



TOWN OF BRISTOL, RHODE ISLAND

TECHNICAL REVIEW COMMITTEE

**Technical Review Committee Agenda
Tuesday, March 28, 2023 at 10:00 AM
Town Hall - 10 Court Street, Bristol Rhode Island**

A. Pledge of Allegiance

B. New Business

B1. Preliminary Review and Administrative Subdivision

Review - Proposal for a preliminary review of a modified layout to the development at 1200 Hope Street (aka Longfield) and an administrative subdivision to move the lot line between the properties of 1200 Hope Street and 1202 Hope Street (aka Knowlton Court). Modified layout of 1200 Hope Street to revise the driveway and building layout from the approved plan for the re-development of 1200 Hope Street and the approved subdivision for 1202 Hope Street including modifications to the conditions of approval for 1202 Hope Street per Section 8.9 of the Subdivision and Development Review Regulations. Property located at 1200 Hope Street and 1202 Hope Street. Assessor's Plat 103, Parcels 2 and 14. Owners: M11200 Hope Street LLC and 1202 Hope Street Investments, LLC. Zoned: R-10 and 1200 Hope Street is an individually listed property in the Bristol Historic District.

C. Adjourned

Date: March 21, 2023

By: mbw



Town of Bristol, Rhode Island

Department of Community Development

10 Court Street
Bristol, RI 02809
www.bristolri.gov
401-253-7000

TECHNICAL REVIEW COMMITTEE MEETING May 24, 2022

The meeting was held on Tuesday, **May 24, 2022** at 10:00 am
at 9 Court Street, 2nd Floor Conference Room, Department of Community Development
The Technical Review Committee held a meeting for the purpose of review of the application for
1200 & 1202 Hope Street
Concept Plan Review and Administrative Subdivision Review

Present:

Diane M. Williamson, Administrative Officer
Edward M. Tanner, Zoning Officer/Principal Planner
Charles Burke, Zoning Board Duty Member
Charles Millard, Planning Board Duty Member
Jonathan Ames, Historic District Commission Clerk
Sally Butler, Historic District Commissioner

Also Present:

Mike Russell, LOEC
Kyle Ritchie, Express Realty Trust, LLC
Bart Bussinle, Lender

Agenda: Review Concept Plan Review and Administrative Subdivision Review of application to move the lot line between properties of 1200 Hope Street (aka Longfield) and 1202 Hope Street (aka Knowlton Court). Review concept review to change the driveway and building layout from the approved plan for the redevelopment of 1200 Hope Street and the approved subdivision for 1202 Hope Street (Assessor's Plat 103, Parcels 2 and 14) per Section 8.9 of the Subdivision and Development Review Regulations. Owners: Express Realty Trust, LLC and 1202 Hope Street Investments, LLC. Parcels are Zoned Residential R-10; and 1200 Hope Street is an individually listed property in the Bristol Historic District.

This proposal involves two separate projects. Joe Garies is developing the Knowlton Court property at 1202 Hope Street. Mr. Garies has given written permission to proceed but did not attend the meeting.

The following items were discussed:

- Review history of the two developments and their respective permitting.

- Kyle Ritchie, who is the developer for 1200 Hope Street, is proposing a subdivision to obtain some land from 1202 Hope Street to increase the size of the 1200 Hope Street lot. Proposed changes to the layout include the driveway and circulation within the property. This would increase of greater than 25% so this is considered a major change to the approved development and it will need to go back to the planning board.
- The proposed subdivision and the revised development plan will need to be reviewed together.
- Applicants reviewed the proposal for revisions to 1200 Hope Street development plans. They include enlarging the site, which will have less density than previously proposed.
- This proposal will also need to go back to DEM for review as there is a wetlands permit, and also to DOT for review for the revised curb cuts and scenic roadway review. The applicants are looking to get the town to ok the proposed changes before moving to state reviews.
- The applicant would like to remove the previously proposed four unit building at 1200 Hope Street and instead construct four two-family buildings. Thus, the number of dwelling units proposed would not change.
- The TRC reviewed zoning board issues. Proposal is moving in the direction of less non-conformance. The permit expiration date is June 6, 2022 but they may have “started” enough work to not need an extension. The applicant will submit in writing and explain work to date. If the work is not started then they will request a further extension of the previous zoning approval.
- The TRC reviewed the planning board process. The applicants will be approaching DEM and the DOT first, but they will combine the process into one project.
- Reviewed parking layout options & location of parking on site relating to building locations
- Discussed road layout concerns including the traffic impact.
- Discussed the trees at the Hope Street intersection.
- The driveway will be a one-way from south to north with the exit being at Knowlton Court.
- TRC and HDC representatives review historical aspects of proposal. It is an important goal to keep the existing Longfield building as the primary focus of the 1200 Hope Street site. HDC will need to review the new proposed layout. This is a substantial change so it will need to go back before the HDC for review.
- The drainage design for both developments will need to be worked out and looked at in detail. A partnership between the two developments may need easements to allow some drainage features to be located on the other lot, but the developers will try not to merge flows. All changes in drainage design will need to be reviewed by DEM.

- The TRC reviewed proposed parking layout and locations of parking on the site relative to revised building locations.
- Discussed the next steps: Preliminary Plan application for major land development plan with the Planning Board; and an Administrative Subdivision application. Present concept plan to HDC for approval. The design of all the buildings needs to go back in front of the HDC for approvals.
- The TRC discussed zoning approvals and the process for obtaining building permits. As the number of dwelling units would remain the same as previously approved, the density would decrease with the additional land area, and the residential structures would move further away from property lines and each other, it was determined that no additional zoning relief would be required.
- Required affordable housing requirements are being addressed now, as applicant has purchased a multi-family residential dwelling in Bristol, and they are in the process of deed restricting three dwelling units for affordable housing.

Meeting adjourned at 11:00am.

Notes by Ed Tanner



Department of Transportation
Division of Highway and Bridge Maintenance
360 Lincoln Avenue
Warwick, RI 02888

11/15/2022

M1 1200 Hope Street, LLC
133 Tower Hill Road – Suite 1
Wakefield, RI 02879

Subject: Revised - Physical Alteration Permit Application No. **190510**
Location: 1200 Hope Street -Bristol

Dear Applicant:

In reference to the subject Physical Alteration Permit Application (PAPA) Number **190510**, for the proposed work in Bristol, the revised application package received on 9/16/2022, has been reviewed and found to meet our design requirements. The Physical Alteration Permit authorizing construction of the work within or impacting the State Highway Right-of-Way will be issued upon receipt and acceptance of the following:

- Original Insurance Certificate (Section 4.8 Insurance Requirements of the Department's Rules and Regulations for PAPA)
- Original bond in the amount of **\$28,500.00** for the proposed work within or impacting the State Highway Right-of-Way (Section 4.7 Bond Requirements of the Department's Rules and Regulations for PAPA)
- Proof of hired services of an independent testing and inspection firm approved by the Department as required under Section 4.9 of the PAPA regulations since the estimate exceeds \$25,000.

Please note that if all these documents are not received within one (1) year of the date of this letter, the permit application will expire and no longer be valid, requiring re-submission of the application. Please be advised that pursuant to Section 4.6 Part A of the Department's Rules and Regulations regarding Physical Alteration Permits, the collection of a new application fee with a re-submittal is required.

If you have any questions, please contact Arlene Nelson at (401) 734-4842.

THIS LETTER SHALL NOT BE CONSTRUED AS A PHYSICAL ALTERATION PERMIT AUTHORIZING CONSTRUCTION WITHIN OR IMPACTING THE STATE HIGHWAY RIGHT-OF-WAY. A PERMIT WILL NOT BE GRANTED UNTIL ALL OF THE DOCUMENTATION REQUESTED ABOVE HAS BEEN RECEIVED AND ACCEPTED.

Sincerely,

Matthew Ouellette, P.E.
Acting State Highway Maintenance Operations Engineer

Attachments: Rules and Regulations for PAPA - Section 4.8 Insurance Requirements
cc: Michael Russell, P.E.- LDEC (w/o attachments), file

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



A handwritten signature in cursive script, appearing to read "Michael E. Russell", written over the bottom of the professional seal.



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TABLE OF CONTENTS

	<u>Pages</u>
INTRODUCTION	3
EXISTING CONDITIONS	3
PROPOSED CONDITIONS	3
SITE SOIL & GROUNDWATER CONDITIONS	4
METHODOLOGY	4
DRAINAGE SYSTEM MODEL	4-5
STORMWATER TREATMENT	5
ANALYSIS DATA	5

APPENDICES

- Appendix 1 - Pre-Development Analysis Output
- Post-Development Analysis Output
- Appendix 2 - Stormwater Quality Calculations
- Soil Logs
- Appendix 3 - Stormwater Management Checklist
- Mounding Analysis

FIGURES

Pre-Development Watershed Plan &
Post-Development Watershed Plan

- Figure 2 - Site Locus Plan
- Figure 3 - Soil Survey Map



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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.



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.

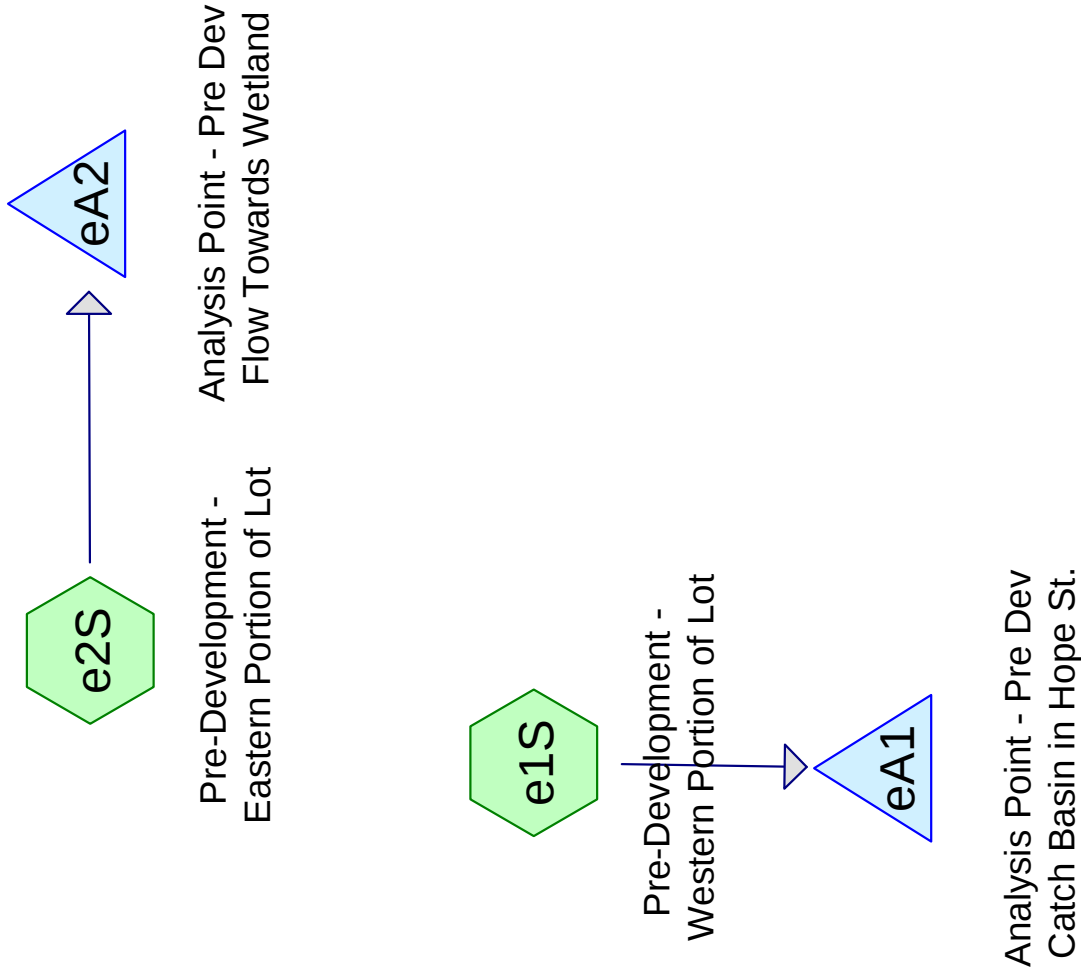
RUNOFF SUMMARY AT ANALYSIS POINTS		
Cover Description		
Cover Type	Hydrologic condition	Curve Number (Class: C)
Landscaping, Lawns	Good	74
Woods	Good	70
Gravel	Good	89
Brush	Good	65
Buildings	-	98
Pavement	-	98
Brick Walkways	-	98

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

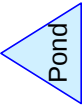


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 Subcat

 Reach

 Pond

 Link

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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

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 3

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

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 4

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

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"

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 5

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

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

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Type III 24-hr 2-yr Rainfall=3.30"

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Page 6

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

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Type III 24-hr 2-yr Rainfall=3.30"

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Page 7

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

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"

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Type III 24-hr 2-yr Rainfall=3.30"

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Page 8

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

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

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Type III 24-hr 10-yr Rainfall=4.90"

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Page 9

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

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Type III 24-hr 10-yr Rainfall=4.90"

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Page 10

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

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"

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Type III 24-hr 10-yr Rainfall=4.90"

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Page 11

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

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Type III 24-hr 25-yr Rainfall=6.10"

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Page 12

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

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Type III 24-hr 25-yr Rainfall=6.10"

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Page 13

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

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"

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Type III 24-hr 25-yr Rainfall=6.10"

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Page 14

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

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

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Type III 24-hr 100-yr Rainfall=8.60"

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Page 15

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

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Type III 24-hr 100-yr Rainfall=8.60"

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Page 16

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

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"

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Type III 24-hr 100-yr Rainfall=8.60"

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Page 17

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

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

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Type III 24-hr WQv Rainfall=1.20"

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Page 18

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

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Type III 24-hr WQv Rainfall=1.20"

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Page 19

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

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"

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Type III 24-hr WQv Rainfall=1.20"

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Page 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

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

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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

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 3

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

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 4

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

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Page 5

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

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Page 6

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				Storage Description		
#1	Invert	Avail.Storage	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 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	Primary	80.45'	8.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900
#3	Primary	80.25'	n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf 4.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

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Page 7

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)
#3	83.75'	7 cf	2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids
		L= 35.0'	6.0" Round Pipe Storage Inside #2
		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

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Page 8

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														
			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
			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														
			Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' 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=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)

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Page 9

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=0.52 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)

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Page 10

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)
#3	83.65'	6 cf	686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids
		6.0" Round Pipe Storage Inside #2	
		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

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Page 11

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=0.02 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)

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Page 12

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'

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Page 13

Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	8.0" Round Culvert L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900 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 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

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Page 14

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
			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=0.20 cfs @ 12.12 hrs HW=83.87' (Free Discharge)

1-Broad-Crested Rectangular Weir (Weir Controls 0.20 cfs @ 0.69 fps)

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Page 15

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)

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 16

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

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Page 17

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 Grass: Bermuda n= 0.410 P2= 3.30"
0.5	82	0.0180	2.72		Shallow Concentrated Flow, BC 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"

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 18

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
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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					

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 20

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			

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 21

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 Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)

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

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 22

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"

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 23

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

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 24

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
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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
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5.0

Direct Entry, Roof Runoff

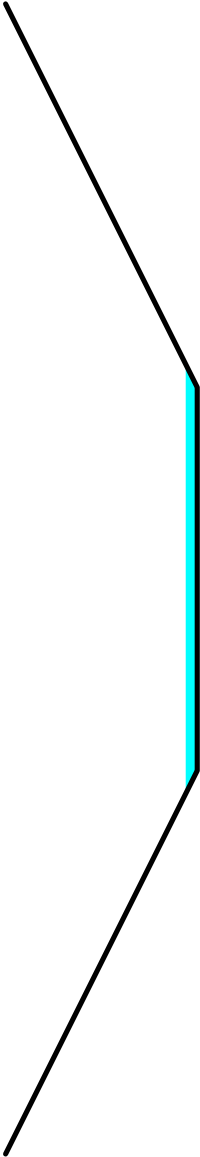
Summary for Reach S1: Post - Dry Swale 1

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)	Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
-3.00	1.00	0.00	0.00	0.0	2.0	0	0.00
-1.00	0.00	1.00	1.00	4.0	6.5	600	17.43
1.00	0.00	1.00	1.00				
3.00	1.00	0.00					

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Page 26

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)

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Type III 24-hr 1-yr Rainfall=2.80"

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Page 27

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 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 Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf 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 Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900 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)

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Page 28

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 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 Inlet / Outlet Invert = 83.15' / 82.10' S = 0.0105 '/' Cc = 0.900 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)

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Type III 24-hr 2-yr Rainfall=3.30"

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Page 29

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

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Page 30

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

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Page 31

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

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Page 32

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 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	Primary	80.45'	8.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900
#3	Primary	80.25'	n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf 4.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

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Page 33

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)
#3	83.75'	7 cf	2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids
		L= 35.0'	6.0" Round Pipe Storage Inside #2
		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

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Page 34

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 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 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 Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900 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)

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Page 35

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)

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Page 36

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)
#3	83.65'	6 cf	686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids
		6.0" Round Pipe Storage Inside #2	
		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

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Page 37

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=0.16 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)

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Page 38

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'

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Printed 12/9/2022

Page 39

Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	8.0" Round Culvert L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900 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 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

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Page 40

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									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80
			Coef. (English)	2.54	2.61	2.61	2.60	2.66	2.70	2.77	2.89	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)

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Page 41

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)

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Page 42

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

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Page 43

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
					Grass: Bermuda n= 0.410 P2= 3.30"
0.5	82	0.0180	2.72		Shallow Concentrated Flow, BC
					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"

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Type III 24-hr 2-yr Rainfall=3.30"

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Page 44

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
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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			

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Page 46

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 = 0.03 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 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			

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Page 47

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			

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

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Type III 24-hr 2-yr Rainfall=3.30"

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Page 48

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
					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 = 0.19 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"

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Type III 24-hr 2-yr Rainfall=3.30"

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Page 49

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

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Page 50

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
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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
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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
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5.0

Direct Entry, Roof Runoff

Summary for Reach S1: Post - Dry Swale 1

Inflow Area =
20,593 sf, 28.07% Impervious,

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

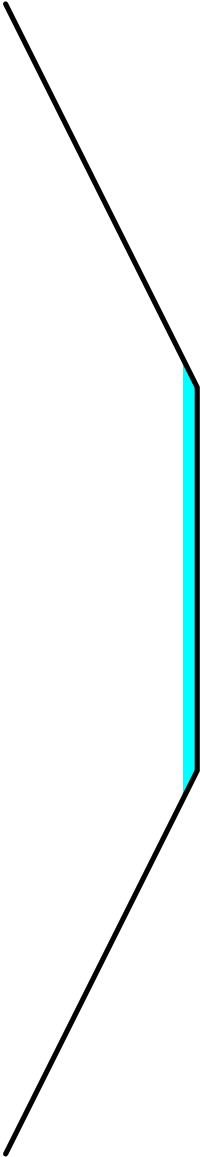
Average Depth at Peak Storage= 0.07'

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)	Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
-3.00	1.00	0.00	0.00	0.0	2.0	0	0.00
-1.00	0.00	1.00	1.00	4.0	6.5	600	17.43
1.00	0.00	1.00					
3.00	1.00	0.00					

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Page 52

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)

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Type III 24-hr 2-yr Rainfall=3.30"

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Page 53

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 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 Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf 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 Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900 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)

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Page 54

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 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 Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900 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)

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Page 55

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

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Page 56

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

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Page 57

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

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Page 58

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				Storage Description		
#1	Invert	Avail.Storage	Inc.Store	Custom Stage Data (Prismatic) Listed below (Recalc)		
	80.00'		4,432 cf			
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 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	Primary	80.45'	8.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900
#3	Primary	80.25'	n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf 4.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

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Page 59

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)
#3	83.75'	7 cf	2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids
		L= 35.0'	6.0" Round Pipe Storage Inside #2
		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

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Page 60

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															
			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	
			Coef. (English)	2.48	2.60	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															
			Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900															
			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)

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Page 61

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=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)

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Printed 12/9/2022

Page 62

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)
#3	83.65'	6 cf	686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids
		6.0" Round Pipe Storage Inside #2	
		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

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Page 63

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=0.52 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)

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Page 64

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'

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Page 65

Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	8.0" Round Culvert L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900 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 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

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Page 66

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
			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=0.40 cfs @ 12.12 hrs HW=83.92' (Free Discharge)

←**1=Broad-Crested Rectangular Weir** (Weir Controls 0.40 cfs @ 0.87 fps)

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Page 67

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)

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Page 68

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

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Page 69

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 Grass: Bermuda n= 0.410 P2= 3.30"
0.5	82	0.0180	2.72		Shallow Concentrated Flow, BC 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"

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Type III 24-hr 10-yr Rainfall=4.90"

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Page 70

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
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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

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Type III 24-hr 10-yr Rainfall=4.90"

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Page 71

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

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Page 72

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			

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Page 73

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 Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)

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

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Page 74

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"

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Page 75

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

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Page 76

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
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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
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2,102	98	Roofs, HSG C
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2,102	98	100.00% Impervious Area
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
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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
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
-------------	------------------	------------------	----------------------	-------------------	-------------

5.0

Direct Entry, Roof Runoff

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Page 77

Summary for Reach S1: Post - Dry Swale 1

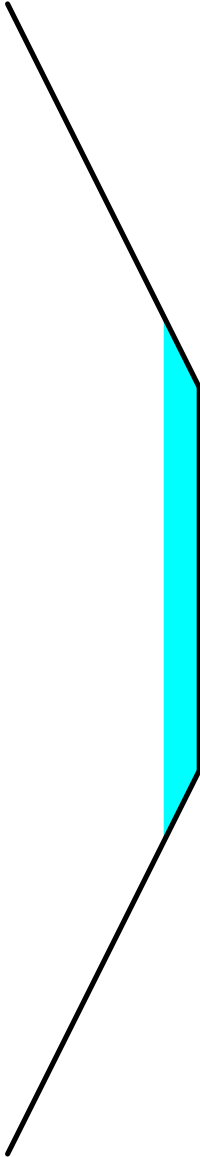
Inflow Area = 20,593 sf, 28.07% Impervious, Inflow Depth = 1.53" for 10-yr event
Inflow = 0.78 cfs @ 12.29 hrs, Volume= 2,622 cf
Outflow = 0.77 cfs @ 12.34 hrs, Volume= 2,622 cf, Atten= 1%, Lag= 2.7 min

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)	Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
-3.00	1.00	0.00	0.00	0.0	2.0	0	0.00
-1.00	0.00	1.00	1.00	4.0	6.5	600	17.43
1.00	0.00	1.00	1.00				
3.00	1.00	0.00					

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Page 78

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)

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Page 79

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 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 Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf 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 Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900 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)

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Page 80

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 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 Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900 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)

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Page 81

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

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Page 82

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

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Page 83

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

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Page 84

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 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	Primary	80.45'	8.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900
#3	Primary	80.25'	n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf 4.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

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Page 85

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)
#3	83.75'	7 cf	2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids
		L= 35.0'	6.0" Round Pipe Storage Inside #2
		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

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Page 86

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 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 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 Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900 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)
1-1=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)

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Page 87

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)

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Printed 12/9/2022

Page 88

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)
#3	83.65'	6 cf	686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids
		6.0" Round Pipe Storage Inside #2	
		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

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Page 89

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)

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Page 90

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'

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Page 91

Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	8.0" Round Culvert L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900 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 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

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Page 92

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
			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=0.52 cfs @ 12.12 hrs HW=83.94' (Free Discharge)
1-Broad-Crested Rectangular Weir (Weir Controls 0.52 cfs @ 0.94 fps)

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Page 93

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
			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=1.61 cfs @ 12.09 hrs HW=82.35' (Free Discharge)
1-Broad-Crested Rectangular Weir (Weir Controls 1.61 cfs @ 1.53 fps)

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Page 94

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

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Page 95

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
					Grass: Bermuda n= 0.410 P2= 3.30"
0.5	82	0.0180	2.72		Shallow Concentrated Flow, BC
					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"

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Type III 24-hr 25-yr Rainfall=6.10"

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Page 96

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
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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

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Page 97

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	Length	Slope	Velocity	Capacity
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)
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

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Page 98

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			

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Page 99

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 Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)

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

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Page 100

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"

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Page 101

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

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Page 102

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

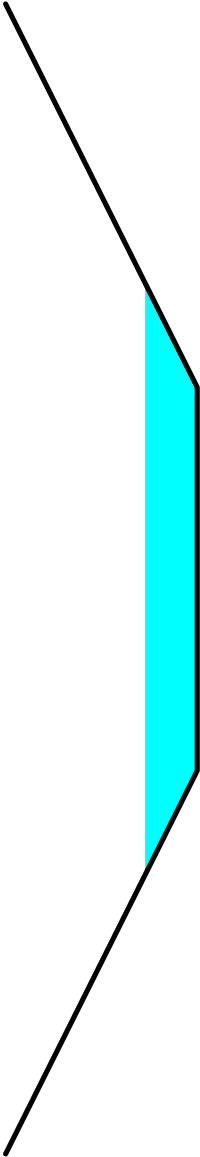
Summary for Reach S1: Post - Dry Swale 1

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)	Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
-3.00	1.00	0.00	0.00	0.0	2.0	0	0.00
-1.00	0.00	1.00	1.00	4.0	6.5	600	17.43
1.00	0.00	1.00	1.00				
3.00	1.00	0.00					

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Page 104

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)

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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 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 Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf 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 Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900 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)

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Page 106

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 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 Inlet / Outlet Invert= 83.15' / 82.10' S= 0.0105 '/' Cc= 0.900 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)

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Page 107

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

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Page 108

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

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Page 109

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

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Page 110

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 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	Primary	80.45'	8.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900
#3	Primary	80.25'	n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf 4.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

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Page 111

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)
#3	83.75'	7 cf	2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids
		L= 35.0'	6.0" Round Pipe Storage Inside #2
		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

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Page 112

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 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 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 Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' Cc= 0.900 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)
1-1-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)

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Page 113

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)

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Page 114

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)
#3	83.65'	6 cf	686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids
		6.0" Round Pipe Storage Inside #2	
		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

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Page 115

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)

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Page 116

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'

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Page 117

Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	8.0" Round Culvert L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900 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 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

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Page 118

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
			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=0.77 cfs @ 12.12 hrs HW=83.98' (Free Discharge)

1-Broad-Crested Rectangular Weir (Weir Controls 0.77 cfs @ 1.08 fps)

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Page 119

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)

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Page 120

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

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Page 121

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 Grass: Bermuda n= 0.410 P2= 3.30"
0.5	82	0.0180	2.72		Shallow Concentrated Flow, BC 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"

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Type III 24-hr 100-yr Rainfall=8.60"

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Page 122

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

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				

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Page 123

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	Length	Slope	Velocity	Capacity
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)
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

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Page 124

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			

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Page 125

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 Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)

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

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Page 126

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"

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Page 127

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

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Page 128

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

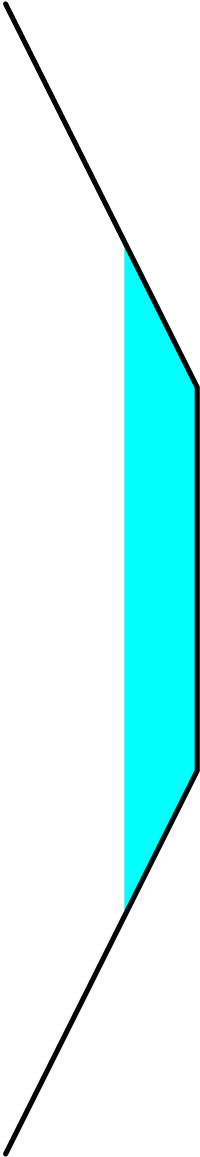
Summary for Reach S1: Post - Dry Swale 1

