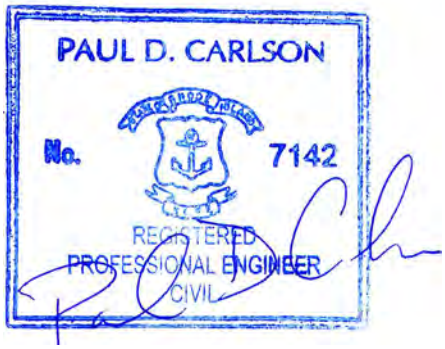
STORMWATER MANAGEMENT NARRATIVE

"BEEF BARN"

200 Industrial Drive
North Smithfield, Rhode Island

January 28, 2020



Prepared for:
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1.0 PROJECT NARRATIVE

1.1 Introduction

InSite Engineering Services (IES) has prepared this report in conjunction with the accompanying site plans "Beef Barn" for Marc Branchaud. The report summarizes the proposed stormwater management system for the redevelopment of the Existing Commercial Building at 200 Industrial Drive in the Town of North Smithfield, R.I. The Commercial building is situated on the northerly side of Industrial Drive, east of the Pound Hill Road Intersection.

The 5.9-acre Site is identified by the Town of N. Smithfield as:

- Plat 08 Lot 300, addressed as 200 Industrial Drive

The redevelopment of the site for "Beef Barn" has been designed in accordance with the guidelines of the Town of North Smithfield Regulations and the Rhode Island Stormwater Design and Installation Standard Manual unless otherwise noted. This report is to be used in conjunction with the Site Plans" Beef Barn".

The stormwater management plan has been developed to employ various types of Best Management Practices (BMP's) to control peak runoff rates, provide water quality, promote groundwater recharge and provide sediment removal. All storm flows from the proposed construction will be captured on site and discharges to offsite areas will be equal or below preconstruction rates. It is anticipated that there will be no flooding impacts or negative impacts to the downstream outfalls resulting from this system.

2.0 EXISTING SITE CONDITIONS

2.1 Property Description

Zoning for the site is "M"-Manufacturing. The proposed use of the property is an allowed use within this district. The sites topography ranges from elevation 228 along the Street to elevation 217 at the pond to the north and elevation 218 at the Tributary to The Branch River running along the easterly property line.

The site contains the main building, constructed sometime around 1970 for commercial use, and accessory structures consisting of a "one story retail building", "shed", "garage", "salt shed" and canopies. Access to the property is by means of an existing curb cut off Industrial Drive. The site is developed with paved and hard packed gravel driveways and parking areas in poor condition.

The Main Building is currently serviced by a private well and is connected to a private force main tied into a municipal sewer, overhead electricity, and natural gas.

Referencing RIDEM's Environmental Resource Maps, the site lies within a Natural Heritage Area, is within a non-community wellhead protection area. A portion of the site falls within the FEMA designated A Flood Zone (no elevation assigned). Resource areas located on site, delineated by Natural Resources

Services, Inc., include a fresh water pond and adjoining swamp, and a river with adjoining swamp. Jurisdictional limits apply to these resource areas.

Existing stormwater management of the site consists of overland flow directed to either the fresh water pond or to the river.

The existing site was analyzed as three Subcatchment Areas with the design points being the fresh water pond or river.

- Subcatchment A (SC-A)- Approximately 46% of the site is impervious comprising of roof, pavement and hard packed gravel, with grassed areas covering an additional 46% of the site. The remaining area is wooded. The design point (DP1) for this watershed is the fresh water pond and adjoining pond to the north.
- Subcatchment B-1 (SC-B1)- This Subcatchment comprises of 63 % impervious area from pavement, roofs and hard packed gravel. Grassed area covers 30 % of the Subcatchment with the remaining area wooded. The Design Point (DP2) for this Subcatchment is the Branch River.
- Subcatchment B-2 (SC-B2)- This Subcatchment comprises of 5 % impervious area from roofs. Grassed area covers 22 % of the Subcatchment with the remaining 73% area wooded. The Design Point (DP3) for this Subcatchment is the Branch River. This Subcatchment will remain unchanged in post developed conditions.

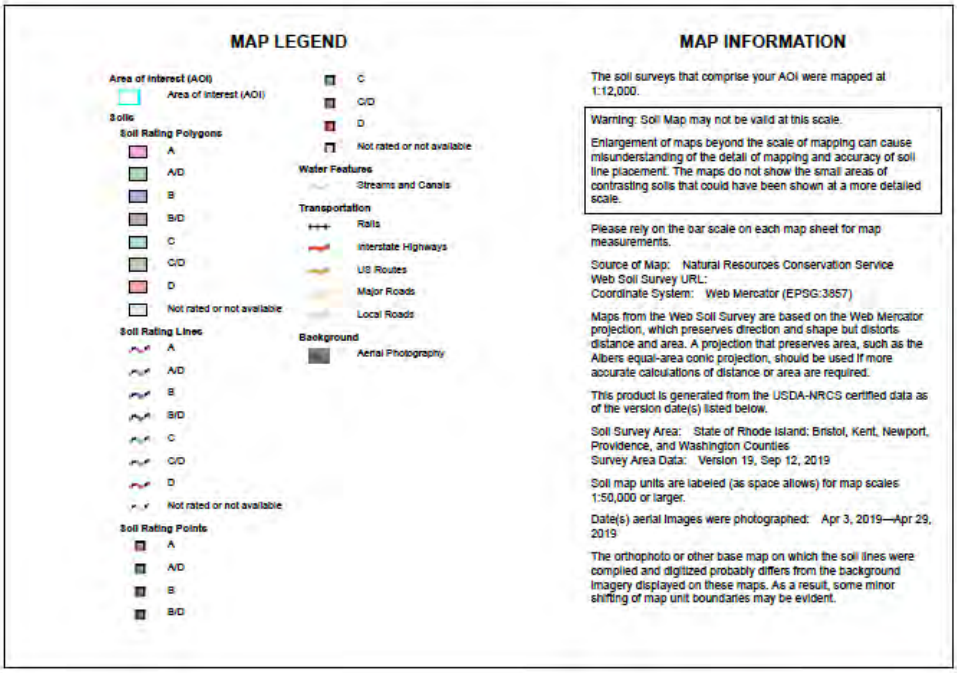
Pre-Development Rates of Runoff and total volumes are summarized in Tables 2 and 3.

2.2 Soil Classification

The USDA Natural Resources Conservation Service's Web Soil Survey classifies surficial Site soils as shown on the accompanying map and soil descriptions.

Soils Map

Hydrologic Soil Group—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
(200 Industrial Drive N.Smithfield RI)



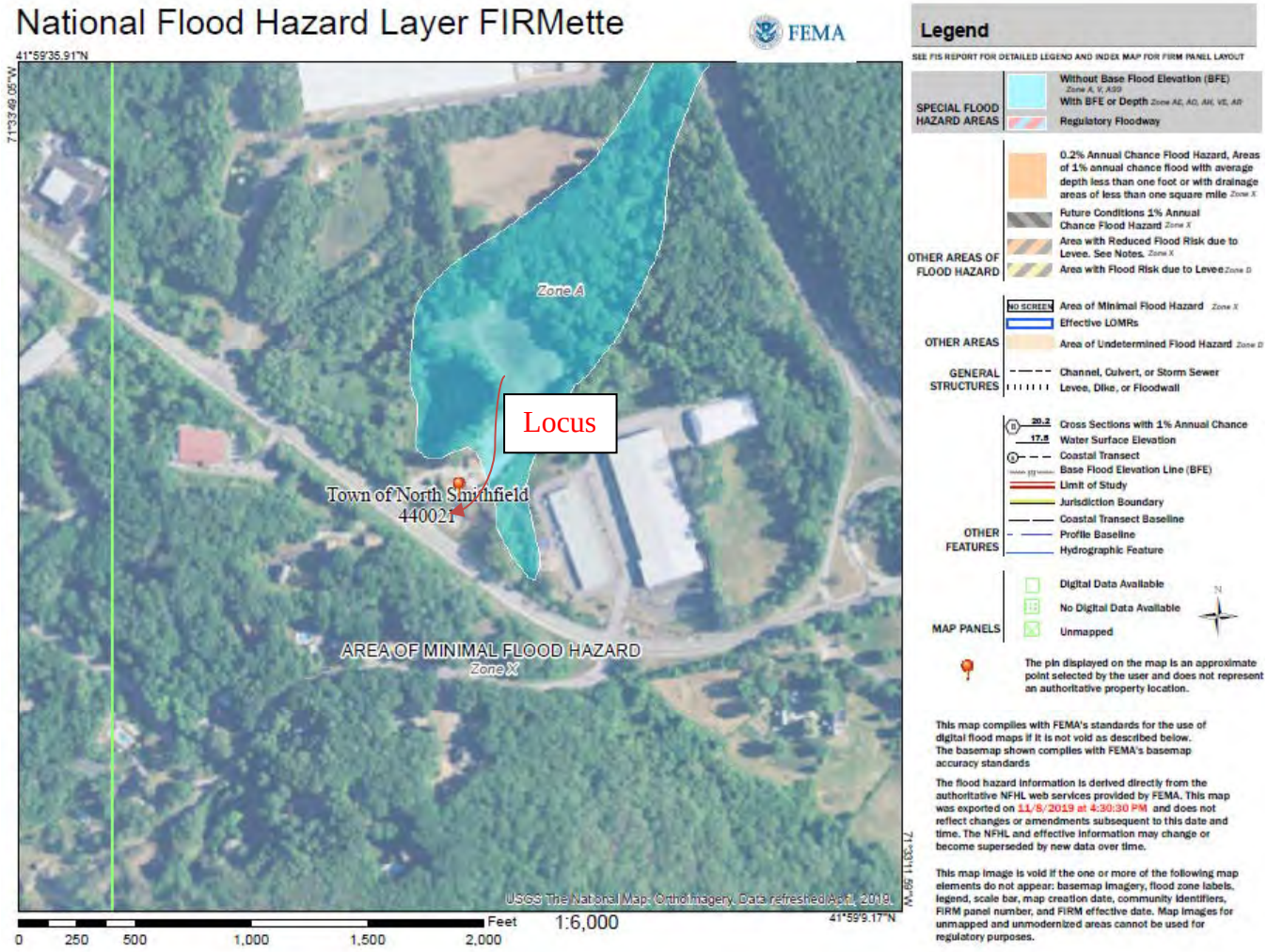
Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ChD	Canton and Charlton very stony fine sandy loams, 15 to 25 percent slopes	B	0.9	3.6%
GhD	Gloucester-Hinckley complex, 15 to 35 percent slopes, very stony	A	0.3	1.3%
HkC	Hinckley loamy sand, 8 to 15 percent slopes	A	11.8	47.2%
Nt	Ninigret fine sandy loam, 0 to 3 percent slopes	C	1.4	5.6%
Pg	Pits, gravel		2.4	9.4%
Rf	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	0.0	0.0%
Sb	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	A/D	6.0	24.0%
W	Water		2.2	8.8%
Totals for Area of Interest			**25.0**	**100.0%**

InSite Engineering Services conducted soil evaluations for the Stormwater Management system on November 13, 2019. On site soils were consistent with the USDA Natural Resources Conservation Service's Web Soil Survey. The results for the soil evaluations are shown on Detail sheet 2 of the Site Plans.

