Sampling Point: UPL-A

[illegible]

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R	OMB Control #: 0710-0024, Exp: 9/30/2027 Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)
--	---

Project/Site: Clarks Pond Stormwater City/County: Amesbury Sampling Date: 7/1/25
Applicant/Owner: _____ State: MA Sampling Point: WET-B
Investigator(s): JTS Section, Township, Range: _____
Landform (hillside, terrace, etc.): Stormwater ditch Local relief (concave, convex, none): concave Slope %: 3-8
Subregion (LRR or MLRA): LRR R, MLRA 144A Lat: 42.860245 Long: 70.927473 Datum: _____
Soil Map Unit Name: Merrimac fine sandy loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil Y, or Hydrology Y significantly disturbed? Are “Normal Circumstances” present? Yes X No _____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>Y</u> No _____ If yes, optional Wetland Site ID: _____
---	---

Remarks: (Explain alternative procedures here or in a separate report.)
Data plot performed in a man-made stormwater swale near wetland flag A8. The area is a non-regulated feature in MA per 310 CMR 10.04.

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators</u> (minimum of one is required; check all that apply) <u>X</u> Surface Water (A1) <u>X</u> Water-Stained Leaves (B9) ____ High Water Table (A2) _____ Aquatic Fauna (B13) ____ Saturation (A3) _____ Marl Deposits (B15) ____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1) ____ Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3) ____ Drift Deposits (B3) <u>X</u> Presence of Reduced Iron (C4) ____ Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6) ____ Iron Deposits (B5) _____ Thin Muck Surface (C7) ____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks) ____ Sparsely Vegetated Concave Surface (B8) _____	<u>Secondary Indicators</u> (minimum of two required) ____ Surface Soil Cracks (B6) ____ Drainage Patterns (B10) ____ Moss Trim Lines (B16) ____ Dry-Season Water Table (C2) ____ Crayfish Burrows (C8) ____ Saturation Visible on Aerial Imagery (C9) ____ Stunted or Stressed Plants (D1) ____ Geomorphic Position (D2) ____ Shallow Aquitard (D3) ____ Microtopographic Relief (D4) ____ FAC-Neutral Test (D5)
---	--

Field Observations: Surface Water Present? Yes _____ No <u>N</u> Depth (inches): _____ Water Table Present? Yes <u>Y</u> No _____ Depth (inches): <u>1</u> Saturation Present? Yes <u>Y</u> No _____ Depth (inches): <u>1</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Hydrology is present, however the hydrology is due to man-made stormwater features.

VEGETATION – Use scientific names of plants.

Sampling Point: WET-B

Tree Stratum (Plot size: <u>N/A</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B) Prevalence Index worksheet: <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 40%;">Total % Cover of:</th> <th style="width: 60%;">Multiply by:</th> </tr> <tr> <td>OBL species <u>15</u></td> <td>x 1 = <u>15</u></td> </tr> <tr> <td>FACW species <u>72</u></td> <td>x 2 = <u>144</u></td> </tr> <tr> <td>FAC species <u>25</u></td> <td>x 3 = <u>75</u></td> </tr> <tr> <td>FACU species <u>13</u></td> <td>x 4 = <u>52</u></td> </tr> <tr> <td>UPL species <u>10</u></td> <td>x 5 = <u>50</u></td> </tr> <tr> <td>Column Totals: <u>135</u> (A)</td> <td><u>336</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>2.49</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>15</u>	x 1 = <u>15</u>	FACW species <u>72</u>	x 2 = <u>144</u>	FAC species <u>25</u>	x 3 = <u>75</u>	FACU species <u>13</u>	x 4 = <u>52</u>	UPL species <u>10</u>	x 5 = <u>50</u>	Column Totals: <u>135</u> (A)	<u>336</u> (B)	Prevalence Index = B/A = <u>2.49</u>	
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Column Totals: <u>135</u> (A)	<u>336</u> (B)																			
Prevalence Index = B/A = <u>2.49</u>																				
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
		=Total Cover																		
Sapling/Shrub Stratum (Plot size: <u>N/A</u>)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
		=Total Cover																		
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Impatiens capensis</u>	<u>70</u>	<u>Yes</u>	<u>FACW</u>																	
2. <u>Ranunculus repens</u>	<u>15</u>	<u>No</u>	<u>FAC</u>																	
3. <u>Symphyotrichum puniceum</u>	<u>15</u>	<u>No</u>	<u>OBL</u>																	
4. <u>Rosa multiflora</u>	<u>10</u>	<u>No</u>	<u>FACU</u>																	
5. <u>Rubus occidentalis</u>	<u>10</u>	<u>No</u>	<u>UPL</u>																	
6. <u>Juncus tenuis</u>	<u>5</u>	<u>No</u>	<u>FAC</u>																	
7. <u>Rumex obtusifolius</u>	<u>5</u>	<u>No</u>	<u>FAC</u>																	
8. <u>Parthenocissus quinquefolia</u>	<u>3</u>	<u>No</u>	<u>FACU</u>																	
9. <u>Bidens frondosa</u>	<u>2</u>	<u>No</u>	<u>FACW</u>																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
12. _____	_____	_____	_____																	
		=Total Cover																		
Woody Vine Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
		=Total Cover																		

Remarks: (Include photo numbers here or on a separate sheet.)
 Hydric vegetation is present, parameter has been met.

SOIL

Sampling Point: WET-B

[illegible]



Appendix D
Stormwater Management Report
(including Site Plans)



Proactive by Design



STORMWATER MANAGEMENT PLAN

**Loft's at Clark's Pond Homeowner Association
15 Cedar Street
Amesbury, MA 01913**

July 2025
File No. 03.0035466.00

PREPARED FOR:

Loft's at Clark's Pond Homeowner Association
Amesbury, Massachusetts

GZA GeoEnvironmental, Inc.

188 Valley Street, Suite 300 | Providence, RI 02909
401-421-4140

Offices Nationwide
www.gza.com

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July 14, 2025

File No. 03.0035466.00

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1.0 INTRODUCTION

In conjunction with the Conservation Commission Notice of Intent application, and behalf of our client, the Loft's at Clark's Pond Homeowner Association, GZA has prepared this Stormwater Management Plan (SWMP) for proposed design to mitigate stormwater related flooding impacting the exterior and interior of building #2 located at 15 Cedar Street in Amesbury, Massachusetts (the "Site"). The proposed stormwater improvements have been designed in accordance with the Massachusetts Stormwater Handbook, revised 2008 (Design Manual) and the current edition of Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Area (Erosion Control Handbook), revised 2003.

	Organization	Contact Person	Address	Phone Number
Site Owner/ Applicant	Loft's at Clark's Pond Homeowner Association	Nick Beck	15 & 25 Cedar Street, Amesbury, MA	413-530-9814
Stormwater Engineer	GZA GeoEnvironmental, Inc. (GZA)	Steve D'Ambrosio, P.E.	1350 Main Street Suite 1400 Springfield, MA	413-726-2126

This SWMP is subject to the Limitations included in **Appendix A**.

The Drawing Set, included in **Appendix H** show the existing site conditions, and proposed stormwater management system.

In accordance with the Design Manual, a completed Stormwater Management Checklist is included in **Appendix B**.

2.0 EXISTING SITE CONDITIONS AND BACKGROUND

The Loft's at Clarks Pond is a condominium complex that is located at 15 & 25 Cedar Street in Amesbury, Massachusetts (the Site), Map 40 Lots 236, 237 and 238. The complex has two residential buildings with associated parking and a gazebo with an outdoor lawn area. The southern portions of the lots are bounded by the Back River which is downgradient from buildings. The Site is abutted to the east and west by residential houses and to the north by industrial/commercial buildings. Building #2 (the "building") experiences flooding at the north entrance that has caused interior damage to the basement and the first floor of the building. The Client has indicated that significant flooding occurred on August 18, 2023, and September 13, 2023, when storms produced approximately 3.7-inches and 2.3-inches, respectively, as reported by the National Oceanic and Atmospheric Administration (NOAA). During these storm events, the stormwater flowing down Cedar Street and "R" Street ponded along the roadway curbing and overtopped onto the facility's landscaped areas in the northwest corner of the Site and ultimately flowed to a low area at the Building 2 north door and flooded the building. The building roof drains have also been observed to become overwhelmed and discharge stormwater into this area. Roof drains on the southeastern corner of the building discharge onto the ground surface, causing flooding and icing of the walkways which is a safety concern for the residents.

The homeowner's association has installed a small pump in a yard drain located to the west of the Building 2 north door entrance that discharges to the parking lot on the South side of the building that is used during storm events. The Client has also indicated that this system has been operated by a generator, since large storm events have historically caused electrical service failure in



the area. Other temporary measures of sand and concrete bags have been used to create a cofferdam in front of the north entrance.

GZA performed topographic survey and an existing drainage pipe survey using CCTV to prepare an existing conditions plan that illustrates the roof drainage system and the stormwater management system within the parking lot. During these field activities, GZA observed that the existing roof drainage system located on the north and west side of the building was previously designed to infiltrate stormwater within existing Site soils. The roof drainage system on the eastern side of the building conveyed stormwater to the stormwater management system installed in the eastern parking lot area. The western roof drainage system also infiltrated water adjacent to the building foundation wall which was also determined to contribute to flooding within the building, with an additional outlet that discharges stormwater into a catch basin (CB-3) located on "R" Street. CB-3 is connected to the City of Amesbury stormwater conveyance system which ultimately discharges into the Back River.

3.0 SUBSURFACE CONDITIONS

The soils identified by the United States Department of Agriculture (USDA) Natural Resources Conservation Service consists of map unit symbols 602 and 254D. 602 is classified as "Urban land" and has an unranked Hydric Soil Rating (HSR). 254D is classified as "Merrimac fine sandy loam, 15-25 percent slopes and has a HSR of A. Due to the unranked HSR for a significant portion of the Site, GZA witnessed five (5) test pits (designated TP-1 through TP-5) on July 1, 2025 to evaluate subsurface conditions in areas potentially suitable for infiltration of roof runoff. Test pits were excavated in both USDA classified soil areas 602 and 254D. Tests pits were excavated by M.T. Mayo Corporation of Woburn, Massachusetts to depths of approximately 4 to 9 feet below ground surface (bgs) using a CAT 306 excavator. The target depth for the test pits was 8-feet; some test pits were terminated shallower than the target depth due to obstructions within the test pit, or deeper than 8 feet where possible.

GZA personnel observed the test pits and prepared the test pit logs included in **Appendix C**. Soil samples were visually classified according to the Modified Burmister classification system and the groundwater table and seasonal high water table were noted on the logs if encountered. As-excavated test pit locations were collected with a hand-held GPS unit upon completion and are shown on the existing conditions figure in **Appendix H**. The generalized subsurface profile at the site generally consists of topsoil at the ground surface, underlain by fill and/or urban fill. The subsurface conditions are described in greater detail in the following sections.

Topsoil

An approximately 6- to 8-inch layer of topsoil was encountered at the ground surface in all borings. Topsoil material consisted of silt with fine to coarse sand and trace roots.

Fill

The fill extended to depths ranging from 8-inches to 8.3 feet below the existing ground surface (bgs). (elevation 21.5 to 10.5 feet). The fill generally consisted of fine to coarse sand with varying amounts of boulders, gravel and silt. Materials indicative of fill that were observed were metal, rubber, brick, and concrete. Excavation through the fill material was generally moderate to difficult in effort.

Urban Fill

The urban fill extended to depths ranging from 8-inch to 7.3 feet bgs. (elevations 19.7 to 12.7 feet). The fill generally consisted of a mixture of sand and silt, with trace debris (glass, brick, metal, plastic, etc.). Excavation through the fill material was generally moderate to difficult in effort.

Groundwater



Groundwater levels were measured in the test pits at the time of excavation in three (TP-1, TP-2, and TP-5) test pits. Groundwater observations were made at the time and under the conditions stated in the exploration logs. Generally, in the areas to the south of building #2, groundwater was observed at approximately 7.5-8.5ft bgs, and the seasonal high-water table was observed by iron staining and redox features at approximately 4.5-5.5-ft bgs. In the area to the north of building #2, only one test pit (TP-5) encountered groundwater. It was observed at approximately 6-ft bgs and seasonal high-water table was observed at approximately 3-ft bgs. Due to obstructions also observed within the test pit, there is potential for the groundwater in this area to be perched on historical concrete structures that remain in the subsurface.

It is anticipated that groundwater levels will vary due to variations in rainfall and other factors different than those prevailing at the time the explorations were performed, and the measurements were made. It should be noted that the seasonally lowest groundwater levels typically occur during the late summer and fall months. Refer to the test pit logs in **Appendix C** for additional details on groundwater observations.

4.0 DEVELOPED SITE CONDITIONS

The Project includes the installation and replacement of roof drainage pipes along the building to then be connected into the existing stormwater management system. The existing stormwater management system includes a perforated pipe (located along the western side of the building) being discharged into the municipal stormwater system via catch basin "CB3" located on R Street. The existing perforated pipes located on the north and west side of the building will either be fully replaced with new PVC pipes or be removed, as shown in the proposed design plan in **Appendix H**. Additionally, existing drainage pipes will be replaced with larger PVC pipes with new pipe inverts in an attempt to minimize flooding of the existing catch basins and lawn drains. These proposed drainage pipes will collect stormwater runoff from the building's roof top and upgradient landscaped area and direct it into the existing catch basins in the parking lot, which travels through the previously installed Vortex water quality treatment units and ultimately discharge to the Back River via an 18" RCP outlet.

Stormwater from the north and south building's roof have separate conveyance systems that ultimately are directed into different drainage pipe systems. The south portion of the building's roof runoff will be captured by five (5) existing roof drains, then be directed into catch basin "H" located within the existing parking lot via a proposed 6-inch PVC pipe. Improvements to the western roof drainage system will include the cutting and capping of the existing pipe being discharged into the municipal catch basin on R Street. Similarly, the north portion of the building's roof runoff will be captured by six (6) existing roof drains, which will then be directed into catch basin "I" located within the existing parking lot via 12-inch PVC pipe. Both proposed drainage systems will connect into the existing 18" RCP stormwater system, which drain through the existing vortex water quality treatment units then discharges into the Back River via the 18" RCP outlet. It should be noted that vortex catch basins are utilized to capture and retain trash, debris and sediment.

This proposed design includes no increase of impervious surfaces and reduces runoff being directed into the municipality's stormwater system. Drainage paths have been slightly altered with the improvements to the conveyance system, however ultimately the stormwater in the existing and proposed condition discharges to the Back River.

5.0 STORMWATER MANAGEMENT STANDARDS

The Design Manual, Volume 1, Chapter 1, entitled: "Storm Water Management Standards" requires that stormwater management systems associated with proposed development projects meet certain stormwater management performance standards. The following sections summarize the applicability of each stormwater management performance standard and describe how the project meets each standard that applies. A post-development hydrologic and hydraulic analysis, and a description of the proposed stormwater management system are also included in Section 6 of this report.



It should be noted that under Standard 7, this project is a redevelopment project meaning Standards 1, 2, 3, 4, 5, and 6 are required to be met only to the maximum extent practicable while Standards 8, 9, and 10 must be met fully.

5.1 STANDARD 1: UNTREATED STORMWATER

Standard 1 requires that no new stormwater conveyance system discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Response: The proposed drainage systems will be directed into the existing stormwater management system which includes Vortex water quality treatment units upgradient from the Back River. The alterations to the existing stormwater management system do not significantly increase discharge flows or velocity, therefore stormwater runoff will not cause erosion into the Back River. Additionally, the existing 18" RCP outlet is protected with a large riprap apron to prevent erosion at the outlet.

5.2 STANDARD 2: POST-DEVELOPMENT PEAK DISCHARGE RATES

Standard 2 requires that stormwater management systems be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.

Response: According to Standard 7, this project is a redevelopment project. As such, this Standard is only required to be met to maximum extent practicable. While the post-development peak discharge rates do minimally exceed the pre-development rates for the 2-yr and 10-yr 24-hr storm event due to removing flow from the municipal system, the flow increase is less than a 1% increase from the pre-development peak discharge rates. This increase is due to eliminating the western roof drain system discharge pipe into the City of Amesbury's stormwater conveyance system in R Street. Removing this discharge pipe and reconfiguring the on-Site drainage system allows the roof runoff to travel through the on-Site stormwater management system, including the vortex units, allowing for stormwater to be treated prior to the discharge point at the Back River. To manage this minimal increase to the Site outfall, on Site BMPs, such as below ground detention systems, would need to be implemented to detain a minimal amount of water. In addition, the Site subsurface conditions were observed to be urban fill, which are not suitable for onsite infiltration BMPs. Due to the minimal increase in peak discharge values, we believe that we have met this Standard to the maximum extent practicable.

5.3 STANDARD 3: GROUNDWATER RECHARGE

Standard 3 requires that stormwater be recharged within the same sub-watershed to maintain groundwater base flow at pre-development recharge levels. Adhering to this standard ensures that the level of the groundwater table, stream base flow, and soil moisture remain the same for pre- and post-development Site conditions.

Response: In the existing condition, roof drainage piping along the western and northern portions of the building have perforated sections to allow for recharge into the groundwater table. Due to their close proximity to the building foundation (within 10-ft), these perforated pipes should be removed to mitigate against water seepage through foundation walls and damage to the building. Other potential areas of infiltration were evaluated. GZA performed test pits, as described above, in the location of potential infiltration areas. Soils were observed to be composed of urban fill throughout the test pits and into the groundwater table. Based on standard design practices described in Volume 2, Chapter 2 and Volume 3, Chapter 1 of the Stormwater Handbook, infiltration should not be performed within areas of urban fill.

5.4 STANDARD 4: WATER QUALITY

The intent of this standard is to protect the waters of the State by reducing the mass of pollutants discharged to surface waters and to reduce the risk of erosion and sedimentation by implementing the BMPs outlined in the Design Manual. BMPs must be designed to accommodate the Water Quality Volume (WQv), which, for this project, is the runoff from the first 0.5 inch of



precipitation that falls on impervious surfaces (existing and proposed) at the Site. The WQV is referred to as the first flush and has been shown to contain the majority of contaminants from a typical stormwater runoff event. The selection process for proposed BMPs implemented on the Site is dependent on the types of contaminants in the first flush. Once a BMP is selected it must be sized appropriately to contain or treat the water quality volume. The total treatment train for stormwater BMPs selected for the site must achieve a TSS removal rate of 80%. The TSS removal percentage for stormwater BMP's is included in Volume 1 Chapter 1 of the Design Manual. In addition, a Long-Term Pollution Control Plan must be developed for the site.

Response: Pollutants discharged to surfaces water through sheet flow, erosion, and sedimentation will not occur with the construction of the proposed drainage systems. Stormwater flow to the vortex units and existing outlet drainage system has been calculated under the proposed condition and the result indicate that there is capacity to treat the minimal increase of stormwater runoff during the 2-yr storm event. As mentioned above, this increase is due to the elimination of the western roof drain discharging to the City of Amesbury's stormwater system within R Street. It is unknown how or if the municipality's stormwater system addressed pollutant discharge. Therefore, the portion of the drainage system that is now being directed on-Site will be treated through the vortex catch basins, improving water quality.

A Long-Term Pollution Prevention Plan (LTPP) is included below:

- **Good Housekeeping**

The facility will be maintained in a clean and orderly manner to reduce the potential to contribute pollutants to storm water discharges.

- **Materials and Waste Products Storage**

Materials and waste products will be property contained and transported off site and will not be stored outdoors on this site.

- **Vehicle Washing**

Vehicle washing will not be performed on this site.

- **Routine Inspections and Maintenance of Stormwater BMPs**

Stormwater BMPs will be maintained and inspected in accordance with Operations and Maintenance Report.

- **Spill Prevention and Response**

Spill response kits will be available on site during construction

- **Maintenance of Lawns, Gardens, and Other Landscaped Areas**

There are landscaped areas on Site surrounding the building. These areas will be maintained in accordance with the Operations and Maintenance Report.

- **Storage and Use of Fertilizers, Herbicides, and Pesticides**

Fertilizers, Herbicides and Pesticides will not be stored or used on this site.

- **Pet Waste Management**

Trash cans and waste bags will be provided along with signage to encourage pet waste pick-up.



- **Operation and Management of Septic Systems**

There will be no septic systems present on this site.

- **Proper Management of Deicing Chemicals and Snow**

Limited salting or sanding will be performed at the facility access driveway, parking lot and pedestrian walkway.

5.5 STANDARD 5: LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS

Land uses with higher potential pollutant loads (LUHPPLs) generally have a higher risk of discharging pollutants to the waters of the state. As listed in the Design Manual the following land uses and activities are classified as LUHPPLs:

- Areas within an industrial site (as defined in 310 CMR 22) that are the location of activities subject to the NPDES Multi-Sector General Permit;
- Auto fueling facilities (i.e., gas stations);
- Exterior vehicle storage, service, maintenance, and equipment cleaning areas;
- Marinas and boatyards
- Parking lots with high-intensity use; and
- Confined disposal facilities and disposal sites.

For these types of Sites, specific BMPs must be used, and typically require a NPDES Multi-Sector General Permit (MSGP) for Industrial Activity.

Response: This Site is not a LUHPPL Site, and a MSGP for stormwater discharge is not required.

5.6 STANDARD 6: PROTECTION OF CRITICAL AREAS

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 best management practices determined by the Design Manual.

Critical areas are Outstanding Resource Waters as designated in 314 CMR 4.00, Special Resource Waters as designated in 314 CMR 4.00, recharge areas for public water supplies as defined in 310 CMR 22.02 (Zone Is, Zone IIs and Interim Wellhead Protection Areas for groundwater sources and Zone A for surface water sources), bathing beaches as defined in 105 CMR 445.000, cold-water fisheries as defined in 314 CMR 9.02 and 310 CMR 10.04, and shellfish growing areas as defined in 314 CMR 9.02 and 310 CMR 10.04.

Response: This Site does not discharge near or to a critical area as designated by 314 CMR 4.00.

5.7 STANDARD 7: REDEVELOPMENT PROJECTS

Redevelopment projects are defined to include the following:

1. Maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving;
2. Development, rehabilitation, expansion, and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area; and



3. Remedial projects specifically designed to provide improved stormwater management, such as projects to separate storm drains and sanitary sewers and stormwater retrofit projects.

Response: This project is considered to be a re-development project as noted in bullet #2 (above) as the proposed design does not result in an increase in impervious areas.

5.8 STANDARD 8: EROSION & SEDIMENT CONTROLS

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff quality. The intent of this standard is to prevent, to the maximum extent practicable, pollutants from coming into contact with stormwater runoff.

Response: Temporary erosion and sediment controls for construction have been incorporated into the proposed design and are shown on the proposed condition plan, in general accordance with the Erosion Control Handbook. Erosion and sediment controls are outlined below:

A. Construction Phase

The construction phase of the proposed project requires the installation of erosion and sediment controls and their maintenance. During the construction phase the following major earthwork activities and their sequence in the construction phase will be as follows:

1. Mobilization.
2. Installation of temporary erosion control measures.
3. Brick pavers removal activities.
4. Excavation of trenches and Installation of proposed drainage system.
5. Connection into existing stormwater management system.
6. Landscape and Site restoration.

In the following practices, the specified activities and controls are minimums only. They should be increased as needed to ensure proper functioning and that their intent to control erosion and sedimentation is met.

Specific controls and practices include:

1. Erosion Control Blanket – Blanket to be installed on all slopes steeper than 33%.
2. Temporary Stabilization - Soil stockpiles that remain in place for at least 6 months shall be stabilized with temporary seed and mulch no later than 30 days from the last construction activity in that area.
3. Catch Basin Inlet Protection – Drop inlet sediment bags will be installed at each catch basin inlets to ensure sediment and/or debris will not enter the existing stormwater system during the construction phase.



4. *Permanent Stabilization - Disturbed portions of the site where construction activities are complete shall be stabilized with permanent seeding no later than 14 days after the last construction activity. The permanent seed mix shall be in accordance with the design plans.*

Other Miscellaneous Controls:

1. *Waste Materials - All waste will be collected and stored in a securely covered metal dumpster as provided by a licensed solid waste management company. The dumpster shall meet all local and state regulations. The dumpster will be emptied as necessary. No construction waste materials shall be buried on-site.*
2. *Hazardous Waste - All hazardous waste materials shall be disposed of in a manner specified by local or state regulations or by the manufacturer.*
3. *Sanitary Waste - All sanitary waste will be collected from the portable units as required by local regulation.*

B. Maintenance and Inspections during Construction:

The following are the minimum requirements for maintenance and inspection of the above controls to ensure they are functioning as intended and to ensure that additional measures are installed, if and when the need arises.

1. *All control measures will be inspected at least once each week and following any storm event of 0.5 inches or greater. If no rain gauge is present on-site, then inspections shall be following any storm event.*
2. *All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report. Sufficient stockpiles of erosion control material shall be kept on-site in reserve in the event that immediate repair is required.*
3. *Accumulated sediment will be removed from silt fence when it has reached one-third the height of the fence.*
4. *Silt fence/hay bale/compost sock barriers will be inspected for depth of sediment, tears, gaps, etc., to see if the fabric or bales are secure and firmly in the ground.*
5. *Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth until fully established.*

5.9 STANDARD 9: STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENANCE

This standard requires that an operations and maintenance plan is developed to ensure that stormwater management systems function properly for the lifetime of the system.

*Response: See **Appendix G** attached for the Site's operations and maintenance plan.*

5.10 STANDARD 10: ILLICIT DISCHARGES

This standard is meant to eliminate illicit discharges to stormwater management systems. Illicit discharges are defined as discharges to the stormwater management system that do not consist entirely of stormwater. An illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation,



uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents. In addition projects within Wetlands jurisdiction must demonstrate compliance with this requirement by submitting to the issuing authority an Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the site and by including in the pollution prevention plan measures to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease.

*Response: The stormwater management system has been designed to collect, convey, and manage only stormwater runoff generated from the existing facility. An Illicit Discharge Compliance Statement is attached as **Appendix F**.*

6.0 SITE HYDROLOGIC AND HYDRAULIC MODELING

A hydrologic and hydraulic analysis (H & H) was performed in accordance with Volume 3 of the Design Manual. The hydrologic analysis was performed using HydroCAD® Version 10 stormwater modeling system computer program. Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method with a Type III 24-hour rainfall distribution. Hydrographs were developed with NOAA Atlas 14, precipitation data for the 2-, 10- and 100-year 24- hour storm event with rainfall depths of 3.39 inches, 5.36 inches and 8.50 inches, respectively.

6.1 PRE-DEVELOPMENT HYDROLOGIC AND HYDRAULIC SUMMARY

The Site was delineated into two watersheds/drainage areas using existing topography and the existing drainage system. The existing Site generally drains in four (4) directions; three of the directions go towards the existing drainage systems (towards catch basins "H", "I", and "G") and one goes towards the municipal stormwater system on R Street. The Site was modeled to discharge at one (1) Design Point called "18" RCP Bell Outlet". The pre-development drainage areas are delineated and identified on attached Sheet 1 of **Appendix H**. Based on information obtained from the USDA web soil survey and test pit observations, approximately half of the existing soils on the Site are considered urban fill and unclassified, therefore those existing soils were modeled as having a hydraulic soil rating of "D". About half of the area is covered with impervious surfaces, such as pavement and the existing building, in fair condition. The remaining area of the Site consists of the existing brick pavers and lawn/grass cover which is in fair condition.



The following table summarizes the input parameters of the pre-development watershed area.

Pre-Development Stormwater Modeling					
Drainage Area	Size (square feet)	Weighted Cn	Tc (min.)	Flow Length (feet)	Percent Impervious
North Area	21,509	92	8.3	264	59%
Southeast Area	6,204	98	2.3	231	100%
Southwest Area	9,492	70	6.7	193	45%
Roof Drain	2,975	98	1.4	138	100%

The following table summarizes the peak discharge rates for the pre-development watershed area for the three design storm frequencies:

Pre-Development Modeling Drainage Area Results			
Drainage Area	Design Storm Frequency		
	2-year Peak Flow (cfs)	10-year Peak Flow (cfs)	100-year Peak Flow (cfs)
Back River	2.03	3.62	6.21

6.2 POST-DEVELOPMENT HYDROLOGIC AND HYDRAULIC SUMMARY

The post-development watershed/drainage areas were delineated according to the Site's proposed stormwater management improvements. The pre-development drainage area perimeters and characteristics were modified according to approximate post-development storm water runoff flow patterns. The post-development drainage areas are delineated and are identified on attached Sheet 2 of **Appendix H**. The primary differences between the pre- and post-development stormwater runoff conditions are:

- The perforated pipe along the western side of the building is proposed to be replaced by a 6" solid PVC and re-directed to the existing on-Site stormwater management system.
- The replacement of the 4" solid PVC along the north and east of the building with a 12" solid PVC and change of inverts to and from the existing catch basins.



- The removal of the perforated 4" pipe located within 10-ft of the building entrance on the north side.

Post-Development Stormwater Modeling					
Drainage Area	Size (square feet)	Weighted Cn	Tc (min.)	Flow Length (feet)	Percent Impervious
North Area	17,623	90	8.3	264	49%
Southeast Area	6,204	98	2.3	231	100%
Southwest Area	7,826	65	6.7	193	33%
South Roof Drain	4,641	98	2.2	36	100%
North Roof Drain	3,886	98	0.7	220	100%

The following table summarizes the peak stormwater runoff discharge rates for each proposed drainage area and the design storm frequencies:

Post-Development Modeling Drainage Area Results			
Drainage Area	Design Storm Frequency		
	2-year Peak Flow (cfs)	10-year Peak Flow (cfs)	100-year Peak Flow (cfs)
Back River	2.07	3.63	6.19

6.3 PRE- VS POST REDEVELOPMENT COMPARISON

As noted below, during the 2-year and 10-year storm events there is a minimal increase in the peak flow between the pre- and post-development condition. The proposed stormwater management system mitigates roof runoff draining into the municipality's stormwater system. The proposed stormwater management system will improve stormwater quality by directing on-Site stormwater through the existing vortex manhole systems.



The following table compares the peak stormwater runoff discharge rates for each proposed drainage area and the design storm frequencies:

Pre- and Post-Development Comparison at Back River			
Model	Design Storm Frequency		
	2-year Peak Flow (cfs)	10-year Peak Flow (cfs)	100-year Peak Flow (cfs)
Pre-Development	2.03	3.62	6.21
Post-Development	2.07	3.63	6.19

Outlet protection for the 18-inch RCP outfall located at the Back River was evaluated to confirm that the minimal increase in peak discharge rates would not cause any erosion. In the existing condition, the outlet is protected by a riprap apron. In the pre-development model, the peak velocity at the outfall is 3.39 feet/sec during the 100-year storm event, and in the post-development condition 3.38 feet/sec, therefore there is no increase in flow velocity and the receiving area is adequately protected by the existing riprap apron.



APPENDIX A

LIMITATIONS



USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.
4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.
6. Water level readings have been made, as described in this Report, in and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.



SCREENING AND ANALYTICAL TESTING

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future Site activities and uses may result in a requirement for additional testing.
9. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.
10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

INTERPRETATION OF DATA

11. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

ADDITIONAL INFORMATION

12. In the event that the Client or others authorized to use this report obtain additional information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

13. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.



APPENDIX B

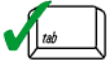
STORMWATER MANAGEMENT CHECKLIST



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 8²
- 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.



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



Steven T. D'Ambrosio 07/14/25
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): _____

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

See attached Stormwater Management Plan

- ☐ 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

See attached Stormwater Management Plan

- ☒ 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 Field¹
- ☐ 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

See attached Stormwater Management Plan

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.

N/A; see attached Stormwater Management Plan

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.

N/A; see attached Stormwater Management Plan

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)

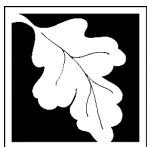
Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☒ 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

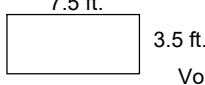
- ☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☒ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.



APPENDIX C

TEST PIT LOGS

GZA TEMPLATE TEST PIT; 7/7/2025; 8:14:55 AM

TEST PIT LOG									
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>			Clark's Pond Stormwater The Lofts at Clark's Pond Amesbury, Massachusetts			EXPLORATION NO.: TP-1 SHEET: 1 of 1 PROJECT NO: 35466 REVIEWED BY: JK			
Logged By: Greg DiMillio Contractor: M.T. Mayo Corp Foreman: Mike Halpin			Test Pit Location: See Plan Ground Surface Elev. (ft.): 20 Date Start: 7/1/2025 Date Finish: 7/1/2025			H. Datum: V. Datum: NAVD88			
Equipment: CAT Model: 306 Reach (ft.): 10 Capacity (cu.yd.): 0.25			Weather: Cloudy, 70s Time Start: 8:37 Time Finish: 10:00			Groundwater Depth (ft.)			
						Date	Time	Depth (ft.)	Symbol
						7/1/25	9:30	8.5	
Depth (ft)	Stratum Description (Modified Burmister Classification)					Elev. (ft.)	Excavation Effort	Boulder Count Qty./Class	Remark
1	Dark brown, SILT, little fine to medium Sand, trace fine to coarse Gravel, trace Roots, dry (TOPSOIL)					19.7	M	2A	1
2	Gray, fine to medium SAND, some Gravel, little Silt, trace Debris (brick, shells, wood, metal, cinders) (URBAN FILL)						M		
3						17.0	M		
4	Tan, fine SAND and SILT, little fine to coarse Gravel, trace Debris, moist (FILL)					16.5	M		
5	Dark gray, fine to medium SAND, little Silt, little fine to coarse Graveel, trace Debris (FILL)					15.8	M		
6	Tan, SILT, some fine to coarse Sand, some fine to coarse Gravel, trace Debris, moist (URBAN FILL)					14.5	M		
7	Red, SILT and fine to coarse Sand, trace Debris (Glass, Deteriorated Brick, Metal, Plastic), wet (URBAN FILL)					12.7	M	2A	2
8	Light brown, fine to medium SAND, some Silt, little Gravel, wet (FILL)					12.0	M		
9	Red Black, SILT, some fine to medium Sand, some fine to coarse Gravel (wet), trace Brick, trace Glass, trace Wood, wet (FILL)					11.2			
10	End of exploration at 8.83 feet.								
Test Pit Plan: 7.5 ft.  3.5 ft. Volume = 9 ± cu.yd.			LEGEND:  Observed Water Level Proportions Used: Trace (Tr) 0-10% Little (Li) 10-20% Some (So) 20-35% And 35-50% Excavation Effort: Easy E Moderate M Difficult D Boulder Size Range Designation: Diameter Letter Designation 6 to 16 in. A 16 to 36 in. B > 36 in. C						
REMARKS	1 - Seasonal highwater table 4 ft 6 in below ground surface. 2 - Test pit terminated due to groundwater infiltration at 8 ft 6 in below ground surface.								
See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.							Exploration No.: TP-1		

GZA TEMPLATE TEST PIT: 7/7/2025; 8:14:56 AM

TEST PIT LOG							
GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>		Clark's Pond Stormwater The Lofts at Clark's Pond Amesbury, Massachusetts		EXPLORATION NO.: TP-2 SHEET: 1 of 1 PROJECT NO: 35466 REVIEWED BY: JK			
Logged By: Greg DiMillio Contractor: M.T. Mayo Corp Foreman: Mike Halpin		Test Pit Location: See Plan Ground Surface Elev. (ft.): 18.5 Date Start: 7/1/2025 Date Finish: 7/1/2025		H. Datum: V. Datum: NAVD88			
Equipment: CAT Model: 306 Reach (ft.): 10 Capacity (cu.yd.): 0.25		Weather: Cloudy, 70s Time Start: 10:06 Time Finish: 11:20		Groundwater Depth (ft.)			
				Date 7/1/25	Time 10:50	Depth (ft.) 7.75	Symbol
Depth (ft)	Stratum Description (Modified Burmister Classification)			Elev. (ft.)	Excavation Effort	Boulder Count Qty./Class	Remark
1	Dark brown, SILT, little fine to medium Sand, trace Roots, dry (TOPSOIL)			18.0	E		
2	Dark brown, fine to medium SAND, some Silt, little Gravel, trace Brick, dry (FILL)			17.0	D	4A	
3	Brown, GRAVEL, little Silt, trace fine to medium Sand, moist (FILL)			16.3	M	1A	
4	Black, fine to medium SAND, little Silt, little Gravel, trace Debris (metal, bricks), moist 1-1.5' thick pocket of rounded coarse Gravel				M		
5					M		1
6					E		
7					E		
8	6 ft to 7.5 ft East wall- 1.5' thick pocket of reddish/black, SILTY CLAY, little fine to coarse Sand, little Debris (glass, wood, roots, metal)(Fill)			11.8			
9	End of exploration at 8 feet.			10.5			
10							
Test Pit Plan: 7.5 ft. 3 ft. Volume = 7 ± cu.yd. North LEGEND: Observed Water Level Proportions Used: Trace (Tr) 0-10% Little (Li) 10-20% Some (So) 20-35% And 35-50% Excavation Effort: Easy E Moderate M Difficult D Boulder Size Range Designation: Diameter Letter Designation 6 to 16 in. A 16 to 36 in. B > 36 in. C							
REMARKS 1 - Seasonal highwater table 5 ft 2 in below ground surface. 2 - Test pit terminated due to groundwater infiltration.							
See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.						Exploration No.: TP-2	

GZA TEMPLATE TEST PIT; 7/7/2025; 8:14:56 AM

TEST PIT LOG								
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>		Clark's Pond Stormwater The Lofts at Clark's Pond Amesbury, Massachusetts		EXPLORATION NO.: TP-3 SHEET: 1 of 1 PROJECT NO: 35466 REVIEWED BY: JK				
Logged By: Greg DiMillio Contractor: M.T. Mayo Corp Foreman: Mike Halpin		Test Pit Location: See Plan Ground Surface Elev. (ft.): 20 Date Start: 7/1/2025 Date Finish: 7/1/2025		H. Datum: V. Datum: NAVD88				
Equipment: CAT Model: 306 Reach (ft.): 10 Capacity (cu.yd.): 0.25		Weather: Cloudy, 80s Time Start: 11:25 Time Finish: 12:25		Groundwater Depth (ft.)				
				Date	Time	Depth (ft.)	Symbol	
				7/1/25	12:00	NE	▼ ▼ ▼	
Depth (ft)	Stratum Description (Modified Burmister Classification)			Elev. (ft.)	Excavation Effort	Boulder Count Qty./Class	Remark	
1	Dark brown, SILT, little fine to medium Sand, trace Roots, dry (TOPSOIL)			19.3	E			
	Tan, fine SAND and SILT, trace fine Gravel, moist, redox layer at transition (FILL)			18.7	E			
2	Brown, fine to coarse SAND, little Silt, little fine to coarse Gravel, trace Debris (metal, wood, brick), moist (FILL)				E	1A	1	
3					M			
4					D			
5	End of exploration at 4.75 feet.			15.3			2	
6								
7								
8								
9								
10								
Test Pit Plan: 7 ft.  3 ft. Volume = 4 ± cu.yd.		LEGEND:  Observed Water Level		Proportions Used: Trace (Tr) 0-10% Little (Li) 10-20% Some (So) 20-35% And 35-50%		Excavation Effort: Easy E Moderate M Difficult D		Boulder Size Range Designation: Diameter Letter Designation 6 to 16 in. A 16 to 36 in. B > 36 in. C
REMARKS	1 - Redox features observed generally around buried metal.							
	2 - Test pit terminated due to buried concrete slab.							
See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.						Exploration No.: TP-3		

GZA TEMPLATE TEST PIT; 7/7/2025; 8:14:56 AM

TEST PIT LOG											
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>			Clark's Pond Stormwater The Lofts at Clark's Pond Amesbury, Massachusetts			EXPLORATION NO.: TP-4 SHEET: 1 of 1 PROJECT NO: 35466 REVIEWED BY: JK					
Logged By: Greg DiMillio Contractor: M.T. Mayo Corp Foreman: Mike Halpin			Test Pit Location: See Plan Ground Surface Elev. (ft.): 21 Date Start: 7/1/2025 Date Finish: 7/1/2025			H. Datum: V. Datum: NAVD88					
Equipment: CAT Model: 306 Reach (ft.): 10 Capacity (cu.yd.): 0.25			Weather: Cloudy, 80s Time Start: 12:25 Time Finish: 12:57			Groundwater Depth (ft.)					
						Date	Time	Depth (ft.)	Symbol		
						7/1/25	12:45	NE	  		
Depth (ft)	Stratum Description (Modified Burmister Classification)					Elev. (ft.)	Excavation Effort	Boulder Count Qty./Class	Remark		
1	Dark brown, SILT, little fine to medium Sand, trace Roots, dry (TOPSOIL)					20.5	E				
2	Brown, fine to medium SAND, some fine to coarse Gravel, little Silt, trace Debris (wood), dry (FILL)						D				
3							D				
4	Tan, fine to medium SAND, trace Silt, moist (Bedding Sand)					17.5	E		1		
5	End of exploration at 4.33 feet.					16.7			2		
6											
7											
8											
9											
10											
Test Pit Plan: 7 ft.  3 ft. Volume = 3 ± cu.yd.			LEGEND:  Observed Water Level			Proportions Used: Trace (Tr) 0-10% Little (Li) 10-20% Some (So) 20-35% And 35-50%				Excavation Effort: Easy E Moderate M Difficult D	Boulder Size Range Designation: Diameter Letter Designation 6 to 16 in. A 16 to 36 in. B > 36 in. C
REMARKS	1 - Yellow caution tape encountered at approximately 3' bgs. Contractor used air knife to loosen soil and confirm presence of buried utilities.										
	2 - Test pit terminated due to presence of buried utilities.										
See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.							Exploration No.: TP-4				

TEST PIT LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Clark's Pond Stormwater
The Lofts at Clark's Pond
Amesbury, Massachusetts

EXPLORATION NO.: TP-5
SHEET: 1 of 1
PROJECT NO: 35466
REVIEWED BY: JK

Logged By: Greg DiMillio
Contractor: M.T. Mayo Corp
Foreman: Mike Halpin

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 22
Date Start: 7/1/2025
Date Finish: 7/1/2025

H. Datum:
V. Datum: NAVD88

Equipment: CAT
Model: 306
Reach (ft.): 10
Capacity (cu.yd.): 0.25

Weather: Cloudy, 80s
Time Start: 1:15
Time Finish: 2:30

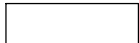
Groundwater Depth (ft.)

Date	Time	Depth (ft.)	Symbol
7/1/25	2:00	6.0	▼

Depth (ft)	Stratum Description (Modified Burmister Classification)	Elev. (ft.)	Excavation Effort	Boulder Count Qty./Class	Remark
	Dark brown, SILT, little fine to medium Sand, trace Roots, dry (TOPSOIL)	21.5	E		
1	Tan, fine to medium SAND, some Silt, trace fine to coarse Gravel, moist (FILL)	20.7	D	5A	
2	Brown, fine to medium SAND, some Cobbles/Boulders, little Silt, trace Debris (metal, rubber), moist (FILL)		M		
3		19.0	M	2B, 5A	1
4	Gray, SILT, trace fine Sand, trace fine Gravel, moist, fully mottled (SILT)		D		
5		17.0	M		2
6	End of exploration at 5 feet.				3
7	End of exploration at 6.5 feet.	15.5			
8					
9					
10					

Test Pit Plan:
12 ft.

North



5 ft.

Volume = **14 ±** cu.yd.

LEGEND:



Proportions Used:
Trace (Tr) 0-10%
Little (Li) 10-20%
Some (So) 20-35%
And 35-50%

Excavation Effort:
Easy E
Moderate M
Difficult D

Boulder Size Range Designation:
Diameter Letter Designation
6 to 16 in. A
16 to 36 in. B
> 36 in. C

REMARKS

- 1 - Seasonal highwater table 3 ft in east wall below ground surface.
- 2 - End of exploration at approximately 5 ft due to concrete in east.
- 3 - Test pit terminated due to groundwater infiltration.