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)	Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
-3.00	1.00	0.00	0.00	0.0	2.0	0	0.00
-1.00	0.00	1.00	1.00	4.0	6.5	600	17.43
1.00	0.00	1.00	1.00				
3.00	1.00	0.00					

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Page 130

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)

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Page 131

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 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 Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf 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 Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900 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)

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Page 132

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 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 Inlet / Outlet Invert = 83.15' / 82.10' S = 0.0105 '/' Cc = 0.900 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)

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Page 133

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

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Page 134

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

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Page 135

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

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Page 136

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 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	Primary	80.45'	8.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.45' / 79.50' S= 0.0792 '/' Cc= 0.900
#3	Primary	80.25'	n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf 4.0" Round Culvert L= 12.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 80.25' / 79.50' S= 0.0625 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

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Page 137

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)
#3	83.75'	7 cf	2,110 cf Overall - 7 cf Embedded = 2,103 cf x 33.0% Voids
		L= 35.0'	6.0" Round Pipe Storage Inside #2
		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

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Page 138

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 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 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 Inlet / Outlet Invert= 83.75' / 82.85' S= 0.0090 '/' 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=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)

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Page 139

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)

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Page 140

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)
#3	83.65'	6 cf	686 cf Overall - 6 cf Embedded = 680 cf x 33.0% Voids
		6.0" Round Pipe Storage Inside #2	
		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

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Page 141

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)

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Page 142

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'

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Page 143

Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	8.0" Round Culvert L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 82.80' / 82.00' S= 0.0087 '/' Cc= 0.900 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 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

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Page 144

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
			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=0.07 cfs @ 12.12 hrs HW=83.84' (Free Discharge)

←**1-Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.48 fps)

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Page 145

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)

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Page 146

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

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Page 147

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 Grass: Bermuda n= 0.410 P2= 3.30"
0.5	82	0.0180	2.72		Shallow Concentrated Flow, BC 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"

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Type III 24-hr WQv Rainfall=1.20"

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Page 148

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
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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			

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Page 150

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 = 0.00 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 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			

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Page 151

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 Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)

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

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Page 152

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"

22024 Hope Street HydroCAD 6-13-22

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Type III 24-hr WQv Rainfall=1.20"

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Page 153

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

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Type III 24-hr WQv Rainfall=1.20"

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Page 154

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	

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Type III 24-hr WQv Rainfall=1.20"

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Page 156

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
			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=81.00' (Free Discharge)
1-Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Type III 24-hr WQv Rainfall=1.20"

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Page 157

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 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 Effective Size= 27.5"W x 14.0"H => 2.34 sf x 6.25'L = 14.6 cf 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 Inlet / Outlet Invert= 84.85' / 84.60' S= 0.0208 '/' Cc= 0.900 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)

22024 Hope Street HydroCAD 6-13-22

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Type III 24-hr WQv Rainfall=1.20"

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Page 158

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 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 Inlet / Outlet Invert = 83.15' / 82.10' S = 0.0105 '/' Cc = 0.900 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
Prepared by: SJE

Date: 6/20/2022 , Revised: 12/9/2022
Checked by: MER

PRE-DEVELOPMENT

Analysis Points (Subcatchment/Pond)	Storm Event									
	1-yr		2-yr		10-yr		25-yr		100-yr	
	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
eA2	1.08	5,293	1.53	7,233	3.15	14,295	4.47	20,129	7.34	33,076
Totals	1.28	5,975	1.78	8,177	3.73	16,190	5.30	22,807	8.70	37,484

POST-DEVELOPMENT

Analysis Points (Subcatchment/Pond)	Storm Event									
	1-yr		2-yr		10-yr		25-yr		100-yr	
	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
pA2	0.39	6,541	0.76	8,631	2.02	15,811	2.96	21,513	6.49	33,700
Totals	0.41	6,667	0.92	9,132	2.54	17,775	3.69	24,727	7.69	39,686

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
 Prepared by: SJE

Date: 6/20/2022 , Revised: 12/9/2022
 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 = $1" \times F \times Ai / 12$, (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
 Prepared by: SJE

Date: 6/20/2022 , Revised: 12/9/2022
 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
<u>System Water Quality Volume</u> <u>(volumes below lowest outlet device)</u>	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	1,315
(BR1) Bio-Retention Basin-1 =			75% = 331		
(FB3) Forebay-3 =	9,147 sf	762.0	25% = 191	192	Required = 805 Provided = 805
(BR2) Bio-Retention Basin-2 =			75% = 572		
	4' 2,794 sf	233.0	100% = 233		
(BR3) Bio-Retention Basin-3 =	4' 122 sf	10.0	100% = 10		503
(US1) Underground System-1 =	15' 5,112 sf	426.0	100% = 426		WQv storm contained & infiltrated (426 cf)
(FB2) Forebay-2 =	2,997 sf	250.0	25% = 63	76	255
(BR4) Bio-Retention Basin-4 =			75% = 187		
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 '15'
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 BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E 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 BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E 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 STREETDate of Test Hole: 10 DECEMBER, 2018Soil Evaluator: N. LETENDRELicense Number: D4019Weather: SUNNY 36°F 0-5 mphShaded: Yes ☐ No ☐ Time: 10:30

TH 1 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox		Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S. Contr.				
A	6	g	s	10YR 3/3				FSL	1fgr	fr	4
Bw ₁	12	g	s	10YR 3/6				SL	1fsbk	fr	3
Bw ₂	20	c	w	10YR 4/4				SL	1fsbk	fr	3
C	30	c	w	2.5Y 9/2	@ 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		Soil Colors		Re-Dox		Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S. Contr.				
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: _____

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

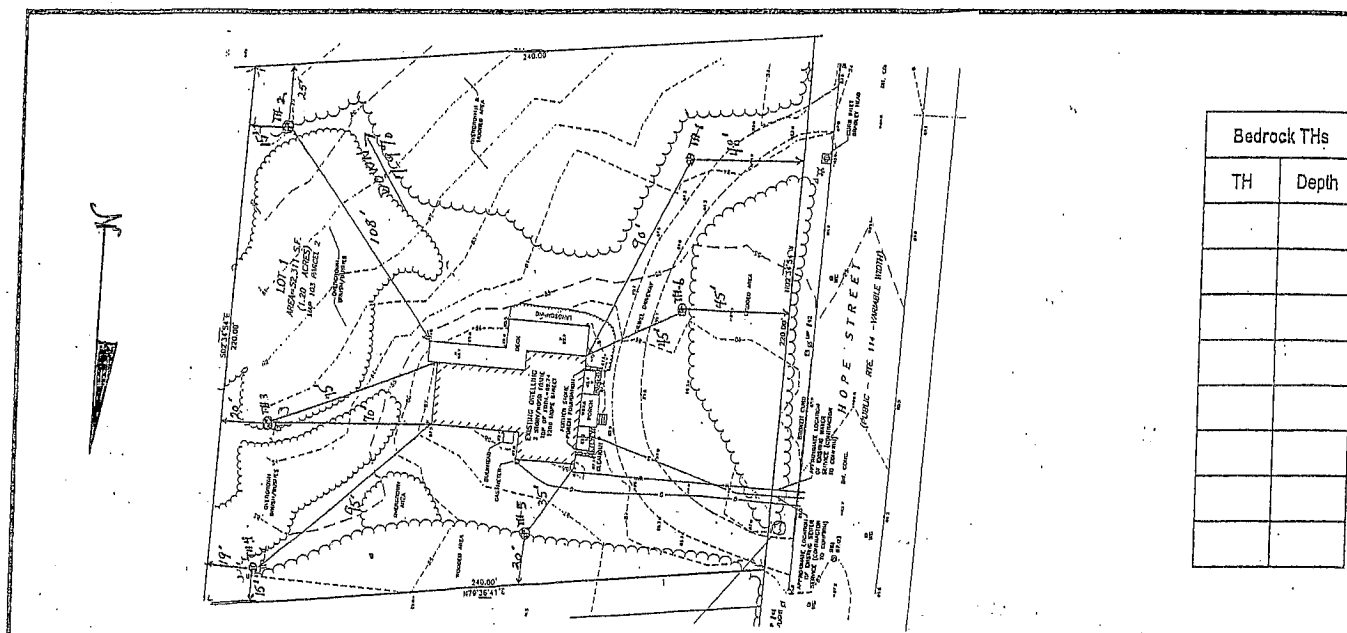
Key:

 Approximate location of test holes

 Approximate location of bedrock test holes

 Estimated gradient and direction of slope

 Approximate direction of due north



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: _____

Signature

License #

Part B prepared by: _____

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



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 STREETDate of Test Hole: 10 DECEMBER, 2018Soil Evaluator: N. LETENDRELicense Number: D4019Weather: SUNNY 36°F 0-5 mphShaded: Yes ☐ No ☐ Time: 10:30

TH <u>3</u> 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
Bw ₁	17	g	w	10YR 4/2				SL	1fsbk	fr	3
Bw ₂	22	C	S	10YR 4/4				SL	1fsbk	fr	3
C	26	e	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 <u>4</u> Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox		Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S. Contr.				
Ap	10	e	w	10YR 3/3				FSL	1fgr	1fr	4
Bw ₁	16	g	w	10YR 4/6				SL	1fsbk	fr	3
Bw ₂	21	g	w	10YR 5/4				SL	1fsbk	fr	3
C	36	C	i	2.5Y 6/4	@24 10YR 5/6	e	1 d	FSL	omm	fr	7
2C	57			5Y 4/2	10YR 5/6	C	1 d	vgSL	omm	fip fih	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: _____

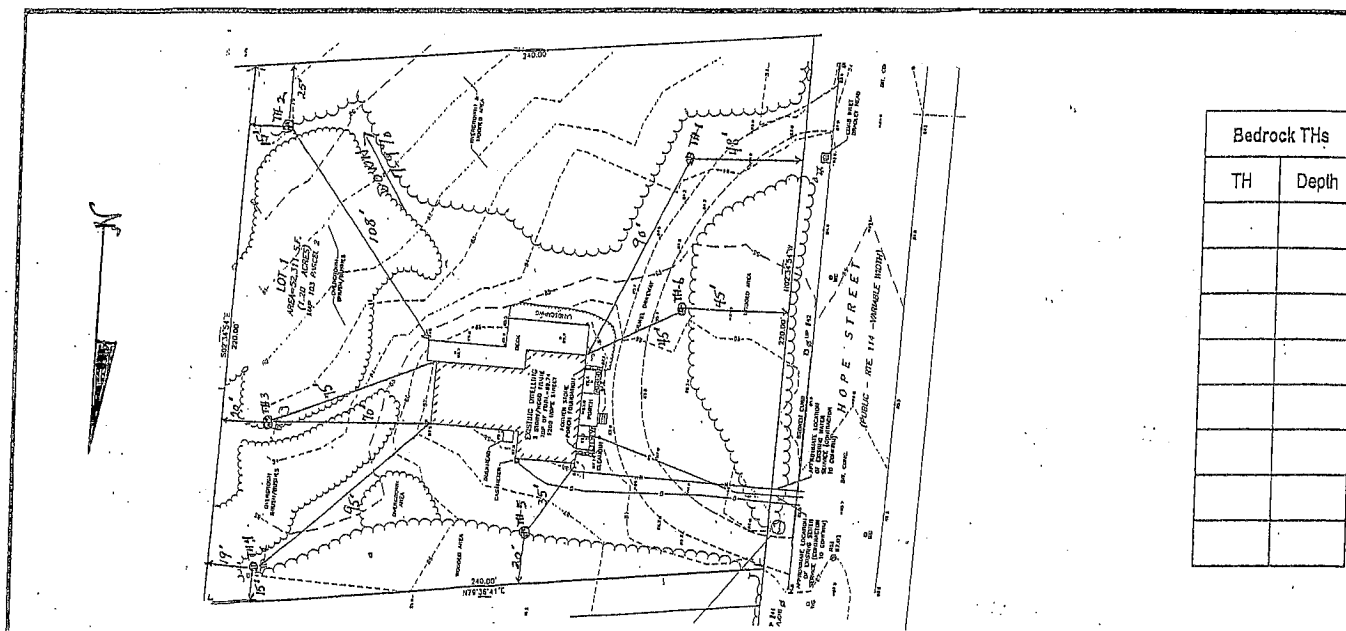
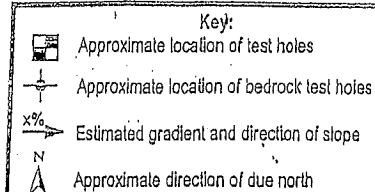
Part B

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



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: [Signature]

Signature

License #

Part B prepared by: [Signature]

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



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 STREETDate of Test Hole: 10 DECEMBER, 2018Soil Evaluator: N. LETENDRELicense Number: D4019Weather: SUNNY 32°F 0-5mphShaded: Yes ☐ No ☐ Time: 10:30

TH <u>5</u> Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox		Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S. Contr.				
<u>FILL</u>	<u>-30 to 0</u>										
<u>C</u>	<u>12</u>	<u>C</u>	<u>b</u>	<u>2.5Y 6/4</u>	<u>@ 0 10YR 5/8</u>	<u>C</u>	<u>1 d</u>	<u>FSL</u>	<u>omm</u>	<u>fr</u>	<u>7</u>
<u>C</u>	<u>18</u>			<u>5Y 4/2</u>	<u>10YR 5/6</u>	<u>C</u>	<u>1 d</u>	<u>vgSL</u>	<u>omm</u>	<u>fr</u>	<u>6</u>
TH <u>6</u> Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox		Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S. Contr.				
<u>Ap</u>	<u>12</u>	<u>C</u>	<u>S</u>	<u>10YR 3/3</u>				<u>FSL</u>	<u>1 fgr</u>	<u>Vsr</u>	<u>4</u>
<u>Bw₁</u>	<u>20</u>	<u>g</u>	<u>i</u>	<u>10YR 4/6</u>				<u>vcbSL</u>	<u>1 fskb</u>	<u>fr</u>	<u>3</u>
<u>Bw₂</u>	<u>29</u>	<u>g</u>	<u>S</u>	<u>10YR 5/4</u>				<u>cbSL</u>	<u>1 fskb</u>	<u>fr</u>	<u>3</u>
<u>C</u>	<u>38</u>	<u>C</u>	<u>S</u>	<u>2.5Y 6/3</u>	<u>@ 32 10YR 5/6</u>	<u>f</u>	<u>1 d</u>	<u>SL</u>	<u>omm</u>	<u>fr</u>	<u>6</u>
<u>Cd</u>	<u>56</u>			<u>2.5Y 4/1</u>	<u>10YR 5/6</u>	<u>C</u>	<u>1 d</u>	<u>gSL</u>	<u>omm</u>	<u>fi</u>	<u>8</u>

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: _____

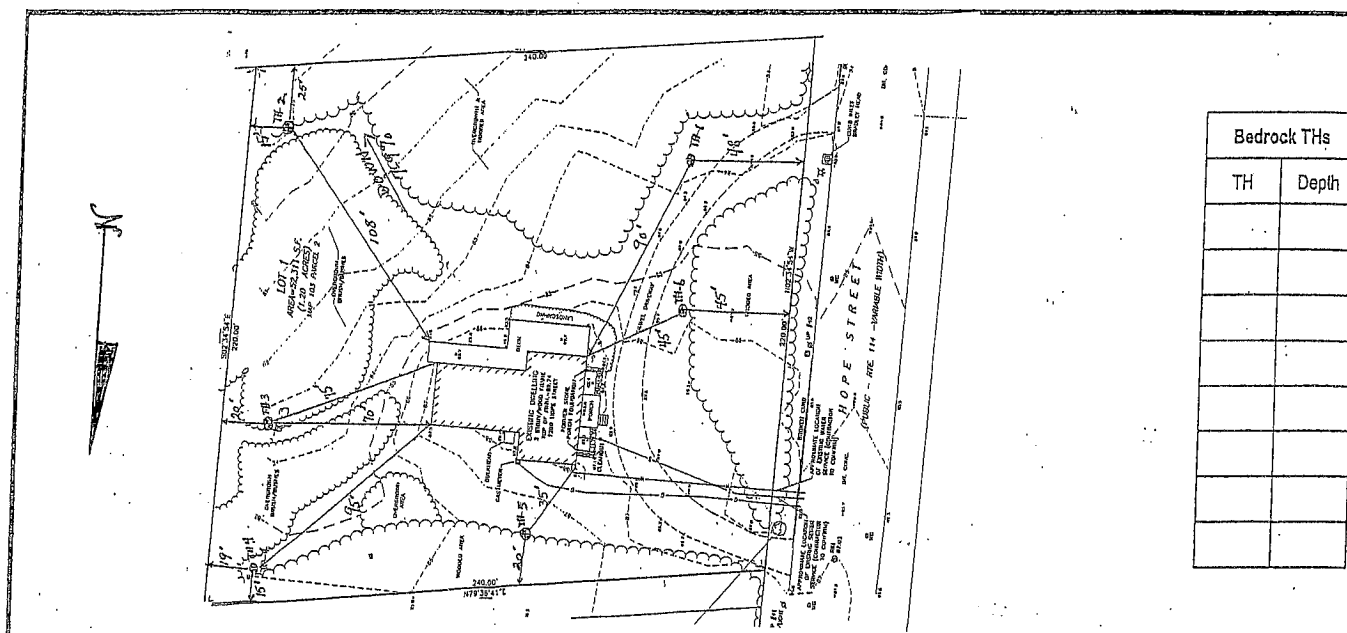
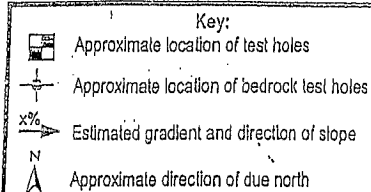
Part B

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



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: _____

Signature

License #

Part B prepared by: _____

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

APPENDIX A: STORMWATER MANAGEMENT PLAN CHECKLIST AND LID PLANNING REPORT – STORMWATER DESIGN SUMMARY

PROJECT NAME Longfield Estates		(RIDEM USE ONLY)
TOWN Bristol		STW/WQC File #:
BRIEF PROJECT DESCRIPTION: Construction of 4 residential structures with associated improvements and renovations of an existing dwelling.		Date Received:

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 WQv 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:	☐ 4 th 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 OLRSM 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		

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

☐	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: 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 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

- ☒ Sensitive resource areas and site constraints are identified (required)
- ☒ Local development regulations have been reviewed (required)
- ☒ All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction
- ☐ 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
- ☒ As much natural vegetation and pre-development hydrology as possible has been maintained

**IF NOT
IMPLEMENTED,
EXPLAIN HERE**

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS ☐ Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies ☐ Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B) ☐ Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) ☐ Development sites and building envelopes have been positioned outside of floodplains ☒ Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features ☒ Development sites and building envelopes have been located to minimize impacts to steep slopes ($\geq 15\%$) ☐ Other (describe):	
C) MINIMIZE CLEARING AND GRADING ☒ Site clearing has been restricted to <u>minimum area needed</u> for building footprints, development activities, construction access, and safety. ☒ Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities) ☐ 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) ☐ Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent	
D) REDUCE IMPERVIOUS COVER ☐ Reduced roadway widths (≤ 22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000) ☐ 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) ☐ Reduced building footprint: Explain approach: ☐ Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) ☐ Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) ☐ Reduced parking lot area: Explain approach ☐ Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc. ☐ Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance) ☐ Other (describe):	
E) DISCONNECT IMPERVIOUS AREA ☐ Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible ☐ Residential street edges allow side-of-the-road drainage into vegetated open swales ☐ Parking lot landscaping breaks up impervious expanse AND accepts runoff ☐ Other (describe):	
F) MITIGATE RUNOFF AT THE POINT OF GENERATION ☒ Small-scale BMPs have been designated to treat runoff as close as possible to the source	

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION ☐ Low-maintenance landscaping has been proposed using native species and cultivars ☐ Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan ☐ Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots	
H) RESTORE STREAMS/WETLANDS ☐ Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands ☐ Removal of invasive species ☐ 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 OLRSM 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)	Recharge Required by Remaining BMPs (cu ft)	Recharge Provided by BMPs (cu ft)
			Portion of Re _v directed to a QPA (cu ft)		
DP-1:	23,850	497		497	764
DP-2:					
DP-3:					
DP-4:					
TOTALS:					
Notes: - Only BMPs listed in RISDISM Table 3-5 “List of BMPs Acceptable for Recharge” may be used to meet the recharge requirement. - 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					

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

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? 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. 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 WQv Required (cu ft)	LID Stormwater Credits (see RICR 8.18)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
			WQv directed to a QPA (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 ☐ NO		This project has met the setback requirements for each BMP. 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					

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

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). (<u>Note</u> : LID design strategies can greatly reduce the peak discharge rate).
☐	☐	Conveyance and natural channel protection for the site have been met. 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:					
<u>Note</u> : The Channel Protection Volume Standard must be met in each waterbody ID.					
☐ YES ☐ 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 ☐ NO	Do additional design restrictions apply resulting from any discharge to cold-water fisheries; 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.).					

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

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. ☐ TR-55 ☐ TR-20 ☐ HydroCAD ☐ Bentley/Haestad ☐ Intellisolve ☐ 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?	

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

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)		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		

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

Table 5-2 Summary of Best Management Practices

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)
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:									

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

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						Exfiltration Rate Applied (in/hr)
			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)	
			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:

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

			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?

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

☒	☐	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: <u>Note:</u> 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? (<u>Note:</u> 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? (<u>Note:</u> 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 <i>Guidance for Preparation of Drainage Area Maps</i> (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

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

		Name: N. Letendre
	☐	RI-registered P.E. 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:				

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

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: ▶ freshwater and coastal wetlands, including lakes and ponds ▶ coastal shoreline features 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: ▶ 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; ▶ Design water surface elevations (applicable storms); ▶ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.; ▶ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.); ▶ 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; ▶ 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 OLRSM approved remedial actions/systems (including ELURs)
☒	☐	Location of existing and proposed roads, buildings, and other structures including limits of disturbance; ▶ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements; ▶ 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.); ▶ Cross sections of roadways, with edge details such as curbs and sidewalks; ▶ 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, S_y	0.2
Initial saturated thickness, h_0 (ft)	10
Maximum allowable water-table rise, σ (ft)	2
Dip, i (ft/ft)	0.05
Slope rotation from x axis, γ (°)	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, ϕ (°)	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
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Time Series Data

Time (d)	Source 1	
	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_o	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 datum¹

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

S_y 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 datum¹

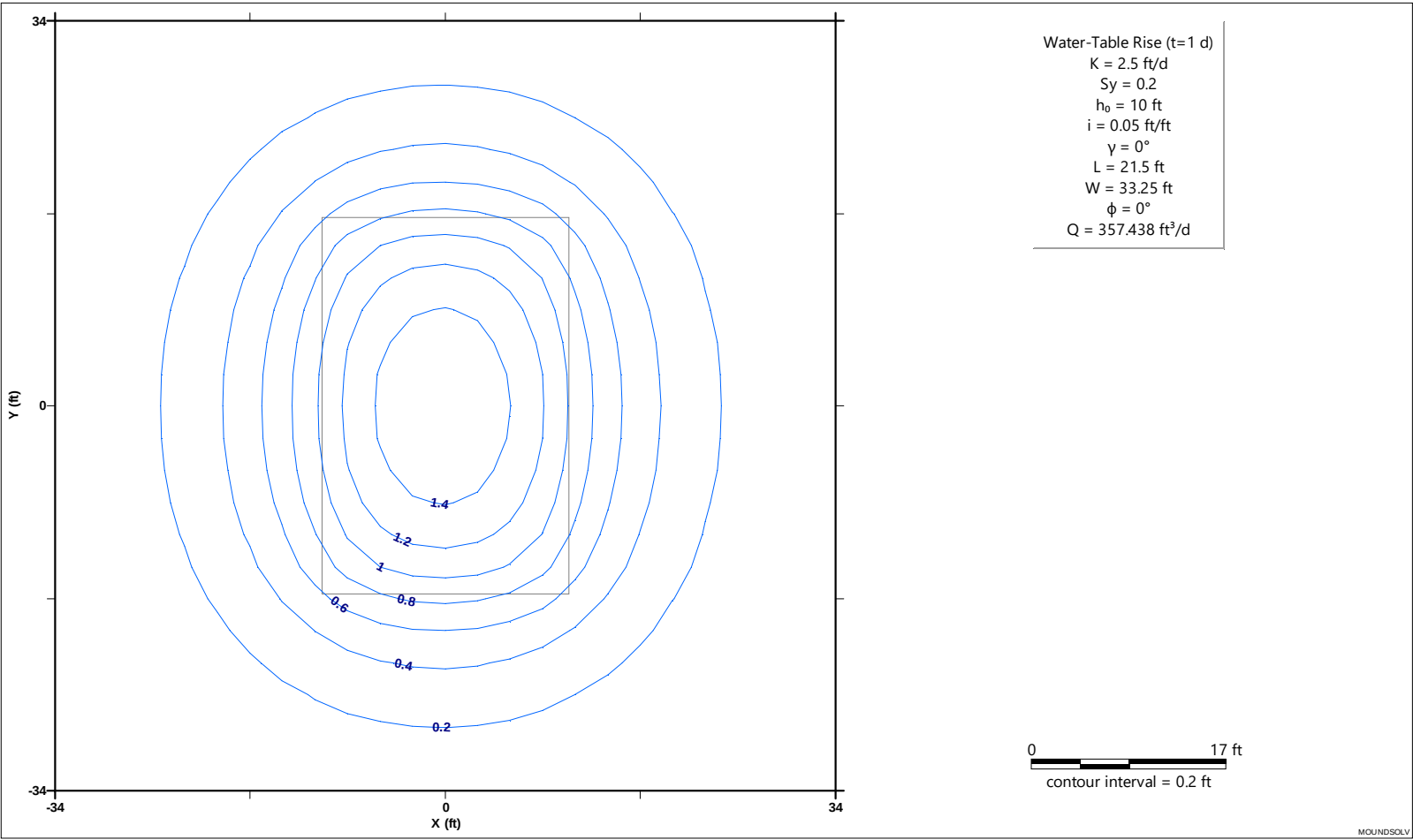
γ is angle between x axis and dip direction

