# STORMWATER MANAGEMENT REPORT

## LONGFIELD ESTATES

**AP 103 LOT 2 & 14**
**1200 & 1202 HOPE STREET**
**BRISTOL, RI**

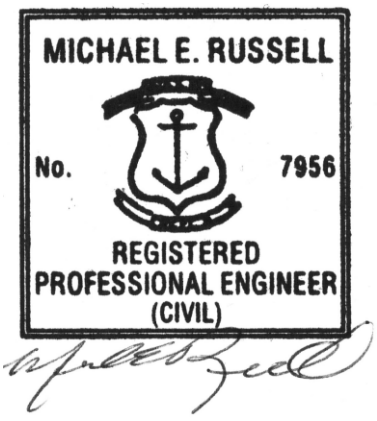
**JUNE, 2022**
*Revised: December 9, 2022*

**Prepared for:**

MI 1200 HOPE ST., LLC.
133 OLD TOWER HILL ROAD, SUITE 1
WAKEFIELD, RI 02879

Prepared by:

Land Development Engineering & Consulting, LLC
207 High Point Ave., Unit 6
Portsmouth, RI 02871

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## INTRODUCTION

This report was prepared to address the Stormwater Management System (SMS) for the Residential Development on AP 103 Lot 2 & 14, 1200 & 1202 Hope Street in Bristol. The project proposes construct four new residential buildings that will have a total of 8 residential units between them. The existing residential dwelling (Longfield) shall be renovated and will provide an additional 2 residential units. The Development will create 10 parking spaces with associated landscaping, utilities & stormwater management system. This report will outline and summarize the current SMS as well the improvements of the proposed development. Said improvements are intended to control peak runoff & volume rates for the added impervious area(s). Additionally, the proposed SMS will provide, at minimum, the water quality & stormwater recharge volumes as required. The SMS as proposed will comply with the Town of Bristol's & State of Rhode Island's Stormwater Management Policy (2018).

## EXISTING CONDITIONS (SUMMARY)

The subject property is approximately 1.76 acres in area and fronts along Hope Street (Route 114) The existing ground cover consists mainly of a lawn with brush/woods along the edges of the property. There is also an existing dwelling and a gravel driveway for the dwelling. The site slopes generally towards the South/Southeast towards an existing wetland. The elevation change across the site is approximately 8 feet. Currently, most of the Runoff from the site sheet flows across the site to an isolated wetland in the southeastern corner of the lot. Some runoff in the Northwestern edge of the lot flows Southwest towards Hope Street (Route 114). The summary of the Pre-Development Analysis is located in Appendix 1 of this report.

## PROPOSED CONDITIONS (SUMMARY)

The project proposes construct four new residential buildings that will have a total of 8 residential units between them. The existing residential dwelling (Longfield) shall be renovated and will provide an additional 2 residential units. The Development will create 10 parking spaces with associated landscaping, utilities & stormwater management system. Site grading will create the cuts & fills throughout the project limits to create the desired site layout and function and will maintain pre-development runoff patterns towards the Southeastern portion of the site. A stormwater collection system will be incorporated into the newly designed parking area to collect runoff from impervious surfaces and landscaped areas within the limit of disturbance. This system consists of dry swales, sediment forebays, lined bio-retention basins, and a dry extended detention basin. The forebays will provide pre-treatment for the bio-retention basins. The system will accommodate a 100-year storm event, handle the water quality volume (WQv) and provide for total suspended solids (TSS) removal. This overall system is designed to accommodate, at minimum, the water quality volume (WQv) required for new development projects. Low impact development practices (LID) will be employed to the maximum extent practicable. Summary of the Post-Development Conditions Analysis is located in Appendix 1 of this report.

## SITE SOIL & GROUNDWATER CONDITIONS

The underlying watershed soils within the developed area consist of the Pittstown silt loam Hydrologic Group C). A soil evaluation and groundwater determination was performed in

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December 2018. Soil textures below the fill consisted primarily of a silt loam mixture with groundwater elevation approximately 12" to 32" feet below original grade.

## METHODOLOGY

HydroCad® Stormwater Modeling System was used to quantify stormwater runoff generated by WQv, 1-year, 2-year, 10-year and 25-year design storms in pre and post development conditions. The calculations were performed using "Dynamic Storage-Indication" to also analyze the impact of the pipe size, material and slope selection in upstream structures. The HydroCad® program utilizes Natural Resource Conservation Service (NRCS) techniques (TR-20) to predict stormwater runoff for given design storms. The calculations performed by HydroCad® are based on the NRCS model return frequency Type III distribution and a user specified design storms. The calculation is also performed using the simple dynamic method which utilizes *Rawls Rate* for infiltration based on soil texture.

The analysis is performed by modeling the drainage area as subcatchments and ponds. A subcatchment is an area that produces runoff and drains into a pond. A pond can be a natural depression, wetland, or manmade structure that detains or retains stormwater runoff. The drainage network pipe design adequacy is evaluated by integrating it in the HydroCad® pond model for drainage structures. The pipes are modeled as the pond outlet-culvert type. Manning's Equation and/or Hazen-Williams hydraulic equations were also utilized to determine the required pipe sizes as well as minimum and maximum pipe slopes.

## DRAINAGE SYSTEM MODEL

The proposed development is analyzed by creating an existing condition or pre-development model and a full build-out or post-development model. The models were created to compare the existing and post-development runoff to the abutting properties and existing SMS. The post-development analysis results are also utilized to adequately size the proposed practices. Analysis within the site was performed using WQv, 1, 2, 10 and 25-year design storm projections. All excess stormwater runoff captured on site will be treated and retained/recharged on site. On site post-development runoff rates flowing overland toward abutting properties will not exceed pre-development runoff rates up to the 25-year event.

The pre-development HydroCad® model within the site consists of two subcatchments, One subcatchment corresponds to the Northwestern portion of the lot that flows southwest towards Hope Street (Route 114). The other subcatchment encompasses the rest of the lot that flows Southeasterly towards the isolated wetland in the corner of the lot. This was created to determine the existing stormwater runoff originating from the site flowing to Hope Street and the to the existing wetland.

Post-development subcatchment models were created for the site. Subcatchment models represent the drainage areas to each of the proposed reaches, drainage structures, or storage & treatment areas. Each of these areas provides elements of treatment, storage, and infiltration in order to effectively mitigate flows to the Point of Analysis in each analyzed storm event. See Post-Development output in Appendix B and summary at the end of this narrative.

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The majority of the paved & landscaped areas for the developed area discharge into a dry swale or sediment forebay before flowing into a bio-retention basin and a detention basin.

## STORMWATER TREATMENT

Stormwater runoff will be treated through the use of Best Management Practices (BMP's). The BMP's used within the proposed development include dry-swales, forebays, bio-retention basins, underground storage systems, underground infiltration systems and a dry extended detention basin. These BMP's will aid in the removal of pollutants within the stormwater runoff as well as provide recharge to the groundwater aquifer.

This system will provide pollutant removal and treatment as required for this development.

## ANALYSIS DATA

The following information was used in performing the calculations for the drainage system.

| **RUNOFF SUMMARY AT ANALYSIS POINTS** | | |
|---|---|---|
| Cover Description | | |
| Cover Type | Hydrologic condition | Curve Number (Class: C) |
| Landscaping, Lawns | Good | 74 |
| Woods | Good | 70 |
| Gravel | Good | 89 |
| Brush | Good | 65 |
| Buildings | - | 98 |
| Pavement | - | 98 |
| Brick Walkways | - | 98 |

Rainfall Data (Type III - 24 Hour Storm Duration*)

| Storm Event | Rainfall |
|---|---|
| WQv | 1.2 inches |
| 1 - Year | 2.8 inches |
| 2 - Year | 3.3 inches |
| 10 - Year | 4.9 inches |
| 25 - Year | 6.1 inches |
| 100 - Year | 8.6 inches |

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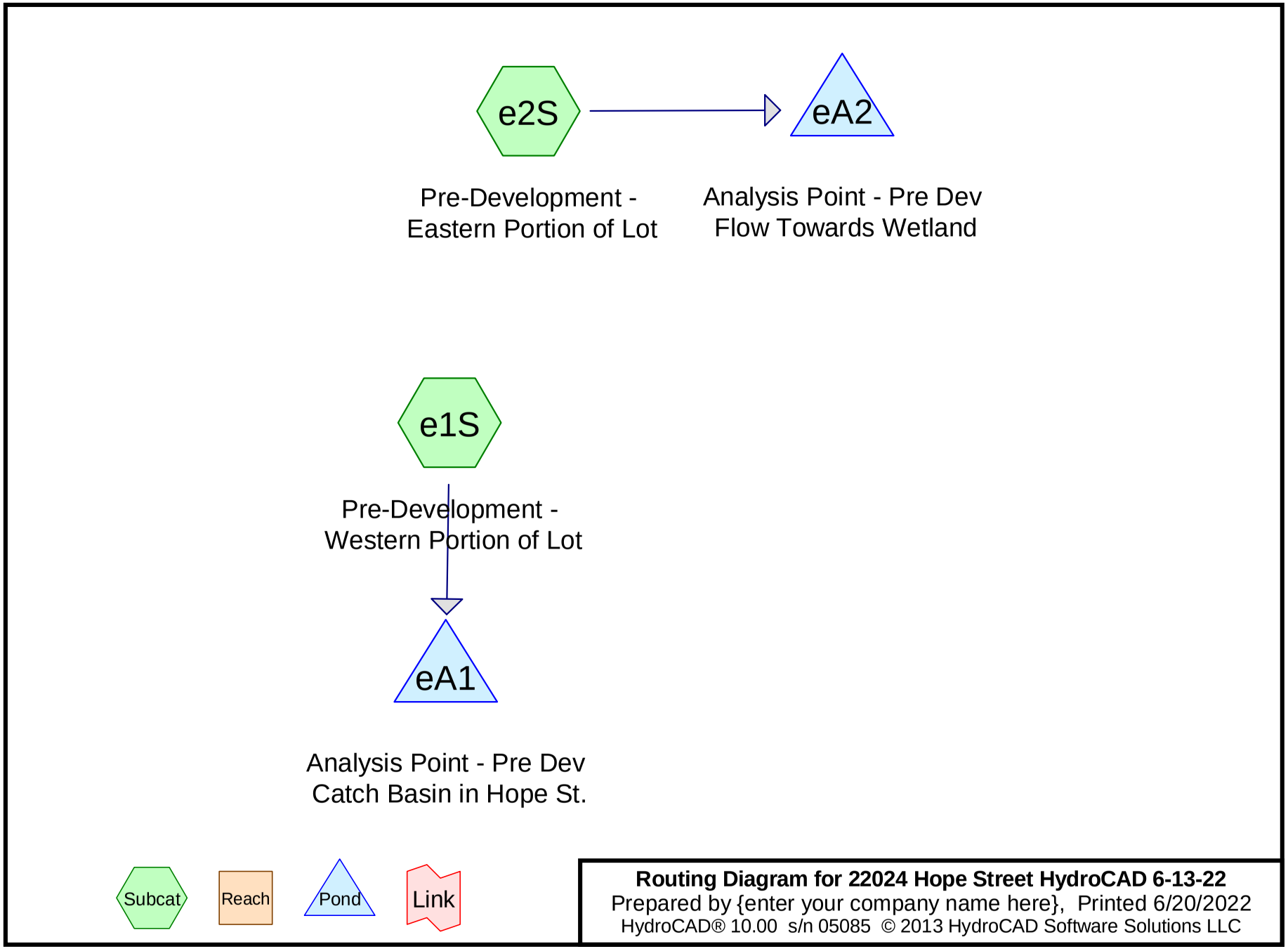



**Routing Diagram for 22024 Hope Street HydroCAD 6-13-22**
Prepared by {enter your company name here}, Printed 6/20/2022

## Area Listing (selected nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 64,639 | 74 | >75% Grass cover, Good, HSG C (e1S, e2S) |
| 7,182 | 65 | Brush, Good, HSG C (e1S, e2S) |
| 2,708 | 96 | Gravel surface, HSG C (e1S, e2S) |
| 1,919 | 98 | Paved parking, HSG C (e2S) |
| 2,892 | 98 | Roofs, HSG C (e2S) |
| **79,340** | **75** | **TOTAL AREA** |

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment e1S: Pre-Development - Western Portion of Lot** Runoff Area=9,269 sf 0.00% Impervious Runoff Depth=0.88"
Flow Length=163' Tc=6.8 min CN=76/0 Runoff=0.20 cfs 682 cf

**Subcatchment e2S: Pre-Development - Eastern Portion of Lot** Runoff Area=70,071 sf 6.87% Impervious Runoff Depth=0.91"
Flow Length=366' Tc=18.3 min CN=74/98 Runoff=1.08 cfs 5,293 cf

**Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.** Inflow=0.20 cfs 682 cf
Primary=0.20 cfs 682 cf

**Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland** Inflow=1.08 cfs 5,293 cf
Primary=1.08 cfs 5,293 cf

**Total Runoff Area = 79,340 sf Runoff Volume = 5,975 cf Average Runoff Depth = 0.90"**
**93.94% Pervious = 74,529 sf 6.06% Impervious = 4,811 sf**

## Summary for Subcatchment e1S: Pre-Development - Western Portion of Lot

Runoff = 0.20 cfs @ 12.11 hrs, Volume= 682 cf, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 825 | 65 | Brush, Good, HSG C |
| 1,021 | 96 | Gravel surface, HSG C |
| 7,423 | 74 | >75% Grass cover, Good, HSG C |
| 9,269 | 76 | Weighted Average |
| 9,269 | 76 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.8 | 20 | 0.0600 | 0.09 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 14 | 0.0050 | 1.14 | | **Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps |
| 0.3 | 33 | 0.0180 | 2.16 | | **Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps |
| 2.5 | 96 | 0.0160 | 0.63 | | **Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps |
| 6.8 | 163 | Total | | | |

## Summary for Subcatchment e2S: Pre-Development - Eastern Portion of Lot

Runoff = 1.08 cfs @ 12.27 hrs, Volume= 5,293 cf, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 6,357 | 65 | Brush, Good, HSG C |
| 1,687 | 96 | Gravel surface, HSG C |
| 2,892 | 98 | Roofs, HSG C |
| 57,216 | 74 | >75% Grass cover, Good, HSG C |
| 1,919 | 98 | Paved parking, HSG C |
| 70,071 | 75 | Weighted Average |
| 65,260 | 74 | 93.13% Pervious Area |
| 4,811 | 98 | 6.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 3.2 | 100 | 0.0110 | 0.52 | | **Shallow Concentrated Flow, BC** |
| | | | | | Woodland Kv= 5.0 fps |
| 3.9 | 216 | 0.0340 | 0.92 | | **Shallow Concentrated Flow, CD** |
| | | | | | Woodland Kv= 5.0 fps |
| 18.3 | 366 | Total | | | |

## Summary for Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.

Inflow Area = 9,269 sf, 0.00% Impervious, Inflow Depth = 0.88" for 1-yr event
Inflow = 0.20 cfs @ 12.11 hrs, Volume= 682 cf
Primary = 0.20 cfs @ 12.11 hrs, Volume= 682 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland

Inflow Area = 70,071 sf, 6.87% Impervious, Inflow Depth = 0.91" for 1-yr event
Inflow = 1.08 cfs @ 12.27 hrs, Volume= 5,293 cf
Primary = 1.08 cfs @ 12.27 hrs, Volume= 5,293 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment e1S: Pre-Development - Western Portion of Lot** Runoff Area=9,269 sf 0.00% Impervious Runoff Depth=1.22"
Flow Length=163' Tc=6.8 min CN=76/0 Runoff=0.28 cfs 944 cf

**Subcatchment e2S: Pre-Development - Eastern Portion of Lot** Runoff Area=70,071 sf 6.87% Impervious Runoff Depth=1.24"
Flow Length=366' Tc=18.3 min CN=74/98 Runoff=1.53 cfs 7,233 cf

**Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.** Inflow=0.28 cfs 944 cf
Primary=0.28 cfs 944 cf

**Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland** Inflow=1.53 cfs 7,233 cf
Primary=1.53 cfs 7,233 cf

**Total Runoff Area = 79,340 sf Runoff Volume = 8,177 cf Average Runoff Depth = 1.24"**
**93.94% Pervious = 74,529 sf 6.06% Impervious = 4,811 sf**

## Summary for Subcatchment e1S: Pre-Development - Western Portion of Lot

Runoff = 0.28 cfs @ 12.11 hrs, Volume= 944 cf, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 825 | 65 | Brush, Good, HSG C |
| 1,021 | 96 | Gravel surface, HSG C |
| 7,423 | 74 | >75% Grass cover, Good, HSG C |
| 9,269 | 76 | Weighted Average |
| 9,269 | 76 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.8 | 20 | 0.0600 | 0.09 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 14 | 0.0050 | 1.14 | | **Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps |
| 0.3 | 33 | 0.0180 | 2.16 | | **Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps |
| 2.5 | 96 | 0.0160 | 0.63 | | **Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps |
| 6.8 | 163 | Total | | | |

## Summary for Subcatchment e2S: Pre-Development - Eastern Portion of Lot

Runoff = 1.53 cfs @ 12.27 hrs, Volume= 7,233 cf, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 6,357 | 65 | Brush, Good, HSG C |
| 1,687 | 96 | Gravel surface, HSG C |
| 2,892 | 98 | Roofs, HSG C |
| 57,216 | 74 | >75% Grass cover, Good, HSG C |
| 1,919 | 98 | Paved parking, HSG C |
| 70,071 | 75 | Weighted Average |
| 65,260 | 74 | 93.13% Pervious Area |
| 4,811 | 98 | 6.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 3.2 | 100 | 0.0110 | 0.52 | | **Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps |
| 3.9 | 216 | 0.0340 | 0.92 | | **Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps |
| 18.3 | 366 | Total | | | |

## Summary for Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.

Inflow Area = 9,269 sf, 0.00% Impervious, Inflow Depth = 1.22" for 2-yr event
Inflow = 0.28 cfs @ 12.11 hrs, Volume= 944 cf
Primary = 0.28 cfs @ 12.11 hrs, Volume= 944 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland

Inflow Area = 70,071 sf, 6.87% Impervious, Inflow Depth = 1.24" for 2-yr event
Inflow = 1.53 cfs @ 12.27 hrs, Volume= 7,233 cf
Primary = 1.53 cfs @ 12.27 hrs, Volume= 7,233 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment e1S: Pre-Development - Western Portion of Lot** Runoff Area=9,269 sf 0.00% Impervious Runoff Depth=2.45"
Flow Length=163' Tc=6.8 min CN=76/0 Runoff=0.58 cfs 1,895 cf

**Subcatchment e2S: Pre-Development - Eastern Portion of Lot** Runoff Area=70,071 sf 6.87% Impervious Runoff Depth=2.45"
Flow Length=366' Tc=18.3 min CN=74/98 Runoff=3.15 cfs 14,295 cf

**Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.** Inflow=0.58 cfs 1,895 cf
Primary=0.58 cfs 1,895 cf

**Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland** Inflow=3.15 cfs 14,295 cf
Primary=3.15 cfs 14,295 cf

**Total Runoff Area = 79,340 sf Runoff Volume = 16,190 cf Average Runoff Depth = 2.45"**
**93.94% Pervious = 74,529 sf 6.06% Impervious = 4,811 sf**

## Summary for Subcatchment e1S: Pre-Development - Western Portion of Lot

Runoff = 0.58 cfs @ 12.10 hrs, Volume= 1,895 cf, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| Area (sf) | CN | Description |
|---|---|---|
| 825 | 65 | Brush, Good, HSG C |
| 1,021 | 96 | Gravel surface, HSG C |
| 7,423 | 74 | >75% Grass cover, Good, HSG C |
| 9,269 | 76 | Weighted Average |
| 9,269 | 76 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.8 | 20 | 0.0600 | 0.09 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 14 | 0.0050 | 1.14 | | **Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps |
| 0.3 | 33 | 0.0180 | 2.16 | | **Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps |
| 2.5 | 96 | 0.0160 | 0.63 | | **Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps |
| 6.8 | 163 | Total | | | |

## Summary for Subcatchment e2S: Pre-Development - Eastern Portion of Lot

Runoff = 3.15 cfs @ 12.26 hrs, Volume= 14,295 cf, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| Area (sf) | CN | Description |
|---|---|---|
| 6,357 | 65 | Brush, Good, HSG C |
| 1,687 | 96 | Gravel surface, HSG C |
| 2,892 | 98 | Roofs, HSG C |
| 57,216 | 74 | >75% Grass cover, Good, HSG C |
| 1,919 | 98 | Paved parking, HSG C |
| 70,071 | 75 | Weighted Average |
| 65,260 | 74 | 93.13% Pervious Area |
| 4,811 | 98 | 6.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 3.2 | 100 | 0.0110 | 0.52 | | **Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps |
| 3.9 | 216 | 0.0340 | 0.92 | | **Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps |
| 18.3 | 366 | Total | | | |

## Summary for Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.

Inflow Area = 9,269 sf, 0.00% Impervious, Inflow Depth = 2.45" for 10-yr event
Inflow = 0.58 cfs @ 12.10 hrs, Volume= 1,895 cf
Primary = 0.58 cfs @ 12.10 hrs, Volume= 1,895 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland

Inflow Area = 70,071 sf, 6.87% Impervious, Inflow Depth = 2.45" for 10-yr event
Inflow = 3.15 cfs @ 12.26 hrs, Volume= 14,295 cf
Primary = 3.15 cfs @ 12.26 hrs, Volume= 14,295 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment e1S: Pre-Development - Western Portion of Lot** Runoff Area=9,269 sf 0.00% Impervious Runoff Depth=3.47"
Flow Length=163' Tc=6.8 min CN=76/0 Runoff=0.83 cfs 2,678 cf

**Subcatchment e2S: Pre-Development - Eastern Portion of Lot** Runoff Area=70,071 sf 6.87% Impervious Runoff Depth=3.45"
Flow Length=366' Tc=18.3 min CN=74/98 Runoff=4.47 cfs 20,129 cf

**Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.** Inflow=0.83 cfs 2,678 cf
Primary=0.83 cfs 2,678 cf

**Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland** Inflow=4.47 cfs 20,129 cf
Primary=4.47 cfs 20,129 cf

**Total Runoff Area = 79,340 sf Runoff Volume = 22,806 cf Average Runoff Depth = 3.45"**
**93.94% Pervious = 74,529 sf 6.06% Impervious = 4,811 sf**

## Summary for Subcatchment e1S: Pre-Development - Western Portion of Lot

Runoff = 0.83 cfs @ 12.10 hrs, Volume= 2,678 cf, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| Area (sf) | CN | Description |
|---|---|---|
| 825 | 65 | Brush, Good, HSG C |
| 1,021 | 96 | Gravel surface, HSG C |
| 7,423 | 74 | >75% Grass cover, Good, HSG C |
| 9,269 | 76 | Weighted Average |
| 9,269 | 76 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.8 | 20 | 0.0600 | 0.09 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 14 | 0.0050 | 1.14 | | **Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps |
| 0.3 | 33 | 0.0180 | 2.16 | | **Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps |
| 2.5 | 96 | 0.0160 | 0.63 | | **Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps |
| 6.8 | 163 | Total | | | |

## Summary for Subcatchment e2S: Pre-Development - Eastern Portion of Lot

Runoff = 4.47 cfs @ 12.25 hrs, Volume= 20,129 cf, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| Area (sf) | CN | Description |
|---|---|---|
| 6,357 | 65 | Brush, Good, HSG C |
| 1,687 | 96 | Gravel surface, HSG C |
| 2,892 | 98 | Roofs, HSG C |
| 57,216 | 74 | >75% Grass cover, Good, HSG C |
| 1,919 | 98 | Paved parking, HSG C |
| 70,071 | 75 | Weighted Average |
| 65,260 | 74 | 93.13% Pervious Area |
| 4,811 | 98 | 6.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 3.2 | 100 | 0.0110 | 0.52 | | **Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps |
| 3.9 | 216 | 0.0340 | 0.92 | | **Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps |
| 18.3 | 366 | Total | | | |

## Summary for Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.

Inflow Area = 9,269 sf, 0.00% Impervious, Inflow Depth = 3.47" for 25-yr event
Inflow = 0.83 cfs @ 12.10 hrs, Volume= 2,678 cf
Primary = 0.83 cfs @ 12.10 hrs, Volume= 2,678 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland

Inflow Area = 70,071 sf, 6.87% Impervious, Inflow Depth = 3.45" for 25-yr event
Inflow = 4.47 cfs @ 12.25 hrs, Volume= 20,129 cf
Primary = 4.47 cfs @ 12.25 hrs, Volume= 20,129 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment e1S: Pre-Development - Western Portion of Lot** Runoff Area=9,269 sf 0.00% Impervious Runoff Depth=5.71"
Flow Length=163' Tc=6.8 min CN=76/0 Runoff=1.36 cfs 4,408 cf

**Subcatchment e2S: Pre-Development - Eastern Portion of Lot** Runoff Area=70,071 sf 6.87% Impervious Runoff Depth=5.66"
Flow Length=366' Tc=18.3 min CN=74/98 Runoff=7.34 cfs 33,076 cf

**Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.** Inflow=1.36 cfs 4,408 cf
Primary=1.36 cfs 4,408 cf

**Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland** Inflow=7.34 cfs 33,076 cf
Primary=7.34 cfs 33,076 cf

**Total Runoff Area = 79,340 sf Runoff Volume = 37,484 cf Average Runoff Depth = 5.67"**
**93.94% Pervious = 74,529 sf 6.06% Impervious = 4,811 sf**

## Summary for Subcatchment e1S: Pre-Development - Western Portion of Lot

Runoff = 1.36 cfs @ 12.10 hrs, Volume= 4,408 cf, Depth= 5.71"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| Area (sf) | CN | Description |
|---|---|---|
| 825 | 65 | Brush, Good, HSG C |
| 1,021 | 96 | Gravel surface, HSG C |
| 7,423 | 74 | >75% Grass cover, Good, HSG C |
| 9,269 | 76 | Weighted Average |
| 9,269 | 76 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.8 | 20 | 0.0600 | 0.09 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 14 | 0.0050 | 1.14 | | **Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps |
| 0.3 | 33 | 0.0180 | 2.16 | | **Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps |
| 2.5 | 96 | 0.0160 | 0.63 | | **Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps |
| 6.8 | 163 | Total | | | |

## Summary for Subcatchment e2S: Pre-Development - Eastern Portion of Lot

Runoff = 7.34 cfs @ 12.25 hrs, Volume= 33,076 cf, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| Area (sf) | CN | Description |
|---|---|---|
| 6,357 | 65 | Brush, Good, HSG C |
| 1,687 | 96 | Gravel surface, HSG C |
| 2,892 | 98 | Roofs, HSG C |
| 57,216 | 74 | >75% Grass cover, Good, HSG C |
| 1,919 | 98 | Paved parking, HSG C |
| 70,071 | 75 | Weighted Average |
| 65,260 | 74 | 93.13% Pervious Area |
| 4,811 | 98 | 6.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 3.2 | 100 | 0.0110 | 0.52 | | **Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps |
| 3.9 | 216 | 0.0340 | 0.92 | | **Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps |
| 18.3 | 366 | Total | | | |

## Summary for Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.

Inflow Area = 9,269 sf, 0.00% Impervious, Inflow Depth = 5.71" for 100-yr event
Inflow = 1.36 cfs @ 12.10 hrs, Volume= 4,408 cf
Primary = 1.36 cfs @ 12.10 hrs, Volume= 4,408 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland

Inflow Area = 70,071 sf, 6.87% Impervious, Inflow Depth = 5.66" for 100-yr event
Inflow = 7.34 cfs @ 12.25 hrs, Volume= 33,076 cf
Primary = 7.34 cfs @ 12.25 hrs, Volume= 33,076 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment e1S: Pre-Development - Western Portion of Lot** Runoff Area=9,269 sf 0.00% Impervious Runoff Depth=0.09"
Flow Length=163' Tc=6.8 min CN=76/0 Runoff=0.01 cfs 67 cf

**Subcatchment e2S: Pre-Development - Eastern Portion of Lot** Runoff Area=70,071 sf 6.87% Impervious Runoff Depth=0.13"
Flow Length=366' Tc=18.3 min CN=74/98 Runoff=0.09 cfs 730 cf

**Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.** Inflow=0.01 cfs 67 cf
Primary=0.01 cfs 67 cf

**Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland** Inflow=0.09 cfs 730 cf
Primary=0.09 cfs 730 cf

**Total Runoff Area = 79,340 sf Runoff Volume = 797 cf Average Runoff Depth = 0.12"**
**93.94% Pervious = 74,529 sf 6.06% Impervious = 4,811 sf**

## Summary for Subcatchment e1S: Pre-Development - Western Portion of Lot

Runoff = 0.01 cfs @ 12.36 hrs, Volume= 67 cf, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| Area (sf) | CN | Description |
|---|---|---|
| 825 | 65 | Brush, Good, HSG C |
| 1,021 | 96 | Gravel surface, HSG C |
| 7,423 | 74 | >75% Grass cover, Good, HSG C |
| 9,269 | 76 | Weighted Average |
| 9,269 | 76 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.8 | 20 | 0.0600 | 0.09 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 14 | 0.0050 | 1.14 | | **Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps |
| 0.3 | 33 | 0.0180 | 2.16 | | **Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps |
| 2.5 | 96 | 0.0160 | 0.63 | | **Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps |
| 6.8 | 163 | Total | | | |

## Summary for Subcatchment e2S: Pre-Development - Eastern Portion of Lot

Runoff = 0.09 cfs @ 12.25 hrs, Volume= 730 cf, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| Area (sf) | CN | Description |
|---|---|---|
| 6,357 | 65 | Brush, Good, HSG C |
| 1,687 | 96 | Gravel surface, HSG C |
| 2,892 | 98 | Roofs, HSG C |
| 57,216 | 74 | >75% Grass cover, Good, HSG C |
| 1,919 | 98 | Paved parking, HSG C |
| 70,071 | 75 | Weighted Average |
| 65,260 | 74 | 93.13% Pervious Area |
| 4,811 | 98 | 6.87% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 3.2 | 100 | 0.0110 | 0.52 | | **Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps |
| 3.9 | 216 | 0.0340 | 0.92 | | **Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps |
| 18.3 | 366 | Total | | | |

## Summary for Pond eA1: Analysis Point - Pre Dev Catch Basin in Hope St.

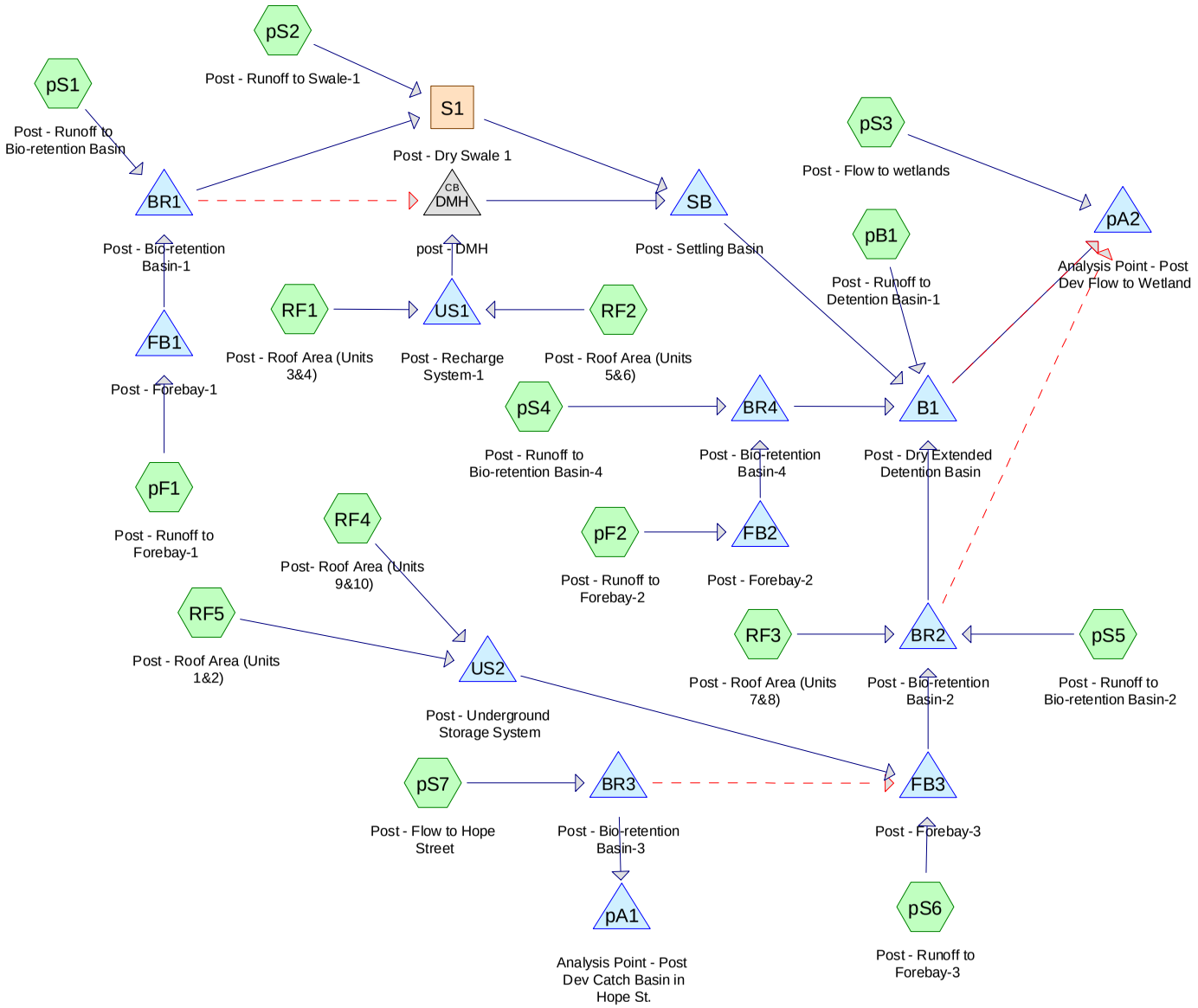
Inflow Area = 9,269 sf, 0.00% Impervious, Inflow Depth = 0.09" for WQv event
Inflow = 0.01 cfs @ 12.36 hrs, Volume= 67 cf
Primary = 0.01 cfs @ 12.36 hrs, Volume= 67 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond eA2: Analysis Point - Pre Dev Flow Towards Wetland

Inflow Area = 70,071 sf, 6.87% Impervious, Inflow Depth = 0.13" for WQv event
Inflow = 0.09 cfs @ 12.25 hrs, Volume= 730 cf
Primary = 0.09 cfs @ 12.25 hrs, Volume= 730 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs




**Routing Diagram for 22024 Hope Street HydroCAD 6-13-22**

Prepared by {enter your company name here}, Printed 12/9/2022

## Area Listing (selected nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 53,735 | 74 | >75% Grass cover, Good, HSG C (pB1, pF1, pF2, pS1, pS2, pS3, pS4, pS5, pS6, pS7) |
| 956 | 98 | Patio/Deck/Stairs (pF1, pS2, pS5, pS7) |
| 11,048 | 98 | Paved parking, HSG C (pF1, pF2, pS6) |
| 12,326 | 98 | Roofs, HSG C (RF1, RF2, RF3, RF4, RF5) |
| 1,622 | 98 | Walkway (pF1, pF2, pS6) |
| **79,687** | **82** | **TOTAL AREA** |

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond B1: Post - Dry Extended Detention Basin** Peak Elev=80.64' Storage=900 cf Inflow=0.73 cfs 4,501 cf
Primary=0.33 cfs 4,171 cf Secondary=0.00 cfs 0 cf Outflow=0.33 cfs 4,171 cf

**Pond BR1: Post - Bio-retention Basin-1** Peak Elev=85.42' Storage=1,018 cf Inflow=0.44 cfs 1,624 cf
Primary=0.00 cfs 0 cf Secondary=0.02 cfs 1,363 cf Outflow=0.02 cfs 1,363 cf

**Pond BR2: Post - Bio-retention Basin-2** Peak Elev=82.25' Storage=927 cf Inflow=0.77 cfs 3,997 cf
Primary=0.53 cfs 1,926 cf Secondary=0.02 cfs 1,997 cf Outflow=0.55 cfs 3,923 cf

**Pond BR3: Post - Bio-retention Basin-3** Peak Elev=84.96' Storage=510 cf Inflow=0.18 cfs 1,113 cf
Primary=0.02 cfs 126 cf Secondary=0.02 cfs 930 cf Outflow=0.04 cfs 1,056 cf

**Pond BR4: Post - Bio-retention Basin-4** Peak Elev=83.83' Storage=277 cf Inflow=0.23 cfs 770 cf
Outflow=0.18 cfs 516 cf

**Pond DMH: post - DMH** Peak Elev=83.00' Inflow=0.12 cfs 1,693 cf
8.0" Round Culvert n=0.013 L=92.0' S=0.0087 '/' Outflow=0.12 cfs 1,693 cf

**Pond FB1: Post - Forebay-1** Peak Elev=86.14' Storage=210 cf Inflow=0.41 cfs 1,610 cf
Outflow=0.40 cfs 1,438 cf

**Pond FB2: Post - Forebay-2** Peak Elev=83.87' Storage=86 cf Inflow=0.20 cfs 760 cf
Outflow=0.20 cfs 684 cf

**Pond FB3: Post - Forebay-3** Peak Elev=82.18' Storage=243 cf Inflow=0.58 cfs 3,486 cf
Outflow=0.57 cfs 3,294 cf

**Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.** Inflow=0.02 cfs 126 cf
Primary=0.02 cfs 126 cf

**Pond pA2: Analysis Point - Post Dev Flow to Wetland** Inflow=0.39 cfs 6,541 cf
Primary=0.39 cfs 6,541 cf

**Subcatchment pB1: Post - Runoff to Detention Basin-1** Runoff Area=2,690 sf 0.00% Impervious Runoff Depth=0.78"
Tc=5.0 min CN=74/0 Runoff=0.05 cfs 176 cf

