STORMWATER MANAGEMENT REPORT

90 JOHNSON ROAD PROPERTY
90 JOHNSON ROAD
PORTLAND, MAINE

PREPARED FOR

TRANSPORT LEASING CORP.
58 LOWELL JUNCTION ROAD
ANDOVER, MA 01810

PREPARED BY

STANTEC CONSULTING SERVICES, INC.
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JULY 2018

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Attachments

1.0 INTRODUCTION

Stantec Consulting Services, Inc. has been retained to prepare the following Stormwater Management analysis for the building and site expansion project at 90 Johnson Road in Portland, ME.

This Stormwater Management analysis has been prepared in accordance with Section 5 – Portland Stormwater Management of the City of Portland Technical Manual, last revised July 26, 2016. As required within Section 5, this project meets the Basic, General, and Flooding Standards as described in the Maine Department of Environmental Protection (MaineDEP) Chapter 500 Rules for Stormwater Management.

The purpose of this analysis is to identify what measures will be implemented to provide stormwater management for the proposed development specifically for water quality improvement, water quantity control, and erosion and sedimentation control. The analysis was prepared to ensure that the development will not result in any adverse effects to the environment, any natural resources, or to properties located downstream of the project site.

2.0 EXISTING SITE CONDITIONS

The project site, located at 90 Johnson Road, is approximately 2.67 acres and is comprised of two properties identified as Lot 1 and 3 on Map 214-A of the City of Portland Assessor's Map (1.68 and 0.99 acres respectively). The site is currently occupied by an approximately 20,260 SF single story building which houses Spectrum offices and warehouse space. The building is surrounded by parking and access drives with a total of 41 parking spaces currently provided. The adjacent property at 68 Johnson Road was historically occupied by a single-family home but has since been demolished several years ago and the property is currently a grassed lot.

The breakdown of the existing lot coverage is summarized in the table below.

Table 1
Existing Lot Coverage Summary

	Lot 1(90 Johnson)	Lot 3 (68 Johnson)
Roof (sf)	20,260	0
Other Impervious (sf)	34,784	285
Landscaped (sf)	18,137	38,251
Wooded (sf)	0	4,588
Total	73,181 SF (1.68 ac)	43,124 SF (0.99 ac)

A portion of the site's drainage is handled through a series of catch basins and storm drain pipes that discharge to a hydrodynamic separator and then to a vegetated underdrained soil filter. The grassed lot sheet flows towards the Brooklawn Cemetery with runoff being captured in two existing catch basins. All stormwater runoff from the site ultimately outlets to a public storm drain system within Johnson Road and Congress Street[1]. The Congress Street system outfalls

[1] See Congress Street & Johnson Road of Unum HO-3 Offsite Traffic Improvement plans by Sebago Technics, City Archive 00731_003__005 date 06-22-98

opposite the Cemetery entrance on Congress Street and is tributary to the Stroudwater and the Fore River. Per the Soils Conservation Service (SCS) Medium Intensity Soils mapping the site consists of Scantic, Lyman-Tunbridge, and Woodbridge soil groups. These are classified as Hydrologic Soil Group C and D.

3.0 PROPOSED SITE CONDITIONS

The proposed development includes the renovations and expansion of the existing Spectrum office/warehouse building. Spectrum occupies other building space on City Line Drive and may consolidate their operations. The applicant is seeking to update the building at 90 Johnson Road to Class A office space. The existing building will be renovated including a vertical expansion to go from one story to three stories. The existing parking area and drive will also be redeveloped into a more functional layout for the expanded use. The undeveloped grassed lot at 68 Johnson Road will include new development of a parking area and associated stormwater management and landscaping. A total of 188 parking spaces are proposed across the properties. Stormwater management will primarily be in the form of porous pavement within the new parking area. The porous pavement is intended to be much like the porous pavement installed at the nearby State of Maine DHHS building off the Jetport Boulevard. Proposed land coverage of the two lots is summarized in the table below:

Table 2
Proposed Lot Coverage Summary

	Lot 1	Lot 3
Roof (sf)	21,398	0
Other Impervious (sf)	41,153	35,521
Landscaped (sf)	10,630	6,785
Wooded (sf)	0	818
Total	73,181 SF	43,124 SF

Drainage patterns on site mostly remain the same in the post development condition. The portion of the project consisting of redevelopment continues to primarily drain to the existing vegetated underdrained filter adjacent to the project. The area that sheet flows to towards the cemetery property consists of the majority of the new parking area and is handled through porous pavement. This area will be drained through a series of subsurface underdrain pipes and it will discharge into the public storm drain system within Johnson Road.

The porous pavement section, as detailed in the plans, will contain the following materials section:

- 3" Porous Asphalt
- Choker Course Aggregate – Variable Thickness from 4" to 19"
- 12" Reservoir Course of 1.5" to 3" Crushed Stone
- 4" Filter Course
- 12" MDOT Type B aggregate course with collection underdrain.

4.0 REFERENCES

The following reference sources were used in preparation of the stormwater analysis:

1. *Stormwater Management for Maine Volume III – BMP Technical Design Manual*, MaineDEP
2. HydroCAD Stormwater Modeling Software, Version 10.00, build 20
3. *MaineDEP Erosion and Sediment Maine Erosion and Sediment Control BMP's,* October 2016 revision
4. *MaineDEP Chapter 500 Rules for Stormwater Management, June 2014 revision*
5. *Section 5 of the City of Portland Technical Manual Portland Stormwater Management*, July 2016 revision
6. *Chapter XX and XX of the City of Portland Code of Ordinances*
7. *U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey*

5.0 METHOD OF ANALYSIS

The hydrologic analysis for predevelopment and post development conditions has been conducted based upon the methodology contained in the USDA Soil Conservation Service's Technical Releases Nos. 20 and 55 (SCS TR-20 and TR-55). For Caribou, Maine, a 24-hour SCS Type II storm distribution was used for the analysis using the following storm frequencies and rainfall amounts:

Table 3
Hydrologic Analysis Parameters

Storm Event	24-Hour Rainfall
2-Year Storm	3.1 inches
10-Year Storm	4.6 inches
25-Year Storm	5.8 inches

The HydroCAD computer program was used in the analysis. This program allows critical points of the watershed to be analyzed using the SCS TR-20 methodology to calculate the anticipated conditions at these points. Drainage areas are defined with runoff curve numbers, times of concentration and travel time data based on methods outlined in the USDA TR-55 Manual. To assess storage and kinematic effects of runoff, the model uses reservoirs and pipes to imitate actual conditions. Specific hydrologic characteristics including travel times, storage capacity, and the effects of hydraulic head are considered for analysis with this program.

To model the watersheds, the drainage system is represented by a network consisting of three basic components:

- **Subcatchment:** A relatively homogenous area of land that drains into a single reach or pond. Each subcatchment generates a runoff hydrograph.
- **Reach:** A uniform stream, channel, or pipe that conveys water from one point to another reach or pond. The outflow of each reach is determined by a hydrograph routing calculation.
- **Pond:** A pond, swamp, dam, or other impoundment which fills with water from one or more sources and empties in a manner determined by a weir, culvert

or other device(s) at its outlet. A pond may empty into a reach or into another pond. The outflow of each pond is also determined by a hydrograph routing calculation.

6.0 EROSION AND SEDIMENTATION CONTROL (BASIC STANDARD)

Erosion and sedimentation control (ESC) will be accomplished for this project through the application of various temporary construction and permanent ESC BMPs as described in the MaineDEP Erosion and Sediment Control BMP Manual. BMPs proposed include but are not limited to the following:

- Stabilized construction entrance
- Siltation fence
- Temporary construction inlet protection
- Slope stabilization

The contractor will also be required to employ ESC BMPs for any on site material stockpiles as well as any areas left denuded for extended periods of time during construction.

The ESC plan for this project adheres to the requirements detailed in Appendix A of MaineDEP's Chapter 500 Rules for Stormwater Management.

7.0 WATER QUALITY MEASURES (GENERAL STANDARD)

The proposed development includes Stormwater BMPs to provide water quality treatment to onsite runoff as required within the General Standard of MaineDEP's Chapter 500 Rules for Stormwater Management. A portion of the project, described as Lot 1 above, is currently developed with an existing building and associated site features. Therefore, the rules for Redevelopment Projects as described in section 4.C.(2)(d)(i) of Chapter 500 have been applied to this portion of the project. The table below summarizes the redevelopment calculation and establishes the treatment level required for redevelopment activity within the project.

Redevelopment Treatment Summary	
Total Redevelopment Area (ac)	1.68
Existing Impact Rating	4.55
Proposed Impact Rating	4.65
Existing Ranked Impact	2.71
Proposed Ranked Impact	2.77
Resultant Ranked Impact Change	0.06
Redeveloped Area Treatment Designation (Site Law Project)	**60%**

The area described as Lot 3 is considered undeveloped since it has not been maintained and is essentially a meadow in the predevelopment condition. All development on this portion of the project will be considered new development and section 4.C.(2)(a)(i) of Chapter 500 defines the required treatment level.

All BMPs for this project have been designed per the MaineDEP Stormwater BMP Design Manual and previously MaineDEP accepted design measures for Porous surfaces. BMPs included in this project as well as their respective design criteria used are as follows:

Vegetated Underdrained Soil Filter: The existing filter adjacent to the site was originally designed to handle 2.5 acres of impervious area. The portion of the site that has been redeveloped remains tributary to the filter, but the total impervious area to the filter from the site has been reduced. For predevelopment conditions approximately 1.16 acres of impervious area drained to the filter. Approximately 1.03 acres of impervious area will drain to the filter in post development conditions. Therefore, the original design has been determined to be adequate without any modifications.

Manmade Porous Surfaces (Porous Pavement): Four areas constructed of porous pavement have been proposed for this project. The entire area is intended to be a direct entry system in order to provide enough storage within the reservoir layer for flood control. The only run-on provided will be from landscaped areas onto porous sections. The surface and associated section have been designed to the following criteria to provide water quality treatment to runoff:

- Treatment Volume: Storage of a 1" rainfall event has been provided for in the reservoir layer which consists of 12 inches of ¾" crushed stone with an assumed porosity of 40%.
- Minimum Surface Area: The surface area required for porous pavement is 20% of tributary impervious area.
- Drawdown Time: The WQV is required to be released over a 24-48 hour period. This criterion will be met by providing an orifice at the end of each collection pipe system.
- Storage for Flood Control: Storage for a 24 hour 25 year frequency storm event should be provided to meet flooding standards. This will be provided within the reservoir section and will be controlled through a 6" overflow pipe.

The two BMPs described above have been designed per MaineDEP's BMP Design Manual to meet all requirements established within MaineDEP's Chapter 500 Rules for Stormwater Management to meet the General Standard.

The table below summarizes the treatment levels provided for both redevelopment activities and new development for the proposed project.

Table 4
Treatment Summary

Description	Required	Provided
Treated New Impervious (%)	95%	98.77%
Treated New Developed (%)	80%	93.83%
Treated Redeveloped Impervious (%)	N/A	90.51%
Treated Redeveloped Developed (%)	60%	85.49%

8.0 STORMWATER MANAGEMENT FOR FLOOD CONTROL (FLOODING STANDARD)

The stormwater system for this project, consisting of the porous pavement reservoir layer has been designed to provide detention, and in turn, reduce peak discharge rates from stormwater runoff. Specifically, the 2, 10, and 25-year storm events have been analyzed for this project. Table 1 in Section 5 above summarizes rainfall amounts for each of the storm events analyzed. Table 2 below summarizes peak discharge rates for each storm event for the predevelopment and post development conditions:

Table 5
Comparison of Peak Discharge Rates at Point of Interest 1

Storm Event & Condition	POI 1 (cfs)	POI 2 (cfs)
2-Yr Predevelopment	1.36	2.31
2-Yr Post Development	0.09	2.19
Change in 2-Yr Peak Discharge Rate	**-1.27**	**-0.12**
10-Yr Predevelopment	2.77	3.91
10-Yr Post Development	0.19	3.35
Change in 10-Yr Peak Discharge Rate	**-2.58**	**-0.56**
25-Yr Predevelopment	3.96	6.04
25-Yr Post Development	0.27	5.11
Change in 25-Yr Peak Discharge Rate	**-3.69**	**-0.93**

Peak discharge rates for each storm event have been decreased from predevelopment to post development conditions for this project. Therefore, the Flooding Standard has been met.

9.0 MAINTENANCE AND GOOD HOUSEKEEPING MEASURES

The owner or the owner's representative will be responsible for maintenance of all permanent stormwater conveyance and treatment systems constructed as part of this project. Inspection, maintenance, and housekeeping action will adhere to Appendix B of MaineDEP's Chapter 500 Rules for Stormwater Management and includes but is not limited to:

- Inspection of infrastructure at regular intervals as established within Appendix B.
- Removal and proper disposal of sediment build up in conveyance systems and BMPs. This will include regular sweeping and vacuuming of the porous pavement surfaces.
- Replacement of any BMP or portion of BMP that is not operating correctly
- Proper documentation of all maintenance activity

The erosion and sediment control plan and maintenance plan have been established to meet the Basic Standard.

10.0 CONCLUSION

The stormwater management system for the proposed development will mitigate negative effects due to stormwater runoff generated from the development by reducing peak discharge rates, improving water quality of stormwater runoff

discharged from the project site, and eliminating potential erosion and sedimentation due to the development. As a result there will be no adverse effects to downstream conveyance systems of properties due to stormwater runoff from this project.

11.0 ATTACHMENTS

Attachment A – Predevelopment Watershed Plan

Attachment B – Post Development Watershed Plan

Attachment C – Predevelopment HydroCAD Computations

Attachment D – Post Development HydroCAD Computations

Attachment E – Water Quality Treatment Summary

Attachment F – Drawdown Computations

Attachment G – Redevelopment Computation

Attachment H – Stormwater Operations & Maintenance Manual

ATTACHMENT A

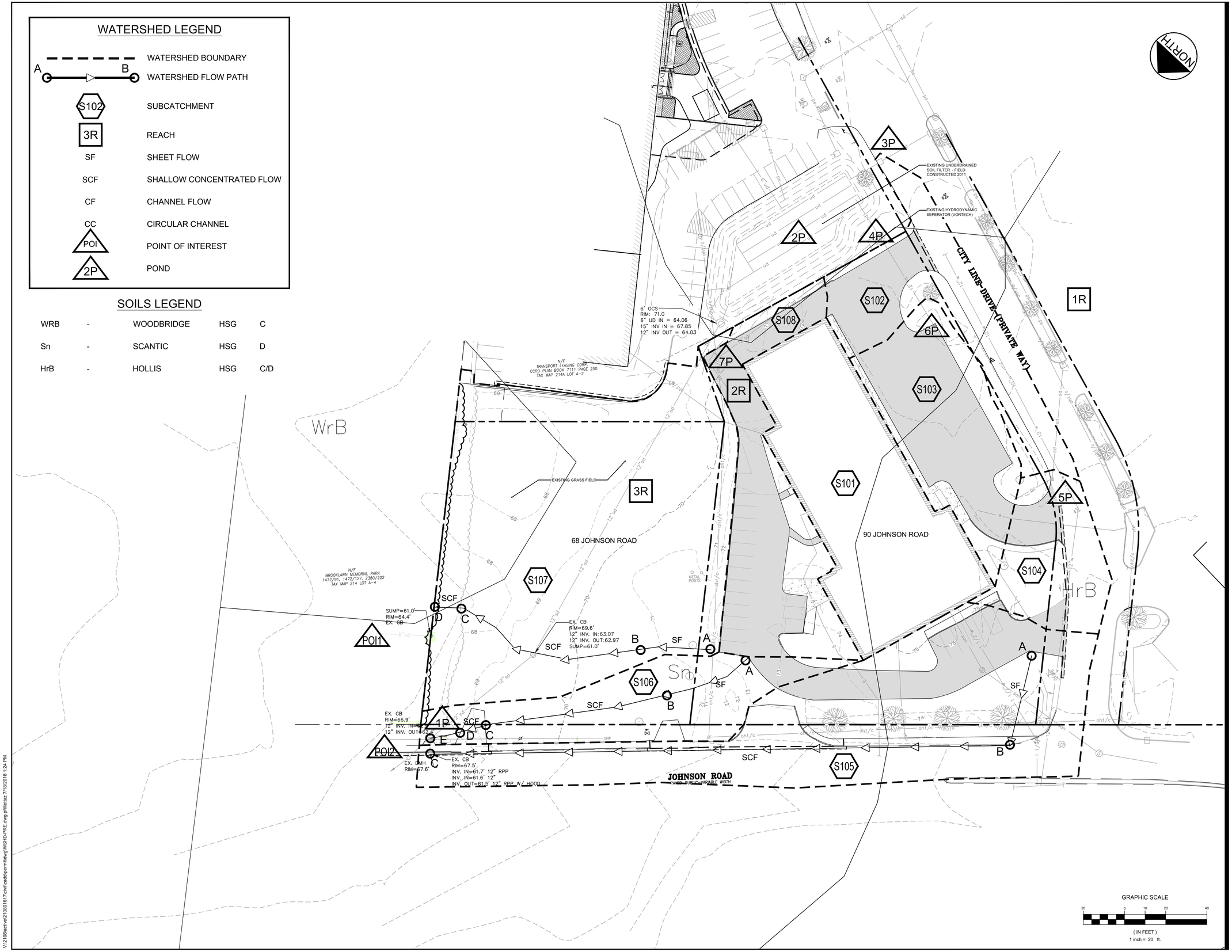
PREDEVELOPMENT WATERSHED PLAN

WATERSHED LEGEND

	WATERSHED BOUNDARY
A — B	WATERSHED FLOW PATH
S102	SUBCATCHMENT
3R	REACH
SF	SHEET FLOW
SCF	SHALLOW CONCENTRATED FLOW
CF	CHANNEL FLOW
CC	CIRCULAR CHANNEL
POI	POINT OF INTEREST
2P	POND

SOILS LEGEND

WRB	-	WOODBRIDGE	HSG	C
Sn	-	SCANTIC	HSG	D
HrB	-	HOLLIS	HSG	C/D



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No.	Revision	By	Appd.	YY.MM.DD
1	SUBMITTED FOR OWNER REVIEW	PBF	SRB	18.07.09
2	SUBMITTED TO CITY FOR LEVEL III SITE PLAN REVIEW	PBF	SRB	18.03.22

File Name:	DWN.	CHKD.	DSGN.	DATE
	PBF	SRB	SRB	18.03.22

Permit-Seal

STATE OF MAINE
STEPHEN R. BUSHEY
07-09-18
LICENSED PROFESSIONAL ENGINEER

Client/Project

TRANSPORT LEASING CORP.
ANDOVER, MA

JOHNSON ROAD PROPERTY
90 JOHNSON ROAD, PORTLAND, MAINE

Title

PREDEVELOPMENT WATERSHED PLAN

Project No.	Scale
210801617	N.T.S.