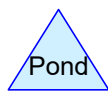
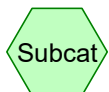
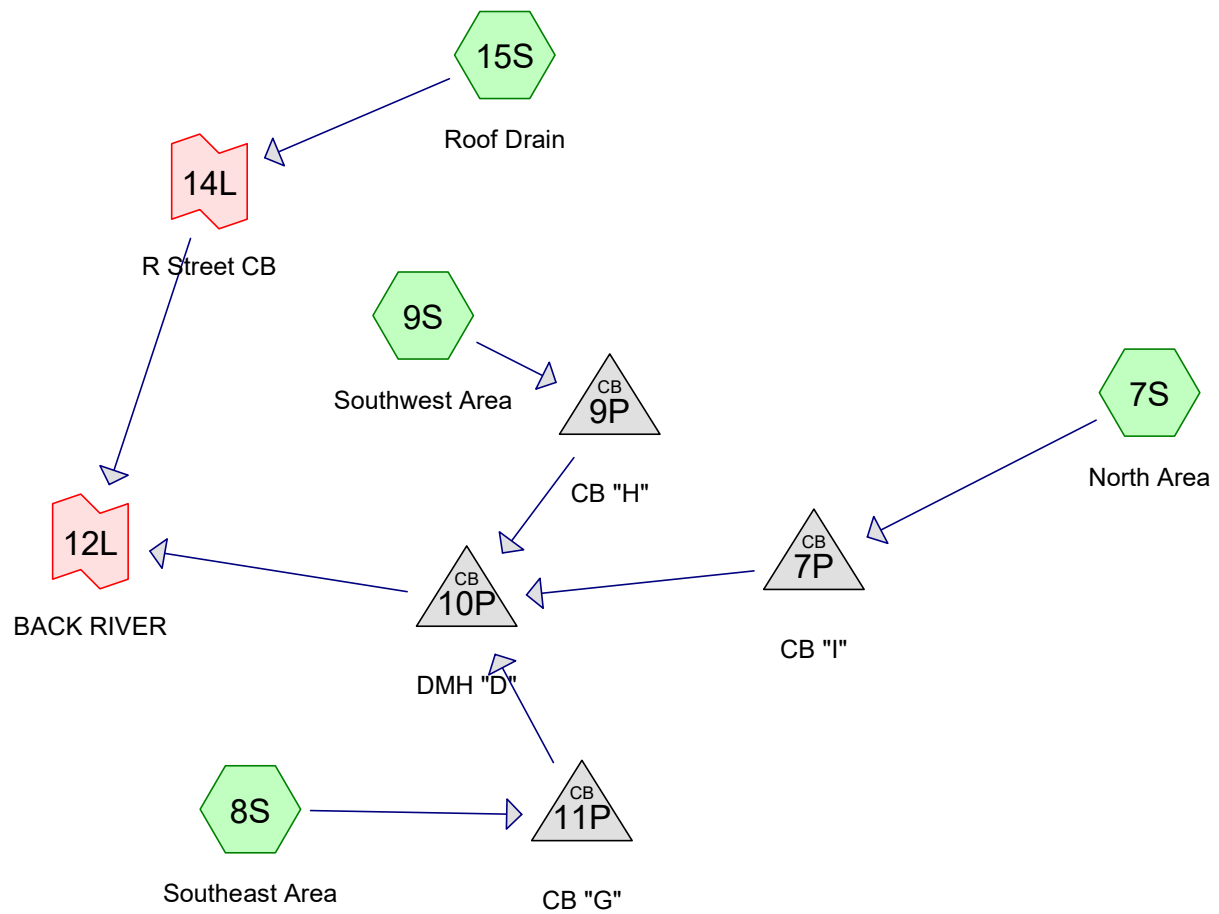
See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TP-5



APPENDIX D

HYDROCAD 10 POST DEVELOPMENT STORMWATER MODELING



Routing Diagram for Existing Conditions - Clarks Pond Stormwater

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Existing Conditions - Clarks Pond Stormwater

Prepared by GZA GeoEnvironmental, Inc

Printed 7/14/2025

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Project Notes

Existing Conditions - Clarks Pond Stormwater

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	2-Year	Type III 24-hr		Default	24.00	1	3.39	2	3.39
2	10-Year	Type III 24-hr		Default	24.00	1	5.36	2	3.39
3	100-Year	Type III 24-hr		Default	24.00	1	8.50	2	3.39

Existing Conditions - Clarks Pond Stormwater

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.091	39	>75% Grass cover, Good, HSG A (9S)
0.173	80	>75% Grass cover, Good, HSG D (7S)
0.030	76	Brick Pavers, HSG A (9S)
0.032	96	Brick Pavers, HSG D (7S)
0.202	98	Paved roads w/curbs & sewers, HSG A (8S, 9S)
0.200	98	Paved roads w/curbs & sewers, HSG D (7S)
0.107	98	Roofs, HSG A (9S, 15S)
0.089	98	Roofs, HSG D (7S)
0.922	88	TOTAL AREA

Existing Conditions - Clarks Pond Stormwater

Prepared by GZA GeoEnvironmental, Inc

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.429	HSG A	8S, 9S, 15S
0.000	HSG B	
0.000	HSG C	
0.494	HSG D	7S
0.000	Other	
0.922		TOTAL AREA

Existing Conditions - Clarks Pond Stormwater

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Page 6

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.091	0.000	0.000	0.173	0.000	0.263	>75% Grass cover, Good	7S, 9S
0.030	0.000	0.000	0.032	0.000	0.061	Brick Pavers	7S, 9S
0.202	0.000	0.000	0.200	0.000	0.402	Paved roads w/curbs & sewers	7S, 8S, 9S
0.107	0.000	0.000	0.089	0.000	0.196	Roofs	7S, 9S, 15 S
0.429	0.000	0.000	0.494	0.000	0.922	TOTAL AREA	

Existing Conditions - Clarks Pond Stormwater

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	15S	0.00	0.00	60.0	0.0100	0.010	0.0	6.0	0.0	
2	15S	0.00	0.00	27.0	0.0100	0.010	0.0	4.0	0.0	
3	7P	12.81	12.80	12.0	0.0008	0.012	0.0	15.0	0.0	
4	9P	13.15	13.02	10.0	0.0130	0.013	0.0	15.0	0.0	
5	10P	12.19	10.92	136.0	0.0093	0.013	0.0	18.0	0.0	
6	11P	13.18	12.87	12.0	0.0258	0.012	0.0	15.0	0.0	

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 7S: North Area Runoff Area=21,509 sf 58.55% Impervious Runoff Depth=2.53"
Flow Length=264' Tc=8.3 min CN=92 Runoff=1.32 cfs 0.104 af

Subcatchment 8S: Southeast Area Runoff Area=6,204 sf 100.00% Impervious Runoff Depth=3.16"
Flow Length=231' Tc=2.3 min CN=98 Runoff=0.54 cfs 0.037 af

Subcatchment 9S: Southwest Area Runoff Area=9,492 sf 44.82% Impervious Runoff Depth=0.94"
Flow Length=193' Tc=6.7 min CN=70 Runoff=0.21 cfs 0.017 af

Subcatchment 15S: Roof Drain Runoff Area=2,975 sf 100.00% Impervious Runoff Depth=3.16"
Flow Length=138' Slope=0.0100 '/' Tc=1.4 min CN=98 Runoff=0.27 cfs 0.018 af

Pond 7P: CB "I" Peak Elev=13.49' Inflow=1.32 cfs 0.104 af
15.0" Round Culvert n=0.012 L=12.0' S=0.0008 '/' Outflow=1.32 cfs 0.104 af

Pond 9P: CB "H" Peak Elev=13.37' Inflow=0.21 cfs 0.017 af
15.0" Round Culvert n=0.013 L=10.0' S=0.0130 '/' Outflow=0.21 cfs 0.017 af

Pond 10P: DMH "D" Peak Elev=12.81' Inflow=1.87 cfs 0.159 af
18.0" Round Culvert n=0.013 L=136.0' S=0.0093 '/' Outflow=1.87 cfs 0.159 af

Pond 11P: CB "G" Peak Elev=13.48' Inflow=0.54 cfs 0.037 af
15.0" Round Culvert n=0.012 L=12.0' S=0.0258 '/' Outflow=0.54 cfs 0.037 af

Link 12L: BACK RIVER Inflow=2.03 cfs 0.177 af
Primary=2.03 cfs 0.177 af

Link 14L: R Street CB Inflow=0.27 cfs 0.018 af
Primary=0.27 cfs 0.018 af

Total Runoff Area = 0.922 ac Runoff Volume = 0.177 af Average Runoff Depth = 2.30"
35.22% Pervious = 0.325 ac 64.78% Impervious = 0.597 ac

Summary for Subcatchment 7S: North Area

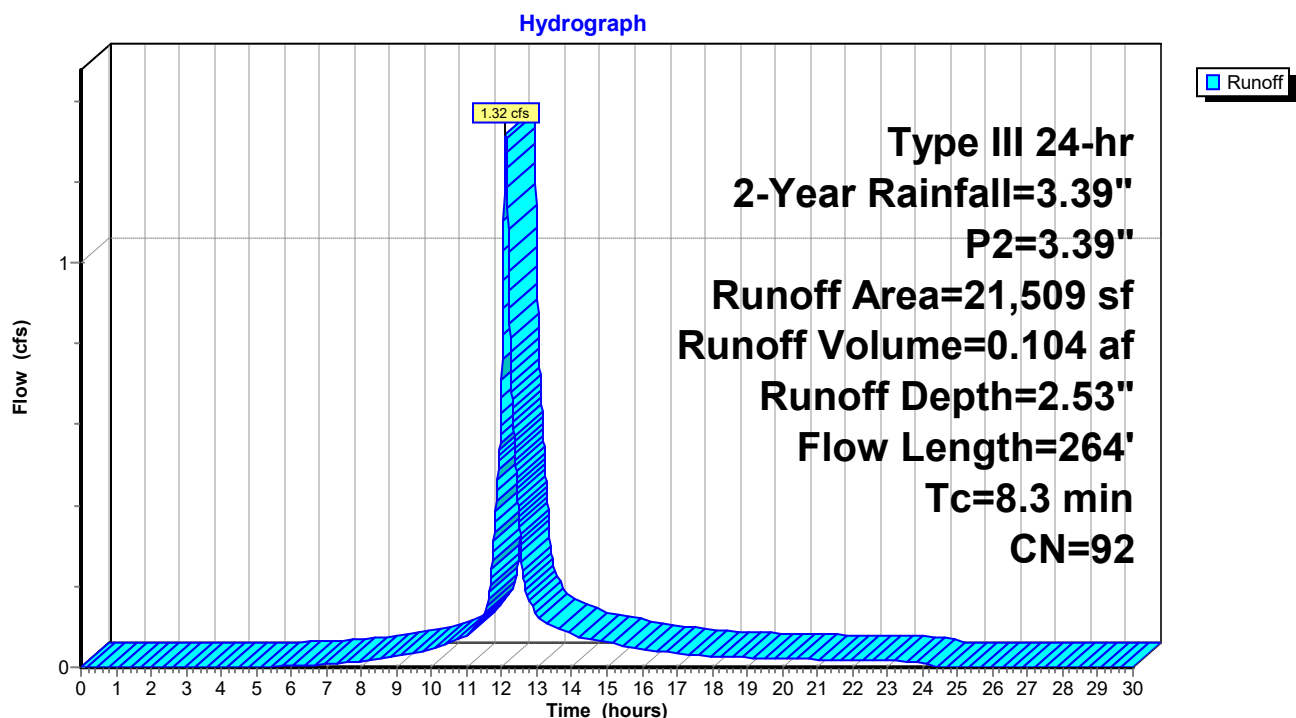
Runoff = 1.32 cfs @ 12.11 hrs, Volume= 0.104 af, Depth= 2.53"
 Routed to Pond 7P : CB "I"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
8,708	98	Paved roads w/curbs & sewers, HSG D
7,530	80	>75% Grass cover, Good, HSG D
* 1,385	96	Brick Pavers, HSG D
3,886	98	Roofs, HSG D
21,509	92	Weighted Average
8,915		41.45% Pervious Area
12,594		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	112	0.0580	0.27		Sheet Flow, over lawn Grass: Short n= 0.150 P2= 3.39"
0.7	37	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	115	0.0240	2.49		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.3	264	Total			

Subcatchment 7S: North Area



Summary for Subcatchment 8S: Southeast Area

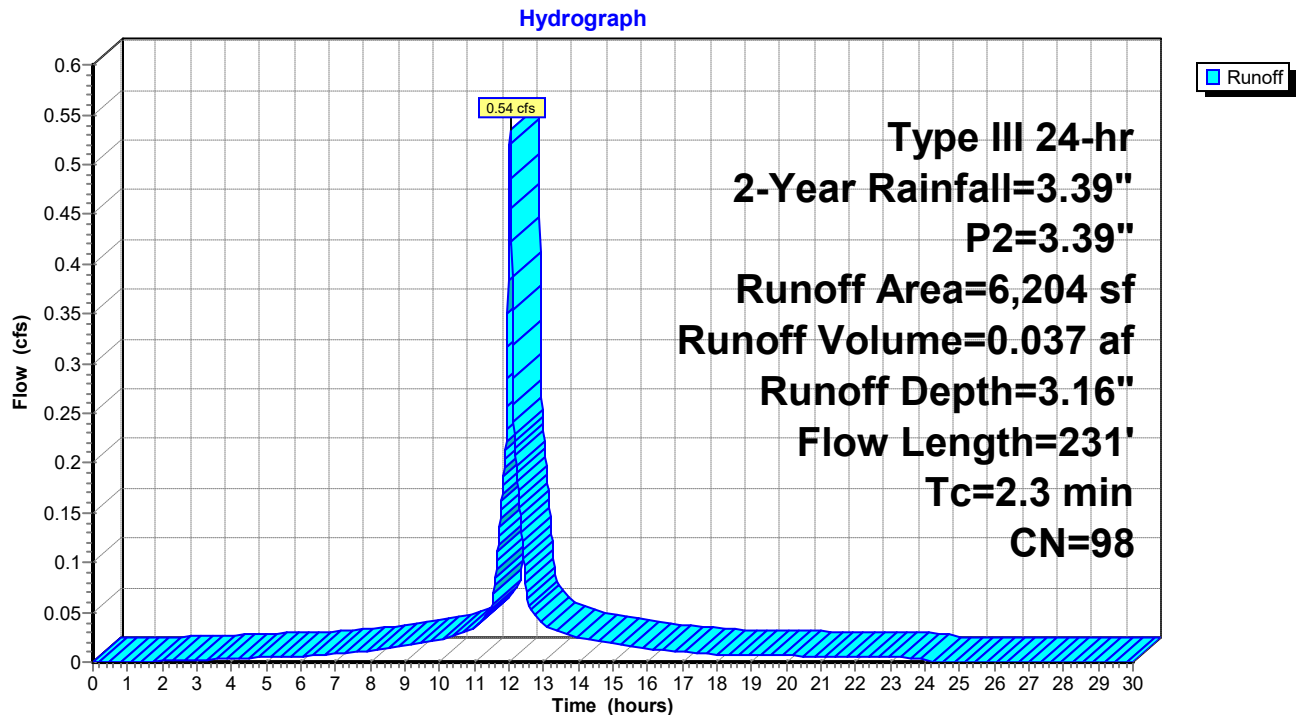
Runoff = 0.54 cfs @ 12.03 hrs, Volume= 0.037 af, Depth= 3.16"
 Routed to Pond 11P : CB "G"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
6,204	98	Paved roads w/curbs & sewers, HSG A
6,204		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.26		Sheet Flow, Sheet flow over paved parking area (100')
					Smooth surfaces n= 0.011 P2= 3.39"
1.0	131	0.0120	2.22		Shallow Concentrated Flow, Shallow conc flow over paved R St
					Paved Kv= 20.3 fps
2.3	231	Total			

Subcatchment 8S: Southeast Area



Summary for Subcatchment 9S: Southwest Area

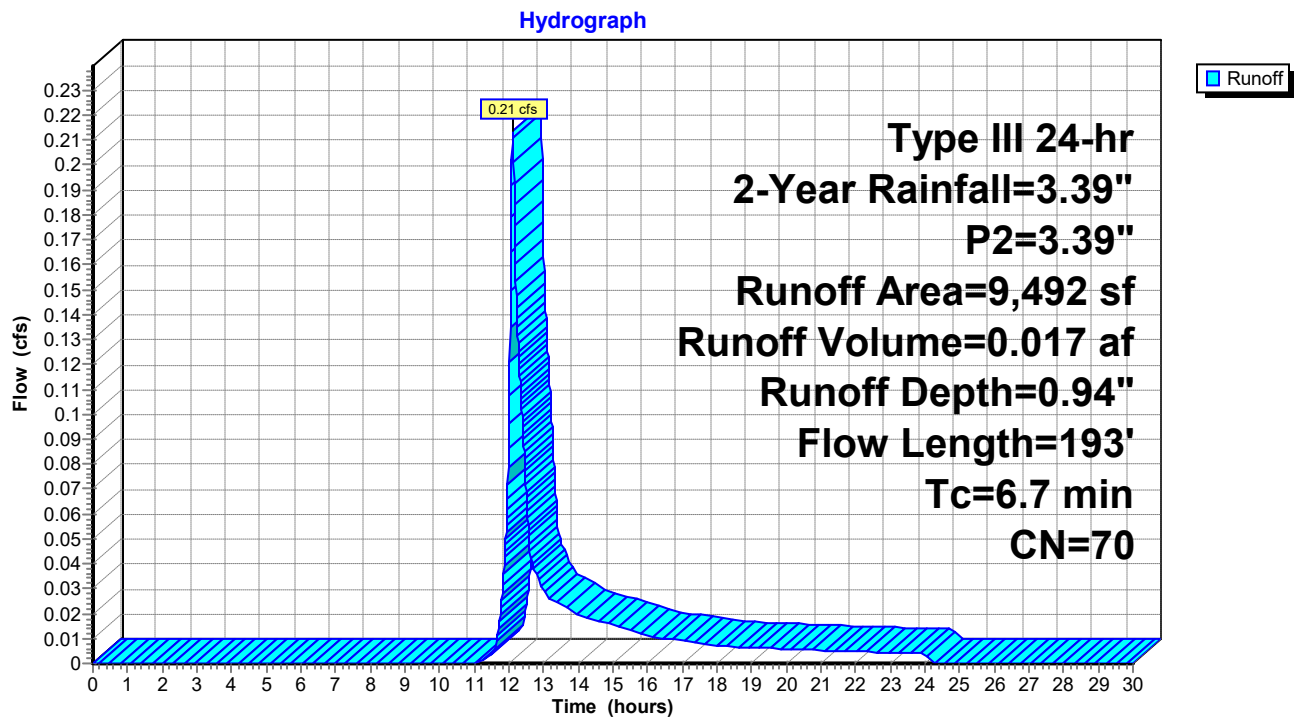
Runoff = 0.21 cfs @ 12.11 hrs, Volume= 0.017 af, Depth= 0.94"
 Routed to Pond 9P : CB "H"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
3,945	39	>75% Grass cover, Good, HSG A
2,588	98	Paved roads w/curbs & sewers, HSG A
1,666	98	Roofs, HSG A
* 1,293	76	Brick Pavers, HSG A
9,492	70	Weighted Average
5,238		55.18% Pervious Area
4,254		44.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	26	0.0190	0.09		Sheet Flow, sheet flow over lawn area (90') Grass: Dense n= 0.240 P2= 3.39"
0.9	94	0.0110	1.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	39	0.0130	0.80		Shallow Concentrated Flow, Shallow conc flow over driveway Short Grass Pasture Kv= 7.0 fps
0.2	34	0.0250	2.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.7	193	Total			

Subcatchment 9S: Southwest Area



Summary for Subcatchment 15S: Roof Drain

[47] Hint: Peak is 107% of capacity of segment #3

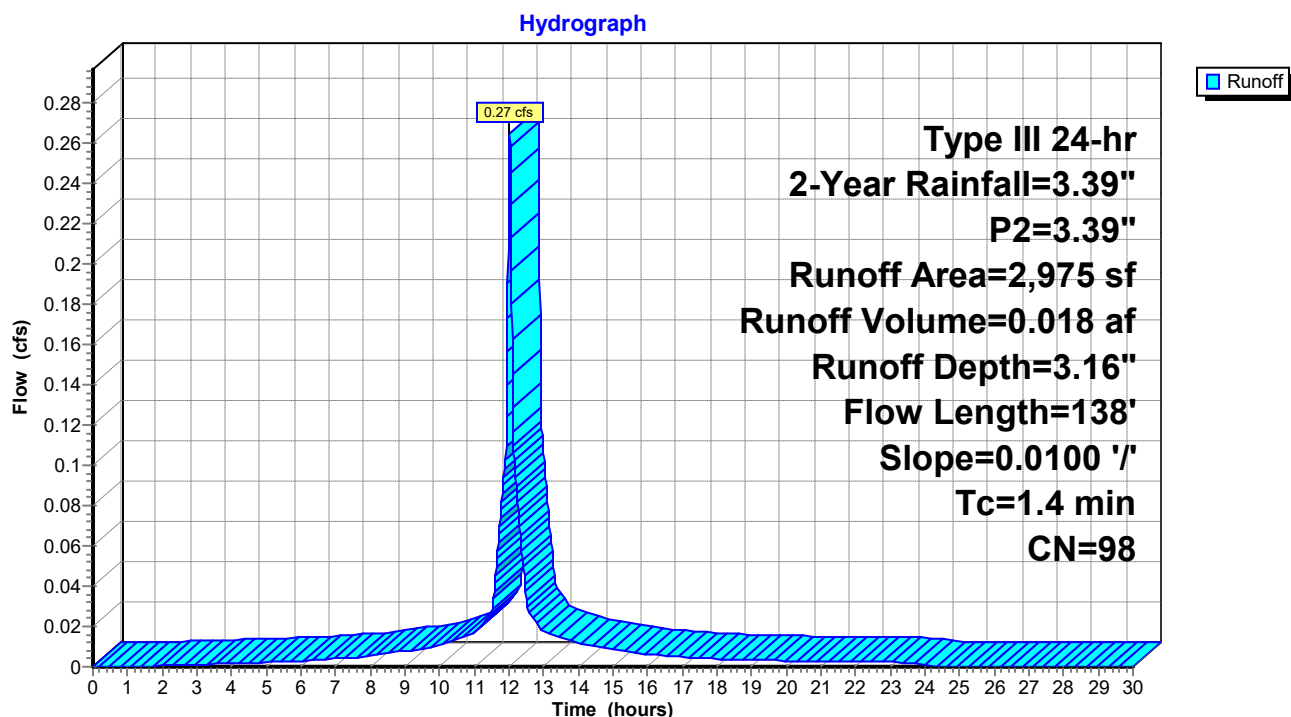
Runoff = 0.27 cfs @ 12.02 hrs, Volume= 0.018 af, Depth= 3.16"
 Routed to Link 14L : R Street CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
2,975	98	Roofs, HSG A
2,975		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	51	0.0100	0.94		Sheet Flow, sheet flow over roof Smooth surfaces n= 0.011 P2= 3.39"
0.3	60	0.0100	3.71	0.73	Pipe Channel, Pipe 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.010 PVC, smooth interior
0.2	27	0.0100	2.84	0.25	Pipe Channel, Pipe 4.0" Round Area= 0.1 sf Perim= 1.0' r= 0.08' n= 0.010 PVC, smooth interior
1.4	138	Total			

Subcatchment 15S: Roof Drain



Summary for Pond 7P: CB "I"

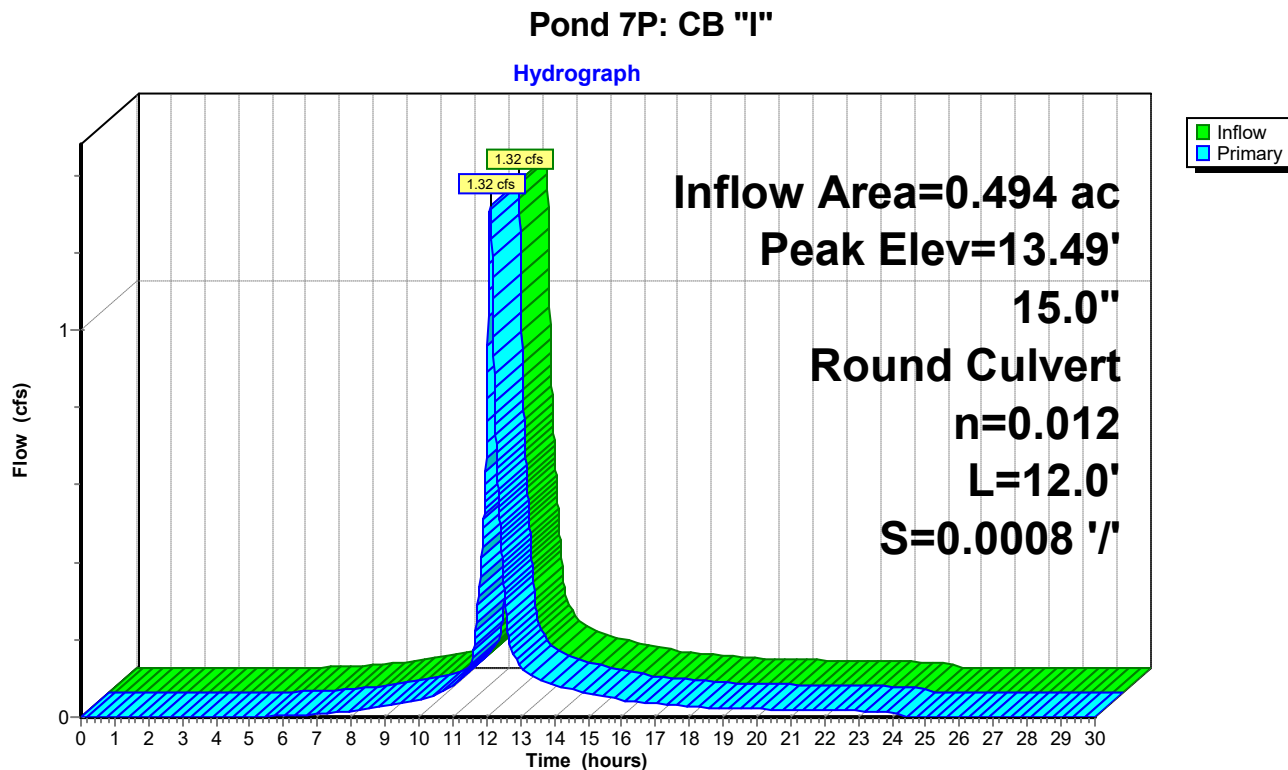
[57] Hint: Peaked at 13.49' (Flood elevation advised)

Inflow Area = 0.494 ac, 58.55% Impervious, Inflow Depth = 2.53" for 2-Year event
 Inflow = 1.32 cfs @ 12.11 hrs, Volume= 0.104 af
 Outflow = 1.32 cfs @ 12.11 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.32 cfs @ 12.11 hrs, Volume= 0.104 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.49' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.81'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 12.81' / 12.80' S= 0.0008 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=1.32 cfs @ 12.11 hrs HW=13.49' TW=12.81' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 1.32 cfs @ 2.79 fps)



Summary for Pond 9P: CB "H"

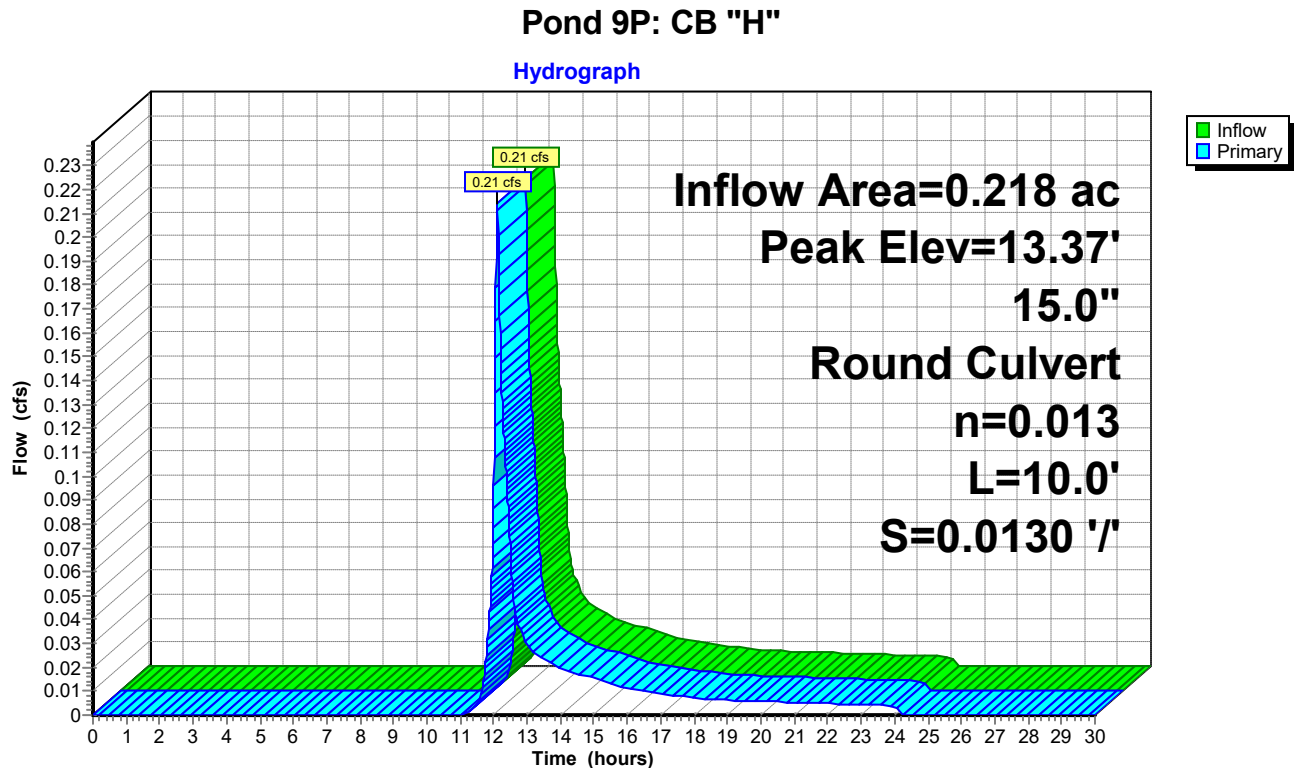
[57] Hint: Peaked at 13.37' (Flood elevation advised)

Inflow Area = 0.218 ac, 44.82% Impervious, Inflow Depth = 0.94" for 2-Year event
 Inflow = 0.21 cfs @ 12.11 hrs, Volume= 0.017 af
 Outflow = 0.21 cfs @ 12.11 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.21 cfs @ 12.11 hrs, Volume= 0.017 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.37' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.15'	15.0" Round Culvert L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.15' / 13.02' S= 0.0130 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=0.21 cfs @ 12.11 hrs HW=13.37' TW=12.81' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 0.21 cfs @ 2.30 fps)



Summary for Pond 10P: DMH "D"

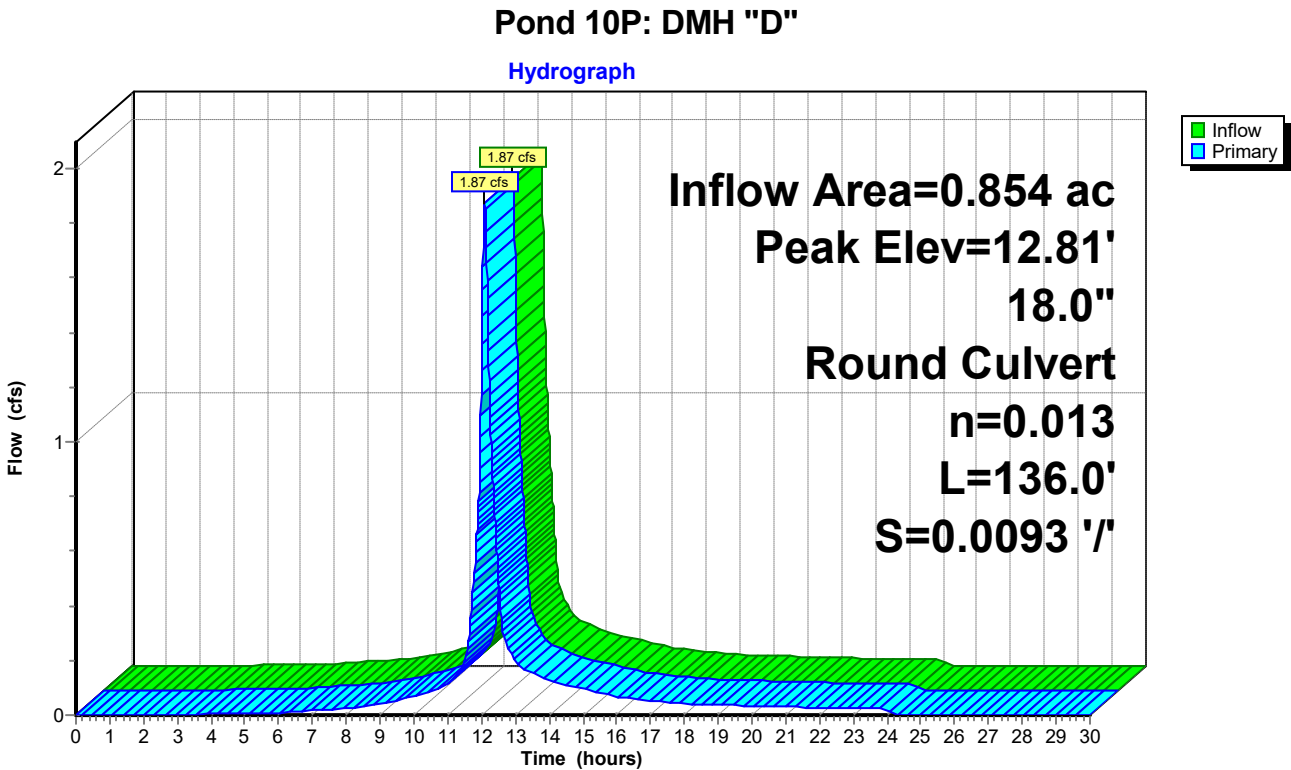
[57] Hint: Peaked at 12.81' (Flood elevation advised)

Inflow Area = 0.854 ac, 61.96% Impervious, Inflow Depth = 2.23" for 2-Year event
Inflow = 1.87 cfs @ 12.09 hrs, Volume= 0.159 af
Outflow = 1.87 cfs @ 12.09 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min
Primary = 1.87 cfs @ 12.09 hrs, Volume= 0.159 af
Routed to Link 12L : BACK RIVER

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 12.81' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.19'	18.0" Round To Back River L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.19' / 10.92' S= 0.0093 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.87 cfs @ 12.09 hrs HW=12.81' TW=0.00' (Dynamic Tailwater)
1=To Back River (Inlet Controls 1.87 cfs @ 2.69 fps)



Summary for Pond 11P: CB "G"

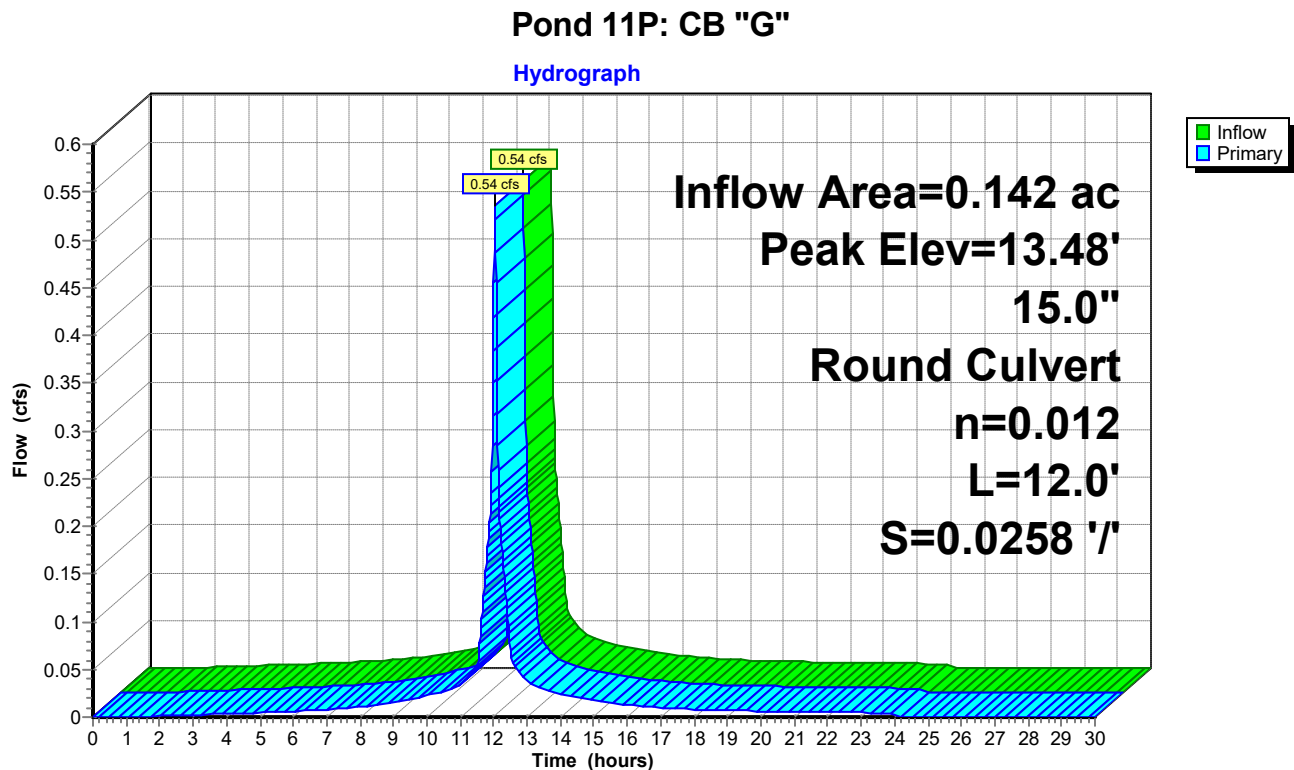
[57] Hint: Peaked at 13.48' (Flood elevation advised)

Inflow Area = 0.142 ac, 100.00% Impervious, Inflow Depth = 3.16" for 2-Year event
 Inflow = 0.54 cfs @ 12.03 hrs, Volume= 0.037 af
 Outflow = 0.54 cfs @ 12.03 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.54 cfs @ 12.03 hrs, Volume= 0.037 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.48' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.18'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.18' / 12.87' S= 0.0258 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=0.53 cfs @ 12.03 hrs HW=13.48' TW=12.76' (Dynamic Tailwater)
 1=Culvert (Inlet Controls 0.53 cfs @ 2.34 fps)

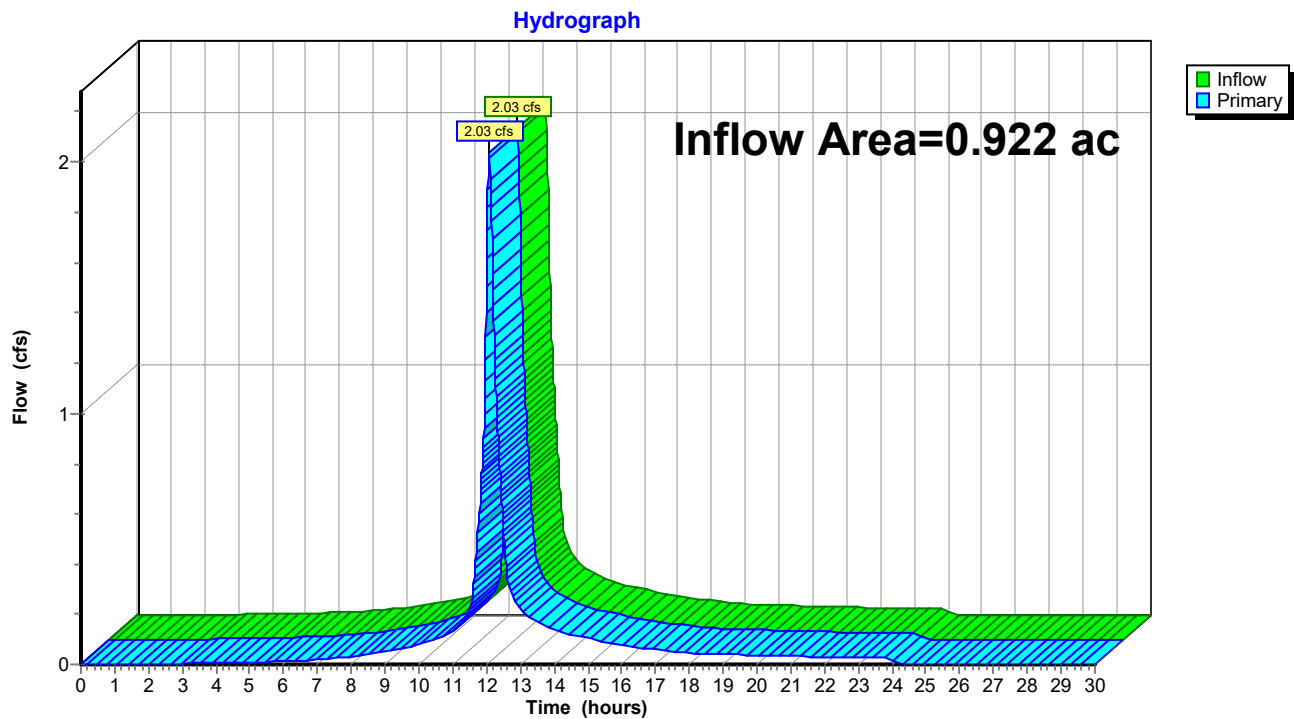


Summary for Link 12L: BACK RIVER

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 2.30" for 2-Year event
Inflow = 2.03 cfs @ 12.09 hrs, Volume= 0.177 af
Primary = 2.03 cfs @ 12.09 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 12L: BACK RIVER

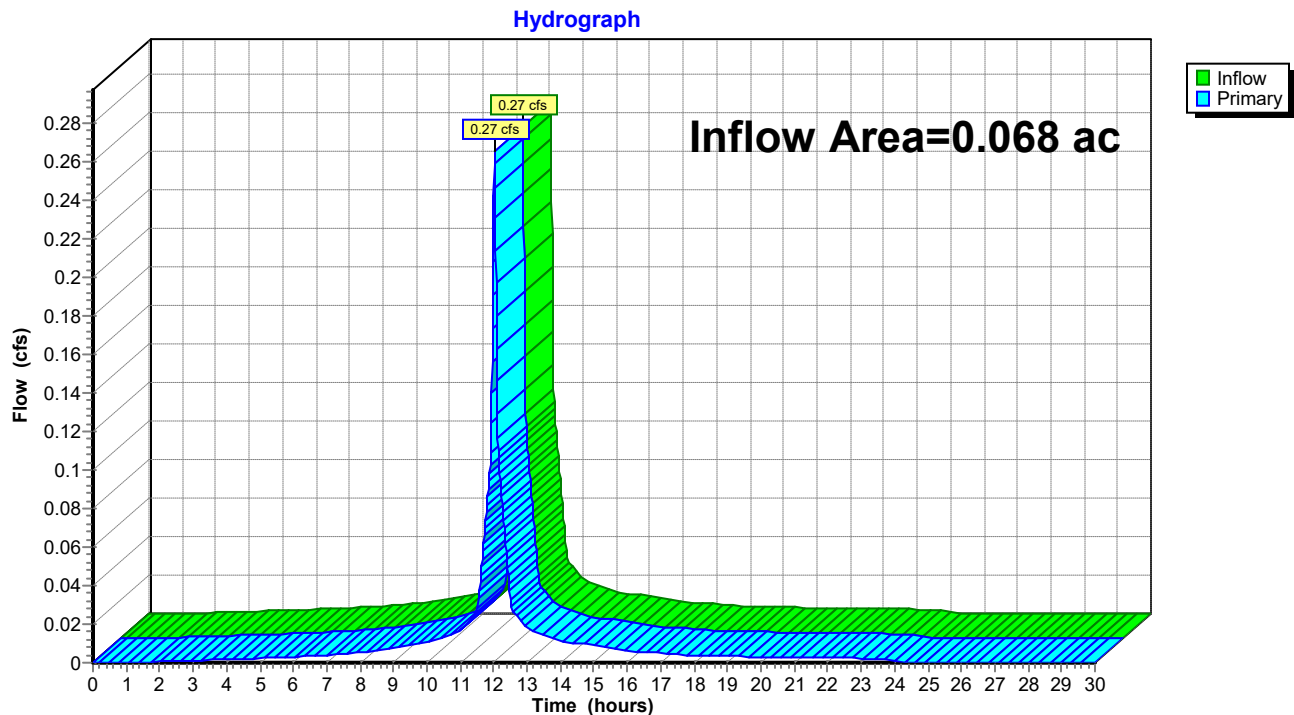


Summary for Link 14L: R Street CB

Inflow Area = 0.068 ac, 100.00% Impervious, Inflow Depth = 3.16" for 2-Year event
Inflow = 0.27 cfs @ 12.02 hrs, Volume= 0.018 af
Primary = 0.27 cfs @ 12.02 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min
Routed to Link 12L : BACK RIVER

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 14L: R Street CB



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 7S: North Area	Runoff Area=21,509 sf 58.55% Impervious Runoff Depth=4.44" Flow Length=264' Tc=8.3 min CN=92 Runoff=2.25 cfs 0.183 af
Subcatchment 8S: Southeast Area	Runoff Area=6,204 sf 100.00% Impervious Runoff Depth=5.12" Flow Length=231' Tc=2.3 min CN=98 Runoff=0.85 cfs 0.061 af
Subcatchment 9S: Southwest Area	Runoff Area=9,492 sf 44.82% Impervious Runoff Depth=2.31" Flow Length=193' Tc=6.7 min CN=70 Runoff=0.57 cfs 0.042 af
Subcatchment 15S: Roof Drain	Runoff Area=2,975 sf 100.00% Impervious Runoff Depth=5.12" Flow Length=138' Slope=0.0100 '/' Tc=1.4 min CN=98 Runoff=0.42 cfs 0.029 af
Pond 7P: CB "I"	Peak Elev=13.72' Inflow=2.25 cfs 0.183 af 15.0" Round Culvert n=0.012 L=12.0' S=0.0008 '/' Outflow=2.25 cfs 0.183 af
Pond 9P: CB "H"	Peak Elev=13.52' Inflow=0.57 cfs 0.042 af 15.0" Round Culvert n=0.013 L=10.0' S=0.0130 '/' Outflow=0.57 cfs 0.042 af
Pond 10P: DMH "D"	Peak Elev=13.06' Inflow=3.36 cfs 0.285 af 18.0" Round Culvert n=0.013 L=136.0' S=0.0093 '/' Outflow=3.36 cfs 0.285 af
Pond 11P: CB "G"	Peak Elev=13.57' Inflow=0.85 cfs 0.061 af 15.0" Round Culvert n=0.012 L=12.0' S=0.0258 '/' Outflow=0.85 cfs 0.061 af
Link 12L: BACK RIVER	Inflow=3.62 cfs 0.315 af Primary=3.62 cfs 0.315 af
Link 14L: R Street CB	Inflow=0.42 cfs 0.029 af Primary=0.42 cfs 0.029 af

Total Runoff Area = 0.922 ac Runoff Volume = 0.315 af Average Runoff Depth = 4.09"
35.22% Pervious = 0.325 ac 64.78% Impervious = 0.597 ac

Summary for Subcatchment 7S: North Area

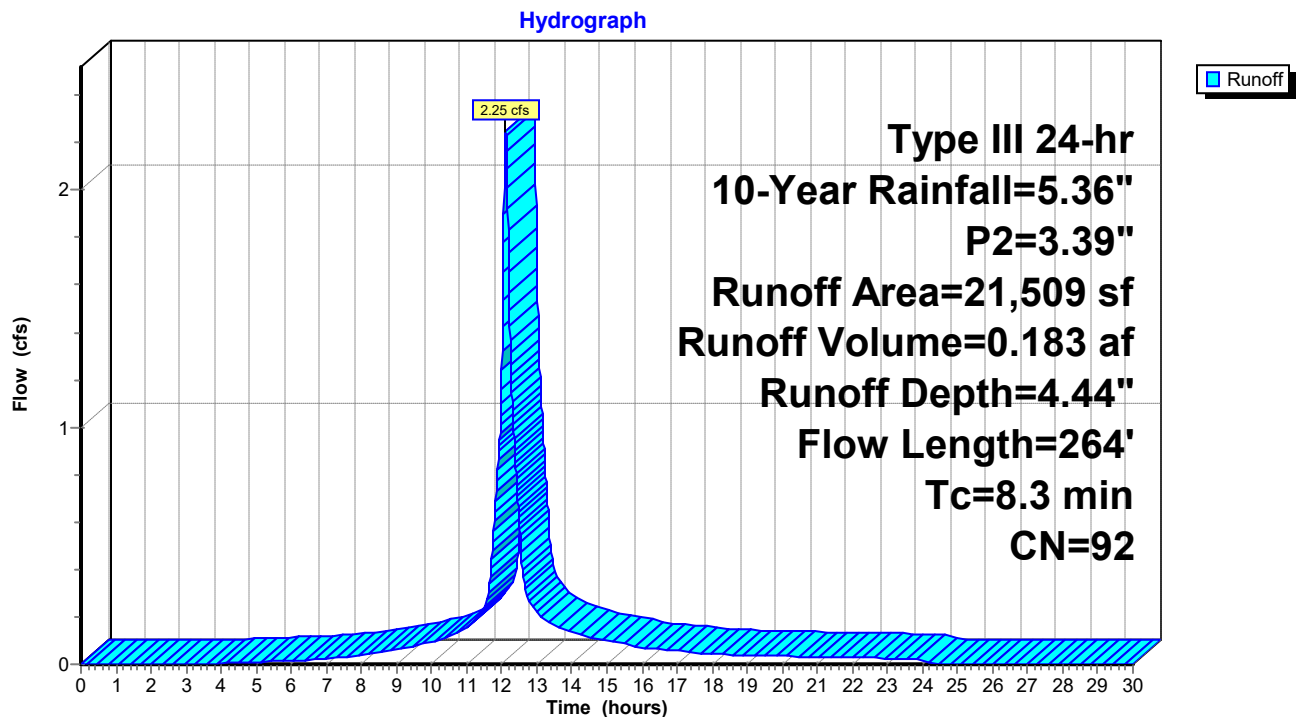
Runoff = 2.25 cfs @ 12.11 hrs, Volume= 0.183 af, Depth= 4.44"
 Routed to Pond 7P : CB "I"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