**Subcatchment pF1: Post - Runoff to Forebay-1** Runoff Area=12,569 sf 42.19% Impervious Runoff Depth=1.54"
Flow Length=126' Tc=10.0 min CN=74/98 Runoff=0.41 cfs 1,610 cf

**Subcatchment pF2: Post - Runoff to Forebay-2** Runoff Area=4,810 sf 62.31% Impervious Runoff Depth=1.90"
Flow Length=64' Tc=8.0 min CN=74/98 Runoff=0.20 cfs 760 cf

**Subcatchment pS1: Post - Runoff to Bio-retention Basin** Runoff Area=2,851 sf 0.00% Impervious Runoff Depth=0.78"
Tc=5.0 min CN=74/0 Runoff=0.06 cfs 186 cf

**Subcatchment pS2: Post - Runoff to Swale-1** Runoff Area=5,173 sf 9.22% Impervious Runoff Depth=0.95"
Tc=5.0 min CN=74/98 Runoff=0.12 cfs 409 cf

**Subcatchment pS3: Post - Flow to wetlands** Runoff Area=5,708 sf 0.00% Impervious Runoff Depth=0.78"
Flow Length=453' Tc=22.1 min CN=74/0 Runoff=0.07 cfs 373 cf

**Subcatchment pS4: Post - Runoff to Bio-retention Basin-4** Runoff Area=1,321 sf 0.00% Impervious Runoff Depth=0.78"
Flow Length=64' Tc=8.0 min CN=74/0 Runoff=0.02 cfs 86 cf

**Subcatchment pS5: Post - Runoff to Bio-retention Basin-2** Runoff Area=1,840 sf 12.93% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=74/98 Runoff=0.05 cfs 156 cf

**Subcatchment pS6: Post - Runoff to Forebay-3** Runoff Area=13,640 sf 32.91% Impervious Runoff Depth=1.37"
Tc=5.0 min CN=74/98 Runoff=0.46 cfs 1,559 cf

**Subcatchment pS7: Post - Flow to Hope Street** Runoff Area=16,759 sf 0.73% Impervious Runoff Depth=0.80"
Flow Length=104' Tc=30.8 min CN=74/98 Runoff=0.18 cfs 1,113 cf

**Subcatchment RF1: Post - Roof Area (Units 3&4)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=2.57"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 547 cf

**Subcatchment RF2: Post - Roof Area (Units 5&6)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=2.57"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 547 cf

**Subcatchment RF3: Post - Roof Area (Units 7&8)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=2.57"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 547 cf

**Subcatchment RF4: Post- Roof Area (Units 9&10)** Runoff Area=2,102 sf 100.00% Impervious Runoff Depth=2.57"
Tc=5.0 min CN=0/98 Runoff=0.13 cfs 450 cf

**Subcatchment RF5: Post - Roof Area (Units 1&2)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=2.57"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 547 cf

**Reach S1: Post - Dry Swale 1** Avg. Flow Depth=0.06' Max Vel=0.89 fps Inflow=0.12 cfs 409 cf
n=0.035 L=150.0' S=0.0200 '/' Capacity=17.43 cfs Outflow=0.11 cfs 409 cf

**Pond SB: Post - Settling Basin** Peak Elev=82.06' Storage=241 cf Inflow=0.20 cfs 2,102 cf
Outflow=0.17 cfs 1,883 cf

**Pond US1: Post - Recharge System-1** Peak Elev=85.04' Storage=423 cf Inflow=0.32 cfs 1,094 cf
Discarded=0.01 cfs 764 cf Primary=0.10 cfs 330 cf Outflow=0.11 cfs 1,094 cf

**Pond US2: Post - Underground Storage System** Peak Elev=83.44' Storage=203 cf Inflow=0.30 cfs 997 cf
4.0" Round Culvert n=0.013 L=100.0' S=0.0105 '/' Outflow=0.15 cfs 997 cf

**Total Runoff Area = 79,687 sf Runoff Volume = 9,067 cf Average Runoff Depth = 1.37"**
**67.43% Pervious = 53,735 sf 32.57% Impervious = 25,952 sf**

## Summary for Pond B1: Post - Dry Extended Detention Basin

Inflow Area = 57,220 sf, 45.14% Impervious, Inflow Depth = 0.94" for 1-yr event
Inflow = 0.73 cfs @ 12.21 hrs, Volume= 4,501 cf
Outflow = 0.33 cfs @ 12.71 hrs, Volume= 4,171 cf, Atten= 55%, Lag= 30.0 min
Primary = 0.33 cfs @ 12.71 hrs, Volume= 4,171 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 80.64' @ 12.71 hrs Surf.Area= 1,522 sf Storage= 900 cf
Flood Elev= 82.50' Surf.Area= 2,300 sf Storage= 4,432 cf

Plug-Flow detention time= 152.3 min calculated for 4,169 cf (93% of inflow)
Center-of-Mass det. time= 87.1 min ( 1,087.5 - 1,000.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 80.00' | 4,432 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.00 | 1,273 | 0 | 0 |
| 81.00 | 1,660 | 1,467 | 1,467 |
| 82.00 | 2,080 | 1,870 | 3,337 |
| 82.50 | 2,300 | 1,095 | 4,432 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Primary | 80.45' | **8.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |
| #3 | Primary | 80.25' | **4.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.33 cfs @ 12.71 hrs HW=80.64' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.13 cfs @ 1.50 fps)
└**3=Culvert** (Inlet Controls 0.20 cfs @ 2.29 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=80.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Summary for Pond BR1: Post - Bio-retention Basin-1

Inflow Area = 15,420 sf, 34.39% Impervious, Inflow Depth = 1.26" for 1-yr event
Inflow = 0.44 cfs @ 12.15 hrs, Volume= 1,624 cf
Outflow = 0.02 cfs @ 15.75 hrs, Volume= 1,363 cf, Atten= 95%, Lag= 215.8 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.02 cfs @ 15.75 hrs, Volume= 1,363 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 85.42' @ 15.75 hrs Surf.Area= 1,891 sf Storage= 1,018 cf
Flood Elev= 86.00' Surf.Area= 2,110 sf Storage= 1,567 cf

Plug-Flow detention time= 532.5 min calculated for 1,362 cf (84% of inflow)
Center-of-Mass det. time= 464.4 min ( 1,304.4 - 840.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 867 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.00' | 694 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids |
| #3 | 83.75' | 7 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 35.0' |
| | | 1,567 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 678 | 0 | 0 |
| 86.00 | 1,055 | 867 | 867 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 1,055 | 0 | 0 |
| 85.00 | 1,055 | 2,110 | 2,110 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 85.75' | **4.0' long x 2.5' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00<br>Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32 |
| #2 | Device 3 | 83.00' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 83.75' | **6.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=83.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.02 cfs @ 15.75 hrs HW=85.42' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 0.74 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR2: Post - Bio-retention Basin-2

Inflow Area = 22,694 sf, 52.62% Impervious, Inflow Depth = 2.11" for 1-yr event
Inflow = 0.77 cfs @ 12.09 hrs, Volume= 3,997 cf
Outflow = 0.55 cfs @ 12.21 hrs, Volume= 3,923 cf, Atten= 29%, Lag= 6.7 min
Primary = 0.53 cfs @ 12.21 hrs, Volume= 1,926 cf
Secondary = 0.02 cfs @ 12.21 hrs, Volume= 1,997 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 82.25' @ 12.21 hrs Surf.Area= 1,720 sf Storage= 927 cf
Flood Elev= 82.50' Surf.Area= 1,796 sf Storage= 1,140 cf

Plug-Flow detention time= 283.1 min calculated for 3,921 cf (98% of inflow)
Center-of-Mass det. time= 265.0 min ( 1,192.0 - 927.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.35' | 836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 80.35' | 292 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>898 cf Overall - 12 cf Embedded = 886 cf x 33.0% Voids |
| #3 | 80.60' | 12 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 61.0' |
| | | 1,140 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.35 | 563 | 0 | 0 |
| 82.00 | 745 | 425 | 425 |
| 82.50 | 898 | 411 | 836 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.35 | 898 | 0 | 0 |
| 81.35 | 898 | 898 | 898 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.10' | **3.5' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 80.35' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 80.60' | **6.0" Round Culvert** L= 62.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.60' / 79.00' S= 0.0258 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.52 cfs @ 12.21 hrs HW=82.25' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.52 cfs @ 0.99 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.21 hrs HW=82.25' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 1.03 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR3: Post - Bio-retention Basin-3

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 0.80" for 1-yr event
Inflow = 0.18 cfs @ 12.48 hrs, Volume= 1,113 cf
Outflow = 0.04 cfs @ 13.64 hrs, Volume= 1,056 cf, Atten= 78%, Lag= 69.8 min
Primary = 0.02 cfs @ 13.64 hrs, Volume= 126 cf
Secondary = 0.02 cfs @ 13.64 hrs, Volume= 930 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 84.96' @ 13.64 hrs Surf.Area= 1,310 sf Storage= 510 cf

Plug-Flow detention time= 371.6 min calculated for 1,056 cf (95% of inflow)
Center-of-Mass det. time= 345.5 min ( 1,236.9 - 891.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 84.40' | 371 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.40' | 224 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids |
| #3 | 83.65' | 6 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 30.0' |
| | | 601 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 84.40 | 374 | 0 | 0 |
| 85.10 | 686 | 371 | 371 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.40 | 686 | 0 | 0 |
| 84.40 | 686 | 686 | 686 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 84.95' | **8.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 85.00' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Secondary | 83.65' | **6.0" Round Culvert** L= 68.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.65' / 83.00' S= 0.0096 '/' Cc= 0.900<br>n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf |
| #4 | Device 3 | 83.40' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |

**Primary OutFlow** Max=0.02 cfs @ 13.64 hrs HW=84.96' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.26 fps)

**Secondary OutFlow** Max=0.02 cfs @ 13.64 hrs HW=84.96' (Free Discharge)
└─**3=Culvert** (Passes 0.02 cfs of 0.73 cfs potential flow)
  ├─**2=Orifice/Grate** ( Controls 0.00 cfs)
  └─**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR4: Post - Bio-retention Basin-4

Inflow Area = 6,131 sf, 48.88% Impervious, Inflow Depth = 1.51" for 1-yr event
Inflow = 0.23 cfs @ 12.12 hrs, Volume= 770 cf
Outflow = 0.18 cfs @ 12.22 hrs, Volume= 516 cf, Atten= 21%, Lag= 5.6 min
Primary = 0.18 cfs @ 12.22 hrs, Volume= 516 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.83' @ 12.22 hrs Surf.Area= 570 sf Storage= 277 cf
Flood Elev= 84.00' Surf.Area= 594 sf Storage= 325 cf

Plug-Flow detention time= 164.1 min calculated for 516 cf (67% of inflow)
Center-of-Mass det. time= 65.7 min ( 888.7 - 823.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 227 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 82.00' | 98 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 297 cf Overall x 33.0% Voids |
| | | 325 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 157 | 0 | 0 |
| 84.00 | 297 | 227 | 227 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 82.00 | 297 | 0 | 0 |
| 83.00 | 297 | 297 | 297 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.75' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.17 cfs @ 12.22 hrs HW=83.83' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.71 fps)

## Summary for Pond DMH: post - DMH

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 3.98" for 1-yr event
Inflow = 0.12 cfs @ 12.40 hrs, Volume= 1,693 cf
Outflow = 0.12 cfs @ 12.40 hrs, Volume= 1,693 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 12.40 hrs, Volume= 1,693 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.00' @ 12.40 hrs
Flood Elev= 85.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.80' | **8.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |

**Primary OutFlow** Max=0.12 cfs @ 12.40 hrs HW=83.00' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.12 cfs @ 2.05 fps)

## Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,569 sf, 42.19% Impervious, Inflow Depth = 1.54" for 1-yr event
Inflow = 0.41 cfs @ 12.14 hrs, Volume= 1,610 cf
Outflow = 0.40 cfs @ 12.16 hrs, Volume= 1,438 cf, Atten= 1%, Lag= 1.3 min
Primary = 0.40 cfs @ 12.16 hrs, Volume= 1,438 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 86.14' @ 12.16 hrs Surf.Area= 278 sf Storage= 210 cf
Flood Elev= 86.50' Surf.Area= 350 sf Storage= 323 cf

Plug-Flow detention time= 93.2 min calculated for 1,437 cf (89% of inflow)
Center-of-Mass det. time= 40.2 min ( 836.1 - 795.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 323 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 95 | 0 | 0 |
| 86.00 | 250 | 173 | 173 |
| 86.50 | 350 | 150 | 323 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 86.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.40 cfs @ 12.16 hrs HW=86.14' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.40 cfs @ 0.95 fps)

## Summary for Pond FB2: Post - Forebay-2

Inflow Area = 4,810 sf, 62.31% Impervious, Inflow Depth = 1.90" for 1-yr event
Inflow = 0.20 cfs @ 12.11 hrs, Volume= 760 cf
Outflow = 0.20 cfs @ 12.12 hrs, Volume= 684 cf, Atten= 1%, Lag= 0.5 min
Primary = 0.20 cfs @ 12.12 hrs, Volume= 684 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.87' @ 12.12 hrs Surf.Area= 133 sf Storage= 86 cf
Flood Elev= 84.00' Surf.Area= 143 sf Storage= 103 cf

Plug-Flow detention time= 88.3 min calculated for 684 cf (90% of inflow)
Center-of-Mass det. time= 38.1 min ( 816.7 - 778.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 103 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 63 | 0 | 0 |
| 84.00 | 143 | 103 | 103 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.80' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.20 cfs @ 12.12 hrs HW=83.87' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.20 cfs @ 0.69 fps)

## Summary for Pond FB3: Post - Forebay-3

Inflow Area = 18,298 sf, 49.99% Impervious, Inflow Depth = 2.29" for 1-yr event
Inflow = 0.58 cfs @ 12.08 hrs, Volume= 3,486 cf
Outflow = 0.57 cfs @ 12.11 hrs, Volume= 3,294 cf, Atten= 3%, Lag= 1.2 min
Primary = 0.57 cfs @ 12.11 hrs, Volume= 3,294 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.18' @ 12.11 hrs Surf.Area= 312 sf Storage= 243 cf
Flood Elev= 82.50' Surf.Area= 400 sf Storage= 358 cf

Plug-Flow detention time= 81.6 min calculated for 3,294 cf (94% of inflow)
Center-of-Mass det. time= 31.3 min ( 959.5 - 928.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 358 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 121 | 0 | 0 |
| 82.00 | 263 | 192 | 192 |
| 82.50 | 400 | 166 | 358 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.56 cfs @ 12.11 hrs HW=82.18' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.56 cfs @ 1.06 fps)

## Summary for Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 0.09" for 1-yr event
Inflow = 0.02 cfs @ 13.64 hrs, Volume= 126 cf
Primary = 0.02 cfs @ 13.64 hrs, Volume= 126 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond pA2: Analysis Point - Post Dev Flow to Wetland

Inflow Area = 62,928 sf, 41.05% Impervious, Inflow Depth = 1.25" for 1-yr event
Inflow = 0.39 cfs @ 12.67 hrs, Volume= 6,541 cf
Primary = 0.39 cfs @ 12.67 hrs, Volume= 6,541 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Subcatchment pB1: Post - Runoff to Detention Basin-1

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 176 cf, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,690 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 2,690 | 74 | Weighted Average |
| | 2,690 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pF1: Post - Runoff to Forebay-1

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 1,610 cf, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 4,205 | 98 | Paved parking, HSG C |
| | 7,266 | 74 | >75% Grass cover, Good, HSG C |
| * | 979 | 98 | Walkway |
| * | 119 | 98 | Patio/Deck/Stairs |
| | 12,569 | 84 | Weighted Average |
| | 7,266 | 74 | 57.81% Pervious Area |
| | 5,303 | 98 | 42.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.5 | 44 | 0.0300 | 0.08 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.5 | 82 | 0.0180 | 2.72 | | **Shallow Concentrated Flow, BC**<br>Paved Kv= 20.3 fps |
| 10.0 | 126 | Total | | | |

## Summary for Subcatchment pF2: Post - Runoff to Forebay-2

Runoff = 0.20 cfs @ 12.11 hrs, Volume= 760 cf, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,813 | 74 | >75% Grass cover, Good, HSG C |
| | 2,847 | 98 | Paved parking, HSG C |
| * | 150 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 4,810 | 89 | Weighted Average |
| | 1,813 | 74 | 37.69% Pervious Area |
| | 2,997 | 98 | 62.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS1: Post - Runoff to Bio-retention Basin

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 186 cf, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,851 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Patio/Deck/Stairs |
| | 2,851 | 74 | Weighted Average |
| | 2,851 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Runoff to swale** |

## Summary for Subcatchment pS2: Post - Runoff to Swale-1

Runoff = 0.12 cfs @ 12.08 hrs, Volume= 409 cf, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 4,696 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 477 | 98 | Patio/Deck/Stairs |
| | 5,173 | 76 | Weighted Average |
| | 4,696 | 74 | 90.78% Pervious Area |
| | 477 | 98 | 9.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Parking Runoff** |

## Summary for Subcatchment pS3: Post - Flow to wetlands

Runoff = 0.07 cfs @ 12.34 hrs, Volume= 373 cf, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 5,708 | 74 | >75% Grass cover, Good, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 5,708 | 74 | Weighted Average |
| 5,708 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 8.6 | 183 | 0.0050 | 0.35 | | **Shallow Concentrated Flow, BC** |
| | | | | | Woodland Kv= 5.0 fps |
| 1.9 | 117 | 0.0400 | 1.00 | | **Shallow Concentrated Flow, CD** |
| | | | | | Woodland Kv= 5.0 fps |
| 0.3 | 103 | 0.0300 | 5.33 | 26.67 | **Channel Flow, DE** |
| | | | | | Area= 5.0 sf Perim= 10.2' r= 0.49' |
| | | | | | n= 0.030 Earth, grassed & winding |
| 22.1 | 453 | Total | | | |

## Summary for Subcatchment pS4: Post - Runoff to Bio-retention Basin-4

Runoff = 0.02 cfs @ 12.13 hrs, Volume= 86 cf, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,321 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 1,321 | 74 | Weighted Average |
| | 1,321 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** |
| | | | | | Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS5: Post - Runoff to Bio-retention Basin-2

Runoff = 0.05 cfs @ 12.08 hrs, Volume= 156 cf, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 1,602 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 238 | 98 | Patio/Deck/Stairs |
| | 0 | 98 | Roofs, HSG C |
| | 1,840 | 77 | Weighted Average |
| | 1,602 | 74 | 87.07% Pervious Area |
| | 238 | 98 | 12.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS6: Post - Runoff to Forebay-3

Runoff = 0.46 cfs @ 12.08 hrs, Volume= 1,559 cf, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 3,996 | 98 | Paved parking, HSG C |
| | 9,151 | 74 | >75% Grass cover, Good, HSG C |
| * | 493 | 98 | Walkway |
| | 13,640 | 82 | Weighted Average |
| | 9,151 | 74 | 67.09% Pervious Area |
| | 4,489 | 98 | 32.91% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS7: Post - Flow to Hope Street

Runoff = 0.18 cfs @ 12.48 hrs, Volume= 1,113 cf, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 16,637 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkways |
| * | 122 | 98 | Patio/Deck/Stairs |
| | 16,759 | 74 | Weighted Average |
| | 16,637 | 74 | 99.27% Pervious Area |
| | 122 | 98 | 0.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.6 | 60 | 0.0030 | 0.03 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 44 | 0.0450 | 3.42 | | **Shallow Concentrated Flow, BC** |
| | | | | | Unpaved Kv= 16.1 fps |
| 30.8 | 104 | Total | | | |

## Summary for Subcatchment RF1: Post - Roof Area (Units 3&4)

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 547 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF2: Post - Roof Area (Units 5&6)

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 547 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF3: Post - Roof Area (Units 7&8)

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 547 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF4: Post- Roof Area (Units 9&10)

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 450 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 2,102 | 98 | Roofs, HSG C |
| 2,102 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF5: Post - Roof Area (Units 1&2)

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 547 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-yr Rainfall=2.80"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Reach S1: Post - Dry Swale 1

Inflow Area = 20,593 sf, 28.07% Impervious, Inflow Depth = 0.24" for 1-yr event
Inflow = 0.12 cfs @ 12.08 hrs, Volume= 409 cf
Outflow = 0.11 cfs @ 12.16 hrs, Volume= 409 cf, Atten= 8%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Max. Velocity= 0.89 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.30 fps, Avg. Travel Time= 8.3 min

Peak Storage= 19 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 17.43 cfs

Custom cross-section, Length= 150.0' Slope= 0.0200 '/'
Constant n= 0.035 Earth, dense weeds
Inlet Invert= 85.00', Outlet Invert= 82.00'

| Offset (feet) | Elevation (feet) | Chan.Depth (feet) |
|---|---|---|
| -3.00 | 1.00 | 0.00 |
| -1.00 | 0.00 | 1.00 |
| 1.00 | 0.00 | 1.00 |
| 3.00 | 1.00 | 0.00 |

| Depth (feet) | End Area (sq-ft) | Perim. (feet) | Storage (cubic-feet) | Discharge (cfs) |
|---|---|---|---|---|
| 0.00 | 0.0 | 2.0 | 0 | 0.00 |
| 1.00 | 4.0 | 6.5 | 600 | 17.43 |

## Summary for Pond SB: Post - Settling Basin

Inflow Area = 25,705 sf, 42.37% Impervious, Inflow Depth = 0.98" for 1-yr event
Inflow = 0.20 cfs @ 12.21 hrs, Volume= 2,102 cf
Outflow = 0.17 cfs @ 12.44 hrs, Volume= 1,883 cf, Atten= 15%, Lag= 13.8 min
Primary = 0.17 cfs @ 12.44 hrs, Volume= 1,883 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.06' @ 12.44 hrs Surf.Area= 347 sf Storage= 241 cf

Plug-Flow detention time= 143.1 min calculated for 1,882 cf (90% of inflow)
Center-of-Mass det. time= 53.2 min ( 1,188.1 - 1,134.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 416 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 108 | 0 | 0 |
| 82.00 | 331 | 220 | 220 |
| 82.50 | 456 | 197 | 416 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.17 cfs @ 12.44 hrs HW=82.06' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.65 fps)

## Summary for Pond US1: Post - Recharge System-1

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 2.57" for 1-yr event
Inflow = 0.32 cfs @ 12.07 hrs, Volume= 1,094 cf
Outflow = 0.11 cfs @ 12.33 hrs, Volume= 1,094 cf, Atten= 66%, Lag= 15.4 min
Discarded = 0.01 cfs @ 8.60 hrs, Volume= 764 cf
Primary = 0.10 cfs @ 12.33 hrs, Volume= 330 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 85.04' @ 12.33 hrs Surf.Area= 715 sf Storage= 423 cf
Flood Elev= 86.30' Surf.Area= 715 sf Storage= 837 cf

Plug-Flow detention time= 263.3 min calculated for 1,094 cf (100% of inflow)
Center-of-Mass det. time= 263.4 min ( 1,021.8 - 758.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 84.00' | 405 cf | **21.50'W x 33.25'L x 2.33'H Field A**<br>1,668 cf Overall - 439 cf Embedded = 1,229 cf x 33.0% Voids |
| #2A | 84.50' | 439 cf | **Infiltrator H-20 Chamber** x 30 Inside #1<br>Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf<br>Overall Size= 34.0"W x 16.0"H x 6.25'L |
| | | 845 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 84.00' | **0.500 in/hr Exfiltration over Surface area** |
| #2 | Primary | 84.85' | **6.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Discarded OutFlow** Max=0.01 cfs @ 8.60 hrs HW=84.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.10 cfs @ 12.33 hrs HW=85.04' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.10 cfs @ 1.49 fps)

## Summary for Pond US2: Post - Underground Storage System

Inflow Area = 4,658 sf,100.00% Impervious, Inflow Depth = 2.57" for 1-yr event
Inflow = 0.30 cfs @ 12.07 hrs, Volume= 997 cf
Outflow = 0.15 cfs @ 12.21 hrs, Volume= 997 cf, Atten= 51%, Lag= 8.3 min
Primary = 0.15 cfs @ 12.21 hrs, Volume= 997 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.44' @ 12.21 hrs Surf.Area= 998 sf Storage= 203 cf

Plug-Flow detention time= 33.7 min calculated for 997 cf (100% of inflow)
Center-of-Mass det. time= 33.9 min ( 792.3 - 758.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.15' | 1,484 cf | **18.0" Round Pipe Storage** x 14<br>L= 60.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.15' | **4.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.14 cfs @ 12.21 hrs HW=83.44' (Free Discharge)
**1=Culvert** (Barrel Controls 0.14 cfs @ 2.39 fps)

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond B1: Post - Dry Extended Detention Basin** Peak Elev=80.81' Storage=1,161 cf Inflow=1.21 cfs 6,343 cf
Primary=0.66 cfs 6,012 cf Secondary=0.00 cfs 0 cf Outflow=0.66 cfs 6,012 cf

**Pond BR1: Post - Bio-retention Basin-1** Peak Elev=85.76' Storage=1,328 cf Inflow=0.57 cfs 2,114 cf
Primary=0.02 cfs 81 cf Secondary=0.02 cfs 1,771 cf Outflow=0.04 cfs 1,852 cf

**Pond BR2: Post - Bio-retention Basin-2** Peak Elev=82.31' Storage=973 cf Inflow=0.98 cfs 4,854 cf
Primary=0.84 cfs 2,685 cf Secondary=0.02 cfs 2,093 cf Outflow=0.86 cfs 4,778 cf

**Pond BR3: Post - Bio-retention Basin-3** Peak Elev=84.99' Storage=528 cf Inflow=0.27 cfs 1,562 cf
Primary=0.16 cfs 501 cf Secondary=0.02 cfs 1,004 cf Outflow=0.17 cfs 1,505 cf

**Pond BR4: Post - Bio-retention Basin-4** Peak Elev=83.86' Storage=284 cf Inflow=0.28 cfs 978 cf
Outflow=0.27 cfs 723 cf

**Pond DMH: post - DMH** Peak Elev=83.06' Inflow=0.20 cfs 2,272 cf
8.0" Round Culvert n=0.013 L=92.0' S=0.0087 '/' Outflow=0.20 cfs 2,272 cf

**Pond FB1: Post - Forebay-1** Peak Elev=86.16' Storage=216 cf Inflow=0.52 cfs 2,024 cf
Outflow=0.51 cfs 1,851 cf

**Pond FB2: Post - Forebay-2** Peak Elev=83.88' Storage=87 cf Inflow=0.25 cfs 933 cf
Outflow=0.25 cfs 857 cf

**Pond FB3: Post - Forebay-3** Peak Elev=82.21' Storage=253 cf Inflow=0.75 cfs 4,184 cf
Outflow=0.73 cfs 3,992 cf

**Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.** Inflow=0.16 cfs 501 cf
Primary=0.16 cfs 501 cf

**Pond pA2: Analysis Point - Post Dev Flow to Wetland** Inflow=0.76 cfs 8,631 cf
Primary=0.76 cfs 8,631 cf

**Subcatchment pB1: Post - Runoff to Detention Basin-1** Runoff Area=2,690 sf 0.00% Impervious Runoff Depth=1.10"
Tc=5.0 min CN=74/0 Runoff=0.08 cfs 247 cf

**Subcatchment pF1: Post - Runoff to Forebay-1** Runoff Area=12,569 sf 42.19% Impervious Runoff Depth=1.93"
Flow Length=126' Tc=10.0 min CN=74/98 Runoff=0.52 cfs 2,024 cf

**Subcatchment pF2: Post - Runoff to Forebay-2** Runoff Area=4,810 sf 62.31% Impervious Runoff Depth=2.33"
Flow Length=64' Tc=8.0 min CN=74/98 Runoff=0.25 cfs 933 cf

**Subcatchment pS1: Post - Runoff to Bio-retention Basin** Runoff Area=2,851 sf 0.00% Impervious Runoff Depth=1.10"
Tc=5.0 min CN=74/0 Runoff=0.08 cfs 262 cf

**Subcatchment pS2: Post - Runoff to Swale-1** Runoff Area=5,173 sf 9.22% Impervious Runoff Depth=1.28"
Tc=5.0 min CN=74/98 Runoff=0.17 cfs 554 cf

**Subcatchment pS3: Post - Flow to wetlands** Runoff Area=5,708 sf 0.00% Impervious Runoff Depth=1.10"
Flow Length=453' Tc=22.1 min CN=74/0 Runoff=0.10 cfs 525 cf

**Subcatchment pS4: Post - Runoff to Bio-retention Basin-4** Runoff Area=1,321 sf 0.00% Impervious Runoff Depth=1.10"
Flow Length=64' Tc=8.0 min CN=74/0 Runoff=0.03 cfs 122 cf

**Subcatchment pS5: Post - Runoff to Bio-retention Basin-2** Runoff Area=1,840 sf 12.93% Impervious Runoff Depth=1.36"
Tc=5.0 min CN=74/98 Runoff=0.06 cfs 208 cf

**Subcatchment pS6: Post - Runoff to Forebay-3** Runoff Area=13,640 sf 32.91% Impervious Runoff Depth=1.75"
Tc=5.0 min CN=74/98 Runoff=0.60 cfs 1,989 cf

**Subcatchment pS7: Post - Flow to Hope Street** Runoff Area=16,759 sf 0.73% Impervious Runoff Depth=1.12"
Flow Length=104' Tc=30.8 min CN=74/98 Runoff=0.27 cfs 1,562 cf

**Subcatchment RF1: Post - Roof Area (Units 3&4)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=0/98 Runoff=0.19 cfs 653 cf

**Subcatchment RF2: Post - Roof Area (Units 5&6)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=0/98 Runoff=0.19 cfs 653 cf

**Subcatchment RF3: Post - Roof Area (Units 7&8)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=0/98 Runoff=0.19 cfs 653 cf

**Subcatchment RF4: Post- Roof Area (Units 9&10)** Runoff Area=2,102 sf 100.00% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 537 cf

**Subcatchment RF5: Post - Roof Area (Units 1&2)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=0/98 Runoff=0.19 cfs 653 cf

**Reach S1: Post - Dry Swale 1** Avg. Flow Depth=0.07' Max Vel=1.01 fps Inflow=0.17 cfs 635 cf
n=0.035 L=150.0' S=0.0200 '/' Capacity=17.43 cfs Outflow=0.16 cfs 635 cf

**Pond SB: Post - Settling Basin** Peak Elev=82.10' Storage=253 cf Inflow=0.35 cfs 2,907 cf
Outflow=0.33 cfs 2,687 cf

**Pond US1: Post - Recharge System-1** Peak Elev=85.11' Storage=461 cf Inflow=0.38 cfs 1,307 cf
Discarded=0.01 cfs 806 cf Primary=0.18 cfs 501 cf Outflow=0.19 cfs 1,307 cf

**Pond US2: Post - Underground Storage System** Peak Elev=83.48' Storage=239 cf Inflow=0.35 cfs 1,191 cf
4.0" Round Culvert n=0.013 L=100.0' S=0.0105 '/' Outflow=0.17 cfs 1,191 cf

**Total Runoff Area = 79,687 sf Runoff Volume = 11,577 cf Average Runoff Depth = 1.74"**
**67.43% Pervious = 53,735 sf 32.57% Impervious = 25,952 sf**

## Summary for Pond B1: Post - Dry Extended Detention Basin

Inflow Area = 57,220 sf, 45.14% Impervious, Inflow Depth = 1.33" for 2-yr event
Inflow = 1.21 cfs @ 12.24 hrs, Volume= 6,343 cf
Outflow = 0.66 cfs @ 12.51 hrs, Volume= 6,012 cf, Atten= 45%, Lag= 16.7 min
Primary = 0.66 cfs @ 12.51 hrs, Volume= 6,012 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 80.81' @ 12.51 hrs Surf.Area= 1,587 sf Storage= 1,161 cf
Flood Elev= 82.50' Surf.Area= 2,300 sf Storage= 4,432 cf

Plug-Flow detention time= 131.1 min calculated for 6,009 cf (95% of inflow)
Center-of-Mass det. time= 72.4 min ( 1,082.4 - 1,010.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 80.00' | 4,432 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.00 | 1,273 | 0 | 0 |
| 81.00 | 1,660 | 1,467 | 1,467 |
| 82.00 | 2,080 | 1,870 | 3,337 |
| 82.50 | 2,300 | 1,095 | 4,432 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Primary | 80.45' | **8.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |
| #3 | Primary | 80.25' | **4.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.66 cfs @ 12.51 hrs HW=80.81' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.40 cfs @ 2.05 fps)
└**3=Culvert** (Inlet Controls 0.26 cfs @ 3.03 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=80.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Summary for Pond BR1: Post - Bio-retention Basin-1

Inflow Area = 15,420 sf, 34.39% Impervious, Inflow Depth = 1.64" for 2-yr event
Inflow = 0.57 cfs @ 12.15 hrs, Volume= 2,114 cf
Outflow = 0.04 cfs @ 14.41 hrs, Volume= 1,852 cf, Atten= 93%, Lag= 135.7 min
Primary = 0.02 cfs @ 14.41 hrs, Volume= 81 cf
Secondary = 0.02 cfs @ 14.41 hrs, Volume= 1,771 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 85.76' @ 14.41 hrs Surf.Area= 2,021 sf Storage= 1,328 cf
Flood Elev= 86.00' Surf.Area= 2,110 sf Storage= 1,567 cf

Plug-Flow detention time= 609.7 min calculated for 1,851 cf (88% of inflow)
Center-of-Mass det. time= 553.1 min ( 1,385.9 - 832.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 867 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.00' | 694 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids |
| #3 | 83.75' | 7 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 35.0' |
| | | 1,567 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 678 | 0 | 0 |
| 86.00 | 1,055 | 867 | 867 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 1,055 | 0 | 0 |
| 85.00 | 1,055 | 2,110 | 2,110 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 85.75' | **4.0' long x 2.5' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00<br>Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32 |
| #2 | Device 3 | 83.00' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 83.75' | **6.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.01 cfs @ 14.41 hrs HW=85.76' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.28 fps)

**Secondary OutFlow** Max=0.02 cfs @ 14.41 hrs HW=85.76' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 0.80 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR2: Post - Bio-retention Basin-2

Inflow Area = 22,694 sf, 52.62% Impervious, Inflow Depth = 2.57" for 2-yr event
Inflow = 0.98 cfs @ 12.09 hrs, Volume= 4,854 cf
Outflow = 0.86 cfs @ 12.14 hrs, Volume= 4,778 cf, Atten= 12%, Lag= 2.9 min
Primary = 0.84 cfs @ 12.14 hrs, Volume= 2,685 cf
Secondary = 0.02 cfs @ 12.14 hrs, Volume= 2,093 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 82.31' @ 12.14 hrs Surf.Area= 1,737 sf Storage= 973 cf
Flood Elev= 82.50' Surf.Area= 1,796 sf Storage= 1,140 cf

Plug-Flow detention time= 244.9 min calculated for 4,775 cf (98% of inflow)
Center-of-Mass det. time= 228.6 min ( 1,144.5 - 916.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.35' | 836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 80.35' | 292 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 898 cf Overall - 12 cf Embedded = 886 cf x 33.0% Voids |
| #3 | 80.60' | 12 cf | **6.0" Round Pipe Storage** Inside #2 |
| | | | L= 61.0' |
| | | 1,140 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.35 | 563 | 0 | 0 |
| 82.00 | 745 | 425 | 425 |
| 82.50 | 898 | 411 | 836 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.35 | 898 | 0 | 0 |
| 81.35 | 898 | 898 | 898 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.10' | **3.5' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 80.35' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 80.60' | **6.0" Round Culvert** L= 62.0' RCP, sq.cut end projecting, Ke= 0.500 |
| | | | Inlet / Outlet Invert= 80.60' / 79.00' S= 0.0258 '/' Cc= 0.900 |
| | | | n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.83 cfs @ 12.14 hrs HW=82.31' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.83 cfs @ 1.15 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.14 hrs HW=82.31' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 1.04 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR3: Post - Bio-retention Basin-3

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 1.12" for 2-yr event
Inflow = 0.27 cfs @ 12.46 hrs, Volume= 1,562 cf
Outflow = 0.17 cfs @ 12.79 hrs, Volume= 1,505 cf, Atten= 35%, Lag= 19.9 min
Primary = 0.16 cfs @ 12.79 hrs, Volume= 501 cf
Secondary = 0.02 cfs @ 12.79 hrs, Volume= 1,004 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 84.99' @ 12.79 hrs Surf.Area= 1,323 sf Storage= 528 cf

Plug-Flow detention time= 291.9 min calculated for 1,505 cf (96% of inflow)
Center-of-Mass det. time= 271.8 min ( 1,152.9 - 881.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 84.40' | 371 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.40' | 224 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids |
| #3 | 83.65' | 6 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 30.0' |
| | | 601 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 84.40 | 374 | 0 | 0 |
| 85.10 | 686 | 371 | 371 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.40 | 686 | 0 | 0 |
| 84.40 | 686 | 686 | 686 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 84.95' | **8.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 85.00' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Secondary | 83.65' | **6.0" Round Culvert** L= 68.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.65' / 83.00' S= 0.0096 '/' Cc= 0.900<br>n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf |
| #4 | Device 3 | 83.40' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |

**Primary OutFlow** Max=0.16 cfs @ 12.79 hrs HW=84.99' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.16 cfs @ 0.50 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.79 hrs HW=84.99' (Free Discharge)
└─**3=Culvert** (Passes 0.02 cfs of 0.73 cfs potential flow)
  ├─**2=Orifice/Grate** ( Controls 0.00 cfs)
  └─**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR4: Post - Bio-retention Basin-4

