NORTHEAST ENGINEERS & CONSULTANTS, INC.

Stormwater Runoff Analysis

"Valley Crossing"
Assessor's Map 107NE, Lot 402B
0 Valley Road
Middletown, RI

Prepared For
James S. Clausen
Revocable Trust
7067 Villa Estelle Court
Orlando, FL 32819

Rev. March 1, 2023

6 Valley Road ● Middletown, RI 02842 ● p. 401.849.0810 ● f. 401.846.4169 ● northeastengineers.com
Civil ● Site ● Land Development ● Waterfront ● Coastal Engineering ● Environmental ● Geotechnical ● Structural ● Renewable ● Surveying

TABLE OF CONTENTS

1.0 PROJECT NARRATIVE

1.1 SITE INFORMATION

City / Town:	Middletown, Rhode Island
Adjacent Roadways:	Valley Road (RI State Roadway)
Lot(s) identification:	A.P. 107NE Lot 402B
Zoning District:	LBA (Limited Business – Traffic Sensitive)
Current Use:	Vacant
Site Area:	2.25 Acres
FEMA Zone and Map:	Zone "X (Panel 44005C0093J)

1.2 EXISTING IMPROVEMENTS AND SITE CONDITIONS

The Site includes a single parcel which was formerly Parcel "B" of a three-lot subdivision of Lot 402 completed in 2021. The Site is, and has historically been, a vacant property. The Site fronts on Valley Road (RI RT 214), a state maintained right of way. The Site also has a small amount of frontage at the rear of the lot on Bristol Road, a town-maintained roadway. There is no formal access to the Site from either roadway. The Site abuts vacant commercial properties to the north and south, both of which also front on Valley Road. To the rear and northeast of the Site lies small residential properties zoned R20 (high density residential). Ground cover on the Site is limited to grasses, with larger shrub vegetation along the perimeter edges. Municipal sewer and water mains are available to the rear of the Site in Bristol Road. Overhead electrical and communication services are available on the east side of Valley Road. There are no stormwater quality or control devices located on the property. The frontage along Valley Road includes a bituminous concrete sidewalk with precast concrete curbing. Both the sidewalk and the curbing are in poor condition.

1.3 PROTECTED FEATURES

A small area of freshwater wetlands is located in the northeast corner of the property. These wetlands were delineated by Natural Resource Services, Inc. in January of 2019. There is no perimeter wetland associated with this small area of wetlands. The property is located in the Town of Middletown Watershed Protection District Zone 2. The ultimate receiving waterbody for the property is Bailey's Brook (WB ID RI0007035R-01). This waterway has been assessed with a TMDL for bacteria (enterococcus).

1.4 SITE TERRAIN AND SOILS

In general, the site slopes from upland residential properties to the northeast down towards Valley Road and then northwest towards the vacant abutting property. Only a small portion of the property slopes towards the state-maintained sidewalk. Slopes vary between 3% and 8%. No portion of the property has slopes approaching or exceeding 15%. The soil types on site are mapped as PmA and PmB (Pittstown silt loams) by the USDA Natural Resource Conservation Service. These silt loams are type C hydrologic soils common to Aquidneck Island. Class IV soil evaluations performed in the area of development revealed **sandy loams** near the surface with **silty loams** below. The depths to seasonal high groundwater were assessed at about 60 inches by water table monitoring performed in February 2023.

1.5 PROPOSED IMPROVEMENTS

The applicant intends to construct a medical office on the vacant property. The development will occupy the front of the site. A single 10,000 square foot structure is proposed. The site shall be accessed via a new paved driveway from Valley Road. This driveway will require a new curb cut. The existing curb cut, at the north end of the site, will be closed. This new curb cut is to be situated sufficiently far from the southern property line so as to provide appropriate sight lines and RIDOT edge clearance. Parking is to be provided surrounding the structure. Vehicle access around the structure is provided for proper circulation. An enclosed trash area is to be located to the rear of structure. The one-way aisle to the north of the structure will provide the loading zone required by the zoning ordinance. Concrete sidewalks are to run along all sides of the medical office. The proposed lot coverage shall be within the maximum 35% lot coverage allowable by the zoning ordinance. The rear of the property will be planted with meadow grasses.

New public and private utility services will be provided for the site. The water service is proposed from Bristol Road in order to avoid cutting the state roadway and will require the approval of Newport Water. The proposed sewer service will connect to an existing main in Woolsey Road via a pressurized service in the shoulder of Bristol Road. A sewer manhole proposed at the corner of Bristol Road and Woolsey Road will provide the transition from pressurized service to gravity service. This sewer connection will require approval from the Middletown Public Works Department. The proposed electrical service from the overhead lines shall be subject to design and approval by National Grid. As no connections to subsurface utilities in Valley Road are proposed, no RIDOT utility permits are expected to be required.

Stormwater control for this development will be provided an infiltration basin located along the north side of the property. Pretreatment for this device will be provided by a sediment forebay. A smaller, infiltration area, supported by a Stormcepter STC450i hydrodynamic separator, is provided along the south side of the propert. A vegetated swale along the front of the property will provide conveyance of stormwater from abutting and upstream properties through the property and towards Bailey Brook to the north. In order to prevent parking lot runoff from entering Valley Road, a trench drain is proposed in the entrance drive. This device is routed back into the site and into the smaller infiltration area. A second swale is to be provided behind the development to capture and convey stormwater from upstream residential properties. This swale will discharge to the freshwater wetlands on the property. This device has been included in the design to provide additional stormwater treatment for upstream off-site impervious surfaces in order to offset pollutants generated by the development.

2.0 PROPOSED ALTERATIONS AND STORMWATER CONSIDERATIONS

2.1 STORMWATER SYSTEM OBJECTIVES

The objectives of the project stormwater system are to accomplish the following:

- **Provide water quality treatment and groundwater recharge for stormwater runoff in accordance with the Rhode Island Stormwater Design and Installation Rules (250-RICR-150-10-8), hereafter abbreviated as the "Rules".**
- **Convey stormwater from upland residential properties through the property.**
- **Maintain the overall drainage patterns from the site to the extent practicable.**
- **Minimize the peak runoff to the downstream DOT right of way.**
- **Minimize the total 24-hour volume runoff to the downstream DOT right of way.**

2.2 REDEVELOPMENT SITE

As the existing site lot coverage consists of much less than 40% impervious and there are no existing impervious surfaces to be redeveloped, this project does not qualify as a "redevelopment site" per section 8.12 of the Rules.

2.3 MINIMUM STORMWATER MANAGEMENT STANDARDS

2.3.1 MINIMUM STANDARD 1: LID SITE PLANNING AND DESIGN STRATEGIES

The proposed development utilizes LID designs conforming to the Rules. These elements are located immediately downstream of the new improvements and will directly treat the newly generated runoff with minimal interception of on-site clean runoff.

2.3.2 MINIMUM STANDARD 2: GROUNDWATER RECHARGE

This standard shall be met by the two infiltration areas. A total of **0.70 acres** of impervious surfaces requires recharge. This equates to a total of **633** cubic feet of recharge volume based on the underlying hydrologic soil type. Per the HydroCAD analysis of the 1.2-inch WQ storm (split pervious method) a total of **2,222** cubic feet of recharge is provided. Refer to Appendix E for complete calculations.

2.3.3 MINIMUM STANDARD 3: WATER QUALITY

This standard shall be met by the two infiltration areas. A total of **0.70 acres** of impervious surfaces requiring water quality is proposed. This equates to a total of **2,533** cubic feet of water quality volume. Per the HydroCAD analysis of the 1.2-inch WQ storm (split pervious method) a total of **4,227** cubic feet of treatment is provided. Refer to Appendix E for complete calculations. As shown in the WQ storm analysis, the entire complement of the WQ storm volume is infiltrated in the two devices. Refer to Appendix F for the water quality storm calculations.

Additional water quality is provided by a dry swale for upland offsite single family residential properties. A total of **3,150** cubic feet of water quality volume is provided by this device. A total of **0.35** acres of

abutting residential neighborhoods drains to the wet swale. These areas are approximately **38%** impervious yielding a total of **5,793** square feet of off-site impervious This dry swale is sufficient to provide the required **483** cubic feet of water quality volume. Refer to Appendix E for complete calculations.

2.3.4 MINIMUM STANDARD 4: CONVEYANCE AND NATURAL CHANNEL PROTECTION

This standard may be waived for facilities with less than one acre of imperious area; however, channel protection volume has been provided for in the infiltration basin. Sizing of the channel protection volume orifice is shown in Appendix E.

2.3.5 MINIMUM STANDARD 5: OVERBANK FLOOD PROTECTION

The TR-20 HydroCAD model demonstrates that the proposed system will successfully mitigate the 100-year storm event. In these calculations, all pre-development land was characterized as "good condition" as required by this standard. An off-site component of runoff from upstream residential properties passes through the development area, which was also modeled as "good condition". The modeling also demonstrates that the structures and stormwater devices will safely pass the 100-year storm event without flooding or breaching.

2.3.6 MINIMUM STANDARD 6: REDEVELOPMENT AND INFILL PROJECTS

As stated in section 2.2 above, this project does not qualify as a re-development project.

2.3.7 MINIMUM STANDARD 7: POLLUTION PREVENTION

Source controls and pollution prevention measures will be present during all phases of construction. A separate stormwater pollution prevention plan (Soil Erosion and Sediment Control Narrative) has been prepared.

2.3.8 MINIMUM STANDARD 8: LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS

The use of this property does not quality as a LUHPPL and does not require any specific source controls, limited BMPs, or and additional state permitting.

2.3.9 MINIMUM STANDARD 9: ILLICIT DISCHARGES

Neither the using use nor any proposed uses will include any discharges considered to be "illicit" per the Rules.

2.3.10 MINIMUM STANDARD 10: SOILS EROSION AND SEDIMENT CONTROL

Soil erosion and sediment control measures will be implemented during all phases of construction. A SESC plan has been provided in the permitting plan set and a separate Soil Erosion and Sediment Control Narrative has been prepared.

2.3.11 MINIMUM STANDARD 11: STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE

An Operations and Maintenance (O&M) Document has been prepared. This document satisfies the minimum requirements of the Rules.

2.4 OVERALL STORMWATER DESIGN FUNCTION

The overall design of the stormwater system is to provide a reduction in peak rate of runoff and total volume runoff, and will meet the 11 minimum standards established in the Rules. All proposed stormwater devices are to be situated downstream of the proposed improvements or offsite impervious areas and upstream of the existing receiving points for the runoff from this catchment. The existing drainage patterns across the site will be minimally impacted. There will be minimal impacts to the receiving state right of way.

2.5 POLLUTANT LOADING CALCLUATION

The downstream receiving water body, Bailey's Brook, has a TMDL for bacteria (enterococcus). A pollutant loading analysis (PLA) was performed for the development. This calculation is located in Appendix E. There will be a reduction in bacterial pollutant loading as a result of this development.

3.0 DESIGN MODELING METHODOLOGY

Runoff and routing calculations have been performed for the watershed areas affected by the proposed development under existing and proposed development conditions scenarios. Time of concentration and runoff curve number calculations have been performed using the method described in NRCS Technical Release 55 – Urban Hydrology for Small Watersheds. The TR-20 based HydroCAD modeling software has been utilized to perform the more complex runoff and routing calculations, most of which are beyond the scope of the TR-55 method.

Design rainfall events have been modeled using the Soil Conservation Service (SCS) Type III hydrograph for 24-hour duration storms. The rainfall depth for each return period is taken from Section 8.6 of the Rules. This Section split the state into five regions for rainfall frequency based on county. The project site is located in the **Newport** County region. The rainfall frequency values required by the Rules and used in this drainage analysis are listed in the table below.

Rainfall Frequency Values for **Newport County** Rhode Island with 24-Hour Storm Duration					
RIDEM *Stormwater Design and Installation Rules (250-RICR-150-10-8)*					
Frequency	1-Yr	2-Yr	10-Yr	25-Yr	100-Yr
Inches of Rainfall	2.8	3.3	4.9	6.1	8.6

The existing and proposed conditions runoff calculations were analyzed and the proposed stormwater system was designed to mitigate the peak runoff for the 1, 2, 10, 25, and 100-year 24-hour design storms. The resulting design effectively mitigates and treats runoff from newly developed areas of the site before allowing it to discharge in a non-erosive manner to downstream areas in accordance with the Rules.

3.1 ANALYSIS DESIGN POINTS AND OFF-SITE CONTRIBUTIONS

The proposed development contributes stormwater runoff to the following design points. These design points provide a direct comparison for pre-construction and post-construction runoff flows and runoff volumes.

1. Valley Road
2. Northwesterly Abutter

The following off-site areas contribute surface stormwater runoff to these design points. This runoff either drains through the project area or contributes in some manner which directly affects the design of the stormwater system and has been included in the design calculations. These areas are:

1. Upstream residential properties
2. Commerical development (minuature golf course) currently under construction to the south.

Watershed maps for both the existing and proposed conditions can be found in Appendix B. These maps demonstrate the areas of the site which contribute to each of the design points and indicate the general pattern of surface or piped runoff flow.

4.0 STORMWATER RUNOFF COMPARISONS

Analysis of the existing and proposed runoff during design storms demonstrates that there will no increase in the peak runoff and total volume runoff to the downstream design points as a result of the development. Comparisons of the runoff at the design points are given below in Section 4.1. The runoff volumes given have been evaluated over a 24-hour period. All of the HydroCAD modeling worksheets are attached in Appendices C and D.

4.1 SUMMARY OF STORMWATER CALCULATIONS

Table 4.1.1 Comparison of Runoff Values at Valley Road (101 vs. 201)

Storm Return Period	Existing Conditions Peak Runoff (cfs)	Proposed Conditions Peak Runoff (cfs)	Existing Conditions 24-hr Volume Runoff (af)	Proposed Conditions Volume 24-hr Runoff (af)
1-year	0.09	0.12	0.006	0.008
2-year	0.11	0.15	0.007	0.010
10-year	0.18	0.24	0.012	0.017
25-year	0.23	0.31	0.016	0.023
100-year	0.33	0.46	0.024	0.034

Table 4.1.2 Comparison of Runoff Values at Northwest Abutter (102 vs. 202)

Storm Return Period	Existing Conditions Peak Runoff (cfs)	Proposed Conditions Peak Runoff (cfs)	Existing Conditions 24-hr Volume Runoff (af)	Proposed Conditions Volume 24-hr Runoff (af)
1-year	6.30	5.83	0.761	0.706
2-year	9.31	8.98	1.059	0.995
10-year	19.92	18.90	2.121	2.052
25-year	28.13	26.87	2.983	2.915
100-year	45.86	44.99	4.868	4.796

5.0 LIMITATIONS AND SPECIAL TERMS AND CONDITIONS

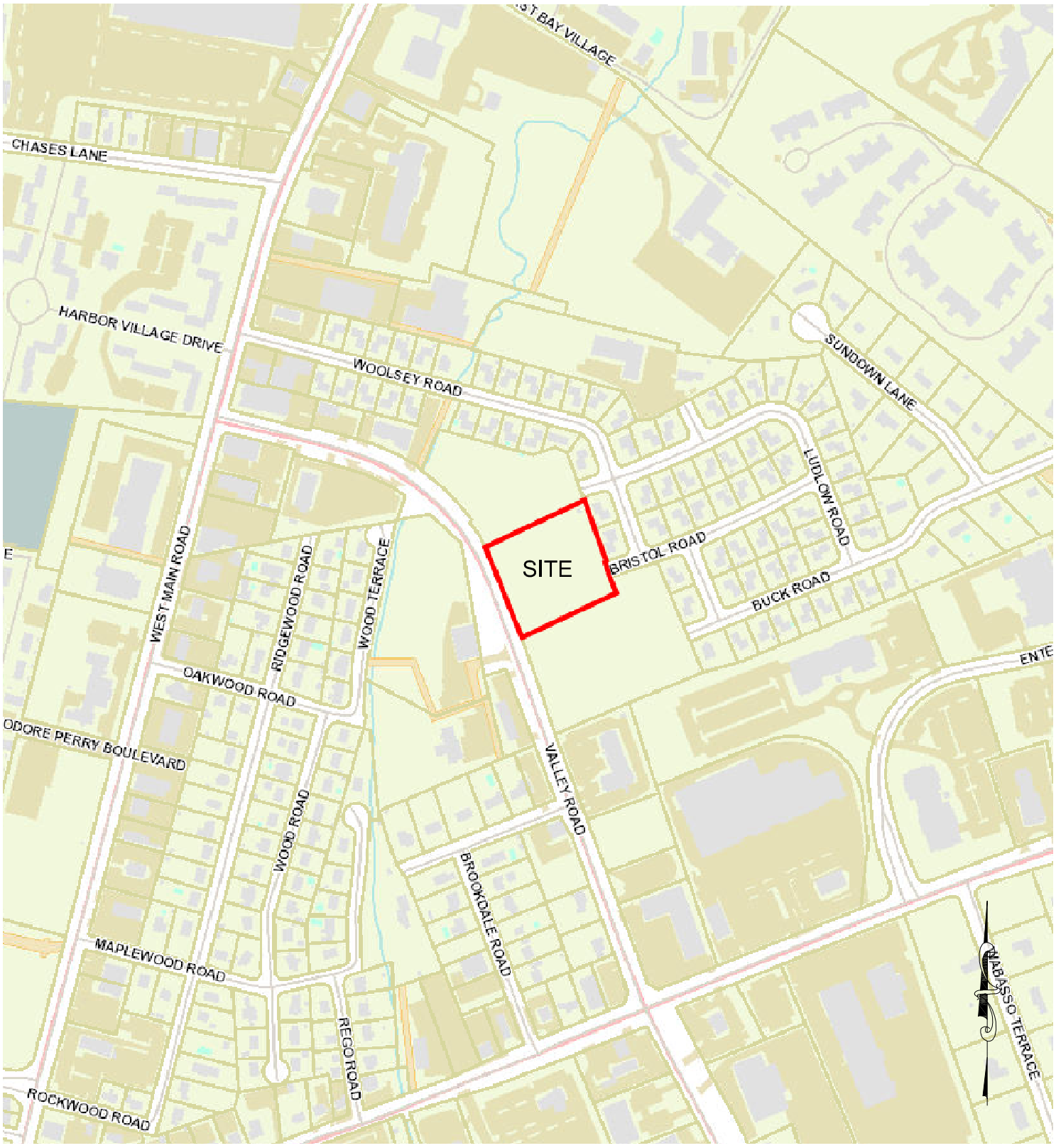
1. NE&C's evaluation was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and NE&C observed the degree of care and skill generally exercised by other consultants under similar circumstances and conditions. No warrantee expressed or implied is made.

2. Any additional research conducted should be reviewed by Northeast Engineers & Consultants, Inc., such that the conclusions presented herein may be modified.

3. All observations documented in this report were performed under the existing conditions at the time of the assessment.

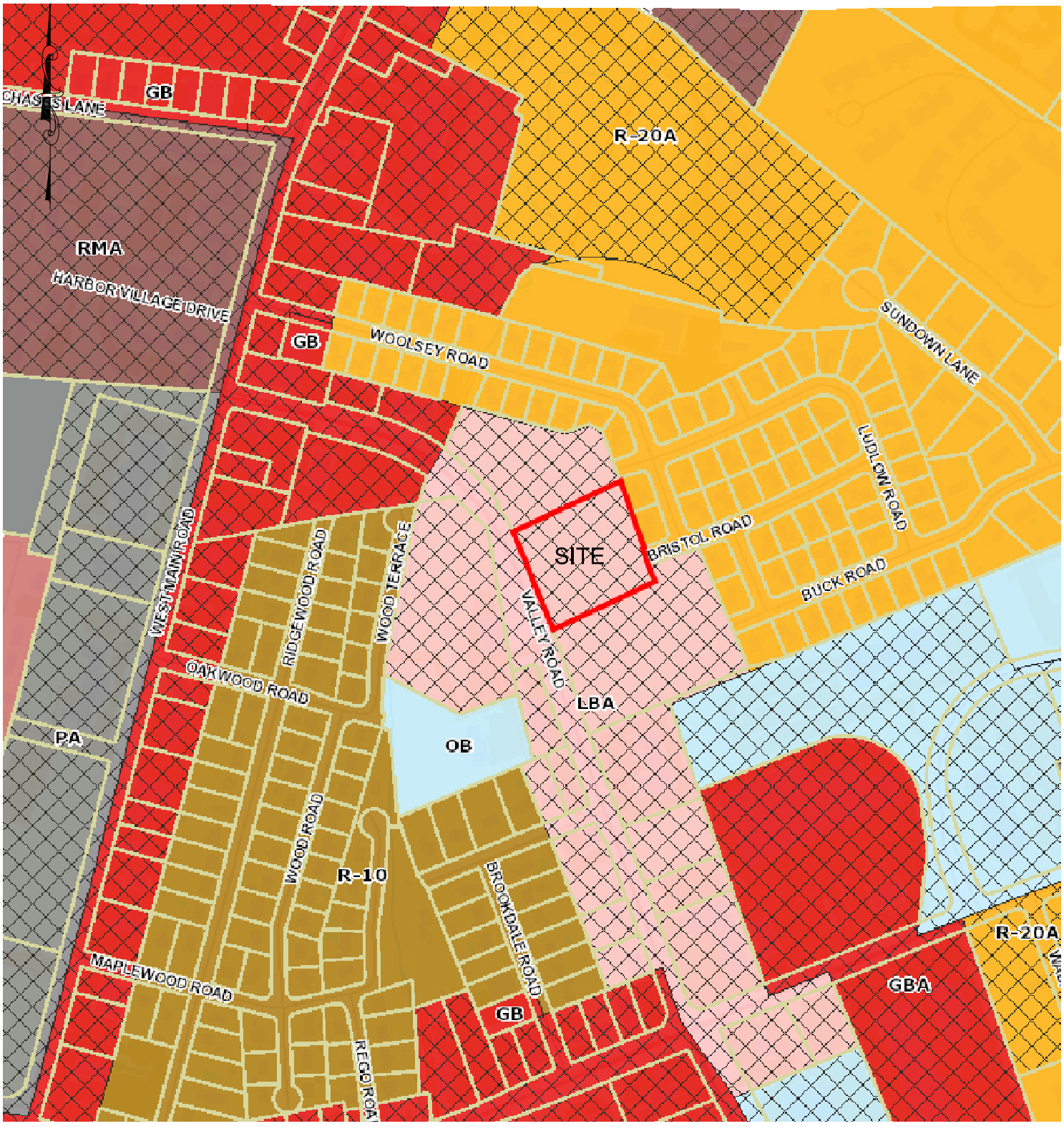
4. This report has been prepared on the behalf of and is for the exclusive use of the Client. This report and findings contained herein shall not, in whole or in part be disseminated or conveyed to any party, nor used by any other party in whole or in part, without the written consent of NE&C.

