# NOTICE OF INTENT

# COMMERCIAL STREET (ROUTE 140)

AT WALNUT STREET, FOXBOROUGH, MASSACHUSETTS

Prepared for:

**Town of Foxborough Department of Public Works**
70 Elm Street
Foxborough, MA 02035

Prepared by:

**TEC, Inc.**
282 Merrimack Street
2nd Floor
Lawrence MA, 01843

June 20, 2023

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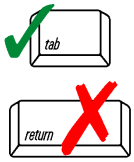
**Massachusetts Department of Environmental Protection**
Bureau of Resource Protection - Wetlands

# 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
Foxborough
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):

Commercial St (Route 140) at Walnut St IntersectionCommercial Street (a. Street Address) | Foxborough (b. City/Town) | 02035 (c. Zip Code)

Latitude and Longitude: | 42.0484 (d. Latitude) | -71.2452 (e. Longitude)

N/A - public right of way (f. Assessors Map/Plat Number) | N/A - public right of way (g. Parcel /Lot Number)

2. Applicant:

Chris (a. First Name) | Gallagher (b. Last Name)

Town of Foxborough (c. Organization)

40 South St #1, Foxborough (d. Street Address)

Foxborough (e. City/Town) | MA (f. State) | 02035 (g. Zip Code)

508-543-1228 (h. Phone Number) | (i. Fax Number) | cgallagher@foxboroughma.gov (j. Email Address)

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

(a. First Name) | (b. Last Name)

(c. Organization)

(d. Street Address)

(e. City/Town) | (f. State) | (g. Zip Code)

(h. Phone Number) | (i. Fax Number) | (j. Email address)

4. Representative (if any):

Peter (a. First Name) | Ellison (b. Last Name)

TEC, Inc. (c. Company)

282 Merrimack St (d. Street Address)

Lawrence (e. City/Town) | MA (f. State) | 01843 (g. Zip Code)

978-794-1792 (h. Phone Number) | (i. Fax Number) | pellison@theengineeringcorp.com (j. Email address)

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

exempt (a. Total Fee Paid) | exempt (b. State Fee Paid) | exempt (c. City/Town Fee Paid)

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## A. General Information (continued)

6. General Project Description:

The purpose of this project is to improve vehicular traffic, drainage, and pedestrian safety along Commercial Street (Route 140). The project scope includes proposing new turning lanes, traffic signals, and crosswalks.

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)

10.53(3)(f) - maintenance and improvement of existing public roadways

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(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:

Norfolk
a. County

b. Certificate # (if registered land)

c. Book

d. Page Number

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

1. ☐ 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.
2. ☒ 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.

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## 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 | 18 (TEMP)<br>1. square feet | 18<br>2. square feet |
| c. ☐ Land Under Waterbodies and Waterways | 1. square feet<br>3. cubic yards dredged | 2. square feet |

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| d. ☐ Bordering Land Subject to Flooding | 1. square feet<br>3. cubic feet of flood storage lost | 2. square feet<br>4. cubic feet replaced |
| e. ☐ Isolated Land Subject to Flooding | 1. square feet<br>2. cubic feet of flood storage lost | 3. cubic feet replaced |
| f. ☐ Riverfront Area | 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: _____ square feet

4. Proposed alteration of the Riverfront Area:

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.

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## 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.

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| a. ☐ Designated Port Areas | Indicate size under Land Under the Ocean, below | |
| b. ☐ Land Under the Ocean | 1. square feet<br>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 |

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| 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<br>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<br>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

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## 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

   08-2021
   (MassMapper)

   **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**

   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/ma-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.

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## 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 - Cohasset to Rhode Island border, and the Cape & Islands:

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

North Shore - Hull to New Hampshire border:

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).

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## 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.

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## 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.

COMMERCIAL STREET (ROUTE 140) AT WALNUT STREET
a. Plan Title

TEC, Inc.
b. Prepared By

Peter Ellison, PE
c. Signed and Stamped by

06/20/2023
d. Final Revision Date

As Noted
e. Scale

f. Additional Plan or Document Title

g. Date

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:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

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## 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: 6/22/23

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any)

6. Date: 6/20/2023

**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.

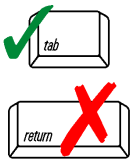
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

**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:

| | |
|---|---|
| Commercial St (Route 140) at Walnut St IntersectionCommercial Stree<br>a. Check number | Foxborough<br>b. City/Town |
| exempt<br>c. Check number | exempt<br>d. Fee amount |

2. Applicant Mailing Address:

| | | |
|---|---|---|
| Chris<br>a. First Name | Gallagher<br>b. Last Name | |
| Town of Foxborough<br>c. Organization | | |
| 40 South St #1, Foxborough<br>d. Mailing Address | | |
| Foxborough<br>e. City/Town | MA<br>f. State | 02035<br>g. Zip Code |
| 508-543-1228<br>h. Phone Number | <br>i. Fax Number | cgallagher@foxboroughma.gov<br>j. Email Address |

3. Property Owner (if different):

| | | |
|---|---|---|
| <br>a. First Name | <br>b. Last Name | |
| <br>c. Organization | | |
| <br>d. Mailing Address | | |
| <br>e. City/Town | <br>f. State | <br>g. Zip Code |
| <br>h. Phone Number | <br>i. Fax Number | <br>j. Email Address |

## B. Fees

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

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.

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## B. Fees (continued)

| Step 1/Type of Activity | Step 2/Number of Activities | Step 3/Individual Activity Fee | Step 4/Subtotal Activity Fee |
|---|---|---|---|
| 2e.) inland limited projects minus road crossing and agriculture | 1 | exempt | exempt |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**Step 5/Total Project Fee:** exempt

**Step 6/Fee Payments:**

| | |
|---|---|
| Total Project Fee: | exempt<br>a. Total Fee from Step 5 |
| State share of filing Fee: | exempt<br>b. 1/2 Total Fee **less $**12.50 |
| City/Town share of filling Fee: | exempt<br>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.)

# 1. NARRATIVE

## Introduction

The Town of Foxborough Department of Public Works, the Applicant, is proposing roadway and drainage improvements along Commercial Street from 0.24 miles South of Walnut Street to 0.22 miles North of Walnut Street in Foxborough, MA. The project will include the extension of the northbound left-turn lane onto Walnut Street, the addition of a southbound right-turn lane and left-turn lane onto Walnut Street, alterations to the existing median, improved pedestrian, transportation and traffic infrastructure throughout the Walnut Street intersection, alterations to the I-95 Exit 13B, and drainage improvements. The purpose of this project is to provide traffic, drainage, and pedestrian safety improvements on Commercial Street (Route 140) in Foxborough.

The Project will include the construction of approximately 2,400 feet of roadway improvements. This Notice of Intent has been prepared to show compliance with the Wetlands Protection Act and Town of Foxborough Wetlands Protection Bylaw. The project includes work within state and local buffer zones of jurisdictional wetlands as well as within the Bordering Land Subject to Flooding (BLSF) associated with the adjacent wetlands. The proposed construction is to be done within the existing right-of-way. Impacts to buffer zones are proposed due to the installation of masonry walls and riprap slopes to improve roadway shoulder stabilization. Impacts to buffer zones and wetland resource areas have been avoided, minimized, and mitigated to the maximum extent practicable.

## Existing Conditions

The project site begins just south of the I-95 Exit 13B off-ramp. The off-ramp merges onto Route 140, with no traffic signal in place. The northbound side of Commercial Street is a two-lane road from the I-95 Exit 13B off-ramp to the intersection with Walnut Street. There is a short left-turn lane to turn west onto Walnut Street. The roadway merges to single-lane traffic north of Walnut Street.

The southbound side of Commercial Street is also a two-lane road from the I-95 connection to Walnut Street, and a single-lane road north of Walnut. No right-turn lane or left-turn lane onto Walnut Street exists.

No traffic signals or pedestrian traffic infrastructure exist on-site. Turning onto Commercial Street from Walnut Street can be challenging at times due to the lack of traffic signal infrastructure. Motorists must cross four lanes of traffic with no signal guidance. No crosswalks exist so pedestrians have the option to cross Commercial Street at an unmarked location, or proceed along the roadway shoulder at grade with on-coming motorists. The roadway shoulders on Commercial Street are a mix of poor grass cover and gravel shoulder area. The

medians between the north and southbound lanes are of varying width. The pavement condition at the Walnut Street connections to Route 140 is poor.

The approximate topography of Commercial Street starts at a low point of elevation 225 feet just south of the I-95 connection. There is a high point of elevation 237.6 just south of the Walnut Street intersection, near the midpoint of the limit of work. The road then slopes down to elevation 232 feet at the northern limit of work.

There is an existing closed drainage system on site. Small isolated closed drainage systems are located throughout the project area. These drainage outfalls are located on both sides of Commercial Street, discharging nearby and within bordering vegetated wetlands. The southern section of the Commercial Street drainage enters a larger system that continues along Commercial Street, south of the project limits.

The site is comprised of several different soil types as shown in the Web Soil Survey Report provided by the United States Department of Agriculture, Natural Resources Conservation Service. The road and surrounding areas are comprised of Woodbridge fine sandy loam, Sudbury fine sandy loam, and Swansea muck soil types. These soil types are considered hydrologic soil groups C/D, B, and B/D. Saturated conditions/high groundwater is presumed for the C/D and B/D soils, given the numerous wetlands along Commercial Street. HSG D is utilized in the stormwater analysis for the Project. Refer to Appendix C to review the full NRCS Soil Report for further information on soil groupings and characteristics on site.

## Proposed Improvements

Proposed improvements at the southern end of the limits of work begin with the reconstructed I-95 Exit 7B connection. The ramp will approach Commercial Street closer to perpendicular, and a traffic signal will control traffic off the ramp and within the northbound lanes of Commercial Street. Moving north, the median width will be reduced approaching the Walnut Street intersection to allow for a 250’ extension of the left-turn lane onto Walnut Street.

Traffic signals and pedestrian infrastructure are proposed throughout the Commercial/Walnut intersection. A sewer main will be installed on Walnut Street through the intersection. Sidewalk connections are proposed on Commercial and Walnut, leaving opportunity for future sidewalk installation along the roadways. Crosswalks and traffic signals will allow for safe pedestrian and vehicular travel. The existing triangular median at the western Walnut connection is proposed to be removed.

North of the intersection, the northbound roadway will be expanded to allow room for the merging of the two travel lanes. The southbound roadway will be expanded to include a straight & right-turning lane onto Walnut Street and an exclusive left turn lane onto Walnut Street. The shape of the median in this location is proposed to be altered to fit the new lane configuration.

The roadway will be expanded into the existing shoulders which are semi-pervious, but heavily compacted. This roadway widening will increase the impervious area by 30,326 SF compared to existing conditions.

The approximate topography of Commercial Street is proposed to match existing conditions. The southern limit of work starts at a low point of elevation 225 feet just south of the I-95 connection. There is a high point of elevation 239 just south of the Walnut Street intersection, near the midpoint of the limit of work. The road then slopes down to elevation 232 feet at the northern limit of work.

The proposed drainage system includes new structures, adjustments to existing structures, and the removal of existing structures. The southern section of the Commercial Street drainage will continue to enter the system that continues along Commercial Street, south of the project limits. Catch basins in this area will be adjusted or replaced in the proposed curb and low point locations. Adjustments are proposed to the isolated system just south of the Walnut Street intersection, but the outlet location remains the same as existing. A larger closed system is proposed for the drainage north of the intersection, and the adjusted outlet is proposed approximately 50' south of the original location. The northernmost closed drainage outlet on the northbound side and the outlet on the southbound side of Commercial Street are to remain, with proposed adjustments to the drainage structures. Two asphalt swale outlets are proposed to be removed.

For more information on stormwater infrastructure and analysis, see Section 5 – Stormwater Report.

## Resource Areas & Impacts

The proposed project includes traffic, roadway, and associated stormwater improvements within the buffer zones of wetland resource areas along Route 140. Wetland resource areas at the site were delineated by Rimmer Environmental Consulting (REC) in January 2020. For more information and further detail on the delineation performed, please refer to the Wetland Resource Delineation Report in Section 4 of this Notice of Intent package. The following describes the type of wetlands and proposed impacts to each resource area and buffer zone in detail:

*Bordering Vegetated Wetlands*
REC identified 5 bordering vegetated wetlands (BVW) adjacent to Commercial Street, described by flags A, B, C, D, and E in the report.

*A-series BVW*
Wetland Flags A1 through A11 are located at the southeast corner of Commercial Street and Walnut Street. No direct permanent or temporary impacts are proposed to the A-series BVW. Work proposed within the 100-foot buffer includes pavement construction, roadway widening less than a single lane, vertical granite curbing, slope granite edging, concrete wheelchair ramp, asphalt sidewalk, traffic signal posts/foundations, conduit installation, drainage improvements,

sewer main, site grading, a chain link fence, limited tree trimming/clearing, and erosion control installation.

Due to the proximity to the existing roadway, work within 25-feet of the wetland is unavoidable. Work within the 25-foot buffer includes vertical granite curbing, concrete wheelchair ramp, asphalt sidewalk, traffic signal post, conduit, site grading, selective tree trimming/clearing, chain link fence, and erosion control installation. The existing pavement/curbing on Commercial Street is 26-feet away from the A-series wetland. It would be impossible to provide the proposed pedestrian and traffic signal accommodations without entering the 25-foot buffer zone. It is important to note that the 25-foot buffer in this area is previously disturbed and partially impervious roadway shoulder. The buffer zone is regularly mown and cleared to provide adequate safety sight distance at the intersection.

*B-series BVW*
Wetland flags B1 through B23, east of Commercial and north of Walnut, are located inside the Commercial Street right-of-way along Hersey Pond. No direct permanent impacts are proposed to the B-series BVW. Work proposed within the 100-foot buffer includes pavement mill and overlay, roadway widening, full depth pavement, sloped granite edging, drainage infrastructure, stone for pipe ends, asphalt sidewalks, concrete wheelchair ramp, chain link fence, modified rockfill slope, site grading, and erosion control installation.

Due to the proximity to the existing roadway, work within 25-feet of the wetland is unavoidable. Work within the 25-foot buffer includes roadway widening, sloped granite edging, asphalt sidewalk, chain link fence, modified rockfill slope, drainage infrastructure, stone for pipe ends, stone masonry wall, site grading, and erosion control installation.

A stone masonry wall is proposed adjacent to wetland flag B20. The wall is proposed to prevent any permanent impacts to the B-series wetland. During construction of the wall, the project will result in 18 square feet of temporary impacts to the B-series wetland. The impacts will be caused as the result of site grading and excavation at the front of the retaining wall. Following construction of the wall, the wetland will be restored to its original condition.

The existing pavement/curbing on Commercial Street is 22-feet away from the B-series wetland. It would be impossible to provide the proposed pedestrian and roadway improvements without entering the 25-foot buffer zone. It is important to note that the 25-foot buffer in this area is previously disturbed and partially impervious roadway shoulder. The project has proposed a combination of retaining walls, rock slopes, and vegetated slopes at the edge of the improvements to avoid and minimize the impacts to the buffer zone. Stormwater improvements are being provided as mitigation for the buffer zone impacts.

C-series BVW
Wetland Flags C15 through C19, west of Commercial and north of Walnut, is located inside the Commercial Street right-of-way along Hersey Pond. No direct permanent impacts are proposed to the C-series BVW. Work within 100-feet of this BVW includes sloped granite edging, pavement construction, roadway widening, tree removal, site grading, drainage infrastructure, and erosion control installation.

Due to the proximity to the existing roadway, work within 25-feet of the wetland is unavoidable. Work within the 25-foot buffer includes full depth pavement construction, roadway widening less than a single lane, sloped granite edging, site grading, tree removal, drainage infrastructure, and erosion control installation.

The existing pavement/curbing on Commercial Street is 24-feet away from the C-series BVW. It would be impossible to provide the proposed pedestrian and roadway improvements without entering the 25-foot buffer zone. It is important to note that the 25-foot buffer in this area is previously disturbed and partially impervious roadway shoulder. The roadway shoulder is regularly mowed and maintained as part of the roadway maintenance.

*D-series BVW*
Wetland flags D1 through D16, at the northwest corner of Commercial and Walnut, are located outside both street rights-of-way. No direct or temporary impacts are proposed to the D-series wetland. Work within 100-feet of this BVW includes vertical granite curbing, sloped granite edging, pavement construction, roadway widening less than a single lane, asphalt sidewalks, concrete wheelchair ramps, traffic signal posts and foundations, conduit, sewer force main, drainage infrastructure, site grading, and erosion control installation.

Due to the proximity to the existing roadway, work within 25-feet of the wetland is unavoidable. Work within the 25-foot buffer includes removal of existing pavement and curbing, site grading, traffic signal post, and erosion control installation.

*E-series BVW/Inland Bank*
Wetland Flags E1 through E25 are located at the southwest corner of Commercial Street and Walnut Street and along the south side of Walnut. No direct or temporary impacts are proposed to the E-series wetland. Work within 100-feet of this BVW include mill and overlay, sloped granite edging, concrete wheelchair ramps, vertical granite curbing, traffic signal posts and foundations, drainage infrastructure, sewer main, modified rockfill slope, site grading, and erosion control installation.

Due to the proximity to the existing roadway, work within 25-feet of the wetland is unavoidable. Work within the 25-foot buffer includes sloped granite edging, vertical granite curbing, pavement mill and overlay, concrete wheelchair ramps, traffic signal posts and foundations, conduit, modified rockfill slope, site grading, and erosion control installation.

The existing pavement on Walnut Street is 4-feet from the E-series BVW. It would be impossible to provide the roadway improvements without entering the 25-foot buffer zone. A modified rockfill slope is proposed to avoid and minimize impacts to the wetland.

*Inland Bank*
WF#C1-15 qualifies as inland bank resource. C1 through C4 is the bank of Hersey Pond, and C4 through C15 is the bank of an intermittent stream. Work within 100-feet of this bank includes sloped granite edging, pavement mill and overlay, roadway widening less than a single lane, full depth pavement, stone for pipe ends, asphalt driveway, drainage infrastructure, site grading, and erosion control installation.

Due to proximity to the existing roadway, work within 25-feet of the wetland is unavoidable. Work within the 25-foot buffer includes sloped granite edging, guardrail, full depth pavement, pavement mill and overlay, stone for pipe ends, asphalt driveway, site grading, and erosion control installation.

The existing pavement on Commercial Street is within 21-feet of the C-series wetland. It would be impossible to provide the roadway improvements without entering the 25-foot buffer zone.

*Bordering Land Subject to Flooding*
The 100-year floodplain associated with Hersey Pond is elevation 229 on the west side of Commercial Street, and elevation 227 on the east side of Commercial Street, as shown on the National Flood Hazard Layer FIRMette. This likely indicates that Commercial Street and the culvert connecting the two sides is a restriction. The lowest elevation within the roadway limit of work is 231.4, indicating that the roadway construction will not impact any BLSF.

**Other Resource Areas**
REC concluded that no Priority Habitats, or Estimated Habitats of Rare Wetlands Wildlife, vernal pools, or other types of wetland resource areas are located within 100 feet of the project area.

## Anticipated Construction Sequence

The following sequence is typical of site walkway construction.

1. Obtain/record Order of Conditions from Foxborough Conservation Commission.
2. Conduct pre-construction meeting with Conservation Commission agent, the Engineer, and the Town.
3. Install erosion control barriers consisting of 12-inch compost filter tube and silt fence (or similar as the means and methods will be determined by the contractor) along the proposed limit of work and silt sacks in existing catch basins as indicated on the project plans. All erosion control barriers will be approved by the Conservation Commission agent prior to the start of any land disturbing activities.
4. Perform general site prep including clearing and grubbing for roadway lane expansion and improvements.
5. Install proposed drainage, traffic control signals, pavement, curbing, and sidewalk.
6. Repair/install removed or damaged sections of landscaped areas with loam and seed.
7. Install permanent ADA compliant features and pavement markings.
8. Perform final inspection and address punch list items.
9. Request final acceptance by the Town.
10. Request and obtain Certificate of Compliance from Conservation Commission (this may be up to three years following construction).
11. Remove erosion control barriers and silt sacks assuming landscaped areas are stabilized.

## Mitigation

Prior to construction, erosion control and sedimentation barriers will be installed between the project and resource areas along the established limit-of-work. Additionally, silt sacks will be placed in all existing and proposed catch basins once installed, to intercept any construction sediments. These barriers will be placed downgradient of the project area to prevent runoff from entering resource areas and buffer zones. The proposed stormwater management system will provide an improvement to the quality of runoff leaving the roadway by providing a new deep sump catch basins. All project areas disturbed within the buffer zones will be restored and vegetated. Erosion control barriers will not be removed until the site is completely stabilized.

## Wetlands Protection Act Performance Standards

### Limited Project

Portions of the project fall under the following Limited Projects:

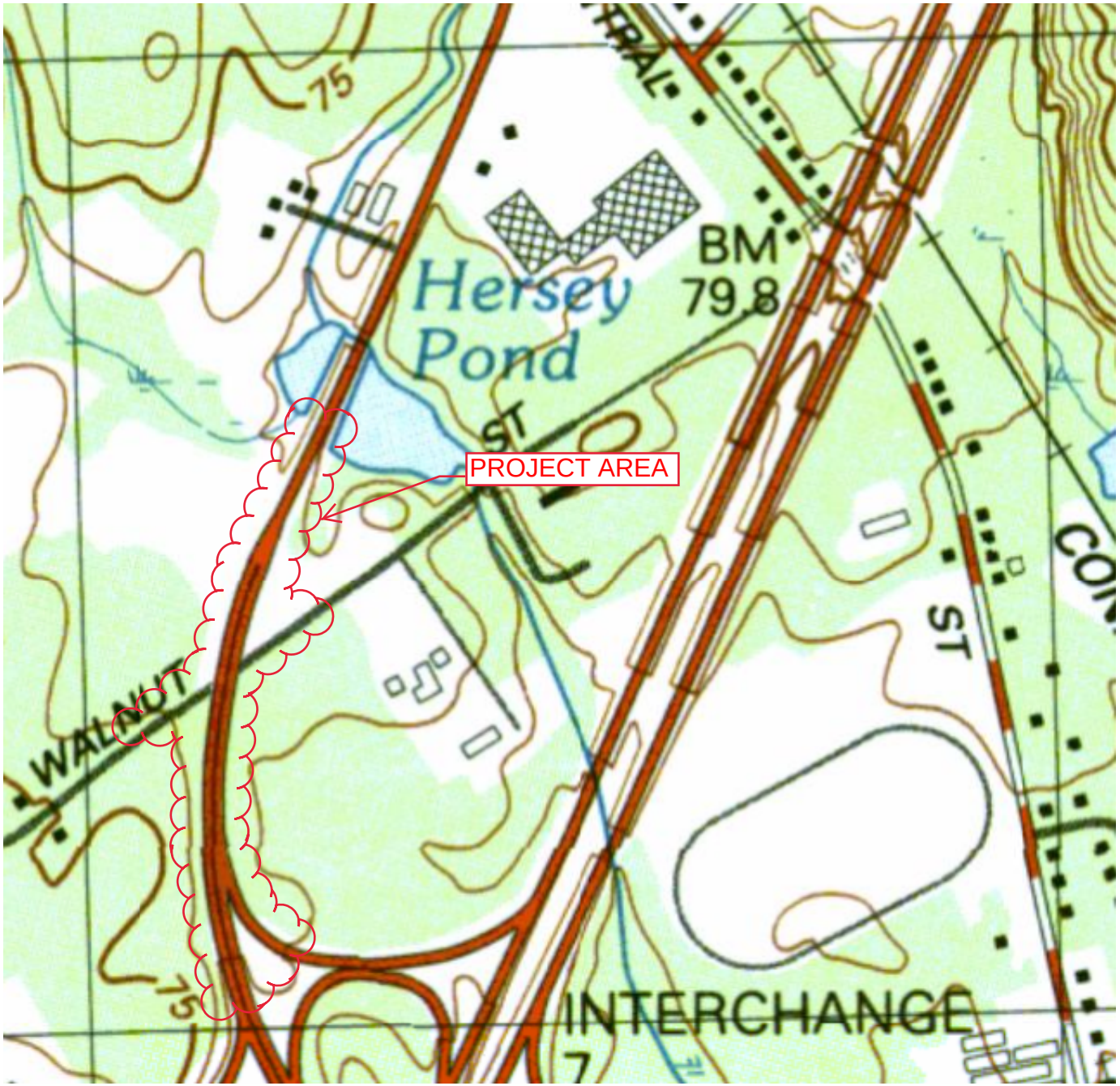
The proposed sidewalks to increase safety and the other roadway improvements conform to the Limited Project standard at 310 CMR 10.53(3)(f) which reads, "Maintenance and improvement of existing public roadways, but limited to widening less than a single lane, adding shoulders, correcting substandard intersections, and improving inadequate drainage systems."

## Conclusion

The Town of Foxborough is proposing to make traffic, drainage, and pedestrian safety improvements on Commercial Street (Route 140). The project will include the extension of the northbound left-turn lane onto Walnut Street, the addition of a southbound right-turn lane and left-turn lane onto Walnut Street, alterations to the existing median, improved pedestrian transportation and traffic infrastructure throughout the Walnut Street intersection, alterations to the I-95 Exit 13B, and an improved closed drainage system. Buffer zone impacts have been minimized to the maximum extent practicable. Portions of the work qualify as a Limited Project. The project does not result in any permanent impacts to wetland areas. Approximately 18 square feet of temporary impacts to BVW are proposed to construct a new stone masonry retaining wall adjacent to the B-series wetland.

The Applicant respectfully requests that the Foxborough Conservation Commission finds that the Project successfully upholds the interests of the Wetlands Protection Act and subsequently issues an Order of Conditions.

## 2. SUPPORTING MAPS AND DATA




USGS Topographic Maps

# National Flood Hazard Layer FIRMette

FEMA

71°15'2"W 42°3'7"N


71°14'24"W 42°2'40"N

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

1:6,000

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

## Legend

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

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

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

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

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

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

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

N

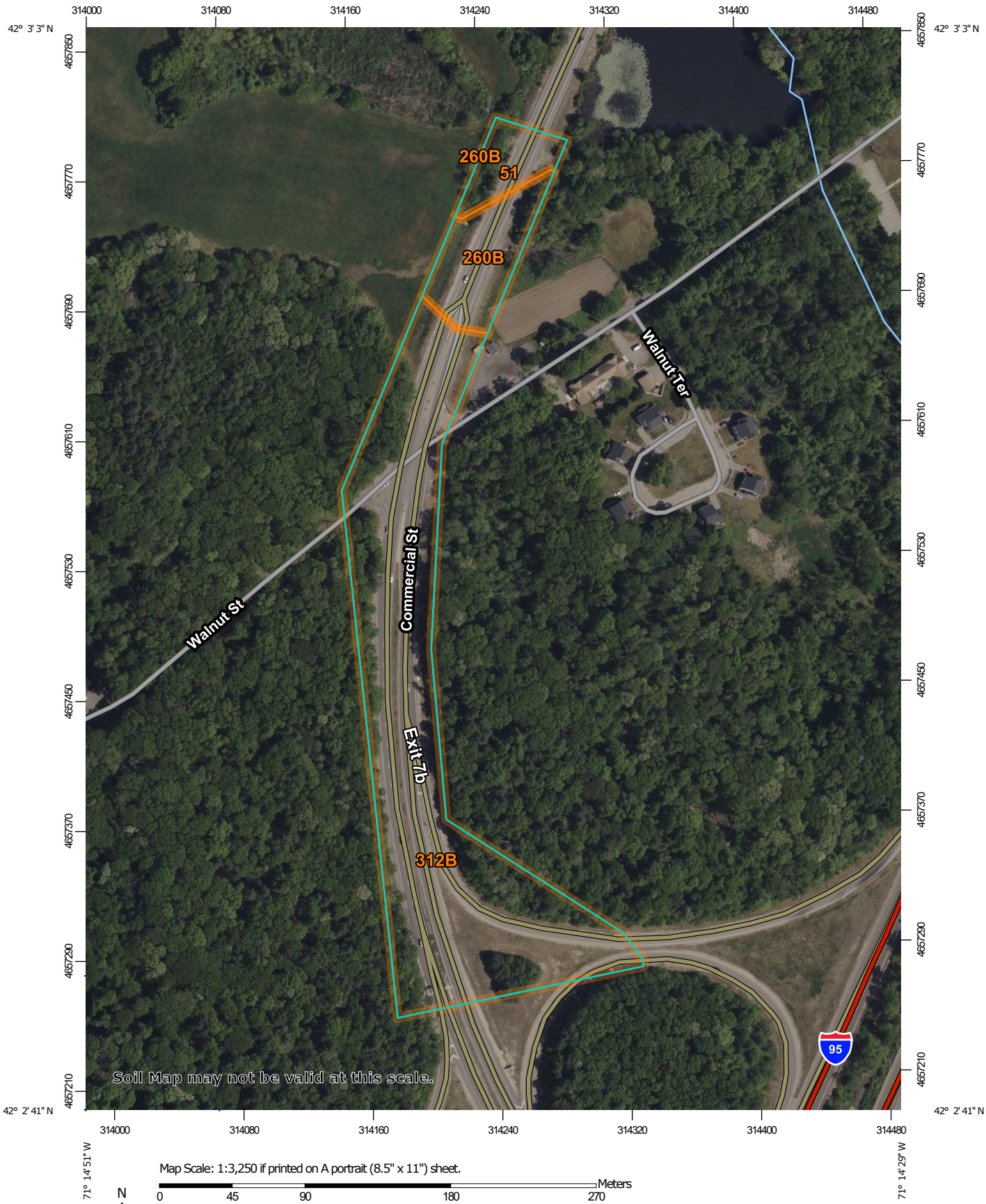
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/23/2023 at 10:13 AM 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.

# Custom Soil Resource Report
## Soil Map (Walnut Street, Foxboroguh, MA )




Map Scale: 1:3,250 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

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

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil 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 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 18, Sep 9, 2022

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

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

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

# Rare Habitat


Property Tax Parcels

NHESP Estimated Habitats of Rare Wildlife

NHESP Priority Habitats of Rare Species

Map Features for Imagery

## 3. PHOTO LOG

# PHOTO LOG

**Figure 1** – I-95 Exit 7B off-ramp approaching Commercial Street. Photo taken on the northbound shoulder of Commercial Street, facing northwest.

**Figure 2** – Commercial Street approaching Walnut Street. Photo taken the northbound shoulder of Commercial Street, facing northwest.

## PHOTO LOG

**Figure 3** –Commercial Street & Walnut Street intersection. Photo taken facing southwest.

**Figure 4** – Commercial Street & Walnut Street intersection. Photo taken facing northeast.

## PHOTO LOG

**Figure 5** – Commercial Street approaching Walnut Street. Photo taken in the northbound lane, facing south.

**Figure 6** – Commercial Street towards the northern limit of work. Photo taken in the northbound lane, facing north.

# 4. WETLAND RESOURCE DELINEATION REPORT

**Wetland Resource Delineation Report**
**Route 140 at Walnut Street**
**Foxborough**
**January 27, 2020**

The project area includes the location of proposed improvements along Route 140 and Walnut Street beginning on Commercial Street (Route 140) at the Route I-95 southbound ramps and extending north to a point approximately 1,000 feet north of Walnut Street, and including approximately 500 feet along each leg of Walnut Street and 400 feet along the I-95 southbound ramps as indicated in Figure 1 below. Rimmer Environmental Consulting (REC) conducted a field inspection of the project area on January 21, 2020. At that time, wetland resources subject to jurisdiction under the Massachusetts Wetlands Protection Act (MGL Ch 131 §. 40) and the Town of Foxborough Wetlands Protection Bylaw (Ch 267) within and immediately adjacent to the project area were identified.

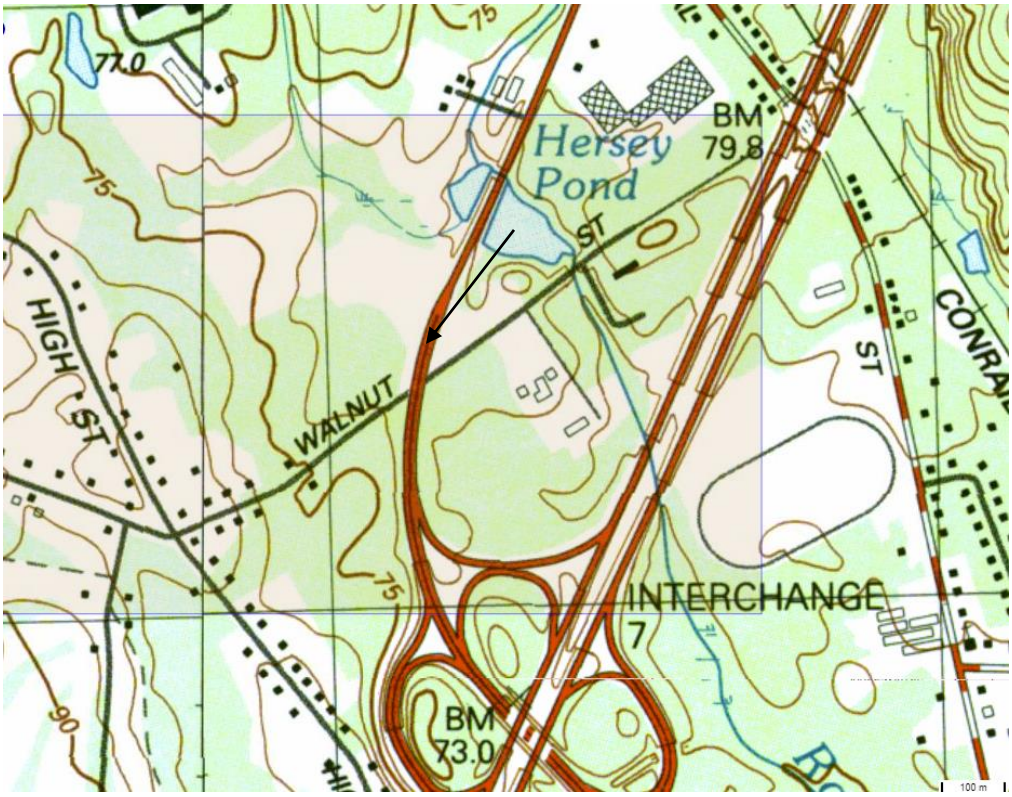



Fig. 1: USGS Topographic Quadrangle Locus

The following wetland resources were observed and delineated within the project site.

Flags A1-A11

There is a forested swamp on the south side of Walnut Street at the intersection with Route 140. It contains an overstory of red maple (*Acer rubrum*) and American elm (*Ulmus americana*) with an understory of highbush blueberry (*Vaccinium corymbosum*), northern arrow-wood (*Viburnum recognitum*), maleberry (*Lyonia ligustrina*) and poison ivy (*Toxicodendron radicans*). The wetland extends up to the toe of the roadway right of way as well as off-site to the east.

This wetland qualifies as a Bordering Vegetated Wetland (BVW) under state and local regulations and a 100-foot Buffer Zone extends from the limit of BVW. In addition, the local bylaw regulations contain a 25-foot setback requirement from BVW for most activities.

Flags B1-B16 and B17-B23

This is the wetland complex extending along Hersey Pond in the northern project limit on the east side of Route 140. The pond shore contains a narrow band of marsh and a wooded swamp extending from its southern bank. The wetland line extends close to the toe of the roadway embankment and continues south then east along the edge of an agricultural field. The vegetative community along the edge of this wetland consists of an overstory of red maple, with an understory of winterberry (*Ilex verticillata*), glossy buckthorn (*Frangula alnus*), meadowsweet (*Spiraea alba*).

This wetland qualifies as a BVW under state and local regulations and a 100-foot Buffer Zone extends from the limit of BVW. In addition, the local bylaw regulations contain a 25-foot setback requirement from BVW for most activities.

Flags C1-C19

Hersey Pond is bisected by Route 140. On the west side of the road at the northern end of the project site opposite the B series described above, REC delineated the east bank of the pond by flags C1-C4. Continuing south, the east bank of an intermittent stream draining into the pond was delineated by flags C4-C10 and C10-C15. There is a culvert under a farm road providing access to an agricultural field off-site to the west between flags C10 and C11. From C15-C19 is a swale between the agricultural field and Route 140 which contains wet meadow vegetation, including mostly purple loosestrife (*Lythrum salicaria*).

Flags C1-C15 qualify as Inland Bank Resource under state and local wetland regulations with C1-C4 being the pond Bank and C4-C15 the intermittent stream Bank. Flags C15-C19 represent the limits of BVW under state and local regulations.

A 100-foot Buffer Zone extends from the limit of both BVW and Bank resource. In addition, the local bylaw regulations contain a 25-foot setback requirement from BVW and Bank for most activities.

Flags D1-D5 and D6-D16

A forested wetland was delineated on the north side of Walnut Street, west of the intersection with Route 140. The vegetative community is similar to the A-series wetland described above. There is an upland forested area between the wetland edge and Walnut Street which consists primarily of red oak (*Quercus rubra*), white pine (*Pinus strobus*) and witch hazel (*Hamamelis virginiana*). This wetland extends off-site to the north.

This wetland qualifies as a BVW under state and local regulations and a 100-foot Buffer Zone extends from the limit of BVW. In addition, the local bylaw regulations contain a 25-foot setback requirement from BVW for most activities.

Flags E1-E25

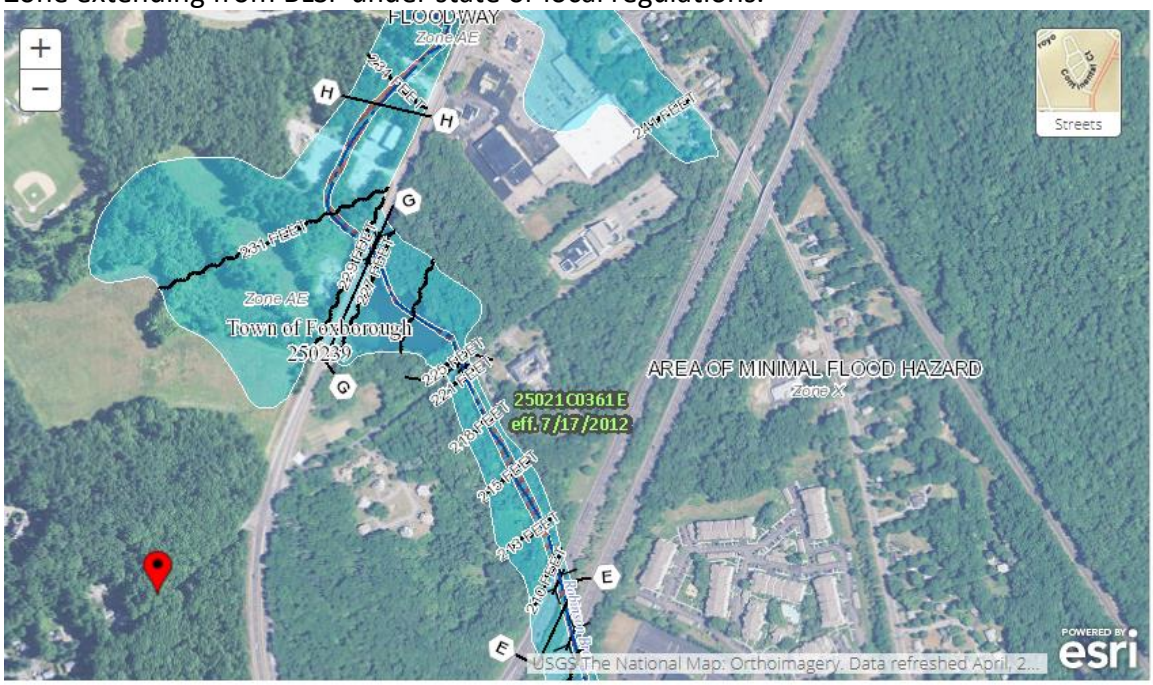
Opposite the D series above, on the south side of the west leg of Walnut Street in the westernmost limit of the project site is a very small area of BVW, delineated by flags E1-E4. This pocket wetland drains into what appears to be a dug drainage ditch along the south side of Walnut Street to a point where it discharges into a culvert at the intersection with Route 140. The ditch delineated along both banks by flags E5-E25 qualifies as Inland Bank resource associated with an intermittent stream.

This wetland qualifies as BVW and Inland Bank under state and local regulations and a 100-foot Buffer Zone extends from the limit of both resources. In addition, the local bylaw regulations contain a 25-foot setback requirement from BVW and Bank for most activities.

Bordering Land Subject to Flooding (BLSF)

The FEMA flood mapping for the project area (see Figure 2 below) indicates a 100-year floodplain extending from Hersey Pond. On the west side of Route 140, the 100-year flood elevation is 235 (NAVD88) and on the east side it is 227, indicating the road is likely a restriction. The limit of the 100-year flood elevation that extends beyond the limit of flagged resources described above is

regulated as BLSF under state and local regulations. There is no 100-foot Buffer Zone extending from BLSF under state or local regulations.




*Other Resources*

The project is not located within Priority Habitat or Estimated Habitat of Rare Wetlands Wildlife and there are no certified vernal pools within 100 feet of the project area, although the D series contains an area indicated as a potential vernal pool, as determined by reference to the most recently available data from the Massachusetts Division of Fisheries and Wildlife – Natural Heritage and Endangered Species Program available on MassGIS.

# 5. STORMWATER REPORT

# Commercial Street (Route 140) at Walnut Street

*Foxborough*

PREPARED FOR

Town of Foxborough DPW
70 Elm Street
Foxborough, MA 02035

PREPARED BY

TEC, Inc.
282 Merrimack Street , 2nd Floor
Lawrence, MA, 01843

June 20, 2023

# Table of Contents



# List of Figures



# List of Tables

## Attachments

# 1

# Introduction

This Stormwater Management Report has been prepared to demonstrate compliance with the Massachusetts Stormwater Management Standards (the Standards) in accordance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) and Water Quality Certification Regulations (314 CMR 9.00). Appendix A includes a completed Massachusetts Department of Environmental Protection (MassDEP) Checklist for Stormwater Report, stamped by a Massachusetts registered professional engineer.

The Project follows the guidance presented in the MassDOT Stormwater Design Guide (SDG), and stormwater management systems are designed in accordance with the Standards.

# 2

# Project Summary

The Applicant, Town of Foxborough Department of Public Works, is proposing the Transportation Improvements to Commercial Street (Route 140) at Walnut Street for roadway, traffic, drainage, and pedestrian safety improvements along Commercial Street from 0.2 miles South of Walnut Street to 0.2 miles North of Walnut Street in Foxborough, MA. As proposed, the Project consists of extension of the northbound left-turn lane on Walnut Street, the addition of a southbound right-turn lane onto Walnut Street, alterations to the existing median, improved pedestrian transportation and traffic infrastructure throughout the Walnut Street intersection, alterations to the I-95 Exit 7B, and drainage improvements. The proposed area disturbed by the Project is 5.5 acres.

The Project limits includes approximately 0.4 miles of improvements along Commercial Street (State Route 140) and 700 feet of improvements along Walnut Street, owned by the Town of Foxborough.

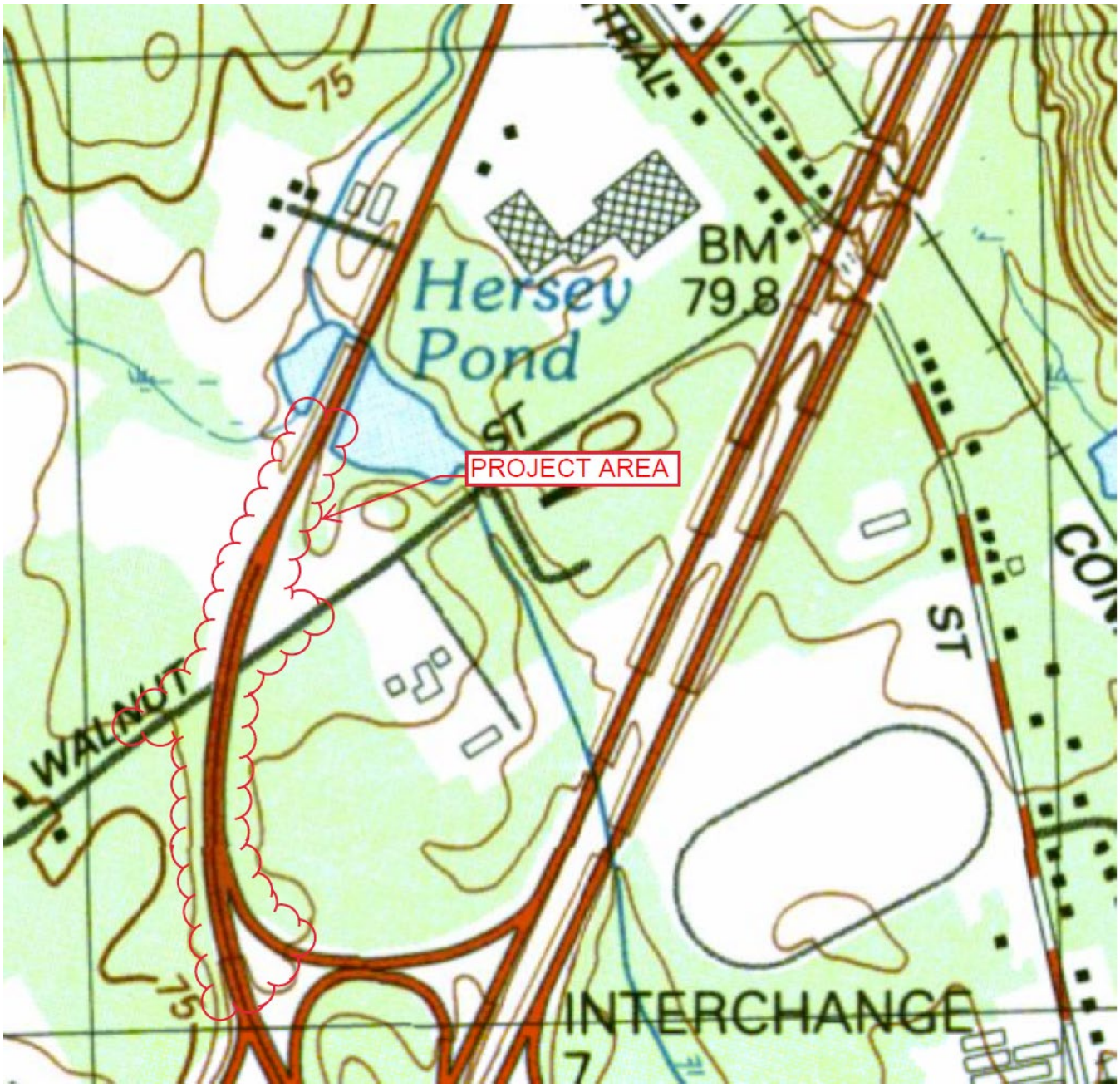
This drainage study was performed to assess the potential impacts of the proposed improvements and to provide measures to mitigate any impacts to resource areas near the Project. The limits of disturbance for this Project are confined to the existing footprint of the Commercial Street right-of-way. Minor widening of the corridor is proposed with curbing and additional shoulder width. Runoff from the roadway and shoulders is caught in the existing drainage system which is discharged into the surrounding wetlands. The Project will provide an improved stormwater management system incorporating Best Management Practices (BMPs) design elements that will comply with the Massachusetts Stormwater Management Handbook to the maximum extent practicable. This analysis has been prepared to verify that the Project will result in improved stormwater collection and treatment at the site.

The proposed stormwater management system outlined in this report has been designed to meet the Stormwater Standards identified in the Massachusetts Department of Environmental Protection (DEP) Massachusetts Stormwater Handbook to the maximum extent practicable. The design improves stormwater capture and treatment, reduces the risk of erosion and sedimentation, and improves stormwater runoff quality.

See Figure 1 for the Project Locus Map.

**Figure 1 Locus Figure**

## USGS Topo



# 3

# Existing Conditions

The existing roadway has been divided into nine subcatchment areas referenced in Figure 2 consisting of impervious paved lanes, curbing, and paved medians. Pervious areas consist of roadway shoulders and a grass median. The approximate topography of the site starts at a low point of 224′ on Commercial Street and 228′ in the I-95 Exit 7B off-ramp. The two lanes converge at an elevation of 234′ and continue to slope up to a high point of 238. The roadway then slopes down to 236′, where it intersects Walnut Street, and continues to a low point of 232′ at the project termination, just south of the Hersey Pond/Robinson Brook culvert crossing under Commercial Street. The approximate topography of Walnut Street begin at elevation 241′ at the western limit of work, intersects Commercial at elevation 236′, and reaches elevation 230′ at the eastern limit of work. Stormwater on site will enter various closed drainage systems on site or sheet flow overland, eventually reaching one of four existing Design points, three considered Wetlands, and the remaining one the closed drainage system on Commercial Street, beyond the limits of work.

Review of the NRCS Soil Survey map of the project area identified Woodbridge find sandy loam, Sudbury find sandy loam, and Swansea muck soil types. These soil types are considered hydrologic soil groups C/D, B, and B/D. Review of the soil information indicates saturated conditions/high groundwater for the C/D and B/D soils, given the numerous wetlands along Commercial Street. HSG D is utilized in the stormwater analysis for the Project. Appendix B provides detailed soils information, including the NRCS soil survey data for the project area and results of on-site subsurface investigations.

The existing site contains 1.79 acres of pervious area constisting of grassed and semi-pervious roadway shoulder areas, as well as 3.70 acres of impervious area constisting of roadway pavement, curbing, and medians.

Existing stormwater runoff travels to four Design Points (DP). Design Point A (DP-A) is a closed drainage system on Commercial Street, at the southern limit of work. Design Point B (DP-B) is the wetland at the southeast corner of the Commercial/Walnut Intersection, delineated by the A flag series. Design Point C (DP-C) is the set of wetlands from the northeast corner of the Commercial/Walnut Intersection to the northern limit of work, delineated by the B flag series. Design Point D (DP-D) is the set of wetlands from the northwest corner of the Commercial/Walnut Intersection to the northern limit of work, delineated by the C and D flag series.

The *Pre-Development Drainage Areas* are depicted in *Figure 2* of this report. This figure presents the delineation of the existing subcatchment areas and the Design Points. There are 9 existing subcatchment areas which are outlined below:

Existing Subcatchment Area A1 (EX-A1) is comprised of 13,351 SF of pervious land area consisting of roadway shoulders and grassed median, and 44,899 SF of impervious area consisting of roadway and curb. Stormwater within EX-A1 currently enters the closed drainage system on Commercial Street that extends beyond the southern limit of work (DP-A).

Existing Subcatchment Area B1 (EX-B1) is comprised of 8,918 SF of pervious land area consisting of roadway shoulders and grassed median, and 9,502 SF of impervious area consisting of roadway and curb. Stormwater within EX-B1 currently sheet flows to the wetland to the southeast of the intersection (DP-B).

Existing Subcatchment Area B2 (EX-B2) is comprised of 207 SF of pervious land area consisting of roadway shoulders and grassed median, and 826 SF of impervious area consisting of roadway and curb. Stormwater within EX-B2 currently enters an isolated closed drainage system on Commercial Street and outlets into the wetland to the southeast of the intersection (DP-B).

Existing Subcatchment Area B3 (EX-B3) is comprised of 4,297 SF of pervious land area consisting of roadway shoulders and grassed median, and 33,461 SF of impervious area consisting of roadway, curb, and paved median. Stormwater within EX-B3 currently enters a second isolated closed drainage system on Commercial Street and outlets into the wetland to the southeast of the intersection (DP-B).

Existing Subcatchment Area C1 (EX-C1) is comprised of 31,440 SF pervious land area consisting of roadway shoulders and 35,168 SF of impervious area consisting of roadway and curb. Stormwater within EX-C1 currently sheets flows overland or along the curb into concrete swales into the wetlands to the northeast of the intersection (DP-C).

Existing Subcatchment Area C2 (EX-C2) is comprised of 0 SF pervious land area and 20,601 SF of impervious area consisting of roadway, paved median, and curb. Stormwater within EX-C2 currently enters an isolated closed drainage system on Commercial Street and outlets into the wetlands to the northeast of the intersection (DP-C).

Existing Subcatchment Area C3 (EX-C3) is comprised of 0 SF pervious land area and 14,772 SF of impervious area consisting of roadway and curb. Stormwater within EX-C3 currently enters an isolated closed drainage system on Commercial Street and outlets into the wetlands to the northeast of the intersection (DP-C).

Existing Subcatchment Area D1 (EX-D1) is comprised of 19,750 SF of pervious land area consisting of roadway shoulders and grassed median, and 386 SF of impervious area consisting of a gravel drive. Stormwater within EX-D1 currently sheet flows into the wetlands to the northwest of the intersection (DP-D).

Existing Subcatchment Area D2 (EX-D2) is comprised of 0 SF pervious land area and 1,362 SF of impervious area consisting of roadway and curb. Stormwater within EX-D2 currently enters an isolated closed drainage system on Commercial Street and outlets into the wetlands to the northwest of the intersection (DP-D).

Table 1 presents the existing drainage areas and their characteristics. See Figure 2 for existing drainage areas and existing SCMs by design point.

**Table 1 Existing Drainage Areas**

| Drainage Area | Design Point | Area (acres) | Curve Number |
|---|---|---|---|
| EX-A1 | DP-A | 1.337 | 94 |
| EX-B1 | DP-B | 0.423 | 90 |
| EX-B2 | DP-B | 0.024 | 95 |
| EX-B3 | DP-B | 0.867 | 96 |
| EX-C1 | DP-C | 1.529 | 90 |
| EX-C2 | DP-C | 0.473 | 98 |
| EX-C3 | DP-C | 0.339 | 98 |
| EX-D1 | DP-D | 0.462 | 82 |
| EX-D2 | DP-D | 0.031 | 98 |

Table 2 lists the existing SCMs and provides a description of each.