Inflow Area = 6,131 sf, 48.88% Impervious, Inflow Depth = 1.91" for 2-yr event
Inflow = 0.28 cfs @ 12.12 hrs, Volume= 978 cf
Outflow = 0.27 cfs @ 12.15 hrs, Volume= 723 cf, Atten= 5%, Lag= 1.8 min
Primary = 0.27 cfs @ 12.15 hrs, Volume= 723 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.86' @ 12.15 hrs Surf.Area= 574 sf Storage= 284 cf
Flood Elev= 84.00' Surf.Area= 594 sf Storage= 325 cf

Plug-Flow detention time= 140.3 min calculated for 723 cf (74% of inflow)
Center-of-Mass det. time= 52.2 min ( 868.9 - 816.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 227 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 82.00' | 98 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 297 cf Overall x 33.0% Voids |
| | | 325 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 157 | 0 | 0 |
| 84.00 | 297 | 227 | 227 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 82.00 | 297 | 0 | 0 |
| 83.00 | 297 | 297 | 297 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.75' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.26 cfs @ 12.15 hrs HW=83.86' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.26 cfs @ 0.83 fps)

## Summary for Pond DMH: post - DMH

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 5.33" for 2-yr event
Inflow = 0.20 cfs @ 12.23 hrs, Volume= 2,272 cf
Outflow = 0.20 cfs @ 12.23 hrs, Volume= 2,272 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.20 cfs @ 12.23 hrs, Volume= 2,272 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.06' @ 12.23 hrs
Flood Elev= 85.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.80' | **8.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |

**Primary OutFlow** Max=0.20 cfs @ 12.23 hrs HW=83.06' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.20 cfs @ 2.36 fps)

## Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,569 sf, 42.19% Impervious, Inflow Depth = 1.93" for 2-yr event
Inflow = 0.52 cfs @ 12.14 hrs, Volume= 2,024 cf
Outflow = 0.51 cfs @ 12.16 hrs, Volume= 1,851 cf, Atten= 1%, Lag= 1.2 min
Primary = 0.51 cfs @ 12.16 hrs, Volume= 1,851 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 86.16' @ 12.16 hrs Surf.Area= 283 sf Storage= 216 cf
Flood Elev= 86.50' Surf.Area= 350 sf Storage= 323 cf

Plug-Flow detention time= 80.4 min calculated for 1,851 cf (91% of inflow)
Center-of-Mass det. time= 35.1 min ( 829.1 - 793.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 323 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 95 | 0 | 0 |
| 86.00 | 250 | 173 | 173 |
| 86.50 | 350 | 150 | 323 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 86.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.51 cfs @ 12.16 hrs HW=86.16' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.51 cfs @ 1.03 fps)

## Summary for Pond FB2: Post - Forebay-2

Inflow Area = 4,810 sf, 62.31% Impervious, Inflow Depth = 2.33" for 2-yr event
Inflow = 0.25 cfs @ 12.11 hrs, Volume= 933 cf
Outflow = 0.25 cfs @ 12.12 hrs, Volume= 857 cf, Atten= 1%, Lag= 0.5 min
Primary = 0.25 cfs @ 12.12 hrs, Volume= 857 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.88' @ 12.12 hrs Surf.Area= 134 sf Storage= 87 cf
Flood Elev= 84.00' Surf.Area= 143 sf Storage= 103 cf

Plug-Flow detention time= 77.0 min calculated for 857 cf (92% of inflow)
Center-of-Mass det. time= 34.0 min ( 810.3 - 776.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 103 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 63 | 0 | 0 |
| 84.00 | 143 | 103 | 103 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.80' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.25 cfs @ 12.12 hrs HW=83.88' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.25 cfs @ 0.74 fps)

## Summary for Pond FB3: Post - Forebay-3

Inflow Area = 18,298 sf, 49.99% Impervious, Inflow Depth = 2.74" for 2-yr event
Inflow = 0.75 cfs @ 12.08 hrs, Volume= 4,184 cf
Outflow = 0.73 cfs @ 12.10 hrs, Volume= 3,992 cf, Atten= 3%, Lag= 1.1 min
Primary = 0.73 cfs @ 12.10 hrs, Volume= 3,992 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.21' @ 12.10 hrs Surf.Area= 320 sf Storage= 253 cf
Flood Elev= 82.50' Surf.Area= 400 sf Storage= 358 cf

Plug-Flow detention time= 72.1 min calculated for 3,990 cf (95% of inflow)
Center-of-Mass det. time= 27.7 min ( 946.9 - 919.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 358 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 121 | 0 | 0 |
| 82.00 | 263 | 192 | 192 |
| 82.50 | 400 | 166 | 358 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.72 cfs @ 12.10 hrs HW=82.21' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.72 cfs @ 1.16 fps)

## Summary for Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 0.36" for 2-yr event
Inflow = 0.16 cfs @ 12.79 hrs, Volume= 501 cf
Primary = 0.16 cfs @ 12.79 hrs, Volume= 501 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond pA2: Analysis Point - Post Dev Flow to Wetland

Inflow Area = 62,928 sf, 41.05% Impervious, Inflow Depth = 1.65" for 2-yr event
Inflow = 0.76 cfs @ 12.50 hrs, Volume= 8,631 cf
Primary = 0.76 cfs @ 12.50 hrs, Volume= 8,631 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Subcatchment pB1: Post - Runoff to Detention Basin-1

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 247 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,690 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 2,690 | 74 | Weighted Average |
| | 2,690 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pF1: Post - Runoff to Forebay-1

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 2,024 cf, Depth= 1.93"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 4,205 | 98 | Paved parking, HSG C |
| | 7,266 | 74 | >75% Grass cover, Good, HSG C |
| * | 979 | 98 | Walkway |
| * | 119 | 98 | Patio/Deck/Stairs |
| | 12,569 | 84 | Weighted Average |
| | 7,266 | 74 | 57.81% Pervious Area |
| | 5,303 | 98 | 42.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.5 | 44 | 0.0300 | 0.08 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.5 | 82 | 0.0180 | 2.72 | | **Shallow Concentrated Flow, BC**<br>Paved Kv= 20.3 fps |
| 10.0 | 126 | Total | | | |

## Summary for Subcatchment pF2: Post - Runoff to Forebay-2

Runoff = 0.25 cfs @ 12.11 hrs, Volume= 933 cf, Depth= 2.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,813 | 74 | >75% Grass cover, Good, HSG C |
| | 2,847 | 98 | Paved parking, HSG C |
| * | 150 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 4,810 | 89 | Weighted Average |
| | 1,813 | 74 | 37.69% Pervious Area |
| | 2,997 | 98 | 62.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** |
| | | | | | Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS1: Post - Runoff to Bio-retention Basin

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 262 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,851 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Patio/Deck/Stairs |
| | 2,851 | 74 | Weighted Average |
| | 2,851 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Runoff to swale** |

## Summary for Subcatchment pS2: Post - Runoff to Swale-1

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 554 cf, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 4,696 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 477 | 98 | Patio/Deck/Stairs |
| | 5,173 | 76 | Weighted Average |
| | 4,696 | 74 | 90.78% Pervious Area |
| | 477 | 98 | 9.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Parking Runoff** |

## Summary for Subcatchment pS3: Post - Flow to wetlands

Runoff = 0.10 cfs @ 12.33 hrs, Volume= 525 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 5,708 | 74 | >75% Grass cover, Good, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 5,708 | 74 | Weighted Average |
| 5,708 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 8.6 | 183 | 0.0050 | 0.35 | | **Shallow Concentrated Flow, BC**<br>Woodland Kv= 5.0 fps |
| 1.9 | 117 | 0.0400 | 1.00 | | **Shallow Concentrated Flow, CD**<br>Woodland Kv= 5.0 fps |
| 0.3 | 103 | 0.0300 | 5.33 | 26.67 | **Channel Flow, DE**<br>Area= 5.0 sf Perim= 10.2' r= 0.49'<br>n= 0.030 Earth, grassed & winding |
| 22.1 | 453 | Total | | | |

## Summary for Subcatchment pS4: Post - Runoff to Bio-retention Basin-4

Runoff = 0.03 cfs @ 12.12 hrs, Volume= 122 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,321 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 1,321 | 74 | Weighted Average |
| | 1,321 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC**<br>Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS5: Post - Runoff to Bio-retention Basin-2

Runoff = 0.06 cfs @ 12.08 hrs, Volume= 208 cf, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 1,602 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 238 | 98 | Patio/Deck/Stairs |
| | 0 | 98 | Roofs, HSG C |
| | 1,840 | 77 | Weighted Average |
| | 1,602 | 74 | 87.07% Pervious Area |
| | 238 | 98 | 12.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS6: Post - Runoff to Forebay-3

Runoff = 0.60 cfs @ 12.08 hrs, Volume= 1,989 cf, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 3,996 | 98 | Paved parking, HSG C |
| | 9,151 | 74 | >75% Grass cover, Good, HSG C |
| * | 493 | 98 | Walkway |
| | 13,640 | 82 | Weighted Average |
| | 9,151 | 74 | 67.09% Pervious Area |
| | 4,489 | 98 | 32.91% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS7: Post - Flow to Hope Street

Runoff = 0.27 cfs @ 12.46 hrs, Volume= 1,562 cf, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 16,637 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkways |
| * | 122 | 98 | Patio/Deck/Stairs |
| | 16,759 | 74 | Weighted Average |
| | 16,637 | 74 | 99.27% Pervious Area |
| | 122 | 98 | 0.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.6 | 60 | 0.0030 | 0.03 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 44 | 0.0450 | 3.42 | | **Shallow Concentrated Flow, BC**<br>Unpaved Kv= 16.1 fps |
| 30.8 | 104 | Total | | | |

## Summary for Subcatchment RF1: Post - Roof Area (Units 3&4)

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 653 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF2: Post - Roof Area (Units 5&6)

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 653 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF3: Post - Roof Area (Units 7&8)

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 653 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF4: Post- Roof Area (Units 9&10)

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 537 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 2,102 | 98 | Roofs, HSG C |
| 2,102 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF5: Post - Roof Area (Units 1&2)

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 653 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.30"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Reach S1: Post - Dry Swale 1

Inflow Area = 20,593 sf, 28.07% Impervious, Inflow Depth = 0.37" for 2-yr event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 635 cf
Outflow = 0.16 cfs @ 12.15 hrs, Volume= 635 cf, Atten= 6%, Lag= 4.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Max. Velocity= 1.01 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.32 fps, Avg. Travel Time= 7.7 min

Peak Storage= 24 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 17.43 cfs

Custom cross-section, Length= 150.0' Slope= 0.0200 '/'
Constant n= 0.035 Earth, dense weeds
Inlet Invert= 85.00', Outlet Invert= 82.00'

| Offset (feet) | Elevation (feet) | Chan.Depth (feet) |
|---|---|---|
| -3.00 | 1.00 | 0.00 |
| -1.00 | 0.00 | 1.00 |
| 1.00 | 0.00 | 1.00 |
| 3.00 | 1.00 | 0.00 |

| Depth (feet) | End Area (sq-ft) | Perim. (feet) | Storage (cubic-feet) | Discharge (cfs) |
|---|---|---|---|---|
| 0.00 | 0.0 | 2.0 | 0 | 0.00 |
| 1.00 | 4.0 | 6.5 | 600 | 17.43 |

## Summary for Pond SB: Post - Settling Basin

Inflow Area = 25,705 sf, 42.37% Impervious, Inflow Depth = 1.36" for 2-yr event
Inflow = 0.35 cfs @ 12.17 hrs, Volume= 2,907 cf
Outflow = 0.33 cfs @ 12.26 hrs, Volume= 2,687 cf, Atten= 6%, Lag= 5.2 min
Primary = 0.33 cfs @ 12.26 hrs, Volume= 2,687 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.10' @ 12.24 hrs Surf.Area= 355 sf Storage= 253 cf

Plug-Flow detention time= 123.1 min calculated for 2,686 cf (92% of inflow)
Center-of-Mass det. time= 42.7 min ( 1,221.5 - 1,178.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 416 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 108 | 0 | 0 |
| 82.00 | 331 | 220 | 220 |
| 82.50 | 456 | 197 | 416 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.30 cfs @ 12.26 hrs HW=82.10' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 0.79 fps)

## Summary for Pond US1: Post - Recharge System-1

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 3.07" for 2-yr event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 1,307 cf
Outflow = 0.19 cfs @ 12.21 hrs, Volume= 1,307 cf, Atten= 50%, Lag= 8.2 min
Discarded = 0.01 cfs @ 8.08 hrs, Volume= 806 cf
Primary = 0.18 cfs @ 12.21 hrs, Volume= 501 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 85.11' @ 12.21 hrs Surf.Area= 715 sf Storage= 461 cf
Flood Elev= 86.30' Surf.Area= 715 sf Storage= 837 cf

Plug-Flow detention time= 237.9 min calculated for 1,306 cf (100% of inflow)
Center-of-Mass det. time= 238.1 min ( 992.9 - 754.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 84.00' | 405 cf | **21.50'W x 33.25'L x 2.33'H Field A**<br>1,668 cf Overall - 439 cf Embedded = 1,229 cf x 33.0% Voids |
| #2A | 84.50' | 439 cf | **Infiltrator H-20 Chamber** x 30 Inside #1<br>Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf<br>Overall Size= 34.0"W x 16.0"H x 6.25'L |
| | | 845 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 84.00' | **0.500 in/hr Exfiltration over Surface area** |
| #2 | Primary | 84.85' | **6.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Discarded OutFlow** Max=0.01 cfs @ 8.08 hrs HW=84.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.18 cfs @ 12.21 hrs HW=85.11' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.18 cfs @ 1.74 fps)

## Summary for Pond US2: Post - Underground Storage System

Inflow Area = 4,658 sf,100.00% Impervious, Inflow Depth = 3.07" for 2-yr event
Inflow = 0.35 cfs @ 12.07 hrs, Volume= 1,191 cf
Outflow = 0.17 cfs @ 12.21 hrs, Volume= 1,191 cf, Atten= 52%, Lag= 8.5 min
Primary = 0.17 cfs @ 12.21 hrs, Volume= 1,191 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.48' @ 12.21 hrs Surf.Area= 1,041 sf Storage= 239 cf

Plug-Flow detention time= 33.5 min calculated for 1,191 cf (100% of inflow)
Center-of-Mass det. time= 32.8 min ( 787.7 - 754.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.15' | 1,484 cf | **18.0" Round Pipe Storage** x 14<br>L= 60.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.15' | **4.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.17 cfs @ 12.21 hrs HW=83.48' (Free Discharge)
**1=Culvert** (Barrel Controls 0.17 cfs @ 2.45 fps)

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond B1: Post - Dry Extended Detention Basin** Peak Elev=81.45' Storage=2,259 cf Inflow=2.88 cfs 12,754 cf
Primary=1.80 cfs 12,424 cf Secondary=0.00 cfs 0 cf Outflow=1.80 cfs 12,424 cf

**Pond BR1: Post - Bio-retention Basin-1** Peak Elev=85.91' Storage=1,474 cf Inflow=1.01 cfs 3,815 cf
Primary=0.63 cfs 1,542 cf Secondary=0.02 cfs 2,013 cf Outflow=0.66 cfs 3,555 cf

**Pond BR2: Post - Bio-retention Basin-2** Peak Elev=82.41' Storage=1,058 cf Inflow=1.66 cfs 7,690 cf
Primary=1.53 cfs 5,316 cf Secondary=0.02 cfs 2,300 cf Outflow=1.55 cfs 7,616 cf

**Pond BR3: Post - Bio-retention Basin-3** Peak Elev=85.04' Storage=559 cf Inflow=0.57 cfs 3,215 cf
Primary=0.52 cfs 1,964 cf Secondary=0.05 cfs 1,194 cf Outflow=0.57 cfs 3,158 cf

**Pond BR4: Post - Bio-retention Basin-4** Peak Elev=83.90' Storage=297 cf Inflow=0.48 cfs 1,685 cf
Outflow=0.46 cfs 1,430 cf

**Pond DMH: post - DMH** Peak Elev=83.20' Inflow=0.45 cfs 3,094 cf
8.0" Round Culvert n=0.013 L=92.0' S=0.0087 '/' Outflow=0.45 cfs 3,094 cf

**Pond FB1: Post - Forebay-1** Peak Elev=86.24' Storage=237 cf Inflow=0.89 cfs 3,444 cf
Outflow=0.88 cfs 3,272 cf

**Pond FB2: Post - Forebay-2** Peak Elev=83.92' Storage=91 cf Inflow=0.41 cfs 1,510 cf
Outflow=0.40 cfs 1,434 cf

**Pond FB3: Post - Forebay-3** Peak Elev=82.30' Storage=283 cf Inflow=1.28 cfs 6,491 cf
Outflow=1.26 cfs 6,299 cf

**Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.** Inflow=0.52 cfs 1,964 cf
Primary=0.52 cfs 1,964 cf

**Pond pA2: Analysis Point - Post Dev Flow to Wetland** Inflow=2.02 cfs 15,811 cf
Primary=2.02 cfs 15,811 cf

**Subcatchment pB1: Post - Runoff to Detention Basin-1** Runoff Area=2,690 sf 0.00% Impervious Runoff Depth=2.28"
Tc=5.0 min CN=74/0 Runoff=0.17 cfs 512 cf

**Subcatchment pF1: Post - Runoff to Forebay-1** Runoff Area=12,569 sf 42.19% Impervious Runoff Depth=3.29"
Flow Length=126' Tc=10.0 min CN=74/98 Runoff=0.89 cfs 3,444 cf

**Subcatchment pF2: Post - Runoff to Forebay-2** Runoff Area=4,810 sf 62.31% Impervious Runoff Depth=3.77"
Flow Length=64' Tc=8.0 min CN=74/98 Runoff=0.41 cfs 1,510 cf

**Subcatchment pS1: Post - Runoff to Bio-retention Basin** Runoff Area=2,851 sf 0.00% Impervious Runoff Depth=2.28"
Tc=5.0 min CN=74/0 Runoff=0.18 cfs 543 cf

**Subcatchment pS2: Post - Runoff to Swale-1** Runoff Area=5,173 sf 9.22% Impervious Runoff Depth=2.50"
Tc=5.0 min CN=74/98 Runoff=0.35 cfs 1,079 cf

**Subcatchment pS3: Post - Flow to wetlands** Runoff Area=5,708 sf 0.00% Impervious Runoff Depth=2.28"
Flow Length=453' Tc=22.1 min CN=74/0 Runoff=0.22 cfs 1,087 cf

**Subcatchment pS4: Post - Runoff to Bio-retention Basin-4** Runoff Area=1,321 sf 0.00% Impervious Runoff Depth=2.28"
Flow Length=64' Tc=8.0 min CN=74/0 Runoff=0.07 cfs 252 cf

**Subcatchment pS5: Post - Runoff to Bio-retention Basin-2** Runoff Area=1,840 sf 12.93% Impervious Runoff Depth=2.59"
Tc=5.0 min CN=74/98 Runoff=0.13 cfs 398 cf

**Subcatchment pS6: Post - Runoff to Forebay-3** Runoff Area=13,640 sf 32.91% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=74/98 Runoff=1.08 cfs 3,487 cf

**Subcatchment pS7: Post - Flow to Hope Street** Runoff Area=16,759 sf 0.73% Impervious Runoff Depth=2.30"
Flow Length=104' Tc=30.8 min CN=74/98 Runoff=0.57 cfs 3,215 cf

**Subcatchment RF1: Post - Roof Area (Units 3&4)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=0/98 Runoff=0.29 cfs 993 cf

**Subcatchment RF2: Post - Roof Area (Units 5&6)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=0/98 Runoff=0.29 cfs 993 cf

**Subcatchment RF3: Post - Roof Area (Units 7&8)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=0/98 Runoff=0.29 cfs 993 cf

**Subcatchment RF4: Post- Roof Area (Units 9&10)** Runoff Area=2,102 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=0/98 Runoff=0.24 cfs 817 cf

**Subcatchment RF5: Post - Roof Area (Units 1&2)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=0/98 Runoff=0.29 cfs 993 cf

**Reach S1: Post - Dry Swale 1** Avg. Flow Depth=0.19' Max Vel=1.74 fps Inflow=0.78 cfs 2,622 cf
n=0.035 L=150.0' S=0.0200 '/' Capacity=17.43 cfs Outflow=0.77 cfs 2,622 cf

**Pond SB: Post - Settling Basin** Peak Elev=82.22' Storage=298 cf Inflow=1.05 cfs 5,715 cf
Outflow=1.04 cfs 5,496 cf

**Pond US1: Post - Recharge System-1** Peak Elev=85.30' Storage=552 cf Inflow=0.57 cfs 1,987 cf
Discarded=0.01 cfs 906 cf Primary=0.42 cfs 1,080 cf Outflow=0.43 cfs 1,987 cf

**Pond US2: Post - Underground Storage System** Peak Elev=83.60' Storage=378 cf Inflow=0.52 cfs 1,810 cf
4.0" Round Culvert n=0.013 L=100.0' S=0.0105 '/' Outflow=0.21 cfs 1,810 cf

**Total Runoff Area = 79,687 sf Runoff Volume = 20,316 cf Average Runoff Depth = 3.06"**
**67.43% Pervious = 53,735 sf 32.57% Impervious = 25,952 sf**

## Summary for Pond B1: Post - Dry Extended Detention Basin

Inflow Area = 57,220 sf, 45.14% Impervious, Inflow Depth = 2.67" for 10-yr event
Inflow = 2.88 cfs @ 12.13 hrs, Volume= 12,754 cf
Outflow = 1.80 cfs @ 12.44 hrs, Volume= 12,424 cf, Atten= 37%, Lag= 18.8 min
Primary = 1.80 cfs @ 12.44 hrs, Volume= 12,424 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 81.45' @ 12.44 hrs Surf.Area= 1,850 sf Storage= 2,259 cf
Flood Elev= 82.50' Surf.Area= 2,300 sf Storage= 4,432 cf

Plug-Flow detention time= 77.6 min calculated for 12,417 cf (97% of inflow)
Center-of-Mass det. time= 43.9 min ( 969.7 - 925.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 80.00' | 4,432 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.00 | 1,273 | 0 | 0 |
| 81.00 | 1,660 | 1,467 | 1,467 |
| 82.00 | 2,080 | 1,870 | 3,337 |
| 82.50 | 2,300 | 1,095 | 4,432 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Primary | 80.45' | **8.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |
| #3 | Primary | 80.25' | **4.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=1.80 cfs @ 12.44 hrs HW=81.45' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.37 cfs @ 3.94 fps)
└**3=Culvert** (Inlet Controls 0.43 cfs @ 4.90 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=80.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Summary for Pond BR1: Post - Bio-retention Basin-1

Inflow Area = 15,420 sf, 34.39% Impervious, Inflow Depth = 2.97" for 10-yr event
Inflow = 1.01 cfs @ 12.14 hrs, Volume= 3,815 cf
Outflow = 0.66 cfs @ 12.30 hrs, Volume= 3,555 cf, Atten= 35%, Lag= 9.3 min
Primary = 0.63 cfs @ 12.30 hrs, Volume= 1,542 cf
Secondary = 0.02 cfs @ 12.30 hrs, Volume= 2,013 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 85.91' @ 12.30 hrs Surf.Area= 2,076 sf Storage= 1,474 cf
Flood Elev= 86.00' Surf.Area= 2,110 sf Storage= 1,567 cf

Plug-Flow detention time= 383.7 min calculated for 3,555 cf (93% of inflow)
Center-of-Mass det. time= 347.2 min ( 1,164.2 - 817.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 867 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.00' | 694 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids |
| #3 | 83.75' | 7 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 35.0' |
| | | 1,567 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 678 | 0 | 0 |
| 86.00 | 1,055 | 867 | 867 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 1,055 | 0 | 0 |
| 85.00 | 1,055 | 2,110 | 2,110 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 85.75' | **4.0' long x 2.5' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00<br>Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32 |
| #2 | Device 3 | 83.00' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 83.75' | **6.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.62 cfs @ 12.30 hrs HW=85.91' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.62 cfs @ 0.98 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.30 hrs HW=85.91' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 0.82 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR2: Post - Bio-retention Basin-2

Inflow Area = 22,694 sf, 52.62% Impervious, Inflow Depth = 4.07" for 10-yr event
Inflow = 1.66 cfs @ 12.09 hrs, Volume= 7,690 cf
Outflow = 1.55 cfs @ 12.12 hrs, Volume= 7,616 cf, Atten= 7%, Lag= 1.9 min
Primary = 1.53 cfs @ 12.12 hrs, Volume= 5,316 cf
Secondary = 0.02 cfs @ 12.12 hrs, Volume= 2,300 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 82.41' @ 12.12 hrs Surf.Area= 1,767 sf Storage= 1,058 cf
Flood Elev= 82.50' Surf.Area= 1,796 sf Storage= 1,140 cf

Plug-Flow detention time= 171.3 min calculated for 7,616 cf (99% of inflow)
Center-of-Mass det. time= 159.2 min ( 1,039.9 - 880.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.35' | 836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 80.35' | 292 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>898 cf Overall - 12 cf Embedded = 886 cf x 33.0% Voids |
| #3 | 80.60' | 12 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 61.0' |
| | | 1,140 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.35 | 563 | 0 | 0 |
| 82.00 | 745 | 425 | 425 |
| 82.50 | 898 | 411 | 836 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.35 | 898 | 0 | 0 |
| 81.35 | 898 | 898 | 898 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.10' | **3.5' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 80.35' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 80.60' | **6.0" Round Culvert** L= 62.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.60' / 79.00' S= 0.0258 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=1.53 cfs @ 12.12 hrs HW=82.41' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.53 cfs @ 1.43 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.12 hrs HW=82.41' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 1.06 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR3: Post - Bio-retention Basin-3

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 2.30" for 10-yr event
Inflow = 0.57 cfs @ 12.44 hrs, Volume= 3,215 cf
Outflow = 0.57 cfs @ 12.46 hrs, Volume= 3,158 cf, Atten= 0%, Lag= 1.0 min
Primary = 0.52 cfs @ 12.46 hrs, Volume= 1,964 cf
Secondary = 0.05 cfs @ 12.46 hrs, Volume= 1,194 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 85.04' @ 12.46 hrs Surf.Area= 1,344 sf Storage= 559 cf

Plug-Flow detention time= 164.1 min calculated for 3,158 cf (98% of inflow)
Center-of-Mass det. time= 153.5 min ( 1,013.6 - 860.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 84.40' | 371 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.40' | 224 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids |
| #3 | 83.65' | 6 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 30.0' |
| | | 601 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 84.40 | 374 | 0 | 0 |
| 85.10 | 686 | 371 | 371 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.40 | 686 | 0 | 0 |
| 84.40 | 686 | 686 | 686 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 84.95' | **8.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 85.00' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Secondary | 83.65' | **6.0" Round Culvert** L= 68.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.65' / 83.00' S= 0.0096 '/' Cc= 0.900<br>n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf |
| #4 | Device 3 | 83.40' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |

**Primary OutFlow** Max=0.52 cfs @ 12.46 hrs HW=85.04' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.52 cfs @ 0.75 fps)

**Secondary OutFlow** Max=0.05 cfs @ 12.46 hrs HW=85.04' (Free Discharge)
└**3=Culvert** (Passes 0.05 cfs of 0.74 cfs potential flow)
  ├**2=Orifice/Grate** (Weir Controls 0.04 cfs @ 0.63 fps)
  └**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR4: Post - Bio-retention Basin-4

Inflow Area = 6,131 sf, 48.88% Impervious, Inflow Depth = 3.30" for 10-yr event
Inflow = 0.48 cfs @ 12.12 hrs, Volume= 1,685 cf
Outflow = 0.46 cfs @ 12.14 hrs, Volume= 1,430 cf, Atten= 3%, Lag= 1.0 min
Primary = 0.46 cfs @ 12.14 hrs, Volume= 1,430 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.90' @ 12.14 hrs Surf.Area= 581 sf Storage= 297 cf
Flood Elev= 84.00' Surf.Area= 594 sf Storage= 325 cf

Plug-Flow detention time= 102.0 min calculated for 1,430 cf (85% of inflow)
Center-of-Mass det. time= 37.2 min ( 840.0 - 802.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 227 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 82.00' | 98 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 297 cf Overall x 33.0% Voids |
| | | 325 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 157 | 0 | 0 |
| 84.00 | 297 | 227 | 227 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 82.00 | 297 | 0 | 0 |
| 83.00 | 297 | 297 | 297 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.75' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.46 cfs @ 12.14 hrs HW=83.90' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.46 cfs @ 0.99 fps)

## Summary for Pond DMH: post - DMH

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 7.26" for 10-yr event
Inflow = 0.45 cfs @ 12.14 hrs, Volume= 3,094 cf
Outflow = 0.45 cfs @ 12.14 hrs, Volume= 3,094 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.45 cfs @ 12.14 hrs, Volume= 3,094 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.20' @ 12.14 hrs
Flood Elev= 85.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.80' | **8.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |

**Primary OutFlow** Max=0.44 cfs @ 12.14 hrs HW=83.20' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.44 cfs @ 2.89 fps)

## Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,569 sf, 42.19% Impervious, Inflow Depth = 3.29" for 10-yr event
Inflow = 0.89 cfs @ 12.14 hrs, Volume= 3,444 cf
Outflow = 0.88 cfs @ 12.16 hrs, Volume= 3,272 cf, Atten= 1%, Lag= 1.1 min
Primary = 0.88 cfs @ 12.16 hrs, Volume= 3,272 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 86.24' @ 12.16 hrs Surf.Area= 297 sf Storage= 237 cf
Flood Elev= 86.50' Surf.Area= 350 sf Storage= 323 cf

Plug-Flow detention time= 53.9 min calculated for 3,270 cf (95% of inflow)
Center-of-Mass det. time= 25.3 min ( 813.6 - 788.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 323 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 95 | 0 | 0 |
| 86.00 | 250 | 173 | 173 |
| 86.50 | 350 | 150 | 323 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 86.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.88 cfs @ 12.16 hrs HW=86.24' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.88 cfs @ 1.24 fps)

## Summary for Pond FB2: Post - Forebay-2

Inflow Area = 4,810 sf, 62.31% Impervious, Inflow Depth = 3.77" for 10-yr event
Inflow = 0.41 cfs @ 12.11 hrs, Volume= 1,510 cf
Outflow = 0.40 cfs @ 12.12 hrs, Volume= 1,434 cf, Atten= 1%, Lag= 0.4 min
Primary = 0.40 cfs @ 12.12 hrs, Volume= 1,434 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.92' @ 12.12 hrs Surf.Area= 136 sf Storage= 91 cf
Flood Elev= 84.00' Surf.Area= 143 sf Storage= 103 cf

Plug-Flow detention time= 54.3 min calculated for 1,433 cf (95% of inflow)
Center-of-Mass det. time= 25.4 min ( 796.2 - 770.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 103 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 63 | 0 | 0 |
| 84.00 | 143 | 103 | 103 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.80' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.40 cfs @ 12.12 hrs HW=83.92' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.40 cfs @ 0.87 fps)

## Summary for Pond FB3: Post - Forebay-3

Inflow Area = 18,298 sf, 49.99% Impervious, Inflow Depth = 4.26" for 10-yr event
Inflow = 1.28 cfs @ 12.08 hrs, Volume= 6,491 cf
Outflow = 1.26 cfs @ 12.09 hrs, Volume= 6,299 cf, Atten= 2%, Lag= 0.9 min
Primary = 1.26 cfs @ 12.09 hrs, Volume= 6,299 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.30' @ 12.09 hrs Surf.Area= 345 sf Storage= 283 cf
Flood Elev= 82.50' Surf.Area= 400 sf Storage= 358 cf

Plug-Flow detention time= 52.4 min calculated for 6,295 cf (97% of inflow)
Center-of-Mass det. time= 20.0 min ( 905.8 - 885.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 358 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 121 | 0 | 0 |
| 82.00 | 263 | 192 | 192 |
| 82.50 | 400 | 166 | 358 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=1.23 cfs @ 12.09 hrs HW=82.29' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.23 cfs @ 1.40 fps)

## Summary for Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 1.41" for 10-yr event
Inflow = 0.52 cfs @ 12.46 hrs, Volume= 1,964 cf
Primary = 0.52 cfs @ 12.46 hrs, Volume= 1,964 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond pA2: Analysis Point - Post Dev Flow to Wetland

Inflow Area = 62,928 sf, 41.05% Impervious, Inflow Depth = 3.01" for 10-yr event
Inflow = 2.02 cfs @ 12.41 hrs, Volume= 15,811 cf
Primary = 2.02 cfs @ 12.41 hrs, Volume= 15,811 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Subcatchment pB1: Post - Runoff to Detention Basin-1

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 512 cf, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,690 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 2,690 | 74 | Weighted Average |
| | 2,690 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pF1: Post - Runoff to Forebay-1

Runoff = 0.89 cfs @ 12.14 hrs, Volume= 3,444 cf, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 4,205 | 98 | Paved parking, HSG C |
| | 7,266 | 74 | >75% Grass cover, Good, HSG C |
| * | 979 | 98 | Walkway |
| * | 119 | 98 | Patio/Deck/Stairs |
| | 12,569 | 84 | Weighted Average |
| | 7,266 | 74 | 57.81% Pervious Area |
| | 5,303 | 98 | 42.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.5 | 44 | 0.0300 | 0.08 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.5 | 82 | 0.0180 | 2.72 | | **Shallow Concentrated Flow, BC**<br>Paved Kv= 20.3 fps |
| 10.0 | 126 | Total | | | |

## Summary for Subcatchment pF2: Post - Runoff to Forebay-2

Runoff = 0.41 cfs @ 12.11 hrs, Volume= 1,510 cf, Depth= 3.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,813 | 74 | >75% Grass cover, Good, HSG C |
| | 2,847 | 98 | Paved parking, HSG C |
| * | 150 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 4,810 | 89 | Weighted Average |
| | 1,813 | 74 | 37.69% Pervious Area |
| | 2,997 | 98 | 62.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** |
| | | | | | Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS1: Post - Runoff to Bio-retention Basin

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 543 cf, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,851 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Patio/Deck/Stairs |
| | 2,851 | 74 | Weighted Average |
| | 2,851 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Runoff to swale** |

## Summary for Subcatchment pS2: Post - Runoff to Swale-1

Runoff = 0.35 cfs @ 12.08 hrs, Volume= 1,079 cf, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 4,696 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 477 | 98 | Patio/Deck/Stairs |
| | 5,173 | 76 | Weighted Average |
| | 4,696 | 74 | 90.78% Pervious Area |
| | 477 | 98 | 9.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Parking Runoff** |

## Summary for Subcatchment pS3: Post - Flow to wetlands

Runoff = 0.22 cfs @ 12.32 hrs, Volume= 1,087 cf, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| Area (sf) | CN | Description |
|---|---|---|
| 5,708 | 74 | >75% Grass cover, Good, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 5,708 | 74 | Weighted Average |
| 5,708 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 8.6 | 183 | 0.0050 | 0.35 | | **Shallow Concentrated Flow, BC** |
| | | | | | Woodland Kv= 5.0 fps |
| 1.9 | 117 | 0.0400 | 1.00 | | **Shallow Concentrated Flow, CD** |
| | | | | | Woodland Kv= 5.0 fps |
| 0.3 | 103 | 0.0300 | 5.33 | 26.67 | **Channel Flow, DE** |
| | | | | | Area= 5.0 sf Perim= 10.2' r= 0.49' |
| | | | | | n= 0.030 Earth, grassed & winding |
| 22.1 | 453 | Total | | | |

## Summary for Subcatchment pS4: Post - Runoff to Bio-retention Basin-4

Runoff = 0.07 cfs @ 12.12 hrs, Volume= 252 cf, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,321 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 1,321 | 74 | Weighted Average |
| | 1,321 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** |
| | | | | | Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS5: Post - Runoff to Bio-retention Basin-2

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 398 cf, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 1,602 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 238 | 98 | Patio/Deck/Stairs |
| | 0 | 98 | Roofs, HSG C |
| | 1,840 | 77 | Weighted Average |
| | 1,602 | 74 | 87.07% Pervious Area |
| | 238 | 98 | 12.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS6: Post - Runoff to Forebay-3

Runoff = 1.08 cfs @ 12.08 hrs, Volume= 3,487 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 3,996 | 98 | Paved parking, HSG C |
| | 9,151 | 74 | >75% Grass cover, Good, HSG C |
| * | 493 | 98 | Walkway |
| | 13,640 | 82 | Weighted Average |
| | 9,151 | 74 | 67.09% Pervious Area |
| | 4,489 | 98 | 32.91% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS7: Post - Flow to Hope Street

Runoff = 0.57 cfs @ 12.44 hrs, Volume= 3,215 cf, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 16,637 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkways |
| * | 122 | 98 | Patio/Deck/Stairs |
| | 16,759 | 74 | Weighted Average |
| | 16,637 | 74 | 99.27% Pervious Area |
| | 122 | 98 | 0.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.6 | 60 | 0.0030 | 0.03 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 44 | 0.0450 | 3.42 | | **Shallow Concentrated Flow, BC** |
| | | | | | Unpaved Kv= 16.1 fps |
| 30.8 | 104 | Total | | | |

## Summary for Subcatchment RF1: Post - Roof Area (Units 3&4)

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 993 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF2: Post - Roof Area (Units 5&6)

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 993 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF3: Post - Roof Area (Units 7&8)

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 993 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF4: Post- Roof Area (Units 9&10)

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 817 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| Area (sf) | CN | Description |
|---|---|---|
| 2,102 | 98 | Roofs, HSG C |
| 2,102 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF5: Post - Roof Area (Units 1&2)

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 993 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.90"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Reach S1: Post - Dry Swale 1

Inflow Area = 20,593 sf, 28.07% Impervious, Inflow Depth = 1.53" for 10-yr event
Inflow = 0.78 cfs @ 12.29 hrs, Volume= 2,622 cf
Outflow = 0.77 cfs @ 12.34 hrs, Volume= 2,622 cf, Atten= 1%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Max. Velocity= 1.74 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.41 fps, Avg. Travel Time= 6.1 min