APPENDIX A FIGURES



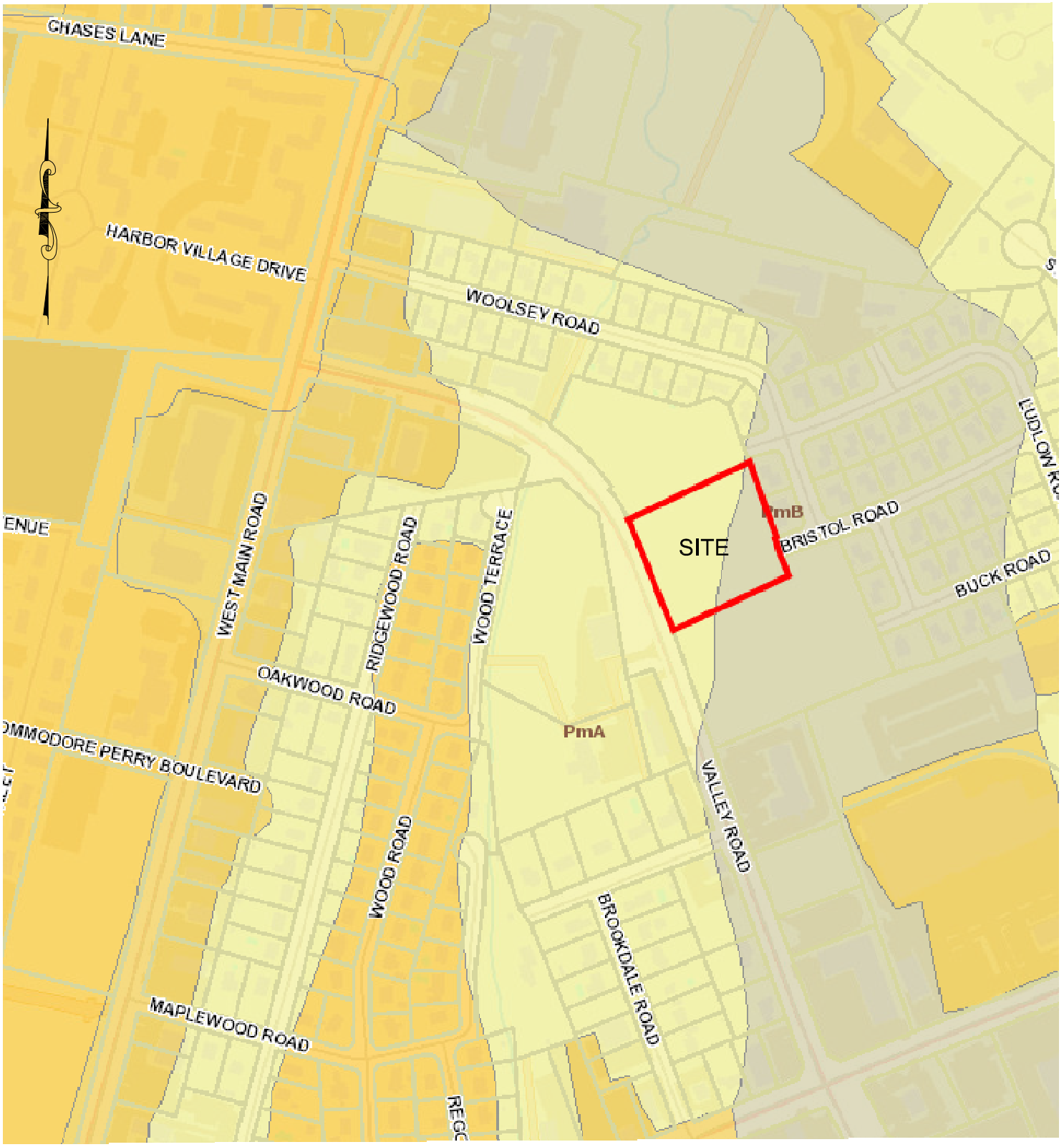
Scale: NTS	Date: 07JUN22	Designed By: JJR	Drawn By: JJR	Checked By: GES

Project Title:	Drawing Title:	
VALLEY CROSSING MIDDLETOWN, RHODE ISLAND	LOCUS MAP	
Issued for: PERMITTING	Drawing Number: FIG 1	Project Number: 18225.5



Scale: NTS	Date: 07JUN22	Designed By: JJR	Drawn By: JJR	Checked By: GES

Project Title:	Drawing Title:	
VALLEY CROSSING MIDDLETOWN, RHODE ISLAND	ZONING MAP	
Issued for: PERMITTING	Drawing Number: FIG 2	Project Number: 18225.5



Scale: NTS	Date: 07JUN22	Designed By: JJR	Drawn By: JJR	Checked By: GES

Project Title:	Drawing Title:	
VALLEY CROSSING MIDDLETOWN, RHODE ISLAND	SOILS MAP	
Issued for: PERMITTING	Drawing Number: FIG 3	Project Number: 18225.5

APPENDIX B WATERSHED MAPS

NORTHEAST ENGINEERS
& CONSULTANTS, INC.
A KNOWLEDGE CORPORATION®
6 VALLEY ROAD MIDDLETOWN RHODE ISLAND 02842
PHONE (401) 849-0810 FAX (401) 846-4169
WWW.NORTHEASTENGINEERS.COM

SITE/CIVIL
LAND PLANNING
WATERFRONT
SURVEYING
GEOTECHNICAL
ENVIRONMENTAL
TRANSPORTATION
STRUCTURAL

No.	Revision	Date	App.
1	SITE REDESIGN	22FEB23	

Designed By: JJR | Drawn by: JR | Checked by: GES
Scale: 1"=50' | Date: 06JAN23

Project Title:

VALLEY CROSSING I
A.P. 107NE LOT 402B
VALLEY ROAD
MIDDLETOWN
RHODE ISLAND

Client/Owner:
JAMES H. CLAUSEN REVOCABLE TRUST
7067 VILLA ESTELLE DRIVE
ORLANDO, FL 32819

Issued for:
PERMITTING

Drawing Title:
EXISTING
WATERSHED PLAN

JEREMY J. ROSA
No. 9826
22FEB23
REGISTERED PROFESSIONAL ENGINEER
CIVIL

Drawing Number: W-1
Sheet 1 of 1
Project Number: 18225.5
Survey Index: – –

P:\Projects\2018\18225 PW Campbell\Calculations\18225.5\18225_W1 LOT B REV.dwg

NORTHEAST ENGINEERS
& CONSULTANTS, INC.

SITE/CIVIL
LAND PLANNING
WATERFRONT
SURVEYING
GEOTECHNICAL
ENVIRONMENTAL
TRANSPORTATION
STRUCTURAL

A KNOWLEDGE CORPORATION®

6 VALLEY ROAD MIDDLETOWN RHODE ISLAND 02842
PHONE (401) 849-0810 FAX (401) 846-4169
WWW.NORTHEASTENGINEERS.COM

DESIGN POINT 2
ABUTTER A.P. 107NE LOT 402C

STORM	PEAK (cfs)	VOL (af)
1-YEAR	5.83	0.706
2-YEAR	8.98	0.995
10-YEAR	18.90	2.052
25-YEAR	26.87	2.915
100-YEAR	44.99	4.796

DESIGN POINT 1
VALLEY ROAD (RI RT 214)

STORM	PEAK (cfs)	VOL (af)
1-YEAR	0.12	0.008
2-YEAR	0.15	0.010
10-YEAR	0.24	0.017
25-YEAR	0.31	0.023
100-YEAR	0.46	0.034

GRAPHIC SCALE
50 0 25 50 100 200
(in feet)
1"=50'

No.	Revision	Date	App.
1	SITE REDESIGN	22FEB23	

Designed By: JJR | Drawn by: JR | Checked by: GES
Scale: 1"=50' | Date: 06JAN23

Project Title:

VALLEY CROSSING I
A.P. 107NE LOT 402B
VALLEY ROAD
MIDDLETOWN
RHODE ISLAND

Client/Owner:
JAMES H. CLAUSEN REVOCABLE TRUST
7067 VILLA ESTELLE DRIVE
ORLANDO, FL 32819

Issued for:
PERMITTING

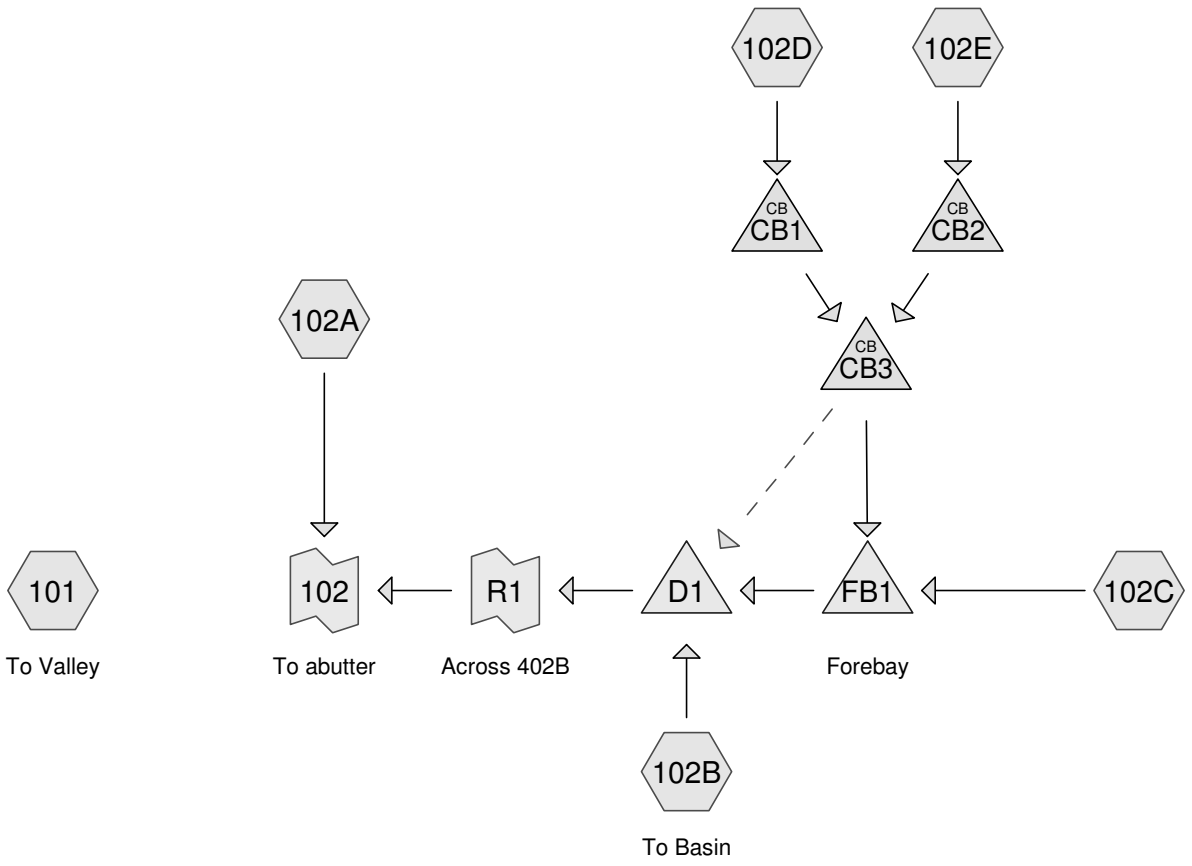
Drawing Title:
PROPOSED
WATERSHED PLAN

JEREMY J. ROSA
No. 9826
22FEB23
REGISTERED PROFESSIONAL ENGINEER
CIVIL

Drawing Number: W-2
Sheet 1 of 1
Project Number: 18225.5
Survey Index: – –

P:\Projects\2018\18225 PW Campbell\Calculations\18225.5\18225_W2 LOT B REV 2.dwg

APPENDIX C EXISTING CONDITIONS HYDROCAD



Subcat Reach Pond Link

Routing Diagram for 2023-01-06 18225.5 EX WITH LOT A
Prepared by Northeast Engineers & Consultants, Inc., Printed 3/3/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.802	83	1/4 acre lots, 38% imp, HSG C (102A)
4.936	74	>75% Grass cover, Good, HSG C (101, 102A, 102B, 102C, 102D, 102E)
0.120	98	Basin (102B)
0.061	98	Bristol Road (102A)
0.014	98	Building (102E)
0.391	98	Driveway (102B, 102C, 102D, 102E)
0.038	98	Forebay (102C)
0.129	85	Minigolf (102A)
0.209	98	Minigolf Impervious surfaces (102B)
0.161	74	Minigolf Pervious surfaces (102B)
0.038	98	Sidewalk (102B, 102C)
0.046	98	Sidewalk/Patio (102D, 102E)
0.027	98	Valley Road Sidewalk (101)

Summary for Subcatchment 101: To Valley

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 0.006 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	1,178	98	Valley Road Sidewalk
	550	74	>75% Grass cover, Good, HSG C
	1,728	90	Weighted Average
	550	74	31.83% Pervious Area
	1,178	98	68.17% Impervious Area

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

Summary for Subcatchment 102A:

Runoff = 6.24 cfs @ 12.29 hrs, Volume= 0.683 af, Depth> 0.98"
Routed to Link 102 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
	165,628	83	1/4 acre lots, 38% imp, HSG C
	189,042	74	>75% Grass cover, Good, HSG C
*	5,625	85	Minigolf
*	2,667	98	Bristol Road
	362,962	78	Weighted Average
	297,356	74	81.92% Pervious Area
	65,606	98	18.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawms**
					Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban**
					Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads**
					Paved Kv= 20.3 fps
2.8	630	0.0539	3.74		**Shallow Concentrated Flow, Grasses**
					Unpaved Kv= 16.1 fps
6.7	290	0.0020	0.72		**Shallow Concentrated Flow, Across front of Lot 402B**
					Unpaved Kv= 16.1 fps
20.0	1,617	Total			

Summary for Subcatchment 102B: To Basin

Runoff = 1.29 cfs @ 12.07 hrs, Volume= 0.089 af, Depth> 1.56"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 102C:

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.027 af, Depth> 1.16"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 102D:

Runoff = 0.96 cfs @ 12.12 hrs, Volume= 0.074 af, Depth> 1.80"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 102E:

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af, Depth> 1.35"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 1.80" for 1-YEAR event
Inflow = 0.96 cfs @ 12.12 hrs, Volume= 0.074 af
Outflow = 0.96 cfs @ 12.12 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.12 hrs, Volume= 0.074 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.34' @ 12.12 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.95 cfs @ 12.12 hrs HW=71.34' TW=69.85' (Dynamic Tailwater)
1=12" ADS (Barrel Controls 0.95 cfs @ 3.22 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 1.35" for 1-YEAR event
Inflow = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af
Outflow = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 70.24' @ 12.09 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 12.08 hrs HW=70.24' TW=69.83' (Dynamic Tailwater)
↑—**1=12" ADS** (Outlet Controls 0.23 cfs @ 2.47 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 1.70" for 1-YEAR event
Inflow = 1.17 cfs @ 12.11 hrs, Volume= 0.090 af
Outflow = 1.17 cfs @ 12.11 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min
Primary = 0.68 cfs @ 12.11 hrs, Volume= 0.084 af
Routed to Pond FB1 : Forebay
Secondary = 0.49 cfs @ 12.11 hrs, Volume= 0.007 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.85' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.68 cfs @ 12.11 hrs HW=69.85' TW=68.85' (Dynamic Tailwater)
↑—**1=6" PVC** (Barrel Controls 0.68 cfs @ 3.45 fps)

Secondary OutFlow Max=0.49 cfs @ 12.11 hrs HW=69.85' TW=65.68' (Dynamic Tailwater)
↑—**2=12" ADS** (Inlet Controls 0.49 cfs @ 2.01 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 1.46" for 1-YEAR event
Inflow = 2.60 cfs @ 12.10 hrs, Volume= 0.195 af
Outflow = 0.70 cfs @ 12.54 hrs, Volume= 0.159 af, Atten= 73%, Lag= 26.9 min
Discarded = 0.08 cfs @ 12.54 hrs, Volume= 0.080 af
Primary = 0.62 cfs @ 12.54 hrs, Volume= 0.078 af
Routed to Link R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.15' @ 12.54 hrs Surf.Area= 3,557 sf Storage= 3,174 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 85.7 min (923.6 - 837.9)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20
			Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.08 cfs @ 12.54 hrs HW=66.15' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.62 cfs @ 12.54 hrs HW=66.15' TW=0.00' (Dynamic Tailwater)
2=Staged Concrete Weir (Weir Controls 0.62 cfs @ 1.95 fps)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 1.44" for 1-YEAR event
Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.111 af
Outflow = 0.94 cfs @ 12.16 hrs, Volume= 0.100 af, Atten= 11%, Lag= 4.0 min
Primary = 0.94 cfs @ 12.16 hrs, Volume= 0.100 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 68.86' @ 12.16 hrs Surf.Area= 1,116 sf Storage= 812 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 77.3 min calculated for 0.100 af (90% of inflow)
Center-of-Mass det. time= 29.0 min (858.6 - 829.6)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500
			Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900
			n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=0.94 cfs @ 12.16 hrs HW=68.86' TW=65.81' (Dynamic Tailwater)
1=6" PVC X 3 (Inlet Controls 0.94 cfs @ 2.05 fps)

Summary for Link 102: To abutter

Inflow Area = 9.933 ac, 23.77% Impervious, Inflow Depth > 0.92" for 1-YEAR event
Inflow = 6.30 cfs @ 12.31 hrs, Volume= 0.761 af
Primary = 6.30 cfs @ 12.31 hrs, Volume= 0.761 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link R1: Across 402B

Time Lag equal to shallow concenrtated flow across front of Lot 402B.

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth = 0.59" for 1-YEAR event
Inflow = 0.62 cfs @ 12.54 hrs, Volume= 0.078 af
Primary = 0.62 cfs @ 12.65 hrs, Volume= 0.078 af, Atten= 0%, Lag= 6.7 min
Routed to Link 102 : To abutter

Primary outflow = Inflow delayed by 6.7 min, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 101: To Valley

Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.007 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	1,178	98	Valley Road Sidewalk
	550	74	>75% Grass cover, Good, HSG C
	1,728	90	Weighted Average
	550	74	31.83% Pervious Area
	1,178	98	68.17% Impervious Area

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

Summary for Subcatchment 102A:

Runoff = 8.69 cfs @ 12.29 hrs, Volume= 0.931 af, Depth> 1.34"
Routed to Link 102 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
	165,628	83	1/4 acre lots, 38% imp, HSG C
	189,042	74	>75% Grass cover, Good, HSG C
*	5,625	85	Minigolf
*	2,667	98	Bristol Road
	362,962	78	Weighted Average
	297,356	74	81.92% Pervious Area
	65,606	98	18.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawms** Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban** Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads** Paved Kv= 20.3 fps
2.8	630	0.0539	3.74		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
6.7	290	0.0020	0.72		**Shallow Concentrated Flow, Across front of Lot 402B** Unpaved Kv= 16.1 fps
20.0	1,617	Total			

Summary for Subcatchment 102B: To Basin

Runoff = 1.65 cfs @ 12.07 hrs, Volume= 0.113 af, Depth> 2.00"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 102C:

Runoff = 0.52 cfs @ 12.08 hrs, Volume= 0.036 af, Depth> 1.55"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 102D:

Runoff = 1.19 cfs @ 12.12 hrs, Volume= 0.093 af, Depth> 2.26"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 102E:

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 0.021 af, Depth> 1.76"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 2.26" for 2-YEAR event
Inflow = 1.19 cfs @ 12.12 hrs, Volume= 0.093 af
Outflow = 1.19 cfs @ 12.12 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min
Primary = 1.19 cfs @ 12.12 hrs, Volume= 0.093 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.41' @ 12.12 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.19 cfs @ 12.12 hrs HW=71.41' TW=69.94' (Dynamic Tailwater)
1=12" ADS (Barrel Controls 1.19 cfs @ 3.40 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 1.76" for 2-YEAR event
Inflow = 0.31 cfs @ 12.08 hrs, Volume= 0.021 af
Outflow = 0.31 cfs @ 12.08 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.08 hrs, Volume= 0.021 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 70.29' @ 12.09 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 12.08 hrs HW=70.28' TW=69.92' (Dynamic Tailwater)
↑—**1=12" ADS** (Outlet Controls 0.30 cfs @ 2.49 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 2.15" for 2-YEAR event
Inflow = 1.47 cfs @ 12.11 hrs, Volume= 0.114 af
Outflow = 1.47 cfs @ 12.11 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min
Primary = 0.71 cfs @ 12.11 hrs, Volume= 0.102 af
Routed to Pond FB1 : Forebay
Secondary = 0.76 cfs @ 12.11 hrs, Volume= 0.013 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.94' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.71 cfs @ 12.11 hrs HW=69.94' TW=68.89' (Dynamic Tailwater)
↑—**1=6" PVC** (Barrel Controls 0.71 cfs @ 3.64 fps)

Secondary OutFlow Max=0.76 cfs @ 12.11 hrs HW=69.94' TW=65.96' (Dynamic Tailwater)
↑—**2=12" ADS** (Inlet Controls 0.76 cfs @ 2.26 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 1.90" for 2-YEAR event
Inflow = 3.37 cfs @ 12.09 hrs, Volume= 0.253 af
Outflow = 1.20 cfs @ 12.44 hrs, Volume= 0.212 af, Atten= 64%, Lag= 20.8 min
Discarded = 0.09 cfs @ 12.44 hrs, Volume= 0.084 af
Primary = 1.11 cfs @ 12.44 hrs, Volume= 0.128 af
Routed to Link R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.32' @ 12.44 hrs Surf.Area= 3,893 sf Storage= 3,794 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 62.6 min (892.2 - 829.6)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20
			Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.09 cfs @ 12.44 hrs HW=66.32' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=1.11 cfs @ 12.44 hrs HW=66.32' TW=0.00' (Dynamic Tailwater)
2=Staged Concrete Weir (Weir Controls 1.11 cfs @ 2.36 fps)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 1.80" for 2-YEAR event
Inflow = 1.23 cfs @ 12.09 hrs, Volume= 0.138 af
Outflow = 1.10 cfs @ 12.15 hrs, Volume= 0.127 af, Atten= 11%, Lag= 3.7 min
Primary = 1.10 cfs @ 12.15 hrs, Volume= 0.127 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 68.90' @ 12.15 hrs Surf.Area= 1,132 sf Storage= 855 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 67.7 min calculated for 0.127 af (92% of inflow)
Center-of-Mass det. time= 26.7 min (851.8 - 825.1)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500
			Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900
			n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=1.10 cfs @ 12.15 hrs HW=68.90' TW=66.08' (Dynamic Tailwater)
1=6" PVC X 3 (Inlet Controls 1.10 cfs @ 2.16 fps)

Summary for Link 102: To abutter

Inflow Area = 9.933 ac, 23.77% Impervious, Inflow Depth > 1.28" for 2-YEAR event
Inflow = 9.31 cfs @ 12.31 hrs, Volume= 1.059 af
Primary = 9.31 cfs @ 12.31 hrs, Volume= 1.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link R1: Across 402B

Time Lag equal to shallow concenrtated flow across front of Lot 402B.