Sheet

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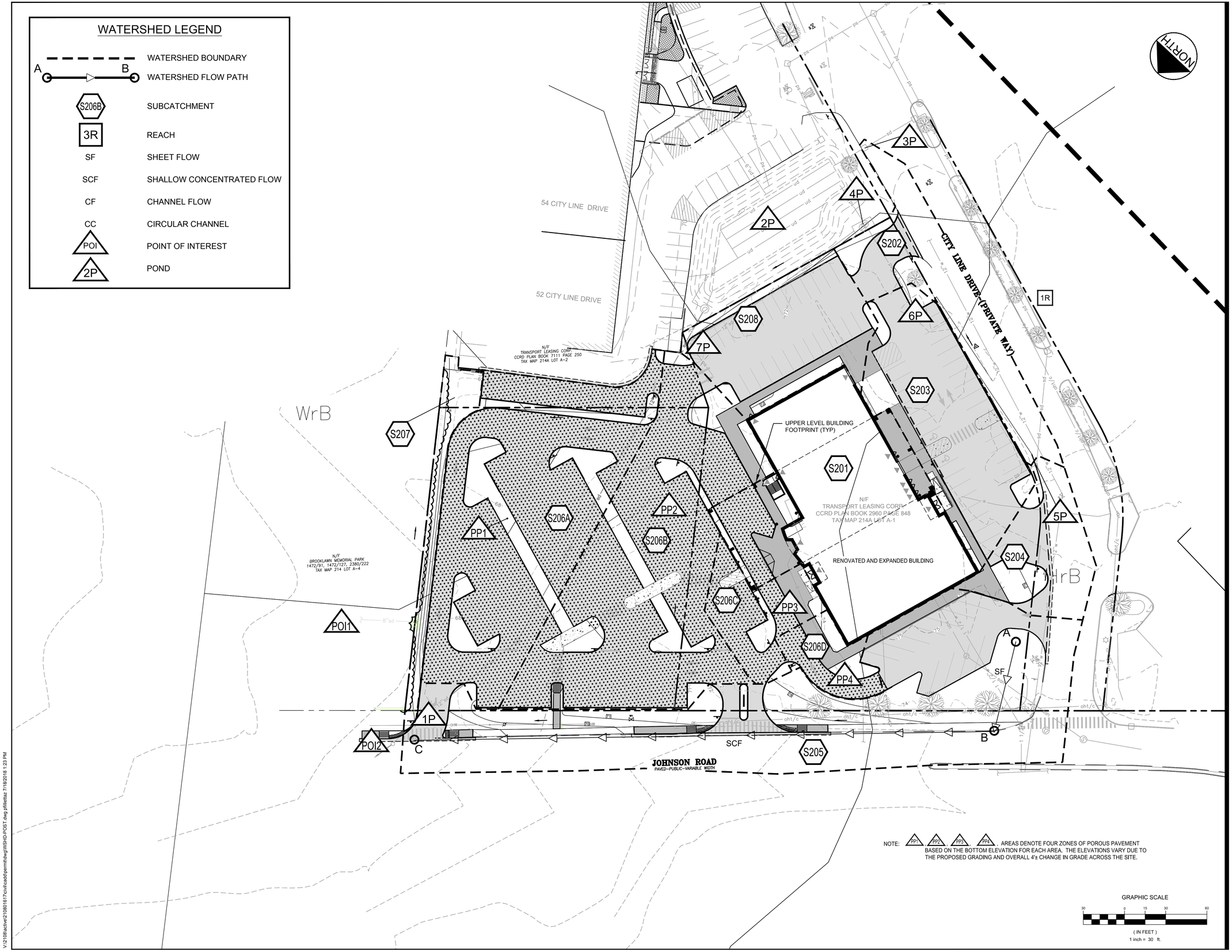
ATTACHMENT B

POST DEVELOPMENT WATERSHED PLAN

WATERSHED LEGEND

- WATERSHED BOUNDARY
- A — B: WATERSHED FLOW PATH
- S206B: SUBCATCHMENT
- 3R: REACH
- SF: SHEET FLOW
- SCF: SHALLOW CONCENTRATED FLOW
- CF: CHANNEL FLOW
- CC: CIRCULAR CHANNEL
- POI: POINT OF INTEREST
- 2P: POND



NOTE: PP1 PP2 PP3 PP4 AREAS DENOTE FOUR ZONES OF POROUS PAVEMENT BASED ON THE BOTTOM ELEVATION FOR EACH AREA. THE ELEVATIONS VARY DUE TO THE PROPOSED GRADING AND OVERALL 4'± CHANGE IN GRADE ACROSS THE SITE.

GRAPHIC SCALE

30 0 15 30 60

(IN FEET)

1 inch = 30 ft.

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Stantec

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Permit-Seal

STATE OF MAINE
STEPHEN R. BUSBY
07-09-18
LICENSED PROFESSIONAL ENGINEER

Client/Project

TRANSPORT LEASING CORP.
ANDOVER, MA

JOHNSON ROAD
PROPERTY

90 JOHNSON ROAD, PORTLAND, MAINE

Title

POST DEVELOPMENT WATERSHED PLAN

Project No.	Scale
210801617	1" = 30'

Sheet

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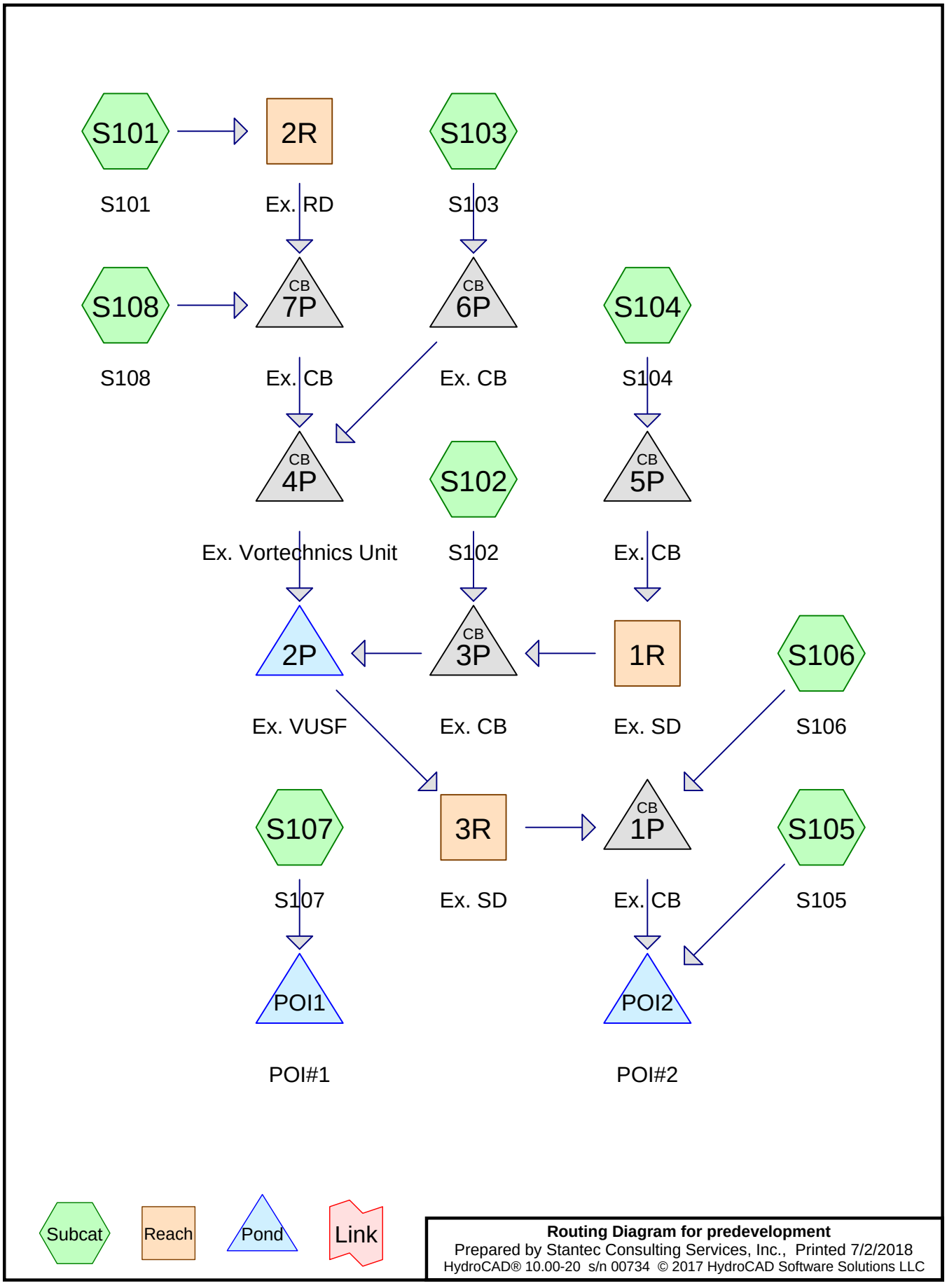
ATTACHMENT C

PREDEVELOPMENT HYDROCAD COMPUTATIONS



Routing Diagram for predevelopment
Prepared by Stantec Consulting Services, Inc., Printed 7/2/2018

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.145	79	50-75% Grass cover, Fair, HSG C (S105)
0.049	84	50-75% Grass cover, Fair, HSG D (S105)
0.248	74	>75% Grass cover, Good, HSG C (S102, S103, S104, S107, S108)
1.124	80	>75% Grass cover, Good, HSG D (S102, S103, S106, S107, S108)
0.643	98	Paved parking, HSG C (S102, S103, S104, S105, S108)
0.794	98	Paved parking, HSG D (S102, S103, S105, S106, S108)
0.192	98	Roofs, HSG C (S101)
0.273	98	Roofs, HSG D (S101)
0.066	70	Woods, Good, HSG C (S107)
0.040	77	Woods, Good, HSG D (S106, S107)
3.573	**89**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.293	HSG C	S101, S102, S103, S104, S105, S107, S108
2.280	HSG D	S101, S102, S103, S105, S106, S107, S108
0.000	Other	
3.573		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.145	0.049	0.000	0.194	50-75% Grass cover, Fair	S105
0.000	0.000	0.248	1.124	0.000	1.372	>75% Grass cover, Good	S102, S103, S104, S106, S107, S108
0.000	0.000	0.643	0.794	0.000	1.437	Paved parking	S102, S103, S104, S105, S106, S108
0.000	0.000	0.192	0.273	0.000	0.465	Roofs	S101
0.000	0.000	0.066	0.040	0.000	0.105	Woods, Good	S106, S107
0.000	**0.000**	**1.293**	**2.280**	**0.000**	**3.573**	**TOTAL AREA**	

Summary for Subcatchment S101: S101

Runoff = 1.41 cfs @ 12.07 hrs, Volume= 0.111 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
11,879	98	Roofs, HSG D
8,381	98	Roofs, HSG C
20,260	98	Weighted Average
20,260		100.00% Impervious Area

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

Summary for Subcatchment S102: S102

Runoff = 0.76 cfs @ 12.07 hrs, Volume= 0.056 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
5,739	98	Paved parking, HSG D
3,723	98	Paved parking, HSG C
1,258	80	>75% Grass cover, Good, HSG D
1,230	74	>75% Grass cover, Good, HSG C
11,950	94	Weighted Average
2,488		20.82% Pervious Area
9,462		79.18% Impervious Area

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

Summary for Subcatchment S103: S103

Runoff = 0.78 cfs @ 12.07 hrs, Volume= 0.058 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
6,090	98	Paved parking, HSG C
4,098	98	Paved parking, HSG D
1,212	74	>75% Grass cover, Good, HSG C
897	80	>75% Grass cover, Good, HSG D
12,297	94	Weighted Average
2,109		17.15% Pervious Area
10,188		82.85% Impervious Area

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

Summary for Subcatchment S104: S104

Runoff = 0.52 cfs @ 12.07 hrs, Volume= 0.040 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
464	74	>75% Grass cover, Good, HSG C
7,115	98	Paved parking, HSG C
7,579	97	Weighted Average
464		6.12% Pervious Area
7,115		93.88% Impervious Area

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

Summary for Subcatchment S105: S105

Runoff = 1.71 cfs @ 12.14 hrs, Volume= 0.146 af, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
2,137	84	50-75% Grass cover, Fair, HSG D
6,297	79	50-75% Grass cover, Fair, HSG C
13,218	98	Paved parking, HSG D
10,736	98	Paved parking, HSG C
32,388	93	Weighted Average
8,434		26.04% Pervious Area
23,954		73.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
2.7	420	0.0167	2.62		**Shallow Concentrated Flow, B to C**
					Paved Kv= 20.3 fps
10.2	470	Total			

Summary for Subcatchment S106: S106

Runoff = 0.41 cfs @ 12.13 hrs, Volume= 0.033 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
1,431	98	Paved parking, HSG D
210	77	Woods, Good, HSG D
10,099	80	>75% Grass cover, Good, HSG D
11,740	82	Weighted Average
10,309		87.81% Pervious Area
1,431		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
3.9	165	0.0100	0.70		**Shallow Concentrated Flow, B to C**
					Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0400	4.06		**Shallow Concentrated Flow, C to D**
					Paved Kv= 20.3 fps
0.3	25	0.0400	1.40		**Shallow Concentrated Flow, D to E**
					Short Grass Pasture Kv= 7.0 fps
8.6	258	Total			

Summary for Subcatchment S107: S107

Runoff = 1.36 cfs @ 12.11 hrs, Volume= 0.105 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
33,773	80	>75% Grass cover, Good, HSG D
7,381	74	>75% Grass cover, Good, HSG C
2,860	70	Woods, Good, HSG C
1,518	77	Woods, Good, HSG D
45,532	78	Weighted Average
45,532		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.17		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
1.8	145	0.0370	1.35		**Shallow Concentrated Flow, B to C**
					Short Grass Pasture Kv= 7.0 fps
0.4	20	0.0300	0.87		**Shallow Concentrated Flow, C to D**
					Woodland Kv= 5.0 fps
7.1	215	Total			

Summary for Subcatchment S108: S108

Runoff = 0.86 cfs @ 12.07 hrs, Volume= 0.063 af, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
10,119	98	Paved parking, HSG D
330	98	Paved parking, HSG C
2,951	80	>75% Grass cover, Good, HSG D
506	74	>75% Grass cover, Good, HSG C
13,906	93	Weighted Average
3,457		24.86% Pervious Area
10,449		75.14% Impervious Area

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

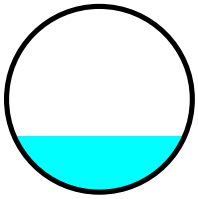
Summary for Reach 1R: Ex. SD

Inflow Area = 0.174 ac, 93.88% Impervious, Inflow Depth = 2.76" for 2-Yr event
Inflow = 0.52 cfs @ 12.07 hrs, Volume= 0.040 af
Outflow = 0.50 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 3%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.57 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 1.9 min

Peak Storage= 19 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.61 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 95.0' Slope= 0.0054 '/'
Inlet Invert= 67.11', Outlet Invert= 66.60'



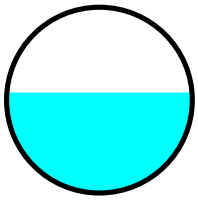
Summary for Reach 2R: Ex. RD

Inflow Area = 0.465 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-Yr event
Inflow = 1.41 cfs @ 12.07 hrs, Volume= 0.111 af
Outflow = 1.38 cfs @ 12.08 hrs, Volume= 0.111 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.21 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 1.0 min

Peak Storage= 27 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.46 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 63.0' Slope= 0.0048 '/'
Inlet Invert= 67.20', Outlet Invert= 66.90'



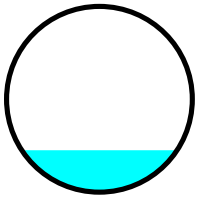
Summary for Reach 3R: Ex. SD

Inflow Area = 1.515 ac, 87.09% Impervious, Inflow Depth = 2.59" for 2-Yr event
Inflow = 0.28 cfs @ 13.58 hrs, Volume= 0.327 af
Outflow = 0.28 cfs @ 13.60 hrs, Volume= 0.327 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.11 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.58 fps, Avg. Travel Time= 1.0 min

Peak Storage= 12 cf @ 13.59 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.52 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 94.0' Slope= 0.0050 '/'
Inlet Invert= 62.97', Outlet Invert= 62.50'



Summary for Pond 1P: Ex. CB

Inflow Area = 1.784 ac, 75.78% Impervious, Inflow Depth = 2.42" for 2-Yr event
Inflow = 0.60 cfs @ 12.13 hrs, Volume= 0.360 af
Outflow = 0.60 cfs @ 12.13 hrs, Volume= 0.360 af, Atten= 0%, Lag= 0.0 min
Primary = 0.60 cfs @ 12.13 hrs, Volume= 0.360 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 62.84' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	62.40'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.40' / 61.70' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.59 cfs @ 12.13 hrs HW=62.84' (Free Discharge)
1=Culvert (Inlet Controls 0.59 cfs @ 1.78 fps)

Summary for Pond 2P: Ex. VUSF

Inflow Area = 1.515 ac, 87.09% Impervious, Inflow Depth = 2.59" for 2-Yr event
Inflow = 4.25 cfs @ 12.08 hrs, Volume= 0.327 af
Outflow = 0.28 cfs @ 13.58 hrs, Volume= 0.327 af, Atten= 93%, Lag= 90.3 min
Primary = 0.28 cfs @ 13.58 hrs, Volume= 0.327 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.99' @ 13.58 hrs Surf.Area= 5,495 sf Storage= 6,804 cf

Plug-Flow detention time= 290.7 min calculated for 0.327 af (100% of inflow)
Center-of-Mass det. time= 290.6 min (1,066.3 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	66.50'	13,049 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.50	3,670	0	0
67.00	4,261	1,983	1,983
68.00	5,510	4,886	6,868
69.00	6,851	6,181	13,049