Peak Storage= 66 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 17.43 cfs

Custom cross-section, Length= 150.0' Slope= 0.0200 '/'
Constant n= 0.035 Earth, dense weeds
Inlet Invert= 85.00', Outlet Invert= 82.00'

| Offset (feet) | Elevation (feet) | Chan.Depth (feet) |
|---|---|---|
| -3.00 | 1.00 | 0.00 |
| -1.00 | 0.00 | 1.00 |
| 1.00 | 0.00 | 1.00 |
| 3.00 | 1.00 | 0.00 |

| Depth (feet) | End Area (sq-ft) | Perim. (feet) | Storage (cubic-feet) | Discharge (cfs) |
|---|---|---|---|---|
| 0.00 | 0.0 | 2.0 | 0 | 0.00 |
| 1.00 | 4.0 | 6.5 | 600 | 17.43 |

## Summary for Pond SB: Post - Settling Basin

Inflow Area = 25,705 sf, 42.37% Impervious, Inflow Depth = 2.67" for 10-yr event
Inflow = 1.05 cfs @ 12.33 hrs, Volume= 5,715 cf
Outflow = 1.04 cfs @ 12.35 hrs, Volume= 5,496 cf, Atten= 1%, Lag= 1.2 min
Primary = 1.04 cfs @ 12.35 hrs, Volume= 5,496 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.22' @ 12.35 hrs Surf.Area= 385 sf Storage= 298 cf

Plug-Flow detention time= 68.4 min calculated for 5,496 cf (96% of inflow)
Center-of-Mass det. time= 17.5 min ( 1,046.1 - 1,028.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 416 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 108 | 0 | 0 |
| 82.00 | 331 | 220 | 220 |
| 82.50 | 456 | 197 | 416 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=1.03 cfs @ 12.35 hrs HW=82.22' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.03 cfs @ 1.19 fps)

## Summary for Pond US1: Post - Recharge System-1

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 4.66" for 10-yr event
Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,987 cf
Outflow = 0.43 cfs @ 12.14 hrs, Volume= 1,987 cf, Atten= 25%, Lag= 4.0 min
Discarded = 0.01 cfs @ 6.40 hrs, Volume= 906 cf
Primary = 0.42 cfs @ 12.14 hrs, Volume= 1,080 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 85.30' @ 12.14 hrs Surf.Area= 715 sf Storage= 552 cf
Flood Elev= 86.30' Surf.Area= 715 sf Storage= 837 cf

Plug-Flow detention time= 188.1 min calculated for 1,985 cf (100% of inflow)
Center-of-Mass det. time= 188.3 min ( 935.7 - 747.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 84.00' | 405 cf | **21.50'W x 33.25'L x 2.33'H Field A**<br>1,668 cf Overall - 439 cf Embedded = 1,229 cf x 33.0% Voids |
| #2A | 84.50' | 439 cf | **Infiltrator H-20 Chamber** x 30 Inside #1<br>Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf<br>Overall Size= 34.0"W x 16.0"H x 6.25'L |
| | | 845 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 84.00' | **0.500 in/hr Exfiltration over Surface area** |
| #2 | Primary | 84.85' | **6.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Discarded OutFlow** Max=0.01 cfs @ 6.40 hrs HW=84.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.42 cfs @ 12.14 hrs HW=85.29' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.42 cfs @ 2.27 fps)

## Summary for Pond US2: Post - Underground Storage System

Inflow Area = 4,658 sf,100.00% Impervious, Inflow Depth = 4.66" for 10-yr event
Inflow = 0.52 cfs @ 12.07 hrs, Volume= 1,810 cf
Outflow = 0.21 cfs @ 12.50 hrs, Volume= 1,810 cf, Atten= 61%, Lag= 25.5 min
Primary = 0.21 cfs @ 12.50 hrs, Volume= 1,810 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.60' @ 12.29 hrs Surf.Area= 1,157 sf Storage= 378 cf

Plug-Flow detention time= 31.6 min calculated for 1,809 cf (100% of inflow)
Center-of-Mass det. time= 31.7 min ( 779.2 - 747.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.15' | 1,484 cf | **18.0" Round Pipe Storage** x 14<br>L= 60.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.15' | **4.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.21 cfs @ 12.50 hrs HW=83.57' (Free Discharge)
**1=Culvert** (Barrel Controls 0.21 cfs @ 2.42 fps)

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond B1: Post - Dry Extended Detention Basin** Peak Elev=82.07' Storage=3,485 cf Inflow=4.24 cfs 17,915 cf
Primary=2.45 cfs 17,488 cf Secondary=0.19 cfs 97 cf Outflow=2.64 cfs 17,584 cf

**Pond BR1: Post - Bio-retention Basin-1** Peak Elev=85.99' Storage=1,562 cf Inflow=1.37 cfs 5,174 cf
Primary=1.21 cfs 2,777 cf Secondary=0.02 cfs 2,138 cf Outflow=1.24 cfs 4,915 cf

**Pond BR2: Post - Bio-retention Basin-2** Peak Elev=82.47' Storage=1,110 cf Inflow=2.17 cfs 9,891 cf
Primary=2.02 cfs 7,444 cf Secondary=0.02 cfs 2,374 cf Outflow=2.04 cfs 9,818 cf

**Pond BR3: Post - Bio-retention Basin-3** Peak Elev=85.06' Storage=574 cf Inflow=0.83 cfs 4,592 cf
Primary=0.73 cfs 3,214 cf Secondary=0.09 cfs 1,321 cf Outflow=0.82 cfs 4,535 cf

**Pond BR4: Post - Bio-retention Basin-4** Peak Elev=83.94' Storage=306 cf Inflow=0.63 cfs 2,242 cf
Outflow=0.61 cfs 1,987 cf

**Pond DMH: post - DMH** Peak Elev=83.26' Inflow=0.55 cfs 3,681 cf
8.0" Round Culvert n=0.013 L=92.0' S=0.0087 '/' Outflow=0.55 cfs 3,681 cf

**Pond FB1: Post - Forebay-1** Peak Elev=86.29' Storage=252 cf Inflow=1.19 cfs 4,570 cf
Outflow=1.18 cfs 4,397 cf

**Pond FB2: Post - Forebay-2** Peak Elev=83.94' Storage=94 cf Inflow=0.53 cfs 1,958 cf
Outflow=0.52 cfs 1,882 cf

**Pond FB3: Post - Forebay-3** Peak Elev=82.35' Storage=303 cf Inflow=1.67 cfs 8,282 cf
Outflow=1.64 cfs 8,090 cf

**Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.** Inflow=0.73 cfs 3,214 cf
Primary=0.73 cfs 3,214 cf

**Pond pA2: Analysis Point - Post Dev Flow to Wetland** Inflow=2.96 cfs 21,513 cf
Primary=2.96 cfs 21,513 cf

**Subcatchment pB1: Post - Runoff to Detention Basin-1** Runoff Area=2,690 sf 0.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=74/0 Runoff=0.24 cfs 733 cf

**Subcatchment pF1: Post - Runoff to Forebay-1** Runoff Area=12,569 sf 42.19% Impervious Runoff Depth=4.36"
Flow Length=126' Tc=10.0 min CN=74/98 Runoff=1.19 cfs 4,570 cf

**Subcatchment pF2: Post - Runoff to Forebay-2** Runoff Area=4,810 sf 62.31% Impervious Runoff Depth=4.88"
Flow Length=64' Tc=8.0 min CN=74/98 Runoff=0.53 cfs 1,958 cf

**Subcatchment pS1: Post - Runoff to Bio-retention Basin** Runoff Area=2,851 sf 0.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=74/0 Runoff=0.26 cfs 777 cf

**Subcatchment pS2: Post - Runoff to Swale-1** Runoff Area=5,173 sf 9.22% Impervious Runoff Depth=3.51"
Tc=5.0 min CN=74/98 Runoff=0.49 cfs 1,512 cf

**Subcatchment pS3: Post - Flow to wetlands** Runoff Area=5,708 sf 0.00% Impervious Runoff Depth=3.27"
Flow Length=453' Tc=22.1 min CN=74/0 Runoff=0.32 cfs 1,555 cf

**Subcatchment pS4: Post - Runoff to Bio-retention Basin-4** Runoff Area=1,321 sf 0.00% Impervious Runoff Depth=3.27"
Flow Length=64' Tc=8.0 min CN=74/0 Runoff=0.11 cfs 360 cf

**Subcatchment pS5: Post - Runoff to Bio-retention Basin-2** Runoff Area=1,840 sf 12.93% Impervious Runoff Depth=3.60"
Tc=5.0 min CN=74/98 Runoff=0.18 cfs 553 cf

**Subcatchment pS6: Post - Runoff to Forebay-3** Runoff Area=13,640 sf 32.91% Impervious Runoff Depth=4.12"
Tc=5.0 min CN=74/98 Runoff=1.45 cfs 4,686 cf

**Subcatchment pS7: Post - Flow to Hope Street** Runoff Area=16,759 sf 0.73% Impervious Runoff Depth=3.29"
Flow Length=104' Tc=30.8 min CN=74/98 Runoff=0.83 cfs 4,592 cf

**Subcatchment RF1: Post - Roof Area (Units 3&4)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=5.86"
Tc=5.0 min CN=0/98 Runoff=0.36 cfs 1,249 cf

**Subcatchment RF2: Post - Roof Area (Units 5&6)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=5.86"
Tc=5.0 min CN=0/98 Runoff=0.36 cfs 1,249 cf

**Subcatchment RF3: Post - Roof Area (Units 7&8)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=5.86"
Tc=5.0 min CN=0/98 Runoff=0.36 cfs 1,249 cf

**Subcatchment RF4: Post- Roof Area (Units 9&10)** Runoff Area=2,102 sf 100.00% Impervious Runoff Depth=5.86"
Tc=5.0 min CN=0/98 Runoff=0.29 cfs 1,027 cf

**Subcatchment RF5: Post - Roof Area (Units 1&2)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=5.86"
Tc=5.0 min CN=0/98 Runoff=0.36 cfs 1,249 cf

**Reach S1: Post - Dry Swale 1** Avg. Flow Depth=0.27' Max Vel=2.15 fps Inflow=1.49 cfs 4,289 cf
n=0.035 L=150.0' S=0.0200 '/' Capacity=17.43 cfs Outflow=1.48 cfs 4,289 cf

**Pond SB: Post - Settling Basin** Peak Elev=82.33' Storage=342 cf Inflow=1.97 cfs 7,971 cf
Outflow=1.95 cfs 7,751 cf

**Pond US1: Post - Recharge System-1** Peak Elev=85.41' Storage=600 cf Inflow=0.72 cfs 2,497 cf
Discarded=0.01 cfs 953 cf Primary=0.52 cfs 1,544 cf Outflow=0.53 cfs 2,497 cf

**Pond US2: Post - Underground Storage System** Peak Elev=83.72' Storage=515 cf Inflow=0.65 cfs 2,275 cf
4.0" Round Culvert n=0.013 L=100.0' S=0.0105 '/' Outflow=0.21 cfs 2,275 cf

**Total Runoff Area = 79,687 sf Runoff Volume = 27,316 cf Average Runoff Depth = 4.11"**
**67.43% Pervious = 53,735 sf 32.57% Impervious = 25,952 sf**

## Summary for Pond B1: Post - Dry Extended Detention Basin

Inflow Area = 57,220 sf, 45.14% Impervious, Inflow Depth = 3.76" for 25-yr event
Inflow = 4.24 cfs @ 12.16 hrs, Volume= 17,915 cf
Outflow = 2.64 cfs @ 12.39 hrs, Volume= 17,584 cf, Atten= 38%, Lag= 13.9 min
Primary = 2.45 cfs @ 12.39 hrs, Volume= 17,488 cf
Secondary = 0.19 cfs @ 12.39 hrs, Volume= 97 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 82.07' @ 12.39 hrs Surf.Area= 2,111 sf Storage= 3,485 cf
Flood Elev= 82.50' Surf.Area= 2,300 sf Storage= 4,432 cf

Plug-Flow detention time= 63.8 min calculated for 17,584 cf (98% of inflow)
Center-of-Mass det. time= 37.7 min ( 932.8 - 895.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 80.00' | 4,432 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.00 | 1,273 | 0 | 0 |
| 81.00 | 1,660 | 1,467 | 1,467 |
| 82.00 | 2,080 | 1,870 | 3,337 |
| 82.50 | 2,300 | 1,095 | 4,432 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Primary | 80.45' | **8.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |
| #3 | Primary | 80.25' | **4.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=2.45 cfs @ 12.39 hrs HW=82.07' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.91 cfs @ 5.46 fps)
└**3=Culvert** (Inlet Controls 0.54 cfs @ 6.19 fps)

**Secondary OutFlow** Max=0.19 cfs @ 12.39 hrs HW=82.07' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.67 fps)

## Summary for Pond BR1: Post - Bio-retention Basin-1

Inflow Area = 15,420 sf, 34.39% Impervious, Inflow Depth = 4.03" for 25-yr event
Inflow = 1.37 cfs @ 12.14 hrs, Volume= 5,174 cf
Outflow = 1.24 cfs @ 12.20 hrs, Volume= 4,915 cf, Atten= 9%, Lag= 3.6 min
Primary = 1.21 cfs @ 12.20 hrs, Volume= 2,777 cf
Secondary = 0.02 cfs @ 12.20 hrs, Volume= 2,138 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 85.99' @ 12.20 hrs Surf.Area= 2,108 sf Storage= 1,562 cf
Flood Elev= 86.00' Surf.Area= 2,110 sf Storage= 1,567 cf

Plug-Flow detention time= 299.3 min calculated for 4,912 cf (95% of inflow)
Center-of-Mass det. time= 272.0 min ( 1,081.0 - 808.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 867 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.00' | 694 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids |
| #3 | 83.75' | 7 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 35.0' |
| | | 1,567 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 678 | 0 | 0 |
| 86.00 | 1,055 | 867 | 867 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 1,055 | 0 | 0 |
| 85.00 | 1,055 | 2,110 | 2,110 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 85.75' | **4.0' long x 2.5' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00<br>Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32 |
| #2 | Device 3 | 83.00' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 83.75' | **6.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=1.21 cfs @ 12.20 hrs HW=85.99' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.21 cfs @ 1.24 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.20 hrs HW=85.99' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 0.84 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR2: Post - Bio-retention Basin-2

Inflow Area = 22,694 sf, 52.62% Impervious, Inflow Depth = 5.23" for 25-yr event
Inflow = 2.17 cfs @ 12.09 hrs, Volume= 9,891 cf
Outflow = 2.04 cfs @ 12.12 hrs, Volume= 9,818 cf, Atten= 6%, Lag= 1.8 min
Primary = 2.02 cfs @ 12.12 hrs, Volume= 7,444 cf
Secondary = 0.02 cfs @ 12.12 hrs, Volume= 2,374 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 82.47' @ 12.12 hrs Surf.Area= 1,786 sf Storage= 1,110 cf
Flood Elev= 82.50' Surf.Area= 1,796 sf Storage= 1,140 cf

Plug-Flow detention time= 138.4 min calculated for 9,818 cf (99% of inflow)
Center-of-Mass det. time= 128.7 min ( 986.4 - 857.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.35' | 836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 80.35' | 292 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 898 cf Overall - 12 cf Embedded = 886 cf x 33.0% Voids |
| #3 | 80.60' | 12 cf | **6.0" Round Pipe Storage** Inside #2 |
| | | | L= 61.0' |
| | | 1,140 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.35 | 563 | 0 | 0 |
| 82.00 | 745 | 425 | 425 |
| 82.50 | 898 | 411 | 836 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.35 | 898 | 0 | 0 |
| 81.35 | 898 | 898 | 898 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.10' | **3.5' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 80.35' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 80.60' | **6.0" Round Culvert** L= 62.0' RCP, sq.cut end projecting, Ke= 0.500 |
| | | | Inlet / Outlet Invert= 80.60' / 79.00' S= 0.0258 '/' Cc= 0.900 |
| | | | n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=2.00 cfs @ 12.12 hrs HW=82.46' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 2.00 cfs @ 1.57 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.12 hrs HW=82.46' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 1.07 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR3: Post - Bio-retention Basin-3

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 3.29" for 25-yr event
Inflow = 0.83 cfs @ 12.43 hrs, Volume= 4,592 cf
Outflow = 0.82 cfs @ 12.45 hrs, Volume= 4,535 cf, Atten= 0%, Lag= 0.9 min
Primary = 0.73 cfs @ 12.45 hrs, Volume= 3,214 cf
Secondary = 0.09 cfs @ 12.45 hrs, Volume= 1,321 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 85.06' @ 12.45 hrs Surf.Area= 1,354 sf Storage= 574 cf

Plug-Flow detention time= 119.0 min calculated for 4,535 cf (99% of inflow)
Center-of-Mass det. time= 111.3 min ( 961.3 - 850.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 84.40' | 371 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.40' | 224 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids |
| #3 | 83.65' | 6 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 30.0' |
| | | 601 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 84.40 | 374 | 0 | 0 |
| 85.10 | 686 | 371 | 371 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.40 | 686 | 0 | 0 |
| 84.40 | 686 | 686 | 686 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 84.95' | **8.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 85.00' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Secondary | 83.65' | **6.0" Round Culvert** L= 68.0' RCP, sq.cut end projecting, Ke= 0.500 |
| | | | Inlet / Outlet Invert= 83.65' / 83.00' S= 0.0096 '/' Cc= 0.900 |
| | | | n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf |
| #4 | Device 3 | 83.40' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |

**Primary OutFlow** Max=0.73 cfs @ 12.45 hrs HW=85.06' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.73 cfs @ 0.84 fps)

**Secondary OutFlow** Max=0.09 cfs @ 12.45 hrs HW=85.06' (Free Discharge)
└**3=Culvert** (Passes 0.09 cfs of 0.75 cfs potential flow)
  ├**2=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.79 fps)
  └**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR4: Post - Bio-retention Basin-4

Inflow Area = 6,131 sf, 48.88% Impervious, Inflow Depth = 4.39" for 25-yr event
Inflow = 0.63 cfs @ 12.12 hrs, Volume= 2,242 cf
Outflow = 0.61 cfs @ 12.13 hrs, Volume= 1,987 cf, Atten= 2%, Lag= 0.9 min
Primary = 0.61 cfs @ 12.13 hrs, Volume= 1,987 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.94' @ 12.13 hrs Surf.Area= 585 sf Storage= 306 cf
Flood Elev= 84.00' Surf.Area= 594 sf Storage= 325 cf

Plug-Flow detention time= 86.5 min calculated for 1,987 cf (89% of inflow)
Center-of-Mass det. time= 32.9 min ( 828.5 - 795.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 227 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 82.00' | 98 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 297 cf Overall x 33.0% Voids |
| | | 325 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 157 | 0 | 0 |
| 84.00 | 297 | 227 | 227 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 82.00 | 297 | 0 | 0 |
| 83.00 | 297 | 297 | 297 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.75' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.60 cfs @ 12.13 hrs HW=83.93' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.60 cfs @ 1.09 fps)

## Summary for Pond DMH: post - DMH

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 8.64" for 25-yr event
Inflow = 0.55 cfs @ 12.14 hrs, Volume= 3,681 cf
Outflow = 0.55 cfs @ 12.14 hrs, Volume= 3,681 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.55 cfs @ 12.14 hrs, Volume= 3,681 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.26' @ 12.14 hrs
Flood Elev= 85.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.80' | **8.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |

**Primary OutFlow** Max=0.54 cfs @ 12.14 hrs HW=83.25' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.54 cfs @ 3.04 fps)

## Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,569 sf, 42.19% Impervious, Inflow Depth = 4.36" for 25-yr event
Inflow = 1.19 cfs @ 12.14 hrs, Volume= 4,570 cf
Outflow = 1.18 cfs @ 12.15 hrs, Volume= 4,397 cf, Atten= 1%, Lag= 1.0 min
Primary = 1.18 cfs @ 12.15 hrs, Volume= 4,397 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 86.29' @ 12.15 hrs Surf.Area= 307 sf Storage= 252 cf
Flood Elev= 86.50' Surf.Area= 350 sf Storage= 323 cf

Plug-Flow detention time= 43.4 min calculated for 4,395 cf (96% of inflow)
Center-of-Mass det. time= 21.1 min ( 805.7 - 784.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 323 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 95 | 0 | 0 |
| 86.00 | 250 | 173 | 173 |
| 86.50 | 350 | 150 | 323 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 86.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=1.17 cfs @ 12.15 hrs HW=86.28' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.17 cfs @ 1.37 fps)

## Summary for Pond FB2: Post - Forebay-2

Inflow Area = 4,810 sf, 62.31% Impervious, Inflow Depth = 4.88" for 25-yr event
Inflow = 0.53 cfs @ 12.11 hrs, Volume= 1,958 cf
Outflow = 0.52 cfs @ 12.12 hrs, Volume= 1,882 cf, Atten= 1%, Lag= 0.4 min
Primary = 0.52 cfs @ 12.12 hrs, Volume= 1,882 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.94' @ 12.12 hrs Surf.Area= 138 sf Storage= 94 cf
Flood Elev= 84.00' Surf.Area= 143 sf Storage= 103 cf

Plug-Flow detention time= 44.6 min calculated for 1,882 cf (96% of inflow)
Center-of-Mass det. time= 21.4 min ( 789.1 - 767.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 103 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 63 | 0 | 0 |
| 84.00 | 143 | 103 | 103 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.80' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.52 cfs @ 12.12 hrs HW=83.94' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.52 cfs @ 0.94 fps)

## Summary for Pond FB3: Post - Forebay-3

Inflow Area = 18,298 sf, 49.99% Impervious, Inflow Depth = 5.43" for 25-yr event
Inflow = 1.67 cfs @ 12.08 hrs, Volume= 8,282 cf
Outflow = 1.64 cfs @ 12.09 hrs, Volume= 8,090 cf, Atten= 1%, Lag= 0.8 min
Primary = 1.64 cfs @ 12.09 hrs, Volume= 8,090 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.35' @ 12.09 hrs Surf.Area= 360 sf Storage= 303 cf
Flood Elev= 82.50' Surf.Area= 400 sf Storage= 358 cf

Plug-Flow detention time= 42.4 min calculated for 8,086 cf (98% of inflow)
Center-of-Mass det. time= 16.4 min ( 878.5 - 862.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 358 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 121 | 0 | 0 |
| 82.00 | 263 | 192 | 192 |
| 82.50 | 400 | 166 | 358 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=1.61 cfs @ 12.09 hrs HW=82.35' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.61 cfs @ 1.53 fps)

## Summary for Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 2.30" for 25-yr event
Inflow = 0.73 cfs @ 12.45 hrs, Volume= 3,214 cf
Primary = 0.73 cfs @ 12.45 hrs, Volume= 3,214 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond pA2: Analysis Point - Post Dev Flow to Wetland

Inflow Area = 62,928 sf, 41.05% Impervious, Inflow Depth = 4.10" for 25-yr event
Inflow = 2.96 cfs @ 12.38 hrs, Volume= 21,513 cf
Primary = 2.96 cfs @ 12.38 hrs, Volume= 21,513 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Subcatchment pB1: Post - Runoff to Detention Basin-1

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 733 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,690 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 2,690 | 74 | Weighted Average |
| | 2,690 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pF1: Post - Runoff to Forebay-1

Runoff = 1.19 cfs @ 12.14 hrs, Volume= 4,570 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 4,205 | 98 | Paved parking, HSG C |
| | 7,266 | 74 | >75% Grass cover, Good, HSG C |
| * | 979 | 98 | Walkway |
| * | 119 | 98 | Patio/Deck/Stairs |
| | 12,569 | 84 | Weighted Average |
| | 7,266 | 74 | 57.81% Pervious Area |
| | 5,303 | 98 | 42.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.5 | 44 | 0.0300 | 0.08 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.5 | 82 | 0.0180 | 2.72 | | **Shallow Concentrated Flow, BC**<br>Paved Kv= 20.3 fps |
| 10.0 | 126 | Total | | | |

## Summary for Subcatchment pF2: Post - Runoff to Forebay-2

Runoff = 0.53 cfs @ 12.11 hrs, Volume= 1,958 cf, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,813 | 74 | >75% Grass cover, Good, HSG C |
| | 2,847 | 98 | Paved parking, HSG C |
| * | 150 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 4,810 | 89 | Weighted Average |
| | 1,813 | 74 | 37.69% Pervious Area |
| | 2,997 | 98 | 62.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS1: Post - Runoff to Bio-retention Basin

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 777 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,851 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Patio/Deck/Stairs |
| | 2,851 | 74 | Weighted Average |
| | 2,851 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Runoff to swale** |

## Summary for Subcatchment pS2: Post - Runoff to Swale-1

Runoff = 0.49 cfs @ 12.08 hrs, Volume= 1,512 cf, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 4,696 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 477 | 98 | Patio/Deck/Stairs |
| | 5,173 | 76 | Weighted Average |
| | 4,696 | 74 | 90.78% Pervious Area |
| | 477 | 98 | 9.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Parking Runoff** |

## Summary for Subcatchment pS3: Post - Flow to wetlands

Runoff = 0.32 cfs @ 12.31 hrs, Volume= 1,555 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| Area (sf) | CN | Description |
|---|---|---|
| 5,708 | 74 | >75% Grass cover, Good, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 5,708 | 74 | Weighted Average |
| 5,708 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 8.6 | 183 | 0.0050 | 0.35 | | **Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps |
| 1.9 | 117 | 0.0400 | 1.00 | | **Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps |
| 0.3 | 103 | 0.0300 | 5.33 | 26.67 | **Channel Flow, DE** Area= 5.0 sf Perim= 10.2' r= 0.49' n= 0.030 Earth, grassed & winding |
| 22.1 | 453 | Total | | | |

## Summary for Subcatchment pS4: Post - Runoff to Bio-retention Basin-4

Runoff = 0.11 cfs @ 12.12 hrs, Volume= 360 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,321 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 1,321 | 74 | Weighted Average |
| | 1,321 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS5: Post - Runoff to Bio-retention Basin-2

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 553 cf, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 1,602 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 238 | 98 | Patio/Deck/Stairs |
| | 0 | 98 | Roofs, HSG C |
| | 1,840 | 77 | Weighted Average |
| | 1,602 | 74 | 87.07% Pervious Area |
| | 238 | 98 | 12.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS6: Post - Runoff to Forebay-3

Runoff = 1.45 cfs @ 12.08 hrs, Volume= 4,686 cf, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 3,996 | 98 | Paved parking, HSG C |
| | 9,151 | 74 | >75% Grass cover, Good, HSG C |
| * | 493 | 98 | Walkway |
| | 13,640 | 82 | Weighted Average |
| | 9,151 | 74 | 67.09% Pervious Area |
| | 4,489 | 98 | 32.91% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS7: Post - Flow to Hope Street

Runoff = 0.83 cfs @ 12.43 hrs, Volume= 4,592 cf, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 16,637 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkways |
| * | 122 | 98 | Patio/Deck/Stairs |
| | 16,759 | 74 | Weighted Average |
| | 16,637 | 74 | 99.27% Pervious Area |
| | 122 | 98 | 0.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.6 | 60 | 0.0030 | 0.03 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 44 | 0.0450 | 3.42 | | **Shallow Concentrated Flow, BC** |
| | | | | | Unpaved Kv= 16.1 fps |
| 30.8 | 104 | Total | | | |

## Summary for Subcatchment RF1: Post - Roof Area (Units 3&4)

Runoff = 0.36 cfs @ 12.07 hrs, Volume= 1,249 cf, Depth= 5.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF2: Post - Roof Area (Units 5&6)

Runoff = 0.36 cfs @ 12.07 hrs, Volume= 1,249 cf, Depth= 5.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF3: Post - Roof Area (Units 7&8)

Runoff = 0.36 cfs @ 12.07 hrs, Volume= 1,249 cf, Depth= 5.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF4: Post- Roof Area (Units 9&10)

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 1,027 cf, Depth= 5.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| Area (sf) | CN | Description |
|---|---|---|
| 2,102 | 98 | Roofs, HSG C |
| 2,102 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF5: Post - Roof Area (Units 1&2)

Runoff = 0.36 cfs @ 12.07 hrs, Volume= 1,249 cf, Depth= 5.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.10"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Reach S1: Post - Dry Swale 1

Inflow Area = 20,593 sf, 28.07% Impervious, Inflow Depth = 2.50" for 25-yr event
Inflow = 1.49 cfs @ 12.18 hrs, Volume= 4,289 cf
Outflow = 1.48 cfs @ 12.22 hrs, Volume= 4,289 cf, Atten= 1%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Max. Velocity= 2.15 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.47 fps, Avg. Travel Time= 5.4 min

Peak Storage= 103 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 17.43 cfs

Custom cross-section, Length= 150.0' Slope= 0.0200 '/'
Constant n= 0.035 Earth, dense weeds
Inlet Invert= 85.00', Outlet Invert= 82.00'

| Offset (feet) | Elevation (feet) | Chan.Depth (feet) |
|---|---|---|
| -3.00 | 1.00 | 0.00 |
| -1.00 | 0.00 | 1.00 |
| 1.00 | 0.00 | 1.00 |
| 3.00 | 1.00 | 0.00 |

| Depth (feet) | End Area (sq-ft) | Perim. (feet) | Storage (cubic-feet) | Discharge (cfs) |
|---|---|---|---|---|
| 0.00 | 0.0 | 2.0 | 0 | 0.00 |
| 1.00 | 4.0 | 6.5 | 600 | 17.43 |

## Summary for Pond SB: Post - Settling Basin

Inflow Area = 25,705 sf, 42.37% Impervious, Inflow Depth = 3.72" for 25-yr event
Inflow = 1.97 cfs @ 12.21 hrs, Volume= 7,971 cf
Outflow = 1.95 cfs @ 12.23 hrs, Volume= 7,751 cf, Atten= 1%, Lag= 0.8 min
Primary = 1.95 cfs @ 12.23 hrs, Volume= 7,751 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.33' @ 12.23 hrs Surf.Area= 413 sf Storage= 342 cf

Plug-Flow detention time= 51.7 min calculated for 7,751 cf (97% of inflow)
Center-of-Mass det. time= 12.4 min ( 986.3 - 973.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 416 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 108 | 0 | 0 |
| 82.00 | 331 | 220 | 220 |
| 82.50 | 456 | 197 | 416 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=1.94 cfs @ 12.23 hrs HW=82.33' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.94 cfs @ 1.48 fps)

## Summary for Pond US1: Post - Recharge System-1

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 5.86" for 25-yr event
Inflow = 0.72 cfs @ 12.07 hrs, Volume= 2,497 cf
Outflow = 0.53 cfs @ 12.14 hrs, Volume= 2,497 cf, Atten= 26%, Lag= 4.0 min
Discarded = 0.01 cfs @ 4.96 hrs, Volume= 953 cf
Primary = 0.52 cfs @ 12.14 hrs, Volume= 1,544 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 85.41' @ 12.14 hrs Surf.Area= 715 sf Storage= 600 cf
Flood Elev= 86.30' Surf.Area= 715 sf Storage= 837 cf

Plug-Flow detention time= 164.1 min calculated for 2,496 cf (100% of inflow)
Center-of-Mass det. time= 164.4 min ( 908.4 - 744.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 84.00' | 405 cf | **21.50'W x 33.25'L x 2.33'H Field A**<br>1,668 cf Overall - 439 cf Embedded = 1,229 cf x 33.0% Voids |
| #2A | 84.50' | 439 cf | **Infiltrator H-20 Chamber** x 30 Inside #1<br>Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf<br>Overall Size= 34.0"W x 16.0"H x 6.25'L |
| | | 845 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 84.00' | **0.500 in/hr Exfiltration over Surface area** |
| #2 | Primary | 84.85' | **6.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Discarded OutFlow** Max=0.01 cfs @ 4.96 hrs HW=84.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.52 cfs @ 12.14 hrs HW=85.40' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.52 cfs @ 2.64 fps)

## Summary for Pond US2: Post - Underground Storage System

Inflow Area = 4,658 sf,100.00% Impervious, Inflow Depth = 5.86" for 25-yr event
Inflow = 0.65 cfs @ 12.07 hrs, Volume= 2,275 cf
Outflow = 0.21 cfs @ 12.86 hrs, Volume= 2,275 cf, Atten= 68%, Lag= 47.0 min
Primary = 0.21 cfs @ 12.86 hrs, Volume= 2,275 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.72' @ 12.36 hrs Surf.Area= 1,222 sf Storage= 515 cf

Plug-Flow detention time= 32.9 min calculated for 2,274 cf (100% of inflow)
Center-of-Mass det. time= 33.0 min ( 777.0 - 744.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.15' | 1,484 cf | **18.0" Round Pipe Storage** x 14<br>L= 60.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.15' | **4.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.21 cfs @ 12.86 hrs HW=83.57' (Free Discharge)
**1=Culvert** (Barrel Controls 0.21 cfs @ 2.42 fps)

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond B1: Post - Dry Extended Detention Basin** Peak Elev=82.46' Storage=4,335 cf Inflow=7.03 cfs 28,949 cf
Primary=2.78 cfs 25,267 cf Secondary=3.23 cfs 3,348 cf Outflow=6.01 cfs 28,615 cf

**Pond BR1: Post - Bio-retention Basin-1** Peak Elev=86.09' Storage=1,567 cf Inflow=2.13 cfs 8,130 cf
Primary=2.04 cfs 5,529 cf Secondary=0.02 cfs 2,275 cf Outflow=2.06 cfs 7,804 cf

**Pond BR2: Post - Bio-retention Basin-2** Peak Elev=82.56' Storage=1,140 cf Inflow=3.25 cfs 14,644 cf
Primary=2.82 cfs 11,922 cf Secondary=0.02 cfs 2,486 cf Outflow=2.84 cfs 14,408 cf

**Pond BR3: Post - Bio-retention Basin-3** Peak Elev=85.10' Storage=601 cf Inflow=1.38 cfs 7,663 cf
Primary=1.20 cfs 5,986 cf Secondary=0.18 cfs 1,620 cf Outflow=1.38 cfs 7,606 cf

**Pond BR4: Post - Bio-retention Basin-4** Peak Elev=84.00' Storage=324 cf Inflow=0.95 cfs 3,439 cf
Outflow=0.93 cfs 3,184 cf

**Pond DMH: post - DMH** Peak Elev=83.36' Inflow=0.76 cfs 4,838 cf
8.0" Round Culvert n=0.013 L=92.0' S=0.0087 '/' Outflow=0.76 cfs 4,838 cf

**Pond FB1: Post - Forebay-1** Peak Elev=86.38' Storage=281 cf Inflow=1.82 cfs 7,004 cf
Outflow=1.81 cfs 6,831 cf

**Pond FB2: Post - Forebay-2** Peak Elev=83.98' Storage=100 cf Inflow=0.78 cfs 2,914 cf
Outflow=0.77 cfs 2,838 cf

**Pond FB3: Post - Forebay-3** Peak Elev=82.46' Storage=343 cf Inflow=2.51 cfs 12,160 cf
Outflow=2.47 cfs 11,968 cf

**Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.** Inflow=1.20 cfs 5,986 cf
Primary=1.20 cfs 5,986 cf

**Pond pA2: Analysis Point - Post Dev Flow to Wetland** Inflow=6.49 cfs 33,700 cf
Primary=6.49 cfs 33,700 cf

**Subcatchment pB1: Post - Runoff to Detention Basin-1** Runoff Area=2,690 sf 0.00% Impervious Runoff Depth=5.47"
Tc=5.0 min CN=74/0 Runoff=0.40 cfs 1,225 cf

**Subcatchment pF1: Post - Runoff to Forebay-1** Runoff Area=12,569 sf 42.19% Impervious Runoff Depth=6.69"
Flow Length=126' Tc=10.0 min CN=74/98 Runoff=1.82 cfs 7,004 cf

**Subcatchment pF2: Post - Runoff to Forebay-2** Runoff Area=4,810 sf 62.31% Impervious Runoff Depth=7.27"
Flow Length=64' Tc=8.0 min CN=74/98 Runoff=0.78 cfs 2,914 cf

**Subcatchment pS1: Post - Runoff to Bio-retention Basin** Runoff Area=2,851 sf 0.00% Impervious Runoff Depth=5.47"
Tc=5.0 min CN=74/0 Runoff=0.43 cfs 1,299 cf

**Subcatchment pS2: Post - Runoff to Swale-1** Runoff Area=5,173 sf 9.22% Impervious Runoff Depth=5.73"
Tc=5.0 min CN=74/98 Runoff=0.80 cfs 2,471 cf

**Subcatchment pS3: Post - Flow to wetlands** Runoff Area=5,708 sf 0.00% Impervious Runoff Depth=5.47"
Flow Length=453' Tc=22.1 min CN=74/0 Runoff=0.54 cfs 2,600 cf

**Subcatchment pS4: Post - Runoff to Bio-retention Basin-4** Runoff Area=1,321 sf 0.00% Impervious Runoff Depth=5.47"
Flow Length=64' Tc=8.0 min CN=74/0 Runoff=0.18 cfs 602 cf

**Subcatchment pS5: Post - Runoff to Bio-retention Basin-2** Runoff Area=1,840 sf 12.93% Impervious Runoff Depth=5.84"
Tc=5.0 min CN=74/98 Runoff=0.29 cfs 895 cf

**Subcatchment pS6: Post - Runoff to Forebay-3** Runoff Area=13,640 sf 32.91% Impervious Runoff Depth=6.42"
Tc=5.0 min CN=74/98 Runoff=2.26 cfs 7,295 cf

**Subcatchment pS7: Post - Flow to Hope Street** Runoff Area=16,759 sf 0.73% Impervious Runoff Depth=5.49"
Flow Length=104' Tc=30.8 min CN=74/98 Runoff=1.38 cfs 7,663 cf