2.3 Flood Zone Classification

Referencing the National Flood Insurance Program, Flood Insurance Map, Community Panel Number **44007C0156G**, effective on **03/02/2009**, A Portion of the proposed project falls within a Special Flood Hazard Area (A)- No flood zone elevation assigned in this area.



2.4 Groundwater

Groundwater on the Site falls within two categories. The Recharge area that contributes to the freshwater pond and adjoining swamp is classified by RIDEM as "GAA". The recharge area that contributes to the Branch River and adjoining swamp is classified by RIDEM as "GA". The Environmental Resource Map identifies a Non community wellhead protection area encompassing the site. The proposed restaurant will abandon the well and connect to the public water supply.

2.5 Surface Water

The Environmental Resource Map indicates the nearest surface water body is the Tributary to the Branch River to the east and a pond to the west.

3.0 - PROPOSED SITE CONDITIONS

3.1 Site Plan

The Beef Barn. proposes redevelopment of the existing property with improvements described as follows.

- Re-development of a parking lot and Access Driveways.
- Re-development of the main building as the restaurant and construction of an outside dining area.
- Construction of stormwater management system utilizing LID strategies to include the following:
  - Stone filled PVC-Pervious Pavers in parking lot
  - Dry Swales with Stone Diaphragm as pretreatment.
- Public water- install new water service and abandon service from private well.
- Extension of Overhead and Underground Electrical

Consideration was given to conserving environmentally sensitive features and minimizing impact on the existing hydrology.

3.2 Stormwater Management Considerations

The comprehensive drainage design is separated into four Subcatchment areas. The total drainage area analyzed is approximately 2.29+/- Acres. Runoff from impervious areas is directed towards the pond or the river and mimics existing conditions. Runoff is managed in a system consisting of a Dry Swales and a Parking area constructed with a PVC stone filled Pervious Pavers.

For both the Pre-construction and Post Construction scenarios, the times of concentrations (TOC) for the longest overland flow path within each area were determined using the TR-55 Method. Each flow path is represented individually on the subarea calculation sheets. A weighted curve number CN, was derived for each subarea based on proposed land usage and soil types. The respective pre-construction rates of runoff were interpreted as allowable release rates for post-construction design.

4.0 STORMWATER MANAGEMENT STANDARDS

This proposed Stormwater Management System complies with the current regulations of the Rhode Island Department of Environmental Management (RIDEM). Compliance and applicability of the eleven (11) Stormwater Management Standards outlined in the Rhode Island Stormwater Design and Installation Standards Manual, amended March 2015 are listed below. In accordance with the Pre application meeting on October 2, 2019 at RIDEM, the "Beef Barn" site is to be considered a redevelopment site. Fifty percent (50%) of the area of proposed redevelopment impervious cover needs to be provided with water quality treatment meeting the Stormwater Rules. One Hundred percent (100%) of any net new impervious cover will need to be provided with water quality.

4.1 Minimum Standard 1: LID Site Planning and Design Strategies

LID site planning and design strategies must be used to the maximum extent practicable in order to reduce the generation of the water runoff volume for both new and redevelopment projects.

The LID Site Planning and Design Criteria was utilized in the site planning process. The full list of approved LID methods and/or procedures were explored at the site. LID methods proposed for this site are dry swales and pervious pavers. These items are documented in the Stormwater Management Checklist found in Appendix C.

4.2 Minimum Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub watershed to maintain baseflow at pre-development recharge levels to the maximum extent practicable in accordance with the requirements and exemptions described in Section 3.3.2 of the Rhode Island Stormwater Management Standards. For redevelopment sites with 40% or more existing impervious coverage standard 2 must be addressed. Recharge and Water Quality shall be managed in accordance with the acceptable technique of utilizing on-site structural BMP's to provide recharge and water quality management for at least 50% of redevelopment area.

The objective of the groundwater recharge standard is to protect water table levels, stream baseflow, wetlands, and soil moisture levels. Infiltrating stormwater may also provide significant water quality benefits such as reduction of bacteria, nutrients, and metals when infiltrated into the soil profile.

The Groundwater Recharge (Rev) volume of stormwater is based on the amount of impervious area and hydrologic soil group (HSG) as follows:

$$Re_V = (1") (F) (I)/12$$

Where:

Re_V = groundwater recharge volume (c.f.)
F = recharge factor
I = impervious area (s.f.)

Sub Catchment Post A1

Roof, hard packed gravel surface and pavement directed to Dry Swale -3.
Existing impervious area equals proposed impervious area in this Subcatchment.
***Redevelopment Impervious area** = 20,771 s.f.*
F= 0.60(HSG-A)
Rev (50%) = .5(1") (20771 s.f.) (0.6)/12 = 520 c.f.
Total available storage in Dry Swale 3 = 1,284 c.f.
Recharge volume provided = 1,284 c.f.> Recharge volume required = 520 c.f.

Sub Catchment Post A2

Roof, hard packed gravel surface and pavement directed to Dry Swale 1 and 2.
Existing impervious area in this Subcatchment = 12,456 s.f.
Proposed total impervious area in this Subcatchment = 16,091 s.f.
***Redevelopment Impervious area** = 12,456 s.f.*
F= 0.60(HSG-A)
Rev (50%) = .5(1") (12456 s.f.) (0.6)/12 = 312 c.f.
***New Impervious area =** 3,635 s.f.*
Rev (100%) = (1") (3635 s.f.) (0.6)/12 = 182 c.f.
Total required Rev = 494 c.f.
Total available storage in Dry Swale 1 and 2 = 1,624 c.f.
Recharge volume provided = 1,624 c.f.> Recharge volume required = 494 c.f.

Sub Catchment Post B1

Roof, hard packed gravel surface and pavement directed to Pervious PVC Paver Parking Lot.
Existing impervious area in this Subcatchment = 10,814 s.f.
Proposed total impervious area in this Subcatchment = 13,324 s.f.
F= 0.60(HSG-A)
***Redevelopment Impervious area** = 10,814 s.f.*
F= 0.60(HSG-A)
Rev (50%) = .5(1") (10814 s.f.) (0.6)/12 = 270 c.f.
***New Impervious area =** 2510 s.f.*
Rev (100%) = (1") (2510 s.f.) (0.6)/12 = 126 c.f.
Total required Rev = 396 c.f.

Total available storage in Pervious PVC Paver Parking Lot = 3,432 c.f.
Recharge volume provided = 3,432 c.f.> Recharge volume required = 396 c.f.

4.3 Minimum Standard 3: Water Quality

For redevelopment sites with 40% or more existing impervious coverage standard 3 must be addressed. Recharge and Water Quality shall be managed in accordance with the acceptable technique of utilizing on-site structural BMP's to provide recharge and water quality management for at least 50% of redevelopment area.

Stormwater runoff must be treated before discharge. The amount that must be treated from each rainfall event is known as the required water quality volume (WQ_V) and is the portion of runoff containing the majority of the pollutants. The water quality volume is calculated using the following equation:

$$WQ_v = (1")(I_{imp\ area})(1/12)$$

A minimum (WQv) volume of 0.2 watershed inches (0.2" over entire disturbed area) is required.

The Total amount of impervious area for the site is 44,911 c.f.
The minimum WQv for this area is

44,911(.2") (1/12) = 749 c.f.

The total WQv provided for this site is 6,340 c.f. as tabulated below

TOTAL WQV PROVIDED

BMP	WQv Provided (c.f.)
Dry Swale 3	1284
Dry Swale 1 &2	1624
Pervious Pavement	3432
Total WQv	**6340**

WQv CALCULATIONS FOR WATERSHED AREAS

Sub Catchment Post A1

Redevelopment Impervious area = 20,771 s.f.

$WQ_v(50\%) = 1"\ (20771\ s.f.)\ (1/12)(.5) = 866\ c.f.$

The minimum Dry Swale surface area required is calculated as follows:

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

For a filter bed depth $(d_f) = 3.0$

$k = 1.0\ ft/day$
max head $(h_{max}) = 9"$
avg head $(h_f) = 4.5"$
drain time $t_f = 2\ day$

A_f = *(866 c.f.) (3')/ (1.0* $^{ft}/_{day}$*)(0.375' + 3') (2 day) = 385s.f.*

Surface Area of Dry Swale 3 design = 636 s.f.
Volume of Dry Swale = 1284 c.f.

Provided Surface area of 636 s.f.> required surface area(A_f) of 385 s.f.
Provided Volume of 1284 c.f.> required volume of 866 c.f.

Sub Catchment Post A2

Redevelopment Impervious area = 12 ,456 s.f.

$WQ_v(50\%)$ *= 1" (12456 s.f.) (1/12)(.5) = 519 c.f.*

New Impervious area = 3,635 s.f.

$WQ_v(100\%)$ *= 1" (3635 s.f.) (1/12) = 303 c.f.*

Total Wqv = 822 c.f.

The minimum Dry Swale surface area required is calculated as follows:

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

For a filter bed depth (d_f) *= 3.5*

$k = 1.0\ ^{ft}/_{day}$
max head (h_{max}) *= 9"*
avg head (h_f) *= 4.5"*
drain time t_f *= 2 day*

A_f = *(822 c.f.) (3.5')/ (1.0* $^{ft}/_{day}$*)(0.375' + 3.5') (2 day) = 372s.f.*

Surface Area of Dry Swale 1 and 2 design = 900 s.f.
Volume of Dry Swale = 1624 c.f.

Provided Surface area of 900 s.f.> required surface area(A_f) of 372 s.f.
Provided Volume of 1624 c.f.> required volume of 822 c.f.

Sub Catchment Post B1

Redevelopment Impervious area *= 10,814 s.f.*

$WQ_v(50\%)$ *= 1" (10814 s.f.) (1/12)(.5) = 451 c.f.*

New Impervious area = 2510 s.f.

WQ_v *= 1" (2,510 s.f.)(1/12) = 210 c.f.*

Total Wqv = 661 c.f.

Surface Area of Pervious Pavement infiltration surface = 5200 s.f.
Total available storage in pervious paver system = 3,432 c.f.

Provided Volume of 3,432 c.f.> required volume of 661 c.f.

4.4 Minimum Standard 4: Conveyance and Natural Channel Protection

Open drainage and pipe conveyance systems must be designed to provide adequate passage for flows leading to, from, and through stormwater management facilities for at least the peak flow from the 10-year, 24-hour Type III design storm event. Protection for natural channels downstream must be supplied by providing 24-hour extended detention of the one-year, 24-hour Type III design storm event runoff volume.