**Table 2 Existing SCMs**

| SCM | Description |
|---|---|
| Catch Basins & Manholes | The existing site utilizes deep sump catch basins and drainage manholes to convey roadway drainage to the design points. |

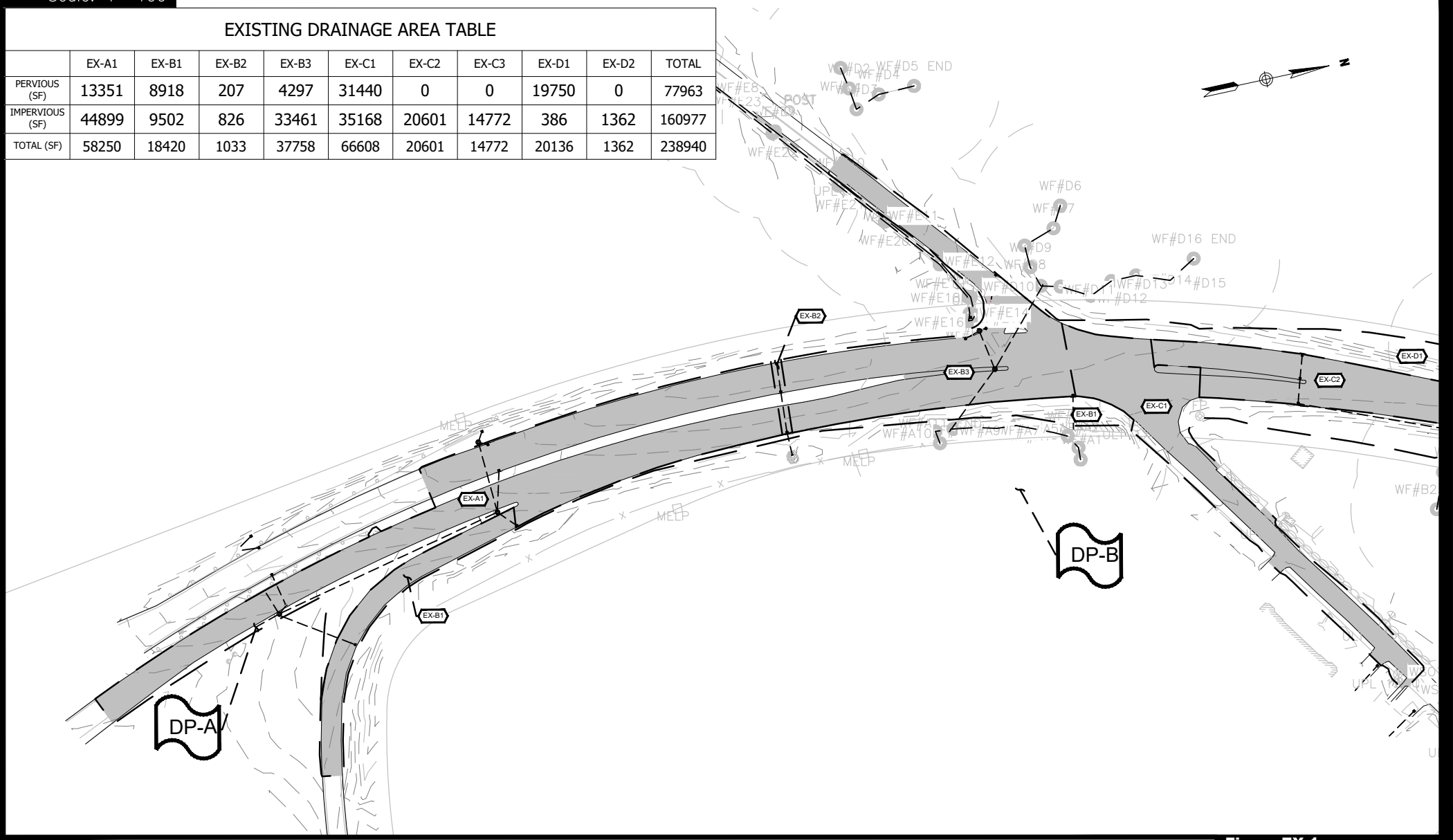
Key features in and around the project area include wetlands and their respective jurisdictional buffer zones and are shown on Figure 3. The Project is partially located within the 100-year floodplain as shown on the National Flood Hazard Layer FIRMette, 25023C0361E eff. 7/17/2012 included in Appendix B. The proposed construction within the limits of the 100-year flood elevation will not alter the existing elevation profile currently present on site.

**Figure 2 Existing Drainage Patterns**

Scale: 1"=100'

## EXISTING DRAINAGE AREA TABLE

| | EX-A1 | EX-B1 | EX-B2 | EX-B3 | EX-C1 | EX-C2 | EX-C3 | EX-D1 | EX-D2 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| PERVIOUS (SF) | 13351 | 8918 | 207 | 4297 | 31440 | 0 | 0 | 19750 | 0 | 77963 |
| IMPERVIOUS (SF) | 44899 | 9502 | 826 | 33461 | 35168 | 20601 | 14772 | 386 | 1362 | 160977 |
| TOTAL (SF) | 58250 | 18420 | 1033 | 37758 | 66608 | 20601 | 14772 | 20136 | 1362 | 238940 |




LEGEND

PR-# SUBCATCHMENT AREA

P# INFILTRATION/ DETENTION BMP

DP-# DESIGN POINT

DRAINAGE AREA BOUNDARY

TC = TOP OF CURB
BC = BOTTOM OF CURB
HP = HIGH POINT
LP = LOW POINT

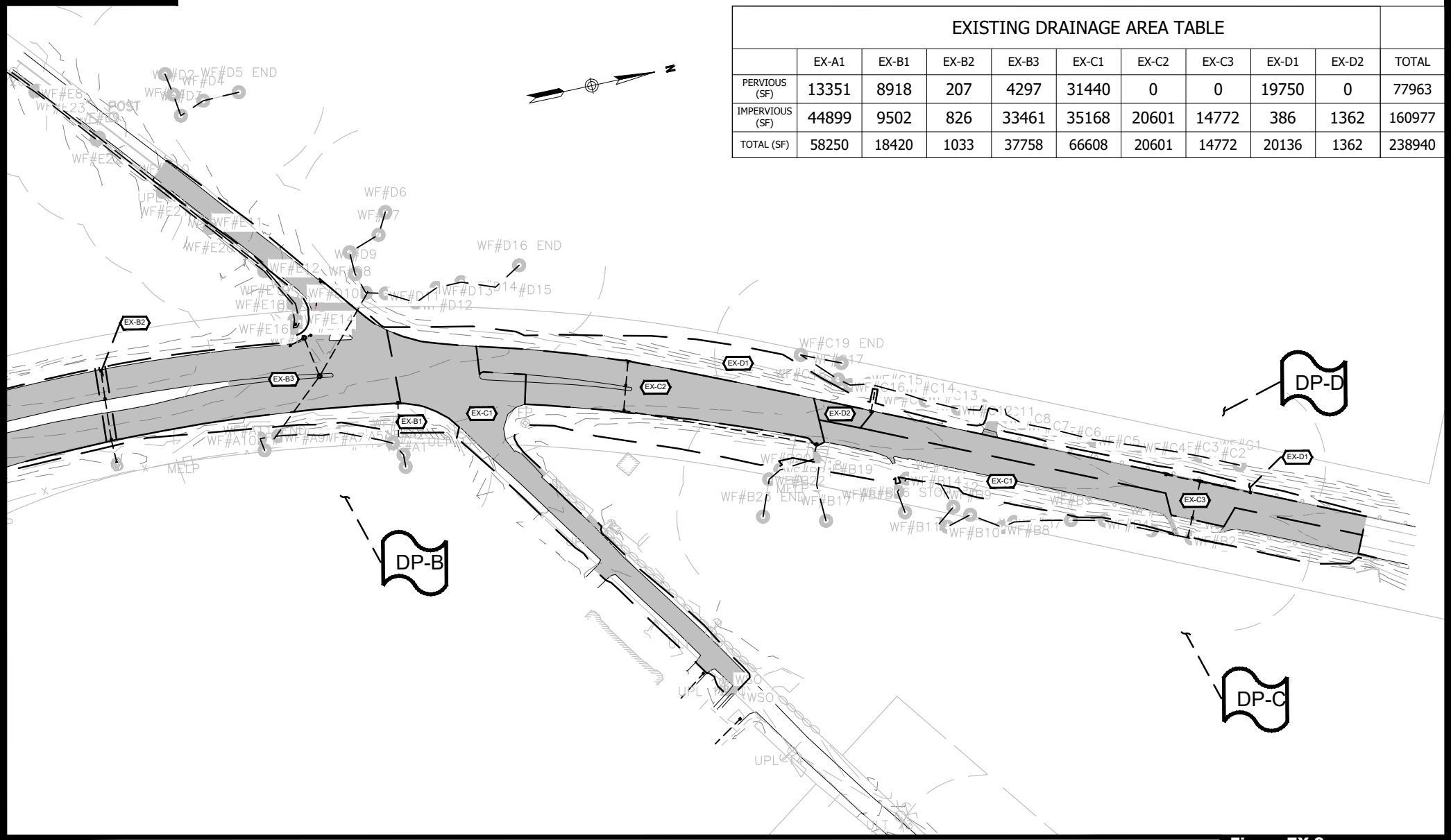
TEC The Engineering Corp

**Figure EX-1**

**EXISTING DRAINAGE PATTERNS**

Scale: 1"=100'

| EXISTING DRAINAGE AREA TABLE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | EX-A1 | EX-B1 | EX-B2 | EX-B3 | EX-C1 | EX-C2 | EX-C3 | EX-D1 | EX-D2 | TOTAL |
| PERVIOUS (SF) | 13351 | 8918 | 207 | 4297 | 31440 | 0 | 0 | 19750 | 0 | 77963 |
| IMPERVIOUS (SF) | 44899 | 9502 | 826 | 33461 | 35168 | 20601 | 14772 | 386 | 1362 | 160977 |
| TOTAL (SF) | 58250 | 18420 | 1033 | 37758 | 66608 | 20601 | 14772 | 20136 | 1362 | 238940 |




LEGEND

PR-1 SUBCATCHMENT AREA

P1 INFILTRATION/ DETENTION BMP

DP-1 DESIGN POINT

DRAINAGE AREA BOUNDARY

TC = TOP OF CURB
BC = BOTTOM OF CURB
HP = HIGH POINT
LP = LOW POINT

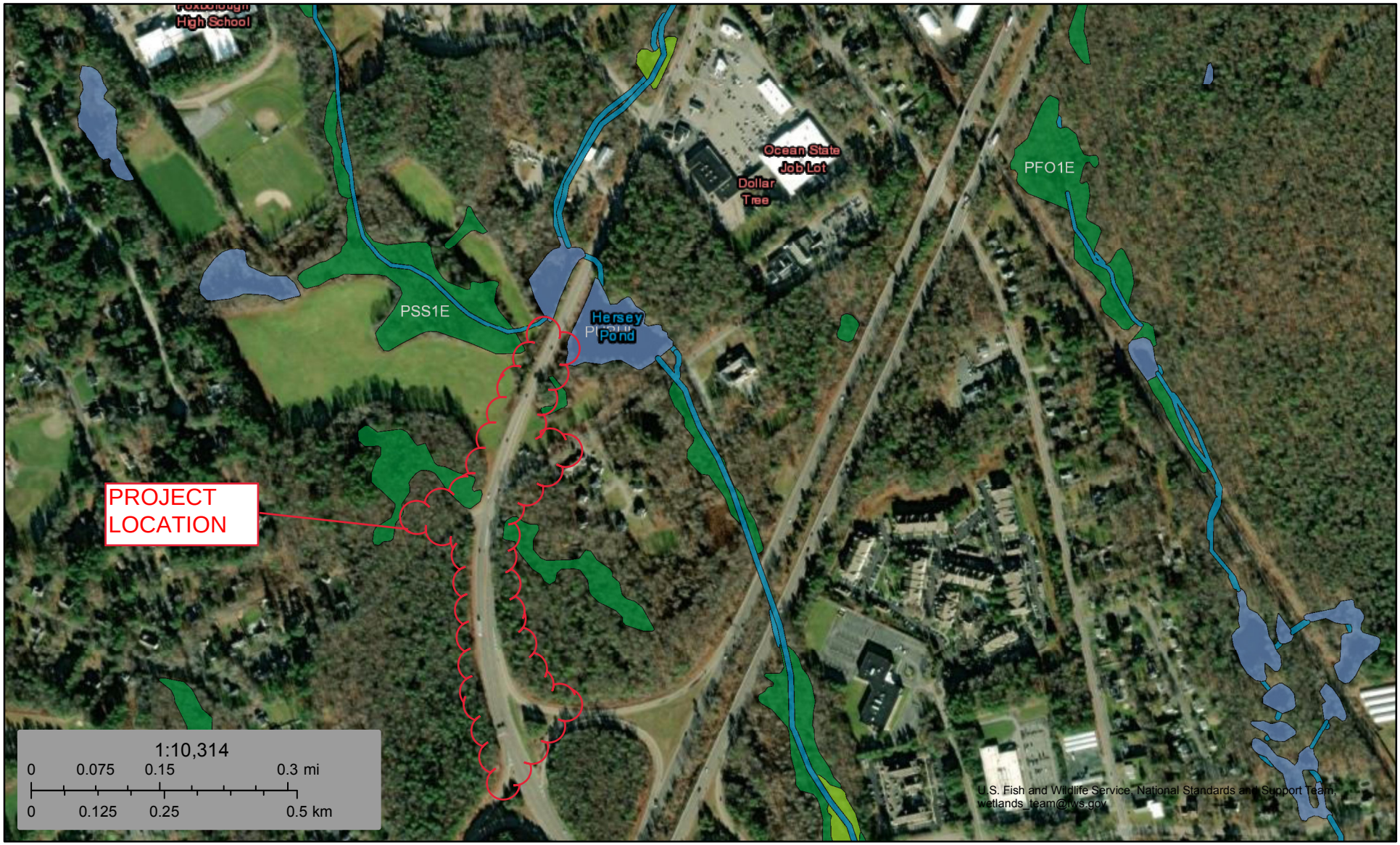
**Figure EX-2**

**EXISTING DRAINAGE PATTERNS**

**Figure 3 Existing Key Features and Wetland Resource Areas**

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Wetlands




May 23, 2023

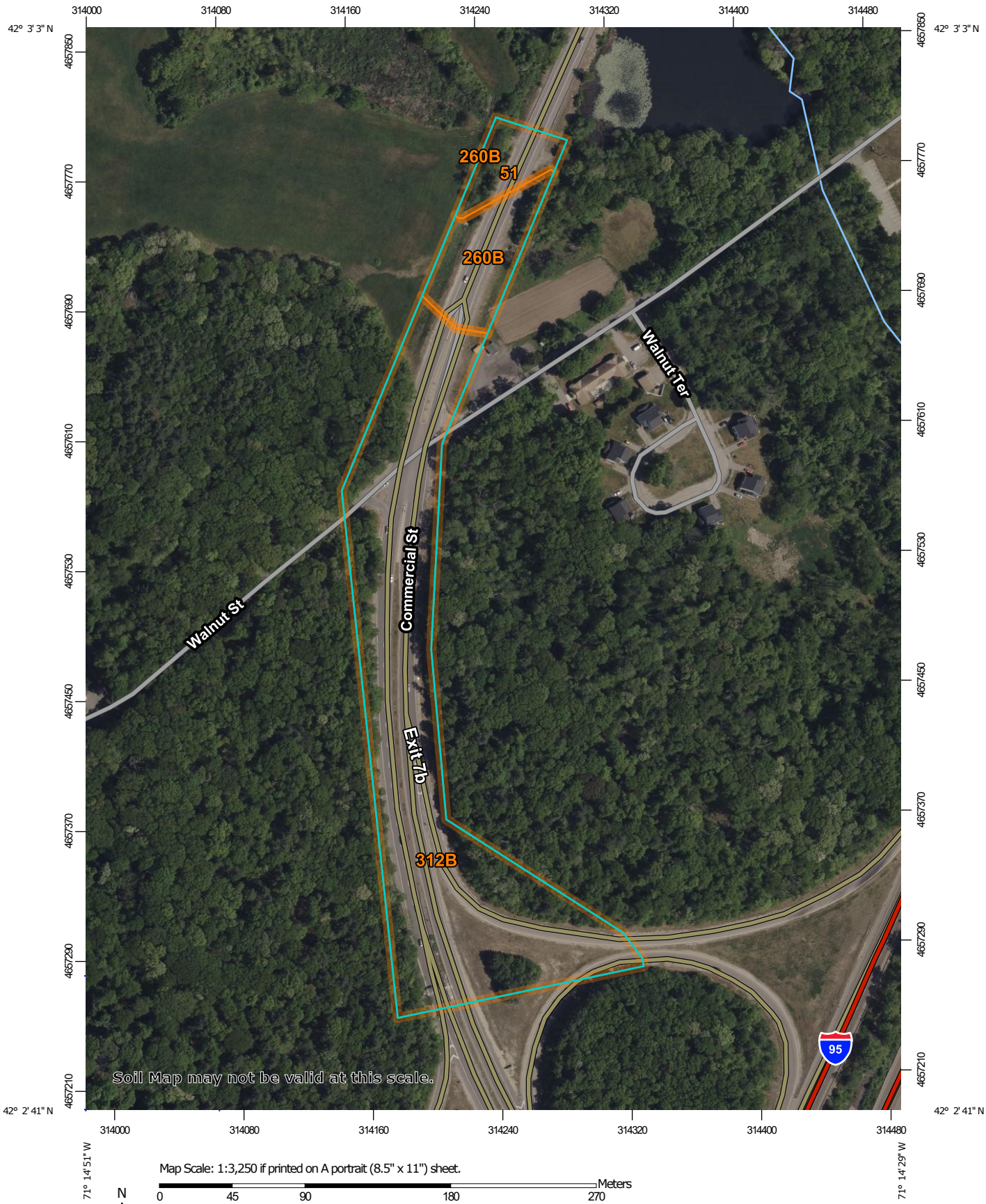
**Wetlands**

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

## Figure 4 NRCS Soils Information

# Custom Soil Resource Report
## Soil Map (Walnut Street, Foxboroguh, MA )




Map Scale: 1:3,250 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

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

# 4

# Proposed Conditions

The proposed conditions will include the construction of approximately 2,400 feet of roadway improvements along Commercial Street and Walnut Street. The improvements will be performed within the previously disturbed roadway shoulders. Roadway expansion and sidewalk addition will increase the impervious area by 30,326 SF compared to existing conditions.

Vertical granite curbing and asphalt sidewalks are proposed along the roadway to direct water into the proposed drainage infrastructure. Sidewalks are designed to drain toward the roadway at approximately 1.5% cross slope.

Proposed stormwater management in site will include adjusting and remodling drainage structures, as well as proposing new and removing old structures. Stormwater will be routed through the existing closed drainage systems and will maintain the same Design Points as in the existing conditions. The proposed drainage system will utilize outlets from the existing system to mimic existing drainage patterns where possible. Four outlets shall remain unchanged with the exception of additional riprap stabilization. One closed drainage outlet will be shifted approximately 50 feet to the south. Another outlet will be changed from a concrete swale to a closed drainage outlet. Two other concrete swale outlets will be removed. The proposed stormwater management system has been designed in accordance with the Massachusetts Stormwater Standards.

Overall, proposed improvements will promote effective stormwater management collection and treatment and mitigate risks to resources. Due to the increase in impervious area, the peak flows increase in multiple locations, but by a negligible amount.

Table 3 provides a breakdown of the impervious area for the Project.

**Table 3 Impervious Area**

| Condition | Impervious Area (sq. ft) |
|---|---|
| Existing | 160,977 |
| Proposed | 191,303 |
| **Net** | + 30,326 |

The proposed stormwater management system is designed to mimic existing drainage patterns and reduce direct disturbances due to construction activities and erosion within the buffer zones of nearby wetlands. In the proposed conditions analysis, the same design points

identified and analyzed under the existing conditions were considered. The post-development subcatchment areas are identified in Figure 5, *Proposed Drainage Patterns*. The post-development subcatchment ares include the existing and expanded roadway, the proposed sidewalks, and the grassed shoulders.

Proposed Subcatchment Area A1 (PR-A1) is comprised of 3,238 SF of pervious land area consisting of roadway shoulders and grassed median, and 52,346 SF of impervious area consisting of roadway and curb. Stormwater within PR-A1 will enter the closed drainage system on Commercial Street that extends beyond the southern limit of work (DP-A).

Proposed Subcatchment Area B1 (PR-B1) is comprised of 17,561 SF of pervious land area consisting of roadway shoulders and grassed median, and 3,743 SF of impervious area consisting of roadway and curb. Stormwater within PR-B1 will sheet flow to the wetland to the southeast of the intersection (DP-B).

Proposed Subcatchment Area B2 (PR -B2) is comprised of 0 SF of pervious land area and 156 SF of impervious area consisting of roadway and curb. Stormwater PR EX-B2 will enter an isolated closed drainage system on Commercial Street and outlets into the wetland to the southeast of the intersection (DP-B).

Proposed Subcatchment Area B3 (PR-B3) is comprised of 1,124 SF of pervious land area of roadway shoulders and 35,206 SF of impervious area consisting of roadway, sidewalk, curb, and paved median. Stormwater within PR-B3 will enter an isolated closed drainage system on Commercial Street and outlets into the wetland to the southeast of the intersection (DP-B).

Proposed Subcatchment Area C1 (PR-C1) is comprised of 0 SF pervious land area and 7,048 SF of impervious area consisting of roadway, sidewalk, and curb. Stormwater within PR-C1 will enter an isolated closed drainage system on Commercial Street and outlets into the wetlands to the northeast of the intersection (DP-C).

Proposed Subcatchment Area C2 (PR-C2) is comprised of 12,643 SF pervious land area of roadway shoulders and 20,540 SF of impervious area consisting of roadway, paved median, and curb. Stormwater within PR-C2 will sheet flow to the wetland to the northeast of the intersection (DP-C).

Proposed Subcatchment Area C3 (PR-C3) is comprised of 0 SF pervious land area and 64,958 SF of impervious area consisting of roadway and curb. Stormwater within PR-C3 will enter an isolated closed drainage system on Commercial Street and outlets into the wetlands to the northeast of the intersection (DP-C). PR-C3 and PR-C1 enter the same isolated system.

Proposed Subcatchment Area C4 (PR-C4) is comprised of 0 SF pervious land area and 5,330 SF of impervious area consisting of roadway and curb. Stormwater within PR-C4 will enter a single catch basin on Commercial Street that outlets into the wetlands to the northeast of the intersection (DP-C).

Proposed Subcatchment Area D1 (PR-D1) is comprised of 13,071 SF of pervious land area consisting of roadway shoulders and grassed median, and 351 SF of impervious area consisting of a gravel drive. Stormwater within PR-D1 will sheet flow into the wetlands to the northwest of the intersection (DP-D).

Proposed Subcatchment Area D2 (PR-D2) is comprised of 0 SF pervious land area and 1,625 SF of impervious area consisting of roadway and curb. Stormwater within PR-D2 will enter a single catch basin on Commercial Street that outlets into the wetlands to the northwest of the intersection (DP-D).

Table 4 presents the proposed drainage areas and their characteristics under proposed conditions. Figure 5 shows proposed drainage patterns and drainage area delineations by design point.

**Table 4 Proposed Drainage Areas**

| Drainage Area | Design Point | Area (acres) | Curve Numbers |
|---|---|---|---|
| PR-A1 | DP-A | 1.276 | 97 |
| PR-B1 | DP-B | 0.489 | 85 |
| PR-B2 | DP-B | 0.004 | 98 |
| PR-B3 | DP-B | 0.834 | 98 |
| PR-C1 | DP-C | 0.162 | 98 |
| PR-C2 | DP-C | 0.762 | 92 |
| PR-C3 | DP-C | 1.491 | 98 |
| PR-C4 | DP-C | 0.122 | 98 |
| PR-D1 | DP-D | 0.308 | 82 |
| PR-D2 | DP-D | 0.037 | 98 |

See Figure 5 for proposed drainage areas and proposed SCMs by design point.

Table 5 lists the proposed SCMs and provides a description of each.

**Table 5 Proposed SCMs**

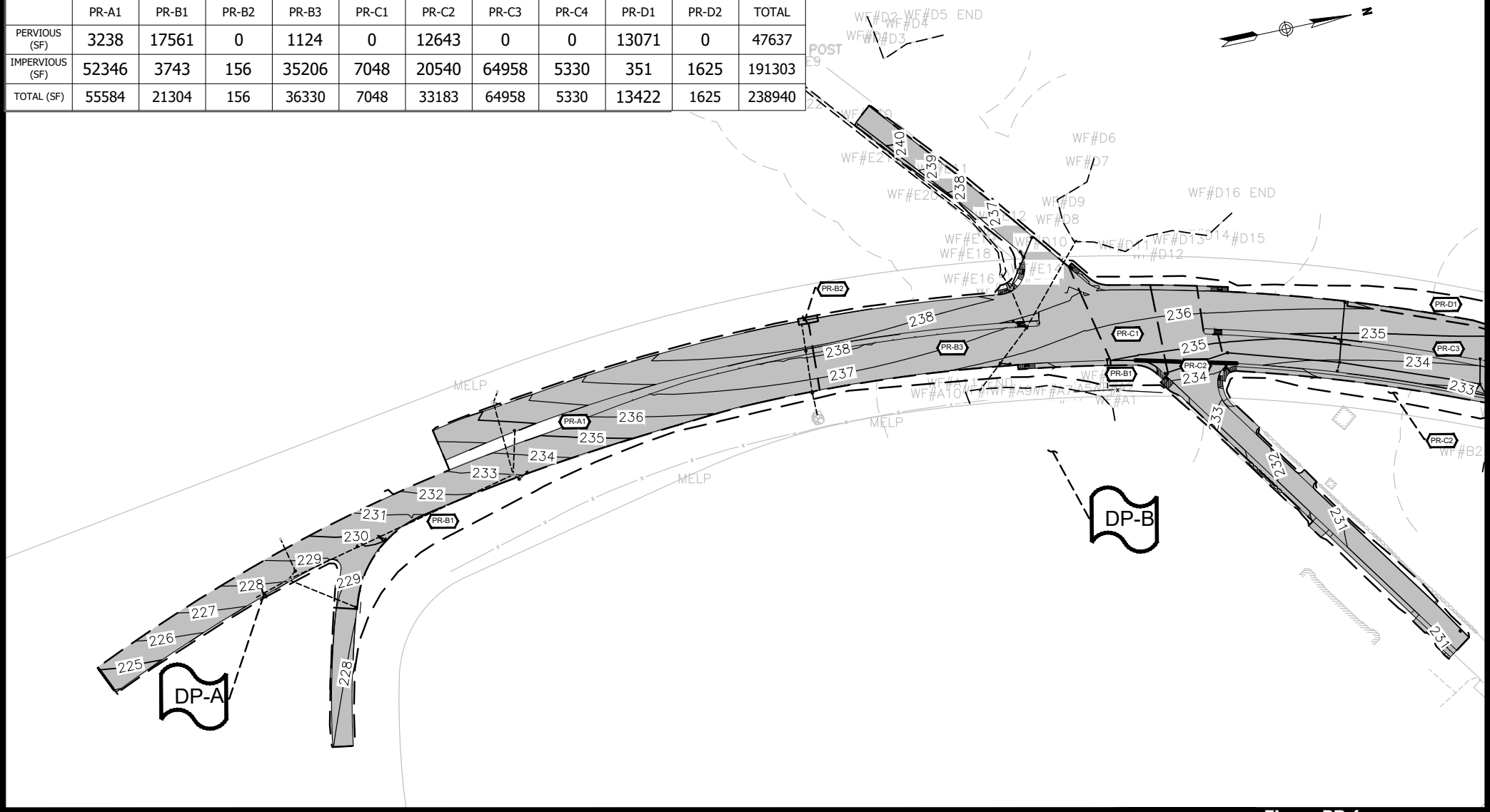
| SCM | Description |
|---|---|
| Catch Basins & Manholes | The project proposes new deep sump and hooded catch basins and drainage manholes to convey roadway drainage to the design points. |

**Figure 5 Proposed Drainage Patterns**

Scale: 1"=100'

## PROPOSED DRAINAGE AREA TABLE

| | PR-A1 | PR-B1 | PR-B2 | PR-B3 | PR-C1 | PR-C2 | PR-C3 | PR-C4 | PR-D1 | PR-D2 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PERVIOUS (SF) | 3238 | 17561 | 0 | 1124 | 0 | 12643 | 0 | 0 | 13071 | 0 | 47637 |
| IMPERVIOUS (SF) | 52346 | 3743 | 156 | 35206 | 7048 | 20540 | 64958 | 5330 | 351 | 1625 | 191303 |
| TOTAL (SF) | 55584 | 21304 | 156 | 36330 | 7048 | 33183 | 64958 | 5330 | 13422 | 1625 | 238940 |




LEGEND

PR-# SUBCATCHMENT AREA

P# INFILTRATION/ DETENTION BMP

DP-# DESIGN POINT

DRAINAGE AREA BOUNDARY

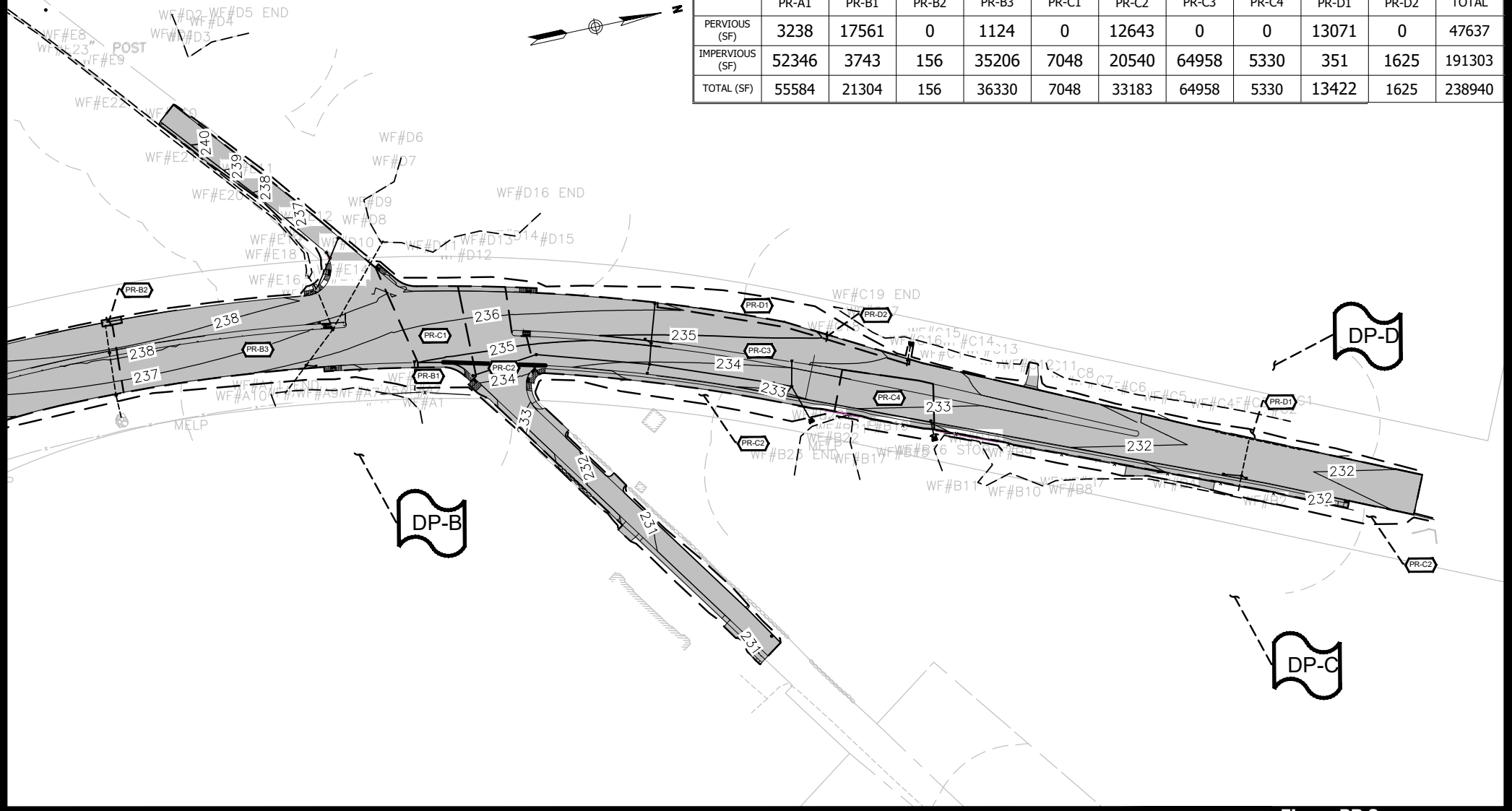
TC = TOP OF CURB
BC = BOTTOM OF CURB
HP = HIGH POINT
LP = LOW POINT

**Figure PR-1**

**PROPOSED DRAINAGE PATTERNS**

Scale: 1"=100'

| PROPOSED DRAINAGE AREA TABLE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PR-A1 | PR-B1 | PR-B2 | PR-B3 | PR-C1 | PR-C2 | PR-C3 | PR-C4 | PR-D1 | PR-D2 | TOTAL |
| PERVIOUS (SF) | 3238 | 17561 | 0 | 1124 | 0 | 12643 | 0 | 0 | 13071 | 0 | 47637 |
| IMPERVIOUS (SF) | 52346 | 3743 | 156 | 35206 | 7048 | 20540 | 64958 | 5330 | 351 | 1625 | 191303 |
| TOTAL (SF) | 55584 | 21304 | 156 | 36330 | 7048 | 33183 | 64958 | 5330 | 13422 | 1625 | 238940 |




LEGEND

PR-# SUBCATCHMENT AREA

P# INFILTRATION/ DETENTION BMP

DP-# DESIGN POINT

DRAINAGE AREA BOUNDARY

TC = TOP OF CURB
BC = BOTTOM OF CURB
HP = HIGH POINT
LP = LOW POINT

**Figure PR-2**

**PROPOSED DRAINAGE PATTERNS**

# 5

# Impaired Waters and TMDLs

As described under the Proposed Conditions section, the Project will discharge to Bordering Vegetated Wetlands and Hersey Pond/Robinson Brook. Of these water bodies, Robinson Brook is impaired based on the MassDEP Year 2022 Integrated List of Waters, also known as the 303(d) list.

Table 6 lists the receiving water bodies that are impaired and if the water body has a TMDL. MassDOT is expecting to receive a Transportation Separate Storm Sewer System (TS4) Permit from EPA, which will require that pollutant reductions presented in the TMDL be met on the watershed scale. As a result, the TMDL reductions do not need to be met by MassDOT on a project-by-project basis, but rather, MassDOT strives to make incremental progress towards achieving the required TMDL pollutant reductions with each project. Incremental progress is achieved through the implementation of SCMs designed to treat for the specific pollutants of concern for waterbodies within the watershed.

**Table 6 Impaired Waters and TMDL Information**

| Water Body | 303(d) Category | 303(d) Impairments | TMDL | TMDL Pollutant | TMDL Report Name |
|---|---|---|---|---|---|
| Robinson Brook | 5 | Benthic Macroinvertebrates | Yes | Benthic Macroinvertebrates | Final Pathogen TMDL for the Taunton River Watershed |
| Robinson Brook | 5 | Physical Substrate Habitat Alterations | No | | Final Pathogen TMDL for the Taunton River Watershed |

Due to the limited scope of work being proposed as part of this project, there are no specific SCM's being proposed to achieve the pollutant reductions listed in the TMDL.

Table 7 lists each water body, the proposed SCMs that drain to it, and each SCM's estimated pollutant removal per year.

**Table 7 Nutrient Removal for Project**

| Water Body | SCM | Nutrient Removal (lbs/yr) |
|---|---|---|
| **Hersey Pond/Robinson Brook** | | |
| | N/A | 0 |
| | Total Provided by SCMs | 0 |
| | | |

See Standard 4 in Section 6 below for more water quality calculations and discussion.

# 6

# Stormwater Management Standards

As demonstrated below, the proposed Project complies with the MassDEP Stormwater Management Standards (the Standards). The Project is a redevelopment. The Project is a limited project (expansion of less than one lane) and only meets certain standards (MEP) to the maximum extent practicable.

Since proposing additional treatment BMPs was not feasible with the existing righ-of-way, the proposed project follows existing drainage patterns and utilizes the most of the existing stormwater management network. The increase in impervious area is associated with a vital pedestrian and vehicular traffic safety improvement at the Commercial Street and Walnut Street intersection. The stormwater management plan controls the flow of stormwater, reduces the risk of erosion, and provides quality treatment that complies with MassDEP Stormwater Standards to the maximum extent practicable.

## Standard 1: No New Untreated Discharges

*No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

The Project retains the locations of existing discharge points along Commercial Street. Two discharge points have been eliminated. All altered outfalls are designed with rip rap protection to prevent erosion to the bordering wetlands. Appendix C provides supporting calculations for the outlet protection design. The project has been designed to comply with Standard 1.

## Standard 2: Peak Rate Attenuation

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

The Project is a redevelopment. The Project is a limited project (expansion of less than one lane) and has been designed to meet Standard 2 to the maximum extent practicable.

**Table 8 Rainfall Depths (in)**

| Design Storm Event | Rainfall Depth (in) |
|---|---|
| 2-year | 3.43 |
| 10-year | 5.24 |
| 100-year | 8.11 |

Table 9 provides a summary of peak rates for each design point under existing and proposed conditions. Appendix D provides computations and supporting information regarding the hydraulic and hydrologic modeling.

**Table 9 Peak Discharge Rates (cfs)**

| Design Point | Existing | | | Proposed | | |
|---|---|---|---|---|---|---|
| | 2-year | 10-year | 100-year | 2-year | 10-year | 100-year |
| DP-A | 6.05 | 9.62 | 15.20 | 6.10 | 9.44 | 14.70 |
| DP-B | 5.91 | 9.41 | 14.89 | 5.74 | 9.24 | 14.79 |
| DP-C | 10.16 | 16.43 | 26.26 | 11.88 | 18.55 | 29.05 |
| DP-D | 1.57 | 2.89 | 5.01 | 1.13 | 2.05 | 3.53 |

As summarized in Table 9 Peak Discharge Rates, the Project does increase peak discharge rates for the 2, 10, and 100-Year storm events for Design Point C. The peak discharge rates for all storms is reduced or remains the same for Design Points B, and D. Peak discharge for Design Point A is increased in the 2-year abd reduced in the 10 and 100-year storm events.

The increase in peak discharge rates to Design Point C is due to the new impervious area created by the Project, associated with the expansion of less than one lane and the new paved asphalt sidewalks. The proposed changes are vital to the vehicular traffic and pedestrian safety improvements at the Commercial Street and Walnut Street intersection. The expansion of less than one lane and the cretation of a "footpath" subjects this Project to the maximum extent practicable.

Design Point C is the large portion of Hersey Pond location east of Commercial Street. This portion of Hersey Pond has a surface area of over 2.5 acres. The slight increase in peak rates will have a negligible effect on a pond of this size, even in the 100-year storm event. Based on TEC's analysis, the total volume of runoff to Hersey Pond in a 100-year stom event will increase by 8,923 cubic feet of runoff. This increase in volume would only result in a water

level change of 0.95-inches. There will be no downstream impacts to Hersey Pond or associated waterbodies as a result of the project.

The HydroCAD analysis and output can be foundin Appendix D, *Hydraulic and Hydrologic Data*.

## Standard 3: Recharge

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

This project does not propose any infiltration BMPs due to the existing right-of-way constraints. The existing roadway has no infiltration BMPs and directly discharges stormwater runoff into the adjacent wetland resource areas. As a roadway redevelopment project, the project meets Standard 3 to the maximum extent practicable.

Table 10 provides the required recharge volume for the Project, and Table 11 provides the recharge volumes proposed for each design point.

**Table 10 Required Recharge Volume for Project**

| | HSG A | HSG B | HSG C | HSG D | Total |
|---|---|---|---|---|---|
| Existing Impervious (sq. ft.) | | | | 160,977 | 160,977 |
| Proposed Impervious (sq. ft.) | | | | 191,303 | 191,303 |
| Net Impervious Area (sq. ft.) | | | | 30,326 | 30,326 |
| Target depth, F (in) | 0.60 | 0.35 | 0.25 | 0.10 | - |
| **Required Recharge Volume, ReV (cf)** | | | | 253 | 253 |

**Table 11 Provided Recharge Volumes at Each Design Point**

| | HSG A | HSG B | HSG C | HSG D | Total |
|---|---|---|---|---|---|
| **DP-A** | | | | | |
| Net Impervious Area (sf) | | | | 7,447 | 7,447 |
| Required Recharge Volume, ReV (cf) | | | | 62.1 | 62.1 |
| Provided Recharge Volume (cf) | | | | 0 | 0 |
| **DP-B** | | | | | |
| Net Impervious Area (sf) | | | | -4,684 | -4,684 |
| Required Recharge Volume, ReV (cf) | | | | -39 | -39 |
| Provided Recharge Volume (cf) | | | | 0 | 0 |

| | HSG A | HSG B | HSG C | HSG D | Total |
|---|---|---|---|---|---|
| **DP-C** | | | | | |
| Net Impervious Area (sf) | | | | 27,355 | 27,355 |
| Required Recharge Volume, ReV (cf) | | | | 228 | 228 |
| Provided Recharge Volume (cf) | | | | 0 | 0 |
| **DP-D** | | | | | |
| Net Impervious Area (sf) | | | | 228 | 228 |
| Required Recharge Volume, ReV (cf) | | | | 1.9 | 1.9 |
| Provided Recharge Volume (cf) | | | | 0 | 0 |

Appendix B provides soil evaluation information (including the geotechnical report if applicable), and Appendix C provides computations, drawdown calculations, and supporting information regarding recharge.

## Standard 4: Water Quality Treatment

*Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:*

- *Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained.*
- *Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook.*
- *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

Table 12 shows the WQV to be treated for both new and existing impervious area within each drainage area, organized by design point. The Project discharges to Hersey Pond/Robinson Brook (Design Point C), which is an impaired waterbody with a TMDL.

**Table 12 WQV at Each Design Point**

| Design Point | WQV for New IA (cf) | WQV for Existing IA (cf) | Total WQV (cf) |
|---|---|---|---|
| DP-A | 0 | 0 | 0 |
| DP-B | 0 | 0 | 0 |
| DP-C | 0 | 0 | 0 |
| DP-D | 0 | 0 | 0 |
| **Project Total** | **0** | **0** | **0** |

Table 13 shows the WQV provided by the SCMs at each design point.

**Table 13 WQV Provided by the SCMs at Each Design Point**

| Design Point | Pretreatment (y/n) | WQV Provided (cf) | Meets Total WQV | Meets Required WQV for New IA |
|---|---|---|---|---|
| DP-A | y | | | |
| *N/A* | | | *no* | *no* |
| Total | | 0 | | |
| DP-B | y | | | |
| *N/A* | | | *no* | *no* |
| Total | | 0 | | |
| DP-C | y | | | |
| *N/A* | | | *no* | *no* |
| Total | | 0 | | |
| DP-D | y | | | |
| *N/A* | | | *no* | *no* |
| Total | | 0 | | |
| **Project Total** | | **0** | ***no*** | ***no*** |

In all Design Points , the project provides no water quality volume due to right of way constraints, topography at the edge of the road, and the abundance of HSG-D soils present throughout the project area. Given the existing conditions, proposing new infiltration BMP's are not feasible.

## Standard 5: Land Uses with Higher Potential Pollutant Loads

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

Standard 5 does not apply to the Project. There are no Land Uses with Higher Potential Pollutant Loads within the project area.

## Standard 6: 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 Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "stormwater discharge" as defined in 314 CMR 3.04(2)(a)1 or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.*

There are critical areas upland nearby the Project area, but not within the limits of work. Zone C is located approximately 1,000 feet to the west of the project area. Zone II and Zone A are located approximately 2,500 feet to the west of the project area. The bordering vegetated wetland Design Points to the west of the project do not directly connect to either critical area. Standard 6 does not apply to the Project. There are no Critical Areas within the project area.

## Standard 7: Redevelopment

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

The Project is considered a redevelopment project and like previously stated, the Stormwater Management Standards 2, 3, and 4 were met to the maximum extent practicable. The project proposes to increase impervious area on site by converting existing roadway shoulder to wider roadway lanes and paved asphalt sidewalk. As a traffic safety and pedestrian safety improvement project, the improvements do qualify as a redevelopment project and therefore must only meet the standards to the maximum extent practicable.

## Standard 8: Erosion and Sediment Control

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

The implementation of erosion and sediment (E&S) controls during construction is considered a standard practice for all MassDOT projects. E&S controls will be installed before any land disturbance begins for the Project and will remain in place for the duration

of the Project. The E&S controls for the Project are shown on the project plans and include a compost filter socks, silt fences, and inlet protection devices.

The Project disturbs 5.5 acres of land; therefore, the project contractor will request coverage under the NPDES Construction General Permit (CGP) and develop a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP follows the requirements of this standard and complies with the NPDES CGP.

## Standard 9: Operation and Maintenance Plan

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

MassDOT O&M plans are implemented on a programmatic level by each MassDOT district. Each MassDOT district office is responsible for providing operation and maintenance for the MassDOT stormwater management systems within their respective jurisdictions. Appendix E includes the O&M Plan for this project.

Commercial Street is owned by MassDOT, and the O&M and LTPPP designate the operation and maintenance to MassDOT. Walnut Street is owned by the Town of Foxborough, and the operation and maintenance activities on Walnut Street will be implemented by the Town of Foxborough. Appendix E includes the O&M Plan for this project.

## Standard 10: Prohibition of Illicit Discharges

*All illicit discharges to the stormwater management system are prohibited.*

Illicit Discharge Statement

The project's stormwater management system, as shown on the plans submitted with this report, have been designed in full compliance with Standard 10. The project area does not have any known illicit connections. Any illicit connections to the stormwater management system found in the project limit of work during construction will be removed and/or resolved through MassDOT's Illicit Discharge Detention and Elimination (IDDE) Program. The Long-Term Pollution Prevention Plan, provided in Appendix E, includes measures to prevent illicit discharges.

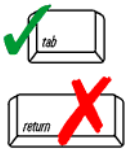
# Appendix A: MassDEP Checklist for Stormwater Report

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

# Checklist for Stormwater Report

## A. Introduction

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




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

The Stormwater Report must include:

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

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

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

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

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

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

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

# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

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

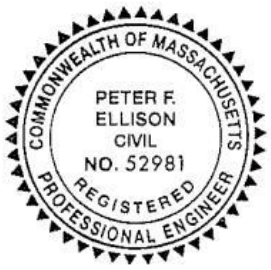
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that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

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

## Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature




6-20-2023

Signature and Date

## Checklist

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

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

# Checklist for Stormwater Report

## Checklist (continued)

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

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

**Standard 1: No New Untreated Discharges**

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

`

# Checklist for Stormwater Report

## Checklist (continued)

**Standard 2: Peak Rate Attenuation**

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

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

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

**Standard 3: Recharge**

☒ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

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

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

☐ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

☐ Site is comprised solely of C and D soils and/or bedrock at the land surface

☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000

☐ Solid Waste Landfill pursuant to 310 CMR 19.000

☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

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

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

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

# Checklist for Stormwater Report

## Checklist (continued)

**Standard 3: Recharge** (continued)

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

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

**Standard 4: Water Quality**

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

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

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

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

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

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

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

# Checklist for Stormwater Report

## Checklist (continued)

**Standard 4: Water Quality** (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

**Standard 6: Critical Areas**

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

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

# Checklist for Stormwater Report

## Checklist (continued)

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

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

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

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

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

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

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

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

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

# Checklist for Stormwater Report

## Checklist (continued)

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

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

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

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

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

**Standard 9: Operation and Maintenance Plan**

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

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

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

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

**Standard 10: Prohibition of Illicit Discharges**

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

☒ An Illicit Discharge Compliance Statement is attached;

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

# Appendix B: Soils and FEMA Information

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 Norfolk and Suffolk Counties, Massachusetts


May 23, 2023

# 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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# Contents

# How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

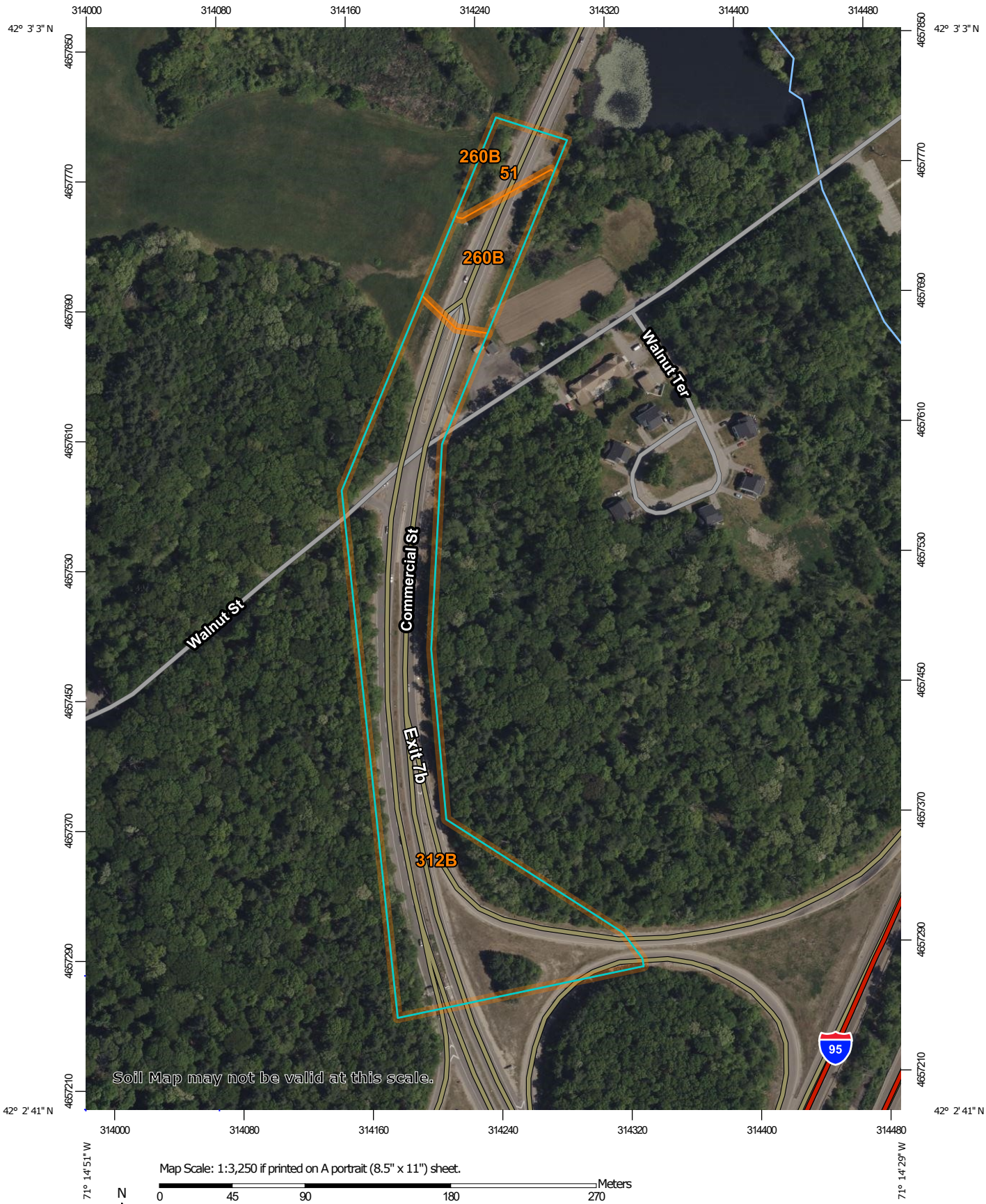
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

# Soil Map

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

# Custom Soil Resource Report
## Soil Map (Walnut Street, Foxboroguh, MA )




Map Scale: 1:3,250 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

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

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil 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 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 18, Sep 9, 2022

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

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

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

# Map Unit Legend (Walnut Street, Foxboroguh, MA )

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 51 | Swansea muck, 0 to 1 percent slopes | 0.5 | 6.2% |
| 260B | Sudbury fine sandy loam, 2 to 8 percent slopes | 0.9 | 11.5% |
| 312B | Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony | 6.8 | 82.3% |
| **Totals for Area of Interest** | | **8.2** | **100.0%** |

# Map Unit Descriptions (Walnut Street, Foxboroguh, MA )

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.