Area (sf)	CN	Description
8,708	98	Paved roads w/curbs & sewers, HSG D
7,530	80	>75% Grass cover, Good, HSG D
* 1,385	96	Brick Pavers, HSG D
3,886	98	Roofs, HSG D
21,509	92	Weighted Average
8,915		41.45% Pervious Area
12,594		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	112	0.0580	0.27		Sheet Flow, over lawn Grass: Short n= 0.150 P2= 3.39"
0.7	37	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	115	0.0240	2.49		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.3	264	Total			

Subcatchment 7S: North Area



Summary for Subcatchment 8S: Southeast Area

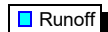
Routed to Pond 11P : CB "G"

Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

6,204	100.00% Impervious Area
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2.3	231	Total
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Subcatchment 8S: Southeast Area



Summary for Subcatchment 9S: Southwest Area

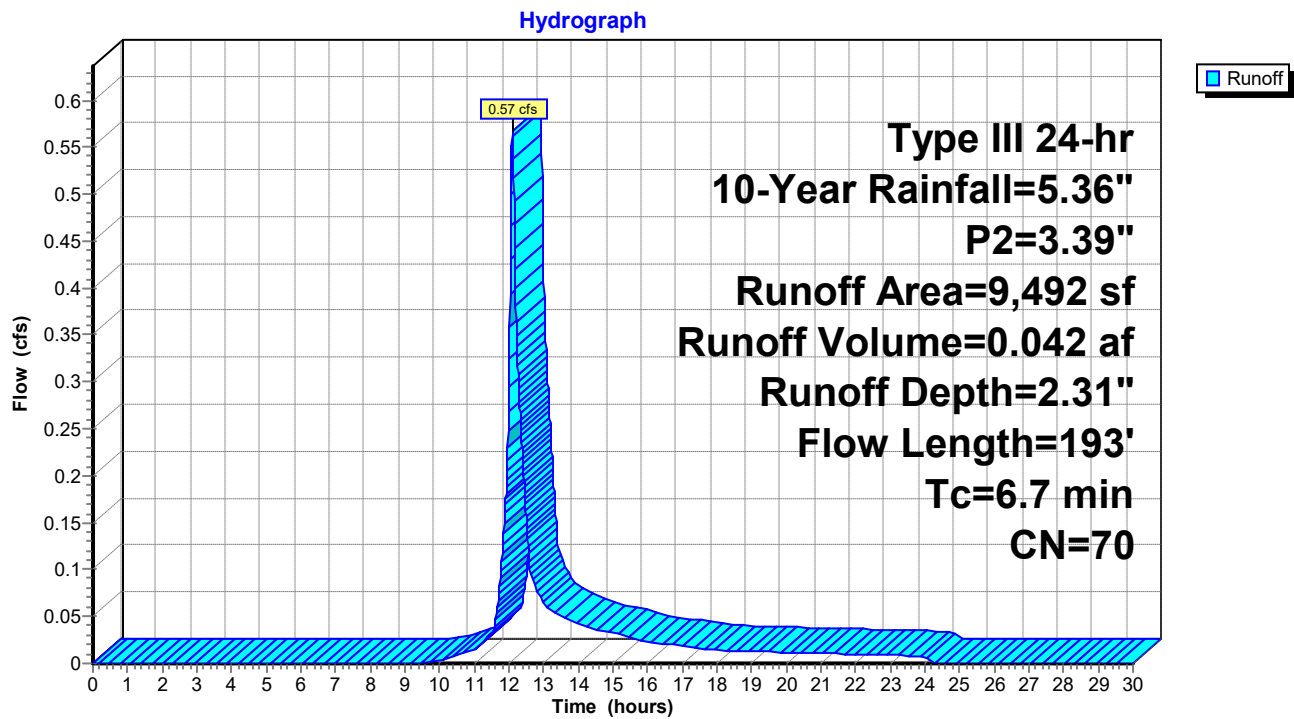
Runoff = 0.57 cfs @ 12.10 hrs, Volume= 0.042 af, Depth= 2.31"
 Routed to Pond 9P : CB "H"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

Area (sf)	CN	Description
3,945	39	>75% Grass cover, Good, HSG A
2,588	98	Paved roads w/curbs & sewers, HSG A
1,666	98	Roofs, HSG A
* 1,293	76	Brick Pavers, HSG A
9,492	70	Weighted Average
5,238		55.18% Pervious Area
4,254		44.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	26	0.0190	0.09		Sheet Flow, sheet flow over lawn area (90') Grass: Dense n= 0.240 P2= 3.39"
0.9	94	0.0110	1.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	39	0.0130	0.80		Shallow Concentrated Flow, Shallow conc flow over driveway Short Grass Pasture Kv= 7.0 fps
0.2	34	0.0250	2.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.7	193	Total			

Subcatchment 9S: Southwest Area



Summary for Subcatchment 15S: Roof Drain

[47] Hint: Peak is 171% of capacity of segment #3

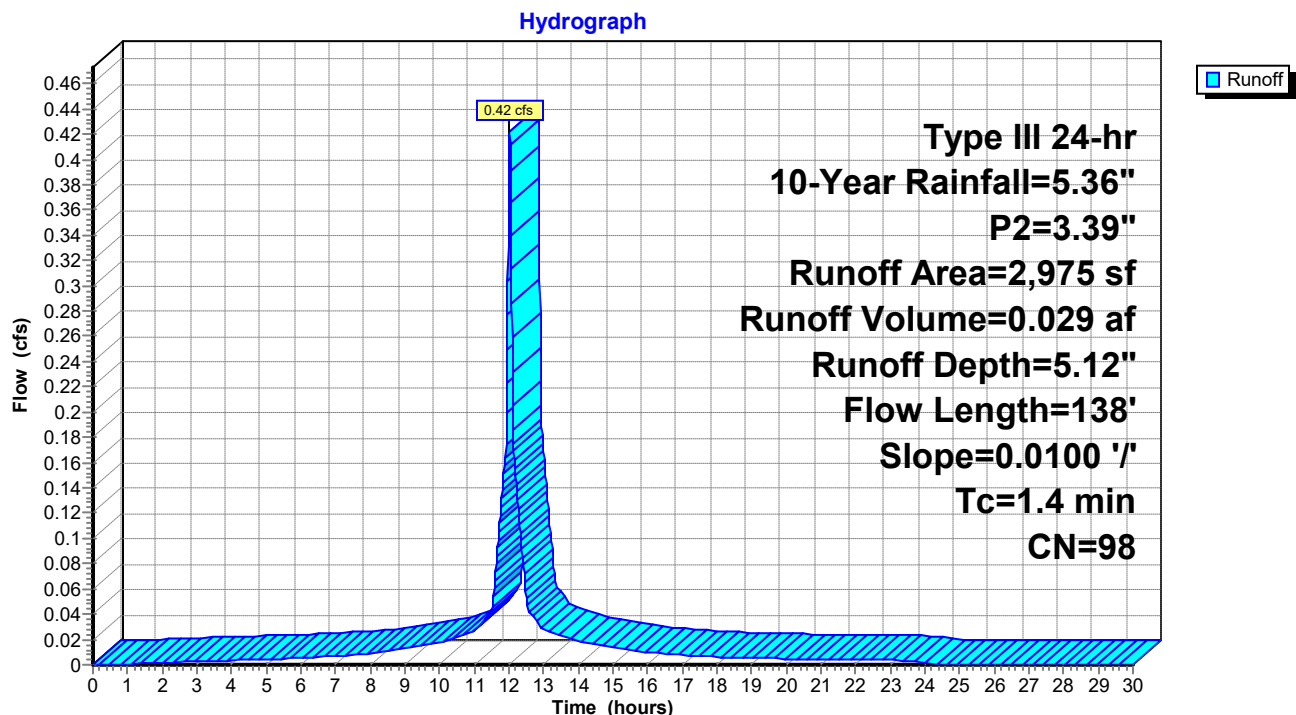
Runoff = 0.42 cfs @ 12.02 hrs, Volume= 0.029 af, Depth= 5.12"
 Routed to Link 14L : R Street CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

Area (sf)	CN	Description
2,975	98	Roofs, HSG A
2,975		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	51	0.0100	0.94		Sheet Flow, sheet flow over roof Smooth surfaces n= 0.011 P2= 3.39"
0.3	60	0.0100	3.71	0.73	Pipe Channel, Pipe 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.010 PVC, smooth interior
0.2	27	0.0100	2.84	0.25	Pipe Channel, Pipe 4.0" Round Area= 0.1 sf Perim= 1.0' r= 0.08' n= 0.010 PVC, smooth interior
1.4	138	Total			

Subcatchment 15S: Roof Drain



Summary for Pond 7P: CB "I"

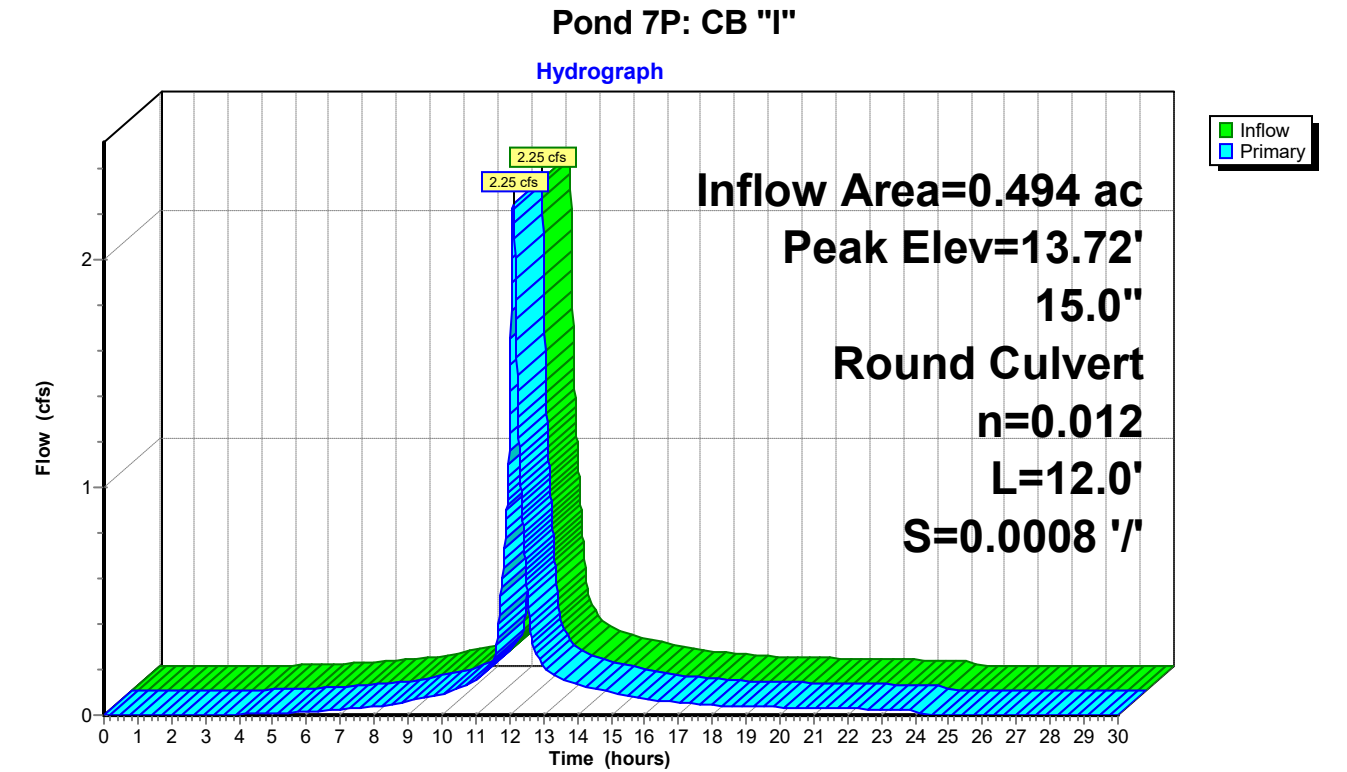
[57] Hint: Peaked at 13.72' (Flood elevation advised)

Inflow Area = 0.494 ac, 58.55% Impervious, Inflow Depth = 4.44" for 10-Year event
Inflow = 2.25 cfs @ 12.11 hrs, Volume= 0.183 af
Outflow = 2.25 cfs @ 12.11 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min
Primary = 2.25 cfs @ 12.11 hrs, Volume= 0.183 af
Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 13.72' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.81'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 12.81' / 12.80' S= 0.0008 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=2.25 cfs @ 12.11 hrs HW=13.72' TW=13.05' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.25 cfs @ 3.28 fps)



Summary for Pond 9P: CB "H"

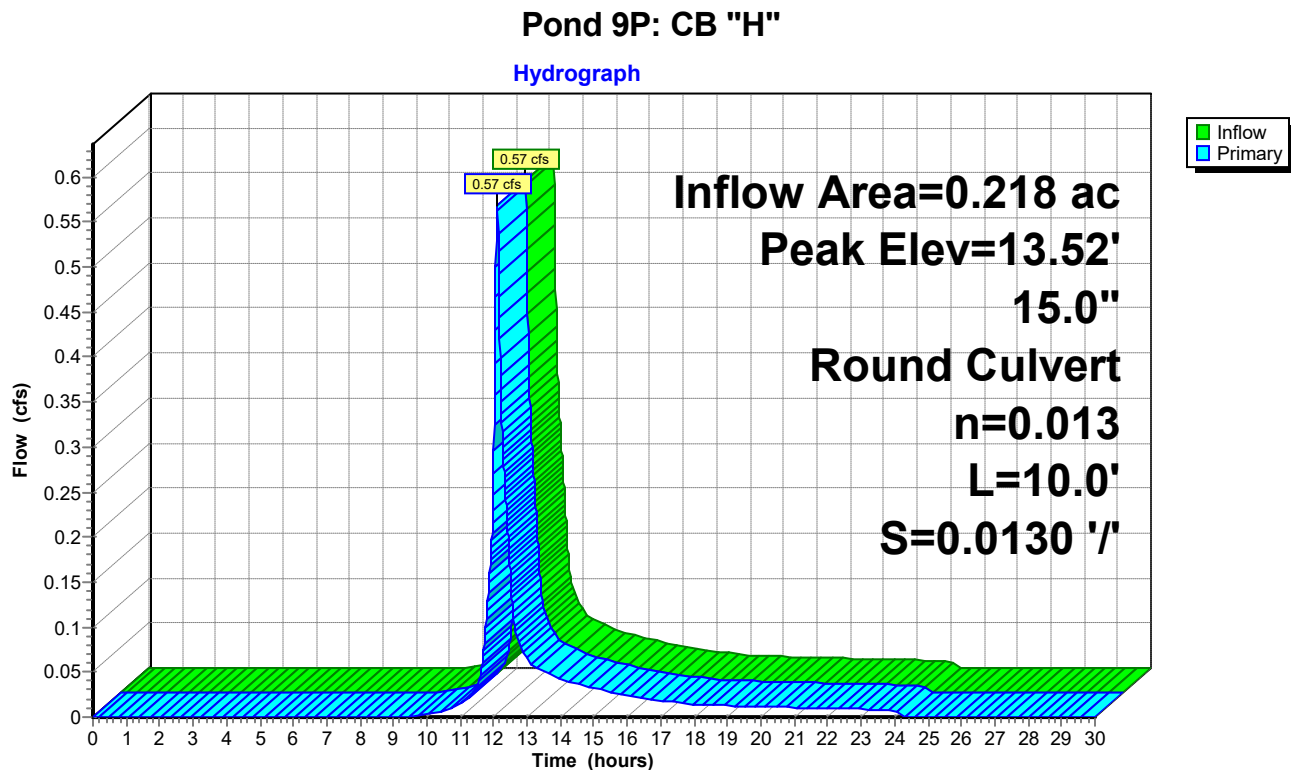
[57] Hint: Peaked at 13.52' (Flood elevation advised)

Inflow Area = 0.218 ac, 44.82% Impervious, Inflow Depth = 2.31" for 10-Year event
 Inflow = 0.57 cfs @ 12.10 hrs, Volume= 0.042 af
 Outflow = 0.57 cfs @ 12.10 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.57 cfs @ 12.10 hrs, Volume= 0.042 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.52' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.15'	15.0" Round Culvert L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.15' / 13.02' S= 0.0130 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=0.57 cfs @ 12.10 hrs HW=13.52' TW=13.06' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 0.57 cfs @ 2.85 fps)



Summary for Pond 10P: DMH "D"

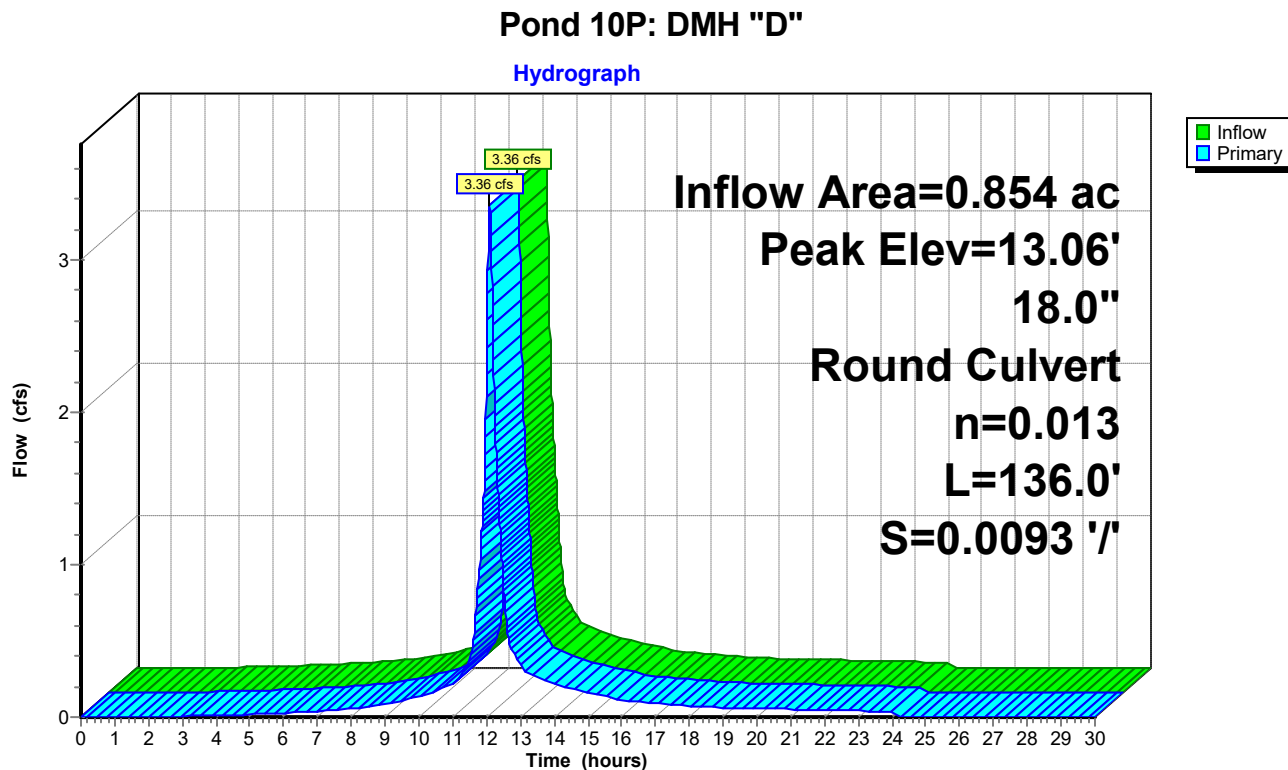
[57] Hint: Peaked at 13.06' (Flood elevation advised)

Inflow Area = 0.854 ac, 61.96% Impervious, Inflow Depth = 4.01" for 10-Year event
 Inflow = 3.36 cfs @ 12.09 hrs, Volume= 0.285 af
 Outflow = 3.36 cfs @ 12.09 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.36 cfs @ 12.09 hrs, Volume= 0.285 af
 Routed to Link 12L : BACK RIVER

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.06' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.19'	18.0" Round To Back River L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.19' / 10.92' S= 0.0093 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.36 cfs @ 12.09 hrs HW=13.06' TW=0.00' (Dynamic Tailwater)
 1=To Back River (Inlet Controls 3.36 cfs @ 3.17 fps)



Summary for Pond 11P: CB "G"

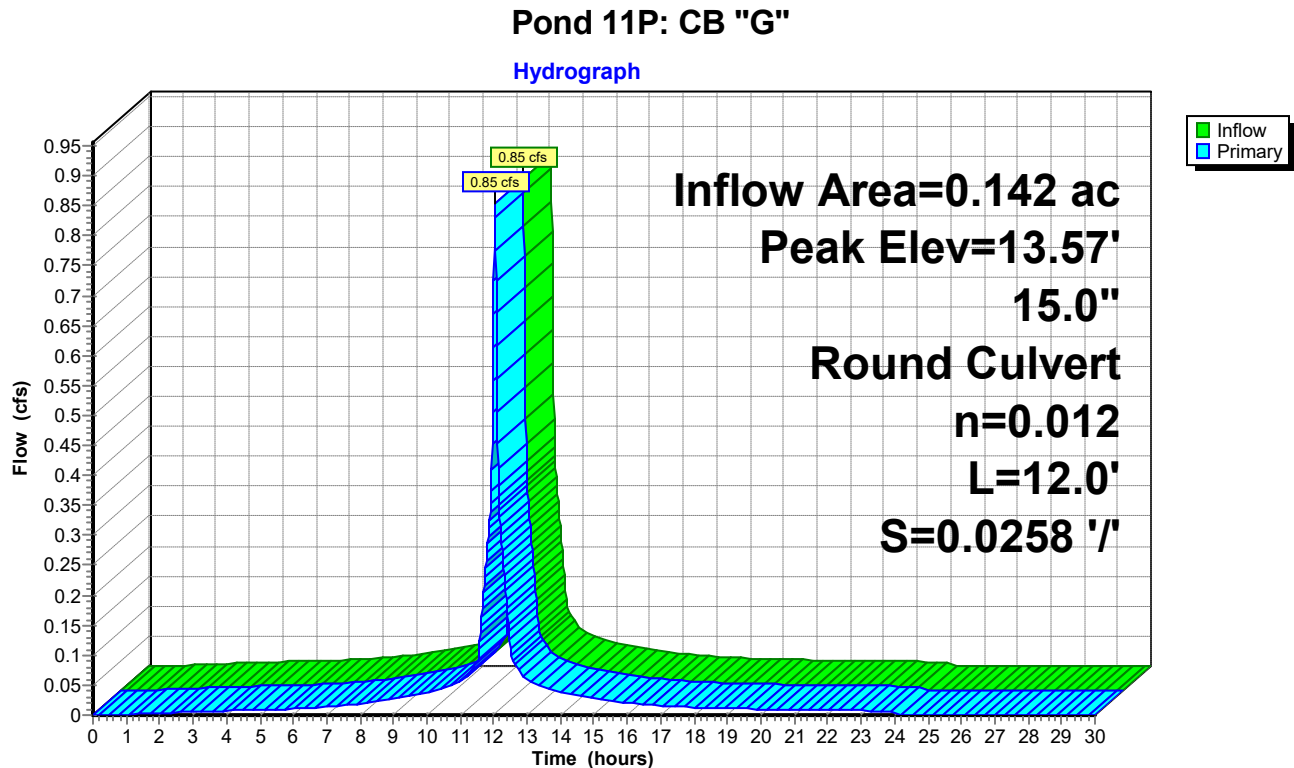
[57] Hint: Peaked at 13.57' (Flood elevation advised)

Inflow Area = 0.142 ac, 100.00% Impervious, Inflow Depth = 5.12" for 10-Year event
 Inflow = 0.85 cfs @ 12.03 hrs, Volume= 0.061 af
 Outflow = 0.85 cfs @ 12.03 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.85 cfs @ 12.03 hrs, Volume= 0.061 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.57' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.18'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.18' / 12.87' S= 0.0258 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=0.85 cfs @ 12.03 hrs HW=13.57' TW=12.98' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.85 cfs @ 3.90 fps)

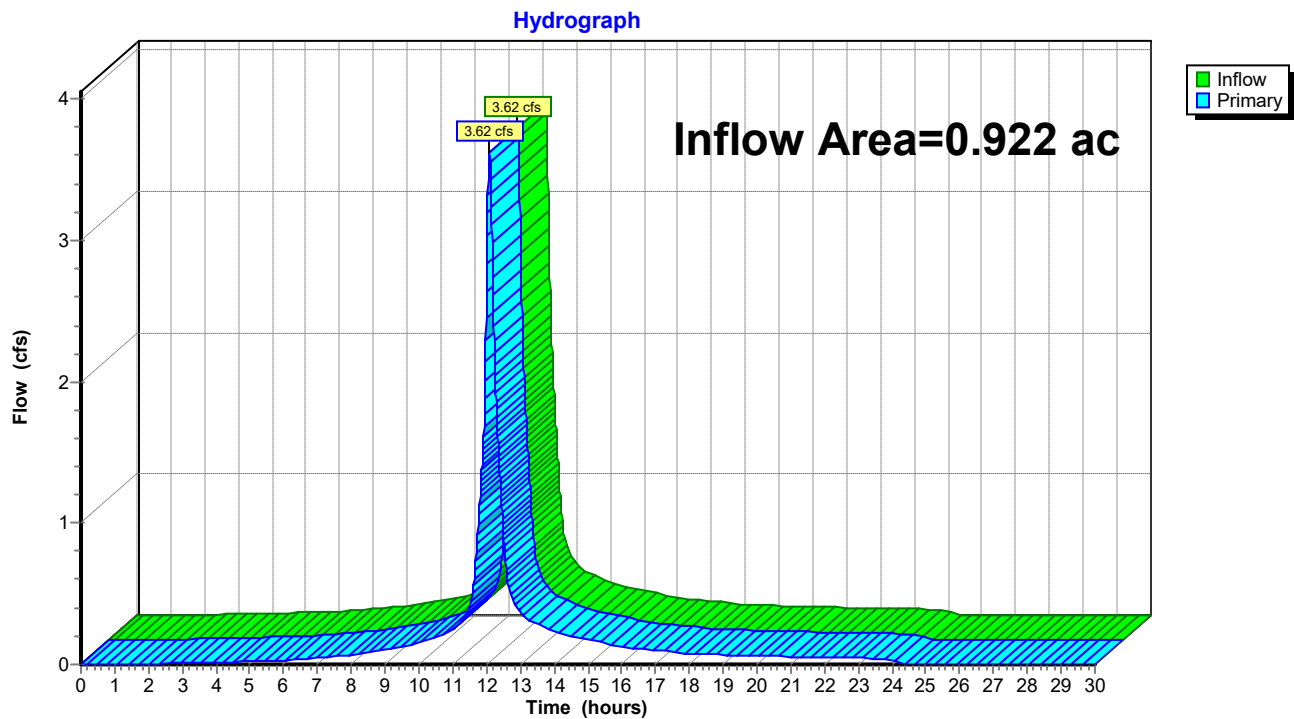


Summary for Link 12L: BACK RIVER

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 4.09" for 10-Year event
Inflow = 3.62 cfs @ 12.09 hrs, Volume= 0.315 af
Primary = 3.62 cfs @ 12.09 hrs, Volume= 0.315 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 12L: BACK RIVER

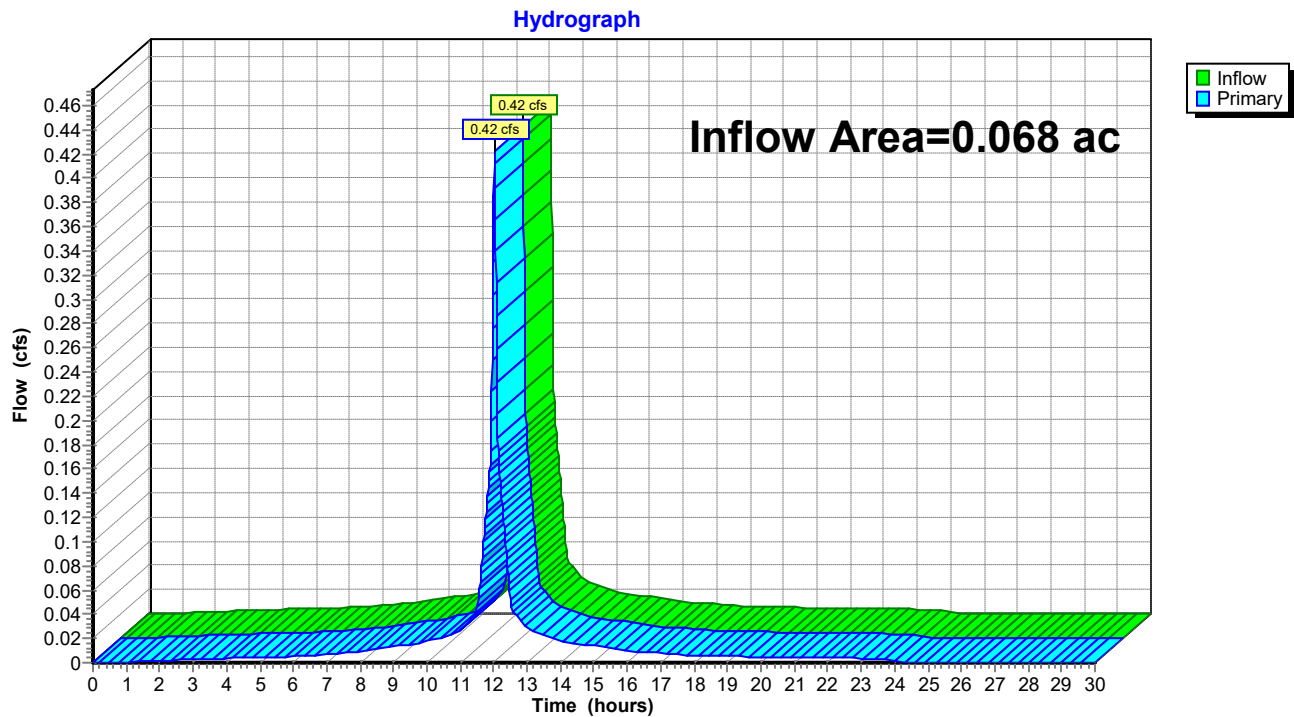


Summary for Link 14L: R Street CB

Inflow Area = 0.068 ac, 100.00% Impervious, Inflow Depth = 5.12" for 10-Year event
Inflow = 0.42 cfs @ 12.02 hrs, Volume= 0.029 af
Primary = 0.42 cfs @ 12.02 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Routed to Link 12L : BACK RIVER

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 14L: R Street CB



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 7S: North Area	Runoff Area=21,509 sf 58.55% Impervious Runoff Depth=7.54" Flow Length=264' Tc=8.3 min CN=92 Runoff=3.71 cfs 0.310 af
Subcatchment 8S: Southeast Area	Runoff Area=6,204 sf 100.00% Impervious Runoff Depth=8.26" Flow Length=231' Tc=2.3 min CN=98 Runoff=1.36 cfs 0.098 af
Subcatchment 9S: Southwest Area	Runoff Area=9,492 sf 44.82% Impervious Runoff Depth=4.90" Flow Length=193' Tc=6.7 min CN=70 Runoff=1.22 cfs 0.089 af
Subcatchment 15S: Roof Drain	Runoff Area=2,975 sf 100.00% Impervious Runoff Depth=8.26" Flow Length=138' Slope=0.0100 '/' Tc=1.4 min CN=98 Runoff=0.67 cfs 0.047 af
Pond 7P: CB "I"	Peak Elev=14.04' Inflow=3.71 cfs 0.310 af 15.0" Round Culvert n=0.012 L=12.0' S=0.0008 '/' Outflow=3.71 cfs 0.310 af
Pond 9P: CB "H"	Peak Elev=13.71' Inflow=1.22 cfs 0.089 af 15.0" Round Culvert n=0.013 L=10.0' S=0.0130 '/' Outflow=1.22 cfs 0.089 af
Pond 10P: DMH "D"	Peak Elev=13.41' Inflow=5.79 cfs 0.497 af 18.0" Round Culvert n=0.013 L=136.0' S=0.0093 '/' Outflow=5.79 cfs 0.497 af
Pond 11P: CB "G"	Peak Elev=13.70' Inflow=1.36 cfs 0.098 af 15.0" Round Culvert n=0.012 L=12.0' S=0.0258 '/' Outflow=1.36 cfs 0.098 af
Link 12L: BACK RIVER	Inflow=6.21 cfs 0.544 af Primary=6.21 cfs 0.544 af
Link 14L: R Street CB	Inflow=0.67 cfs 0.047 af Primary=0.67 cfs 0.047 af

Total Runoff Area = 0.922 ac Runoff Volume = 0.544 af Average Runoff Depth = 7.08"
35.22% Pervious = 0.325 ac 64.78% Impervious = 0.597 ac

Summary for Subcatchment 7S: North Area

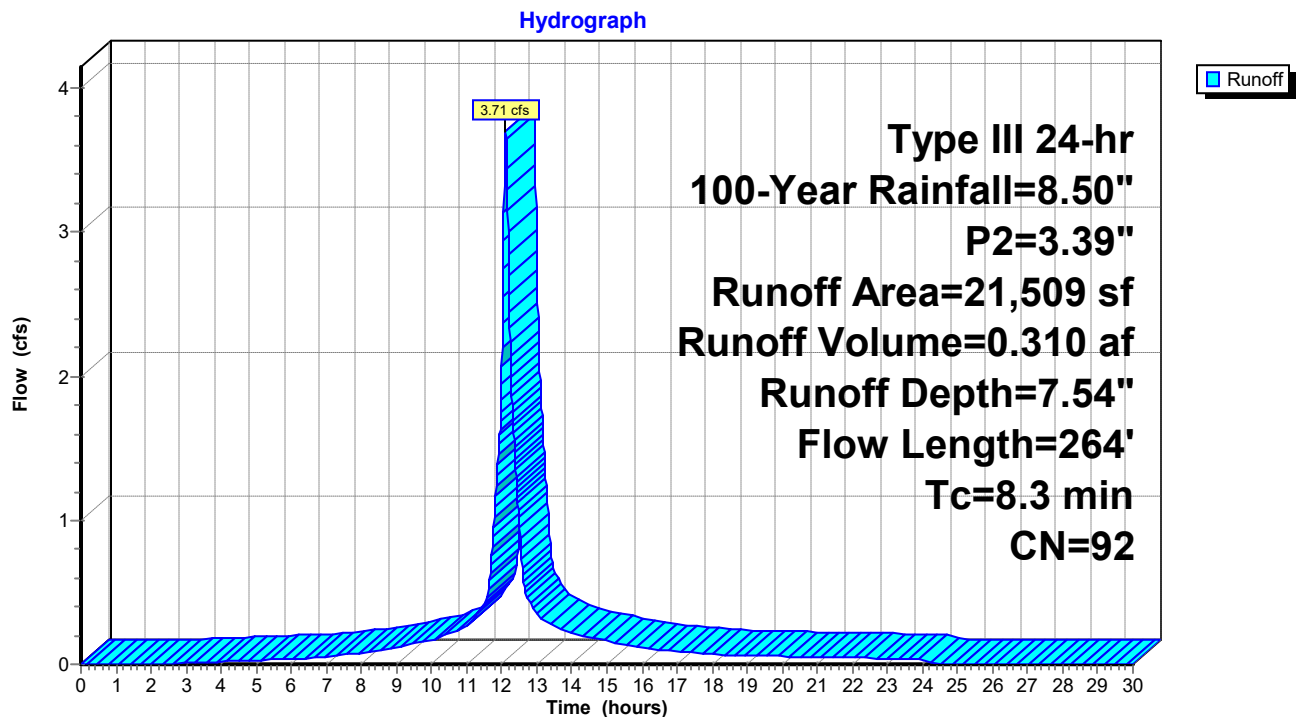
Runoff = 3.71 cfs @ 12.11 hrs, Volume= 0.310 af, Depth= 7.54"
 Routed to Pond 7P : CB "I"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
8,708	98	Paved roads w/curbs & sewers, HSG D
7,530	80	>75% Grass cover, Good, HSG D
* 1,385	96	Brick Pavers, HSG D
3,886	98	Roofs, HSG D
21,509	92	Weighted Average
8,915		41.45% Pervious Area
12,594		58.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	112	0.0580	0.27		Sheet Flow, over lawn Grass: Short n= 0.150 P2= 3.39"
0.7	37	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	115	0.0240	2.49		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.3	264	Total			

Subcatchment 7S: North Area



Summary for Subcatchment 8S: Southeast Area

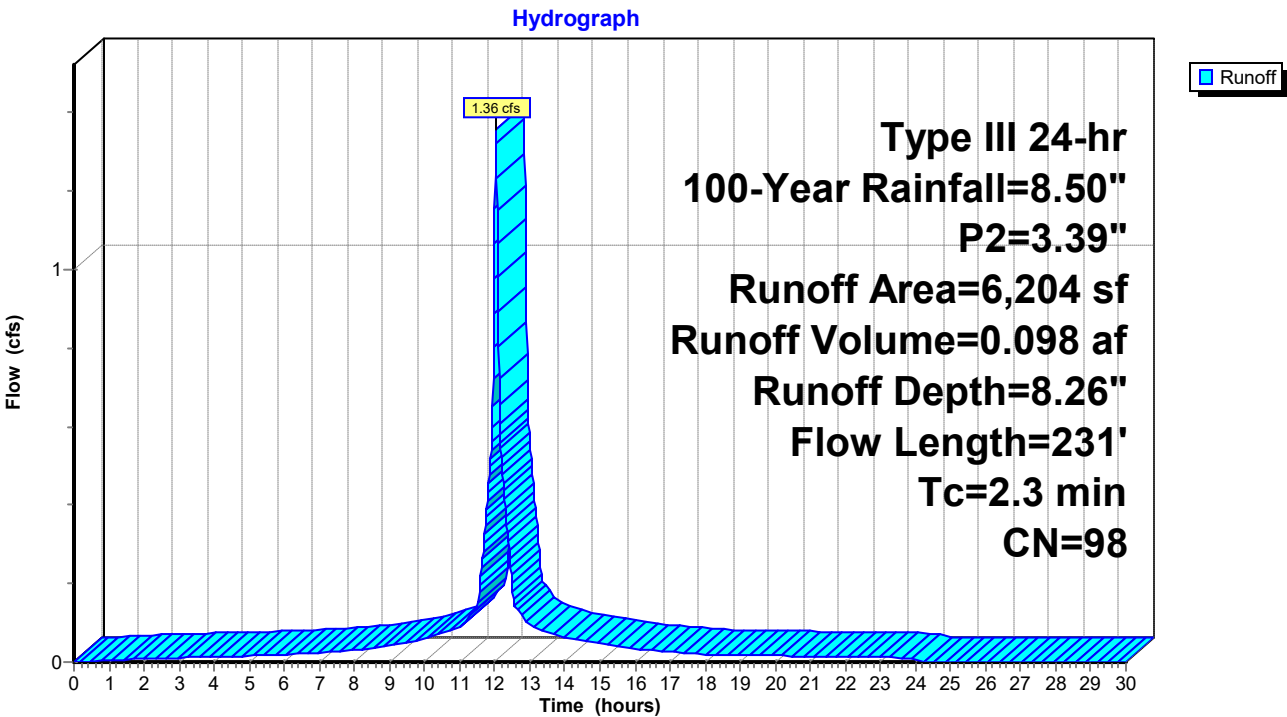
Runoff = 1.36 cfs @ 12.03 hrs, Volume= 0.098 af, Depth= 8.26"
Routed to Pond 11P : CB "G"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
6,204	98	Paved roads w/curbs & sewers, HSG A
6,204		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.26		Sheet Flow, Sheet flow over paved parking area (100') Smooth surfaces n= 0.011 P2= 3.39"
1.0	131	0.0120	2.22		Shallow Concentrated Flow, Shallow conc flow over paved R St Paved Kv= 20.3 fps
2.3	231	Total			

Subcatchment 8S: Southeast Area



Summary for Subcatchment 9S: Southwest Area

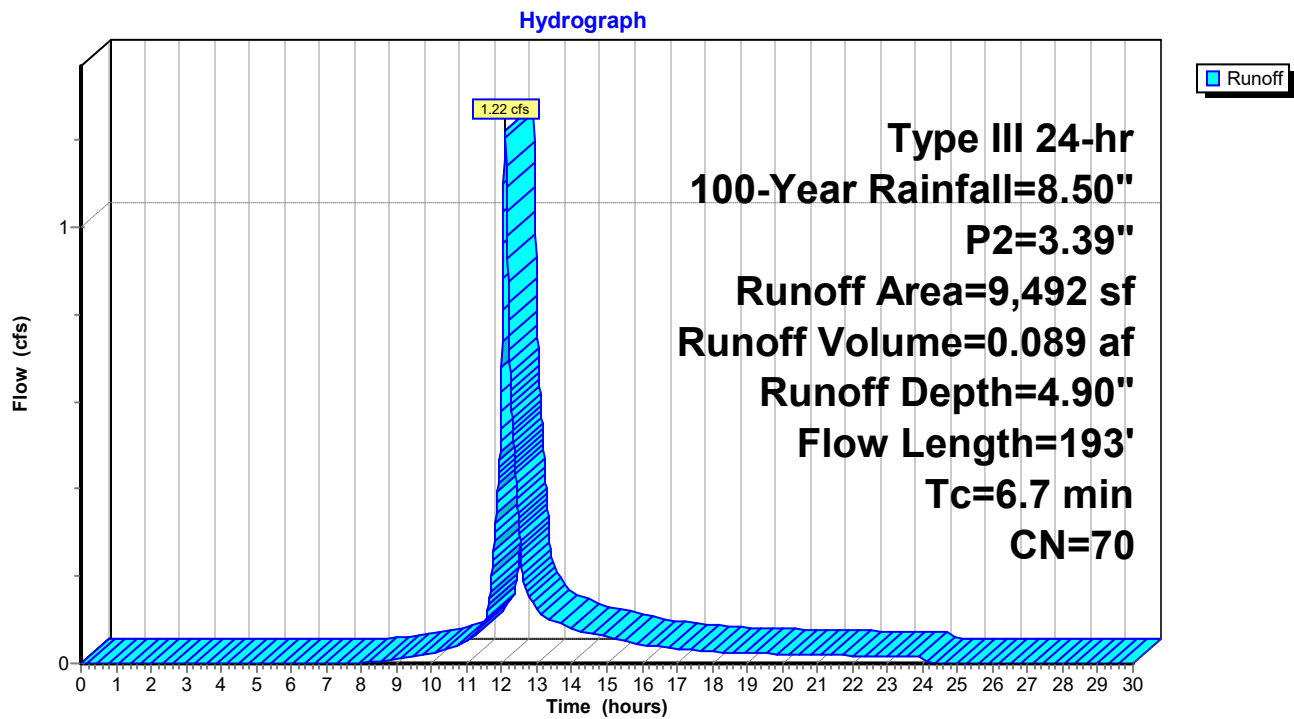
Runoff = 1.22 cfs @ 12.10 hrs, Volume= 0.089 af, Depth= 4.90"
 Routed to Pond 9P : CB "H"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
3,945	39	>75% Grass cover, Good, HSG A
2,588	98	Paved roads w/curbs & sewers, HSG A
1,666	98	Roofs, HSG A
* 1,293	76	Brick Pavers, HSG A
9,492	70	Weighted Average
5,238		55.18% Pervious Area
4,254		44.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	26	0.0190	0.09		Sheet Flow, sheet flow over lawn area (90') Grass: Dense n= 0.240 P2= 3.39"
0.9	94	0.0110	1.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	39	0.0130	0.80		Shallow Concentrated Flow, Shallow conc flow over driveway Short Grass Pasture Kv= 7.0 fps
0.2	34	0.0250	2.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.7	193	Total			