The Dry Swales and the pervious pavers have been designed to provide Twenty-four hour extended detention of the one year, design storm event. The stormwater system reduces the frequency and magnitude of overbank flooding and protects downstream and abutting structures from flooding.

4.5 Minimum Standard 5: Overbank Flood Protection

Larger storm events also can cause flood damage and other impacts. These impacts can be significantly reduced by storing and releasing stormwater runoff in a gradual manner that ensures pre-development peak discharges are not exceeded. Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 1-year, 10-year and 100-year, 24-hour Type III design storm events.

The stormwater system was designed using a computerization of the Soil Conservation Service (SCS) method, for the computation of runoff hydrographs and peak discharge rates. All stormwater management computations and pond modeling has been performed through the use of the ***Hydrocad*** *V 10.0 Stormwater modeling software.*

The rainfall duration intensity curves were developed from 24-hour rainfall intensities were obtained from the U.S. Weather Bureau, for the Providence, RI area. The drainage analysis is based on the SCS method with a rainfall distribution Type III, for the 1-year, 10-year, and 100-year design frequency storms and also the 25-year storm as required by the City of Providence.

1 year = 2.7 inches
10 year = 4.9 inches
25 year = 6.1 inches (Town of N. Smithfield)
100 year = 8.7 inches

Evaluation of the contributing area(s), size, soil type(s), slope, and ground cover provide the necessary information required to develop rainfall event hydrographs. Rainfall event hydrographs are time/volume mathematical representations of how stormwater runoff volume is generated from different size storm events over a period of 24 hours for a specific watershed area. Each hydrograph depicts a bell-shaped curve where the area under the curve represents the volume of stormwater flow in cubic feet.

Hydrographs were developed for each sub catchment area for existing-and proposed conditions. The peak discharge rate was determined for each storm event. The site was designed to reduce the stormwater volume generated for each storm even including the 100-year design storm

(worst case scenario). The flow from the site will be discharged from the site at rates below or equal to the existing conditions discharge rates for each storm event.

TABLE 1: "BEEF BARN" WATERSHED AREA			
EXISTING CONDITIONS WATERSHED NAME	TOTAL AREA (ACRES)	PROPOSED CONDITIONS WATERSHED NAME	TOTAL AREA (ACRES)
Existing Conditions		Post-Development	
PRE-A, B1 & B2	2.29	POST A1,A2,B1 & B2	2.29
TOTAL =	2.29	TOTAL =	2.29

TABLE 2: "BEEF BARN"
DESIGN POINT 1- Pond

COMPARISON OF PRE- AND POST-DEVELOPMENT PEAK DISCHARGE RATES

EXISTING CONDITIONS			PROPOSED CONDITIONS			PEAK
WATERSHED AREA (ACRES)	FREQUENCY STORM (YEAR)	PEAK DISCHARGE (CFS)	WATERSHED AREA(S) (ACRES)	FREQUENCY STORM (YEAR)	PEAK DISCHARGE (CFS)	DISCHARGE DIFFERENCE (CFS)
Subcatchment Existing A	1	0.53	Subcatchment Proposed A1& A2	1	0.0	-0.53
	2	1.06		2	0.09	-0.97
	10	2.84		10	1.67	-1.17
	25	4.38		25	2.79	-1.59
	100	8.03		100	7.28	-0.75

TABLE 2: "BEEF BARN"
DESIGN POINT 2 -River

COMPARISON OF PRE- AND POST-DEVELOPMENT PEAK DISCHARGE RATES

EXISTING CONDITIONS			PROPOSED CONDITIONS			PEAK
WATERSHED AREA (ACRES)	FREQUENCY STORM (YEAR)	PEAK DISCHARGE (CFS)	WATERSHED AREA(S) (ACRES)	FREQUENCY STORM (YEAR)	PEAK DISCHARGE (CFS)	DISCHARGE DIFFERENCE (CFS)
Subcatchment Existing B1	1	0.25	Subcatchment Proposed B1	1	0.0	-0.25
	2	0.41		2	0.0	-0.41
	10	0.88		10	0.0	-0.88
	25	1.27		25	0.0	-1.27
	100	2.15		100	0.0	-2.15

TABLE 2: "BEEF BARN"
DESIGN POINT 3 -River

COMPARISON OF PRE- AND POST-DEVELOPMENT PEAK DISCHARGE RATES

EXISTING CONDITIONS			PROPOSED CONDITIONS			PEAK
WATERSHED AREA (ACRES)	FREQUENCY STORM (YEAR)	PEAK DISCHARGE (CFS)	WATERSHED AREA(S) (ACRES)	FREQUENCY STORM (YEAR)	PEAK DISCHARGE (CFS)	DISCHARGE DIFFERENCE (CFS)
Subcatchment Existing B2	1	0.0	Subcatchment Proposed B2	1	0.0	0.0
	2	0.0		2	0.0	0.0
	10	0.0		10	0.0	0.0
	25	0.01		25	0.01	0.0
	100	0.15		100	0.15	0.0

A *Comparison of Pre- and Post-Development Peak Discharge Rates*

The conclusion of the results shows that under proposed conditions, the peak discharge rates are less than the pre-development condition rates for the 1, 10, 25 (Town of N. Smithfield), and 100-year design frequency storms. The proposed stormwater treatment practices and detention facilities will not have potential detrimental effects on downstream areas.

The total runoff volumes were analyzed to determine impacts of any increases in total runoff volumes to the Pond and the Branch River.

TABLE 3: "BEEF BARN"
DESIGN POINT 1-The POND

COMPARISON OF PRE- AND POST-DEVELOPMENT RUNOFF VOLUMES

EXISTING CONDITIONS			PROPOSED CONDITIONS			RUNOFF VOLUME DIFFERENCE (AC/FT)
WATERSHED AREA (ACRES)	FREQUENCY STORM (YEAR)	RUNOFF VOLUME (AC/FT)	WATERSHED AREA (ACRES)	FREQUENCY STORM (YEAR)	RUNOFF VOLUME (AC/FT)	
Subcatchment Existing A	1	0.0539	Subcatchment Proposed A	1	0.00	-0.0539
	2	0.0916		2	0.0072	-0.0844
	10	0.2191		10	0.0728	-0.1463
	25	0.3320		25	0.1734	-0.1586
	100	0.6059		100	0.4350	-0.1709

TABLE 3: "BEEF BARN"
DESIGN POINT 1-The Branch River

COMPARISON OF PRE- AND POST-DEVELOPMENT RUNOFF VOLUMES

EXISTING CONDITIONS			PROPOSED CONDITIONS			RUNOFF VOLUME DIFFERENCE (AC/FT)
WATERSHED AREA (ACRES)	FREQUENCY STORM (YEAR)	RUNOFF VOLUME (AC/FT)	WATERSHED AREA (ACRES)	FREQUENCY STORM (YEAR)	RUNOFF VOLUME (AC/FT)	
Subcatchment Existing B1 and B2	1	0.0539	Subcatchment Proposed B1 and B2	1	0.00	-0.0539
	2	0.0916		2	0.0072	-0.0844
	10	0.2191		10	0.0728	-0.1463
	25	0.3320		25	0.1734	-0.1586
	100	0.6059		100	0.4350	-0.1709

The conclusion of the results shows that under proposed conditions, the runoff volumes are significantly less than the pre-development condition rates for the 1,2, 10, 25 and 100-year design frequency storms. The proposed Beef Barn site improvements will not have potential or detrimental effects on the Pond and the Branch River.

4.6 Minimum Standard 6: Redevelopment and Infill Projects

The purpose of this minimum standard is to establish the alternative requirements for projects or portions of a project where existing impervious areas will be redeveloped or where the site qualifies as infill. In no case on a redevelopment or infill project shall the levels of stormwater treatment and recharge be less than the levels prior to initiation of the proposed project.

The Beef Barn project is a redevelopment project. The project will meet all of the requirements of Standard 6. Stormwater treatment and recharge will be greater than existing levels.

4.7 Minimum Standard 7: Pollution Prevention

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff These measures shall be outlined in a stormwater pollution prevention plan. The intent of this standard is to prevent, to the maximum extent practicable, pollutants from coming into contact with stormwater runoff.

This Standard is addressed in Minimum Standard 10 and 11 below.

4.8 Minimum Standard 8: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads (LUHPPLs) require the use of specific source control and pollution prevention measures and the specific stormwater BMPs approved for such use.

The Beef Barn site is not a land use with higher potential pollutant loads (LUHPPL). Standard 8 is not applicable for this project.

4.9 Minimum Standard 9: Illicit Discharges

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, and sub-drains and French drains near OWTSs that do not meet the State's OWTS Rules (setbacks vary depending on the capacity of the OWTS, the type of conveyance system, and the sensitivity of the receiving waters). The stormwater management system is the system for conveying, treating, and infiltrating stormwater on site, including stormwater best management practices and any pipes intended to transport stormwater to ground water, surface water, or municipal separate storm sewer system (MS4). Illicit discharges to the stormwater management system, i.e., illicit connections, are discharges not entirely comprised of stormwater that are not specifically authorized by a National Pollutant Discharge Elimination System (NPDES) or RIPDES permit. The objective of this standard is to prevent pollutants from being discharged into MS4s and Waters of the State, and to safeguard the environment and public health, safety, and welfare.

The owner shall be responsible for the prohibition of illicit discharges on site. Discharges from sub-drains and French drains are not tied to any stormwater management system. The site has a connection to the existing sewer system.

4.10 Minimum Standard 10: Construction Activity Soil Erosion, Runoff, Sedimentation, and Pollution Prevention Control Measure Requirements

Erosion and sedimentation control (ESC) practices must be utilized during the construction phase as well as during any land disturbing activities.

The site shall be developed in a manner to minimize land disturbances in accordance with State of Rhode Island Soil Erosion and Sediment Control Manual issued 2009 and amended 2015. The following specific construction strategies, techniques and erosion control measures are more specifically described as follows:

1. Avoid and Protect Sensitive Areas and Natural Features

Areas of existing and remaining vegetation and areas that are to be protected during construction are delineated on the plans. The proposed activities are consistent with Minimum Standard 1, Low Impact Development (LID) Site Planning and Design Strategies and have been designed to maximize the protection of natural drainage areas.

2. Minimize Area of Disturbance

Limits of Disturbance (LOD) are clearly marked on all SESC plans. The amount of land area for the project site has been minimized. Existing vegetation will remain in place to maximum extent possible. The project has been designed to control the peak runoff and flows under the post construction design. The site has been designed in accordance with Minimum Standard 1, Low Impact Development Site Planning and Design Strategies, Section 3.3.1.3., Appendix A Checklist 1.D. and Chapter Four – LID Site Planning and Design Strategies, Section 4.5.1.