ϕ is angle between dip direction and x^* axis of recharge source

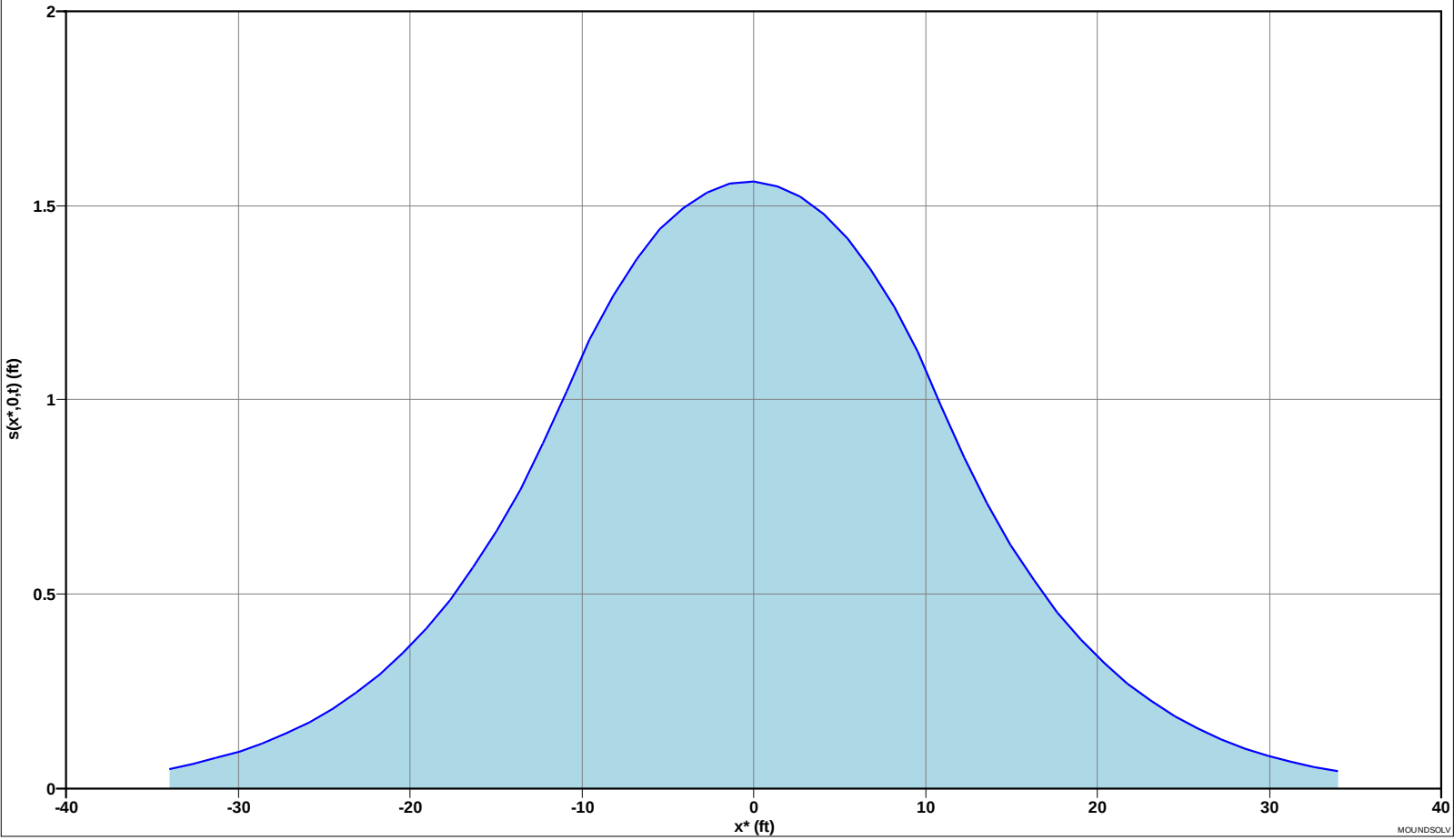
σ is maximum acceptable water-table rise

¹Elevation datum is the base of aquifer beneath the center of primary recharge source

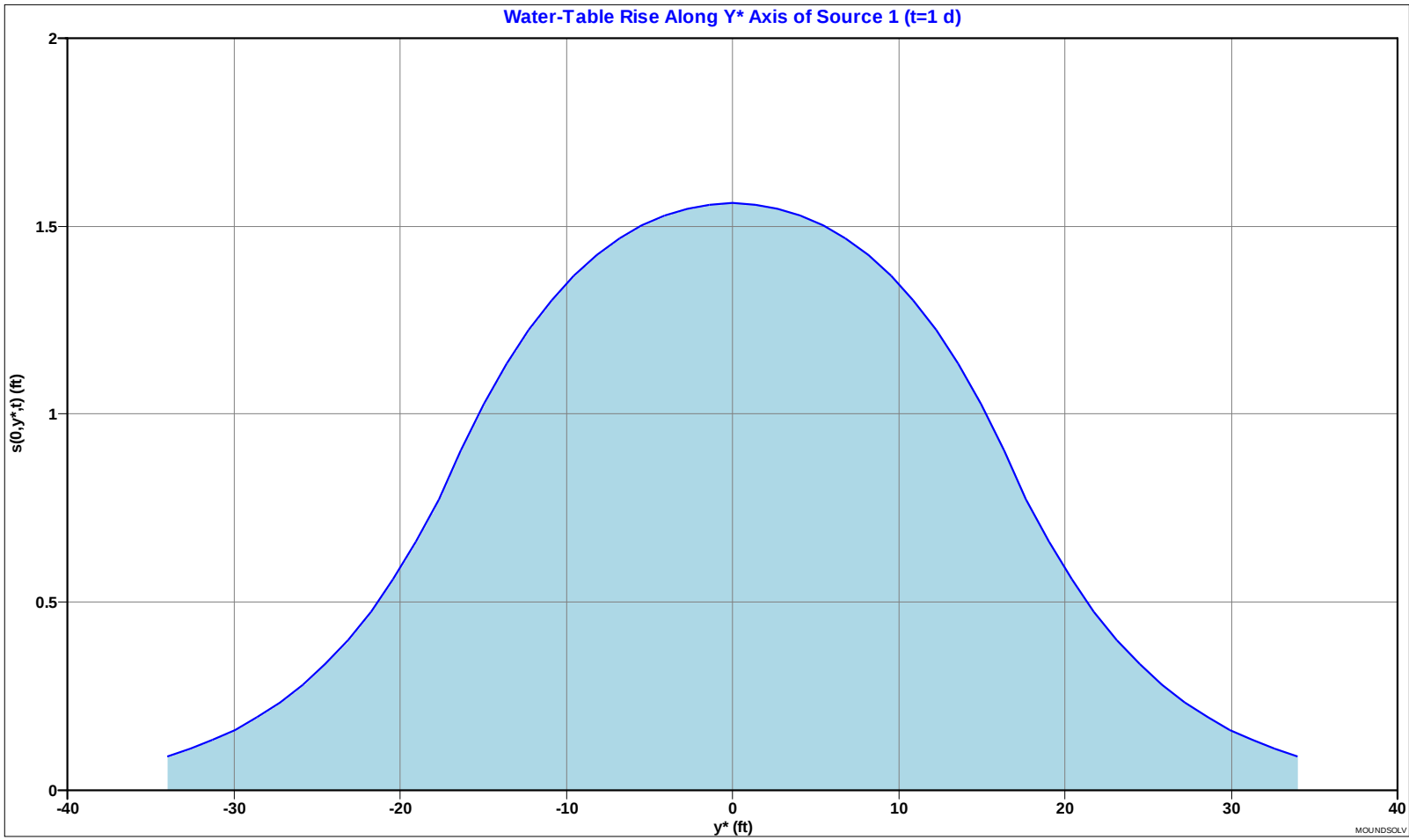
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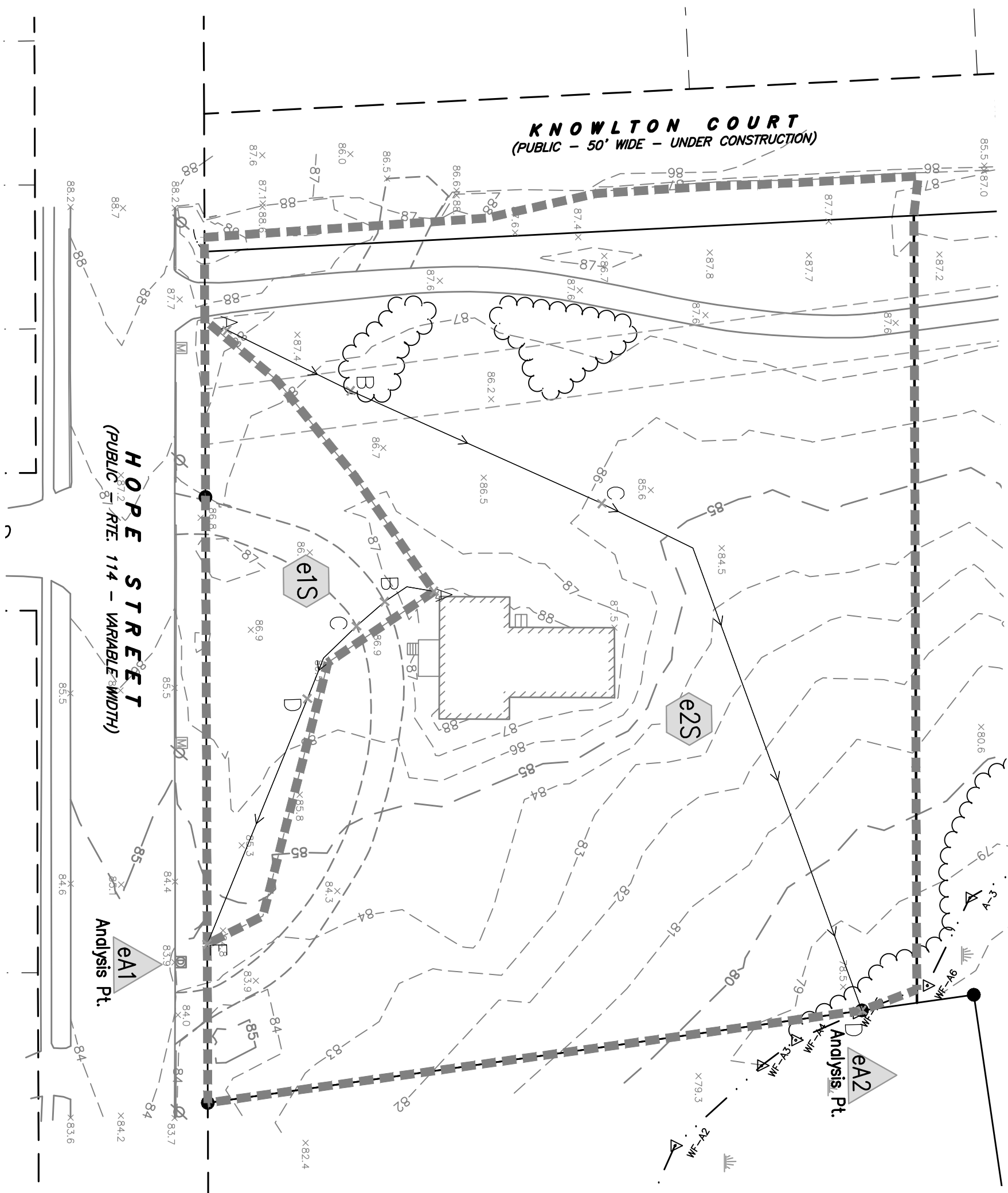


Water-Table Rise Along X* Axis of Source 1 (t=1 d)



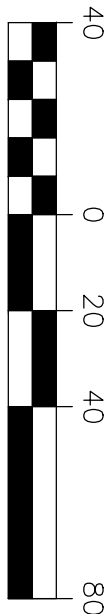
Water-Table Rise Along Y* Axis of Source 1 (t=1 d)





WATERSHED LEGEND

-
- Legend:
- SUBCATCHMENT AREA
 - POND / STRUCTURE
 - REACH / CHANNEL
 - PRE-DEVELOPMENT SUBCATCHMENT BOUNDARY



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**



DATE: JUNE 15, 2022

REV. DATE:

PROJ.#:	22024
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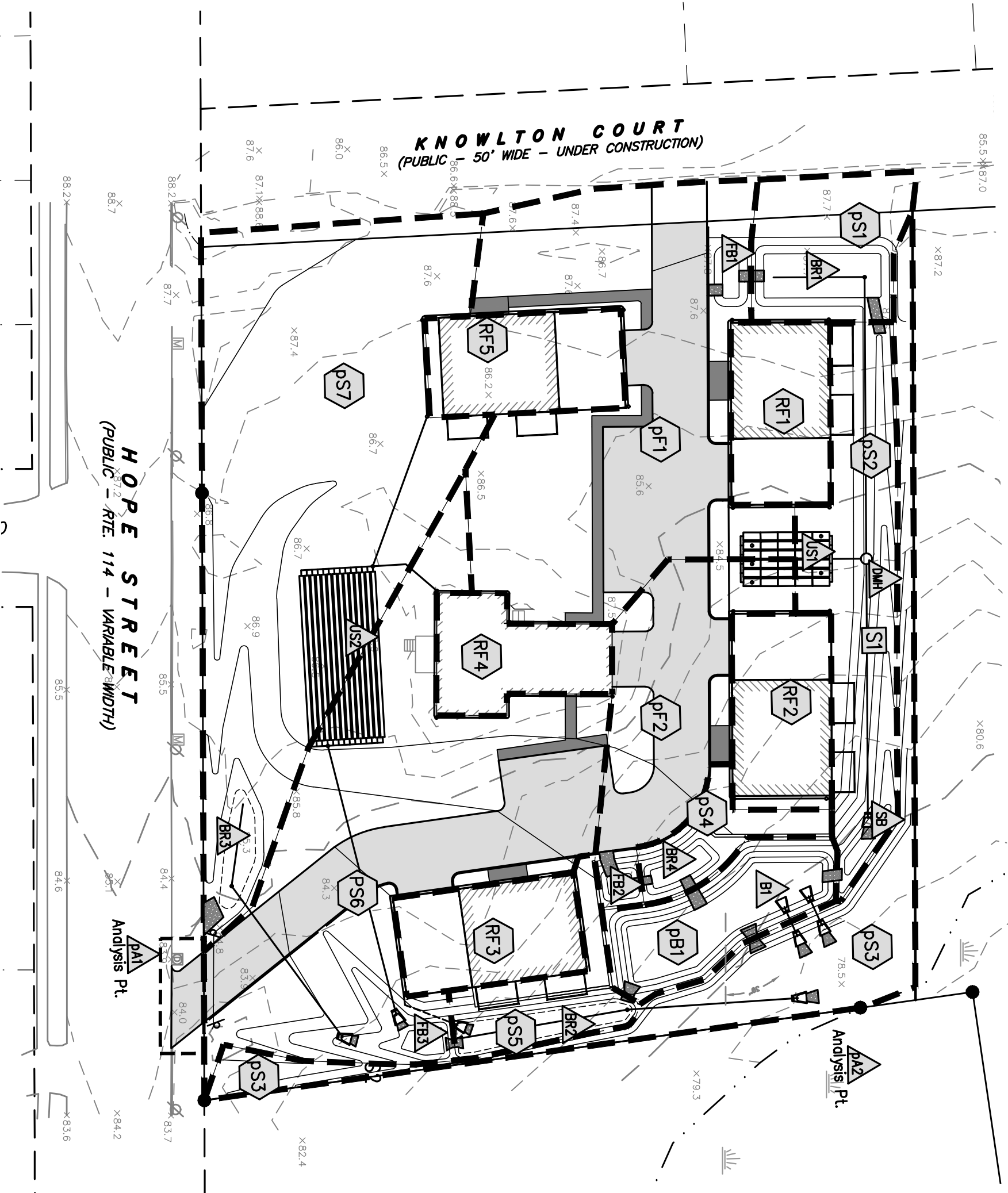
SCALE :
1" = 40'

DRAWN BY:
SJE

CHECK BY:
MER

ISSUED FOR : PERMITTING

PREPARED FOR: EXPRESS REALTY TRUST, LLC



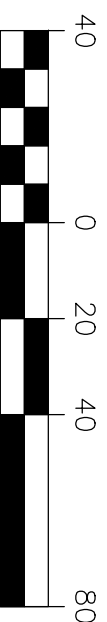
HOPE STREET
(PUBLIC - RTE. 114 - VARIABLE WIDTH)

KNOWLTON COURT
(PUBLIC - 50' WIDE - UNDER CONSTRUCTION)

Analysis Pt.
PA1

Analysis Pt.
PA2

- WATERSHED LEGEND**
- SUBCATCHMENT AREA
 - POND / STRUCTURE
 - REACH / CHANNEL
 - Tc-FLOWPATH
START END POST-DEVELOPMENT
 - POSTE-DEVELOPMENT
SUBCATCHMENT
BOUNDARY



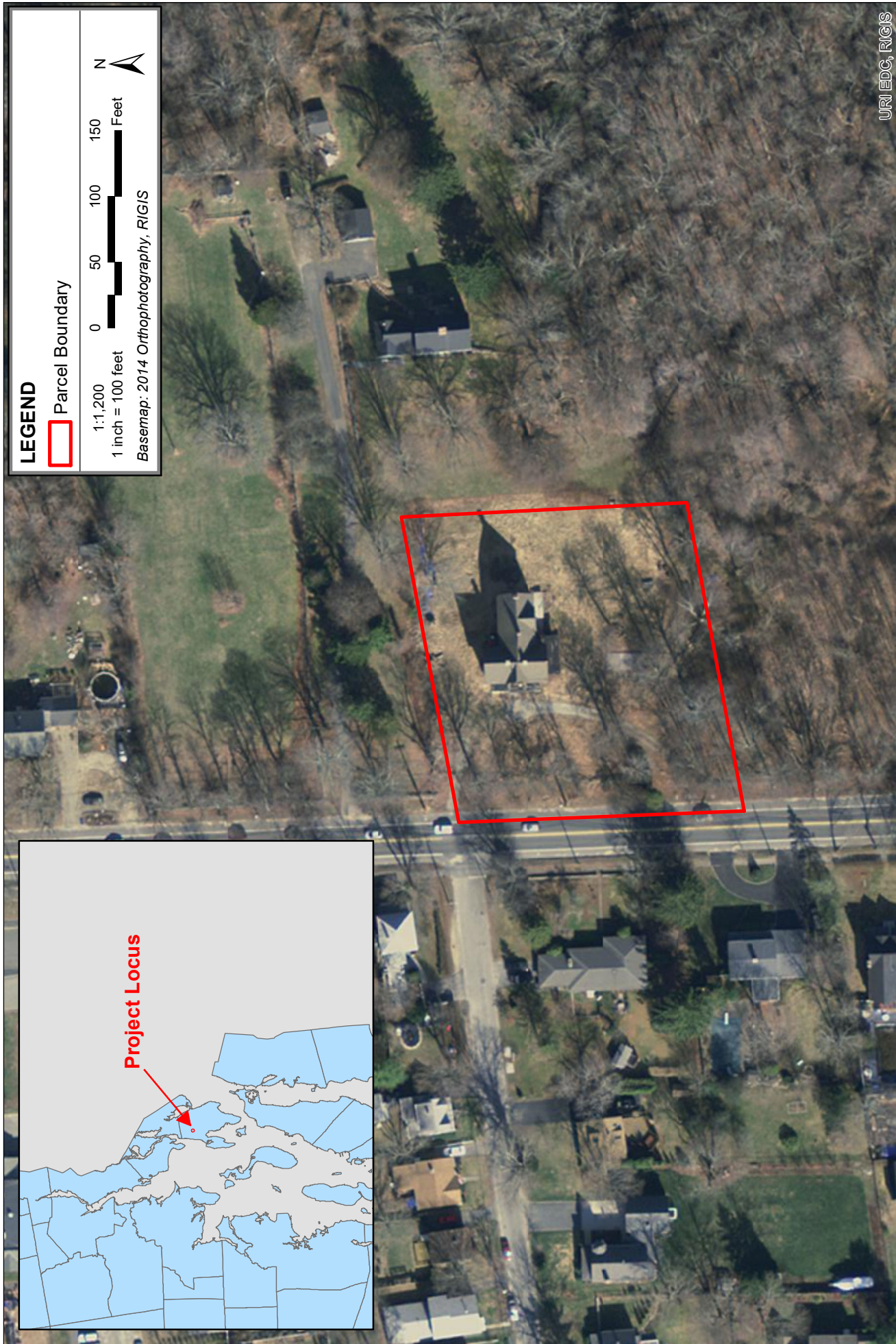
POST DEVELOPMENT WATERSHED PLAN

1200 & 1202 HOPE STREET
ASSESSOR'S MAP 103 , LOT 2 & 14
BRISTOL, RHODE ISLAND

DATE: JUNE 15, 2022			REV. DATE:
PROJ.#: 22024	SCALE : 1" = 40'	DRAWN BY: SJE	CHECK BY: MER
ISSUED FOR : PERMITTING			
PREPARED FOR: EXPRESS REALTY TRUST, LLC			



207 HIGH POINT AVE.
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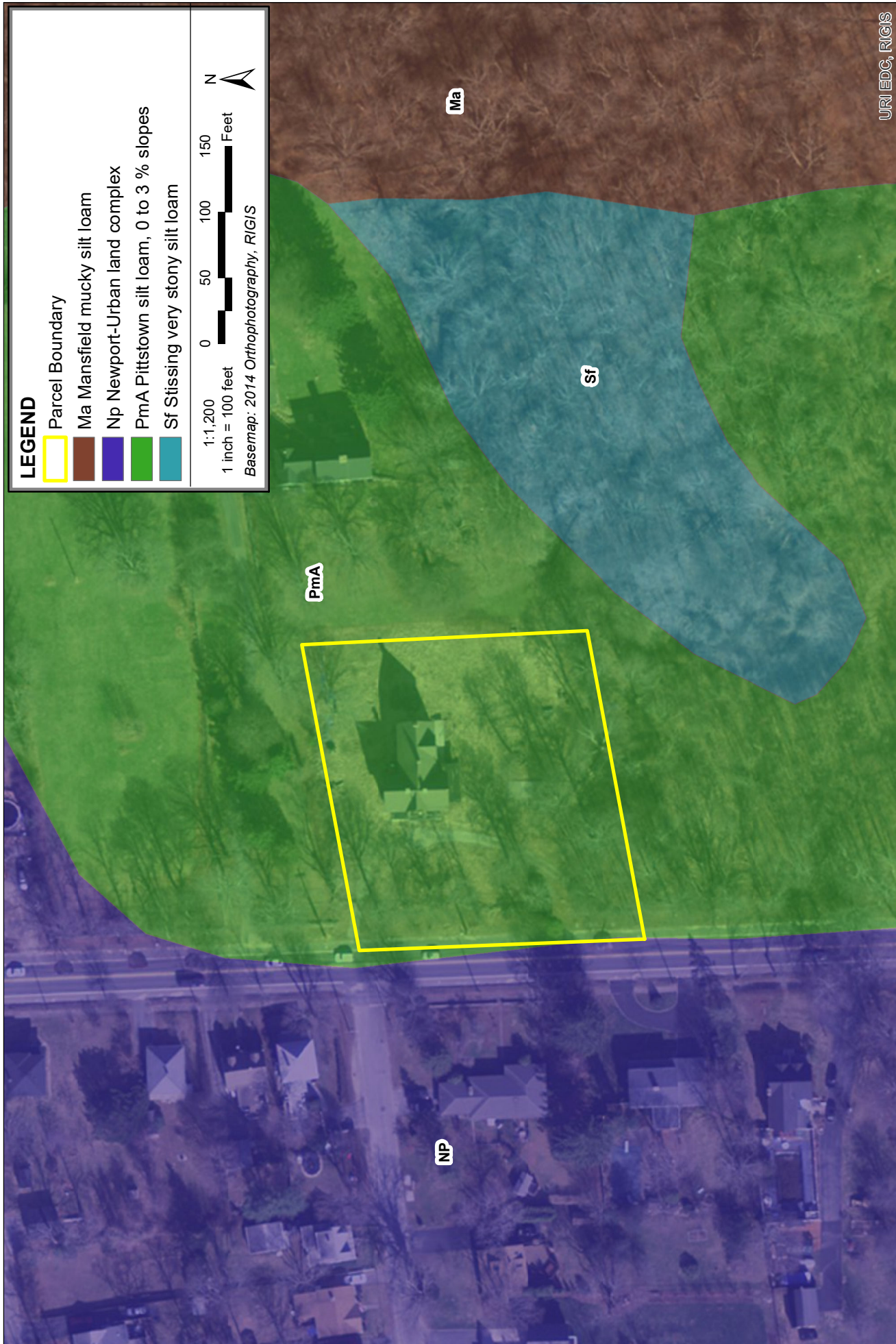
UN/EDC, R/GIS



Figure 2 - Site Locus
February 19, 2019

Land Development Engineering & Consulting, LLC

1200 Hope Street - Bristol, Rhode Island
Map 103 Parcel 2
LDEC Project No. 18050



1200 Hope Street - Bristol, Rhode Island
Map 103 Parcel 2
LDEC Project No. 18050

Figure 3 - SSURGO Soils
February 19, 2019



Land Development Engineering & Consulting, LLC



RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
 235 Promenade Street
 Providence, Rhode Island 02908

March 6, 2023

MI 1200 Hope St., LLC
 Kyle Richie, Member
 133 Tower Hill Road
 Wakefield, RI 02879

1202 Hope St. Investments, LLC
 Joseph Garies, Member
 P.O. Box 246
 Warren, RI 02885

REVISED PERMIT

Re: Wetland Application No. 19-0149, RIPDES File No. RIR101910 in reference to the location below:

Approximately 120 feet east of Hope Street, (Route 114), at 1200 Hope Street, by utility pole numbers 41 to 43, approximately 275 feet east southeast of the intersection of Hope Street and Gibson Road, Assessor's Plat 103, Lots (Parcels) 2 and 14, Bristol, RI.

Dear Messrs. Ritchie and Garies:

The Department of Environmental Management's ("DEM") Freshwater Wetlands Program ("Program") has completed its review of your Application for Permit Modification and has evaluated your proposed modifications to the previously permitted construction of three residential buildings and renovation of an existing residential dwelling with a new driveway and parking spaces, utilities, landscaping, and a stormwater management system as illustrated and detailed on revised site plans submitted with your application. The revised site plans were received by the DEM on December 19, 2022 (Note: Sheet 7 of 8 is NOT included with the approved plan set).

Based upon the Program's evaluation of the revised project and pursuant to 250-RICR-150-15-1.11(C) of the Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act, 250-RICR-150-15-1, it is the Program's determination that a revised permit for the modified project may be issued under the following terms and conditions:

1. This letter is the DEM's revised permit for this project under the R.I. Fresh Water Wetlands Act, R.I. Gen Laws. § 2-1-18 et seq.
2. This revised permit is specifically limited to the project, site alterations and limits of disturbance as detailed on the site plans submitted with your application and received by the DEM on December 19, 2022. A copy of the site plans stamped approved by the DEM is enclosed. Changes or revisions to the project that would alter freshwater wetlands are not authorized without a permit from the DEM.
3. Where the terms and conditions of the revised permit conflict with the approved site plans, these terms and conditions shall be deemed to supersede the site plans.
4. A copy of the stamped approved site plans and a copy of this revised permit must be kept at the site at all times during site preparation, construction, and final stabilization. Copies of this revised permit and the stamped approved plans must be made available for review by any DEM or town representative upon request.

5. **Within ten (10) days of the receipt of this revised permit, you must record this permit in the land evidence records of the Town of Bristol and supply this Program with written documentation obtained from the Town showing this revised permit was recorded.**
6. The approved site plans have been amended to correct the page numbering sequence. Please be advised that the second plan sheet has been renumbered in red ink as sheet 2 of 8.
7. This revised permit expires four (4) years from the date of issue of the original letter of March 4, 2020, unless renewed pursuant to 250-RICR-150-15-1.9(D)(5).

Except as authorized in this revised permit pursuant to revised and approved site plans (enclosed), all terms and conditions previously specified in the Program's permit dated March 4, 2020 (copy enclosed), remain in effect.

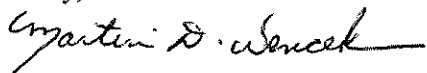
You are required to comply with the terms and conditions of this revised permit and to carry out this project in compliance with 250-RICR-150-15-1 at all times. Failure to do so may result in an enforcement action by the Program.

In permitting the proposed alterations, the DEM assumes no responsibility for damages resulting from faulty design or construction.