Subcatchment 9S: Southwest Area



Summary for Subcatchment 15S: Roof Drain

[47] Hint: Peak is 271% of capacity of segment #3

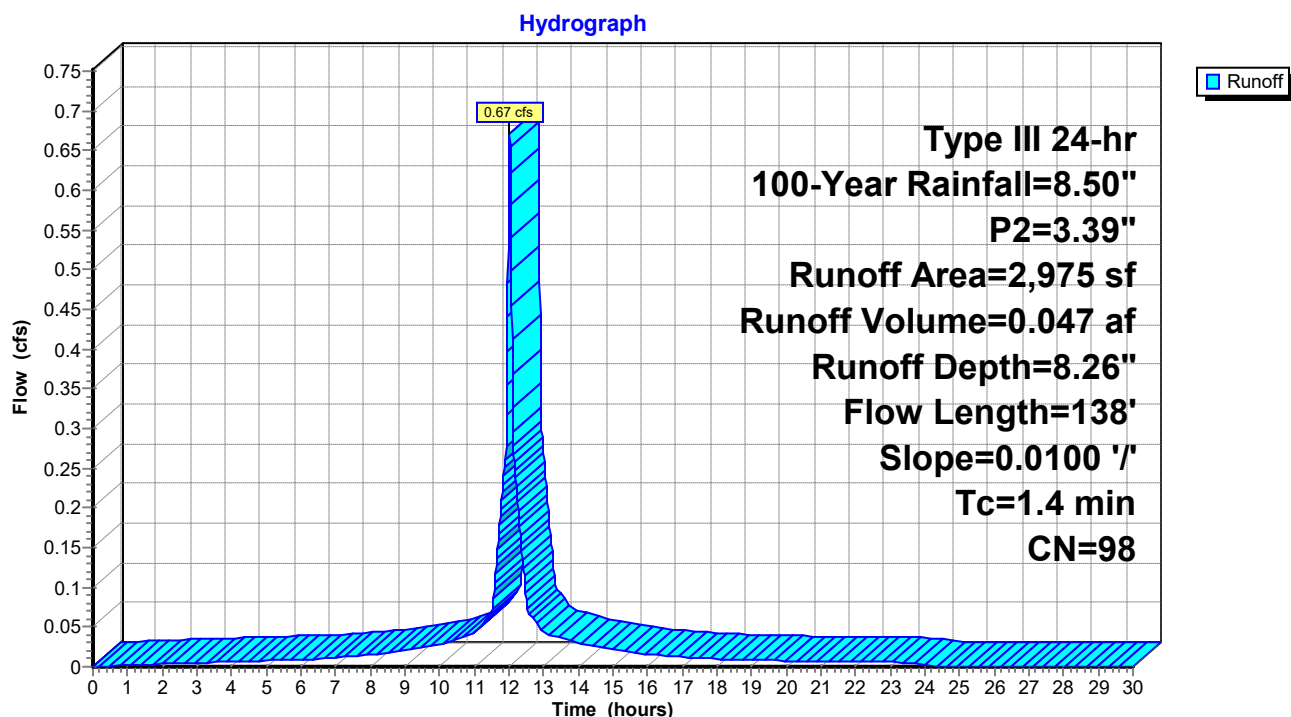
Runoff = 0.67 cfs @ 12.02 hrs, Volume= 0.047 af, Depth= 8.26"
 Routed to Link 14L : R Street CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
2,975	98	Roofs, HSG A
2,975		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	51	0.0100	0.94		Sheet Flow, sheet flow over roof Smooth surfaces n= 0.011 P2= 3.39"
0.3	60	0.0100	3.71	0.73	Pipe Channel, Pipe 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.010 PVC, smooth interior
0.2	27	0.0100	2.84	0.25	Pipe Channel, Pipe 4.0" Round Area= 0.1 sf Perim= 1.0' r= 0.08' n= 0.010 PVC, smooth interior
1.4	138	Total			

Subcatchment 15S: Roof Drain



Summary for Pond 7P: CB "I"

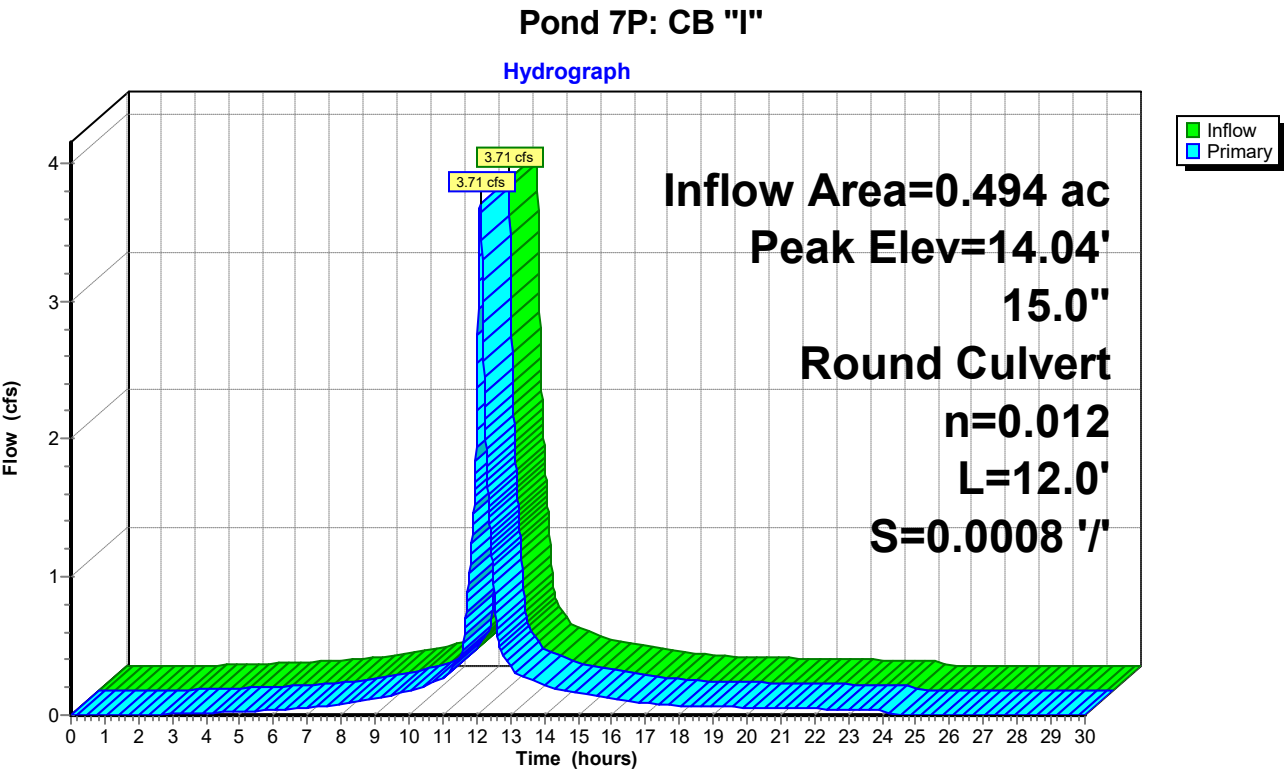
[57] Hint: Peaked at 14.04' (Flood elevation advised)

Inflow Area = 0.494 ac, 58.55% Impervious, Inflow Depth = 7.54" for 100-Year event
Inflow = 3.71 cfs @ 12.11 hrs, Volume= 0.310 af
Outflow = 3.71 cfs @ 12.11 hrs, Volume= 0.310 af, Atten= 0%, Lag= 0.0 min
Primary = 3.71 cfs @ 12.11 hrs, Volume= 0.310 af
Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 14.04' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.81'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 12.81' / 12.80' S= 0.0008 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=3.70 cfs @ 12.11 hrs HW=14.03' TW=13.39' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.70 cfs @ 3.83 fps)



Summary for Pond 9P: CB "H"

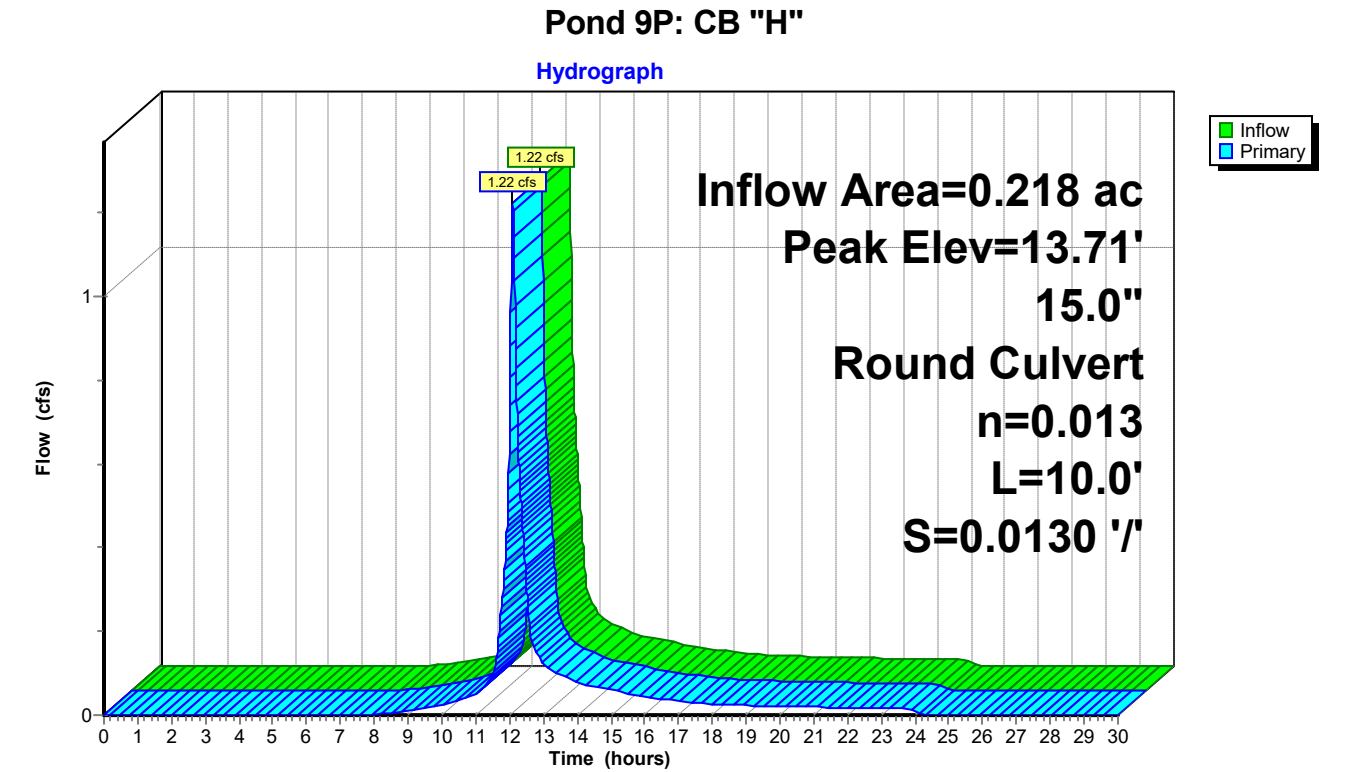
[57] Hint: Peaked at 13.71' (Flood elevation advised)

Inflow Area = 0.218 ac, 44.82% Impervious, Inflow Depth = 4.90" for 100-Year event
Inflow = 1.22 cfs @ 12.10 hrs, Volume= 0.089 af
Outflow = 1.22 cfs @ 12.10 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.10 hrs, Volume= 0.089 af
Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 13.71' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.15'	15.0" Round Culvert L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.15' / 13.02' S= 0.0130 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=1.22 cfs @ 12.10 hrs HW=13.71' TW=13.41' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.22 cfs @ 3.36 fps)



Summary for Pond 10P: DMH "D"

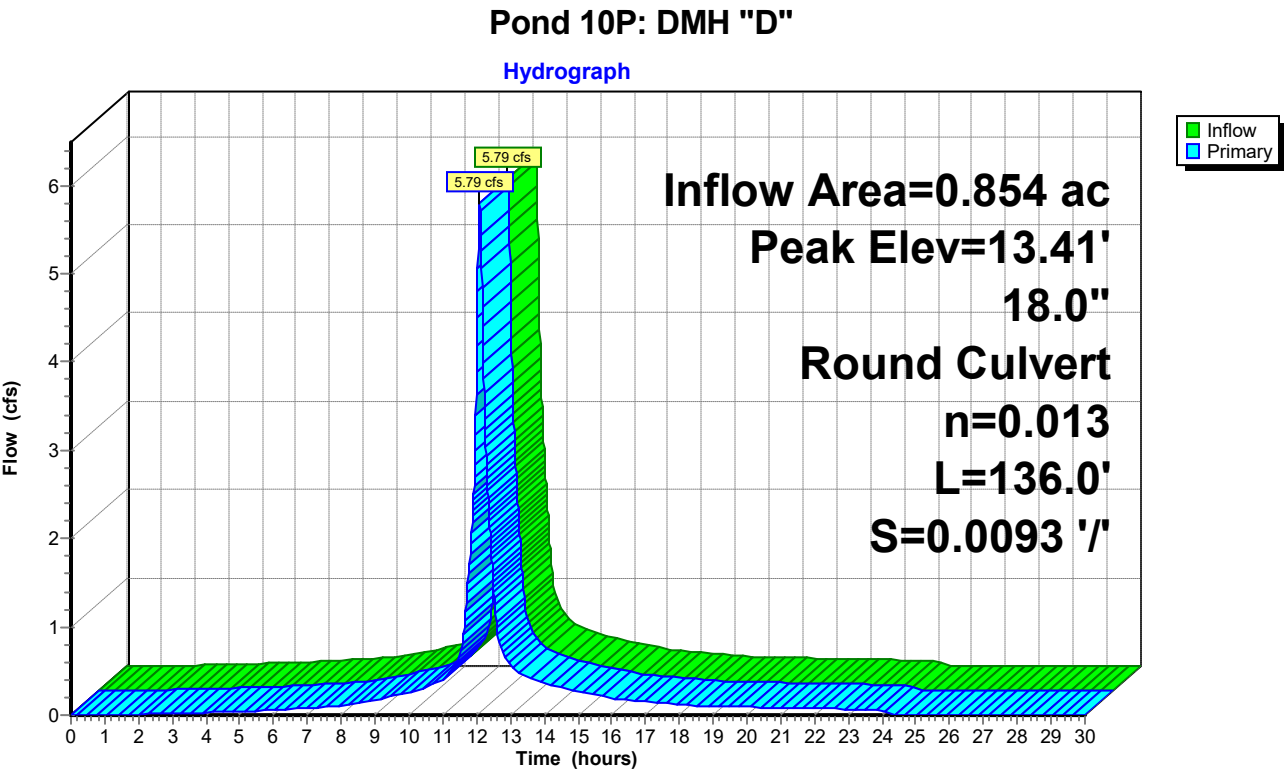
[57] Hint: Peaked at 13.41' (Flood elevation advised)

Inflow Area = 0.854 ac, 61.96% Impervious, Inflow Depth = 6.99" for 100-Year event
Inflow = 5.79 cfs @ 12.09 hrs, Volume= 0.497 af
Outflow = 5.79 cfs @ 12.09 hrs, Volume= 0.497 af, Atten= 0%, Lag= 0.0 min
Primary = 5.79 cfs @ 12.09 hrs, Volume= 0.497 af
Routed to Link 12L : BACK RIVER

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 13.41' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.19'	18.0" Round To Back River L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.19' / 10.92' S= 0.0093 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.79 cfs @ 12.09 hrs HW=13.41' TW=0.00' (Dynamic Tailwater)
1=To Back River (Inlet Controls 5.79 cfs @ 3.76 fps)



Summary for Pond 11P: CB "G"

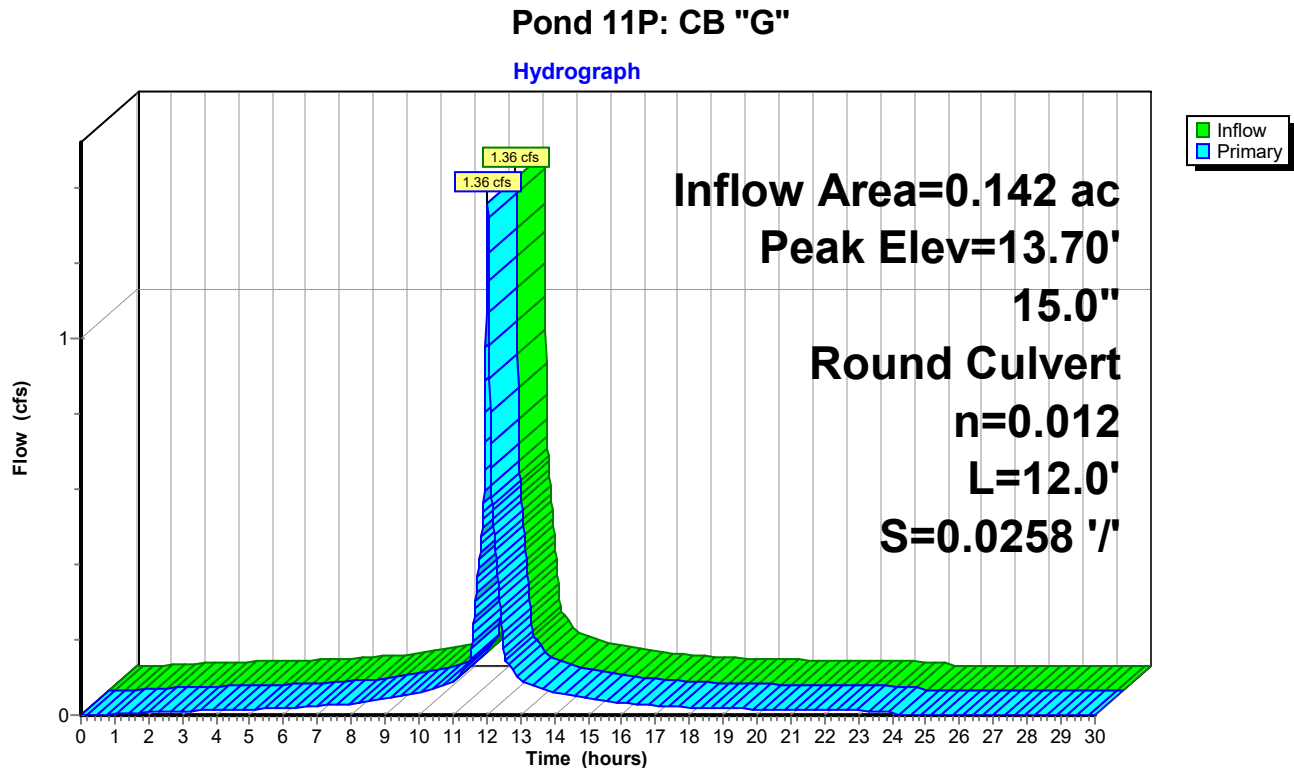
[57] Hint: Peaked at 13.70' (Flood elevation advised)

Inflow Area = 0.142 ac, 100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
 Inflow = 1.36 cfs @ 12.03 hrs, Volume= 0.098 af
 Outflow = 1.36 cfs @ 12.03 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.36 cfs @ 12.03 hrs, Volume= 0.098 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.70' @ 12.05 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.18'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.18' / 12.87' S= 0.0258 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=1.32 cfs @ 12.03 hrs HW=13.69' TW=13.28' (Dynamic Tailwater)
 1=Culvert (Outlet Controls 1.32 cfs @ 4.12 fps)

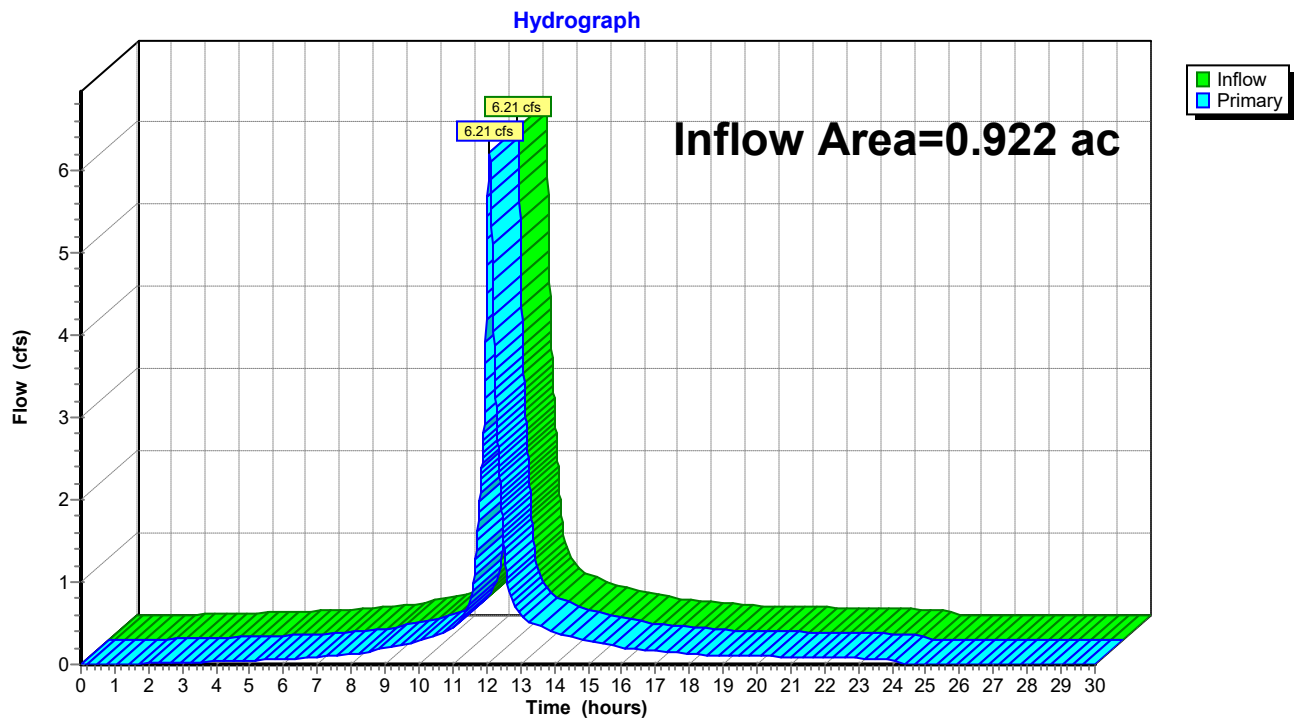


Summary for Link 12L: BACK RIVER

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 7.08" for 100-Year event
Inflow = 6.21 cfs @ 12.09 hrs, Volume= 0.544 af
Primary = 6.21 cfs @ 12.09 hrs, Volume= 0.544 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 12L: BACK RIVER

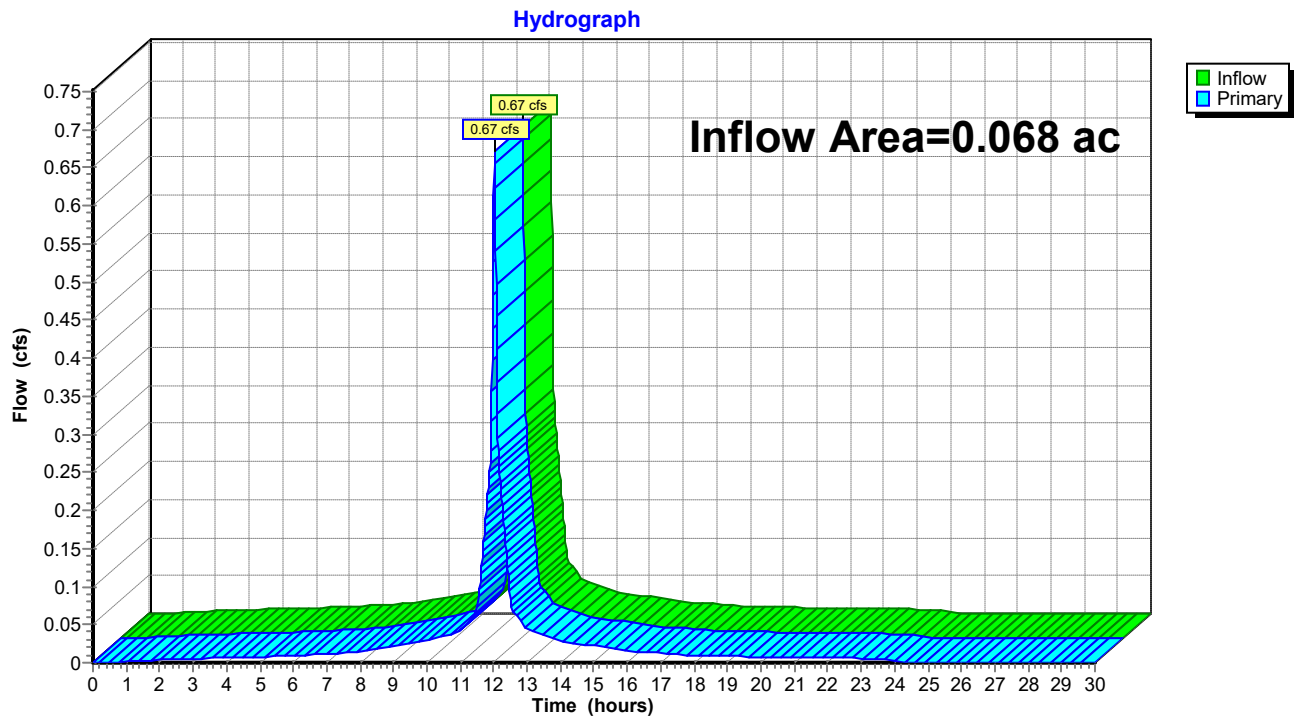


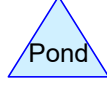
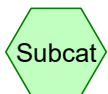
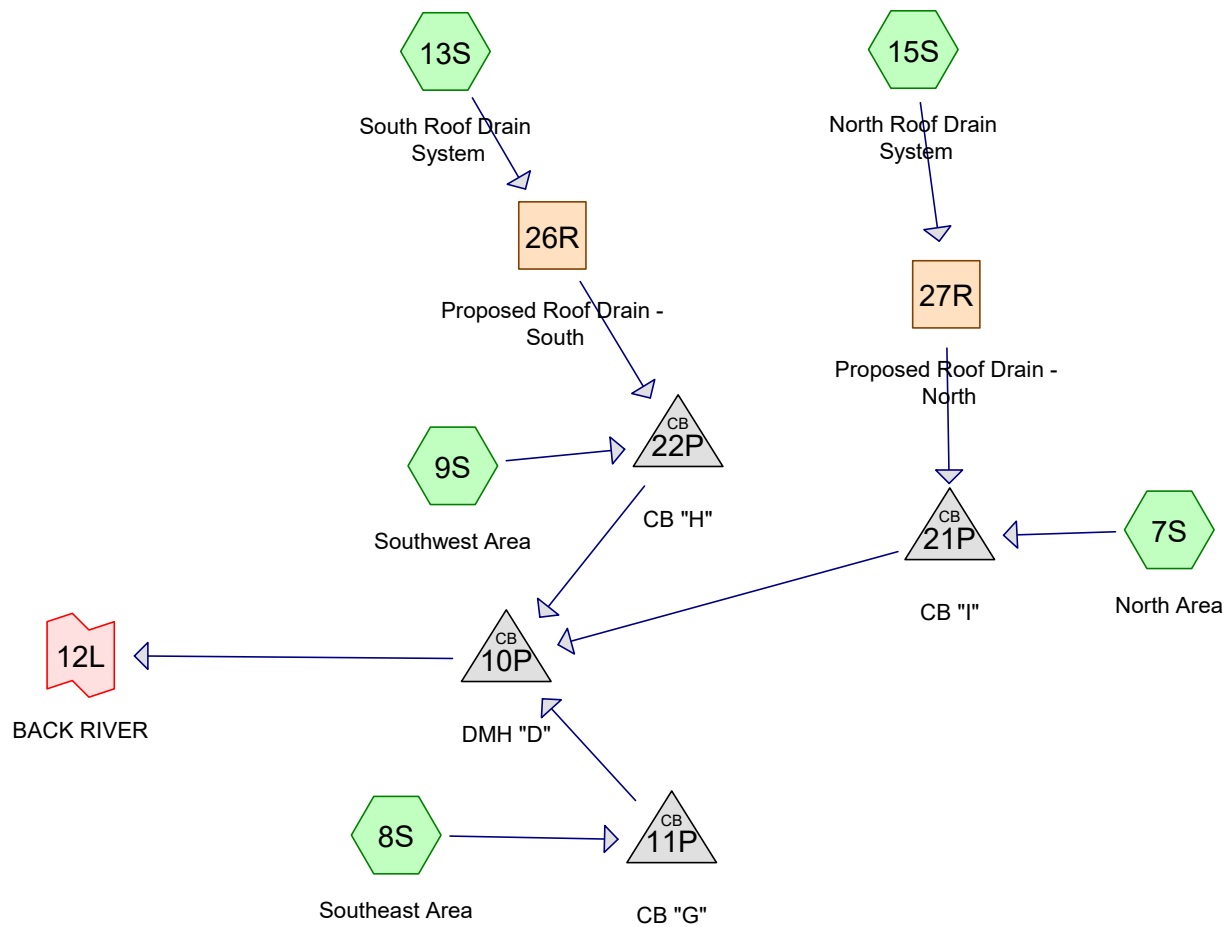
Summary for Link 14L: R Street CB

Inflow Area = 0.068 ac, 100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.67 cfs @ 12.02 hrs, Volume= 0.047 af
Primary = 0.67 cfs @ 12.02 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min
Routed to Link 12L : BACK RIVER

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 14L: R Street CB





Routing Diagram for Proposed Conditions - Clarks Pond Stormwater
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Proposed Conditions - Clarks Pond Stormwater

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Project Notes

Rainfall events imported from "Existing Conditions - Clarks Pond Stormwater.hcp"

Rainfall events imported from "Existing Conditions - Clarks Pond Stormwater.hcp"

Proposed Conditions - Clarks Pond Stormwater

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	2-Year	Type III 24-hr		Default	24.00	1	3.39	2	3.39
2	10-Year	Type III 24-hr		Default	24.00	1	5.36	2	3.39
3	100-Year	Type III 24-hr		Default	24.00	1	8.50	2	3.39

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.091	39	>75% Grass cover, Good, HSG A (9S)
0.173	80	>75% Grass cover, Good, HSG D (7S)
0.030	76	Brick Pavers, HSG A (9S)
0.032	96	Brick Pavers, HSG D (7S)
0.202	98	Paved roads w/curbs & sewers, HSG A (8S, 9S)
0.200	98	Paved roads w/curbs & sewers, HSG D (7S)
0.196	98	Roofs, HSG A (13S, 15S)
0.922	88	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.518	HSG A	8S, 9S, 13S, 15S
0.000	HSG B	
0.000	HSG C	
0.405	HSG D	
0.000	Other	7S
0.922		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.091	0.000	0.000	0.173	0.000	0.263	>75% Grass cover, Good	7S, 9S
0.030	0.000	0.000	0.032	0.000	0.061	Brick Pavers	7S, 9S
0.202	0.000	0.000	0.200	0.000	0.402	Paved roads w/curbs & sewers	7S, 8S, 9S
0.196	0.000	0.000	0.000	0.000	0.196	Roofs	13 S, 15 S
0.518	0.000	0.000	0.405	0.000	0.922	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	15S	0.00	0.00	190.0	0.0205	0.012	0.0	12.0	0.0	
2	26R	19.90	16.00	206.0	0.0189	0.010	0.0	6.0	0.0	
3	27R	18.00	14.10	190.0	0.0205	0.010	0.0	12.0	0.0	
4	10P	12.19	10.92	136.0	0.0093	0.013	0.0	18.0	0.0	
5	11P	13.18	12.87	12.0	0.0258	0.012	0.0	15.0	0.0	
6	21P	12.83	12.82	12.0	0.0008	0.012	0.0	15.0	0.0	
7	22P	13.15	13.02	10.0	0.0130	0.013	0.0	15.0	0.0	

Summary for Subcatchment 7S: North Area

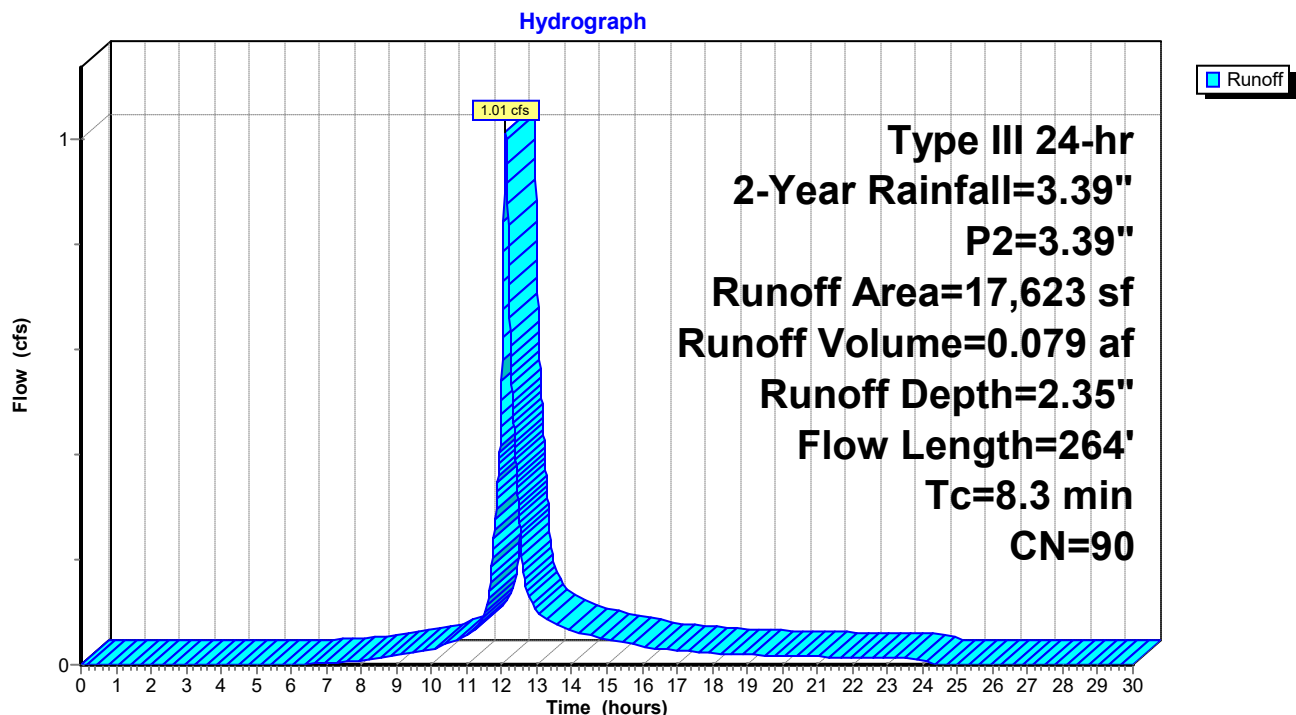
Runoff = 1.01 cfs @ 12.11 hrs, Volume= 0.079 af, Depth= 2.35"
 Routed to Pond 21P : CB "I"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
8,708	98	Paved roads w/curbs & sewers, HSG D
7,530	80	>75% Grass cover, Good, HSG D
* 1,385	96	Brick Pavers, HSG D
17,623	90	Weighted Average
8,915		50.59% Pervious Area
8,708		49.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	112	0.0580	0.27		Sheet Flow, over lawn Grass: Short n= 0.150 P2= 3.39"
0.7	37	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	115	0.0240	2.49		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.3	264	Total			

Subcatchment 7S: North Area



Summary for Subcatchment 8S: Southeast Area

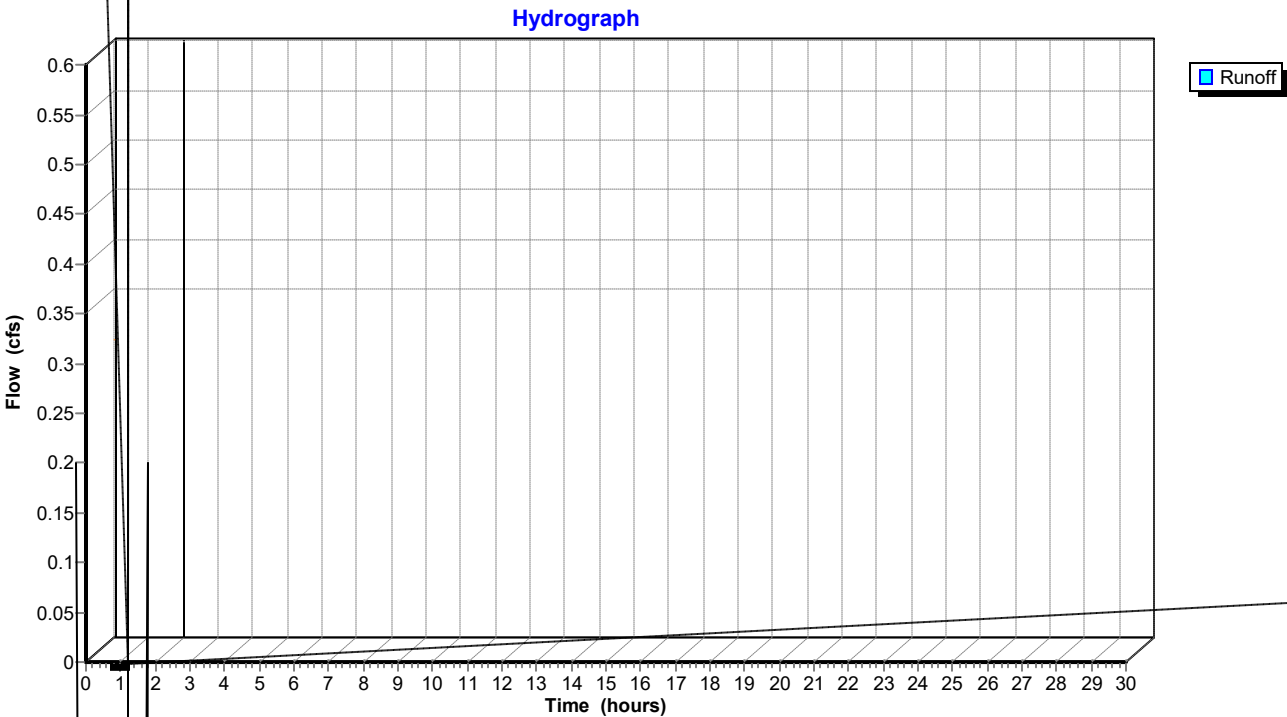
Runoff = 0.54 cfs @ 12.03 hrs, Volume= 0.037 af, Depth= 3.16"
Routed to Pond 11P : CB "G"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
6,204	98	Paved roads w/curbs & sewers, HSG A
6,204		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.26		Sheet Flow, Sheet flow over paved parking area (100') Smooth surfaces n= 0.011 P2= 3.39"
1.0	131	0.0120	2.22		Shallow Concentrated Flow, Shallow conc flow over paved R St Paved Kv= 20.3 fps
2.3	231	Total			

Subcatchment 8S: Southeast Area



Summary for Subcatchment 9S: Southwest Area

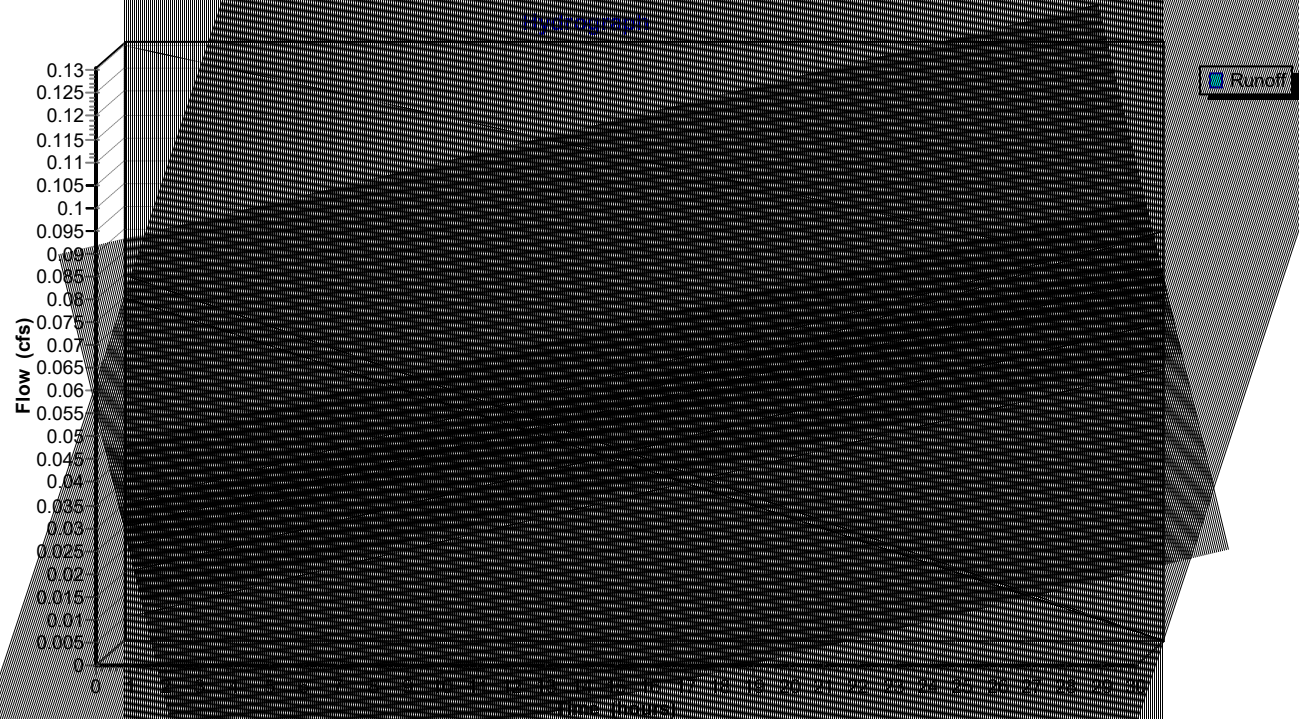
Runoff = 0.12 cfs @ 12.11 hrs, Volume= 0.010 af, Depth= 0.70"
 Routed to Pond 22P : CB "H"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
3,945	39	>75% Grass cover, Good, HSG A
2,588	98	Paved roads w/curbs & sewers, HSG A
1,293	76	Brick Pavers, HSG A
7,826	65	Weighted Average
5,238		66.93% Pervious Area
2,588		33.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	26	0.0190	0.09		Sheet Flow, sheet flow over lawn area (90') Grass: Dense n= 0.240 P2= 3.39"
0.9	94	0.0110	1.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	39	0.0130	0.80		Shallow Concentrated Flow, Shallow conc flow over driveway Short Grass Pasture Kv= 7.0 fps
0.2	34	0.0250	2.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.7	193	Total			

Subcatchment 9S: Southwest Area



Summary for Subcatchment 13S: South Roof Drain System

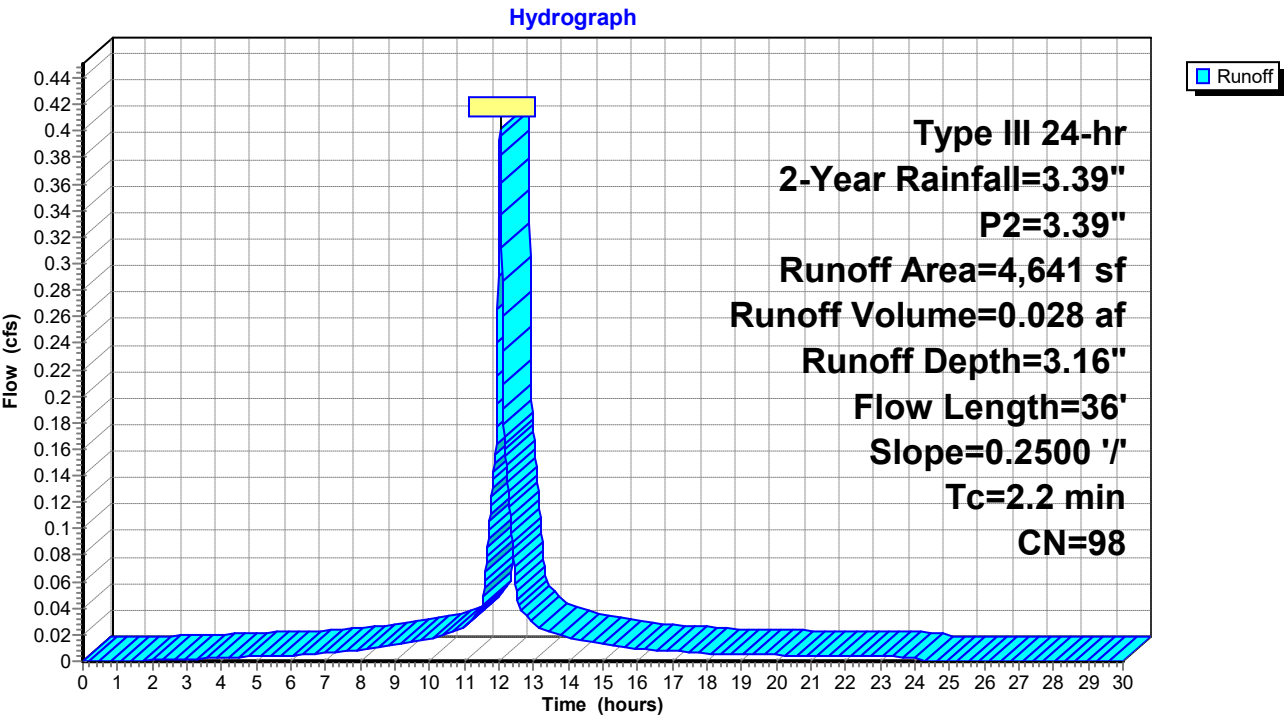
Runoff = 0.40 cfs @ 12.03 hrs, Volume= 0.028 af, Depth= 3.16"
Routed to Reach 26R : Proposed Roof Drain - South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
4,641	98	Roofs, HSG A
4,641		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	36	0.2500	0.27		Sheet Flow, across roof
					Grass: Dense n= 0.240 P2= 3.39"

Subcatchment 13S: South Roof Drain System



Summary for Subcatchment 15S: North Roof Drain System

[49] Hint: $T_c < 2dt$ may require smaller dt

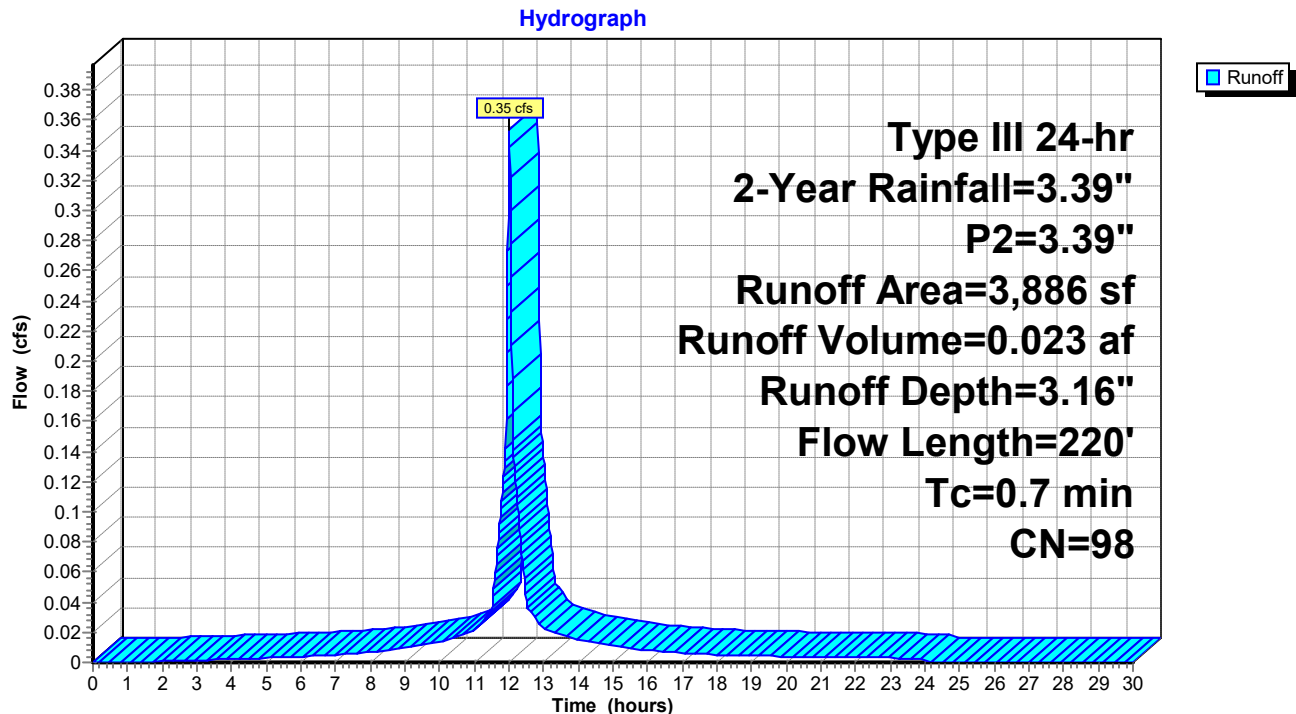
Runoff = 0.35 cfs @ 12.01 hrs, Volume= 0.023 af, Depth= 3.16"
 Routed to Reach 27R : Proposed Roof Drain - North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, $dt=0.01$ hrs
 Type III 24-hr 2-Year Rainfall=3.39", P2=3.39"