Device	Routing	Invert	Outlet Devices
#1	Primary	64.01'	**12.0" Round Culvert**
			L= 273.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 64.01' / 63.07' S= 0.0034 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	67.85'	**9.5" Vert. Orifice/Grate** C= 0.600
#3	Device 2	67.85'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	64.06'	**2.0" Vert. Orifice/Grate** C= 0.600
#5	Device 4	66.50'	**2.410 in/hr Exfiltration over Surface area above 64.06'**
			Excluded Surface area = 0 sf

Primary OutFlow Max=0.28 cfs @ 13.58 hrs HW=67.99' (Free Discharge)
└**1=Culvert** (Passes 0.28 cfs of 3.93 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.27 fps)
    └**3=Orifice/Grate** (Passes 0.07 cfs of 0.09 cfs potential flow)
  └**4=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.44 fps)
    └**5=Exfiltration** (Passes 0.21 cfs of 0.31 cfs potential flow)

Summary for Pond 3P: Ex. CB

Inflow Area = 0.448 ac, 84.88% Impervious, Inflow Depth = 2.57" for 2-Yr event
Inflow = 1.25 cfs @ 12.08 hrs, Volume= 0.096 af
Outflow = 1.25 cfs @ 12.08 hrs, Volume= 0.096 af, Atten= 0%, Lag= 0.0 min
Primary = 1.25 cfs @ 12.08 hrs, Volume= 0.096 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.09' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.21 cfs @ 12.08 hrs HW=67.08' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 1.21 cfs @ 2.58 fps)

Summary for Pond 4P: Ex. Vortechnics Unit

Inflow Area = 1.067 ac, 88.02% Impervious, Inflow Depth = 2.60" for 2-Yr event
Inflow = 3.00 cfs @ 12.08 hrs, Volume= 0.231 af
Outflow = 3.00 cfs @ 12.08 hrs, Volume= 0.231 af, Atten= 0%, Lag= 0.0 min
Primary = 3.00 cfs @ 12.08 hrs, Volume= 0.231 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.15' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.60'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 66.60' / 66.50' S= 0.0033 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.91 cfs @ 12.08 hrs HW=68.10' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.91 cfs @ 3.70 fps)

Summary for Pond 5P: Ex. CB

Inflow Area = 0.174 ac, 93.88% Impervious, Inflow Depth = 2.76" for 2-Yr event
Inflow = 0.52 cfs @ 12.07 hrs, Volume= 0.040 af
Outflow = 0.52 cfs @ 12.07 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.07 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.95' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	68.54'	**12.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.54' / 67.21' S= 0.0171 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.50 cfs @ 12.07 hrs HW=68.94' (Free Discharge)
1=Culvert (Inlet Controls 0.50 cfs @ 1.70 fps)

Summary for Pond 6P: Ex. CB

Inflow Area = 0.282 ac, 82.85% Impervious, Inflow Depth = 2.45" for 2-Yr event
Inflow = 0.78 cfs @ 12.07 hrs, Volume= 0.058 af
Outflow = 0.78 cfs @ 12.07 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min
Primary = 0.78 cfs @ 12.07 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.40' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.80'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.80' / 66.60' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.75 cfs @ 12.07 hrs HW=67.39' (Free Discharge)
1=Culvert (Barrel Controls 0.75 cfs @ 2.26 fps)

Summary for Pond 7P: Ex. CB

Inflow Area = 0.784 ac, 89.88% Impervious, Inflow Depth = 2.66" for 2-Yr event
Inflow = 2.23 cfs @ 12.08 hrs, Volume= 0.174 af
Outflow = 2.23 cfs @ 12.08 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min
Primary = 2.23 cfs @ 12.08 hrs, Volume= 0.174 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.41' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.70'	**12.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.70' / 66.60' S= 0.0007 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.16 cfs @ 12.08 hrs HW=68.35' (Free Discharge)
1=Culvert (Barrel Controls 2.16 cfs @ 2.75 fps)

Summary for Pond POI1: POI#1

Inflow Area = 1.045 ac, 0.00% Impervious, Inflow Depth = 1.20" for 2-Yr event
Inflow = 1.36 cfs @ 12.11 hrs, Volume= 0.105 af
Primary = 1.36 cfs @ 12.11 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond POI2: POI#2

Inflow Area = 2.528 ac, 75.24% Impervious, Inflow Depth = 2.40" for 2-Yr event
Inflow = 2.31 cfs @ 12.14 hrs, Volume= 0.505 af
Primary = 2.31 cfs @ 12.14 hrs, Volume= 0.505 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Subcatchment S101: S101

Runoff = 2.10 cfs @ 12.07 hrs, Volume= 0.169 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
11,879	98	Roofs, HSG D
8,381	98	Roofs, HSG C
20,260	98	Weighted Average
20,260		100.00% Impervious Area

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

Summary for Subcatchment S102: S102

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 0.089 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
5,739	98	Paved parking, HSG D
3,723	98	Paved parking, HSG C
1,258	80	>75% Grass cover, Good, HSG D
1,230	74	>75% Grass cover, Good, HSG C
11,950	94	Weighted Average
2,488		20.82% Pervious Area
9,462		79.18% Impervious Area

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

Summary for Subcatchment S103: S103

Runoff = 1.22 cfs @ 12.07 hrs, Volume= 0.092 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
6,090	98	Paved parking, HSG C
4,098	98	Paved parking, HSG D
1,212	74	>75% Grass cover, Good, HSG C
897	80	>75% Grass cover, Good, HSG D
12,297	94	Weighted Average
2,109		17.15% Pervious Area
10,188		82.85% Impervious Area

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

Summary for Subcatchment S104: S104

Runoff = 0.78 cfs @ 12.07 hrs, Volume= 0.062 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
464	74	>75% Grass cover, Good, HSG C
7,115	98	Paved parking, HSG C
7,579	97	Weighted Average
464		6.12% Pervious Area
7,115		93.88% Impervious Area

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

Summary for Subcatchment S105: S105

Runoff = 2.70 cfs @ 12.14 hrs, Volume= 0.236 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
2,137	84	50-75% Grass cover, Fair, HSG D
6,297	79	50-75% Grass cover, Fair, HSG C
13,218	98	Paved parking, HSG D
10,736	98	Paved parking, HSG C
32,388	93	Weighted Average
8,434		26.04% Pervious Area
23,954		73.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
2.7	420	0.0167	2.62		**Shallow Concentrated Flow, B to C**
					Paved Kv= 20.3 fps
10.2	470	Total			

Summary for Subcatchment S106: S106

Runoff = 0.78 cfs @ 12.12 hrs, Volume= 0.061 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
1,431	98	Paved parking, HSG D
210	77	Woods, Good, HSG D
10,099	80	>75% Grass cover, Good, HSG D
11,740	82	Weighted Average
10,309		87.81% Pervious Area
1,431		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
3.9	165	0.0100	0.70		**Shallow Concentrated Flow, B to C**
					Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0400	4.06		**Shallow Concentrated Flow, C to D**
					Paved Kv= 20.3 fps
0.3	25	0.0400	1.40		**Shallow Concentrated Flow, D to E**
					Short Grass Pasture Kv= 7.0 fps
8.6	258	Total			

Summary for Subcatchment S107: S107

Runoff = 2.77 cfs @ 12.11 hrs, Volume= 0.207 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
33,773	80	>75% Grass cover, Good, HSG D
7,381	74	>75% Grass cover, Good, HSG C
2,860	70	Woods, Good, HSG C
1,518	77	Woods, Good, HSG D
45,532	78	Weighted Average
45,532		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.17		**Sheet Flow, A to B** Grass: Short n= 0.150 P2= 3.10"
1.8	145	0.0370	1.35		**Shallow Concentrated Flow, B to C** Short Grass Pasture Kv= 7.0 fps
0.4	20	0.0300	0.87		**Shallow Concentrated Flow, C to D** Woodland Kv= 5.0 fps
7.1	215	Total			

Summary for Subcatchment S108: S108

Runoff = 1.35 cfs @ 12.07 hrs, Volume= 0.101 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
10,119	98	Paved parking, HSG D
330	98	Paved parking, HSG C
2,951	80	>75% Grass cover, Good, HSG D
506	74	>75% Grass cover, Good, HSG C
13,906	93	Weighted Average
3,457		24.86% Pervious Area
10,449		75.14% Impervious Area

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

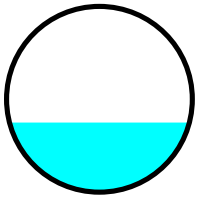
Summary for Reach 1R: Ex. SD

Inflow Area = 0.174 ac, 93.88% Impervious, Inflow Depth = 4.25" for 10-Yr event
Inflow = 0.78 cfs @ 12.07 hrs, Volume= 0.062 af
Outflow = 0.76 cfs @ 12.09 hrs, Volume= 0.062 af, Atten= 3%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.88 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 1.7 min

Peak Storage= 25 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.61 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 95.0' Slope= 0.0054 '/'
Inlet Invert= 67.11', Outlet Invert= 66.60'



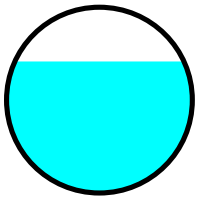
Summary for Reach 2R: Ex. RD

Inflow Area = 0.465 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-Yr event
Inflow = 2.10 cfs @ 12.07 hrs, Volume= 0.169 af
Outflow = 2.06 cfs @ 12.08 hrs, Volume= 0.169 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.50 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 0.9 min

Peak Storage= 37 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.46 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 63.0' Slope= 0.0048 '/'
Inlet Invert= 67.20', Outlet Invert= 66.90'



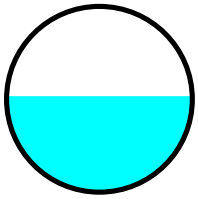
Summary for Reach 3R: Ex. SD

Inflow Area = 1.515 ac, 87.09% Impervious, Inflow Depth = 4.07" for 10-Yr event
Inflow = 1.33 cfs @ 12.50 hrs, Volume= 0.514 af
Outflow = 1.33 cfs @ 12.51 hrs, Volume= 0.514 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.25 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 0.9 min

Peak Storage= 38 cf @ 12.51 hrs
Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.52 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 94.0' Slope= 0.0050 '/'
Inlet Invert= 62.97', Outlet Invert= 62.50'



Summary for Pond 1P: Ex. CB

Inflow Area = 1.784 ac, 75.78% Impervious, Inflow Depth = 3.86" for 10-Yr event
Inflow = 1.59 cfs @ 12.43 hrs, Volume= 0.575 af
Outflow = 1.59 cfs @ 12.43 hrs, Volume= 0.575 af, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.43 hrs, Volume= 0.575 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 63.19' @ 12.43 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	62.40'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.40' / 61.70' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.59 cfs @ 12.43 hrs HW=63.19' (Free Discharge)
1=Culvert (Inlet Controls 1.59 cfs @ 2.39 fps)

Summary for Pond 2P: Ex. VUSF

Inflow Area = 1.515 ac, 87.09% Impervious, Inflow Depth = 4.07" for 10-Yr event
Inflow = 6.53 cfs @ 12.08 hrs, Volume= 0.514 af
Outflow = 1.33 cfs @ 12.50 hrs, Volume= 0.514 af, Atten= 80%, Lag= 25.4 min
Primary = 1.33 cfs @ 12.50 hrs, Volume= 0.514 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.47' @ 12.50 hrs Surf.Area= 6,141 sf Storage= 9,611 cf

Plug-Flow detention time= 239.4 min calculated for 0.513 af (100% of inflow)
Center-of-Mass det. time= 239.6 min (1,005.1 - 765.5)

Volume	Invert	Avail.Storage	Storage Description
#1	66.50'	13,049 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.50	3,670	0	0
67.00	4,261	1,983	1,983
68.00	5,510	4,886	6,868
69.00	6,851	6,181	13,049

Device	Routing	Invert	Outlet Devices
#1	Primary	64.01'	**12.0" Round Culvert**
			L= 273.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 64.01' / 63.07' S= 0.0034 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	67.85'	**9.5" Vert. Orifice/Grate** C= 0.600
#3	Device 2	67.85'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	64.06'	**2.0" Vert. Orifice/Grate** C= 0.600
#5	Device 4	66.50'	**2.410 in/hr Exfiltration over Surface area above 64.06'**
			Excluded Surface area = 0 sf

Primary OutFlow Max=1.33 cfs @ 12.50 hrs HW=68.47' (Free Discharge)
- **1=Culvert** (Passes 1.33 cfs of 4.17 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 1.11 cfs @ 2.68 fps)
    - **3=Orifice/Grate** (Passes 1.11 cfs of 1.63 cfs potential flow)
  - **4=Orifice/Grate** (Orifice Controls 0.22 cfs @ 10.02 fps)
    - **5=Exfiltration** (Passes 0.22 cfs of 0.34 cfs potential flow)

Summary for Pond 3P: Ex. CB

Inflow Area = 0.448 ac, 84.88% Impervious, Inflow Depth = 4.04" for 10-Yr event
Inflow = 1.92 cfs @ 12.08 hrs, Volume= 0.151 af
Outflow = 1.92 cfs @ 12.08 hrs, Volume= 0.151 af, Atten= 0%, Lag= 0.0 min
Primary = 1.92 cfs @ 12.08 hrs, Volume= 0.151 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.27' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.86 cfs @ 12.08 hrs HW=67.25' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 1.86 cfs @ 2.95 fps)

Summary for Pond 4P: Ex. Vortechnics Unit

Inflow Area = 1.067 ac, 88.02% Impervious, Inflow Depth = 4.08" for 10-Yr event
Inflow = 4.61 cfs @ 12.08 hrs, Volume= 0.362 af
Outflow = 4.61 cfs @ 12.08 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.0 min
Primary = 4.61 cfs @ 12.08 hrs, Volume= 0.362 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.46' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.60'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 66.60' / 66.50' S= 0.0033 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.46 cfs @ 12.08 hrs HW=69.34' (Free Discharge)
- **1=Culvert** (Inlet Controls 4.46 cfs @ 5.68 fps)

Summary for Pond 5P: Ex. CB

Inflow Area = 0.174 ac, 93.88% Impervious, Inflow Depth = 4.25" for 10-Yr event
Inflow = 0.78 cfs @ 12.07 hrs, Volume= 0.062 af
Outflow = 0.78 cfs @ 12.07 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min
Primary = 0.78 cfs @ 12.07 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.05' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	68.54'	**12.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.54' / 67.21' S= 0.0171 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.75 cfs @ 12.07 hrs HW=69.04' (Free Discharge)
1=Culvert (Inlet Controls 0.75 cfs @ 1.90 fps)

Summary for Pond 6P: Ex. CB

Inflow Area = 0.282 ac, 82.85% Impervious, Inflow Depth = 3.91" for 10-Yr event
Inflow = 1.22 cfs @ 12.07 hrs, Volume= 0.092 af
Outflow = 1.22 cfs @ 12.07 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.07 hrs, Volume= 0.092 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.58' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.80'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.80' / 66.60' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.17 cfs @ 12.07 hrs HW=67.56' (Free Discharge)
1=Culvert (Barrel Controls 1.17 cfs @ 2.54 fps)

Summary for Pond 7P: Ex. CB

Inflow Area = 0.784 ac, 89.88% Impervious, Inflow Depth = 4.14" for 10-Yr event
Inflow = 3.40 cfs @ 12.08 hrs, Volume= 0.270 af
Outflow = 3.40 cfs @ 12.08 hrs, Volume= 0.270 af, Atten= 0%, Lag= 0.0 min
Primary = 3.40 cfs @ 12.08 hrs, Volume= 0.270 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.46' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.70'	**12.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.70' / 66.60' S= 0.0007 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.29 cfs @ 12.08 hrs HW=69.35' (Free Discharge)
1=Culvert (Barrel Controls 3.29 cfs @ 4.20 fps)

Summary for Pond POI1: POI#1

Inflow Area = 1.045 ac, 0.00% Impervious, Inflow Depth = 2.38" for 10-Yr event
Inflow = 2.77 cfs @ 12.11 hrs, Volume= 0.207 af
Primary = 2.77 cfs @ 12.11 hrs, Volume= 0.207 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond POI2: POI#2

Inflow Area = 2.528 ac, 75.24% Impervious, Inflow Depth = 3.85" for 10-Yr event
Inflow = 3.91 cfs @ 12.16 hrs, Volume= 0.811 af
Primary = 3.91 cfs @ 12.16 hrs, Volume= 0.811 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Subcatchment S101: S101

Runoff = 2.66 cfs @ 12.07 hrs, Volume= 0.216 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
11,879	98	Roofs, HSG D
8,381	98	Roofs, HSG C
20,260	98	Weighted Average
20,260		100.00% Impervious Area

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

Summary for Subcatchment S102: S102

Runoff = 1.52 cfs @ 12.07 hrs, Volume= 0.117 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
5,739	98	Paved parking, HSG D
3,723	98	Paved parking, HSG C
1,258	80	>75% Grass cover, Good, HSG D
1,230	74	>75% Grass cover, Good, HSG C
11,950	94	Weighted Average
2,488		20.82% Pervious Area
9,462		79.18% Impervious Area

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

Summary for Subcatchment S103: S103

Runoff = 1.56 cfs @ 12.07 hrs, Volume= 0.120 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
6,090	98	Paved parking, HSG C
4,098	98	Paved parking, HSG D
1,212	74	>75% Grass cover, Good, HSG C
897	80	>75% Grass cover, Good, HSG D
12,297	94	Weighted Average
2,109		17.15% Pervious Area
10,188		82.85% Impervious Area

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

Summary for Subcatchment S104: S104

Runoff = 0.99 cfs @ 12.07 hrs, Volume= 0.079 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
464	74	>75% Grass cover, Good, HSG C
7,115	98	Paved parking, HSG C
7,579	97	Weighted Average
464		6.12% Pervious Area
7,115		93.88% Impervious Area

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

Summary for Subcatchment S105: S105

Runoff = 3.48 cfs @ 12.14 hrs, Volume= 0.309 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
2,137	84	50-75% Grass cover, Fair, HSG D
6,297	79	50-75% Grass cover, Fair, HSG C
13,218	98	Paved parking, HSG D
10,736	98	Paved parking, HSG C
32,388	93	Weighted Average
8,434		26.04% Pervious Area
23,954		73.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
2.7	420	0.0167	2.62		**Shallow Concentrated Flow, B to C**
					Paved Kv= 20.3 fps
10.2	470	Total			