This revised permit does not remove your obligation to obtain any local, state, or federal approvals or permits required by ordinance or law and does not relieve you from any duties owed to adjacent landowners with specific reference to any changes in drainage.

Please contact Jane Kelly of this office at (telephone: 401-222-6820 ext. 2777420) should you have any questions regarding this letter.

Sincerely,



Martin D. Wencek, Program Supervisor
Freshwater Wetlands Program
Office of Water Resources
MDW/JEK/jek

Enclosure: Approved revised site plan
 Letter dated March 4, 2020

cc: Micheal Russell, Land Development Engineering & Consulting, LLC
 Richard Pimenta, Bristol Building Official
 Thomas Principe, Principe Engineering, Inc.



RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
 235 Promenade Street
 Providence, Rhode Island 02908

March 4, 2020

1200 Hope Street, LLC
 C/o Deborah Dimaggio
 161 N. Clarke St., Suite 1600
 Chicago, IL 60601

Insignificant Alteration – Permit

RE: Wetland Application No. 19-0149, Groundwater Discharge/UIC Program File No. 001920, and RIPDES Program File No. RIR 101910 in reference to the property and proposed property located:

Approximately 120 feet east of Hope Street (RI Route 114) at 1200 Hope Street, by utility pole numbers 41 to 43, approximately 275 feet east southeast of the intersection of Gibson Road and Hope Street, Assessor's Plat 103, Lot 2, Bristol, RI.

Dear Ms. Dimaggio:

Kindly be advised that the Department of Environmental Management's ("DEM") Freshwater Wetlands Program ("Program") has completed its review of your **Request for Preliminary Determination** application. This review included a site inspection of the above referenced property ("subject property") and an evaluation of the proposed construction of three residential buildings and renovation of an existing residential dwelling with new driveway and parking spaces, utilities, landscaping, and a stormwater management system as illustrated and detailed on site plans submitted with your application. These site plans were received by the DEM on January 24, 2020.

Our observations of the subject property, review of the site plans and evaluation of the proposed project reveals that alterations of freshwater wetlands are proposed. However, pursuant to 250-RICR-150-15-1.9 of the Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act, 250-150-15-1, this project may be permitted as an **insignificant alteration** to freshwater wetlands under the following terms and conditions:

Terms and Conditions for Wetlands Application No. 19-0149; RIPDES No. RIR101910; Groundwater Discharge/UIC No. 001920:

1. This letter is the DEM's permit for this project under the R.I. Fresh Water Wetlands Act, R.I. Gen. Laws § 2-1-18 et seq. This application review has also included review of any stormwater infiltration system subject to the DEM Groundwater Discharge Rules (Rules for the Discharge of Non-Sanitary Wastewater and Other Fluid to or Below the Ground Surface), 250-RICR-150-05-4.
2. This determination also includes your final authorization to discharge storm water associated with construction activity under the **2018 RIDPES General Permit for Stormwater Discharge During Construction Activity ("CGP")**. For future references and inquiry, your permit authorization number is RIPDES No. **RIR101910**.

3. This permit is specifically limited to the project, site alterations and limits of disturbance as detailed on the site plans submitted with your application and received by the DEM on January 24, 2020. A copy of the site plans stamped approved by the DEM is enclosed. Changes or revisions to the project that would alter freshwater wetlands are not authorized without a permit from the DEM.
4. Where the terms and conditions of the permit conflict with the approved site plans, these terms and conditions shall be deemed to supersede the site plans.
5. You must notify this Program in writing of the anticipated start date, and of your contractor's contact information, by submitting the Notice of Start of Construction Form prior to commencement of any permitted site alterations or construction activity. You must also notify this Program in writing upon completion of the project, including submittal of the Notice of Termination Form. The Start of Construction Form and the Notice of Termination can be found on the webpage: dem.ri.gov/stormwaterconstruction
6. A copy of the stamped approved site plans and a copy of this permit must be kept at the site at all times during site preparation, construction, and final stabilization. Copies of this permit and the stamped approved plans must be made available for review by any DEM or city/town representative upon request.
7. Within ten (10) days of the receipt of this permit, you must record this permit in the land evidence records of the Town of Bristol and supply this Program with written documentation obtained from the Town showing this permit was recorded.
8. The effective date of this permit is the date this letter was issued. This permit expires four (4) years from the date of this letter unless renewed pursuant to the Rules.
9. Any material utilized in this project must be clean and free of matter that could pollute any freshwater wetland.
10. Prior to commencement of site alterations, you shall erect or post a sign resistant to the weather and at least twelve (12) inches wide and eighteen (18) inches long, which boldly identifies the initials "DEM" and the application number of this permit. This sign must be maintained at the site in a conspicuous location until such time that the project is complete.
11. Both the owner and the contractor retained to undertake the construction activity are required to comply with all terms and conditions of the CGP. This includes maintaining the Soil Erosion and Sediment Control (SESC) Plan, performing the required inspections and maintenance of the selected Best Management Practices (BMPs), and retaining inspection records. Further information on the requirements of the CGP is available at:
<http://www.dem.ri.gov/programs/benviron/water/permits/swcoord/pdf/cpg092618.pdf>.
12. Temporary erosion and sediment controls detailed or described on the approved site plans shall be properly installed at the site prior to or commensurate with site alterations. Such controls shall be properly maintained, replaced, supplemented, or modified as necessary throughout the life of this project to minimize soil erosion and to prevent sediment from being deposited in any wetlands not subject to disturbance under this permit.
13. Upon permanent stabilization of all disturbed soils, temporary erosion and/or sediment controls must be removed.

14. You are responsible for the proper installation, operation, maintenance and stability of any mitigative features, stormwater treatment facilities, and systems of treatment and control that are installed or used in compliance with this permit to prevent harm to adjacent wetlands until documentation is provided that this responsibility has been assigned to another entity. Operation and maintenance shall be as described in the plan entitled, "Stormwater Best Management Practices Operation and Maintenance Plan, for: Preferred Realty Services, LLC., 1200 Hope St. AP. 103, Lot 2, Bristol, RI," dated April 2019, revised: November 2019, as prepared by Land Development Engineering and Consulting, LLC, 680 Aquidneck Ave., Middletown, RI 02842.
15. You are obligated to install, utilize and follow all best management practices detailed or described on the approved site plans in the construction of the project to minimize or prevent adverse impacts to any adjacent freshwater wetlands and the functions and values provided by such wetlands.
16. All plantings of shrubs, trees or other forms of vegetation as shown or detailed on the approved plans, or detailed in this permit, must be installed as soon as possible after completion of final grading; weather and season permitting.
17. You must provide written certification from a registered land surveyor or registered professional engineer that the stormwater drainage system including any and all basins, piping systems, catch basins, culverts, swales and any other stormwater management control features have been constructed/installed in accordance with the site plans approved by this permit. This written certification must be submitted to this Program within twenty (20) days of its request or upon completion of the project.

Pursuant to the provisions in 250-RICR-150-15-1.7(A)(9) and 250-RICR-150-15-1.11(D), as applicable, any properly recorded and valid permit is automatically transferred to the new owner upon sale of the property.

Please be aware that the RIDEM's Rules and Regulations Governing the Establishment of Various Fees (250-RICR-30-00-1) require that RIPDES CGP permit holders to pay an Annual Fee of \$100.00. An invoice will be sent to the owner on record in May/June of each year if the construction was still active as of December 31st of the previous year. The owner will be responsible for the Annual Fee until the construction activity has been completed, the site has been properly stabilized, and a completed Notice of Termination (NOT) has been received by the RIPDES Program.

Please note that the General Conditions within the RI GP apply to all activities authorized under the RI GP. Please review them carefully to thoroughly familiarize yourself with their contents. You may wish to discuss all permit conditions with your contractor to ensure that the work can be accomplished in a manner which conforms to all requirements.

You are required to comply with the terms and conditions of this permit and to carry out this project in compliance with the Rules at all times. Failure to do so may result in an enforcement action by this Department.

In permitting the proposed alterations, the DEM assumes no responsibility for damages resulting from faulty design or construction.

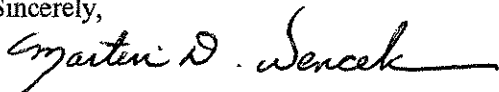
Kindly be advised that this permit is not equivalent to a verification of the type or extent of freshwater wetlands on site. Should you wish to have the types and extent of freshwater wetlands verified, you may submit the appropriate application in accordance with 250-RICR-150-15-1.8(C).

This permit does not remove your obligation to obtain any local, state, or federal approvals or permits required by ordinance or law and does not relieve you from any duties owed to adjacent landowners with specific reference to any changes in drainage.

Application No. 19-0149
Page 4

Please contact Daniel Kowal of this office (telephone: 401-222-4700, x7416) should you have any questions regarding this letter.

Sincerely,



Martin D. Wencek, Permitting Supervisor
Freshwater Wetlands Program
Office of Water Resources
MDW/DMK/dmk

Enclosure: Approved site plans

cc: Nicholas A. Pisani, DEM Stormwater Program
Craig Roy, DEM Groundwater/UIC Program
Michael E. Russell, PE, Land Development Engineering & Consulting, LLC
Richard J. Pimenta, Bristol Building Official

Bristol, Rhode Island

MARCH 6, 2023
REVISED: MARCH 15, 2023

LAND DEVELOPMENT ENGINEERING
& CONSULTING, LLC.
680 AQUIDNECK AVENUE
MIDDLETOWN, RI 02842
(401) 354-2050

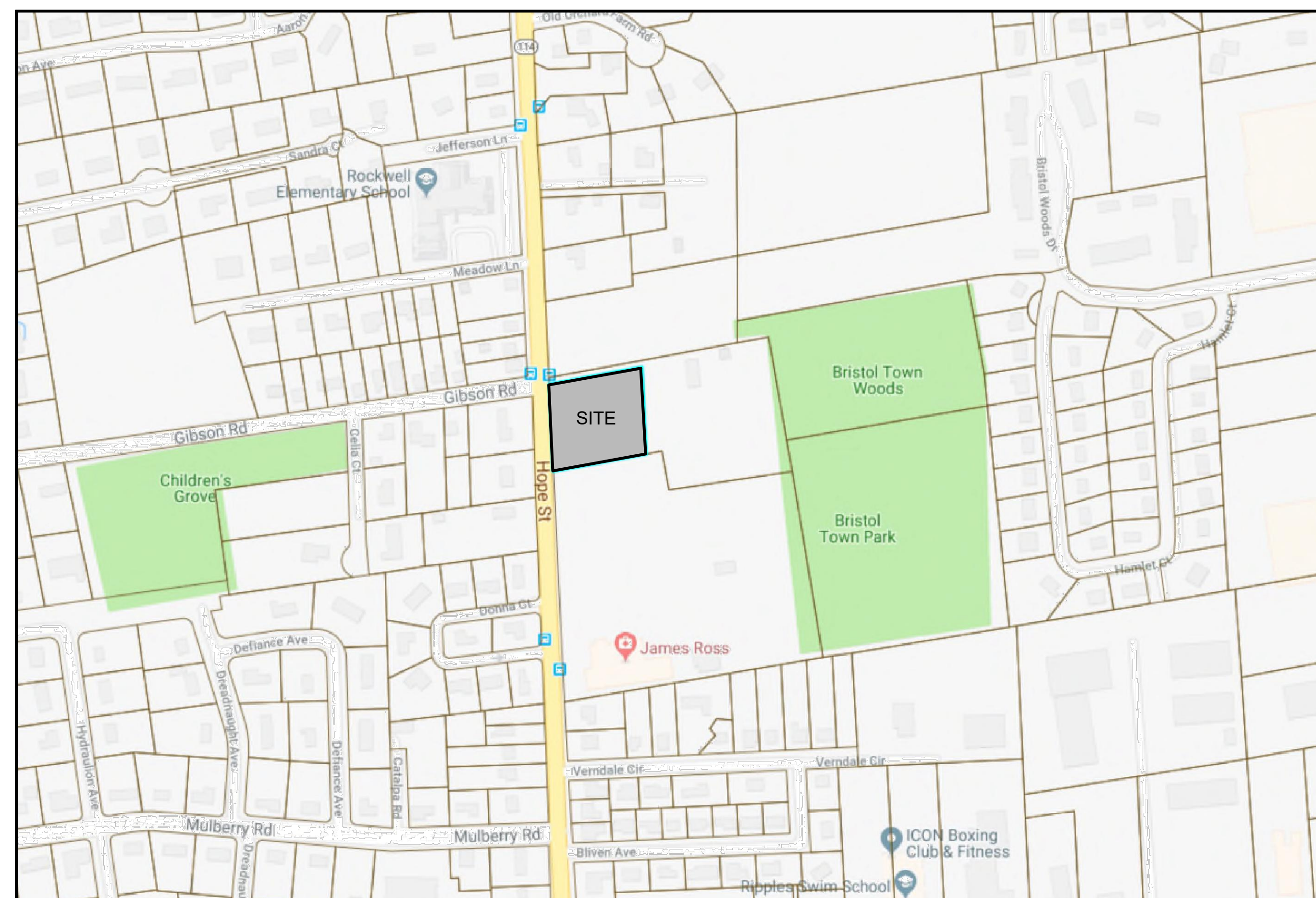
LAND DEVELOPMENT ENGINEERING
& CONSULTING, LLC.
680 AQUIDNECK AVENUE
MIDDLETOWN, RI 02842
(401) 354-2050

VERDE DESIGN + HORTICULTURE
6 DEBLOIS STREET
NEWPORT, RI 02840
(401) 619-0562

M1 1200 HOPE ST., LLC
133 TOWERHILL RD. SUITE 1, WAKEFIELD RI 02879
&
1202 HOPE ST. INVESTMENTS, LLC.
P.O. BOX 246, WARREN RI 02885

DOT APPROVAL:
PHYSICAL ALTERATIONS PERMIT APPLICATION# 190510
RIDEM APPROVAS:
WGC 19-100, FWW# 19-0149
UIC# 001920, RIR# 101910

LOCUS MAP

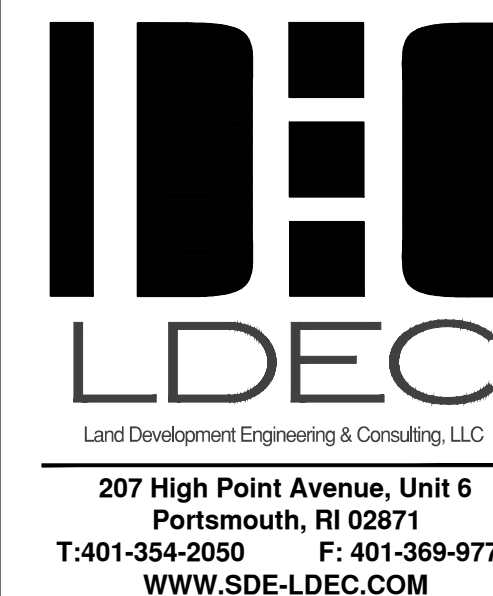


PLAN INDEX

<u>TITLE</u>	<u>SHEET NO.</u>
COVER SHEET	1
EXISTING CONDITIONS PLAN	2
LOTTING PLAN	3
SITE LAYOUT PLAN	4
GRADING & DRAINAGE PLAN	5
UTILITY PLAN	6
EROSION CONTROL PLAN	7
LANDSCAPING PLAN	8
CONSTRUCTION DETAILS	9

DATE _____

PLANNING BOARD SIGNATURES

[illegible]

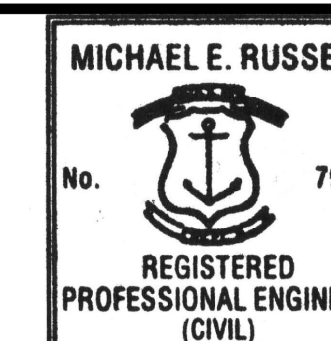
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100	100.00

DATE: MARCH 6, 2023

DRAWN BY: S.JF	DESIGN BY: S.JF	CHECK BY: MFB
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PROJECT NO.	22024
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ISSUED FOR:
PERMITTING



MAJOR LAND DEVELOPMENT FINAL PLAN APPLICATION

PREPARED FOR
LESSORS MAP 103, PARCEL 2 & 14
PREFERRED REALTY SERVICES, LLC

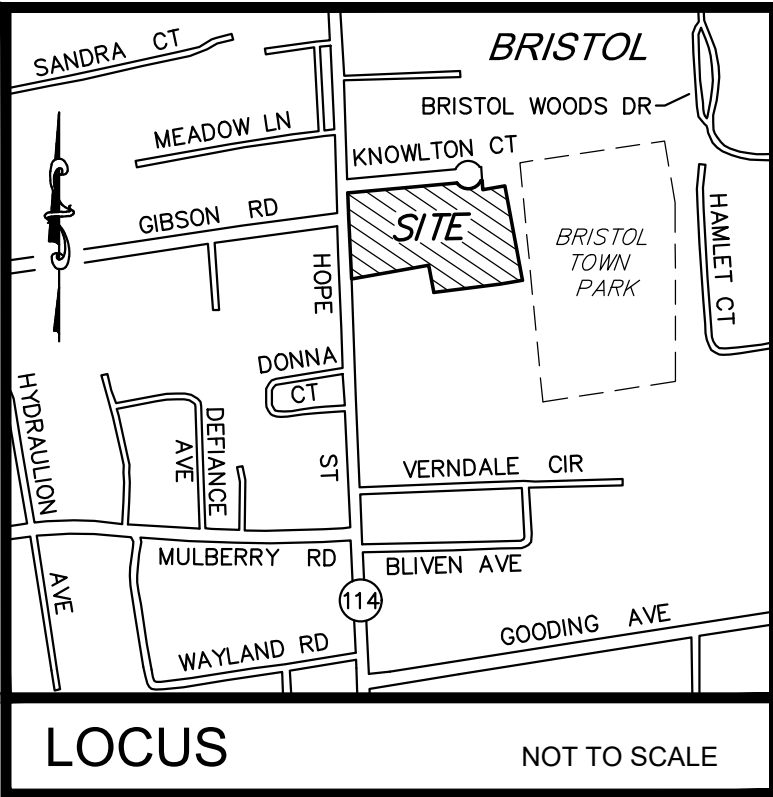
DRAWING TITLE:

COVER

SCALE: **NTS**

SHEET NO.

1 OF 9



- NOTES:**
- EXISTING CONDITIONS INFORMATION WAS COMPILED FROM AN ACTUAL ON THE GROUND SURVEY PERFORMED BY LAND DEVELOPMENT ENGINEERING & CONSULTING, LLC BETWEEN AUGUST 3, 2018 AND APRIL 18, 2022.
 - ELEVATIONS ARE REFERENCED TO NAVD88.
 - THE SITE IS NOT LOCATED WITHIN ANY SPECIAL FLOOD HAZARD AREAS AS DETERMINED FROM THE TOWN OF BRISTOL FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP COMMUNITY-PANEL NUMBER 445393 0011 H (MAP EFFECTIVE DATE JULY 7, 2014).
 - THIS PLAN AND ANY ACCOMPANYING CERTIFICATIONS DO NOT CONSTITUTE A CERTIFICATION OF TITLE TO THE PROPERTY DISPLAYED HEREON. THE OWNER OF LOCUS AND ABUTTING PROPERTIES ARE SHOWN ACCORDING TO CURRENT TOWN ASSESSORS RECORDS.
 - EXISTING UTILITY LINES SHOWN ON THIS PLAN ARE FROM AVAILABLE INFORMATION AND ARE APPROXIMATE LOCATIONS. THERE MAY BE EXISTING LINES OTHER THAN THOSE INDICATED. LAND DEVELOPMENT ENGINEERING & CONSULTING, LLC ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER PUBLIC UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED.
 - THE DELINEATION OF WETLAND FLAGS WF-A1 THROUGH WF-A6 WAS PERFORMED BY NATURAL RESOURCE SERVICES, INC. ON MARCH 15, 2019 AND WETLAND FLAGS A-3 THROUGH A-16 ARE AS SHOWN ON AN APPROVED MASTER SUBDIVISION PLAN BY SITE ENGINEERING, INC.
 - MAP 103, PARCEL 14 (SHOWN AS LOT 5 OF PLAN REFERENCE 1 BELOW) IS SUBJECT TO THE FOLLOWING CONDITIONS: NO PART OF LOT 5 AS SHOWN ON THE REFERENCED SUBDIVISION PLAN MAY BE DEVELOPED WITH DWELLING UNITS. SUBJECT TO RECEIVING FUTURE APPROVAL FROM THE PLANNING BOARD, PART OF LOT 5 MAY POSSIBLY BE USED FOR ACCESS, PARKING OR OPEN SPACE FOR ABUTTING PROPERTY AND PROVIDED FURTHER THAT NO PART OF THIS SUBDIVISION MAY BE USED IN THE DENSITY CALCULATION FOR ANY OTHER PROPERTY. THIS CONDITION SHALL BE A CONDITION OF THE DECISION TO BE ALSO PLACED ON THE PLANS AND SHALL ALSO BE A DEED RESTRICTION RECORDED IN THE LAND EVIDENCE RECORDS RUNNING TO THE BENEFIT OF THE TOWN.

- PLAN REFERENCES:**
- "PRELIMINARY PLAN FOR ELIZABETH COURT, AP 103 LOT 14, HOPE STREET IN BRISTOL, RHODE ISLAND", PREPARED FOR 1202 HOPE STREET INVESTMENT, LLC BY PRINCIPLE COMPANY, INC., DATED APRIL 12, 2021 (REV. 7/27/21) WHICH IS TO BE RECORDED AT THE TOWN OF BRISTOL LAND EVIDENCE RECORDS OFFICE.
 - "EXISTING CONDITIONS PLAN OF LAND, 1202 HOPE STREET, BRISTOL, RI", PREPARED FOR JOSEPH GARIES BY TURNING POINT SURVEY COMPANY, INC., DATED AUGUST, 5, 2020.

CURRENT OWNERS AND APPLICANTS	
MI 1200 HOPE ST, LLC PO BOX 572 WARREN, RI 02885 TITLE REFERENCE: DEED BK.2173/PG.176 SITE LOCATION: 1200 HOPE STREET BRISTOL, RHODE ISLAND ASSESSORS REFERENCE: MAP 103 PARCEL 2	1202 HOPE STREET INVESTMENTS, LLC PO BOX 246 WARREN, RI 02885 TITLE REFERENCE: DEED BK.1990/PG.179 SITE LOCATION: 1202 HOPE STREET BRISTOL, RHODE ISLAND ASSESSORS REFERENCE: MAP 103 PARCEL 14

CERTIFICATION

THIS SURVEY HAS BEEN CONDUCTED AND THE PLAN HAS BEEN PREPARED PURSUANT TO 435-RICR-00-00-1.9 OF THE RULES AND REGULATIONS ADOPTED BY THE RHODE ISLAND STATE BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS BETWEEN AUGUST 3, 2018 AND MARCH 7, 2023, AS FOLLOWS:

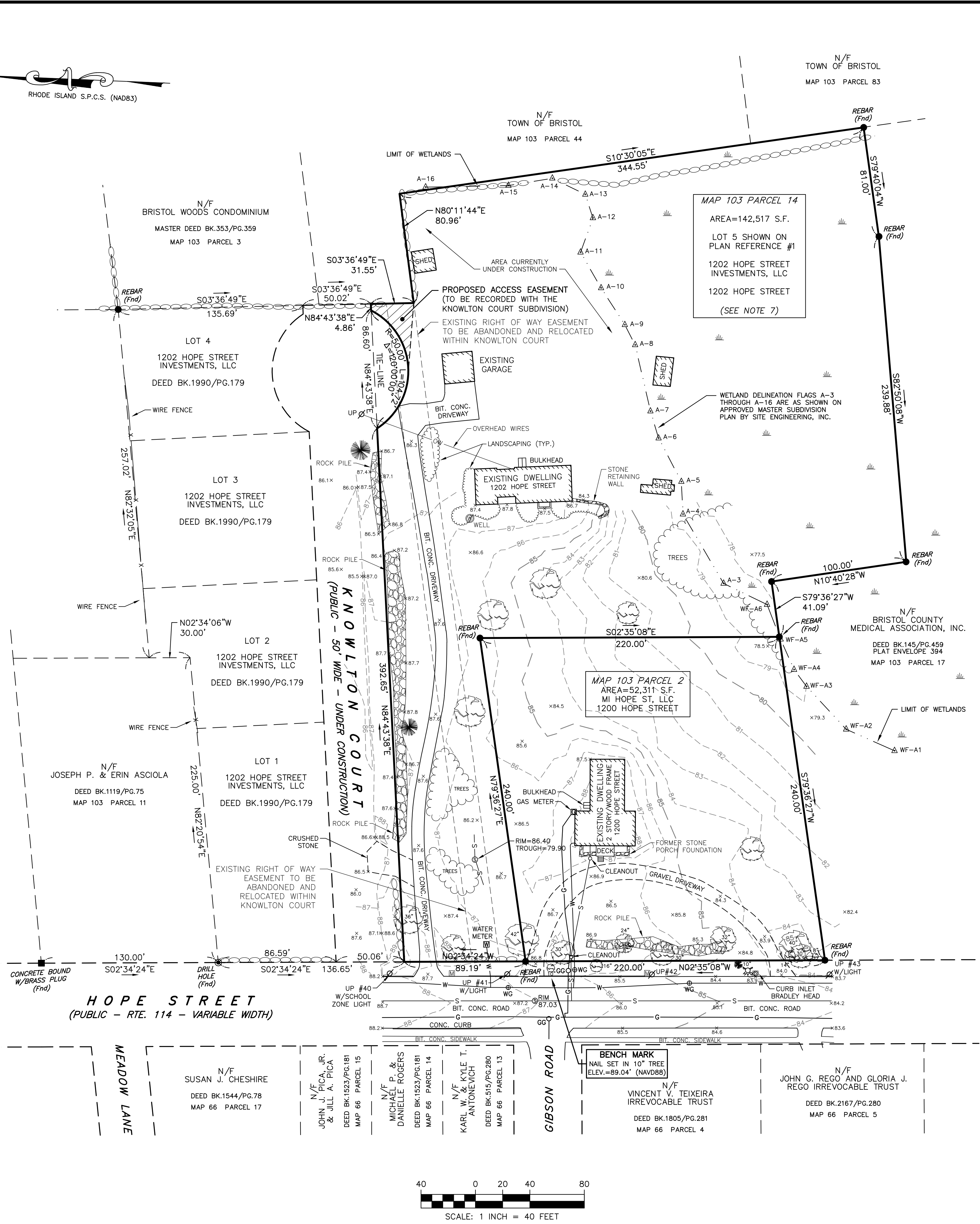
COMPREHENSIVE BOUNDARY SURVEY CLASS I
DATA ACCUMULATION SURVEY CLASS III
TOPOGRAPHIC SURVEY ACCURACY T-1

THE PURPOSE FOR THE CONDUCT OF THE SURVEY AND FOR THE PREPARATION OF THE PLAN IS AS FOLLOWS:

TO PROVIDE AN EXISTING CONDITIONS PLAN TO ACCOMPANY AN ADMINISTRATIVE SUBDIVISION FILING.