# Norfolk and Suffolk Counties, Massachusetts

## 51—Swansea muck, 0 to 1 percent slopes

### Map Unit Setting

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

### Map Unit Composition

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

### Description of Swansea

#### Setting

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

#### Typical profile

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

#### Properties and qualities

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

#### Interpretive groups

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

### Minor Components

#### Freetown

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

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

**Whitman**

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

**Scarboro**

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

## 260B—Sudbury fine sandy loam, 2 to 8 percent slopes

**Map Unit Setting**

*National map unit symbol:* vky4
*Elevation:* 0 to 2,100 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:* All areas are prime farmland

**Map Unit Composition**

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

**Description of Sudbury**

**Setting**

*Landform:* Outwash plains
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Linear
*Across-slope shape:* Concave
*Parent material:* Friable coarse-loamy eolian deposits over loose sandy glaciofluvial deposits

**Typical profile**

*H1 - 0 to 11 inches:* sandy loam

*H2 - 11 to 22 inches:* sandy loam
*H3 - 22 to 60 inches:* gravelly coarse sand

**Properties and qualities**

*Slope:* 2 to 8 percent
*Depth to restrictive feature:* 18 to 36 inches to strongly contrasting textural stratification
*Drainage class:* Moderately well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (2.00 to 6.00 in/hr)
*Depth to water table:* About 18 to 36 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Low (about 4.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2e
*Hydrologic Soil Group:* B
*Ecological site:* F144AY027MA - Moist Sandy Outwash
*Hydric soil rating:* No

**Minor Components**

**Walpole**

*Percent of map unit:* 5 percent
*Landform:* Terraces
*Hydric soil rating:* Yes

**Merrimac**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

**Deerfield**

*Percent of map unit:* 5 percent
*Landform:* Outwash plains
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* No

## 312B—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony

**Map Unit Setting**

*National map unit symbol:* 2t2qs
*Elevation:* 0 to 1,580 feet
*Mean annual precipitation:* 36 to 71 inches
*Mean annual air temperature:* 39 to 55 degrees F

*Frost-free period:* 140 to 240 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Woodbridge, extremely stony, and similar soils:* 82 percent
*Minor components:* 18 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Woodbridge, Extremely Stony**

**Setting**

*Landform:* Ground moraines, hills, drumlins
*Landform position (two-dimensional):* Summit, backslope, footslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Linear
*Parent material:* Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

**Typical profile**

*Oe - 0 to 2 inches:* moderately decomposed plant material
*A - 2 to 9 inches:* fine sandy loam
*Bw1 - 9 to 20 inches:* fine sandy loam
*Bw2 - 20 to 32 inches:* fine sandy loam
*Cd - 32 to 67 inches:* gravelly fine sandy loam

**Properties and qualities**

*Slope:* 0 to 8 percent
*Surface area covered with cobbles, stones or boulders:* 9.0 percent
*Depth to restrictive feature:* 20 to 43 inches to densic material
*Drainage class:* Moderately well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)
*Depth to water table:* About 19 to 27 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)
*Available water supply, 0 to 60 inches:* Low (about 4.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* C/D
*Ecological site:* F144AY037MA - Moist Dense Till Uplands
*Hydric soil rating:* No

**Minor Components**

**Paxton, extremely stony**

*Percent of map unit:* 10 percent
*Landform:* Ground moraines, hills, drumlins
*Landform position (two-dimensional):* Summit, shoulder, backslope
*Landform position (three-dimensional):* Side slope, crest
*Down-slope shape:* Convex, linear
*Across-slope shape:* Linear, convex
*Hydric soil rating:* No

**Ridgebury, extremely stony**

*Percent of map unit:* 8 percent
*Landform:* Hills, drainageways, drumlins, depressions, ground moraines
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Head slope, base slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

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# National Flood Hazard Layer FIRMette

FEMA

71°15'2"W 42°3'7"N


71°14'24"W 42°2'40"N

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

1:6,000

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

## Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/23/2023 at 10:13 AM 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: Supporting Calculations

Location: **Pre-Treatment Train**

| A<br>BMP[1] | B<br>TSS Removal Rate[1] | C<br>Starting TSS Load* | D<br>Amount Removed (B*C) | E<br>Remaining Load (C-D) |
|---|---|---|---|---|
| **Deep Sump Catch Basins** | **0.25** | **1.00** | **0.25** | **0.75** |

**Total TSS Removal =** **25%**

**Separate Form Needs to be Completed for Each Outlet or BMP Train**

Project: **T0962 Commercial Street (Route 140) at Walnut Street**

Prepared By: **TEC, Inc.**

Date: **6/12/2023**

**Riprap Apron Sizing Computations – Commercial Street (Route 140) at Walnut Street**

Sizing calculations based on guidance from Federal Highway Administration Hydraulic Engineering Circular No. 14, 3rd edition, dated July 2006

By: TEC, Inc. 06/12/2023

$$D_{50} = 0.2D\left(\frac{Q}{\sqrt{gD^{2.5}}}\right)^{4/3}\left(\frac{D}{TW}\right)$$

$$D_{50} = riprap\ size\ (ft)$$

$$Q = design\ discharge\ \left(\frac{ft^3}{s}\right)$$

$$D = culvert\ diameter\ (ft)$$

$$TW = tailwater\ depth\ (ft)$$

$$g = acceleration\ due\ to\ gravity\ \left(32.2\ \frac{ft}{s^2}\right)$$

**Table 10.1. Example Riprap Classes and Apron Dimensions**

| Class | $D_{50}$ (mm) | $D_{50}$ (in) | Apron Length[1] | Apron Depth |
|---|---|---|---|---|
| 1 | 125 | 5 | 4D | $3.5D_{50}$ |
| 2 | 150 | 6 | 4D | $3.3D_{50}$ |
| 3 | 250 | 10 | 5D | $2.4D_{50}$ |
| 4 | 350 | 14 | 6D | $2.2D_{50}$ |
| 5 | 500 | 20 | 7D | $2.0D_{50}$ |
| 6 | 550 | 22 | 8D | $2.0D_{50}$ |

[1]D is the culvert rise.

**Proposed FES 25**

$$D_{50} = 0.2(1.25\ ft)\left(\frac{12.3\ \frac{ft^3}{s}}{\sqrt{(32.2\ \frac{ft}{s^2})(1.25ft)^{2.5}}}\right)^{4/3}\left(\frac{1.25ft}{0.4(1.25ft)}\right) = 1.51\ ft = 18.1\ inches$$

$$= Class\ 5\ (Table\ 10.1)$$

$$Length = 7D = 7(1.25\ ft) = 8.8\ ft$$

$$Depth = 2(D_{50}) = 2\ (18.1\ in) = 36.2\ inches$$

Note: Design flow from HydroCAD was estimated to be 12.30 cfs (outflow from subcatchments PR-C1 and PR-C3 during a 10-year storm). Based on this low flow rate, the flared end section has been designed with Class 5 length and depth of rip rap apron.

**Proposed FES 26**

$$D_{50} = 0.2(1.0\ ft)\left(\frac{0.28\ \frac{ft^3}{s}}{\sqrt{(32.2\ \frac{ft}{s^2})(1.0ft)^{2.5}}}\right)^{4/3}\left(\frac{1.0ft}{0.4(1.0ft)}\right) = 0.01\ ft = 0.11\ inches$$
$$= Class\ 1\ (Table\ 10.1)$$

$$Length = 4D = 4(1.0\ ft) = 4\ ft$$

$$Depth = 3.5(D_{50}) = 3.5\ (5\ in) = 17.5\ inches$$

Note: Design flow from HydroCAD was estimated to be 0.28 cfs (outflow from subcatchment PR-D2 during a 10-year storm). Based on this low flow rate, the culvert has been designed with the minimum recommended length and depth of rip rap apron.

**Proposed FES 27**

$$D_{50} = 0.2(1.0\ ft)\left(\frac{0.91\ \frac{ft^3}{s}}{\sqrt{(32.2\ \frac{ft}{s^2})(1.0ft)^{2.5}}}\right)^{4/3}\left(\frac{1.0ft}{0.4(1.0ft)}\right) = 0.04\ ft = 0.5\ inches$$
$$= Class\ 1\ (Table\ 10.1)$$

$$Length = 4D = 4(1.0\ ft) = 4\ ft$$

$$Depth = 3.5(D_{50}) = 3.5\ (5\ in) = 17.5\ inches$$

Note: Design flow from HydroCAD was estimated to be 0.91 cfs (outflow from subcatchment PR-C4 during a 10-year storm). Based on this low flow rate, the culvert has been designed with the minimum recommended length and depth of rip rap apron.

# Appendix D: Hydraulic and Hydrologic Data

**NOAA Atlas 14, Volume 10, Version 3**
**Location name: Foxboro, Massachusetts, USA***
**Latitude: 42.0475°, Longitude: -71.2469°**
**Elevation: 245 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

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

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.312** (0.245-0.392) | **0.384** (0.301-0.482) | **0.501** (0.392-0.631) | **0.598** (0.465-0.758) | **0.732** (0.552-0.974) | **0.831** (0.614-1.13) | **0.938** (0.675-1.33) | **1.06** (0.718-1.53) | **1.26** (0.814-1.87) | **1.42** (0.897-2.16) |
| 10-min | **0.442** (0.348-0.555) | **0.544** (0.427-0.683) | **0.710** (0.555-0.895) | **0.848** (0.659-1.07) | **1.04** (0.781-1.38) | **1.18** (0.870-1.60) | **1.33** (0.956-1.89) | **1.51** (1.02-2.17) | **1.78** (1.15-2.65) | **2.01** (1.27-3.05) |
| 15-min | **0.520** (0.409-0.653) | **0.640** (0.502-0.804) | **0.835** (0.653-1.05) | **0.997** (0.775-1.26) | **1.22** (0.919-1.62) | **1.39** (1.02-1.89) | **1.56** (1.12-2.22) | **1.78** (1.20-2.56) | **2.09** (1.36-3.12) | **2.36** (1.50-3.59) |
| 30-min | **0.719** (0.565-0.902) | **0.888** (0.697-1.12) | **1.16** (0.910-1.47) | **1.39** (1.08-1.76) | **1.71** (1.29-2.27) | **1.94** (1.43-2.64) | **2.19** (1.58-3.11) | **2.49** (1.68-3.59) | **2.94** (1.90-4.38) | **3.32** (2.10-5.04) |
| 60-min | **0.918** (0.721-1.15) | **1.14** (0.891-1.43) | **1.49** (1.17-1.88) | **1.79** (1.39-2.27) | **2.19** (1.65-2.92) | **2.50** (1.84-3.40) | **2.82** (2.03-4.00) | **3.20** (2.16-4.62) | **3.78** (2.45-5.64) | **4.27** (2.70-6.50) |
| 2-hr | **1.17** (0.924-1.45) | **1.47** (1.16-1.83) | **1.96** (1.54-2.45) | **2.37** (1.85-2.98) | **2.93** (2.22-3.87) | **3.34** (2.49-4.53) | **3.79** (2.75-5.36) | **4.34** (2.94-6.19) | **5.16** (3.36-7.63) | **5.88** (3.74-8.85) |
| 3-hr | **1.35** (1.08-1.68) | **1.70** (1.35-2.12) | **2.28** (1.80-2.84) | **2.75** (2.16-3.45) | **3.41** (2.60-4.49) | **3.89** (2.91-5.25) | **4.42** (3.22-6.22) | **5.06** (3.44-7.18) | **6.04** (3.94-8.87) | **6.88** (4.38-10.3) |
| 6-hr | **1.77** (1.42-2.18) | **2.20** (1.76-2.72) | **2.91** (2.32-3.60) | **3.50** (2.77-4.34) | **4.30** (3.30-5.61) | **4.90** (3.68-6.54) | **5.54** (4.06-7.71) | **6.32** (4.32-8.89) | **7.50** (4.92-10.9) | **8.51** (5.45-12.6) |
| 12-hr | **2.32** (1.87-2.83) | **2.82** (2.27-3.45) | **3.64** (2.92-4.47) | **4.33** (3.45-5.34) | **5.27** (4.06-6.80) | **5.97** (4.50-7.87) | **6.72** (4.93-9.21) | **7.60** (5.23-10.6) | **8.92** (5.88-12.8) | **10.0** (6.45-14.7) |
| 24-hr | **2.82** (2.29-3.42) | **3.43** (2.78-4.16) | **4.42** (3.57-5.38) | **5.24** (4.20-6.41) | **6.37** (4.94-8.16) | **7.21** (5.48-9.43) | **8.11** (5.99-11.0) | **9.18** (6.34-12.6) | **10.8** (7.15-15.3) | **12.1** (7.85-17.6) |
| 2-day | **3.20** (2.62-3.85) | **3.95** (3.23-4.76) | **5.17** (4.21-6.25) | **6.19** (5.00-7.52) | **7.58** (5.94-9.66) | **8.61** (6.61-11.2) | **9.74** (7.27-13.2) | **11.1** (7.72-15.2) | **13.2** (8.81-18.6) | **15.1** (9.78-21.6) |
| 3-day | **3.49** (2.87-4.19) | **4.30** (3.53-5.16) | **5.62** (4.59-6.75) | **6.71** (5.45-8.11) | **8.21** (6.45-10.4) | **9.32** (7.18-12.1) | **10.5** (7.89-14.2) | **12.0** (8.37-16.3) | **14.3** (9.57-20.1) | **16.3** (10.6-23.3) |
| 4-day | **3.77** (3.10-4.50) | **4.60** (3.78-5.50) | **5.96** (4.88-7.14) | **7.09** (5.77-8.54) | **8.64** (6.81-10.9) | **9.79** (7.56-12.6) | **11.0** (8.29-14.8) | **12.6** (8.78-17.0) | **14.9** (10.0-20.8) | **17.0** (11.1-24.1) |
| 7-day | **4.52** (3.75-5.37) | **5.40** (4.46-6.41) | **6.82** (5.62-8.12) | **8.00** (6.55-9.58) | **9.62** (7.62-12.0) | **10.8** (8.39-13.8) | **12.1** (9.12-16.1) | **13.7** (9.62-18.3) | **16.1** (10.8-22.2) | **18.1** (11.9-25.5) |
| 10-day | **5.24** (4.36-6.20) | **6.14** (5.10-7.26) | **7.60** (6.29-9.02) | **8.82** (7.25-10.5) | **10.5** (8.33-13.0) | **11.7** (9.11-14.9) | **13.1** (9.82-17.2) | **14.6** (10.3-19.5) | **16.9** (11.4-23.3) | **18.9** (12.4-26.4) |
| 20-day | **7.38** (6.19-8.66) | **8.34** (6.98-9.80) | **9.92** (8.27-11.7) | **11.2** (9.30-13.3) | **13.0** (10.4-15.9) | **14.4** (11.2-17.9) | **15.8** (11.8-20.3) | **17.3** (12.3-22.8) | **19.4** (13.2-26.3) | **21.0** (13.9-29.0) |
| 30-day | **9.15** (7.70-10.7) | **10.2** (8.55-11.9) | **11.8** (9.91-13.9) | **13.2** (11.0-15.6) | **15.1** (12.1-18.3) | **16.6** (12.9-20.5) | **18.0** (13.5-22.8) | **19.5** (13.9-25.5) | **21.4** (14.6-28.8) | **22.8** (15.1-31.3) |
| 45-day | **11.4** (9.60-13.2) | **12.4** (10.5-14.5) | **14.2** (11.9-16.6) | **15.7** (13.1-18.4) | **17.7** (14.2-21.3) | **19.3** (15.0-23.6) | **20.8** (15.5-26.0) | **22.2** (15.9-28.8) | **23.9** (16.4-32.0) | **25.1** (16.7-34.2) |
| 60-day | **13.2** (11.2-15.3) | **14.3** (12.1-16.6) | **16.2** (13.7-18.8) | **17.7** (14.9-20.7) | **19.8** (16.0-23.8) | **21.5** (16.8-26.2) | **23.1** (17.3-28.7) | **24.5** (17.6-31.6) | **26.1** (17.9-34.7) | **27.1** (18.0-36.8) |

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

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

Please refer to NOAA Atlas 14 document for more information.

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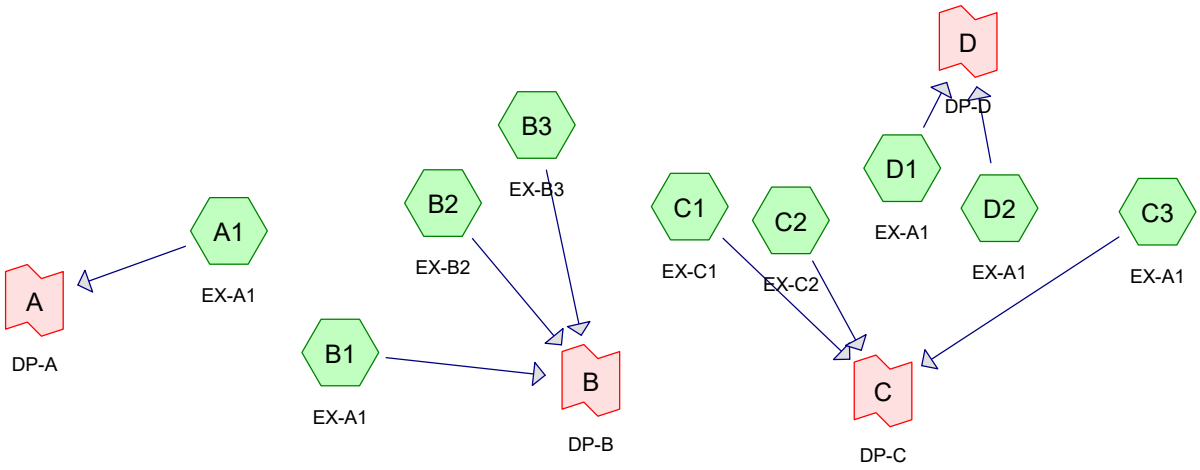
## PF graphical




Subcat Reach Pond Link

**Routing Diagram for T0962_Pre Drainage**
Prepared by IO, Printed 6/13/2023

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 3.696 | 98 | Paved parking, HSG D (A1, B1, B2, B3, C1, C2, C3, D1, D2) |
| 1.790 | 82 | Woods/grass comb., Fair, HSG D (A1, B1, B2, B3, C1, D1) |
| **5.485** | **93** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 0.000 | HSG A | |
| 0.000 | HSG B | |
| 0.000 | HSG C | |
| 5.485 | HSG D | A1, B1, B2, B3, C1, C2, C3, D1, D2 |
| 0.000 | Other | |
| **5.485** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | 3.696 | 0.000 | 3.696 | Paved parking | A1, B1, B2, B3, C1, C2, C3, D1, D2 |
| 0.000 | 0.000 | 0.000 | 1.790 | 0.000 | 1.790 | Woods/grass comb., Fair | A1, B1, B2, B3, C1, D1 |
| **0.000** | **0.000** | **0.000** | **5.485** | **0.000** | **5.485** | **TOTAL AREA** | |

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A1: EX-A1** Runoff Area=58,250 sf 77.08% Impervious Runoff Depth=2.77"
Tc=6.0 min CN=94 Runoff=6.05 cfs 0.308 af

**Subcatchment B1: EX-A1** Runoff Area=18,420 sf 51.59% Impervious Runoff Depth=2.38"
Tc=6.0 min CN=90 Runoff=1.72 cfs 0.084 af

**Subcatchment B2: EX-B2** Runoff Area=1,033 sf 79.96% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=95 Runoff=0.11 cfs 0.006 af

**Subcatchment B3: EX-B3** Runoff Area=37,758 sf 88.62% Impervious Runoff Depth=2.98"
Tc=6.0 min CN=96 Runoff=4.08 cfs 0.215 af

**Subcatchment C1: EX-C1** Runoff Area=66,608 sf 52.80% Impervious Runoff Depth=2.38"
Tc=6.0 min CN=90 Runoff=6.23 cfs 0.304 af

**Subcatchment C2: EX-C2** Runoff Area=20,601 sf 100.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=2.29 cfs 0.126 af

**Subcatchment C3: EX-A1** Runoff Area=14,772 sf 100.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=1.64 cfs 0.090 af

**Subcatchment D1: EX-A1** Runoff Area=20,136 sf 1.92% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=82 Runoff=1.42 cfs 0.066 af

**Subcatchment D2: EX-A1** Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.008 af

**Link A: DP-A** Inflow=6.05 cfs 0.308 af
Primary=6.05 cfs 0.308 af

**Link B: DP-B** Inflow=5.91 cfs 0.305 af
Primary=5.91 cfs 0.305 af

**Link C: DP-C** Inflow=10.16 cfs 0.520 af
Primary=10.16 cfs 0.520 af

**Link D: DP-D** Inflow=1.57 cfs 0.075 af
Primary=1.57 cfs 0.075 af

**Total Runoff Area = 5.485 ac Runoff Volume = 1.208 af Average Runoff Depth = 2.64"**
**32.63% Pervious = 1.790 ac 67.37% Impervious = 3.696 ac**

## Summary for Subcatchment A1: EX-A1

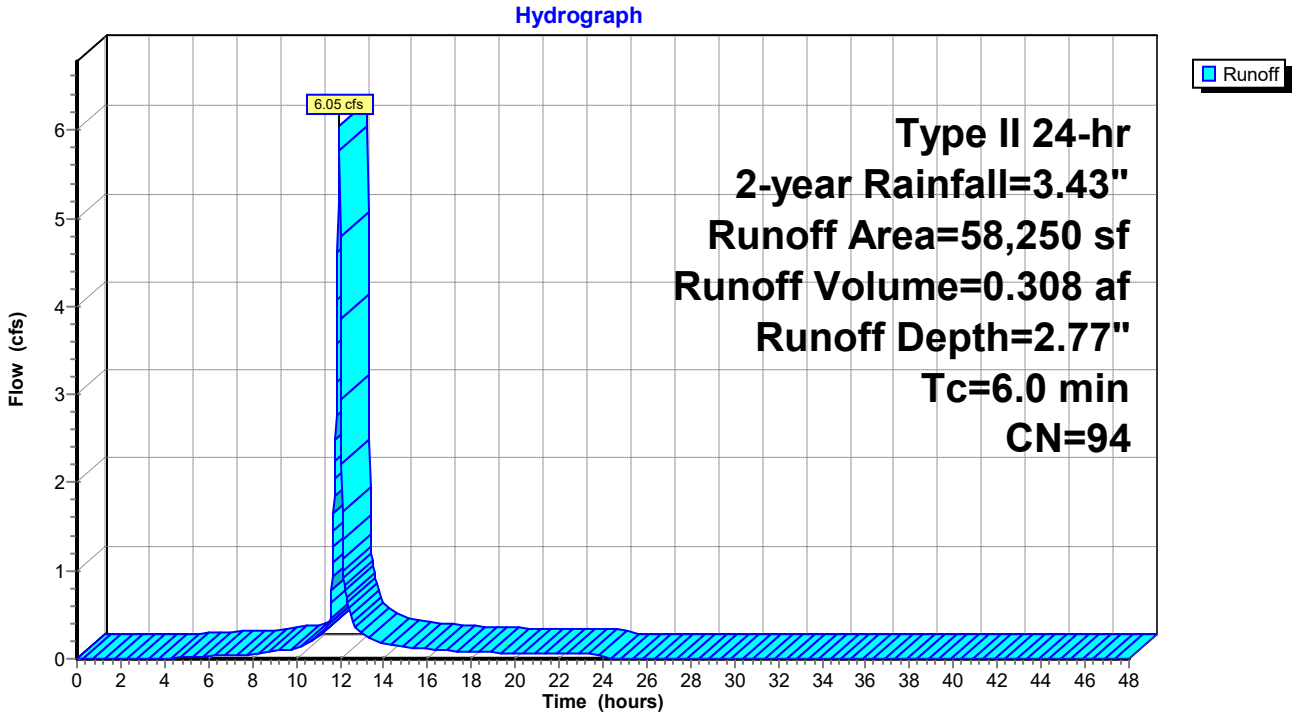
Runoff = 6.05 cfs @ 11.97 hrs, Volume= 0.308 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 13,351 | 82 | Woods/grass comb., Fair, HSG D |
| 44,899 | 98 | Paved parking, HSG D |
| 58,250 | 94 | Weighted Average |
| 13,351 | | 22.92% Pervious Area |
| 44,899 | | 77.08% Impervious Area |

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

## Subcatchment A1: EX-A1



## Summary for Subcatchment B1: EX-A1

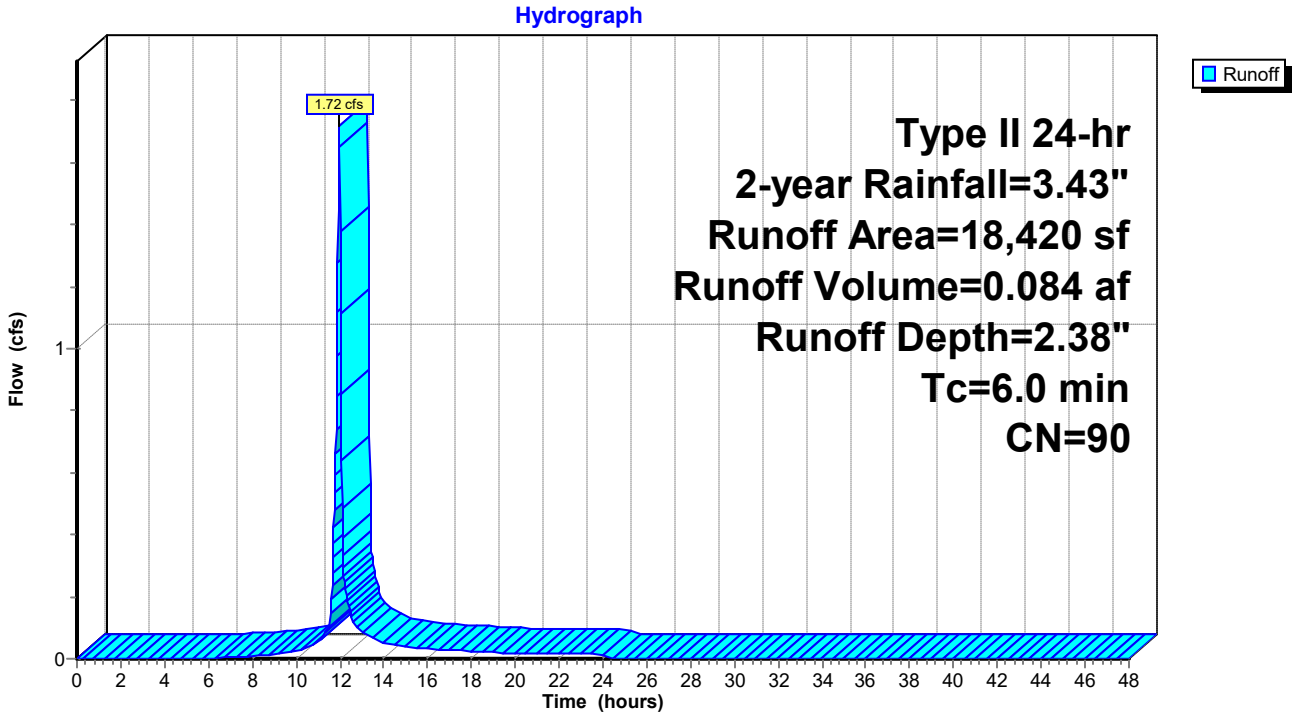
Runoff = 1.72 cfs @ 11.97 hrs, Volume= 0.084 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 8,918 | 82 | Woods/grass comb., Fair, HSG D |
| 9,502 | 98 | Paved parking, HSG D |
| 18,420 | 90 | Weighted Average |
| 8,918 | | 48.41% Pervious Area |
| 9,502 | | 51.59% Impervious Area |

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

## Subcatchment B1: EX-A1



## Summary for Subcatchment B2: EX-B2

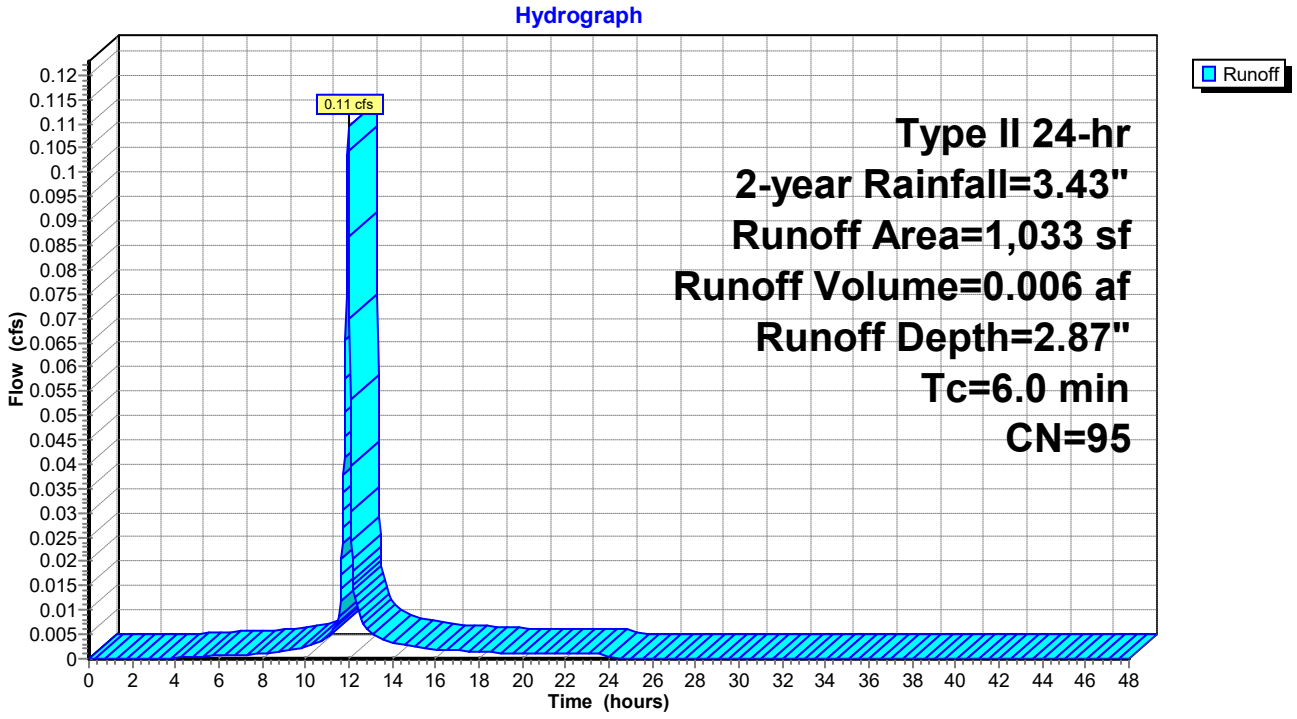
Runoff = 0.11 cfs @ 11.97 hrs, Volume= 0.006 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 207 | 82 | Woods/grass comb., Fair, HSG D |
| 826 | 98 | Paved parking, HSG D |
| 1,033 | 95 | Weighted Average |
| 207 | | 20.04% Pervious Area |
| 826 | | 79.96% Impervious Area |

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

### Subcatchment B2: EX-B2



## Summary for Subcatchment B3: EX-B3

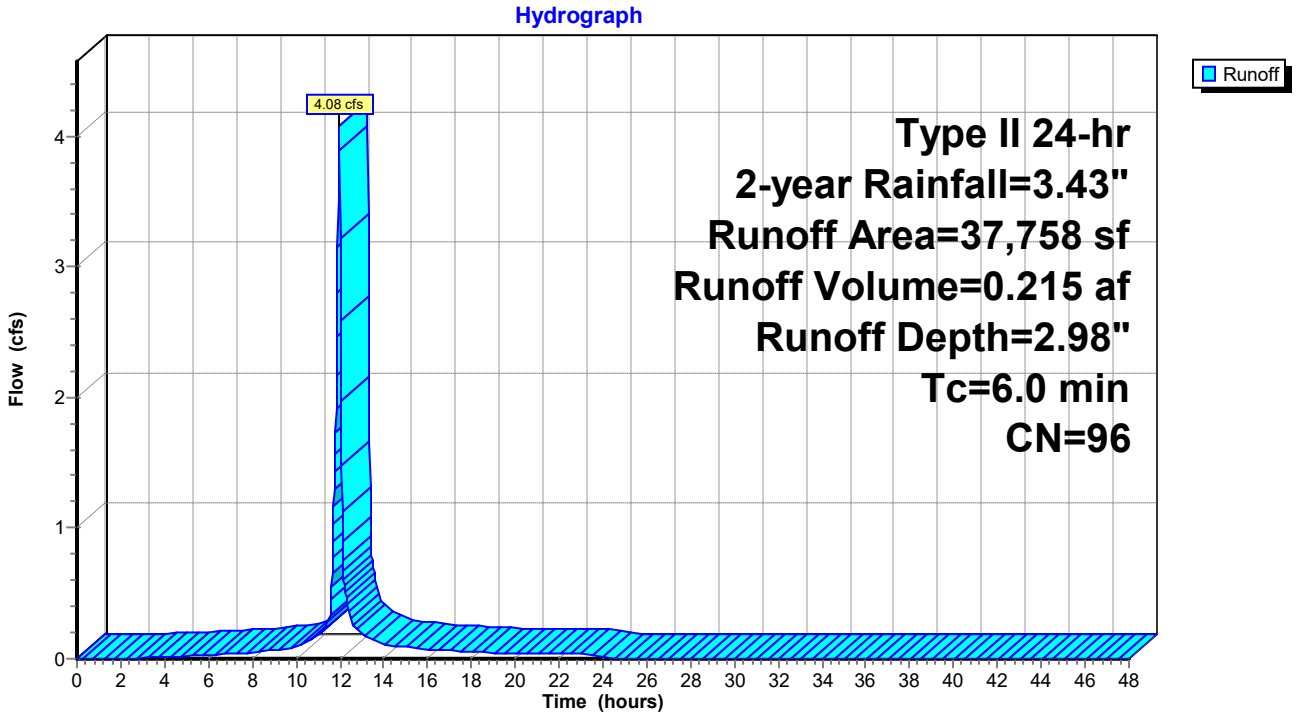
Runoff = 4.08 cfs @ 11.97 hrs, Volume= 0.215 af, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 4,297 | 82 | Woods/grass comb., Fair, HSG D |
| 33,461 | 98 | Paved parking, HSG D |
| 37,758 | 96 | Weighted Average |
| 4,297 | | 11.38% Pervious Area |
| 33,461 | | 88.62% Impervious Area |

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

### Subcatchment B3: EX-B3



## Summary for Subcatchment C1: EX-C1

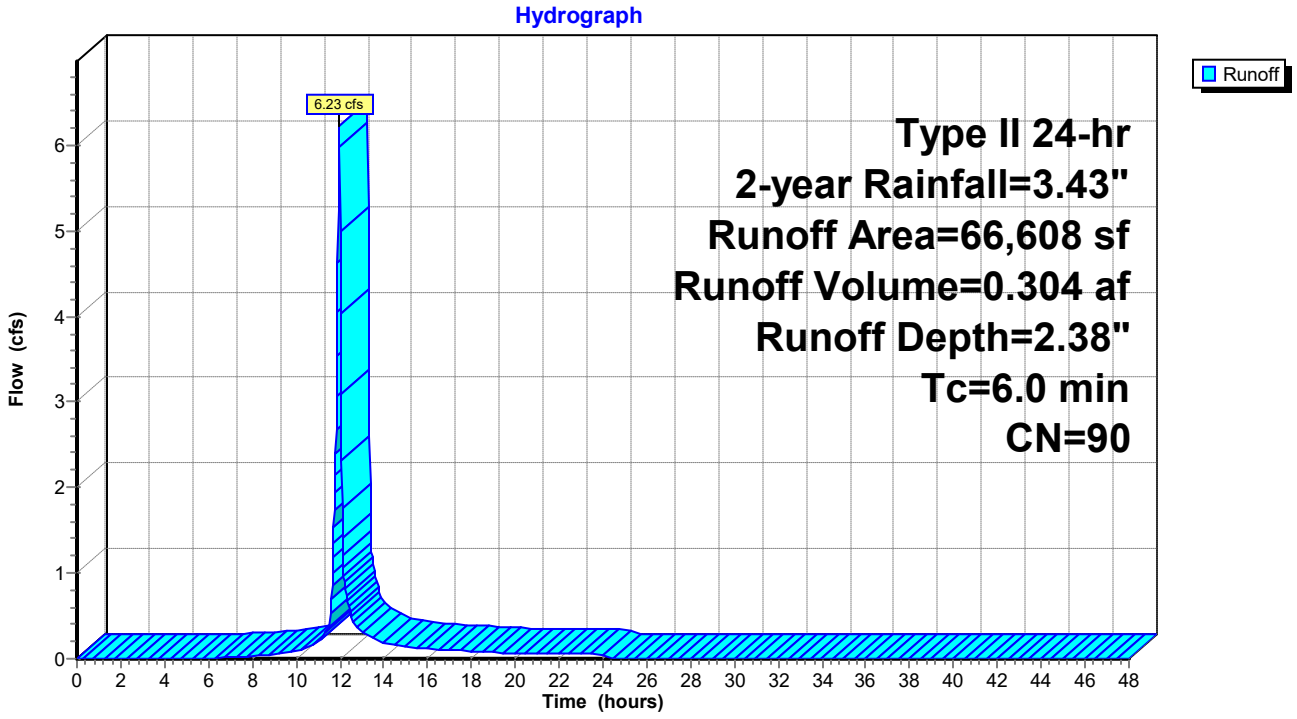
Runoff = 6.23 cfs @ 11.97 hrs, Volume= 0.304 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 31,440 | 82 | Woods/grass comb., Fair, HSG D |
| 35,168 | 98 | Paved parking, HSG D |
| 66,608 | 90 | Weighted Average |
| 31,440 | | 47.20% Pervious Area |
| 35,168 | | 52.80% Impervious Area |

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

### Subcatchment C1: EX-C1



## Summary for Subcatchment C2: EX-C2

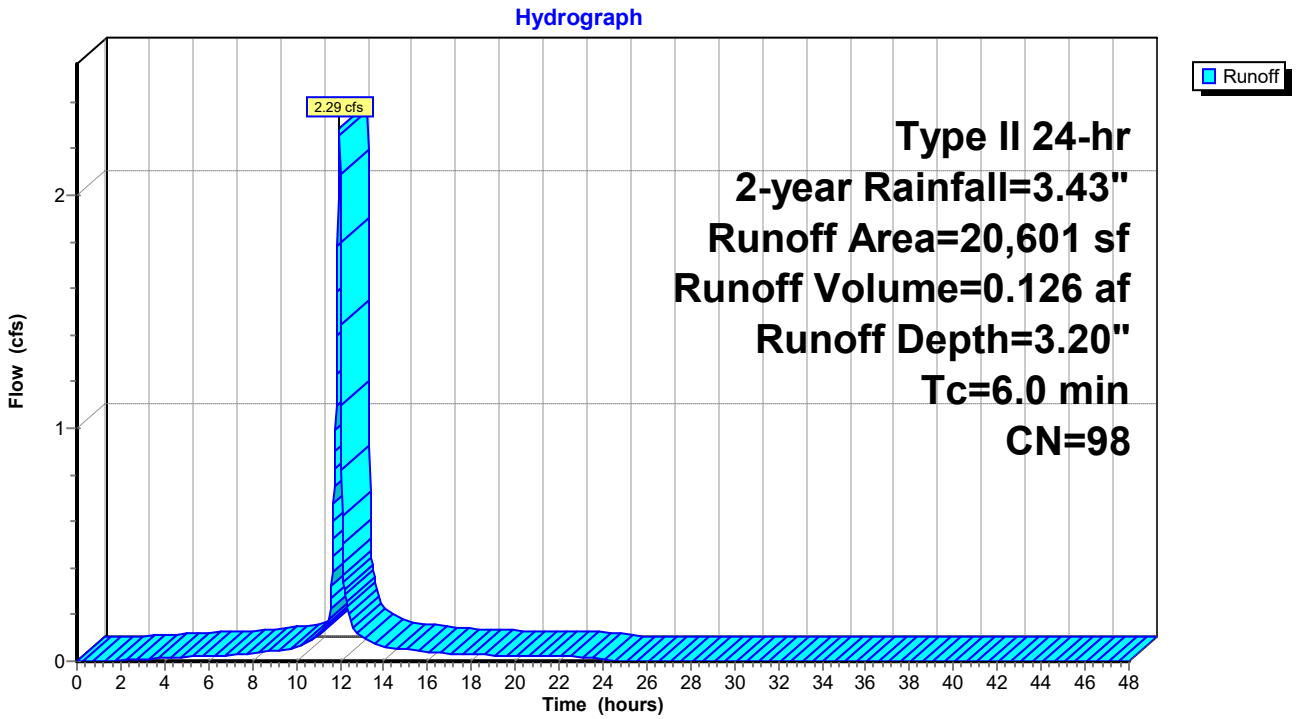
Runoff = 2.29 cfs @ 11.97 hrs, Volume= 0.126 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 20,601 | 98 | Paved parking, HSG D |
| 20,601 | 98 | Weighted Average |
| 20,601 | | 100.00% Impervious Area |

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

## Subcatchment C2: EX-C2



## Summary for Subcatchment C3: EX-A1

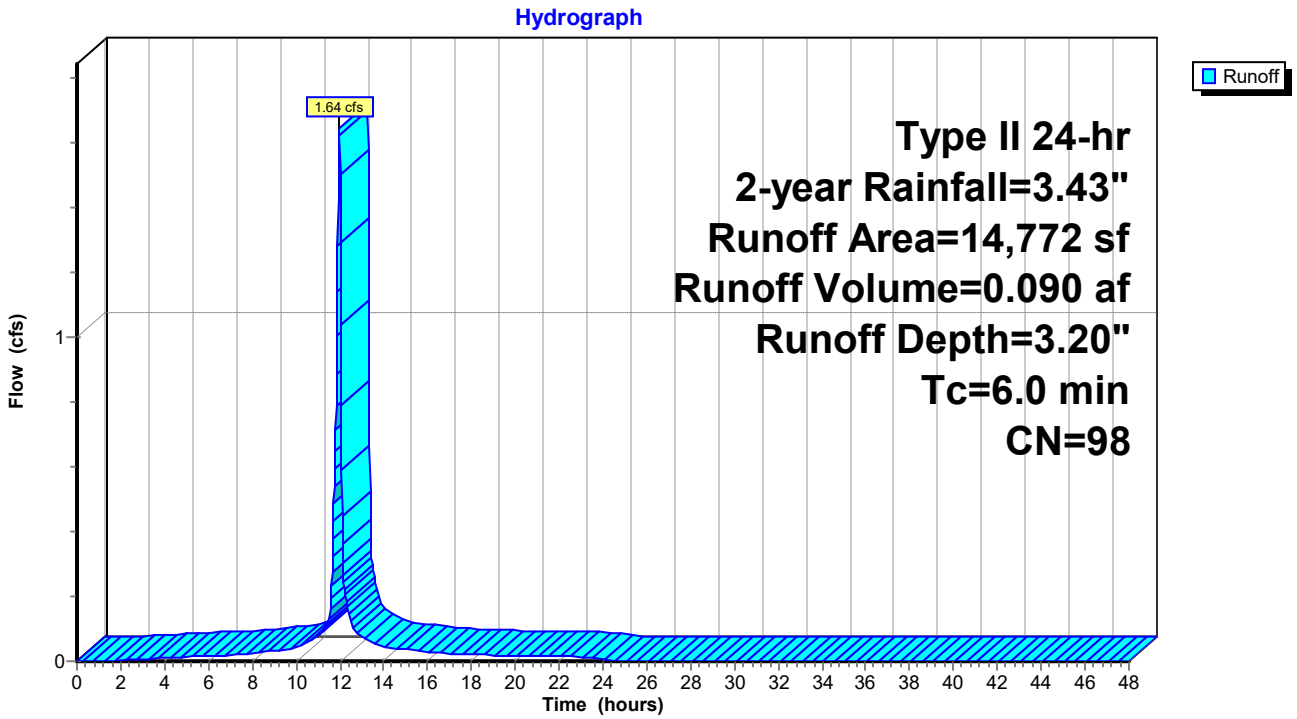
Runoff = 1.64 cfs @ 11.97 hrs, Volume= 0.090 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 14,772 | 98 | Paved parking, HSG D |
| 14,772 | 98 | Weighted Average |
| 14,772 | | 100.00% Impervious Area |

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

## Subcatchment C3: EX-A1



## Summary for Subcatchment D1: EX-A1

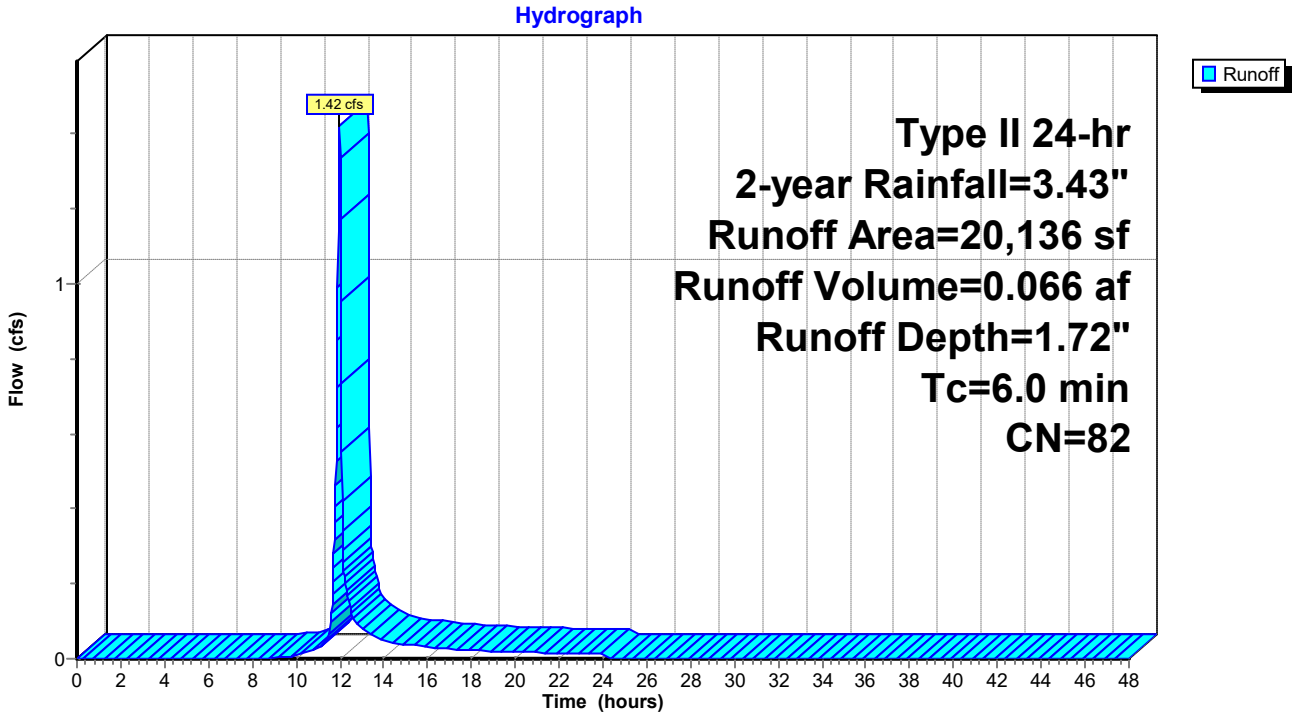
Runoff = 1.42 cfs @ 11.97 hrs, Volume= 0.066 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 19,750 | 82 | Woods/grass comb., Fair, HSG D |
| 386 | 98 | Paved parking, HSG D |
| 20,136 | 82 | Weighted Average |
| 19,750 | | 98.08% Pervious Area |
| 386 | | 1.92% Impervious Area |

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

### Subcatchment D1: EX-A1



## Summary for Subcatchment D2: EX-A1

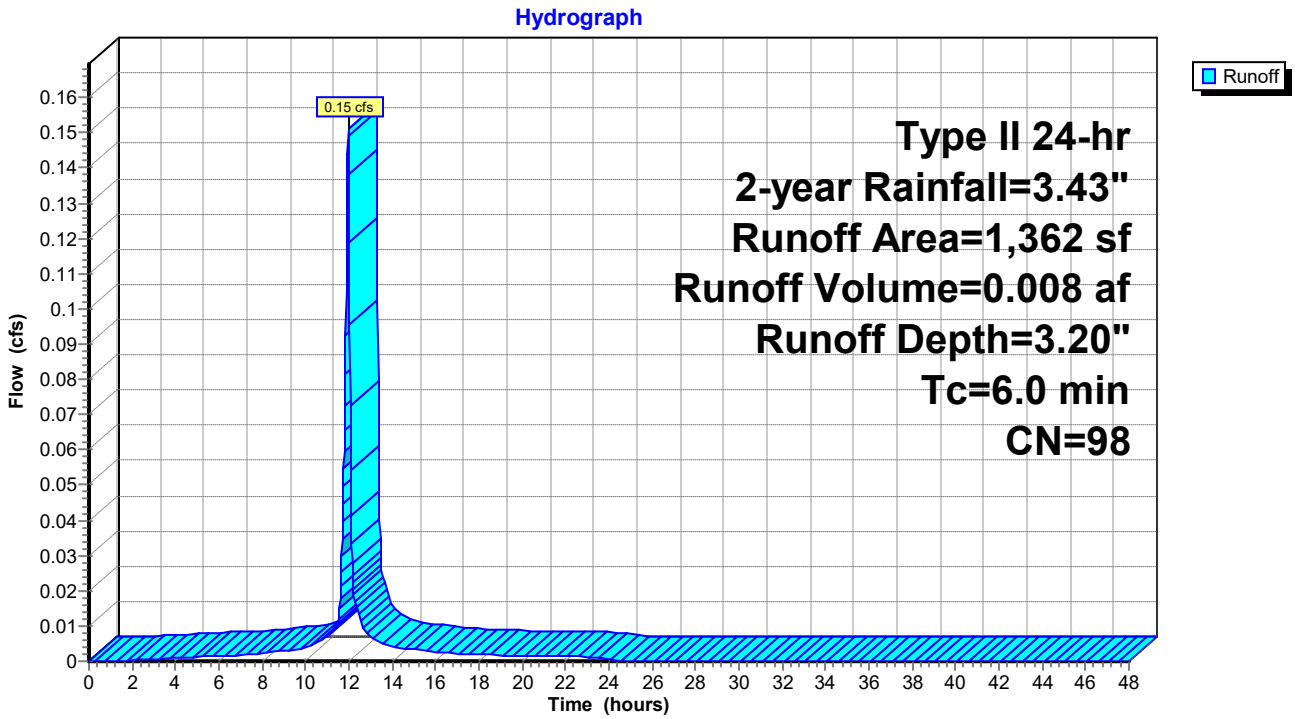
Runoff = 0.15 cfs @ 11.97 hrs, Volume= 0.008 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 1,362 | 98 | Paved parking, HSG D |
| 1,362 | 98 | Weighted Average |
| 1,362 | | 100.00% Impervious Area |

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

## Subcatchment D2: EX-A1

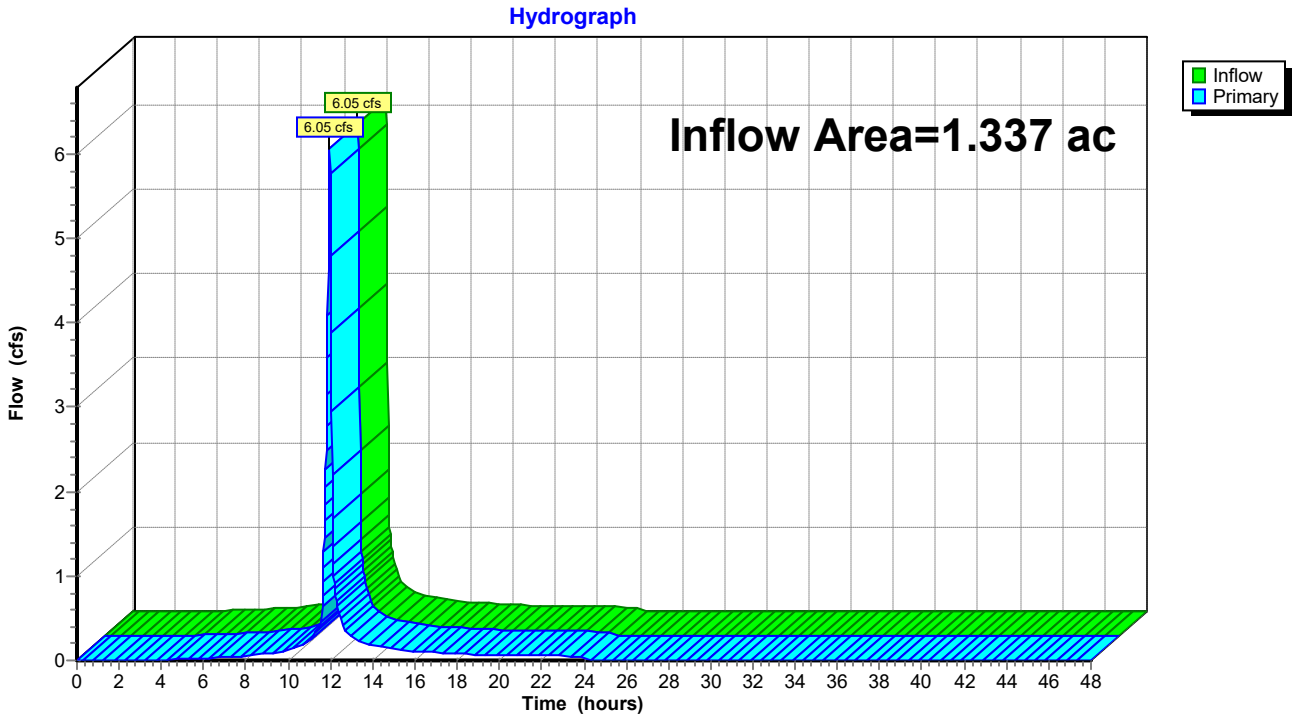


## Summary for Link A: DP-A

Inflow Area = 1.337 ac, 77.08% Impervious, Inflow Depth = 2.77" for 2-year event
Inflow = 6.05 cfs @ 11.97 hrs, Volume= 0.308 af
Primary = 6.05 cfs @ 11.97 hrs, Volume= 0.308 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link A: DP-A

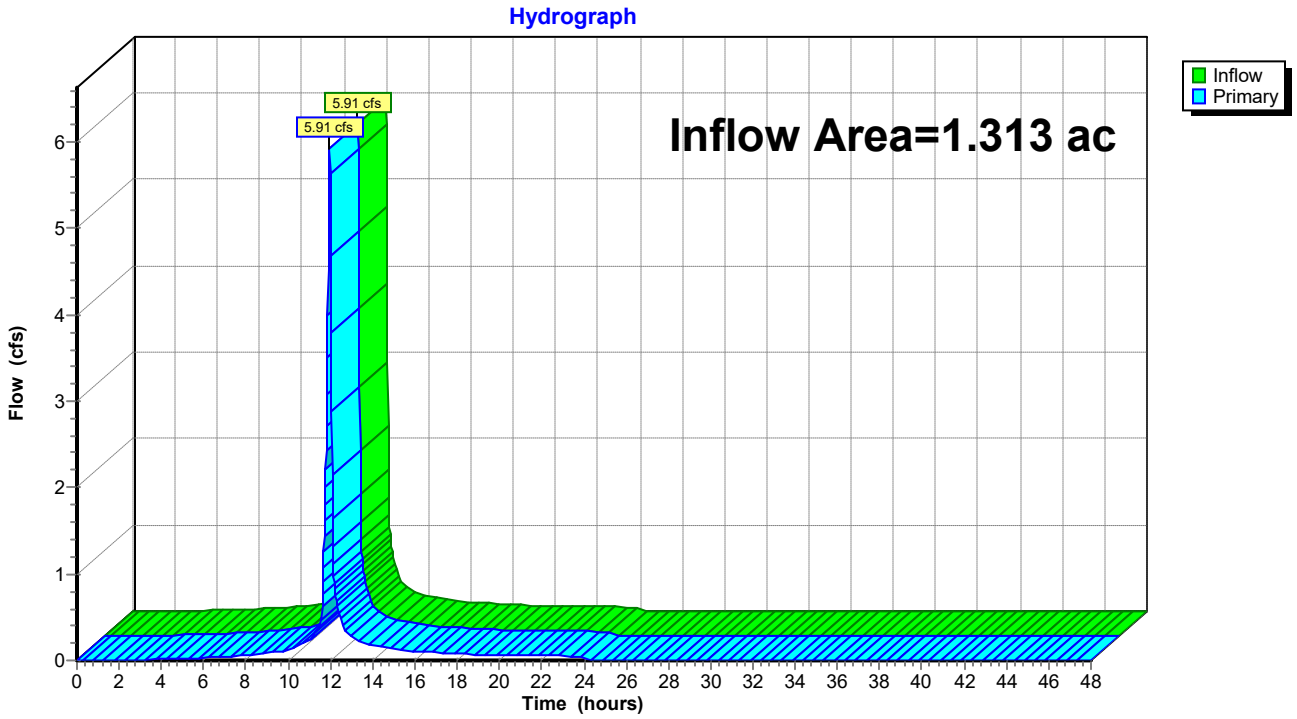


## Summary for Link B: DP-B

Inflow Area = 1.313 ac, 76.54% Impervious, Inflow Depth = 2.78" for 2-year event
Inflow = 5.91 cfs @ 11.97 hrs, Volume= 0.305 af
Primary = 5.91 cfs @ 11.97 hrs, Volume= 0.305 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link B: DP-B