Summary for Subcatchment S106: S106

Runoff = 1.08 cfs @ 12.12 hrs, Volume= 0.085 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
1,431	98	Paved parking, HSG D
210	77	Woods, Good, HSG D
10,099	80	>75% Grass cover, Good, HSG D
11,740	82	Weighted Average
10,309		87.81% Pervious Area
1,431		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
3.9	165	0.0100	0.70		**Shallow Concentrated Flow, B to C**
					Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0400	4.06		**Shallow Concentrated Flow, C to D**
					Paved Kv= 20.3 fps
0.3	25	0.0400	1.40		**Shallow Concentrated Flow, D to E**
					Short Grass Pasture Kv= 7.0 fps
8.6	258	Total			

Summary for Subcatchment S107: S107

Runoff = 3.96 cfs @ 12.10 hrs, Volume= 0.296 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
33,773	80	>75% Grass cover, Good, HSG D
7,381	74	>75% Grass cover, Good, HSG C
2,860	70	Woods, Good, HSG C
1,518	77	Woods, Good, HSG D
45,532	78	Weighted Average
45,532		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.17		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
1.8	145	0.0370	1.35		**Shallow Concentrated Flow, B to C**
					Short Grass Pasture Kv= 7.0 fps
0.4	20	0.0300	0.87		**Shallow Concentrated Flow, C to D**
					Woodland Kv= 5.0 fps
7.1	215	Total			

Summary for Subcatchment S108: S108

Runoff = 1.75 cfs @ 12.07 hrs, Volume= 0.133 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
10,119	98	Paved parking, HSG D
330	98	Paved parking, HSG C
2,951	80	>75% Grass cover, Good, HSG D
506	74	>75% Grass cover, Good, HSG C
13,906	93	Weighted Average
3,457		24.86% Pervious Area
10,449		75.14% Impervious Area

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

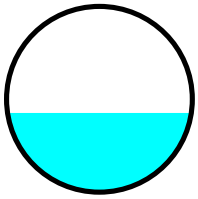
Summary for Reach 1R: Ex. SD

Inflow Area = 0.174 ac, 93.88% Impervious, Inflow Depth = 5.44" for 25-Yr event
Inflow = 0.99 cfs @ 12.07 hrs, Volume= 0.079 af
Outflow = 0.96 cfs @ 12.09 hrs, Volume= 0.079 af, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.07 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 1.5 min

Peak Storage= 30 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.61 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 95.0' Slope= 0.0054 '/'
Inlet Invert= 67.11', Outlet Invert= 66.60'



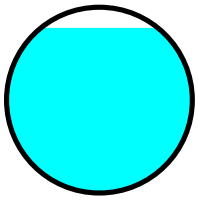
Summary for Reach 2R: Ex. RD

Inflow Area = 0.465 ac,100.00% Impervious, Inflow Depth = 5.56" for 25-Yr event
Inflow = 2.66 cfs @ 12.07 hrs, Volume= 0.216 af
Outflow = 2.61 cfs @ 12.08 hrs, Volume= 0.216 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.56 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 0.8 min

Peak Storage= 47 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.89'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.46 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 63.0' Slope= 0.0048 '/'
Inlet Invert= 67.20', Outlet Invert= 66.90'



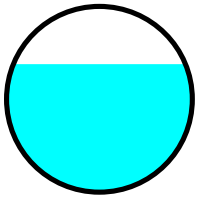
Summary for Reach 3R: Ex. SD

Inflow Area = 1.515 ac, 87.09% Impervious, Inflow Depth = 5.26" for 25-Yr event
Inflow = 2.06 cfs @ 12.45 hrs, Volume= 0.664 af
Outflow = 2.06 cfs @ 12.46 hrs, Volume= 0.664 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.58 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.81 fps, Avg. Travel Time= 0.9 min

Peak Storage= 54 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.69'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.52 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 94.0' Slope= 0.0050 '/'
Inlet Invert= 62.97', Outlet Invert= 62.50'



Summary for Pond 1P: Ex. CB

Inflow Area = 1.784 ac, 75.78% Impervious, Inflow Depth = 5.04" for 25-Yr event
Inflow = 2.62 cfs @ 12.20 hrs, Volume= 0.749 af
Outflow = 2.62 cfs @ 12.20 hrs, Volume= 0.749 af, Atten= 0%, Lag= 0.0 min
Primary = 2.62 cfs @ 12.20 hrs, Volume= 0.749 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 63.67' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	62.40'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.40' / 61.70' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.62 cfs @ 12.20 hrs HW=63.67' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.62 cfs @ 3.33 fps)

Summary for Pond 2P: Ex. VUSF

Inflow Area = 1.515 ac, 87.09% Impervious, Inflow Depth = 5.26" for 25-Yr event
Inflow = 8.34 cfs @ 12.08 hrs, Volume= 0.664 af
Outflow = 2.06 cfs @ 12.45 hrs, Volume= 0.664 af, Atten= 75%, Lag= 22.4 min
Primary = 2.06 cfs @ 12.45 hrs, Volume= 0.664 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.85' @ 12.45 hrs Surf.Area= 6,645 sf Storage= 12,013 cf

Plug-Flow detention time= 213.0 min calculated for 0.663 af (100% of inflow)
Center-of-Mass det. time= 213.3 min (973.4 - 760.2)

Volume	Invert	Avail.Storage	Storage Description
#1	66.50'	13,049 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.50	3,670	0	0
67.00	4,261	1,983	1,983
68.00	5,510	4,886	6,868
69.00	6,851	6,181	13,049

Device	Routing	Invert	Outlet Devices
#1	Primary	64.01'	**12.0" Round Culvert**
			L= 273.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 64.01' / 63.07' S= 0.0034 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	67.85'	**9.5" Vert. Orifice/Grate** C= 0.600
#3	Device 2	67.85'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	64.06'	**2.0" Vert. Orifice/Grate** C= 0.600
#5	Device 4	66.50'	**2.410 in/hr Exfiltration over Surface area above 64.06'**
			Excluded Surface area = 0 sf

Primary OutFlow Max=2.06 cfs @ 12.45 hrs HW=68.85' (Free Discharge)
└**1=Culvert** (Passes 2.06 cfs of 4.34 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 1.84 cfs @ 3.73 fps)
    └**3=Orifice/Grate** (Passes 1.84 cfs of 3.56 cfs potential flow)
  └**4=Orifice/Grate** (Orifice Controls 0.23 cfs @ 10.44 fps)
    └**5=Exfiltration** (Passes 0.23 cfs of 0.37 cfs potential flow)

Summary for Pond 3P: Ex. CB

Inflow Area = 0.448 ac, 84.88% Impervious, Inflow Depth = 5.23" for 25-Yr event
Inflow = 2.46 cfs @ 12.08 hrs, Volume= 0.196 af
Outflow = 2.46 cfs @ 12.08 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Primary = 2.46 cfs @ 12.08 hrs, Volume= 0.196 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.41' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.38 cfs @ 12.08 hrs HW=67.39' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 2.38 cfs @ 3.22 fps)

Summary for Pond 4P: Ex. Vortechnics Unit

Inflow Area = 1.067 ac, 88.02% Impervious, Inflow Depth = 5.27" for 25-Yr event
Inflow = 5.88 cfs @ 12.08 hrs, Volume= 0.468 af
Outflow = 5.88 cfs @ 12.08 hrs, Volume= 0.468 af, Atten= 0%, Lag= 0.0 min
Primary = 5.88 cfs @ 12.08 hrs, Volume= 0.468 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 70.95' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.60'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 66.60' / 66.50' S= 0.0033 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.70 cfs @ 12.08 hrs HW=70.74' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.70 cfs @ 7.25 fps)

Summary for Pond 5P: Ex. CB

Inflow Area = 0.174 ac, 93.88% Impervious, Inflow Depth = 5.44" for 25-Yr event
Inflow = 0.99 cfs @ 12.07 hrs, Volume= 0.079 af
Outflow = 0.99 cfs @ 12.07 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min
Primary = 0.99 cfs @ 12.07 hrs, Volume= 0.079 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.13' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	68.54'	**12.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.54' / 67.21' S= 0.0171 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.95 cfs @ 12.07 hrs HW=69.12' (Free Discharge)
1=Culvert (Inlet Controls 0.95 cfs @ 2.04 fps)

Summary for Pond 6P: Ex. CB

Inflow Area = 0.282 ac, 82.85% Impervious, Inflow Depth = 5.10" for 25-Yr event
Inflow = 1.56 cfs @ 12.07 hrs, Volume= 0.120 af
Outflow = 1.56 cfs @ 12.07 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.07 hrs, Volume= 0.120 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.71' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.80'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.80' / 66.60' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.51 cfs @ 12.07 hrs HW=67.69' (Free Discharge)
1=Culvert (Barrel Controls 1.51 cfs @ 2.70 fps)

Summary for Pond 7P: Ex. CB

Inflow Area = 0.784 ac, 89.88% Impervious, Inflow Depth = 5.33" for 25-Yr event
Inflow = 4.33 cfs @ 12.08 hrs, Volume= 0.348 af
Outflow = 4.33 cfs @ 12.08 hrs, Volume= 0.348 af, Atten= 0%, Lag= 0.0 min
Primary = 4.33 cfs @ 12.08 hrs, Volume= 0.348 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 70.61' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.70'	**12.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.70' / 66.60' S= 0.0007 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.20 cfs @ 12.08 hrs HW=70.45' (Free Discharge)
1=Culvert (Barrel Controls 4.20 cfs @ 5.34 fps)

Summary for Pond POI1: POI#1

Inflow Area = 1.045 ac, 0.00% Impervious, Inflow Depth = 3.40" for 25-Yr event
Inflow = 3.96 cfs @ 12.10 hrs, Volume= 0.296 af
Primary = 3.96 cfs @ 12.10 hrs, Volume= 0.296 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

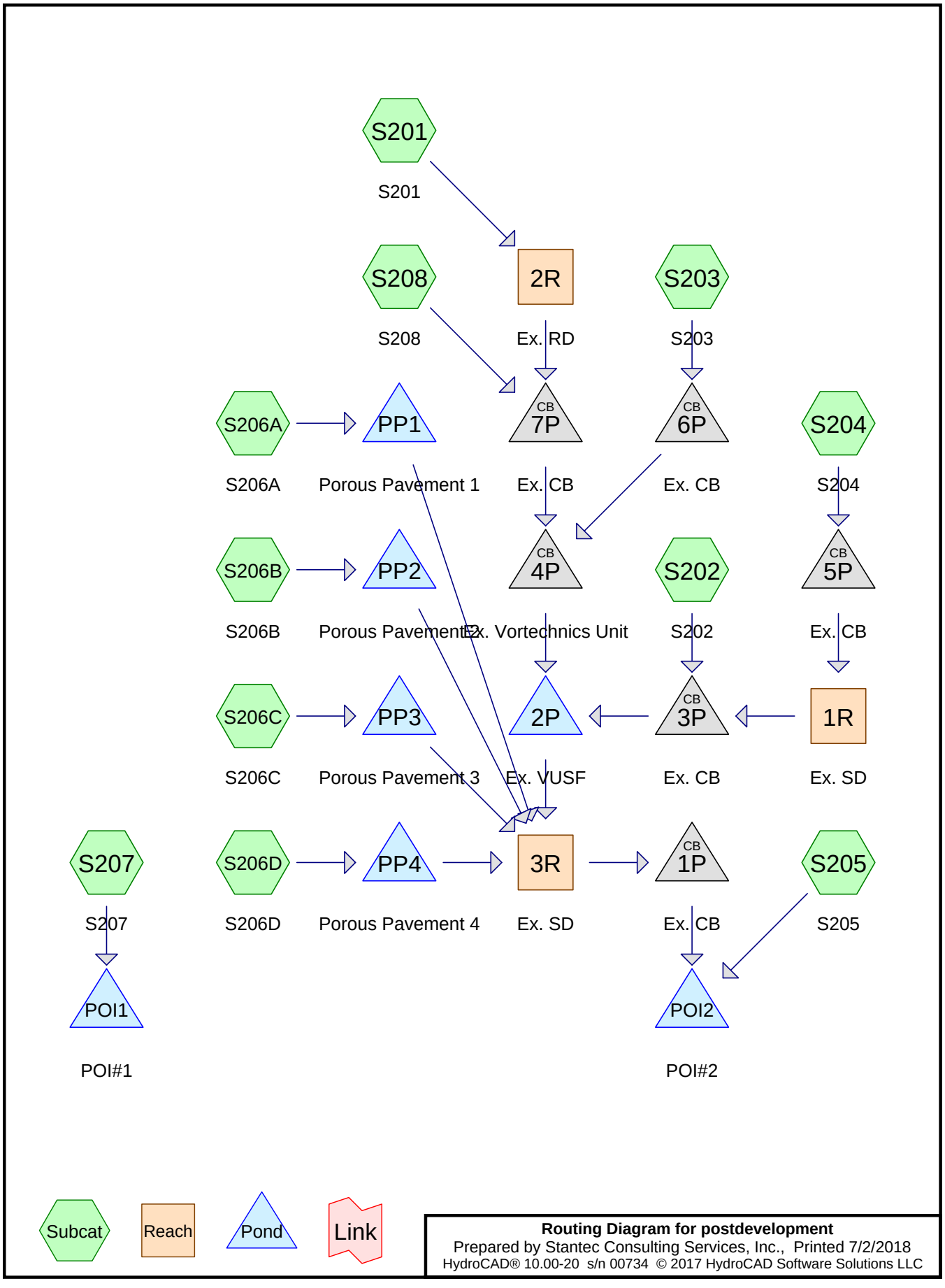
Summary for Pond POI2: POI#2

Inflow Area = 2.528 ac, 75.24% Impervious, Inflow Depth = 5.02" for 25-Yr event
Inflow = 6.04 cfs @ 12.16 hrs, Volume= 1.058 af
Primary = 6.04 cfs @ 12.16 hrs, Volume= 1.058 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

ATTACHMENT D

POST DEVELOPMENT HYDROCAD COMPUTATIONS



Routing Diagram for postdevelopment

Prepared by Stantec Consulting Services, Inc., Printed 7/2/2018

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.254	74	>75% Grass cover, Good, HSG C (S202, S203, S204, S205, S206A, S206D, S207, S208)
0.366	80	>75% Grass cover, Good, HSG D (S202, S203, S205, S206A, S206B, S206C, S206D, S207, S208)
0.802	98	Paved parking, HSG C (S202, S203, S204, S205, S206A, S206D, S208)
1.640	98	Paved parking, HSG D (S202, S203, S205, S206A, S206B, S206C, S206D, S208)
0.210	98	Roofs, HSG C (S201)
0.282	98	Roofs, HSG D (S201)
0.014	70	Woods, Good, HSG C (S207)
0.005	77	Woods, Good, HSG D (S207)
3.573	**94**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.280	HSG C	S201, S202, S203, S204, S205, S206A, S206D, S207, S208
2.294	HSG D	S201, S202, S203, S205, S206A, S206B, S206C, S206D, S207, S208
0.000	Other	
3.573		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.254	0.366	0.000	0.621	>75% Grass cover, Good	S202, S203, S204, S205, S206A, S206B, S206C, S206D, S207, S208
0.000	0.000	0.802	1.640	0.000	2.442	Paved parking	S202, S203, S204, S205, S206A, S206B, S206C, S206D, S208
0.000	0.000	0.210	0.282	0.000	0.491	Roofs	S201
0.000	0.000	0.014	0.005	0.000	0.019	Woods, Good	S207
0.000	**0.000**	**1.280**	**2.294**	**0.000**	**3.573**	**TOTAL AREA**	

Summary for Subcatchment S201: S201

Runoff = 1.49 cfs @ 12.07 hrs, Volume= 0.117 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
12,271	98	Roofs, HSG D
9,127	98	Roofs, HSG C
21,398	98	Weighted Average
21,398		100.00% Impervious Area

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

Summary for Subcatchment S202: S202

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 0.040 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
3,185	98	Paved parking, HSG D
3,505	98	Paved parking, HSG C
1,579	80	>75% Grass cover, Good, HSG D
1,053	74	>75% Grass cover, Good, HSG C
9,322	92	Weighted Average
2,632		28.23% Pervious Area
6,690		71.77% Impervious Area

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

Summary for Subcatchment S203: S203

Runoff = 0.86 cfs @ 12.07 hrs, Volume= 0.067 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
7,931	98	Paved parking, HSG C
4,162	98	Paved parking, HSG D
191	74	>75% Grass cover, Good, HSG C
342	80	>75% Grass cover, Good, HSG D
12,626	97	Weighted Average
533		4.22% Pervious Area
12,093		95.78% Impervious Area

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

Summary for Subcatchment S204: S204

Runoff = 0.40 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
1,038	74	>75% Grass cover, Good, HSG C
5,313	98	Paved parking, HSG C
6,351	94	Weighted Average
1,038		16.34% Pervious Area
5,313		83.66% Impervious Area

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

Summary for Subcatchment S205: S205

Runoff = 1.78 cfs @ 12.14 hrs, Volume= 0.150 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
5,415	80	>75% Grass cover, Good, HSG D
4,992	74	>75% Grass cover, Good, HSG C
12,697	98	Paved parking, HSG D
11,718	98	Paved parking, HSG C
34,822	92	Weighted Average
10,407		29.89% Pervious Area
24,415		70.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
2.7	420	0.0167	2.62		**Shallow Concentrated Flow, B to C**
					Paved Kv= 20.3 fps
10.2	470	Total			

Summary for Subcatchment S206A: S206A

Runoff = 1.64 cfs @ 12.07 hrs, Volume= 0.123 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
14,994	98	Paved parking, HSG D
2,860	80	>75% Grass cover, Good, HSG D
5,893	98	Paved parking, HSG C
1,403	74	>75% Grass cover, Good, HSG C
25,150	95	Weighted Average
4,263		16.95% Pervious Area
20,887		83.05% Impervious Area

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

Summary for Subcatchment S206B: S206B

Runoff = 1.69 cfs @ 12.07 hrs, Volume= 0.128 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
3,346	80	>75% Grass cover, Good, HSG D
21,909	98	Paved parking, HSG D
25,255	96	Weighted Average
3,346		13.25% Pervious Area
21,909		86.75% Impervious Area