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth = 0.96" for 2-YEAR event
Inflow = 1.11 cfs @ 12.44 hrs, Volume= 0.128 af
Primary = 1.11 cfs @ 12.55 hrs, Volume= 0.128 af, Atten= 0%, Lag= 6.7 min
Routed to Link 102 : To abutter

Primary outflow = Inflow delayed by 6.7 min, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 101: To Valley

Runoff = 0.18 cfs @ 12.07 hrs, Volume= 0.012 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	1,178	98	Valley Road Sidewalk
	550	74	>75% Grass cover, Good, HSG C
	1,728	90	Weighted Average
	550	74	31.83% Pervious Area
	1,178	98	68.17% Impervious Area

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

Summary for Subcatchment 102A:

Runoff = 17.29 cfs @ 12.28 hrs, Volume= 1.817 af, Depth> 2.62"
Routed to Link 102 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
	165,628	83	1/4 acre lots, 38% imp, HSG C
	189,042	74	>75% Grass cover, Good, HSG C
*	5,625	85	Minigolf
*	2,667	98	Bristol Road
	362,962	78	Weighted Average
	297,356	74	81.92% Pervious Area
	65,606	98	18.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawms**
					Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban**
					Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads**
					Paved Kv= 20.3 fps
2.8	630	0.0539	3.74		**Shallow Concentrated Flow, Grasses**
					Unpaved Kv= 16.1 fps
6.7	290	0.0020	0.72		**Shallow Concentrated Flow, Across front of Lot 402B**
					Unpaved Kv= 16.1 fps
20.0	1,617	Total			

Summary for Subcatchment 102B: To Basin

Runoff = 2.82 cfs @ 12.07 hrs, Volume= 0.197 af, Depth> 3.47"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 102C:

Runoff = 0.98 cfs @ 12.08 hrs, Volume= 0.068 af, Depth> 2.89"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 102D:

Runoff = 1.95 cfs @ 12.12 hrs, Volume= 0.155 af, Depth> 3.77"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 102E:

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 0.038 af, Depth> 3.18"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 3.77" for 10-YEAR event
Inflow = 1.95 cfs @ 12.12 hrs, Volume= 0.155 af
Outflow = 1.95 cfs @ 12.12 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min
Primary = 1.95 cfs @ 12.12 hrs, Volume= 0.155 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.64' @ 12.12 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.95 cfs @ 12.12 hrs HW=71.64' TW=70.19' (Dynamic Tailwater)
1=12" ADS (Outlet Controls 1.95 cfs @ 3.75 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 3.18" for 10-YEAR event
Inflow = 0.56 cfs @ 12.07 hrs, Volume= 0.038 af
Outflow = 0.56 cfs @ 12.07 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.07 hrs, Volume= 0.038 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 70.44' @ 12.09 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.53 cfs @ 12.07 hrs HW=70.43' TW=70.16' (Dynamic Tailwater)
↑—**1=12" ADS** (Outlet Controls 0.53 cfs @ 2.43 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 3.64" for 10-YEAR event
Inflow = 2.45 cfs @ 12.10 hrs, Volume= 0.194 af
Outflow = 2.45 cfs @ 12.10 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.10 hrs, Volume= 0.156 af
Routed to Pond FB1 : Forebay
Secondary = 1.65 cfs @ 12.11 hrs, Volume= 0.038 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.19' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.10 hrs HW=70.19' TW=69.01' (Dynamic Tailwater)
↑—**1=6" PVC** (Outlet Controls 0.80 cfs @ 4.08 fps)

Secondary OutFlow Max=1.65 cfs @ 12.11 hrs HW=70.19' TW=66.58' (Dynamic Tailwater)
↑—**2=12" ADS** (Inlet Controls 1.65 cfs @ 2.83 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 3.35" for 10-YEAR event
Inflow = 5.77 cfs @ 12.09 hrs, Volume= 0.447 af
Outflow = 2.97 cfs @ 12.29 hrs, Volume= 0.400 af, Atten= 49%, Lag= 11.9 min
Discarded = 0.11 cfs @ 12.29 hrs, Volume= 0.095 af
Primary = 2.86 cfs @ 12.29 hrs, Volume= 0.304 af
Routed to Link R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.78' @ 12.29 hrs Surf.Area= 4,819 sf Storage= 5,795 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= 89.6 min calculated for 0.400 af (89% of inflow)
Center-of-Mass det. time= 39.8 min (851.5 - 811.7)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20
			Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.11 cfs @ 12.29 hrs HW=66.78' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=2.86 cfs @ 12.29 hrs HW=66.78' TW=0.00' (Dynamic Tailwater)
2=Staged Concrete Weir (Weir Controls 2.86 cfs @ 3.24 fps)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 2.92" for 10-YEAR event
Inflow = 1.77 cfs @ 12.08 hrs, Volume= 0.224 af
Outflow = 1.50 cfs @ 12.15 hrs, Volume= 0.213 af, Atten= 16%, Lag= 4.0 min
Primary = 1.50 cfs @ 12.15 hrs, Volume= 0.213 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.03' @ 12.15 hrs Surf.Area= 1,185 sf Storage= 1,002 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 50.6 min calculated for 0.213 af (95% of inflow)
Center-of-Mass det. time= 22.5 min (837.0 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500
			Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900
			n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=1.50 cfs @ 12.15 hrs HW=69.03' TW=66.69' (Dynamic Tailwater)
1=6" PVC X 3 (Inlet Controls 1.50 cfs @ 2.54 fps)

Summary for Link 102: To abutter

Inflow Area = 9.933 ac, 23.77% Impervious, Inflow Depth > 2.56" for 10-YEAR event
Inflow = 19.92 cfs @ 12.29 hrs, Volume= 2.121 af
Primary = 19.92 cfs @ 12.29 hrs, Volume= 2.121 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link R1: Across 402B

Time Lag equal to shallow concenrtated flow across front of Lot 402B.

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 2.28" for 10-YEAR event
Inflow = 2.86 cfs @ 12.29 hrs, Volume= 0.304 af
Primary = 2.86 cfs @ 12.40 hrs, Volume= 0.304 af, Atten= 0%, Lag= 6.7 min
Routed to Link 102 : To abutter

Primary outflow = Inflow delayed by 6.7 min, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 101: To Valley

Runoff = 0.23 cfs @ 12.07 hrs, Volume= 0.016 af, Depth> 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	1,178	98	Valley Road Sidewalk
	550	74	>75% Grass cover, Good, HSG C
	1,728	90	Weighted Average
	550	74	31.83% Pervious Area
	1,178	98	68.17% Impervious Area

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

Summary for Subcatchment 102A:

Runoff = 24.14 cfs @ 12.27 hrs, Volume= 2.537 af, Depth> 3.65"
Routed to Link 102 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
	165,628	83	1/4 acre lots, 38% imp, HSG C
	189,042	74	>75% Grass cover, Good, HSG C
*	5,625	85	Minigolf
*	2,667	98	Bristol Road
	362,962	78	Weighted Average
	297,356	74	81.92% Pervious Area
	65,606	98	18.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawms**
					Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban**
					Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads**
					Paved Kv= 20.3 fps
2.8	630	0.0539	3.74		**Shallow Concentrated Flow, Grasses**
					Unpaved Kv= 16.1 fps
6.7	290	0.0020	0.72		**Shallow Concentrated Flow, Across front of Lot 402B**
					Unpaved Kv= 16.1 fps
20.0	1,617	Total			

Summary for Subcatchment 102B: To Basin

Runoff = 3.70 cfs @ 12.07 hrs, Volume= 0.261 af, Depth> 4.61"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 102C:

Runoff = 1.33 cfs @ 12.08 hrs, Volume= 0.093 af, Depth> 3.97"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 102D:

Runoff = 2.51 cfs @ 12.11 hrs, Volume= 0.203 af, Depth> 4.94"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 102E:

Runoff = 0.74 cfs @ 12.07 hrs, Volume= 0.052 af, Depth> 4.29"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 4.94" for 25-YEAR event
Inflow = 2.51 cfs @ 12.11 hrs, Volume= 0.203 af
Outflow = 2.51 cfs @ 12.11 hrs, Volume= 0.203 af, Atten= 0%, Lag= 0.0 min
Primary = 2.51 cfs @ 12.11 hrs, Volume= 0.203 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.83' @ 12.12 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.51 cfs @ 12.11 hrs HW=71.83' TW=70.38' (Dynamic Tailwater)
1=12" ADS (Outlet Controls 2.51 cfs @ 3.88 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 4.29" for 25-YEAR event
Inflow = 0.74 cfs @ 12.07 hrs, Volume= 0.052 af
Outflow = 0.74 cfs @ 12.07 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min
Primary = 0.74 cfs @ 12.07 hrs, Volume= 0.052 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 70.57' @ 12.10 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.69 cfs @ 12.07 hrs HW=70.54' TW=70.33' (Dynamic Tailwater)
↑**1=12" ADS** (Outlet Controls 0.69 cfs @ 2.29 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 4.79" for 25-YEAR event
Inflow = 3.18 cfs @ 12.10 hrs, Volume= 0.255 af
Outflow = 3.18 cfs @ 12.10 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
Primary = 0.84 cfs @ 12.09 hrs, Volume= 0.195 af
Routed to Pond FB1 : Forebay
Secondary = 2.35 cfs @ 12.11 hrs, Volume= 0.060 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.38' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.09 hrs HW=70.37' TW=69.08' (Dynamic Tailwater)
↑**1=6" PVC** (Outlet Controls 0.83 cfs @ 4.25 fps)

Secondary OutFlow Max=2.34 cfs @ 12.11 hrs HW=70.38' TW=66.85' (Dynamic Tailwater)
↑**2=12" ADS** (Inlet Controls 2.34 cfs @ 3.20 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 4.48" for 25-YEAR event
Inflow = 7.55 cfs @ 12.09 hrs, Volume= 0.598 af
Outflow = 4.33 cfs @ 12.25 hrs, Volume= 0.549 af, Atten= 43%, Lag= 9.5 min
Discarded = 0.12 cfs @ 12.25 hrs, Volume= 0.102 af
Primary = 4.20 cfs @ 12.25 hrs, Volume= 0.446 af
Routed to Link R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.02' @ 12.25 hrs Surf.Area= 5,281 sf Storage= 7,023 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 36.2 min (839.0 - 802.8)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20
			Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.12 cfs @ 12.25 hrs HW=67.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=4.20 cfs @ 12.25 hrs HW=67.02' TW=0.00' (Dynamic Tailwater)
2=Staged Concrete Weir (Weir Controls 4.20 cfs @ 3.38 fps)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 3.75" for 25-YEAR event
Inflow = 2.17 cfs @ 12.08 hrs, Volume= 0.288 af
Outflow = 1.76 cfs @ 12.15 hrs, Volume= 0.276 af, Atten= 19%, Lag= 4.3 min
Primary = 1.76 cfs @ 12.15 hrs, Volume= 0.276 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.13' @ 12.15 hrs Surf.Area= 1,234 sf Storage= 1,128 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 43.5 min calculated for 0.276 af (96% of inflow)
Center-of-Mass det. time= 20.5 min (828.9 - 808.4)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500
			Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900
			n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=1.76 cfs @ 12.15 hrs HW=69.13' TW=66.96' (Dynamic Tailwater)
1=6" PVC X 3 (Inlet Controls 1.76 cfs @ 2.98 fps)

Summary for Link 102: To abutter

Inflow Area = 9.933 ac, 23.77% Impervious, Inflow Depth > 3.60" for 25-YEAR event
Inflow = 28.13 cfs @ 12.29 hrs, Volume= 2.983 af
Primary = 28.13 cfs @ 12.29 hrs, Volume= 2.983 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link R1: Across 402B

Time Lag equal to shallow concenrtated flow across front of Lot 402B.

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 3.35" for 25-YEAR event
Inflow = 4.20 cfs @ 12.25 hrs, Volume= 0.446 af
Primary = 4.20 cfs @ 12.36 hrs, Volume= 0.446 af, Atten= 0%, Lag= 6.7 min
Routed to Link 102 : To abutter

Primary outflow = Inflow delayed by 6.7 min, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 101: To Valley

Runoff = 0.33 cfs @ 12.07 hrs, Volume= 0.024 af, Depth> 7.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	1,178	98	Valley Road Sidewalk
	550	74	>75% Grass cover, Good, HSG C
	1,728	90	Weighted Average
	550	74	31.83% Pervious Area
	1,178	98	68.17% Impervious Area

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

Summary for Subcatchment 102A:

Runoff = 38.79 cfs @ 12.27 hrs, Volume= 4.115 af, Depth> 5.93"
Routed to Link 102 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
	165,628	83	1/4 acre lots, 38% imp, HSG C
	189,042	74	>75% Grass cover, Good, HSG C
*	5,625	85	Minigolf
*	2,667	98	Bristol Road
	362,962	78	Weighted Average
	297,356	74	81.92% Pervious Area
	65,606	98	18.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawms**
					Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban**
					Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads**
					Paved Kv= 20.3 fps
2.8	630	0.0539	3.74		**Shallow Concentrated Flow, Grasses**
					Unpaved Kv= 16.1 fps
6.7	290	0.0020	0.72		**Shallow Concentrated Flow, Across front of Lot 402B**
					Unpaved Kv= 16.1 fps
20.0	1,617	Total			

Summary for Subcatchment 102B: To Basin

Runoff = 5.51 cfs @ 12.07 hrs, Volume= 0.398 af, Depth> 7.03"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 102C:

Runoff = 2.08 cfs @ 12.08 hrs, Volume= 0.148 af, Depth> 6.30"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 102D:

Runoff = 3.68 cfs @ 12.11 hrs, Volume= 0.304 af, Depth> 7.39"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 102E:

Runoff = 1.13 cfs @ 12.07 hrs, Volume= 0.081 af, Depth> 6.67"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 7.39" for 100-YEAR event
Inflow = 3.68 cfs @ 12.11 hrs, Volume= 0.304 af
Outflow = 3.68 cfs @ 12.11 hrs, Volume= 0.304 af, Atten= 0%, Lag= 0.0 min
Primary = 3.68 cfs @ 12.11 hrs, Volume= 0.304 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 73.56' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.68 cfs @ 12.11 hrs HW=73.55' TW=70.97' (Dynamic Tailwater)
1=12" ADS (Outlet Controls 3.68 cfs @ 4.69 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 6.67" for 100-YEAR event
Inflow = 1.13 cfs @ 12.07 hrs, Volume= 0.081 af
Outflow = 1.13 cfs @ 12.07 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.07 hrs, Volume= 0.081 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 71.06' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.73 cfs @ 12.07 hrs HW=70.91' TW=70.85' (Dynamic Tailwater)
↑—**1=12" ADS** (Outlet Controls 0.73 cfs @ 1.27 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 7.22" for 100-YEAR event
Inflow = 4.70 cfs @ 12.10 hrs, Volume= 0.385 af
Outflow = 4.70 cfs @ 12.10 hrs, Volume= 0.385 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.09 hrs, Volume= 0.272 af
Routed to Pond FB1 : Forebay
Secondary = 3.74 cfs @ 12.10 hrs, Volume= 0.113 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.98' @ 12.10 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.95 cfs @ 12.09 hrs HW=70.96' TW=69.30' (Dynamic Tailwater)
↑—**1=6" PVC** (Outlet Controls 0.95 cfs @ 4.83 fps)

Secondary OutFlow Max=3.74 cfs @ 12.10 hrs HW=70.98' TW=67.22' (Dynamic Tailwater)
↑—**2=12" ADS** (Inlet Controls 3.74 cfs @ 4.76 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 6.89" for 100-YEAR event
Inflow = 11.08 cfs @ 12.09 hrs, Volume= 0.919 af
Outflow = 7.39 cfs @ 12.20 hrs, Volume= 0.867 af, Atten= 33%, Lag= 7.0 min
Discarded = 0.13 cfs @ 12.20 hrs, Volume= 0.115 af
Primary = 7.26 cfs @ 12.20 hrs, Volume= 0.753 af
Routed to Link R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.36' @ 12.20 hrs Surf.Area= 5,554 sf Storage= 8,865 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= 62.7 min calculated for 0.867 af (94% of inflow)
Center-of-Mass det. time= 32.1 min (822.2 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20
			Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.13 cfs @ 12.20 hrs HW=67.36' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=7.26 cfs @ 12.20 hrs HW=67.36' TW=0.00' (Dynamic Tailwater)
2=Staged Concrete Weir (Weir Controls 7.26 cfs @ 3.34 fps)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 5.47" for 100-YEAR event
Inflow = 3.03 cfs @ 12.08 hrs, Volume= 0.420 af
Outflow = 2.16 cfs @ 12.17 hrs, Volume= 0.408 af, Atten= 29%, Lag= 5.2 min
Primary = 2.16 cfs @ 12.17 hrs, Volume= 0.408 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.40' @ 12.17 hrs Surf.Area= 1,356 sf Storage= 1,469 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 34.7 min calculated for 0.408 af (97% of inflow)
Center-of-Mass det. time= 17.8 min (816.0 - 798.2)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500
			Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900
			n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=2.16 cfs @ 12.17 hrs HW=69.40' TW=67.35' (Dynamic Tailwater)
1=6" PVC X 3 (Barrel Controls 2.16 cfs @ 3.66 fps)

Summary for Link 102: To abutter

Inflow Area = 9.933 ac, 23.77% Impervious, Inflow Depth > 5.88" for 100-YEAR event
Inflow = 45.86 cfs @ 12.28 hrs, Volume= 4.868 af
Primary = 45.86 cfs @ 12.28 hrs, Volume= 4.868 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

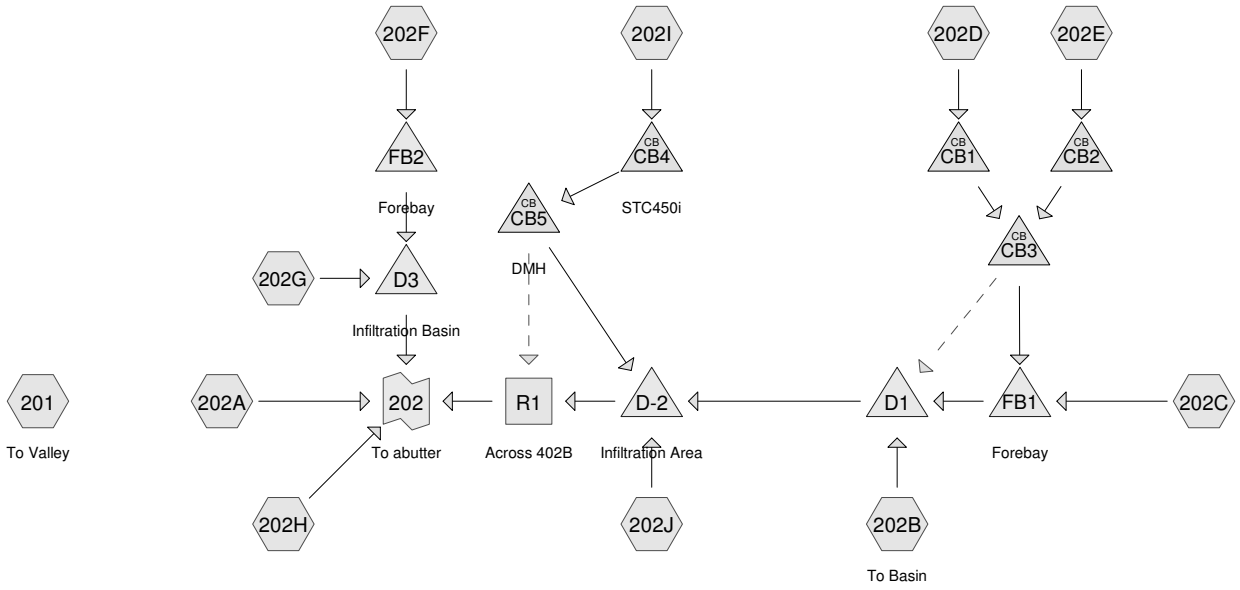
Summary for Link R1: Across 402B

Time Lag equal to shallow concenrtated flow across front of Lot 402B.

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 5.65" for 100-YEAR event
Inflow = 7.26 cfs @ 12.20 hrs, Volume= 0.753 af
Primary = 7.26 cfs @ 12.31 hrs, Volume= 0.752 af, Atten= 0%, Lag= 6.7 min
Routed to Link 102 : To abutter

Primary outflow = Inflow delayed by 6.7 min, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

APPENDIX D PROPOSED CONDITIONS HYDROCAD



Subcat Reach Pond Link

Routing Diagram for 2023-02-21 18225.5 PR WITH LOT A
Prepared by Northeast Engineers & Consultants, Inc., Printed 3/3/2023

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.802	83	1/4 acre lots, 38% imp, HSG C (202A)
3.603	74	>75% Grass cover, Good, HSG C (201, 202A, 202B, 202C, 202D, 202E, 202F, 202G, 202H, 202I, 202J)
0.120	98	Basin (202B)
0.153	98	Basin (98% capture) (202G)
0.061	98	Bristol Road (202A)
0.243	98	Building (202E, 202F)
0.391	98	Driveway (202B, 202C, 202D, 202E)
0.038	98	Forebay (202C)
0.172	71	Meadow, non-grazed, HSG C (202A)
0.129	85	Minigolf (202J)
0.209	98	Minigolf Impervious surfaces (202B)
0.161	74	Minigolf Pervious surfaces (202B)
0.634	98	Pavement (201, 202F, 202I, 202J)
0.041	98	Ponding Area (98% capture) (202J)
0.048	98	Sediment forebay (202F)
0.041	98	Sidewalk (201, 202B, 202C)
0.046	98	Sidewalk/Patio (202D, 202E)
0.056	98	Sidewalks (202F, 202I, 202J)
0.024	98	Valley Road Sidewalk (201)

Summary for Subcatchment 201: To Valley

Runoff = 0.12 cfs @ 12.07 hrs, Volume= 0.008 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	1,046	98	Valley Road Sidewalk
	832	74	>75% Grass cover, Good, HSG C
*	377	98	Pavement
*	143	98	Sidewalk
	2,398	90	Weighted Average
	832	74	34.70% Pervious Area
	1,566	98	65.30% Impervious Area

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

Summary for Subcatchment 202A:

Runoff = 5.29 cfs @ 12.27 hrs, Volume= 0.556 af, Depth> 1.04"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
	165,626	83	1/4 acre lots, 38% imp, HSG C
	103,946	74	>75% Grass cover, Good, HSG C
*	2,667	98	Bristol Road
	7,500	71	Meadow, non-grazed, HSG C
	279,739	79	Weighted Average
	214,134	74	76.55% Pervious Area
	65,605	98	23.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawns** Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban** Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads** Paved Kv= 20.3 fps
1.6	328	0.0457	3.44		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
0.4	75	0.0250	3.27	62.19	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=3.50' D=2.00' Z= 3.0 '/' Top.W=15.50' n= 0.080 Earth, long dense weeds
3.4	188	0.0177	0.93		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
2.5	117	0.0128	0.79		**Shallow Concentrated Flow, Wetlands** Short Grass Pasture Kv= 7.0 fps
18.4	1,405	Total			

Summary for Subcatchment 202B: To Basin

Runoff = 1.29 cfs @ 12.07 hrs, Volume= 0.089 af, Depth> 1.56"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 202C:

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.027 af, Depth> 1.16"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 202D:

Runoff = 0.96 cfs @ 12.12 hrs, Volume= 0.074 af, Depth> 1.80"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 202E:

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af, Depth> 1.35"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Subcatchment 202F:

Runoff = 2.16 cfs @ 12.07 hrs, Volume= 0.153 af, Depth> 2.16"
Routed to Pond FB2 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	10,000	98	Building
*	18,055	98	Pavement
*	1,269	98	Sidewalks
*	2,075	98	Sediment forebay
	5,804	74	>75% Grass cover, Good, HSG C
	37,203	94	Weighted Average
	5,804	74	15.60% Pervious Area
	31,399	98	84.40% Impervious Area

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

Summary for Subcatchment 202G:

Runoff = 0.47 cfs @ 12.07 hrs, Volume= 0.033 af, Depth> 2.25"
Routed to Pond D3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	6,674	98	Basin (98% capture)
	1,089	74	>75% Grass cover, Good, HSG C
	7,763	95	Weighted Average
	1,089	74	14.03% Pervious Area
	6,674	98	85.97% Impervious Area

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

Summary for Subcatchment 202H:

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.012 af, Depth> 0.78"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

Area (sf)	CN	Description
7,850	74	>75% Grass cover, Good, HSG C
7,850	74	100.00% Pervious Area

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

Summary for Subcatchment 202I:

Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.042 af, Depth> 1.88"
Routed to Pond CB4 : STC450i

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
	3,240	74	>75% Grass cover, Good, HSG C
*	7,486	98	Pavement
*	1,004	98	Sidewalks
	11,730	91	Weighted Average
	3,240	74	27.62% Pervious Area
	8,490	98	72.38% Impervious Area

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

Summary for Subcatchment 202J:

Runoff = 0.58 cfs @ 12.10 hrs, Volume= 0.042 af, Depth> 1.22"
Routed to Pond D-2 : Infiltration Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=2.80"

	Area (sf)	CN	Description
*	5,625	85	Minigolf
*	1,782	98	Ponding Area (98% capture)
	8,761	74	>75% Grass cover, Good, HSG C
*	1,682	98	Pavement
*	155	98	Sidewalks
	18,005	82	Weighted Average
	14,386	78	79.90% Pervious Area
	3,619	98	20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0650	0.28		**Sheet Flow, Grasses** Grass: Short n= 0.150 P2= 3.30"
0.3	68	0.0700	4.26		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
6.3	168	Total			