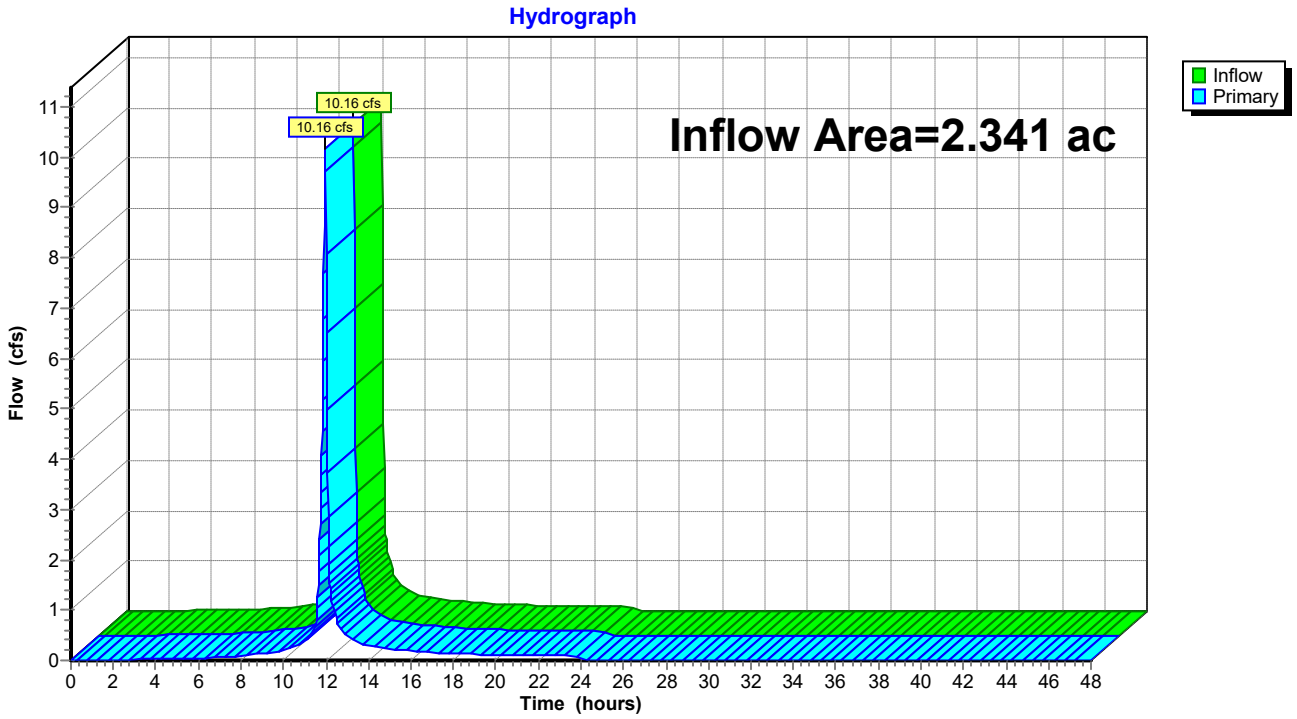


## Summary for Link C: DP-C

Inflow Area = 2.341 ac, 69.17% Impervious, Inflow Depth = 2.66" for 2-year event
Inflow = 10.16 cfs @ 11.97 hrs, Volume= 0.520 af
Primary = 10.16 cfs @ 11.97 hrs, Volume= 0.520 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link C: DP-C

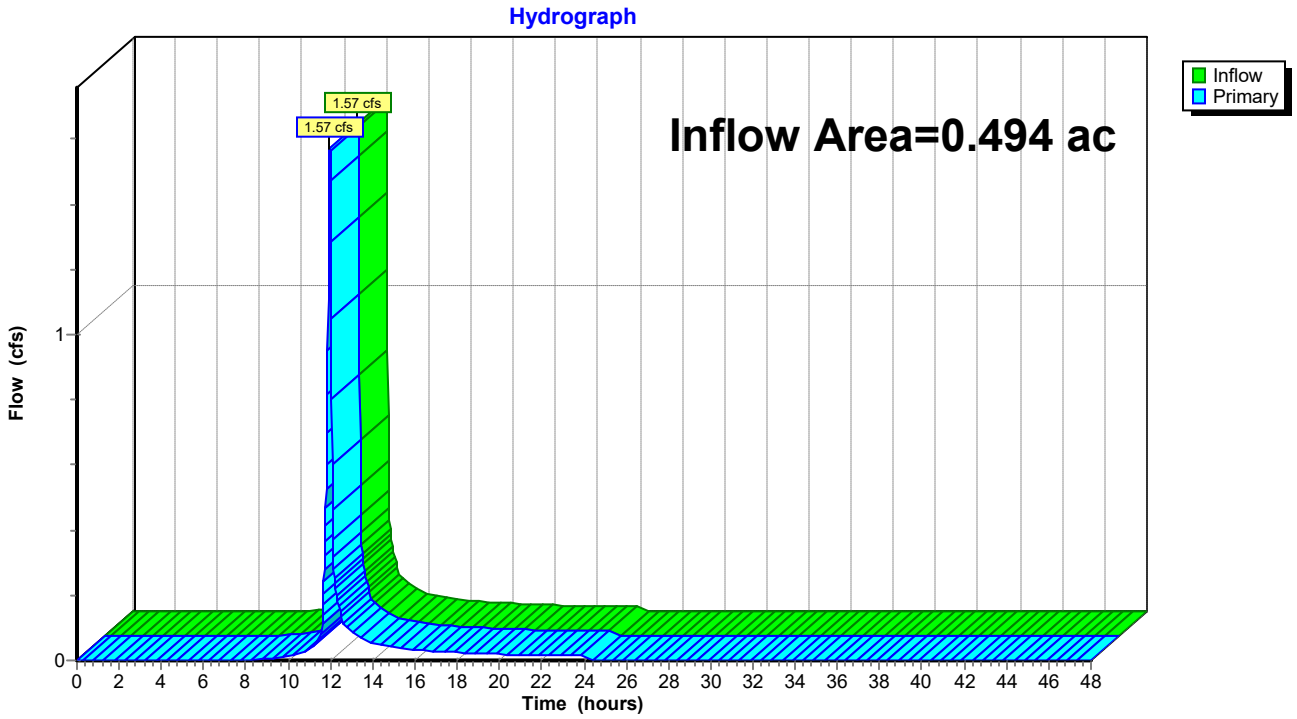


## Summary for Link D: DP-D

Inflow Area = 0.494 ac, 8.13% Impervious, Inflow Depth = 1.82" for 2-year event
Inflow = 1.57 cfs @ 11.97 hrs, Volume= 0.075 af
Primary = 1.57 cfs @ 11.97 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link D: DP-D



Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A1: EX-A1** Runoff Area=58,250 sf 77.08% Impervious Runoff Depth=4.54"
Tc=6.0 min CN=94 Runoff=9.62 cfs 0.506 af

**Subcatchment B1: EX-A1** Runoff Area=18,420 sf 51.59% Impervious Runoff Depth=4.11"
Tc=6.0 min CN=90 Runoff=2.87 cfs 0.145 af

**Subcatchment B2: EX-B2** Runoff Area=1,033 sf 79.96% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=95 Runoff=0.17 cfs 0.009 af

**Subcatchment B3: EX-B3** Runoff Area=37,758 sf 88.62% Impervious Runoff Depth=4.77"
Tc=6.0 min CN=96 Runoff=6.36 cfs 0.345 af

**Subcatchment C1: EX-C1** Runoff Area=66,608 sf 52.80% Impervious Runoff Depth=4.11"
Tc=6.0 min CN=90 Runoff=10.39 cfs 0.523 af

**Subcatchment C2: EX-C2** Runoff Area=20,601 sf 100.00% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=3.52 cfs 0.197 af

**Subcatchment C3: EX-A1** Runoff Area=14,772 sf 100.00% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=2.52 cfs 0.141 af

**Subcatchment D1: EX-A1** Runoff Area=20,136 sf 1.92% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=82 Runoff=2.66 cfs 0.127 af

**Subcatchment D2: EX-A1** Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.013 af

**Link A: DP-A** Inflow=9.62 cfs 0.506 af
Primary=9.62 cfs 0.506 af

**Link B: DP-B** Inflow=9.41 cfs 0.499 af
Primary=9.41 cfs 0.499 af

**Link C: DP-C** Inflow=16.43 cfs 0.862 af
Primary=16.43 cfs 0.862 af

**Link D: DP-D** Inflow=2.89 cfs 0.140 af
Primary=2.89 cfs 0.140 af

**Total Runoff Area = 5.485 ac Runoff Volume = 2.007 af Average Runoff Depth = 4.39"**
**32.63% Pervious = 1.790 ac 67.37% Impervious = 3.696 ac**

## Summary for Subcatchment A1: EX-A1

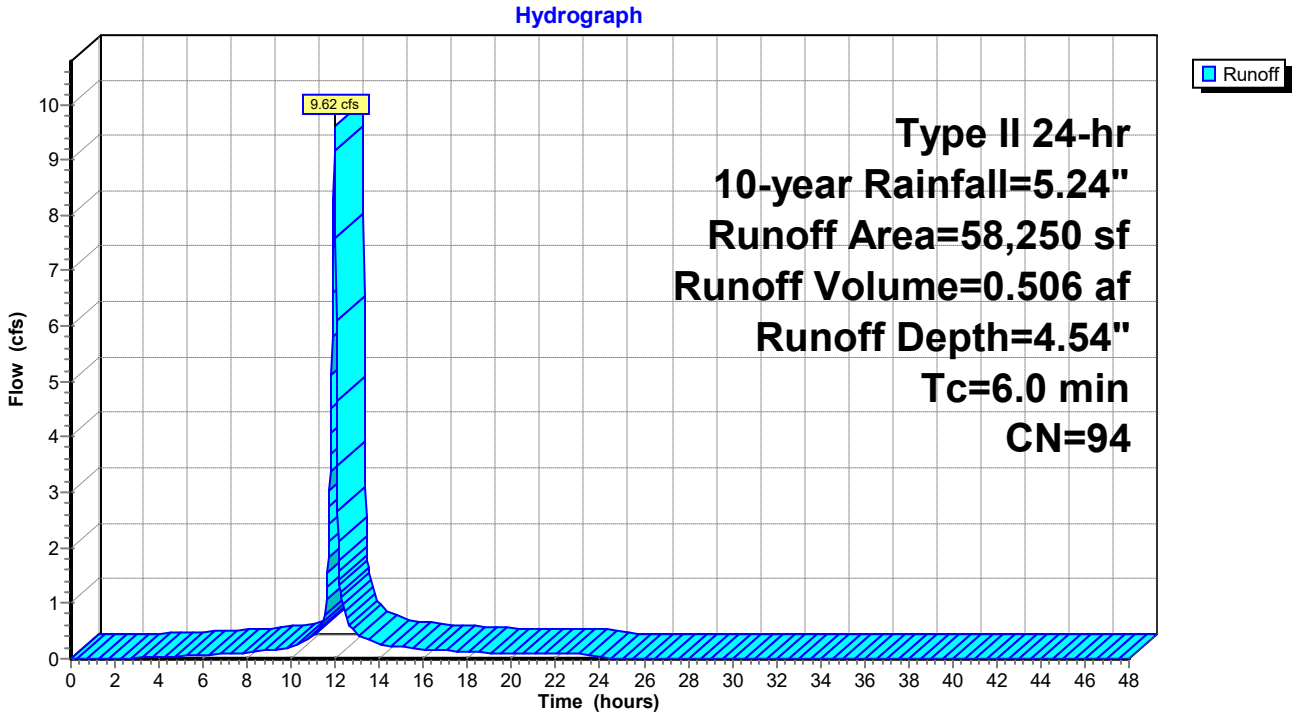
Runoff = 9.62 cfs @ 11.97 hrs, Volume= 0.506 af, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 13,351 | 82 | Woods/grass comb., Fair, HSG D |
| 44,899 | 98 | Paved parking, HSG D |
| 58,250 | 94 | Weighted Average |
| 13,351 | | 22.92% Pervious Area |
| 44,899 | | 77.08% Impervious Area |

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

### Subcatchment A1: EX-A1



## Summary for Subcatchment B1: EX-A1

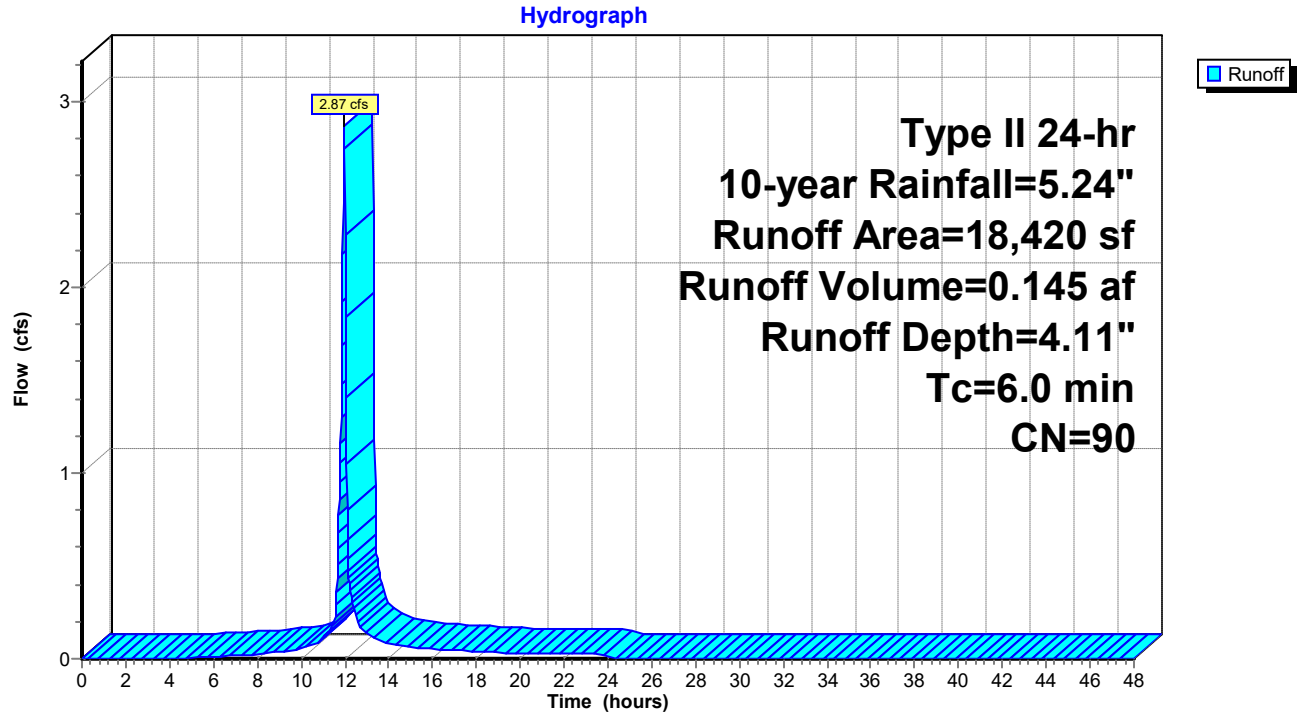
Runoff = 2.87 cfs @ 11.97 hrs, Volume= 0.145 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 8,918 | 82 | Woods/grass comb., Fair, HSG D |
| 9,502 | 98 | Paved parking, HSG D |
| 18,420 | 90 | Weighted Average |
| 8,918 | | 48.41% Pervious Area |
| 9,502 | | 51.59% Impervious Area |

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

### Subcatchment B1: EX-A1



## Summary for Subcatchment B2: EX-B2

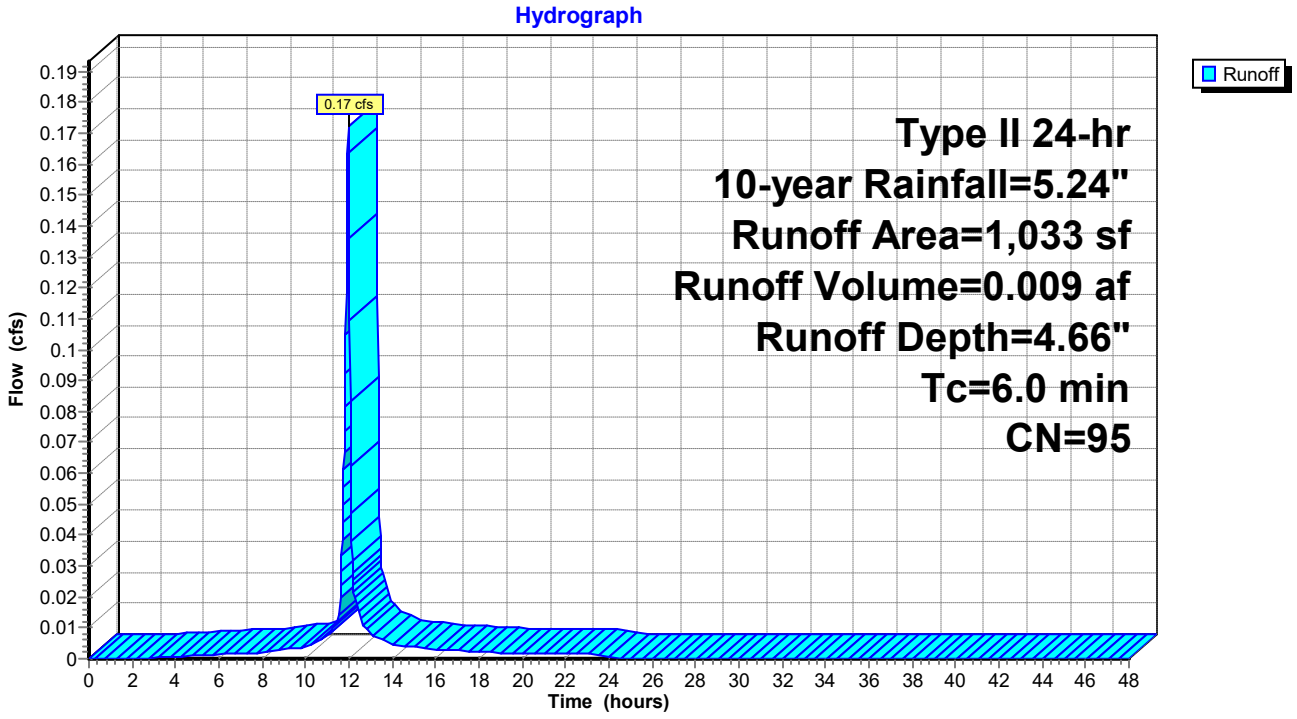
Runoff = 0.17 cfs @ 11.97 hrs, Volume= 0.009 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 207 | 82 | Woods/grass comb., Fair, HSG D |
| 826 | 98 | Paved parking, HSG D |
| 1,033 | 95 | Weighted Average |
| 207 | | 20.04% Pervious Area |
| 826 | | 79.96% Impervious Area |

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

### Subcatchment B2: EX-B2



## Summary for Subcatchment B3: EX-B3

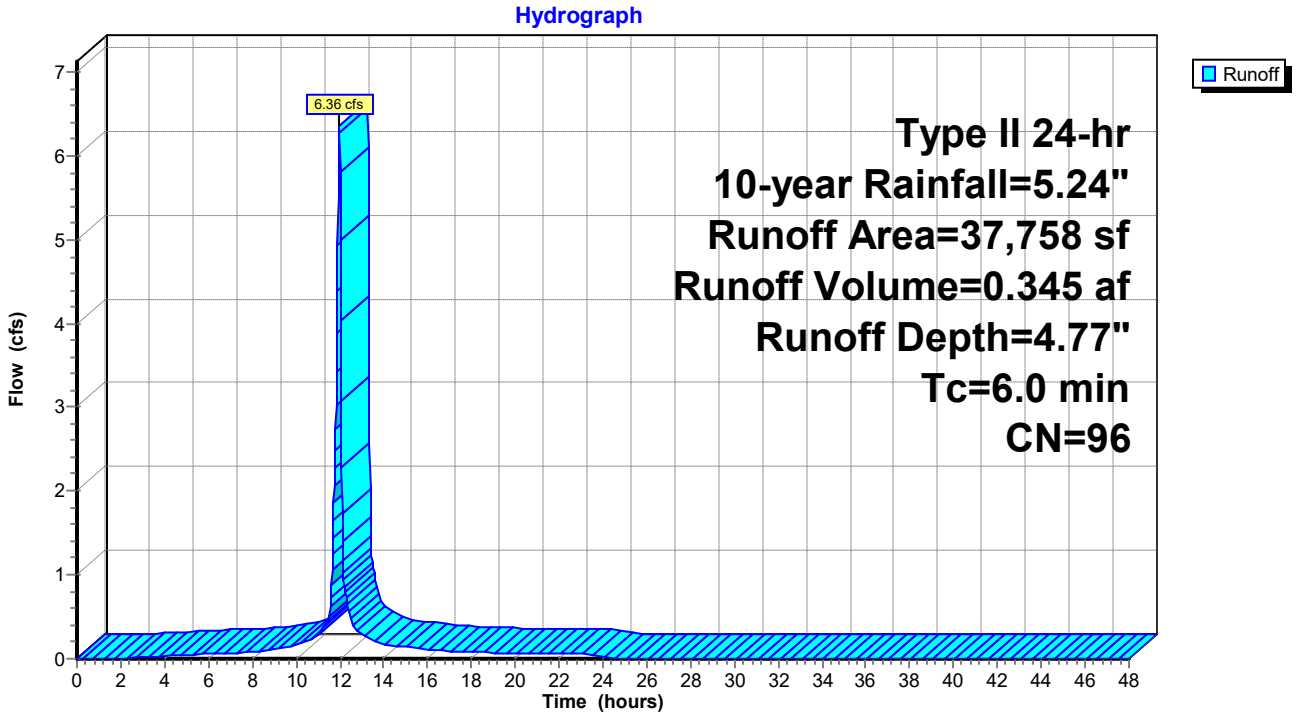
Runoff = 6.36 cfs @ 11.97 hrs, Volume= 0.345 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 4,297 | 82 | Woods/grass comb., Fair, HSG D |
| 33,461 | 98 | Paved parking, HSG D |
| 37,758 | 96 | Weighted Average |
| 4,297 | | 11.38% Pervious Area |
| 33,461 | | 88.62% Impervious Area |

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

## Subcatchment B3: EX-B3



## Summary for Subcatchment C1: EX-C1

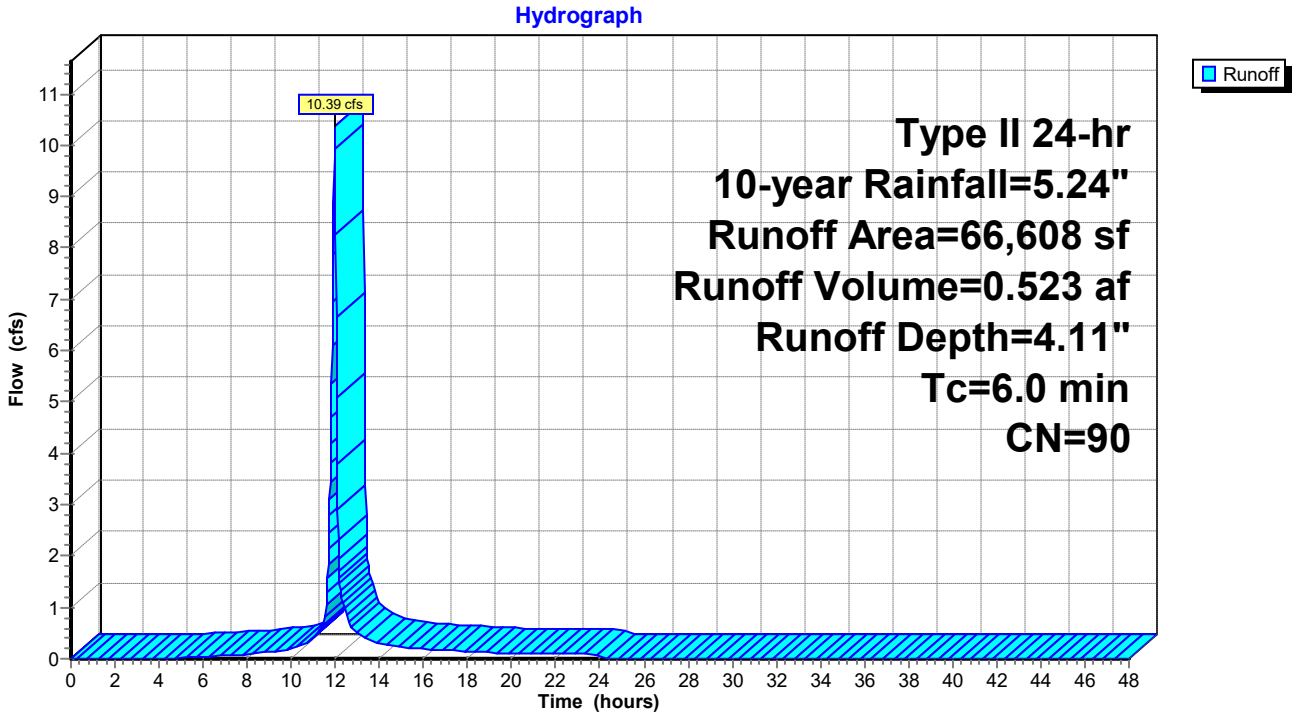
Runoff = 10.39 cfs @ 11.97 hrs, Volume= 0.523 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 31,440 | 82 | Woods/grass comb., Fair, HSG D |
| 35,168 | 98 | Paved parking, HSG D |
| 66,608 | 90 | Weighted Average |
| 31,440 | | 47.20% Pervious Area |
| 35,168 | | 52.80% Impervious Area |

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

### Subcatchment C1: EX-C1



## Summary for Subcatchment C2: EX-C2

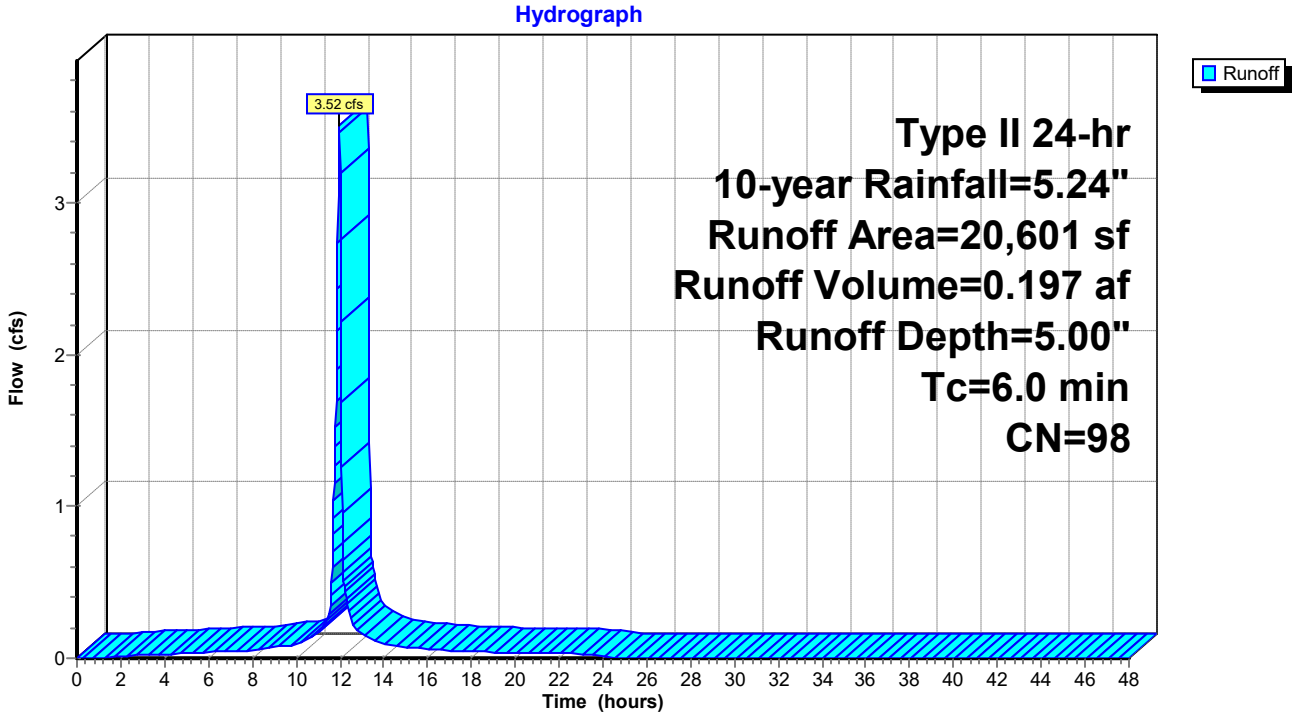
Runoff = 3.52 cfs @ 11.97 hrs, Volume= 0.197 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 20,601 | 98 | Paved parking, HSG D |
| 20,601 | 98 | Weighted Average |
| 20,601 | | 100.00% Impervious Area |

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

## Subcatchment C2: EX-C2



## Summary for Subcatchment C3: EX-A1

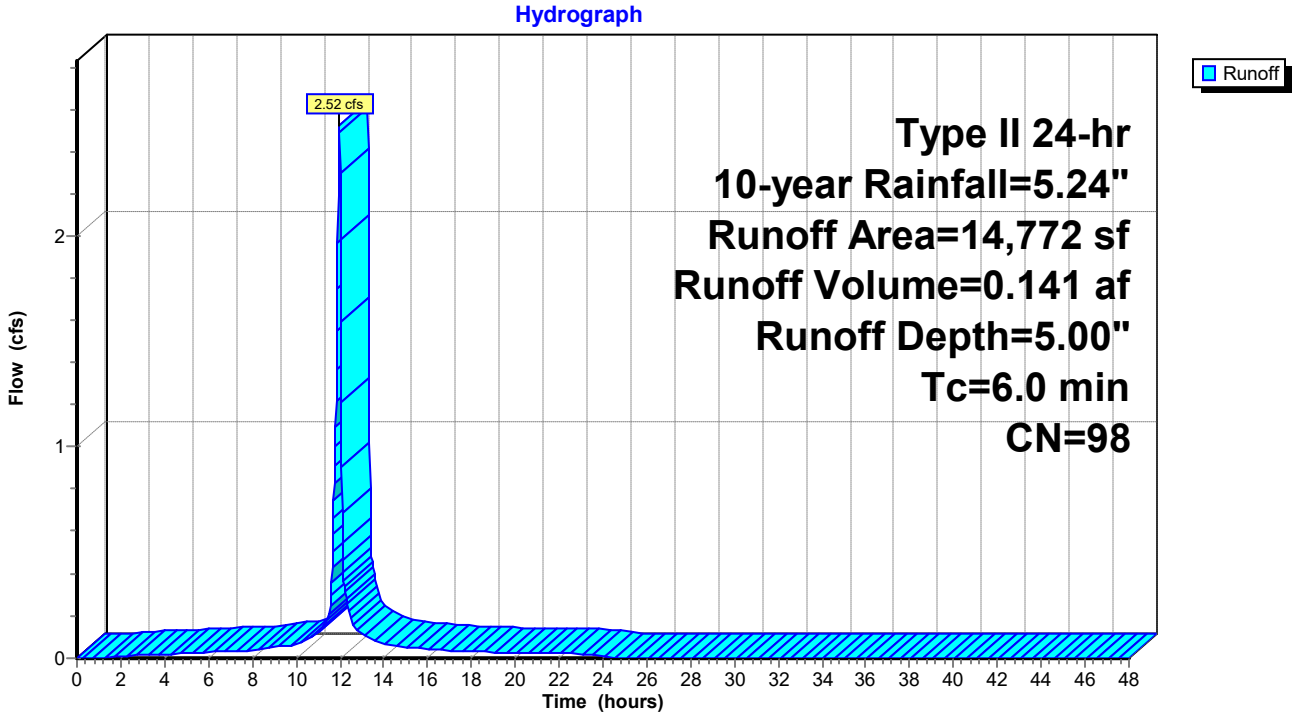
Runoff = 2.52 cfs @ 11.97 hrs, Volume= 0.141 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 14,772 | 98 | Paved parking, HSG D |
| 14,772 | 98 | Weighted Average |
| 14,772 | | 100.00% Impervious Area |

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

### Subcatchment C3: EX-A1



## Summary for Subcatchment D1: EX-A1

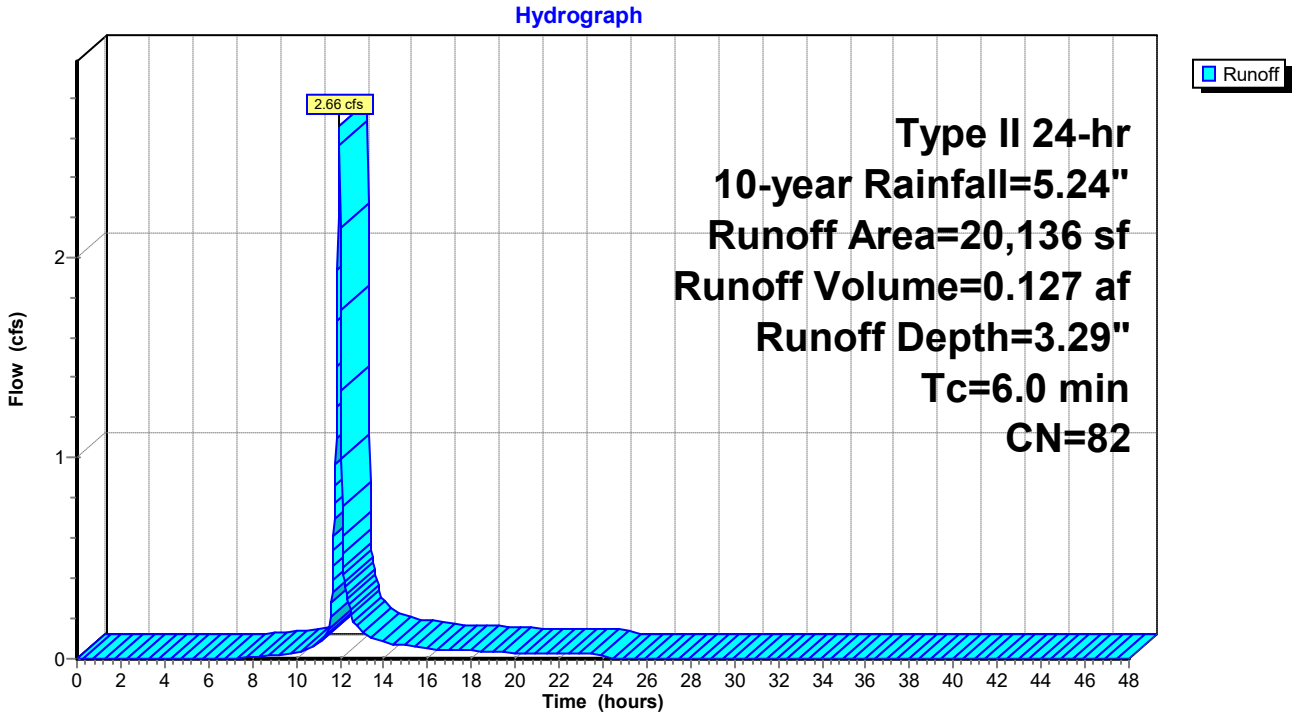
Runoff = 2.66 cfs @ 11.97 hrs, Volume= 0.127 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 19,750 | 82 | Woods/grass comb., Fair, HSG D |
| 386 | 98 | Paved parking, HSG D |
| 20,136 | 82 | Weighted Average |
| 19,750 | | 98.08% Pervious Area |
| 386 | | 1.92% Impervious Area |

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

### Subcatchment D1: EX-A1



## Summary for Subcatchment D2: EX-A1

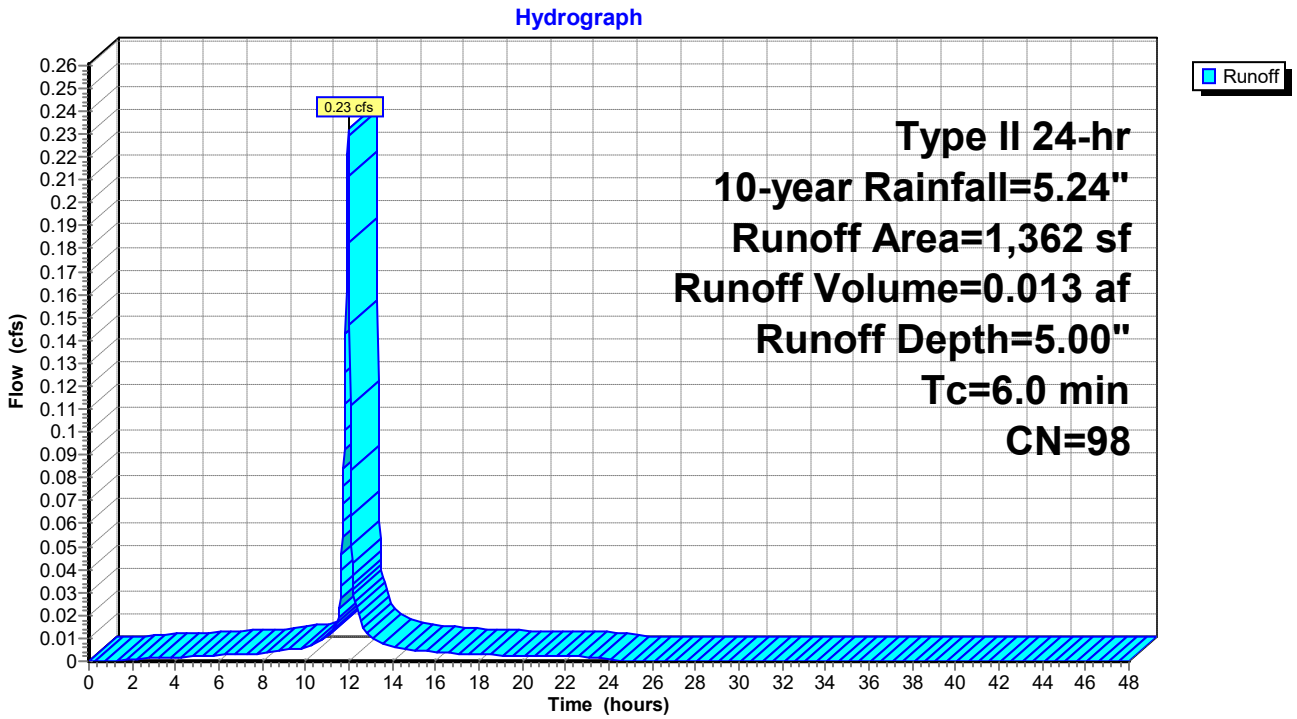
Runoff = 0.23 cfs @ 11.97 hrs, Volume= 0.013 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 1,362 | 98 | Paved parking, HSG D |
| 1,362 | 98 | Weighted Average |
| 1,362 | | 100.00% Impervious Area |

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

## Subcatchment D2: EX-A1

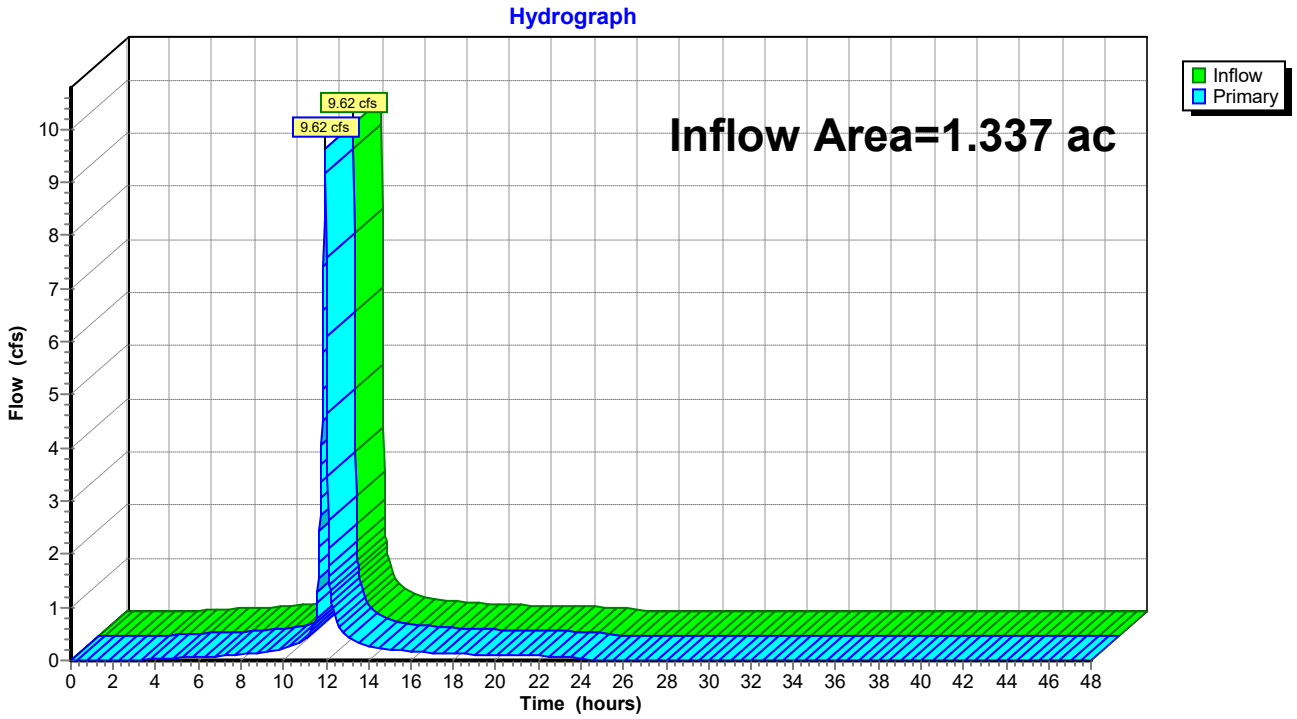


## Summary for Link A: DP-A

Inflow Area = 1.337 ac, 77.08% Impervious, Inflow Depth = 4.54" for 10-year event
Inflow = 9.62 cfs @ 11.97 hrs, Volume= 0.506 af
Primary = 9.62 cfs @ 11.97 hrs, Volume= 0.506 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link A: DP-A

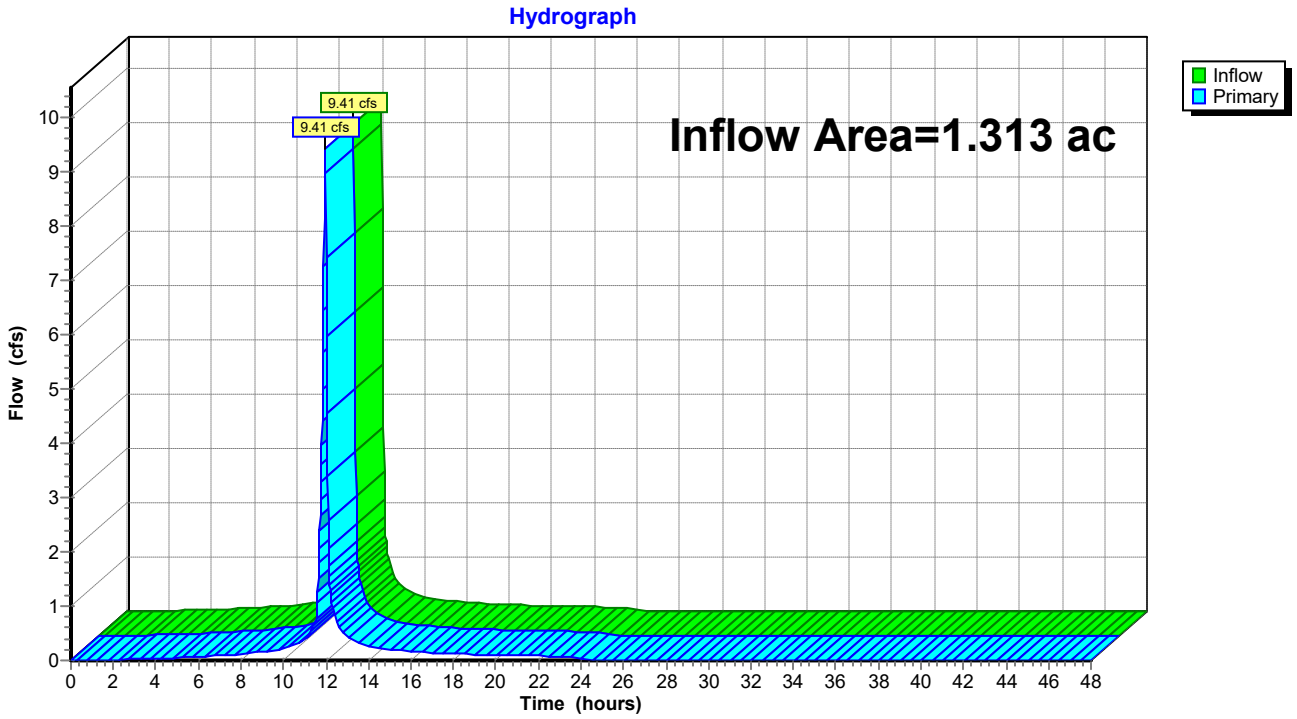


## Summary for Link B: DP-B

Inflow Area = 1.313 ac, 76.54% Impervious, Inflow Depth = 4.56" for 10-year event
Inflow = 9.41 cfs @ 11.97 hrs, Volume= 0.499 af
Primary = 9.41 cfs @ 11.97 hrs, Volume= 0.499 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link B: DP-B

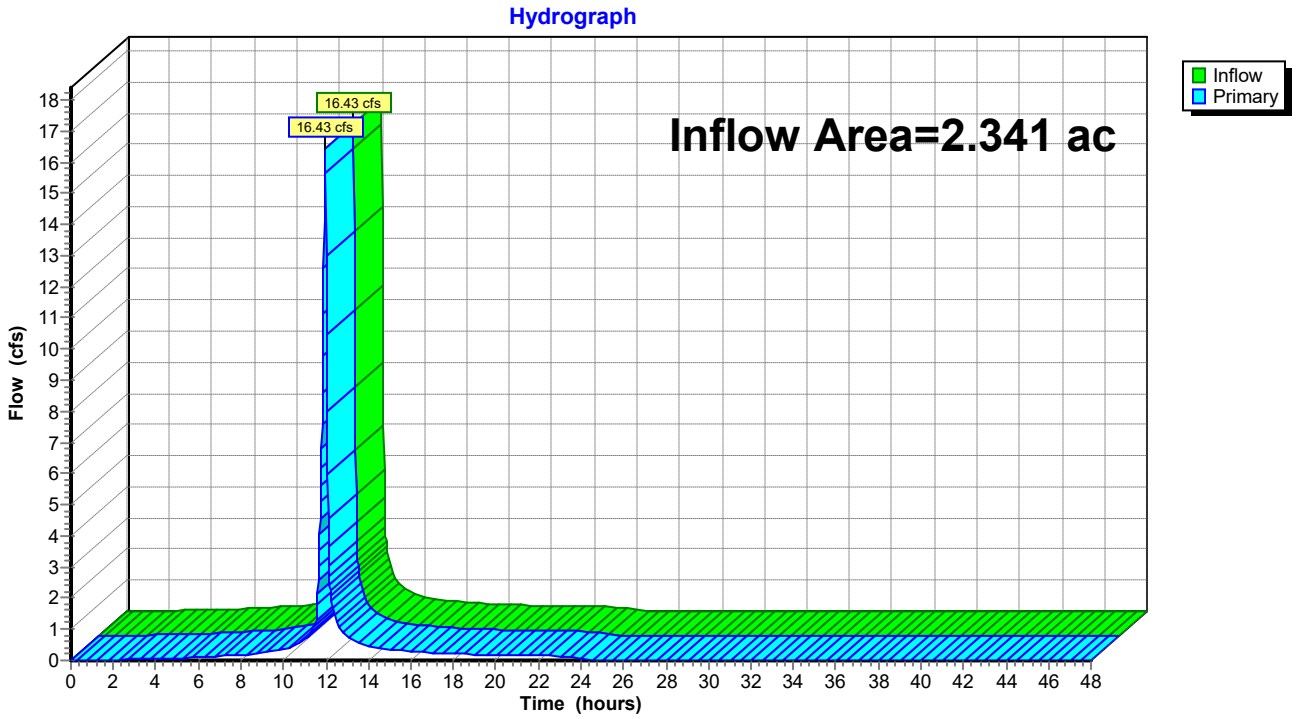


## Summary for Link C: DP-C

Inflow Area = 2.341 ac, 69.17% Impervious, Inflow Depth = 4.42" for 10-year event
Inflow = 16.43 cfs @ 11.97 hrs, Volume= 0.862 af
Primary = 16.43 cfs @ 11.97 hrs, Volume= 0.862 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link C: DP-C

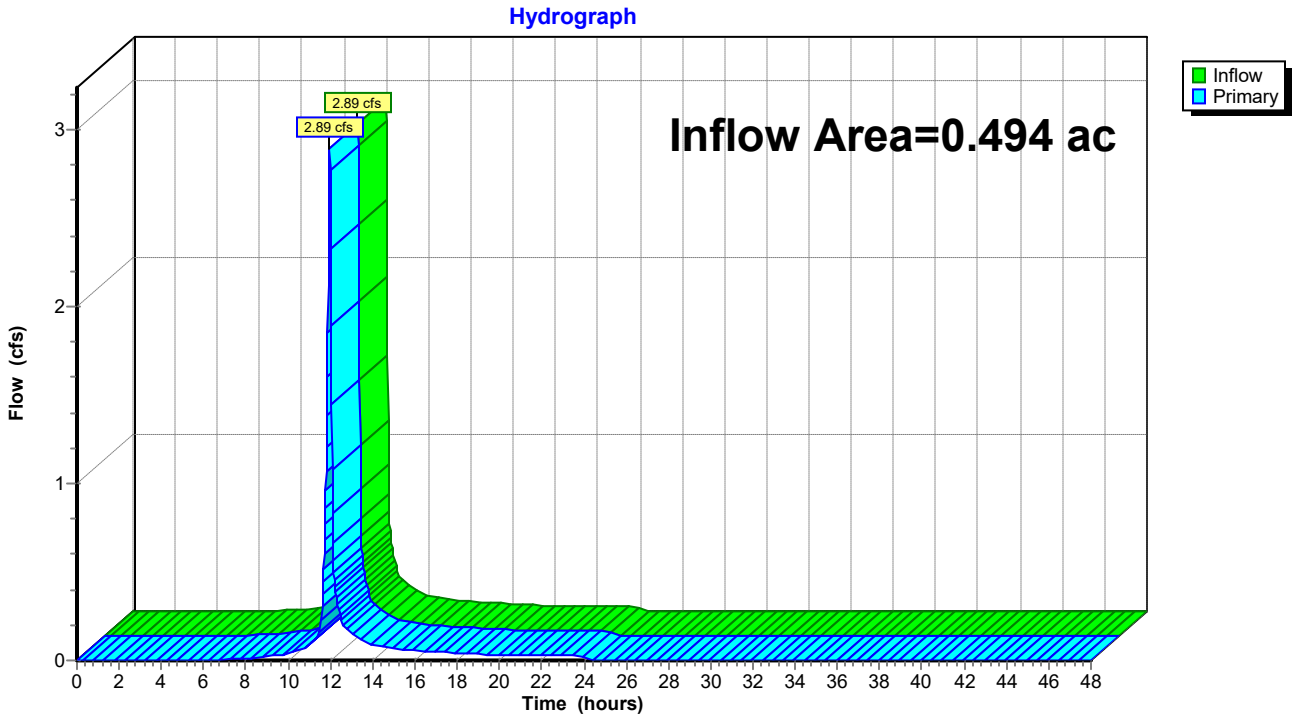


## Summary for Link D: DP-D

Inflow Area = 0.494 ac, 8.13% Impervious, Inflow Depth = 3.40" for 10-year event
Inflow = 2.89 cfs @ 11.97 hrs, Volume= 0.140 af
Primary = 2.89 cfs @ 11.97 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link D: DP-D



Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A1: EX-A1** Runoff Area=58,250 sf 77.08% Impervious Runoff Depth=7.39"
Tc=6.0 min CN=94 Runoff=15.20 cfs 0.824 af

**Subcatchment B1: EX-A1** Runoff Area=18,420 sf 51.59% Impervious Runoff Depth=6.91"
Tc=6.0 min CN=90 Runoff=4.67 cfs 0.244 af

**Subcatchment B2: EX-B2** Runoff Area=1,033 sf 79.96% Impervious Runoff Depth=7.51"
Tc=6.0 min CN=95 Runoff=0.27 cfs 0.015 af

**Subcatchment B3: EX-B3** Runoff Area=37,758 sf 88.62% Impervious Runoff Depth=7.63"
Tc=6.0 min CN=96 Runoff=9.95 cfs 0.551 af

**Subcatchment C1: EX-C1** Runoff Area=66,608 sf 52.80% Impervious Runoff Depth=6.91"
Tc=6.0 min CN=90 Runoff=16.88 cfs 0.881 af

**Subcatchment C2: EX-C2** Runoff Area=20,601 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=5.46 cfs 0.310 af

**Subcatchment C3: EX-A1** Runoff Area=14,772 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=3.92 cfs 0.222 af

**Subcatchment D1: EX-A1** Runoff Area=20,136 sf 1.92% Impervious Runoff Depth=5.96"
Tc=6.0 min CN=82 Runoff=4.65 cfs 0.230 af