Area (sf)	CN	Description
3,886	98	Roofs, HSG A
3,886		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	30	0.2500	3.06		Sheet Flow, over roof
					Smooth surfaces n= 0.011 P2= 3.39"
0.5	190	0.0205	7.04	5.53	Pipe Channel,
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
					n= 0.012 Corrugated PP, smooth interior
0.7	220	Total			

Subcatchment 15S: North Roof Drain System



Summary for Reach 26R: Proposed Roof Drain - South

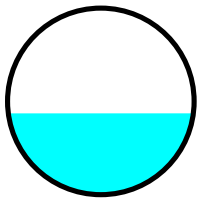
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.107 ac, 100.00% Impervious, Inflow Depth = 3.16" for 2-Year event
Inflow = 0.40 cfs @ 12.03 hrs, Volume= 0.028 af
Outflow = 0.40 cfs @ 12.04 hrs, Volume= 0.028 af, Atten= 1%, Lag= 0.5 min
Routed to Pond 22P : CB "H"

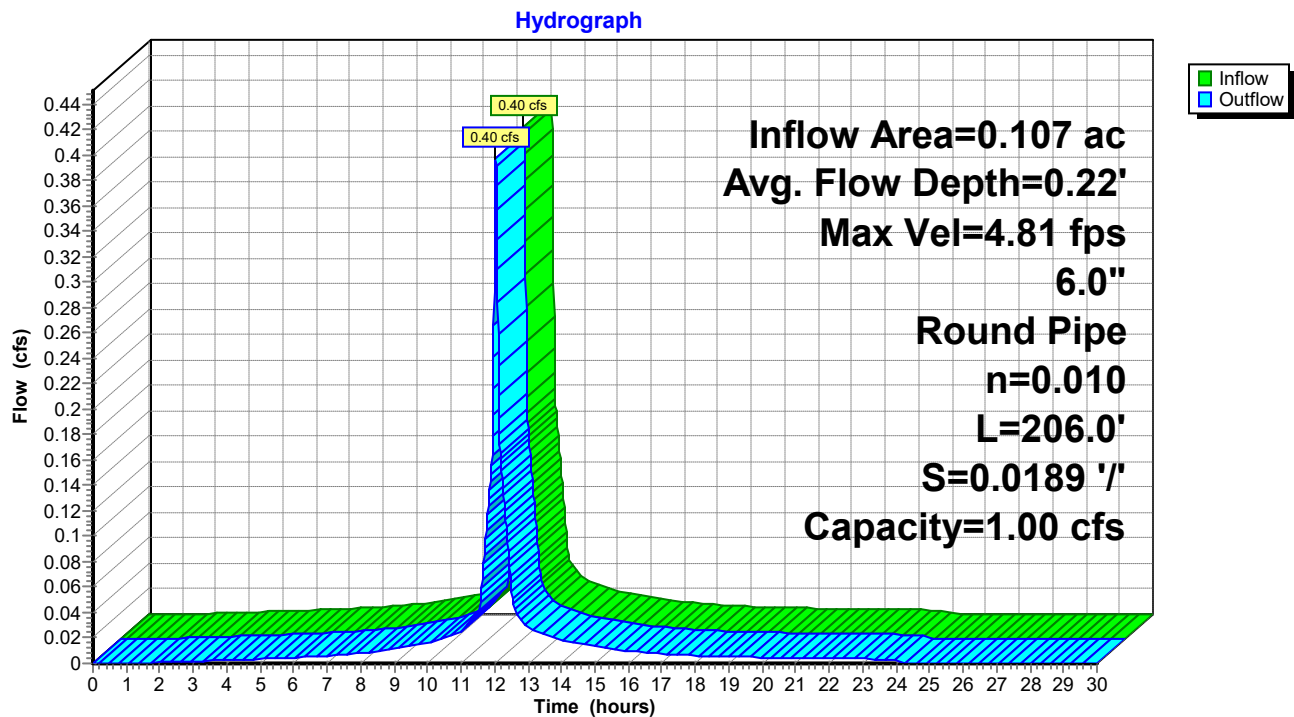
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.81 fps, Min. Travel Time= 0.7 min
Avg. Velocity= 1.54 fps, Avg. Travel Time= 2.2 min

Peak Storage= 17 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.22', Surface Width= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.00 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 206.0' Slope= 0.0189 '/'
Inlet Invert= 19.90', Outlet Invert= 16.00'



Reach 26R: Proposed Roof Drain - South



Summary for Reach 27R: Proposed Roof Drain - North

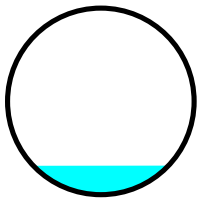
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.089 ac, 100.00% Impervious, Inflow Depth = 3.16" for 2-Year event
Inflow = 0.35 cfs @ 12.01 hrs, Volume= 0.023 af
Outflow = 0.35 cfs @ 12.02 hrs, Volume= 0.023 af, Atten= 2%, Lag= 0.5 min
Routed to Pond 21P : CB "I"

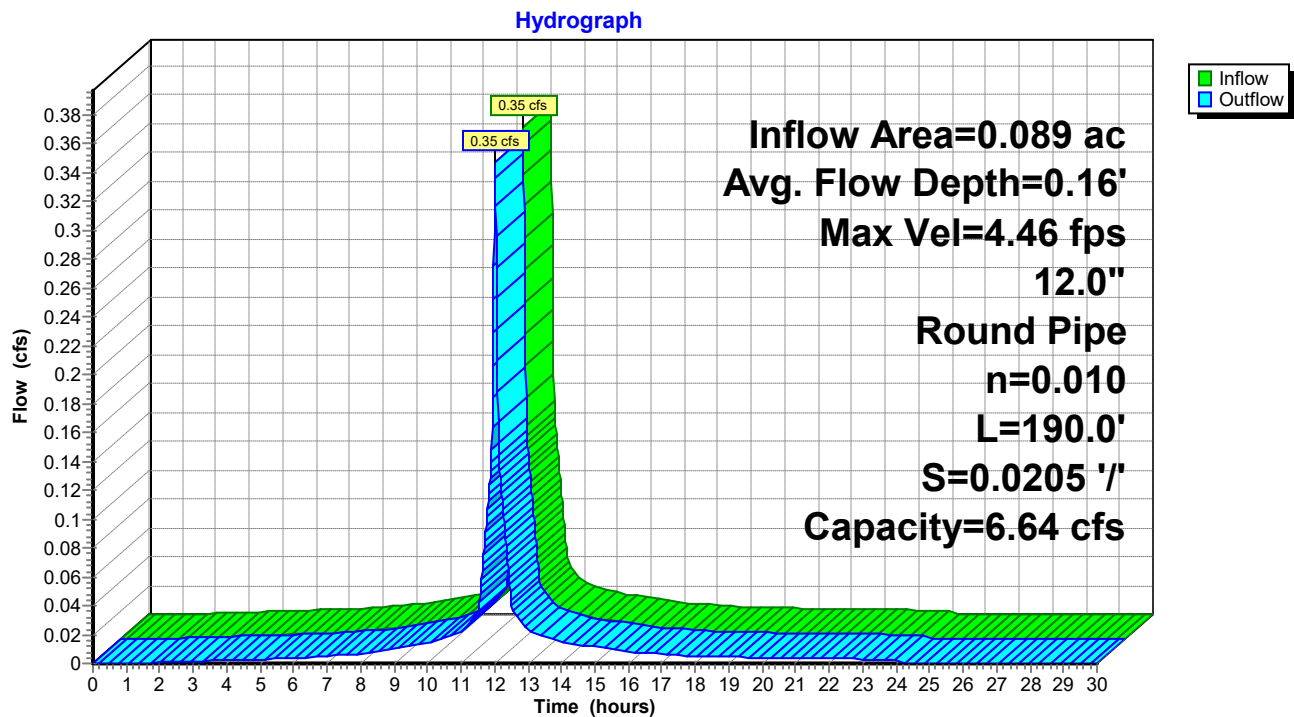
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.46 fps, Min. Travel Time= 0.7 min
Avg. Velocity= 1.39 fps, Avg. Travel Time= 2.3 min

Peak Storage= 15 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 0.72'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.64 cfs

12.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 190.0' Slope= 0.0205 '/'
Inlet Invert= 18.00', Outlet Invert= 14.10'



Reach 27R: Proposed Roof Drain - North



Summary for Pond 10P: DMH "D"

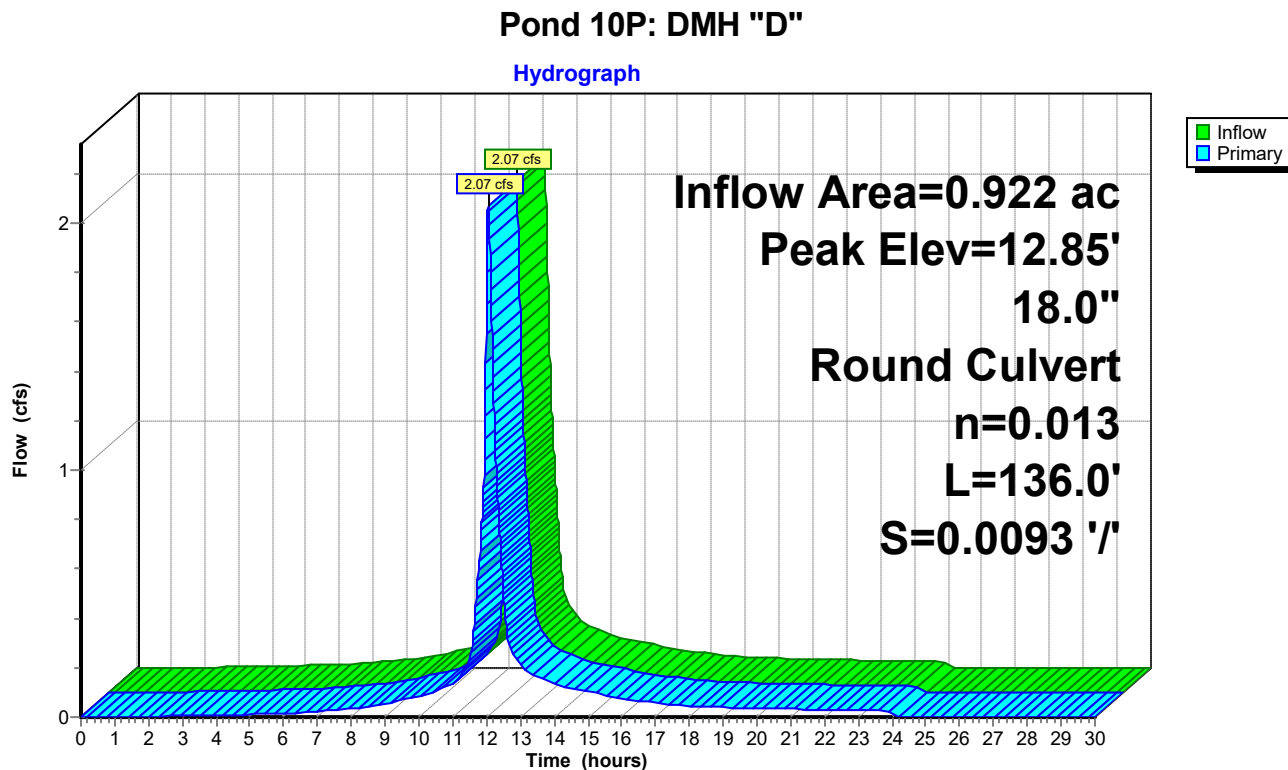
[57] Hint: Peaked at 12.85' (Flood elevation advised)

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 2.32" for 2-Year event
 Inflow = 2.07 cfs @ 12.06 hrs, Volume= 0.178 af
 Outflow = 2.07 cfs @ 12.06 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.07 cfs @ 12.06 hrs, Volume= 0.178 af
 Routed to Link 12L : BACK RIVER

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 12.85' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.19'	18.0" Round To Back River L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.19' / 10.92' S= 0.0093 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=2.07 cfs @ 12.06 hrs HW=12.85' TW=0.00' (Dynamic Tailwater)
 ↳ **To Back River** (Inlet Controls 2.07 cfs @ 2.77 fps)



Summary for Pond 11P: CB "G"

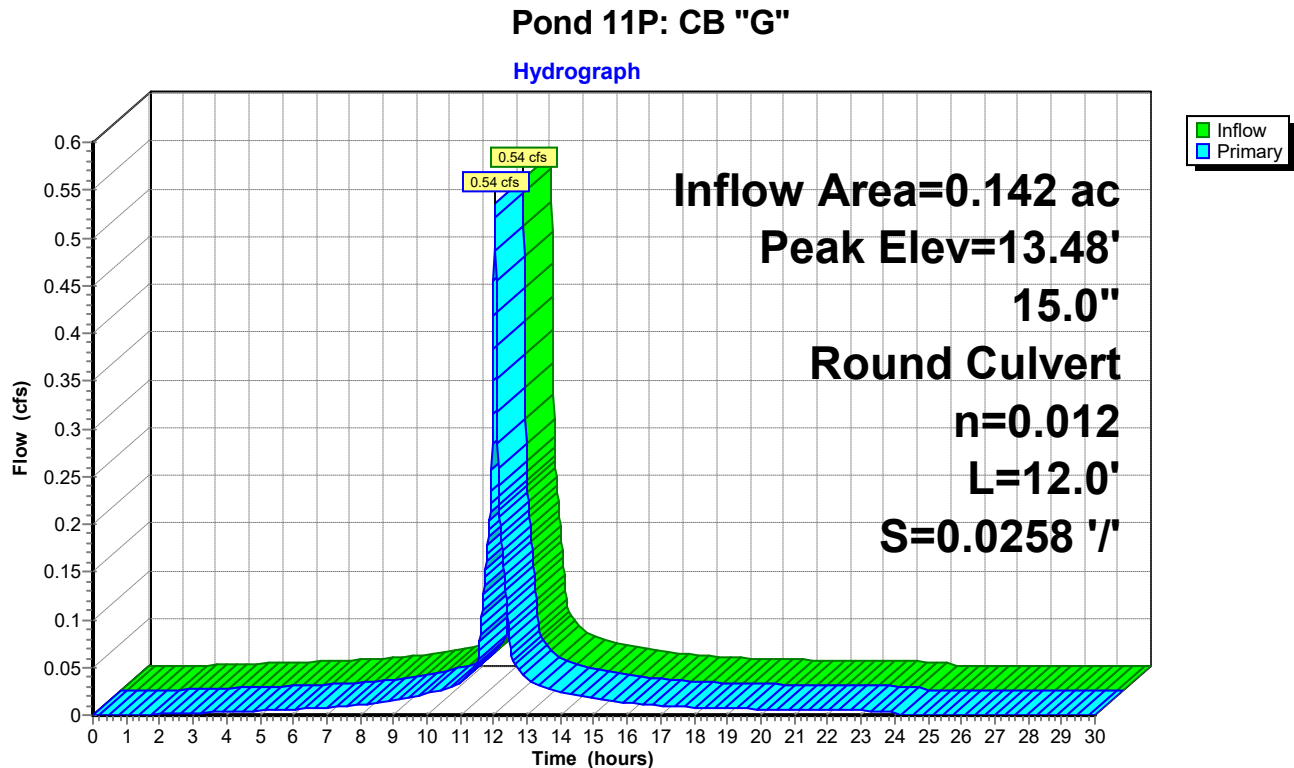
[57] Hint: Peaked at 13.48' (Flood elevation advised)

Inflow Area = 0.142 ac, 100.00% Impervious, Inflow Depth = 3.16" for 2-Year event
 Inflow = 0.54 cfs @ 12.03 hrs, Volume= 0.037 af
 Outflow = 0.54 cfs @ 12.03 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.54 cfs @ 12.03 hrs, Volume= 0.037 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.48' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.18'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.18' / 12.87' S= 0.0258 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=0.53 cfs @ 12.03 hrs HW=13.48' TW=12.84' (Dynamic Tailwater)
 1=Culvert (Inlet Controls 0.53 cfs @ 2.34 fps)



Summary for Pond 21P: CB "I"

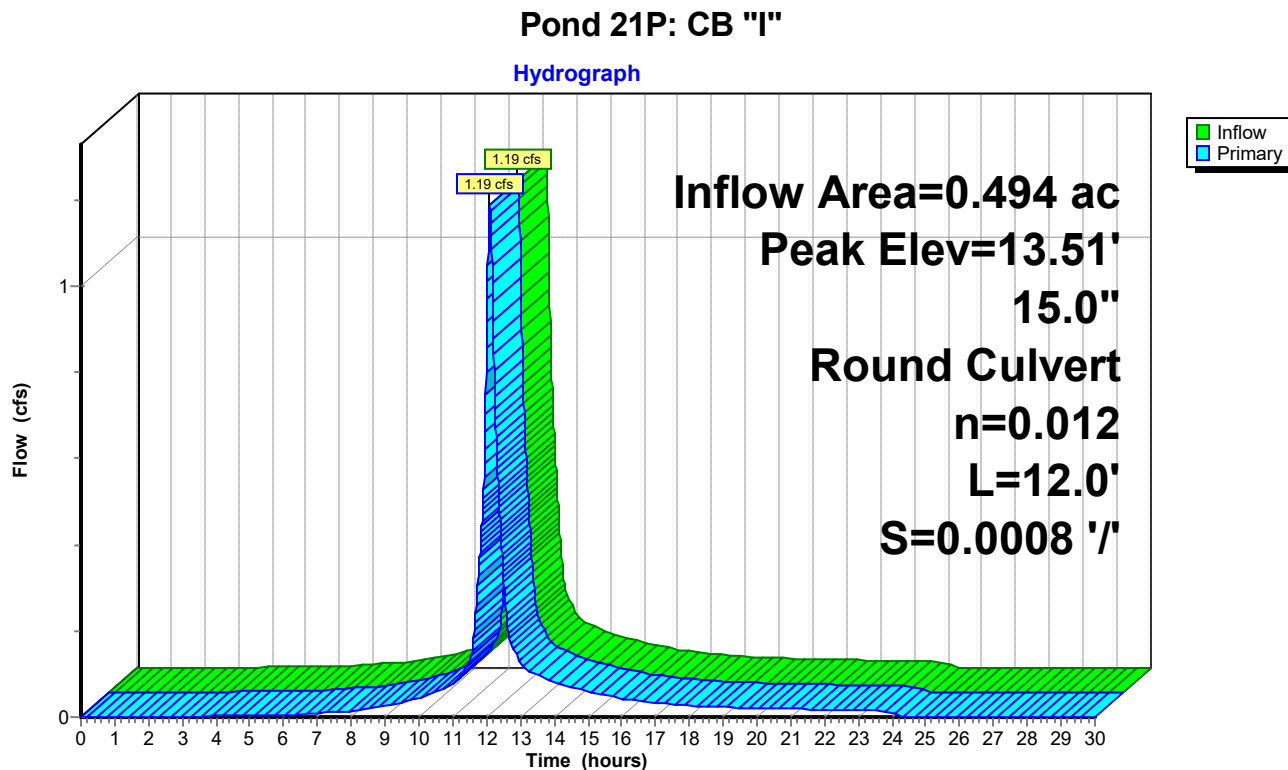
[57] Hint: Peaked at 13.51' (Flood elevation advised)

Inflow Area = 0.494 ac, 58.55% Impervious, Inflow Depth = 2.49" for 2-Year event
 Inflow = 1.19 cfs @ 12.10 hrs, Volume= 0.103 af
 Outflow = 1.19 cfs @ 12.10 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.19 cfs @ 12.10 hrs, Volume= 0.103 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.51' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.83'	15.0" Round Culvert L= 12.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 12.83' / 12.82' S= 0.0008 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=1.19 cfs @ 12.10 hrs HW=13.51' TW=12.83' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 1.19 cfs @ 2.54 fps)



Summary for Pond 22P: CB "H"

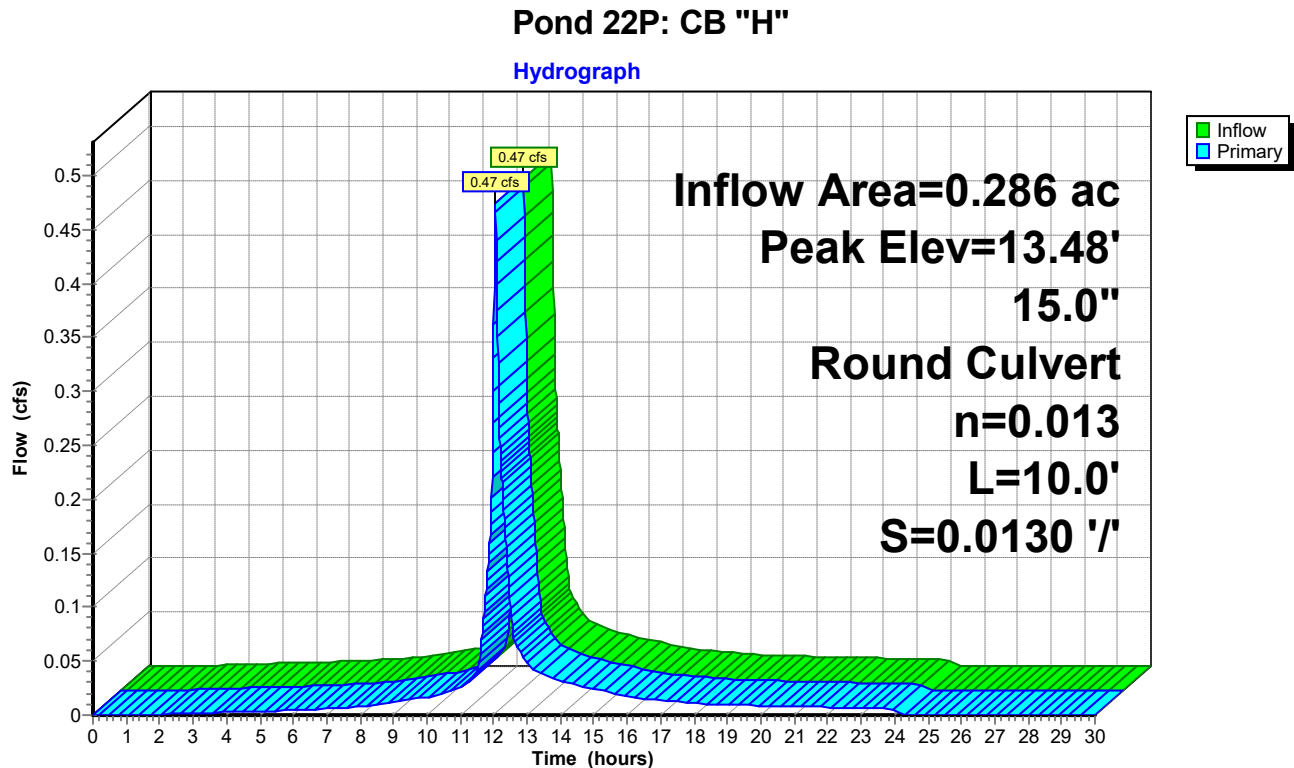
[57] Hint: Peaked at 13.48' (Flood elevation advised)

Inflow Area = 0.286 ac, 57.99% Impervious, Inflow Depth = 1.61" for 2-Year event
 Inflow = 0.47 cfs @ 12.05 hrs, Volume= 0.038 af
 Outflow = 0.47 cfs @ 12.05 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.47 cfs @ 12.05 hrs, Volume= 0.038 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.48' @ 12.05 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.15'	15.0" Round Culvert L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.15' / 13.02' S= 0.0130 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=0.47 cfs @ 12.05 hrs HW=13.48' TW=12.85' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 0.47 cfs @ 2.74 fps)

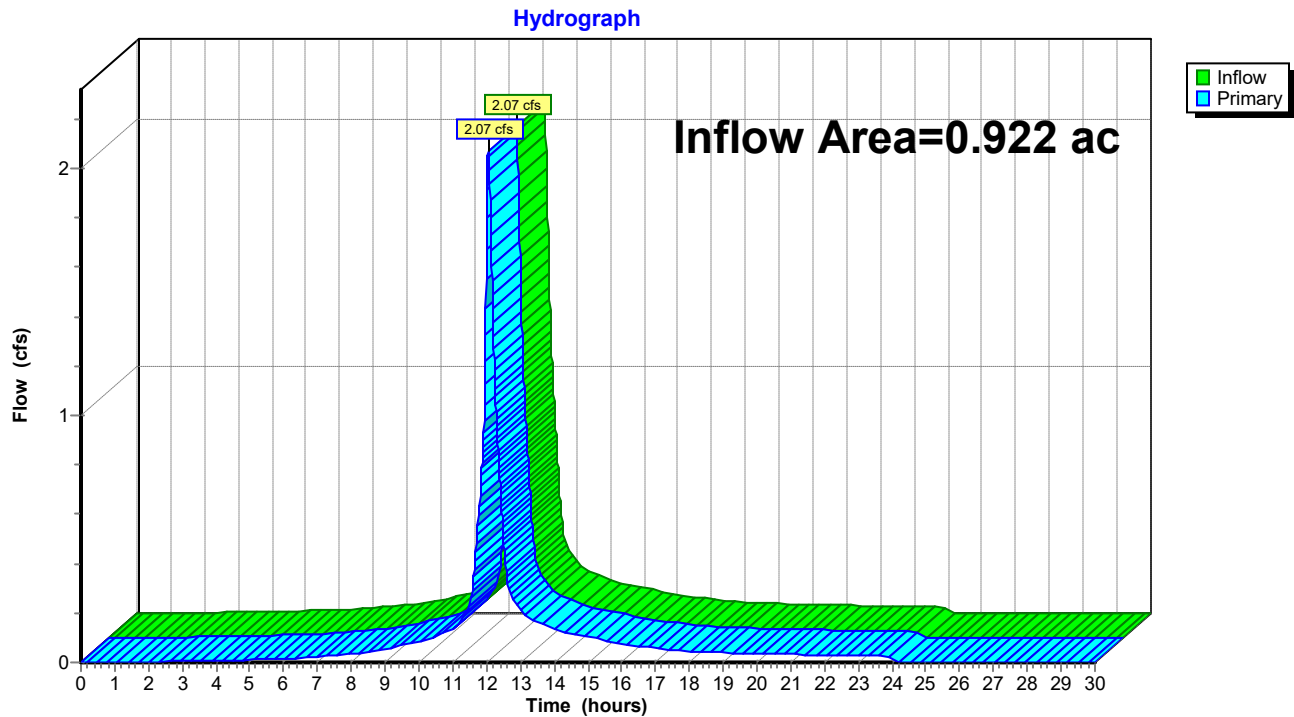


Summary for Link 12L: BACK RIVER

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 2.32" for 2-Year event
Inflow = 2.07 cfs @ 12.06 hrs, Volume= 0.178 af
Primary = 2.07 cfs @ 12.06 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 12L: BACK RIVER



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 7S: North Area	Runoff Area=17,623 sf 49.41% Impervious Runoff Depth=4.22" Flow Length=264' Tc=8.3 min CN=90 Runoff=1.78 cfs 0.142 af
Subcatchment 8S: Southeast Area	Runoff Area=6,204 sf 100.00% Impervious Runoff Depth=5.12" Flow Length=231' Tc=2.3 min CN=98 Runoff=0.85 cfs 0.061 af
Subcatchment 9S: Southwest Area	Runoff Area=7,826 sf 33.07% Impervious Runoff Depth=1.90" Flow Length=193' Tc=6.7 min CN=65 Runoff=0.38 cfs 0.028 af
Subcatchment 13S: South Roof Drain	Runoff Area=4,641 sf 100.00% Impervious Runoff Depth=5.12" Flow Length=36' Slope=0.2500 '/' Tc=2.2 min CN=98 Runoff=0.64 cfs 0.045 af
Subcatchment 15S: North Roof Drain	Runoff Area=3,886 sf 100.00% Impervious Runoff Depth=5.12" Flow Length=220' Tc=0.7 min CN=98 Runoff=0.56 cfs 0.038 af
Reach 26R: Proposed Roof Drain -	Avg. Flow Depth=0.29' Max Vel=5.41 fps Inflow=0.64 cfs 0.045 af 6.0" Round Pipe n=0.010 L=206.0' S=0.0189 '/' Capacity=1.00 cfs Outflow=0.63 cfs 0.045 af
Reach 27R: Proposed Roof Drain - North	Avg. Flow Depth=0.20' Max Vel=5.12 fps Inflow=0.56 cfs 0.038 af 12.0" Round Pipe n=0.010 L=190.0' S=0.0205 '/' Capacity=6.64 cfs Outflow=0.55 cfs 0.038 af
Pond 10P: DMH "D"	Peak Elev=13.10' Inflow=3.63 cfs 0.315 af 18.0" Round Culvert n=0.013 L=136.0' S=0.0093 '/' Outflow=3.63 cfs 0.315 af
Pond 11P: CB "G"	Peak Elev=13.57' Inflow=0.85 cfs 0.061 af 15.0" Round Culvert n=0.012 L=12.0' S=0.0258 '/' Outflow=0.85 cfs 0.061 af
Pond 21P: CB "I"	Peak Elev=13.74' Inflow=2.05 cfs 0.180 af 15.0" Round Culvert n=0.012 L=12.0' S=0.0008 '/' Outflow=2.05 cfs 0.180 af
Pond 22P: CB "H"	Peak Elev=13.63' Inflow=0.93 cfs 0.074 af 15.0" Round Culvert n=0.013 L=10.0' S=0.0130 '/' Outflow=0.93 cfs 0.074 af
Link 12L: BACK RIVER	Inflow=3.63 cfs 0.315 af Primary=3.63 cfs 0.315 af
Total Runoff Area = 0.922 ac Runoff Volume = 0.315 af Average Runoff Depth = 4.10"	
35.22% Pervious = 0.325 ac 64.78% Impervious = 0.597 ac	

Summary for Subcatchment 7S: North Area

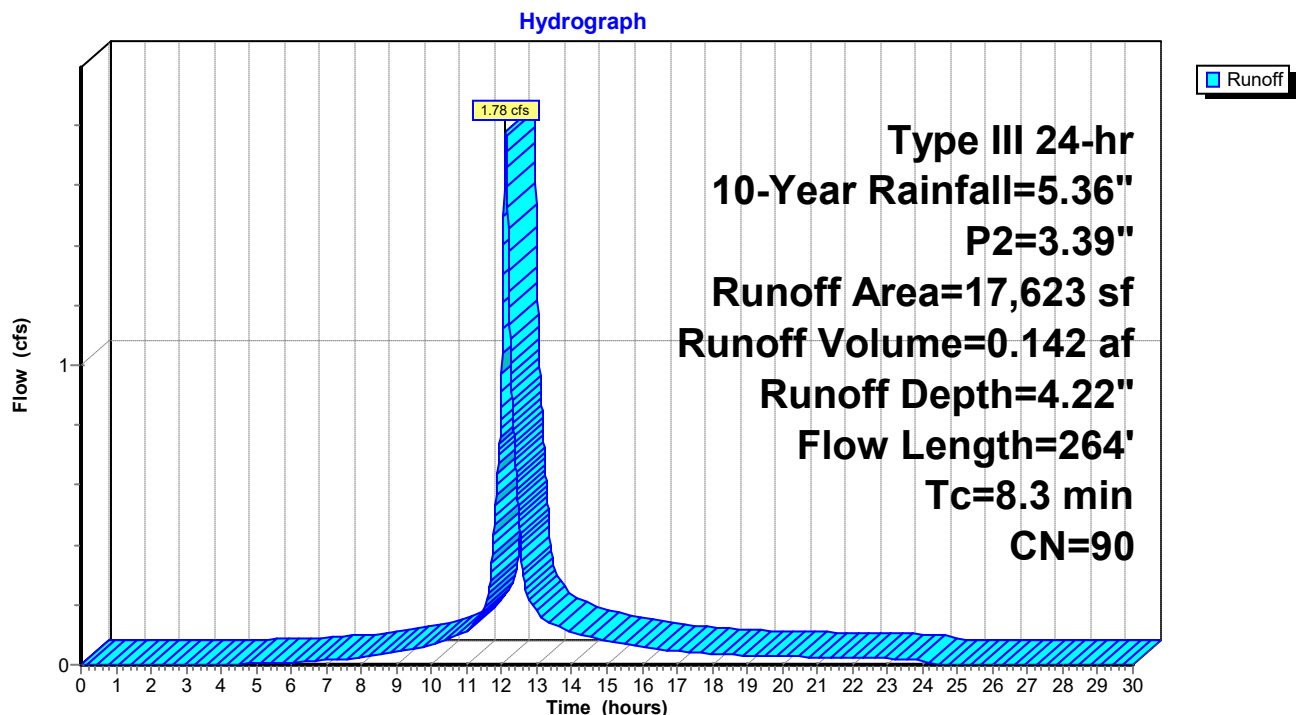
Runoff = 1.78 cfs @ 12.11 hrs, Volume= 0.142 af, Depth= 4.22"
 Routed to Pond 21P : CB "I"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

Area (sf)	CN	Description
8,708	98	Paved roads w/curbs & sewers, HSG D
7,530	80	>75% Grass cover, Good, HSG D
* 1,385	96	Brick Pavers, HSG D
17,623	90	Weighted Average
8,915		50.59% Pervious Area
8,708		49.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	112	0.0580	0.27		Sheet Flow, over lawn Grass: Short n= 0.150 P2= 3.39"
0.7	37	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	115	0.0240	2.49		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.3	264	Total			

Subcatchment 7S: North Area



Summary for Subcatchment 8S: Southeast Area

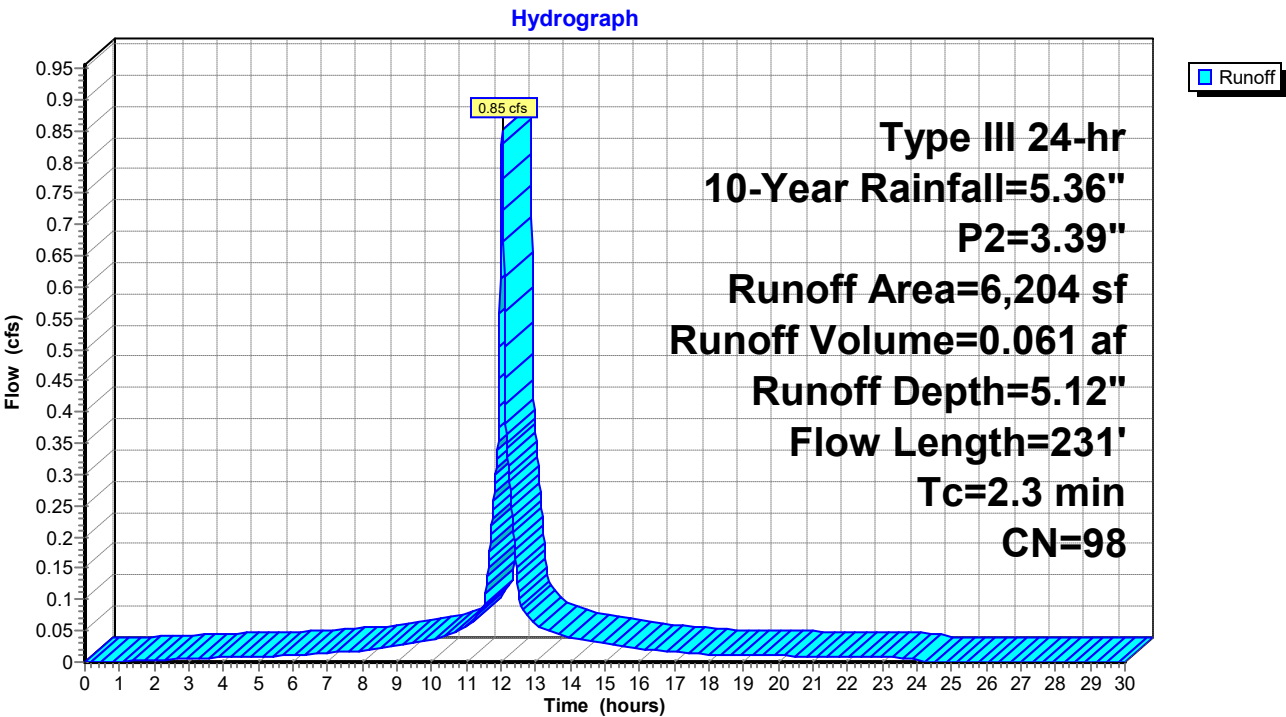
Runoff = 0.85 cfs @ 12.03 hrs, Volume= 0.061 af, Depth= 5.12"
Routed to Pond 11P : CB "G"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

Area (sf)	CN	Description
6,204	98	Paved roads w/curbs & sewers, HSG A
6,204		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.26		Sheet Flow, Sheet flow over paved parking area (100') Smooth surfaces n= 0.011 P2= 3.39"
1.0	131	0.0120	2.22		Shallow Concentrated Flow, Shallow conc flow over paved R St Paved Kv= 20.3 fps
2.3	231	Total			

Subcatchment 8S: Southeast Area



Summary for Subcatchment 9S: Southwest Area

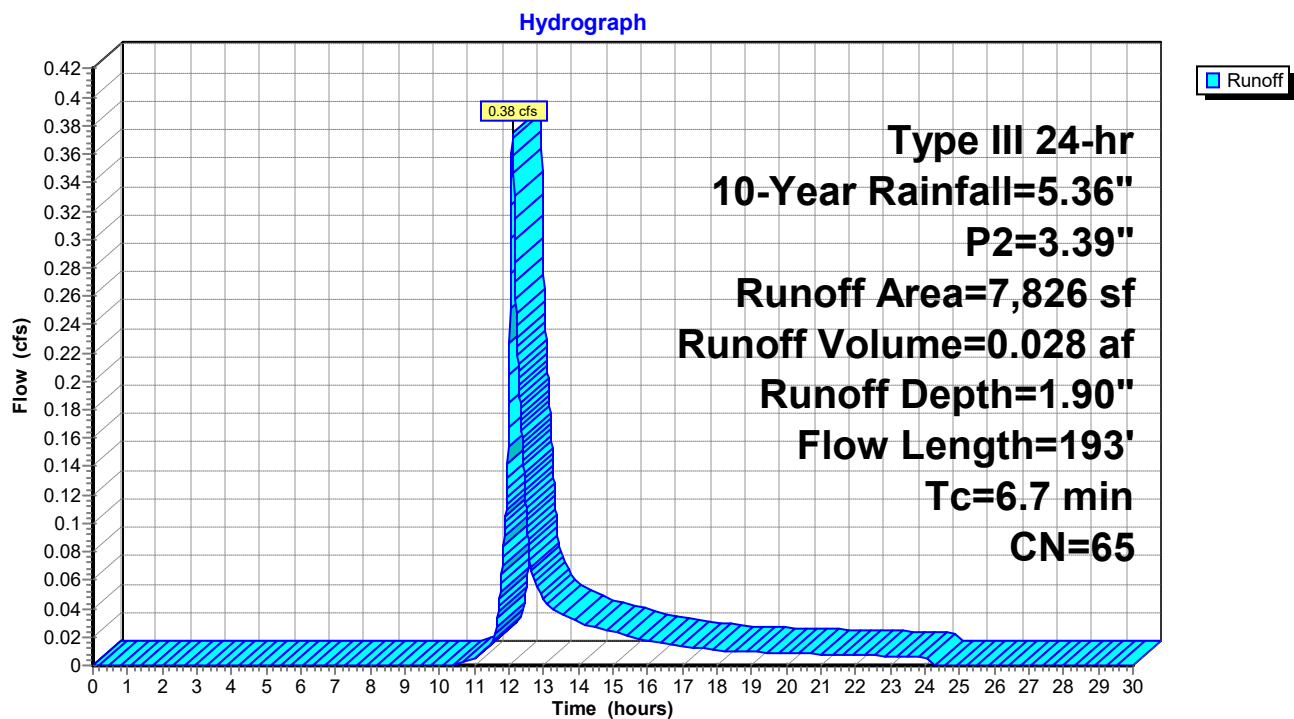
Runoff = 0.38 cfs @ 12.10 hrs, Volume= 0.028 af, Depth= 1.90"
Routed to Pond 22P : CB "H"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

Area (sf)	CN	Description
3,945	39	>75% Grass cover, Good, HSG A
2,588	98	Paved roads w/curbs & sewers, HSG A
1,293	76	Brick Pavers, HSG A
7,826	65	Weighted Average
5,238		66.93% Pervious Area
2,588		33.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	26	0.0190	0.09		Sheet Flow, sheet flow over lawn area (90') Grass: Dense n= 0.240 P2= 3.39"
0.9	94	0.0110	1.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	39	0.0130	0.80		Shallow Concentrated Flow, Shallow conc flow over driveway Short Grass Pasture Kv= 7.0 fps
0.2	34	0.0250	2.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.7	193	Total			

Subcatchment 9S: Southwest Area



Summary for Subcatchment 13S: South Roof Drain System

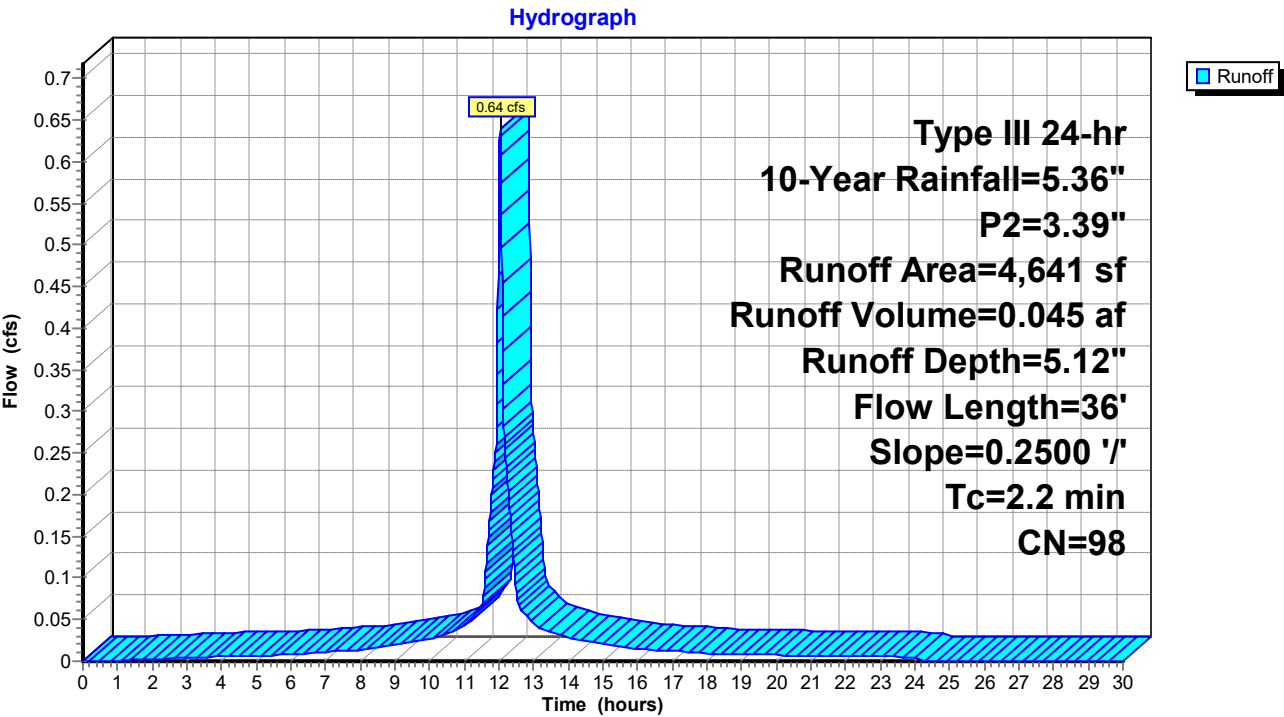
Runoff = 0.64 cfs @ 12.03 hrs, Volume= 0.045 af, Depth= 5.12"
Routed to Reach 26R : Proposed Roof Drain - South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

Area (sf)	CN	Description
4,641	98	Roofs, HSG A
4,641		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	36	0.2500	0.27		Sheet Flow, across roof
Grass: Dense n= 0.240 P2= 3.39"					