**Subcatchment RF1: Post - Roof Area (Units 3&4)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=8.36"
Tc=5.0 min CN=0/98 Runoff=0.51 cfs 1,781 cf

**Subcatchment RF2: Post - Roof Area (Units 5&6)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=8.36"
Tc=5.0 min CN=0/98 Runoff=0.51 cfs 1,781 cf

**Subcatchment RF3: Post - Roof Area (Units 7&8)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=8.36"
Tc=5.0 min CN=0/98 Runoff=0.51 cfs 1,781 cf

**Subcatchment RF4: Post- Roof Area (Units 9&10)** Runoff Area=2,102 sf 100.00% Impervious Runoff Depth=8.36"
Tc=5.0 min CN=0/98 Runoff=0.42 cfs 1,464 cf

**Subcatchment RF5: Post - Roof Area (Units 1&2)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=8.36"
Tc=5.0 min CN=0/98 Runoff=0.51 cfs 1,781 cf

**Reach S1: Post - Dry Swale 1** Avg. Flow Depth=0.38' Max Vel=2.59 fps Inflow=2.71 cfs 8,000 cf
n=0.035 L=150.0' S=0.0200 '/' Capacity=17.43 cfs Outflow=2.65 cfs 8,000 cf

**Pond SB: Post - Settling Basin** Peak Elev=82.47' Storage=404 cf Inflow=3.41 cfs 12,837 cf
Outflow=3.41 cfs 12,618 cf

**Pond US1: Post - Recharge System-1** Peak Elev=85.70' Storage=696 cf Inflow=1.01 cfs 3,561 cf
Discarded=0.01 cfs 999 cf Primary=0.73 cfs 2,562 cf Outflow=0.74 cfs 3,561 cf

**Pond US2: Post - Underground Storage System** Peak Elev=83.97' Storage=828 cf Inflow=0.92 cfs 3,245 cf
4.0" Round Culvert n=0.013 L=100.0' S=0.0105 '/' Outflow=0.22 cfs 3,245 cf

**Total Runoff Area = 79,687 sf Runoff Volume = 42,554 cf Average Runoff Depth = 6.41"**
**67.43% Pervious = 53,735 sf 32.57% Impervious = 25,952 sf**

## Summary for Pond B1: Post - Dry Extended Detention Basin

Inflow Area = 57,220 sf, 45.14% Impervious, Inflow Depth = 6.07" for 100-yr event
Inflow = 7.03 cfs @ 12.12 hrs, Volume= 28,949 cf
Outflow = 6.01 cfs @ 12.22 hrs, Volume= 28,615 cf, Atten= 15%, Lag= 5.7 min
Primary = 2.78 cfs @ 12.22 hrs, Volume= 25,267 cf
Secondary = 3.23 cfs @ 12.22 hrs, Volume= 3,348 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 82.46' @ 12.22 hrs Surf.Area= 2,281 sf Storage= 4,335 cf
Flood Elev= 82.50' Surf.Area= 2,300 sf Storage= 4,432 cf

Plug-Flow detention time= 46.7 min calculated for 28,615 cf (99% of inflow)
Center-of-Mass det. time= 29.7 min ( 888.7 - 859.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 80.00' | 4,432 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.00 | 1,273 | 0 | 0 |
| 81.00 | 1,660 | 1,467 | 1,467 |
| 82.00 | 2,080 | 1,870 | 3,337 |
| 82.50 | 2,300 | 1,095 | 4,432 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Primary | 80.45' | **8.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |
| #3 | Primary | 80.25' | **4.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=2.77 cfs @ 12.22 hrs HW=82.45' (Free Discharge)
└**2=Culvert** (Inlet Controls 2.17 cfs @ 6.22 fps)
└**3=Culvert** (Inlet Controls 0.60 cfs @ 6.87 fps)

**Secondary OutFlow** Max=3.16 cfs @ 12.22 hrs HW=82.45' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 3.16 cfs @ 1.75 fps)

## Summary for Pond BR1: Post - Bio-retention Basin-1

Inflow Area = 15,420 sf, 34.39% Impervious, Inflow Depth = 6.33" for 100-yr event
Inflow = 2.13 cfs @ 12.14 hrs, Volume= 8,130 cf
Outflow = 2.06 cfs @ 12.14 hrs, Volume= 7,804 cf, Atten= 3%, Lag= 0.0 min
Primary = 2.04 cfs @ 12.14 hrs, Volume= 5,529 cf
Secondary = 0.02 cfs @ 12.08 hrs, Volume= 2,275 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 86.09' @ 12.14 hrs Surf.Area= 2,110 sf Storage= 1,567 cf
Flood Elev= 86.00' Surf.Area= 2,110 sf Storage= 1,567 cf

Plug-Flow detention time= 210.5 min calculated for 7,804 cf (96% of inflow)
Center-of-Mass det. time= 186.9 min ( 984.1 - 797.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 867 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.00' | 694 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids |
| #3 | 83.75' | 7 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 35.0' |
| | | 1,567 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 678 | 0 | 0 |
| 86.00 | 1,055 | 867 | 867 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 1,055 | 0 | 0 |
| 85.00 | 1,055 | 2,110 | 2,110 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 85.75' | **4.0' long x 2.5' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00<br>Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32 |
| #2 | Device 3 | 83.00' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 83.75' | **6.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=2.01 cfs @ 12.14 hrs HW=86.09' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 2.01 cfs @ 1.49 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.08 hrs HW=86.06' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 0.85 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR2: Post - Bio-retention Basin-2

Inflow Area = 22,694 sf, 52.62% Impervious, Inflow Depth = 7.74" for 100-yr event
Inflow = 3.25 cfs @ 12.09 hrs, Volume= 14,644 cf
Outflow = 2.84 cfs @ 12.09 hrs, Volume= 14,408 cf, Atten= 13%, Lag= 0.0 min
Primary = 2.82 cfs @ 12.09 hrs, Volume= 11,922 cf
Secondary = 0.02 cfs @ 12.04 hrs, Volume= 2,486 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 82.56' @ 12.09 hrs Surf.Area= 1,796 sf Storage= 1,140 cf
Flood Elev= 82.50' Surf.Area= 1,796 sf Storage= 1,140 cf

Plug-Flow detention time= 113.3 min calculated for 14,408 cf (98% of inflow)
Center-of-Mass det. time= 94.7 min ( 923.6 - 828.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.35' | 836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 80.35' | 292 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 898 cf Overall - 12 cf Embedded = 886 cf x 33.0% Voids |
| #3 | 80.60' | 12 cf | **6.0" Round Pipe Storage** Inside #2 |
| | | | L= 61.0' |
| | | 1,140 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.35 | 563 | 0 | 0 |
| 82.00 | 745 | 425 | 425 |
| 82.50 | 898 | 411 | 836 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.35 | 898 | 0 | 0 |
| 81.35 | 898 | 898 | 898 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.10' | **3.5' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 80.35' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 80.60' | **6.0" Round Culvert** L= 62.0' RCP, sq.cut end projecting, Ke= 0.500 |
| | | | Inlet / Outlet Invert= 80.60' / 79.00' S= 0.0258 '/' Cc= 0.900 |
| | | | n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=2.78 cfs @ 12.09 hrs HW=82.55' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 2.78 cfs @ 1.76 fps)

**Secondary OutFlow** Max=0.02 cfs @ 12.04 hrs HW=82.51' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 1.08 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR3: Post - Bio-retention Basin-3

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 5.49" for 100-yr event
Inflow = 1.38 cfs @ 12.42 hrs, Volume= 7,663 cf
Outflow = 1.38 cfs @ 12.43 hrs, Volume= 7,606 cf, Atten= 0%, Lag= 0.6 min
Primary = 1.20 cfs @ 12.43 hrs, Volume= 5,986 cf
Secondary = 0.18 cfs @ 12.43 hrs, Volume= 1,620 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 85.10' @ 12.43 hrs Surf.Area= 1,372 sf Storage= 601 cf

Plug-Flow detention time= 76.7 min calculated for 7,606 cf (99% of inflow)
Center-of-Mass det. time= 71.7 min ( 907.2 - 835.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 84.40' | 371 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.40' | 224 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids |
| #3 | 83.65' | 6 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 30.0' |
| | | 601 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 84.40 | 374 | 0 | 0 |
| 85.10 | 686 | 371 | 371 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.40 | 686 | 0 | 0 |
| 84.40 | 686 | 686 | 686 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 84.95' | **8.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 85.00' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Secondary | 83.65' | **6.0" Round Culvert** L= 68.0' RCP, sq.cut end projecting, Ke= 0.500 |
| | | | Inlet / Outlet Invert= 83.65' / 83.00' S= 0.0096 '/' Cc= 0.900 |
| | | | n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf |
| #4 | Device 3 | 83.40' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |

**Primary OutFlow** Max=1.20 cfs @ 12.43 hrs HW=85.10' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.20 cfs @ 0.99 fps)

**Secondary OutFlow** Max=0.18 cfs @ 12.43 hrs HW=85.10' (Free Discharge)
└**3=Culvert** (Passes 0.18 cfs of 0.76 cfs potential flow)
  ├**2=Orifice/Grate** (Weir Controls 0.17 cfs @ 1.04 fps)
  └**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR4: Post - Bio-retention Basin-4

Inflow Area = 6,131 sf, 48.88% Impervious, Inflow Depth = 6.73" for 100-yr event
Inflow = 0.95 cfs @ 12.12 hrs, Volume= 3,439 cf
Outflow = 0.93 cfs @ 12.13 hrs, Volume= 3,184 cf, Atten= 2%, Lag= 0.8 min
Primary = 0.93 cfs @ 12.13 hrs, Volume= 3,184 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 84.00' @ 12.13 hrs Surf.Area= 593 sf Storage= 324 cf
Flood Elev= 84.00' Surf.Area= 594 sf Storage= 325 cf

Plug-Flow detention time= 66.3 min calculated for 3,184 cf (93% of inflow)
Center-of-Mass det. time= 27.1 min ( 812.3 - 785.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 227 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 82.00' | 98 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 297 cf Overall x 33.0% Voids |
| | | 325 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 157 | 0 | 0 |
| 84.00 | 297 | 227 | 227 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 82.00 | 297 | 0 | 0 |
| 83.00 | 297 | 297 | 297 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.75' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.92 cfs @ 12.13 hrs HW=83.99' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.92 cfs @ 1.26 fps)

## Summary for Pond DMH: post - DMH

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 11.36" for 100-yr event
Inflow = 0.76 cfs @ 12.14 hrs, Volume= 4,838 cf
Outflow = 0.76 cfs @ 12.14 hrs, Volume= 4,838 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.76 cfs @ 12.14 hrs, Volume= 4,838 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.36' @ 12.14 hrs
Flood Elev= 85.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.80' | **8.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |

**Primary OutFlow** Max=0.75 cfs @ 12.14 hrs HW=83.36' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.75 cfs @ 3.26 fps)

## Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,569 sf, 42.19% Impervious, Inflow Depth = 6.69" for 100-yr event
Inflow = 1.82 cfs @ 12.14 hrs, Volume= 7,004 cf
Outflow = 1.81 cfs @ 12.15 hrs, Volume= 6,831 cf, Atten= 1%, Lag= 0.9 min
Primary = 1.81 cfs @ 12.15 hrs, Volume= 6,831 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 86.38' @ 12.15 hrs Surf.Area= 325 sf Storage= 281 cf
Flood Elev= 86.50' Surf.Area= 350 sf Storage= 323 cf

Plug-Flow detention time= 30.9 min calculated for 6,828 cf (97% of inflow)
Center-of-Mass det. time= 15.7 min ( 794.3 - 778.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 323 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 95 | 0 | 0 |
| 86.00 | 250 | 173 | 173 |
| 86.50 | 350 | 150 | 323 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 86.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=1.79 cfs @ 12.15 hrs HW=86.37' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.79 cfs @ 1.59 fps)

## Summary for Pond FB2: Post - Forebay-2

Inflow Area = 4,810 sf, 62.31% Impervious, Inflow Depth = 7.27" for 100-yr event
Inflow = 0.78 cfs @ 12.11 hrs, Volume= 2,914 cf
Outflow = 0.77 cfs @ 12.12 hrs, Volume= 2,838 cf, Atten= 1%, Lag= 0.3 min
Primary = 0.77 cfs @ 12.12 hrs, Volume= 2,838 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.98' @ 12.12 hrs Surf.Area= 141 sf Storage= 100 cf
Flood Elev= 84.00' Surf.Area= 143 sf Storage= 103 cf

Plug-Flow detention time= 32.3 min calculated for 2,836 cf (97% of inflow)
Center-of-Mass det. time= 16.0 min ( 778.9 - 762.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 103 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 63 | 0 | 0 |
| 84.00 | 143 | 103 | 103 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.80' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.77 cfs @ 12.12 hrs HW=83.98' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.77 cfs @ 1.08 fps)

## Summary for Pond FB3: Post - Forebay-3

Inflow Area = 18,298 sf, 49.99% Impervious, Inflow Depth = 7.97" for 100-yr event
Inflow = 2.51 cfs @ 12.08 hrs, Volume= 12,160 cf
Outflow = 2.47 cfs @ 12.09 hrs, Volume= 11,968 cf, Atten= 1%, Lag= 0.8 min
Primary = 2.47 cfs @ 12.09 hrs, Volume= 11,968 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.46' @ 12.09 hrs Surf.Area= 390 sf Storage= 343 cf
Flood Elev= 82.50' Surf.Area= 400 sf Storage= 358 cf

Plug-Flow detention time= 30.9 min calculated for 11,968 cf (98% of inflow)
Center-of-Mass det. time= 12.1 min ( 844.4 - 832.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 358 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 121 | 0 | 0 |
| 82.00 | 263 | 192 | 192 |
| 82.50 | 400 | 166 | 358 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=2.43 cfs @ 12.09 hrs HW=82.46' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 2.43 cfs @ 1.77 fps)

## Summary for Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 4.29" for 100-yr event
Inflow = 1.20 cfs @ 12.43 hrs, Volume= 5,986 cf
Primary = 1.20 cfs @ 12.43 hrs, Volume= 5,986 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond pA2: Analysis Point - Post Dev Flow to Wetland

Inflow Area = 62,928 sf, 41.05% Impervious, Inflow Depth = 6.43" for 100-yr event
Inflow = 6.49 cfs @ 12.22 hrs, Volume= 33,700 cf
Primary = 6.49 cfs @ 12.22 hrs, Volume= 33,700 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Subcatchment pB1: Post - Runoff to Detention Basin-1

Runoff = 0.40 cfs @ 12.08 hrs, Volume= 1,225 cf, Depth= 5.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,690 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 2,690 | 74 | Weighted Average |
| | 2,690 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pF1: Post - Runoff to Forebay-1

Runoff = 1.82 cfs @ 12.14 hrs, Volume= 7,004 cf, Depth= 6.69"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 4,205 | 98 | Paved parking, HSG C |
| | 7,266 | 74 | >75% Grass cover, Good, HSG C |
| * | 979 | 98 | Walkway |
| * | 119 | 98 | Patio/Deck/Stairs |
| | 12,569 | 84 | Weighted Average |
| | 7,266 | 74 | 57.81% Pervious Area |
| | 5,303 | 98 | 42.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.5 | 44 | 0.0300 | 0.08 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.5 | 82 | 0.0180 | 2.72 | | **Shallow Concentrated Flow, BC**<br>Paved Kv= 20.3 fps |
| 10.0 | 126 | Total | | | |

## Summary for Subcatchment pF2: Post - Runoff to Forebay-2

Runoff = 0.78 cfs @ 12.11 hrs, Volume= 2,914 cf, Depth= 7.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,813 | 74 | >75% Grass cover, Good, HSG C |
| | 2,847 | 98 | Paved parking, HSG C |
| * | 150 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 4,810 | 89 | Weighted Average |
| | 1,813 | 74 | 37.69% Pervious Area |
| | 2,997 | 98 | 62.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** |
| | | | | | Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS1: Post - Runoff to Bio-retention Basin

Runoff = 0.43 cfs @ 12.08 hrs, Volume= 1,299 cf, Depth= 5.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,851 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Patio/Deck/Stairs |
| | 2,851 | 74 | Weighted Average |
| | 2,851 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Runoff to swale** |

## Summary for Subcatchment pS2: Post - Runoff to Swale-1

Runoff = 0.80 cfs @ 12.08 hrs, Volume= 2,471 cf, Depth= 5.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 4,696 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 477 | 98 | Patio/Deck/Stairs |
| | 5,173 | 76 | Weighted Average |
| | 4,696 | 74 | 90.78% Pervious Area |
| | 477 | 98 | 9.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Parking Runoff** |

## Summary for Subcatchment pS3: Post - Flow to wetlands

Runoff = 0.54 cfs @ 12.30 hrs, Volume= 2,600 cf, Depth= 5.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| Area (sf) | CN | Description |
|---|---|---|
| 5,708 | 74 | >75% Grass cover, Good, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 5,708 | 74 | Weighted Average |
| 5,708 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 8.6 | 183 | 0.0050 | 0.35 | | **Shallow Concentrated Flow, BC** |
| | | | | | Woodland Kv= 5.0 fps |
| 1.9 | 117 | 0.0400 | 1.00 | | **Shallow Concentrated Flow, CD** |
| | | | | | Woodland Kv= 5.0 fps |
| 0.3 | 103 | 0.0300 | 5.33 | 26.67 | **Channel Flow, DE** |
| | | | | | Area= 5.0 sf Perim= 10.2' r= 0.49' |
| | | | | | n= 0.030 Earth, grassed & winding |
| 22.1 | 453 | Total | | | |

## Summary for Subcatchment pS4: Post - Runoff to Bio-retention Basin-4

Runoff = 0.18 cfs @ 12.12 hrs, Volume= 602 cf, Depth= 5.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,321 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 1,321 | 74 | Weighted Average |
| | 1,321 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** |
| | | | | | Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS5: Post - Runoff to Bio-retention Basin-2

Runoff = 0.29 cfs @ 12.08 hrs, Volume= 895 cf, Depth= 5.84"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 1,602 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 238 | 98 | Patio/Deck/Stairs |
| | 0 | 98 | Roofs, HSG C |
| | 1,840 | 77 | Weighted Average |
| | 1,602 | 74 | 87.07% Pervious Area |
| | 238 | 98 | 12.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS6: Post - Runoff to Forebay-3

Runoff = 2.26 cfs @ 12.07 hrs, Volume= 7,295 cf, Depth= 6.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 3,996 | 98 | Paved parking, HSG C |
| | 9,151 | 74 | >75% Grass cover, Good, HSG C |
| * | 493 | 98 | Walkway |
| | 13,640 | 82 | Weighted Average |
| | 9,151 | 74 | 67.09% Pervious Area |
| | 4,489 | 98 | 32.91% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS7: Post - Flow to Hope Street

Runoff = 1.38 cfs @ 12.42 hrs, Volume= 7,663 cf, Depth= 5.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 16,637 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkways |
| * | 122 | 98 | Patio/Deck/Stairs |
| | 16,759 | 74 | Weighted Average |
| | 16,637 | 74 | 99.27% Pervious Area |
| | 122 | 98 | 0.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.6 | 60 | 0.0030 | 0.03 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 44 | 0.0450 | 3.42 | | **Shallow Concentrated Flow, BC** |
| | | | | | Unpaved Kv= 16.1 fps |
| 30.8 | 104 | Total | | | |

## Summary for Subcatchment RF1: Post - Roof Area (Units 3&4)

Runoff = 0.51 cfs @ 12.07 hrs, Volume= 1,781 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF2: Post - Roof Area (Units 5&6)

Runoff = 0.51 cfs @ 12.07 hrs, Volume= 1,781 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF3: Post - Roof Area (Units 7&8)

Runoff = 0.51 cfs @ 12.07 hrs, Volume= 1,781 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF4: Post- Roof Area (Units 9&10)

Runoff = 0.42 cfs @ 12.07 hrs, Volume= 1,464 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| Area (sf) | CN | Description |
|---|---|---|
| 2,102 | 98 | Roofs, HSG C |
| 2,102 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF5: Post - Roof Area (Units 1&2)

Runoff = 0.51 cfs @ 12.07 hrs, Volume= 1,781 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Reach S1: Post - Dry Swale 1

Inflow Area = 20,593 sf, 28.07% Impervious, Inflow Depth = 4.66" for 100-yr event
Inflow = 2.71 cfs @ 12.11 hrs, Volume= 8,000 cf
Outflow = 2.65 cfs @ 12.15 hrs, Volume= 8,000 cf, Atten= 2%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Max. Velocity= 2.59 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 4.4 min

Peak Storage= 158 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 17.43 cfs

Custom cross-section, Length= 150.0' Slope= 0.0200 '/'
Constant n= 0.035 Earth, dense weeds
Inlet Invert= 85.00', Outlet Invert= 82.00'

| Offset (feet) | Elevation (feet) | Chan.Depth (feet) |
|---|---|---|
| -3.00 | 1.00 | 0.00 |
| -1.00 | 0.00 | 1.00 |
| 1.00 | 0.00 | 1.00 |
| 3.00 | 1.00 | 0.00 |

| Depth (feet) | End Area (sq-ft) | Perim. (feet) | Storage (cubic-feet) | Discharge (cfs) |
|---|---|---|---|---|
| 0.00 | 0.0 | 2.0 | 0 | 0.00 |
| 1.00 | 4.0 | 6.5 | 600 | 17.43 |

## Summary for Pond SB: Post - Settling Basin

Inflow Area = 25,705 sf, 42.37% Impervious, Inflow Depth = 5.99" for 100-yr event
Inflow = 3.41 cfs @ 12.15 hrs, Volume= 12,837 cf
Outflow = 3.41 cfs @ 12.16 hrs, Volume= 12,618 cf, Atten= 0%, Lag= 0.9 min
Primary = 3.41 cfs @ 12.16 hrs, Volume= 12,618 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.47' @ 12.16 hrs Surf.Area= 449 sf Storage= 404 cf

Plug-Flow detention time= 34.2 min calculated for 12,618 cf (98% of inflow)
Center-of-Mass det. time= 8.4 min ( 918.7 - 910.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 416 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 108 | 0 | 0 |
| 82.00 | 331 | 220 | 220 |
| 82.50 | 456 | 197 | 416 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=3.40 cfs @ 12.16 hrs HW=82.47' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 3.40 cfs @ 1.80 fps)

## Summary for Pond US1: Post - Recharge System-1

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 8.36" for 100-yr event
Inflow = 1.01 cfs @ 12.07 hrs, Volume= 3,561 cf
Outflow = 0.74 cfs @ 12.14 hrs, Volume= 3,561 cf, Atten= 27%, Lag= 4.2 min
Discarded = 0.01 cfs @ 2.96 hrs, Volume= 999 cf
Primary = 0.73 cfs @ 12.14 hrs, Volume= 2,562 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 85.70' @ 12.14 hrs Surf.Area= 715 sf Storage= 696 cf
Flood Elev= 86.30' Surf.Area= 715 sf Storage= 837 cf

Plug-Flow detention time= 130.6 min calculated for 3,559 cf (100% of inflow)
Center-of-Mass det. time= 130.9 min ( 870.3 - 739.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 84.00' | 405 cf | **21.50'W x 33.25'L x 2.33'H Field A**<br>1,668 cf Overall - 439 cf Embedded = 1,229 cf x 33.0% Voids |
| #2A | 84.50' | 439 cf | **Infiltrator H-20 Chamber** x 30 Inside #1<br>Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf<br>Overall Size= 34.0"W x 16.0"H x 6.25'L |
| | | 845 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 84.00' | **0.500 in/hr Exfiltration over Surface area** |
| #2 | Primary | 84.85' | **6.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Discarded OutFlow** Max=0.01 cfs @ 2.96 hrs HW=84.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.73 cfs @ 12.14 hrs HW=85.69' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.73 cfs @ 3.70 fps)

## Summary for Pond US2: Post - Underground Storage System

Inflow Area = 4,658 sf,100.00% Impervious, Inflow Depth = 8.36" for 100-yr event
Inflow = 0.92 cfs @ 12.07 hrs, Volume= 3,245 cf
Outflow = 0.22 cfs @ 12.44 hrs, Volume= 3,245 cf, Atten= 76%, Lag= 22.0 min
Primary = 0.22 cfs @ 12.44 hrs, Volume= 3,245 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.97' @ 12.44 hrs Surf.Area= 1,255 sf Storage= 828 cf

Plug-Flow detention time= 37.3 min calculated for 3,243 cf (100% of inflow)
Center-of-Mass det. time= 37.5 min ( 776.9 - 739.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.15' | 1,484 cf | **18.0" Round Pipe Storage** x 14<br>L= 60.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.15' | **4.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.22 cfs @ 12.44 hrs HW=83.97' (Free Discharge)
**1=Culvert** (Barrel Controls 0.22 cfs @ 2.56 fps)

Time span=0.00-72.00 hrs, dt=0.04 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond B1: Post - Dry Extended Detention Basin**
Peak Elev=80.01' Storage=14 cf Inflow=0.00 cfs 14 cf
Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

**Pond BR1: Post - Bio-retention Basin-1**
Peak Elev=83.78' Storage=272 cf Inflow=0.10 cfs 315 cf
Primary=0.00 cfs 0 cf Secondary=0.00 cfs 54 cf Outflow=0.00 cfs 54 cf

**Pond BR2: Post - Bio-retention Basin-2**
Peak Elev=81.58' Storage=444 cf Inflow=0.22 cfs 883 cf
Primary=0.00 cfs 0 cf Secondary=0.02 cfs 809 cf Outflow=0.02 cfs 809 cf

**Pond BR3: Post - Bio-retention Basin-3**
Peak Elev=83.68' Storage=62 cf Inflow=0.01 cfs 96 cf
Primary=0.00 cfs 0 cf Secondary=0.00 cfs 39 cf Outflow=0.00 cfs 39 cf

**Pond BR4: Post - Bio-retention Basin-4**
Peak Elev=83.46' Storage=186 cf Inflow=0.07 cfs 186 cf
Outflow=0.00 cfs 0 cf

**Pond DMH: post - DMH**
Peak Elev=82.83' Inflow=0.00 cfs 54 cf
8.0" Round Culvert n=0.013 L=92.0' S=0.0087 '/' Outflow=0.00 cfs 54 cf

**Pond FB1: Post - Forebay-1**
Peak Elev=86.06' Storage=187 cf Inflow=0.12 cfs 473 cf
Outflow=0.10 cfs 300 cf

**Pond FB2: Post - Forebay-2**
Peak Elev=83.84' Storage=81 cf Inflow=0.07 cfs 255 cf
Outflow=0.07 cfs 179 cf

**Pond FB3: Post - Forebay-3**
Peak Elev=82.07' Storage=212 cf Inflow=0.16 cfs 837 cf
Outflow=0.15 cfs 645 cf

**Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.**
Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

**Pond pA2: Analysis Point - Post Dev Flow to Wetland**
Inflow=0.02 cfs 838 cf
Primary=0.02 cfs 838 cf

**Subcatchment pB1: Post - Runoff to Detention Basin-1** Runoff Area=2,690 sf 0.00% Impervious Runoff Depth=0.06"
Tc=5.0 min CN=74/0 Runoff=0.00 cfs 14 cf

**Subcatchment pF1: Post - Runoff to Forebay-1** Runoff Area=12,569 sf 42.19% Impervious Runoff Depth=0.45"
Flow Length=126' Tc=10.0 min CN=74/98 Runoff=0.12 cfs 473 cf

**Subcatchment pF2: Post - Runoff to Forebay-2** Runoff Area=4,810 sf 62.31% Impervious Runoff Depth=0.64"
Flow Length=64' Tc=8.0 min CN=74/98 Runoff=0.07 cfs 255 cf

**Subcatchment pS1: Post - Runoff to Bio-retention Basin** Runoff Area=2,851 sf 0.00% Impervious Runoff Depth=0.06"
Tc=5.0 min CN=74/0 Runoff=0.00 cfs 15 cf

**Subcatchment pS2: Post - Runoff to Swale-1** Runoff Area=5,173 sf 9.22% Impervious Runoff Depth=0.15"
Tc=5.0 min CN=74/98 Runoff=0.01 cfs 63 cf

**Subcatchment pS3: Post - Flow to wetlands** Runoff Area=5,708 sf 0.00% Impervious Runoff Depth=0.06"
Flow Length=453' Tc=22.1 min CN=74/0 Runoff=0.00 cfs 29 cf

**Subcatchment pS4: Post - Runoff to Bio-retention Basin-4** Runoff Area=1,321 sf 0.00% Impervious Runoff Depth=0.06"
Flow Length=64' Tc=8.0 min CN=74/0 Runoff=0.00 cfs 7 cf

**Subcatchment pS5: Post - Runoff to Bio-retention Basin-2** Runoff Area=1,840 sf 12.93% Impervious Runoff Depth=0.18"
Tc=5.0 min CN=74/98 Runoff=0.01 cfs 28 cf

**Subcatchment pS6: Post - Runoff to Forebay-3** Runoff Area=13,640 sf 32.91% Impervious Runoff Depth=0.37"
Tc=5.0 min CN=74/98 Runoff=0.12 cfs 416 cf

**Subcatchment pS7: Post - Flow to Hope Street** Runoff Area=16,759 sf 0.73% Impervious Runoff Depth=0.07"
Flow Length=104' Tc=30.8 min CN=74/98 Runoff=0.01 cfs 96 cf

**Subcatchment RF1: Post - Roof Area (Units 3&4)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 210 cf

**Subcatchment RF2: Post - Roof Area (Units 5&6)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 210 cf

**Subcatchment RF3: Post - Roof Area (Units 7&8)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 210 cf

**Subcatchment RF4: Post- Roof Area (Units 9&10)** Runoff Area=2,102 sf 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 173 cf

**Subcatchment RF5: Post - Roof Area (Units 1&2)** Runoff Area=2,556 sf 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 210 cf

**Reach S1: Post - Dry Swale 1** Avg. Flow Depth=0.01' Max Vel=0.36 fps Inflow=0.01 cfs 63 cf
n=0.035 L=150.0' S=0.0200 '/' Capacity=17.43 cfs Outflow=0.01 cfs 63 cf

**Pond SB: Post - Settling Basin** Peak Elev=81.65' Storage=117 cf Inflow=0.01 cfs 117 cf
Outflow=0.00 cfs 0 cf

**Pond US1: Post - Recharge System-1** Peak Elev=84.61' Storage=181 cf Inflow=0.13 cfs 420 cf
Discarded=0.01 cfs 420 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 420 cf

**Pond US2: Post - Underground Storage System** Peak Elev=83.32' Storage=90 cf Inflow=0.12 cfs 383 cf
4.0" Round Culvert n=0.013 L=100.0' S=0.0105 '/' Outflow=0.06 cfs 383 cf

**Total Runoff Area = 79,687 sf Runoff Volume = 2,408 cf Average Runoff Depth = 0.36"**
**67.43% Pervious = 53,735 sf 32.57% Impervious = 25,952 sf**

## Summary for Pond B1: Post - Dry Extended Detention Basin

Inflow Area = 57,220 sf, 45.14% Impervious, Inflow Depth = 0.00" for WQv event
Inflow = 0.00 cfs @ 12.40 hrs, Volume= 14 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 80.01' @ 24.32 hrs Surf.Area= 1,277 sf Storage= 14 cf
Flood Elev= 82.50' Surf.Area= 2,300 sf Storage= 4,432 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 80.00' | 4,432 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.00 | 1,273 | 0 | 0 |
| 81.00 | 1,660 | 1,467 | 1,467 |
| 82.00 | 2,080 | 1,870 | 3,337 |
| 82.50 | 2,300 | 1,095 | 4,432 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Primary | 80.45' | **8.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |
| #3 | Primary | 80.25' | **4.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=80.00' (Free Discharge)
└**2=Culvert** ( Controls 0.00 cfs)
└**3=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=80.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Summary for Pond BR1: Post - Bio-retention Basin-1

Inflow Area = 15,420 sf, 34.39% Impervious, Inflow Depth = 0.25" for WQv event
Inflow = 0.10 cfs @ 12.22 hrs, Volume= 315 cf
Outflow = 0.00 cfs @ 20.81 hrs, Volume= 54 cf, Atten= 97%, Lag= 515.6 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 20.81 hrs, Volume= 54 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.78' @ 20.81 hrs Surf.Area= 1,055 sf Storage= 272 cf
Flood Elev= 86.00' Surf.Area= 2,110 sf Storage= 1,567 cf

Plug-Flow detention time= 603.4 min calculated for 54 cf (17% of inflow)
Center-of-Mass det. time= 442.2 min ( 1,338.2 - 895.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 867 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.00' | 694 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids |
| #3 | 83.75' | 7 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 35.0' |
| | | 1,567 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 678 | 0 | 0 |
| 86.00 | 1,055 | 867 | 867 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 1,055 | 0 | 0 |
| 85.00 | 1,055 | 2,110 | 2,110 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 85.75' | **4.0' long x 2.5' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00<br>Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32 |
| #2 | Device 3 | 83.00' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 83.75' | **6.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=83.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 20.81 hrs HW=83.78' (Free Discharge)
└**3=Culvert** (Barrel Controls 0.00 cfs @ 0.68 fps)
└**2=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

## Summary for Pond BR2: Post - Bio-retention Basin-2

Inflow Area = 22,694 sf, 52.62% Impervious, Inflow Depth = 0.47" for WQv event
Inflow = 0.22 cfs @ 12.10 hrs, Volume= 883 cf
Outflow = 0.02 cfs @ 14.55 hrs, Volume= 809 cf, Atten= 92%, Lag= 147.1 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.02 cfs @ 14.55 hrs, Volume= 809 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 81.58' @ 14.55 hrs Surf.Area= 1,526 sf Storage= 444 cf
Flood Elev= 82.50' Surf.Area= 1,796 sf Storage= 1,140 cf

Plug-Flow detention time= 339.0 min calculated for 809 cf (92% of inflow)
Center-of-Mass det. time= 291.8 min ( 1,161.9 - 870.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.35' | 836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 80.35' | 292 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 898 cf Overall - 12 cf Embedded = 886 cf x 33.0% Voids |
| #3 | 80.60' | 12 cf | **6.0" Round Pipe Storage** Inside #2 |
| | | | L= 61.0' |
| | | 1,140 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.35 | 563 | 0 | 0 |
| 82.00 | 745 | 425 | 425 |
| 82.50 | 898 | 411 | 836 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 80.35 | 898 | 0 | 0 |
| 81.35 | 898 | 898 | 898 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.10' | **3.5' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 80.35' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |
| #3 | Secondary | 80.60' | **6.0" Round Culvert** L= 62.0' RCP, sq.cut end projecting, Ke= 0.500 |
| | | | Inlet / Outlet Invert= 80.60' / 79.00' S= 0.0258 '/' Cc= 0.900 |
| | | | n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=80.35' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.02 cfs @ 14.55 hrs HW=81.58' (Free Discharge)
└**3=Culvert** (Passes 0.02 cfs of 0.81 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

## Summary for Pond BR3: Post - Bio-retention Basin-3

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 0.07" for WQv event
Inflow = 0.01 cfs @ 12.77 hrs, Volume= 96 cf
Outflow = 0.00 cfs @ 18.37 hrs, Volume= 39 cf, Atten= 71%, Lag= 335.9 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 18.37 hrs, Volume= 39 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.68' @ 18.37 hrs Surf.Area= 686 sf Storage= 62 cf

Plug-Flow detention time= 491.2 min calculated for 39 cf (41% of inflow)
Center-of-Mass det. time= 298.9 min ( 1,289.2 - 990.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 84.40' | 371 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 83.40' | 224 cf | **Filter Material (Prismatic)** Listed below (Recalc)<br>686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids |
| #3 | 83.65' | 6 cf | **6.0" Round Pipe Storage** Inside #2<br>L= 30.0' |
| | | 601 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 84.40 | 374 | 0 | 0 |
| 85.10 | 686 | 371 | 371 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.40 | 686 | 0 | 0 |
| 84.40 | 686 | 686 | 686 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 84.95' | **8.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |
| #2 | Device 3 | 85.00' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Secondary | 83.65' | **6.0" Round Culvert** L= 68.0' RCP, sq.cut end projecting, Ke= 0.500 |
| | | | Inlet / Outlet Invert= 83.65' / 83.00' S= 0.0096 '/' Cc= 0.900 |
| | | | n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.20 sf |
| #4 | Device 3 | 83.40' | **0.500 in/hr Exfiltration over Surface area** Phase-In= 0.01' |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=83.40' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 18.37 hrs HW=83.68' (Free Discharge)
└─**3=Culvert** (Barrel Controls 0.00 cfs @ 0.60 fps)
  ├─**2=Orifice/Grate** ( Controls 0.00 cfs)
  └─**4=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

## Summary for Pond BR4: Post - Bio-retention Basin-4

Inflow Area = 6,131 sf, 48.88% Impervious, Inflow Depth = 0.36" for WQv event
Inflow = 0.07 cfs @ 12.12 hrs, Volume= 186 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.46' @ 25.16 hrs Surf.Area= 519 sf Storage= 186 cf
Flood Elev= 84.00' Surf.Area= 594 sf Storage= 325 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 227 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |
| #2 | 82.00' | 98 cf | **Filter Material (Prismatic)** Listed below (Recalc) |
| | | | 297 cf Overall x 33.0% Voids |
| | | 325 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 157 | 0 | 0 |
| 84.00 | 297 | 227 | 227 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 82.00 | 297 | 0 | 0 |
| 83.00 | 297 | 297 | 297 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.75' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=82.00' (Free Discharge)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Summary for Pond DMH: post - DMH

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 0.13" for WQv event
Inflow = 0.00 cfs @ 20.81 hrs, Volume= 54 cf
Outflow = 0.00 cfs @ 20.81 hrs, Volume= 54 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 20.81 hrs, Volume= 54 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.83' @ 20.81 hrs
Flood Elev= 85.00'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.80' | **8.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf |

**Primary OutFlow** Max=0.00 cfs @ 20.81 hrs HW=82.83' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.00 cfs @ 0.63 fps)

## Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,569 sf, 42.19% Impervious, Inflow Depth = 0.45" for WQv event
Inflow = 0.12 cfs @ 12.14 hrs, Volume= 473 cf
Outflow = 0.10 cfs @ 12.22 hrs, Volume= 300 cf, Atten= 14%, Lag= 4.9 min
Primary = 0.10 cfs @ 12.22 hrs, Volume= 300 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 86.06' @ 12.22 hrs Surf.Area= 261 sf Storage= 187 cf
Flood Elev= 86.50' Surf.Area= 350 sf Storage= 323 cf

Plug-Flow detention time= 199.3 min calculated for 300 cf (64% of inflow)
Center-of-Mass det. time= 89.4 min ( 891.5 - 802.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 85.00' | 323 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 85.00 | 95 | 0 | 0 |
| 86.00 | 250 | 173 | 173 |
| 86.50 | 350 | 150 | 323 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 86.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.09 cfs @ 12.22 hrs HW=86.05' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.09 cfs @ 0.59 fps)

## Summary for Pond FB2: Post - Forebay-2

Inflow Area = 4,810 sf, 62.31% Impervious, Inflow Depth = 0.64" for WQv event
Inflow = 0.07 cfs @ 12.11 hrs, Volume= 255 cf
Outflow = 0.07 cfs @ 12.12 hrs, Volume= 179 cf, Atten= 2%, Lag= 0.7 min
Primary = 0.07 cfs @ 12.12 hrs, Volume= 179 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 83.84' @ 12.12 hrs Surf.Area= 130 sf Storage= 81 cf
Flood Elev= 84.00' Surf.Area= 143 sf Storage= 103 cf

Plug-Flow detention time= 164.5 min calculated for 179 cf (70% of inflow)
Center-of-Mass det. time= 69.0 min ( 860.4 - 791.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.00' | 103 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 83.00 | 63 | 0 | 0 |
| 84.00 | 143 | 103 | 103 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.80' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.07 cfs @ 12.12 hrs HW=83.84' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.48 fps)

## Summary for Pond FB3: Post - Forebay-3

Inflow Area = 18,298 sf, 49.99% Impervious, Inflow Depth = 0.55" for WQv event
Inflow = 0.16 cfs @ 12.08 hrs, Volume= 837 cf
Outflow = 0.15 cfs @ 12.12 hrs, Volume= 645 cf, Atten= 4%, Lag= 1.9 min
Primary = 0.15 cfs @ 12.12 hrs, Volume= 645 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 82.07' @ 12.12 hrs Surf.Area= 283 sf Storage= 212 cf
Flood Elev= 82.50' Surf.Area= 400 sf Storage= 358 cf

Plug-Flow detention time= 167.3 min calculated for 645 cf (77% of inflow)
Center-of-Mass det. time= 64.7 min ( 900.2 - 835.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 358 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 121 | 0 | 0 |
| 82.00 | 263 | 192 | 192 |
| 82.50 | 400 | 166 | 358 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 |
| | | | Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.15 cfs @ 12.12 hrs HW=82.07' (Free Discharge)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.15 cfs @ 0.69 fps)

## Summary for Pond pA1: Analysis Point - Post Dev Catch Basin in Hope St.

Inflow Area = 16,759 sf, 0.73% Impervious, Inflow Depth = 0.00" for WQv event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Pond pA2: Analysis Point - Post Dev Flow to Wetland

Inflow Area = 62,928 sf, 41.05% Impervious, Inflow Depth = 0.16" for WQv event
Inflow = 0.02 cfs @ 12.72 hrs, Volume= 838 cf
Primary = 0.02 cfs @ 12.72 hrs, Volume= 838 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs

## Summary for Subcatchment pB1: Post - Runoff to Detention Basin-1

Runoff = 0.00 cfs @ 12.40 hrs, Volume= 14 cf, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,690 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 2,690 | 74 | Weighted Average |
| | 2,690 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pF1: Post - Runoff to Forebay-1

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 473 cf, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 4,205 | 98 | Paved parking, HSG C |
| | 7,266 | 74 | >75% Grass cover, Good, HSG C |
| * | 979 | 98 | Walkway |
| * | 119 | 98 | Patio/Deck/Stairs |
| | 12,569 | 84 | Weighted Average |
| | 7,266 | 74 | 57.81% Pervious Area |
| | 5,303 | 98 | 42.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.5 | 44 | 0.0300 | 0.08 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.5 | 82 | 0.0180 | 2.72 | | **Shallow Concentrated Flow, BC**<br>Paved Kv= 20.3 fps |
| 10.0 | 126 | Total | | | |

## Summary for Subcatchment pF2: Post - Runoff to Forebay-2

Runoff = 0.07 cfs @ 12.11 hrs, Volume= 255 cf, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,813 | 74 | >75% Grass cover, Good, HSG C |
| | 2,847 | 98 | Paved parking, HSG C |
| * | 150 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 4,810 | 89 | Weighted Average |
| | 1,813 | 74 | 37.69% Pervious Area |
| | 2,997 | 98 | 62.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB** Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC** Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS1: Post - Runoff to Bio-retention Basin

Runoff = 0.00 cfs @ 12.40 hrs, Volume= 15 cf, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 2,851 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Patio/Deck/Stairs |
| | 2,851 | 74 | Weighted Average |
| | 2,851 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Runoff to swale** |

## Summary for Subcatchment pS2: Post - Runoff to Swale-1

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 63 cf, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 4,696 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 477 | 98 | Patio/Deck/Stairs |
| | 5,173 | 76 | Weighted Average |
| | 4,696 | 74 | 90.78% Pervious Area |
| | 477 | 98 | 9.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Parking Runoff** |

## Summary for Subcatchment pS3: Post - Flow to wetlands

Runoff = 0.00 cfs @ 12.67 hrs, Volume= 29 cf, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| Area (sf) | CN | Description |
|---|---|---|
| 5,708 | 74 | >75% Grass cover, Good, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 5,708 | 74 | Weighted Average |
| 5,708 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.2 | 50 | 0.0260 | 0.07 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 8.6 | 183 | 0.0050 | 0.35 | | **Shallow Concentrated Flow, BC**<br>Woodland Kv= 5.0 fps |
| 1.9 | 117 | 0.0400 | 1.00 | | **Shallow Concentrated Flow, CD**<br>Woodland Kv= 5.0 fps |
| 0.3 | 103 | 0.0300 | 5.33 | 26.67 | **Channel Flow, DE**<br>Area= 5.0 sf Perim= 10.2' r= 0.49'<br>n= 0.030 Earth, grassed & winding |
| 22.1 | 453 | Total | | | |

## Summary for Subcatchment pS4: Post - Runoff to Bio-retention Basin-4

Runoff = 0.00 cfs @ 12.45 hrs, Volume= 7 cf, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 1,321 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkway |
| | 0 | 98 | Roofs, HSG C |
| | 1,321 | 74 | Weighted Average |
| | 1,321 | 74 | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.9 | 40 | 0.0400 | 0.08 | | **Sheet Flow, AB**<br>Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.1 | 24 | 0.0200 | 2.87 | | **Shallow Concentrated Flow, BC**<br>Paved Kv= 20.3 fps |
| 8.0 | 64 | Total | | | |

## Summary for Subcatchment pS5: Post - Runoff to Bio-retention Basin-2

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 28 cf, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 0 | 98 | Paved parking, HSG C |
| | 1,602 | 74 | >75% Grass cover, Good, HSG C |
| * | 0 | 98 | Walkway |
| * | 238 | 98 | Patio/Deck/Stairs |
| | 0 | 98 | Roofs, HSG C |
| | 1,840 | 77 | Weighted Average |
| | 1,602 | 74 | 87.07% Pervious Area |
| | 238 | 98 | 12.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS6: Post - Runoff to Forebay-3

Runoff = 0.12 cfs @ 12.07 hrs, Volume= 416 cf, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 3,996 | 98 | Paved parking, HSG C |
| | 9,151 | 74 | >75% Grass cover, Good, HSG C |
| * | 493 | 98 | Walkway |
| | 13,640 | 82 | Weighted Average |
| | 9,151 | 74 | 67.09% Pervious Area |
| | 4,489 | 98 | 32.91% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, AB** |

## Summary for Subcatchment pS7: Post - Flow to Hope Street

Runoff = 0.01 cfs @ 12.77 hrs, Volume= 96 cf, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| | Area (sf) | CN | Description |
|---|---|---|---|
| | 16,637 | 74 | >75% Grass cover, Good, HSG C |
| | 0 | 98 | Paved parking, HSG C |
| * | 0 | 98 | Walkways |
| * | 122 | 98 | Patio/Deck/Stairs |
| | 16,759 | 74 | Weighted Average |
| | 16,637 | 74 | 99.27% Pervious Area |
| | 122 | 98 | 0.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.6 | 60 | 0.0030 | 0.03 | | **Sheet Flow, AB** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.30" |
| 0.2 | 44 | 0.0450 | 3.42 | | **Shallow Concentrated Flow, BC** |
| | | | | | Unpaved Kv= 16.1 fps |
| 30.8 | 104 | Total | | | |

## Summary for Subcatchment RF1: Post - Roof Area (Units 3&4)

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 210 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF2: Post - Roof Area (Units 5&6)

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 210 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF3: Post - Roof Area (Units 7&8)

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 210 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF4: Post- Roof Area (Units 9&10)

Runoff = 0.05 cfs @ 12.07 hrs, Volume= 173 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| Area (sf) | CN | Description |
|---|---|---|
| 2,102 | 98 | Roofs, HSG C |
| 2,102 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Subcatchment RF5: Post - Roof Area (Units 1&2)

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 210 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

| Area (sf) | CN | Description |
|---|---|---|
| 2,556 | 98 | Roofs, HSG C |
| 2,556 | 98 | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry, Roof Runoff** |

## Summary for Reach S1: Post - Dry Swale 1

Inflow Area = 20,593 sf, 28.07% Impervious, Inflow Depth = 0.04" for WQv event
Inflow = 0.01 cfs @ 12.07 hrs, Volume= 63 cf
Outflow = 0.01 cfs @ 12.25 hrs, Volume= 63 cf, Atten= 20%, Lag= 10.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Max. Velocity= 0.36 fps, Min. Travel Time= 7.0 min
Avg. Velocity = 0.28 fps, Avg. Travel Time= 9.0 min

Peak Storage= 4 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 17.43 cfs

Custom cross-section, Length= 150.0' Slope= 0.0200 '/'
Constant n= 0.035 Earth, dense weeds
Inlet Invert= 85.00', Outlet Invert= 82.00'

| Offset (feet) | Elevation (feet) | Chan.Depth (feet) |
|---|---|---|
| -3.00 | 1.00 | 0.00 |
| -1.00 | 0.00 | 1.00 |
| 1.00 | 0.00 | 1.00 |
| 3.00 | 1.00 | 0.00 |

| Depth (feet) | End Area (sq-ft) | Perim. (feet) | Storage (cubic-feet) | Discharge (cfs) |
|---|---|---|---|---|
| 0.00 | 0.0 | 2.0 | 0 | 0.00 |
| 1.00 | 4.0 | 6.5 | 600 | 17.43 |

## Summary for Pond SB: Post - Settling Basin

Inflow Area = 25,705 sf, 42.37% Impervious, Inflow Depth = 0.05" for WQv event
Inflow = 0.01 cfs @ 12.25 hrs, Volume= 117 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 81.65' @ 71.00 hrs Surf.Area= 253 sf Storage= 117 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 81.00' | 416 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 81.00 | 108 | 0 | 0 |
| 82.00 | 331 | 220 | 220 |
| 82.50 | 456 | 197 | 416 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 82.00' | **4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=81.00' (Free Discharge)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Summary for Pond US1: Post - Recharge System-1

Inflow Area = 5,112 sf,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.13 cfs @ 12.07 hrs, Volume= 420 cf
Outflow = 0.01 cfs @ 11.20 hrs, Volume= 420 cf, Atten= 94%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.20 hrs, Volume= 420 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 84.61' @ 13.61 hrs Surf.Area= 715 sf Storage= 181 cf
Flood Elev= 86.30' Surf.Area= 715 sf Storage= 837 cf

Plug-Flow detention time= 185.9 min calculated for 420 cf (100% of inflow)
Center-of-Mass det. time= 185.8 min ( 966.9 - 781.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 84.00' | 405 cf | **21.50'W x 33.25'L x 2.33'H Field A**<br>1,668 cf Overall - 439 cf Embedded = 1,229 cf x 33.0% Voids |
| #2A | 84.50' | 439 cf | **Infiltrator H-20 Chamber** x 30 Inside #1<br>Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf<br>Overall Size= 34.0"W x 16.0"H x 6.25'L |
| | | 845 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 84.00' | **0.500 in/hr Exfiltration over Surface area** |
| #2 | Primary | 84.85' | **6.0" Round Culvert** L= 12.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Discarded OutFlow** Max=0.01 cfs @ 11.20 hrs HW=84.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=84.00' (Free Discharge)
↑—**2=Culvert** ( Controls 0.00 cfs)

## Summary for Pond US2: Post - Underground Storage System

Inflow Area = 4,658 sf,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.12 cfs @ 12.07 hrs, Volume= 383 cf
Outflow = 0.06 cfs @ 12.22 hrs, Volume= 383 cf, Atten= 53%, Lag= 8.8 min
Primary = 0.06 cfs @ 12.22 hrs, Volume= 383 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.04 hrs
Peak Elev= 83.32' @ 12.22 hrs Surf.Area= 790 sf Storage= 90 cf

Plug-Flow detention time= 41.7 min calculated for 382 cf (100% of inflow)
Center-of-Mass det. time= 41.9 min ( 823.0 - 781.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 83.15' | 1,484 cf | **18.0" Round Pipe Storage** x 14<br>L= 60.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 83.15' | **4.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500<br>Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf |

**Primary OutFlow** Max=0.06 cfs @ 12.22 hrs HW=83.32' (Free Discharge)
**1=Culvert** (Barrel Controls 0.06 cfs @ 1.90 fps)

# LONGFIELD ESTATES

1200 & 1202 Hope Street - Bristol, RI

STORMWATER MANAGEMENT

## STORMWATER RUNOFF VOLUME & FLOW RATES SUMMARY

SDE Job No.: 22024 Date: 6/20/2022 , *Revised:* 12/9/2022

Prepared by: SJE Checked by: MER

### PRE-DEVELOPMENT

| Analysis Points | Storm Event | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1-yr | | 2-yr | | 10-yr | | 25-yr | | 100-yr | | 1.2 inch Storm | |
| (Subcatchment/Pond) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) |
| | | | | | | | | | | | | |
| **eA1** | **0.20** | 682 | **0.25** | 944 | **0.58** | 1,895 | **0.83** | 2,678 | **1.36** | 4,408 | **0.01** | 67.0 |
| **eA2** | **1.08** | 5,293 | **1.53** | 7,233 | **3.15** | 14,295 | **4.47** | 20,129 | **7.34** | 33,076 | **0.09** | 730.0 |
| | | | | | | | | | | | | |
| **Totals** | **1.28** | 5,975 | **1.78** | 8,177 | **3.73** | 16,190 | **5.30** | 22,807 | **8.70** | 37,484 | **0.10** | 797.0 |

### POST-DEVELOPMENT

| Analysis Points | Storm Event | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1-yr | | 2-yr | | 10-yr | | 25-yr | | 100-yr | | 1.2 inch Storm | |
| (Subcatchment/Pond) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) | **Rate (cfs)** | Vol. (cf) |
| | | | | | | | | | | | | |
| **pA1** | **0.02** | 126 | **0.16** | 501 | **0.52** | 1,964 | **0.73** | 3,214 | **1.20** | 5,986 | **0.00** | 0 |
| **pA2** | **0.39** | 6,541 | **0.76** | 8,631 | **2.02** | 15,811 | **2.96** | 21,513 | **6.49** | 33,700 | **0.02** | 838 |
| | | | | | | | | | | | | |
| **Totals** | **0.41** | 6,667 | **0.92** | 9,132 | **2.54** | 17,775 | **3.69** | 24,727 | **7.69** | 39,686 | **0.02** | 838 |

*Notes:*

***Totals*** *are the summations of the Analysis points values ( Overall combine values leaving the site ).*

*Analysis points* ***eA1*** *&* ***pA1*** *are pre-development and post-development comparisons. (Site's runoff flow toward Hope Street)*

*Analysis points* ***eP1*** *&* ***pP1*** *are pre-development and post-development comparisons. (Site's runoff flow to the existing wetland)*

*Refer to Hydrocad® calculations for additional information.*

# LONGFIELD ESTATES

1200 & 1202 Hope Stree - Bristol, RI
STORMWATER MANAGEMENT
**STORMWATER RECHARGE CALCULATION WORKSHEET**

SDE Job No.: 22024 Date: 6/20/2022 , *Revised:* 12/9/2022
Prepared by: SJE Checked by: MER

| Hydrologic Group | A | B | C | D | ReV |
|---|---|---|---|---|---|
| Target Runoff Depth Factor (Inches of Runoff) | 0.60 | 0.35 | 0.25 | 0.10 | **(cf)** |
| Total Increase of Impervious Areas, (sf): | | | | | |
| Proposed Driveway & Parking | | | 13,626 | | |
| Proposed Buildings | | | 10,224 | | |
| | | | | | |
| X inches of runoff, (cf) | 0 | 0 | 497 | 0 | 497 |
| | | | | | |
| **Total Recharge Volume Required = 1" x F x Ai / 12 , (ac-ft.)** | | | **Total ReV (cf) =** | | **497** |

| Structure | Infiltration Rate (inches / hour) | Recharged Volume ( cu.ft.) | ReV Volume Below Outlet Structure (cu.ft.) |
|---|---|---|---|
| | | | |
| Underground System-1 | 0.50 | 764 | 319 |
| | | | |
| | | | |
| | | | |
| **Total Recharge Volume Provided, (cf) =** | | **765** | **319** |

Note:
1. System Infiltration rates are derived from the 1982 Rawls rates based on field observed soil texture (HSG C).
2. Recharged volume are calculated utilizing Simple Dynamic Method : Automated
3. Calculations are based on 1-Yr , 24-Hr storm event.

# LONGFIELD ESTATES

1200 & 1202 Hope Street - Bristol, RI

STORMWATER MANAGEMENT

**WATER QUALITY TREATMENT VOLUME CALCULATION WORKSHEET**

SDE Job No.: 22024 Date: 6/20/2022 , *Revised:* 12/9/2022

Prepared by: SJE Checked by: MER

| **Impervious Area** | **Area sf** | | **X in. of runoff 1.0 cf** | | **1.2 inch rainfall cf** |
|---|---|---|---|---|---|
| Total Impervious Area Excluding Roof | *13,626* | | *1,136* | | |
| Building Roof Area | *12,326* | | *1,027* | | |
| | | | | | |
| **1.2 inch rainfall total runoff** | | | | | **2,575** |
| ***Total Water Quality Volume , (cf) =*** | | | ***2,163*** | | **2,575** |
| **System Water Quality Volume** **(volumes below lowest outlet device)** | *Impervious Area to BMP* | WQv | Treatment Required (cf) | Pretreatment Provided (cf) | Extended Treatment (cf) |
| (FB1) Forebay-1 = | *5,303 sf* | 442.0 | 25% = 111 | 173 | |
| (BR1) Bio-Retention Basin-1 = | | | 75% = 331 | | 1,315 |
| (FB3) Forebay-3 = | *9,147 sf* | 762.0 | 25% = 191 | 192 | |
| (BR2) Bio-Retention Basin-2 = | | | 75% = 572 | | Required = 805 |
| | '4' *2,794 sf* | 233.0 | 100% = 233 | | Provided = 805 |
| (BR3) Bio-Retention Basin-3 = | '4' *122 sf* | 10.0 | 100% = 10 | | 503 |
| (US1) Underground System-1 = | '5' *5,112 sf* | 426.0 | 100% = 426 | | WQv storm contained & infiltrated (426 cf) |
| (FB2) Forebay-2 = | *2,997 sf* | 250.0 | 25% = 63 | 76 | |
| (BR4) Bio-Retention Basin-4 = | | | 75% = 187 | | 255 |
| Total = | *25,475 sf* | | | 441 | 3,304 |
| **Total Water Quality Volume Available , (cf) =** | | | **3,745** | | |

Note:

1. Total water quality volume (WQV) in the 1.2 inch rainfall event is the inflow volume flowing toward the drainage system.
2. Recharged volume are calculated utilizing Simple Dynamic Method : Automated
3. Refer to HydroCAD report for additional information.
4. Inflow is roof runoff and/or deck/patio runoff that directly flows into bio-retention basins 2&3
5. Inflow is roof runoff only '5'
6. 477 sf of deck/patio area discharges into the dry swale before entering the extended detention basin.

# LONGFIELD ESTATES

1200 & 1202 Hope Street - Bristol, RI

STORMWATER MANAGEMENT

## TSS REMOVAL CALCULATION WORKSHEET

SDE Job No.: 22024 Date: 6/20/2022 , Revised: 12/9/2022

Prepared by: SJE Checked by: MER

Design Point PA1 - Hope Street

| A<br>BMP | B<br>TSS Removal Rate | C<br>Starting TSS Load* | D<br>Amount Removed (BxC) | E<br>Remaining Load (C-D) |
|---|---|---|---|---|
| Bio-retention Basin | 90.0% | 1.000 | 0.900 | 0.100 |
| | 0.0% | 0.100 | 0.000 | 0.100 |
| | | 0.100 | 0.000 | 0.100 |
| | | **Total TSS Removal =** | **90.0%** | |

Design Point PA2 - Existing Wetland

| A<br>BMP | B<br>TSS Removal Rate | C<br>Starting TSS Load* | D<br>Amount Removed (BxC) | E<br>Remaining Load (C-D) |
|---|---|---|---|---|
| Forebay | 25.0% | 1.000 | 0.250 | 0.750 |
| Bio-retention Basin | 90.0% | 0.750 | 0.675 | 0.075 |
| | | 0.075 | 0.000 | 0.075 |
| | | **Total TSS Removal =** | **92.5%** | |

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description  Application Number _____

Property Owner: 1200 HOPE STREET, L.L.C.
Property Location: BRISTOL 1200 HOPE STREET
Date of Test Hole: 10 DECEMBER, 2018
Soil Evaluator: N. LETENDRE  License Number: D4019
Weather: SUNNY 36°F 0-5mph  Shaded: Yes ☐ No ☐ Time: 10:30

| TH 1 Horizon | Depth | Horizon Boundaries: Dist | Horizon Boundaries: Topo | Soil Colors: Matrix | Soil Colors: Re-Dox Features | Re-Dox: Ab. S. Contr. | Texture | Structure | Consistence | Soil Category |
|---|---|---|---|---|---|---|---|---|---|---|
| A | 6 | g | s | 10YR 3/3 | | | FSL | 1fgr | fr | 4 |
| Bw1 | 12 | g | s | 10YR 3/6 | | | SL | 1fsbk | fr | 3 |
| Bw2 | 20 | c | w | 10YR 4/4 | | | SL | 1fsbk | fr | 3 |
| C | 30 | c | w | 2.5Y 5/2 | @24 2.5Y 5/6 | f 1 f | SL | omm | fr | 6 |
| Cd | 52 | | | 2.5Y 4/1 | 10YR 5/6 | c 1 d | FSL | omm | Vfi | 9 |
| | | | | | | | | | | |

| TH 2 Horizon | Depth | Horizon Boundaries: Dist | Horizon Boundaries: Topo | Soil Colors: Matrix | Soil Colors: Re-Dox Features | Re-Dox: Ab. S. Contr. | Texture | Structure | Consistence | Soil Category |
|---|---|---|---|---|---|---|---|---|---|---|
| A | 10 | c | w | 10YR 3/3 | | | ch FSL | 1fgr | fr | 4 |
| Bw | 16 | c | w | 10YR 4/6 | @12 10YR 5/8 | f 1 f | SL | 1fsbk. | fr | 3 |
| C | 50 | | | 2.5Y 4/1 | 10YR 5/6 | c 1 d | FSL | omm | fr | 7 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

TH 1 Soil Class A Total Depth 52" Impervious/Limiting Layer Depth N/A (og) GW Seepage Depth N/A SHWT 24" (og)
TH 2 Soil Class A Total Depth 50" Impervious/Limiting Layer Depth N/A (og) GW Seepage Depth 38" SHWT 12" (og)

Comments: _____

Revised 1/31/14

18-0119

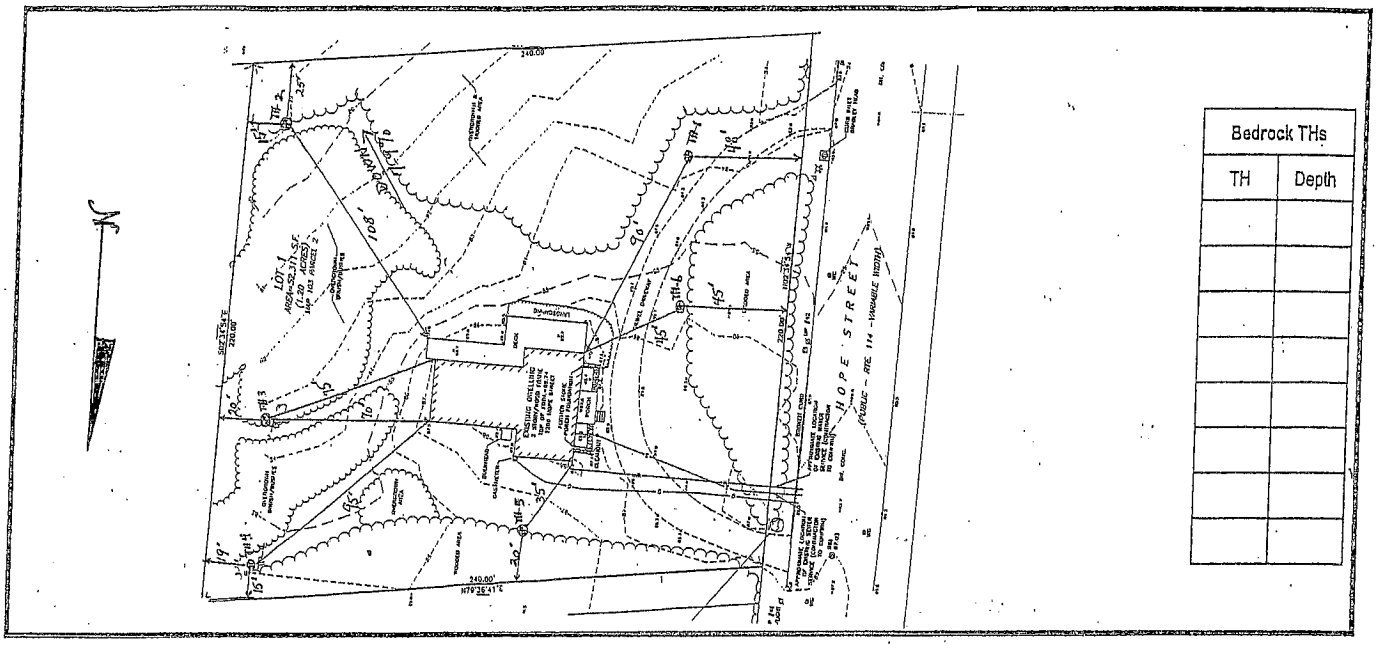
Part B

Site Evaluation – to be completed by Soil Evaluator or Class II or III Designer

Please use the area below to locate:

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*
   *OFFSETS MUST BE SHOWN

Key:
- Approximate location of test holes
- Approximate location of bedrock test holes
- X% Estimated gradient and direction of slope
- N Approximate direction of due north




| Bedrock THs | |
|---|---|
| TH | Depth |
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| | |
| | |

1. Relief and Slope: _____
2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above. NO ☒ YES ☐
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 38? NO ☒ YES ☐
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch. SITE IS PREVIOUSLY DEVELOPED NO ☐ YES ☒
8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☒ MODERATE ☐ SEVERE ☐
9. Landscape position: SHOULDER SLOPE
10. Vegetation: DISTURBANCE VARIETY
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site: _____

Certification

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: _____ D4619 (Signature / License #) Part B prepared by: _____ D4619 (Signature / License #)

DO NOT WRITE IN THIS SPACE

Witnessed Soil Evaluation Decision: Concur ☐ Inconclusive ☐ Disclaim ☐

Unwitnessed Soil Evaluations Decision: Accept ☐ Inconclusive ☐ Disclaim ☐

Wet Season Determination required ☐ Additional Field Review Required ☐

Explanation: _____

Signature Authorized Agent _____ Date _____

Revised 1/31/14

18-0119

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description  Application Number _____

Property Owner: 1200 HOPE STREET, L.L.C.
Property Location: BRISTOL 1200 HOPE STREET
Date of Test Hole: 10 DECEMBER, 2018
Soil Evaluator: N. LETENDRE  License Number: D4019
Weather: SUNNY 36°F 0-5mph  Shaded: Yes ☐ No ☐ Time: 10:30

| TH 3 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. S. Contr. | | | | | |
| FILL | -8 to 0 | | | | | | | | | | |
| A | 10 | c | s | 10YR 3/4 | | | | FSL | 1fsbk | fr | 4 |
| Bw1 | 17 | g | w | 10YR 4/2 | | | | SL | 1fsbk | fr | 3 |
| Bw2 | 22 | c | s | 10YR 4/4 | | | | SL | 1fsbk | fr | 3 |
| C | 26 | c | w | 2.5Y 4/2 | @24 2.5Y 4/4 | f 1 f. | | gLS | omm | fr | 6 |
| 2C | 42 | | | 2.5Y 4/1 | 10YR 5/6 | C 1 d | | FSL | omm | fr | 7 |

| TH 4 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | Texture | Structure | Consistence | Soil Category |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. S. Contr. | | | | |
| Ap | 10 | c | w | 10YR 3/3 | | | FSL | 1fgr | √fr | 4 |
| Bw1 | 16 | g | w | 10YR 4/6 | | | SL | 1fsbk | fr | 3 |
| Bw2 | 21 | g | w | 10YR 5/4 | | | SL | 1fsbk | fr | 3 |
| C | 36 | c | i | 2.5Y 6/4 | @24 10YR 5/6 | c 1 d | FSL | omm | fr | 7 |
| 2C | 57 | | | 5Y 4/2 | 10YR 5/6 | c 1 d | vgSL | 0mm | f1P f1H | 8 |
| | | | | | | | | | | |

TH 3 Soil Class A Total Depth 50" Impervious/Limiting Layer Depth N/A (og) GW Seepage Depth N/A SHWT 24" (og)
TH 4 Soil Class A Total Depth 57" Impervious/Limiting Layer Depth N/A (og) GW Seepage Depth N/A SHWT 24" (og)

Comments: _____

Revised 1/31/14

18-0119

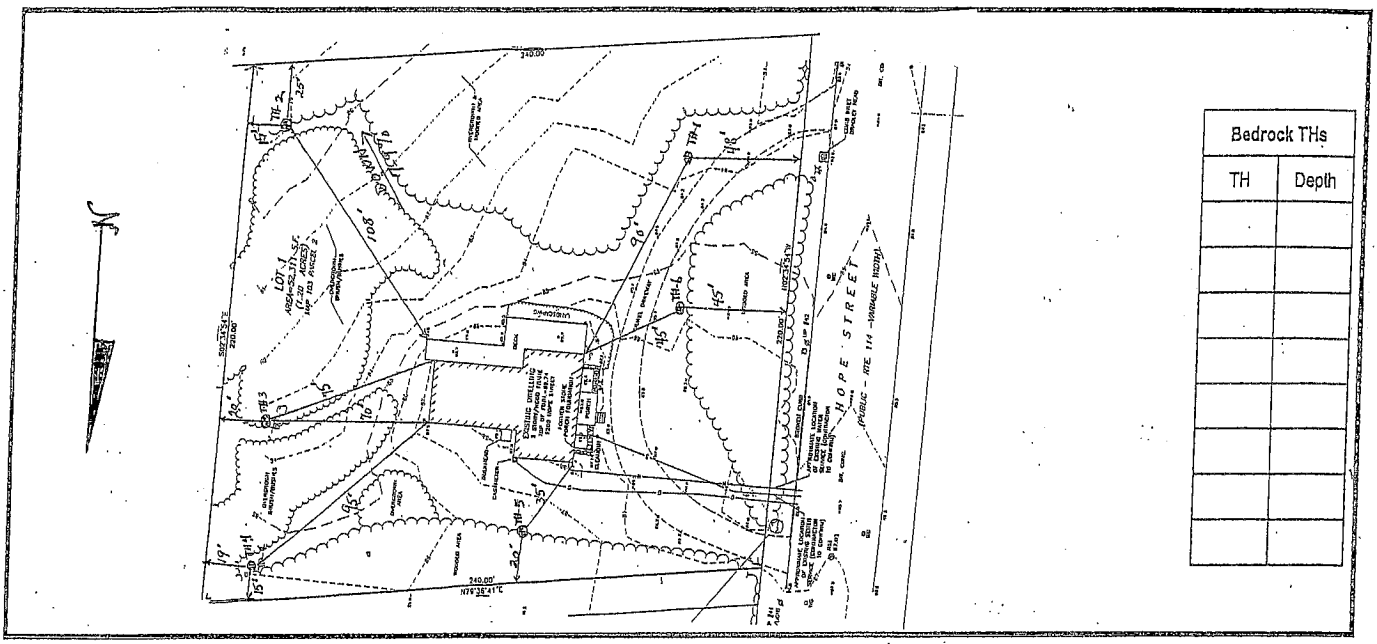
Part B

Site Evaluation – to be completed by Soil Evaluator or Class II or III Designer

Please use the area below to locate:

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*
   *OFFSETS MUST BE SHOWN

Key:
- Approximate location of test holes
- Approximate location of bedrock test holes
- x% Estimated gradient and direction of slope
- N Approximate direction of due north




| Bedrock THs | |
|---|---|
| TH | Depth |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

1. Relief and Slope: _____
2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above. NO ☒ YES ☐
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 38? NO ☒ YES ☐
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch. SITE IS PREVIOUSLY DEVELOPED NO ☐ YES ☒
8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☒ MODERATE ☐ SEVERE ☐
9. Landscape position: SHOULDER SLOPE
10. Vegetation: DISTURBANCE VARIETY
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site: _____

**Certification**

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: _____ D4C19 (Signature / License #) Part B prepared by: _____ D4C19 (Signature / License #)

DO NOT WRITE IN THIS SPACE

Witnessed Soil Evaluation Decision: Concur ☐ Inconclusive ☐ Disclaim ☐

Unwitnessed Soil Evaluations Decision: Accept ☐ Inconclusive ☐ Disclaim ☐

Wet Season Determination required ☐ Additional Field Review Required ☐

Explanation: _____

Signature Authorized Agent _____ Date _____

Revised 1/31/14

18-0119

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description  Application Number _____

Property Owner: 1200 HOPE STREET, L.L.C.
Property Location: BRISTOL 1200 HOPE STREET
Date of Test Hole: 10 DECEMBER, 2018
Soil Evaluator: N. LETENDRE  License Number: D4019
Weather: SUNNY 36°F 0-5mph  Shaded: Yes ☐ No ☐ Time: 10:30

| TH 5 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. S. Contr. | | | | | |
| FILL | -30to0 | | | | | | | | | | |
| C | 12 | c | b | 2.5Y 6/4 | @0 10YR 5/8 | c | 1 d | FSL | omm | fr | 7 |
| C | 18 | | | 5Y 4/2 | 10YR 5/6 | c | 1 d | vgSL | omm | fr | 6 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| TH 6 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. S. Contr. | | | | | |
| Ap | 12 | c | s | 10YR 3/3 | | | | FSL | 1fgr | VSfr | 4 |
| Bw1 | 20 | g | i | 10YR 4/6 | | | | vcbSL | 1fsbk | fr | 3 |
| Bw2 | 29 | g | s | 10YR 5/4 | | | | cbSL | 1fsbk | fr | 3 |
| C | 38 | c | s | 2.5Y 5/3 | @32 10YR 5/6 | f | 1 d | SL | omm | fr | 6 |
| Cd | 56 | | | 2.5Y 4/1 | 10YR 5/6 | c | 1 d | gSL | omm | fi | 8 |
| | | | | | | | | | | | |

TH 5 Soil Class A Total Depth 48" Impervious/Limiting Layer Depth N/A (og) GW Seepage Depth N/A SHWT 0 (og)
TH 6 Soil Class A Total Depth 56" Impervious/Limiting Layer Depth N/A (og) GW Seepage Depth N/A SHWT 32" (og)