**Subcatchment D2: EX-A1** Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=0.36 cfs 0.021 af

**Link A: DP-A** Inflow=15.20 cfs 0.824 af
Primary=15.20 cfs 0.824 af

**Link B: DP-B** Inflow=14.89 cfs 0.810 af
Primary=14.89 cfs 0.810 af

**Link C: DP-C** Inflow=26.26 cfs 1.414 af
Primary=26.26 cfs 1.414 af

**Link D: DP-D** Inflow=5.01 cfs 0.250 af
Primary=5.01 cfs 0.250 af

**Total Runoff Area = 5.485 ac Runoff Volume = 3.297 af Average Runoff Depth = 7.21"**
**32.63% Pervious = 1.790 ac 67.37% Impervious = 3.696 ac**

## Summary for Subcatchment A1: EX-A1

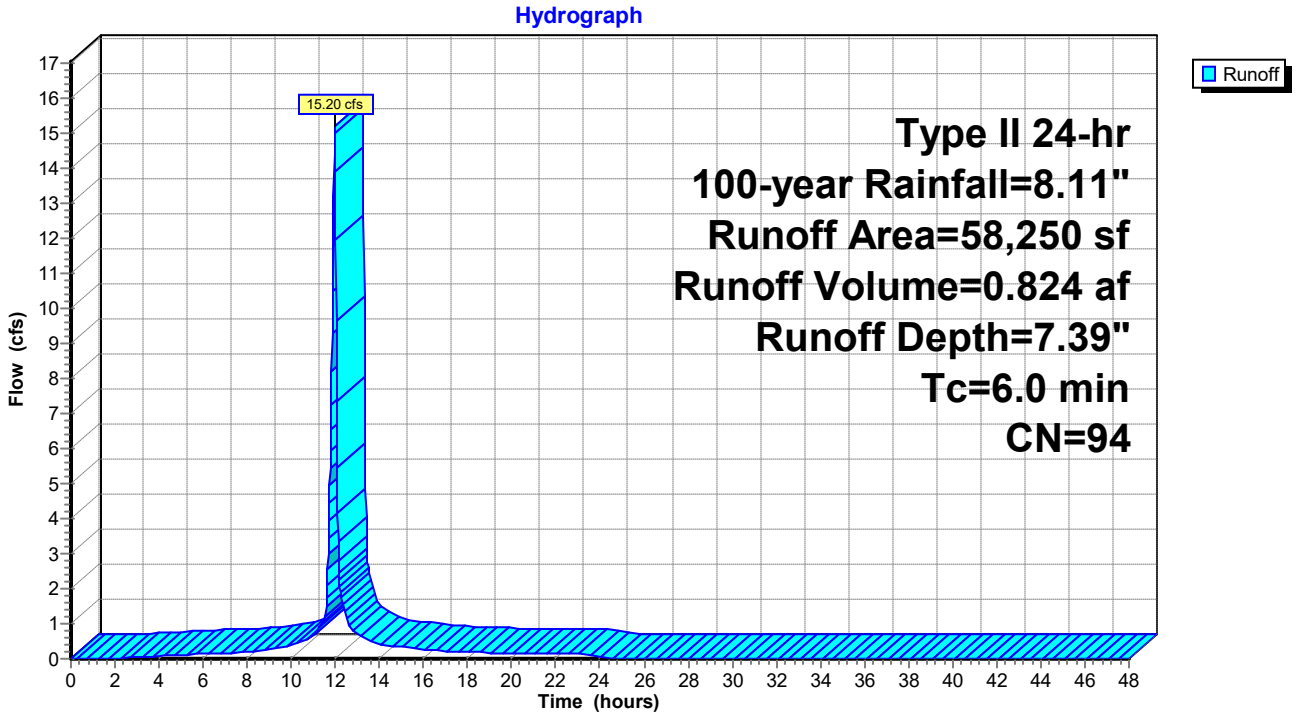
Runoff = 15.20 cfs @ 11.97 hrs, Volume= 0.824 af, Depth= 7.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 13,351 | 82 | Woods/grass comb., Fair, HSG D |
| 44,899 | 98 | Paved parking, HSG D |
| 58,250 | 94 | Weighted Average |
| 13,351 | | 22.92% Pervious Area |
| 44,899 | | 77.08% Impervious Area |

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

## Subcatchment A1: EX-A1



## Summary for Subcatchment B1: EX-A1

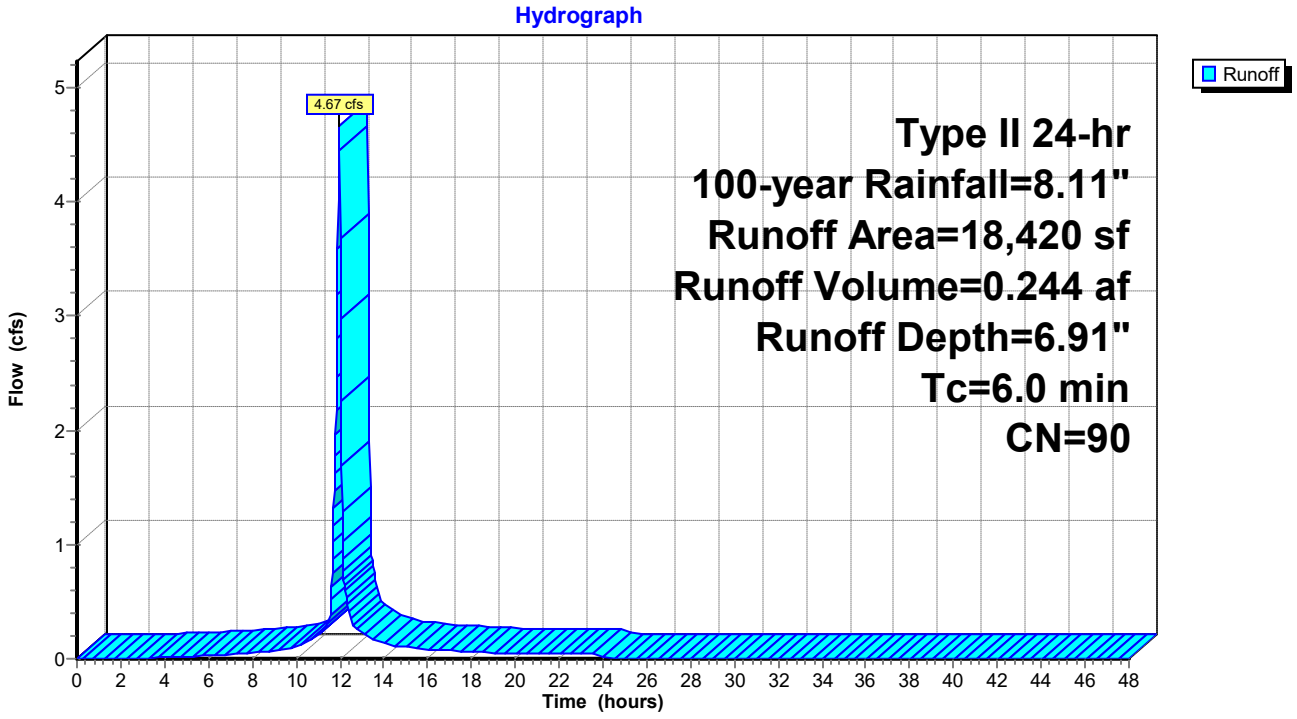
Runoff = 4.67 cfs @ 11.97 hrs, Volume= 0.244 af, Depth= 6.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 8,918 | 82 | Woods/grass comb., Fair, HSG D |
| 9,502 | 98 | Paved parking, HSG D |
| 18,420 | 90 | Weighted Average |
| 8,918 | | 48.41% Pervious Area |
| 9,502 | | 51.59% Impervious Area |

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

## Subcatchment B1: EX-A1



## Summary for Subcatchment B2: EX-B2

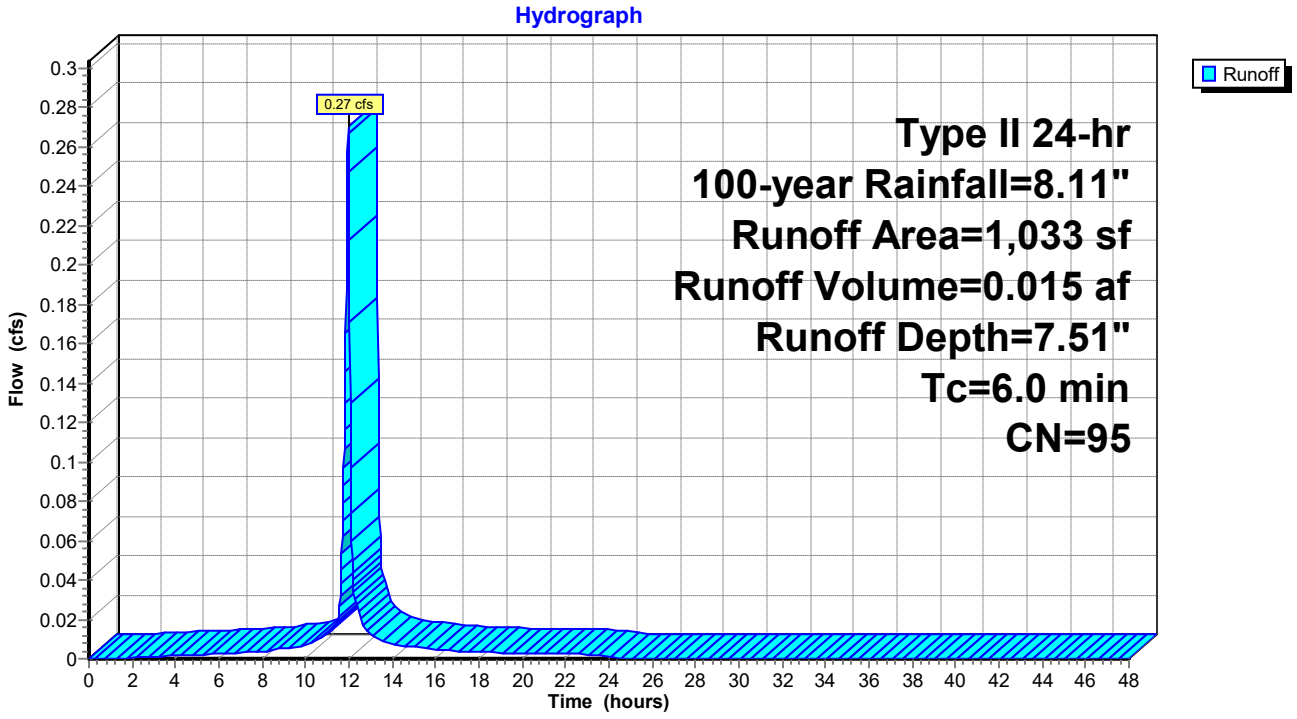
Runoff = 0.27 cfs @ 11.97 hrs, Volume= 0.015 af, Depth= 7.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 207 | 82 | Woods/grass comb., Fair, HSG D |
| 826 | 98 | Paved parking, HSG D |
| 1,033 | 95 | Weighted Average |
| 207 | | 20.04% Pervious Area |
| 826 | | 79.96% Impervious Area |

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

### Subcatchment B2: EX-B2



## Summary for Subcatchment B3: EX-B3

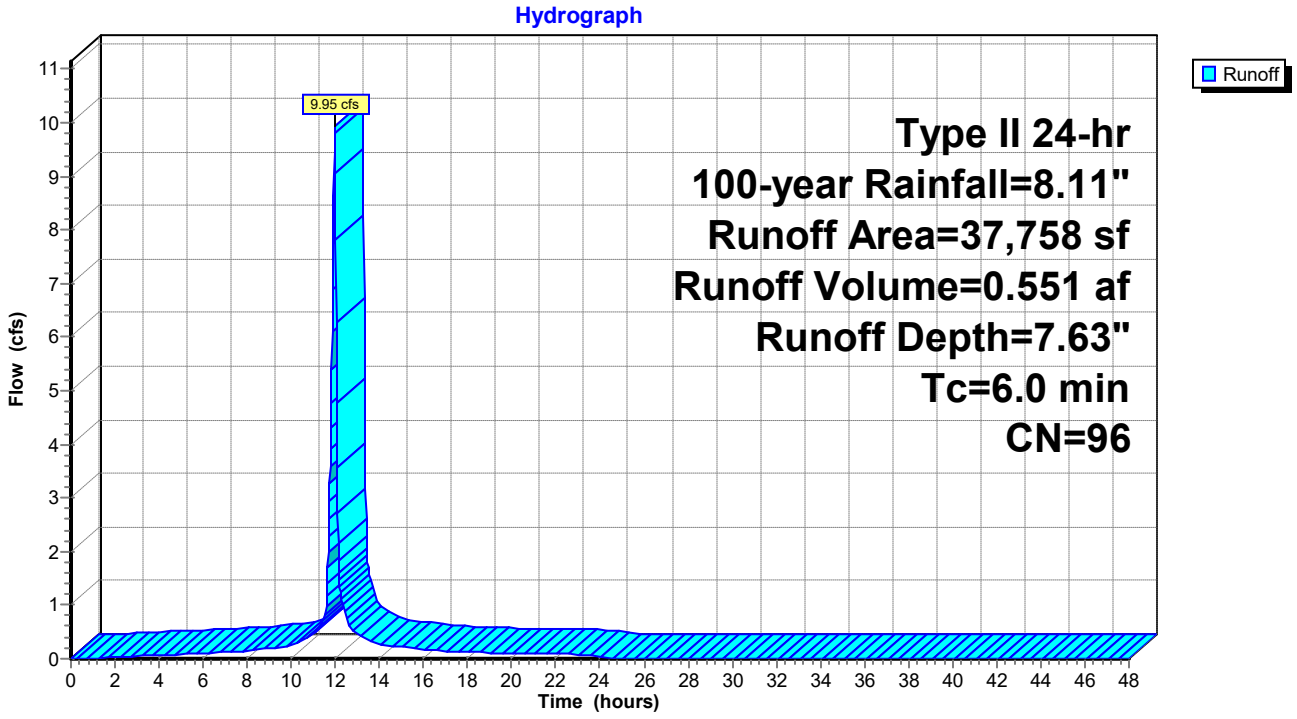
Runoff = 9.95 cfs @ 11.97 hrs, Volume= 0.551 af, Depth= 7.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 4,297 | 82 | Woods/grass comb., Fair, HSG D |
| 33,461 | 98 | Paved parking, HSG D |
| 37,758 | 96 | Weighted Average |
| 4,297 | | 11.38% Pervious Area |
| 33,461 | | 88.62% Impervious Area |

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

### Subcatchment B3: EX-B3



## Summary for Subcatchment C1: EX-C1

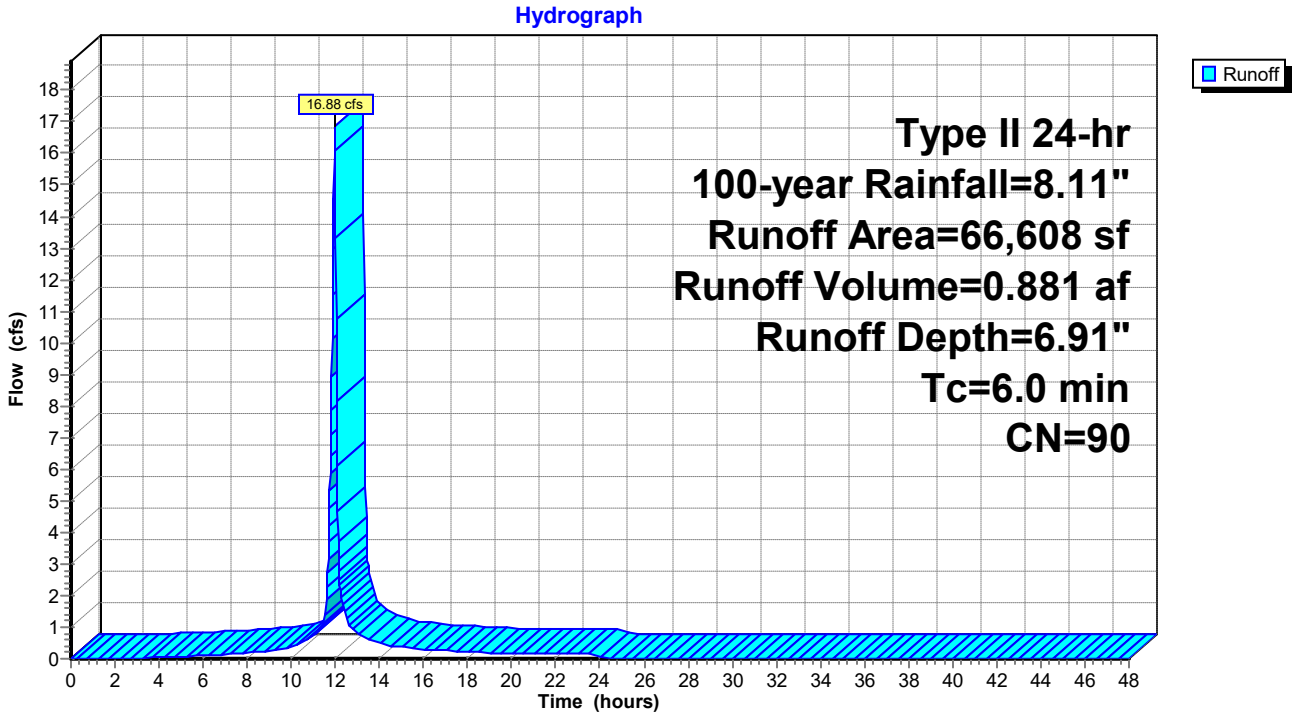
Runoff = 16.88 cfs @ 11.97 hrs, Volume= 0.881 af, Depth= 6.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 31,440 | 82 | Woods/grass comb., Fair, HSG D |
| 35,168 | 98 | Paved parking, HSG D |
| 66,608 | 90 | Weighted Average |
| 31,440 | | 47.20% Pervious Area |
| 35,168 | | 52.80% Impervious Area |

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

## Subcatchment C1: EX-C1



## Summary for Subcatchment C2: EX-C2

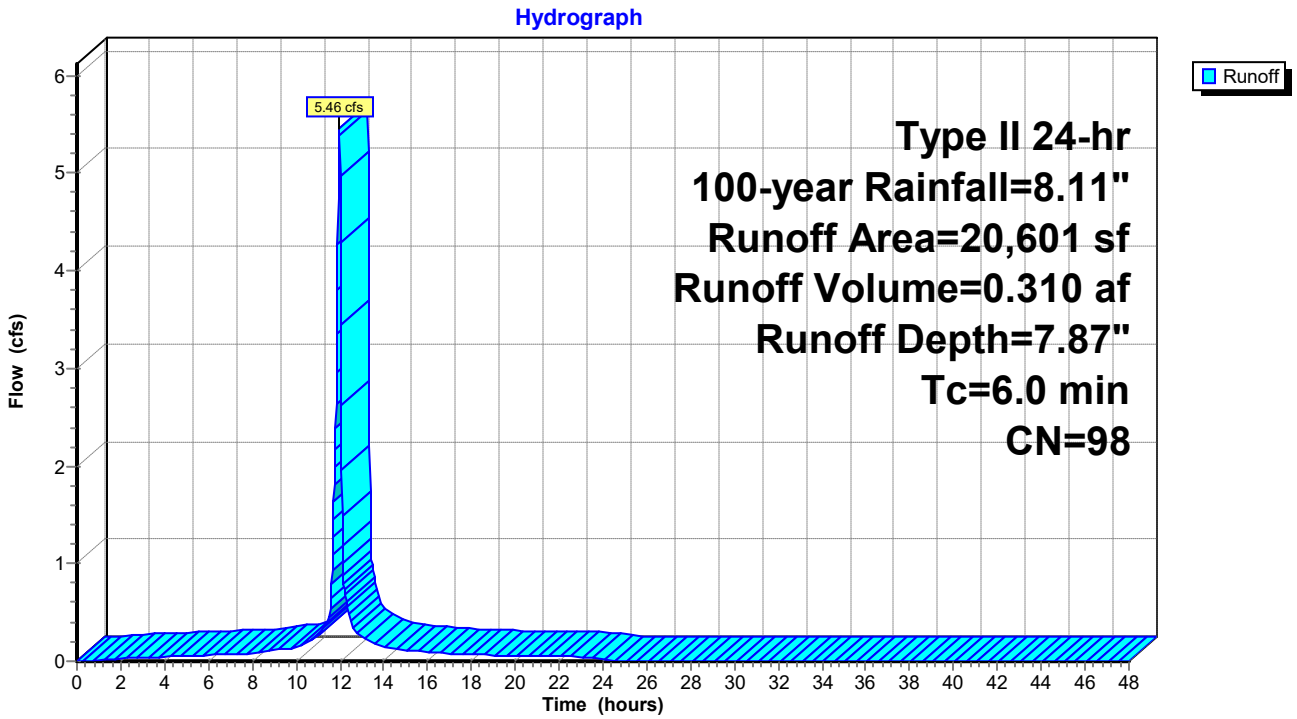
Runoff = 5.46 cfs @ 11.97 hrs, Volume= 0.310 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 20,601 | 98 | Paved parking, HSG D |
| 20,601 | 98 | Weighted Average |
| 20,601 | | 100.00% Impervious Area |

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

## Subcatchment C2: EX-C2



## Summary for Subcatchment C3: EX-A1

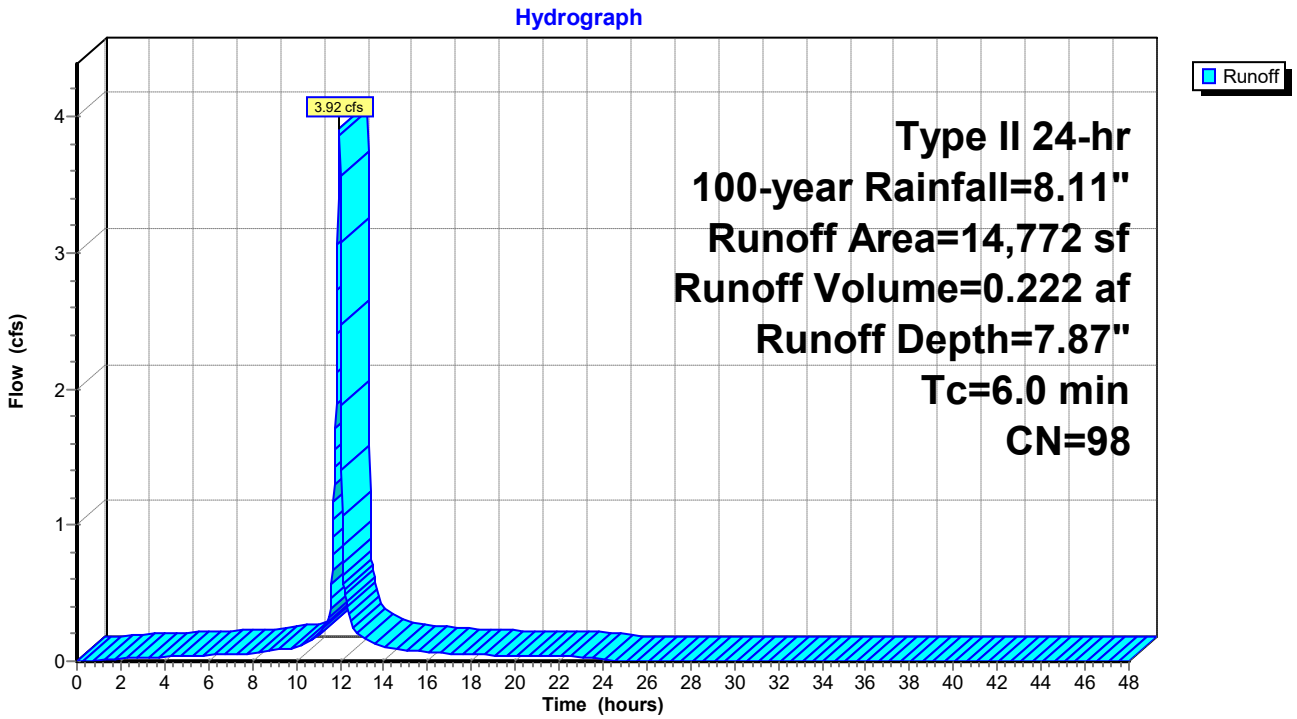
Runoff = 3.92 cfs @ 11.97 hrs, Volume= 0.222 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 14,772 | 98 | Paved parking, HSG D |
| 14,772 | 98 | Weighted Average |
| 14,772 | | 100.00% Impervious Area |

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

### Subcatchment C3: EX-A1



## Summary for Subcatchment D1: EX-A1

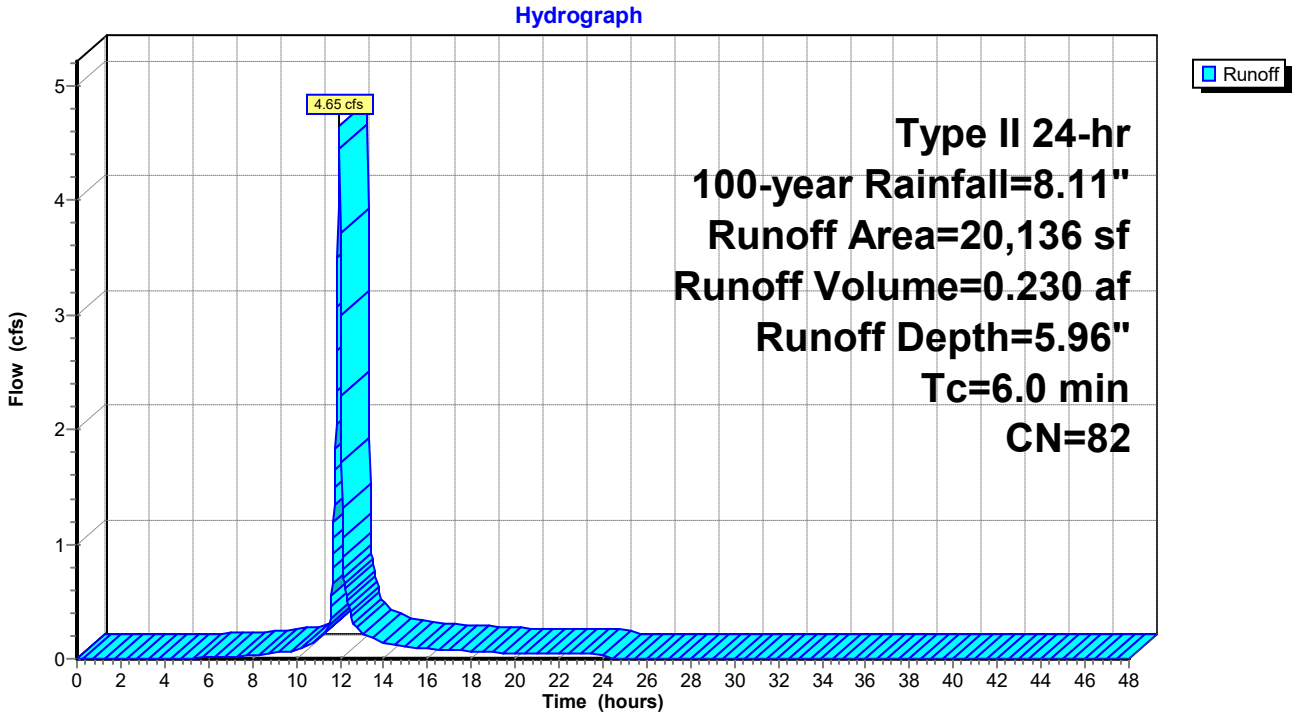
Runoff = 4.65 cfs @ 11.97 hrs, Volume= 0.230 af, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 19,750 | 82 | Woods/grass comb., Fair, HSG D |
| 386 | 98 | Paved parking, HSG D |
| 20,136 | 82 | Weighted Average |
| 19,750 | | 98.08% Pervious Area |
| 386 | | 1.92% Impervious Area |

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

### Subcatchment D1: EX-A1



## Summary for Subcatchment D2: EX-A1

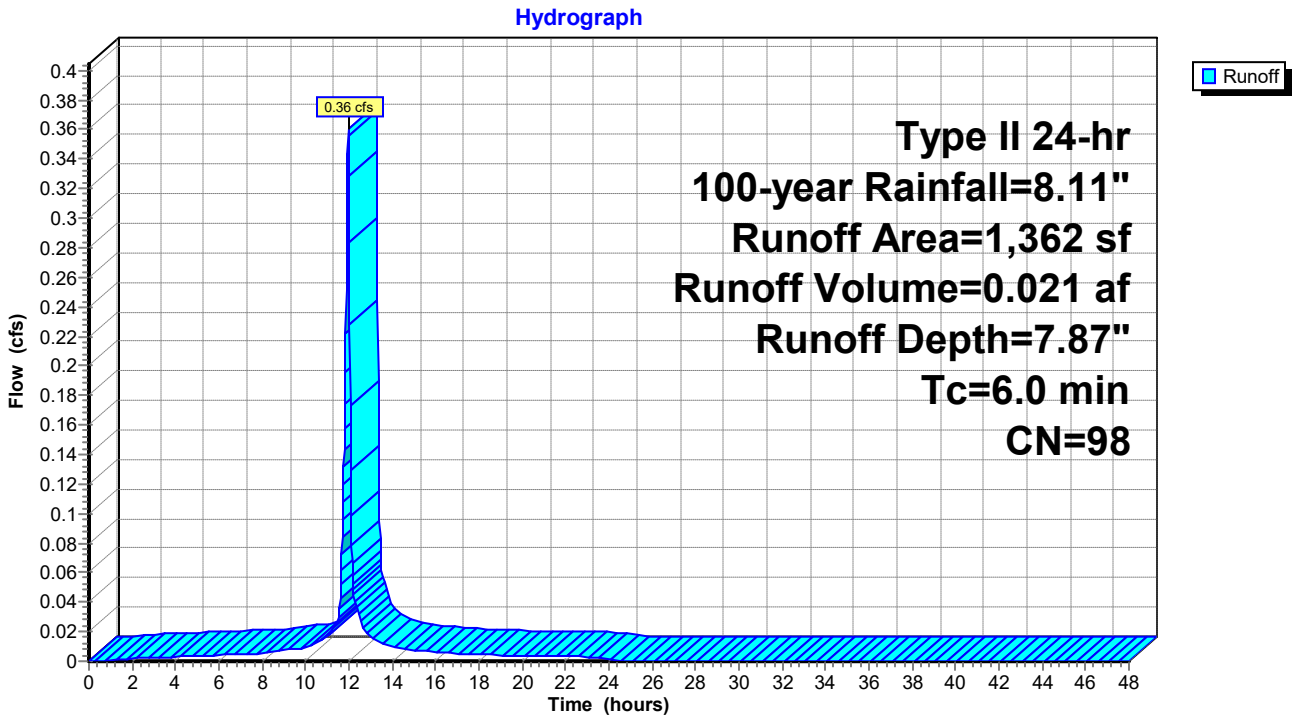
Runoff = 0.36 cfs @ 11.97 hrs, Volume= 0.021 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 1,362 | 98 | Paved parking, HSG D |
| 1,362 | 98 | Weighted Average |
| 1,362 | | 100.00% Impervious Area |

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

## Subcatchment D2: EX-A1

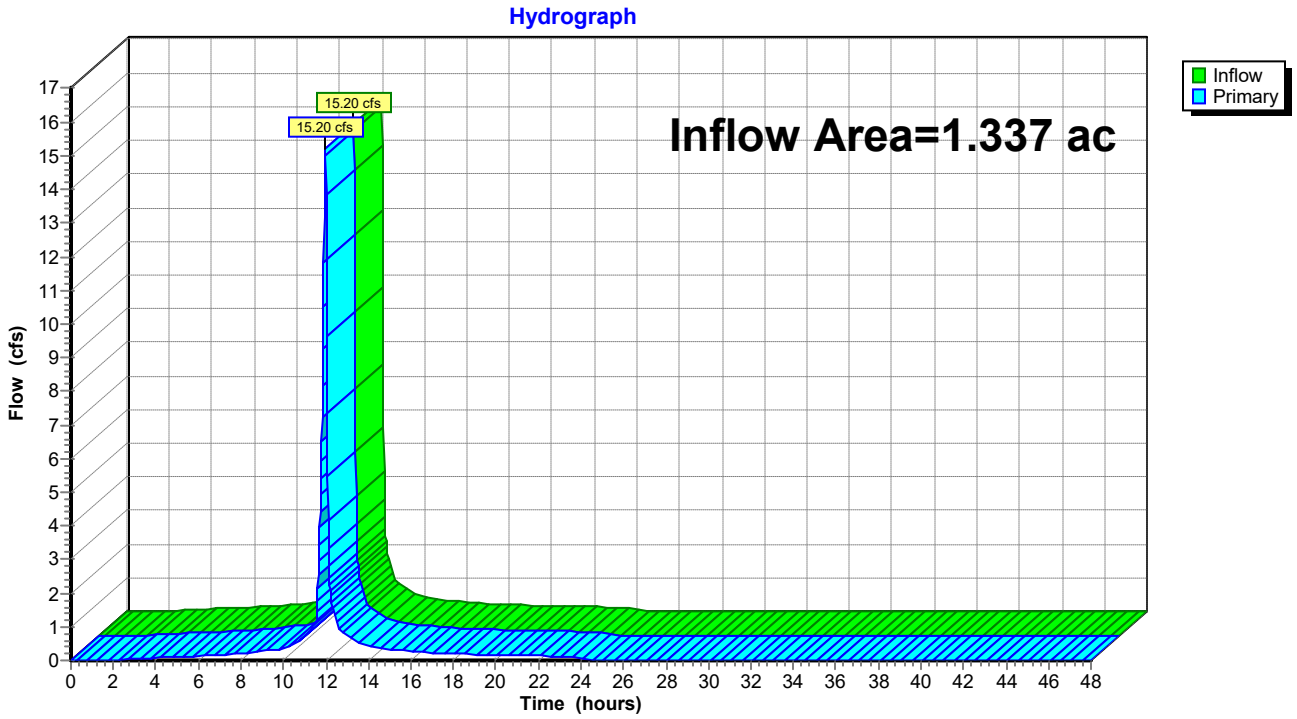


## Summary for Link A: DP-A

Inflow Area = 1.337 ac, 77.08% Impervious, Inflow Depth = 7.39" for 100-year event
Inflow = 15.20 cfs @ 11.97 hrs, Volume= 0.824 af
Primary = 15.20 cfs @ 11.97 hrs, Volume= 0.824 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link A: DP-A

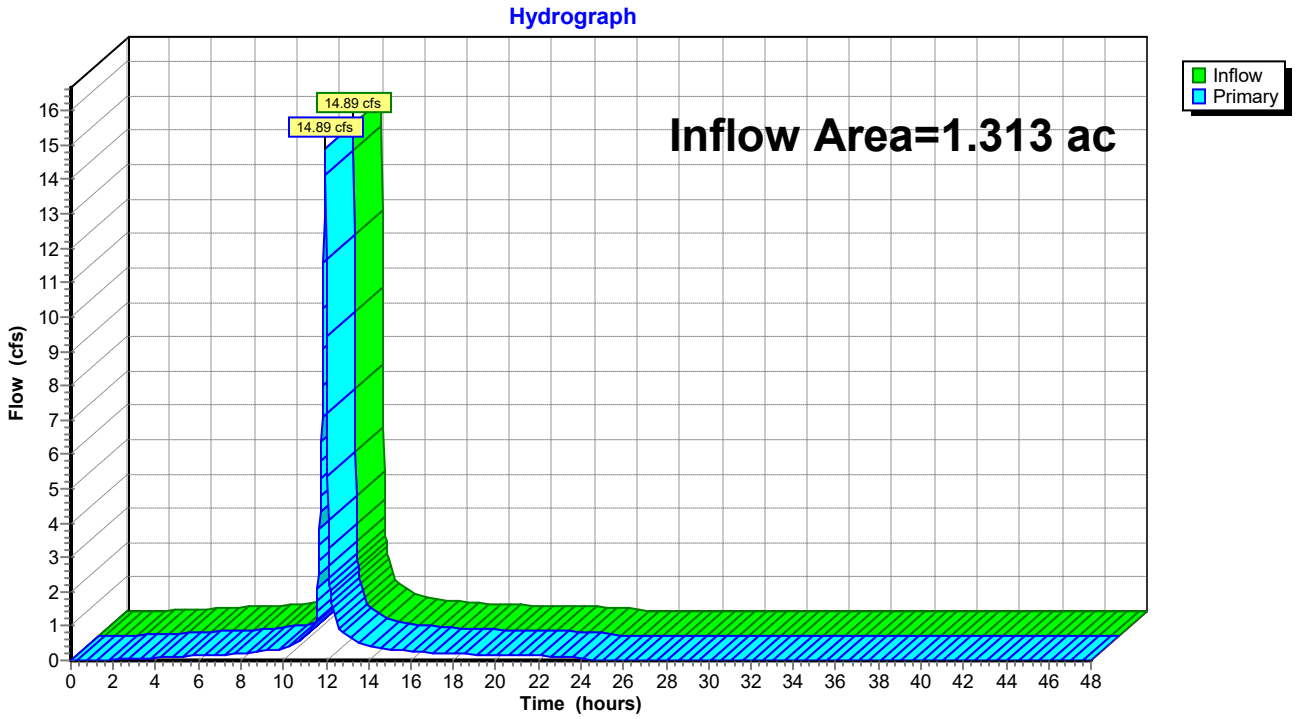


## Summary for Link B: DP-B

Inflow Area = 1.313 ac, 76.54% Impervious, Inflow Depth = 7.40" for 100-year event
Inflow = 14.89 cfs @ 11.97 hrs, Volume= 0.810 af
Primary = 14.89 cfs @ 11.97 hrs, Volume= 0.810 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link B: DP-B

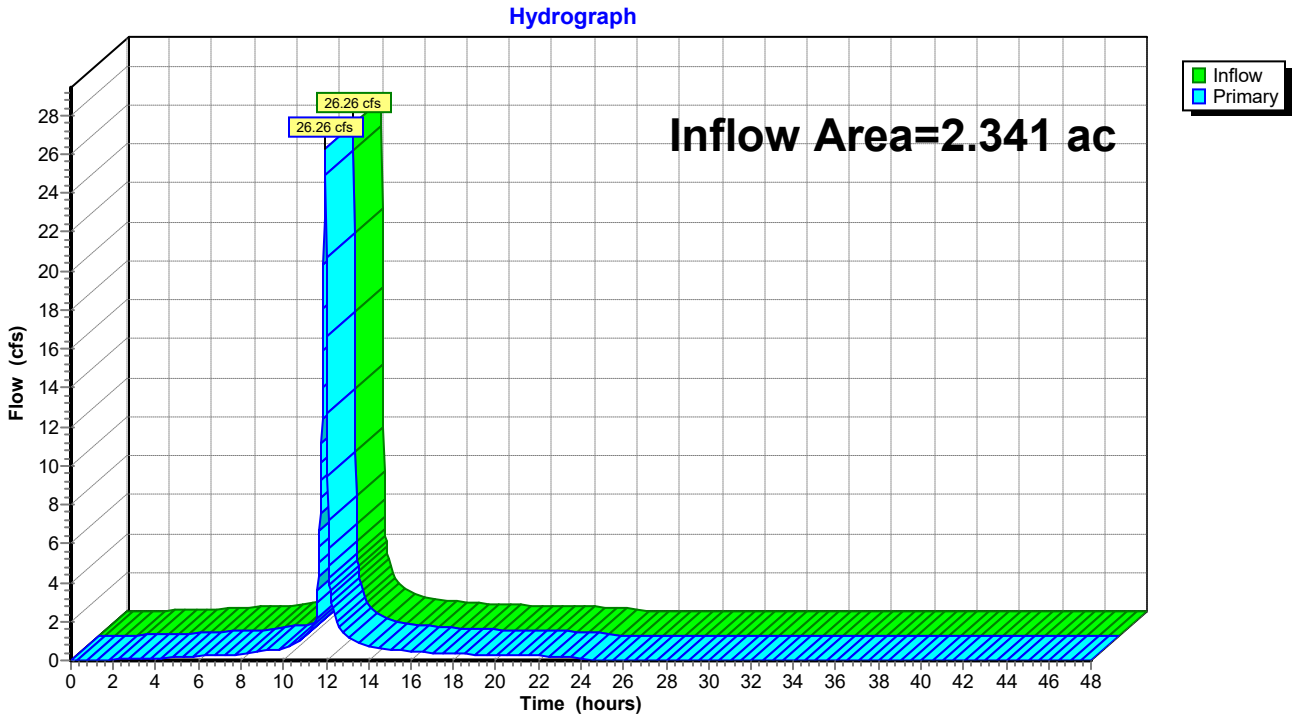


## Summary for Link C: DP-C

Inflow Area = 2.341 ac, 69.17% Impervious, Inflow Depth = 7.25" for 100-year event
Inflow = 26.26 cfs @ 11.97 hrs, Volume= 1.414 af
Primary = 26.26 cfs @ 11.97 hrs, Volume= 1.414 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link C: DP-C

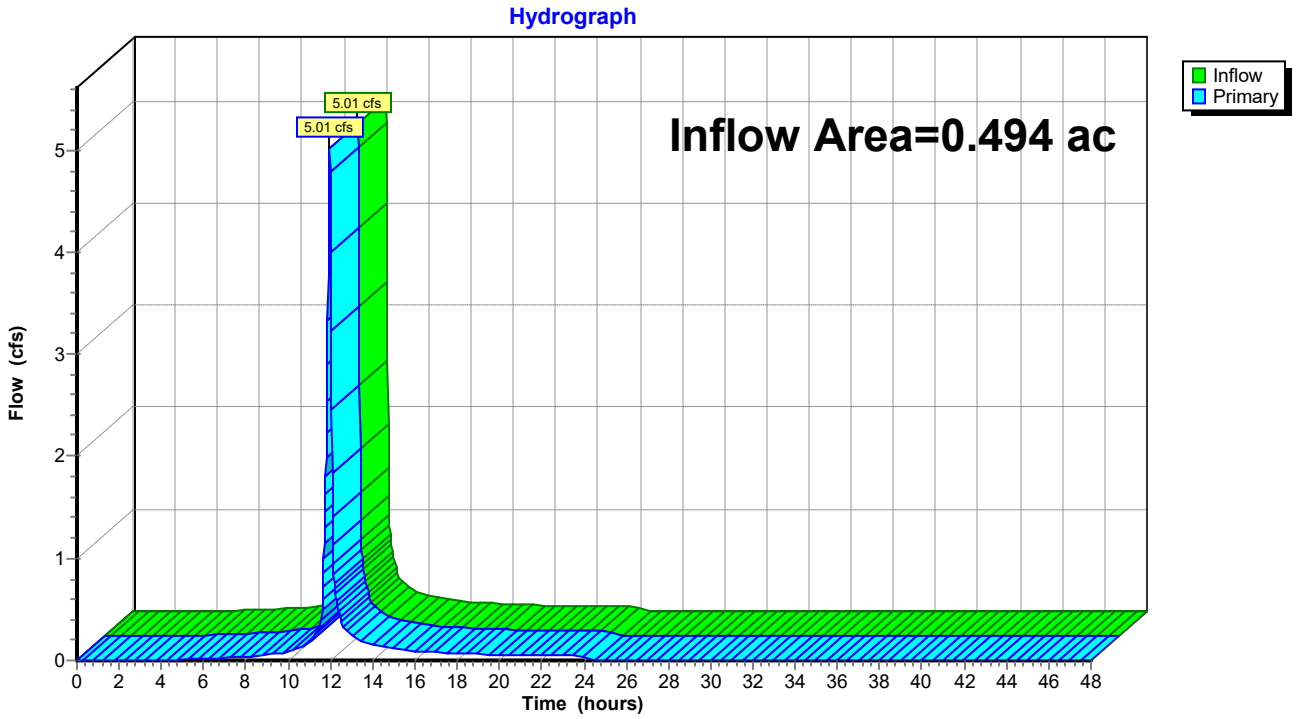


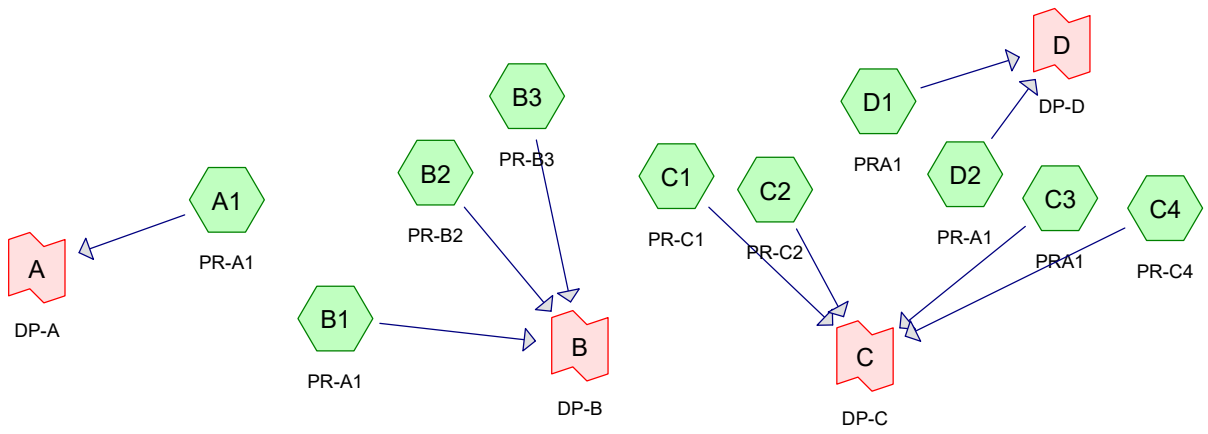
## Summary for Link D: DP-D

Inflow Area = 0.494 ac, 8.13% Impervious, Inflow Depth = 6.08" for 100-year event
Inflow = 5.01 cfs @ 11.97 hrs, Volume= 0.250 af
Primary = 5.01 cfs @ 11.97 hrs, Volume= 0.250 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link D: DP-D






Subcat Reach Pond Link

**Routing Diagram for T0962_Post Drainage**
Prepared by IO, Printed 6/13/2023

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 4.392 | 98 | Paved parking, HSG D (A1, B1, B2, B3, C1, C2, C3, C4, D1, D2) |
| 1.094 | 82 | Woods/grass comb., Fair, HSG D (A1, B1, B3, C2, D1) |
| **5.485** | **95** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 0.000 | HSG A | |
| 0.000 | HSG B | |
| 0.000 | HSG C | |
| 5.485 | HSG D | A1, B1, B2, B3, C1, C2, C3, C4, D1, D2 |
| 0.000 | Other | |
| **5.485** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | 4.392 | 0.000 | 4.392 | Paved parking | A1, B1, B2, B3, C1, C2, C3, C4, D1, D2 |
| 0.000 | 0.000 | 0.000 | 1.094 | 0.000 | 1.094 | Woods/grass comb., Fair | A1, B1, B3, C2, D1 |
| **0.000** | **0.000** | **0.000** | **5.485** | **0.000** | **5.485** | **TOTAL AREA** | |

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A1: PR-A1** Runoff Area=55,584 sf 94.17% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=97 Runoff=6.10 cfs 0.328 af

**Subcatchment B1: PR-A1** Runoff Area=21,304 sf 17.57% Impervious Runoff Depth=1.96"
Tc=6.0 min CN=85 Runoff=1.69 cfs 0.080 af

**Subcatchment B2: PR-B2** Runoff Area=156 sf 100.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=0.02 cfs 0.001 af

**Subcatchment B3: PR-B3** Runoff Area=36,330 sf 96.91% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=4.04 cfs 0.222 af

**Subcatchment C1: PR-C1** Runoff Area=7,048 sf 100.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.043 af

**Subcatchment C2: PR-C2** Runoff Area=33,183 sf 61.90% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=92 Runoff=3.28 cfs 0.163 af

**Subcatchment C3: PRA1** Runoff Area=64,958 sf 100.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=7.22 cfs 0.397 af

**Subcatchment C4: PR-C4** Runoff Area=5,330 sf 100.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.033 af

**Subcatchment D1: PRA1** Runoff Area=13,422 sf 2.62% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=82 Runoff=0.95 cfs 0.044 af

**Subcatchment D2: PR-A1** Runoff Area=1,625 sf 100.00% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.010 af

**Link A: DP-A** Inflow=6.10 cfs 0.328 af
Primary=6.10 cfs 0.328 af

**Link B: DP-B** Inflow=5.74 cfs 0.303 af
Primary=5.74 cfs 0.303 af

**Link C: DP-C** Inflow=11.88 cfs 0.636 af
Primary=11.88 cfs 0.636 af

**Link D: DP-D** Inflow=1.13 cfs 0.054 af
Primary=1.13 cfs 0.054 af

**Total Runoff Area = 5.485 ac Runoff Volume = 1.321 af Average Runoff Depth = 2.89"**
**19.94% Pervious = 1.094 ac 80.06% Impervious = 4.392 ac**

## Summary for Subcatchment A1: PR-A1

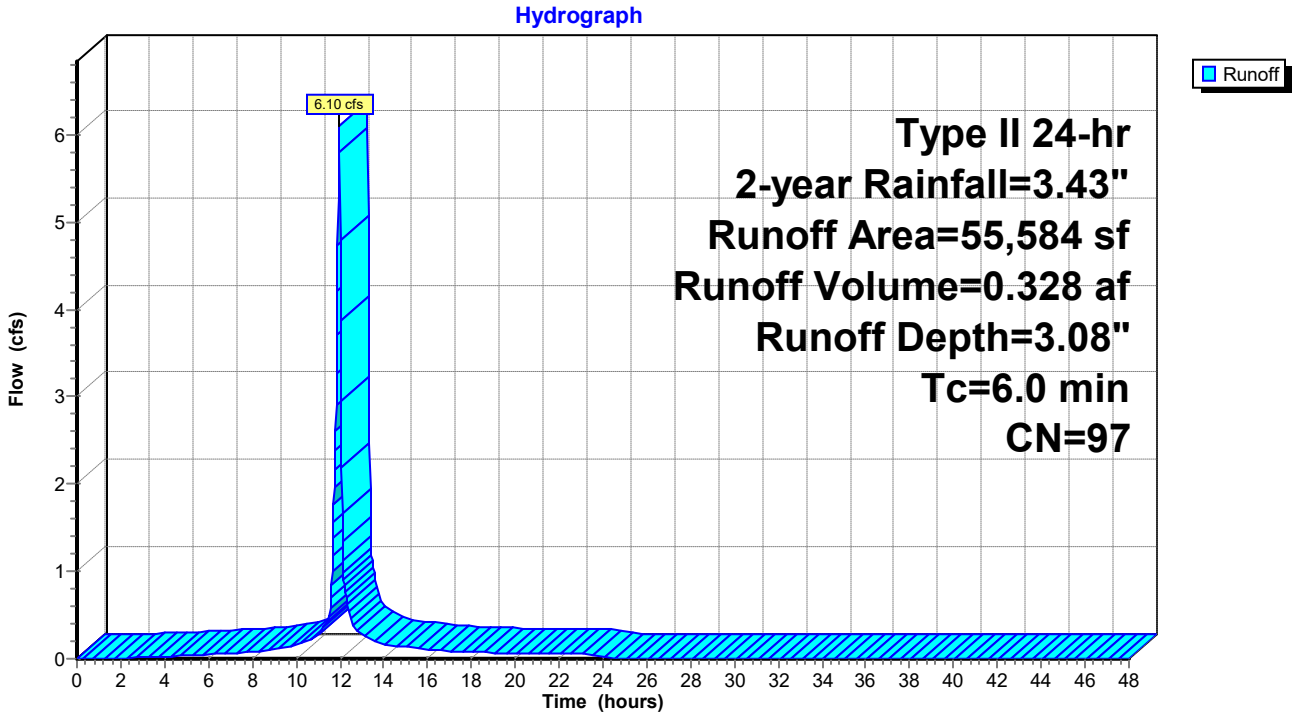
Runoff = 6.10 cfs @ 11.97 hrs, Volume= 0.328 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 3,238 | 82 | Woods/grass comb., Fair, HSG D |
| 52,346 | 98 | Paved parking, HSG D |
| 55,584 | 97 | Weighted Average |
| 3,238 | | 5.83% Pervious Area |
| 52,346 | | 94.17% Impervious Area |

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

## Subcatchment A1: PR-A1



## Summary for Subcatchment B1: PR-A1

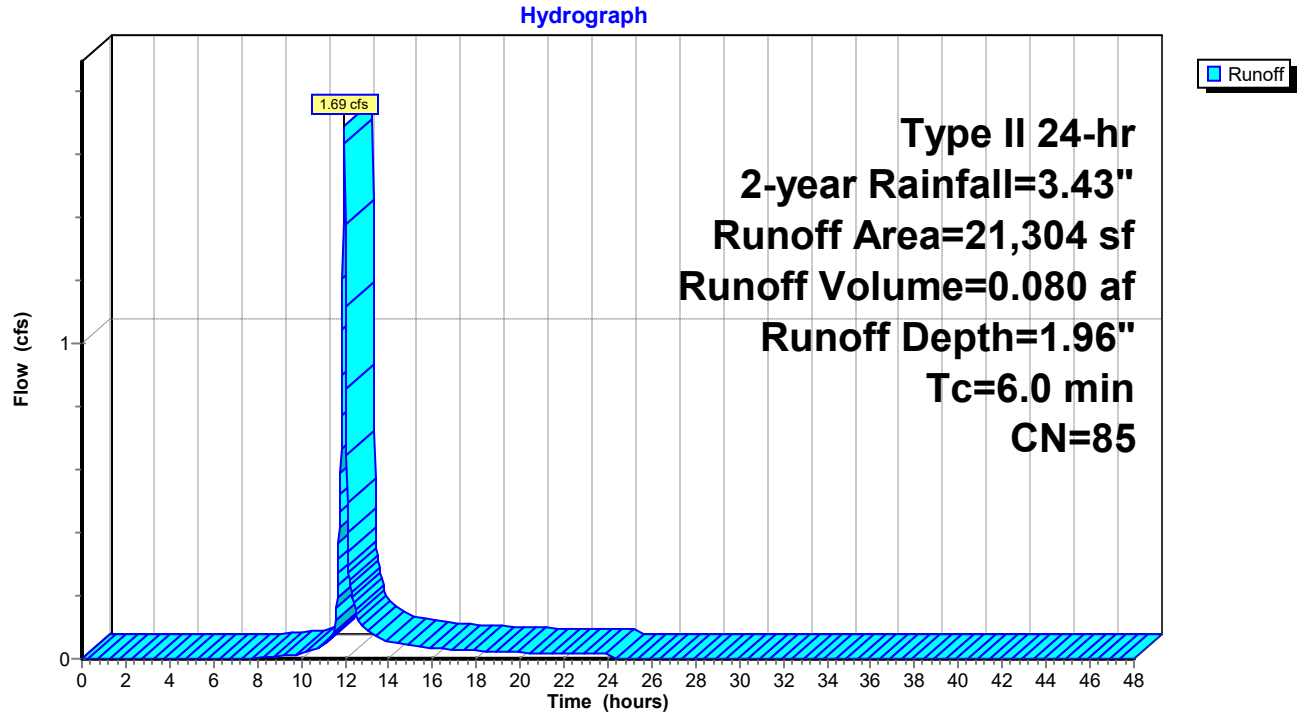
Runoff = 1.69 cfs @ 11.97 hrs, Volume= 0.080 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 17,561 | 82 | Woods/grass comb., Fair, HSG D |
| 3,743 | 98 | Paved parking, HSG D |
| 21,304 | 85 | Weighted Average |
| 17,561 | | 82.43% Pervious Area |
| 3,743 | | 17.57% Impervious Area |