Summary for Reach R1: Across 402B

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth = 0.55" for 1-YEAR event
Inflow = 0.88 cfs @ 12.47 hrs, Volume= 0.105 af
Outflow = 0.88 cfs @ 12.48 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.8 min
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.98 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 2.06 fps, Avg. Travel Time= 1.7 min

Peak Storage= 61 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.04' , Surface Width= 8.15'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 804.36 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 205.0' Slope= 0.2878 '/'
Inlet Invert= 65.25', Outlet Invert= 6.25'

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 1.80" for 1-YEAR event
Inflow = 0.96 cfs @ 12.12 hrs, Volume= 0.074 af
Outflow = 0.96 cfs @ 12.12 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.12 hrs, Volume= 0.074 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.34' @ 12.12 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.95 cfs @ 12.12 hrs HW=71.34' TW=69.85' (Dynamic Tailwater)
1=12" ADS (Barrel Controls 0.95 cfs @ 3.22 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 1.35" for 1-YEAR event
Inflow = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af
Outflow = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.24' @ 12.09 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 12.08 hrs HW=70.24' TW=69.83' (Dynamic Tailwater)
1=12" ADS (Outlet Controls 0.23 cfs @ 2.47 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 1.70" for 1-YEAR event
Inflow = 1.17 cfs @ 12.11 hrs, Volume= 0.090 af
Outflow = 1.17 cfs @ 12.11 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min
Primary = 0.68 cfs @ 12.11 hrs, Volume= 0.084 af
Routed to Pond FB1 : Forebay
Secondary = 0.49 cfs @ 12.11 hrs, Volume= 0.007 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.85' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.68 cfs @ 12.11 hrs HW=69.85' TW=68.85' (Dynamic Tailwater)
1=6" PVC (Barrel Controls 0.68 cfs @ 3.45 fps)

Secondary OutFlow Max=0.49 cfs @ 12.11 hrs HW=69.85' TW=65.68' (Dynamic Tailwater)
2=12" ADS (Inlet Controls 0.49 cfs @ 2.01 fps)

Summary for Pond CB4: STC450i

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 1.88" for 1-YEAR event
Inflow = 0.61 cfs @ 12.07 hrs, Volume= 0.042 af
Outflow = 0.61 cfs @ 12.07 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
Primary = 0.61 cfs @ 12.07 hrs, Volume= 0.042 af
Routed to Pond CB5 : DMH

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.90' @ 12.07 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Round 12" ADS** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.61 cfs @ 12.07 hrs HW=66.90' TW=66.13' (Dynamic Tailwater)
1=12" ADS (Barrel Controls 0.61 cfs @ 3.03 fps)

Summary for Pond CB5: DMH

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 1.88" for 1-YEAR event
Inflow = 0.61 cfs @ 12.07 hrs, Volume= 0.042 af
Outflow = 0.61 cfs @ 12.07 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
Primary = 0.61 cfs @ 12.07 hrs, Volume= 0.042 af
Routed to Pond D-2 : Infiltration Area
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.13' @ 12.07 hrs
Flood Elev= 70.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.20'	**6.0" Round 6"ADS** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 65.20' / 65.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	66.50'	**12.0" Round 12" ADS** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.61 cfs @ 12.07 hrs HW=66.13' TW=64.93' (Dynamic Tailwater)
1=6"ADS (Barrel Controls 0.61 cfs @ 3.10 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=65.20' TW=65.25' (Dynamic Tailwater)
2=12" ADS (Controls 0.00 cfs)

Summary for Pond D-2: Infiltration Area

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 0.86" for 1-YEAR event
Inflow = 1.18 cfs @ 12.08 hrs, Volume= 0.163 af
Outflow = 0.91 cfs @ 12.47 hrs, Volume= 0.139 af, Atten= 23%, Lag= 23.2 min
Discarded = 0.03 cfs @ 12.47 hrs, Volume= 0.034 af
Primary = 0.88 cfs @ 12.47 hrs, Volume= 0.105 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 65.47' @ 12.47 hrs Surf.Area= 1,296 sf Storage= 1,506 cf
Flood Elev= 67.00' Surf.Area= 1,782 sf Storage= 3,791 cf

Plug-Flow detention time= 92.1 min calculated for 0.139 af (85% of inflow)
Center-of-Mass det. time= 45.4 min (867.2 - 821.8)

Volume	Invert	Avail.Storage	Storage Description
#1	64.00'	3,791 cf	**Ponding (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.00	600	0	0
65.00	1,225	913	913
66.00	1,375	1,300	2,213
67.00	1,782	1,579	3,791

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**24.0" W x 18.0" H Box (3) 24x18 box culverts X 3.00** L= 50.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 65.25' / 65.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.00 sf
#2	Discarded	64.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 12.47 hrs HW=65.47' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.88 cfs @ 12.47 hrs HW=65.47' TW=65.29' (Dynamic Tailwater)
↑—**1=(3) 24x18 box culverts** (Barrel Controls 0.88 cfs @ 0.89 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 1.46" for 1-YEAR event
Inflow = 2.60 cfs @ 12.10 hrs, Volume= 0.195 af
Outflow = 0.70 cfs @ 12.54 hrs, Volume= 0.159 af, Atten= 73%, Lag= 26.9 min
Discarded = 0.08 cfs @ 12.54 hrs, Volume= 0.080 af
Primary = 0.62 cfs @ 12.54 hrs, Volume= 0.078 af
Routed to Pond D-2 : Infiltration Area

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.15' @ 12.54 hrs Surf.Area= 3,557 sf Storage= 3,174 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 85.7 min (923.6 - 837.9)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20 Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.08 cfs @ 12.54 hrs HW=66.15' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.62 cfs @ 12.54 hrs HW=66.15' TW=65.47' (Dynamic Tailwater)
2=Staged Concrete Weir (Weir Controls 0.62 cfs @ 1.95 fps)

Summary for Pond D3: Infiltration Basin

Inflow Area = 1.032 ac, 84.67% Impervious, Inflow Depth > 1.63" for 1-YEAR event
Inflow = 2.47 cfs @ 12.09 hrs, Volume= 0.141 af
Outflow = 0.17 cfs @ 13.65 hrs, Volume= 0.140 af, Atten= 93%, Lag= 93.2 min
Discarded = 0.11 cfs @ 13.65 hrs, Volume= 0.108 af
Primary = 0.06 cfs @ 13.65 hrs, Volume= 0.033 af
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.64' @ 13.65 hrs Surf.Area= 4,612 sf Storage= 2,642 cf
Flood Elev= 70.00' Surf.Area= 6,674 sf Storage= 16,217 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 173.0 min (1,011.4 - 838.4)

Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	16,217 cf	**Infiltration (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.00	3,640	0	0
68.00	5,157	4,399	4,399
69.00	5,903	5,530	9,929
70.00	6,674	6,289	16,217

Device	Routing	Invert	Outlet Devices
#1	Primary	67.10'	**1.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	67.00'	**1.020 in/hr Exfiltration over Surface area below 68.00'**
#3	Primary	68.00'	**Custom Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 2.00
			Width (feet) 0.50 0.50 5.00 5.00

Discarded OutFlow Max=0.11 cfs @ 13.65 hrs HW=67.64' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.06 cfs @ 13.65 hrs HW=67.64' TW=0.00' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.06 cfs @ 3.29 fps)
3=Custom Weir (Controls 0.00 cfs)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 1.44" for 1-YEAR event
Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.111 af
Outflow = 0.94 cfs @ 12.16 hrs, Volume= 0.100 af, Atten= 11%, Lag= 4.0 min
Primary = 0.94 cfs @ 12.16 hrs, Volume= 0.100 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 68.86' @ 12.16 hrs Surf.Area= 1,116 sf Storage= 812 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 77.3 min calculated for 0.100 af (90% of inflow)
Center-of-Mass det. time= 29.0 min (858.6 - 829.6)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=0.94 cfs @ 12.16 hrs HW=68.86' TW=65.81' (Dynamic Tailwater)
1=6" PVC X 3 (Inlet Controls 0.94 cfs @ 2.05 fps)

Summary for Pond FB2: Forebay

Inflow Area = 0.854 ac, 84.40% Impervious, Inflow Depth > 2.16" for 1-YEAR event
Inflow = 2.16 cfs @ 12.07 hrs, Volume= 0.153 af
Outflow = 2.03 cfs @ 12.10 hrs, Volume= 0.107 af, Atten= 6%, Lag= 1.7 min
Primary = 2.03 cfs @ 12.10 hrs, Volume= 0.107 af
Routed to Pond D3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.16' @ 12.10 hrs Surf.Area= 1,736 sf Storage= 2,279 cf
Flood Elev= 70.00' Surf.Area= 2,075 sf Storage= 3,879 cf

Plug-Flow detention time= 157.0 min calculated for 0.107 af (70% of inflow)
Center-of-Mass det. time= 65.3 min (855.5 - 790.2)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	3,879 cf	**Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	875	0	0
68.00	1,268	536	536
70.00	2,075	3,343	3,879

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**90.0 deg x 10.0' long x 1.00' rise Overflow wier** Cv= 2.50 (C= 3.13)

Primary OutFlow Max=2.03 cfs @ 12.10 hrs HW=69.16' TW=67.19' (Dynamic Tailwater)
1=Overflow wier (Weir Controls 2.03 cfs @ 1.25 fps)

Summary for Link 202: To abutter

Inflow Area = 9.917 ac, 35.43% Impervious, Inflow Depth > 0.85" for 1-YEAR event
Inflow = 5.83 cfs @ 12.31 hrs, Volume= 0.706 af
Primary = 5.83 cfs @ 12.31 hrs, Volume= 0.706 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 201: To Valley

Runoff = 0.15 cfs @ 12.07 hrs, Volume= 0.010 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	1,046	98	Valley Road Sidewalk
	832	74	>75% Grass cover, Good, HSG C
*	377	98	Pavement
*	143	98	Sidewalk
	2,398	90	Weighted Average
	832	74	34.70% Pervious Area
	1,566	98	65.30% Impervious Area

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

Summary for Subcatchment 202A:

Runoff = 7.29 cfs @ 12.26 hrs, Volume= 0.753 af, Depth> 1.41"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
	165,626	83	1/4 acre lots, 38% imp, HSG C
	103,946	74	>75% Grass cover, Good, HSG C
*	2,667	98	Bristol Road
	7,500	71	Meadow, non-grazed, HSG C
	279,739	79	Weighted Average
	214,134	74	76.55% Pervious Area
	65,605	98	23.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawns** Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban** Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads** Paved Kv= 20.3 fps
1.6	328	0.0457	3.44		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
0.4	75	0.0250	3.27	62.19	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=3.50' D=2.00' Z= 3.0 '/' Top.W=15.50' n= 0.080 Earth, long dense weeds
3.4	188	0.0177	0.93		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
2.5	117	0.0128	0.79		**Shallow Concentrated Flow, Wetlands** Short Grass Pasture Kv= 7.0 fps
18.4	1,405	Total			

Summary for Subcatchment 202B: To Basin

Runoff = 1.65 cfs @ 12.07 hrs, Volume= 0.113 af, Depth> 2.00"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 202C:

Runoff = 0.52 cfs @ 12.08 hrs, Volume= 0.036 af, Depth> 1.55"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 202D:

Runoff = 1.19 cfs @ 12.12 hrs, Volume= 0.093 af, Depth> 2.26"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 202E:

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 0.021 af, Depth> 1.76"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Subcatchment 202F:

Runoff = 2.62 cfs @ 12.07 hrs, Volume= 0.188 af, Depth> 2.64"
Routed to Pond FB2 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	10,000	98	Building
*	18,055	98	Pavement
*	1,269	98	Sidewalks
*	2,075	98	Sediment forebay
	5,804	74	>75% Grass cover, Good, HSG C
	37,203	94	Weighted Average
	5,804	74	15.60% Pervious Area
	31,399	98	84.40% Impervious Area

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

Summary for Subcatchment 202G:

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 0.041 af, Depth> 2.74"
Routed to Pond D3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	6,674	98	Basin (98% capture)
	1,089	74	>75% Grass cover, Good, HSG C
	7,763	95	Weighted Average
	1,089	74	14.03% Pervious Area
	6,674	98	85.97% Impervious Area

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

Summary for Subcatchment 202H:

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.017 af, Depth> 1.10"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

Area (sf)	CN	Description
7,850	74	>75% Grass cover, Good, HSG C
7,850	74	100.00% Pervious Area

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

Summary for Subcatchment 202I:

Runoff = 0.76 cfs @ 12.07 hrs, Volume= 0.053 af, Depth> 2.35"
Routed to Pond CB4 : STC450i

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
	3,240	74	>75% Grass cover, Good, HSG C
*	7,486	98	Pavement
*	1,004	98	Sidewalks
	11,730	91	Weighted Average
	3,240	74	27.62% Pervious Area
	8,490	98	72.38% Impervious Area

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

Summary for Subcatchment 202J:

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 0.056 af, Depth> 1.62"
Routed to Pond D-2 : Infiltration Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YEAR Rainfall=3.30"

	Area (sf)	CN	Description
*	5,625	85	Minigolf
*	1,782	98	Ponding Area (98% capture)
	8,761	74	>75% Grass cover, Good, HSG C
*	1,682	98	Pavement
*	155	98	Sidewalks
	18,005	82	Weighted Average
	14,386	78	79.90% Pervious Area
	3,619	98	20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0650	0.28		**Sheet Flow, Grasses** Grass: Short n= 0.150 P2= 3.30"
0.3	68	0.0700	4.26		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
6.3	168	Total			

Summary for Reach R1: Across 402B

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth = 0.92" for 2-YEAR event
Inflow = 1.60 cfs @ 12.36 hrs, Volume= 0.175 af
Outflow = 1.60 cfs @ 12.37 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.6 min
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.75 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.14 fps, Avg. Travel Time= 1.6 min

Peak Storage= 87 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.05' , Surface Width= 8.21'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 804.36 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 205.0' Slope= 0.2878 '/'
Inlet Invert= 65.25', Outlet Invert= 6.25'

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 2.26" for 2-YEAR event
Inflow = 1.19 cfs @ 12.12 hrs, Volume= 0.093 af
Outflow = 1.19 cfs @ 12.12 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min
Primary = 1.19 cfs @ 12.12 hrs, Volume= 0.093 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.41' @ 12.12 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.19 cfs @ 12.12 hrs HW=71.41' TW=69.94' (Dynamic Tailwater)
└**1=12" ADS** (Barrel Controls 1.19 cfs @ 3.40 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 1.76" for 2-YEAR event
Inflow = 0.31 cfs @ 12.08 hrs, Volume= 0.021 af
Outflow = 0.31 cfs @ 12.08 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.08 hrs, Volume= 0.021 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.29' @ 12.09 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 12.08 hrs HW=70.28' TW=69.92' (Dynamic Tailwater)
└**1=12" ADS** (Outlet Controls 0.30 cfs @ 2.49 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 2.15" for 2-YEAR event
Inflow = 1.47 cfs @ 12.11 hrs, Volume= 0.114 af
Outflow = 1.47 cfs @ 12.11 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min
Primary = 0.71 cfs @ 12.11 hrs, Volume= 0.102 af
Routed to Pond FB1 : Forebay
Secondary = 0.76 cfs @ 12.11 hrs, Volume= 0.013 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.94' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.71 cfs @ 12.11 hrs HW=69.94' TW=68.89' (Dynamic Tailwater)
└**1=6" PVC** (Barrel Controls 0.71 cfs @ 3.64 fps)

Secondary OutFlow Max=0.76 cfs @ 12.11 hrs HW=69.94' TW=65.96' (Dynamic Tailwater)
└**2=12" ADS** (Inlet Controls 0.76 cfs @ 2.26 fps)

Summary for Pond CB4: STC450i

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 2.35" for 2-YEAR event
Inflow = 0.76 cfs @ 12.07 hrs, Volume= 0.053 af
Outflow = 0.76 cfs @ 12.07 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min
Primary = 0.76 cfs @ 12.07 hrs, Volume= 0.053 af
Routed to Pond CB5 : DMH

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.96' @ 12.07 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Round 12" ADS** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.75 cfs @ 12.07 hrs HW=66.96' TW=66.46' (Dynamic Tailwater)
1=12" ADS (Barrel Controls 0.75 cfs @ 3.16 fps)

Summary for Pond CB5: DMH

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 2.35" for 2-YEAR event
Inflow = 0.76 cfs @ 12.07 hrs, Volume= 0.053 af
Outflow = 0.76 cfs @ 12.07 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min
Primary = 0.76 cfs @ 12.07 hrs, Volume= 0.053 af
Routed to Pond D-2 : Infiltration Area
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.47' @ 12.07 hrs
Flood Elev= 70.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.20'	**6.0" Round 6"ADS** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 65.20' / 65.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	66.50'	**12.0" Round 12" ADS** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.75 cfs @ 12.07 hrs HW=66.46' TW=65.21' (Dynamic Tailwater)
1=6"ADS (Barrel Controls 0.75 cfs @ 3.84 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=65.20' TW=65.25' (Dynamic Tailwater)
2=12" ADS (Controls 0.00 cfs)

Summary for Pond D-2: Infiltration Area

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 1.24" for 2-YEAR event
Inflow = 1.64 cfs @ 12.12 hrs, Volume= 0.236 af
Outflow = 1.63 cfs @ 12.36 hrs, Volume= 0.210 af, Atten= 1%, Lag= 14.3 min
Discarded = 0.03 cfs @ 12.36 hrs, Volume= 0.035 af
Primary = 1.60 cfs @ 12.36 hrs, Volume= 0.175 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 65.55' @ 12.36 hrs Surf.Area= 1,308 sf Storage= 1,612 cf
Flood Elev= 67.00' Surf.Area= 1,782 sf Storage= 3,791 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 28.1 min (843.5 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	64.00'	3,791 cf	**Ponding (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.00	600	0	0
65.00	1,225	913	913
66.00	1,375	1,300	2,213
67.00	1,782	1,579	3,791

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**24.0" W x 18.0" H Box (3) 24x18 box culverts X 3.00** L= 50.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 65.25' / 65.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.00 sf
#2	Discarded	64.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 12.36 hrs HW=65.55' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.60 cfs @ 12.36 hrs HW=65.55' TW=65.30' (Dynamic Tailwater)
↑—**1=(3) 24x18 box culverts** (Barrel Controls 1.60 cfs @ 1.17 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 1.90" for 2-YEAR event
Inflow = 3.37 cfs @ 12.09 hrs, Volume= 0.253 af
Outflow = 1.20 cfs @ 12.44 hrs, Volume= 0.212 af, Atten= 64%, Lag= 20.8 min
Discarded = 0.09 cfs @ 12.44 hrs, Volume= 0.084 af
Primary = 1.11 cfs @ 12.44 hrs, Volume= 0.128 af
Routed to Pond D-2 : Infiltration Area

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.32' @ 12.44 hrs Surf.Area= 3,893 sf Storage= 3,794 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 62.6 min (892.2 - 829.6)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20 Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.09 cfs @ 12.44 hrs HW=66.32' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=1.11 cfs @ 12.44 hrs HW=66.32' TW=65.55' (Dynamic Tailwater)
2=Staged Concrete Weir (Weir Controls 1.11 cfs @ 2.36 fps)

Summary for Pond D3: Infiltration Basin

Inflow Area = 1.032 ac, 84.67% Impervious, Inflow Depth > 2.12" for 2-YEAR event
Inflow = 3.05 cfs @ 12.09 hrs, Volume= 0.182 af
Outflow = 0.19 cfs @ 13.77 hrs, Volume= 0.168 af, Atten= 94%, Lag= 101.0 min
Discarded = 0.12 cfs @ 13.77 hrs, Volume= 0.117 af
Primary = 0.07 cfs @ 13.77 hrs, Volume= 0.051 af
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.89' @ 13.77 hrs Surf.Area= 4,985 sf Storage= 3,825 cf
Flood Elev= 70.00' Surf.Area= 6,674 sf Storage= 16,217 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 191.8 min (1,019.5 - 827.7)

Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	16,217 cf	**Infiltration (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.00	3,640	0	0
68.00	5,157	4,399	4,399
69.00	5,903	5,530	9,929
70.00	6,674	6,289	16,217

Device	Routing	Invert	Outlet Devices
#1	Primary	67.10'	**1.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	67.00'	**1.020 in/hr Exfiltration over Surface area below 68.00'**
#3	Primary	68.00'	**Custom Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 2.00
			Width (feet) 0.50 0.50 5.00 5.00

Discarded OutFlow Max=0.12 cfs @ 13.77 hrs HW=67.89' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.07 cfs @ 13.77 hrs HW=67.89' TW=0.00' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.07 cfs @ 4.06 fps)
3=Custom Weir (Controls 0.00 cfs)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 1.80" for 2-YEAR event
Inflow = 1.23 cfs @ 12.09 hrs, Volume= 0.138 af
Outflow = 1.10 cfs @ 12.15 hrs, Volume= 0.127 af, Atten= 11%, Lag= 3.7 min
Primary = 1.10 cfs @ 12.15 hrs, Volume= 0.127 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 68.90' @ 12.15 hrs Surf.Area= 1,132 sf Storage= 855 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 67.7 min calculated for 0.127 af (92% of inflow)
Center-of-Mass det. time= 26.7 min (851.8 - 825.1)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=1.10 cfs @ 12.15 hrs HW=68.90' TW=66.08' (Dynamic Tailwater)
└**1=6" PVC X 3** (Inlet Controls 1.10 cfs @ 2.16 fps)

Summary for Pond FB2: Forebay

Inflow Area = 0.854 ac, 84.40% Impervious, Inflow Depth > 2.64" for 2-YEAR event
Inflow = 2.62 cfs @ 12.07 hrs, Volume= 0.188 af
Outflow = 2.51 cfs @ 12.09 hrs, Volume= 0.141 af, Atten= 4%, Lag= 1.4 min
Primary = 2.51 cfs @ 12.09 hrs, Volume= 0.141 af
Routed to Pond D3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.18' @ 12.09 hrs Surf.Area= 1,746 sf Storage= 2,320 cf
Flood Elev= 70.00' Surf.Area= 2,075 sf Storage= 3,879 cf

Plug-Flow detention time= 140.5 min calculated for 0.141 af (75% of inflow)
Center-of-Mass det. time= 57.1 min (841.8 - 784.7)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	3,879 cf	**Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	875	0	0
68.00	1,268	536	536
70.00	2,075	3,343	3,879

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**90.0 deg x 10.0' long x 1.00' rise Overflow wier** Cv= 2.50 (C= 3.13)

Primary OutFlow Max=2.50 cfs @ 12.09 hrs HW=69.18' TW=67.37' (Dynamic Tailwater)
└**1=Overflow wier** (Weir Controls 2.50 cfs @ 1.34 fps)

Summary for Link 202: To abutter

Inflow Area = 9.917 ac, 35.43% Impervious, Inflow Depth > 1.20" for 2-YEAR event
Inflow = 8.98 cfs @ 12.27 hrs, Volume= 0.995 af
Primary = 8.98 cfs @ 12.27 hrs, Volume= 0.995 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 201: To Valley

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 0.017 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	1,046	98	Valley Road Sidewalk
	832	74	>75% Grass cover, Good, HSG C
*	377	98	Pavement
*	143	98	Sidewalk
	2,398	90	Weighted Average
	832	74	34.70% Pervious Area
	1,566	98	65.30% Impervious Area

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

Summary for Subcatchment 202A:

Runoff = 14.28 cfs @ 12.25 hrs, Volume= 1.448 af, Depth> 2.71"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
	165,626	83	1/4 acre lots, 38% imp, HSG C
	103,946	74	>75% Grass cover, Good, HSG C
*	2,667	98	Bristol Road
	7,500	71	Meadow, non-grazed, HSG C
	279,739	79	Weighted Average
	214,134	74	76.55% Pervious Area
	65,605	98	23.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawns** Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban** Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads** Paved Kv= 20.3 fps
1.6	328	0.0457	3.44		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
0.4	75	0.0250	3.27	62.19	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=3.50' D=2.00' Z= 3.0 '/' Top.W=15.50' n= 0.080 Earth, long dense weeds
3.4	188	0.0177	0.93		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
2.5	117	0.0128	0.79		**Shallow Concentrated Flow, Wetlands** Short Grass Pasture Kv= 7.0 fps
18.4	1,405	Total			

Summary for Subcatchment 202B: To Basin

Runoff = 2.82 cfs @ 12.07 hrs, Volume= 0.197 af, Depth> 3.47"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 202C:

Runoff = 0.98 cfs @ 12.08 hrs, Volume= 0.068 af, Depth> 2.89"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 202D:

Runoff = 1.95 cfs @ 12.12 hrs, Volume= 0.155 af, Depth> 3.77"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 202E:

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 0.038 af, Depth> 3.18"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Subcatchment 202F:

Runoff = 4.07 cfs @ 12.07 hrs, Volume= 0.299 af, Depth> 4.21"
Routed to Pond FB2 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	10,000	98	Building
*	18,055	98	Pavement
*	1,269	98	Sidewalks
*	2,075	98	Sediment forebay
	5,804	74	>75% Grass cover, Good, HSG C
	37,203	94	Weighted Average
	5,804	74	15.60% Pervious Area
	31,399	98	84.40% Impervious Area

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

Summary for Subcatchment 202G:

Runoff = 0.86 cfs @ 12.07 hrs, Volume= 0.064 af, Depth> 4.32"
Routed to Pond D3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	6,674	98	Basin (98% capture)
	1,089	74	>75% Grass cover, Good, HSG C
	7,763	95	Weighted Average
	1,089	74	14.03% Pervious Area
	6,674	98	85.97% Impervious Area

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

Summary for Subcatchment 202H:

Runoff = 0.50 cfs @ 12.08 hrs, Volume= 0.034 af, Depth> 2.28"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

Area (sf)	CN	Description
7,850	74	>75% Grass cover, Good, HSG C
7,850	74	100.00% Pervious Area

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

Summary for Subcatchment 202I:

Runoff = 1.22 cfs @ 12.07 hrs, Volume= 0.087 af, Depth> 3.88"
Routed to Pond CB4 : STC450i

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
	3,240	74	>75% Grass cover, Good, HSG C
*	7,486	98	Pavement
*	1,004	98	Sidewalks
	11,730	91	Weighted Average
	3,240	74	27.62% Pervious Area
	8,490	98	72.38% Impervious Area

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

Summary for Subcatchment 202J:

Runoff = 1.43 cfs @ 12.09 hrs, Volume= 0.103 af, Depth> 2.99"
Routed to Pond D-2 : Infiltration Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=4.90"

	Area (sf)	CN	Description
*	5,625	85	Minigolf
*	1,782	98	Ponding Area (98% capture)
	8,761	74	>75% Grass cover, Good, HSG C
*	1,682	98	Pavement
*	155	98	Sidewalks
	18,005	82	Weighted Average
	14,386	78	79.90% Pervious Area
	3,619	98	20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0650	0.28		**Sheet Flow, Grasses** Grass: Short n= 0.150 P2= 3.30"
0.3	68	0.0700	4.26		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
6.3	168	Total			

Summary for Reach R1: Across 402B

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 2.24" for 10-YEAR event
Inflow = 4.33 cfs @ 12.14 hrs, Volume= 0.427 af
Outflow = 4.32 cfs @ 12.15 hrs, Volume= 0.427 af, Atten= 0%, Lag= 0.5 min
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.49 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.29 fps, Avg. Travel Time= 1.5 min

Peak Storage= 161 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 8.38'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 804.36 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 205.0' Slope= 0.2878 '/'
Inlet Invert= 65.25', Outlet Invert= 6.25'

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 3.77" for 10-YEAR event
Inflow = 1.95 cfs @ 12.12 hrs, Volume= 0.155 af
Outflow = 1.95 cfs @ 12.12 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min
Primary = 1.95 cfs @ 12.12 hrs, Volume= 0.155 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.64' @ 12.12 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.95 cfs @ 12.12 hrs HW=71.64' TW=70.19' (Dynamic Tailwater)
└**1=12" ADS** (Outlet Controls 1.95 cfs @ 3.75 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 3.18" for 10-YEAR event
Inflow = 0.56 cfs @ 12.07 hrs, Volume= 0.038 af
Outflow = 0.56 cfs @ 12.07 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.07 hrs, Volume= 0.038 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.44' @ 12.09 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.53 cfs @ 12.07 hrs HW=70.43' TW=70.16' (Dynamic Tailwater)
└**1=12" ADS** (Outlet Controls 0.53 cfs @ 2.43 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 3.64" for 10-YEAR event
Inflow = 2.45 cfs @ 12.10 hrs, Volume= 0.194 af
Outflow = 2.45 cfs @ 12.10 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.10 hrs, Volume= 0.156 af
Routed to Pond FB1 : Forebay
Secondary = 1.65 cfs @ 12.11 hrs, Volume= 0.038 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.19' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.10 hrs HW=70.19' TW=69.01' (Dynamic Tailwater)
└**1=6" PVC** (Outlet Controls 0.80 cfs @ 4.08 fps)

Secondary OutFlow Max=1.65 cfs @ 12.11 hrs HW=70.19' TW=66.58' (Dynamic Tailwater)
└**2=12" ADS** (Inlet Controls 1.65 cfs @ 2.83 fps)

Summary for Pond CB4: STC450i

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 3.88" for 10-YEAR event
Inflow = 1.22 cfs @ 12.07 hrs, Volume= 0.087 af
Outflow = 1.22 cfs @ 12.07 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.07 hrs, Volume= 0.087 af
Routed to Pond CB5 : DMH

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.16' @ 12.08 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Round 12" ADS** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.20 cfs @ 12.07 hrs HW=67.16' TW=66.85' (Dynamic Tailwater)
1=12" ADS (Outlet Controls 1.20 cfs @ 3.10 fps)

Summary for Pond CB5: DMH

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 3.88" for 10-YEAR event
Inflow = 1.22 cfs @ 12.07 hrs, Volume= 0.087 af
Outflow = 1.22 cfs @ 12.07 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min
Primary = 0.83 cfs @ 12.06 hrs, Volume= 0.084 af
Routed to Pond D-2 : Infiltration Area
Secondary = 0.39 cfs @ 12.07 hrs, Volume= 0.003 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.85' @ 12.07 hrs
Flood Elev= 70.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.20'	**6.0" Round 6"ADS** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 65.20' / 65.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	66.50'	**12.0" Round 12" ADS** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.06 hrs HW=66.83' TW=65.67' (Dynamic Tailwater)
1=6"ADS (Outlet Controls 0.83 cfs @ 4.22 fps)

Secondary OutFlow Max=0.39 cfs @ 12.07 hrs HW=66.85' TW=65.34' (Dynamic Tailwater)
2=12" ADS (Barrel Controls 0.39 cfs @ 2.38 fps)

Summary for Pond D-2: Infiltration Area

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 2.58" for 10-YEAR event
Inflow = 4.37 cfs @ 12.14 hrs, Volume= 0.491 af
Outflow = 4.31 cfs @ 12.17 hrs, Volume= 0.462 af, Atten= 1%, Lag= 2.1 min
Discarded = 0.03 cfs @ 12.17 hrs, Volume= 0.039 af
Primary = 4.27 cfs @ 12.17 hrs, Volume= 0.424 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 65.77' @ 12.17 hrs Surf.Area= 1,341 sf Storage= 1,903 cf
Flood Elev= 67.00' Surf.Area= 1,782 sf Storage= 3,791 cf

Plug-Flow detention time= 40.5 min calculated for 0.462 af (94% of inflow)
Center-of-Mass det. time= 14.0 min (824.4 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	64.00'	3,791 cf	**Ponding (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.00	600	0	0
65.00	1,225	913	913
66.00	1,375	1,300	2,213
67.00	1,782	1,579	3,791

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**24.0" W x 18.0" H Box (3) 24x18 box culverts X 3.00** L= 50.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 65.25' / 65.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.00 sf
#2	Discarded	64.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 12.17 hrs HW=65.77' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=4.27 cfs @ 12.17 hrs HW=65.77' TW=65.35' (Dynamic Tailwater)
1=(3) 24x18 box culverts (Barrel Controls 4.27 cfs @ 1.82 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 3.35" for 10-YEAR event
Inflow = 5.77 cfs @ 12.09 hrs, Volume= 0.447 af
Outflow = 2.97 cfs @ 12.29 hrs, Volume= 0.400 af, Atten= 49%, Lag= 11.9 min
Discarded = 0.11 cfs @ 12.29 hrs, Volume= 0.095 af
Primary = 2.86 cfs @ 12.29 hrs, Volume= 0.304 af
Routed to Pond D-2 : Infiltration Area

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.78' @ 12.29 hrs Surf.Area= 4,819 sf Storage= 5,795 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= 89.6 min calculated for 0.400 af (89% of inflow)
Center-of-Mass det. time= 39.8 min (851.5 - 811.7)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20 Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.11 cfs @ 12.29 hrs HW=66.78' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=2.86 cfs @ 12.29 hrs HW=66.78' TW=65.75' (Dynamic Tailwater)
↑—**2=Staged Concrete Weir** (Weir Controls 2.86 cfs @ 3.24 fps)

Summary for Pond D3: Infiltration Basin

Inflow Area = 1.032 ac, 84.67% Impervious, Inflow Depth > 3.69" for 10-YEAR event
Inflow = 4.76 cfs @ 12.09 hrs, Volume= 0.317 af
Outflow = 0.65 cfs @ 12.61 hrs, Volume= 0.277 af, Atten= 86%, Lag= 31.7 min
Discarded = 0.12 cfs @ 12.13 hrs, Volume= 0.134 af
Primary = 0.53 cfs @ 12.61 hrs, Volume= 0.143 af
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 68.42' @ 12.61 hrs Surf.Area= 5,467 sf Storage= 6,604 cf
Flood Elev= 70.00' Surf.Area= 6,674 sf Storage= 16,217 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 155.9 min (964.3 - 808.5)

Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	16,217 cf	**Infiltration (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.00	3,640	0	0
68.00	5,157	4,399	4,399
69.00	5,903	5,530	9,929
70.00	6,674	6,289	16,217

Device	Routing	Invert	Outlet Devices
#1	Primary	67.10'	**1.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	67.00'	**1.020 in/hr Exfiltration over Surface area below 68.00'**
#3	Primary	68.00'	**Custom Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 2.00
			Width (feet) 0.50 0.50 5.00 5.00

Discarded OutFlow Max=0.12 cfs @ 12.13 hrs HW=68.00' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.53 cfs @ 12.61 hrs HW=68.42' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.09 cfs @ 5.36 fps)
└—**3=Custom Weir** (Weir Controls 0.44 cfs @ 2.11 fps)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 2.92" for 10-YEAR event
Inflow = 1.77 cfs @ 12.08 hrs, Volume= 0.224 af
Outflow = 1.50 cfs @ 12.15 hrs, Volume= 0.213 af, Atten= 16%, Lag= 4.0 min
Primary = 1.50 cfs @ 12.15 hrs, Volume= 0.213 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.03' @ 12.15 hrs Surf.Area= 1,185 sf Storage= 1,002 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 50.6 min calculated for 0.213 af (95% of inflow)
Center-of-Mass det. time= 22.5 min (837.0 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=1.50 cfs @ 12.15 hrs HW=69.03' TW=66.69' (Dynamic Tailwater)
1=6" PVC X 3 (Inlet Controls 1.50 cfs @ 2.54 fps)

Summary for Pond FB2: Forebay

Inflow Area = 0.854 ac, 84.40% Impervious, Inflow Depth > 4.21" for 10-YEAR event
Inflow = 4.07 cfs @ 12.07 hrs, Volume= 0.299 af
Outflow = 3.93 cfs @ 12.09 hrs, Volume= 0.253 af, Atten= 3%, Lag= 1.2 min
Primary = 3.93 cfs @ 12.09 hrs, Volume= 0.253 af
Routed to Pond D3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.25' @ 12.09 hrs Surf.Area= 1,771 sf Storage= 2,432 cf
Flood Elev= 70.00' Surf.Area= 2,075 sf Storage= 3,879 cf

Plug-Flow detention time= 110.9 min calculated for 0.253 af (84% of inflow)
Center-of-Mass det. time= 46.3 min (818.9 - 772.7)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	3,879 cf	**Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	875	0	0
68.00	1,268	536	536
70.00	2,075	3,343	3,879

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**90.0 deg x 10.0' long x 1.00' rise Overflow wier** Cv= 2.50 (C= 3.13)

Primary OutFlow Max=3.93 cfs @ 12.09 hrs HW=69.25' TW=67.88' (Dynamic Tailwater)
1=Overflow wier (Weir Controls 3.93 cfs @ 1.55 fps)

Summary for Link 202: To abutter

Inflow Area = 9.917 ac, 35.43% Impervious, Inflow Depth > 2.48" for 10-YEAR event
Inflow = 18.90 cfs @ 12.25 hrs, Volume= 2.052 af
Primary = 18.90 cfs @ 12.25 hrs, Volume= 2.052 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 201: To Valley

Runoff = 0.31 cfs @ 12.07 hrs, Volume= 0.023 af, Depth> 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	1,046	98	Valley Road Sidewalk
	832	74	>75% Grass cover, Good, HSG C
*	377	98	Pavement
*	143	98	Sidewalk
	2,398	90	Weighted Average
	832	74	34.70% Pervious Area
	1,566	98	65.30% Impervious Area

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

Summary for Subcatchment 202A:

Runoff = 19.80 cfs @ 12.25 hrs, Volume= 2.010 af, Depth> 3.76"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
	165,626	83	1/4 acre lots, 38% imp, HSG C
	103,946	74	>75% Grass cover, Good, HSG C
*	2,667	98	Bristol Road
	7,500	71	Meadow, non-grazed, HSG C
	279,739	79	Weighted Average
	214,134	74	76.55% Pervious Area
	65,605	98	23.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawns** Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban** Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads** Paved Kv= 20.3 fps
1.6	328	0.0457	3.44		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
0.4	75	0.0250	3.27	62.19	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=3.50' D=2.00' Z= 3.0 '/' Top.W=15.50' n= 0.080 Earth, long dense weeds
3.4	188	0.0177	0.93		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
2.5	117	0.0128	0.79		**Shallow Concentrated Flow, Wetlands** Short Grass Pasture Kv= 7.0 fps
18.4	1,405	Total			

Summary for Subcatchment 202B: To Basin

Runoff = 3.70 cfs @ 12.07 hrs, Volume= 0.261 af, Depth> 4.61"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 202C:

Runoff = 1.33 cfs @ 12.08 hrs, Volume= 0.093 af, Depth> 3.97"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 202D:

Runoff = 2.51 cfs @ 12.11 hrs, Volume= 0.203 af, Depth> 4.94"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 202E:

Runoff = 0.74 cfs @ 12.07 hrs, Volume= 0.052 af, Depth> 4.29"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Subcatchment 202F:

Runoff = 5.14 cfs @ 12.07 hrs, Volume= 0.384 af, Depth> 5.39"
Routed to Pond FB2 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	10,000	98	Building
*	18,055	98	Pavement
*	1,269	98	Sidewalks
*	2,075	98	Sediment forebay
	5,804	74	>75% Grass cover, Good, HSG C
	37,203	94	Weighted Average
	5,804	74	15.60% Pervious Area
	31,399	98	84.40% Impervious Area

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

Summary for Subcatchment 202G:

Runoff = 1.08 cfs @ 12.07 hrs, Volume= 0.082 af, Depth> 5.51"
Routed to Pond D3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	6,674	98	Basin (98% capture)
	1,089	74	>75% Grass cover, Good, HSG C
	7,763	95	Weighted Average
	1,089	74	14.03% Pervious Area
	6,674	98	85.97% Impervious Area

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

Summary for Subcatchment 202H:

Runoff = 0.72 cfs @ 12.08 hrs, Volume= 0.049 af, Depth> 3.27"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

Area (sf)	CN	Description
7,850	74	>75% Grass cover, Good, HSG C
7,850	74	100.00% Pervious Area

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

Summary for Subcatchment 202I:

Runoff = 1.56 cfs @ 12.07 hrs, Volume= 0.113 af, Depth> 5.05"
Routed to Pond CB4 : STC450i

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
	3,240	74	>75% Grass cover, Good, HSG C
*	7,486	98	Pavement
*	1,004	98	Sidewalks
	11,730	91	Weighted Average
	3,240	74	27.62% Pervious Area
	8,490	98	72.38% Impervious Area

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

Summary for Subcatchment 202J:

Runoff = 1.94 cfs @ 12.09 hrs, Volume= 0.140 af, Depth> 4.07"
Routed to Pond D-2 : Infiltration Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YEAR Rainfall=6.10"

	Area (sf)	CN	Description
*	5,625	85	Minigolf
*	1,782	98	Ponding Area (98% capture)
	8,761	74	>75% Grass cover, Good, HSG C
*	1,682	98	Pavement
*	155	98	Sidewalks
	18,005	82	Weighted Average
	14,386	78	79.90% Pervious Area
	3,619	98	20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0650	0.28		**Sheet Flow, Grasses** Grass: Short n= 0.150 P2= 3.30"
0.3	68	0.0700	4.26		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
6.3	168	Total			

Summary for Reach R1: Across 402B

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 3.31" for 25-YEAR event
Inflow = 6.28 cfs @ 12.14 hrs, Volume= 0.630 af
Outflow = 6.28 cfs @ 12.15 hrs, Volume= 0.630 af, Atten= 0%, Lag= 0.3 min
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.33 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.43 fps, Avg. Travel Time= 1.4 min

Peak Storage= 203 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 8.48'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 804.36 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 205.0' Slope= 0.2878 '/'
Inlet Invert= 65.25', Outlet Invert= 6.25'

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 4.94" for 25-YEAR event
Inflow = 2.51 cfs @ 12.11 hrs, Volume= 0.203 af
Outflow = 2.51 cfs @ 12.11 hrs, Volume= 0.203 af, Atten= 0%, Lag= 0.0 min
Primary = 2.51 cfs @ 12.11 hrs, Volume= 0.203 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.83' @ 12.12 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.51 cfs @ 12.11 hrs HW=71.83' TW=70.38' (Dynamic Tailwater)
↑—**1=12" ADS** (Outlet Controls 2.51 cfs @ 3.88 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 4.29" for 25-YEAR event
Inflow = 0.74 cfs @ 12.07 hrs, Volume= 0.052 af
Outflow = 0.74 cfs @ 12.07 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min
Primary = 0.74 cfs @ 12.07 hrs, Volume= 0.052 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.57' @ 12.10 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.69 cfs @ 12.07 hrs HW=70.54' TW=70.33' (Dynamic Tailwater)
↑—**1=12" ADS** (Outlet Controls 0.69 cfs @ 2.29 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 4.79" for 25-YEAR event
Inflow = 3.18 cfs @ 12.10 hrs, Volume= 0.255 af
Outflow = 3.18 cfs @ 12.10 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
Primary = 0.84 cfs @ 12.09 hrs, Volume= 0.195 af
Routed to Pond FB1 : Forebay
Secondary = 2.35 cfs @ 12.11 hrs, Volume= 0.060 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.38' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.09 hrs HW=70.37' TW=69.08' (Dynamic Tailwater)
↑—**1=6" PVC** (Outlet Controls 0.83 cfs @ 4.25 fps)

Secondary OutFlow Max=2.34 cfs @ 12.11 hrs HW=70.38' TW=66.85' (Dynamic Tailwater)
↑—**2=12" ADS** (Inlet Controls 2.34 cfs @ 3.20 fps)

Summary for Pond CB4: STC450i

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 5.05" for 25-YEAR event
Inflow = 1.56 cfs @ 12.07 hrs, Volume= 0.113 af
Outflow = 1.56 cfs @ 12.07 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.07 hrs, Volume= 0.113 af
Routed to Pond CB5 : DMH

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.30' @ 12.08 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Round 12" ADS** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.54 cfs @ 12.07 hrs HW=67.30' TW=66.98' (Dynamic Tailwater)
1=12" ADS (Outlet Controls 1.54 cfs @ 3.16 fps)

Summary for Pond CB5: DMH

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 5.05" for 25-YEAR event
Inflow = 1.56 cfs @ 12.07 hrs, Volume= 0.113 af
Outflow = 1.56 cfs @ 12.07 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min
Primary = 0.84 cfs @ 12.06 hrs, Volume= 0.105 af
Routed to Pond D-2 : Infiltration Area
Secondary = 0.72 cfs @ 12.07 hrs, Volume= 0.008 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.99' @ 12.07 hrs
Flood Elev= 70.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.20'	**6.0" Round 6"ADS** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 65.20' / 65.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	66.50'	**12.0" Round 12" ADS** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.84 cfs @ 12.06 hrs HW=66.97' TW=65.78' (Dynamic Tailwater)
1=6"ADS (Outlet Controls 0.84 cfs @ 4.27 fps)

Secondary OutFlow Max=0.72 cfs @ 12.07 hrs HW=66.98' TW=65.36' (Dynamic Tailwater)
2=12" ADS (Barrel Controls 0.72 cfs @ 2.79 fps)

Summary for Pond D-2: Infiltration Area

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 3.64" for 25-YEAR event
Inflow = 6.11 cfs @ 12.14 hrs, Volume= 0.692 af
Outflow = 6.05 cfs @ 12.17 hrs, Volume= 0.663 af, Atten= 1%, Lag= 1.9 min
Discarded = 0.03 cfs @ 12.17 hrs, Volume= 0.041 af
Primary = 6.02 cfs @ 12.17 hrs, Volume= 0.622 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 65.89' @ 12.17 hrs Surf.Area= 1,358 sf Storage= 2,057 cf
Flood Elev= 67.00' Surf.Area= 1,782 sf Storage= 3,791 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 11.9 min (820.4 - 808.5)

Volume	Invert	Avail.Storage	Storage Description
#1	64.00'	3,791 cf	**Ponding (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.00	600	0	0
65.00	1,225	913	913
66.00	1,375	1,300	2,213
67.00	1,782	1,579	3,791

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**24.0" W x 18.0" H Box (3) 24x18 box culverts X 3.00** L= 50.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 65.25' / 65.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.00 sf
#2	Discarded	64.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 12.17 hrs HW=65.89' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=6.02 cfs @ 12.17 hrs HW=65.89' TW=65.37' (Dynamic Tailwater)
↑—**1=(3) 24x18 box culverts** (Barrel Controls 6.02 cfs @ 2.10 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 4.48" for 25-YEAR event
Inflow = 7.55 cfs @ 12.09 hrs, Volume= 0.598 af
Outflow = 4.33 cfs @ 12.25 hrs, Volume= 0.549 af, Atten= 43%, Lag= 9.5 min
Discarded = 0.12 cfs @ 12.25 hrs, Volume= 0.102 af
Primary = 4.20 cfs @ 12.25 hrs, Volume= 0.446 af
Routed to Pond D-2 : Infiltration Area

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.02' @ 12.25 hrs Surf.Area= 5,281 sf Storage= 7,025 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 36.2 min (839.0 - 802.8)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20 Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.12 cfs @ 12.25 hrs HW=67.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=4.20 cfs @ 12.25 hrs HW=67.02' TW=65.88' (Dynamic Tailwater)
└**2=Staged Concrete Weir** (Weir Controls 4.20 cfs @ 3.38 fps)