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

Summary for Subcatchment S206C: S206C

Runoff = 0.31 cfs @ 12.07 hrs, Volume= 0.024 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
517	80	>75% Grass cover, Good, HSG D
4,184	98	Paved parking, HSG D
4,701	96	Weighted Average
517		11.00% Pervious Area
4,184		89.00% Impervious Area

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

Summary for Subcatchment S206D: S206D

Runoff = 0.18 cfs @ 12.07 hrs, Volume= 0.014 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
327	80	>75% Grass cover, Good, HSG D
82	74	>75% Grass cover, Good, HSG C
2,180	98	Paved parking, HSG D
239	98	Paved parking, HSG C
2,828	95	Weighted Average
409		14.46% Pervious Area
2,419		85.54% Impervious Area

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

Summary for Subcatchment S207: S207

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
686	80	>75% Grass cover, Good, HSG D
1,738	74	>75% Grass cover, Good, HSG C
596	70	Woods, Good, HSG C
222	77	Woods, Good, HSG D
3,242	75	Weighted Average
3,242		100.00% Pervious Area

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

Summary for Subcatchment S208: S208

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.048 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.10"

Area (sf)	CN	Description
8,139	98	Paved parking, HSG D
338	98	Paved parking, HSG C
891	80	>75% Grass cover, Good, HSG D
585	74	>75% Grass cover, Good, HSG C
9,953	95	Weighted Average
1,476		14.83% Pervious Area
8,477		85.17% Impervious Area

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

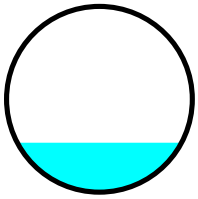
Summary for Reach 1R: Ex. SD

Inflow Area = 0.146 ac, 83.66% Impervious, Inflow Depth = 2.45" for 2-Yr event
Inflow = 0.40 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.39 cfs @ 12.09 hrs, Volume= 0.030 af, Atten= 3%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.40 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.79 fps, Avg. Travel Time= 2.0 min

Peak Storage= 16 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.61 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 95.0' Slope= 0.0054 '/'
Inlet Invert= 67.11', Outlet Invert= 66.60'



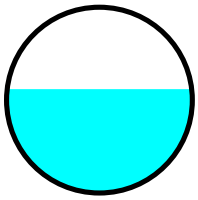
Summary for Reach 2R: Ex. RD

Inflow Area = 0.491 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-Yr event
Inflow = 1.49 cfs @ 12.07 hrs, Volume= 0.117 af
Outflow = 1.46 cfs @ 12.08 hrs, Volume= 0.117 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.25 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 0.9 min

Peak Storage= 28 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.46 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 63.0' Slope= 0.0048 '/'
Inlet Invert= 67.20', Outlet Invert= 66.90'



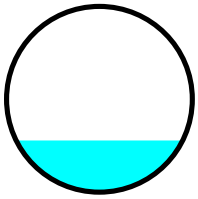
Summary for Reach 3R: Ex. SD

Inflow Area = 2.699 ac, 87.91% Impervious, Inflow Depth > 2.60" for 2-Yr event
Inflow = 0.42 cfs @ 12.80 hrs, Volume= 0.586 af
Outflow = 0.42 cfs @ 12.80 hrs, Volume= 0.585 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.38 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.61 fps, Avg. Travel Time= 1.0 min

Peak Storage= 17 cf @ 12.80 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.52 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 94.0' Slope= 0.0050 '/'
Inlet Invert= 62.97', Outlet Invert= 62.50'



Summary for Pond 1P: Ex. CB

Inflow Area = 2.699 ac, 87.91% Impervious, Inflow Depth > 2.60" for 2-Yr event
Inflow = 0.42 cfs @ 12.80 hrs, Volume= 0.585 af
Outflow = 0.42 cfs @ 12.80 hrs, Volume= 0.585 af, Atten= 0%, Lag= 0.0 min
Primary = 0.42 cfs @ 12.80 hrs, Volume= 0.585 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 62.77' @ 12.80 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	62.40'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.40' / 61.70' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.80 hrs HW=62.77' (Free Discharge)
1=Culvert (Inlet Controls 0.42 cfs @ 1.63 fps)

Summary for Pond 2P: Ex. VUSF

Inflow Area = 1.369 ac, 90.48% Impervious, Inflow Depth = 2.65" for 2-Yr event
Inflow = 3.89 cfs @ 12.08 hrs, Volume= 0.302 af
Outflow = 0.21 cfs @ 14.00 hrs, Volume= 0.302 af, Atten= 95%, Lag= 115.4 min
Primary = 0.21 cfs @ 14.00 hrs, Volume= 0.302 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.90' @ 14.00 hrs Surf.Area= 5,381 sf Storage= 6,305 cf

Plug-Flow detention time= 283.6 min calculated for 0.302 af (100% of inflow)
Center-of-Mass det. time= 283.6 min (1,055.1 - 771.5)

Volume	Invert	Avail.Storage	Storage Description
#1	66.50'	13,049 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.50	3,670	0	0
67.00	4,261	1,983	1,983
68.00	5,510	4,886	6,868
69.00	6,851	6,181	13,049

Device	Routing	Invert	Outlet Devices
#1	Primary	64.01'	**12.0" Round Culvert**
			L= 273.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 64.01' / 63.07' S= 0.0034 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	67.85'	**9.5" Vert. Orifice/Grate** C= 0.600
#3	Device 2	67.85'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	64.06'	**2.0" Vert. Orifice/Grate** C= 0.600
#5	Device 4	66.50'	**2.410 in/hr Exfiltration over Surface area above 64.06'**
			Excluded Surface area = 0 sf

Primary OutFlow Max=0.21 cfs @ 14.00 hrs HW=67.90' (Free Discharge)
└**1=Culvert** (Passes 0.21 cfs of 3.89 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.74 fps)
    └**3=Orifice/Grate** (Passes 0.01 cfs of 0.01 cfs potential flow)
  └**4=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.33 fps)
    └**5=Exfiltration** (Passes 0.20 cfs of 0.30 cfs potential flow)

Summary for Pond 3P: Ex. CB

Inflow Area = 0.360 ac, 76.58% Impervious, Inflow Depth = 2.33" for 2-Yr event
Inflow = 0.94 cfs @ 12.08 hrs, Volume= 0.070 af
Outflow = 0.94 cfs @ 12.08 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.94 cfs @ 12.08 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.00' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.91 cfs @ 12.08 hrs HW=66.99' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.91 cfs @ 2.38 fps)

Summary for Pond 4P: Ex. Vortechnics Unit

Inflow Area = 1.010 ac, 95.43% Impervious, Inflow Depth = 2.76" for 2-Yr event
Inflow = 2.95 cfs @ 12.08 hrs, Volume= 0.233 af
Outflow = 2.95 cfs @ 12.08 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.0 min
Primary = 2.95 cfs @ 12.08 hrs, Volume= 0.233 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.13' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.60'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 66.60' / 66.50' S= 0.0033 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.86 cfs @ 12.08 hrs HW=68.08' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.86 cfs @ 3.64 fps)

Summary for Pond 5P: Ex. CB

Inflow Area = 0.146 ac, 83.66% Impervious, Inflow Depth = 2.45" for 2-Yr event
Inflow = 0.40 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.40 cfs @ 12.07 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.07 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.90' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	68.54'	**12.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.54' / 67.21' S= 0.0171 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 12.07 hrs HW=68.89' (Free Discharge)
1=Culvert (Inlet Controls 0.39 cfs @ 1.59 fps)

Summary for Pond 6P: Ex. CB

Inflow Area = 0.290 ac, 95.78% Impervious, Inflow Depth = 2.76" for 2-Yr event
Inflow = 0.86 cfs @ 12.07 hrs, Volume= 0.067 af
Outflow = 0.86 cfs @ 12.07 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.07 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.44' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.80'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.80' / 66.60' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.07 hrs HW=67.42' (Free Discharge)
1=Culvert (Barrel Controls 0.83 cfs @ 2.32 fps)

Summary for Pond 7P: Ex. CB

Inflow Area = 0.720 ac, 95.29% Impervious, Inflow Depth = 2.77" for 2-Yr event
Inflow = 2.10 cfs @ 12.08 hrs, Volume= 0.166 af
Outflow = 2.10 cfs @ 12.08 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 2.10 cfs @ 12.08 hrs, Volume= 0.166 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.32' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.70'	**12.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.70' / 66.60' S= 0.0007 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.03 cfs @ 12.08 hrs HW=68.27' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.03 cfs @ 2.59 fps)

Summary for Pond POI1: POI#1

Inflow Area = 0.074 ac, 0.00% Impervious, Inflow Depth = 1.03" for 2-Yr event
Inflow = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af
Primary = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond POI2: POI#2

Inflow Area = 3.499 ac, 83.85% Impervious, Inflow Depth > 2.52" for 2-Yr event
Inflow = 2.19 cfs @ 12.14 hrs, Volume= 0.736 af
Primary = 2.19 cfs @ 12.14 hrs, Volume= 0.736 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond PP1: Porous Pavement 1

Inflow Area = 0.577 ac, 83.05% Impervious, Inflow Depth = 2.55" for 2-Yr event
Inflow = 1.64 cfs @ 12.07 hrs, Volume= 0.123 af
Outflow = 0.04 cfs @ 17.10 hrs, Volume= 0.117 af, Atten= 98%, Lag= 301.7 min
Primary = 0.04 cfs @ 17.10 hrs, Volume= 0.117 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.24' @ 17.10 hrs Surf.Area= 20,887 sf Storage= 3,548 cf

Plug-Flow detention time= 891.1 min calculated for 0.117 af (96% of inflow)
Center-of-Mass det. time= 867.6 min (1,648.6 - 781.0)

Volume	Invert	Avail.Storage	Storage Description
#1	67.82'	8,355 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 20,887 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.82	20,887	0	0
68.82	20,887	20,887	20,887

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Device 4	67.82'	**3.000 in/hr Exfiltration over Surface area above 66.65'** Excluded Surface area = 0 sf
#3	Primary	68.32'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	66.65'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.04 cfs @ 17.10 hrs HW=68.24' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.04 cfs @ 6.73 fps)
└**4=Orifice/Grate** (Passes 0.04 cfs of 1.10 cfs potential flow)
└**2=Exfiltration** (Passes 0.04 cfs of 1.45 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PP2: Porous Pavement 2

Inflow Area = 0.580 ac, 86.75% Impervious, Inflow Depth = 2.65" for 2-Yr event
Inflow = 1.69 cfs @ 12.07 hrs, Volume= 0.128 af
Outflow = 0.05 cfs @ 15.75 hrs, Volume= 0.128 af, Atten= 97%, Lag= 221.0 min
Primary = 0.05 cfs @ 15.75 hrs, Volume= 0.128 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.75' @ 15.75 hrs Surf.Area= 20,435 sf Storage= 3,291 cf

Plug-Flow detention time= 585.8 min calculated for 0.128 af (100% of inflow)
Center-of-Mass det. time= 586.1 min (1,360.2 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1	69.35'	8,174 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 20,435 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
69.35	20,435	0	0
70.35	20,435	20,435	20,435

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	69.35'	**3.000 in/hr Exfiltration over Surface area above 68.18'** Excluded Surface area = 0 sf
#3	Primary	69.85'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	68.18'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 15.75 hrs HW=69.75' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 6.73 fps)
└**4=Orifice/Grate** (Passes 0.05 cfs of 1.09 cfs potential flow)
└**2=Exfiltration** (Passes 0.05 cfs of 1.42 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PP3: Porous Pavement 3

Inflow Area = 0.108 ac, 89.00% Impervious, Inflow Depth = 2.65" for 2-Yr event
Inflow = 0.31 cfs @ 12.07 hrs, Volume= 0.024 af
Outflow = 0.06 cfs @ 12.50 hrs, Volume= 0.024 af, Atten= 80%, Lag= 25.6 min
Primary = 0.06 cfs @ 12.50 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 70.50' @ 12.50 hrs Surf.Area= 5,149 sf Storage= 266 cf

Plug-Flow detention time= 25.8 min calculated for 0.024 af (100% of inflow)
Center-of-Mass det. time= 25.8 min (799.8 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1	70.37'	2,060 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 5,149 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.37	5,149	0	0
71.37	5,149	5,149	5,149

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	70.37'	**3.000 in/hr Exfiltration over Surface area above 69.20'** Excluded Surface area = 0 sf
#3	Primary	70.87'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	69.20'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 12.50 hrs HW=70.50' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 7.91 fps)
  - **4=Orifice/Grate** (Passes 0.06 cfs of 0.97 cfs potential flow)
    - **2=Exfiltration** (Passes 0.06 cfs of 0.36 cfs potential flow)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PP4: Porous Pavement 4

Inflow Area = 0.065 ac, 85.54% Impervious, Inflow Depth = 2.55" for 2-Yr event
Inflow = 0.18 cfs @ 12.07 hrs, Volume= 0.014 af
Outflow = 0.07 cfs @ 12.29 hrs, Volume= 0.014 af, Atten= 61%, Lag= 13.4 min
Primary = 0.07 cfs @ 12.29 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 71.40' @ 12.29 hrs Surf.Area= 1,473 sf Storage= 73 cf

Plug-Flow detention time= 5.0 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (786.1 - 781.0)

Volume	Invert	Avail.Storage	Storage Description
#1	71.28'	589 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 1,473 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.28	1,473	0	0
72.28	1,473	1,473	1,473

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	71.28'	**3.000 in/hr Exfiltration over Surface area above 70.11'** Excluded Surface area = 0 sf
#3	Primary	71.78'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	70.11'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 12.29 hrs HW=71.40' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.14 fps)
  - **4=Orifice/Grate** (Passes 0.07 cfs of 0.97 cfs potential flow)
    - **2=Exfiltration** (Passes 0.07 cfs of 0.10 cfs potential flow)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Subcatchment S201: S201

Runoff = 2.22 cfs @ 12.07 hrs, Volume= 0.179 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
12,271	98	Roofs, HSG D
9,127	98	Roofs, HSG C
21,398	98	Weighted Average
21,398		100.00% Impervious Area

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

Summary for Subcatchment S202: S202

Runoff = 0.89 cfs @ 12.07 hrs, Volume= 0.066 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
3,185	98	Paved parking, HSG D
3,505	98	Paved parking, HSG C
1,579	80	>75% Grass cover, Good, HSG D
1,053	74	>75% Grass cover, Good, HSG C
9,322	92	Weighted Average
2,632		28.23% Pervious Area
6,690		71.77% Impervious Area

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

Summary for Subcatchment S203: S203

Runoff = 1.30 cfs @ 12.07 hrs, Volume= 0.103 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
7,931	98	Paved parking, HSG C
4,162	98	Paved parking, HSG D
191	74	>75% Grass cover, Good, HSG C
342	80	>75% Grass cover, Good, HSG D
12,626	97	Weighted Average
533		4.22% Pervious Area
12,093		95.78% Impervious Area

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

Summary for Subcatchment S204: S204

Runoff = 0.63 cfs @ 12.07 hrs, Volume= 0.048 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
1,038	74	>75% Grass cover, Good, HSG C
5,313	98	Paved parking, HSG C
6,351	94	Weighted Average
1,038		16.34% Pervious Area
5,313		83.66% Impervious Area

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

Summary for Subcatchment S205: S205

Runoff = 2.85 cfs @ 12.14 hrs, Volume= 0.246 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
5,415	80	>75% Grass cover, Good, HSG D
4,992	74	>75% Grass cover, Good, HSG C
12,697	98	Paved parking, HSG D
11,718	98	Paved parking, HSG C
34,822	92	Weighted Average
10,407		29.89% Pervious Area
24,415		70.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
2.7	420	0.0167	2.62		**Shallow Concentrated Flow, B to C**
					Paved Kv= 20.3 fps
10.2	470	Total			

Summary for Subcatchment S206A: S206A

Runoff = 2.53 cfs @ 12.07 hrs, Volume= 0.194 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
14,994	98	Paved parking, HSG D
2,860	80	>75% Grass cover, Good, HSG D
5,893	98	Paved parking, HSG C
1,403	74	>75% Grass cover, Good, HSG C
25,150	95	Weighted Average
4,263		16.95% Pervious Area
20,887		83.05% Impervious Area

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

Summary for Subcatchment S206B: S206B

Runoff = 2.57 cfs @ 12.07 hrs, Volume= 0.200 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
3,346	80	>75% Grass cover, Good, HSG D
21,909	98	Paved parking, HSG D
25,255	96	Weighted Average
3,346		13.25% Pervious Area
21,909		86.75% Impervious Area

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

Summary for Subcatchment S206C: S206C

Runoff = 0.48 cfs @ 12.07 hrs, Volume= 0.037 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
517	80	>75% Grass cover, Good, HSG D
4,184	98	Paved parking, HSG D
4,701	96	Weighted Average
517		11.00% Pervious Area
4,184		89.00% Impervious Area

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

Summary for Subcatchment S206D: S206D

Runoff = 0.28 cfs @ 12.07 hrs, Volume= 0.022 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
327	80	>75% Grass cover, Good, HSG D
82	74	>75% Grass cover, Good, HSG C
2,180	98	Paved parking, HSG D
239	98	Paved parking, HSG C
2,828	95	Weighted Average
409		14.46% Pervious Area
2,419		85.54% Impervious Area

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

Summary for Subcatchment S207: S207

Runoff = 0.19 cfs @ 12.08 hrs, Volume= 0.013 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
686	80	>75% Grass cover, Good, HSG D
1,738	74	>75% Grass cover, Good, HSG C
596	70	Woods, Good, HSG C
222	77	Woods, Good, HSG D
3,242	75	Weighted Average
3,242		100.00% Pervious Area

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

Summary for Subcatchment S208: S208

Runoff = 1.00 cfs @ 12.07 hrs, Volume= 0.077 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.60"

Area (sf)	CN	Description
8,139	98	Paved parking, HSG D
338	98	Paved parking, HSG C
891	80	>75% Grass cover, Good, HSG D
585	74	>75% Grass cover, Good, HSG C
9,953	95	Weighted Average
1,476		14.83% Pervious Area
8,477		85.17% Impervious Area

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

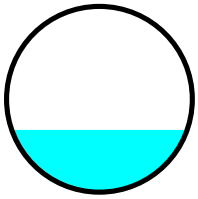
Summary for Reach 1R: Ex. SD

Inflow Area = 0.146 ac, 83.66% Impervious, Inflow Depth = 3.91" for 10-Yr event
Inflow = 0.63 cfs @ 12.07 hrs, Volume= 0.048 af
Outflow = 0.61 cfs @ 12.09 hrs, Volume= 0.048 af, Atten= 3%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.72 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 1.8 min