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

### Subcatchment B1: PR-A1



## Summary for Subcatchment B2: PR-B2

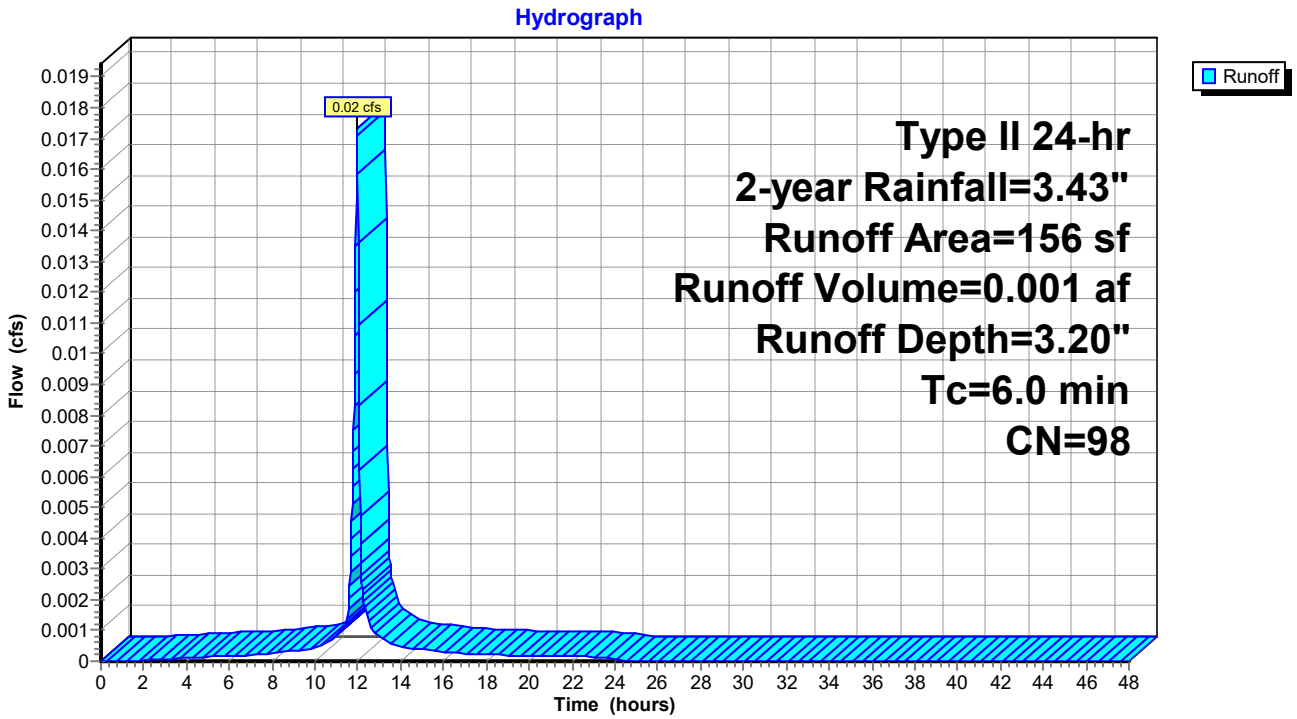
Runoff = 0.02 cfs @ 11.97 hrs, Volume= 0.001 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 156 | 98 | Paved parking, HSG D |
| 156 | 98 | Weighted Average |
| 156 | | 100.00% Impervious Area |

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

## Subcatchment B2: PR-B2



## Summary for Subcatchment B3: PR-B3

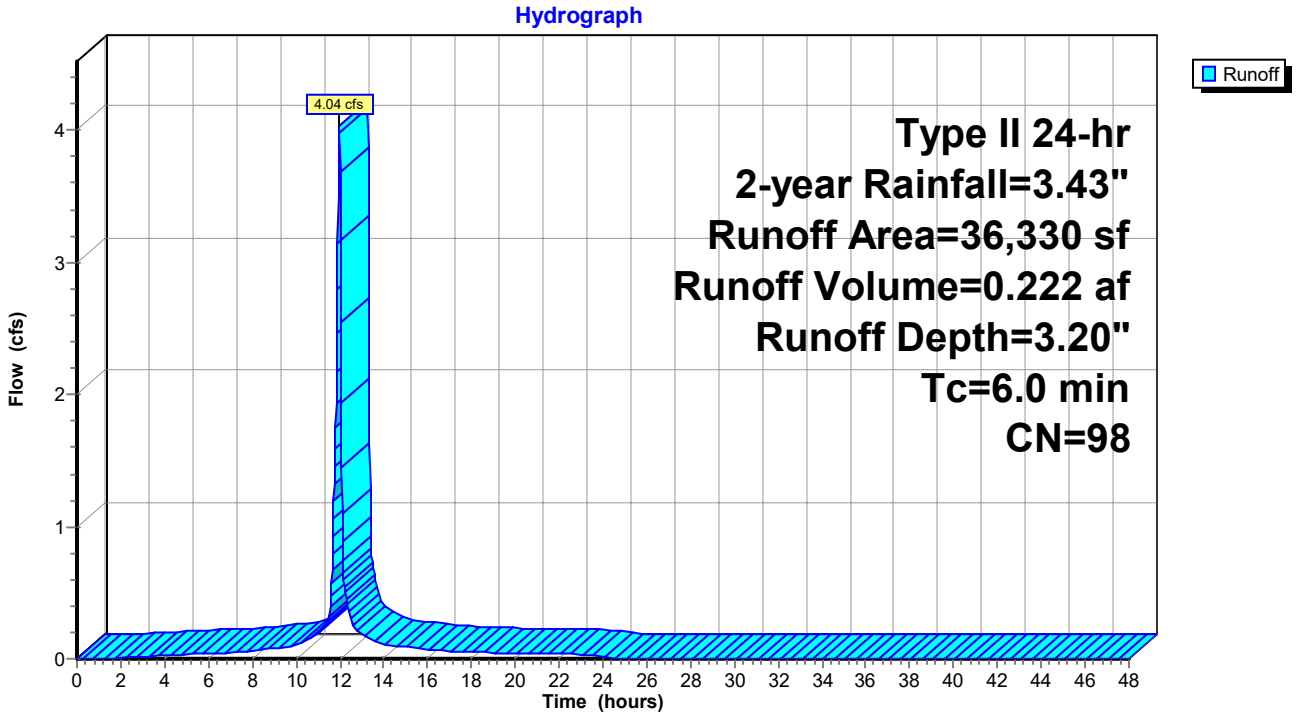
Runoff = 4.04 cfs @ 11.97 hrs, Volume= 0.222 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 1,124 | 82 | Woods/grass comb., Fair, HSG D |
| 35,206 | 98 | Paved parking, HSG D |
| 36,330 | 98 | Weighted Average |
| 1,124 | | 3.09% Pervious Area |
| 35,206 | | 96.91% Impervious Area |

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

### Subcatchment B3: PR-B3



## Summary for Subcatchment C1: PR-C1

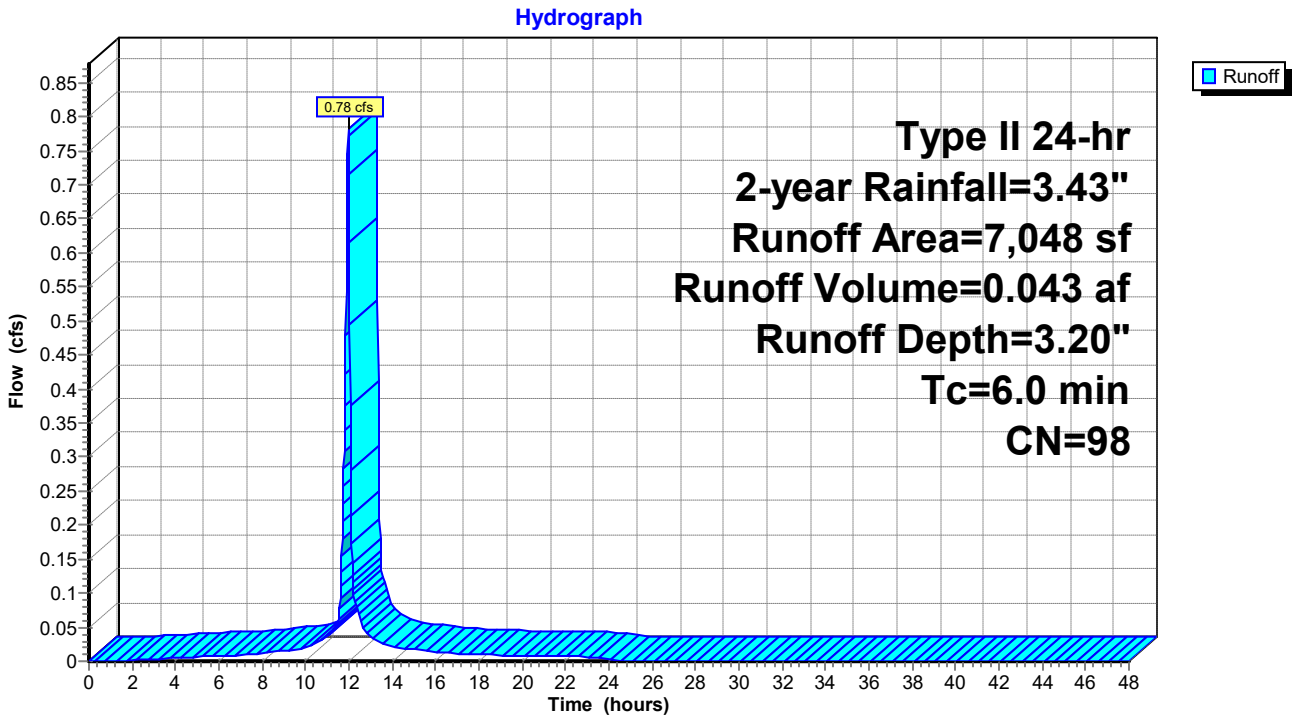
Runoff = 0.78 cfs @ 11.97 hrs, Volume= 0.043 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 7,048 | 98 | Paved parking, HSG D |
| 7,048 | 98 | Weighted Average |
| 7,048 | | 100.00% Impervious Area |

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

## Subcatchment C1: PR-C1



## Summary for Subcatchment C2: PR-C2

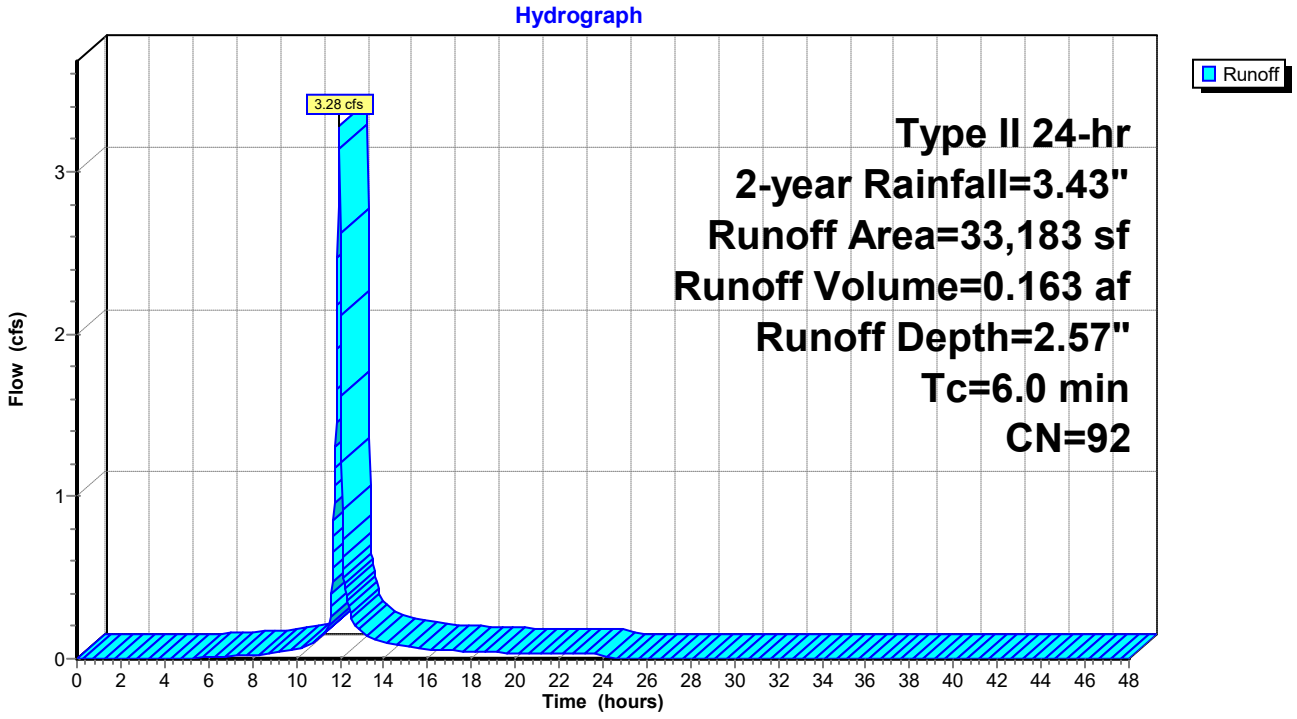
Runoff = 3.28 cfs @ 11.97 hrs, Volume= 0.163 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 12,643 | 82 | Woods/grass comb., Fair, HSG D |
| 20,540 | 98 | Paved parking, HSG D |
| 33,183 | 92 | Weighted Average |
| 12,643 | | 38.10% Pervious Area |
| 20,540 | | 61.90% Impervious Area |

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

## Subcatchment C2: PR-C2



## Summary for Subcatchment C3: PRA1

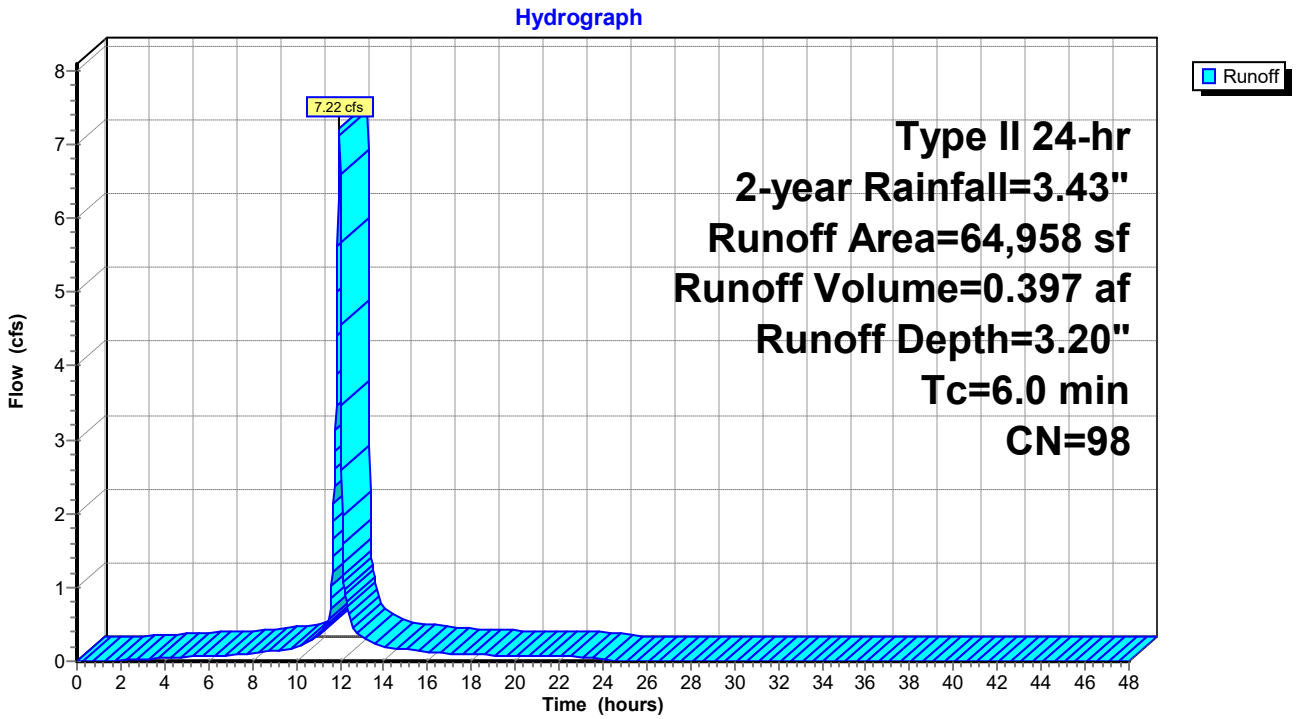
Runoff = 7.22 cfs @ 11.97 hrs, Volume= 0.397 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 64,958 | 98 | Paved parking, HSG D |
| 64,958 | 98 | Weighted Average |
| 64,958 | | 100.00% Impervious Area |

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

### Subcatchment C3: PRA1



## Summary for Subcatchment C4: PR-C4

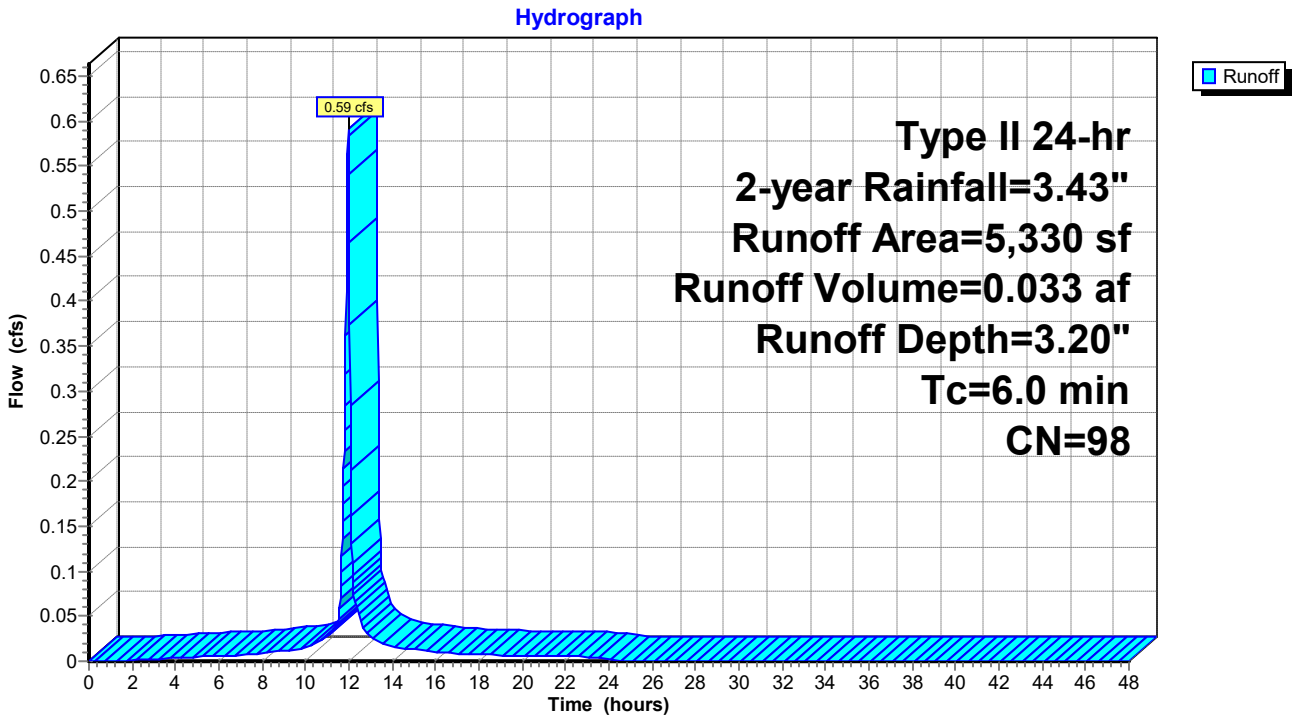
Runoff = 0.59 cfs @ 11.97 hrs, Volume= 0.033 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 5,330 | 98 | Paved parking, HSG D |
| 5,330 | 98 | Weighted Average |
| 5,330 | | 100.00% Impervious Area |

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

## Subcatchment C4: PR-C4



## Summary for Subcatchment D1: PRA1

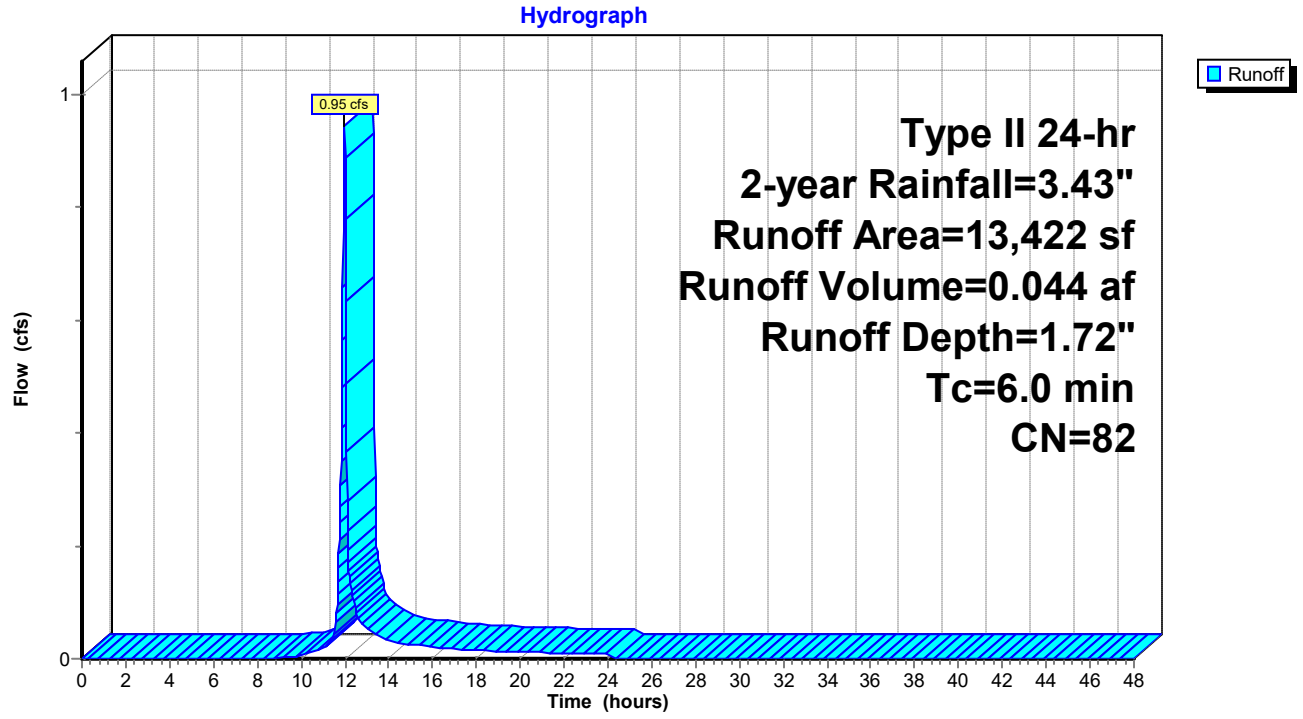
Runoff = 0.95 cfs @ 11.97 hrs, Volume= 0.044 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 13,071 | 82 | Woods/grass comb., Fair, HSG D |
| 351 | 98 | Paved parking, HSG D |
| 13,422 | 82 | Weighted Average |
| 13,071 | | 97.38% Pervious Area |
| 351 | | 2.62% Impervious Area |

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

### Subcatchment D1: PRA1



## Summary for Subcatchment D2: PR-A1

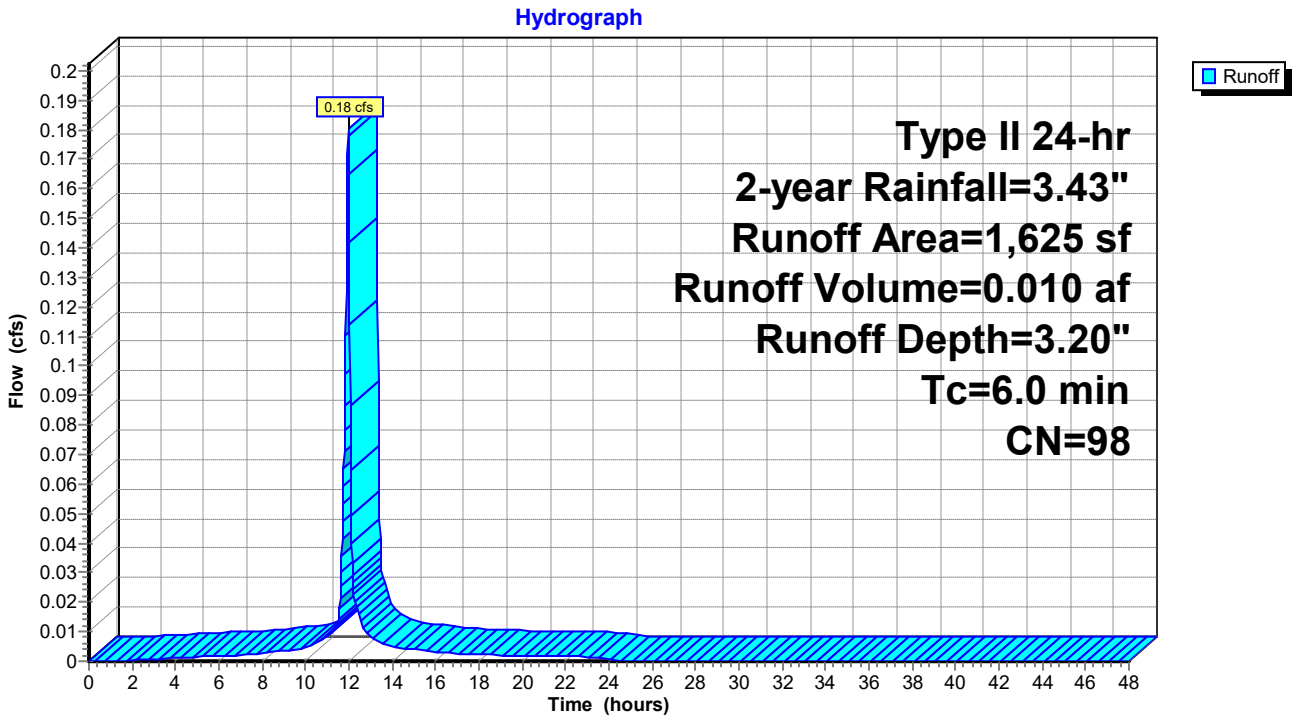
Runoff = 0.18 cfs @ 11.97 hrs, Volume= 0.010 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-year Rainfall=3.43"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 1,625 | 98 | Paved parking, HSG D |
| 1,625 | 98 | Weighted Average |
| 1,625 | | 100.00% Impervious Area |

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

## Subcatchment D2: PR-A1

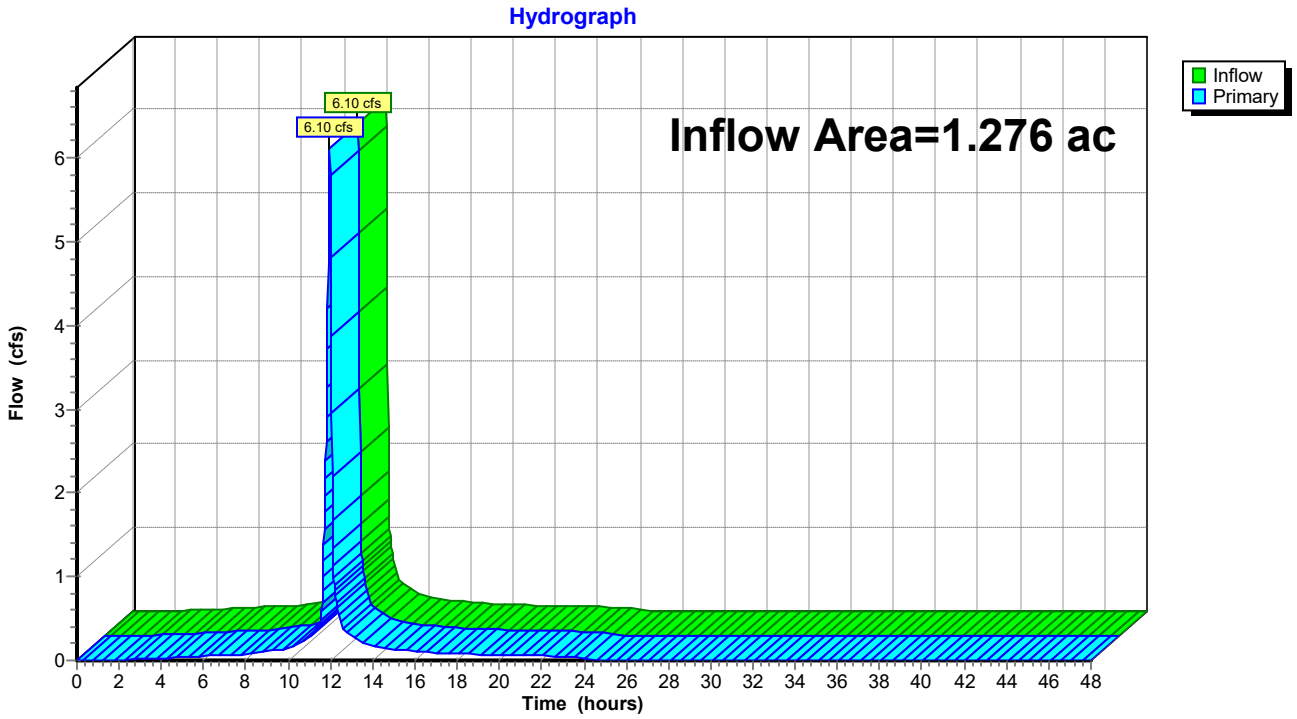


## Summary for Link A: DP-A

Inflow Area = 1.276 ac, 94.17% Impervious, Inflow Depth = 3.08" for 2-year event
Inflow = 6.10 cfs @ 11.97 hrs, Volume= 0.328 af
Primary = 6.10 cfs @ 11.97 hrs, Volume= 0.328 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link A: DP-A

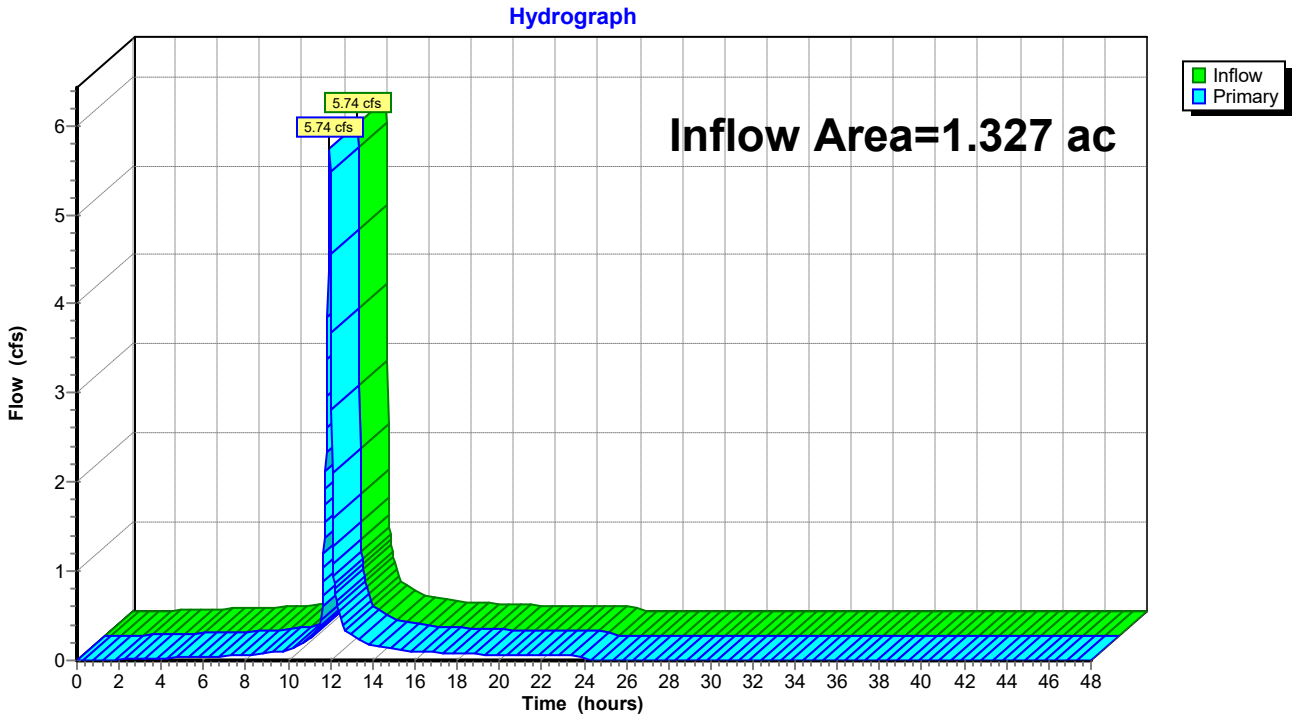


## Summary for Link B: DP-B

Inflow Area = 1.327 ac, 67.67% Impervious, Inflow Depth = 2.74" for 2-year event
Inflow = 5.74 cfs @ 11.97 hrs, Volume= 0.303 af
Primary = 5.74 cfs @ 11.97 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link B: DP-B

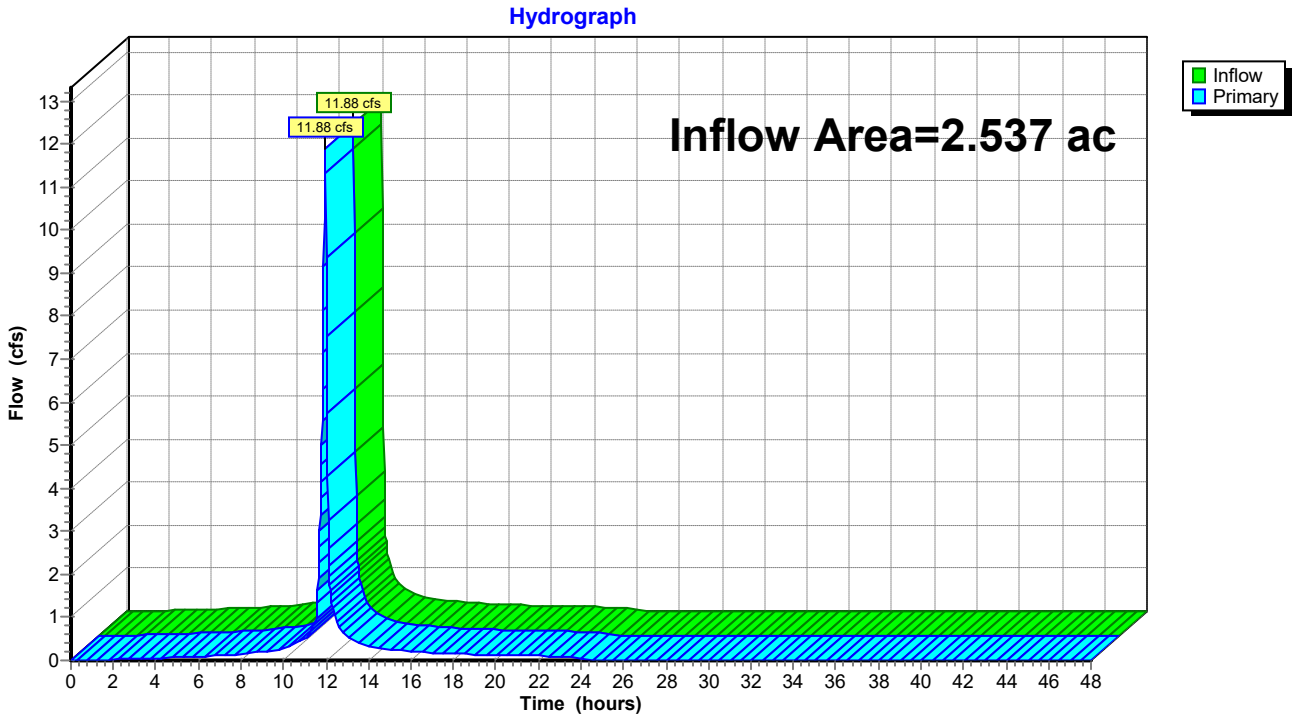


## Summary for Link C: DP-C

Inflow Area = 2.537 ac, 88.56% Impervious, Inflow Depth = 3.01" for 2-year event
Inflow = 11.88 cfs @ 11.97 hrs, Volume= 0.636 af
Primary = 11.88 cfs @ 11.97 hrs, Volume= 0.636 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link C: DP-C

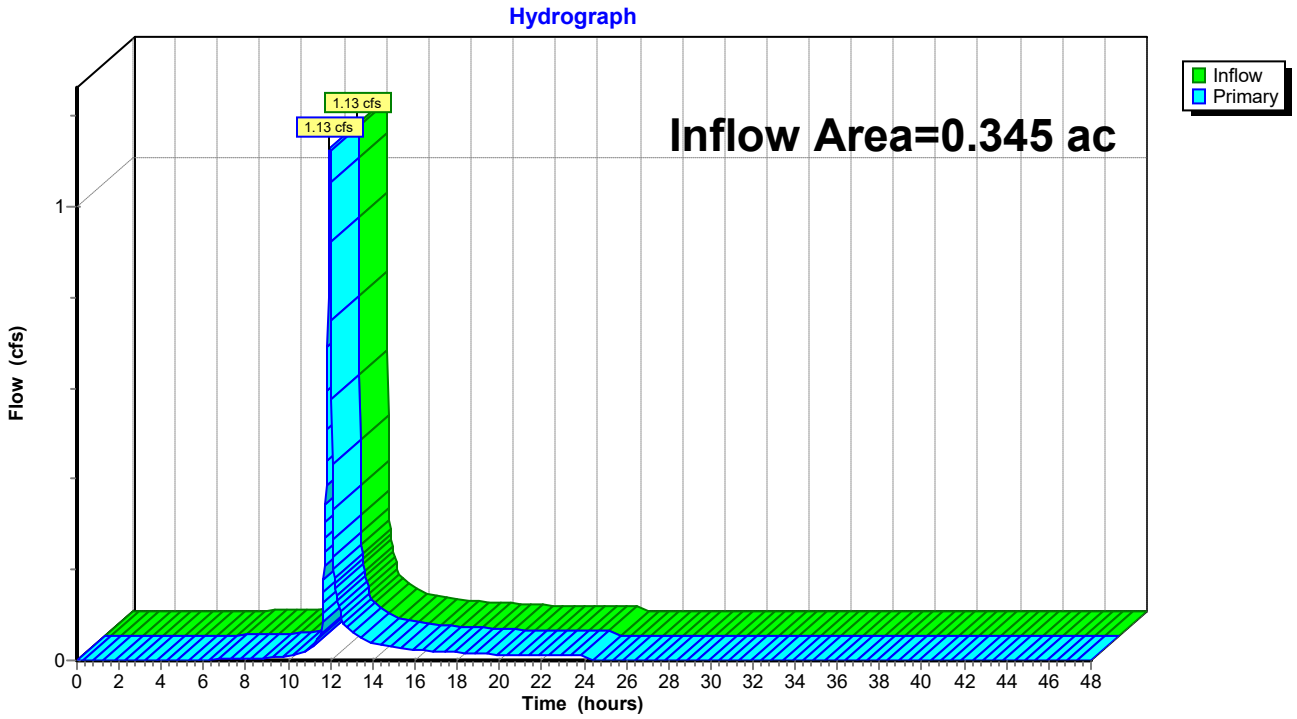


## Summary for Link D: DP-D

Inflow Area = 0.345 ac, 13.13% Impervious, Inflow Depth = 1.88" for 2-year event
Inflow = 1.13 cfs @ 11.97 hrs, Volume= 0.054 af
Primary = 1.13 cfs @ 11.97 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link D: DP-D



Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A1: PR-A1** Runoff Area=55,584 sf 94.17% Impervious Runoff Depth=4.89"
Tc=6.0 min CN=97 Runoff=9.44 cfs 0.520 af

**Subcatchment B1: PR-A1** Runoff Area=21,304 sf 17.57% Impervious Runoff Depth=3.59"
Tc=6.0 min CN=85 Runoff=3.01 cfs 0.146 af

**Subcatchment B2: PR-B2** Runoff Area=156 sf 100.00% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=0.03 cfs 0.001 af

**Subcatchment B3: PR-B3** Runoff Area=36,330 sf 96.91% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=6.21 cfs 0.348 af

**Subcatchment C1: PR-C1** Runoff Area=7,048 sf 100.00% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=1.20 cfs 0.067 af

**Subcatchment C2: PR-C2** Runoff Area=33,183 sf 61.90% Impervious Runoff Depth=4.32"
Tc=6.0 min CN=92 Runoff=5.34 cfs 0.274 af

**Subcatchment C3: PRA1** Runoff Area=64,958 sf 100.00% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=11.10 cfs 0.622 af

**Subcatchment C4: PR-C4** Runoff Area=5,330 sf 100.00% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=0.91 cfs 0.051 af

**Subcatchment D1: PRA1** Runoff Area=13,422 sf 2.62% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=82 Runoff=1.77 cfs 0.085 af

**Subcatchment D2: PR-A1** Runoff Area=1,625 sf 100.00% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=98 Runoff=0.28 cfs 0.016 af

**Link A: DP-A** Inflow=9.44 cfs 0.520 af
Primary=9.44 cfs 0.520 af

**Link B: DP-B** Inflow=9.24 cfs 0.496 af
Primary=9.24 cfs 0.496 af

**Link C: DP-C** Inflow=18.55 cfs 1.015 af
Primary=18.55 cfs 1.015 af

**Link D: DP-D** Inflow=2.05 cfs 0.100 af
Primary=2.05 cfs 0.100 af

**Total Runoff Area = 5.485 ac Runoff Volume = 2.130 af Average Runoff Depth = 4.66"**
**19.94% Pervious = 1.094 ac 80.06% Impervious = 4.392 ac**

## Summary for Subcatchment A1: PR-A1

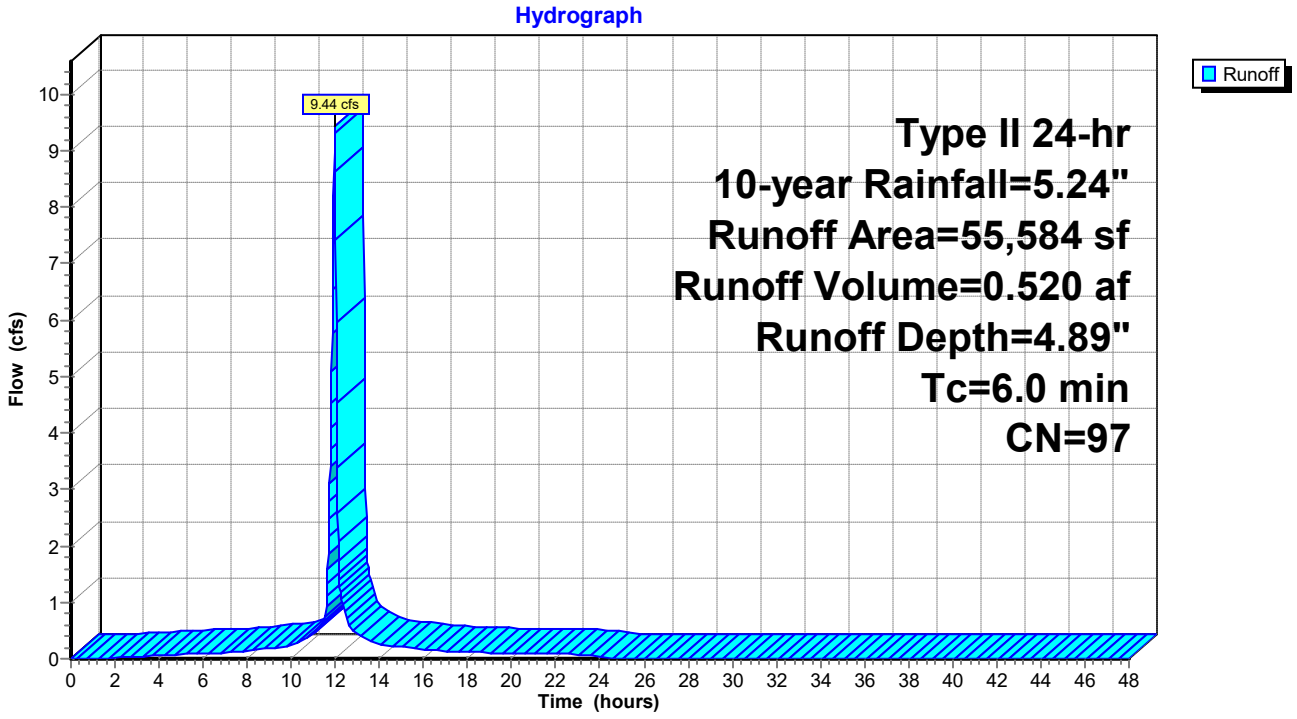
Runoff = 9.44 cfs @ 11.97 hrs, Volume= 0.520 af, Depth= 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 3,238 | 82 | Woods/grass comb., Fair, HSG D |
| 52,346 | 98 | Paved parking, HSG D |
| 55,584 | 97 | Weighted Average |
| 3,238 | | 5.83% Pervious Area |
| 52,346 | | 94.17% Impervious Area |

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

### Subcatchment A1: PR-A1



## Summary for Subcatchment B1: PR-A1

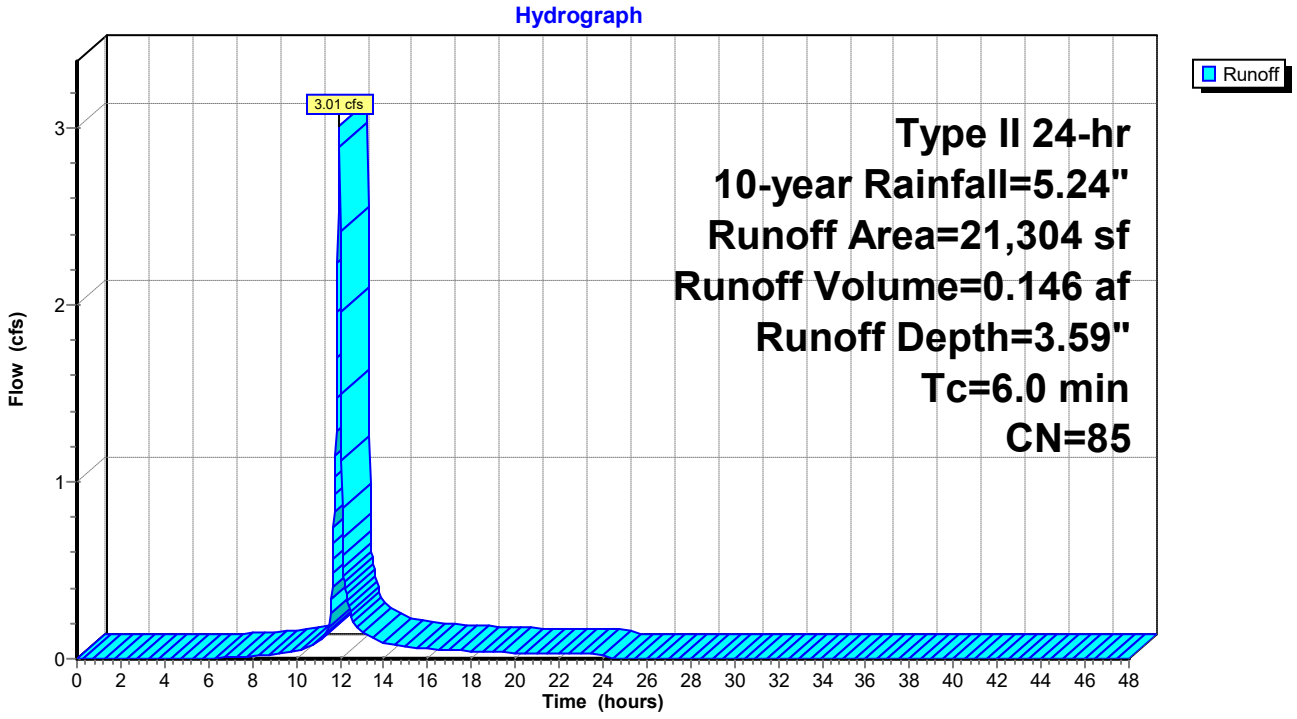
Runoff = 3.01 cfs @ 11.97 hrs, Volume= 0.146 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 17,561 | 82 | Woods/grass comb., Fair, HSG D |
| 3,743 | 98 | Paved parking, HSG D |
| 21,304 | 85 | Weighted Average |
| 17,561 | | 82.43% Pervious Area |
| 3,743 | | 17.57% Impervious Area |

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

### Subcatchment B1: PR-A1



## Summary for Subcatchment B2: PR-B2

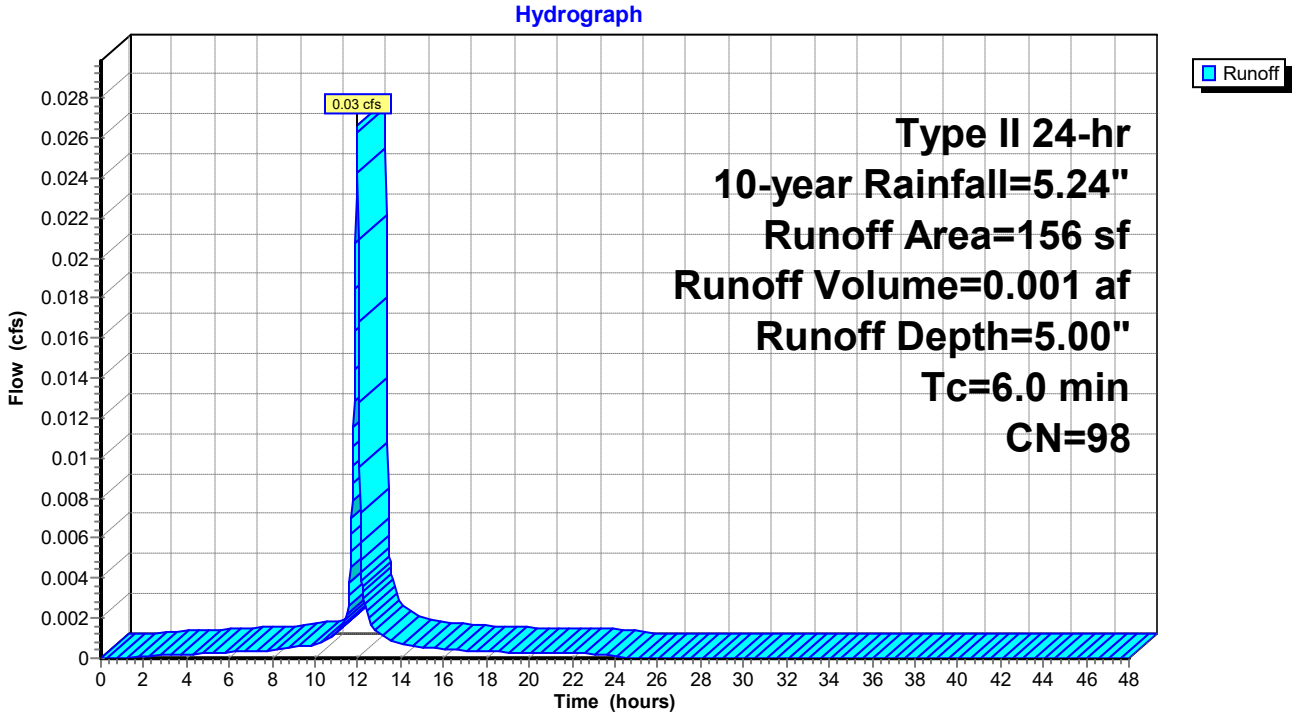
Runoff = 0.03 cfs @ 11.97 hrs, Volume= 0.001 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 156 | 98 | Paved parking, HSG D |
| 156 | 98 | Weighted Average |
| 156 | | 100.00% Impervious Area |