Subcatchment 13S: South Roof Drain System



Summary for Subcatchment 15S: North Roof Drain System

[49] Hint: $T_c < 2dt$ may require smaller dt

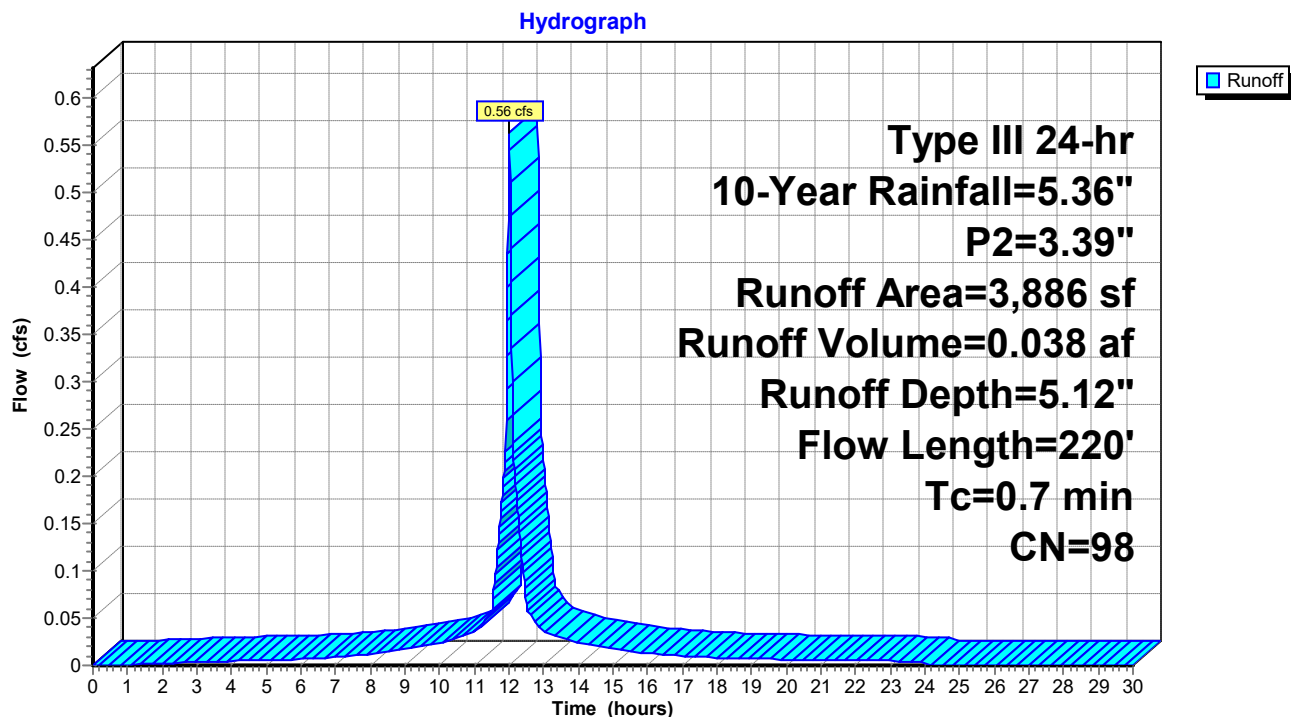
Runoff = 0.56 cfs @ 12.01 hrs, Volume= 0.038 af, Depth= 5.12"
 Routed to Reach 27R : Proposed Roof Drain - North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, $dt=0.01$ hrs
 Type III 24-hr 10-Year Rainfall=5.36", P2=3.39"

Area (sf)	CN	Description
3,886	98	Roofs, HSG A
3,886		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	30	0.2500	3.06		Sheet Flow, over roof Smooth surfaces $n=0.011$ P2= 3.39"
0.5	190	0.0205	7.04	5.53	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' $r=0.25'$ $n=0.012$ Corrugated PP, smooth interior
0.7	220	Total			

Subcatchment 15S: North Roof Drain System



Summary for Reach 26R: Proposed Roof Drain - South

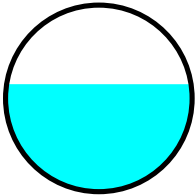
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.107 ac, 100.00% Impervious, Inflow Depth = 5.12" for 10-Year event
Inflow = 0.64 cfs @ 12.03 hrs, Volume= 0.045 af
Outflow = 0.63 cfs @ 12.04 hrs, Volume= 0.045 af, Atten= 1%, Lag= 0.5 min
Routed to Pond 22P : CB "H"

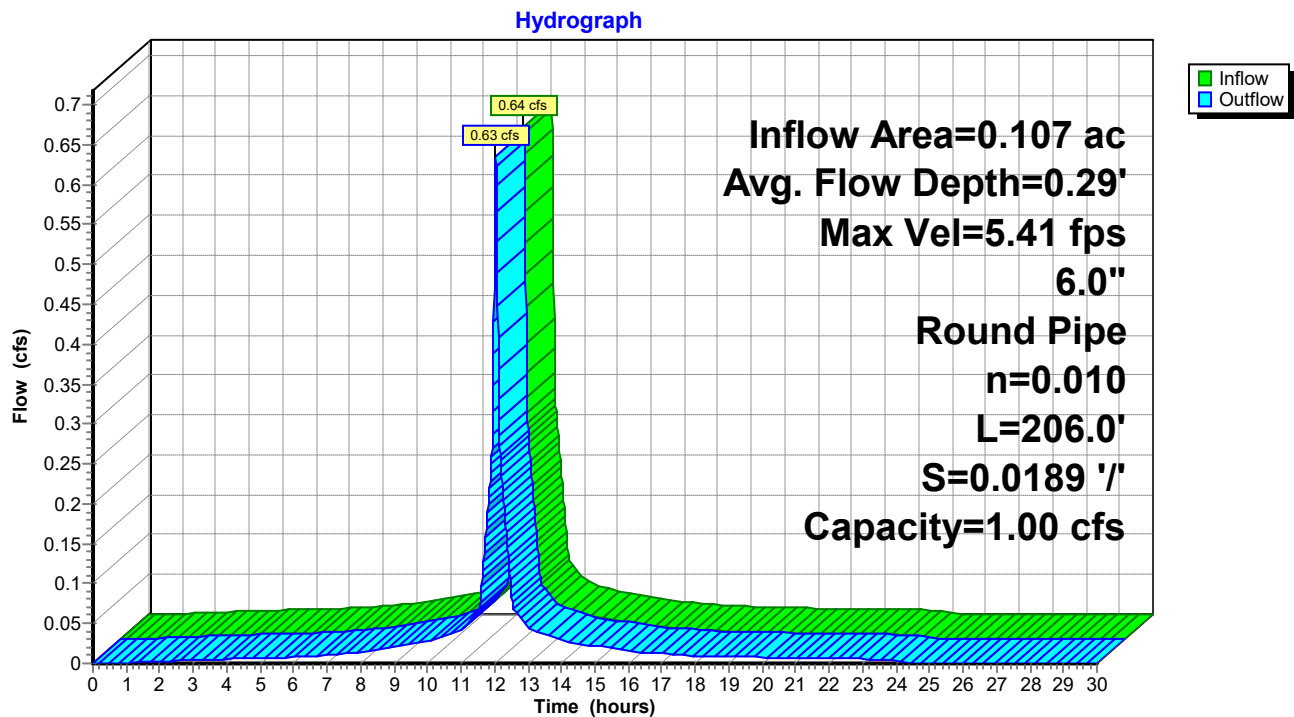
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.41 fps, Min. Travel Time= 0.6 min
Avg. Velocity= 1.78 fps, Avg. Travel Time= 1.9 min

Peak Storage= 24 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.29' , Surface Width= 0.49'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.00 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 206.0' Slope= 0.0189 '/'
Inlet Invert= 19.90', Outlet Invert= 16.00'



Reach 26R: Proposed Roof Drain - South



Summary for Reach 27R: Proposed Roof Drain - North

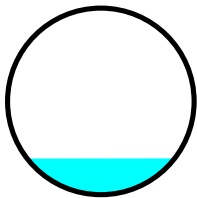
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.089 ac, 100.00% Impervious, Inflow Depth = 5.12" for 10-Year event
Inflow = 0.56 cfs @ 12.01 hrs, Volume= 0.038 af
Outflow = 0.55 cfs @ 12.02 hrs, Volume= 0.038 af, Atten= 2%, Lag= 0.4 min
Routed to Pond 21P : CB "I"

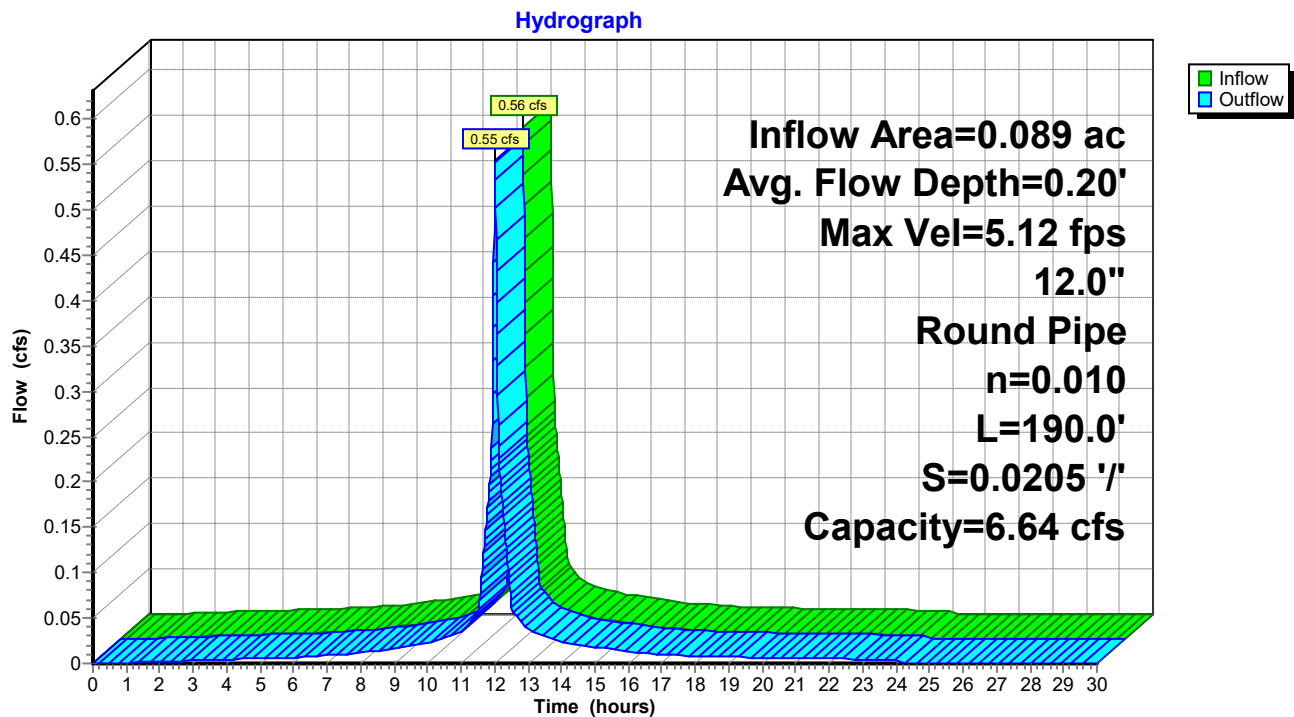
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.12 fps, Min. Travel Time= 0.6 min
Avg. Velocity= 1.60 fps, Avg. Travel Time= 2.0 min

Peak Storage= 21 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 0.79'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.64 cfs

12.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 190.0' Slope= 0.0205 '/'
Inlet Invert= 18.00', Outlet Invert= 14.10'



Reach 27R: Proposed Roof Drain - North



Summary for Pond 10P: DMH "D"

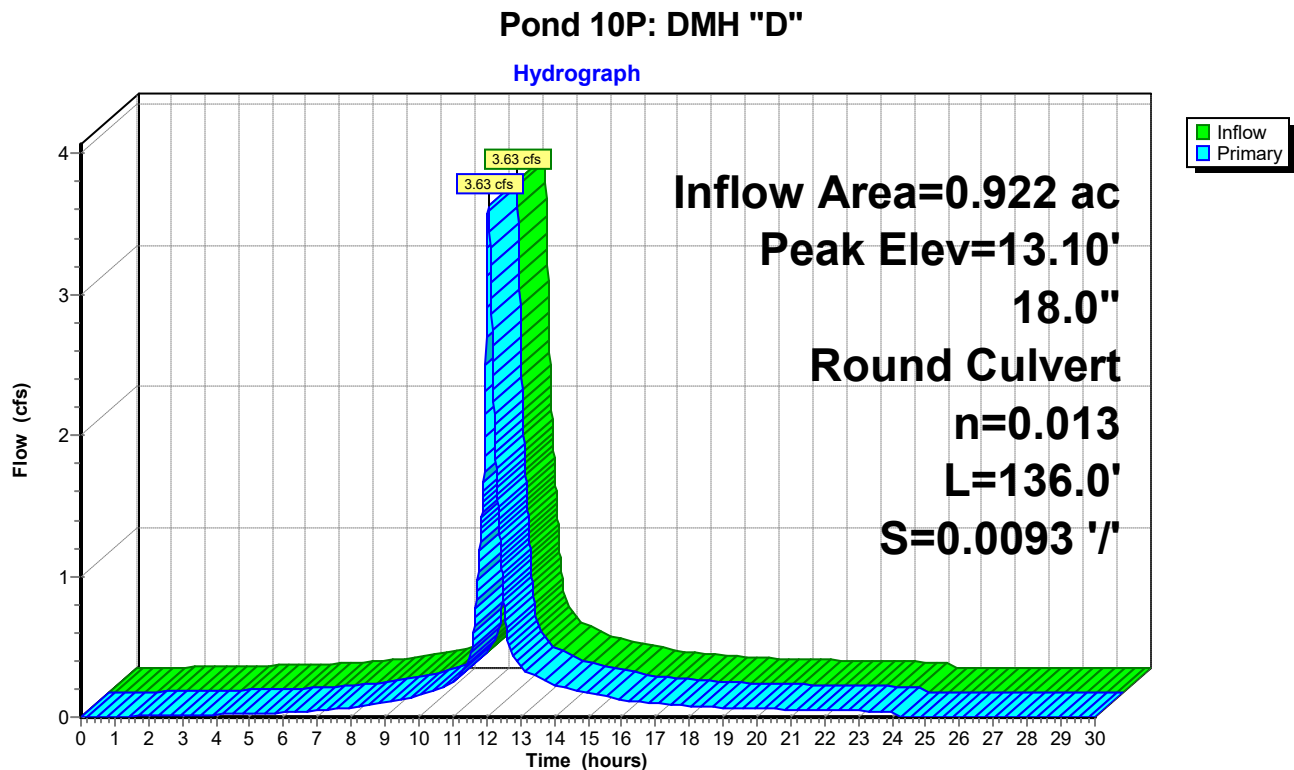
[57] Hint: Peaked at 13.10' (Flood elevation advised)

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 4.10" for 10-Year event
 Inflow = 3.63 cfs @ 12.06 hrs, Volume= 0.315 af
 Outflow = 3.63 cfs @ 12.06 hrs, Volume= 0.315 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.63 cfs @ 12.06 hrs, Volume= 0.315 af
 Routed to Link 12L : BACK RIVER

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.10' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.19'	18.0" Round To Back River L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.19' / 10.92' S= 0.0093 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=3.63 cfs @ 12.06 hrs HW=13.10' TW=0.00' (Dynamic Tailwater)
 ↳ **To Back River** (Inlet Controls 3.63 cfs @ 3.24 fps)



Summary for Pond 11P: CB "G"

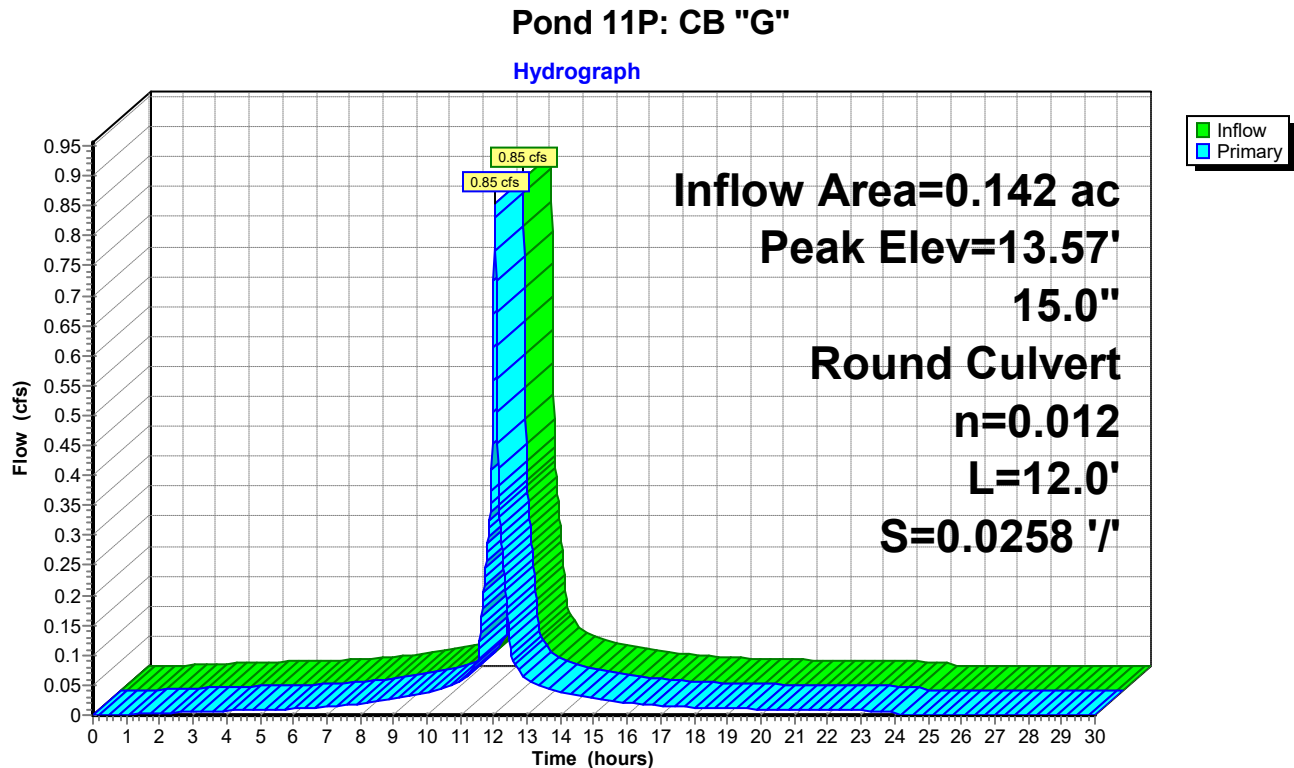
[57] Hint: Peaked at 13.57' (Flood elevation advised)

Inflow Area = 0.142 ac, 100.00% Impervious, Inflow Depth = 5.12" for 10-Year event
 Inflow = 0.85 cfs @ 12.03 hrs, Volume= 0.061 af
 Outflow = 0.85 cfs @ 12.03 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.85 cfs @ 12.03 hrs, Volume= 0.061 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.57' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.18'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.18' / 12.87' S= 0.0258 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=0.85 cfs @ 12.03 hrs HW=13.57' TW=13.08' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 0.85 cfs @ 3.90 fps)



Summary for Pond 21P: CB "I"

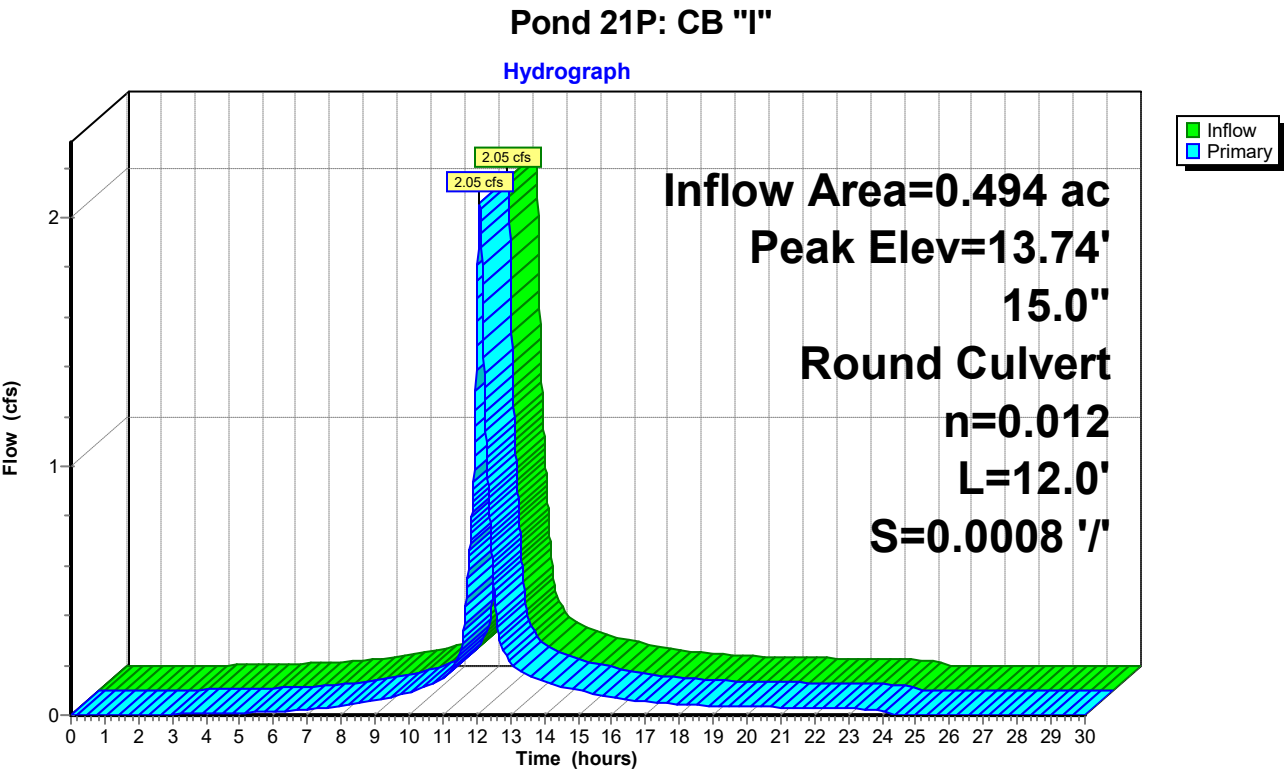
[57] Hint: Peaked at 13.74' (Flood elevation advised)

Inflow Area = 0.494 ac, 58.55% Impervious, Inflow Depth = 4.39" for 10-Year event
Inflow = 2.05 cfs @ 12.10 hrs, Volume= 0.180 af
Outflow = 2.05 cfs @ 12.10 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min
Primary = 2.05 cfs @ 12.10 hrs, Volume= 0.180 af
Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 13.74' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.83'	15.0" Round Culvert L= 12.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 12.83' / 12.82' S= 0.0008 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=2.05 cfs @ 12.10 hrs HW=13.74' TW=13.07' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.05 cfs @ 2.98 fps)



Summary for Pond 22P: CB "H"

[57] Hint: Peaked at 13.63' (Flood elevation advised)

Inflow Area =
 Inflow =
 Outflow =
 Primary =

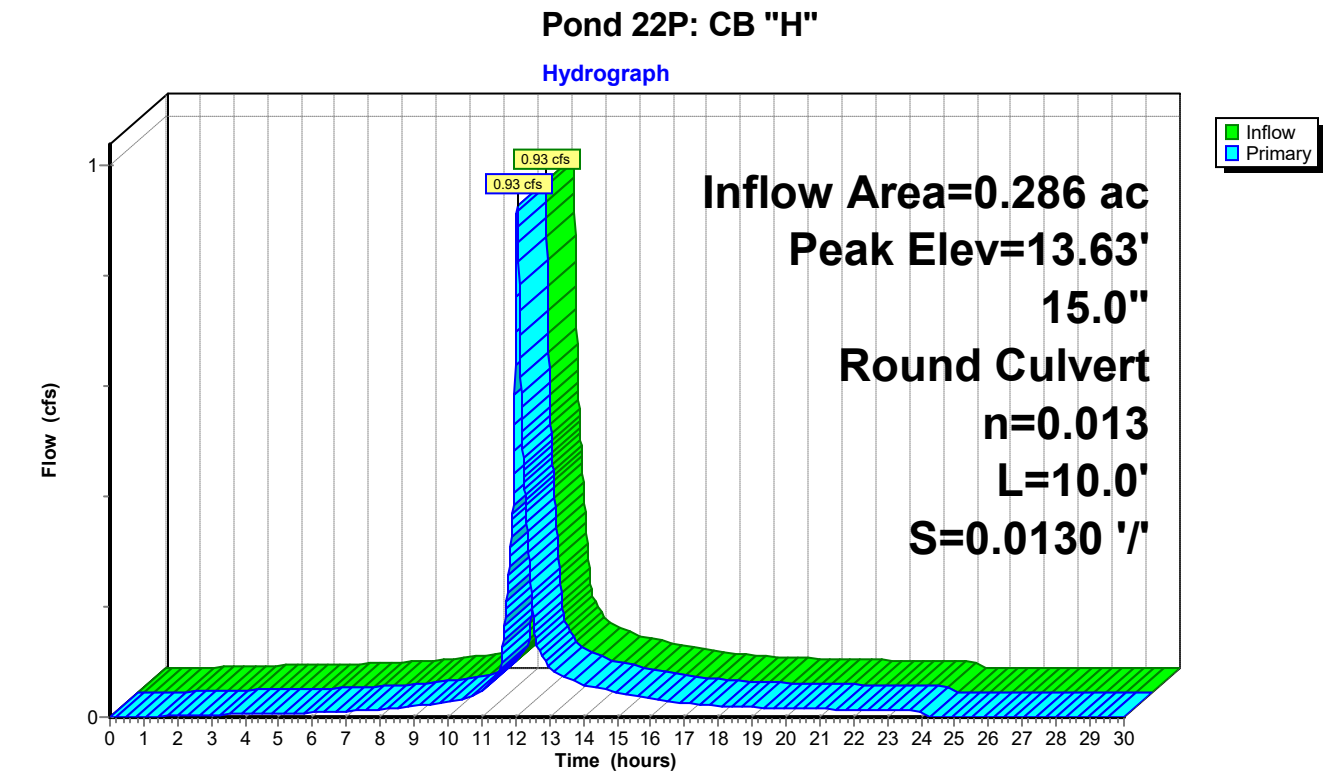
0.286 ac, 57.99% Impervious, Inflow Depth = 3.10" for 10-Year event
 = 0.93 cfs @ 12.05 hrs, Volume= 0.074 af
 = 0.93 cfs @ 12.05 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
 = 0.93 cfs @ 12.05 hrs, Volume= 0.074 af

Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.63' @ 12.05 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.15'	15.0" Round Culvert L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.15' / 13.02' S= 0.0130 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=0.92 cfs @ 12.05 hrs HW=13.63' TW=13.10' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 0.92 cfs @ 3.17 fps)

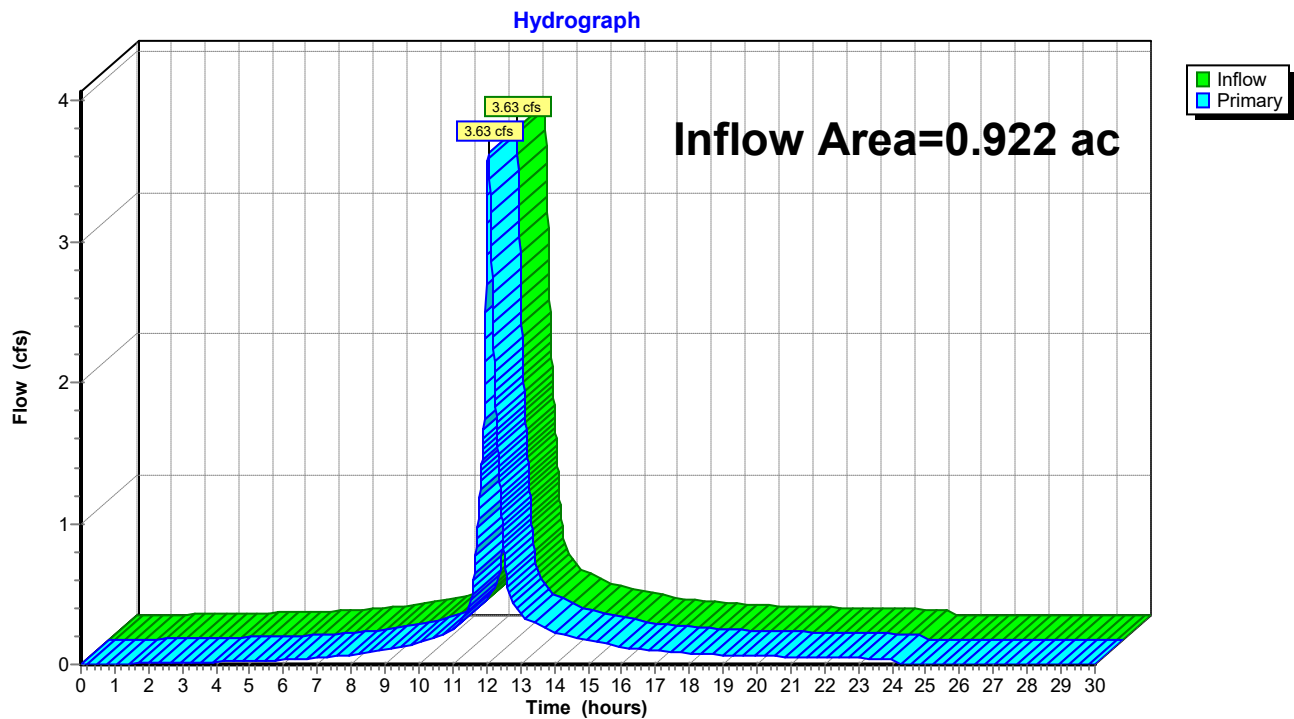


Summary for Link 12L: BACK RIVER

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 4.10" for 10-Year event
Inflow = 3.63 cfs @ 12.06 hrs, Volume= 0.315 af
Primary = 3.63 cfs @ 12.06 hrs, Volume= 0.315 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 12L: BACK RIVER



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 7S: North Area	Runoff Area=17,623 sf 49.41% Impervious Runoff Depth=7.30" Flow Length=264' Tc=8.3 min CN=90 Runoff=2.98 cfs 0.246 af
Subcatchment 8S: Southeast Area	Runoff Area=6,204 sf 100.00% Impervious Runoff Depth=8.26" Flow Length=231' Tc=2.3 min CN=98 Runoff=1.36 cfs 0.098 af
Subcatchment 9S: Southwest Area	Runoff Area=7,826 sf 33.07% Impervious Runoff Depth=4.30" Flow Length=193' Tc=6.7 min CN=65 Runoff=0.88 cfs 0.064 af
Subcatchment 13S: South Roof Drain	Runoff Area=4,641 sf 100.00% Impervious Runoff Depth=8.26" Flow Length=36' Slope=0.2500 '/' Tc=2.2 min CN=98 Runoff=1.02 cfs 0.073 af
Subcatchment 15S: North Roof Drain	Runoff Area=3,886 sf 100.00% Impervious Runoff Depth=8.26" Flow Length=220' Tc=0.7 min CN=98 Runoff=0.90 cfs 0.061 af
Reach 26R: Proposed Roof Drain -	Avg. Flow Depth=0.41' Max Vel=5.83 fps Inflow=1.02 cfs 0.073 af 6.0" Round Pipe n=0.010 L=206.0' S=0.0189 '/' Capacity=1.00 cfs Outflow=1.00 cfs 0.073 af
Reach 27R: Proposed Roof Drain - North	Avg. Flow Depth=0.25' Max Vel=5.87 fps Inflow=0.90 cfs 0.061 af 12.0" Round Pipe n=0.010 L=190.0' S=0.0205 '/' Capacity=6.64 cfs Outflow=0.88 cfs 0.061 af
Pond 10P: DMH "D"	Peak Elev=13.47' Inflow=6.19 cfs 0.543 af 18.0" Round Culvert n=0.013 L=136.0' S=0.0093 '/' Outflow=6.19 cfs 0.543 af
Pond 11P: CB "G"	Peak Elev=13.75' Inflow=1.36 cfs 0.098 af 15.0" Round Culvert n=0.012 L=12.0' S=0.0258 '/' Outflow=1.36 cfs 0.098 af
Pond 21P: CB "I"	Peak Elev=14.07' Inflow=3.42 cfs 0.307 af 15.0" Round Culvert n=0.012 L=12.0' S=0.0008 '/' Outflow=3.42 cfs 0.307 af
Pond 22P: CB "H"	Peak Elev=13.84' Inflow=1.74 cfs 0.138 af 15.0" Round Culvert n=0.013 L=10.0' S=0.0130 '/' Outflow=1.74 cfs 0.138 af
Link 12L: BACK RIVER	Inflow=6.19 cfs 0.543 af Primary=6.19 cfs 0.543 af
Total Runoff Area = 0.922 ac Runoff Volume = 0.543 af Average Runoff Depth = 7.07"	
35.22% Pervious = 0.325 ac 64.78% Impervious = 0.597 ac	

Summary for Subcatchment 7S: North Area

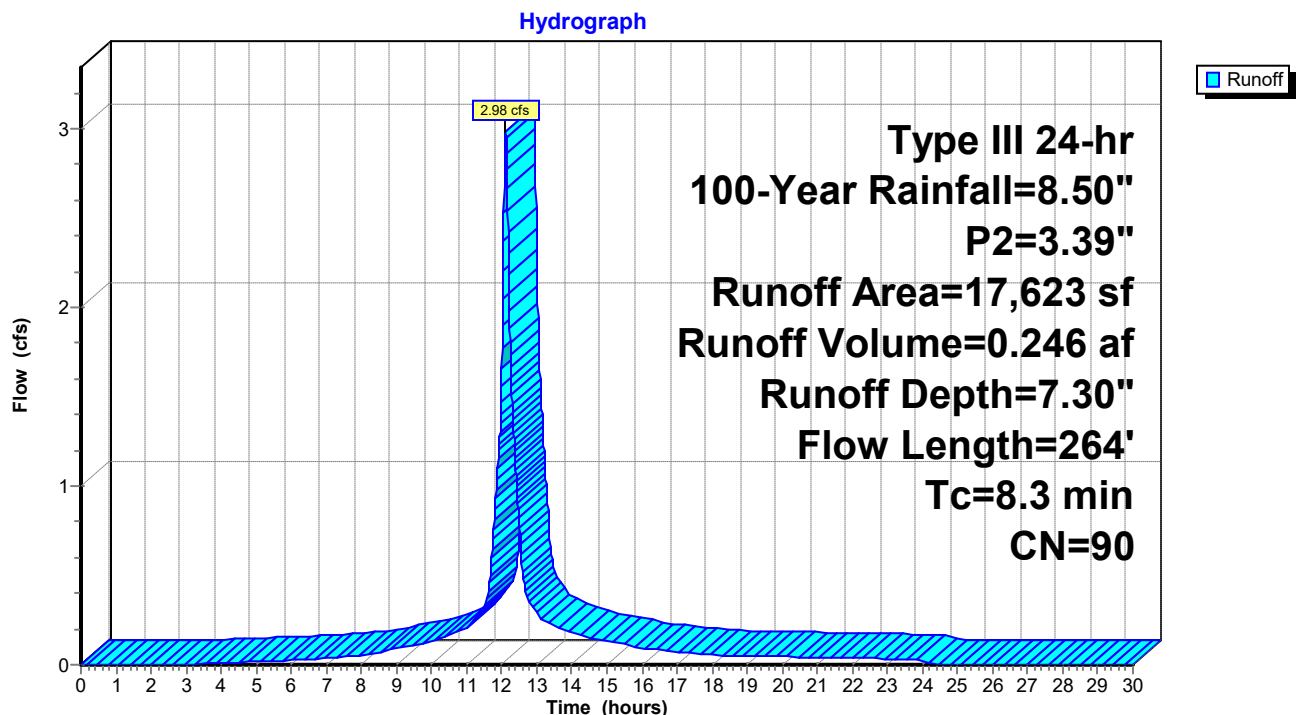
Runoff = 2.98 cfs @ 12.11 hrs, Volume= 0.246 af, Depth= 7.30"
 Routed to Pond 21P : CB "I"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
8,708	98	Paved roads w/curbs & sewers, HSG D
7,530	80	>75% Grass cover, Good, HSG D
* 1,385	96	Brick Pavers, HSG D
17,623	90	Weighted Average
8,915		50.59% Pervious Area
8,708		49.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	112	0.0580	0.27		Sheet Flow, over lawn Grass: Short n= 0.150 P2= 3.39"
0.7	37	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	115	0.0240	2.49		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.3	264	Total			

Subcatchment 7S: North Area



Summary for Subcatchment 8S: Southeast Area

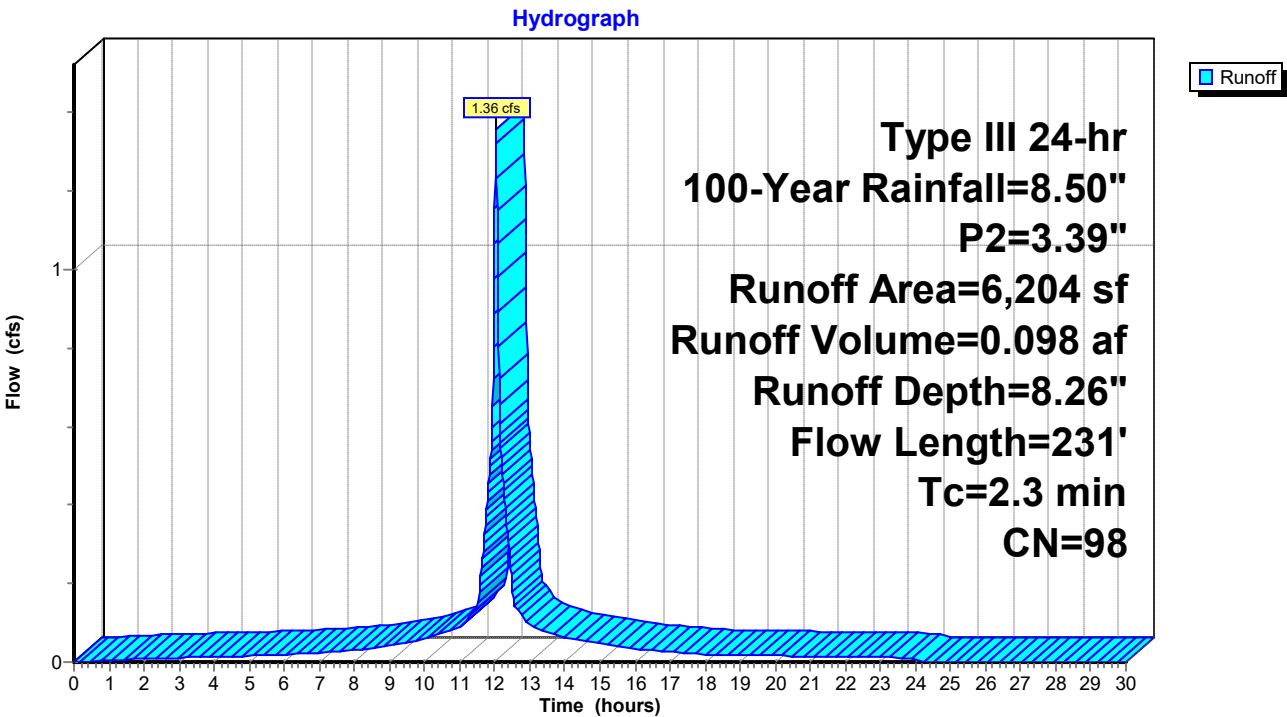
Runoff = 1.36 cfs @ 12.03 hrs, Volume= 0.098 af, Depth= 8.26"
Routed to Pond 11P : CB "G"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
6,204	98	Paved roads w/curbs & sewers, HSG A
6,204		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0150	1.26		Sheet Flow, Sheet flow over paved parking area (100') Smooth surfaces n= 0.011 P2= 3.39"
1.0	131	0.0120	2.22		Shallow Concentrated Flow, Shallow conc flow over paved R St Paved Kv= 20.3 fps
2.3	231	Total			

Subcatchment 8S: Southeast Area



Summary for Subcatchment 9S: Southwest Area

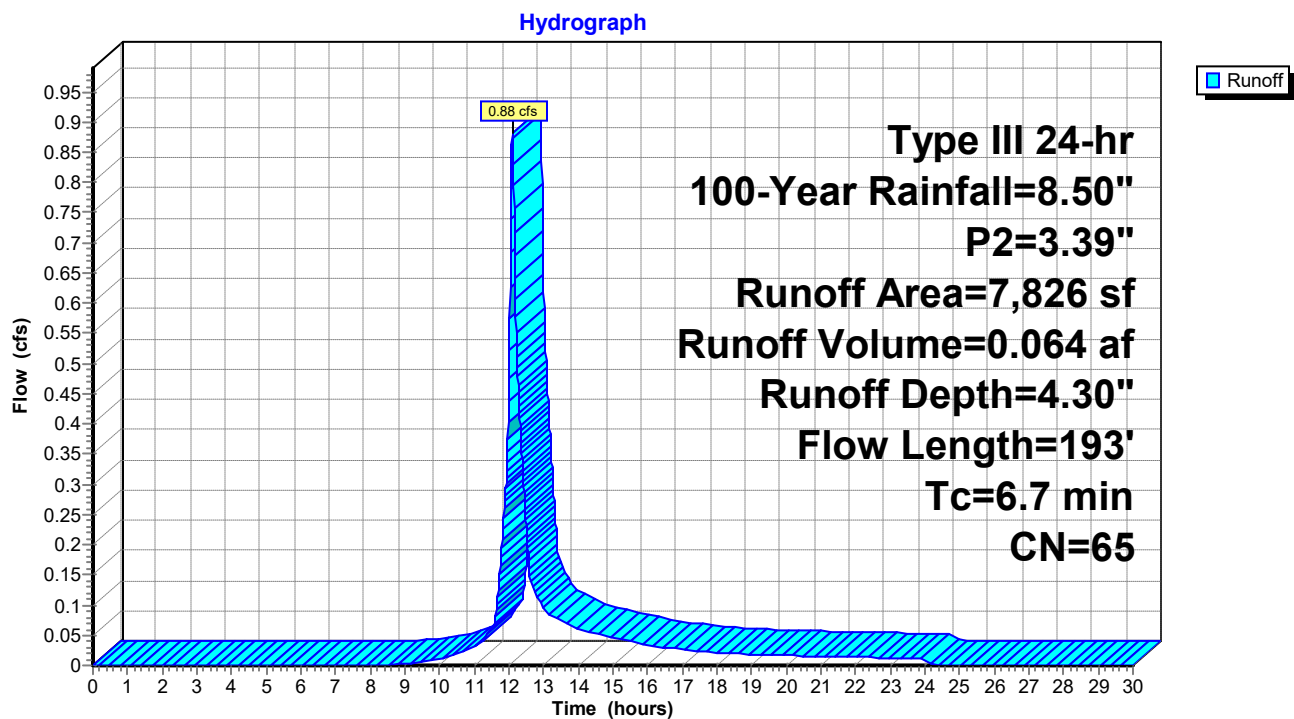
Runoff = 0.88 cfs @ 12.10 hrs, Volume= 0.064 af, Depth= 4.30"
 Routed to Pond 22P : CB "H"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
3,945	39	>75% Grass cover, Good, HSG A
2,588	98	Paved roads w/curbs & sewers, HSG A
1,293	76	Brick Pavers, HSG A
7,826	65	Weighted Average
5,238		66.93% Pervious Area
2,588		33.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	26	0.0190	0.09		Sheet Flow, sheet flow over lawn area (90') Grass: Dense n= 0.240 P2= 3.39"
0.9	94	0.0110	1.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	39	0.0130	0.80		Shallow Concentrated Flow, Shallow conc flow over driveway Short Grass Pasture Kv= 7.0 fps
0.2	34	0.0250	2.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.7	193	Total			

Subcatchment 9S: Southwest Area



Summary for Subcatchment 13S: South Roof Drain System

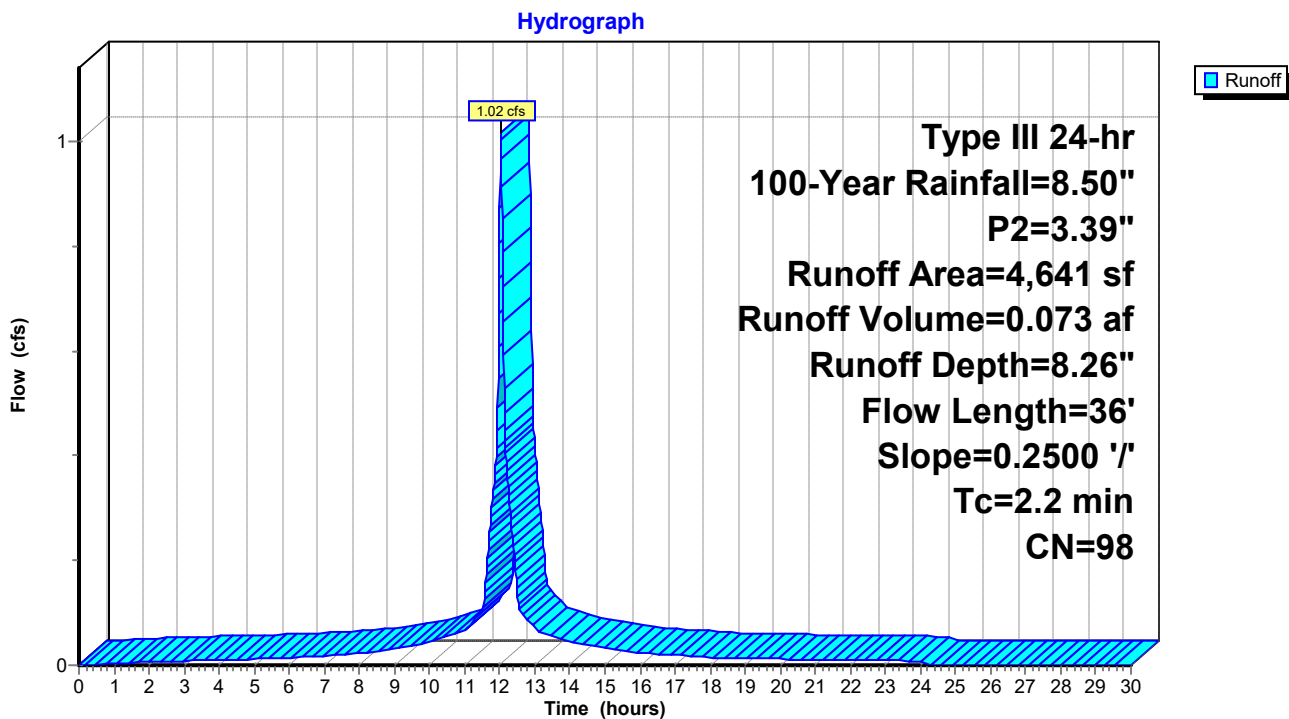
Runoff = 1.02 cfs @ 12.03 hrs, Volume= 0.073 af, Depth= 8.26"
 Routed to Reach 26R : Proposed Roof Drain - South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
4,641	98	Roofs, HSG A
4,641		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	36	0.2500	0.27		Sheet Flow, across roof Grass: Dense n= 0.240 P2= 3.39"