Peak Storage= 22 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.61 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 95.0' Slope= 0.0054 '/'
Inlet Invert= 67.11', Outlet Invert= 66.60'



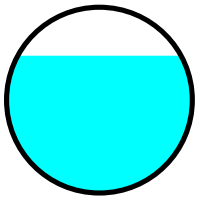
Summary for Reach 2R: Ex. RD

Inflow Area = 0.491 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-Yr event
Inflow = 2.22 cfs @ 12.07 hrs, Volume= 0.179 af
Outflow = 2.18 cfs @ 12.08 hrs, Volume= 0.179 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.53 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 0.8 min

Peak Storage= 39 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.74'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.46 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 63.0' Slope= 0.0048 '/'
Inlet Invert= 67.20', Outlet Invert= 66.90'



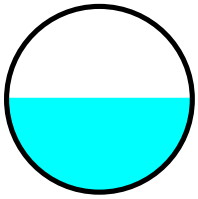
Summary for Reach 3R: Ex. SD

Inflow Area = 2.699 ac, 87.91% Impervious, Inflow Depth > 3.96" for 10-Yr event
Inflow = 1.29 cfs @ 12.55 hrs, Volume= 0.891 af
Outflow = 1.29 cfs @ 12.57 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.23 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 0.9 min

Peak Storage= 38 cf @ 12.56 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.52 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 94.0' Slope= 0.0050 '/'
Inlet Invert= 62.97', Outlet Invert= 62.50'



Summary for Pond 1P: Ex. CB

Inflow Area = 2.699 ac, 87.91% Impervious, Inflow Depth > 3.96" for 10-Yr event
Inflow = 1.29 cfs @ 12.57 hrs, Volume= 0.891 af
Outflow = 1.29 cfs @ 12.57 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.0 min
Primary = 1.29 cfs @ 12.57 hrs, Volume= 0.891 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 63.09' @ 12.57 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	62.40'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.40' / 61.70' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.29 cfs @ 12.57 hrs HW=63.09' (Free Discharge)
1=Culvert (Inlet Controls 1.29 cfs @ 2.23 fps)

Summary for Pond 2P: Ex. VUSF

Inflow Area = 1.369 ac, 90.48% Impervious, Inflow Depth = 4.13" for 10-Yr event
Inflow = 5.94 cfs @ 12.08 hrs, Volume= 0.471 af
Outflow = 1.04 cfs @ 12.53 hrs, Volume= 0.471 af, Atten= 83%, Lag= 27.4 min
Primary = 1.04 cfs @ 12.53 hrs, Volume= 0.471 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.36' @ 12.53 hrs Surf.Area= 5,996 sf Storage= 8,954 cf

Plug-Flow detention time= 248.1 min calculated for 0.471 af (100% of inflow)
Center-of-Mass det. time= 248.2 min (1,010.1 - 761.9)

Volume	Invert	Avail.Storage	Storage Description
#1	66.50'	13,049 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.50	3,670	0	0
67.00	4,261	1,983	1,983
68.00	5,510	4,886	6,868
69.00	6,851	6,181	13,049

Device	Routing	Invert	Outlet Devices
#1	Primary	64.01'	**12.0" Round Culvert**
			L= 273.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 64.01' / 63.07' S= 0.0034 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	67.85'	**9.5" Vert. Orifice/Grate** C= 0.600
#3	Device 2	67.85'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	64.06'	**2.0" Vert. Orifice/Grate** C= 0.600
#5	Device 4	66.50'	**2.410 in/hr Exfiltration over Surface area above 64.06'**
			Excluded Surface area = 0 sf

Primary OutFlow Max=1.04 cfs @ 12.53 hrs HW=68.36' (Free Discharge)
- **1=Culvert** (Passes 1.04 cfs of 4.11 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.82 cfs @ 2.44 fps)
    - **3=Orifice/Grate** (Passes 0.82 cfs of 1.15 cfs potential flow)
  - **4=Orifice/Grate** (Orifice Controls 0.22 cfs @ 9.89 fps)
    - **5=Exfiltration** (Passes 0.22 cfs of 0.33 cfs potential flow)

Summary for Pond 3P: Ex. CB

Inflow Area = 0.360 ac, 76.58% Impervious, Inflow Depth = 3.79" for 10-Yr event
Inflow = 1.49 cfs @ 12.08 hrs, Volume= 0.114 af
Outflow = 1.49 cfs @ 12.08 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min
Primary = 1.49 cfs @ 12.08 hrs, Volume= 0.114 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.15' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.44 cfs @ 12.08 hrs HW=67.14' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 1.44 cfs @ 2.72 fps)

Summary for Pond 4P: Ex. Vortechnics Unit

Inflow Area = 1.010 ac, 95.43% Impervious, Inflow Depth = 4.25" for 10-Yr event
Inflow = 4.45 cfs @ 12.08 hrs, Volume= 0.358 af
Outflow = 4.45 cfs @ 12.08 hrs, Volume= 0.358 af, Atten= 0%, Lag= 0.0 min
Primary = 4.45 cfs @ 12.08 hrs, Volume= 0.358 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.31' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.60'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 66.60' / 66.50' S= 0.0033 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.31 cfs @ 12.08 hrs HW=69.19' (Free Discharge)
- **1=Culvert** (Inlet Controls 4.31 cfs @ 5.49 fps)

Summary for Pond 5P: Ex. CB

Inflow Area = 0.146 ac, 83.66% Impervious, Inflow Depth = 3.91" for 10-Yr event
Inflow = 0.63 cfs @ 12.07 hrs, Volume= 0.048 af
Outflow = 0.63 cfs @ 12.07 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.07 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.00' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	68.54'	**12.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.54' / 67.21' S= 0.0171 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.61 cfs @ 12.07 hrs HW=68.99' (Free Discharge)
1=Culvert (Inlet Controls 0.61 cfs @ 1.79 fps)

Summary for Pond 6P: Ex. CB

Inflow Area = 0.290 ac, 95.78% Impervious, Inflow Depth = 4.25" for 10-Yr event
Inflow = 1.30 cfs @ 12.07 hrs, Volume= 0.103 af
Outflow = 1.30 cfs @ 12.07 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min
Primary = 1.30 cfs @ 12.07 hrs, Volume= 0.103 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.61' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.80'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.80' / 66.60' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.25 cfs @ 12.07 hrs HW=67.59' (Free Discharge)
1=Culvert (Barrel Controls 1.25 cfs @ 2.58 fps)

Summary for Pond 7P: Ex. CB

Inflow Area = 0.720 ac, 95.29% Impervious, Inflow Depth = 4.26" for 10-Yr event
Inflow = 3.17 cfs @ 12.08 hrs, Volume= 0.255 af
Outflow = 3.17 cfs @ 12.08 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
Primary = 3.17 cfs @ 12.08 hrs, Volume= 0.255 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.21' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.70'	**12.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.70' / 66.60' S= 0.0007 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.07 cfs @ 12.08 hrs HW=69.12' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.07 cfs @ 3.91 fps)

Summary for Pond POI1: POI#1

Inflow Area = 0.074 ac, 0.00% Impervious, Inflow Depth = 2.13" for 10-Yr event
Inflow = 0.19 cfs @ 12.08 hrs, Volume= 0.013 af
Primary = 0.19 cfs @ 12.08 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond POI2: POI#2

Inflow Area = 3.499 ac, 83.85% Impervious, Inflow Depth > 3.90" for 10-Yr event
Inflow = 3.35 cfs @ 12.15 hrs, Volume= 1.137 af
Primary = 3.35 cfs @ 12.15 hrs, Volume= 1.137 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond PP1: Porous Pavement 1

Inflow Area = 0.577 ac, 83.05% Impervious, Inflow Depth = 4.02" for 10-Yr event
Inflow = 2.53 cfs @ 12.07 hrs, Volume= 0.194 af
Outflow = 0.10 cfs @ 14.97 hrs, Volume= 0.161 af, Atten= 96%, Lag= 174.0 min
Primary = 0.10 cfs @ 14.97 hrs, Volume= 0.161 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.47' @ 14.97 hrs Surf.Area= 20,887 sf Storage= 5,411 cf

Plug-Flow detention time= 780.7 min calculated for 0.160 af (83% of inflow)
Center-of-Mass det. time= 712.8 min (1,482.3 - 769.5)

Volume	Invert	Avail.Storage	Storage Description
#1	67.82'	8,355 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 20,887 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.82	20,887	0	0
68.82	20,887	20,887	20,887

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Device 4	67.82'	**3.000 in/hr Exfiltration over Surface area above 66.65'** Excluded Surface area = 0 sf
#3	Primary	68.32'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	66.65'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.10 cfs @ 14.97 hrs HW=68.47' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.10 fps)
  - **4=Orifice/Grate** (Passes 0.04 cfs of 1.18 cfs potential flow)
    - **2=Exfiltration** (Passes 0.04 cfs of 1.45 cfs potential flow)
- **3=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.31 fps)

Summary for Pond PP2: Porous Pavement 2

Inflow Area = 0.580 ac, 86.75% Impervious, Inflow Depth = 4.14" for 10-Yr event
Inflow = 2.57 cfs @ 12.07 hrs, Volume= 0.200 af
Outflow = 0.11 cfs @ 14.71 hrs, Volume= 0.200 af, Atten= 96%, Lag= 158.1 min
Primary = 0.11 cfs @ 14.71 hrs, Volume= 0.200 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.99' @ 14.71 hrs Surf.Area= 20,435 sf Storage= 5,209 cf

Plug-Flow detention time= 727.0 min calculated for 0.200 af (100% of inflow)
Center-of-Mass det. time= 726.8 min (1,490.3 - 763.5)

Volume	Invert	Avail.Storage	Storage Description
#1	69.35'	8,174 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 20,435 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
69.35	20,435	0	0
70.35	20,435	20,435	20,435

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	69.35'	**3.000 in/hr Exfiltration over Surface area above 68.18'** Excluded Surface area = 0 sf
#3	Primary	69.85'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	68.18'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.11 cfs @ 14.71 hrs HW=69.99' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 7.12 fps)
  - **4=Orifice/Grate** (Passes 0.06 cfs of 1.18 cfs potential flow)
    - **2=Exfiltration** (Passes 0.06 cfs of 1.42 cfs potential flow)
- **3=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.26 fps)

Summary for Pond PP3: Porous Pavement 3

Inflow Area = 0.108 ac, 89.00% Impervious, Inflow Depth = 4.14" for 10-Yr event
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 0.037 af
Outflow = 0.06 cfs @ 12.59 hrs, Volume= 0.037 af, Atten= 87%, Lag= 31.4 min
Primary = 0.06 cfs @ 12.59 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 70.61' @ 12.59 hrs Surf.Area= 5,149 sf Storage= 501 cf

Plug-Flow detention time= 51.6 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 51.6 min (815.1 - 763.5)

Volume	Invert	Avail.Storage	Storage Description
#1	70.37'	2,060 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 5,149 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.37	5,149	0	0
71.37	5,149	5,149	5,149

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	70.37'	**3.000 in/hr Exfiltration over Surface area above 69.20'** Excluded Surface area = 0 sf
#3	Primary	70.87'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	69.20'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 12.59 hrs HW=70.61' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 8.08 fps)
  - **4=Orifice/Grate** (Passes 0.06 cfs of 1.02 cfs potential flow)
    - **2=Exfiltration** (Passes 0.06 cfs of 0.36 cfs potential flow)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PP4: Porous Pavement 4

Inflow Area = 0.065 ac, 85.54% Impervious, Inflow Depth = 4.02" for 10-Yr event
Inflow = 0.28 cfs @ 12.07 hrs, Volume= 0.022 af
Outflow = 0.07 cfs @ 12.43 hrs, Volume= 0.022 af, Atten= 74%, Lag= 21.4 min
Primary = 0.07 cfs @ 12.43 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 71.59' @ 12.43 hrs Surf.Area= 1,473 sf Storage= 184 cf

Plug-Flow detention time= 12.5 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 12.5 min (782.0 - 769.5)

Volume	Invert	Avail.Storage	Storage Description
#1	71.28'	589 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 1,473 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.28	1,473	0	0
72.28	1,473	1,473	1,473

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	71.28'	**3.000 in/hr Exfiltration over Surface area above 70.11'** Excluded Surface area = 0 sf
#3	Primary	71.78'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	70.11'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 12.43 hrs HW=71.59' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.38 fps)
  - **4=Orifice/Grate** (Passes 0.07 cfs of 1.05 cfs potential flow)
    - **2=Exfiltration** (Passes 0.07 cfs of 0.10 cfs potential flow)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Subcatchment S201: S201

Runoff = 2.81 cfs @ 12.07 hrs, Volume= 0.228 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
12,271	98	Roofs, HSG D
9,127	98	Roofs, HSG C
21,398	98	Weighted Average
21,398		100.00% Impervious Area

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

Summary for Subcatchment S202: S202

Runoff = 1.16 cfs @ 12.07 hrs, Volume= 0.087 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
3,185	98	Paved parking, HSG D
3,505	98	Paved parking, HSG C
1,579	80	>75% Grass cover, Good, HSG D
1,053	74	>75% Grass cover, Good, HSG C
9,322	92	Weighted Average
2,632		28.23% Pervious Area
6,690		71.77% Impervious Area

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

Summary for Subcatchment S203: S203

Runoff = 1.65 cfs @ 12.07 hrs, Volume= 0.132 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
7,931	98	Paved parking, HSG C
4,162	98	Paved parking, HSG D
191	74	>75% Grass cover, Good, HSG C
342	80	>75% Grass cover, Good, HSG D
12,626	97	Weighted Average
533		4.22% Pervious Area
12,093		95.78% Impervious Area

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

Summary for Subcatchment S204: S204

Runoff = 0.81 cfs @ 12.07 hrs, Volume= 0.062 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
1,038	74	>75% Grass cover, Good, HSG C
5,313	98	Paved parking, HSG C
6,351	94	Weighted Average
1,038		16.34% Pervious Area
5,313		83.66% Impervious Area

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

Summary for Subcatchment S205: S205

Runoff = 3.69 cfs @ 12.14 hrs, Volume= 0.325 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
5,415	80	>75% Grass cover, Good, HSG D
4,992	74	>75% Grass cover, Good, HSG C
12,697	98	Paved parking, HSG D
11,718	98	Paved parking, HSG C
34,822	92	Weighted Average
10,407		29.89% Pervious Area
24,415		70.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow, A to B**
					Grass: Short n= 0.150 P2= 3.10"
2.7	420	0.0167	2.62		**Shallow Concentrated Flow, B to C**
					Paved Kv= 20.3 fps
10.2	470	Total			

Summary for Subcatchment S206A: S206A

Runoff = 3.23 cfs @ 12.07 hrs, Volume= 0.251 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
14,994	98	Paved parking, HSG D
2,860	80	>75% Grass cover, Good, HSG D
5,893	98	Paved parking, HSG C
1,403	74	>75% Grass cover, Good, HSG C
25,150	95	Weighted Average
4,263		16.95% Pervious Area
20,887		83.05% Impervious Area

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

Summary for Subcatchment S206B: S206B

Runoff = 3.27 cfs @ 12.07 hrs, Volume= 0.257 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
3,346	80	>75% Grass cover, Good, HSG D
21,909	98	Paved parking, HSG D
25,255	96	Weighted Average
3,346		13.25% Pervious Area
21,909		86.75% Impervious Area

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

Summary for Subcatchment S206C: S206C

Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
517	80	>75% Grass cover, Good, HSG D
4,184	98	Paved parking, HSG D
4,701	96	Weighted Average
517		11.00% Pervious Area
4,184		89.00% Impervious Area

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

Summary for Subcatchment S206D: S206D

Runoff = 0.36 cfs @ 12.07 hrs, Volume= 0.028 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
327	80	>75% Grass cover, Good, HSG D
82	74	>75% Grass cover, Good, HSG C
2,180	98	Paved parking, HSG D
239	98	Paved parking, HSG C
2,828	95	Weighted Average
409		14.46% Pervious Area
2,419		85.54% Impervious Area

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

Summary for Subcatchment S207: S207

Runoff = 0.27 cfs @ 12.08 hrs, Volume= 0.019 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
686	80	>75% Grass cover, Good, HSG D
1,738	74	>75% Grass cover, Good, HSG C
596	70	Woods, Good, HSG C
222	77	Woods, Good, HSG D
3,242	75	Weighted Average
3,242		100.00% Pervious Area

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

Summary for Subcatchment S208: S208

Runoff = 1.28 cfs @ 12.07 hrs, Volume= 0.099 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=5.80"

Area (sf)	CN	Description
8,139	98	Paved parking, HSG D
338	98	Paved parking, HSG C
891	80	>75% Grass cover, Good, HSG D
585	74	>75% Grass cover, Good, HSG C
9,953	95	Weighted Average
1,476		14.83% Pervious Area
8,477		85.17% Impervious Area

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

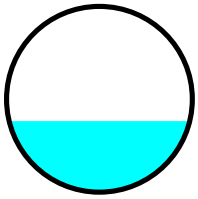
Summary for Reach 1R: Ex. SD

Inflow Area = 0.146 ac, 83.66% Impervious, Inflow Depth = 5.10" for 25-Yr event
Inflow = 0.81 cfs @ 12.07 hrs, Volume= 0.062 af
Outflow = 0.79 cfs @ 12.09 hrs, Volume= 0.062 af, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.91 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 1.7 min

Peak Storage= 26 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.61 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 95.0' Slope= 0.0054 '/'
Inlet Invert= 67.11', Outlet Invert= 66.60'



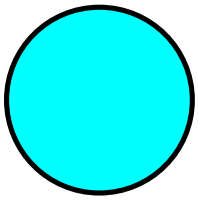
Summary for Reach 2R: Ex. RD

Inflow Area = 0.491 ac,100.00% Impervious, Inflow Depth = 5.56" for 25-Yr event
Inflow = 2.81 cfs @ 12.07 hrs, Volume= 0.228 af
Outflow = 2.46 cfs @ 12.10 hrs, Volume= 0.228 af, Atten= 12%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.57 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 0.8 min

Peak Storage= 51 cf @ 12.08 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.46 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 63.0' Slope= 0.0048 '/'
Inlet Invert= 67.20', Outlet Invert= 66.90'