3. Minimize the Disturbance of Steep Slopes

The site development will minimize the steep slopes on the property. The maximum slope on the property is 5 %. The site design will comply with Minimum Standard 1, Low Impact Development Site Planning and Design Strategies, Section 3.3.1.3 and Appendix A Checklist 1.D. Locating Sites in Less Sensitive Areas, and Chapter Four – LID Site Planning and Design Strategies, Section 4.5.1 Avoid the Impacts.

4. Preserve Topsoil

The site operator shall preserve and stockpile existing topsoil. The topsoil will be reused on site. All remaining material will be hauled off site.

5. Stabilize Soils

The site shall be stabilized immediately whenever clearing, grading, excavating activities have permanently ceased within the site. Hydro seed will be used throughout the site. Any disturbed

soils exposed prior to October 15th will be seeded by that date. Any areas that do not have adequate vegetative stabilization by November 15th will be stabilized through the use of degradable mulches that will cover and protect soil surfaces. If construction continues within the site during the period from October 15th through April 15th, care will be taken to ensure that only the area required for that day's work is exposed, and all erodible soil will re-stabilized within 5 working days.

6. Protect Storm Drain Inlets

The site operator shall install inlet protection measures at existing catch basins and paved waterways that remove sediment from discharge prior to entry into the storm drain system. The operator will clean and/or remove and replace, the protection measures as sediment accumulates. Accumulated sediment adjacent to the inlet protection measures will be removed by the end of the same work day in which it is found.

7. Protect Storm Drain Outlets

Haybales and riprap are to be used at the outfall to protect and prevent scour and erosion at discharge points.

8. Establish Temporary Controls for the Protection of Post- Construction Stormwater Control Measures

Straw wattles shall be installed to protect bioretention basins and infiltration areas as they are installed and throughout the construction phase of the project so that they will function properly when they are brought online. The erosion and sediment control plan identify areas where infiltration measures are proposed and the site contractor shall restrict construction activity within these areas to prevent compaction of the area.

9. Establish Sediment Barriers

Straw wattles shall be installed along the perimeter areas of the site. The site contractor will maintain the sediment barriers in accordance with the maintenance requirements specified by the product manufacturer or the Rhode Island Soil Erosion and Sediment Control Handbook.

10. Divert or Manage Run-on from Up-gradient Areas

Straw wattles will be used to limit stormwater flow from coming onto the project area, and to divert and slow on-site stormwater flow from exposed soils to limit erosion, runoff, and the discharge of pollutants from the site.

11. Properly Design Constructed Stormwater Conveyance Channels

The paved waterways and stone weirs have been sized to handle the peak flow from the 10-year, 24-hour Type III design storm.

12. Retain Sediment On-Site

The SESC Plan states different stormwater practices that control erosion, control run-off, and control sediment. The combination of practices must be designed to prevent discharges of sediment. The plans shall include inlet protection, construction entrances, and containment of stockpiled materials.

13. Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows

The Construction Plan identifies the discharge points and location of bioretention basins and pervious pavers that control both peak flow rates and total runoff volume that will minimize flooding, channel erosion, and stream bank erosion.

14. Construction Activity Pollution Prevention Control Measures

The SESC Plan describes all of the pollution prevention measures that will be implemented to control pollutants in stormwater. The operator shall install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants in accordance with the SESC Plan requirements outlined in the Rhode Island Soil Erosion and Sediment Control Handbook

15. Control Measure Installation, Inspections, Maintenance, and Corrective Actions

The installation of straw wattles will be completed by the time each phase of earth-disturbance has begun. The site will be inspected by the engineer or owner at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff. If an inspection reveals a problem, the operator will work to fix the problem immediately after discovering the problem and complete such work by the close of the next work day, if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance. If new straw wattles or haybales are needed, the operator will install and make operational by no later than seven (7) calendar days from the time of discovery

Site specific areas of concern are:

* *Construction of the pervious paver systems and dry swales*
* *Construction of new utilities*
* *Slope stabilization*
* *Prevention of erosion and sediments adjacent properties*
* *At the Engineer's discretion, and following final grading of the surrounding slopes, a line of staked straw waddle shall be installed near the property line to prevent eroded soils from depositing in the drainage systems and on adjacent properties, and a line of silt fence shall be installed as shown on the plans.*

4.11 Minimum Standard 11: Stormwater Management System Operation and Maintenance

The stormwater management system, including all structural stormwater controls and conveyances, must have an operation and maintenance plan to ensure that it continues to function as designed.

The Beef Barn. as the owner, will be responsible for the operation and maintenance of the stormwater management system and all of its appurtenances. The owner will keep a written record of inspection dates and findings, maintenance operations, and all repairs. Refer to the Stormwater Management System Operation and Maintenance (Standard 11) section of this report for the maintenance program. A separate Operation and Maintenance Plan will be recorded and maintained on site.

O&M Access and Safety:

- *Access to ALL Stormwater management systems should be safe and efficient*
- *All egress and ingress routes should be maintained to design standard below:*
- *Access routes should be inspected and maintained*
- *Obstacles preventing maintenance personnel and / or equipment access should be removed*
- *Walkways should be clear of obstructions and maintained to design standards*
- *Roadways should be maintained to accommodate the size and weight of vehicles that use the roadways*
- *Gravel or ground cover should be added if erosion occurs (for example, as a result of vehicle or pedestrian traffic)*
- *All fences should be maintained to preserve their functionality and appearance*
- *Collapsed fences should be restored to an upright position*
- *Jagged edges and damaged fences should be repaired or replaced*

5.0 Conclusions

The proposed "Beef Barn" project will incorporate a drainage system comprising the use of BMP's such as Dry Swales & PVC Pervious pavers with storage infiltration system. The use of these BMP's result in:

- *An equal or less peak discharge rate for the 2-year, 10-year, and 100-year design frequency storms.*
- *Compliance with the Rhode Island Stormwater Design and Installation Standards Manual*
- *80% TSS Removal*
- *No detrimental effects of the water quality due to the basin's ability to retain and/or remove nutrients or act as a natural pollution filter.*
- *No decrease in flood storage capacity that would impair the wetland's ability to protect life and/or property.*
- *Minimal impacts to the natural characteristics of the wetland and to the plants and habitats of the wetlands.*

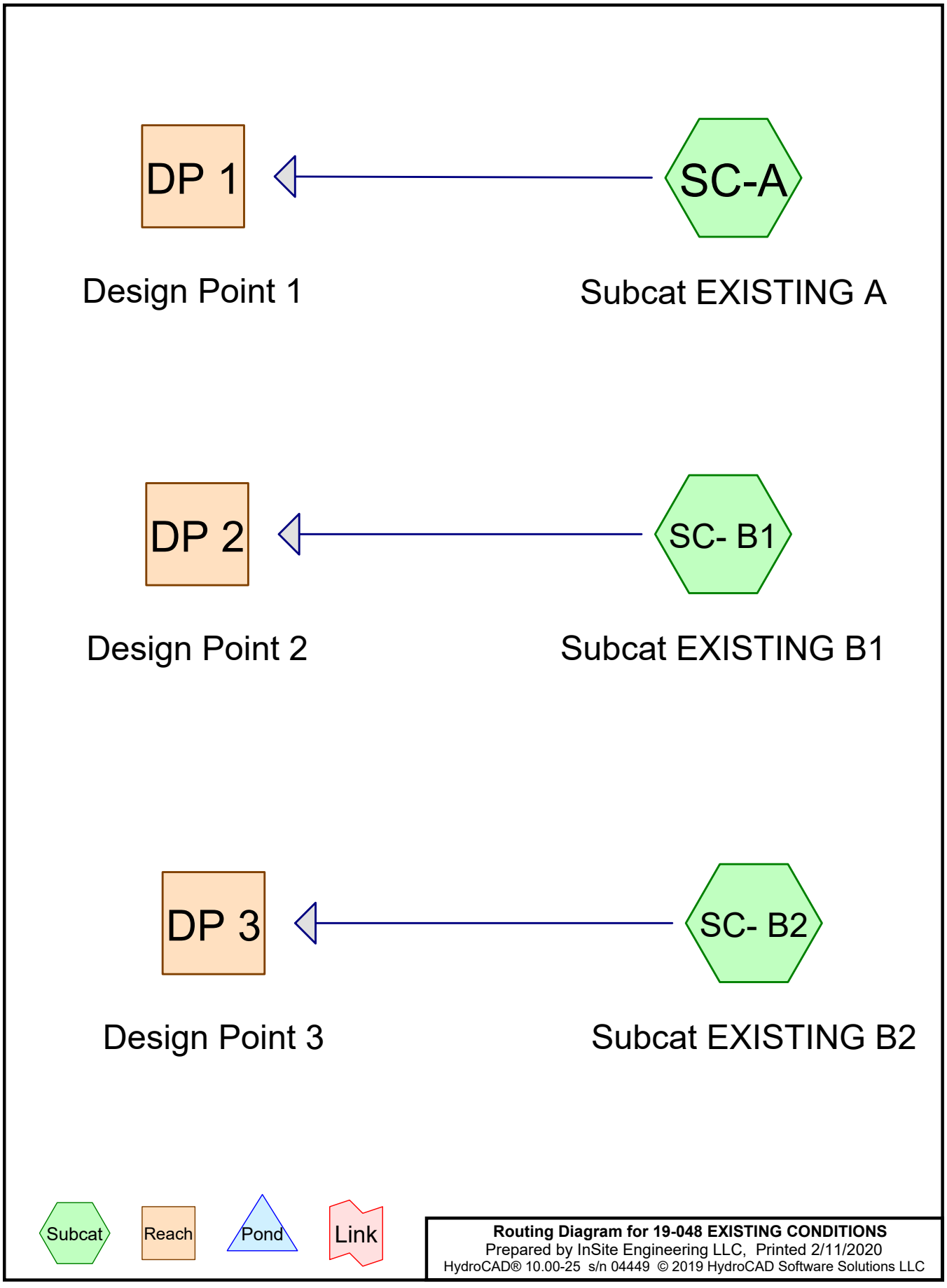
The drainage system has been designed to accommodate the anticipated flows in accordance with N. Smithfield's Rules and Regulations. Pre- and Post-Construction Watershed Plans are included, demonstrating watershed areas, flow paths and Curve numbers.

The discharge has been designed to withhold the peak rates of runoff to below the pre-construction rate analyzed for the site. The system was designed to provide cleansing of the stormwater and to provide the required storage volume in order to detain the peak flow rates and provide a zero-net-increase to the surrounding areas. The discharge with appropriate BMP's, accounts for a composite of the post construction controlled and uncontrolled flows as indicated on the schematic diagram and watershed maps.

It is the opinion of this engineer that the proposed "Beef Barn" stormwater management program is in compliance with the latest Rhode Island Stormwater Design and Installation Standards Manual.