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

## Subcatchment B2: PR-B2



## Summary for Subcatchment B3: PR-B3

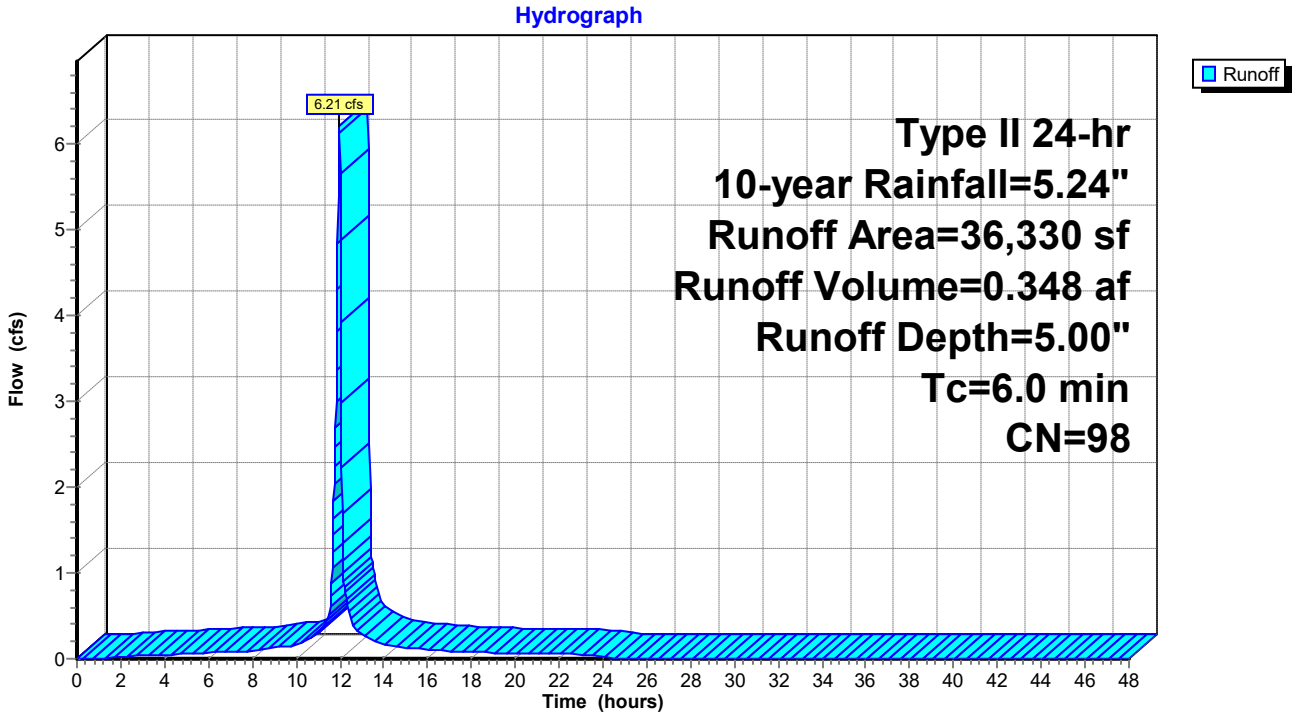
Runoff = 6.21 cfs @ 11.97 hrs, Volume= 0.348 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 1,124 | 82 | Woods/grass comb., Fair, HSG D |
| 35,206 | 98 | Paved parking, HSG D |
| 36,330 | 98 | Weighted Average |
| 1,124 | | 3.09% Pervious Area |
| 35,206 | | 96.91% Impervious Area |

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

### Subcatchment B3: PR-B3



## Summary for Subcatchment C1: PR-C1

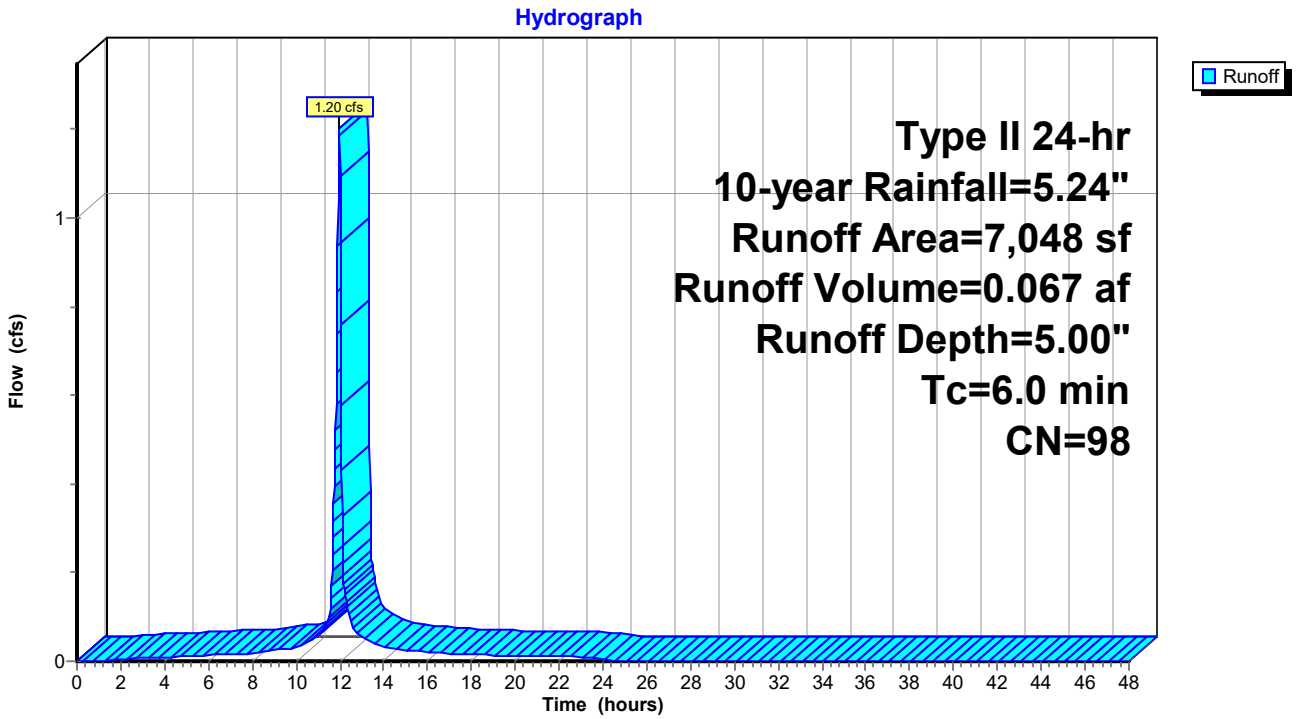
Runoff = 1.20 cfs @ 11.97 hrs, Volume= 0.067 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 7,048 | 98 | Paved parking, HSG D |
| 7,048 | 98 | Weighted Average |
| 7,048 | | 100.00% Impervious Area |

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

## Subcatchment C1: PR-C1



## Summary for Subcatchment C2: PR-C2

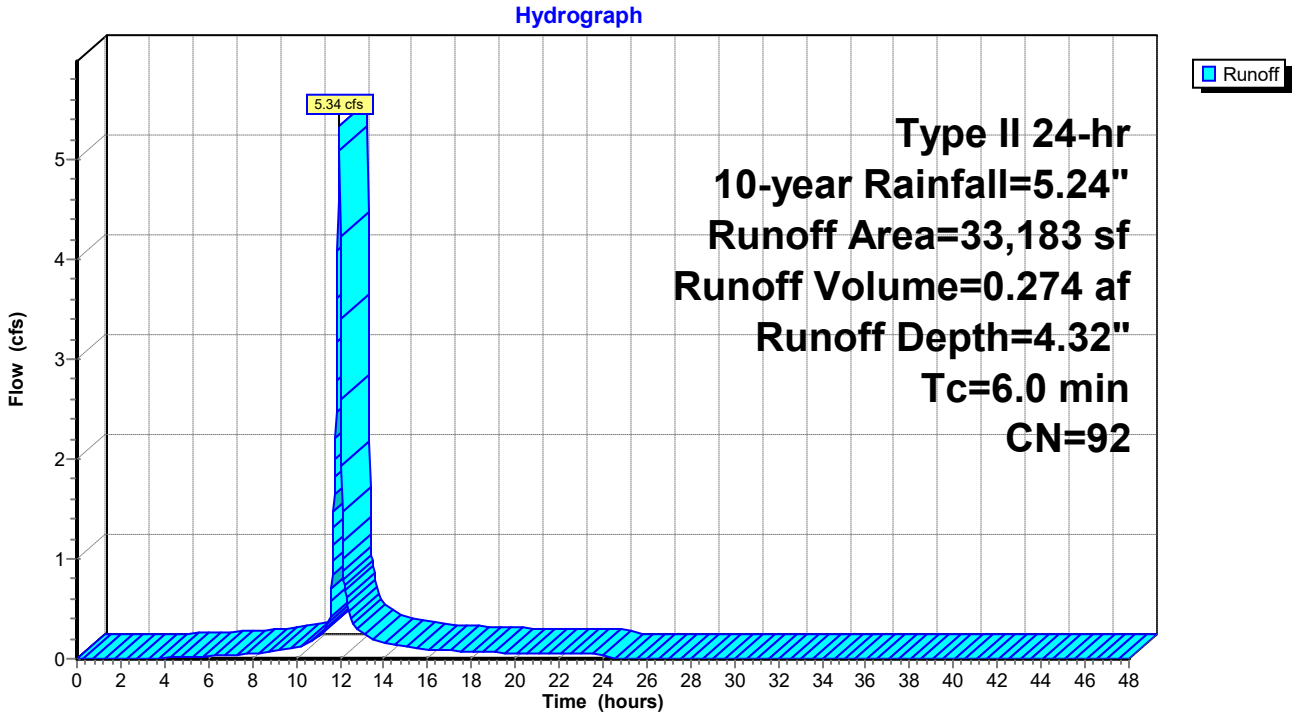
Runoff = 5.34 cfs @ 11.97 hrs, Volume= 0.274 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 12,643 | 82 | Woods/grass comb., Fair, HSG D |
| 20,540 | 98 | Paved parking, HSG D |
| 33,183 | 92 | Weighted Average |
| 12,643 | | 38.10% Pervious Area |
| 20,540 | | 61.90% Impervious Area |

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

## Subcatchment C2: PR-C2



## Summary for Subcatchment C3: PRA1

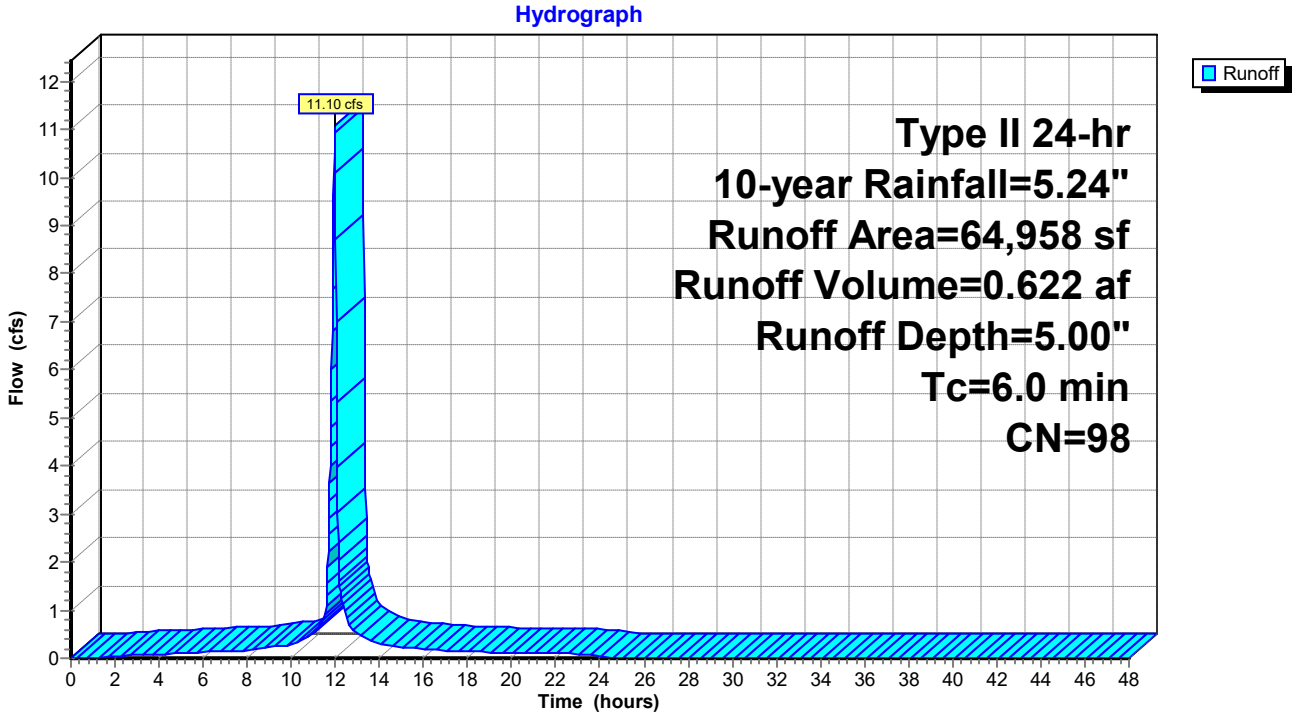
Runoff = 11.10 cfs @ 11.97 hrs, Volume= 0.622 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 64,958 | 98 | Paved parking, HSG D |
| 64,958 | 98 | Weighted Average |
| 64,958 | | 100.00% Impervious Area |

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

## Subcatchment C3: PRA1



## Summary for Subcatchment C4: PR-C4

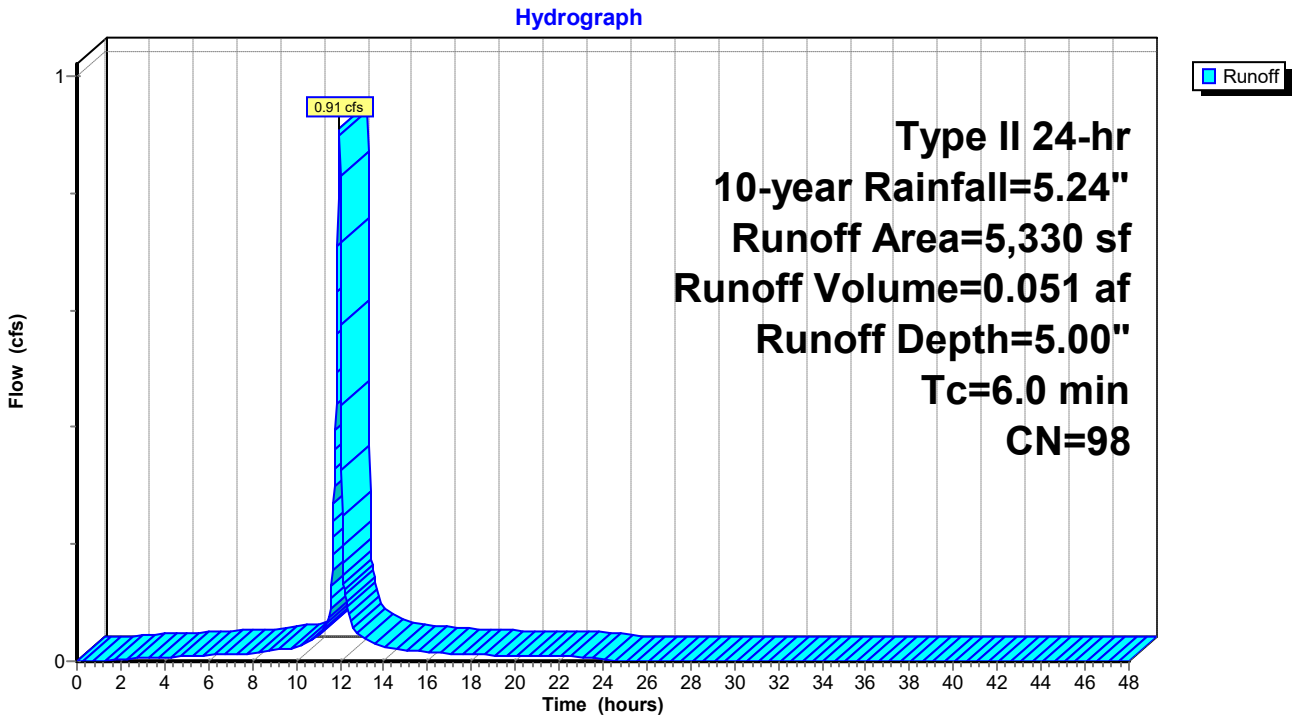
Runoff = 0.91 cfs @ 11.97 hrs, Volume= 0.051 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 5,330 | 98 | Paved parking, HSG D |
| 5,330 | 98 | Weighted Average |
| 5,330 | | 100.00% Impervious Area |

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

## Subcatchment C4: PR-C4



## Summary for Subcatchment D1: PRA1

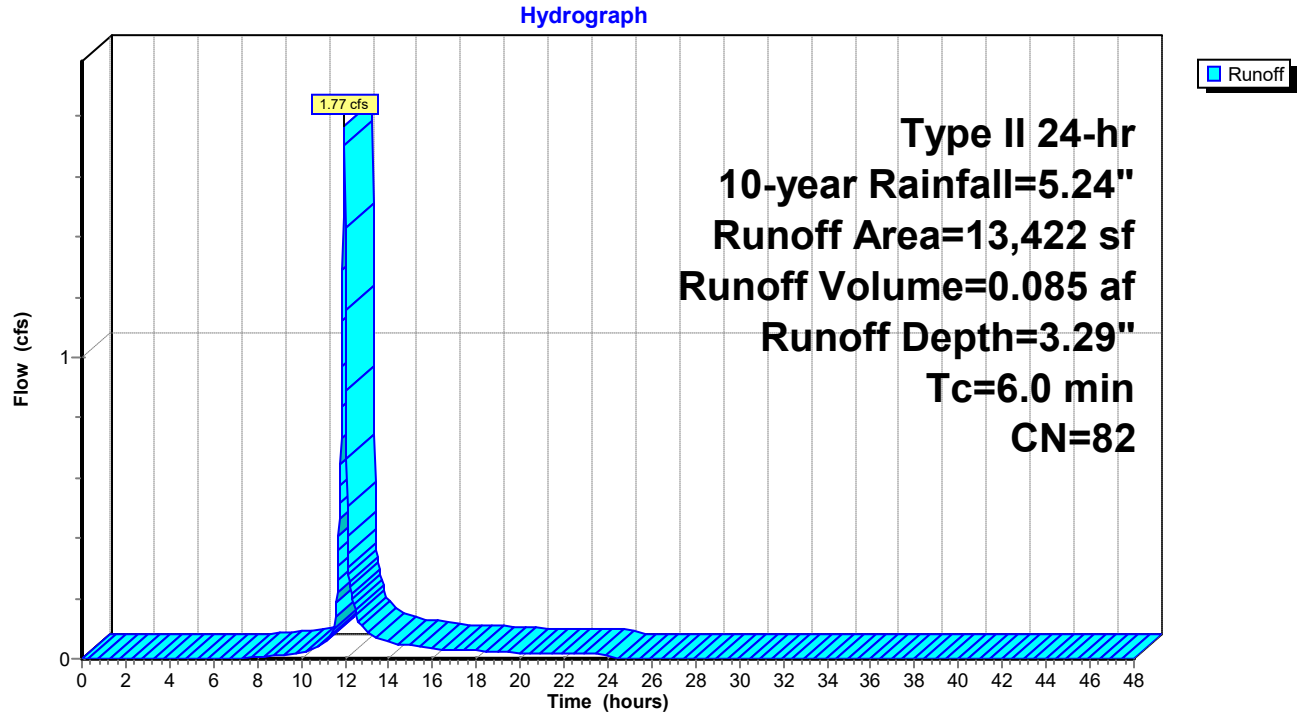
Runoff = 1.77 cfs @ 11.97 hrs, Volume= 0.085 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 13,071 | 82 | Woods/grass comb., Fair, HSG D |
| 351 | 98 | Paved parking, HSG D |
| 13,422 | 82 | Weighted Average |
| 13,071 | | 97.38% Pervious Area |
| 351 | | 2.62% Impervious Area |

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

### Subcatchment D1: PRA1



## Summary for Subcatchment D2: PR-A1

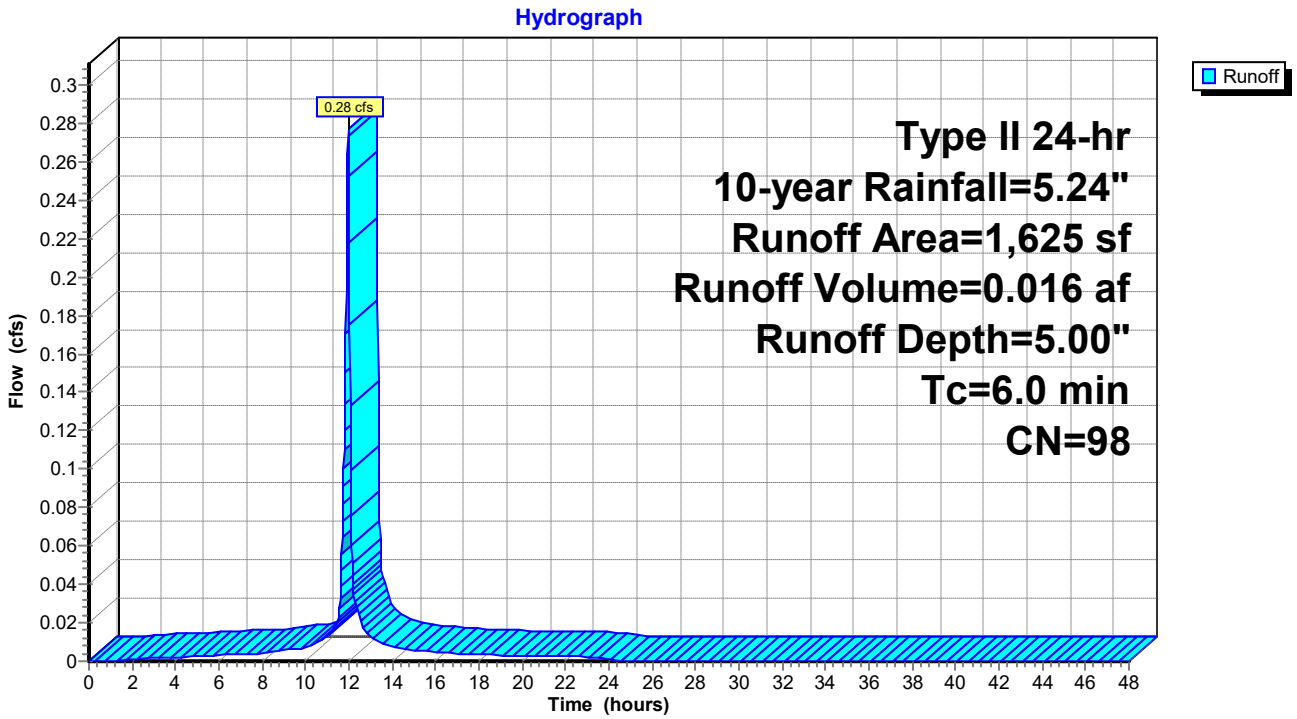
Runoff = 0.28 cfs @ 11.97 hrs, Volume= 0.016 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-year Rainfall=5.24"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 1,625 | 98 | Paved parking, HSG D |
| 1,625 | 98 | Weighted Average |
| 1,625 | | 100.00% Impervious Area |

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

## Subcatchment D2: PR-A1

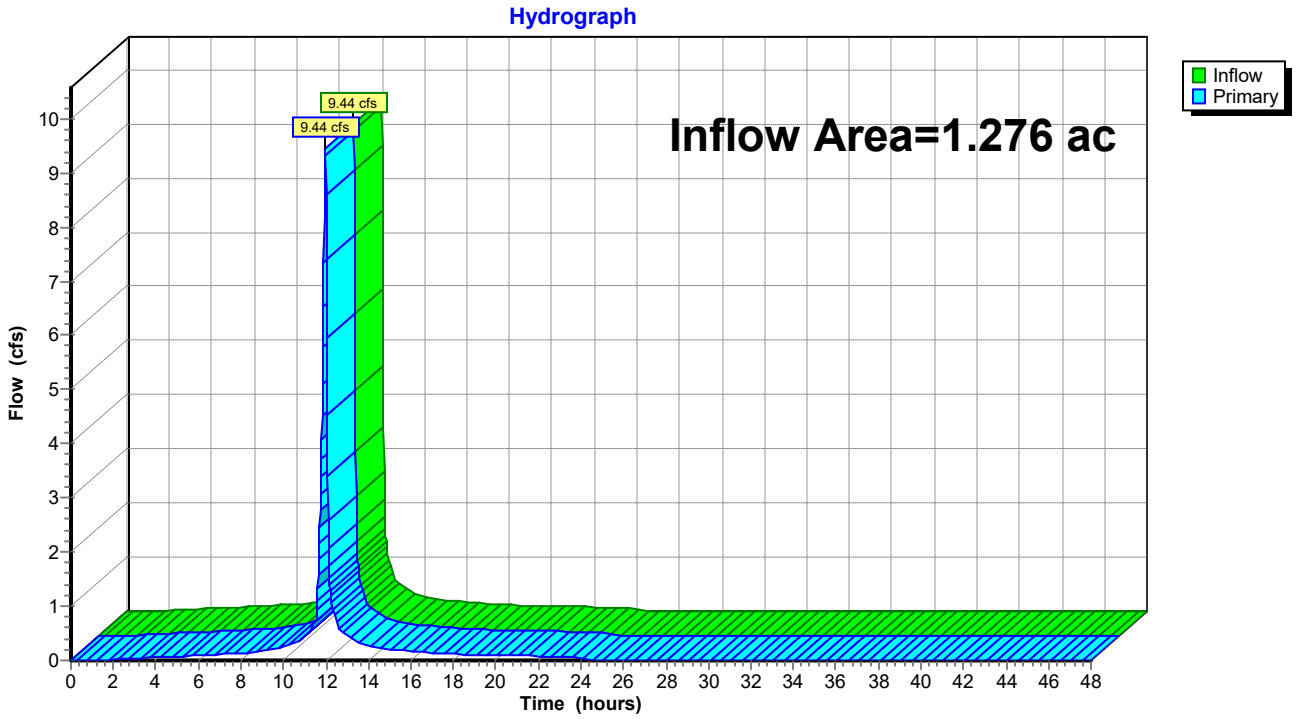


## Summary for Link A: DP-A

Inflow Area = 1.276 ac, 94.17% Impervious, Inflow Depth = 4.89" for 10-year event
Inflow = 9.44 cfs @ 11.97 hrs, Volume= 0.520 af
Primary = 9.44 cfs @ 11.97 hrs, Volume= 0.520 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link A: DP-A

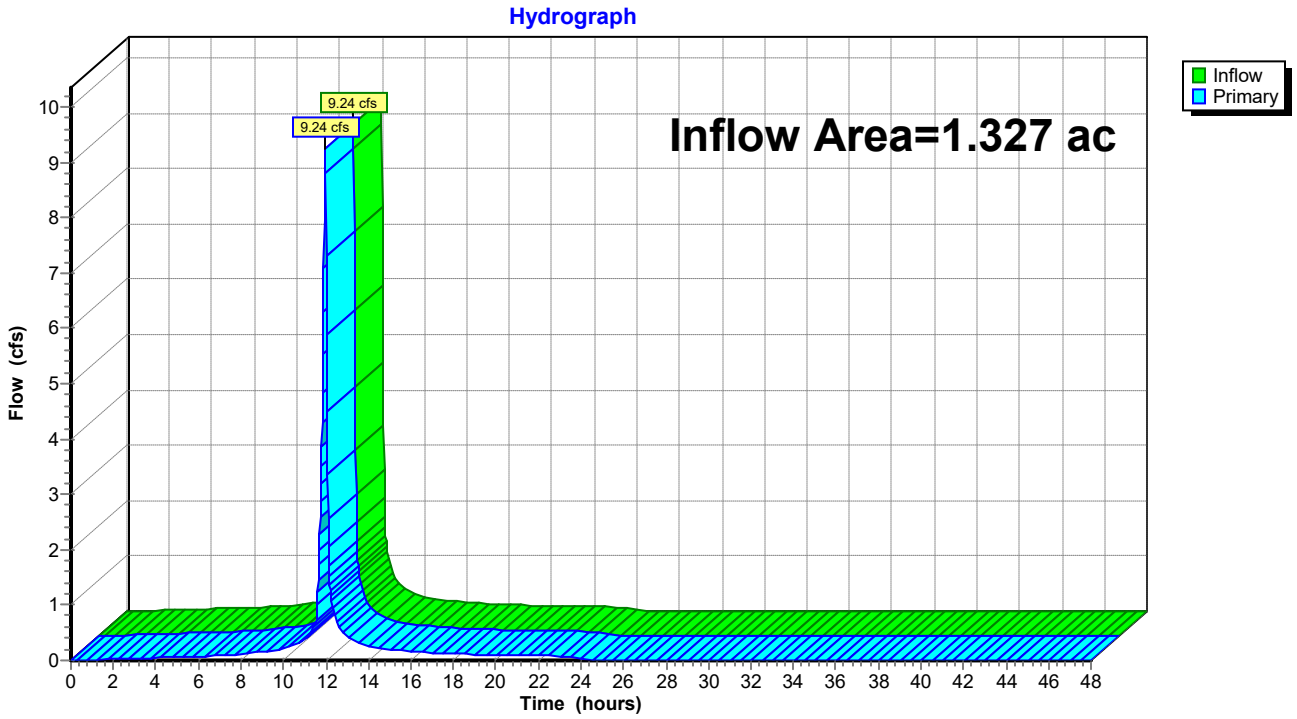


## Summary for Link B: DP-B

Inflow Area = 1.327 ac, 67.67% Impervious, Inflow Depth = 4.48" for 10-year event
Inflow = 9.24 cfs @ 11.97 hrs, Volume= 0.496 af
Primary = 9.24 cfs @ 11.97 hrs, Volume= 0.496 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link B: DP-B

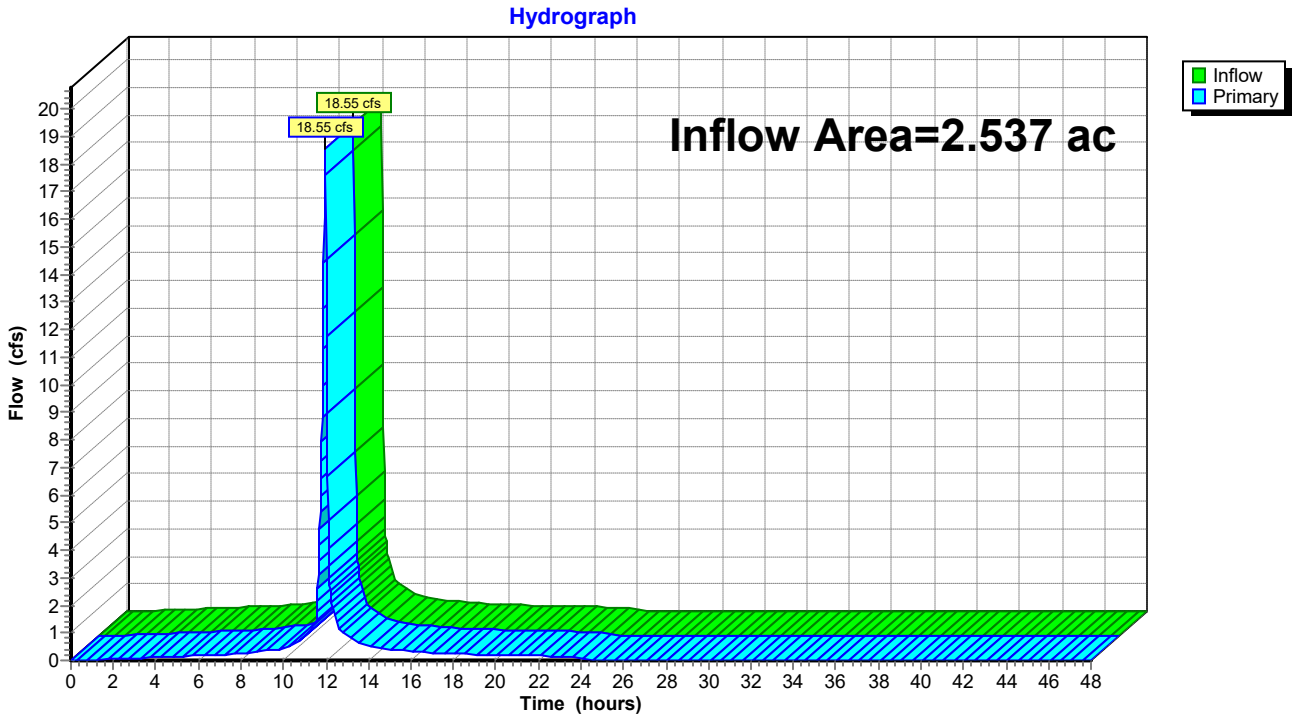


## Summary for Link C: DP-C

Inflow Area = 2.537 ac, 88.56% Impervious, Inflow Depth = 4.80" for 10-year event
Inflow = 18.55 cfs @ 11.97 hrs, Volume= 1.015 af
Primary = 18.55 cfs @ 11.97 hrs, Volume= 1.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link C: DP-C

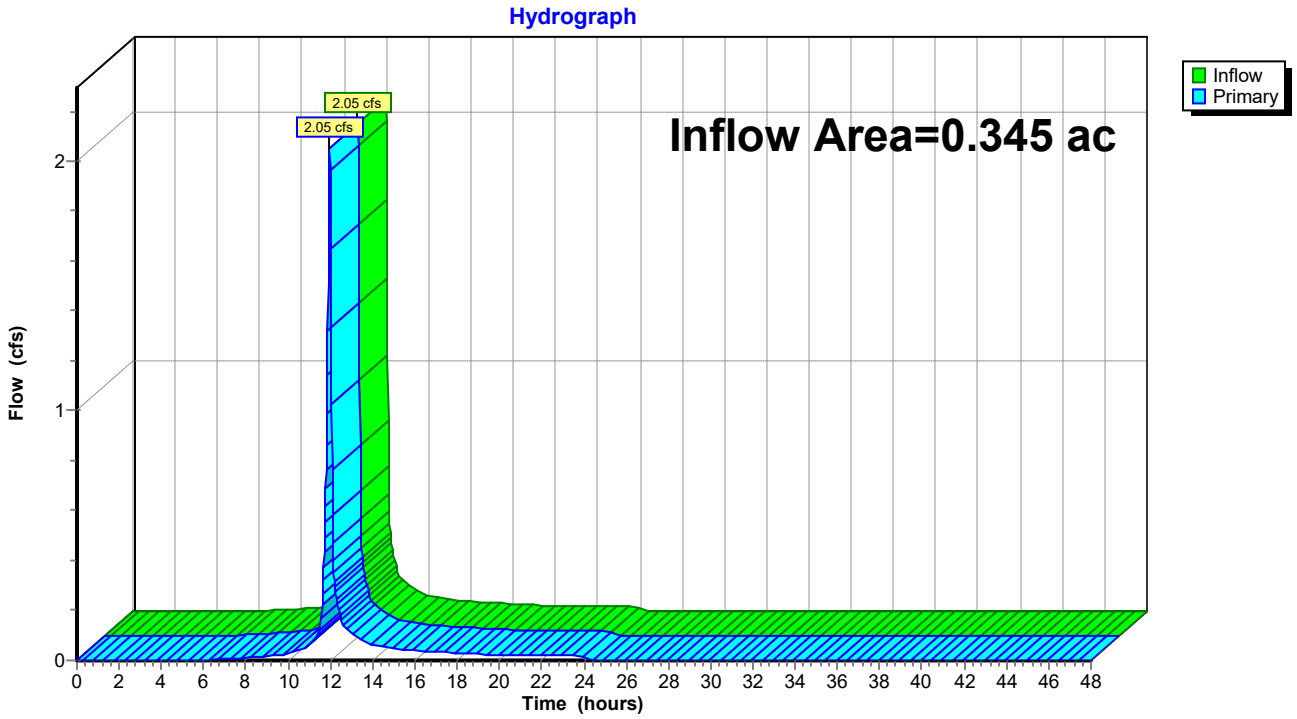


## Summary for Link D: DP-D

Inflow Area = 0.345 ac, 13.13% Impervious, Inflow Depth = 3.48" for 10-year event
Inflow = 2.05 cfs @ 11.97 hrs, Volume= 0.100 af
Primary = 2.05 cfs @ 11.97 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link D: DP-D



Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A1: PR-A1** Runoff Area=55,584 sf 94.17% Impervious Runoff Depth=7.75"
Tc=6.0 min CN=97 Runoff=14.70 cfs 0.824 af

**Subcatchment B1: PR-A1** Runoff Area=21,304 sf 17.57% Impervious Runoff Depth=6.32"
Tc=6.0 min CN=85 Runoff=5.12 cfs 0.258 af

**Subcatchment B2: PR-B2** Runoff Area=156 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=0.04 cfs 0.002 af

**Subcatchment B3: PR-B3** Runoff Area=36,330 sf 96.91% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=9.63 cfs 0.547 af

**Subcatchment C1: PR-C1** Runoff Area=7,048 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=1.87 cfs 0.106 af

**Subcatchment C2: PR-C2** Runoff Area=33,183 sf 61.90% Impervious Runoff Depth=7.15"
Tc=6.0 min CN=92 Runoff=8.55 cfs 0.454 af

**Subcatchment C3: PRA1** Runoff Area=64,958 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=17.22 cfs 0.978 af

**Subcatchment C4: PR-C4** Runoff Area=5,330 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=1.41 cfs 0.080 af

**Subcatchment D1: PRA1** Runoff Area=13,422 sf 2.62% Impervious Runoff Depth=5.96"
Tc=6.0 min CN=82 Runoff=3.10 cfs 0.153 af

**Subcatchment D2: PR-A1** Runoff Area=1,625 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=0.43 cfs 0.024 af

**Link A: DP-A** Inflow=14.70 cfs 0.824 af
Primary=14.70 cfs 0.824 af

**Link B: DP-B** Inflow=14.79 cfs 0.807 af
Primary=14.79 cfs 0.807 af

**Link C: DP-C** Inflow=29.05 cfs 1.618 af
Primary=29.05 cfs 1.618 af

**Link D: DP-D** Inflow=3.53 cfs 0.178 af
Primary=3.53 cfs 0.178 af

**Total Runoff Area = 5.485 ac Runoff Volume = 3.427 af Average Runoff Depth = 7.50"**
**19.94% Pervious = 1.094 ac 80.06% Impervious = 4.392 ac**

## Summary for Subcatchment A1: PR-A1

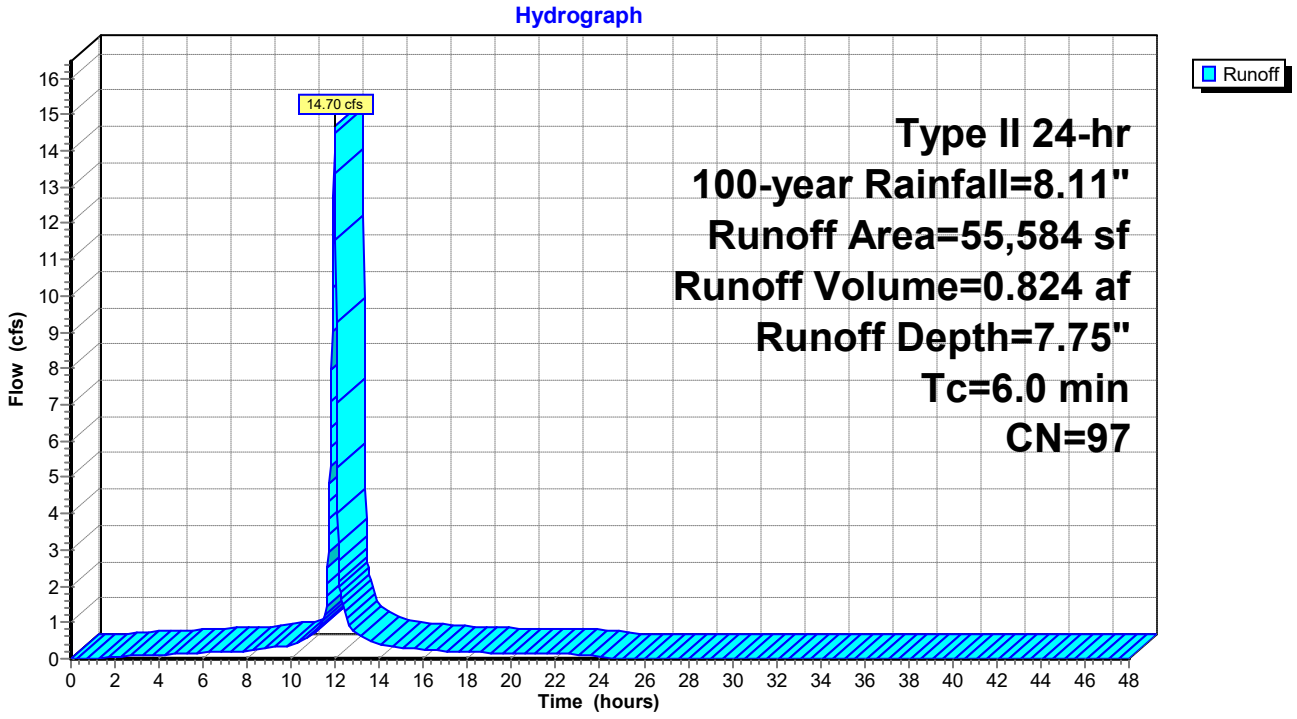
Runoff = 14.70 cfs @ 11.97 hrs, Volume= 0.824 af, Depth= 7.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 3,238 | 82 | Woods/grass comb., Fair, HSG D |
| 52,346 | 98 | Paved parking, HSG D |
| 55,584 | 97 | Weighted Average |
| 3,238 | | 5.83% Pervious Area |
| 52,346 | | 94.17% Impervious Area |

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

## Subcatchment A1: PR-A1



## Summary for Subcatchment B1: PR-A1

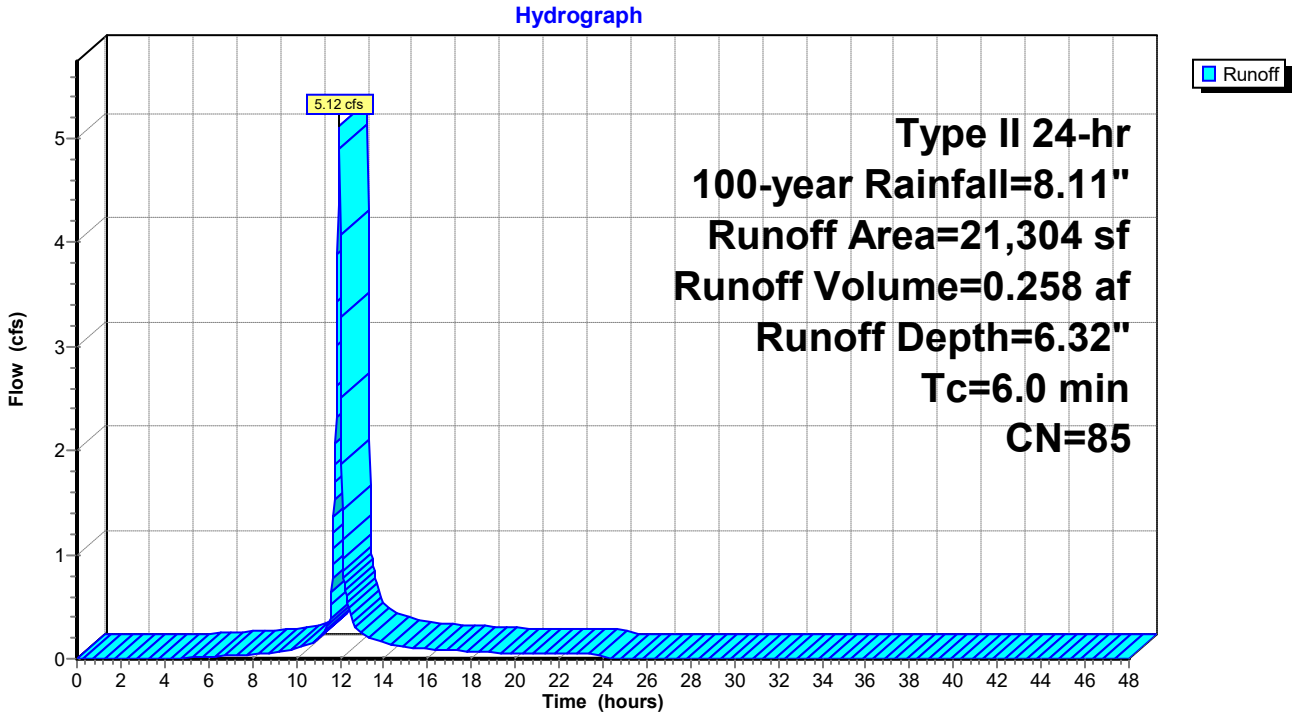
Runoff = 5.12 cfs @ 11.97 hrs, Volume= 0.258 af, Depth= 6.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 17,561 | 82 | Woods/grass comb., Fair, HSG D |
| 3,743 | 98 | Paved parking, HSG D |
| 21,304 | 85 | Weighted Average |
| 17,561 | | 82.43% Pervious Area |
| 3,743 | | 17.57% Impervious Area |

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

### Subcatchment B1: PR-A1



## Summary for Subcatchment B2: PR-B2

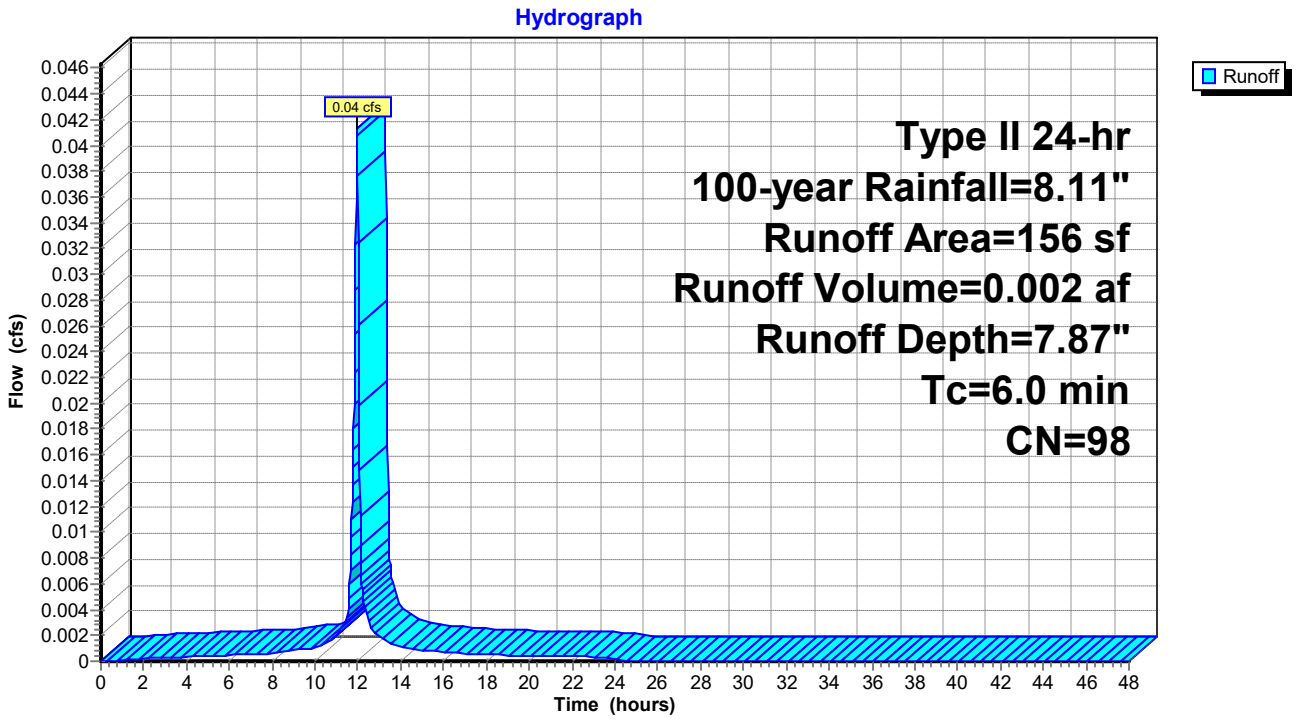
Runoff = 0.04 cfs @ 11.97 hrs, Volume= 0.002 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 156 | 98 | Paved parking, HSG D |
| 156 | 98 | Weighted Average |
| 156 | | 100.00% Impervious Area |

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

## Subcatchment B2: PR-B2



## Summary for Subcatchment B3: PR-B3

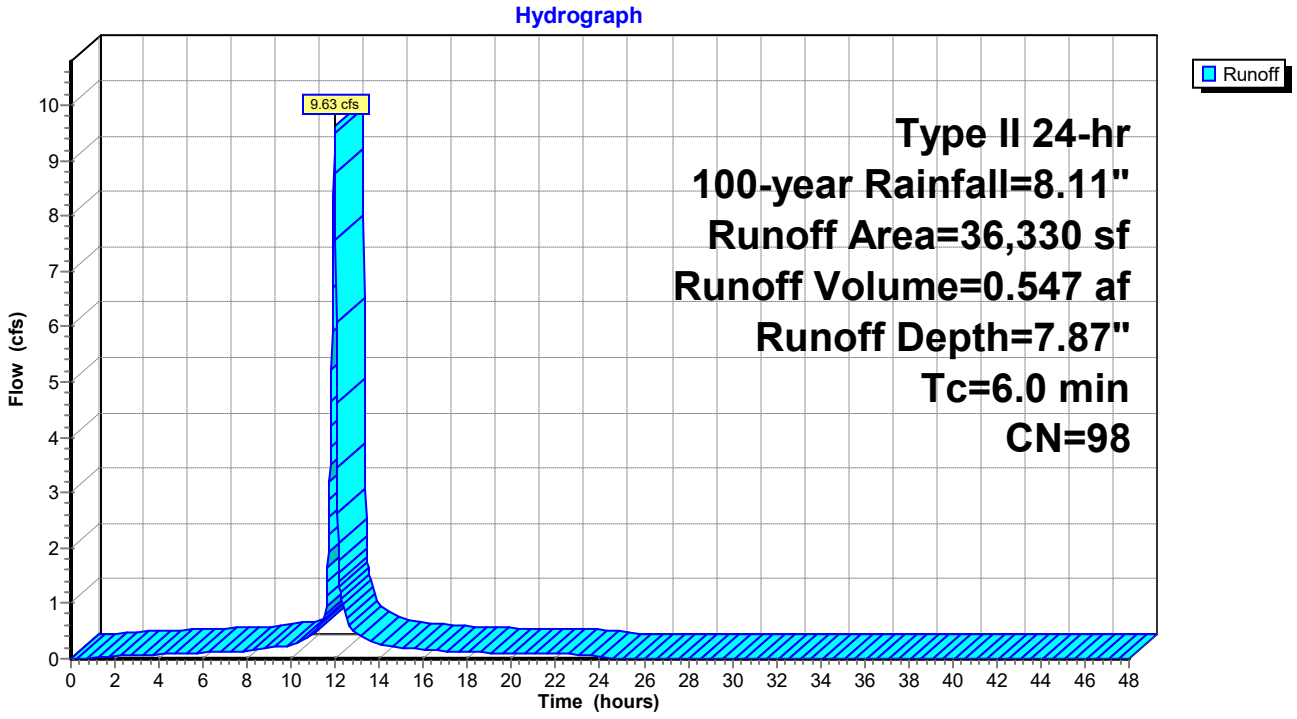
Runoff = 9.63 cfs @ 11.97 hrs, Volume= 0.547 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 1,124 | 82 | Woods/grass comb., Fair, HSG D |
| 35,206 | 98 | Paved parking, HSG D |
| 36,330 | 98 | Weighted Average |
| 1,124 | | 3.09% Pervious Area |
| 35,206 | | 96.91% Impervious Area |

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

## Subcatchment B3: PR-B3



## Summary for Subcatchment C1: PR-C1

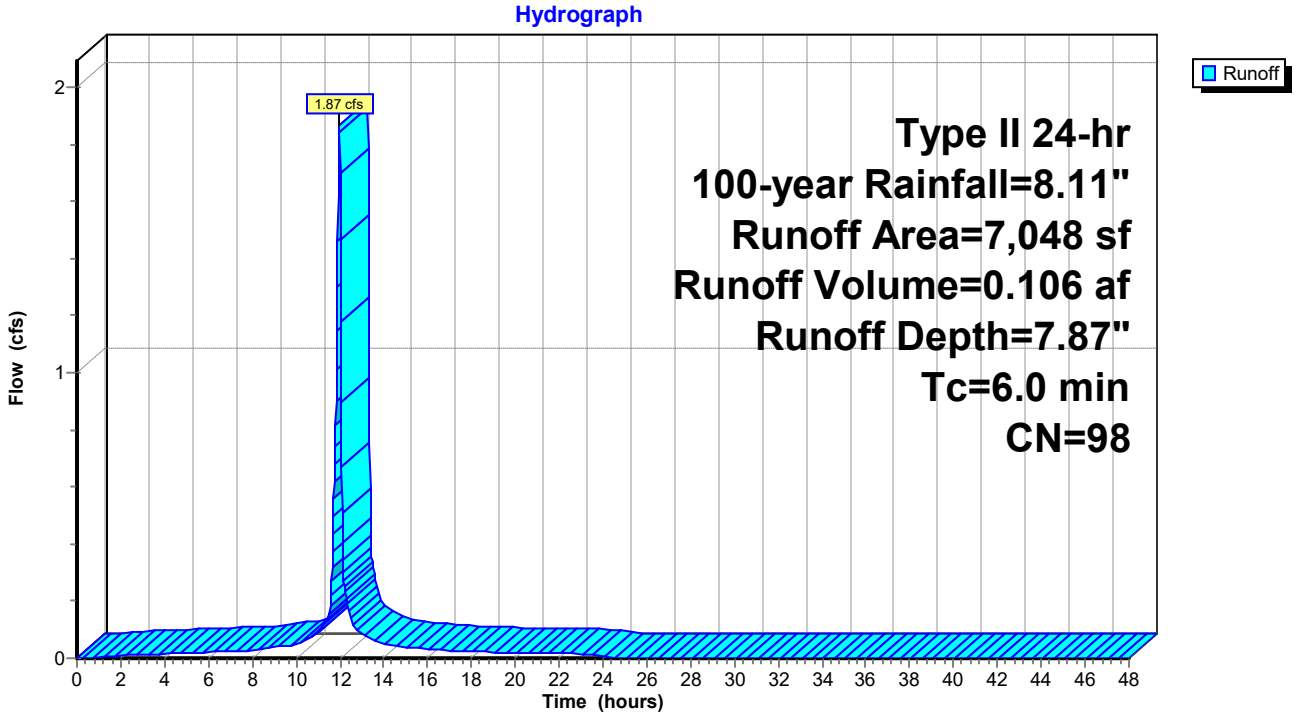
Runoff = 1.87 cfs @ 11.97 hrs, Volume= 0.106 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 7,048 | 98 | Paved parking, HSG D |
| 7,048 | 98 | Weighted Average |
| 7,048 | | 100.00% Impervious Area |