BY Robert L. Mason

ROBERT L. MASON, PROFESSIONAL LAND SURVEYOR, LICENSE NO. 2001, COA NO. LS.000A533-COA



LEGEND

- ① DRAIN MANHOLE
- ⚡ FIRE HYDRANT
- ⊗ GAS GATE
- ☐ MAIL BOX
- ⊙ SEWER MANHOLE
- 85.9 SPOT ELEVATION
- STONE WALL
- ☐ TREE
- TREE LINE
- ⊙ UP UTILITY POLE
- ⊙ WG WATER GATE
- △ WETLANDS
- △ WF WETLAND FLAG
- G UNDERGROUND GAS
- S UNDERGROUND SEWER
- W UNDERGROUND WATER

RESIDENTIAL 10 (R-10) ZONING DISTRICT

REGULATION	REQUIREMENT
MIN. LOT AREA	10,000 S.F.
LOT FRONTAGE	80'
FRONT SETBACK	30'
SIDE SETBACK	15'
REAR SETBACK	30'
MAX. BUILDING HEIGHT	35'
MAX. LOT COVERAGE	25%

1200 HOPE STREET (MAP 103, PARCEL 2) IS LOCATED IN THE BRISTOL HISTORIC DISTRICT

LDEC
Land Development Engineering & Consulting, LLC
207 High Point Avenue, Unit 6
Portsmouth, RI 02871
T: 401-354-2050 F: 401-369-9775
WWW.SDE-LDEC.COM

NO.	DATE	DESCRIPTION
1	8/23/22	UPDATE CURRENT OWNERS
2	8/23/22	REVISIONS PER TOWN REVIEW COMMENTS
3	3/7/23	REVISIONS PER TOWN REVIEW COMMENTS

PLAN REVISIONS

DATE: APRIL 26, 2022

DRAWN BY: RLM COMPS. BY: RLM CHECK BY: RLM/MER

PROJECT NO. 22024

ISSUED FOR: APPROVAL

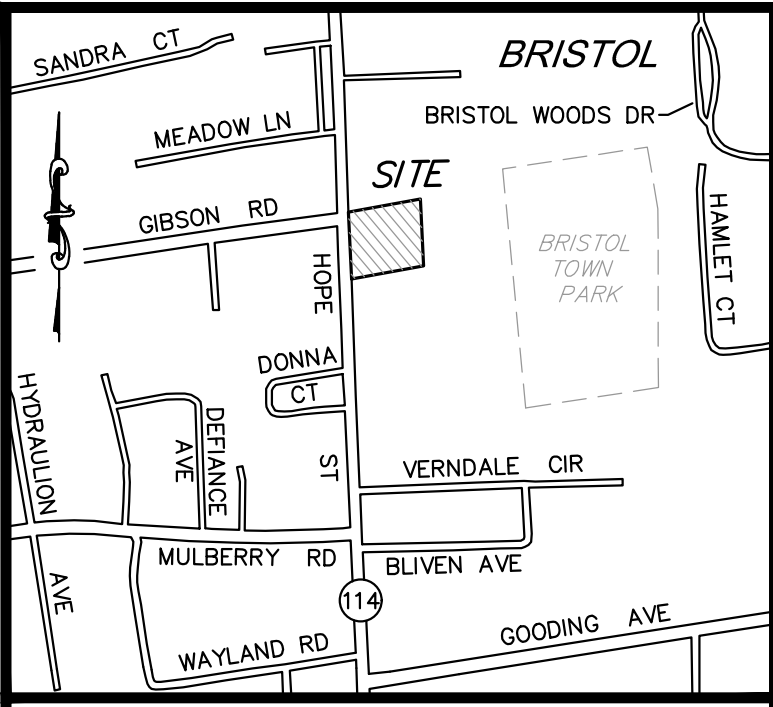
ROBERT L. MASON
No. 2001
PROFESSIONAL LAND SURVEYOR

ADMINISTRATIVE SUBDIVISION
1200 & 1202 HOPE STREET
BRISTOL, RHODE ISLAND
ASSESSORS MAP 103, PARCELS 2 & 14
PREPARED FOR
MI 1200 HOPE ST, LLC

DRAWING TITLE: EXISTING CONDITIONS

SCALE: 1" = 40'

SHEET NO. 2 OF 9



LOCUS NOT TO SCALE

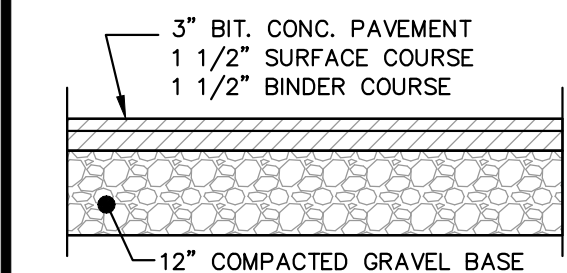
- LEGEND**
- ⊙ DRAIN MANHOLE
 - ⊙ FIRE HYDRANT
 - ⊙ MAIL BOX
 - ⊙ SEWER MANHOLE
 - ⊙ SPOT ELEVATION
 - STONE WALL
 - TREE LINE
 - UTILITY POLE
 - WATER GATE
 - W WATER LINE
 - G UNDERGROUND GAS
 - Δ A10 WETLAND FLAG
 - WETLANDS
- PROPOSED GRADE**
- PROPOSED CONTOUR**
- PROPOSED DRAIN LINE**
- PROPOSED GAS LINE**
- PROPOSED ELECTRIC/ TELEPHONE/CABLE**
- LOW PRESSURE SEWER**

CURRENT OWNER
EXPRESS REALTY TRUST, LLC
25 LILLIS AVENUE
BARRINGTON, RI 02806

TITLE REFERENCE:
DEED BK.2110/PG.96

SITE LOCATION:
1200 HOPE STREET
BRISTOL, RHODE ISLAND

ASSESSORS REFERENCE:
MAP 103 PARCEL 2



BID ALTERNATIVE NOTE:
EXISTING BITUMINOUS PAVEMENT PARKING TO BE RECLAIMED/RECYCLED PER RIDOT SECTION 406.

TYPICAL BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE

PARKING TABLE	
REQUIRED	PROPOSED
2 SPACES/ DWELLING UNIT	10 DWELLING UNITS = 20 SPACES
EXTERIOR PARKING SPACES	10 SPACES
GARAGE PARKING SPACES	10 SPACES

NOTES:

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- WETLAND DELINEATION PERFORMED BY NATURAL RESOURCE SERVICES INC., ON MARCH 15, 2019.

LOCAL PERMITS

PLANNING BOARD DECISION:
RECORDED DECEMBER 16, 2019.
DOC#: 00003581, BOOK: 2012, PG: 82

ZONING BOARD DECISION:
RECORDED DECEMBER 19, 2018.
DOC# 0003744, BOOK: 1967, PG: 269-270

STATE PERMITS

RIDOT PAPA NO. 190510
RIDEM WETLANDS APPLICATION NO. 19-0149
GROUNDWATER DISCHARGE/UIC NO. 001920
RIPDES NO. RIR-101910

ZONING REQUIREMENTS:

CONSERVATION DEVELOPMENT LAND DEVELOPMENT
PROJECT / MULTI FAMILY DWELLING UNITS
UNDERLYING DISTRICT: RESIDENTIAL DISTRICT (R-10)

SITE IS ALSO AN INDIVIDUALLY LISTED PROPERTY IN THE BRISTOL HISTORICAL DISTRICT.

	REQUIRED	EXISTING	PROPOSED
LOT AREA	10,000 S.F.	52,311 S.F.	52,311 S.F.
LOT FRONTAGE	80 FT.	220 FT.	220 FT.
FRONT YARD SETBACK	75 FT.	73.1 FT.	73.1 FT.*
SIDE YARD SETBACK	50 FT.	47.6 FT.	14.7 FT.*
REAR YARD SETBACK	50 FT.	85.3 FT.	22 FT.*
MAX. LOT COVERAGE	25%	5.75%	16.5%
MAX. BUILDING HEIGHT	35 FT.	—	35 FT.**
SETBACK BETWEEN 2 MULTI-FAMILY BUILDINGS	50 FT.	N/A	30 FT.*

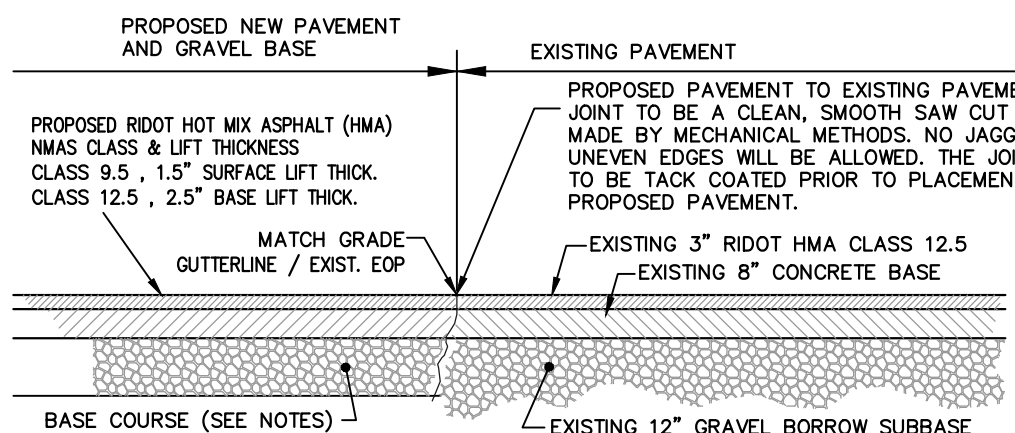
OPEN SPACE 50% 88.7% 54.6%

(*ZONING RELIEF RECEIVED, ZONING BOARD PERMIT FILE NO. 2018-41, RECORDED IN LAND EVIDENCE 12-19-2018, DOCUMENT NO. 3744 BK. 1967 PG. 269)

(**35 FT. HEIGHT FOR THE PROPOSED CONDOS. EXISTING STRUCTURE TO REMAIN UNCHANGED)

BY RIGHT DENSITY = 5 DWELLING UNITS
(CONVENTIONAL)

PROPOSED DENSITY = 10 DWELLING UNITS
(LAND DEVELOPMENT PROJECTS - RESOURCE CONSERVATION AND CREATIVE DEVELOPMENT OVERLAY)

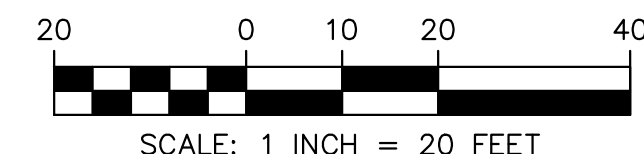
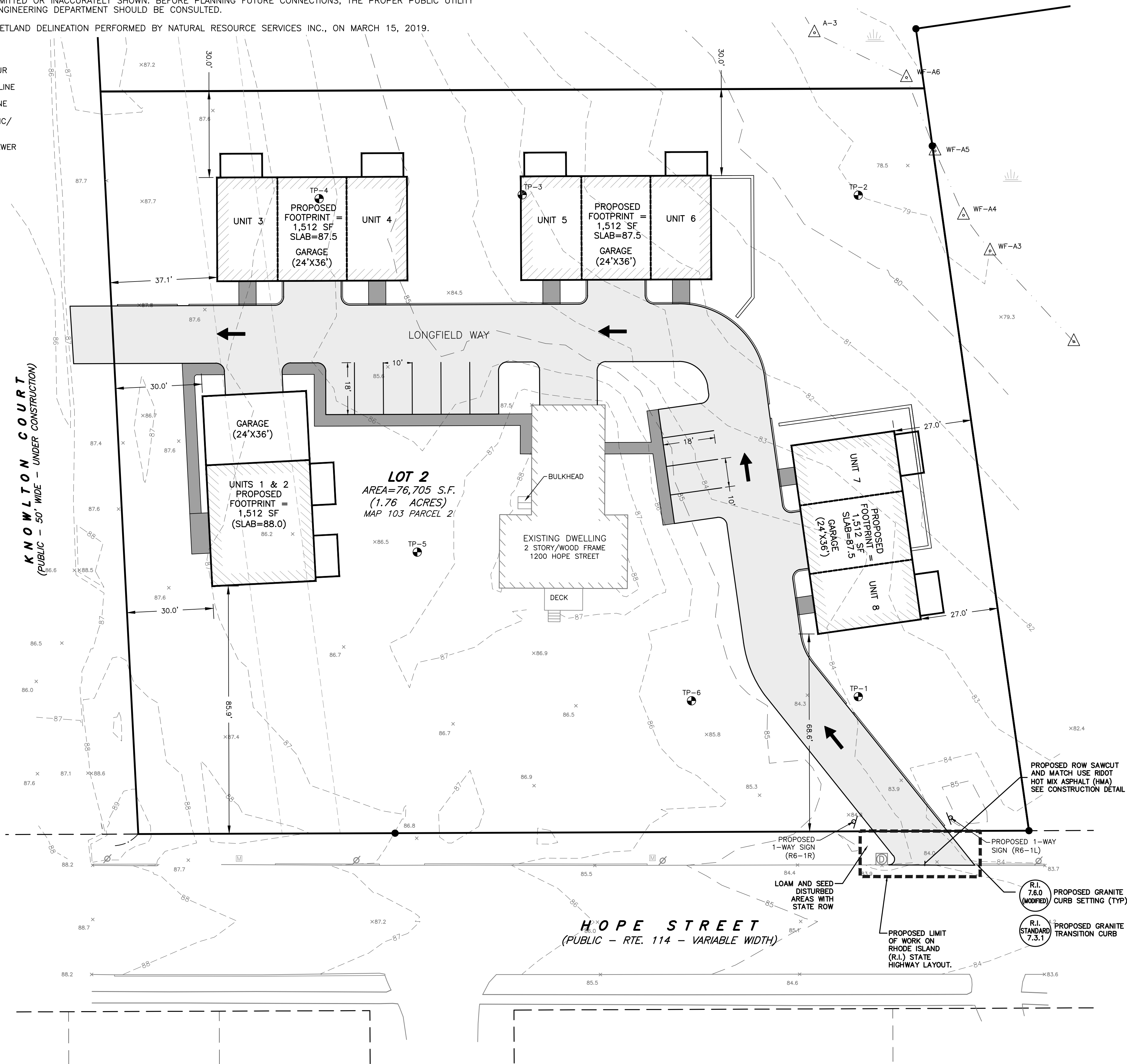


PAVEMENT SAW CUT & MATCH ROADWAY ENTRANCE & UTILITY TRENCH
NOT TO SCALE

NOTES:

- ROADWAY PAVEMENT SAW CUTTING CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH SECTION 932 AND SECTION 934.03.1 OF THE R.I. STANDARD SPECIFICATIONS.
- AGGREGATES, GRAVEL BASE AND SUBBASE COURSES MATERIALS AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH SECTION 300 AND SECTION M.01 OF THE R.I. STANDARD SPECIFICATIONS.
- PAVEMENT MATERIALS AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH SECTION 400 AND SECTION M.03 OF THE R.I. STANDARD SPECIFICATIONS AND HOT MIX ASPHALT (HMA) CONSTRUCTION.
- CONCRETE MATERIAL AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH SECTION 600 OF THE R.I. STANDARD SPECIFICATIONS.
- DEPTH(S) OF NEW MATERIALS SHALL AT MINIMUM MATCH EXISTING PAVEMENT CONSTRUCTION DEPTHS FOR GRAVEL BORROW, SUBBASE, BASE, AND HOT MIX ASPHALT (HMA).
- PAVEMENT CONSTRUCTION SHALL CONFORM TO RHODE ISLAND STANDARD SPECIFICATIONS M.03.06 AND RIDOT SECT. 401.03.11 AND HOT MIX ASPHALT (HMA) CONSTRUCTION.
- GRAVEL BORROW TYPE C SHALL CONFORM TO RHODE ISLAND STANDARD SPECIFICATIONS M.01.09 RIDOT SECT. 401.03.11.
- GRAVEL BORROW SHALL CONSIST OF INERT MATERIAL THAT IS HARD, DURABLE STONE AND COARSE SAND, FREE FROM LOAM AND CLAY, SURFACE COATINGS AND DELETERIOUS MATERIALS. GRADATION REQUIREMENTS FOR GRAVEL SHALL BE DETERMINED BY AASHTO-T11 AND T27 AND SHALL CONFORM TO THE FOLLOWING:

SIEVE DESIGNATION	PERCENT PASSING	MAXIMUM SIZE OF STONE IN GRAVEL SHALL BE 2 INCHES LARGEST DIMENSION
1/2 IN	50-85	
NO. 4	40-75	
NO. 50	8-25	
NO. 200	0-10	



207 High Point Avenue, Unit 6
Portsmouth, RI 02871
T:401-354-2050 F:401-369-9775
WWW.SDE-LDEC.COM

NO.	DATE	DESCRIPTION
1.	3/15/2023	MODIFIED DRIVEWAY LOCATIONS

PLAN REVISIONS

DATE: MARCH 6, 2023

DRAWN BY: SJE COMPS. BY: SJE CHECK BY: RLM/MER

PROJECT NO. 22024

ISSUED FOR: PERMITTING



PROPOSED SITE PLAN

1200 & 1202 HOPE STREET
BRISTOL, RHODE ISLAND
ASSESSORS MAP 103, PARCEL 2 & 14

PREPARED FOR
PREFERRED REALTY SERVICES, LLC

DRAWING TITLE:

SITE PLAN

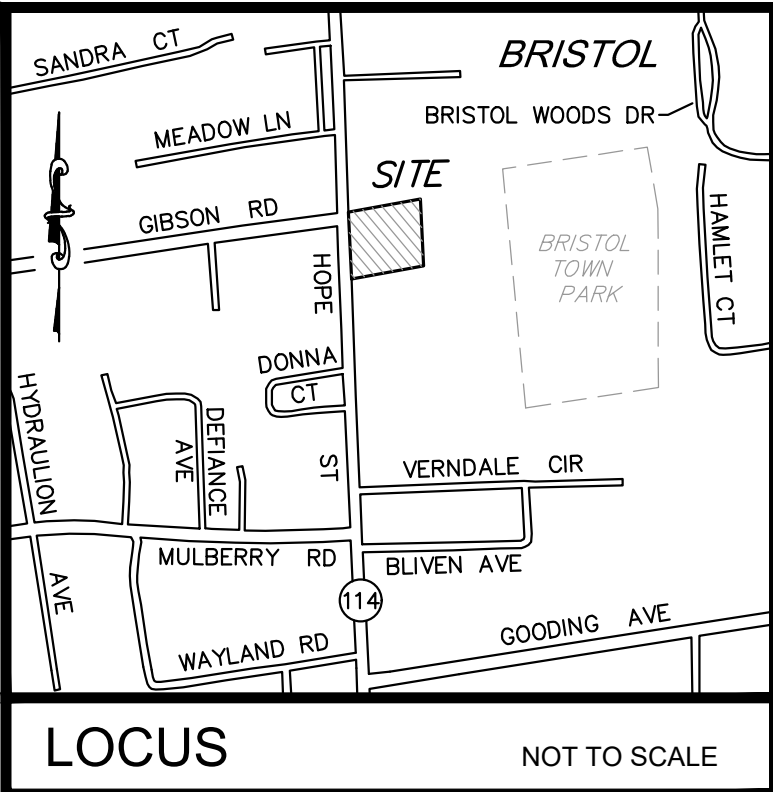
SCALE: 1" = 20'

SHEET NO.

4 OF 9

MEMBER _____ DATE _____

PLANNING BOARD SIGNATURES _____



NOTES:

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- ELEVATIONS ARE REFERENCED TO NAVD88.
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- WETLAND DELINEATION PERFORMED BY NATURAL RESOURCE SERVICES INC., ON MARCH 15, 2019.

LEGEND

- ⊕ DRAIN MANHOLE
 - ⊕ FIRE HYDRANT
 - ⊕ MAIL BOX
 - ⊕ SEWER MANHOLE
 - ⊕ SPOT ELEVATION
 - ⊕ STONE WALL
 - ⊕ TREE LINE
 - ⊕ UTILITY POLE
 - ⊕ WATER GATE
 - W WATER LINE
 - G UNDERGROUND GAS
 - Δ A10 WETLAND FLAG
 - WETLANDS
- PROPOSED GRADE: +88.88
- PROPOSED CONTOUR: 88
- PROPOSED DRAIN LINE: 12" D
- PROPOSED GAS LINE: G
- PROPOSED ELECTRIC/TELEPHONE/CABLE: ECT
- LOW PRESSURE SEWER: FM

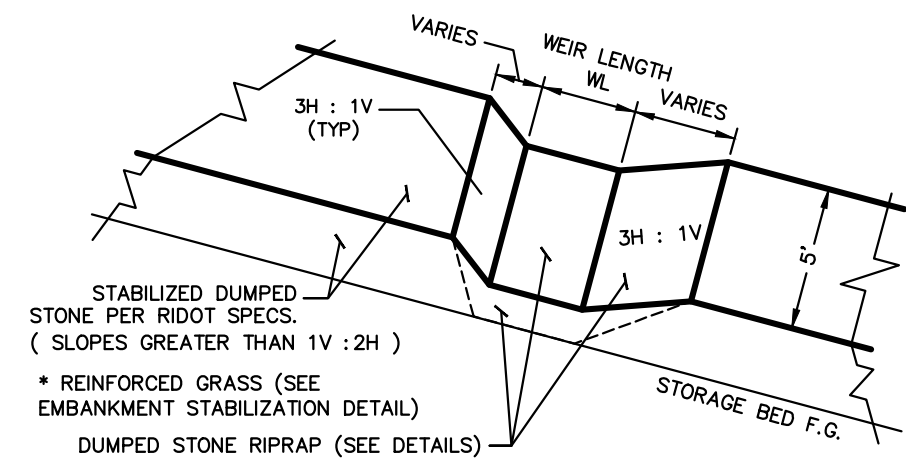
CURRENT OWNER

EXPRESS REALTY TRUST, LLC
25 LILLIS AVENUE
BARRINGTON, RI 02806

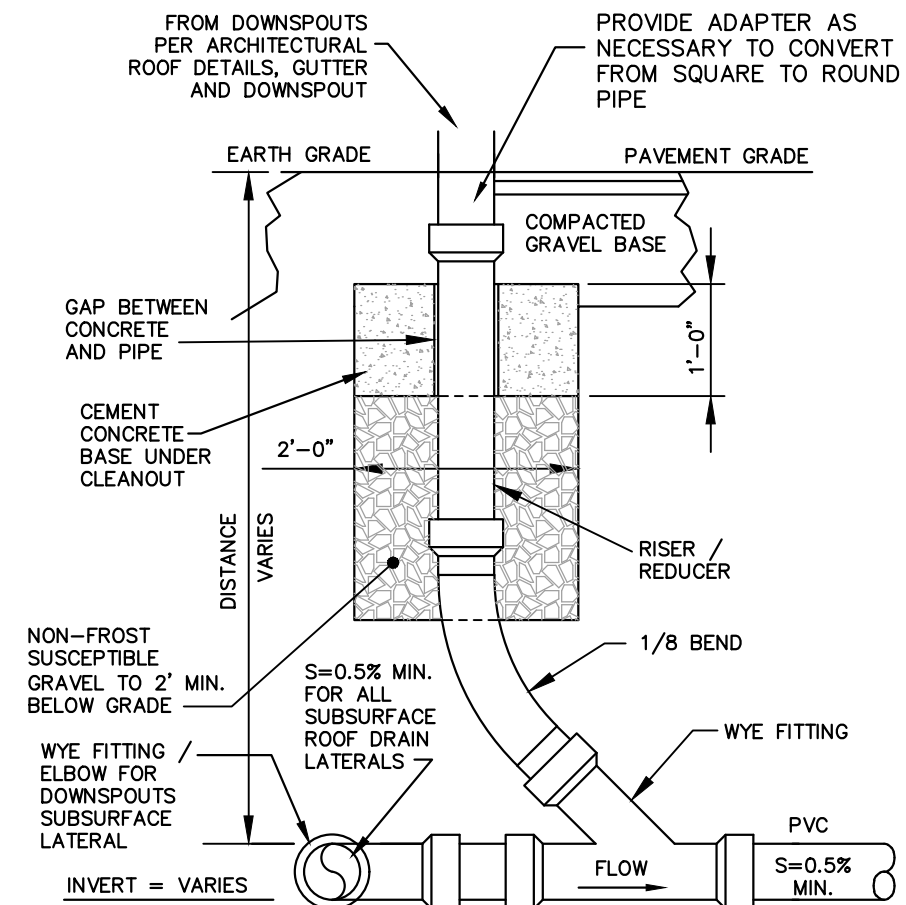
TITLE REFERENCE:
DEED BK.2110/PG.96

SITE LOCATION:
1200 HOPE STREET
BRISTOL, RHODE ISLAND

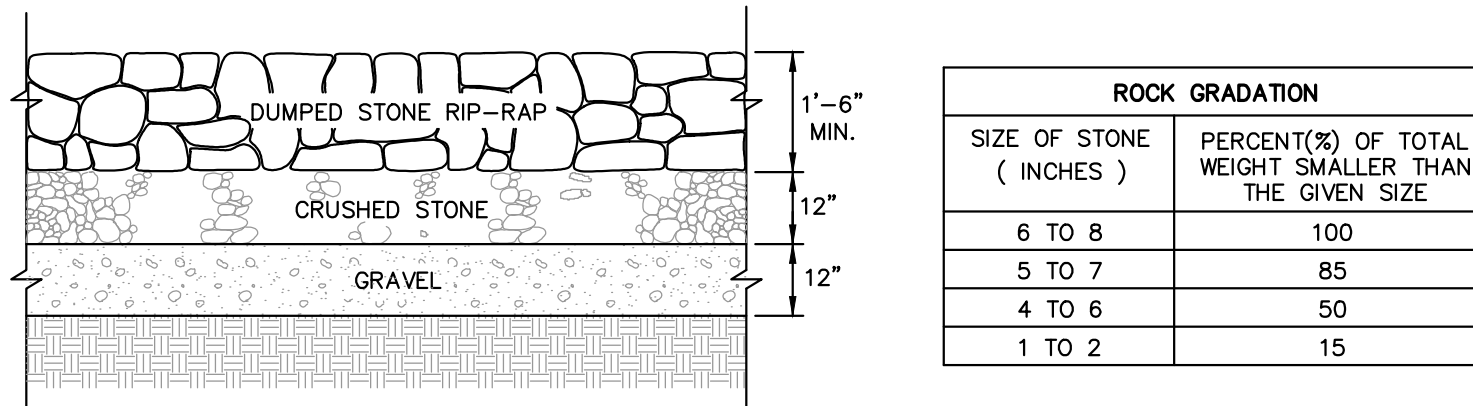
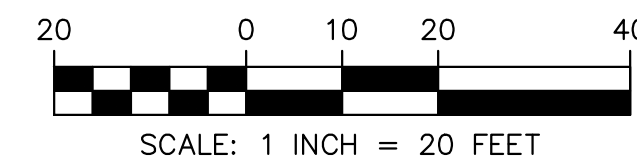
ASSESSORS REFERENCE:
MAP 103 - PARCEL 2