APPENDIX A

1, 2,10,25 & 100-Year Storm Calculations (Pre-and Post-Construction)



Routing Diagram for 19-048 EXISTING CONDITIONS
Prepared by InSite Engineering LLC, Printed 2/11/2020

Summary for Subcatchment SC- B1: Subcat EXISTING B1

Runoff = 0.25 cfs @ 12.17 hrs, Volume= 937 cf, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Prov County RI Rainfall=2.70"

Area (sf)	CN	Description
4,980	39	>75% Grass cover, Good, HSG A
59	61	>75% Grass cover, Good, HSG B
8,966	96	Gravel surface, HSG A
97	96	Gravel surface, HSG B
989	98	Paved parking, HSG A
762	98	Roofs, HSG A
1,387	30	Woods, Good, HSG A
17,240	74	Weighted Average
15,489		89.84% Pervious Area
1,751		10.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	25	0.0080	0.04		**Sheet Flow, Sheet Flow**
					Grass: Bermuda n= 0.410 P2= 3.30"
0.4	51	0.0140	1.90		**Shallow Concentrated Flow, SCF_!**
					Unpaved Kv= 16.1 fps
0.7	125	0.0320	2.88		**Shallow Concentrated Flow, SCF-2**
					Unpaved Kv= 16.1 fps
11.4	201	Total			

Summary for Subcatchment SC- B2: Subcat EXISTING B2

Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Prov County RI Rainfall=2.70"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, Sheet Flow**
					Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow, SCF-1**
					Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Subcatchment SC-A: Subcat EXISTING A

Runoff = 0.53 cfs @ 12.17 hrs, Volume= 2,348 cf, Depth> 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Prov County RI Rainfall=2.70"

Area (sf)	CN	Description
28,389	39	>75% Grass cover, Good, HSG A
5,165	61	>75% Grass cover, Good, HSG B
7,011	96	Gravel surface, HSG A
20,551	98	Paved parking, HSG A
834	98	Paved parking, HSG B
4,831	98	Roofs, HSG A
5,548	30	Woods, Good, HSG A
72,329	67	Weighted Average
46,113		63.75% Pervious Area
26,216		36.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1400	0.15		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	72	0.1500	2.71		**Shallow Concentrated Flow, SCF1** Short Grass Pasture Kv= 7.0 fps
0.4	67	0.0150	2.49		**Shallow Concentrated Flow, SCF-2** Paved Kv= 20.3 fps
2.4	99	0.0100	0.70		**Shallow Concentrated Flow, SCF-3** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0010	0.64		**Shallow Concentrated Flow, SCF-4** Paved Kv= 20.3 fps
0.4	52	0.0980	2.19		**Shallow Concentrated Flow, SCF-5** Short Grass Pasture Kv= 7.0 fps
9.9	365	Total			

Summary for Reach DP 1: Design Point 1

Inflow Area = 72,329 sf, 36.25% Impervious, Inflow Depth > 0.39" for 1-Year Prov County RI event
Inflow = 0.53 cfs @ 12.17 hrs, Volume= 2,348 cf
Outflow = 0.53 cfs @ 12.17 hrs, Volume= 2,348 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: Design Point 2

Inflow Area = 17,240 sf, 10.16% Impervious, Inflow Depth > 0.65" for 1-Year Prov County RI event
Inflow = 0.25 cfs @ 12.17 hrs, Volume= 937 cf
Outflow = 0.25 cfs @ 12.17 hrs, Volume= 937 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 3: Design Point 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth = 0.00" for 1-Year Prov County RI event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Subcatchment SC- B1: Subcat EXISTING B1

Runoff = 0.41 cfs @ 12.17 hrs, Volume= 1,444 cf, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Prov County RI Rainfall=3.30"

Area (sf)	CN	Description
4,980	39	>75% Grass cover, Good, HSG A
59	61	>75% Grass cover, Good, HSG B
8,966	96	Gravel surface, HSG A
97	96	Gravel surface, HSG B
989	98	Paved parking, HSG A
762	98	Roofs, HSG A
1,387	30	Woods, Good, HSG A
17,240	74	Weighted Average
15,489		89.84% Pervious Area
1,751		10.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	25	0.0080	0.04		**Sheet Flow, Sheet Flow** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	51	0.0140	1.90		**Shallow Concentrated Flow, SCF_!** Unpaved Kv= 16.1 fps
0.7	125	0.0320	2.88		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
11.4	201	Total			

Summary for Subcatchment SC- B2: Subcat EXISTING B2

Runoff = 0.00 cfs @ 0.10 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Prov County RI Rainfall=3.30"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, Sheet Flow** Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow, SCF-1** Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Subcatchment SC-A: Subcat EXISTING A

Runoff = 1.06 cfs @ 12.16 hrs, Volume= 3,990 cf, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Prov County RI Rainfall=3.30"

Area (sf)	CN	Description
28,389	39	>75% Grass cover, Good, HSG A
5,165	61	>75% Grass cover, Good, HSG B
7,011	96	Gravel surface, HSG A
20,551	98	Paved parking, HSG A
834	98	Paved parking, HSG B
4,831	98	Roofs, HSG A
5,548	30	Woods, Good, HSG A
72,329	67	Weighted Average
46,113		63.75% Pervious Area
26,216		36.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1400	0.15		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	72	0.1500	2.71		**Shallow Concentrated Flow, SCF1** Short Grass Pasture Kv= 7.0 fps
0.4	67	0.0150	2.49		**Shallow Concentrated Flow, SCF-2** Paved Kv= 20.3 fps
2.4	99	0.0100	0.70		**Shallow Concentrated Flow, SCF-3** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0010	0.64		**Shallow Concentrated Flow, SCF-4** Paved Kv= 20.3 fps
0.4	52	0.0980	2.19		**Shallow Concentrated Flow, SCF-5** Short Grass Pasture Kv= 7.0 fps
9.9	365	Total			

Summary for Reach DP 1: Design Point 1

Inflow Area = 72,329 sf, 36.25% Impervious, Inflow Depth > 0.66" for 2-Year Prov County RI event
Inflow = 1.06 cfs @ 12.16 hrs, Volume= 3,990 cf
Outflow = 1.06 cfs @ 12.16 hrs, Volume= 3,990 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: Design Point 2

Inflow Area = 17,240 sf, 10.16% Impervious, Inflow Depth > 1.01" for 2-Year Prov County RI event
Inflow = 0.41 cfs @ 12.17 hrs, Volume= 1,444 cf
Outflow = 0.41 cfs @ 12.17 hrs, Volume= 1,444 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 3: Design Point 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth = 0.00" for 2-Year Prov County RI event
Inflow = 0.00 cfs @ 0.10 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.10 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Subcatchment SC- B1: Subcat EXISTING B1

Runoff = 0.88 cfs @ 12.16 hrs, Volume= 3,032 cf, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Prov County RI Rainfall=4.90"

Area (sf)	CN	Description
4,980	39	>75% Grass cover, Good, HSG A
59	61	>75% Grass cover, Good, HSG B
8,966	96	Gravel surface, HSG A
97	96	Gravel surface, HSG B
989	98	Paved parking, HSG A
762	98	Roofs, HSG A
1,387	30	Woods, Good, HSG A
17,240	74	Weighted Average
15,489		89.84% Pervious Area
1,751		10.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	25	0.0080	0.04		**Sheet Flow, Sheet Flow** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	51	0.0140	1.90		**Shallow Concentrated Flow, SCF_!** Unpaved Kv= 16.1 fps
0.7	125	0.0320	2.88		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
11.4	201	Total			

Summary for Subcatchment SC- B2: Subcat EXISTING B2

Runoff = 0.00 cfs @ 15.31 hrs, Volume= 42 cf, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Prov County RI Rainfall=4.90"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, Sheet Flow** Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow, SCF-1** Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Subcatchment SC-A: Subcat EXISTING A

Runoff = 2.84 cfs @ 12.15 hrs, Volume= 9,545 cf, Depth> 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Prov County RI Rainfall=4.90"

Area (sf)	CN	Description
28,389	39	>75% Grass cover, Good, HSG A
5,165	61	>75% Grass cover, Good, HSG B
7,011	96	Gravel surface, HSG A
20,551	98	Paved parking, HSG A
834	98	Paved parking, HSG B
4,831	98	Roofs, HSG A
5,548	30	Woods, Good, HSG A
72,329	67	Weighted Average
46,113		63.75% Pervious Area
26,216		36.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1400	0.15		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	72	0.1500	2.71		**Shallow Concentrated Flow, SCF1** Short Grass Pasture Kv= 7.0 fps
0.4	67	0.0150	2.49		**Shallow Concentrated Flow, SCF-2** Paved Kv= 20.3 fps
2.4	99	0.0100	0.70		**Shallow Concentrated Flow, SCF-3** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0010	0.64		**Shallow Concentrated Flow, SCF-4** Paved Kv= 20.3 fps
0.4	52	0.0980	2.19		**Shallow Concentrated Flow, SCF-5** Short Grass Pasture Kv= 7.0 fps
9.9	365	Total			

Summary for Reach DP 1: Design Point 1

Inflow Area = 72,329 sf, 36.25% Impervious, Inflow Depth > 1.58" for 10-Year Prov County RI event
Inflow = 2.84 cfs @ 12.15 hrs, Volume= 9,545 cf
Outflow = 2.84 cfs @ 12.15 hrs, Volume= 9,545 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: Design Point 2

Inflow Area = 17,240 sf, 10.16% Impervious, Inflow Depth > 2.11" for 10-Year Prov County RI event
Inflow = 0.88 cfs @ 12.16 hrs, Volume= 3,032 cf
Outflow = 0.88 cfs @ 12.16 hrs, Volume= 3,032 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 3: Design Point 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth > 0.05" for 10-Year Prov County RI event
Inflow = 0.00 cfs @ 15.31 hrs, Volume= 42 cf
Outflow = 0.00 cfs @ 15.31 hrs, Volume= 42 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Subcatchment SC- B1: Subcat EXISTING B1

Runoff = 1.27 cfs @ 12.16 hrs, Volume= 4,364 cf, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Prov County RI Rainfall=6.10"

Area (sf)	CN	Description
4,980	39	>75% Grass cover, Good, HSG A
59	61	>75% Grass cover, Good, HSG B
8,966	96	Gravel surface, HSG A
97	96	Gravel surface, HSG B
989	98	Paved parking, HSG A
762	98	Roofs, HSG A
1,387	30	Woods, Good, HSG A
17,240	74	Weighted Average
15,489		89.84% Pervious Area
1,751		10.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	25	0.0080	0.04		**Sheet Flow, Sheet Flow**
					Grass: Bermuda n= 0.410 P2= 3.30"
0.4	51	0.0140	1.90		**Shallow Concentrated Flow, SCF_!**
					Unpaved Kv= 16.1 fps
0.7	125	0.0320	2.88		**Shallow Concentrated Flow, SCF-2**
					Unpaved Kv= 16.1 fps
11.4	201	Total			