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

## Subcatchment C1: PR-C1



## Summary for Subcatchment C2: PR-C2

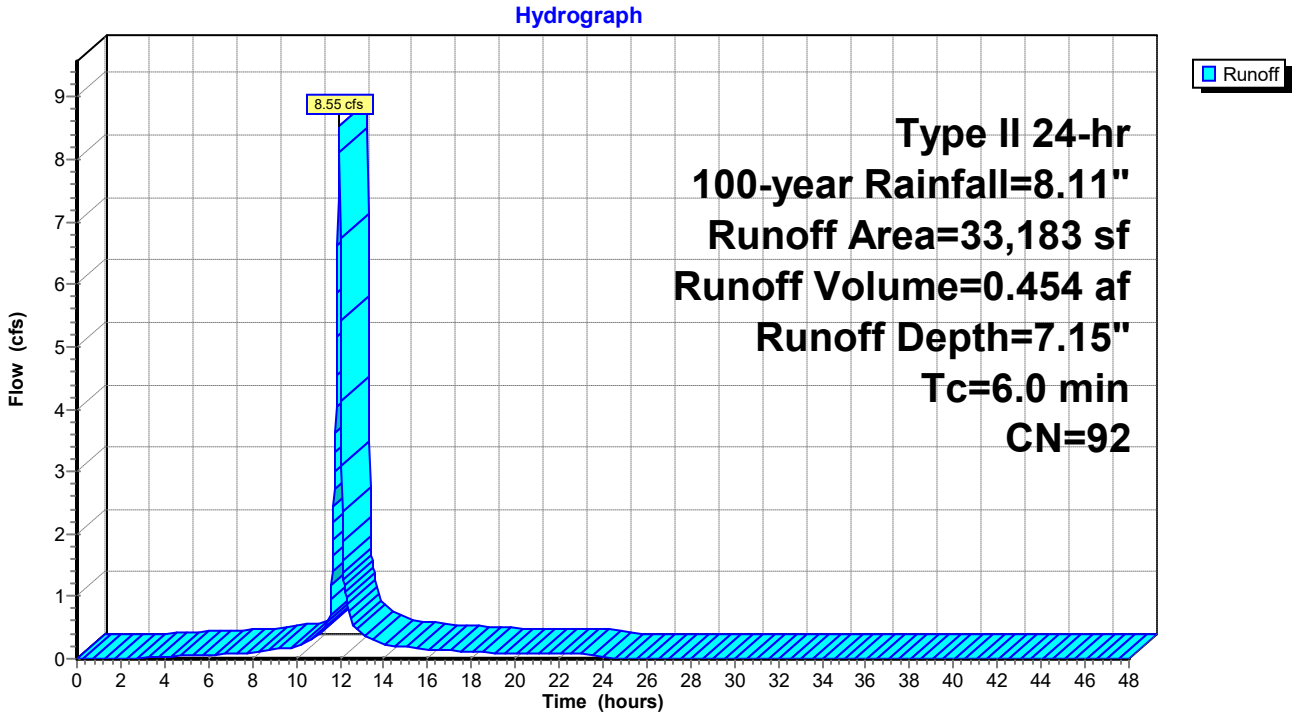
Runoff = 8.55 cfs @ 11.97 hrs, Volume= 0.454 af, Depth= 7.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 12,643 | 82 | Woods/grass comb., Fair, HSG D |
| 20,540 | 98 | Paved parking, HSG D |
| 33,183 | 92 | Weighted Average |
| 12,643 | | 38.10% Pervious Area |
| 20,540 | | 61.90% Impervious Area |

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

## Subcatchment C2: PR-C2



## Summary for Subcatchment C3: PRA1

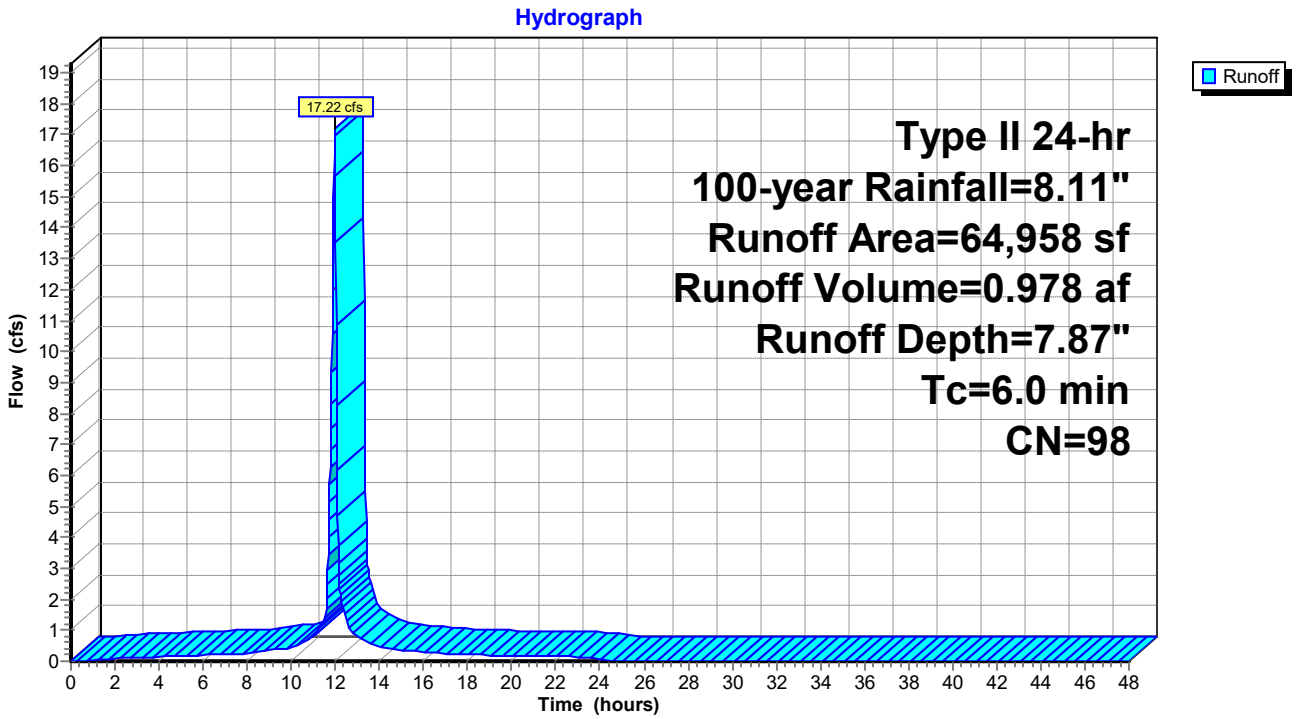
Runoff = 17.22 cfs @ 11.97 hrs, Volume= 0.978 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 64,958 | 98 | Paved parking, HSG D |
| 64,958 | 98 | Weighted Average |
| 64,958 | | 100.00% Impervious Area |

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

### Subcatchment C3: PRA1



## Summary for Subcatchment C4: PR-C4

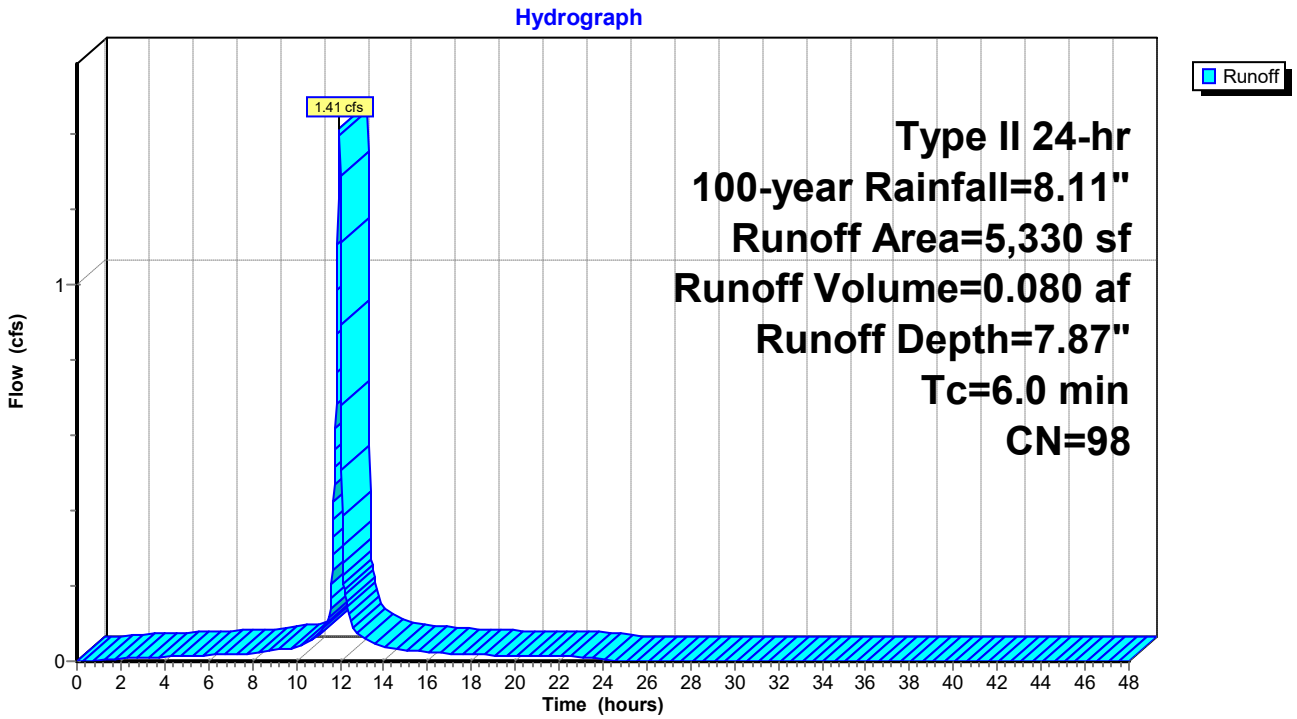
Runoff = 1.41 cfs @ 11.97 hrs, Volume= 0.080 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 5,330 | 98 | Paved parking, HSG D |
| 5,330 | 98 | Weighted Average |
| 5,330 | | 100.00% Impervious Area |

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

## Subcatchment C4: PR-C4



## Summary for Subcatchment D1: PRA1

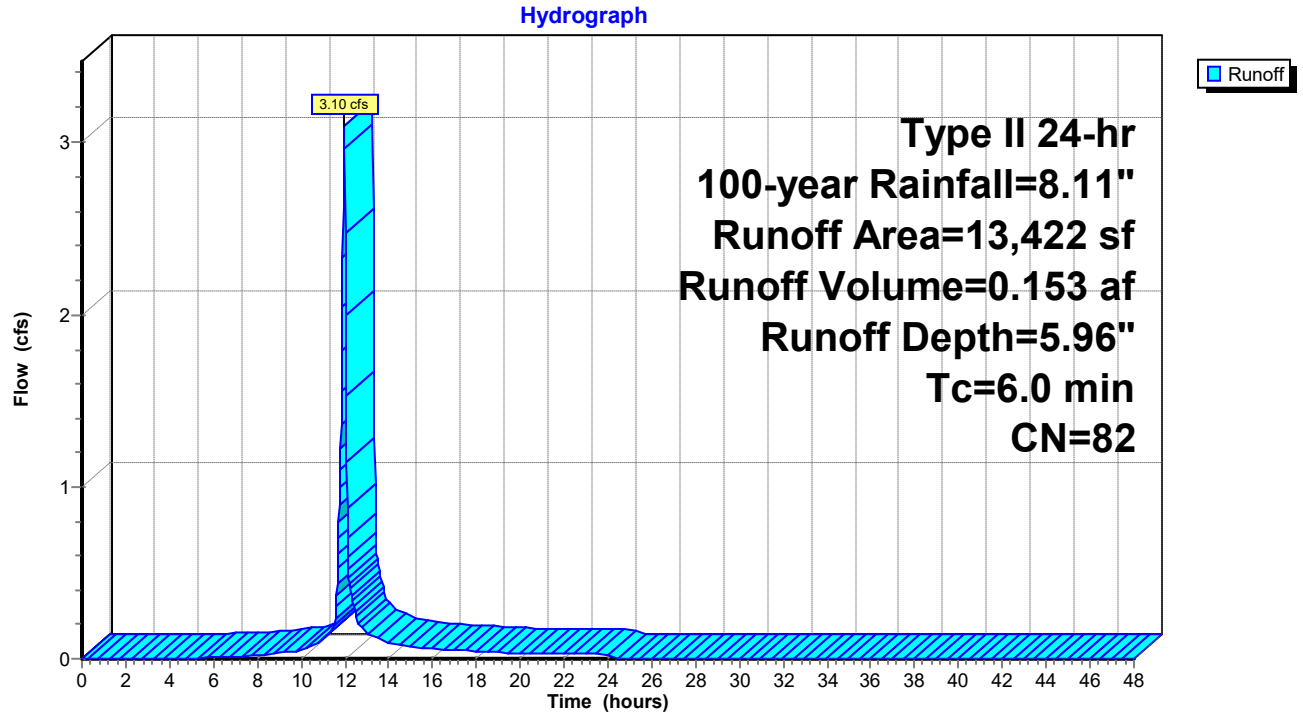
Runoff = 3.10 cfs @ 11.97 hrs, Volume= 0.153 af, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 13,071 | 82 | Woods/grass comb., Fair, HSG D |
| 351 | 98 | Paved parking, HSG D |
| 13,422 | 82 | Weighted Average |
| 13,071 | | 97.38% Pervious Area |
| 351 | | 2.62% Impervious Area |

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

### Subcatchment D1: PRA1



## Summary for Subcatchment D2: PR-A1

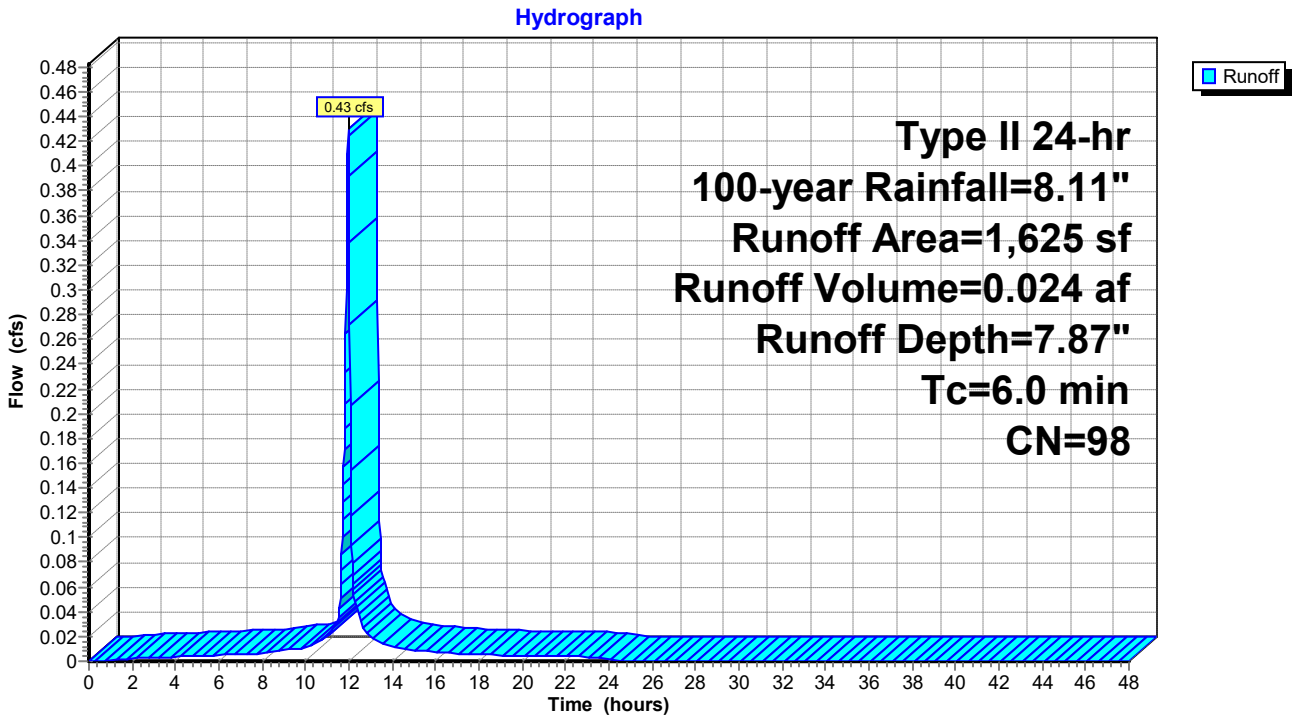
Runoff = 0.43 cfs @ 11.97 hrs, Volume= 0.024 af, Depth= 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 100-year Rainfall=8.11"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 82 | Woods/grass comb., Fair, HSG D |
| 1,625 | 98 | Paved parking, HSG D |
| 1,625 | 98 | Weighted Average |
| 1,625 | | 100.00% Impervious Area |

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

## Subcatchment D2: PR-A1

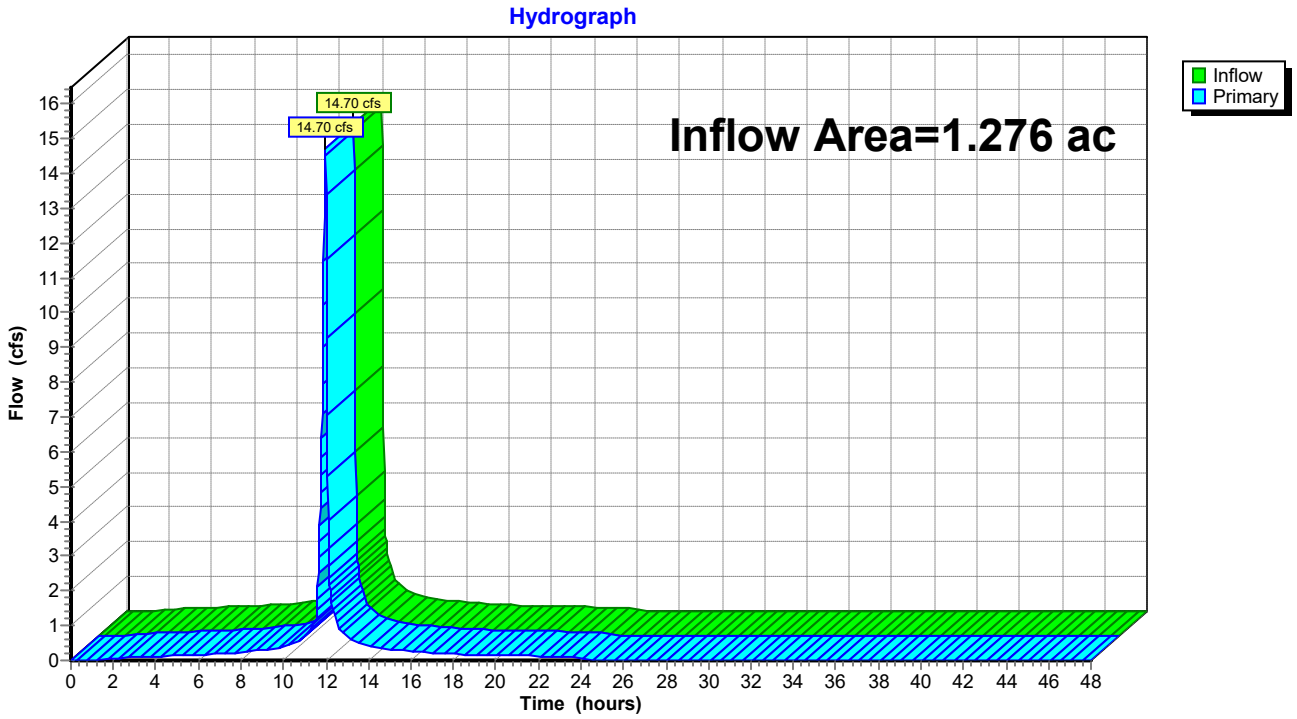


## Summary for Link A: DP-A

Inflow Area = 1.276 ac, 94.17% Impervious, Inflow Depth = 7.75" for 100-year event
Inflow = 14.70 cfs @ 11.97 hrs, Volume= 0.824 af
Primary = 14.70 cfs @ 11.97 hrs, Volume= 0.824 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link A: DP-A

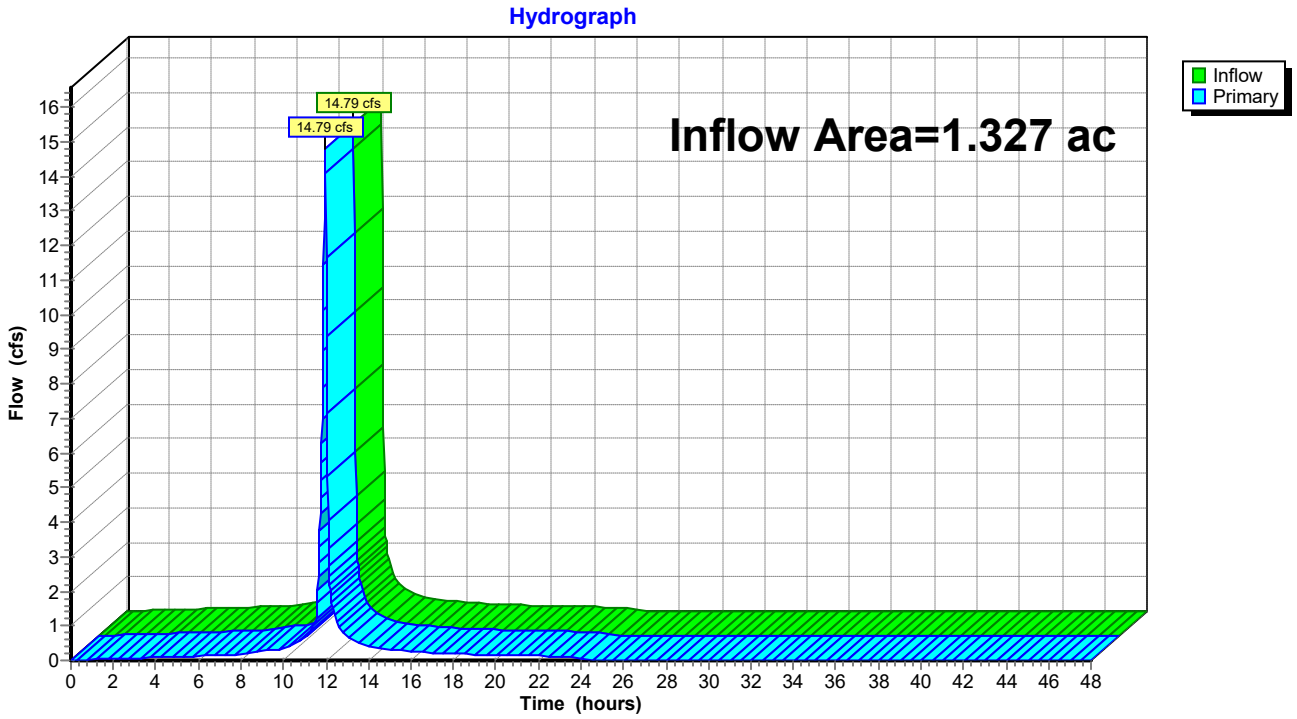


## Summary for Link B: DP-B

Inflow Area = 1.327 ac, 67.67% Impervious, Inflow Depth = 7.30" for 100-year event
Inflow = 14.79 cfs @ 11.97 hrs, Volume= 0.807 af
Primary = 14.79 cfs @ 11.97 hrs, Volume= 0.807 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link B: DP-B

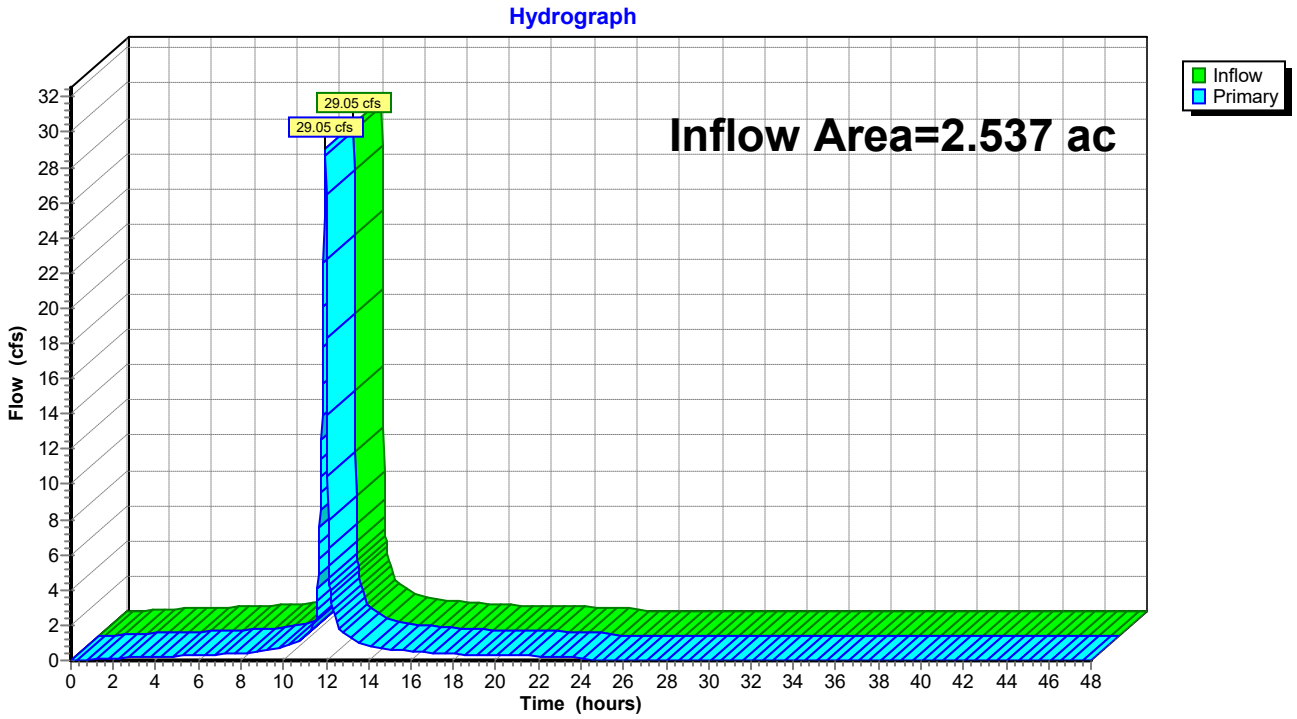


## Summary for Link C: DP-C

Inflow Area = 2.537 ac, 88.56% Impervious, Inflow Depth = 7.65" for 100-year event
Inflow = 29.05 cfs @ 11.97 hrs, Volume= 1.618 af
Primary = 29.05 cfs @ 11.97 hrs, Volume= 1.618 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link C: DP-C

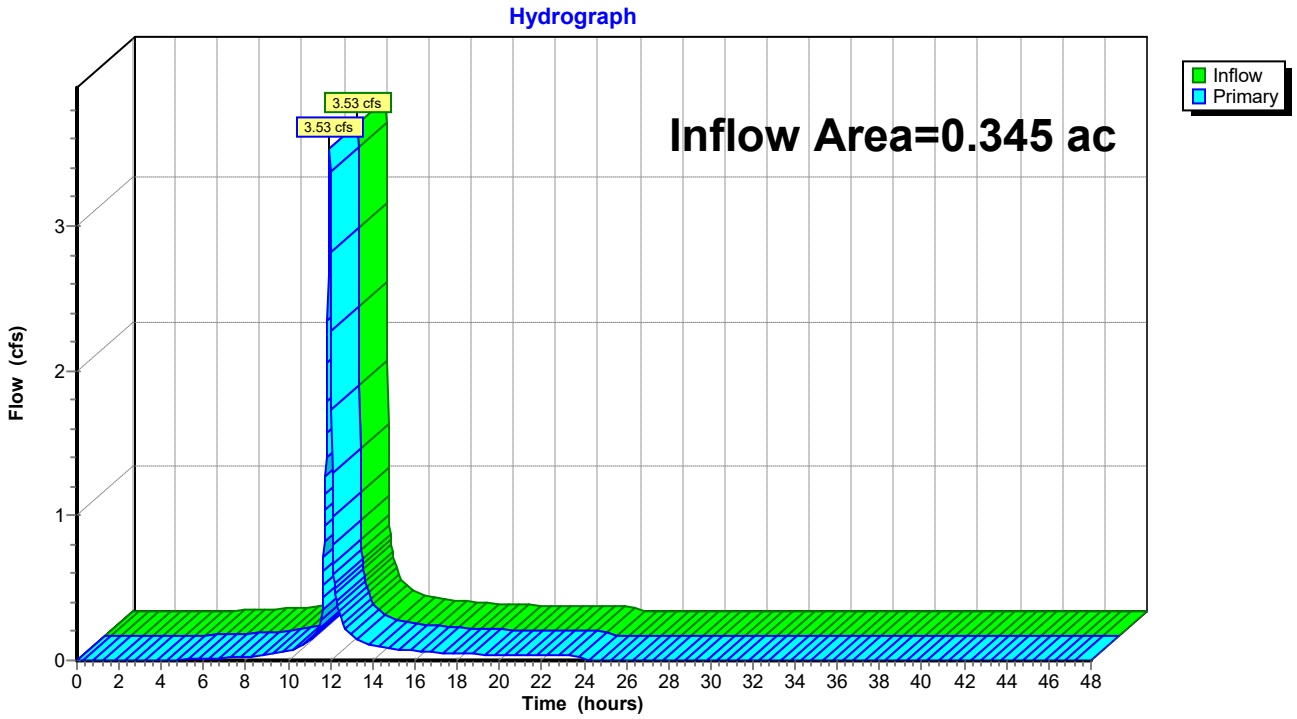


## Summary for Link D: DP-D

Inflow Area = 0.345 ac, 13.13% Impervious, Inflow Depth = 6.17" for 100-year event
Inflow = 3.53 cfs @ 11.97 hrs, Volume= 0.178 af
Primary = 3.53 cfs @ 11.97 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

## Link D: DP-D



# Appendix E: O&M Plan and LTPPP

# Commercial Street (Route 140) at Walnut Street

## Stormwater Management System Operation and Maintenance Plan and Long-Term Pollution Prevention Plan

*Foxborough*

PREPARED FOR

Town of Foxborough DPW
70 Elm Street
Foxborough, MA 02035

PREPARED BY

TEC, Inc.
282 Merrimack Street , 2nd Floor
Lawrence, MA, 01843

June 20, 2023

Commercial Street (Route140) at Walnut Street

# Table of Contents

# 1

# Stormwater Management System Operation and Maintenance (O&M) Plan

This Stormwater Management System Operation and Maintenance (O&M) Plan describes the approach for inspection and maintenance of drainage infrastructure and structural stormwater control measures (SCMs) to minimize contaminant loading for Foxborough. In general, inspection and maintenance activities will be conducted consistent with the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer System (MS4) and MassDOT's anticipated NPDES Transportation Separate Storm Sewer System (TS4) Permit.

This document has been prepared per the requirements of Massachusetts Department of Environmental Protection (MassDEP) Regulations 310 CMR 10.05 (6)(k)(9) and satisfies the requirements of Massachusetts Stormwater Standard 9.

## 1.1 Responsible Party

In accordance with MassDOT procedures, the MassDOT District 5 office located in Taunton, MA, is responsible for the maintenance of all stormwater management systems on Commercial Street and the I-95 Exit 7B off-ramp.

Questions or concerns regarding activities associated with this O&M Plan should be addressed to MassDOT's District 5 office located at 1000 County Street, Taunton, MA 02780, phone (857) 368-5000, during regular weekday hours, or to MassDOT's Highway Operations Center located in South Boston, MA at (800) 227-0608 during all other times and days, including weekends and holidays.

The Town of Foxborough will be responsible for the operation and maintenance of all stormwater management systems within Walnut Street. Questions or concerns regarding activities associated with this O&M Plan should be address to the Town of Foxborough Department of Public Works located at 70 Elm St, Foxborough, MA 02035, phone (508) 543-1228.

## 1.2 Inspection and Maintenance Measures and Record-Keeping

See Figure 3 of the Stormwater Management Report for the proposed stormwater system within the project limits. The stormwater management system covered by this O&M Plan consists of the following measures:

Commercial Street (Route140) at Walnut Street

- Deep Sump Catch Basins
- Drainage Manholes

MassDOT uses a performance-based inspection and maintenance program for SCMs and catch basins. The Town of Foxborough shall implement the same inspection and maintenance program. For SCMs, MassDOT's overall approach is to inspect SCMs, and based on the results of the inspections, perform maintenance to preserve functionality. For catch basins, MassDOT's overall approach is to perform maintenance at an interval that maintains the functionality of the catch basin (e.g., sump is less than 50% full of sediment). Catch basin inspections, including documentation of sediment accumulation, and maintenance will generally occur simultaneously.

MassDOT's O&M program is data driven. Inspections and maintenance are recorded by personnel using hand-held tablets in the field to document sediment accumulation, maintenance action performed, and follow-up actions needed. Data are recorded in MassDOT's asset management system which is accessible in the field (mobile) or the office (desktop).

The table below summarizes data that is generally collected for each asset type. For all assets, the inspector and inspection date are recorded. Photo documentation of structure condition is taken and attached to the inspection record.

| Inspection Form | Applicable Stormwater Assets | Information Collected |
|---|---|---|
| Inlets | › Catch basins | › Sediment accumulation<br>› Trash/Debris accumulation<br>› Signs of contamination<br>› Frame and grate condition<br>› Overall structure condition |
| Storm Discharge Points | › Outlets to SCMs | › Presence of flow<br>› Signs of contaminated flow<br>› Sediment accumulation<br>› Level of erosion<br>› Pipe condition<br>› Scour protection condition<br>› Overall structure condition |

Inspection and maintenance records can be made available using the asset management system through request with the MassDOT District 5 Environmental Engineer. Records will be kept for at least three years. Representatives of the Foxborough Conservation Commission(s), MassDEP, and US EPA may obtain access to these records, upon request. Additionally, MassDOT will allow members and agents of MassDEP and the Conservation Commission(s) to enter and inspect the premises, upon request, to evaluate and ensure that the Operation and Maintenance Plan requirements for each SCM are being followed.

Commercial Street (Route140) at Walnut Street

Maintenance actions will not occur at any set frequency, but rather will be based on condition and impact to functionality. Maintenance to be performed on the stormwater system includes:

| | Potential Maintenance Actions | |
|---|---|---|
| Catch Basins and Outlets | • Clear inlet and remove and properly dispose of sediment, trash, leaf litter, debris, and vegetation<br>• Regrade areas that show signs of ponding and channelization<br>• Repair or replace structural components<br>• Repair damaged or eroded areas | • Provide or rehabilitate erosion control at the outlet<br>• Regrade and replace the channel materials<br>• Remove woody growth<br>• Stabilize or reconstruct eroded areas<br>• Treat invasive plants according to MassDOT Vegetation Management Plan |

Based on the results of the inspection, repairs will be made in accordance with MassDOT standard practices. Maintenance will be prioritized given the urgency of the required maintenance and availability of staff, contracts, etc. Maintenance may require contracting if existing contracts are unavailable to perform the work. More intensive remedial activities may require permitting and/or an engineering solution.

## 1.3 Erosion and Sediment Control Measures during Maintenance Activities

For maintenance activities that could result in discharges of sediments or other contaminants into wetlands, waterways, or other resource areas regulated under 310 CMR 10.00, the responsible maintenance personnel will employ measures to prevent migration of these sediments/contaminants. Such temporary measures may include, but are not necessarily limited to, the use of siltation barriers, catch basin silt sacks/filter bags, pipe plugs, cofferdams deployed within the stormwater structure, turbidity curtains, or other practices designed to prevent such discharges.

Where maintenance occurs in areas that are confined, with no risk of discharge to adjacent water bodies, no special measures may be needed. Examples include, but are not limited to: (1) cleaning of a forebay under dry conditions when the work can be completed and exposed surfaces stabilized prior to placing it back into service; and (2) catch basin cleaning where the activity is limited to removing material from a sump below the elevation of the outlet pipe.

## 1.4 O&M Budget

MassDOT and the Rown of Foxborough perform maintenance for stormwater management systems as part of their routine operation and maintenance budget for roadways and bridges. MassDOT budgets are managed at the district level and vary by fiscal year, depending on funding sources.

# 2

# Long-Term Pollution Prevention Plan

This Long-Term Pollution Prevention Plan (LTPPP) describes the approach for pollution prevention and related maintenance activities for Commercial Street (Route 140) at Walnut Street. In general, long-term pollution prevention and related maintenance activities will be conducted consistent with:

- The National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer System (MS4),
- MassDOT's anticipated NPDES Transportation Separate Storm Sewer System (TS4) Permit, and
- Measures outlined in MassDOT's Stormwater Management Plan (SWMP).

This LTPPP satisfies the requirements related to pollution prevention under Massachusetts Stormwater Standards 4, 5, 6, and 10.

## 2.1 Practices for Long-Term Pollution Prevention

For the facilities covered, long-term pollution prevention includes the following measures.

- good housekeeping;
- storing materials and waste products inside or under cover;
- vehicle washing;
- routine inspections and maintenance of SCMs;
- spill prevention and response;
- maintenance of lawns, gardens, and other landscaped areas;
- storage and use of fertilizers, herbicides, and pesticides;
- pet waste management;
- operation and management of septic systems; and
- proper management of deicing chemicals and snow.

### 2.1.1 Litter Pick-up

MassDOT and the Town of Foxborough will conduct litter pick-up from the stormwater management facilities in conjunction with routine road maintenance activities.

### 2.1.2 Inspection and Maintenance of Stormwater Assets

MassDOT and the Town of Foxborough will conduct inspection and maintenance of drainage infrastructure and the stormwater control measures (SCMs) in accordance with the O&M Plan, as described in Section 1.

### 2.1.3 Maintenance of Landscaped Areas

Routine mowing will be conducted according to standard MassDOT and the Town of Foxborough practices. SCM basin bottoms and embankments designed to impound water should be mowed as required to prevent establishment of woody vegetation.

Except in rare circumstances, MassDOT and the Town of Foxborough does not use fertilizers, herbicides, and pesticides for the maintenance of facilities. Exceptions include using fertilizer to ensure the survival of new plantings and herbicides to control invasive plants. Use of fertilizers and herbicides is reviewed and approved by the MassDOT Landscape Design Section and District 5 Environmental Engineer prior to application. Local Conservation Commission review may also be required.

### 2.1.4 Snow and Ice Management

Snow and Ice Management will be conducted consistent with the practices outlined in the MassDOT Snow and Ice Control Program Environmental Status and Planning Report (ESPR), formerly known as the Snow and Ice Control Generic Environmental Impact Report (GEIR), and according to Town of Foxborough standard practices.

In accordance with the Snow and Ice Control ESPR, no sand is used on MassDOT properties for snow and ice control. The exception to this rule is within reduced salt areas where high sodium levels have been found in drinking water sources.

### 2.1.5 Street Sweeping

Routine highway cleaning, with a brush-type street sweeper, will be conducted in accordance with standard MassDOT practices. Sweeping will occur annually in the Spring.

### 2.1.6 Prohibition of Illicit Discharges

The MassDEP Stormwater Management Standard 10 prohibits illicit discharges to the stormwater management system. Illicit discharges are discharges that do not consist entirely of stormwater, except for certain specified non-stormwater discharges.

In accordance with the existing MS4 permit and anticipated TS4 permit requirements, examples of discharges from the following sources are not considered illicit discharges:

- Firefighting activities*
- Foundation drains
- Flows from riparian habitats/wetlands
- Potable water sources

- Water line flushing
- Footing drains
- Landscape irrigation
- Individual residential car washing
- Uncontaminated groundwater
- Rising groundwater
- Diverted stream flows
- Dechlorinated swimming pool water
- Street wash waters
- Wash water from residential buildings (no detergents)
- Condensation from air conditioning units
- Run-on from private driveways caused by precipitation
- Lawn watering
- Water from crawl space pumps

*Water from firefighting activities is allowed and need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

Based on plan review and confirmation in the field, there are no known or proposed illicit connections associated with Commercial Street (Route 140) over Walnut Street. Should an interconnection to the stormwater management system be identified, the MassDOT PM will coordinate with the District Permits Engineer to confirm if the connections are authorized. For unauthorized connections, the MassDOT PM and/or MassDOT Environmental Services Section will investigate the connections and if they are determined to be illicit, the connections will be managed through MassDOT's Illicit Discharge Detection and Elimination (IDDE) program and/or through other agencies.

### 2.1.7 Spill Prevention and Response

Response procedures will be implemented at drainage system outlets nearby the adjacent Bordering Vegetated Wetlands for any significant release of hazardous materials such as fuels, oils, or chemical materials that have the potential of discharging to Hersey Pond. *S*pill containment measures such as booms, caps, covers, pneumatic plugs, absorbent material etc. shall be provided nearby the site.

Reportable quantities will immediately be reported to the applicable Federal, State, and local agencies as required by law. Reportable quantities of chemical, fuels, or oils are established under the Clean Water Act and enforced through MassDEP. The MassDEP Emergency Response Program shall be immediately notified in accordance with required procedures for the report of a release (telephone (888) 304-1133).

MassDOT works with first responders and/or public water supply owners to determine the best approach to protect water supplies, and provides training and materials to carry out action plans. In the case of a spill, applicable containment and clean-up procedures will be performed immediately. These procedures are implemented in accordance with the Unified Response Manual at the local level by first responders, which includes the Town of Foxborough local public safety departments (e.g., fire, police, public works, board of health). MassDOT will be on-site to aid with traffic control and to provide clean-up supplies, as necessary. Spill material collected during the response will be promptly removed and disposed of in accordance with Federal, State, and local requirements. If necessary, a licensed emergency response contractor will assist in cleanup of releases depending on the amount of the release and the ability of the responsible party to perform the required response.

# Commercial Street
# (Route 140) at Walnut Street

PREPARED FOR

Town of Foxborough DPW
70 Elm Street
Foxborough, MA 02035

PREPARED BY

*TEC, INC.*
*282 Merrimack Street*
2nd Floor
Lawrence MA, 01843

June 20, 2023

**Name of Applicant:** **Town of Foxborough DPW**
**Name of Facility:** **Commercial Street (Route 140) at Walnut Street**
**Location:** **Foxborough, MA**

## Good Housekeeping BMPs

Minimize the potential for contaminants to enter or runoff the site during construction activities. Fuel and other equipment related fluids will be properly stored. The Contractor shall establish secure storage areas that collect any spillage to meet requirements of the Town of Foxborough Fire Department regarding the storage of flammable materials. The Contractor shall complete and submit the plans to the Engineer.

### General Requirements

The following presents a proactive approach to all of the best management practices, erosion and sedimentation controls, mitigation measures, and monitoring activities for this Project.

### Compost Filter Tube

Compost filter tubes are used as temporary perimeter controls where construction activities will disturb existing surfaces. They can also be used to contain soil stockpiles areas. Compost filter tubes consist of mulched compost material in a fabric faceted to the ground along the site at low/downslope areas with wooden stakes. Refer to the project plans for proper installation of compost filter tubes. When installed correctly and inspected frequently compost filter tubes can be an effective barrier to sediment leaving the site in stormwater runoff.

### Storm Drain Inlet Protection

Storm drain inlet protection measures prevent soil and debris from entering storm drain inlets. These measures will be implemented before the Site is disturbed by using silt sacks, compost filter socks, or staked bales in combination with silt fence. Storm drain inlet protection will be installed at all down gradient catch basins adjacent to the project site outside the protection of other erosion control barriers, all catch basins within the construction site, and at low points within the construction site that are connected to the storm drainage system.

### Temporary Seeding and Slope Stabilization

Seeding shall be used to temporarily stabilize areas that will not be brought to final grade for a period of more than 30 working days and to stabilize disturbed areas before final grading or in a season not suitable for permanent seeding. Stabilization of open soil surfaces will be implemented within 14 days after grading or construction activities have temporarily or permanently ceased, unless there is sufficient snow cover to prohibit implementation.

Vegetative slope stabilization will be used to minimize erosion on slopes of 3:1 or flatter. Annual grasses, such as annual rye, will be used to ensure rapid germination and production of root mass. Permanent stabilization will be completed with the planting of perennial grasses or legumes. Establishment of temporary and permanent vegetative cover may be established by hydro-seeding or sodding. A suitable topsoil, good seedbed preparation, and adequate lime, fertilizer, and water will be provided for effective establishment of these vegetative stabilization methods. Root systems restrain the soils so that they are less apt to be dislodged and carried offsite by stormwater runoff or wind. Temporary seeding also reduces the problems associated with mud and dust from bare soil surfaces during construction. Mulch will also be used after permanent seeding to protect soil from the impact of falling rain and to increase the capacity of the soil to absorb water.

**General Maintenance**

Refer to the Inspection and Maintenance Checklist (at the end of this section) identifying inspection and maintenance measures for each specific practice.

The contractor or subcontractor will be responsible for implementing each control shown on the Plan. In accordance with EPA regulations, the contractor must sign a copy of a certification to verify that a plan has been prepared and that permit regulations are understood.

The onsite contractor will inspect all sediment and erosion control structures weekly and after each rainfall event meeting the minimum requirements as defined in the Plan. Records of the inspections will be prepared and maintained onsite by the contractor as required by the Plan.

- Silt shall be removed from behind barriers if greater than half-way from the top of the erosion control device or as needed.
- Damaged or deteriorated items will be repaired immediately after identification.
- The underside of filter tubes should be kept in close contact with the earth and reset as necessary.
- Sediment that is collected in structures shall be disposed of properly and covered if stored onsite.
- At a minimum establish good housekeeping BMPs for:
    - Material handling and waste management
    - Staging areas
    - Designate washout areas
    - Equipment vehicle fueling and maintenance
    - Spill prevention and control

Erosion control structures shall remain in place until all disturbed earth has been securely stabilized. After removal of structures, disturbed areas shall be regraded and stabilized as necessary.

## Spill Prevention and Control

The Contractor will actively maintain and manage the site activities with the procedures outlined in this Plan. In the event of petroleum or other deleterious substance spill, action will be taken by the Contractor to contain and remove the spill. The Contractor will comply with the relevant section(s) of the Oil Pollution Prevention Act, 40 CFR 112.7.

### Responsibility

All project personnel share the responsibility for the initial control and reporting of the oil and other substance spill, especially the personnel that first discover the spill. The Site Safety and Health Officer (SSHO) will be responsible for determining the necessary safety equipment and for establishing safety practices to be followed by the Contractor during the clean-up operations. All personnel will be trained in the use of and location of this equipment, prior to the commencement of the construction.

The Contractor's goal is to provide effective, efficient, and coordinated action to minimize or mitigate damages to the environment and public health and welfare from oil or other substance discharges, conforming to applicable federal, state, and local regulations, as well as other provisions and restrictions. In the event of spills or releases that may occur during the Project, a representative on-site qualified by OSHA training requirements (29 CFR 1910.120) for a Level 3 Hazmat Technician will be provided and will have the responsibility and authority for supervising the cleanup. If the representative determines that the cleanup operations are beyond the capacity of the Contractor, assistance shall be requested from its Subcontractor.

In the event of an emergency spill, the Contractor will be responsible for retaining the environmental Subcontractor. The selected environmental subcontractor will develop a Hazardous Materials Health and Safety Plan, which will be referenced when a spill or release is discovered, and the control of the spill or release is beyond the scope of the Spill Prevention Control and Countermeasure plan. The Contractor's Project Manager is responsible for giving the SSHO directions for initiating the Hazardous Materials Health and Safety Plan.

Alert and reporting procedures will become effective immediately upon observance and indication of a spill or discharge of oil or other substances on the project.

Reportable observations are:

1. Leaks or spills
2. Soils which are discolored or have an odor
3. Discharge of oil or other similar substances from drain pipes

The Engineer will be informed immediately of all substantial spills, releases, or other substance discharges. All telephone numbers for the Emergency Response agencies will be posted on site. The Contractor or its Subcontractors will implement control and countermeasures immediately.

**Fuel and Oil Delivery Trucks**

The equipment superintendent or designee will monitor all truck unloading procedures to verify all hoses are tight and do not leak, and if necessary, will tighten, adjust, or replace them to prevent a release of any kind. In the event of a major spill, alert and initial report procedures will be implemented, and an emergency response contractor will be called in to perform the cleanup.

**Equipment**

Motorized equipment that require fuel and oil to operate will be inspected prior to the start of each work shift by the operator (in the field) to ensure there is no leakage of oil, fuel, or other material. Trucks will be inspected prior to use for potential leaks or drips. If a leak is found, repairs will be made immediately, and spillage will be cleaned up manually using sorbent material. Vehicles that are found to be leaking will be immediately taken out of service until repairs can be made.

**Drum Storage**

Drum storage, if any, will be located in a secure area within the Project limits away from environmental areas of concern. Petroleum liquids and other substances stored in drums will be kept in a drum container that consists of a drum rack and drip containment pan that is capable of containing 110% of the stored volume should the drum rupture.

**Lubrication / Oil Maintenance**

Replacement lubrication will be directly deposited from the lubrication truck to the equipment lubrication reservoir. No other container system will be used to transport oil to the equipment. Mobile equipment will be serviced off site or in the lay-down area. Equipment that cannot be moved will be serviced in the field. The Contractor will place a containment pan or absorbent below the service area prior to initiating service activities in the field. Waste disposal will be completed by the Contractor or by a waste disposal firm. Miscellaneous lubricants for operating equipment will be limited to daily quantities.

**Spent Oil**

Oil that has already been used on the job will be disposed of via a certified waste disposal firm. Spent oil will be stored in a labeled (hazardous waste signs) and vented fuel storage cell located at the staging area awaiting disposal by a certified waste disposal firm (i.e. Enpro, Inc.). The staging area will be located within the boundary of the project and inspected daily for leaks or spills. The storage cell will be bermed to contain 110% of the largest container or 10% of the total volume in storage, whichever is greater.

## Special Oil Spill Equipment

### Sorbent Pads

Sorbent pads will be available to absorb oil and petroleum compounds. If necessary, the pads will be used to absorb oil spills or leaks by placing them on the oil and giving them adequate time to absorb it. The sorbent pads will be stored in equipment box located in the maintenance area. The pads shall float and be water repellent, so they can absorb oil on water. Saturated/contaminated pads will be placed in an appropriate container and stored within the maintenance area. A certified waste disposal firm will dispose of the approved containers.

### Sorbent Compound

The compound will be used for contaminants spilled on decks or hard surfaces. In most cases, it can be applied directly to spills, but if the spill is large, it can be used to form a dike around the spill to prevent further migration.

**Best Management Practices – Maintenance/Evaluation Checklist**
**Construction Practices**

| Best Management Practice | Inspection Frequency | Date Inspected | Inspector | Minimum Maintenance and Key Items to Check | Cleaning/Repair Needed ☐yes ☐no (List Items) | Date of Cleaning/Repair | Performed by |
|---|---|---|---|---|---|---|---|
| Compost Filter tubes | Inspect at least once per week and after each rain event | | | • Silt shall be removed from the compost filter tube if reaches half-way from the top of tube and as needed. The underside of the tube should be laid in close contact with the earth and reset as necessary. | | | |
| Catch Basin Inlet Protection | Inspect at least once per week and after each rain event | | | • Remove accumulated sediment when the capacity is reduced by half. | | | |
| Temporary Seeding and Slope | Inspect at least once per week and after every rain event | | | • Seeding shall be used to temporarily stabilize areas that will not be brought to final grade for a period of more than 30 working days and to stabilize disturbed areas before final grading or in a season not suitable for permanent seeding. Stabilization of open soil surfaces will be implemented within 14 days after grading or construction activities have temporarily or permanently ceased, unless there is sufficient snow cover to prohibit implementation. | | | |

## 6. ABUTTERS LIST

RECEIVED
BOARD OF ASSESSORS
MAY 23 2023
TOWN OF FOXBOROUGH

# BOARD OF ASSESSORS
# TOWN OF FOXBOROUGH
## 40 SOUTH STREET
## FOXBOROUGH MASSACHUSETTS 02035

(508) 543-1215 Fax: (508) 543-6278

**CERTIFICATION OF ABUTTERS**

PROPERTY OWNER: Town of Foxborough.

MAILING ADDESSS: 40 South st #1, Foxborough, MA, 02035

PROPERTY LOCATION: Commercial street (Route 140) at Walnut Street Intersection.

ASSESSORS MAP/PARCEL: Not applicable.

APPLICANT: TEC, Inc PHONE: 7744373705

AUTHORITY REQUESTING LIST: Comservation Commission.

DATE SUBMITTED: 05/22/2023.

LIST REQUESTED:
- ___ 500 FT
- ___ 300 FT
- X 100 FT
- X DIRECT ABUTTER
- ___ ABUTTER TO ABUTTER

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I, Kimi Kwan, acting as a custodian of assessment records, do hereby certify that the attached documents contain true and complete information from the most recent tax list of the Town of Foxborough, Massachusetts.

I further state that these documents include the names and addresses of

Map/Parcel N/A

Date: 5/23/23

BOARD OF ASSESSORS
FOXBOROUGH MASSACHUSETTS

Massachusetts General Law c. 40A, s.11, "The assessors maintaining any applicable tax list shall certify to the permit granting authority or special permit granting authority the names and addresses of parties in interest and such certification shall be conclusive for all purposes."

The Assessors Office will complete the abutters list within 7-10 business days. There is a $25.00 fee for an abutters list.

"The applicant is solely responsible for requesting the appropriate abutters list required by the applicable Mass General Law."

Abutting Properties for
WALNUT STREET/COMMERICAL ST INTERSECTION
FOXBOROUGH, MA 02035
(100 Feet)
5/23/2023

| Parcel Number | Property Address | Owner Name | Owner Address | Owner City | Owner State | Owner Zip |
|---|---|---|---|---|---|---|
| 120-008-000 | WALNUT STREET | COMMONWEALTH OF MA | 1 ASHBURTON PLACE 4 FL | BOSTON | MA | 02408 |
| 121-037-000 | WALNUT STREET | COMMONWEALTH OF MA | 1 ASHBURTON PLACE 4 FL | BOSTON | MA | 02108-1552 |
| 133-020-000 | 44 WALNUT STREET | BETTES STACEY | 44 WALNUT STREET | FOXBOROUGH | MA | 02035 |
| 133-021-000 | 46 WALNUT STREET | OLEARY JAMES M, TIMOTHY F & JANINE KRULA | 16 MEADE STREET | WAREHAM | MA | 02571 |
| 133-022-000 | 1 WALNUT TERRACE | FOXBOROUGH HOUSING AUTHORITY | 90 N CARL ANNON COURT | FOXBOROUGH | MA | 02035-0000 |
| 133-023-000 | WALNUT STREET | FOXBOROUGH HOUSING AUTHORITY | 90 N CARL ANNON COURT | FOXBOROUGH | MA | 02035-0000 |