Comments: _____

Revised 1/31/14

18-0119

Part B

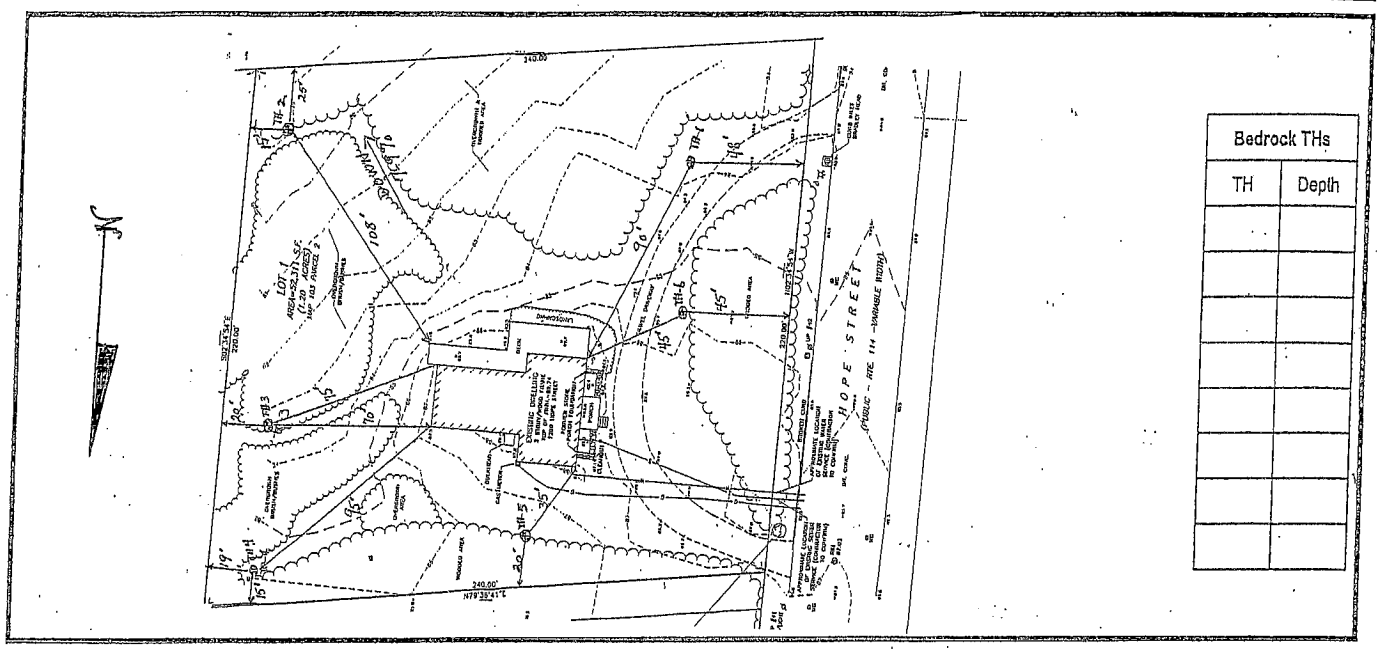
Site Evaluation – to be completed by Soil Evaluator or Class II or III Designer

Please use the area below to locate:

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*

*OFFSETS MUST BE SHOWN

Key:
- Approximate location of test holes
- Approximate location of bedrock test holes
- x% Estimated gradient and direction of slope
- N Approximate direction of due north




| Bedrock THs | |
|---|---|
| TH | Depth |
| | |
| | |
| | |
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| | |
| | |
| | |
| | |

1. Relief and Slope: _____
2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above. NO ☒ YES ☐
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 38? NO ☒ YES ☐
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch. SITE IS PREVIOUSLY DEVELOPED NO ☐ YES ☒
8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☒ MODERATE ☐ SEVERE ☐
9. Landscape position: SHOULDER SLOPE
10. Vegetation: DISTURBANCE VARIETY
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site: _____

**Certification**

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: _____ D4619 (Signature / License #) Part B prepared by: _____ D4619 (Signature / License #)

DO NOT WRITE IN THIS SPACE

Witnessed Soil Evaluation Decision: Concur ☐ Inconclusive ☐ Disclaim ☐

Unwitnessed Soil Evaluations Decision: Accept ☐ Inconclusive ☐ Disclaim ☐

Wet Season Determination required ☐ Additional Field Review Required ☐

Explanation: _____

Signature Authorized Agent _____ Date _____

Revised 1/31/14

18-0119

# APPENDIX A: STORMWATER MANAGEMENT PLAN CHECKLIST AND LID PLANNING REPORT – STORMWATER DESIGN SUMMARY

| | |
|---|---|
| **PROJECT NAME**<br>**Longfield Estates** | **(RIDEM USE ONLY)**<br>**STW/WQC File #:**<br>**Date Received:** |
| **TOWN**<br>**Bristol** | |
| **BRIEF PROJECT DESCRIPTION:**<br>Construction of 4 residential structures with associated improvements and renovations of an existing dwelling. | |

## Stormwater Management Plan (SMP) Elements – Minimum Standards

**When submitting a SMP,[1] submit four separately bound documents**: Appendix A Checklist; Stormwater Site Planning, Analysis and Design Report with Plan Set/Drawings; Soil Erosion and Sediment Control (SESC) Plan, and Post Construction Operations and Maintenance (O&M) Plan. Please refer to Suggestions to Promote Brevity**.**

Note**: All stormwater construction projects must create a Stormwater Management Plan (SMP). However, not every element listed below is required per the** RIDEM Stormwater Rules **and the** RIPDES Construction General Permit (CGP)**. This checklist will help identify the required elements to be submitted with an Application for Stormwater Construction Permit & Water Quality Certification.**

## PART 1. PROJECT AND SITE INFORMATION

**PROJECT TYPE** (Check all that apply)

| | | | | |
|---|---|---|---|---|
| ☒ Residential | ☐ Commercial | ☐ Federal | ☐ Retrofit | ☐ Restoration |
| ☒ Road | ☒ Utility | ☒ Fill | ☐ Dredge | ☐ Mine |
| ☐ Other (specify): | | | | |

**SITE INFORMATION**

☒ Vicinity Map

**INITIAL DISCHARGE LOCATION(S):** The WQv discharges to: (You may choose more than one answer if several discharge points are associated with the project.)

| ☒ **Groundwater** | ☒ **Surface Water** | ☐ **MS4** |
|---|---|---|
| ☐ GAA | ☒ Isolated Wetland | ☐ RIDOT |
| ☐ GA | ☐ Named Waterbody | ☐ RIDOT Alteration Permit is Approved |
| ☒ GB | ☐ Unnamed Waterbody Connected to Named Waterbody | ☐ Town |
| | | ☐ Other (specify): |

**ULTIMATE RECEIVING WATERBODY LOCATION(S):** Include pertinent information that applies to both $WQ_v$ and flow from larger storm events including overflows. Choose all that apply, and repeat table for each waterbody.

| | | | |
|---|---|---|---|
| ☒ Groundwater or Disconnected Wetland | ☐ SRWP | | |
| ☐ Waterbody Name: | ☐ Coldwater | ☐ Warmwater | ☐ Unassessed |
| ☐ Waterbody ID: | ☐ 4th order stream of pond 50 acres or more | | |
| ☐ TMDL for: | ☐ Watershed of flood prone river (e.g., Pocasset River) | | |
| ☐ Contributes to a priority outfall listed in the TMDL | ☐ Contributes stormwater to a public beach | | |
| ☐ 303(d) list – Impairment(s) for: | ☐ Contributes to shellfishing grounds | | |

[1] Applications for a Construction General Permit that do not require any other permits from RIDEM and will disturb less than 5 acres over the entire course of the project do not need to submit a SMP. The Appendix A checklist must still be submitted.

| **PROJECT HISTORY** | | |
|---|---|---|
| ☐ RIDEM Pre- Application Meeting | Meeting Date: | ☐ Minutes Attached |
| ☐ Municipal Master Plan Approval | Approval Date: | ☐ Minutes Attached |
| ☐ Subdivision Suitability Required | Approval #: | |
| ☐ Previous Enforcement Action has been taken on the property | Enforcement #: | |

| **FLOODPLAIN & FLOODWAY See** Guidance Pertaining to Floodplain and Floodways | |
|---|---|
| ☐ Riverine 100-year floodplain: **FEMA FLOODPLAIN FIRMETTE** has been reviewed and the 100-year floodplain is on site | |
| ☐ Delineated from FEMA Maps | |
| NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional | |
| ☐ Calculated by Professional Engineer | |
| ☐ Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain | Amount of Fill (CY): |
| | Amount of Cut (CY): |
| ☐ Restrictions or modifications are proposed to the flow path or velocities in a floodway | |
| ☐ Floodplain storage capacity is impacted | |
| ☐ Project area is not within 100-year floodplain as defined by RIDEM | |

| **CRMC JURISDICTION** |
|---|
| ☐ CRMC Assent required |
| ☐ Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP: |
| ☐ Sea level rise mitigation has been designed into this project |

| **LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:** | | | |
|---|---|---|---|
| **1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)** | | | |
| | ☐ Known or suspected releases of HAZARDOUS MATERIAL are present at the site (Hazardous Material is defined in Rule 1.4(A)(33) of 250-140-30-1 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Materials (the Remediation Regulations)) | | **RIDEM CONTACT:** |
| | ☐ Known or suspected releases of PETROLEUM PRODUCT are present at the site (Petroleum Product as defined in Rule 1.5(A)(84) of 250-140-25-1 of the RIDEM Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials) | | |
| | ☐ This site is identified on the RIDEM Environmental Resources Map as one of the following regulated facilities | | **SITE ID#**: |
| | | ☐ CERCLIS/Superfund (NPL) | |
| | | ☐ State Hazardous Waste Site (SHWS) | |
| | | ☐ Environmental Land Usage Restriction (ELUR) | |
| | | ☐ Leaking Underground Storage Tank (LUST) | |
| | | ☐ Closed Landfill | |
| Note: If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSMM Project Manager associated with the Site to determine if subsurface infiltration of stormwater is allowable for the project. Indicate if the infiltration corresponds to "Red," "Yellow" or "Green" as described in Section 3.2.8 of the RISDISM Guidance (Subsurface Contamination Guidance). Also, note and reference approval in PART 3, Minimum Standard 2: Groundwater Recharge/Infiltration**.** | | | |
| **2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:** | | | |
| | ☐ Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php | | |
| | ☐ Auto Fueling Facility (e.g., gas station) | | |
| | ☐ Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area | | |

| | | |
|---|---|---|
| | ☐ Road Salt Storage and Loading Areas (exposed to rainwater) | |
| | ☐ Outdoor Storage and Loading/Unloading of Hazardous Substances | |
| **3.** | **STORMWATER INDUSTRIAL PERMITTING** | |
| | ☐ The site is associated with existing or proposed activities that are considered Land Uses with Higher Potential Pollutant Loads (LUHPPLS) (see RICR 8.14.C) | Activities:<br>Sector: |
| | ☐ Construction is proposed on a site that is subject to THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS. | MSGP permit # |
| | ☐ Additional stormwater treatment is required by the MSGP<br>Explain: | |

| **REDEVELOPMENT STANDARD – MINIMUM STANDARD 6** | | |
|---|---|---|
| ☒ Pre Construction Impervious Area | | |
| | ☒ Total Pre-Construction Impervious Area (**TIA**): 5,106 sf | |
| | ☒ Total Site Area (**TSA**): 76,705 sf | |
| | ☒ Jurisdictional Wetlands (**JW**): 48 sf | |
| | ☒ Conservation Land (**CL**) | |
| ☐ Calculate the Site Size (defined as contiguous properties under same ownership) | | |
| | ☒ Site Size (**SS**) = (**TSA**) – (**JW**) – (**CL**) | |
| | ☒ (**TIA**) / (**SS**) = 0.067 | ☐ (**TIA**) / (**SS**) >**0.4**? |
| ☐ YES, Redevelopment | | |

## **PART 2.** LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1

(NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS)

This section may be deleted if not required.

**Note:** A written description must be provided specifying why each method is not being used or is not applicable at the Site. Appropriate answers may include:

- Town requires … (state the specific local requirement)
- Meets Town's dimensional requirement of …
- Not practical for site because …
- Applying for waiver/variance to achieve this (pending/approved/denied)
- Applying for wavier/variance to seek relief from this (pending/approved/denied)

| ***A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS*** | **IF NOT IMPLEMENTED, EXPLAIN HERE** |
|---|---|
| ☒ Sensitive resource areas and site constraints are identified (required)<br>☒ Local development regulations have been reviewed (required)<br>☒ All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction<br>☐ Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. **Note:** If Conservation Development has been used, check box and skip to Subpart C<br>☒ As much natural vegetation and pre-development hydrology as possible has been maintained | |

| | |
|---|---|
| ***B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS***<br>☐ Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies<br>☐ Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B)<br>☐ Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's)<br>☐ Development sites and building envelopes have been positioned outside of floodplains<br>☒ Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features<br>☒ Development sites and building envelopes have been located to minimize impacts to steep slopes (≥15%)<br>☐ Other (describe): | |
| ***C) MINIMIZE CLEARING AND GRADING***<br>☒ Site clearing has been restricted to <u>minimum area needed</u> for building footprints, development activities, construction access, and safety.<br>☒ Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities)<br>☐ Protection for stands of trees and individual trees and their root zones to be preserved has been specified, and such protection extends at least to the tree canopy drip line(s)<br>☐ Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent | |
| ***D) REDUCE IMPERVIOUS COVER***<br>☐ Reduced roadway widths (≤22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000)<br>☐ Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface)<br>☐ Reduced building footprint: Explain approach:<br>☐ Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface)<br>☐ Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around)<br>☐ Reduced parking lot area: Explain approach<br>☐ Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc.<br>☐ Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance)<br>☐ Other (describe): | |
| ***E) DISCONNECT IMPERVIOUS AREA***<br>☐ Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible<br>☐ Residential street edges allow side-of-the-road drainage into vegetated open swales<br>☐ Parking lot landscaping breaks up impervious expanse AND accepts runoff<br>☐ Other (describe): | |
| ***F) MITIGATE RUNOFF AT THE POINT OF GENERATION***<br>☒ Small-scale BMPs have been designated to treat runoff as close as possible to the source | |

| | |
|---|---|
| ***G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION***<br>☐ Low-maintenance landscaping has been proposed using native species and cultivars<br>☐ Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan<br>☐ Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots | |
| ***H) RESTORE STREAMS/WETLANDS***<br>☐ Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands<br>☐ Removal of invasive species<br>☐ Other | |

## **PART 3.** SUMMARY OF REMAINING STANDARDS

| **GROUNDWATER RECHARGE – MINIMUM STANDARD 2** | | |
|---|---|---|
| **YES** | **NO** | |
| ☒ | ☐ | The project has been designed to meet the groundwater recharge standard. |
| ☐ | ☐ | If "No," the justification for groundwater recharge criterion waiver has been explained in the Narrative (e.g., threat of groundwater contamination or physical limitation), if applicable (see RICR 8.8.D); |
| ☐ | ☐ | Your waiver request has been explained in the Narrative, if applicable. |
| ☐ | ☒ | Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification? |
| ☐ | ☐ | If "Yes," has approval for infiltration by the OLRSMM Site Project Manager, per Part 1, Minimum Standard 8, been requested? |

**TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)**
(Add or Subtract Rows as Necessary)

| **Design Point** | **Impervious Area Treated (sq ft)** | **Total $Re_v$ Required (cu ft)** | **LID Stormwater Credits (see RISDISM Section 4.6.1)** **Portion of $Re_v$ directed to a QPA (cu ft)** | **Recharge Required by Remaining BMPs (cu ft)** | **Recharge Provided by BMPs (cu ft)** |
|---|---|---|---|---|---|
| DP-1: | 23,850 | 497 | | 497 | 764 |
| DP-2: | | | | | |
| DP-3: | | | | | |
| DP-4: | | | | | |
| **TOTALS**: | | | | | |

Notes:
1. Only BMPs listed in RISDISM Table 3-5 "List of BMPs Acceptable for Recharge" may be used to meet the recharge requirement.
2. Recharge requirement must be satisfied for each waterbody ID.

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):

See Appendix 2 of the Stormwater Management Report

| WATER QUALITY – MINIMUM STANDARD 3 | | |
|---|---|---|
| **YES** | **NO** | |
| ☒ | ☐ | Does this project meet or exceed the required water quality volume WQv (see RICR 8.9.E-I)? |
| ☒ | ☐ | Is the proposed final impervious cover greater than 20% of the disturbed area (see RICR 8.9.E-I)? |
| ☒ | ☐ | If "Yes," either the Modified Curve Number Method or the Split Pervious/Impervious method in Hydro-CAD was used to calculate WQv; or, |
| ☐ | ☐ | If "Yes," either TR-55 or TR-20 was used to calculate WQv; and, |
| ☐ | ☐ | If "No," the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area. |
| ☐ | ☐ | Not Applicable |
| ☒ | ☐ | Does this project meet or exceed the ability to treat required water quality flow WQf (see RICR 8.9.I.1-3)? |
| ☐ | ☒ | Does this project propose an increase of impervious cover to a receiving water body with impairments?<br>If "Yes," please indicate below the method that was used to address the water quality requirements of no further degradation to a low-quality water. |
| ☐ | ☒ | RICR 8.36. A Pollutant Loading Analysis is needed and has been completed. |
| ☐ | ☐ | The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters) has been followed as applicable. |
| ☐ | ☒ | BMPs are proposed that are on the approved technology list . If "Yes," please provide all required worksheets from the manufacturer. |
| ☐ | ☐ | Additional pollutant-specific requirements and/or pollutant removal efficiencies are applicable to the site as the result of a TMDL, SAMP, or other watershed-specific requirements.<br>If "Yes," please describe: |

**TABLE 3-1: Summary of Water Quality** (see RICR 8.9)

| Design Point and WB ID | Impervious area treated (sq ft) | Total $WQ_v$ Required (cu ft) | LID Stormwater Credits (see RICR 8.18) WQv directed to a QPA (cu ft) | Water Quality Treatment Remaining (cu ft) | Water Quality Provided by BMPs (cu ft) |
|---|---|---|---|---|---|
| DP-1: | 25,952 | 2,163 | | 2,163 | 3,745 |
| DP-2: | | | | | |
| DP-3: | | | | | |
| DP-4: | | | | | |
| **TOTALS**: | | | | | |

Notes:
1. Only BMPs listed in RICR 8.20 and 8.25 or the Approved Technologies List of BMPs is Acceptable for Water Quality treatment.
2. For each Design Point, the Water Quality Volume Standard must be met for each Waterbody ID.

| | |
|---|---|
| ☒ YES<br>☐ NO | This project has met the setback requirements for each BMP.<br>If "No," please explain: |

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):

See Appendix 2 of the Stormwater Management Report

| CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4 | | | |
|---|---|---|---|
| **YES** | **NO** | | |
| ☒ | ☐ | Is this standard waived? If "Yes," please indicate one or more of the reasons below: | |
| | | ☐ | The project directs discharge to a large river (i.e., 4th-order stream or larger. See RISDISM Appendix I for State-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters. |
| | | ☒ | The project is a small facility with impervious cover of less than or equal to 1 acre. |
| | | ☐ | The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (Note: LID design strategies can greatly reduce the peak discharge rate). |
| ☐ | ☐ | Conveyance and natural channel protection for the site have been met.<br>If "No,' explain why: | |

| TABLE 4-1: Summary of Channel Protection Volumes (see RICR 8.10) | | | | | |
|---|---|---|---|---|---|
| **Design Point** | **Receiving Water Body Name** | **Coldwater Fishery? (Y/N)** | **Total CPv Required (cu ft)** | **Total CPv Provided (cu ft)** | **Average Release Rate Modeled in the 1-yr storm (cfs)** |
| DP-1: | | | | | |
| DP-2: | | | | | |
| DP-3: | | | | | |
| DP-4: | | | | | |
| **TOTALS**: | | | | | |
| Note: The Channel Protection Volume Standard must be met in each waterbody ID. | | | | | |
| ☐ YES<br>☐ NO | The CPv is released at roughly a uniform rate over a 24-hour duration (see examples of sizing calculations in Appendix D of the RISDISM). | | | | |
| ☐ YES<br>☐ NO | Do additional design restrictions apply resulting from any discharge to cold-water fisheries;<br>If "Yes," please indicate restrictions and solutions below. | | | | |
| ☐ Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.). | | | | | |

| **OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5** | | | |
|---|---|---|---|
| **YES** | **NO** | | |
| ☐ | ☒ | Is this standard waived? If yes, please indicate one or more of the reasons below: | |
| | | ☐ | The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for state-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters. |
| | | ☐ | A Downstream Analysis (see RICR 8.11.D and E) indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (e.g., through coincident peaks). |
| ☐ | ☒ | Does the project flow to an MS4 system or subject to other stormwater requirements? If "Yes," indicate as follows: | |
| | | ☐ | RIDOT |
| | | ☐ | Other (specify): |
| Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT's regulations indicate that post-volumes must be **less** than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4. | | | |
| | | Indicate below which model was used for your analysis.<br>☐ TR-55 ☐ TR-20 ☐ HydroCAD ☐ Bentley/Haestad ☐ Intellisolve<br>☐ Other (Specify): | |
| **YES** | **NO** | | |
| ☒ | ☐ | Does the drainage design demonstrate that flows from the 100-year storm event through a BMP will safely manage and convey the 100-year storm? If "No," please explain briefly below and reference where in the application further documentation can be found (i.e., name of report/document, page numbers, appendices, etc.): | |
| ☒ | ☐ | Do off-site areas contribute to the sub-watersheds and design points? If "Yes," | |
| ☒ | ☐ | Are the areas modeled as "present condition" for both pre- and post-development analysis? | |
| ☒ | ☐ | Are the off-site areas shown on the subwatershed maps? | |
| ☒ | ☐ | Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff? | |
| ☐ | ☒ | Is a Downstream Analysis required (see RICR 8.11.E.1)? | |
| ☒ | ☐ | Calculate the following: | |
| | | ☒ | Area of disturbance within the sub-watershed (areas): 1.76+/- acres |
| | | ☒ | Impervious cover (%): 32.6% |
| ☐ | ☒ | Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)? | |
| ☒ | ☐ | Does this project meet the overbank flood protection standard? | |

| Table 5-1 Hydraulic Analysis Summary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Subwatershed (Design Point)** | **1.2" Peak Flow** (cfs) ** | | **1-yr Peak Flow** (cfs) | | **10-yr Peak Flow** (cfs) | | **100-yr Peak Flow** (cfs) | |
| | Pre (cfs) | Post (cfs) | Pre (cfs) | Post (cfs) | Pre (cfs) | Post (cfs) | Pre (cfs) | Post (cfs) |
| A1: | 0.01 | 0.00 | 0.20 | 0.02 | 0.58 | 0.52 | 1.36 | 1.20 |
| A2: | 0.09 | 0.02 | 1.08 | 0.39 | 3.15 | 2.02 | 7.34 | 6.49 |
| | | | | | | | | |
| | | | | | | | | |
| **TOTALS**: | | | | | | | | |

** Utilize modified curve number method or split pervious /impervious method in HydroCAD.

Note: The hydraulic analysis must demonstrate no impact to each individual subwatershed DP unless each DP discharges to the same wetland or water resource.

| **Indicate as follows where the pertinent calculations and/or information for the items above are provided** | **Name of report/document, page numbers, appendices, etc.** |
|---|---|
| Existing conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations. | See Appendix 2 of the Stormwater Management Report |
| Proposed conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, water surface elevations, and routing showing the methodologies used and supporting calculations. | See Appendix 2 of the Stormwater Management Report |
| Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration. | See Appendix 2 of the Stormwater Management Report |
| Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities). | See Appendix 2 of the Stormwater Management Report |

| Table 5-2 Summary of Best Management Practices | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DP #** | **BMP ID** | **BMP Type** (e.g., bioretention, tree filter) | **BMP Functions** | | | | | **Bypass Type** | **Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4** | | |
| | | | Pre-Treatment (Y/N/NA) | $Re_v$ | $WQ_v$ | $CP_v$ (Y/N/NA) | Overbank Flood Reduction (Y/N/NA) | External (E) Internal (I) or NA | Yes/No | Technical Justification (Design Report page number) | Distance Provided |
| pA2 | US1 | Underground Infiltration System | | 764 | 426 | | | N/a | Y | | |
| pA2 | FB1 | Sediment Forebay-1 | 173 | | | | | N/a | Y | | |
| pA2 | FB2 | Sediment Forebay-2 | 76 | | | | | N/a | Y | | |
| pA2 | FB3 | Sediment Forebay-3 | 192 | | | | | N/a | Y | | |

| Table 5-2 Summary of Best Management Practices | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DP #** | **BMP ID** | **BMP Type** (e.g., bioretention, tree filter) | **BMP Functions** | | | | | **Bypass Type** | **Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4** | | |
| | | | Pre-Treatment (Y/N/ NA) | $Re_v$ | $WQ_v$ | $CP_v$ (Y/N/ NA) | Overbank Flood Reduction (Y/N/NA) | External (E) Internal (I) or NA | Yes/ No | Technical Justification (Design Report page number) | Distance Provided |
| pA2 | BR1 | Bio-retention Basin-1 | | | 1315 | | | N/a | Y | | |
| pA2 | BR2 | Bio-retention Basin-2 | | | 805 | | | N/a | Y | | |
| pA1 | BR3 | Bio-retention Basin-3 | | | 503 | | | N/a | Y | | |
| pA1 | BR4 | Bio-retention Basin-4 | | | 255 | | | N/a | Y | | |
| | | **TOTALS**: | | | | | | | | | |

| Table 5.3 Summary of Soils to Evaluate Each BMP | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DP # | BMP ID | **BMP Type** (e.g., bioretention, tree filter) | Soils Analysis for Each BMP | | | | | | |
| | | | Test Pit ID# and Ground Elevation | | SHWT Elevation (ft) | Bottom of Practice Elevation* (ft) | Separation Distance Provided (ft) | Hydrologic Soil Group (A, B, C, D) | Exfiltration Rate Applied (in/hr) |
| | | | Primary | Secondary | | | | | |
| pA2 | US1 | Underground Infiltration System | TH-3 | TH-4 | 84.0 | 82.0 | 2′ | C | .27 |
| pA2 | FB1 | Sediment Forebay-1 | TH-3 | TH-4 | 85.5 | 85.0 | Lined | C | N/a |
| pA2 | FB2 | Sediment Forebay-2 | TH-2 | TH-3 | 81.0 | 83.0 | Lined | C | N/a |
| pA2 | FB3 | Sediment Forebay-3 | TH-1 | TH-6 | 80.5 | 80.3 | Lined | c | N/a |
| pA2 | BR1 | Bio-retention Basin-1 | TH-3 | TH-4 | 85.5 | 85.0 | Lined | C | N/a |
| pA2 | BR2 | Bio-retention Basin-2 | TH-2 | TH-1 | 81.0 | 80.0 | Lined | C | N/a |
| pA1 | BR3 | Bio-retention Basin-3 | TH-1 | TH-6 | 84.4 | 82.7 | Lined | C | N/a |
| pA1 | BR4 | Bio-retention Basin-4 | TH-2 | TH-3 | 81.0 | 83.0 | 2′ | C | N/a |
| pA2 | B1 | Dry Extended Detention Basin | TH-2 | TH-3 | 80.0 | 80.0 | 0′ | C | N/a |
| | | **TOTALS**: | | | | | | | |

* For underground infiltration systems (UICs) bottom equals bottom of stone, for surface infiltration basins bottom equals bottom of basin, for filters bottom equals interface of storage and top of filter layer

| LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8 | | | |
|---|---|---|---|
| **YES** | **NO** | **N/A** | |
| ☐ | ☐ | ☒ | Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9. |
| ☐ | ☐ | ☐ | Are these activities already covered under an MSGP? If "No," please explain if you have applied for an MSGP or intend to do so? |
| ☐ | ☐ | ☐ | List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, "Acceptable BMPs for Use at LUHPPLs." Please list BMPs: |
| ☐ | ☐ | ☐ | Additional BMPs, or additional pretreatment BMP's if any, that meet RIPDES MSGP requirements; Please list BMPs: |

| | | | |
|---|---|---|---|
| | | | |
| | | | Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.). |

| **ILLICIT DISCHARGES – MINIMUM STANDARD 9** | | | |
|---|---|---|---|
| Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit. | | | |
| **YES** | **NO** | **N/A** | |
| ☒ | ☐ | ☐ | Have you checked for illicit discharges? |
| ☐ | ☒ | ☐ | Have any been found and/or corrected? If "Yes," please identify. |
| ☐ | ☐ | ☐ | Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)? |

| **SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10** | | | | |
|---|---|---|---|---|
| **YES** | **NO** | **N/A** | | |
| ☒ | ☐ | ☐ | | Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set? |
| ☒ | ☐ | ☐ | | Have you provided a **separately-bound** document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed). |
| | | | | If "No," include a document with your submittal that addresses the following elements of an SESC Plan: |
| | | | ☐ | Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met: |
| | | | ☐ | Provide Natural Buffers and Maintain Existing Vegetation |
| | | | ☐ | Minimize Area of Disturbance |
| | | | ☐ | Minimize the Disturbance of Steep Slopes |
| | | | ☐ | Preserve Topsoil |
| | | | ☐ | Stabilize Soils |
| | | | ☐ | Protect Storm Drain Inlets |
| | | | ☐ | Protect Storm Drain Outlets |
| | | | ☐ | Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures |
| | | | ☐ | Establish Perimeter Controls and Sediment Barriers |
| | | | ☐ | Divert or Manage Run-On from Up-Gradient Areas |
| | | | ☐ | Properly Design Constructed Stormwater Conveyance Channels |
| | | | ☐ | Retain Sediment On-Site |
| | | | ☐ | Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows |
| | | | ☐ | Apply Construction Activity Pollution Prevention Control Measures |
| | | | ☐ | Install, Inspect, and Maintain Control Measures and Take Corrective Actions |
| | | | ☐ | Qualified SESC Plan Preparer's Information and Certification |
| | | | ☐ | Operator's Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities |
| | | | ☐ | Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required |

| **STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9** | | |
|---|---|---|
| **Operation and Maintenance Section** | | |
| **YES** | **NO** | |
| ☒ | ☐ | Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable? |

| | | |
|---|---|---|
| ☒ | ☐ | Have you provided a **separately-bound** Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E? |
| ☒ | ☐ | Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If "No," why not? |
| ☒ | ☐ | Is the property owner or homeowner's association responsible for the stormwater maintenance of all BMP's? If "No," you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.). |
| ☐ | ☒ | Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If "Yes," have you obtained them? Or please explain your plan to obtain them: |
| ☐ | ☒ | Is stormwater being directed from public areas to private property? If "Yes," note the following: Note: This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner. |
| **Pollution Prevention Section** | | |
| ☐ | ☒ | Designated snow stockpile locations? |
| ☐ | ☒ | Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State? |
| ☐ | ☒ | Asphalt-only based sealants? |
| ☐ | ☒ | Pet waste stations? (Note: If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan). |
| ☐ | ☒ | Regular sweeping? Please describe: |
| ☐ | ☒ | De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan). |
| ☐ | ☒ | A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan). |

# PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

| **Existing and Proposed Subwatershed Mapping (REQUIRED)** | | |
|---|---|---|
| **YES** | **NO** | |
| ☒ | ☐ | Existing and proposed drainage area delineations |
| ☒ | ☐ | Locations of all streams and drainage swales |
| ☒ | ☐ | Drainage flow paths, mapped according to the DEM *Guidance for Preparation of Drainage Area Maps* (included in RISDISM Appendix K) |
| ☒ | ☐ | Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable |
| ☒ | ☐ | Logs of borings and/or test pit investigations along with supporting soils/geotechnical report |
| ☒ | ☐ | Mapped seasonal high-water-table test pit locations |
| ☒ | ☐ | Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs |
| ☒ | ☐ | Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans |
| ☒ | ☐ | Mapped bedrock outcrops adjacent to any infiltration BMP |
| ☒ | ☐ | Soils were logged by a: |
| | ☒ | DEM-licensed Class IV soil evaluator |

| | | |
|---|---|---|
| | | Name: N. Letendre |
| | ☐ | RI-registered P.E.<br>Name: |

| Subwatershed and Impervious Area Summary | | | | |
|---|---|---|---|---|
| **Subwatershed (area to each design point)** | **First Receiving Water ID or MS4** | **Area Disturbed (units)** | **Existing Impervious (units)** | **Proposed Impervious (units)** |
| **DP-1:** | | | | |
| **DP-2:** | | | | |
| **DP-3:** | | | | |
| **DP-4:** | | | | |
| **TOTALS:** | | | | |

| **Site Construction Plans (Indicate that the following applicable specifications are provided)** | | |
|---|---|---|
| **YES** | **NO** | |
| ☒ | ☐ | Existing and proposed plans (scale not greater than 1" = 40') with North arrow |
| ☒ | ☐ | Existing and proposed site topography (with 1 or 2-foot contours); 10-foot contours accepted for off-site areas |
| ☒ | ☐ | Boundaries of existing predominant vegetation and proposed limits of clearing |
| ☒ | ☐ | Site Location clarification |
| ☒ | ☐ | Location and field-verified boundaries of resource protection areas such as:<br>► freshwater and coastal wetlands, including lakes and ponds<br>► coastal shoreline features<br>Perennial and intermittent streams, in addition to Areas Subject to Storm Flowage (ASSFs) |
| ☒ | ☐ | All required setbacks (e.g., buffers, water-supply wells, septic systems) |
| ☒ | ☐ | Representative cross-section and profile drawings, and notes and details of structural stormwater management practices and conveyances (i.e., storm drains, open channels, swales, etc.), which include:<br>► Location and size of the stormwater treatment practices (type of practice, depth, area). Stormwater treatment practices (BMPs) must have labels that correspond to RISDISM Table 5-2;<br>► Design water surface elevations (applicable storms);<br>► Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.;<br>► Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.);<br>► Location of floodplain and, if applicable, floodway limits and relationship of site to upstream and downstream properties or drainage that could be affected by work in the floodplain;<br>► Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting |
| ☒ | ☐ | Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables |
| ☒ | ☐ | Mapping of any OLRSMM-approved remedial actions/systems (including ELURs) |
| ☒ | ☐ | Location of existing and proposed roads, buildings, and other structures including limits of disturbance;<br>► Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements;<br>► Location of existing and proposed conveyance systems, such as grass channels, swales, and storm drains, and location(s) of final discharge point(s) (wetland, waterbody, etc.);<br>► Cross sections of roadways, with edge details such as curbs and sidewalks;<br>► Location and dimensions of channel modifications, such as bridge or culvert crossings |
| ☒ | ☐ | Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization |

# MOUNDSOLV
# GROUNDWATER MOUNDING ANALYSIS
# FOR A SLOPING WATER-TABLE AQUIFER
# ZLOTNIK ET AL. (2017) SOLUTION

## Solution Method

**Zlotnik et al. (2017) transient solution for a rectangular source (linearization method 1)**

## Site Description

### *Aquifer Data*

| Property | Value |
|---|---|
| Horizontal hydraulic conductivity, *K* (ft/d) | 2.5 |
| Specific yield, *Sy* | 0.2 |
| Initial saturated thickness, $h_0$ (ft) | 10 |
| Maximum allowable water-table rise, $\sigma$ (ft) | 2 |
| Dip, *i* (ft/ft) | 0.05 |
| Slope rotation from x axis, $\gamma$ (°) | 0 |

### *Recharge Sources*

| Property | Source 1 |
|---|---|
| X coordinate at center, *X* (ft) | 0 |
| Y coordinate at center, *Y* (ft) | 0 |
| Dimension along x* axis, *L* (ft) | 21.5 |
| Dimension along y* axis, *W* (ft) | 33.25 |
| Rotation from slope direction, $\phi$ (°) | 0 |
| Recharge rate, *Q* ($ft^3/d$) | 357.4375 |
| Infiltration rate, *q* (ft/d) | 0.5 |

## Monitoring Points

### *Elapsed Time, t = 1 d*

| Name | x (ft) | y (ft) | s (ft) | h (ft) | z (ft) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Source 1 | 0 | 0 | 1.561 | 11.56 | 0 |

## Time Series Data

| Time | Source 1 | |
|---|---|---|
| (d) | s (ft) | h (ft) |
| 0 | 0 | 10 |
| 0.002916 | 0.00729 | 10.01 |
| 0.006561 | 0.0164 | 10.02 |
| 0.01112 | 0.02779 | 10.03 |
| 0.01681 | 0.04203 | 10.04 |
| 0.02393 | 0.05983 | 10.06 |
| 0.03283 | 0.08207 | 10.08 |
| 0.04395 | 0.1099 | 10.11 |
| 0.05786 | 0.1445 | 10.14 |
| 0.07524 | 0.1876 | 10.19 |
| 0.09696 | 0.2408 | 10.24 |
| 0.1241 | 0.3058 | 10.31 |
| 0.1581 | 0.3843 | 10.38 |
| 0.2005 | 0.4776 | 10.48 |
| 0.2535 | 0.5868 | 10.59 |
| 0.3198 | 0.7122 | 10.71 |
| 0.4027 | 0.8537 | 10.85 |
| 0.5063 | 1.011 | 11.01 |
| 0.6358 | 1.182 | 11.18 |
| 0.7977 | 1.366 | 11.37 |
| 1 | 1.561 | 11.56 |