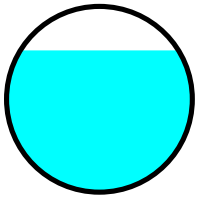
Summary for Reach 3R: Ex. SD

Inflow Area = 2.699 ac, 87.91% Impervious, Inflow Depth > 5.13" for 25-Yr event
Inflow = 2.34 cfs @ 12.52 hrs, Volume= 1.155 af
Outflow = 2.34 cfs @ 12.53 hrs, Volume= 1.155 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.64 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.92 fps, Avg. Travel Time= 0.8 min

Peak Storage= 60 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.52 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 94.0' Slope= 0.0050 '/'
Inlet Invert= 62.97', Outlet Invert= 62.50'



Summary for Pond 1P: Ex. CB

Inflow Area = 2.699 ac, 87.91% Impervious, Inflow Depth > 5.13" for 25-Yr event
Inflow = 2.34 cfs @ 12.53 hrs, Volume= 1.155 af
Outflow = 2.34 cfs @ 12.53 hrs, Volume= 1.155 af, Atten= 0%, Lag= 0.0 min
Primary = 2.34 cfs @ 12.53 hrs, Volume= 1.155 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 63.51' @ 12.53 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	62.40'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.40' / 61.70' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.34 cfs @ 12.53 hrs HW=63.51' (Free Discharge)
1=Culvert (Inlet Controls 2.34 cfs @ 2.97 fps)

Summary for Pond 2P: Ex. VUSF

Inflow Area = 1.369 ac, 90.48% Impervious, Inflow Depth = 5.32" for 25-Yr event
Inflow = 7.26 cfs @ 12.08 hrs, Volume= 0.607 af
Outflow = 1.81 cfs @ 12.46 hrs, Volume= 0.607 af, Atten= 75%, Lag= 22.9 min
Primary = 1.81 cfs @ 12.46 hrs, Volume= 0.607 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.70' @ 12.46 hrs Surf.Area= 6,443 sf Storage= 11,029 cf

Plug-Flow detention time= 220.5 min calculated for 0.607 af (100% of inflow)
Center-of-Mass det. time= 220.7 min (977.6 - 756.9)

Volume	Invert	Avail.Storage	Storage Description
#1	66.50'	13,049 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.50	3,670	0	0
67.00	4,261	1,983	1,983
68.00	5,510	4,886	6,868
69.00	6,851	6,181	13,049

Device	Routing	Invert	Outlet Devices
#1	Primary	64.01'	**12.0" Round Culvert**
			L= 273.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 64.01' / 63.07' S= 0.0034 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	67.85'	**9.5" Vert. Orifice/Grate** C= 0.600
#3	Device 2	67.85'	**15.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	64.06'	**2.0" Vert. Orifice/Grate** C= 0.600
#5	Device 4	66.50'	**2.410 in/hr Exfiltration over Surface area above 64.06'**
			Excluded Surface area = 0 sf

Primary OutFlow Max=1.81 cfs @ 12.46 hrs HW=68.70' (Free Discharge)
└**1=Culvert** (Passes 1.81 cfs of 4.27 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 1.59 cfs @ 3.23 fps)
    └**3=Orifice/Grate** (Passes 1.59 cfs of 2.77 cfs potential flow)
  └**4=Orifice/Grate** (Orifice Controls 0.22 cfs @ 10.27 fps)
    └**5=Exfiltration** (Passes 0.22 cfs of 0.36 cfs potential flow)

Summary for Pond 3P: Ex. CB

Inflow Area = 0.360 ac, 76.58% Impervious, Inflow Depth = 4.96" for 25-Yr event
Inflow = 1.92 cfs @ 12.08 hrs, Volume= 0.149 af
Outflow = 1.92 cfs @ 12.08 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min
Primary = 1.92 cfs @ 12.08 hrs, Volume= 0.149 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.27' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.50'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.86 cfs @ 12.08 hrs HW=67.25' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 1.86 cfs @ 2.95 fps)

Summary for Pond 4P: Ex. Vortechnics Unit

Inflow Area = 1.010 ac, 95.43% Impervious, Inflow Depth = 5.45" for 25-Yr event
Inflow = 5.42 cfs @ 12.07 hrs, Volume= 0.458 af
Outflow = 5.42 cfs @ 12.07 hrs, Volume= 0.458 af, Atten= 0%, Lag= 0.0 min
Primary = 5.42 cfs @ 12.07 hrs, Volume= 0.458 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 70.37' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.60'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 66.60' / 66.50' S= 0.0033 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.24 cfs @ 12.07 hrs HW=70.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.24 cfs @ 6.68 fps)

Summary for Pond 5P: Ex. CB

Inflow Area = 0.146 ac, 83.66% Impervious, Inflow Depth = 5.10" for 25-Yr event
Inflow = 0.81 cfs @ 12.07 hrs, Volume= 0.062 af
Outflow = 0.81 cfs @ 12.07 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min
Primary = 0.81 cfs @ 12.07 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.06' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	68.54'	**12.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.54' / 67.21' S= 0.0171 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.78 cfs @ 12.07 hrs HW=69.05' (Free Discharge)
1=Culvert (Inlet Controls 0.78 cfs @ 1.92 fps)

Summary for Pond 6P: Ex. CB

Inflow Area = 0.290 ac, 95.78% Impervious, Inflow Depth = 5.44" for 25-Yr event
Inflow = 1.65 cfs @ 12.07 hrs, Volume= 0.132 af
Outflow = 1.65 cfs @ 12.07 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.0 min
Primary = 1.65 cfs @ 12.07 hrs, Volume= 0.132 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 67.75' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.80'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.80' / 66.60' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.59 cfs @ 12.07 hrs HW=67.72' (Free Discharge)
1=Culvert (Barrel Controls 1.59 cfs @ 2.74 fps)

Summary for Pond 7P: Ex. CB

Inflow Area = 0.720 ac, 95.29% Impervious, Inflow Depth = 5.45" for 25-Yr event
Inflow = 3.71 cfs @ 12.08 hrs, Volume= 0.327 af
Outflow = 3.71 cfs @ 12.08 hrs, Volume= 0.327 af, Atten= 0%, Lag= 0.0 min
Primary = 3.71 cfs @ 12.08 hrs, Volume= 0.327 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 69.82' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	66.70'	**12.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.70' / 66.60' S= 0.0007 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.66 cfs @ 12.08 hrs HW=69.77' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.66 cfs @ 4.66 fps)

Summary for Pond POI1: POI#1

Inflow Area = 0.074 ac, 0.00% Impervious, Inflow Depth = 3.11" for 25-Yr event
Inflow = 0.27 cfs @ 12.08 hrs, Volume= 0.019 af
Primary = 0.27 cfs @ 12.08 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond POI2: POI#2

Inflow Area = 3.499 ac, 83.85% Impervious, Inflow Depth > 5.07" for 25-Yr event
Inflow = 5.11 cfs @ 12.17 hrs, Volume= 1.479 af
Primary = 5.11 cfs @ 12.17 hrs, Volume= 1.479 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond PP1: Porous Pavement 1

Inflow Area = 0.577 ac, 83.05% Impervious, Inflow Depth = 5.21" for 25-Yr event
Inflow = 3.23 cfs @ 12.07 hrs, Volume= 0.251 af
Outflow = 0.23 cfs @ 13.27 hrs, Volume= 0.215 af, Atten= 93%, Lag= 71.8 min
Primary = 0.23 cfs @ 13.27 hrs, Volume= 0.215 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 68.59' @ 13.27 hrs Surf.Area= 20,887 sf Storage= 6,415 cf

Plug-Flow detention time= 635.6 min calculated for 0.215 af (86% of inflow)
Center-of-Mass det. time= 573.1 min (1,336.6 - 763.5)

Volume	Invert	Avail.Storage	Storage Description
#1	67.82'	8,355 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 20,887 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.82	20,887	0	0
68.82	20,887	20,887	20,887

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Device 4	67.82'	**3.000 in/hr Exfiltration over Surface area above 66.65'** Excluded Surface area = 0 sf
#3	Primary	68.32'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	66.65'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.23 cfs @ 13.27 hrs HW=68.59' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.30 fps)
  - **4=Orifice/Grate** (Passes 0.04 cfs of 1.23 cfs potential flow)
    - **2=Exfiltration** (Passes 0.04 cfs of 1.45 cfs potential flow)
- **3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 1.76 fps)

Summary for Pond PP2: Porous Pavement 2

Inflow Area = 0.580 ac, 86.75% Impervious, Inflow Depth = 5.33" for 25-Yr event
Inflow = 3.27 cfs @ 12.07 hrs, Volume= 0.257 af
Outflow = 0.24 cfs @ 13.14 hrs, Volume= 0.257 af, Atten= 93%, Lag= 64.4 min
Primary = 0.24 cfs @ 13.14 hrs, Volume= 0.257 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 70.11' @ 13.14 hrs Surf.Area= 20,435 sf Storage= 6,241 cf

Plug-Flow detention time= 629.7 min calculated for 0.257 af (100% of inflow)
Center-of-Mass det. time= 627.8 min (1,385.9 - 758.0)

Volume	Invert	Avail.Storage	Storage Description
#1	69.35'	8,174 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 20,435 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
69.35	20,435	0	0
70.35	20,435	20,435	20,435

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	69.35'	**3.000 in/hr Exfiltration over Surface area above 68.18'** Excluded Surface area = 0 sf
#3	Primary	69.85'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	68.18'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.24 cfs @ 13.14 hrs HW=70.11' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 7.32 fps)
  - **4=Orifice/Grate** (Passes 0.06 cfs of 1.23 cfs potential flow)
    - **2=Exfiltration** (Passes 0.06 cfs of 1.42 cfs potential flow)
- **3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 1.75 fps)

Summary for Pond PP3: Porous Pavement 3

Inflow Area = 0.108 ac, 89.00% Impervious, Inflow Depth = 5.33" for 25-Yr event
Inflow = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af
Outflow = 0.06 cfs @ 12.75 hrs, Volume= 0.048 af, Atten= 89%, Lag= 40.8 min
Primary = 0.06 cfs @ 12.75 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 70.71' @ 12.75 hrs Surf.Area= 5,149 sf Storage= 701 cf

Plug-Flow detention time= 75.6 min calculated for 0.048 af (100% of inflow)
Center-of-Mass det. time= 75.6 min (833.6 - 758.0)

Volume	Invert	Avail.Storage	Storage Description
#1	70.37'	2,060 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 5,149 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.37	5,149	0	0
71.37	5,149	5,149	5,149

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	70.37'	**3.000 in/hr Exfiltration over Surface area above 69.20'** Excluded Surface area = 0 sf
#3	Primary	70.87'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	69.20'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 12.75 hrs HW=70.71' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 8.21 fps)
  - **4=Orifice/Grate** (Passes 0.06 cfs of 1.06 cfs potential flow)
    - **2=Exfiltration** (Passes 0.06 cfs of 0.36 cfs potential flow)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PP4: Porous Pavement 4

Inflow Area = 0.065 ac, 85.54% Impervious, Inflow Depth = 5.21" for 25-Yr event
Inflow = 0.36 cfs @ 12.07 hrs, Volume= 0.028 af
Outflow = 0.08 cfs @ 12.48 hrs, Volume= 0.028 af, Atten= 79%, Lag= 24.8 min
Primary = 0.08 cfs @ 12.48 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 71.77' @ 12.48 hrs Surf.Area= 1,473 sf Storage= 287 cf

Plug-Flow detention time= 20.1 min calculated for 0.028 af (100% of inflow)
Center-of-Mass det. time= 20.1 min (783.7 - 763.5)

Volume	Invert	Avail.Storage	Storage Description
#1	71.28'	589 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 1,473 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.28	1,473	0	0
72.28	1,473	1,473	1,473

Device	Routing	Invert	Outlet Devices
#1	Primary	67.75'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Device 4	71.28'	**3.000 in/hr Exfiltration over Surface area above 70.11'** Excluded Surface area = 0 sf
#3	Primary	71.78'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	70.11'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 12.48 hrs HW=71.77' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 9.59 fps)
  - **4=Orifice/Grate** (Passes 0.08 cfs of 1.12 cfs potential flow)
    - **2=Exfiltration** (Passes 0.08 cfs of 0.10 cfs potential flow)
- **3=Orifice/Grate** (Controls 0.00 cfs)

ATTACHMENT E

WATER QUALITY TREATMENT SUMMARY

90 Johnson Road Stormwater Management Summary

Subarea ID	New Development			Redevelopment			Treated New Impervious Area (sf)	Treated New Landscaped Area (sf)	Treated Redeveloped Impervious Area (sf)	Treated Redeveloped Landscaped Area (sf)
	Impervious Area (sf)	Landscaped Area (sf)	Total Developed Area (sf)	Impervious Area (sf)	Landscaped Area (sf)	Total Redeveloped Area (sf)				
S201	0	0	0	21,396	0	21,396	0	0	21,396	0
S202	0	0	0	1,320	1,105	2,425	0	0	1,320	1,105
S203	0	0	0	12,093	507	12,600	0	0	12,093	507
S204	0	0	0	1,993	807	2,800	0	0	1,993	807
S208	0	0	0	8,477	1,476	9,953	0	0	8,477	1,476
S205	478	0	478	5,999	4,692	10,691	0	0	0	0
S206A	20,887	4,263	25,150	0	0	0	20,887	4,263	0	0
S206B	16,595	2,382	18,977	5,529	749	6,278	16,595	2,382	5,529	749
S206C	0	0	0	4,184	517	4,701	0	0	4,184	517
S206D	0	0	0	2,419	409	2,828	0	0	2,419	409
S207	0	2,424	2,424	0	0	0	0	0	0	0
Total (sf)	**37,960**	**9,069**	**47,029**	**63,410**	**10,262**	**73,672**	**37,482**	**6,645**	**57,411**	**5,570**
Total (ac)	**0.87**	**0.21**	**1.08**	**1.46**	**0.24**	**1.69**	**0.86**	**0.15**	**1.32**	**0.13**

BMP Summary

Subarea ID	Treatment Method	Water Quality Volume Required (cf)	Water Quality Volume Provided (cf)	BMP Surface Area Required (sf)	BMP Surface Area Provided (sf)
S201 S202 S203 S204 S208	Existing Vegetated Underdrained Filter	3,903	4,801	2,342	3,670
S205	Untreated	N/A	N/A	N/A	N/A
S206A	Porous Pavement 1	1,883	4,177	N/A	20,887
S206B	Porous Pavement 2	1,948	4,087	N/A	20,435
S206C	Porous Pavement 3	366	1,030	N/A	5,149
S206D	Porous Pavement 4	215	295	N/A	1,473

Treatment Summary

	Required	Provided
Treated New Impervious (%)	95%	98.74%
Treated New Developed (%)	80%	93.83%
Treated Redev Impervious (%)	N/A	90.54%
Treated Redev Developed (%)	60%	85.49%

ATTACHMENT F

DRAWDOWN COMPUTATIONS

Drawdown Calculation - Porous Pavement #1

Orifice Diameter =1 in

Elev. (ft)	Depth (ft)	Surface Area (sq.ft)	Ave. End Area (sq.ft)	End Area Depth (ft)	Incremental Volume (cf)	Head, h (ft)	Orifice Flow (cfs)	Drawdown Time (secs)	Drawdown Time (hours)
68.32	0.50	20,887	20887.00	0.25	2088.70	1.67	0.0339	61625.73	17.118
68.07	0.25	20,887	20887.00	0.25	2088.70	1.42	0.0312	66841.31	18.567
67.82	0.00	20,887	0.00	0.00	0.00	1.17	0.0284	0.00	0.000
								TOTAL	***35.685***

Orifice Formula	$CA\ (2gh)^{1/2}$	
Orifice Diameter:	1	inch
A:	0.005454	sq.ft
Filter Thickness:	1.167	feet
g:	32.174	ft/s^2
C:	0.6	Orifice/Grate

Drawdown Calculation - Porous Pavement #2, #3, & #4

Orifice Diameter =1.25 in

Elev. (ft)	Depth (ft)	Surface Area (sq.ft)	Ave. End Area (sq.ft)	End Area Depth (ft)	Incremental Volume (cf)	Head, h (ft)	Orifice Flow (cfs)	Drawdown Time (secs)	Drawdown Time (hours)
69.85	0.50	27,057	27057.00	0.25	2705.70	1.67	0.0530	51091.15	14.192
69.60	0.25	27,057	27057.00	0.25	2705.70	1.42	0.0488	55415.15	15.393
69.35	0.00	27,057	0.00	0.00	0.00	1.17	0.0443	0.00	0.000
								TOTAL	***29.585***

Orifice Formula	$CA\ (2gh)^{1/2}$	
Orifice Diameter:	1.25	inch
A:	0.008522	sq.ft
Filter Thickness:	1.167	feet
g:	32.174	ft/s^2
C:	0.6	Orifice/Grate

ATTACHMENT G

REDEVELOPMENT COMPUTATIONS

Redevelopment Treatment Calculation						
	Existing Condition			Proposed Condition		
Pollutant Ranking	Area (sf)	Area (ac)	Impact Rating	Area (sf)	Area (ac)	Impact Rating
0	0	0	0	0	0	0
1	0	0	0	0	0.00	0.00
2	21,615	0.50	0.99	18,240	0.42	0.84
3	51,943	1.19	3.58	55,318	1.27	3.81
4	0	0.00	0.00	0	0.00	0.00
5	0	0	0	0	0	0
Total	**73,558**	**1.69**	**4.57**	**73,558**	**1.69**	**4.65**

Redevelopment Treatment Summary	
Total Redevelopment Area (ac)	1.69
Existing Impact Rating	4.57
Proposed Impact Rating	4.65
Existing Ranked Impact	2.71
Proposed Ranked Impact	2.75
Resultant Ranked Impact Change	0.05
Redeveloped Area Treatment	**60%**

ATTACHMENT H

STORMWATER OPERATIONS & MAINTENANCE MANUAL

OPERATION AND MAINTENANCE MANUAL FOR STORMWATER MANAGEMENT AND RELATED STORMWATER FACILITIES

90 JOHNSON ROAD PROPERTY
90 JOHNSON ROAD
PORTLAND, MAINE

PREPARED FOR

TRANSPORT LEASING CORP.
58 LOWELL JUNCTION ROAD
ANDOVER, MA 01810

PREPARED BY

STANTEC CONSULTING SERVICES, INC.
482 PAYNE ROAD
SCARBOROUGH, MAINE 04074
(207) 883-3355

JULY 2018

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APPENDICES

I. INTRODUCTION

Relatively complex stormwater management facilities are commonly installed in development projects including, commercial facilities, and many other developments. The complexity and goals of these systems vary with the nature of the receiving water, as well as the type of development. Runoff from developed areas of the project, including rooftops, paved, or lawn areas typically contain materials that can impact the receiving waters. Source control and the installation of bio-retention facilities and pervious surfaces are often combined with pretreatment measures or vegetated buffer strips. Other best management practices are also among the options that can significantly reduce the non-point pollution discharge from the developed area. These measures are particularly important to projects in the watersheds of sensitive water bodies, or projects with potential impacts to groundwater. With the increased cost of land and development, there is an increased tendency to construct portions of the stormwater management systems underground.