Summary for Pond D3: Infiltration Basin

Inflow Area = 1.032 ac, 84.67% Impervious, Inflow Depth > 4.87" for 25-YEAR event
Inflow = 6.04 cfs @ 12.09 hrs, Volume= 0.419 af
Outflow = 1.24 cfs @ 12.51 hrs, Volume= 0.369 af, Atten= 79%, Lag= 25.5 min
Discarded = 0.12 cfs @ 12.04 hrs, Volume= 0.142 af
Primary = 1.12 cfs @ 12.51 hrs, Volume= 0.226 af
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 68.73' @ 12.51 hrs Surf.Area= 5,698 sf Storage= 8,338 cf
Flood Elev= 70.00' Surf.Area= 6,674 sf Storage= 16,217 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 126.0 min (925.2 - 799.2)

Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	16,217 cf	**Infiltration (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.00	3,640	0	0
68.00	5,157	4,399	4,399
69.00	5,903	5,530	9,929
70.00	6,674	6,289	16,217

Device	Routing	Invert	Outlet Devices
#1	Primary	67.10'	**1.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	67.00'	**1.020 in/hr Exfiltration over Surface area below 68.00'**
#3	Primary	68.00'	**Custom Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 2.00
			Width (feet) 0.50 0.50 5.00 5.00

Discarded OutFlow Max=0.12 cfs @ 12.04 hrs HW=68.03' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=1.12 cfs @ 12.51 hrs HW=68.73' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 6.00 fps)
└**3=Custom Weir** (Weir Controls 1.01 cfs @ 2.79 fps)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 3.75" for 25-YEAR event
Inflow = 2.17 cfs @ 12.08 hrs, Volume= 0.288 af
Outflow = 1.76 cfs @ 12.15 hrs, Volume= 0.276 af, Atten= 19%, Lag= 4.3 min
Primary = 1.76 cfs @ 12.15 hrs, Volume= 0.276 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.13' @ 12.15 hrs Surf.Area= 1,234 sf Storage= 1,128 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 43.5 min calculated for 0.276 af (96% of inflow)
Center-of-Mass det. time= 20.5 min (828.9 - 808.4)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=1.76 cfs @ 12.15 hrs HW=69.13' TW=66.96' (Dynamic Tailwater)
└**1=6" PVC X 3** (Inlet Controls 1.76 cfs @ 2.98 fps)

Summary for Pond FB2: Forebay

Inflow Area = 0.854 ac, 84.40% Impervious, Inflow Depth > 5.39" for 25-YEAR event
Inflow = 5.14 cfs @ 12.07 hrs, Volume= 0.384 af
Outflow = 4.99 cfs @ 12.09 hrs, Volume= 0.337 af, Atten= 3%, Lag= 1.1 min
Primary = 4.99 cfs @ 12.09 hrs, Volume= 0.337 af
Routed to Pond D3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.29' @ 12.09 hrs Surf.Area= 1,788 sf Storage= 2,507 cf
Flood Elev= 70.00' Surf.Area= 2,075 sf Storage= 3,879 cf

Plug-Flow detention time= 97.0 min calculated for 0.337 af (88% of inflow)
Center-of-Mass det. time= 41.5 min (808.2 - 766.7)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	3,879 cf	**Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	875	0	0
68.00	1,268	536	536
70.00	2,075	3,343	3,879

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**90.0 deg x 10.0' long x 1.00' rise Overflow wier** Cv= 2.50 (C= 3.13)

Primary OutFlow Max=4.98 cfs @ 12.09 hrs HW=69.29' TW=68.22' (Dynamic Tailwater)
└**1=Overflow wier** (Weir Controls 4.98 cfs @ 1.67 fps)

Summary for Link 202: To abutter

Inflow Area = 9.917 ac, 35.43% Impervious, Inflow Depth > 3.53" for 25-YEAR event
Inflow = 26.87 cfs @ 12.25 hrs, Volume= 2.915 af
Primary = 26.87 cfs @ 12.25 hrs, Volume= 2.915 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 201: To Valley

Runoff = 0.46 cfs @ 12.07 hrs, Volume= 0.034 af, Depth> 7.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	1,046	98	Valley Road Sidewalk
	832	74	>75% Grass cover, Good, HSG C
*	377	98	Pavement
*	143	98	Sidewalk
	2,398	90	Weighted Average
	832	74	34.70% Pervious Area
	1,566	98	65.30% Impervious Area

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

Summary for Subcatchment 202A:

Runoff = 31.54 cfs @ 12.25 hrs, Volume= 3.237 af, Depth> 6.05"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
	165,626	83	1/4 acre lots, 38% imp, HSG C
	103,946	74	>75% Grass cover, Good, HSG C
*	2,667	98	Bristol Road
	7,500	71	Meadow, non-grazed, HSG C
	279,739	79	Weighted Average
	214,134	74	76.55% Pervious Area
	65,605	98	23.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawns** Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban** Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads** Paved Kv= 20.3 fps
1.6	328	0.0457	3.44		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
0.4	75	0.0250	3.27	62.19	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=3.50' D=2.00' Z= 3.0 '/' Top.W=15.50' n= 0.080 Earth, long dense weeds
3.4	188	0.0177	0.93		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
2.5	117	0.0128	0.79		**Shallow Concentrated Flow, Wetlands** Short Grass Pasture Kv= 7.0 fps
18.4	1,405	Total			

Summary for Subcatchment 202B: To Basin

Runoff = 5.51 cfs @ 12.07 hrs, Volume= 0.398 af, Depth> 7.03"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 202C:

Runoff = 2.08 cfs @ 12.08 hrs, Volume= 0.148 af, Depth> 6.30"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement**
					Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 202D:

Runoff = 3.68 cfs @ 12.11 hrs, Volume= 0.304 af, Depth> 7.39"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 202E:

Runoff = 1.13 cfs @ 12.07 hrs, Volume= 0.081 af, Depth> 6.67"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Subcatchment 202F:

Runoff = 7.35 cfs @ 12.07 hrs, Volume= 0.560 af, Depth> 7.87"
Routed to Pond FB2 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	10,000	98	Building
*	18,055	98	Pavement
*	1,269	98	Sidewalks
*	2,075	98	Sediment forebay
	5,804	74	>75% Grass cover, Good, HSG C
	37,203	94	Weighted Average
	5,804	74	15.60% Pervious Area
	31,399	98	84.40% Impervious Area

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

Summary for Subcatchment 202G:

Runoff = 1.54 cfs @ 12.07 hrs, Volume= 0.119 af, Depth> 7.99"
Routed to Pond D3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	6,674	98	Basin (98% capture)
	1,089	74	>75% Grass cover, Good, HSG C
	7,763	95	Weighted Average
	1,089	74	14.03% Pervious Area
	6,674	98	85.97% Impervious Area

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

Summary for Subcatchment 202H:

Runoff = 1.19 cfs @ 12.07 hrs, Volume= 0.082 af, Depth> 5.46"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

Area (sf)	CN	Description
7,850	74	>75% Grass cover, Good, HSG C
7,850	74	100.00% Pervious Area

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

Summary for Subcatchment 202I:

Runoff = 2.27 cfs @ 12.07 hrs, Volume= 0.169 af, Depth> 7.51"
Routed to Pond CB4 : STC450i

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
	3,240	74	>75% Grass cover, Good, HSG C
*	7,486	98	Pavement
*	1,004	98	Sidewalks
	11,730	91	Weighted Average
	3,240	74	27.62% Pervious Area
	8,490	98	72.38% Impervious Area

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

Summary for Subcatchment 202J:

Runoff = 3.00 cfs @ 12.09 hrs, Volume= 0.221 af, Depth> 6.42"
Routed to Pond D-2 : Infiltration Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=8.60"

	Area (sf)	CN	Description
*	5,625	85	Minigolf
*	1,782	98	Ponding Area (98% capture)
	8,761	74	>75% Grass cover, Good, HSG C
*	1,682	98	Pavement
*	155	98	Sidewalks
	18,005	82	Weighted Average
	14,386	78	79.90% Pervious Area
	3,619	98	20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0650	0.28		**Sheet Flow, Grasses** Grass: Short n= 0.150 P2= 3.30"
0.3	68	0.0700	4.26		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
6.3	168	Total			

Summary for Reach R1: Across 402B

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 5.61" for 100-YEAR event
Inflow = 10.51 cfs @ 12.15 hrs, Volume= 1.068 af
Outflow = 10.51 cfs @ 12.16 hrs, Volume= 1.068 af, Atten= 0%, Lag= 0.3 min
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.71 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.68 fps, Avg. Travel Time= 1.3 min

Peak Storage= 279 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 8.65'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 804.36 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 205.0' Slope= 0.2878 '/'
Inlet Invert= 65.25', Outlet Invert= 6.25'

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 7.39" for 100-YEAR event
Inflow = 3.68 cfs @ 12.11 hrs, Volume= 0.304 af
Outflow = 3.68 cfs @ 12.11 hrs, Volume= 0.304 af, Atten= 0%, Lag= 0.0 min
Primary = 3.68 cfs @ 12.11 hrs, Volume= 0.304 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 73.56' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.68 cfs @ 12.11 hrs HW=73.55' TW=70.97' (Dynamic Tailwater)
↑—**1=12" ADS** (Outlet Controls 3.68 cfs @ 4.69 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 6.67" for 100-YEAR event
Inflow = 1.13 cfs @ 12.07 hrs, Volume= 0.081 af
Outflow = 1.13 cfs @ 12.07 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.07 hrs, Volume= 0.081 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.06' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.73 cfs @ 12.07 hrs HW=70.91' TW=70.85' (Dynamic Tailwater)
↑—**1=12" ADS** (Outlet Controls 0.73 cfs @ 1.27 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 7.22" for 100-YEAR event
Inflow = 4.70 cfs @ 12.10 hrs, Volume= 0.385 af
Outflow = 4.70 cfs @ 12.10 hrs, Volume= 0.385 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.09 hrs, Volume= 0.272 af
Routed to Pond FB1 : Forebay
Secondary = 3.74 cfs @ 12.10 hrs, Volume= 0.113 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.98' @ 12.10 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.95 cfs @ 12.09 hrs HW=70.96' TW=69.30' (Dynamic Tailwater)
↑—**1=6" PVC** (Outlet Controls 0.95 cfs @ 4.83 fps)

Secondary OutFlow Max=3.74 cfs @ 12.10 hrs HW=70.98' TW=67.22' (Dynamic Tailwater)
↑—**2=12" ADS** (Inlet Controls 3.74 cfs @ 4.76 fps)

Summary for Pond CB4: STC450i

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 7.51" for 100-YEAR event
Inflow = 2.27 cfs @ 12.07 hrs, Volume= 0.169 af
Outflow = 2.27 cfs @ 12.07 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 2.27 cfs @ 12.07 hrs, Volume= 0.169 af
Routed to Pond CB5 : DMH

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.57' @ 12.08 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Round 12" ADS** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.24 cfs @ 12.07 hrs HW=67.56' TW=67.21' (Dynamic Tailwater)
1=12" ADS (Inlet Controls 2.24 cfs @ 2.86 fps)

Summary for Pond CB5: DMH

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 7.51" for 100-YEAR event
Inflow = 2.27 cfs @ 12.07 hrs, Volume= 0.169 af
Outflow = 2.27 cfs @ 12.07 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 0.87 cfs @ 12.05 hrs, Volume= 0.146 af
Routed to Pond D-2 : Infiltration Area
Secondary = 1.41 cfs @ 12.07 hrs, Volume= 0.023 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.21' @ 12.07 hrs
Flood Elev= 70.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.20'	**6.0" Round 6"ADS** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 65.20' / 65.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	66.50'	**12.0" Round 12" ADS** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.86 cfs @ 12.05 hrs HW=67.19' TW=65.94' (Dynamic Tailwater)
1=6"ADS (Outlet Controls 0.86 cfs @ 4.39 fps)

Secondary OutFlow Max=1.40 cfs @ 12.07 hrs HW=67.21' TW=65.40' (Dynamic Tailwater)
2=12" ADS (Barrel Controls 1.40 cfs @ 3.29 fps)

Summary for Pond D-2: Infiltration Area

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 5.89" for 100-YEAR event
Inflow = 9.97 cfs @ 12.15 hrs, Volume= 1.120 af
Outflow = 9.88 cfs @ 12.17 hrs, Volume= 1.090 af, Atten= 1%, Lag= 1.4 min
Discarded = 0.03 cfs @ 12.17 hrs, Volume= 0.045 af
Primary = 9.85 cfs @ 12.17 hrs, Volume= 1.045 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.10' @ 12.17 hrs Surf.Area= 1,416 sf Storage= 2,353 cf
Flood Elev= 67.00' Surf.Area= 1,782 sf Storage= 3,791 cf

Plug-Flow detention time= 25.0 min calculated for 1.090 af (97% of inflow)
Center-of-Mass det. time= 9.8 min (812.3 - 802.5)

Volume	Invert	Avail.Storage	Storage Description
#1	64.00'	3,791 cf	**Ponding (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.00	600	0	0
65.00	1,225	913	913
66.00	1,375	1,300	2,213
67.00	1,782	1,579	3,791

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**24.0" W x 18.0" H Box (3) 24x18 box culverts X 3.00** L= 50.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 65.25' / 65.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.00 sf
#2	Discarded	64.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 12.17 hrs HW=66.10' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=9.85 cfs @ 12.17 hrs HW=66.10' TW=65.41' (Dynamic Tailwater)
↑—**1=(3) 24x18 box culverts** (Barrel Controls 9.85 cfs @ 2.57 fps)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 6.89" for 100-YEAR event
Inflow = 11.08 cfs @ 12.09 hrs, Volume= 0.919 af
Outflow = 7.36 cfs @ 12.20 hrs, Volume= 0.867 af, Atten= 34%, Lag= 7.1 min
Discarded = 0.13 cfs @ 12.20 hrs, Volume= 0.115 af
Primary = 7.23 cfs @ 12.20 hrs, Volume= 0.753 af
Routed to Pond D-2 : Infiltration Area

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.37' @ 12.20 hrs Surf.Area= 5,557 sf Storage= 8,887 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= 62.7 min calculated for 0.867 af (94% of inflow)
Center-of-Mass det. time= 32.1 min (822.3 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20 Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.13 cfs @ 12.20 hrs HW=67.37' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=7.23 cfs @ 12.20 hrs HW=67.37' TW=66.10' (Dynamic Tailwater)
2=Staged Concrete Weir (Weir Controls 7.23 cfs @ 3.30 fps)

Summary for Pond D3: Infiltration Basin

Inflow Area = 1.032 ac, 84.67% Impervious, Inflow Depth > 7.35" for 100-YEAR event
Inflow = 8.69 cfs @ 12.08 hrs, Volume= 0.632 af
Outflow = 3.37 cfs @ 12.29 hrs, Volume= 0.564 af, Atten= 61%, Lag= 12.6 min
Discarded = 0.12 cfs @ 11.77 hrs, Volume= 0.156 af
Primary = 3.24 cfs @ 12.29 hrs, Volume= 0.408 af
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.17' @ 12.29 hrs Surf.Area= 6,035 sf Storage= 10,952 cf
Flood Elev= 70.00' Surf.Area= 6,674 sf Storage= 16,217 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 91.6 min (877.4 - 785.7)

Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	16,217 cf	**Infiltration (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.00	3,640	0	0
68.00	5,157	4,399	4,399
69.00	5,903	5,530	9,929
70.00	6,674	6,289	16,217

Device	Routing	Invert	Outlet Devices
#1	Primary	67.10'	**1.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	67.00'	**1.020 in/hr Exfiltration over Surface area below 68.00'**
#3	Primary	68.00'	**Custom Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 2.00
			Width (feet) 0.50 0.50 5.00 5.00

Discarded OutFlow Max=0.12 cfs @ 11.77 hrs HW=68.00' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=3.24 cfs @ 12.29 hrs HW=69.17' TW=0.00' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.12 cfs @ 6.80 fps)
3=Custom Weir (Weir Controls 3.12 cfs @ 2.30 fps)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 5.47" for 100-YEAR event
Inflow = 3.03 cfs @ 12.08 hrs, Volume= 0.420 af
Outflow = 2.16 cfs @ 12.17 hrs, Volume= 0.408 af, Atten= 29%, Lag= 5.2 min
Primary = 2.16 cfs @ 12.17 hrs, Volume= 0.408 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.40' @ 12.17 hrs Surf.Area= 1,356 sf Storage= 1,469 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 34.7 min calculated for 0.408 af (97% of inflow)
Center-of-Mass det. time= 17.8 min (816.0 - 798.2)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=2.16 cfs @ 12.17 hrs HW=69.40' TW=67.35' (Dynamic Tailwater)
1=6" PVC X 3 (Barrel Controls 2.16 cfs @ 3.66 fps)

Summary for Pond FB2: Forebay

Inflow Area = 0.854 ac, 84.40% Impervious, Inflow Depth > 7.87" for 100-YEAR event
Inflow = 7.35 cfs @ 12.07 hrs, Volume= 0.560 af
Outflow = 7.17 cfs @ 12.09 hrs, Volume= 0.514 af, Atten= 2%, Lag= 1.0 min
Primary = 7.17 cfs @ 12.09 hrs, Volume= 0.514 af
Routed to Pond D3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.37' @ 12.09 hrs Surf.Area= 1,820 sf Storage= 2,648 cf
Flood Elev= 70.00' Surf.Area= 2,075 sf Storage= 3,879 cf

Plug-Flow detention time= 77.6 min calculated for 0.513 af (92% of inflow)
Center-of-Mass det. time= 34.7 min (793.0 - 758.3)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	3,879 cf	**Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	875	0	0
68.00	1,268	536	536
70.00	2,075	3,343	3,879

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**90.0 deg x 10.0' long x 1.00' rise Overflow wier** Cv= 2.50 (C= 3.13)

Primary OutFlow Max=7.16 cfs @ 12.09 hrs HW=69.37' TW=68.82' (Dynamic Tailwater)
1=Overflow wier (Weir Controls 7.16 cfs @ 1.88 fps)

Summary for Link 202: To abutter

Inflow Area = 9.917 ac, 35.43% Impervious, Inflow Depth > 5.80" for 100-YEAR event
Inflow = 44.99 cfs @ 12.24 hrs, Volume= 4.796 af
Primary = 44.99 cfs @ 12.24 hrs, Volume= 4.796 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

APPENDIX E SUPPLEMENTARY CALCULATIONS

Northeast Engineers
& Consultants, Inc.

Minimum Standard 3: Water Quality

Project: 18225.5 Valley Crossing

Infiltration Basin D-2 Water Quality Volume Calculations:

Pavement =	0.208	ac		
Roof =	0.000	ac		
Sidewalks =	0.023	ac		
Impervious Area:	0.231	ac	**WQ_R:**	**839 cf**

Total Volume below outlet per HydroCAD = 1,450 cf

Total Volume infiltrated in a WQ Storm = 1,089 cf
(1.2" Split Pervious Method)

Northeast Engineers
& Consultants, Inc.

Minimum Standard 3: Water Quality

Project: 18225.5 Valley Crossing

Infiltration Basin D-3 Water Quality Volume Calculations:

Pavement =	0.414	ac		
Roof =	0.023	ac		
Sidewalks =	0.029	ac		
Impervious Area:	0.467	ac	**WQ_R:**	**1,694 cf**

Total Volume below outlet per HydroCAD = **2,378 cf**
(Basin & Pretreatment)

Total Volume infiltrated in a WQ Storm = **3,138 cf**
(1.2" Split Pervious Method + Pretreatment)

Northeast Engineers
& Consultants, Inc.

Minimum Standard 4: Channel Protection Volume

Project: 18225.5 Valley Crossing

Provided Channel Protection Calculations for Basin D-3:

Volume of 1-Year Storm Runoff (From HydroCAD) $\mathbf{Vol_{1\text{-}YEAR}}$ **0.141 af**
6,142 cf

$$\mathbf{A = Q / (Cd(2gh)^{1/2})}$$

Where:

A = Area of outlet (ft^2)
Q= $\mathbf{Vol_{1\text{-}YEAR}}$ / 86,400 cfs **= 0.071 cfs**
g = 32.2 (ft/s^2)
h = (**z** - 0.5*($\mathbf{D_{ASSUME}}$)) / 2 **= 0.638 ft.**
Cd = 0.6

Where:

z = depth of basin that contains $\mathbf{Vol_{1\text{-}YEAR}}$ **= 1.35 ft**
$\mathbf{D_{ASSUME}}$ **=** Assumed diameter of outlet = **1.8 in.**

A = 0.0185 ft^2
$\mathbf{D_{FINAL}}$ **= 1.8 in.**

Northeast Engineers
& Consultants, Inc.

Minimum Standard 2: Groundwater Recharge

Project: 18225.5 Valley Crossing

Impervious Area*: 30,388 sf

Water Recharge Volume Calculations:

HSG	Recharge Factor (F)
A	0.60
B	0.35
C	0.25
D	0.10

Impervious Area: 30,388 sf **F =** 0.25

$WRec_V$ = (Impervious Area) / 12 X F

$WRec_V$ = **633** cf

Volume of Infiltration for a WQ storm:** **2,222** **cf**

* Total to systems D-2 and D-3

** Total from systems D-2 and D-3 (1.2" WQ Storm, split pervious method)

Northeast Engineers & Consultants, Inc.
A Knowledge Corporation®

6 Valley Road, Middletown, RI 02842
www.northeastengineers.com

SW-1: Dry Swale

Project: 18225.5 Valley Crossing

Water Quality Volume Calculation (RIDEM Minimum Standard 3):

The dry swale provides water quality for upstream residential properties which have no existing water quality treatment. This device is included in the design to compensate for the increased pollutant loads generated by the site.

Length of Swale =	175	feet
Width of Swale =	6	feet
Area of Swale =	1,050	square feet

With this area, the WQ volume is calculated using the following equation:

$$WQ_V = A / [df / [(k) X (hf + df) X (tf)]]$$

Where,

A =	Area of swale	1,050	sf
d_f =	swale bed depth (ft)	1.5	ft
k =	Coefficient of permeability of filter media (ft/day)	1.0	ft/day
h_f =	Average height of water above surface of media	0.75	ft
t_f =	Design filter bed drain time	2	days

Therefore, the provided WQ volume is:

WQ_V = 3,150 cf

The upstream off-site residential catchment has an area of 3.458 acres of which approximately 38% is impervious. The water quality requirment is therefore:

Catchment =	0.35	acres
% impervious =	38%	
Impervious area =	5,793	sq. ft.
WQ_{REQ} =	**483**	**cf**

Northeast Engineers & Consultants, Inc.

Pollutant Loading Analysis

The following method for Pollutant Loading Analysis (PLA) Calculations has been developed from the Rhode Island Stormwater Design and Installation Standards Manual (RISDISM), Appendix H.3.

Stormwater pollutant export load (L, in pounds or billion colonies) from a developed site can be determined by solving the following equation.