Summary for Subcatchment SC- B2: Subcat EXISTING B2

Runoff = 0.01 cfs @ 12.47 hrs, Volume= 188 cf, Depth> 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Prov County RI Rainfall=6.10"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, Sheet Flow**
					Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow, SCF-1**
					Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Subcatchment SC-A: Subcat EXISTING A

Runoff = 4.38 cfs @ 12.14 hrs, Volume= 14,462 cf, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Prov County RI Rainfall=6.10"

Area (sf)	CN	Description
28,389	39	>75% Grass cover, Good, HSG A
5,165	61	>75% Grass cover, Good, HSG B
7,011	96	Gravel surface, HSG A
20,551	98	Paved parking, HSG A
834	98	Paved parking, HSG B
4,831	98	Roofs, HSG A
5,548	30	Woods, Good, HSG A
72,329	67	Weighted Average
46,113		63.75% Pervious Area
26,216		36.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1400	0.15		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	72	0.1500	2.71		**Shallow Concentrated Flow, SCF1** Short Grass Pasture Kv= 7.0 fps
0.4	67	0.0150	2.49		**Shallow Concentrated Flow, SCF-2** Paved Kv= 20.3 fps
2.4	99	0.0100	0.70		**Shallow Concentrated Flow, SCF-3** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0010	0.64		**Shallow Concentrated Flow, SCF-4** Paved Kv= 20.3 fps
0.4	52	0.0980	2.19		**Shallow Concentrated Flow, SCF-5** Short Grass Pasture Kv= 7.0 fps
9.9	365	Total			

Summary for Reach DP 1: Design Point 1

Inflow Area = 72,329 sf, 36.25% Impervious, Inflow Depth > 2.40" for 25-Year Prov County RI event
Inflow = 4.38 cfs @ 12.14 hrs, Volume= 14,462 cf
Outflow = 4.38 cfs @ 12.14 hrs, Volume= 14,462 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: Design Point 2

Inflow Area = 17,240 sf, 10.16% Impervious, Inflow Depth > 3.04" for 25-Year Prov County RI event
Inflow = 1.27 cfs @ 12.16 hrs, Volume= 4,364 cf
Outflow = 1.27 cfs @ 12.16 hrs, Volume= 4,364 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 3: Design Point 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth > 0.22" for 25-Year Prov County RI event
Inflow = 0.01 cfs @ 12.47 hrs, Volume= 188 cf
Outflow = 0.01 cfs @ 12.47 hrs, Volume= 188 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Subcatchment SC- B1: Subcat EXISTING B1

Runoff = 2.15 cfs @ 12.15 hrs, Volume= 7,471 cf, Depth> 5.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Prov County RI Rainfall=8.70"

Area (sf)	CN	Description
4,980	39	>75% Grass cover, Good, HSG A
59	61	>75% Grass cover, Good, HSG B
8,966	96	Gravel surface, HSG A
97	96	Gravel surface, HSG B
989	98	Paved parking, HSG A
762	98	Roofs, HSG A
1,387	30	Woods, Good, HSG A
17,240	74	Weighted Average
15,489		89.84% Pervious Area
1,751		10.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	25	0.0080	0.04		**Sheet Flow, Sheet Flow** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	51	0.0140	1.90		**Shallow Concentrated Flow, SCF_!** Unpaved Kv= 16.1 fps
0.7	125	0.0320	2.88		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
11.4	201	Total			

Summary for Subcatchment SC- B2: Subcat EXISTING B2

Runoff = 0.15 cfs @ 12.15 hrs, Volume= 793 cf, Depth> 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Prov County RI Rainfall=8.70"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow, Sheet Flow** Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow, SCF-1** Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Subcatchment SC-A: Subcat EXISTING A

Runoff = 8.03 cfs @ 12.14 hrs, Volume= 26,394 cf, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Prov County RI Rainfall=8.70"

Area (sf)	CN	Description
28,389	39	>75% Grass cover, Good, HSG A
5,165	61	>75% Grass cover, Good, HSG B
7,011	96	Gravel surface, HSG A
20,551	98	Paved parking, HSG A
834	98	Paved parking, HSG B
4,831	98	Roofs, HSG A
5,548	30	Woods, Good, HSG A
72,329	67	Weighted Average
46,113		63.75% Pervious Area
26,216		36.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1400	0.15		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	72	0.1500	2.71		**Shallow Concentrated Flow, SCF1** Short Grass Pasture Kv= 7.0 fps
0.4	67	0.0150	2.49		**Shallow Concentrated Flow, SCF-2** Paved Kv= 20.3 fps
2.4	99	0.0100	0.70		**Shallow Concentrated Flow, SCF-3** Short Grass Pasture Kv= 7.0 fps
0.6	25	0.0010	0.64		**Shallow Concentrated Flow, SCF-4** Paved Kv= 20.3 fps
0.4	52	0.0980	2.19		**Shallow Concentrated Flow, SCF-5** Short Grass Pasture Kv= 7.0 fps
9.9	365	Total			

Summary for Reach DP 1: Design Point 1

Inflow Area = 72,329 sf, 36.25% Impervious, Inflow Depth > 4.38" for 100-Year Prov County RI event
Inflow = 8.03 cfs @ 12.14 hrs, Volume= 26,394 cf
Outflow = 8.03 cfs @ 12.14 hrs, Volume= 26,394 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: Design Point 2

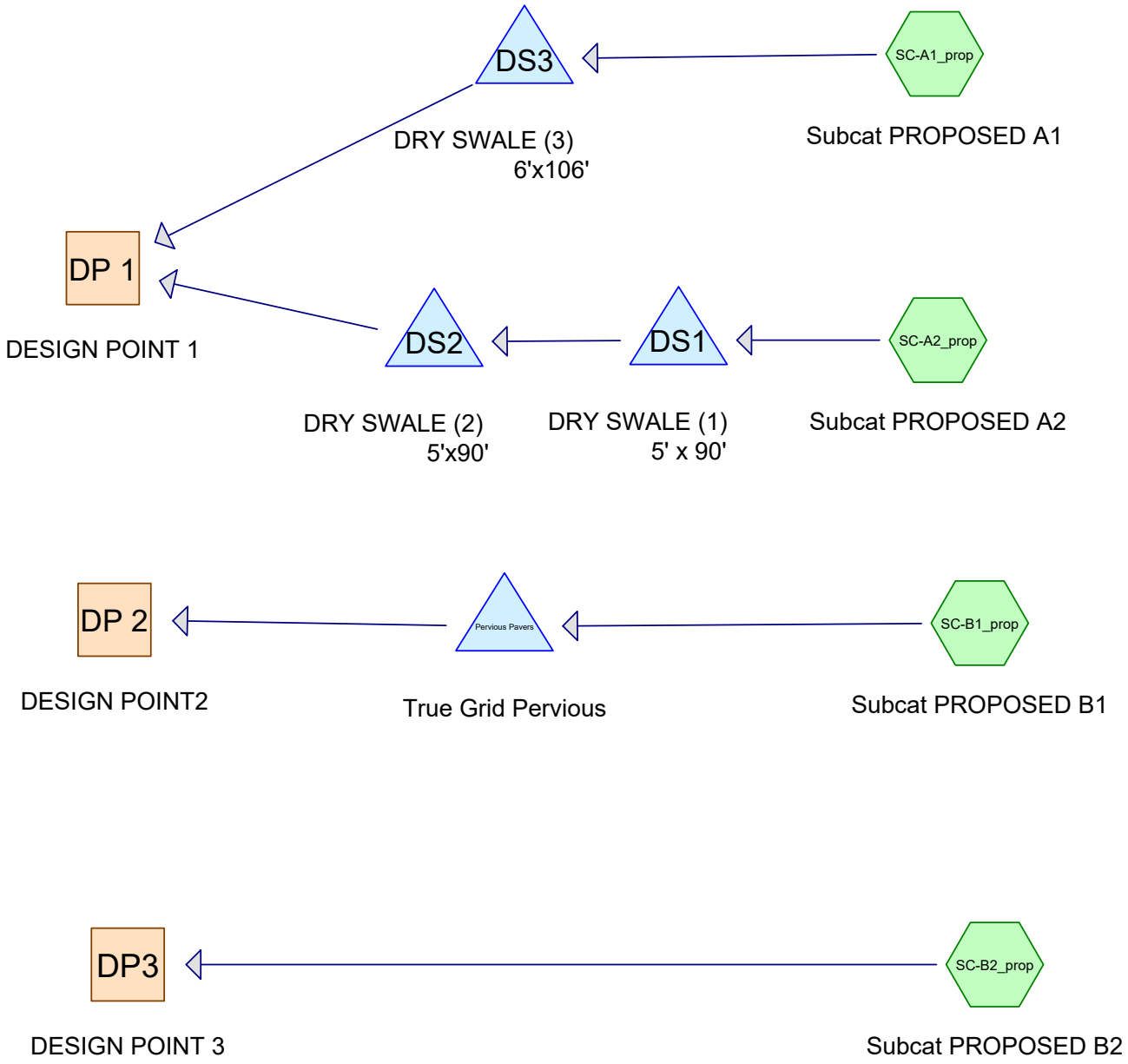
Inflow Area = 17,240 sf, 10.16% Impervious, Inflow Depth > 5.20" for 100-Year Prov County RI event
Inflow = 2.15 cfs @ 12.15 hrs, Volume= 7,471 cf
Outflow = 2.15 cfs @ 12.15 hrs, Volume= 7,471 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs

Summary for Reach DP 3: Design Point 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth > 0.91" for 100-Year Prov County RI event
Inflow = 0.15 cfs @ 12.15 hrs, Volume= 793 cf
Outflow = 0.15 cfs @ 12.15 hrs, Volume= 793 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.10-20.00 hrs, dt= 0.01 hrs



Subcat Reach Pond Link

Routing Diagram for 19-048 PROPOSED CONDITIONS
Prepared by InSite Engineering LLC, Printed 2/11/2020

Summary for Subcatchment SC-A1_prop: Subcat PROPOSED A1

Runoff = 0.46 cfs @ 12.11 hrs, Volume= 1,757 cf, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Prov County RI Rainfall=2.70"

Area (sf)	CN	Description
3,725	98	Roofs, HSG A
11,783	39	>75% Grass cover, Good, HSG A
4,500	96	Gravel surface, HSG A
12,546	98	Paved parking, HSG A
5,488	30	Woods, Good, HSG A
38,042	70	Weighted Average
21,771		57.23% Pervious Area
16,271		42.77% Impervious Area

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

Summary for Subcatchment SC-A2_prop: Subcat PROPOSED A2

Runoff = 0.44 cfs @ 12.10 hrs, Volume= 1,613 cf, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Prov County RI Rainfall=2.70"