Subcatchment 13S: South Roof Drain System



Summary for Subcatchment 15S: North Roof Drain System

[49] Hint: $T_c < 2dt$ may require smaller dt

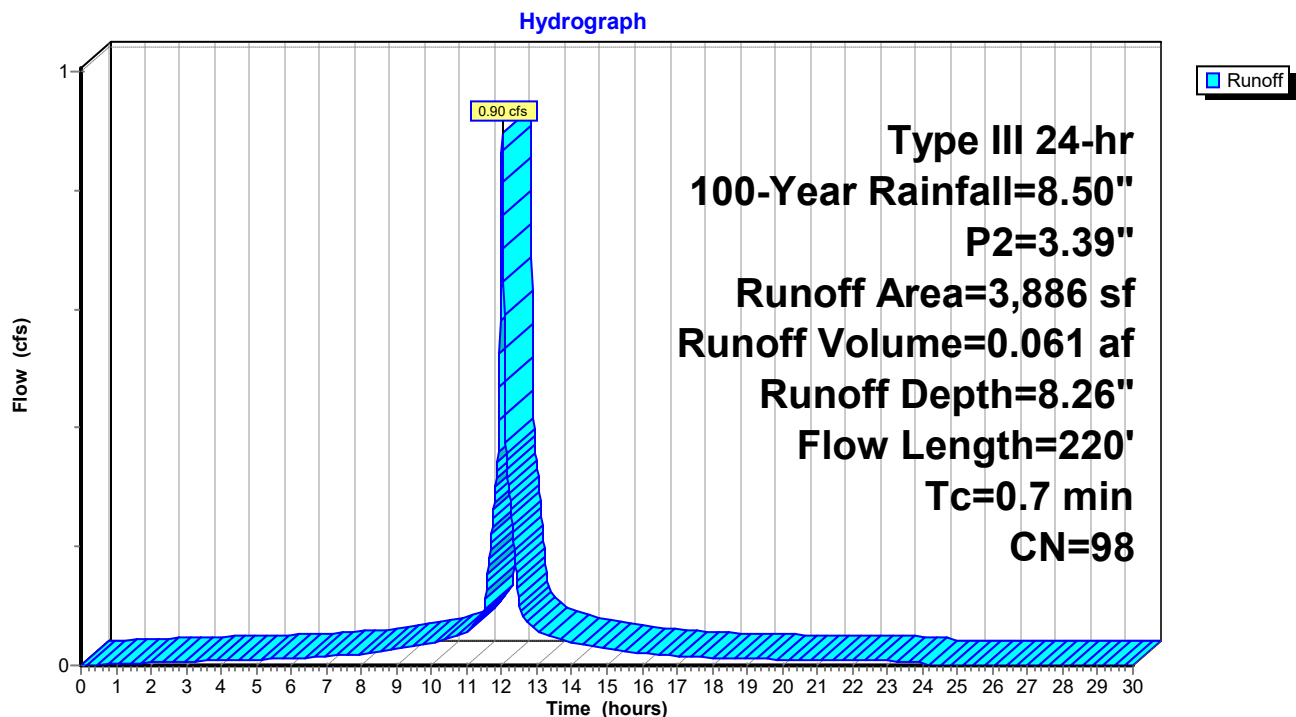
Runoff = 0.90 cfs @ 12.01 hrs, Volume= 0.061 af, Depth= 8.26"
 Routed to Reach 27R : Proposed Roof Drain - North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, $dt=0.01$ hrs
 Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Area (sf)	CN	Description
3,886	98	Roofs, HSG A
3,886		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	30	0.2500	3.06		Sheet Flow, over roof
					Smooth surfaces n= 0.011 P2= 3.39"
0.5	190	0.0205	7.04	5.53	Pipe Channel,
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
					n= 0.012 Corrugated PP, smooth interior
0.7	220	Total			

Subcatchment 15S: North Roof Drain System



Proposed Conditions - Clarks Pond Stormw Type III 24-hr 100-Year Rainfall=8.50", P2=3.39"

Prepared by GZA GeoEnvironmental, Inc

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Summary for Reach 26R: Proposed Roof Drain - South

[52] Hint: Inlet/Outlet conditions not evaluated

[55] Hint: Peak inflow is 102% of Manning's capacity

Inflow Area = 0.107 ac, 100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 1.02 cfs @ 12.03 hrs, Volume= 0.073 af
Outflow = 1.00 cfs @ 12.04 hrs, Volume= 0.073 af, Atten= 1%, Lag= 0.6 min
Routed to Pond 22P : CB "H"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Max. Velocity= 5.83 fps, Min. Travel Time= 0.6 min

Avg. Velocity= 2.06 fps, Avg. Travel Time= 1.7 min

Peak Storage= 36 cf @ 12.04 hrs

Average Depth at Peak Storage= 0.41', Surface Width= 0.38'

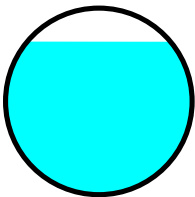
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.00 cfs

6.0" Round Pipe

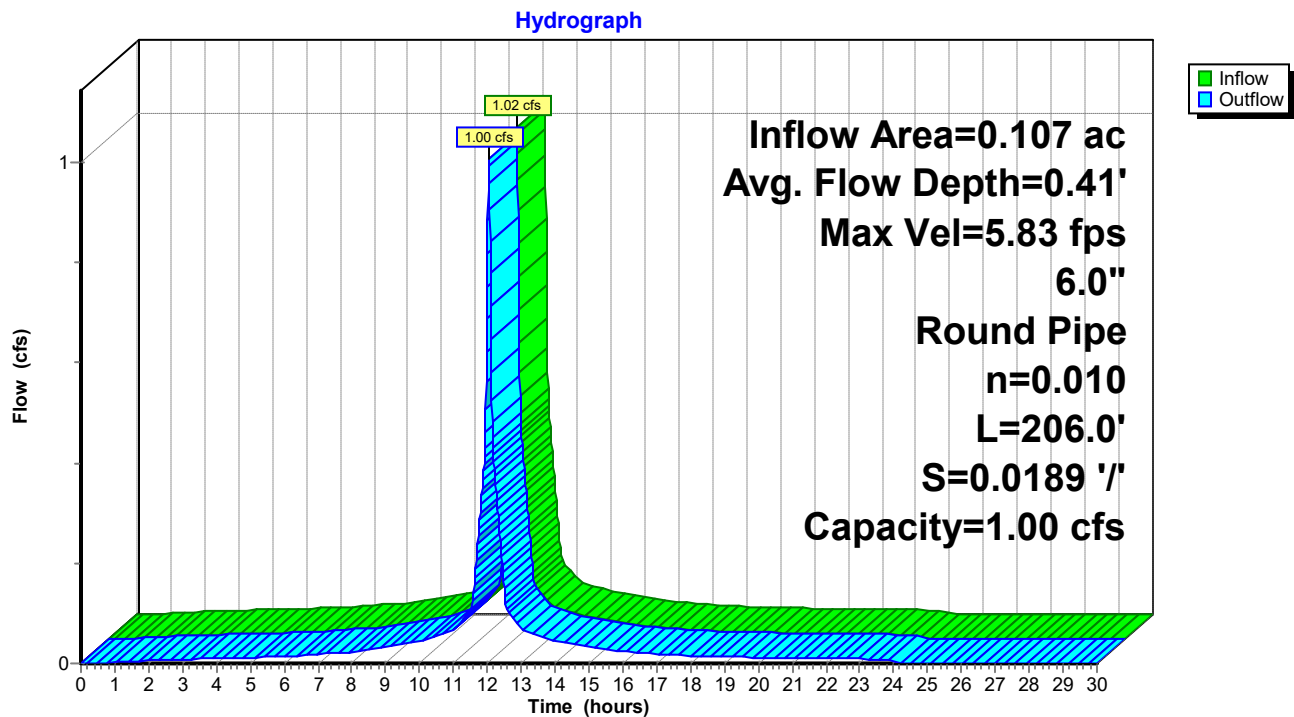
n= 0.010 PVC, smooth interior

Length= 206.0' Slope= 0.0189 '/'

Inlet Invert= 19.90', Outlet Invert= 16.00'



Reach 26R: Proposed Roof Drain - South



Summary for Reach 27R: Proposed Roof Drain - North

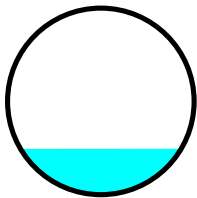
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.089 ac, 100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.90 cfs @ 12.01 hrs, Volume= 0.061 af
Outflow = 0.88 cfs @ 12.02 hrs, Volume= 0.061 af, Atten= 2%, Lag= 0.4 min
Routed to Pond 21P : CB "I"

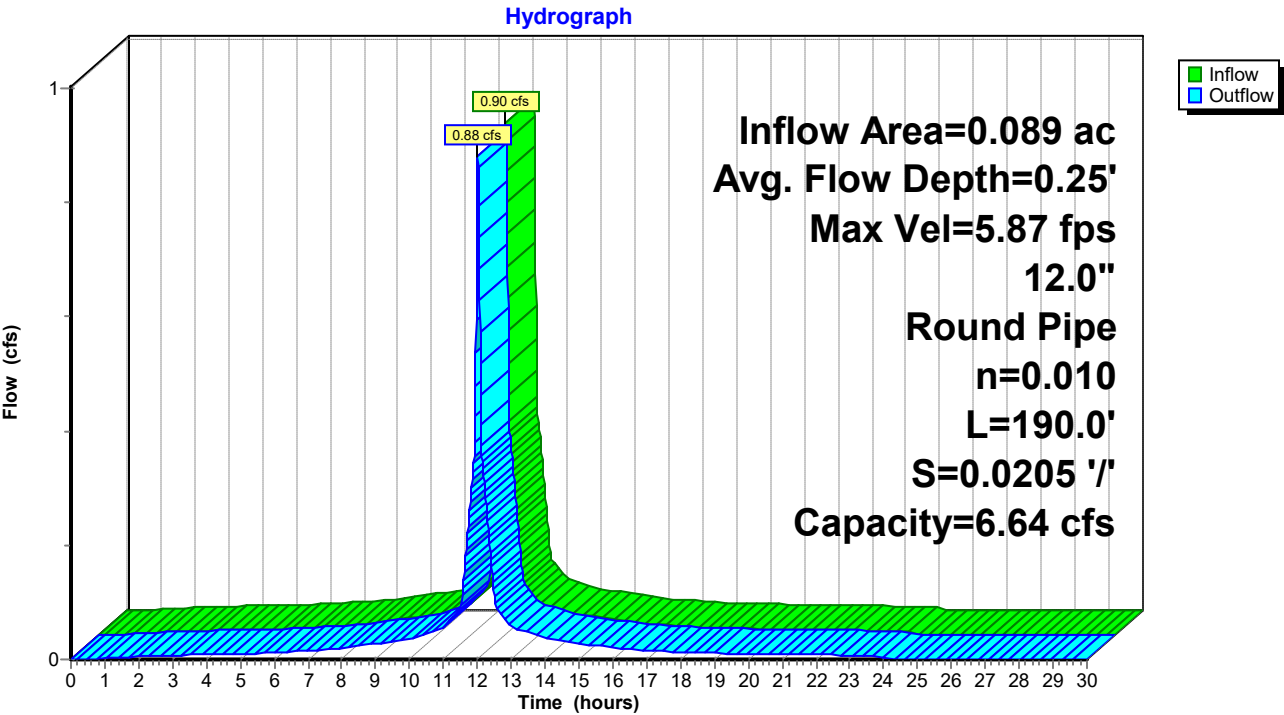
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.87 fps, Min. Travel Time= 0.5 min
Avg. Velocity= 1.84 fps, Avg. Travel Time= 1.7 min

Peak Storage= 29 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.25', Surface Width= 0.86'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.64 cfs

12.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 190.0' Slope= 0.0205 '/'
Inlet Invert= 18.00', Outlet Invert= 14.10'



Reach 27R: Proposed Roof Drain - North



Summary for Pond 10P: DMH "D"

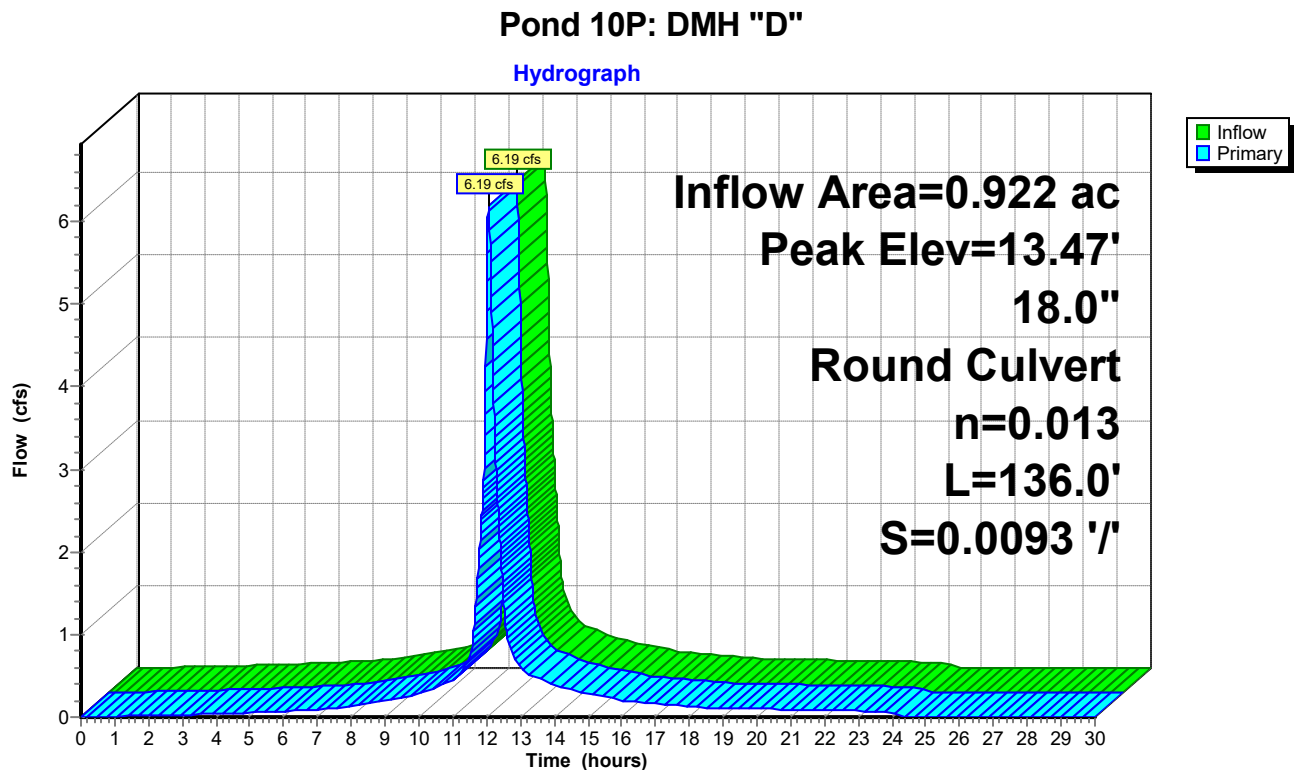
[57] Hint: Peaked at 13.47' (Flood elevation advised)

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 7.07" for 100-Year event
 Inflow = 6.19 cfs @ 12.07 hrs, Volume= 0.543 af
 Outflow = 6.19 cfs @ 12.07 hrs, Volume= 0.543 af, Atten= 0%, Lag= 0.0 min
 Primary = 6.19 cfs @ 12.07 hrs, Volume= 0.543 af
 Routed to Link 12L : BACK RIVER

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.47' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.19'	18.0" Round To Back River L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.19' / 10.92' S= 0.0093 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=6.19 cfs @ 12.07 hrs HW=13.47' TW=0.00' (Dynamic Tailwater)
 ↳ **To Back River** (Inlet Controls 6.19 cfs @ 3.85 fps)



Summary for Pond 11P: CB "G"

[57] Hint: Peaked at 13.75' (Flood elevation advised)

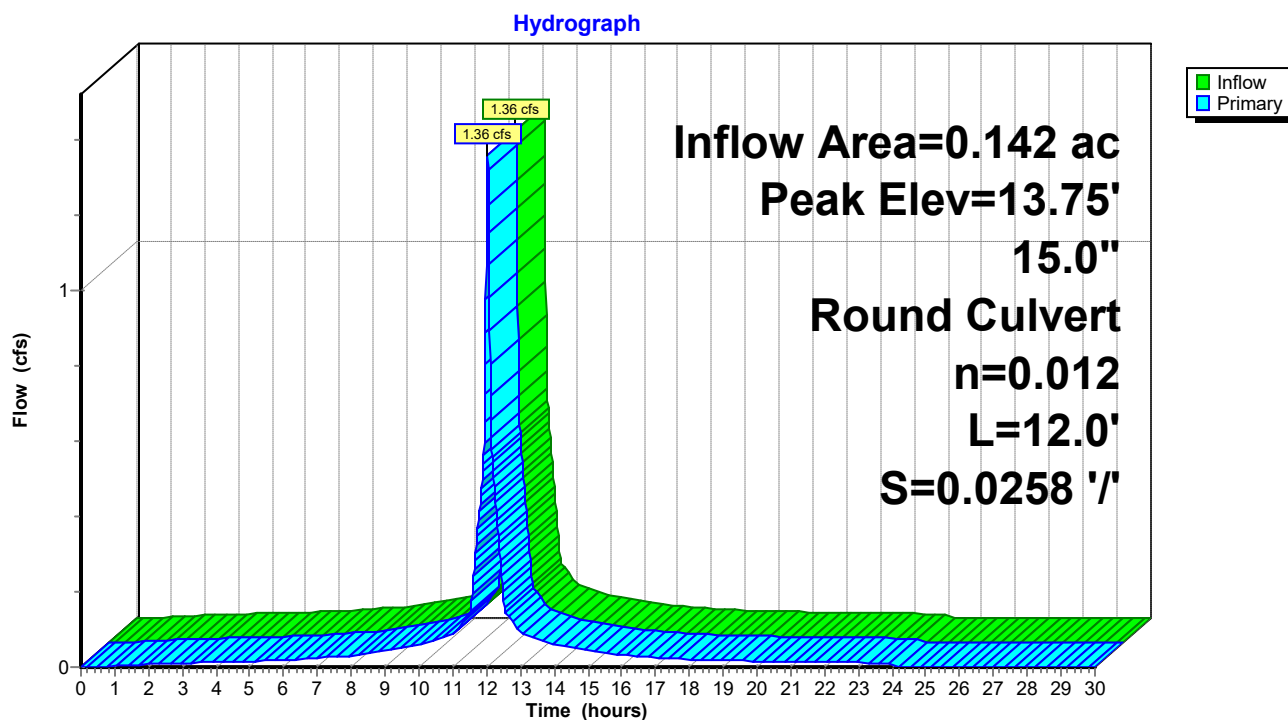
Inflow Area = 0.142 ac, 100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
 Inflow = 1.36 cfs @ 12.03 hrs, Volume= 0.098 af
 Outflow = 1.36 cfs @ 12.03 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.36 cfs @ 12.03 hrs, Volume= 0.098 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.75' @ 12.05 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.18'	15.0" Round Culvert L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.18' / 12.87' S= 0.0258 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=1.29 cfs @ 12.03 hrs HW=13.74' TW=13.43' (Dynamic Tailwater)
 1=Culvert (Outlet Controls 1.29 cfs @ 3.58 fps)

Pond 11P: CB "G"



Summary for Pond 21P: CB "I"

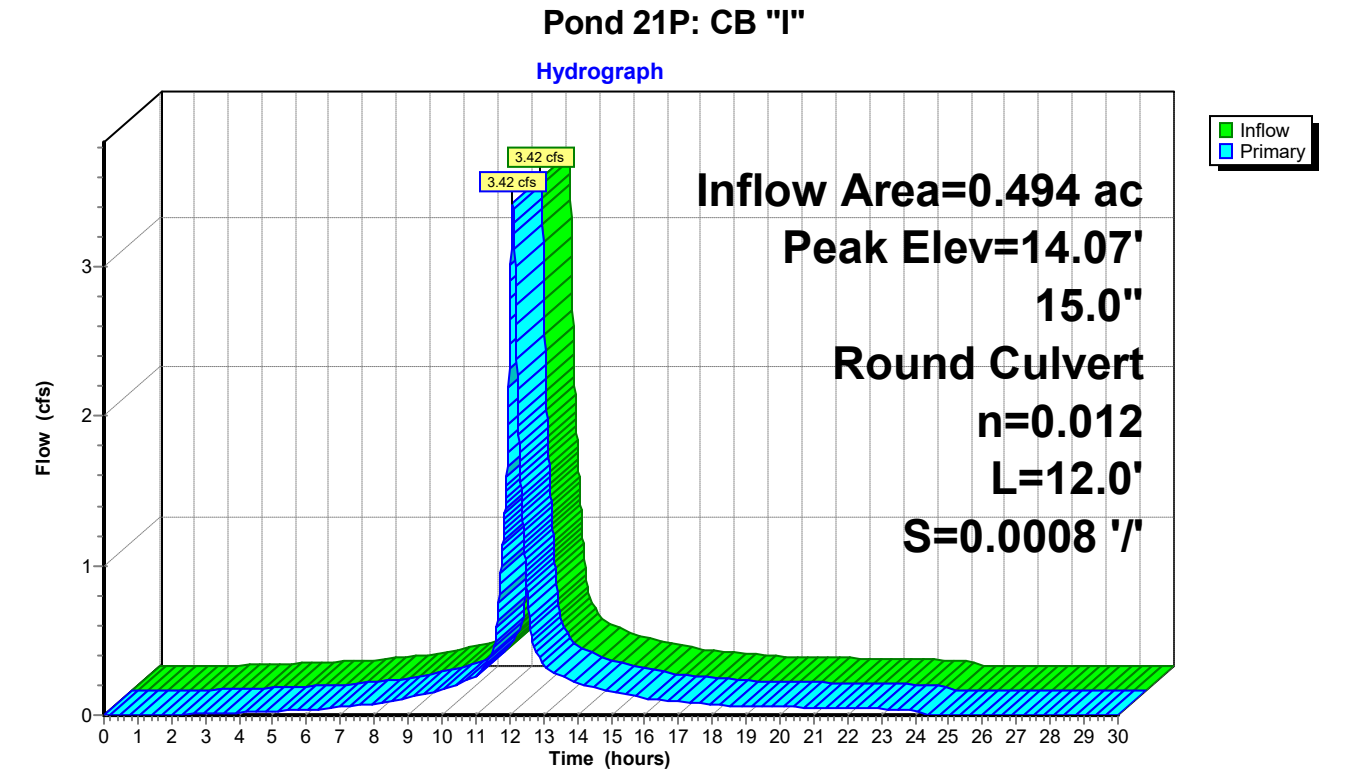
[57] Hint: Peaked at 14.07' (Flood elevation advised)

Inflow Area = 0.494 ac, 58.55% Impervious, Inflow Depth = 7.47" for 100-Year event
Inflow = 3.42 cfs @ 12.10 hrs, Volume= 0.307 af
Outflow = 3.42 cfs @ 12.10 hrs, Volume= 0.307 af, Atten= 0%, Lag= 0.0 min
Primary = 3.42 cfs @ 12.10 hrs, Volume= 0.307 af
Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 14.07' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	12.83'	15.0" Round Culvert L= 12.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 12.83' / 12.82' S= 0.0008 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=3.41 cfs @ 12.10 hrs HW=14.07' TW=13.43' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.41 cfs @ 3.49 fps)



Summary for Pond 22P: CB "H"

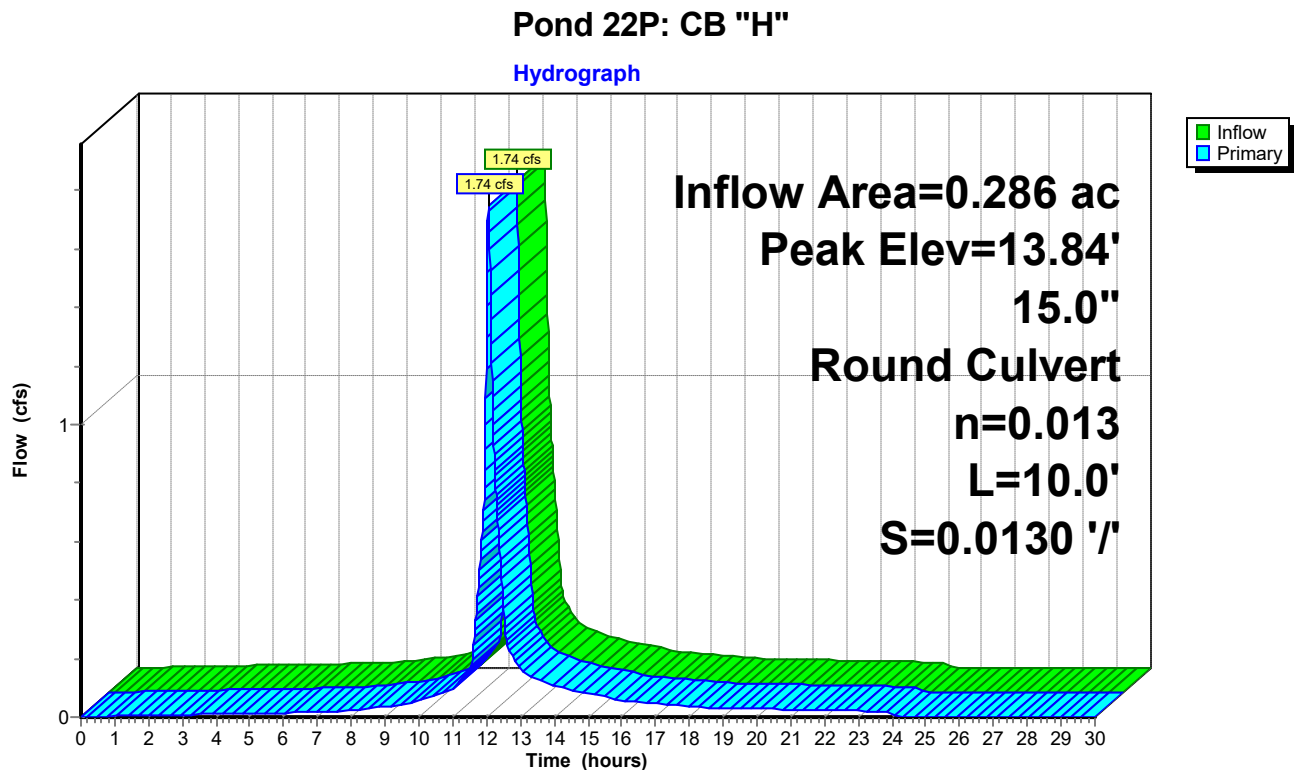
[57] Hint: Peaked at 13.84' (Flood elevation advised)

Inflow Area = 0.286 ac, 57.99% Impervious, Inflow Depth = 5.78" for 100-Year event
 Inflow = 1.74 cfs @ 12.06 hrs, Volume= 0.138 af
 Outflow = 1.74 cfs @ 12.06 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.74 cfs @ 12.06 hrs, Volume= 0.138 af
 Routed to Pond 10P : DMH "D"

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 13.84' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.15'	15.0" Round Culvert L= 10.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 13.15' / 13.02' S= 0.0130 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=1.74 cfs @ 12.06 hrs HW=13.84' TW=13.47' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 1.74 cfs @ 3.63 fps)

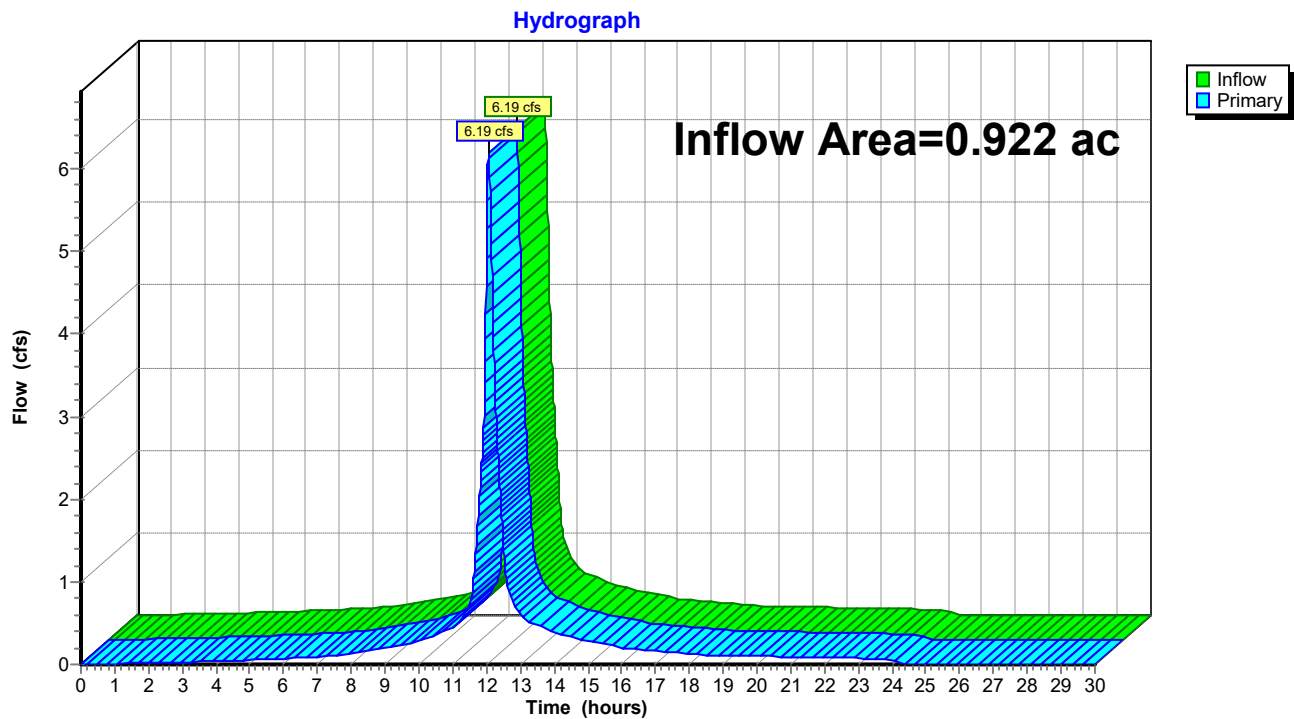


Summary for Link 12L: BACK RIVER

Inflow Area = 0.922 ac, 64.78% Impervious, Inflow Depth = 7.07" for 100-Year event
Inflow = 6.19 cfs @ 12.07 hrs, Volume= 0.543 af
Primary = 6.19 cfs @ 12.07 hrs, Volume= 0.543 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 12L: BACK RIVER





APPENDIX E

NRCS SOIL REPORT



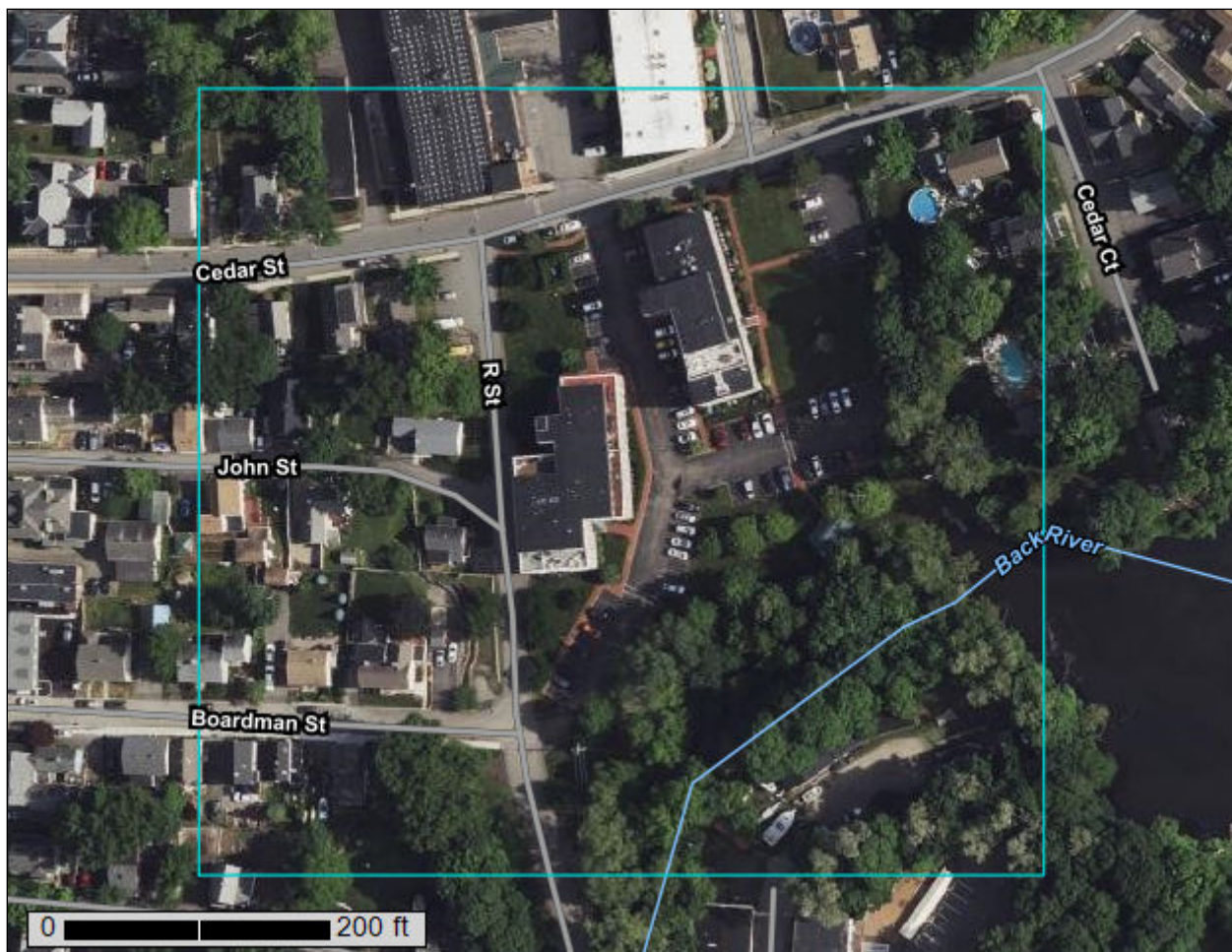
United States
Department of
Agriculture

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 **Essex County, Massachusetts, Northern Part**



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

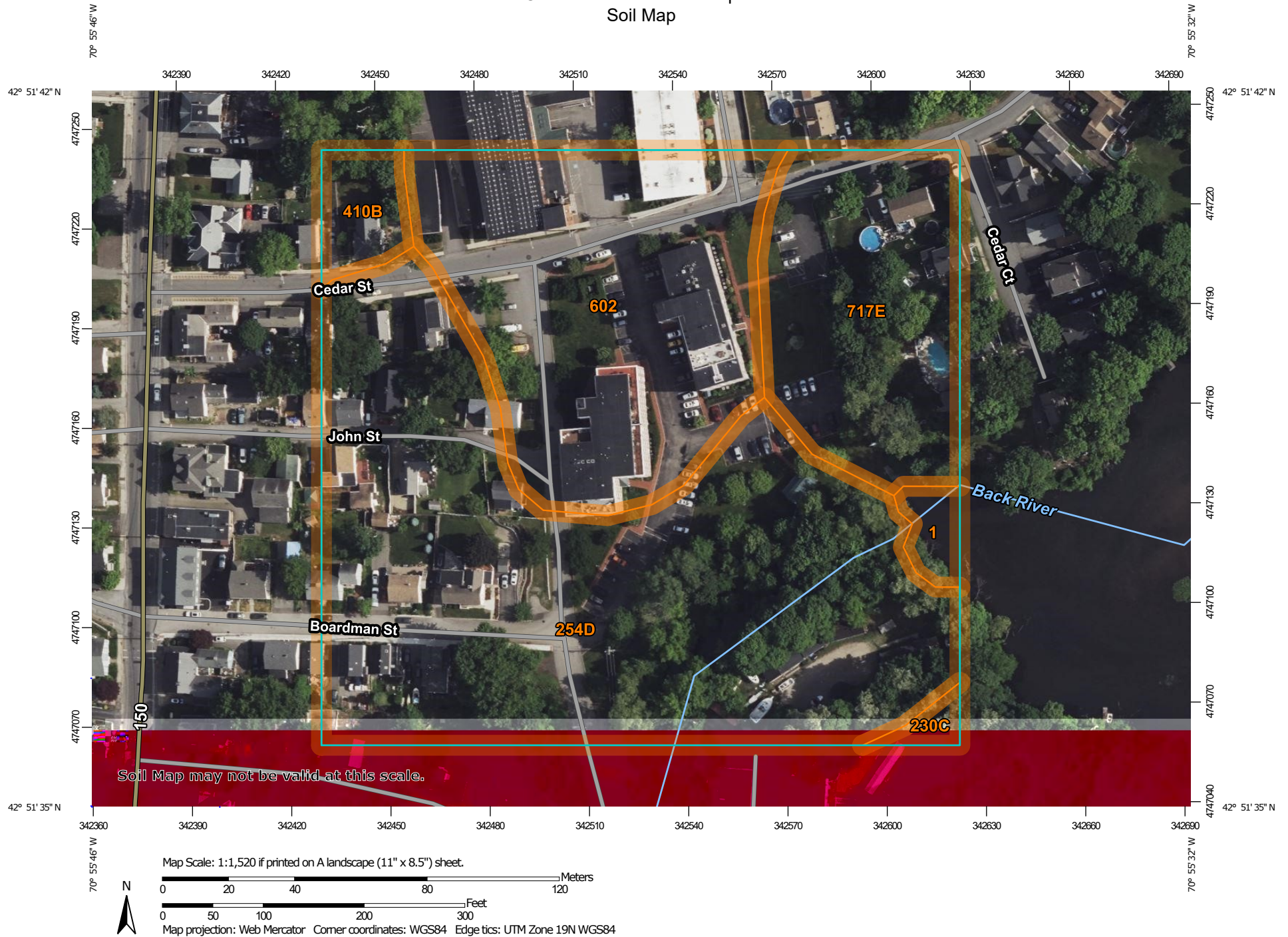
Custom Soil Resource Report

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



Custom Soil Resource Report

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: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 20, Aug 27, 2024

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

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

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	0.1	1.4%
230C	Unadilla very fine sandy loam, 8 to 15 percent slopes	0.1	0.7%
254D	Merrimac fine sandy loam, 15 to 25 percent slopes	4.5	51.9%
410B	Sutton fine sandy loam, 3 to 8 percent slopes	0.2	2.7%
602	Urban land	2.3	27.0%
717E	Rock outcrop-Charlton-Hollis complex, 15 to 35 percent slopes	1.4	16.3%
Totals for Area of Interest		8.6	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.

Essex County, Massachusetts, Northern Part

1—Water

Map Unit Setting

National map unit symbol: vjx4

Frost-free period: 125 to 165 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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

Map Unit Setting

National map unit symbol: vjx1

Elevation: 600 to 1,800 feet

Mean annual precipitation: 45 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 145 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): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Soft coarse-silty glaciolacustrine deposits

Typical profile

H1 - 0 to 9 inches: very fine sandy loam

H2 - 9 to 53 inches: very fine sandy loam

H3 - 53 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Custom Soil Resource Report

Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Ecological site: F144AY024NY - Well Drained Eolian Outwash

Hydric soil rating: No

Minor Components

Belgrade

Percent of map unit: 20 percent

Hydric soil rating: No

254D—Merrimac fine sandy loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2tyrg

Elevation: 0 to 1,890 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Side slope, crest, riser, tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam

Bw1 - 10 to 22 inches: fine sandy loam

Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand

2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Custom Soil Resource Report

Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 10 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash terraces, dunes, outwash plains, deltas
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, outwash terraces, moraines, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread, rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

410B—Sutton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w69j
Elevation: 0 to 1,410 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: All areas are prime farmland

Map Unit Composition

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

Description of Sutton

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 5 inches: fine sandy loam
Bw1 - 5 to 17 inches: fine sandy loam
Bw2 - 17 to 25 inches: sandy loam
C1 - 25 to 39 inches: gravelly sandy loam
C2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
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 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D

Custom Soil Resource Report

Ecological site: F144AY008CT - Moist Till Uplands

Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 9 percent

Landform: Ridges, ground moraines, hills

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Woodbridge

Percent of map unit: 5 percent

Landform: Hills, drumlins, ground moraines

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Leicester

Percent of map unit: 5 percent

Landform: Ground moraines, hills, drainageways, depressions

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave, linear

Across-slope shape: Concave

Hydric soil rating: Yes

Whitman

Percent of map unit: 1 percent

Landform: Drumlins, ground moraines, hills, 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

602—Urban land

Map Unit Setting

National map unit symbol: vjx3

Frost-free period: 125 to 165 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent

Minor components: 20 percent

Custom Soil Resource Report

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Excavated and filled land

Minor Components

Udorthents

Percent of map unit: 10 percent

Hydric soil rating: No

Merrimac

Percent of map unit: 2 percent

Hydric soil rating: No

Hinckley

Percent of map unit: 2 percent

Hydric soil rating: No

Windsor

Percent of map unit: 2 percent

Hydric soil rating: No

Charlton

Percent of map unit: 2 percent

Hydric soil rating: No

Paxton

Percent of map unit: 2 percent

Hydric soil rating: No

717E—Rock outcrop-Charlton-Hollis complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: vjrb

Elevation: 0 to 260 feet

Mean annual precipitation: 45 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 125 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 40 percent

Charlton and similar soils: 30 percent

Hollis and similar soils: 15 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Setting

Parent material: Granite and gneiss

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Description of Charlton

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Friable coarse-loamy eolian deposits over friable coarse-loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 4 inches: fine sandy loam

H2 - 4 to 28 inches: gravelly fine sandy loam

H3 - 28 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 25 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Hollis

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Custom Soil Resource Report

Parent material: Shallow, friable loamy eolian deposits over granite and gneiss

Typical profile

O - 0 to 1 inches: muck

H2 - 1 to 6 inches: fine sandy loam

H3 - 6 to 17 inches: gravelly fine sandy loam

H4 - 17 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 10 to 60 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Minor Components

Sutton

Percent of map unit: 5 percent

Hydric soil rating: No

Leicester

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Chatfield

Percent of map unit: 5 percent

Hydric soil rating: No

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Custom Soil Resource Report

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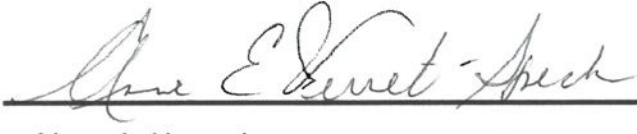


APPENDIX F

ILLICIT DISCHARGE COMPLIANCE STATEMENT

Appendix F: Illicit Discharge Compliance Statement

It is the intent of the applicant, the Loft's at Clark's Pond Homeowner Association, to control illicit disposal into the stormwater management system. There will be no connection to the stormwater management system containing other liquids, chemicals, or solids.

 14 July 2025

Loft's at Clark's Pond Homeowner Association Representative



APPENDIX G

OPERATIONS AND MAINTENANCE INSPECTION LOG



Proactive by Design



STORMWATER MANAGEMENT SYSTEMS: OPERATION AND MAINTENANCE (O&M) PLAN

**Loft's at Clark's Pond Homeowner Association
25 Cedar Street
Amesbury, MA 01913**

July 11, 2025

GZA File No.: 03.0035466.00

PREPARED FOR:

**Loft's at Clark's Pond Homeowner Association
Amesbury, Massachusetts**

GZA GeoEnvironmental, Inc.

188 Valley Street Suite 300 | Providence, RI 02909
401-421-4140



1.0	INTRODUCTION	1
2.0	ROOF DRAINS	1
3.0	CATCH BASINS AND VORTEX CATCH BASINS	1
4.0	FUNDING SOURCES	1

ATTACHMENT:

STORMWATER MANAGEMENT SYSTEM INSPECTION SHEET



1.0 INTRODUCTION

Standard 9 of the *Massachusetts Stormwater Handbook and Stormwater Standards* requires that an operations and maintenance plan is developed to ensure that stormwater management systems function properly for the lifetime of the system.

The Site is located at 25 Cedar Street, Amesbury, Massachusetts. The project includes the installation and replacement of drainage pipes along the building and then connected into the existing stormwater management system. The stormwater management system for the project consists of roof drains, catch basins and vortex catch basins. A stormwater management system inspection sheet is attached, and inspection activities are described herein.

The Loft's at Clark's Pond Homeowner Association are the owners of the stormwater management systems and will be responsible for its operation and maintenance.

2.0 ROOF DRAINS

Roof drains and downspouts shall be inspected at least once a year to ensure no clogging or accumulation of debris or sediment has occurred.

3.0 CATCH BASINS AND VORTEX CATCH BASINS

Catch basins and Vortex catch basins shall be inspected per the manufacturer's schedule but at a minimum be once a year. This is to ensure that it is operating as intended and for the accumulation of sediment, trash and debris. The accumulation of sediment, trash and debris will be removed and be lawfully disposed of.

4.0 FUNDING SOURCES

Funding for routine inspections and maintenance of the stormwater management system will be provided by the Loft's at Clark's Pond Homeowner Association.