(Eq 1) $L = [(P)(P_j)(R_V)/12](C)(A)(2.72)$

Where:

- P = rainfall depth in inches (from Figure H-8 from Appendix H.3 of the RISDISM)
- P_j = rainfall correction factor
- R_V = runoff coefficient expressing the fraction of rainfall converted to runoff
- C = flow weighted mean concentration of the pollutant in urban runoff (mg/L)
- A = contributing drainage area of development site (acres)

For bacteria, the conversion factor is modified, so the loadning equation is:

(Eq 1a) $L = 1.03(10^{-3})(P)(P_j)(R_V)](C')(A)$

Where:

- P = rainfall depth in inches (from Figure H-8 from Appendix H.3 of the RISDISM)
- P_j = rainfall correction factor
- R_V = runoff coefficient expressing the fraction of rainfall converted to runoff
- C' = flow weighted mean of bacteria concentration (#col/100 mL)
- A = contributing drainage area of development site (acres)

The runoff coefficient R_V can be determined from the following equation:

(Eq 2) $R_V = 0.05 + 0.009(\%I)$

Where:

- $\%I$ = percent of the site imperviousness

Site:	Valley Crossing	
Contributing Site Area (ac):	**3.537**	
Pollutant Assessed:	**Bacteria (fecal coliform)**	
Rainfall Depth (P):	**47**	(from Figure H-8 of the RISDISM)
Rainfall Correction Factor (P_j):	**0.9**	(use 0.9)
C or C' (as applicable):	**varies**	(from Table H-2 of the RISDISM)
Area of Existing Impervious (ac):	**0.29906**	
Existing Percent Impervious:	**8.46%**	
Area of Proposed Impervious:	**1.414**	
Proposed Percent Impervious:	**39.97%**	

Existing Conditions (L) = **96** Billion Colonies/year

Proposed Conditions (L) = **56** Billion Colonies/year

Total Pollutant Load Attributed to Improvements = **-40** Billion Colonies/year

NORTHEAST ENGINEERS
& CONSULTANTS, INC. "A Knowledge Corporation" ®
6 VALLEY ROAD MIDDLETOWN RHODE ISLAND 02842 401.849.0810 PHONE 401.846.4169 FAX

Pollutant Loading Analysis (Bacteria)

Project: Valley Crossing
Job Number: 18225.5
Date: 21-Feb-23

Rainfall Depth (P): 47 (from Figure H-8 of the RISDISM)
Rainfall Correction Factor (P_J): 0.9
Pollutant Load (L): $= 1.03(10^{-3})(P)(Pj)(RV)](C')(A)$

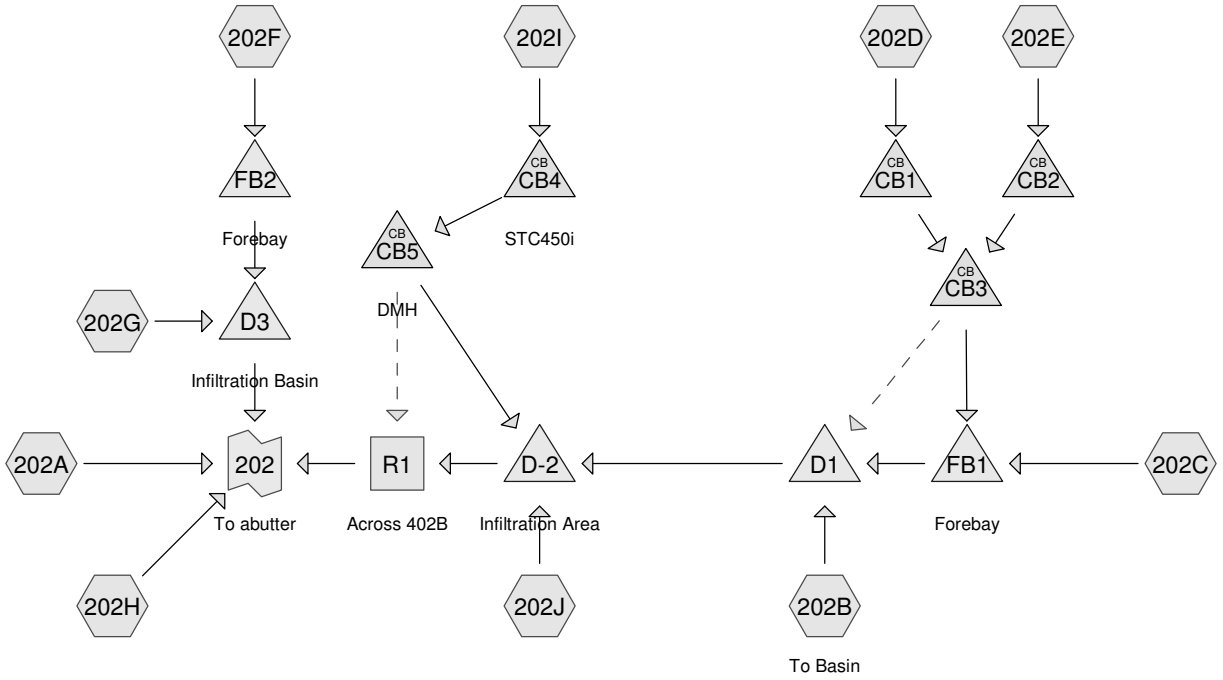
Existing Area Loading Calculations

	Area Description	A = Area (ac)	Impervious Area (ac)	Percent Impervious ($I_{\%}$)	$R_V = 0.05 + (0.009 \times I_{\%})$	$1.03 \times 10^{-3} \times P \times P_J =$	C = Loading Rate	L= Load (bc/y)	Treatment % from BMPs	FL = Final Load after Treatment (bc/y)
(1)	Onsite Area	2.250	0.000	0.0%	0.0500	0.0436	300	1.5	0%	1.5
(2)	Offsite Area (vacant)	0.500	0.000	0.0%	0.0500	0.0436	300	0.3	0%	0.3
(3)	Offsite Area (res.)	0.787	0.299	38.0%	0.3920	0.0436	7000	94.1	0%	94.1
(4)	**Totals:**	**3.537**	**0.299**					**95.9**		**95.9**

Proposed Loading Calculations

	Area Description	A = Area (ac)	Impervious Area (ac)	Percent Impervious ($I_{\%}$)	$R_V = 0.05 + (0.009 \times I_{\%})$	$1.03 \times 10^{-3} \times P \times P_J =$	C = Loading Rate	L= Load (bc/y)	Treatment % from BMPs	FL = Final Load after Treatment (bc/y)
(5)	Onsite to D2	0.386	0.216	56.0%	0.5540	0.0436	4600	42.9	95%	2.1
(6)	Onsite to D3	1.032	0.874	84.7%	0.8120	0.0436	4600	168.0	96%	6.7
(7)	Untreated developed	0.262	0.034	13.0%	0.1668	0.0436	4600	8.8	0%	8.8
(8)	Untreated undev	0.334	0.000	0.00%	0.0500	0.0436	300	0.2	0%	0.2
(9)	Untreated offsite res	0.313	0.119	38.00%	0.3920	0.0436	7000	37.4	0%	37.4
(10)	Offsite Res to Swale	0.450	0.171	38.00%	0.3920	0.0436	300	2.3	70%	0.7
(11)	Onsite to Dry Swale	0.260	0.000	0.00%	0.0500	0.0436	300	0.2	70%	0.1
(12)	Offsite Vacant to Swale	0.500	0.000	0.00%	0.0500	0.0436	300	0.3	70%	0.1
(8)	**Totals:**	**3.537**	**1.414**					**257.2**		**56.1**

APPENDIX F WQ STORM ANALYSIS (SPLIT PERVIOUS METHOD)



Subcat Reach Pond Link

Routing Diagram for 2023-02-21 18225.5 PR WITH LOT A

Prepared by Northeast Engineers & Consultants, Inc., Printed 3/3/2023

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.802	83	1/4 acre lots, 38% imp, HSG C (202A)
3.584	74	>75% Grass cover, Good, HSG C (202A, 202B, 202C, 202D, 202E, 202F, 202G, 202H, 202I, 202J)
0.120	98	Basin (202B)
0.153	98	Basin (98% capture) (202G)
0.061	98	Bristol Road (202A)
0.243	98	Building (202E, 202F)
0.391	98	Driveway (202B, 202C, 202D, 202E)
0.038	98	Forebay (202C)
0.172	71	Meadow, non-grazed, HSG C (202A)
0.129	85	Minigolf (202J)
0.209	98	Minigolf Impervious surfaces (202B)
0.161	74	Minigolf Pervious surfaces (202B)
0.625	98	Pavement (202F, 202I, 202J)
0.041	98	Ponding Area (98% capture) (202J)
0.048	98	Sediment forebay (202F)
0.038	98	Sidewalk (202B, 202C)
0.046	98	Sidewalk/Patio (202D, 202E)
0.056	98	Sidewalks (202F, 202I, 202J)

Summary for Subcatchment 202A:

Runoff = 1.16 cfs @ 12.25 hrs, Volume= 0.148 af, Depth> 0.28"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
	165,626	83	1/4 acre lots, 38% imp, HSG C
	103,946	74	>75% Grass cover, Good, HSG C
*	2,667	98	Bristol Road
	7,500	71	Meadow, non-grazed, HSG C
	279,739	79	Weighted Average
	214,134	74	76.55% Pervious Area
	65,605	98	23.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0300	0.20		**Sheet Flow, Lawns** Grass: Short n= 0.150 P2= 3.30"
0.5	97	0.0400	3.22		**Shallow Concentrated Flow, Lawns/Urban** Unpaved Kv= 16.1 fps
1.8	500	0.0500	4.54		**Shallow Concentrated Flow, Roads** Paved Kv= 20.3 fps
1.6	328	0.0457	3.44		**Shallow Concentrated Flow, Grasses** Unpaved Kv= 16.1 fps
0.4	75	0.0250	3.27	62.19	**Trap/Vee/Rect Channel Flow, Swale** Bot.W=3.50' D=2.00' Z= 3.0 '/' Top.W=15.50' n= 0.080 Earth, long dense weeds
3.4	188	0.0177	0.93		**Shallow Concentrated Flow, Meadow** Short Grass Pasture Kv= 7.0 fps
2.5	117	0.0128	0.79		**Shallow Concentrated Flow, Wetlands** Short Grass Pasture Kv= 7.0 fps
18.4	1,405	Total			

Summary for Subcatchment 202B: To Basin

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 0.033 af, Depth> 0.58"
Routed to Pond D1 :

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	5,210	98	Basin
*	7,026	74	Minigolf Pervious surfaces
*	927	98	Driveway
*	1,274	98	Sidewalk
	6,071	74	>75% Grass cover, Good, HSG C
*	9,097	98	Minigolf Impervious surfaces
	29,605	87	Weighted Average
	13,097	74	44.24% Pervious Area
	16,508	98	55.76% Impervious Area

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

Summary for Subcatchment 202C:

Runoff = 0.09 cfs @ 12.08 hrs, Volume= 0.008 af, Depth> 0.34"
Routed to Pond FB1 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	1,635	98	Forebay
*	1,694	98	Driveway
*	368	98	Sidewalk
	8,566	74	>75% Grass cover, Good, HSG C
	12,263	81	Weighted Average
	8,566	74	69.85% Pervious Area
	3,697	98	30.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	75	0.0550	0.24		**Sheet Flow, Grasses** Grass: Short n= 0.150 P2= 3.30"
0.3	78	0.0550	4.76		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
5.4	153	Total			

Summary for Subcatchment 202D:

Runoff = 0.33 cfs @ 12.11 hrs, Volume= 0.028 af, Depth> 0.68"
Routed to Pond CB1 :

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	12,654	98	Driveway
*	1,695	98	Sidewalk/Patio
	7,168	74	>75% Grass cover, Good, HSG C
	21,517	90	Weighted Average
	7,168	74	33.31% Pervious Area
	14,349	98	66.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0550	0.26		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.2	50	0.1000	5.09		**Shallow Concentrated Flow, Grass** Unpaved Kv= 16.1 fps
1.8	236	0.0120	2.22		**Shallow Concentrated Flow, Pavement** Paved Kv= 20.3 fps
8.4	386	Total			

Summary for Subcatchment 202E:

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 0.006 af, Depth> 0.46"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	600	98	Building
*	323	98	Sidewalk/Patio
*	1,775	98	Driveway
	3,615	74	>75% Grass cover, Good, HSG C
	6,313	84	Weighted Average
	3,615	74	57.26% Pervious Area
	2,698	98	42.74% Impervious Area

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

Summary for Subcatchment 202F:

Runoff = 0.82 cfs @ 12.07 hrs, Volume= 0.060 af, Depth> 0.84"
Routed to Pond FB2 : Forebay

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	10,000	98	Building
*	18,055	98	Pavement
*	1,269	98	Sidewalks
*	2,075	98	Sediment forebay
	5,804	74	>75% Grass cover, Good, HSG C
	37,203	94	Weighted Average
	5,804	74	15.60% Pervious Area
	31,399	98	84.40% Impervious Area

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

Summary for Subcatchment 202G:

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.013 af, Depth> 0.86"
Routed to Pond D3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	6,674	98	Basin (98% capture)
	1,089	74	>75% Grass cover, Good, HSG C
	7,763	95	Weighted Average
	1,089	74	14.03% Pervious Area
	6,674	98	85.97% Impervious Area

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

Summary for Subcatchment 202H:

Runoff = 0.00 cfs @ 12.40 hrs, Volume= 0.001 af, Depth> 0.06"
Routed to Link 202 : To abutter

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

Area (sf)	CN	Description
7,850	74	>75% Grass cover, Good, HSG C
7,850	74	100.00% Pervious Area

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

Summary for Subcatchment 202I:

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af, Depth> 0.73"
Routed to Pond CB4 : STC450i

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
	3,240	74	>75% Grass cover, Good, HSG C
*	7,486	98	Pavement
*	1,004	98	Sidewalks
	11,730	91	Weighted Average
	3,240	74	27.62% Pervious Area
	8,490	98	72.38% Impervious Area

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

Summary for Subcatchment 202J:

Runoff = 0.10 cfs @ 12.10 hrs, Volume= 0.010 af, Depth> 0.29"
Routed to Pond D-2 : Infiltration Area

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.20"

	Area (sf)	CN	Description
*	5,625	85	Minigolf
*	1,782	98	Ponding Area (98% capture)
	8,761	74	>75% Grass cover, Good, HSG C
*	1,682	98	Pavement
*	155	98	Sidewalks
	18,005	82	Weighted Average
	14,386	78	79.90% Pervious Area
	3,619	98	20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0650	0.28		**Sheet Flow, Grasses**
					Grass: Short n= 0.150 P2= 3.30"
0.3	68	0.0700	4.26		**Shallow Concentrated Flow, Grasses**
					Unpaved Kv= 16.1 fps
6.3	168	Total			

Summary for Reach R1: Across 402B

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth = 0.00" for WQ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 804.36 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 205.0' Slope= 0.2878 '/'
Inlet Invert= 65.25', Outlet Invert= 6.25'

Summary for Pond CB1:

Inflow Area = 0.494 ac, 66.69% Impervious, Inflow Depth > 0.68" for WQ event
Inflow = 0.33 cfs @ 12.11 hrs, Volume= 0.028 af
Outflow = 0.33 cfs @ 12.11 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.33 cfs @ 12.11 hrs, Volume= 0.028 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 71.11' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.80'	**12.0" Round 12" ADS** L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 70.80' / 69.50' S= 0.0057 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.11 hrs HW=71.11' TW=69.42' (Dynamic Tailwater)
↑—**1=12" ADS** (Barrel Controls 0.33 cfs @ 2.43 fps)

Summary for Pond CB2:

Inflow Area = 0.145 ac, 42.74% Impervious, Inflow Depth > 0.46" for WQ event
Inflow = 0.07 cfs @ 12.07 hrs, Volume= 0.006 af
Outflow = 0.07 cfs @ 12.07 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.07 cfs @ 12.07 hrs, Volume= 0.006 af
Routed to Pond CB3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 70.13' @ 12.07 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round 12" ADS** L= 35.0' Ke= 0.500

Inlet / Outlet Invert= 70.00' / 69.50' S= 0.0143 '/' Cc= 0.900
n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.07 cfs @ 12.07 hrs HW=70.13' TW=69.40' (Dynamic Tailwater)
1=12" ADS (Inlet Controls 0.07 cfs @ 1.21 fps)

Summary for Pond CB3:

Inflow Area = 0.639 ac, 61.25% Impervious, Inflow Depth > 0.63" for WQ event
Inflow = 0.40 cfs @ 12.11 hrs, Volume= 0.033 af
Outflow = 0.40 cfs @ 12.11 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.11 hrs, Volume= 0.033 af
Routed to Pond FB1 : Forebay
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.43' @ 12.11 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**6.0" Round 6" PVC** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 69.00' / 68.50' S= 0.0076 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf
#2	Secondary	69.50'	**12.0" Round 12" ADS** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 12.11 hrs HW=69.42' TW=68.68' (Dynamic Tailwater)
1=6" PVC (Inlet Controls 0.39 cfs @ 2.22 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=69.00' TW=65.00' (Dynamic Tailwater)
2=12" ADS (Controls 0.00 cfs)

Summary for Pond CB4: STC450i

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 0.73" for WQ event
Inflow = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af
Outflow = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af
Routed to Pond CB5 : DMH

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 66.73' @ 12.07 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Round 12" ADS** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 12.07 hrs HW=66.73' TW=65.55' (Dynamic Tailwater)
1=12" ADS (Barrel Controls 0.22 cfs @ 2.43 fps)

Summary for Pond CB5: DMH

Inflow Area = 0.269 ac, 72.38% Impervious, Inflow Depth > 0.73" for WQ event
Inflow = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af
Outflow = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.22 cfs @ 12.07 hrs, Volume= 0.016 af
Routed to Pond D-2 : Infiltration Area
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 65.55' @ 12.07 hrs
Flood Elev= 70.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.20'	**6.0" Round 6"ADS** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 65.20' / 65.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	66.50'	**12.0" Round 12" ADS** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 66.50' / 66.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 12.07 hrs HW=65.55' TW=64.30' (Dynamic Tailwater)
↑—**1=6"ADS** (Barrel Controls 0.22 cfs @ 2.13 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=65.20' TW=65.25' (Dynamic Tailwater)
↑—**2=12" ADS** (Controls 0.00 cfs)

Summary for Pond D-2: Infiltration Area

Inflow Area = 2.283 ac, 49.64% Impervious, Inflow Depth > 0.14" for WQ event
Inflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.02 cfs @ 13.88 hrs, Volume= 0.025 af, Atten= 93%, Lag= 108.0 min
Discarded = 0.02 cfs @ 13.88 hrs, Volume= 0.025 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R1 : Across 402B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 64.61' @ 13.88 hrs Surf.Area= 981 sf Storage= 482 cf
Flood Elev= 67.00' Surf.Area= 1,782 sf Storage= 3,791 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 173.0 min (976.0 - 803.0)

Volume	Invert	Avail.Storage	Storage Description
#1	64.00'	3,791 cf	**Ponding (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.00	600	0	0
65.00	1,225	913	913
66.00	1,375	1,300	2,213
67.00	1,782	1,579	3,791

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**24.0" W x 18.0" H Box (3) 24x18 box culverts X 3.00** L= 50.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 65.25' / 65.25' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.00 sf
#2	Discarded	64.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 13.88 hrs HW=64.61' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=64.00' TW=65.25' (Dynamic Tailwater)
↑—**1=(3) 24x18 box culverts** (Controls 0.00 cfs)

Summary for Pond D1:

Inflow Area = 1.600 ac, 53.45% Impervious, Inflow Depth > 0.48" for WQ event
Inflow = 0.68 cfs @ 12.11 hrs, Volume= 0.063 af
Outflow = 0.06 cfs @ 13.95 hrs, Volume= 0.063 af, Atten= 91%, Lag= 110.7 min
Discarded = 0.06 cfs @ 13.95 hrs, Volume= 0.063 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond D-2 : Infiltration Area

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 65.49' @ 13.95 hrs Surf.Area= 2,634 sf Storage= 1,139 cf
Flood Elev= 68.00' Surf.Area= 6,066 sf Storage= 12,571 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 178.4 min (1,005.1 - 826.7)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	12,571 cf	**Detention Basin (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	2,055	0	0
66.00	3,247	2,651	2,651
67.00	5,263	4,255	6,906
68.00	6,066	5,665	12,571

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	65.80'	**Staged Concrete Weir, Cv= 2.62 (C= 3.28)**
			Head (feet) 0.00 1.00 1.00 1.35 1.35 2.20
			Width (feet) 0.90 0.90 1.55 1.55 3.45 3.45

Discarded OutFlow Max=0.06 cfs @ 13.95 hrs HW=65.49' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=65.00' TW=64.00' (Dynamic Tailwater)
↑—**2=Staged Concrete Weir** (Controls 0.00 cfs)

Summary for Pond D3: Infiltration Basin

Inflow Area = 1.032 ac, 84.67% Impervious, Inflow Depth > 0.31" for WQ event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 0.026 af
Outflow = 0.09 cfs @ 12.20 hrs, Volume= 0.026 af, Atten= 50%, Lag= 7.8 min
Discarded = 0.09 cfs @ 12.20 hrs, Volume= 0.026 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 202 : To abutter

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 67.01' @ 12.20 hrs Surf.Area= 3,656 sf Storage= 39 cf
Flood Elev= 70.00' Surf.Area= 6,674 sf Storage= 16,217 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.7 min (928.3 - 927.6)

Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	16,217 cf	**Infiltration (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.00	3,640	0	0
68.00	5,157	4,399	4,399
69.00	5,903	5,530	9,929
70.00	6,674	6,289	16,217

Device	Routing	Invert	Outlet Devices
#1	Primary	67.10'	**1.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	67.00'	**1.020 in/hr Exfiltration over Surface area below 68.00'**
#3	Primary	68.00'	**Custom Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.00 Width (feet) 0.50 0.50 5.00 5.00

Discarded OutFlow Max=0.09 cfs @ 12.20 hrs HW=67.01' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=67.00' TW=0.00' (Dynamic Tailwater)
├**1=Orifice/Grate** (Controls 0.00 cfs)
└**3=Custom Weir** (Controls 0.00 cfs)

Summary for Pond FB1: Forebay

Inflow Area = 0.920 ac, 51.74% Impervious, Inflow Depth > 0.54" for WQ event
Inflow = 0.49 cfs @ 12.10 hrs, Volume= 0.041 af
Outflow = 0.36 cfs @ 12.18 hrs, Volume= 0.031 af, Atten= 25%, Lag= 5.0 min
Primary = 0.36 cfs @ 12.18 hrs, Volume= 0.031 af
Routed to Pond D1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 68.71' @ 12.18 hrs Surf.Area= 1,053 sf Storage= 644 cf
Flood Elev= 70.00' Surf.Area= 1,635 sf Storage= 2,372 cf

Plug-Flow detention time= 161.2 min calculated for 0.031 af (74% of inflow)
Center-of-Mass det. time= 71.5 min (865.4 - 793.9)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	2,372 cf	**Sediment Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
68.00	764	0	0
69.00	1,172	968	968
70.00	1,635	1,404	2,372

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**6.0" Round 6" PVC X 3 X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 68.50' / 68.00' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 0.20 sf

Primary OutFlow Max=0.36 cfs @ 12.18 hrs HW=68.71' TW=65.23' (Dynamic Tailwater)
└**1=6" PVC X 3** (Inlet Controls 0.36 cfs @ 1.56 fps)

Summary for Pond FB2: Forebay

Inflow Area = 0.854 ac, 84.40% Impervious, Inflow Depth > 0.84" for WQ event
Inflow = 0.82 cfs @ 12.07 hrs, Volume= 0.060 af
Outflow = 0.04 cfs @ 14.46 hrs, Volume= 0.014 af, Atten= 95%, Lag= 143.2 min
Primary = 0.04 cfs @ 14.46 hrs, Volume= 0.014 af
Routed to Pond D3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 69.01' @ 14.46 hrs Surf.Area= 1,676 sf Storage= 2,025 cf
Flood Elev= 70.00' Surf.Area= 2,075 sf Storage= 3,879 cf

Plug-Flow detention time= 459.5 min calculated for 0.014 af (23% of inflow)
Center-of-Mass det. time= 279.5 min (1,062.5 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	3,879 cf	**Forebay (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	875	0	0
68.00	1,268	536	536
70.00	2,075	3,343	3,879

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**90.0 deg x 10.0' long x 1.00' rise Overflow wier** Cv= 2.50 (C= 3.13)

Primary OutFlow Max=0.04 cfs @ 14.46 hrs HW=69.01' TW=67.00' (Dynamic Tailwater)
↑—**1=Overflow wier** (Weir Controls 0.04 cfs @ 0.34 fps)

Summary for Link 202: To abutter

Inflow Area = 9.917 ac, 35.43% Impervious, Inflow Depth > 0.18" for WQ event
Inflow = 1.17 cfs @ 12.25 hrs, Volume= 0.149 af
Primary = 1.17 cfs @ 12.25 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

APPENDIX G MONITORING WELL RESULTS AND SOIL EVALUATIONS

HOFFMAN ENGINEERING INC.