SEDIMENT FOREBAY OVERFLOW SPILLWAY DETAIL
NOT TO SCALE

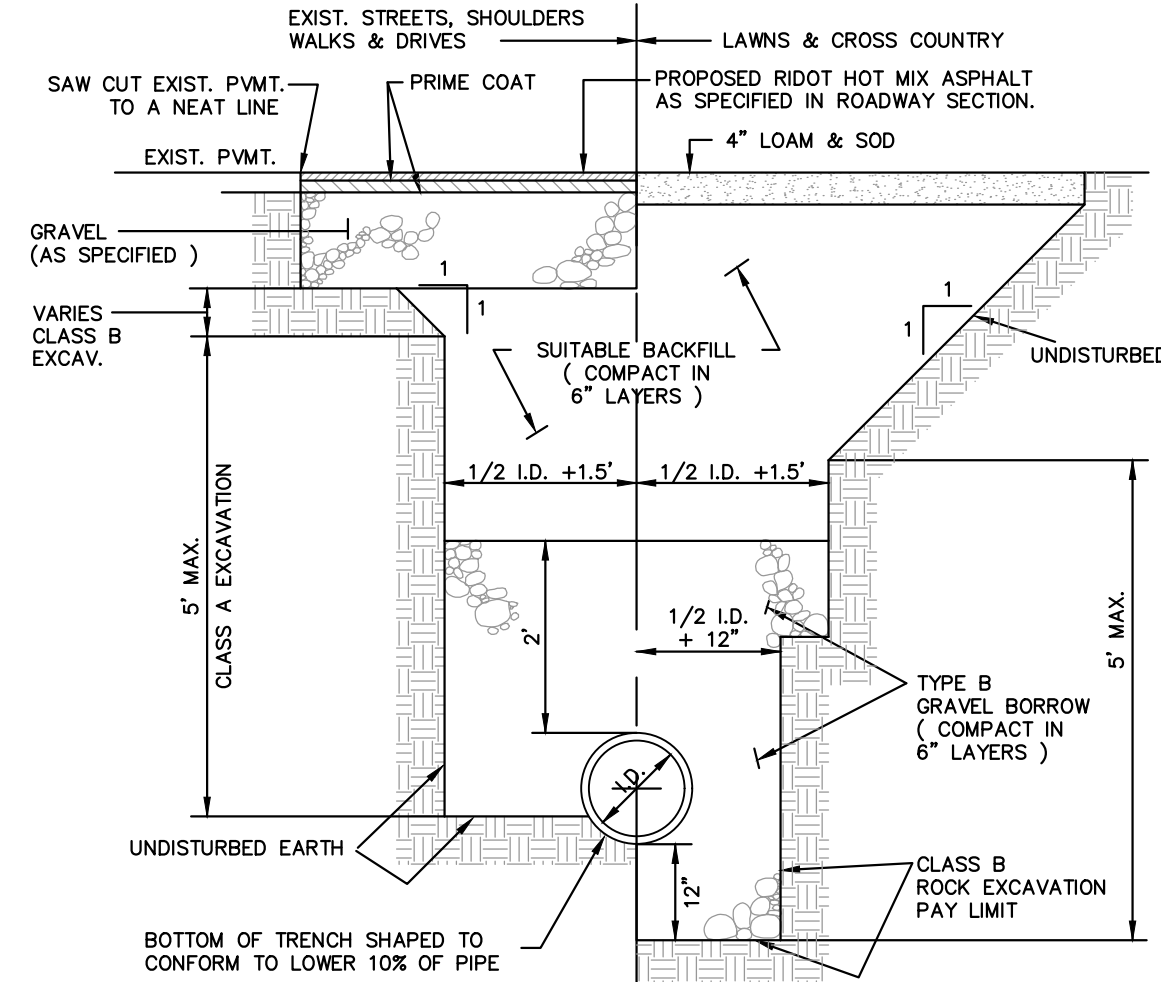


DOWNSPOUT CONNECTION & ROOF DRAIN DETAIL
NOT TO SCALE



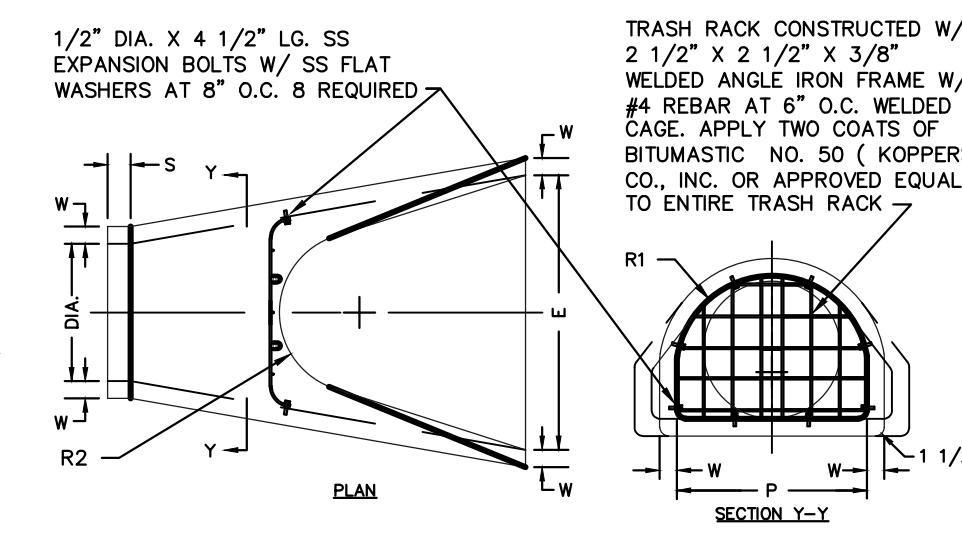
TYPICAL OUTLET PROTECTION DUMPED STONE RIP-RAP DETAIL
NOT TO SCALE

- NOTES:
- STONES SIZES ARE BASED UPON ASSUMED SPECIFIC WEIGHT OF 165 LBS./CF.
 - DUMPED STONE RIP-RAP STONE SIZE AS PER RIDOT (STD. SPEC. SEC. M10.03).

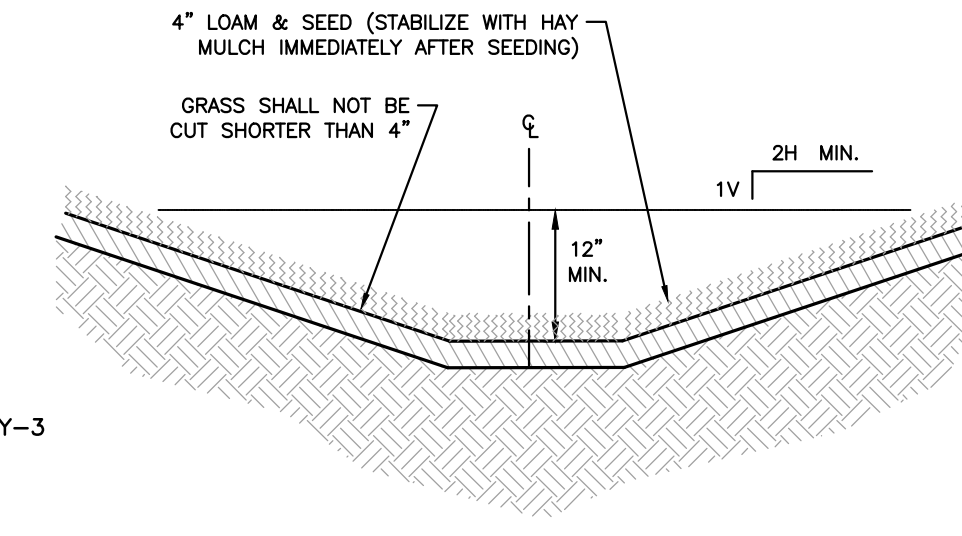


DRAINAGE PIPE TRENCH DETAIL
NOT TO SCALE

- NOTES:
- SHEETING IF USED, IN ALL CASES SHALL BE LEFT IN PLACE BELOW A LINE 1'-0" ABOVE THE TOP OF THE PIPE. UNLESS OTHERWISE INDICATED OR DIRECTED.
 - "COVER" AT ANY POINT SHALL BE DEFINED AS THE VERTICAL DISTANCE FROM THE UNDERMOST POINT OF THE PIPE TO A LINE WHICH CONNECTS THE SURFACE OF UNDISTURBED GROUND AT EITHER SIDE OF THE TRENCH AND IS AT RIGHT ANGLES TO THE DIRECTION OF THE PIPE.
 - SCREENED GRAVEL SHALL BE HARD, DURABLE, ROUNDED PARTICLES, FREE FROM SAND, LOAM, CLAY, EXCESS FINES AND DELETERIOUS MATERIAL, UNIFORMLY GRADED SUCH THAT NOT LESS THAN 95% WILL PASS A 1/2 INCH SIEVE AND NOT MORE THAN 5% PASS A NO. 4 SIEVE.
 - CLASS II GRAVEL BORROW SHALL BE A CLEAN, COARSE GRAINED GRAVEL-SAND MIXTURE, THE MIXTURE SHOULD CONTAIN LESS THEN 5% PASSING THE #200 SIEVE AS WELL AS COMPLYING TO THE REQUIREMENTS OF TABLE 1.
 - WHERE FUTURE EXTENSION OF A PLUGGED PIPE OR A PLUGGED BRANCH WILL ENTAIL ROCK EXCAVATION, TRENCH EXCAVATION IN ROCK SHALL BE EXTENDED FOR A DISTANCE OF 5'-0" BEYOND THE PLUG.

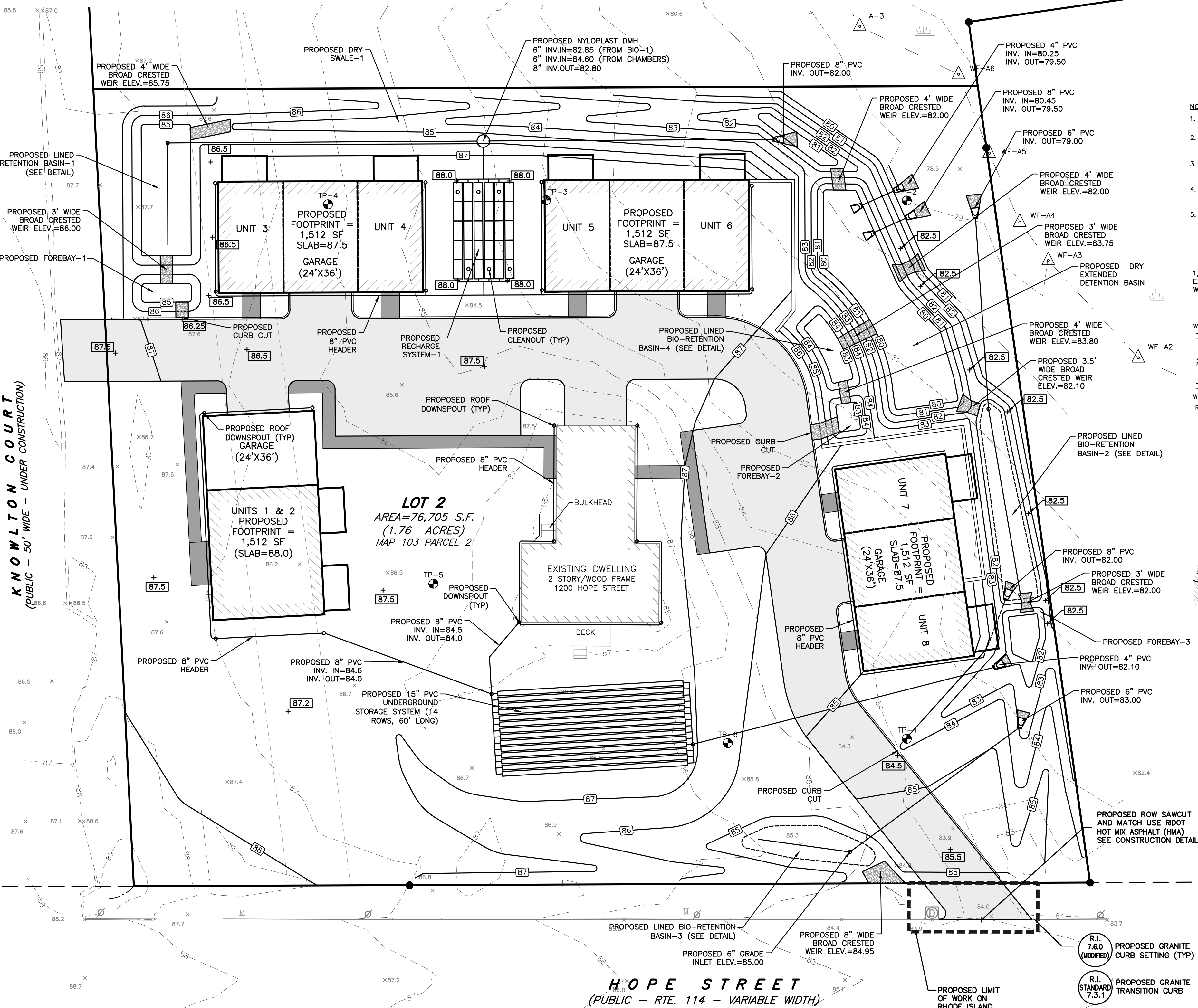


REINFORCED CONCRETE PIPE FLARED ENDS W/ TRASH RACK
NOT TO SCALE



DRY SWALE DETAIL
NOT TO SCALE

MAINTENANCE:
OPEN CHANNEL PRACTICES SHALL BE INSPECTED ANNUALLY AND AFTER STORMS GREATER THAN OR EQUAL THE 1-YEAR, 24-HOUR TYPE III PRECIPITATION EVENT. SEDIMENT BUILD-UP WITHIN THE BOTTOM OF THE CHANNEL OR FILTER STRIP SHALL BE REMOVED WHEN 25% OF THE ORIGINAL WOV VOLUME HAS BEEN EXCEEDED. ERODED SIDE SLOPES AND CHANNEL BOTTOMS SHALL BE STABILIZED AS NECESSARY. IN THE ABSENCE OF EVIDENCE OF CONTAMINATION, REMOVED DEBRIS MAY BE TAKEN TO A LANDFILL OR OTHER PERMITTED FACILITY. SEDIMENT TESTING MAY BE REQUIRED PRIOR TO SEDIMENT DISPOSAL WHEN A LUHPLI IS PRESENT. WOODY VEGETATION IN WET SWALES SHALL BE PRUNED WHERE DEAD OR DYING BRANCHES ARE OBSERVED, AND REINFORCEMENT PLANTINGS SHALL BE PLANTED IF LESS THAN 50% OF THE ORIGINAL VEGETATION ESTABLISHES AFTER TWO YEARS.



MEMBER

DATE

PLANNING BOARD SIGNATURES

LDEC
Land Development Engineering & Consulting, LLC
207 High Point Avenue, Unit 6
Portsmouth, RI 02871
T:401-354-2050 F:401-369-9775
WWW.SDE-LDEC.COM

NO.	DATE	DESCRIPTION	APPROVED	MEET
1.	3/15/2023	MODIFIED DRIVEWAY LOCATIONS		

PLAN REVISIONS

DATE: MARCH 6, 2023

DRAWN BY: SJE COMPS. BY: SJE CHECK BY: RLM/MER

PROJECT NO. 22024

ISSUED FOR:

PERMITTING



GRADING & DRAINAGE PLAN

1200 & 1202 HOPE STREET
BRISTOL, RHODE ISLAND
ASSESSORS MAP 103, PARCEL 2 & 14

PREPARED FOR
PREFERRED REALTY SERVICES, LLC

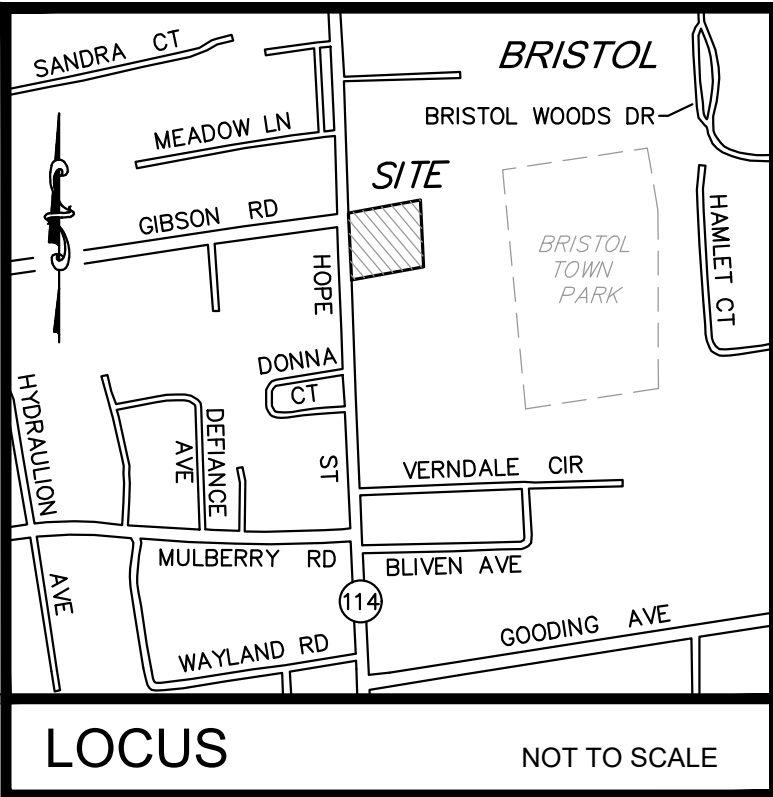
DRAWING TITLE:

GRADING & DRAINAGE PLAN

SCALE: 1" = 20'

SHEET NO.

5 OF 9



NOTES:

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- WETLAND DELINEATION PERFORMED BY NATURAL RESOURCE SERVICES INC., ON MARCH 15, 2019.

CURRENT OWNER

1200 HOPE ST., LLC
161 NORTH CLARK ST., SUITE 1600
CHICAGO, IL 60601

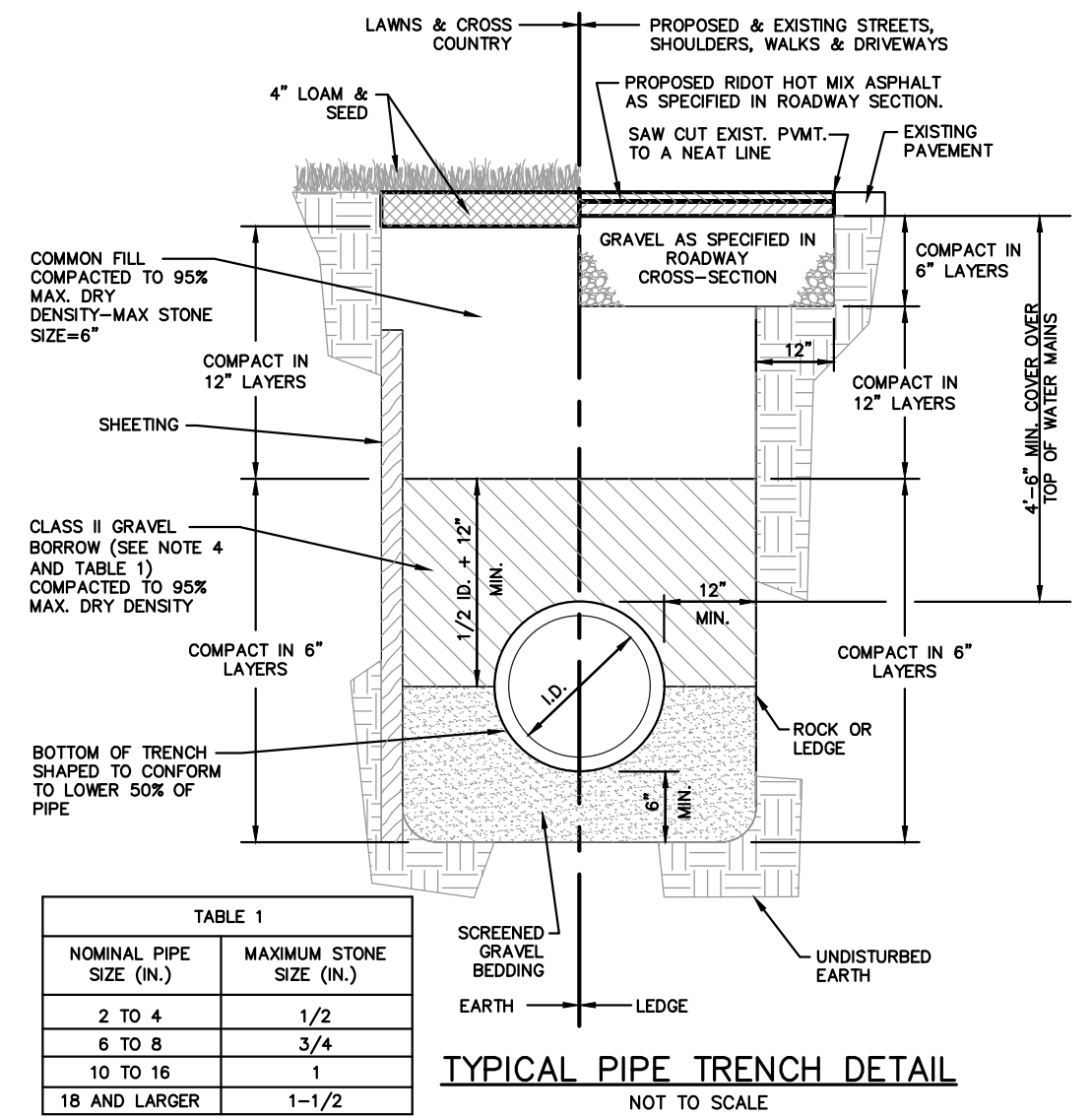
TITLE REFERENCE:
DEED BK.1661/PG.344

SITE LOCATION:
1200 HOPE STREET
BRISTOL, RHODE ISLAND

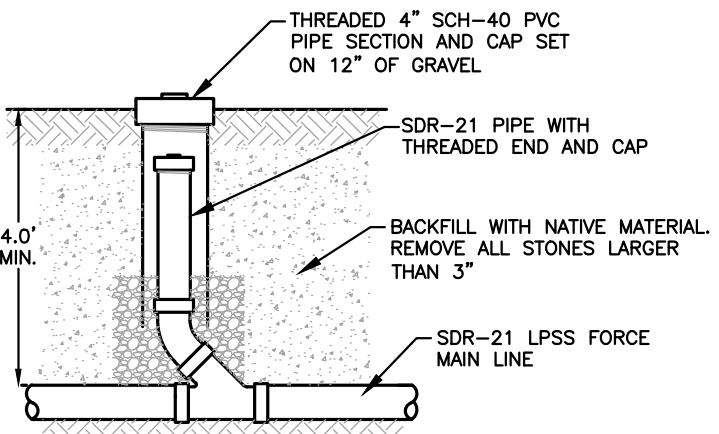
ASSESSORS REFERENCE:
MAP 103 PARCEL 2

PRIVATE SEWER NOTES:

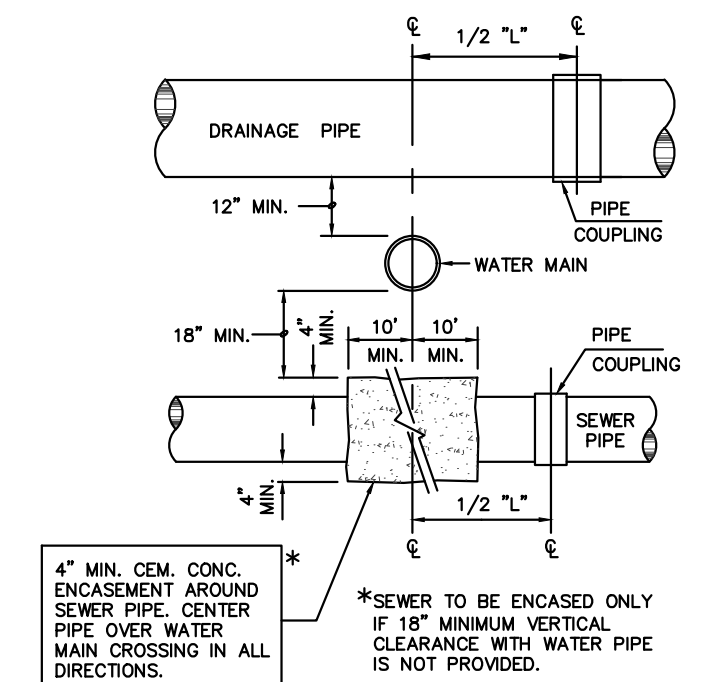
ALL FUTURE MAINTENANCE OF THE ENTIRE LOW PRESSURE SEWER SYSTEM WILL BE THE RESPONSIBILITY OF THE HOMEOWNERS ASSOCIATION FOR THIS DEVELOPMENT.



- NOTES:**
- SHEETING IF USED, IN ALL CASES SHALL BE LEFT IN PLACE BELOW A LINE 1'-0" ABOVE THE TOP OF THE PIPE, UNLESS OTHERWISE INDICATED OR DIRECTED.
 - "COVER" AT ANY POINT SHALL BE DEFINED AS THE VERTICAL DISTANCE FROM THE UNDERMOST POINT OF THE PIPE TO A LINE WHICH CONNECTS THE SURFACE OF UNDISTURBED GROUND AT EITHER SIDE OF THE TRENCH AND IS AT RIGHT ANGLES TO THE DIRECTION OF THE PIPE.
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 - CLASS II GRAVEL BORROW SHALL BE A CLEAN, COARSE GRAINED GRAVEL-SAND MIXTURE. THE MIXTURE SHOULD CONTAIN LESS THAN 5% PASSING THE #200 SIEVE AS WELL AS COMPLYING TO THE REQUIREMENTS OF TABLE 1.
 - WHERE FUTURE EXTENSION OF A PLUGGED PIPE OR A PLUGGED BRANCH WILL ENTER ROCK, EXCAVATION, TRENCH EXCAVATION IN ROCK SHALL BE EXTENDED FOR A DISTANCE OF 5'-0" BEYOND THE PLUG.