Area (sf)	CN	Description
1,662	98	Roofs, HSG A
12,586	98	Paved parking, HSG A
52	30	Woods, Good, HSG A
12,266	39	>75% Grass cover, Good, HSG A
1,843	98	Paved parking, HSG B
4,157	61	>75% Grass cover, Good, HSG B
32,566	71	Weighted Average
16,475		50.59% Pervious Area
16,091		49.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	42	0.0950	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.4	89	0.0400	4.06		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
4.2	131	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC-B1_prop: Subcat PROPOSED B1

Runoff = 0.46 cfs @ 12.13 hrs, Volume= 1,627 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Prov County RI Rainfall=2.70"

Area (sf)	CN	Description
2,678	96	Gravel surface, HSG A
4,509	98	Paved parking, HSG A
862	98	Roofs, HSG A
5,200	98	Unconnected pavement, HSG A
1,477	30	Woods, Good, HSG A
4,080	39	>75% Grass cover, Good, HSG A
75	96	Gravel surface, HSG B
81	61	>75% Grass cover, Good, HSG B
18,962	80	Weighted Average
8,391		44.25% Pervious Area
10,570		55.75% Impervious Area
5,200		49.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	30	0.0200	0.06		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	74	0.0270	3.34		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
9.0	170	Total			

Summary for Subcatchment SC-B2_prop: Subcat PROPOSED B2

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Prov County RI Rainfall=2.70"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Reach DP 1: DESIGN POINT 1

Inflow Area = 70,607 sf, 45.83% Impervious, Inflow Depth = 0.00" for 1-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: DESIGN POINT2

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 0.00" for 1-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: DESIGN POINT 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth = 0.00" for 1-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond DS1: DRY SWALE (1) 5' x 90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 0.59" for 1-Year Prov County RI event
Inflow = 0.44 cfs @ 12.10 hrs, Volume= 1,613 cf
Outflow = 0.04 cfs @ 15.00 hrs, Volume= 1,613 cf, Atten= 92%, Lag= 173.8 min
Discarded = 0.04 cfs @ 15.00 hrs, Volume= 1,613 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 222.83' @ 15.00 hrs Surf.Area= 649 sf Storage= 703 cf

Plug-Flow detention time= 266.2 min calculated for 1,612 cf (100% of inflow)
Center-of-Mass det. time= 266.2 min (1,151.7 - 885.5)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**2.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.04 cfs @ 15.00 hrs HW=222.83' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=219.00' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DS2: DRY SWALE (2) 5'x90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 0.00" for 1-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 219.00' @ 0.00 hrs Surf.Area= 450 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**1.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=219.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.03 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=219.00' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DS3: DRY SWALE (3) 6'x106'

Inflow Area = 38,042 sf, 42.77% Impervious, Inflow Depth = 0.55" for 1-Year Prov County RI event
Inflow = 0.46 cfs @ 12.11 hrs, Volume= 1,757 cf
Outflow = 0.04 cfs @ 15.14 hrs, Volume= 1,757 cf, Atten= 92%, Lag= 181.9 min
Discarded = 0.04 cfs @ 15.14 hrs, Volume= 1,757 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 219.16' @ 15.14 hrs Surf.Area= 677 sf Storage= 727 cf

Plug-Flow detention time= 217.9 min calculated for 1,757 cf (100% of inflow)
Center-of-Mass det. time= 217.9 min (1,107.7 - 889.8)

Volume	Invert	Avail.Storage	Storage Description
#1	216.00'	1,574 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.00	632	0.0	0	0
219.00	632	33.0	626	626
219.10	632	100.0	63	689
220.00	1,336	100.0	886	1,574

Device	Routing	Invert	Outlet Devices
#1	Discarded	216.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 119.00'
#2	Primary	219.50'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.04 cfs @ 15.14 hrs HW=219.16' (Free Discharge)
1=Exfiltration (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=216.00' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond Pervious Pavers: True Grid Pervious

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 1.03" for 1-Year Prov County RI event
Inflow = 0.46 cfs @ 12.13 hrs, Volume= 1,627 cf
Outflow = 0.29 cfs @ 12.28 hrs, Volume= 1,627 cf, Atten= 36%, Lag= 8.9 min
Discarded = 0.29 cfs @ 12.28 hrs, Volume= 1,627 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 221.07' @ 12.28 hrs Surf.Area= 5,200 sf Storage= 124 cf

Plug-Flow detention time= 3.7 min calculated for 1,627 cf (100% of inflow)
Center-of-Mass det. time= 3.7 min (858.4 - 854.7)

Volume	Invert	Avail.Storage	Storage Description
#1	221.00'	6,890 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
221.00	5,200	0.0	0	0
223.00	5,200	33.0	3,432	3,432
223.50	5,200	33.0	858	4,290
224.00	5,200	100.0	2,600	6,890

Device	Routing	Invert	Outlet Devices
#1	Discarded	221.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 216.00'
#2	Primary	223.70'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.29 cfs @ 12.28 hrs HW=221.07' (Free Discharge)
1=Exfiltration (Controls 0.29 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=221.00' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment SC-A1_prop: Subcat PROPOSED A1

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 2,812 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Prov County RI Rainfall=3.30"

Area (sf)	CN	Description
3,725	98	Roofs, HSG A
11,783	39	>75% Grass cover, Good, HSG A
4,500	96	Gravel surface, HSG A
12,546	98	Paved parking, HSG A
5,488	30	Woods, Good, HSG A
38,042	70	Weighted Average
21,771		57.23% Pervious Area
16,271		42.77% Impervious Area

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

Summary for Subcatchment SC-A2_prop: Subcat PROPOSED A2

Runoff = 0.76 cfs @ 12.10 hrs, Volume= 2,548 cf, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Prov County RI Rainfall=3.30"

Area (sf)	CN	Description
1,662	98	Roofs, HSG A
12,586	98	Paved parking, HSG A
52	30	Woods, Good, HSG A
12,266	39	>75% Grass cover, Good, HSG A
1,843	98	Paved parking, HSG B
4,157	61	>75% Grass cover, Good, HSG B
32,566	71	Weighted Average
16,475		50.59% Pervious Area
16,091		49.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	42	0.0950	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.4	89	0.0400	4.06		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
4.2	131	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC-B1_prop: Subcat PROPOSED B1

Runoff = 0.67 cfs @ 12.13 hrs, Volume= 2,337 cf, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Prov County RI Rainfall=3.30"

Area (sf)	CN	Description
2,678	96	Gravel surface, HSG A
4,509	98	Paved parking, HSG A
862	98	Roofs, HSG A
5,200	98	Unconnected pavement, HSG A
1,477	30	Woods, Good, HSG A
4,080	39	>75% Grass cover, Good, HSG A
75	96	Gravel surface, HSG B
81	61	>75% Grass cover, Good, HSG B
18,962	80	Weighted Average
8,391		44.25% Pervious Area
10,570		55.75% Impervious Area
5,200		49.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	30	0.0200	0.06		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	74	0.0270	3.34		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
9.0	170	Total			

Summary for Subcatchment SC-B2_prop: Subcat PROPOSED B2

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Prov County RI Rainfall=3.30"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Reach DP 1: DESIGN POINT 1

Inflow Area = 70,607 sf, 45.83% Impervious, Inflow Depth = 0.05" for 2-Year Prov County RI event
Inflow = 0.09 cfs @ 12.70 hrs, Volume= 312 cf
Outflow = 0.09 cfs @ 12.70 hrs, Volume= 312 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: DESIGN POINT2

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 0.00" for 2-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: DESIGN POINT 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth = 0.00" for 2-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond DS1: DRY SWALE (1) 5' x 90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 0.94" for 2-Year Prov County RI event
Inflow = 0.76 cfs @ 12.10 hrs, Volume= 2,548 cf
Outflow = 0.06 cfs @ 14.76 hrs, Volume= 2,533 cf, Atten= 93%, Lag= 159.5 min
Discarded = 0.06 cfs @ 14.76 hrs, Volume= 2,533 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 223.41' @ 14.76 hrs Surf.Area= 1,002 sf Storage= 1,179 cf

Plug-Flow detention time= 297.6 min calculated for 2,533 cf (99% of inflow)
Center-of-Mass det. time= 294.4 min (1,164.4 - 870.0)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**2.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.06 cfs @ 14.76 hrs HW=223.41' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=219.00' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DS2: DRY SWALE (2) 5'x90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 0.00" for 2-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 219.00' @ 0.00 hrs Surf.Area= 450 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**1.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=219.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.03 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=219.00' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DS3: DRY SWALE (3) 6'x106'

Inflow Area = 38,042 sf, 42.77% Impervious, Inflow Depth = 0.89" for 2-Year Prov County RI event
Inflow = 0.82 cfs @ 12.10 hrs, Volume= 2,812 cf
Outflow = 0.14 cfs @ 12.70 hrs, Volume= 2,812 cf, Atten= 82%, Lag= 35.8 min
Discarded = 0.06 cfs @ 12.70 hrs, Volume= 2,499 cf
Primary = 0.09 cfs @ 12.70 hrs, Volume= 312 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 219.53' @ 12.70 hrs Surf.Area= 965 sf Storage= 1,029 cf

Plug-Flow detention time= 228.1 min calculated for 2,811 cf (100% of inflow)
Center-of-Mass det. time= 228.1 min (1,101.6 - 873.5)

Volume	Invert	Avail.Storage	Storage Description
#1	216.00'	1,574 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.00	632	0.0	0	0
219.00	632	33.0	626	626
219.10	632	100.0	63	689
220.00	1,336	100.0	886	1,574

Device	Routing	Invert	Outlet Devices
#1	Discarded	216.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 119.00'
#2	Primary	219.50'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.06 cfs @ 12.70 hrs HW=219.53' (Free Discharge)
1=Exfiltration (Controls 0.06 cfs)

Primary OutFlow Max=0.08 cfs @ 12.70 hrs HW=219.53' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Weir Controls 0.08 cfs @ 0.53 fps)

Summary for Pond Pervious Pavers: True Grid Pervious

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 1.48" for 2-Year Prov County RI event
Inflow = 0.67 cfs @ 12.13 hrs, Volume= 2,337 cf
Outflow = 0.30 cfs @ 12.41 hrs, Volume= 2,337 cf, Atten= 55%, Lag= 16.6 min
Discarded = 0.30 cfs @ 12.41 hrs, Volume= 2,337 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 221.18' @ 12.41 hrs Surf.Area= 5,200 sf Storage= 313 cf

Plug-Flow detention time= 6.7 min calculated for 2,337 cf (100% of inflow)
Center-of-Mass det. time= 6.6 min (850.6 - 844.0)

Volume	Invert	Avail.Storage	Storage Description
#1	221.00'	6,890 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
221.00	5,200	0.0	0	0
223.00	5,200	33.0	3,432	3,432
223.50	5,200	33.0	858	4,290
224.00	5,200	100.0	2,600	6,890