## Profile Data

***Profile Along X* Axis for Source 1 at Elapsed Time, t = 1 d***

**x* (ft) s (ft) h (ft) z (ft)**

| | | | |
|---|---|---|---|
| -34 | 0.05054 | 8.351 | -1.7 |
| -32.64 | 0.06272 | 8.431 | -1.632 |
| -31.28 | 0.07742 | 8.513 | -1.564 |
| -29.92 | 0.09508 | 8.599 | -1.496 |
| -28.56 | 0.1162 | 8.688 | -1.428 |
| -27.2 | 0.1413 | 8.781 | -1.36 |
| -25.84 | 0.1709 | 8.879 | -1.292 |
| -24.48 | 0.2058 | 8.982 | -1.224 |
| -23.12 | 0.2466 | 9.091 | -1.156 |
| -21.76 | 0.294 | 9.206 | -1.088 |
| -20.4 | 0.349 | 9.329 | -1.02 |
| -19.04 | 0.4124 | 9.46 | -0.952 |
| -17.68 | 0.4851 | 9.601 | -0.884 |
| -16.32 | 0.5681 | 9.752 | -0.816 |
| -14.96 | 0.6624 | 9.914 | -0.748 |
| -13.6 | 0.7688 | 10.09 | -0.68 |
| -12.24 | 0.8886 | 10.28 | -0.612 |
| -10.88 | 1.023 | 10.48 | -0.544 |
| -9.52 | 1.156 | 10.68 | -0.476 |
| -8.16 | 1.27 | 10.86 | -0.408 |
| -6.8 | 1.363 | 11.02 | -0.34 |
| -5.44 | 1.438 | 11.17 | -0.272 |
| -4.08 | 1.495 | 11.29 | -0.204 |
| -2.72 | 1.534 | 11.4 | -0.136 |
| -1.36 | 1.556 | 11.49 | -0.068 |
| 0 | 1.561 | 11.56 | 0 |
| 1.36 | 1.55 | 11.62 | 0.068 |
| 2.72 | 1.522 | 11.66 | 0.136 |
| 4.08 | 1.478 | 11.68 | 0.204 |
| 5.44 | 1.416 | 11.69 | 0.272 |
| 6.8 | 1.337 | 11.68 | 0.34 |
| 8.16 | 1.24 | 11.65 | 0.408 |

| | | | |
|---|---|---|---|
| 9.52 | 1.123 | 11.6 | 0.476 |
| 10.88 | 0.9873 | 11.53 | 0.544 |
| 12.24 | 0.8526 | 11.46 | 0.612 |
| 13.6 | 0.733 | 11.41 | 0.68 |
| 14.96 | 0.6275 | 11.38 | 0.748 |
| 16.32 | 0.5349 | 11.35 | 0.816 |
| 17.68 | 0.4539 | 11.34 | 0.884 |
| 19.04 | 0.3834 | 11.34 | 0.952 |
| 20.4 | 0.3224 | 11.34 | 1.02 |
| 21.76 | 0.2699 | 11.36 | 1.088 |
| 23.12 | 0.2249 | 11.38 | 1.156 |
| 24.48 | 0.1865 | 11.41 | 1.224 |
| 25.84 | 0.1539 | 11.45 | 1.292 |
| 27.2 | 0.1264 | 11.49 | 1.36 |
| 28.56 | 0.1033 | 11.53 | 1.428 |
| 29.92 | 0.08403 | 11.58 | 1.496 |
| 31.28 | 0.06799 | 11.63 | 1.564 |
| 32.64 | 0.05472 | 11.69 | 1.632 |
| 34 | 0.04382 | 11.74 | 1.7 |

*The axes of Source 1 (x*, y*) are rotated 0° from the axes of mapping coordinate system (x, y)*

### *Profile Along Y* Axis for Source 1 at Elapsed Time, t = 1 d*

| y* (ft) | s (ft) | h (ft) | z (ft) |
|---|---|---|---|
| -34 | 0.08893 | 10.09 | 0 |
| -32.64 | 0.1089 | 10.11 | 0 |
| -31.28 | 0.1327 | 10.13 | 0 |
| -29.92 | 0.161 | 10.16 | 0 |
| -28.56 | 0.1946 | 10.19 | 0 |
| -27.2 | 0.2343 | 10.23 | 0 |
| -25.84 | 0.2809 | 10.28 | 0 |

| | | | |
|---|---|---|---|
| -24.48 | 0.3355 | 10.34 | 0 |
| -23.12 | 0.3994 | 10.4 | 0 |
| -21.76 | 0.4736 | 10.47 | 0 |
| -20.4 | 0.5598 | 10.56 | 0 |
| -19.04 | 0.6594 | 10.66 | 0 |
| -17.68 | 0.7741 | 10.77 | 0 |
| -16.32 | 0.9045 | 10.9 | 0 |
| -14.96 | 1.028 | 11.03 | 0 |
| -13.6 | 1.134 | 11.13 | 0 |
| -12.24 | 1.225 | 11.23 | 0 |
| -10.88 | 1.303 | 11.3 | 0 |
| -9.52 | 1.368 | 11.37 | 0 |
| -8.16 | 1.422 | 11.42 | 0 |
| -6.8 | 1.467 | 11.47 | 0 |
| -5.44 | 1.502 | 11.5 | 0 |
| -4.08 | 1.528 | 11.53 | 0 |
| -2.72 | 1.547 | 11.55 | 0 |
| -1.36 | 1.558 | 11.56 | 0 |
| 0 | 1.561 | 11.56 | 0 |
| 1.36 | 1.558 | 11.56 | 0 |
| 2.72 | 1.547 | 11.55 | 0 |
| 4.08 | 1.528 | 11.53 | 0 |
| 5.44 | 1.502 | 11.5 | 0 |
| 6.8 | 1.467 | 11.47 | 0 |
| 8.16 | 1.422 | 11.42 | 0 |
| 9.52 | 1.368 | 11.37 | 0 |
| 10.88 | 1.303 | 11.3 | 0 |
| 12.24 | 1.225 | 11.23 | 0 |
| 13.6 | 1.134 | 11.13 | 0 |
| 14.96 | 1.028 | 11.03 | 0 |
| 16.32 | 0.9045 | 10.9 | 0 |
| 17.68 | 0.7741 | 10.77 | 0 |

| | | | |
|---|---|---|---|
| 19.04 | 0.6594 | 10.66 | 0 |
| 20.4 | 0.5598 | 10.56 | 0 |
| 21.76 | 0.4736 | 10.47 | 0 |
| 23.12 | 0.3994 | 10.4 | 0 |
| 24.48 | 0.3355 | 10.34 | 0 |
| 25.84 | 0.2809 | 10.28 | 0 |
| 27.2 | 0.2343 | 10.23 | 0 |
| 28.56 | 0.1946 | 10.19 | 0 |
| 29.92 | 0.161 | 10.16 | 0 |
| 31.28 | 0.1327 | 10.13 | 0 |
| 32.64 | 0.1089 | 10.11 | 0 |
| 34 | 0.08893 | 10.09 | 0 |

*The axes of Source 1 (x*, y*) are rotated 0° from the axes of mapping coordinate system (x, y)*

## Sensitivity Data

***Source 1, x=0 ft, y=0 ft***

| Parameter | Water-Table Rise (ft) | | | |
|---|---|---|---|---|
| **Multiplier** | **K** | **Sy** | **$h_0$** | **i** |
| 0.8 | 1.71 | 1.765 | 1.71 | 1.561 |
| 0.82 | 1.694 | 1.742 | 1.694 | 1.561 |
| 0.84 | 1.678 | 1.719 | 1.678 | 1.561 |
| 0.86 | 1.662 | 1.698 | 1.662 | 1.561 |
| 0.88 | 1.647 | 1.677 | 1.647 | 1.561 |
| 0.9 | 1.632 | 1.656 | 1.632 | 1.561 |
| 0.92 | 1.617 | 1.636 | 1.617 | 1.561 |
| 0.94 | 1.603 | 1.617 | 1.603 | 1.561 |
| 0.96 | 1.589 | 1.598 | 1.589 | 1.561 |
| 0.98 | 1.575 | 1.579 | 1.575 | 1.561 |
| 1 | 1.561 | 1.561 | 1.561 | 1.561 |
| 1.02 | 1.548 | 1.544 | 1.548 | 1.561 |
| 1.04 | 1.535 | 1.527 | 1.535 | 1.561 |
| | | | | |

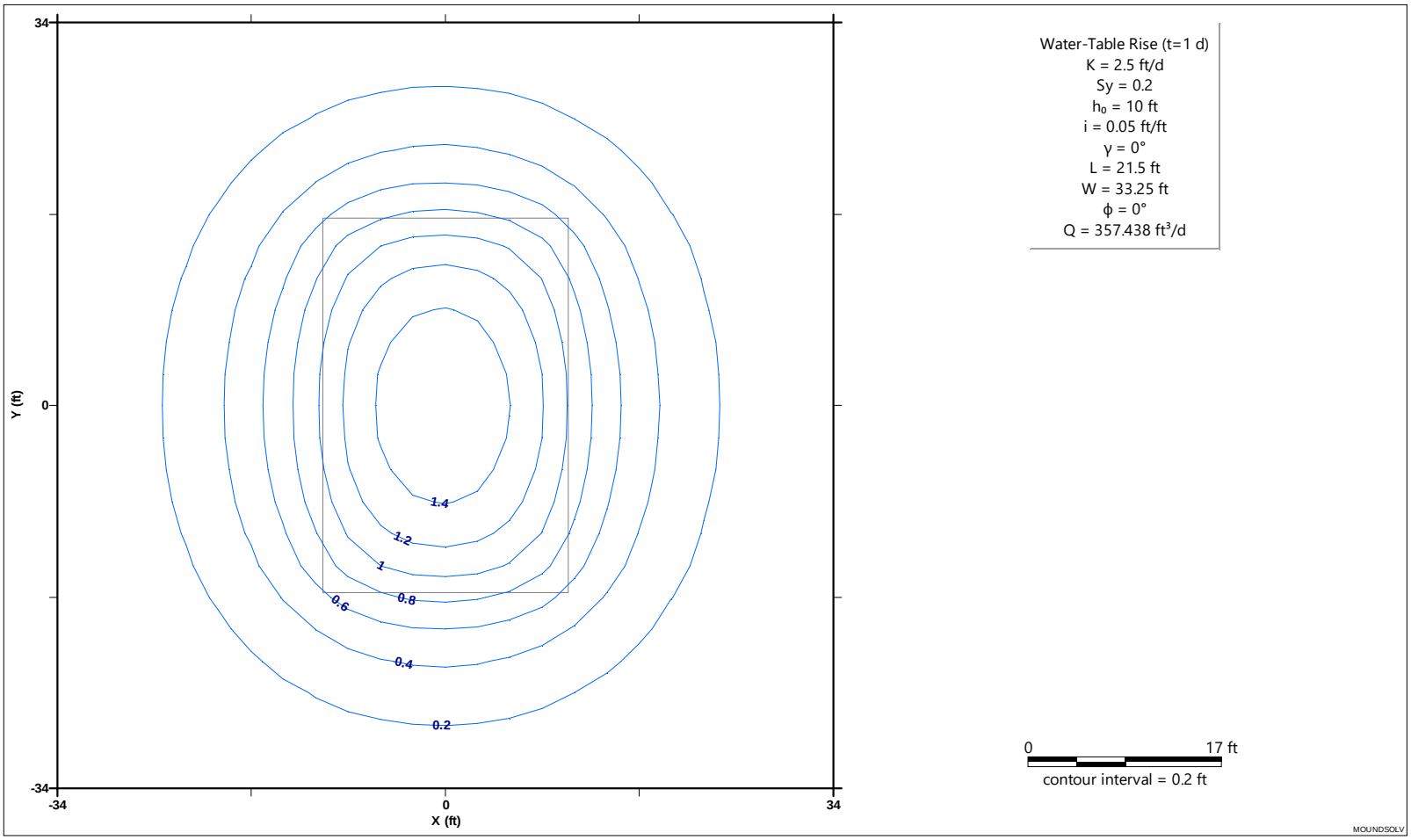
| | | | | |
|---|---|---|---|---|
| 1.06 | 1.522 | 1.51 | 1.522 | 1.561 |
| 1.08 | 1.51 | 1.494 | 1.51 | 1.561 |
| 1.1 | 1.497 | 1.478 | 1.497 | 1.561 |
| 1.12 | 1.485 | 1.462 | 1.485 | 1.561 |
| 1.14 | 1.473 | 1.447 | 1.473 | 1.561 |
| 1.16 | 1.462 | 1.432 | 1.462 | 1.561 |
| 1.18 | 1.45 | 1.417 | 1.45 | 1.561 |
| 1.2 | 1.439 | 1.403 | 1.439 | 1.561 |

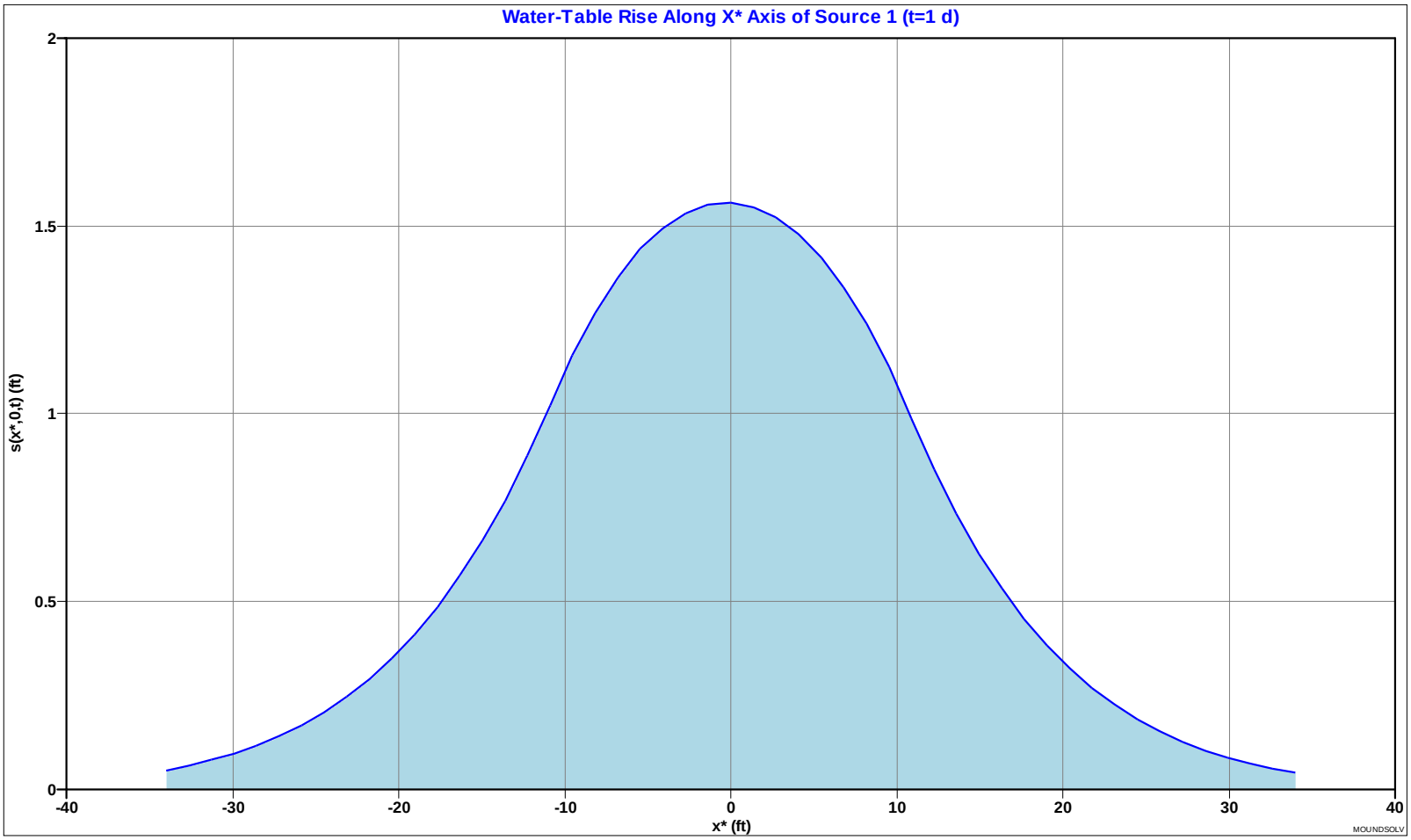
## *Notation*

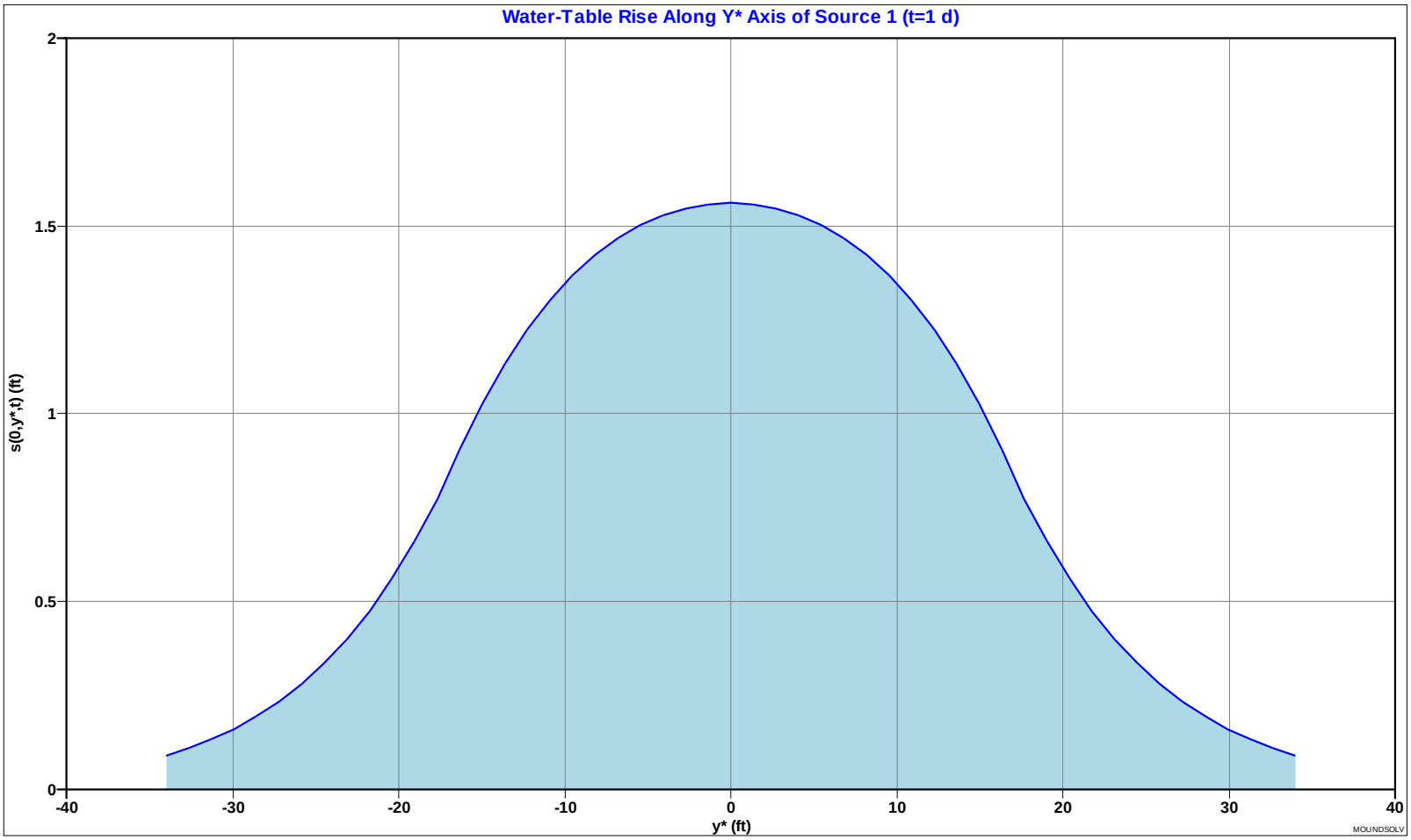
*h* is water-table elevation above datum[1]
$h_0$ is aquifer saturated thickness prior to mounding
*i* is dip of aquifer
*K* is horizontal hydraulic conductivity
*L* is dimension of recharge source parallel to *x** axis
*q* is infiltration rate (= $Q / L \cdot W$)
*Q* is recharge rate
*s* is water-table rise above static water table
*Sy* is specific yield
*t* is time since start of recharge
$t_0$ is time when recharge stops
*W* is dimension of recharge source parallel to *y** axis
*x*, *y* are mapping Cartesian coordinate axes
*x**, *y** are recharge source Cartesian coordinate axes
*z* is elevation above datum[1]
$\gamma$ is angle between *x* axis and dip direction
$\phi$ is angle between dip direction and *x** axis of recharge source
$\sigma$ is maximum acceptable water-table rise

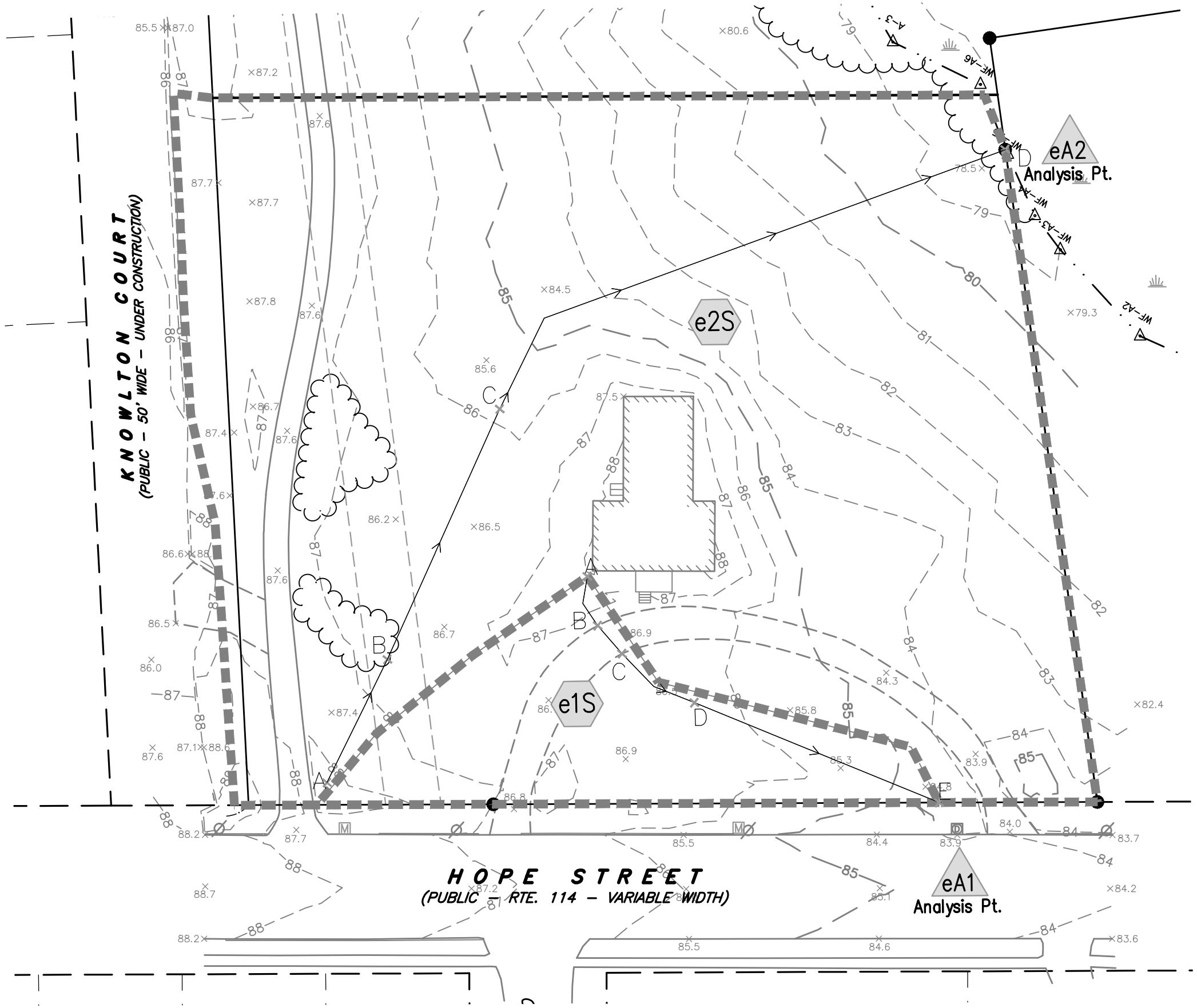
[1]*Elevation datum is the base of aquifer beneath the center of primary recharge source*

Report generated by MOUNDSOLV v4.0 on 12 Dec 2022 at 10:30:38
MOUNDSOLV (www.aqtesolv.com)


Water-Table Rise (t=1 d)
K = 2.5 ft/d
Sy = 0.2
$h_o$ = 10 ft
i = 0.05 ft/ft
γ = 0°
L = 21.5 ft
W = 33.25 ft
ϕ = 0°
Q = 357.438 ft³/d
34
0
-34
Y (ft)
-34
0
34
X (ft)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
17 ft
contour interval = 0.2 ft
MOUNDSOLV


Water-Table Rise Along X* Axis of Source 1 (t=1 d)
2
1.5
1
0.5
0
s(x*,0,t) (ft)
-40
-30
-20
-10
0
10
20
30
40
x* (ft)
MOUNDSOLV


Water-Table Rise Along Y* Axis of Source 1 (t=1 d)
2
1.5
1
0.5
0
s(0,y*,t) (ft)
-40
-30
-20
-10
0
10
20
30
40
y* (ft)
MOUNDSOLV




## WATERSHED LEGEND

- 1 — SUBCATCHMENT AREA
- 1 — POND / STRUCTURE
- 1 — REACH / CHANNEL
- A → B: Tc–FLOWPATH PRE–DEVELOPMENT (START / END)
- PRE–DEVELOPMENT SUBCATCHMENT BOUNDARY

| | |
|---|---|
| DATE: | JUNE 15, 2022 |
| REV. DATE: | |
| DRAWN BY: | SJE |
| CHECK BY: | MER |
| PROJ.#: | 22024 |
| SCALE : | 1" = 40' |
| ISSUED FOR : | PERMITTING |
| PREPARED FOR: | EXPRESS REALTY TRUST, LLC |

# PRE DEVELOPMENT WATERSHED PLAN

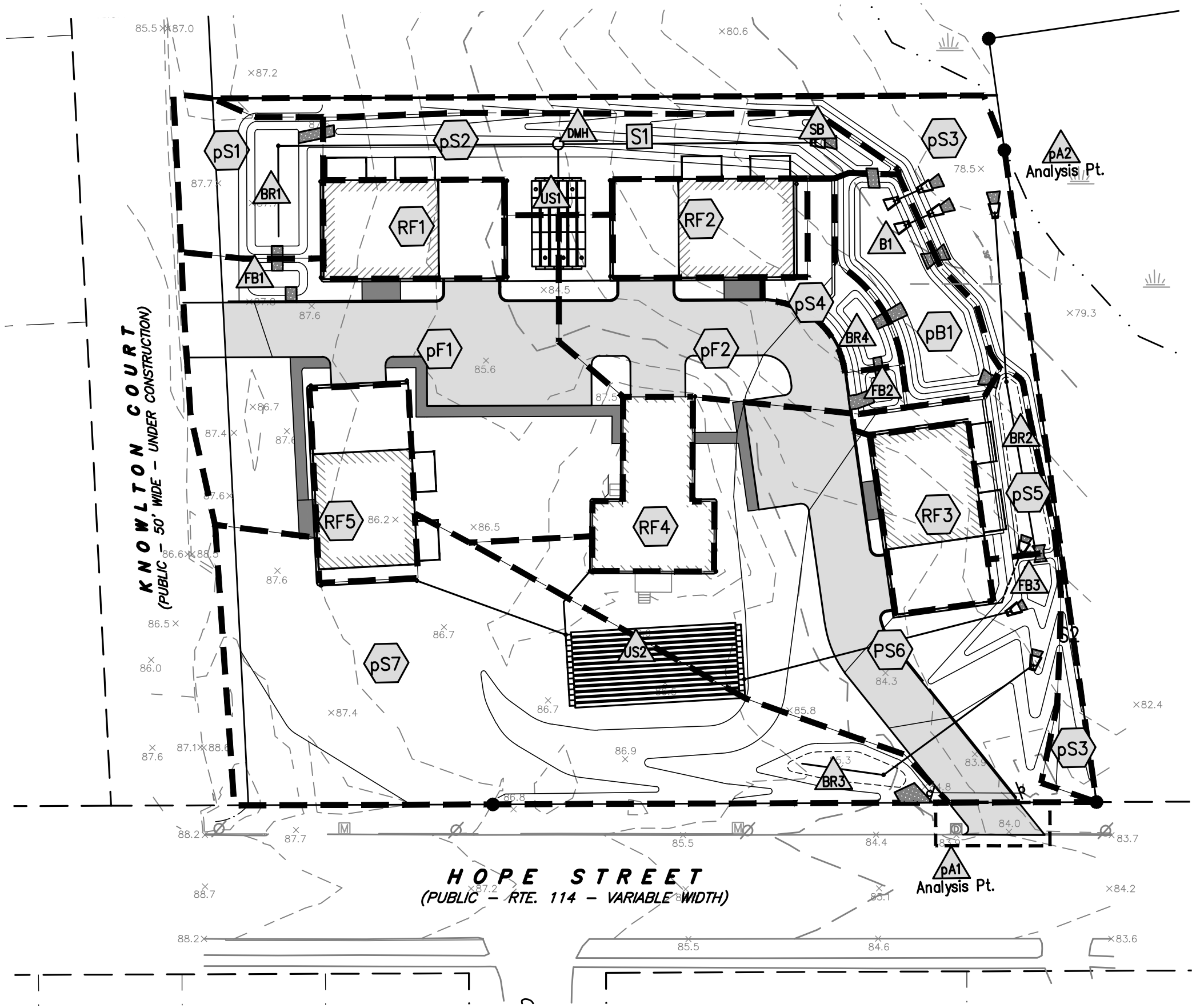
**1200 & 1202 HOPE STREET**
**ASSESSOR'S MAP 103 , LOT 2 & 14**
**BRISTOL, RHODE ISLAND**


207 HIGH POINT AVE.
UNIT 6
Portsmouth, RI 02871
T: 401-354-2050
F: 401-369-9775
WWW.SDE-LDEC.COM

LDEC
Land Development Engineering & Consulting, LLC


40 0 20 40 80

SCALE: 1 INCH = 40 FEET




## WATERSHED LEGEND

- 1 — SUBCATCHMENT AREA
- 1 — POND / STRUCTURE
- 1 — REACH / CHANNEL
- A → B — START → END — Tc–FLOWPATH POST–DEVELOPMENT
- POSTE–DEVELOPMENT SUBCATCHMENT BOUNDARY

40 0 20 40 80

SCALE: 1 INCH = 40 FEET

| DATE: | REV. DATE: |
|---|---|
| JUNE 15, 2022 | |

| PROJ.#: | SCALE : | DRAWN BY: | CHECK BY: |
|---|---|---|---|
| 22024 | 1" = 40' | SJE | MER |

ISSUED FOR : PERMITTING

PREPARED FOR: EXPRESS REALTY TRUST, LLC

# POST DEVELOPMENT WATERSHED PLAN

1200 & 1202 HOPE STREET
ASSESSOR'S MAP 103 , LOT 2 & 14
BRISTOL, RHODE ISLAND

207 HIGH POINT AVE.
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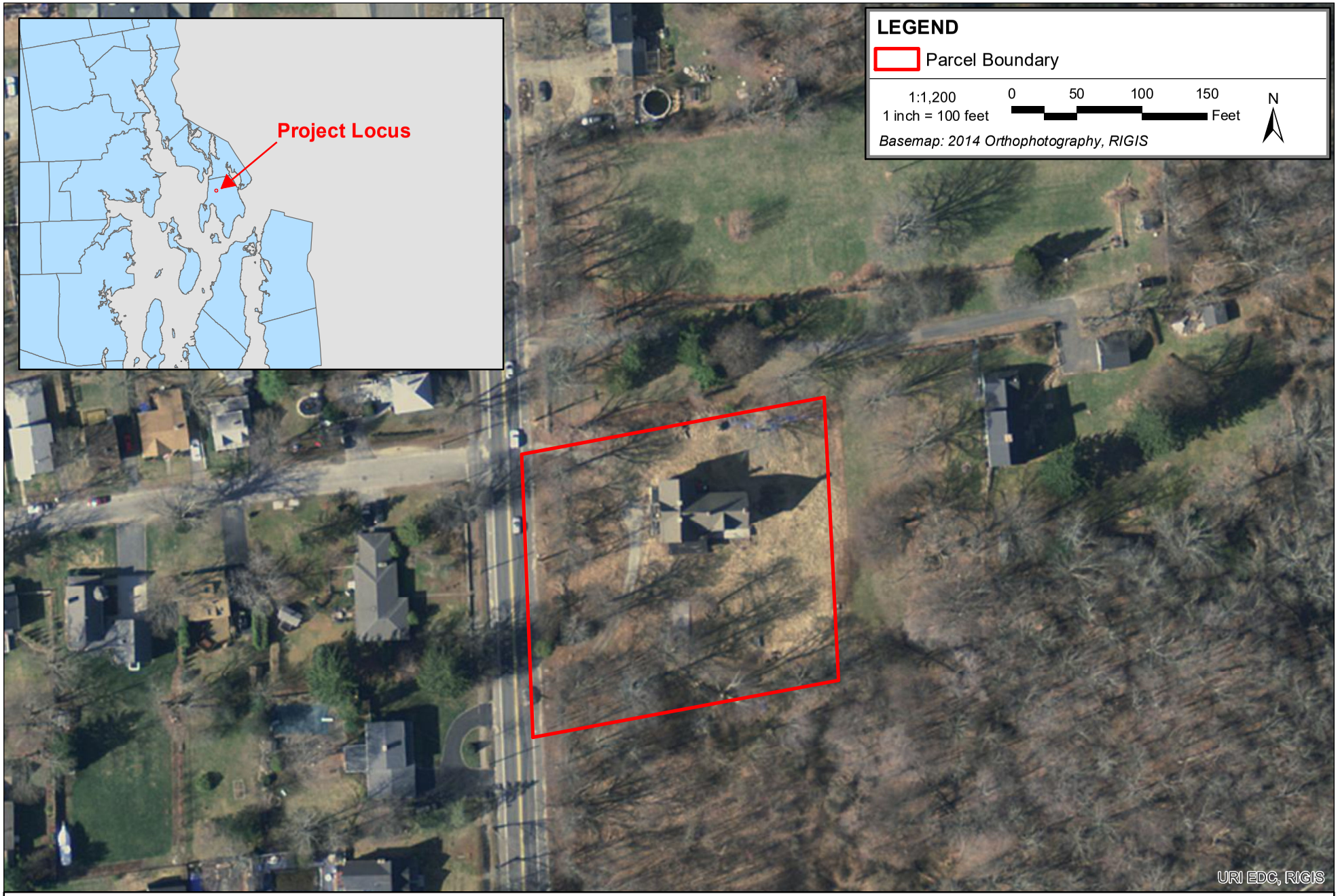
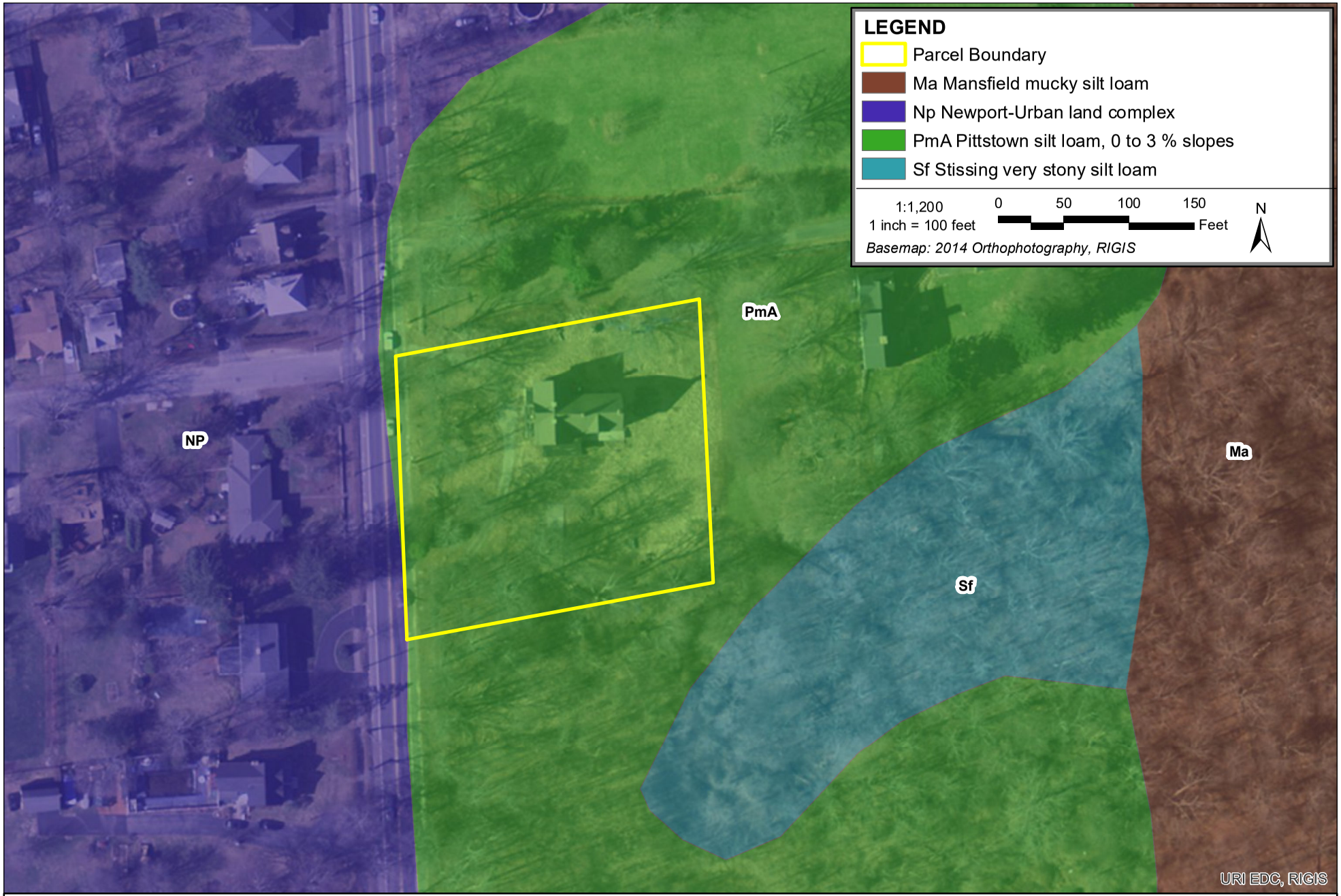
LDEC
Land Development Engineering & Consulting, LLC




**1200 Hope Street - Bristol, Rhode Island**
**Map 103 Parcel 2**
**LDEC Project No. 18050**

**Figure 2 - Site Locus**
**February 19, 2019**

LDEC
Land Development Engineering & Consulting, LLC




**1200 Hope Street - Bristol, Rhode Island**
**Map 103 Parcel 2**
**LDEC Project No. 18050**

**Figure 3 - SSURGO Soils**
**February 19, 2019**

LDEC
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