CLEANOUT & VACUUM CONNECTOR DETAIL (C.O./V.C.)
NOT TO SCALE



SEWER, WATER & DRAIN CROSSING DETAIL
NOT TO SCALE

MEMBER

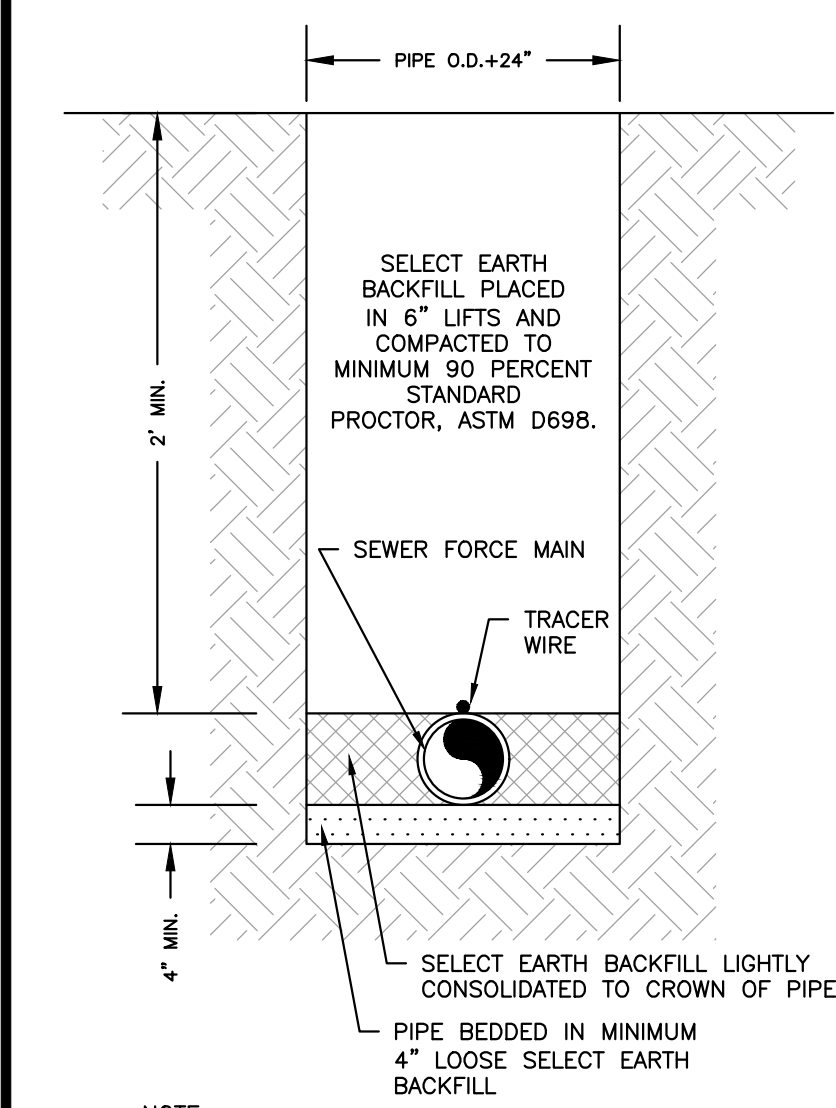
DATE

PLANNING BOARD SIGNATURES

- LEGEND**
- ⊕ DRAIN MANHOLE
 - ⊕ FIRE HYDRANT
 - ⊕ MAIL BOX
 - ⊕ SEWER MANHOLE
 - ⊕ SPOT ELEVATION
 - STONE WALL
 - TREE LINE
 - UTILITY POLE
 - WATER GATE
 - WATER LINE
 - UNDERGROUND GAS
 - ⊕ WETLAND FLAG
 - WETLANDS
- ELECTRIC & TELEPHONE PRIMARY SERVICE DETAIL**
NOT TO SCALE
- SEE NOTE #1
FINISH GRADE (MATCH EXISTING)
2'-6" MIN.
SEE NOTE #2
SEE NOTE #3
4" TYPE DB-60 PVC
SEE NOTE #4
4" TYPE EB-20 PVC

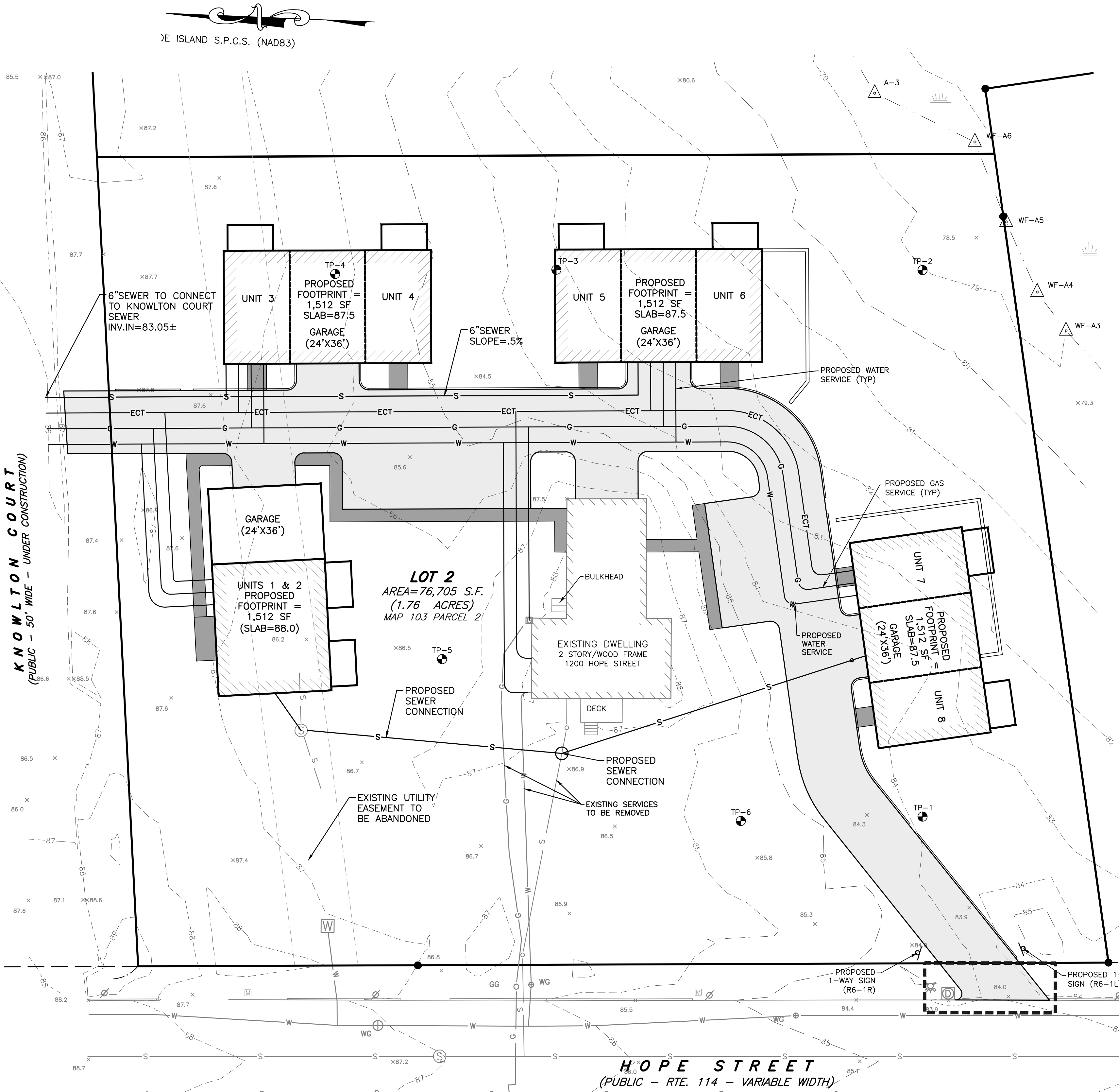
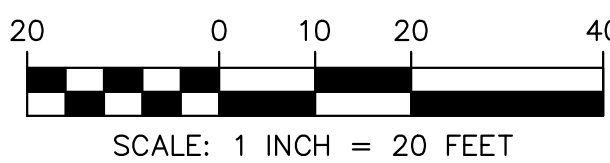
NOTES:

- BACKFILL TO BE FREE OF STONES GREATER THAN ONE INCH AND SHALL NOT CONTAIN ASHES, CHIPPERS, SHELL, OR FROZEN MATERIAL.
- WARNING TAPE TO BE PLACED 12" BELOW FINISH GRADE AND DIRECTLY ABOVE POWER CONDUIT.
- MINIMUM SEPARATION BETWEEN ELECTRICAL CONDUIT AND FOREIGN CONDUIT OR PIPES IS AS FOLLOWS:
COMMUNICATION - 3" OF CONCRETE ENCASEMENT
WATER, GAS, SEWER - 12" WHERE THE PATH OF THESE UTILITIES INTERSECT AT APPROXIMATELY RIGHT ANGLES WITH ELECTRICAL CONDUIT.
24" SEPARATION SHALL BE MAINTAINED BETWEEN PARALLEL PLACEMENT OF THESE UTILITIES AND ELECTRICAL CONDUIT.
- CONCRETE THICKNESS AROUND THE OUTSIDE DUCTS SHALL BE 3 TO 6 INCHES. CONCRETE SHALL BE IN ACCORDANCE WITH STANDARD 0211.



NOTE:
PIPING LESS THAN 4'-FEET BELOW THE PROPOSED GROUND ELEVATION SHALL BE INSULATED.

PVC SANITARY SEWAGE FORCE MAIN TRENCH DETAIL
NOT TO SCALE



HOPE STREET
(PUBLIC - RTE. 114 - VARIABLE WIDTH)

LDEC
Land Development Engineering & Consulting, LLC
207 High Point Avenue, Unit 6
Portsmouth, RI 02871
T: 401-354-2050 F: 401-369-9775
WWW.SDE-LDEC.COM

NO.	DATE	DESCRIPTION	APPROVED
1.	3/15/2023	MODIFIED DRIVEWAY LOCATIONS	MER

PLAN REVISIONS

DATE: MARCH 6, 2023

DRAWN BY: SJE COMPS. BY: SJE CHECK BY: RLM/MER

PROJECT NO. 22024

ISSUED FOR: PERMITTING

MICHAEL E. RUSSELL
No. 7956
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

PROPOSED UTILITY PLAN
1200 & 1202 HOPE STREET
BRISTOL, RHODE ISLAND
ASSESSORS MAP 103, PARCEL 2 & 14
PREPARED FOR
PREFERRED REALTY SERVICES, LLC

DRAWING TITLE:

UTILITY PLAN

SCALE: 1" = 20'

SHEET NO.

6 OF 9



PROPOSED PLANTING LEGEND				
SYMBOL	BOTANICAL NAME	COMMON NAME	QTY	SIZE
SHADE TREES				
ACE RUB	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	2	4" CAL.
ACE FRE	ACER X FREEMANI 'JEFFSRED'	AUTUMN BLAZE MAPLE	1	4" CAL.
QUE PAL	QUERCUS PALUSTRIS	PIN OAK	1	4" CAL.
TC	TILIA CORDATA 'GREENSPIRE'	LITTLE LEAF LINDEN	2	4" CAL.
FLOWERING TREES				
AME CAN	AMELANCHIER CANADENSIS 'AUTUMN BRILLANCE'	AUTUMN BRILLANCE SHADBLOW	3	8/10' CLUMP
MAG GRA	MAGNOLIA GRANDIFLORA 'BRACKEN'S BROWN BEAUTY'	BRACKEN'S BROWN BEAUTY MAGNOLIA	3	8/10" B&B
STE PSE	STEWARTIA PSEUDOCAMELLIA	JAPANESE STEWARTIA	1	4" CAL.
EVERGREEN TREES				
CRY JAP	CRYPTOMERIA JAPONICA 'YOSHINO'	YOSHINO JAPANESE CEDAR	5	7/8' B&B
ILE NEL	ILEX X 'NELLIE STEVENS'	NELLIE STEVENS HOLLY	6	6/7' B&B
JUN HET	JUNIPERUS CHINENSIS 'HETZII'	HETZ COLUMNAR JUNIPER	6	7/8' B&B
JUN VIR	JUNIPERUS VIRGINIANA 'CUPRESSIFOLIA'	EASTERN REDCEDAR	10	8/10' B&B
TOTAL TREES			40	
GENERAL NOTES				
1. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND UTILITIES AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT.				
2. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY THE LOCATION OF ALL UTILITIES BY NOTIFYING DIG-SAFE AT 1-800-322-4844 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION.				
3. THE CONTRACTOR SHALL CONDUCT PRELIMINARY INVESTIGATIONS INCLUDING ALL NECESSARY EXCAVATION TO DETERMINE IF THE WORK CAN BE DONE AS SHOWN ON THE PLANS. CHANGES MAY BE MADE AS REQUIRED BY FIELD CONDITIONS AND AS DIRECTED BY THE LANDSCAPE ARCHITECT.				
4. ALL EXISTING UTILITIES MAY NOT BE SHOWN ON THE DRAWING. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE OF ALL UNDERGROUND UTILITIES AND FOR PROTECTING ALL LINES DURING CONSTRUCTION.				
5. ALL WORK SHALL COMPLY WITH ALL APPLICABLE STATE AND LOCAL REGULATIONS.				
PLANTING NOTES				
1. LANDSCAPE CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING BID TO BECOME COMPLETELY FAMILIAR WITH SITE CONDITIONS.				
2. NO PLANTING WILL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.				
3. CONTRACTOR TO VERIFY ALL UTILITIES ON PROPERTY AND TO PROTECT ALL UTILITIES DURING EXCAVATION.				
4. IF THERE IS A DISCREPANCY BETWEEN THE NUMBER OF PLANTS SHOWN ON THE PLAN AND THE NUMBER OF PLANTS SHOWN IN THE PLANT LIST, THE NUMBER OF PLANTS SHOWN ON THE LIST WILL TAKE PRECEDENCE.				
5. ALL CONTAINER MATERIAL TO BE GROWN IN CONTAINER A MINIMUM OF SIX MONTHS.				
6. ALL MATERIAL SHALL COMPLY WITH THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, ACCORDING TO THE AMERICAN ASSOCIATION OF NURSERYMEN.				
7. CONTRACTOR SHALL REPAIR ALL DAMAGE TO PROPERTY FROM PLANTING OPERATIONS AT NO COST TO THE OWNER.				
8. CONTRACTOR SHALL GUARANTEE NEW PLANT MATERIAL THROUGH ONE CALENDAR YEAR FROM TIME OF PROVISIONAL ACCEPTANCE.				
9. ALL PROPOSED PLANTS SHALL BE LOCATED CAREFULLY AS SHOWN ON THE PLANS AND THE PLACEMENT SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT BEFORE THE INSTALLATION.				
10. ALL DISTURBED AREAS NOT TO BE PAVED OR PLANTED SHALL BE LOAMED AND SEEDED AS SHOWN. SEE SPECIFICATIONS FOR SOIL PREPARATION AND SEED MIX.				
11. TWO INCH (2") DEEP, FINELY SHREDDED BARK MULCH WILL BE INSTALLED AROUND ALL TREES AND SHRUBS THAT ARE ISOLATED FROM GROUND COVER AREAS AND GENERAL SHRUB MASSES.				
12. ALL PLANT MATERIAL SHALL BE INSPECTED BY THE LANDSCAPE ARCHITECT ON SITE PRIOR TO INSTALLATION. THE LANDSCAPE ARCHITECT WILL TAG ALL TREES AT THE NURSERY AND INSPECT THEM AFTER DELIVERY TO THE SITE. SEE SPECIFICATIONS FOR TAGGING, INSPECTION, AND ACCEPTANCE OF PLANT MATERIAL.				
13. LANDSCAPE ARCHITECT SHALL CONFIRM PLANT LIST AND APPROVE SUBSTITUTIONS OF PLANT VARIETIES PRIOR TO ORDERING OF MATERIAL.				
14. SOIL MIX: 1/3 PEAT MOSS, 1/3 SCREENED LOAM, 1/3 DEHYDRATED MANURE.				
15. THE OWNER RESERVES THE RIGHT TO SUBSTITUTE PLANT SELECTIONS WITH PLANTS OF SIMILAR CHARACTERISTICS IF THE SPECIFIED PLANTS ARE NOT AVAILABLE IN ACCEPTABLE QUANTITIES OR CONDITIONS.				

VERDE DESIGN + HORTICULTURE
89 DR MARCUS WHEATLAND BLVD
NEWPORT RI 02840
O. 401 619-0562
verdegarden@gmail.com

CIVIL ENGINEER
LDEC
LAND DEVELOPMENT ENGINEERING & CONSULTING, LLC
1700 WEST MAIN ROAD
MIDDLETOWN RI 04134 2050



LOCUS MAP

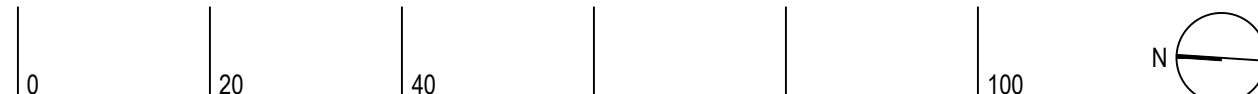
LONGFIELD PROJECT

1200 HOPE STREET
BRISTOL, RI

PROJECT NUMBER: 19.029
DRAWN BY: PR
CHECKED BY: PR
SCALE: 1"=20'-0"
DATE: 11.23.2021

PERMIT PRINT
NOT FOR
CONSTRUCTION

LANDSCAPE PLAN



L1.0

CONSTRUCTION NOTES

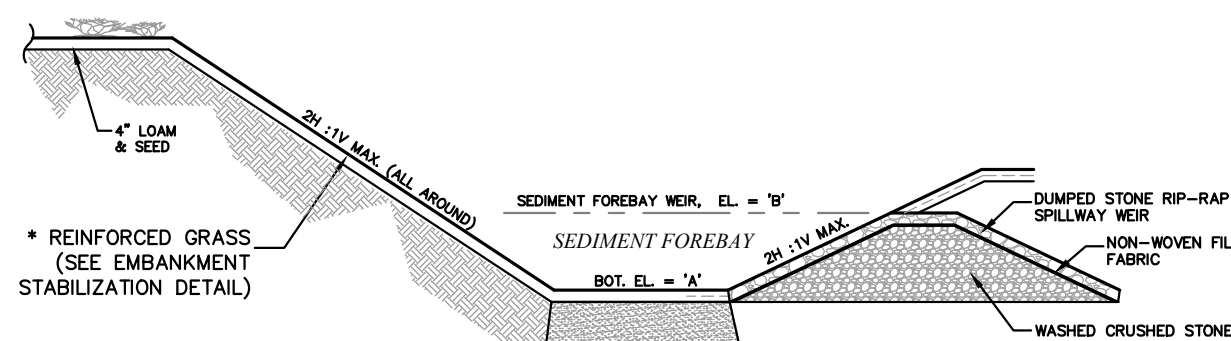
- ALL WORK TO BE DONE WITHIN THE STATE RIGHT OF WAY SHALL CONFORM TO THE R.I. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AMENDED 2013, WITH ALL REVISIONS AND ADDENDA. STANDARD DETAILS FOR THIS WORK ARE R.I. STANDARD DETAILS 1998 EDITION WITH ALL REVISIONS.
- PROPOSED DEVELOPMENT IS SUBJECT TO AN ASSENT APPLICATION APPROVAL & CONDITIONS FROM RIGRCM.
- THE CONTRACTOR SHALL MAKE APPLICATIONS FOR AND PAY ALL FEES FOR PERMITS REQUIRED TO CONSTRUCT THIS PROJECT.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SITE PREPARATION NECESSARY FOR THE COMPLETE INSTALLATION OF THE PROJECT FACILITIES DURING CONSTRUCTION.
- ALL CONSTRUCTION METHODS, MATERIALS, AND COMPONENTS ASSOCIATED WITH THE PROPOSED SUBSURFACE SEWAGE DISPOSAL SYSTEM SHALL BE IN CONFORMANCE WITH THE APPROVED PLANS, THE REQUIREMENTS OF THE TOWN OF BRISTOL AND OF THE STATE ENVIRONMENTAL CODE, AND ALL LOCAL BOARD OF HEALTH REGULATIONS UNLESS A WAIVER HAS BEEN GRANTED.
- ALL CHANGES TO THE PLAN MUST BE APPROVED BY LAND DEVELOPMENT ENGINEERING & CONSULTING, LLC. AND THE LOCAL BOARD OF HEALTH.
- ALL SYSTEM COMPONENTS, EXCEPT PERFORATED PIPING, SHALL BE WATERTIGHT AS REQUIRED BY THE TOWN OF BRISTOL, DEPARTMENT OF PUBLIC WORKS.
- THE LOCATION OF UNDERGROUND UTILITIES AND STRUCTURES ARE APPROXIMATE ONLY. THE ENGINEER DOES NOT GUARANTEE THEIR ACCURACY OR THAT ALL UTILITIES AND SUBSURFACE STRUCTURES ARE SHOWN. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION AND INVERT ELEVATIONS OF THE UTILITIES AND STRUCTURES, AS REQUIRED PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES WITH RECORD DATA SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. THE CONTRACTOR IS CAUTIONED TO CONTACT DIG SAFE (1-888-344-7233) 72 HOURS BEFORE DIGGING.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE HIS WORK WITH THE APPROPRIATE HIGHWAY & UTILITY DEPARTMENTS.
- CONTRACTOR SHALL MAINTAIN ALL EXISTING AND NEWLY INSTALLED UTILITIES IN GOOD WORKING ORDER AND SHALL PROTECT THEM FROM DAMAGE AT ALL TIMES UNTIL THE WORK IS COMPLETED AND ACCEPTED BY THE OWNER.
- ELECTRIC, GAS, TELEPHONE, AND CABLE TELEVISION UTILITY CONNECTIONS AND SERVICES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE RESPECTIVE UTILITY.
- THE CONTRACTOR SHALL UTILIZE ALL MEASURES AND MATERIALS NECESSARY TO ENSURE THE SAFETY OF ALL PERSONS AND PROPERTIES AT THE SITE DURING CONSTRUCTION. ALL EXCAVATIONS SHALL CONFORM TO CURRENT OSHA STANDARDS.
- A MINIMUM OF 18" VERTICAL CLEARANCE SHALL BE MAINTAINED WHENEVER SANITARY SEWERS PASS BELOW WATER MAINS OR DRAIN LINES. OTHERWISE, WATER SERVICE, DRAIN LINES AND SEWER LINES SHALL BE CAREFULLY ENCASED IN CONCRETE FOR A MINIMUM OF TEN (10) FEET FROM THE CROSSING POINT WHERE SEWER LINES PASS ABOVE WATER OR DRAIN LINES, THEY SHALL ALL BE ENCASED IN CONCRETE REGARDLESS OF CLEARANCE.

STORMWATER FACILITY OPERATION AND MAINTENANCE

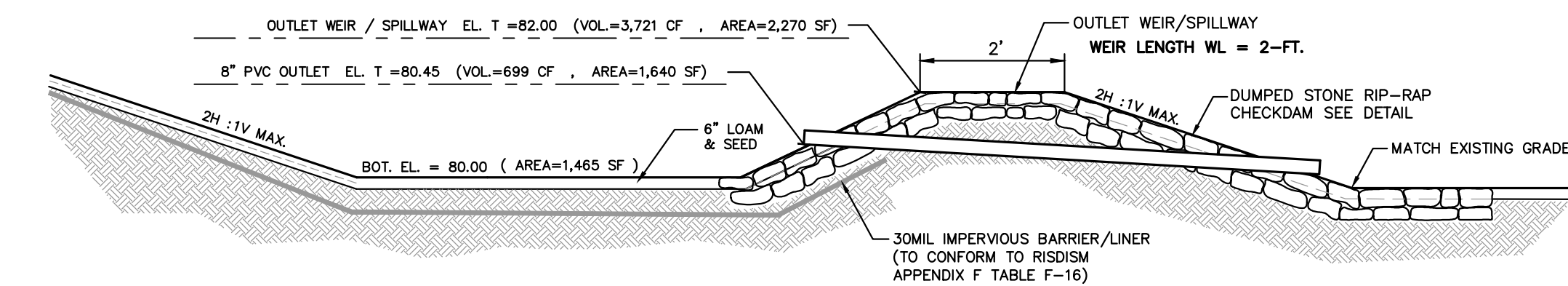
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER INSPECTION AND MAINTENANCE OF ALL STORMWATER FACILITIES UNTIL SUCH TIME AS THE DEVELOPMENT AND ASSOCIATED UTILITIES ARE ACCEPTED BY THE OWNER.
- ALL STORMWATER FACILITIES SHOULD BE INSPECTED AFTER EVERY MAJOR RAINFALL EVENT FOR THE FIRST 3 MONTHS AFTER CONSTRUCTION TO ENSURE PROPER STABILIZATION AND CONSTRUCTION.
- THE CONTRACTOR SHALL INSPECT AND CLEAN ALL FACILITIES OF SEDIMENT AND DEBRIS PRIOR TO THE OWNER'S ACCEPTANCE.
- ACCUMULATED SILT AND SEDIMENT SHOULD BE REMOVED FROM ALL FACILITIES AT LEAST ONCE A YEAR OR MORE FREQUENTLY IF ACCUMULATED DEPTH OF SEDIMENT EXCEEDS THREE INCHES.
- THE SIDE SLOPES AND BOTTOMS OF ALL DRAINAGE SWALES SHOULD BE MOWED TO A MINIMUM HEIGHT OF FOUR INCHES AT LEAST TWICE A YEAR. ALL GRASS CLIPPINGS AND ORGANIC MATTER SHOULD BE REMOVED FROM ALL DRAINAGE WAYS AND WETLAND BUFFER ZONES.
- ALL REMOVED SEDIMENTS ARE TO BE PROPERLY DISPOSED AT A LOCATION TO BE APPROVED BY THE BOARD OF HEALTH, TRANSPORTATION AND DISPOSAL OF SEDIMENTS SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.
- ANY DEFICIENCIES NOTED DURING MAINTENANCE SHALL BE REPORTED TO THE OWNER AND CORRECTED IMMEDIATELY.
- FOLLOW MANDATE PROGRAM AND SCHEDULE FOR EXISTING STORMWATER MANAGEMENT SYSTEM AS APPROVED BY THE TOWN OF BRISTOL AND THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT.