April 3, 2023

Bucci Development, Inc.
Att: Mr. Brian Bucci
PO Box 6187
Warwick, RI 02887

Re: Groundwater Elevation Readings
Middletown Plat 107NE/Lot 402B
0 Valley Road, Middletown, RI

Dear Mr. Bucci:

Hoffman Engineering, Inc. (HEI) is pleased to present the following summary of groundwater elevation readings conducted at the referenced Site. A figure denoting the three gauging locations is attached, and water level readings were conducted utilizing an electronic water level meter, and depths to water noted below are provided from the ground surface. Note, the perc pipe was installed on January 31, 2023 at the request of Northeast Engineers.

Reading Date	**A-3 (Feet) (15 Feet Deep)**	**B-4 (Feet) (18 Feet Deep)**	**Perc Pipe (Feet) (6.5 Feet Deep)**
May 31, 2022	No Reading	8.30	Not Installed
June 10, 2022	10.63	8.58	Not Installed
December 23, 2022	9.98	7.55	Not Installed
January 6, 2023	10.08	7.87	Not Installed
January 10, 2023	10.10	7.97	Not Installed
January 17, 2023	9.37	6.92	Not Installed
February 1, 2023	8.01	6.25	Dry
February 17, 2023	8.37	6.45	Dry
February 22, 2023	8.51	6.95	Dry
March 31, 2023	10.50	8.02	Dry

HEI • 640 TEN ROD ROAD • N. KINGSTOWN • RI • TELE 401-294-9032 • FAX 401-294-1288

If you have any questions please give us a call at 401-294-9032 or email at hoffmanengineering@verizon.net.

Sincerely,

Hoffman Engineering, Inc.
Robert L Hoffman
Robert L. Hoffman, P.E.
President

Attachments: Figure 1 – Site Map

CC: Ms. Lyn Small, Northeast Engineers
Mr. David Bucci, Project Manager

HEI • 640 TEN ROD ROAD • N. KINGSTOWN • RI • TELE 401-294-9032 • FAX 401-294-1288

BASE AERIAL VIA RIDEM ENVIRONMENTAL RESOURCE MAP

LEGEND

○ APPROXIMATE GAUGING LOCATION

HEI HOFFMAN ENGINEERING, INC.
640 Ten Rod Rd.
North Kingstown, RI 02852

SOIL SAMPLE LOCATION PLAN AERIAL

0 VALLEY ROAD
MIDDLETOWN, RHODE ISLAND

DATE: 2-3-23

NORTH: SEE FIGURE

SCALE: SEE FIGURE

FIGURE NO.: 1

HEI JOB NO. 22-46

	Correction Factor (inches)	A-3 Reading (feet)	A-3 Corrected (inches)
1/6/2023	34	10.08	87
1/10/2023	34	10.1	87
1/17/2023	34	9.37	78
2/1/2023	19	8.01	77
2/17/2023	-2	8.37	102
2/22/2023	-2	8.51	104

	Correction Factor (inches)	B-4 Reading (feet)	B-4 Corrected (inches)
1/6/2023	34	7.87	60
1/10/2023	34	7.97	62
1/17/2023	34	6.92	49
2/1/2023	19	6.25	56
2/17/2023	-2	6.45	79
2/22/2023	-2	6.95	85

	Correction Factor (inches)	MW-1 (Perc Pipe) Reading (feet)	MW-1 Corrected (inches)
1/6/2023	34	N/A	N/A
1/10/2023	34	N/A	N/A
1/17/2023	34	N/A	N/A
2/1/2023	19	6.5	59
2/17/2023	-2	6.5	80
2/22/2023	-2	5.9	73

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment Systems Program

Site Evaluation Form
Part A – Soil Profile Description Application Number _____

Property Owner: REGAL LLC
Property Location: A.P. 107NE, Lots 402A, 402B, and 402C | Valley Road, Middletown, Rhode Island
Date of Test Hole: November 15, 2021
Soil Evaluator: Edward J. Avizinis, CPSS, PWS License Number: D4083
Weather: Partly Cloudy – 70° Shaded: Yes ☐ No ☒ Time: 1pm

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	0 – 5	c	s	10YR 3/2	-	-	fSL	2 m gr	fr	4
Bw1	5 – 17	g	w	10YR 4/3	-	-	SL	1 m sbk	fr	3
Bw2	17 – 33	c	i	10YR 5/4	-	-	SL	1 m sbk	fr	3
2Cd	33 – 96	-	-	2.5Y 3/2	10YR 5/6	f 2 P	grSL	0 m	vfr	8

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	0 – 4	c	s	10YR 3/2	-	-	fSL	2 m gr	fr	4
Bw1	4 – 28	c	w	10YR 4/3	-	-	fSL	1 m sbk	fr	4
Bw2	28 – 60	g	w	10YR 5/4	-	-	vfSL	1 m sbk	fr	5
2Cd	60 – 96	-	-	2.5Y 3/2	-	-	gSL	0 m	vfr	8

TH 1 Soil Class A Total Depth 96 Impervious/Limiting Layer Depth >96 (og) GW Seepage Depth >96 SHWT 60" (og)

TH 2 Soil Class A Total Depth 96 Impervious/Limiting Layer Depth >96 (og) GW Seepage Depth >96 SHWT 60" (og)

Comments:

Revised 11/25/18

APPENDIX H RISDISM STORMWATER CHECKLIST (APPENDIX A)

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

PROJECT NAME: Valley Crossing I	**(RIDEM USE ONLY)**
TOWN: Middletown RI	**STW/WQC File #:**
BRIEF PROJECT DESCRIPTION: Construction of a 10k sf medical office building on a vacant property with associated parking, utilities and stormwater control	**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 WQ_v and flow from larger storm events including overflows. Choose all that apply, and repeat table for each waterbody.

☒ Groundwater or Disconnected Wetland	☐ SRWP		
☒ Waterbody Name: Bailey Brook	☐ Coldwater	☐ Warmwater	☐ Unassessed
☒ Waterbody ID: RI0007035R-01	☐ 4th order stream of pond 50 acres or more		
☒ TMDL for: Enterococcus	☐ 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: enterococcus, phosphorus, Lead	☐ Contributes to shellfishing grounds		

[1] Applications for a Construction General Permit that do not require any other permits from RIDEM and will disturb less than 5 acres over the entire course of the project do not need to submit a SMP. The Appendix A checklist must still be submitted.

PROJECT HISTORY		
☐ RIDEM Pre- Application Meeting	Meeting Date:	☐ Minutes Attached
☐ Municipal Master Plan Approval	Approval Date:	☐ Minutes Attached
☐ Subdivision Suitability Required	Approval #:	
☐ Previous Enforcement Action has been taken on the property	Enforcement #:	

FLOODPLAIN & FLOODWAY See Guidance Pertaining to Floodplain and Floodways	
☒ Riverine 100-year floodplain: **FEMA FLOODPLAIN FIRMETTE** has been reviewed and the 100-year floodplain is on site	
☒ Delineated from FEMA Maps	
NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional	
☐ Calculated by Professional Engineer	
☐ Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain	Amount of Fill (CY):
	Amount of Cut (CY):
☐ Restrictions or modifications are proposed to the flow path or velocities in a floodway	
☐ Floodplain storage capacity is impacted	
☒ Project area is not within 100-year floodplain as defined by RIDEM	

CRMC JURISDICTION
☐ CRMC Assent required
☐ Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP:
☐ Sea level rise mitigation has been designed into this project

LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:		
1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)		
	☐ Known or suspected releases of HAZARDOUS MATERIAL are present at the site (Hazardous Material is defined in Rule 1.4(A)(33) of 250-140-30-1 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Materials (the Remediation Regulations))	**RIDEM CONTACT:**
	☐ Known or suspected releases of PETROLEUM PRODUCT are present at the site (Petroleum Product as defined in Rule 1.5(A)(84) of 250-140-25-1 of the RIDEM Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials)	
	☐ This site is identified on the RIDEM Environmental Resources Map as one of the following regulated facilities	**SITE ID#:**
	☐ CERCLIS/Superfund (NPL)	
	☐ State Hazardous Waste Site (SHWS)	
	☐ Environmental Land Usage Restriction (ELUR)	
	☐ Leaking Underground Storage Tank (LUST)	
	☐ Closed Landfill	
Note: If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSMM Project Manager associated with the Site to determine if subsurface infiltration of stormwater is allowable for the project. Indicate if the infiltration corresponds to "Red," "Yellow" or "Green" as described in Section 3.2.8 of the RISDISM Guidance (Subsurface Contamination Guidance). Also, note and reference approval in PART 3, Minimum Standard 2: Groundwater Recharge/Infiltration.		
2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:		
	☐ Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php	
	☐ Auto Fueling Facility (e.g., gas station)	
	☐ Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area	

	☐ Road Salt Storage and Loading Areas (exposed to rainwater)	
	☐ Outdoor Storage and Loading/Unloading of Hazardous Substances	
3.	**STORMWATER INDUSTRIAL PERMITTING**	
	☐ The site is associated with existing or proposed activities that are considered Land Uses with Higher Potential Pollutant Loads (LUHPPLS) (see RICR 8.14.C)	Activities: 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**): 0 acres	
	☒ Total Site Area (**TSA**) 2.25 acres	
	☒ Jurisdictional Wetlands (**JW**) 0.14 acres	
	☒ Conservation Land (**CL**) 0.00 acres	
☒ Calculate the Site Size (defined as contiguous properties under same ownership)		
	☒ Site Size (**SS**) = (**TSA**) – (**JW**) – (**CL**) = 2.11 acres	
	☒ (**TIA**) / (**SS**) = 0.0	☐ (**TIA**) / (**SS**) >**0.4**?
☐ YES, Redevelopment		

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1

.

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	

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 (≥15%) ☐ Other (describe):	No type A or B soils located on site. No steep slopes are present on site.
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	There are minimal trees located in the area of development along Valley Road. These trees are to be removed.
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):	Project proposes the minimum number of paved parking spaces allowed by zoning.
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	

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	N/A

PART 3. SUMMARY OF REMAINING STANDARDS

GROUNDWATER RECHARGE – MINIMUM STANDARD 2		
YES	**NO**	
☒	☐	The project has been designed to meet the groundwater recharge standard.
☐	☐	If "No," the justification for groundwater recharge criterion waiver has been explained in the Narrative (e.g., threat of groundwater contamination or physical limitation), if applicable (see RICR 8.8.D);
☐	☐	Your waiver request has been explained in the Narrative, if applicable.
☐	☒	Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification?
☐	☐	If "Yes," has approval for infiltration by the OLRSMM Site Project Manager, per Part 1, Minimum Standard 8, been requested?

TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)

Design Point	Impervious Area Treated (sq ft)	Total Re_v Required (cu ft)	LID Stormwater Credits (see RISDISM Section 4.6.1) Portion of Re_v directed to a QPA (cu ft)	Recharge Required by Remaining BMPs (cu ft)	Recharge Provided by BMPs (cu ft)
DP-1: Northern Abutter	30,388	633	0	633	2,222
DP-2:					
DP-3:					
DP-4:					
TOTALS:					

Notes:
1. Only BMPs listed in RISDISM Table 3-5 "List of BMPs Acceptable for Recharge" may be used to meet the recharge requirement.
2. Recharge requirement must be satisfied for each waterbody ID.

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):

Stormwater Report: Appendix E "Supplementary Calculations"

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. **BMPs have been designed in accordance with the manual. WQ provided exceeds that which is required. Downstream water body is impaired for bacteria per TMDL.**
☒	☐	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: **Treatment provided for off-site impervious surfaces to compensate for pollutants generated by the development.**

TABLE 3-1: Summary of Water Quality (see RICR 8.9)

Design Point	Impervious area treated (ac.)	Total WQ_v Required (cu ft)	LID Stormwater Credits (see RICR 8.18) WQv directed to a QPA (cu ft)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
Abutter (D-2)	0.231	839	0	839	1,089
Abutter (D-3)	0.467	1,694	0	1,694	3,138
Abutter (dry swale)	0.133	483	0	483	3,150
TOTALS:				3,016	7,377

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.): **Stormwater Report: Appendix E "Supplementary Calculations"**

CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4			
YES	**NO**		
☒	☐	Is this standard waived? If "Yes," please indicate one or more of the reasons below:	
		☐	The project directs discharge to a large river (i.e., 4th-order stream or larger. See RISDISM Appendix I for State-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.
		☒	The project is a small facility with impervious cover of less than or equal to 1 acre**.**
		☐	The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (Note: LID design strategies can greatly reduce the peak discharge rate).
☒	☐	Conveyance and natural channel protection for the site have been met. If "No,' explain why:	

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) 2.0 acres
		☒	Impervious cover (%) 42%
☐	☒	Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)?	
☒	☐	Does this project meet the overbank flood protection standard?	

Table 5-1 Hydraulic Analysis Summary								
Subwatershed (Design Point)	**1.2" Peak Flow** (cfs) **		**1-yr Peak Flow** (cfs)		**10-yr Peak Flow** (cfs)		**100-yr Peak Flow** (cfs)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
DP-1: Valley Rd	0.03	0.05	0.09	0.12	0.18	0.24	0.33	0.46
DP-2: Abutter	1.13	1.17	6.30	6.04	19.92	18.86	45.86	44.90
DP-3:								
DP-4:								
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.	**Stormwater Report Appendix C**
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.	**Stormwater Report Appendix D**
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.	**Stormwater Report Appendix E**
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).	n/a

Table 5-2 Summary of Best Management Practices											
BMP ID	**DP #**	**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 (af)	WQ_v (af)	CP_v (Y/N/NA)	Overbank Flood Reduction (Y/N/NA)	External (E) Internal (I) or NA	Yes/No	Technical Justification (Design Report page number)	Distance Provided
D-2	202	Infiltration	Y	0.25	0.25	N	N	NA	Y		
D-3	202	Infiltration	Y	0.26	0.26	N	N	NA	Y		
R2	202	Dry Swale	N	0	0.07	N	N	NA	Y		
		TOTALS:									

Table 5.3 Summary of Soils to Evaluate Each BMP									
DP #	**BMP ID**	**BMP Type** (e.g., bioretention, tree filter)	**Soils Analysis for Each BMP**						
			Test Pit ID# and Ground Elevation		SHWT Elevation (ft)	Bottom of Practice Elevation* (ft)	Separation Distance Provided (ft)	Hydrologic Soil Group (A, B, C, D)	Exfiltration Rate Applied (in/hr)
			Primary	Secondary					
202	D-2	Infiltration	TH#1		61.00	64	3	C	1.02
202	D-3	Infiltration	MW#1		61.08	67	5.9	C	1.02
		TOTALS:							

* For underground infiltration systems (UICs) bottom equals bottom of stone, for surface infiltration basins bottom equals bottom of basin, for filters bottom equals interface of storage and top of filter layer

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	**NO**	**N/A**	
☐	☐	☒	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.
☐	☐	☒	Are these activities already covered under an MSGP? If "No," please explain if you have applied for an MSGP or intend to do so?
☐	☐	☒	List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, "Acceptable BMPs for Use at LUHPPLs." Please list BMPs:
☐	☐	☒	Additional BMPs, or additional pretreatment BMP's if any, that meet RIPDES MSGP requirements; Please list BMPs:
			Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).

ILLICIT DISCHARGES – MINIMUM STANDARD 9			
Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit.			
YES	**NO**	**N/A**	
☒	☐	☐	Have you checked for illicit discharges?
☐	☒	☐	Have any been found and/or corrected? If "Yes," please identify.
☒	☐	☐	Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10				
YES	**NO**	**N/A**		
☒	☐	☐	Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?	
☒	☐	☐	Have you provided a **separately-bound** document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed).	
			If "No," include a document with your submittal that addresses the following elements of an SESC Plan:	
			☐	Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met:
			☐	Provide Natural Buffers and Maintain Existing Vegetation
			☐	Minimize Area of Disturbance
			☐	Minimize the Disturbance of Steep Slopes
			☐	Preserve Topsoil
			☐	Stabilize Soils
			☐	Protect Storm Drain Inlets
			☐	Protect Storm Drain Outlets
			☐	Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures
			☐	Establish Perimeter Controls and Sediment Barriers
			☐	Divert or Manage Run-On from Up-Gradient Areas
			☐	Properly Design Constructed Stormwater Conveyance Channels
			☐	Retain Sediment On-Site
			☐	Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows
			☐	Apply Construction Activity Pollution Prevention Control Measures
			☐	Install, Inspect, and Maintain Control Measures and Take Corrective Actions
			☐	Qualified SESC Plan Preparer's Information and Certification
			☐	Operator's Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities
			☐	Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9		
Operation and Maintenance Section		
YES	**NO**	
☒	☐	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
☒	☐	Have you provided a **separately-bound** Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
☒	☐	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If "No," why not?
☒	☐	Is the property owner or homeowner's association responsible for the stormwater maintenance of all BMP's? If "No," you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.).
☐	☒	Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If "Yes," have you obtained them? Or please explain your plan to obtain them:

☐	☒	Is stormwater being directed from public areas to private property? If "Yes," note the following: Note: This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner.
Pollution Prevention Section		
☐	☒	Designated snow stockpile locations?
☒	☐	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
☐	☒	Asphalt-only based sealants?
☐	☒	Pet waste stations? (Note: If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan).
☒	☐	Regular sweeping? Please describe:
☐	☒	De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan).
☐	☒	A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan).

PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)			
YES	**NO**		
☒	☐		Existing and proposed drainage area delineations
☒	☐		Locations of all streams and drainage swales
☒	☐		Drainage flow paths, mapped according to the DEM *Guidance for Preparation of Drainage Area Maps* (included in RISDISM Appendix K)
☒	☐		Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable
☒	☐		Logs of borings and/or test pit investigations along with supporting soils/geotechnical report
☒	☐		Mapped seasonal high-water-table test pit locations
☒	☐		Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs
☒	☐		Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans
☐	☒		Mapped bedrock outcrops adjacent to any infiltration BMP
☒	☐		Soils were logged by a:
		☒	DEM-licensed Class IV soil evaluator Name: Ed Avizinis
		☐	RI-registered P.E. Name:

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	**First Receiving Water ID or MS4**	**Area Disturbed (ac)**	**Existing Impervious (ac)**	**Proposed Impervious (ac)**
DP-1: Valley Road	RI0007035R-01	0.05	0.03	0.04
DP-2: Abutter	RI0007035R-01	2.20	0.0	0.92
DP-3:				
TOTALS:		2.25	0.03	0.96

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 OLRSMM-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

APPENDIX I 72-HOUR DRAIN DOWN TABLES

Hydrograph for Pond D-2: Infiltration Area

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	64.00	0.00	0.00	0.00
2.00	0.00	0	64.00	0.00	0.00	0.00
4.00	0.00	0	64.00	0.00	0.00	0.00
6.00	0.01	0	64.00	0.01	0.01	0.00
8.00	0.04	50	64.08	0.02	0.02	0.00
10.00	0.11	414	64.54	0.02	0.02	0.00
12.00	**3.74**	**1,803**	**65.70**	**3.28**	**0.03**	**3.25**
14.00	**0.72**	**1,477**	**65.45**	**0.74**	**0.03**	**0.71**
16.00	0.34	1,390	65.38	0.35	0.03	0.32
18.00	0.17	1,339	65.34	0.18	0.03	0.15
20.00	0.11	1,311	65.32	0.12	0.03	0.09
22.00	0.08	1,294	65.31	0.08	0.03	0.05
24.00	0.05	1,274	65.29	0.06	0.03	0.03
26.00	0.00	1,070	65.13	0.03	0.03	0.00
28.00	0.00	861	64.96	0.03	0.03	0.00
30.00	0.00	666	64.79	0.03	0.03	0.00
32.00	0.00	490	64.62	0.02	0.02	0.00
34.00	0.00	331	64.45	0.02	0.02	0.00
36.00	0.00	191	64.28	0.02	0.02	0.00
38.00	0.00	68	64.11	0.02	0.02	0.00
40.00	0.00	0	64.00	0.00	0.00	0.00
42.00	0.00	0	64.00	0.00	0.00	0.00
44.00	0.00	0	64.00	0.00	0.00	0.00
46.00	0.00	0	64.00	0.00	0.00	0.00
48.00	0.00	0	64.00	0.00	0.00	0.00
50.00	0.00	0	64.00	0.00	0.00	0.00
52.00	0.00	0	64.00	0.00	0.00	0.00
54.00	0.00	0	64.00	0.00	0.00	0.00
56.00	0.00	0	64.00	0.00	0.00	0.00
58.00	0.00	0	64.00	0.00	0.00	0.00
60.00	0.00	0	64.00	0.00	0.00	0.00
62.00	0.00	0	64.00	0.00	0.00	0.00
64.00	0.00	0	64.00	0.00	0.00	0.00
66.00	0.00	0	64.00	0.00	0.00	0.00
68.00	0.00	0	64.00	0.00	0.00	0.00
70.00	0.00	0	64.00	0.00	0.00	0.00
72.00	0.00	0	64.00	0.00	0.00	0.00

Hydrograph for Pond D3: Infiltration Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	67.00	0.00	0.00	0.00
2.00	0.00	0	67.00	0.00	0.00	0.00
4.00	0.01	0	67.00	0.01	0.01	0.00
6.00	0.01	0	67.00	0.01	0.01	0.00
8.00	0.02	0	67.00	0.02	0.02	0.00
10.00	0.05	0	67.00	0.05	0.05	0.00
12.00	**3.64**	**3,966**	**67.92**	**0.19**	**0.12**	**0.07**
14.00	**0.32**	**6,354**	**68.37**	**0.58**	**0.12**	**0.46**
16.00	0.17	5,154	68.14	0.30	0.12	0.17
18.00	0.10	4,425	68.01	0.20	0.12	0.08
20.00	0.08	3,698	67.86	0.19	0.12	0.07
22.00	0.07	2,944	67.71	0.17	0.11	0.06
24.00	0.05	2,198	67.54	0.16	0.11	0.05
26.00	0.00	1,201	67.31	0.13	0.10	0.03
28.00	0.00	423	67.11	0.09	0.09	0.00
30.00	0.00	0	67.00	0.00	0.00	0.00
32.00	0.00	0	67.00	0.00	0.00	0.00
34.00	0.00	0	67.00	0.00	0.00	0.00
36.00	0.00	0	67.00	0.00	0.00	0.00
38.00	0.00	0	67.00	0.00	0.00	0.00
40.00	0.00	0	67.00	0.00	0.00	0.00
42.00	0.00	0	67.00	0.00	0.00	0.00
44.00	0.00	0	67.00	0.00	0.00	0.00
46.00	0.00	0	67.00	0.00	0.00	0.00
48.00	0.00	0	67.00	0.00	0.00	0.00
50.00	0.00	0	67.00	0.00	0.00	0.00
52.00	0.00	0	67.00	0.00	0.00	0.00
54.00	0.00	0	67.00	0.00	0.00	0.00
56.00	0.00	0	67.00	0.00	0.00	0.00
58.00	0.00	0	67.00	0.00	0.00	0.00
60.00	0.00	0	67.00	0.00	0.00	0.00
62.00	0.00	0	67.00	0.00	0.00	0.00
64.00	0.00	0	67.00	0.00	0.00	0.00
66.00	0.00	0	67.00	0.00	0.00	0.00
68.00	0.00	0	67.00	0.00	0.00	0.00
70.00	0.00	0	67.00	0.00	0.00	0.00
72.00	0.00	0	67.00	0.00	0.00	0.00