STORMWATER MANAGEMENT SYSTEM INSPECTION SHEET**Loft's at Clark's Pond Homeowner Association****25 Cedar Street****Amesbury, MA 01913**

DATE:**TIME:****INSPECTOR:****REASON FOR INSPECTION:****ANNUAL****CORRECTIVE**

Maintenance Item	Condition	Corrective action needed
Roof Drains		
Inspect to ensure that roof drains are operating as designed		
Check for accumulated sediment, trash, and debris		

Maintenance Item	Condition	Corrective action needed
Catch Basins and Vortex Catch Basins		
Inspect to ensure that catch basins are operating as designed		
Check for accumulated sediment, trash, and debris		

ADDITIONAL COMMENTS



APPENDIX H

DRAWING SET AND WATERSHED MAPS

LOFT'S AT CLARKS POND

STORMWATER MANAGEMENT & DRAINAGE IMPROVEMENT DESIGN

15 CEDAR ST,
AMESBURY MA 01913

JULY 2025

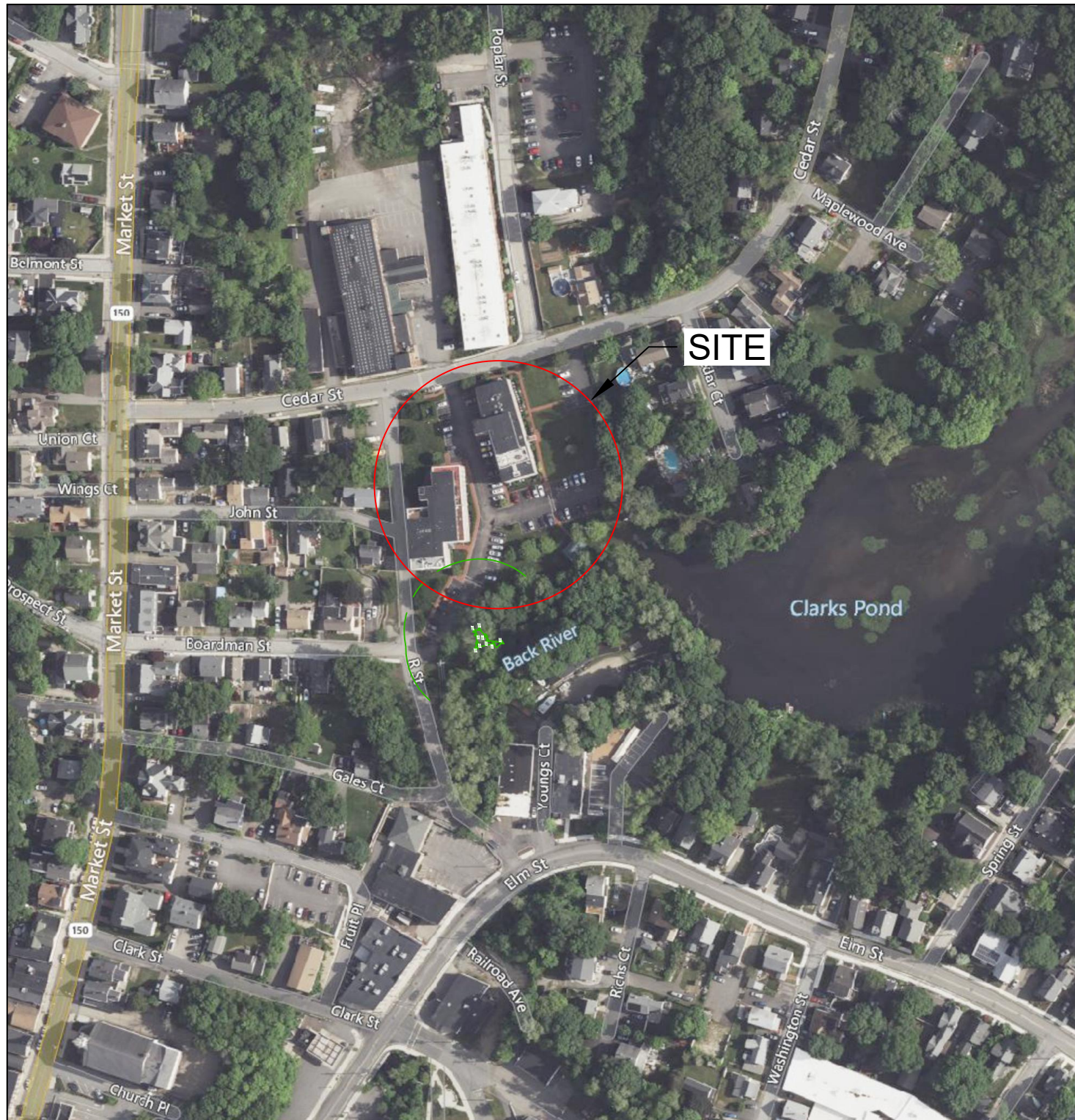
PREPARED FOR:

LOFT'S AT CLARK'S POND
HOMEOWNER ASSOCIATION
15 CEDAR STREET
AMESBURY, MA 01913

DESIGNED BY:



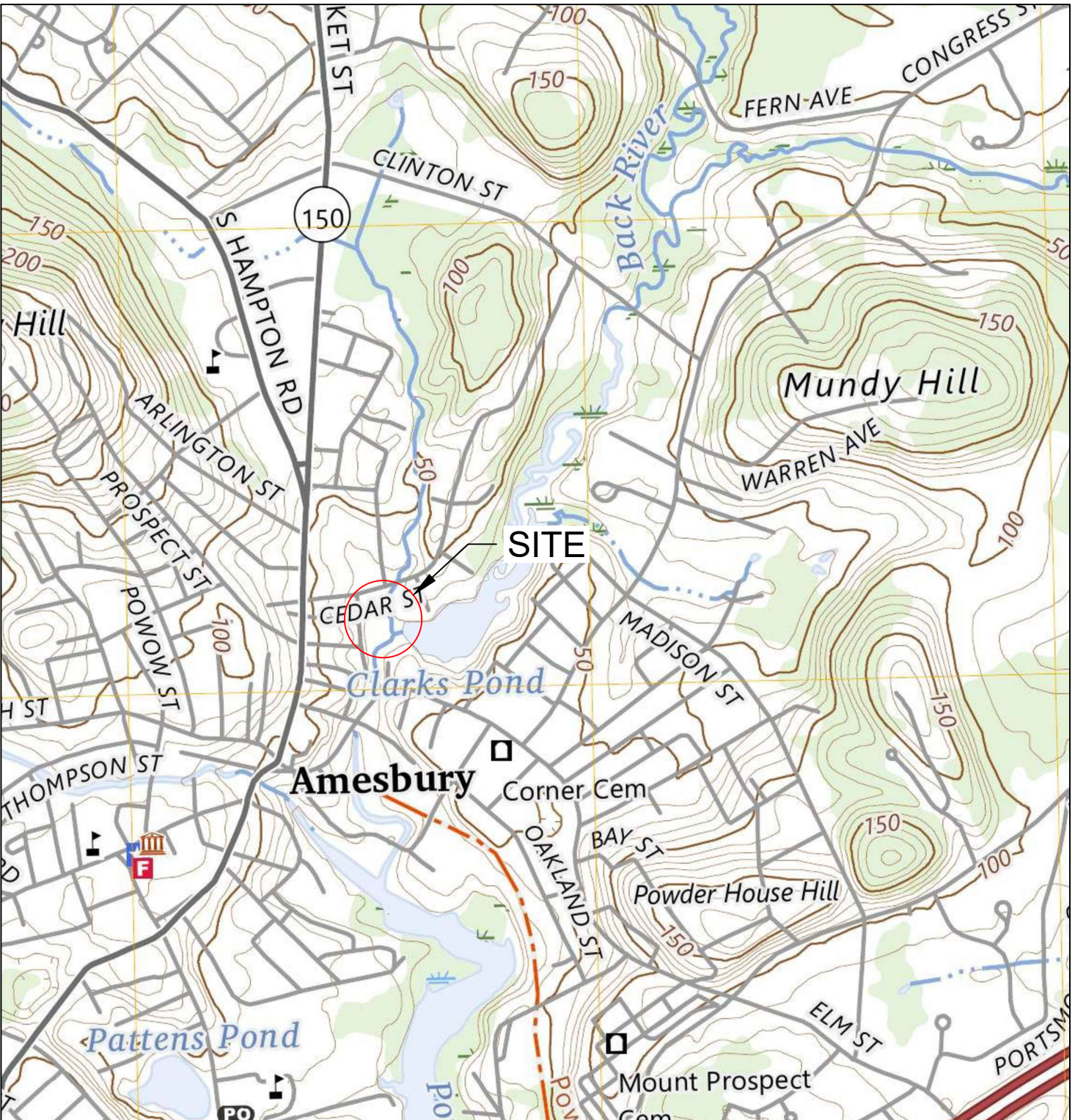
GZA GEOENVIRONMENTAL, INC.
188 VALLEY STREET, SUITE 300
PROVIDENCE, RI 02909



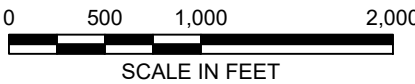
PROJECT VICINITY MAP



SOURCE: BASE MAP FROM MASSACHUSETTS MASSMAPPER GIS.



PROJECT LOCUS MAP

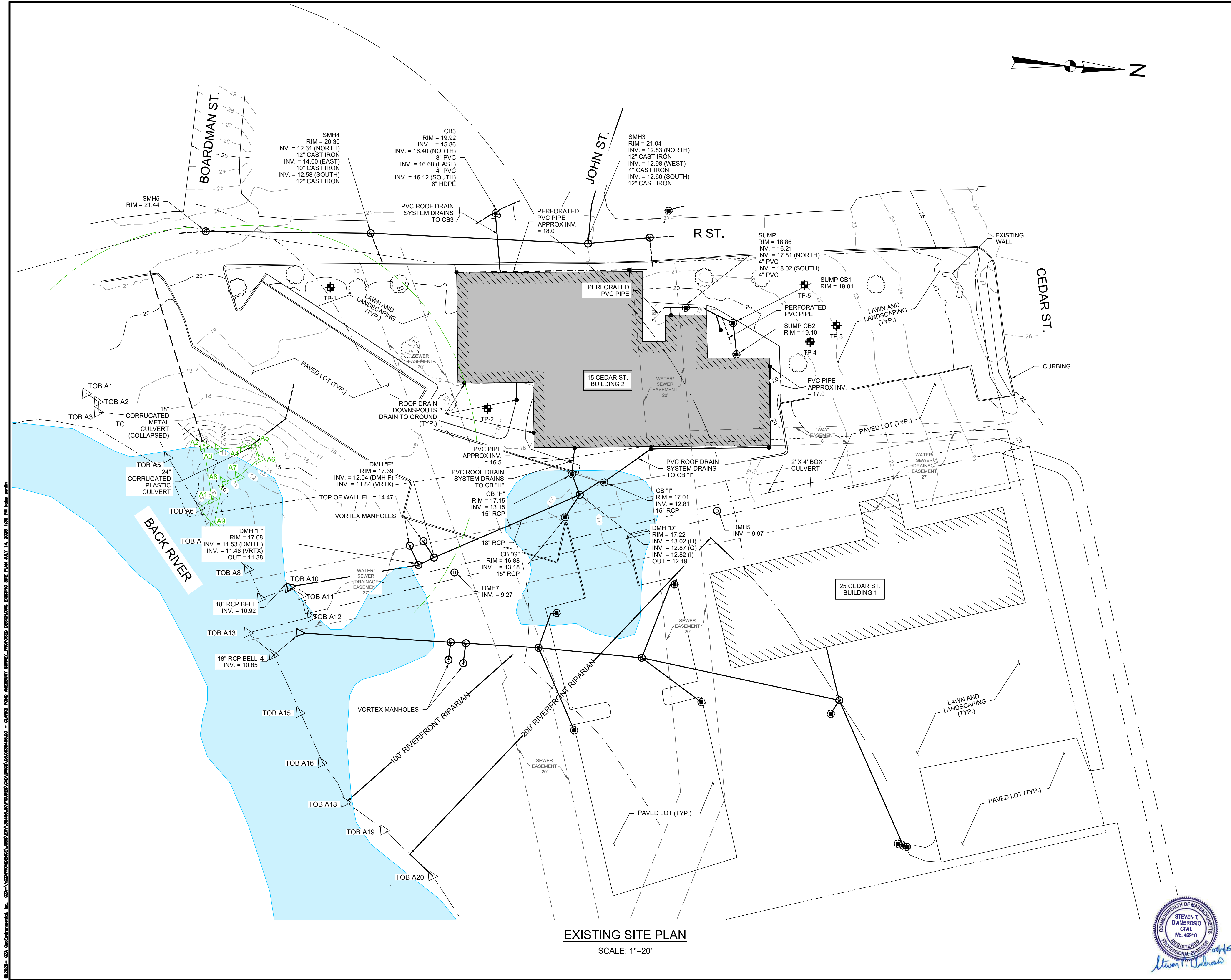


SOURCE: BASE MAP FROM USGS 7.5-MINUTE SERIES
NEWBURYPORT WEST QUADRANGLE 2024.
CONTOUR ELEVATIONS REFERENCE NAVD88 SHOWN IN 10
FOOT INTERVALS

SHEET LIST TABLE	
SHEET #	SHEET TITLE
-	COVER AND INDEX OF DRAWINGS
1	EXISTING CONDITIONS PLAN
2	EXISTING WATERSHED PLAN
3	PROPOSED CONDITIONS PLAN
4	PROPOSED WATERSHED PLAN
5	DETAILS

NO.	ISSUE/DESCRIPTION	BY	DATE
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COVER AND INDEX OF DRAWINGS			
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PROJ MGR: JK	REVIEWED BY: JK	CHECKED BY: ABB	DRAWING
DESIGNED BY: JJZ	DRAWN BY: EJW	SCALE: AS SHOWN	
DATE: July 2025	PROJECT NO. 03.0035466.00	REVISION NO.	
			SHEET NO.

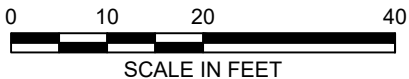




LEGEND

- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- APPROXIMATE PROPERTY LINE
- ROOF DRAIN SYSTEM PIPING
- ROOF DRAIN SYSTEM PERFORATED PIPING
- TOB A1 TOP OF BANK WITH FLAGS
- 100-FOOT RIVERFRONT AREA
- 200-FOOT RIVERFRONT AREA
- FEMA 100-YEAR FLOOD ZONE (ZONE A) (BORDERING LAND SUBJECT TO FLOODING)
- WETLAND FLAGS
- 100-FOOT BUFFER ZONE
- EASEMENTS
- EXISTING DRAIN MANHOLE
- EXISTING DRAIN MANHOLE
- EXISTING DRAIN MANHOLE
- EXISTING CATCH BASIN
- ROOF DRAIN DOWNSPOUT
- EXISTING TREE
- TEST PITS

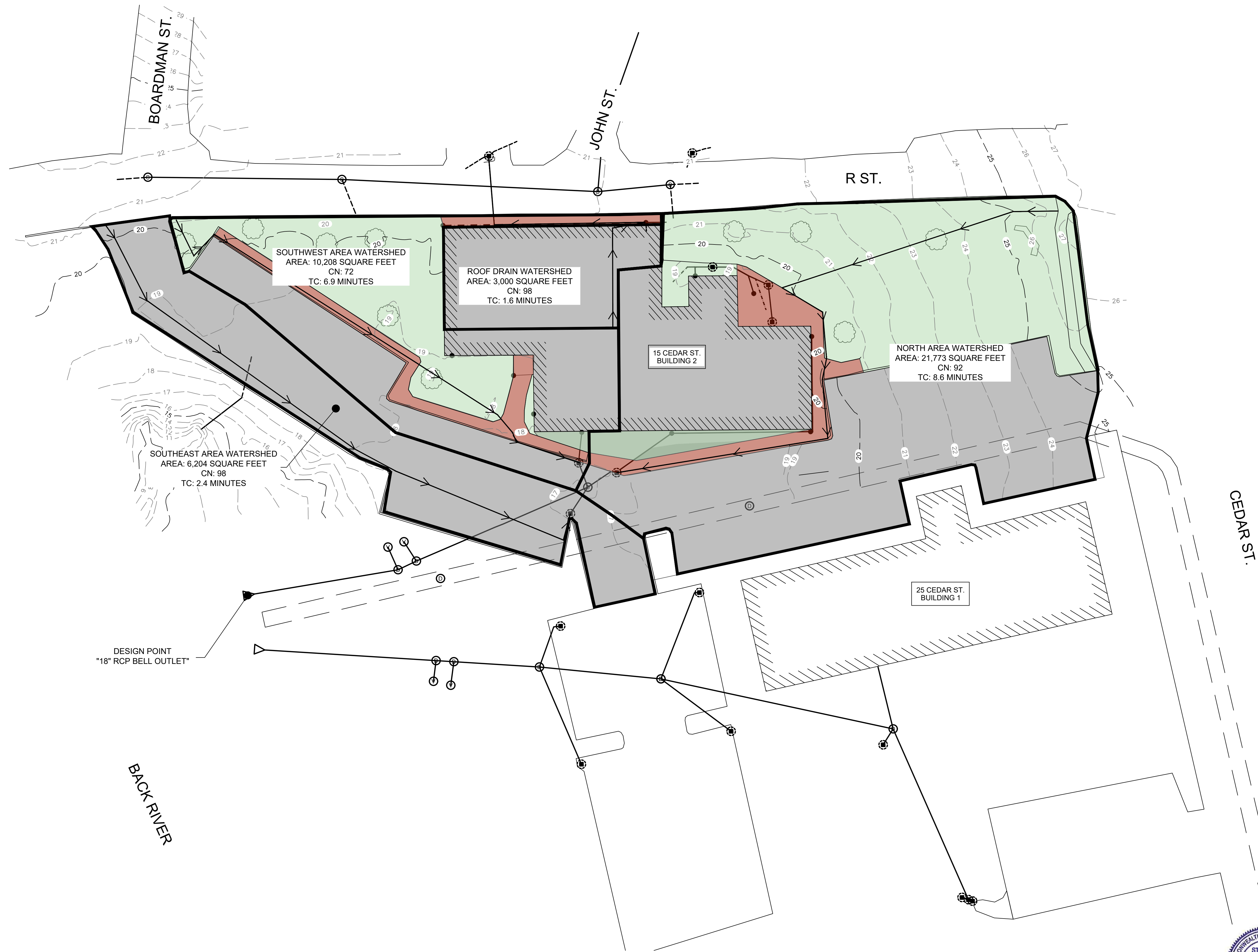
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 - ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88).
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 - TEST PITS WERE PERFORMED BY M.T. MAYO CORPORATION ON JULY 1, 2025 AND OBSERVED BY GZA.
 - TOP OF BANK DELINEATION WAS PERFORMED BY GZA ON JULY 1, 2025.



EXISTING SITE PLAN
SCALE: 1"=20'

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EXISTING SITE PLAN			
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PROJ MGR: JK	REVIEWED BY: JK	CHECKED BY: ABB	DRAWING
DESIGNED BY: JUZ	DRAWN BY: EJW	SCALE: AS SHOWN	1
DATE: July 2025	PROJECT NO. 03.0035466.00	REVISION NO.	SHEET NO.

© 2025 - GZA GeoEnvironmental, Inc. GZA \\\22\PROJECTS\CLARKS POND\WORKS\03.0035466.00 - CLARKS POND\MEASUREMENT SURVEY\PROPOSED DRAINAGE EXISTING\INTERSECTED JULY 14, 2025 1:38 PM haley.pattin



LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION (TC)
- IMPERVIOUS LAND COVER (PAVED ROAD, ROOFS)
- PERVIOUS LAND COVER (GRASS COVER, BRICK PAVERS)

GENERAL NOTES

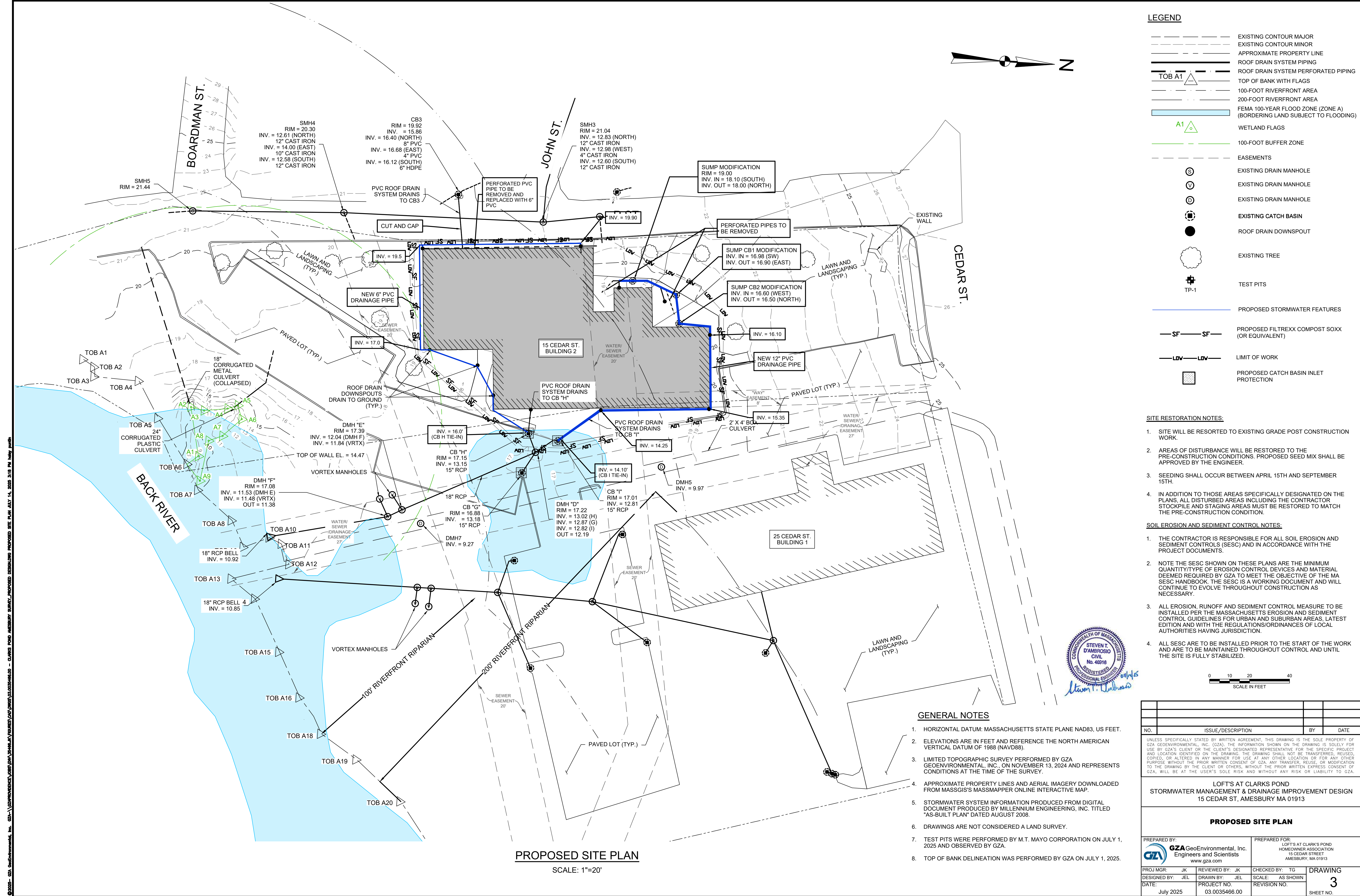
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- TOP OF BANK DELINEATION WAS PERFORMED BY GZA ON JULY 1, 2025.



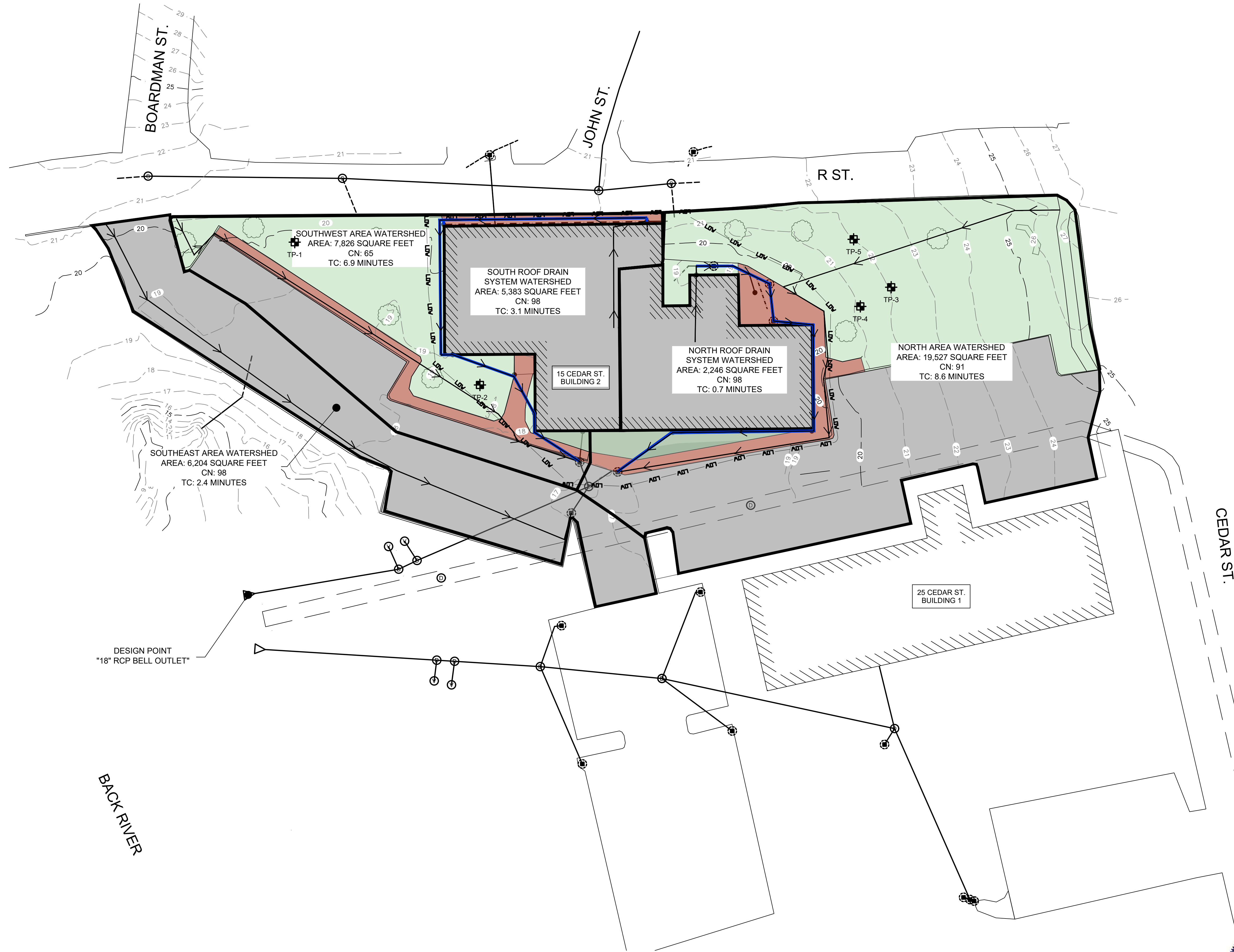
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EXISTING WATERSHED PLAN			
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: LOFT'S AT CLARKS POND HOMEOWNER ASSOCIATION 15 CEDAR STREET AMESBURY, MA 01913	
PROJ MGR: JK	REVIEWED BY: JK	CHECKED BY: ABB	DRAWING
DESIGNED BY: JJZ	DRAWN BY: EJW	SCALE: AS SHOWN	2
DATE: July 2025	PROJECT NO: 03.0035466.00	REVISION NO:	SHEET NO:



© 2025 - GZA GeoEnvironmental, Inc. GZA - 1220PROPOSED SITE PLAN JULY 14, 2025 3:18 PM NAD83 path CLARKS POND MEASUREMENT SURVEY PROPOSED EXISTING PROPOSED SITE PLAN JULY 14, 2025 3:18 PM NAD83 path



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LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION (TC)
- IMPERVIOUS LAND COVER (PAVED ROAD, ROOFS)
- PERVIOUS LAND COVER (GRASS COVER, BRICK PAVERS)
- PROPOSED STORMWATER FEATURES

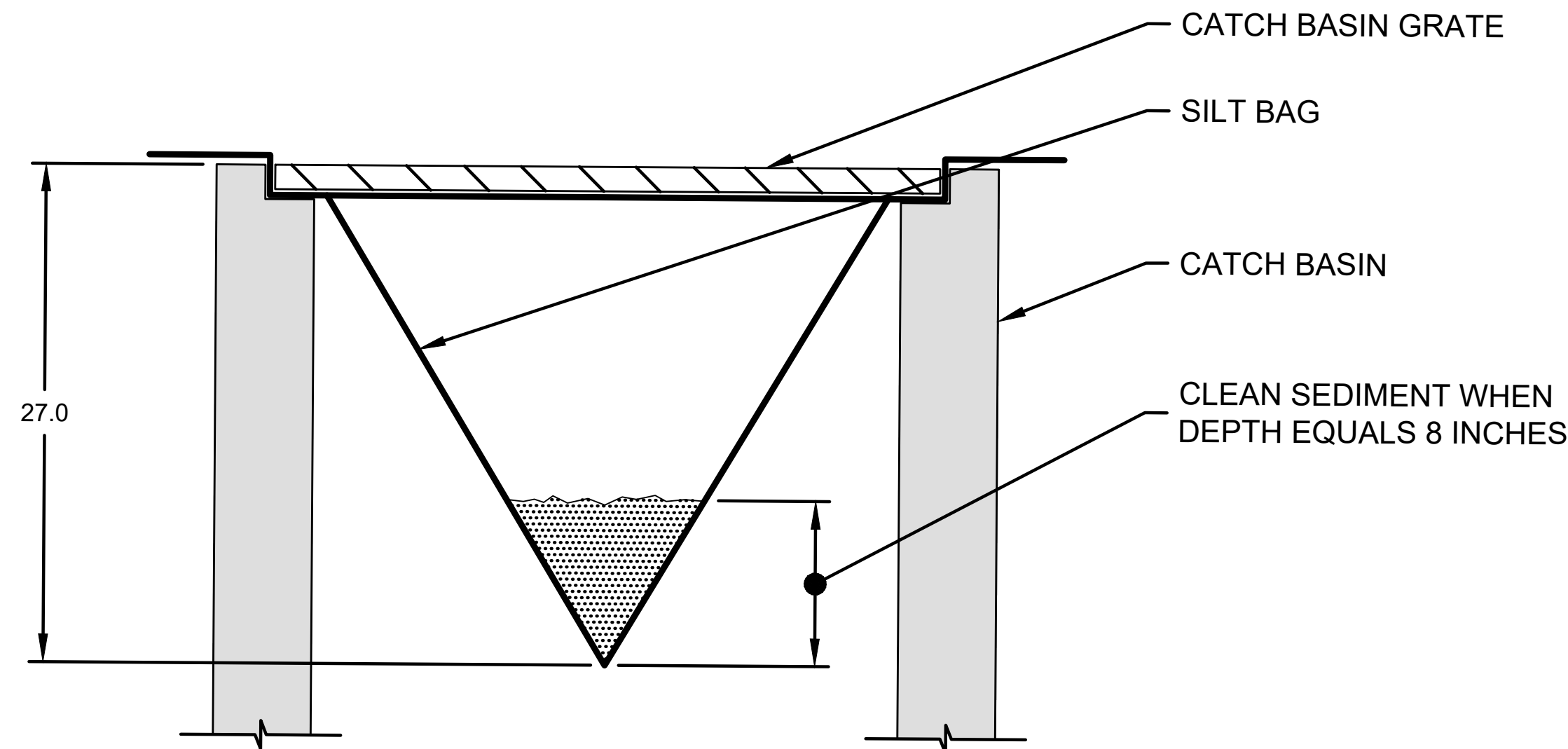
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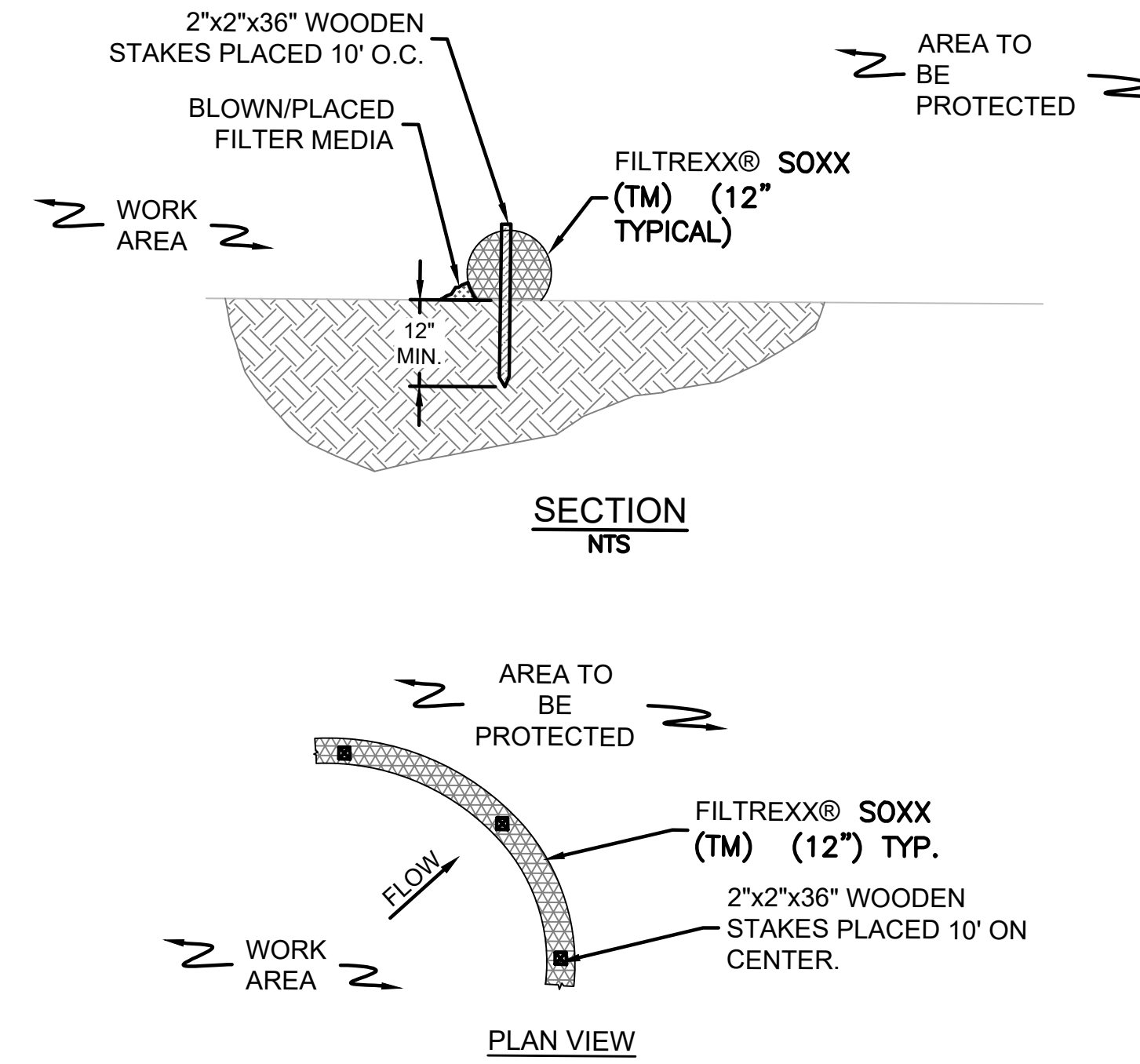
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PROPOSED WATERSHED PLAN			
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: LOFT'S AT CLARKS POND HOMEOWNER ASSOCIATION 15 CEDAR STREET AMESBURY, MA 01913	
PROJ MGR: JK	REVIEWED BY: JK	CHECKED BY: ABB	DRAWING
DESIGNED BY: JJZ	DRAWN BY: EJW	SCALE: AS SHOWN	4
DATE: July 2025	PROJECT NO: 03.0035466.00	REVISION NO:	SHEET NO.





CATCH BASIN INLET PROTECTION DETAIL

NOT TO SCALE

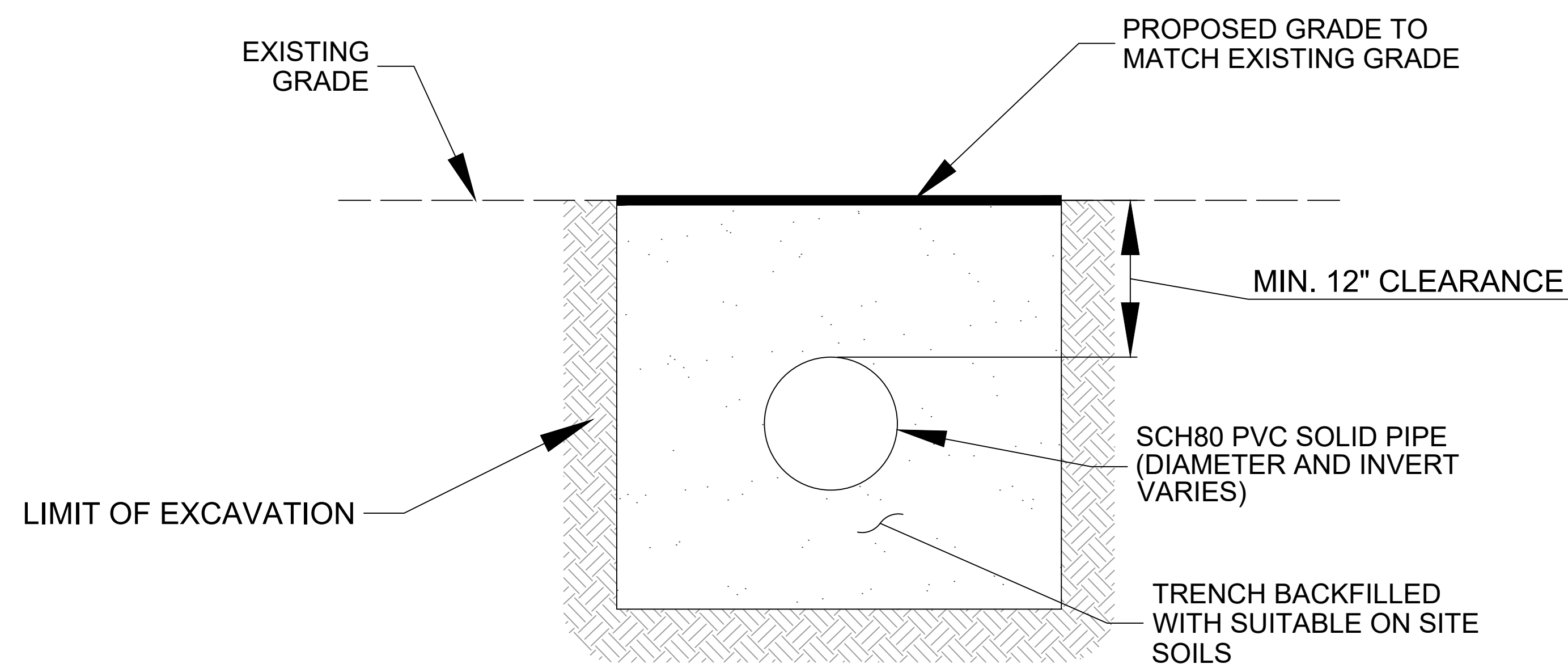


FILTREXX COMPOST SOXX

NOT TO SCALE

NOTES:

1. PRODUCT TO BE FILTREXX SILT SOXX OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL.
2. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
3. FILTER MEDIA FILL TO MEET APPLICATION REQUIREMENTS.
4. COMPOST MATERIAL TO BE DISPERSED ON SITE AS DETERMINED BY NATIONAL GRID ENVIRONMENTAL.



DRAINAGE PIPE TRENCH DETAIL

NOT TO SCALE

NO.	ISSUE/DESCRIPTION	BY	DATE
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.			
LOFT'S AT CLARKS POND STORMWATER MANAGEMENT & DRAINAGE IMPROVEMENT DESIGN 15 CEDAR ST, AMESBURY MA 01913			
DETAILS			
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: LOFT'S AT CLARK'S POND HOMEOWNER ASSOCIATION 15 CEDAR STREET AMESBURY, MA 01913	
PROJ MGR: JK	REVIEWED BY: JK	CHECKED BY: TG	DRAWING
DESIGNED BY: JEL	DRAWN BY: JEL	SCALE: AS SHOWN	5
DATE: July 2025	PROJECT NO: 03.0035466.00	REVISION NO:	
			SHEET NO.



GZA GeoEnvironmental, Inc.



Appendix E
Legal Advertisement Form

LEGAL NOTIFICATION

AMESBURY CONSERVATION COMMISSION

In accordance with the Wetland Protection Act (Massachusetts General Law, Chapter 131, Section 40 and the Amesbury Wetlands Protection Ordinance:

The applicant, Lofts at Clarks Pond has filed a Notice of Intent
Name Form Name

with the Amesbury Conservation Commission for the proposed
stormwater management & drainage improvements on an existing building

Description of work – intent

at 15 & 25 Cedar Stret, Amesbury, MA 01913.
Address of Property

A Public Hearing will be held VIRTUALLY at 6:30 pm on
Address/Location of meeting Time

8/4/2025 at which time all persons and organizations
Month/Day/Year

having interest may be heard. Copies of the application may be examined at the Conservation Commission office, 39 South Hunt Road, Amesbury, MA 01913. The application can also be viewed by visiting the Amesbury Conservation Commission website at
<https://www.amesburyma.gov/AgendaCenter/Conservation-Commission-12>

Regards,

Fred Zackon, Acting Chair

AMESBURY CONSERVATION COMMISSION

Publish: (No later than five (5) days prior to public hearing)

Please send invoice to:

Your Name:

Street Address:

City/Town, State, Zip Code:

Telephone / Cell:

E-mail Address:

Once completed email to: NTLegals@newburyportnews.com



Appendix F

Abutter Information & Documentation

Notification to Abutters

By Hand Delivery, Certified Mail (return receipt requested), or Certificates of Mailing

This is a notification required by law. You are receiving this notification because you have been identified as the owner of land abutting another parcel of land for which certain activities are proposed. Those activities require a permit under the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40).

In accordance with the second paragraph of the Massachusetts Wetlands Protection Act, and 310 CMR 10.05(4)(a) of the Wetlands Regulations, you are hereby notified that:

- A. A Notice of Intent was filed with the (Amesbury) Conservation Commission on (July 14, 2025) seeking permission to remove, fill, dredge, or alter an area subject to protection under M.G.L. c. 131 §40. The following is a description of the proposed activity/activities:

(Perform stormwater management and drainage improvements on an existing residential building roof drainage system and associated stormwater conveyance system within the adjacent parking area. Temporary disturbances only will occur within Bordering Land Subject to Flooding and Riverfront Area, both of which resource areas are under the purview of the Conservation Commission.)

- B. The name of the applicant is: (The Lofts at Clarks Pond Homeowner Association).
- C. The address of the land where the activity is proposed is: (15 & 25 Cedar Street, Map 40. Lots 236, 237 & 238).
- D. Copies of the Notice of Intent may be examined or obtained at the office of the (Amesbury) Conservation Commission, located at (39 South Hunt Road). The regular business hours of the Commission are (M 8-5, T 8-7, W 8-5, R 8-4:30), and the Commission may be reached at (978.300.8100) ext. 254.
- E. Copies of the Notice of Intent may be obtained from the applicant or (GZA GeoEnvironmental) representative by calling (Jackie Kaehler) at (401.427.2749) or (Jaclyn.kaehler@gza.com). An administrative fee may be applied for providing copies of the NOI and plans.
- F. Information regarding the date, time, and location of the public hearing regarding the Notice of Intent may be obtained from the (Amesbury) Conservation Commission. Notice of the public hearing will be published at least five business days in advance, in the (Newburyport Daily News).

Notification provided pursuant to the above requirement does not automatically confer standing to the recipient to request Departmental Action for the underlying matter. See 310 CMR 10.05(7)(a)4.

**NOTIFICATION TO ABUTTERS
UNDER THE MASSACHUSETTS WETLANDS PROTECTION ACT
AND AMESBURY WETLANDS PROTECTION ORDINANCE**

In accordance with the Massachusetts General Laws, Chapter 131, Section 40, and the Amesbury Wetlands Protection Ordinance, you are hereby notified of the following:

The Amesbury Conservation Commission will hold a public hearing on

8/4/2025 at 6:30 pm, located VIRTUALLY
(date) (time) (hearing location)

Amesbury, to consider a Notice of Intent by The Lofts at Clarks Pond Cc submitted by
(application type)

to perform stormwater management & drainage improvements

(brief description of the proposed project)

at 15 & 25 Cedar Street

(project location)

Copies of the application may be examined at the Conservation Commission office, 39 South Hunt Road, Amesbury, MA 01913. The application can also be viewed by visiting the Amesbury Conservation Commission website at <https://www.amesburyma.gov/AgendaCenter/Conservation-Commission-12>. For more information concerning the date, time or place of hearing, contact the Conservation Commission at 978-388-8110.

NOTE: Notice of the public hearing, including its date, time, and place will be posted in City Hall not less than 48 hours in advance. **The meeting link will be on the agenda posted on the City's website.**

NOTE: Notice of the public hearing, including its date, time, and place will be published in the Newburyport Daily News not less than 5 business days prior to the public hearing.

NOTE: You may also contact the Amesbury Conservation Commission or the Department of Environmental Protection (DEP) Wetlands Division- Northeast Regional Office (NERO) for more information about this application or the Wetlands Protection Act. The DEP, Northeast Regional Office can be reached at 978-694-3405.

Covid-19 Notice: This meeting will be conducted under the 'Executive Order Suspending Certain Provisions of the Open Meeting Law G.L. c.30A, §20, signed on March 12, 2020. The public can view this meeting on ACTV Channel 6, and the ACTV website.

To submit a public comment, you can email conservation@amesburyma.gov with PUBLIC COMMENT in the subject line.



Appendix G

NOI Wetland Fee Transmittal Form



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
NOI Wetland Fee Transmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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



A. Applicant Information

1. Location of Project:

15 & 25 Cedar Street

a. Street Address

Amesbury

b. City/Town

On-line payment

DEP=\$70; Town=\$95 + \$165

c. Check number

d. Fee amount

2. Applicant Mailing Address:

Anne

a. First Name

Verret-Speck, Trustee

b. Last Name

The Lofts at Clarks Pond Homeowner Association

c. Organization

15 Cedar Street

d. Mailing Address

Amesbury

e. City/Town

MA

f. State

01913

g. Zip Code

978-375-5546

h. Phone Number

i. Fax Number

verretspeck@gmail.com

j. Email Address

3. Property Owner (if different):

The Lofts at Clarks Pond Condominium Trust

a. First Name

b. Last Name

c/o Affinity Realty

c. Organization

63 Atlantic Avenue

d. Mailing Address

Boston

e. City/Town

MA

f. State

02110

g. Zip Code

857-239-8280 ext

670

i. Fax Number

Stephen@affinityrealty.com

j. Email Address

B. Fees

Fee should be calculated using the following process & worksheet. **Please see Instructions before filling out worksheet.**

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).



Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Category 1	1	\$110 + \$55	\$165
Step 5/Total Project Fee:			\$165

Step 6/Fee Payments:

Total Project Fee:	<u>\$165</u>
	a. Total Fee from Step 5
State share of filing Fee:	<u>\$70</u>
	b. 1/2 Total Fee less \$12.50
City/Town share of filling Fee:	<u>\$95</u>
	c. 1/2 Total Fee plus \$12.50

C. Submittal Requirements

- a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

- b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)



GZA GeoEnvironmental, Inc.