NOTES:

- ALL REFERENCES TO CLASS I OR II MATERIAL ARE PER ASTM D2321 "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST EDITION.
- ALL RETENTION AND DETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, LATEST EDITION AND THE MANUFACTURER'S PUBLISHED INSTALLATION GUIDELINES.
- MEASURES SHOULD BE TAKEN TO PREVENT THE MIGRATION OF NATIVE FINES INTO THE BACKFILL MATERIAL WHEN REQUIRED. SEE ASTM D2321.
- FILTER FABRIC:** A GEOTEXTILE FABRIC MAY BE USED AS SPECIFIED BY THE ENGINEER TO PREVENT THE MIGRATION OF FINES FROM THE NATIVE SOIL INTO THE SELECT BACKFILL MATERIAL.
- FOUNDATIONS:** WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER, AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
- BEDDING:** SUITABLE MATERIAL SHALL BE CLASS I OR II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO THE ENGINEER, UNLESS OTHERWISE NOTED BY THE ENGINEER. MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-1500mm).
- INITIAL BACKFILL:** SUITABLE MATERIAL SHALL BE CLASS I OR II IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
- MINIMUM COVER:** MINIMUM COVER OVER ALL RETENTION/DETENTION SYSTEMS IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER IS 12" UP TO 36" DIAMETER PIPE AND 24" OF COVER FOR 42" - 60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

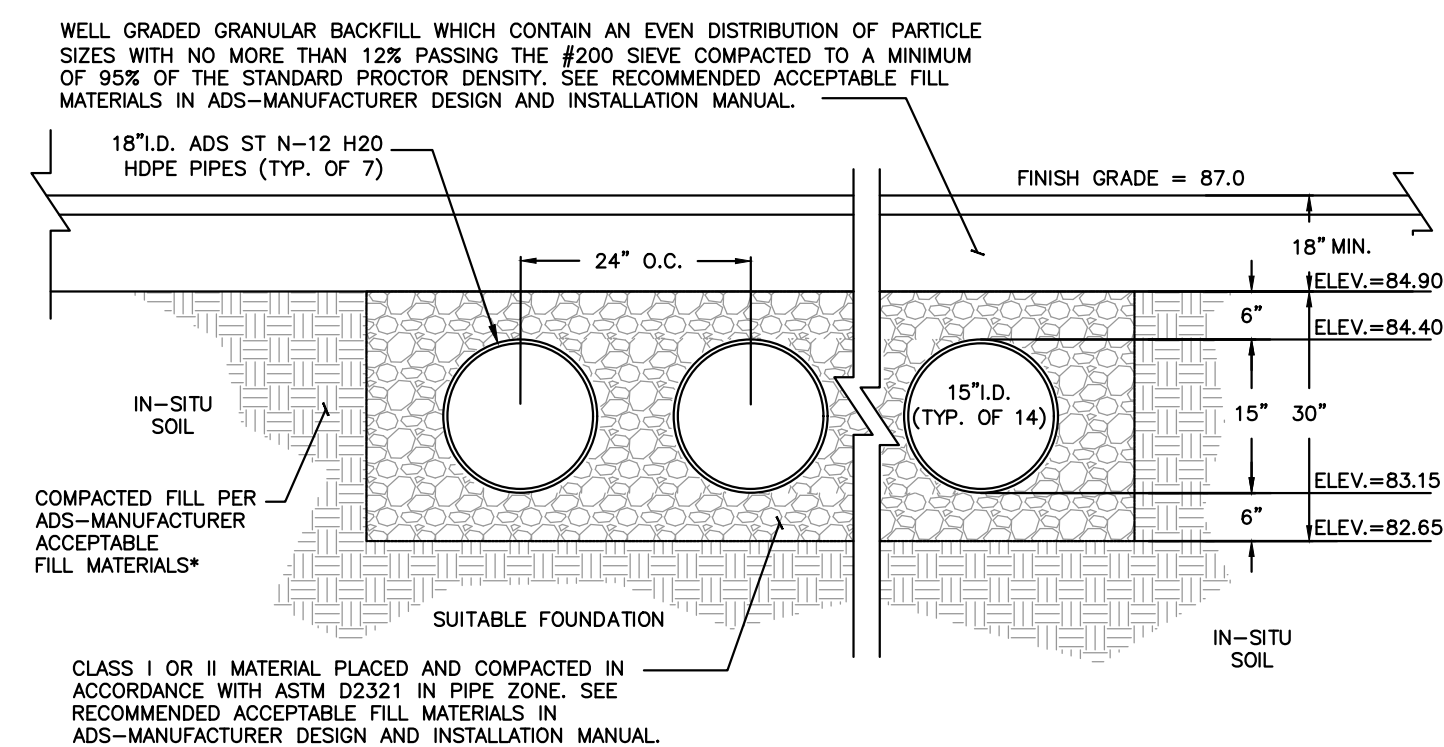


FOREBAY	TH-#	EXISTING ELEV.	SHGW ELEV.	BOTTOM OF BASIN 'A'	OUTLET WEIR ELEV. 'B'
1	TH-4	87.5	85.5	85.0	86.0
2	TH-2	82.0	81.0	83.0	83.8
3	TH-1	82.3	80.3	80.5	82.0

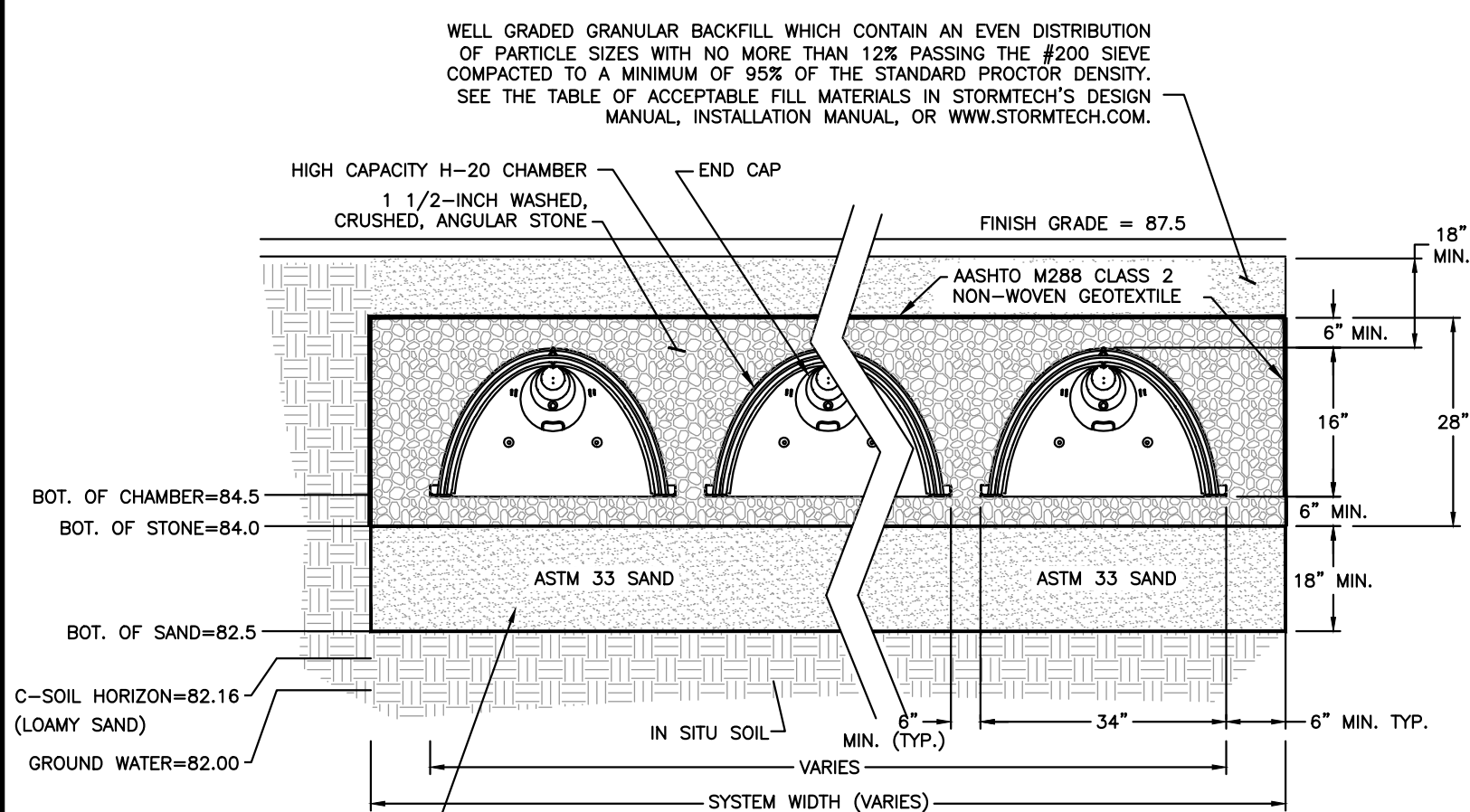


TH-#	EXISTING ELEV.	SHGW ELEV.	BOTTOM OF BASIN
TH-2	81.0	80.0	80.00

NOTES:
1. REFER TO PROJECT DRAINAGE REPORT HYDROCAD® CALCULATIONS FOR ADDITIONAL INFORMATION.

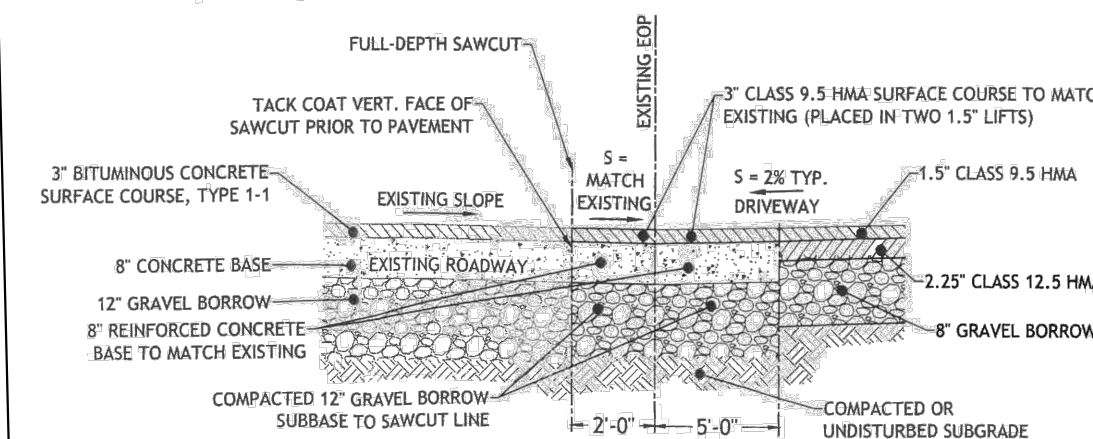


PLASTIC UNDERGROUND STORAGE SYSTEM ADS N-12 SOIL TIGHT (ST) PIPE



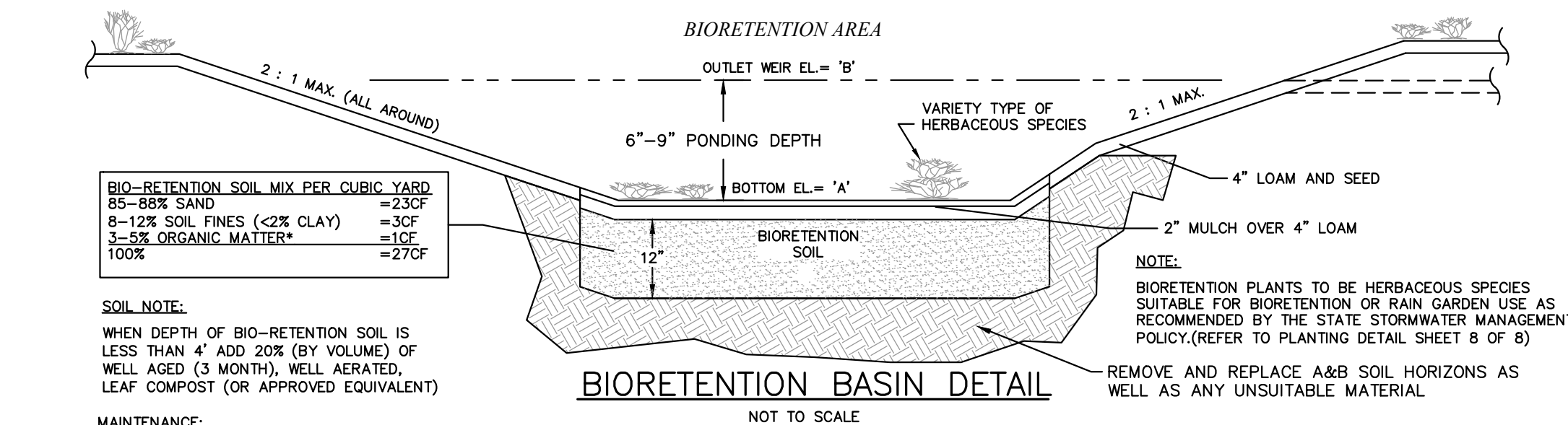
UNDERGROUND SYSTEM	EXISTING ELEV.	SHGW ELEV.	BOTTOM OF CHAMBER	NUMBER OF CHAMBERS WIDE	NUMBER OF CHAMBERS LONG	TOTAL NUMBER OF CHAMBERS
1	84.0	82.0	84.5	6	8	48

- NOTES:**
- ALL WORK WITHIN THE STATE'S RIGHT-OF-WAY (ROW) SHALL CONFORM TO RIDOT'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AMENDED AUGUST 2013 AND STANDARD DETAILS, JUNE 15, 1998, AS AMENDED BY REVISION.
 - UTILITY WORK SHOWN IS FOR REFERENCE. THIS WORK NEEDS TO BE PERMITTED THROUGH A UTILITY PHYSICAL UTILITY PERMIT (PUP) WITH RIDOT'S DIVISION OF MAINTENANCE.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MAINTENANCE AND PROTECTION OF PEDESTRIAN AND VEHICULAR TRAFFIC INCLUDING POLICE PROTECTION. ALL TEMPORARY AND VEHICULAR SIGNS, BARRICADES AND LANE CLOSURES SHALL BE IN CONFORMANCE WITH THE LATEST REVISIONS OF MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
 - CONTRACTOR TO PROVIDE TEMPORARY EROSION CONTROLS TO PROTECT THE STATE ROW DURING THE DEMOLITION OF EXISTING DRIVEWAY AND CONSTRUCTION OF NEW DRIVEWAY.



- NOTES:**
- MINIMUM COMPACTION FOR GRAVEL SUB-BASE OR SUBGRADE: 95% MODIFIED PROCTOR.
 - NO WORK SHOULD BE DONE OUTSIDE OF THE PROJECT SITE. PAVEMENT SHOULD MATCH WHERE NOTED ON THE SITE PLANS.
 - WHEN MATCHING EXISTING PAVEMENT, THE LONGITUDINAL CUT AND MATCH SECTION SHOULD NOT EXCEED PAST THE SHOULDER STRIPING.

ROW SAWCUT AND MATCH DETAIL



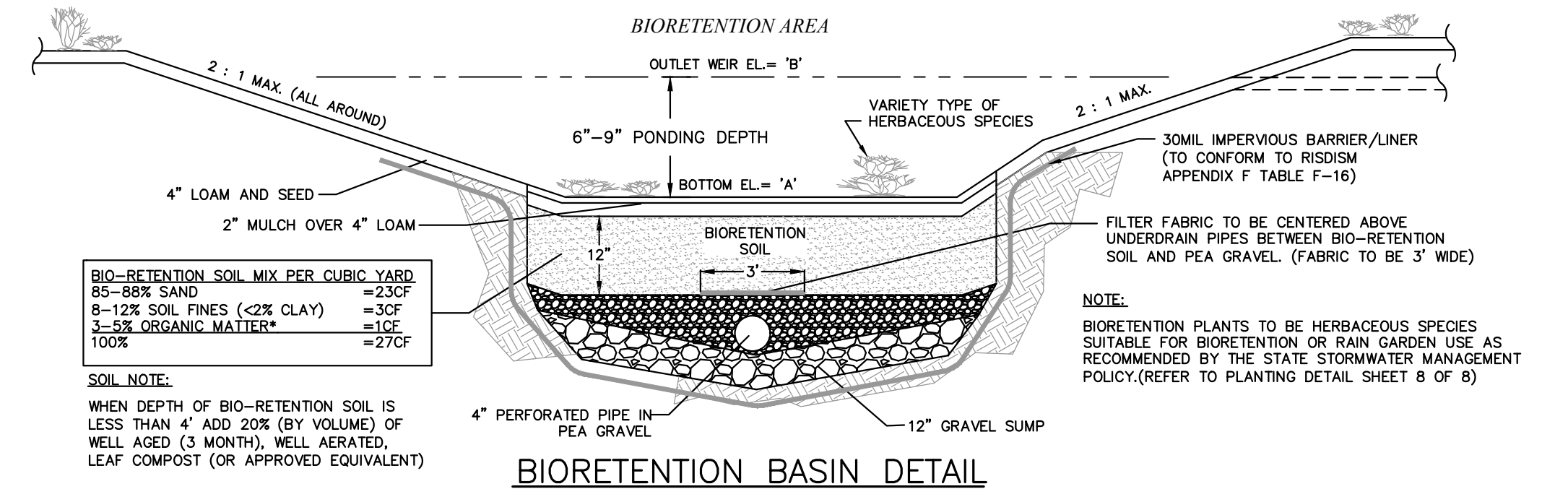
BIO-RETENTION SOIL MIX PER CUBIC YARD
85-85% SAND = 23CF
8-12% SOIL FINES (<2% CLAY) = 3CF
3-5% ORGANIC MATTER* = 1CF
100% = 27CF

SOIL NOTE:
WHEN DEPTH OF BIO-RETENTION SOIL IS LESS THAN 4" ADD 20% (BY VOLUME) OF WELL AGED (3 MONTH), WELL AERATED, LEAF COMPOST (OR APPROVED EQUIVALENT)

MAINTENANCE:

SILT/SEDIMENT SHALL BE REMOVED FROM THE FILTER BED WHEN THE ACCUMULATION EXCEEDS 1 INCH. WHEN THE FILTERING CAPACITY OF THE FILTER DIMINISHES SUBSTANTIALLY, THE TOP FEW INCHES OF DISCOLORED MATERIAL SHALL BE REPLACED WITH FRESH MATERIAL. THE REMOVED SEDIMENTS SHALL BE DISPOSED IN AN ACCEPTABLE MANNER AT AN APPROVED AND PERMITTED LOCATION.

DURING THE SIX MONTHS IMMEDIATELY AFTER CONSTRUCTION, FILTER PRACTICES SHALL BE INSPECTED FOLLOWING AT LEAST THE FIRST TWO PRECIPITATION EVENTS OF AT LEAST 1.0 INCH TO ENSURE THAT THE SYSTEM IS FUNCTIONING PROPERLY. THEREAFTER, INSPECTIONS SHALL BE CONDUCTED ON AN ANNUAL BASIS AND AFTER STORM EVENTS OF GREATER THAN OR EQUAL THE 1-YEAR, 24-HOUR TYPE III PRECIPITATION EVENT.



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85-85% SAND = 23CF
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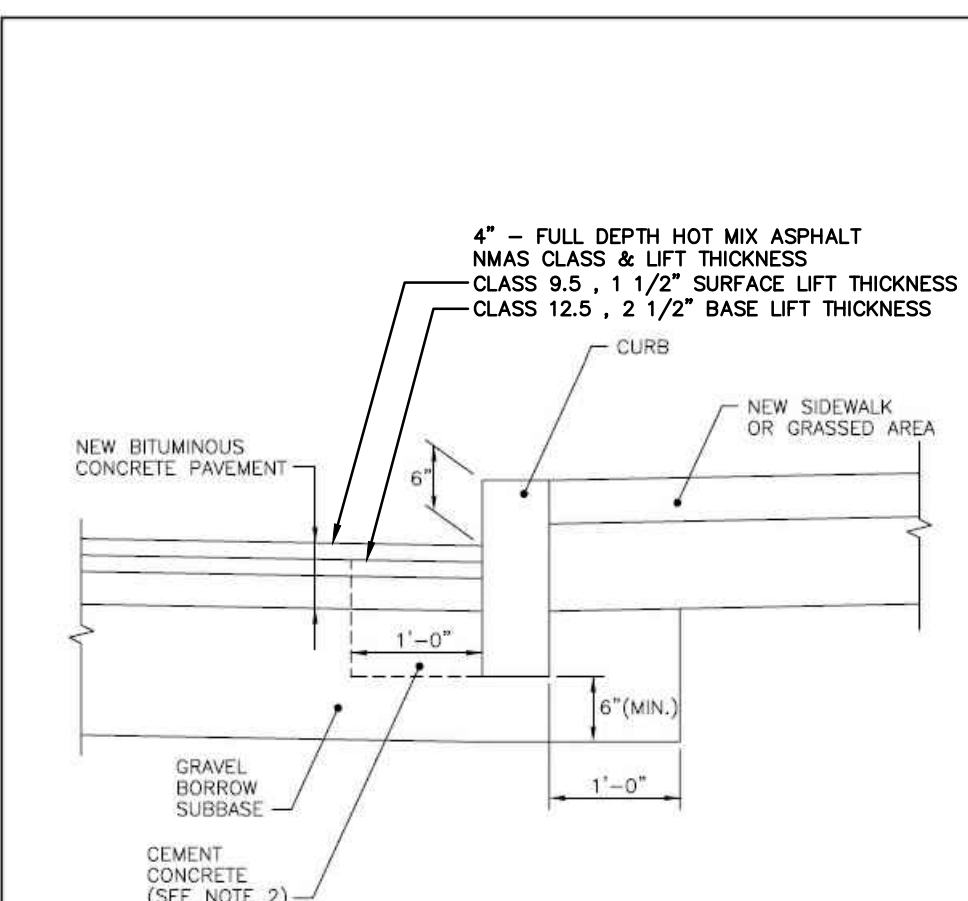
BIORETENTION BASIN FILTER SIZING CALCULATIONS

BIO-RETENTION FILTER BED SIZING CALCULATIONS:
(SECTION 8.23.D.6 OF RISDMM)

$$A_f = (WQ_v)(d_f) / [(k)(h_f + d_f)(t_f)]$$

A_f = MIN SURFACE AREA OF FILTER BED (SF)
 d_f = FILTER BED DEPTH
 k = COEFFICIENT OF PERMEABILITY (1.0 FOR BIO-RETENTION)
 h_f = AVERAGE HEIGHT OF WATER ABOVE SURFACE OF PRACTICE
 t_f = DESIGN FILTER BED DRAIN TIME (2-DAYS MAX)
 $A_f = (WQ_v)(t_f) / [(1)(h_f + 1)(2)]$

BIO-RETENTION BASIN	WQv	df	k	hf	tf	REQUIRED FILTER BED SIZE	PROVIDED FILTER BED SIZE
1	331	1'	1'	0.75'	2	95 SF	678 SF
2	805	1'	1'	0.75'	2	230 SF	563 SF
3	10	1'	1'	0.5'	2	3 SF	374 SF
4	187	1'	1'	0.75'	2	54 SF	157 SF



THE RIDOT HOT MIX ASPHALT (HMA) CONSTRUCTION SPECIFICATIONS NEW DESIGNATION THE TERM "BINDER" SHOULD ONLY BE USED AS A REFERENCE TO LIQUID ASPHALT. REFER TO RIDOT'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AMENDED 2013, WITH ALL REVISIONS, AND R.I. STANDARD DETAILS, 1998 EDITION, WITH ALL REVISIONS.

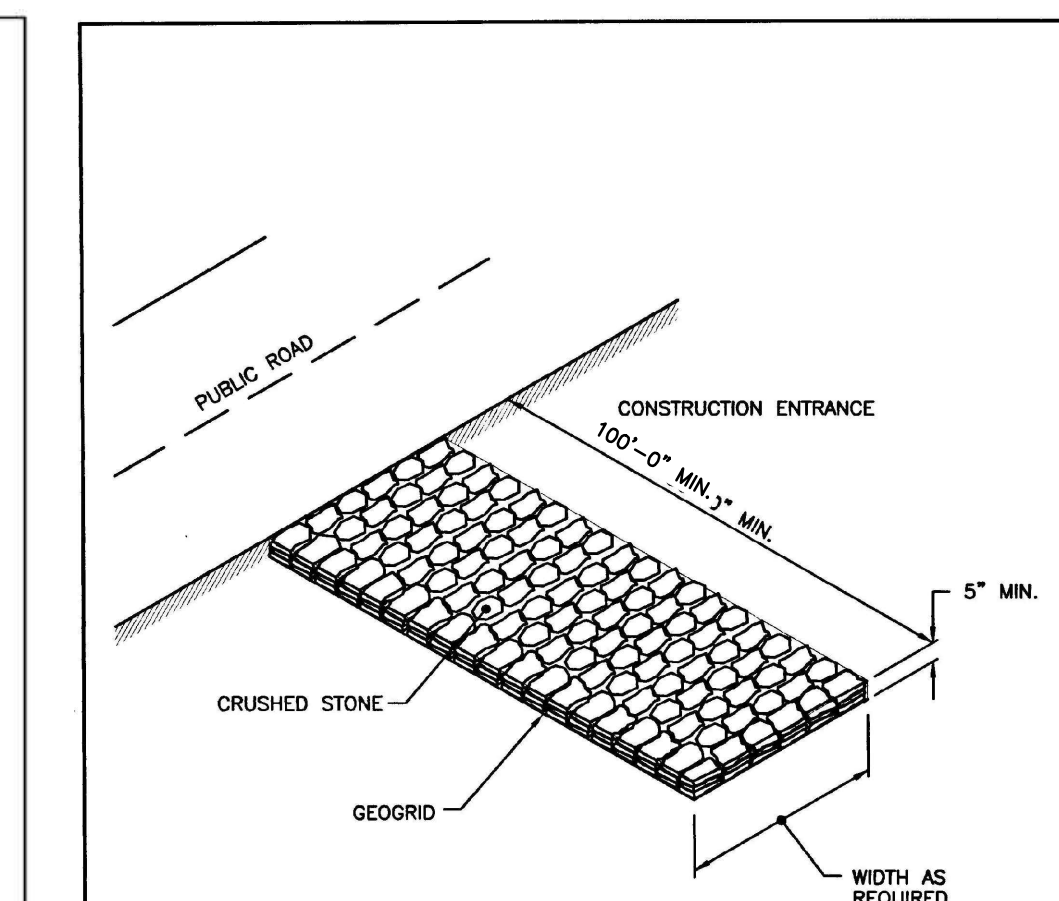
- NOTES:**
- SHALL BE IN ACCORDANCE WITH SECTION 908 OF THE R.I. STANDARD SPECIFICATIONS.
 - CEMENT CONCRETE SHALL BE USED ONLY WHEN THE CURB IS SET AFTER THE BASE, AND/OR BINDER COURSES ARE IN PLACE, OTHERWISE THE CEMENT CONCRETE WILL BE ELIMINATED AND THE GRAVEL BROUGHT UP TO BOTTOM OF THE BASE COURSE.

NO.	BY	DATE
1	MLP	Mar. 05
2	MLP	Mar. 2010
3	MLP	Mar. 2012

3'-0" GRANITE TRANSITION CURB

JUNE 15, 1998

7.3.1



NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 211 OF THE R.I. STANDARD SPECIFICATIONS.

NO.	BY	DATE
1	MLP	Mar. 05
2	MLP	Mar. 2010
3	MLP	Mar. 2012

CONSTRUCTION ACCESS (MODIFIED)

JUNE 15, 1998

9.9.0

MEMBER

DATE

PLANNING BOARD SIGNATURES



207 High Point Avenue, Unit 6
Portsmouth, RI 02871
T: 401-354-2050 F: 401-369-9775
WWW.SDE-LDEC.COM

NO.	DATE	DESCRIPTION	APPROVED
1.	3/15/2023	MODIFIED DRIVEWAY LOCATIONS	MER

PLAN REVISIONS

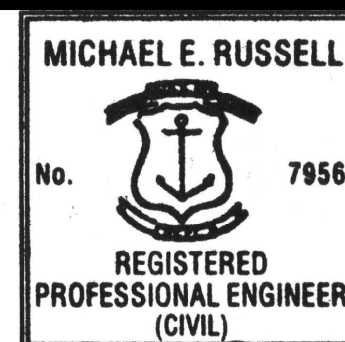
DATE: MARCH 6, 2023

DRAWN BY: SJE COMPS. BY: SJE CHECK BY: RLM/MER

PROJECT NO. 22024

ISSUED FOR:

PERMITTING



MAJOR LAND DEVELOPMENT FINAL PLAN APPLICATION

1200 & 1202 HOPE STREET
BRISTOL, RHODE ISLAND
ASSESSORS MAP 103, PARCEL 2 & 14

PREPARED FOR
PREFERRED REALTY SERVICES, LLC

DRAWING TITLE:

CONSTRUCTION DETAILS

SCALE: 1" = 20'

SHEET NO.

9 OF 9



Town of Bristol, RI
WATER POLLUTION CONTROL DEPARTMENT
2 PLANT AVENUE
BRISTOL, RI 02809-3015
(401) 253-8877 fax: (401) 253-2910

TOWN HALL
10 COURT STREET
BRISTOL, RI 02809
(401) 253-7000

Jose' J. Da Silva, Superintendent

3/16/2023

Comments on Land Modification at 1200 Hope Street.

1. For common gravity sewer pipe servicing structure 3-4 and 5-6 going out to Knowlton Court, main should be an 8 inch diameter pipe rather than 6 inch. There should also be a man-hole installed on the southern end of the piping for maintenance.
2. Plans to permanently abandon or removing existing buried sanitary sewer needs to be shown. Want to prevent groundwater intrusion.
3. What is the proposed sizing and discharge location of the new low pressure sewer servicing structures of 1-2 and 7-8 and the existing 1200 Hope Street dwelling? Are you proposing all to be low pressure or a combination? Needs better detail. There is also a proposed storm water discharge management system proposed in that general area. Why not connect structure 1-2 and 7-8 to the gravity line proposed to Knowlton Court and leave the original 1200 Hope Street as is.
4. Detail for the sewer force main on plans are very shallow, shown to be 2', would be susceptible to freezing. Pipe material should be specified.
5. Plans need to depict locations for cleanouts, (both for gravity and low pressure sewer), plans show proposed drawing of cleanout for a force line at depth of 4 feet.
6. Will this development be private, like a condo complex, with future maintenance being the responsibilities of the owners or public and that of the Town?
7. There are no profile drawings on plan showing depths of gravity sewer.
8. Page eight of plans does not match other sheets of set.

Respectfully,

Jose' Da Silva
Superintendent
Bristol WPCF