The effectiveness of water quality management provisions and other components of the stormwater management system are dependent on their design, upkeep, and maintenance to assure they meet their intended function over an extended period of years. It is critical that the stormwater management facilities are regularly inspected, and that maintenance is performed on an as-needed basis. It must also be recognized that the effectiveness of these facilities, and their maintenance requirements, are related to the stormwater drainage facilities that collect and transport the flow to the ponds, infiltration galleries, and other treatment measures. Thus, maintenance should be directed to the total system, not just the collection system or primary stormwater management facility.

The purpose of this document is to define, in detail, the inspection and maintenance requirements deemed necessary to assure that the stormwater management facilities function as intended when they were designed. Subsequent sections identify individual maintenance items, give a brief commentary of the function and need for the item, a description of the work required, and a suggested frequency of accomplishment. While the suggested programs and schedules must be adapted to specific projects, the material presented should provide guidance for a successful long-term program for operation and maintenance. Certain facilities, specifically the potential water quality volume storage or treatment measures such as bio-retention cells and pervious surfaces are not intended to be placed in service until the tributary catchment area has the permanent cover in place and any contributing turf areas have achieved a 90% catch of vegetation (i.e. established).

A. GUIDELINES OVERVIEW

A summary of the individual components of stormwater management facilities for this project has been prepared. The format used in the summary is as follows:

Preface: A general description of what function/benefit the element is intended to provide. This is a short summary and not intended to provide the design basis, which can be found in other sources.

Inspection: This section provides the inspection requirements for the individual component.

Maintenance: The section provides general information on the routine maintenance requirements of this element.

Frequency: This section outlines the best judgment of the designer on the system to the frequency of maintenance.

Comments: This section provides any particular comment on the site-specific features of this element. This is a summary only. The owner/operator should review the design drawings and documents carefully to understand the particular elements of the project. The end of this section should allow the owner/operator to make notes on the specific program. This may include the selected maintenance procedure, cross-references to applicable design drawings, etc.

A list of the individual inspection/maintenance elements is provided in the table of contents. The guidelines are proposed for initial use with adjustments made as appropriate based upon specific project experience.

This report includes the Operation and Maintenance requirements for any potential BMP identified in the Stormwater Management Report for this project.

B. RESPONSIBLE PARTY

The responsible party for operation and maintenance of the stormwater and other site infrastructure will be Transport Leasing Corp., or their agents or assigns.

II. PROJECT OVERVIEW

Key permits issued (or applied for) on the project include:

- MaineDEP Stormwater Permit through the City of Portland Delegated Authority
- City of Portland Level III Site plan and Subdivision Review

A copy of the permits and Stormwater Management Report should be appended to this manual as Appendix B. The Owner/Operator of the stormwater management system should review these permits for a general description and background of the project, as well as any specific permit conditions or requirements of the project.

The applicant has retained Stantec for civil engineering for the development project. Stantec has prepared the design for the stormwater management facilities and may be contacted at:

Stantec
482 Payne Road
Scarborough, ME 04074
(207) 887.3478

It is recommended the preparer of the plan be contacted with any particular questions on the design intent or similar issues.

The applicable plans and design documents which apply to the project are:

1. Civil Site Plans Prepared by Stantec.
2. The Erosion Control/Sedimentation Control Plan for the project.
3. The Stormwater Management Plan for the project.

A copy of these documents should be retained with this manual.

The proposed design includes pervious pavement and stormwater conveyance lines. There are existing inlets, manholes, outlet control structures, conveyance lines, pretreatment devices, and a vegetated filter that will be utilized for stormwater management for the proposed project.

III. STANDARD INSPECTION/MAINTENANCE DESCRIPTIONS

The following narratives describe the inspection/maintenance provisions for the Stormwater Management system. These O&M procedures will complement scheduled sweeping of the parking lots which is anticipated to occur at least twice per year. Proper O&M is necessary to make sure the system will provide its intended purpose of conveying runoff, removing a substantial amount of the suspended solids, and other contaminants in the stormwater runoff.

A. STORMWATER INLETS

Preface: The success of any stormwater facility relies on the ability to intercept stormwater runoff at the design locations. Stormwater inlets may include catch basins, open culverts, culverts with bar screens, roof scuppers, plaza scuppers, trench drains, and field inlets. Inlets exist throughout the proposed systems.

Inspection: The inspection of inlet points will need to be coordinated with other maintenance items, these include:

- Landscape services
- Building maintenance areas
- Grounds maintenance

The key elements of the inspection are to assure the inlet entry point is clear of debris and will allow the intended water entry.

Maintenance: The key maintenance is the removal of any blockage which restricts the entry of stormwater to the inlet. The removed material should be taken out of the area of the inlet and placed where it will not reenter the runoff collection system. Snow should be removed from inlets

on parking lots or plaza areas. Grass clippings and leaves should be bagged and removed particularly near the yard inlets near the buildings.

Frequency: All inlets should be inspected on a quarterly basis, and after/during significant storm events.

Maintenance Personnel: The maintenance personnel will perform the normal maintenance/ inspections of the inlets and tributary drainage system.

Comments: Maintenance of inlets is critical on this project.

B. TRIBUTARY DRAINAGE SYSTEM

Preface: Stormwater from most of the project will be directed through a conveyance system which transports the flow to a public system within Johnson Road. This conveyance system will be principally overland flow and/or infiltration through porous pavement that discharges to piped drain systems. Most of the sediment is carried by the drainage system is intended to be trapped near the inlets or in pretreatment devices such as an existing Vortechnics hydrodynamic separator. Maintenance of this system can play a key role in the long-term maintenance costs and the effectiveness of the onsite systems.

Inspection: The tributary drainage system should be periodically inspected to assure that it is operating as intended, and that its carrying capacity has not been diminished by accumulations of debris and sediment or other hydraulic impediments. On piped systems, the inlets must be inspected to ensure the rims are set at the proper elevation to optimize flow entry and are not clogged with debris. The inlet catch basins will be equipped with sumps and hooded outlets which will remove gross floatables and large sediment particles from the flow stream. These must be cleaned on an as-needed basis.

The level of sediment in the sumps or hydrodynamic separator should be checked to assure their effectiveness. Pipelines connecting the inlets should be checked to determine if siltation is occurring. This will be most critical on drain lines laid at minimal slopes. This can usually be accomplished by a light and mirror procedure.

Maintenance: Maintenance of the storm drainage system must assure that it continues to serve its design function on a long-term basis, and that its operation does not transport excessive sedimentation to any downstream BMP or the receiving waters. Elevations on the rim of catch basins should be adjusted as needed to assure optimal water entry. Depending on the frost susceptibility of the soil, the rims may become elevated over time causing flow to circumvent the inlet. If a temporary filter bag has been designated for the inlet during construction, silt or other deleterious materials, can significantly reduce capacity and the bags should be removed with the sediment and replaced during construction. Catch basin cleaning would normally be accomplished with vacuum trucks contracted as a maintenance service for the Development. The removed material must be disposed of at an approved site for such materials.

If sediment in the pipeline is observed, it should be removed. This may be accomplished by hydraulic flushing, or by mechanical means. If hydraulic flushing is used the downstream conditions should be analyzed.

Frequency: The piped drainage system should be inspected on an annual basis. Adjustment of inlet rim elevations should be on an as needed basis. Cleaning catch basin sumps, hydrodynamic separator, and pipelines will depend on the rate of accumulation.

Maintenance/Inspection Responsibility:

Maintenance Personnel: A hired 3rd party maintenance crew as retained by the applicant, their agents or assigns.

Special Services: The owner may elect to contract with an independent agent for cleaning of catch basins, sumps, and pipelines. Remedial source control measures may be performed by the owner or an outside service depending upon the nature of the particular situation.

Comments: Maintenance of inlets and catch basins is of utmost importance to the project to avoid unintended release of sediments or related materials in the runoff flow stream.

C. POROUS PAVEMENT

Preface: The porous pavement collects stormwater runoff from the surface before passing it through a treatment section and discharging into a closed drainage system.

Inspection: The pavement should be inspected regularly to ensure that the surface is not clogged, and that runoff can pass freely through the porous section. The asphalt surface must be inspected for integrity and to ensure rutting or deformation of the surface is minimized.

Maintenance: Any debris should be removed from the pavement surface. If the porous pavement area is holding water in excess of 48-72 hours corrective action is needed. To correct a standing water problem, the following remedial actions are recommended:

1. Vacuum any sediment or debris from the pavement surface on a semi-annual basis
2. Ensure the underdrain system is not clogged with any silt or other materials.
3. Ensure that the porous pavement can pass water freely and drain quickly while handling large amounts of water.

Frequency: The porous pavement should be inspected and vacuumed semi-annually and maintained as needed.

Maintenance/Inspection Responsibility: The Owner or an outside agent is responsible for inspection and maintenance of the porous pavement areas.

D. WATER QUALITY FILTERS (ABOVE GROUND)

Preface: The soil filter is an underdrain system with multi-media aggregates. This section is applicable to the existing underdrained grass soil filter.

Inspection: The soil filter can be inspected visually. A good time for inspection is within one day of a substantial rain event.

Maintenance: The procedures for maintenance are as follows:

Inlets

Inlets to each soil filter area should be kept open and in good working condition. This is particularly important around curb breaks and pavement edges. These locations should be marked on the roadway at the completion of construction to allow for winter snow dam removal. All eroded areas should be repaired.

Initial Turf Maintenance (when applicable)

Grassed soil filters should be allowed to develop for one full growing season post-construction prior to their first mowing or replacement of vegetation. This allows for natural re-seeding of grass seed mixes and establishment of a healthy stand of grass or plant materials.

Long-Term Turf Maintenance (when applicable)

It is preferable to only mow grassed soil filters two to three times per year. While grassed soil filters can be mown during routine lawn maintenance, excessive mowing reduces the viability of grasses and grass roots and can over-compact the surface layer of the soil filter media.

Large Debris

Large debris, trash etc. within the ponding area should be removed on a routine basis.

Erosion in the Soil Filter Area

Any eroded areas should be repaired as soon as practicable.

Weeds in the Soil Filter Area

Periodic weeding of the soil filter area may be necessary, particularly in the landscaped soil filters. Hand weeding is required as the use of herbicides is not recommended.

Surface Mulch Layer (when applicable)

Areas devoid of mulch should be re-mulched by hand. Every year, in the spring, a fresh layer of mulch should be added to the soil filter area.

Sedimentation (or Clogging) of Soil Filter Area

If the soil filter area is holding water for a period longer than 48-72 hours, the soil mix has, more than likely, become clogged with sediment and/or the underdrains have clogged. To correct a standing water problem, the following remedial actions are recommended:

1. Evaluate the drainage area to the soil filter area to identify any potential sources of sediment, such as an erosive condition, that may be contributing to the clogging of the device. If a source is identified, it is recommended that that source be eliminated to the fullest extent practicable before proceeding with the remaining recommendations provided below.
2. Flush the underdrains. Use cleanouts to flush the underdrains. Sediment in the drains may be preventing the soil mix from draining. Make sure to provide a way to capture any flushed sediment before it enters the stream environment or storm drain system downstream of the device. If, after flushing the underdrains, the device continues to hold water, the soil mix may be contaminated. As such, following the guidelines provided below is recommended.
3. Gage the extent of soil contamination. To do this, it is recommended that one or more test pits be dug with a shovel and that the soil layer be evaluated for contamination. Once the levels of contamination have been determined (for example, the top 4" of soil appears to be contaminated), it is recommended that you proceed with the remaining remedial actions.
4. Harvest the plants (when applicable). Care should be taken in the removal and temporary storage of the plants so that as many as possible can be harvested for replanting in the soil filter area once the functioning of the device has been restored sufficiently.
5. Remove the mulch layer.
6. Remove the top few inches of contaminated soil plus an additional 2-inch of soil and replace the removed soil with a clean soil mix in accordance with the soil mix specification applicable to the particular soil filter area.
7. Monitor the functioning of the soil filter area during the next two to three rain events. If the device appears to be draining as intended (e.g., there is no standing water 48-72 following a rain event), proceed with the remaining remedial actions. If the area continues to hold standing

water, then the entire soil filter area soil mix and the underdrains may need to be removed and replaced. Reuse of any undamaged underdrains may be possible once they have been cleaned thoroughly.

8. Replant the harvested plants and replace any plants that were rendered unusable during or following their removal from the soil filter area.
9. Replace the removed mulch layer with fresh mulch.
10. Water the plants in the soil filter for the next two or more weeks unless there is sufficient rainfall. This will help the plants to re-establish themselves.

Frequency: The water quality filter should be inspected semi-annually and maintained as needed.

Applicability: The development has one existing filter.

Snow storage within the filters should be prohibited by Maintenance Personnel.

E. LITTER

Litter should be removed as a matter of course by workers and as part of the grounds maintenance contract.

F. SUMMARY CHECKLIST

The above described inspection and maintenance items have been summarized on a checklist attached hereto as Appendix C.

IV. PROGRAM ADMINISTRATION

A. GENERAL

A reliable administrative structure must be established to assure implementation of the maintenance programs described in the foregoing section. Key factors that must be considered in establishing a responsive administrative structure include:

1. Administrative body must be responsible for long-term operation and maintenance of the facilities.

2. Administrative body must have the financial resources to accomplish the inspection and maintenance program over the life of the facility.

3. The administrative body must have a responsible administrator to manage the inspection and maintenance programs.

4. The administrative body must have the staff to accomplish the inspection and maintenance programs or must have authority to contract for the required services.

5. The administrative body must have a management information system sufficient to file, retain, and retrieve all inspection and maintenance records associated with the inspection and maintenance programs.

6. A qualified post construction inspector shall be retained by the Owner. His duties shall include preparing schedules for the Owner's maintenance, summarizing the results of this maintenance and preparing an annual report on the operation, maintenance, and repair of the stormwater system which must be copied to the City. (The Owner shall be responsible for retaining a separate entity to perform maintenance which cannot be performed by the management of building and property grounds.) This person shall also participate in troubleshooting of the stormwater management system if a problem develops.

If any of the above criteria cannot be met by the entity assigned inspection and maintenance responsibilities, it is likely that the system will fail to meet its water quality objectives at some point during its life. While each of the above criteria may be met by a variety of formats, it is critical to clearly establish the assigned administrative body in a responsible and sustainable manner.

B. RECORD KEEPING

Records of all inspections and maintenance work accomplished must be kept and maintained to document facility operations. These records should be filed and retained for a minimum 5-year time span. The filing system should be capable of ready retrieval of data for periodic reviews by appropriate regulatory bodies. Where possible, copies of such records should also be filed with the designated primary regulatory agency for their review for compliance with permit conditions. Typical inspection and maintenance record forms are attached hereto as Appendix B.

C. CONTRACT SERVICES

In some instances, or at specific times, the Maintenance Personnel may not have the staff to conduct the required inspection and/or maintenance programs as outlined in this document. In such cases, the work should be accomplished on a contractual basis with a firm or organization that has the staff and equipment to accomplish the required work.

The service contract for inspection and maintenance should be formal, well written legal document which clearly defines the services to be provided, the contractual conditions that will apply, and detailed payment schedules. Liability insurance should be required in all contracts.

APPENDIX A

Sample Inspection Logs

90 JOHNSON ROAD
PORTLAND, MAINE

STORMWATER MANAGEMENT
WATER QUALITY STORAGE OR WET POND
ANNUAL INSPECTION & MAINTENANCE LOG

FACILITY:		**YEAR:**	
LOCATION:		**CONTRACTOR:**	
FUNCTION:		**INSPECTOR:**	
DATE OF INSPECTION:			
ITEM IDENTIFICATION	**DESCRIPTION OF CONDITIONS**	**MAINTENANCE ACCOMPLISHED**	**DATE OF MAINTENANCE**
GENERAL COMMENTS:			

SAMPLE

90 JOHNSON ROAD
PORTLAND, MAINE

STORMWATER MANAGEMENT
SEMI-ANNUAL INSPECTION & MAINTENANCE LOG

SEMI-ANNUAL INSPECT 1.2	FACILITY:
DATE:	LOCATION:
INSPECTOR:	FUNCTION:
SURFACE CONDITION:	
OUTLET CONDITION	

DEVICE/STRUCTURE	EST. DEPTH SED.	REMOVED? Y/N	EST. VOL. CY	WHERE DISPOSED OF	STRUCTURAL CONDITION

CONTROL STRUCTURE:
DESCRIBE CONDITIONS FOUND & MAINTENANCE ACCOMPLISHED:

APPENDIX B

Permits for Project

(To be Added at a Subsequent Time)

APPENDIX C

Summary Checklist
Inspection and Maintenance

Stormwater Management System Maintenance Program Summary Checklist						
		Frequency				
Item	**Commentary**	**Monthly**	**Quarterly**	**Semi-Annual**	**Annual**	**Long Term**
Stormwater Inlets	Stormwater inlets allow flow entry from a surface swale to a piped system. Entry may or may not be equipped with a bar rack. Inspect entry for debris accumulation. Remove debris to allow unimpeded entry. Lawn clippings and leaves should be removed from yard areas.		X		X Clearing	
Tributary Drainage System	Inspect to assure that the carrying capacity has not been diminished by debris, sediment or other hydraulic impediments.				X	
Porous Pavement	Pavement areas should be inspected and vacuumed semi-annually and maintained as needed.			X		
Water Quality Filters	Filters should be inspected semi-annually and maintained as needed. **Snow storage within the filter should be prohibited by Maintenance Personnel.**			X		
Litter	Litter should be removed daily.					