Device	Routing	Invert	Outlet Devices
#1	Discarded	221.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 216.00'
#2	Primary	223.70'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.30 cfs @ 12.41 hrs HW=221.18' (Free Discharge)
1=Exfiltration (Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=221.00' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment SC-A1_prop: Subcat PROPOSED A1

Runoff = 1.97 cfs @ 12.09 hrs, Volume= 6,221 cf, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Prov County RI Rainfall=4.90"

Area (sf)	CN	Description
3,725	98	Roofs, HSG A
11,783	39	>75% Grass cover, Good, HSG A
4,500	96	Gravel surface, HSG A
12,546	98	Paved parking, HSG A
5,488	30	Woods, Good, HSG A
38,042	70	Weighted Average
21,771		57.23% Pervious Area
16,271		42.77% Impervious Area

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

Summary for Subcatchment SC-A2_prop: Subcat PROPOSED A2

Runoff = 1.76 cfs @ 12.09 hrs, Volume= 5,539 cf, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Prov County RI Rainfall=4.90"

Area (sf)	CN	Description
1,662	98	Roofs, HSG A
12,586	98	Paved parking, HSG A
52	30	Woods, Good, HSG A
12,266	39	>75% Grass cover, Good, HSG A
1,843	98	Paved parking, HSG B
4,157	61	>75% Grass cover, Good, HSG B
32,566	71	Weighted Average
16,475		50.59% Pervious Area
16,091		49.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	42	0.0950	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.4	89	0.0400	4.06		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
4.2	131	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC-B1_prop: Subcat PROPOSED B1

Runoff = 1.29 cfs @ 12.13 hrs, Volume= 4,434 cf, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Prov County RI Rainfall=4.90"

Area (sf)	CN	Description
2,678	96	Gravel surface, HSG A
4,509	98	Paved parking, HSG A
862	98	Roofs, HSG A
5,200	98	Unconnected pavement, HSG A
1,477	30	Woods, Good, HSG A
4,080	39	>75% Grass cover, Good, HSG A
75	96	Gravel surface, HSG B
81	61	>75% Grass cover, Good, HSG B
18,962	80	Weighted Average
8,391		44.25% Pervious Area
10,570		55.75% Impervious Area
5,200		49.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	30	0.0200	0.06		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	74	0.0270	3.34		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
9.0	170	Total			

Summary for Subcatchment SC-B2_prop: Subcat PROPOSED B2

Runoff = 0.00 cfs @ 15.31 hrs, Volume= 62 cf, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Prov County RI Rainfall=4.90"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Reach DP 1: DESIGN POINT 1

Inflow Area = 70,607 sf, 45.83% Impervious, Inflow Depth = 0.54" for 10-Year Prov County RI event
Inflow = 1.67 cfs @ 12.14 hrs, Volume= 3,171 cf
Outflow = 1.67 cfs @ 12.14 hrs, Volume= 3,171 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: DESIGN POINT2

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 0.00" for 10-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: DESIGN POINT 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth = 0.07" for 10-Year Prov County RI event
Inflow = 0.00 cfs @ 15.31 hrs, Volume= 62 cf
Outflow = 0.00 cfs @ 15.31 hrs, Volume= 62 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond DS1: DRY SWALE (1) 5' x 90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 2.04" for 10-Year Prov County RI event
Inflow = 1.76 cfs @ 12.09 hrs, Volume= 5,539 cf
Outflow = 0.92 cfs @ 12.26 hrs, Volume= 5,315 cf, Atten= 48%, Lag= 9.8 min
Discarded = 0.07 cfs @ 12.26 hrs, Volume= 3,192 cf
Primary = 0.85 cfs @ 12.26 hrs, Volume= 2,122 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 223.75' @ 12.26 hrs Surf.Area= 1,220 sf Storage= 1,553 cf

Plug-Flow detention time= 178.2 min calculated for 5,315 cf (96% of inflow)
Center-of-Mass det. time= 155.9 min (1,002.1 - 846.2)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**2.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.07 cfs @ 12.26 hrs HW=223.75' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.84 cfs @ 12.26 hrs HW=223.75' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.84 cfs @ 1.73 fps)

Summary for Pond DS2: DRY SWALE (2) 5'x90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 0.78" for 10-Year Prov County RI event
Inflow = 0.85 cfs @ 12.26 hrs, Volume= 2,122 cf
Outflow = 0.11 cfs @ 13.45 hrs, Volume= 2,122 cf, Atten= 87%, Lag= 71.6 min
Discarded = 0.06 cfs @ 13.45 hrs, Volume= 1,959 cf
Primary = 0.05 cfs @ 13.45 hrs, Volume= 164 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 223.54' @ 13.45 hrs Surf.Area= 1,082 sf Storage= 1,311 cf

Plug-Flow detention time= 274.8 min calculated for 2,122 cf (100% of inflow)
Center-of-Mass det. time= 274.9 min (1,056.6 - 781.6)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**1.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.06 cfs @ 13.45 hrs HW=223.54' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.04 cfs @ 13.45 hrs HW=223.54' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.04 cfs @ 0.65 fps)

Summary for Pond DS3: DRY SWALE (3) 6'x106'

Inflow Area = 38,042 sf, 42.77% Impervious, Inflow Depth = 1.96" for 10-Year Prov County RI event
Inflow = 1.97 cfs @ 12.09 hrs, Volume= 6,221 cf
Outflow = 1.73 cfs @ 12.14 hrs, Volume= 6,220 cf, Atten= 12%, Lag= 2.7 min
Discarded = 0.06 cfs @ 12.14 hrs, Volume= 3,213 cf
Primary = 1.67 cfs @ 12.14 hrs, Volume= 3,007 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 219.69' @ 12.14 hrs Surf.Area= 1,092 sf Storage= 1,196 cf

Plug-Flow detention time= 134.9 min calculated for 6,220 cf (100% of inflow)
Center-of-Mass det. time= 134.8 min (983.6 - 848.8)

Volume	Invert	Avail.Storage	Storage Description
#1	216.00'	1,574 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.00	632	0.0	0	0
219.00	632	33.0	626	626
219.10	632	100.0	63	689
220.00	1,336	100.0	886	1,574

Device	Routing	Invert	Outlet Devices
#1	Discarded	216.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 119.00'
#2	Primary	219.50'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.06 cfs @ 12.14 hrs HW=219.69' (Free Discharge)
1=Exfiltration (Controls 0.06 cfs)

Primary OutFlow Max=1.66 cfs @ 12.14 hrs HW=219.69' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Weir Controls 1.66 cfs @ 1.48 fps)

Summary for Pond Pervious Pavers: True Grid Pervious

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 2.81" for 10-Year Prov County RI event
Inflow = 1.29 cfs @ 12.13 hrs, Volume= 4,434 cf
Outflow = 0.33 cfs @ 12.55 hrs, Volume= 4,434 cf, Atten= 75%, Lag= 25.6 min
Discarded = 0.33 cfs @ 12.55 hrs, Volume= 4,434 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 221.63' @ 12.55 hrs Surf.Area= 5,200 sf Storage= 1,076 cf

Plug-Flow detention time= 20.5 min calculated for 4,432 cf (100% of inflow)
Center-of-Mass det. time= 20.5 min (846.0 - 825.4)

Volume	Invert	Avail.Storage	Storage Description
#1	221.00'	6,890 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
221.00	5,200	0.0	0	0
223.00	5,200	33.0	3,432	3,432
223.50	5,200	33.0	858	4,290
224.00	5,200	100.0	2,600	6,890

Device	Routing	Invert	Outlet Devices
#1	Discarded	221.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 216.00'
#2	Primary	223.70'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.33 cfs @ 12.55 hrs HW=221.63' (Free Discharge)
1=Exfiltration (Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=221.00' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment SC-A1_prop: Subcat PROPOSED A1

Runoff = 2.94 cfs @ 12.09 hrs, Volume= 9,145 cf, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Prov County RI Rainfall=6.10"

Area (sf)	CN	Description
3,725	98	Roofs, HSG A
11,783	39	>75% Grass cover, Good, HSG A
4,500	96	Gravel surface, HSG A
12,546	98	Paved parking, HSG A
5,488	30	Woods, Good, HSG A
38,042	70	Weighted Average
21,771		57.23% Pervious Area
16,271		42.77% Impervious Area

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

Summary for Subcatchment SC-A2_prop: Subcat PROPOSED A2

Runoff = 2.61 cfs @ 12.09 hrs, Volume= 8,086 cf, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Prov County RI Rainfall=6.10"

Area (sf)	CN	Description
1,662	98	Roofs, HSG A
12,586	98	Paved parking, HSG A
52	30	Woods, Good, HSG A
12,266	39	>75% Grass cover, Good, HSG A
1,843	98	Paved parking, HSG B
4,157	61	>75% Grass cover, Good, HSG B
32,566	71	Weighted Average
16,475		50.59% Pervious Area
16,091		49.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	42	0.0950	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.4	89	0.0400	4.06		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
4.2	131	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC-B1_prop: Subcat PROPOSED B1

Runoff = 1.78 cfs @ 12.13 hrs, Volume= 6,118 cf, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Prov County RI Rainfall=6.10"

Area (sf)	CN	Description
2,678	96	Gravel surface, HSG A
4,509	98	Paved parking, HSG A
862	98	Roofs, HSG A
5,200	98	Unconnected pavement, HSG A
1,477	30	Woods, Good, HSG A
4,080	39	>75% Grass cover, Good, HSG A
75	96	Gravel surface, HSG B
81	61	>75% Grass cover, Good, HSG B
18,962	80	Weighted Average
8,391		44.25% Pervious Area
10,570		55.75% Impervious Area
5,200		49.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	30	0.0200	0.06		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	74	0.0270	3.34		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
9.0	170	Total			

Summary for Subcatchment SC-B2_prop: Subcat PROPOSED B2

Runoff = 0.01 cfs @ 12.47 hrs, Volume= 236 cf, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Prov County RI Rainfall=6.10"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Reach DP 1: DESIGN POINT 1

Inflow Area = 70,607 sf, 45.83% Impervious, Inflow Depth = 1.28" for 25-Year Prov County RI event
Inflow = 2.79 cfs @ 12.11 hrs, Volume= 7,555 cf
Outflow = 2.79 cfs @ 12.11 hrs, Volume= 7,555 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: DESIGN POINT2

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 0.00" for 25-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: DESIGN POINT 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth = 0.27" for 25-Year Prov County RI event
Inflow = 0.01 cfs @ 12.47 hrs, Volume= 236 cf
Outflow = 0.01 cfs @ 12.47 hrs, Volume= 236 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond DS1: DRY SWALE (1) 5' x 90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 2.98" for 25-Year Prov County RI event
Inflow = 2.61 cfs @ 12.09 hrs, Volume= 8,086 cf
Outflow = 2.10 cfs @ 12.15 hrs, Volume= 7,765 cf, Atten= 19%, Lag= 3.6 min
Discarded = 0.08 cfs @ 12.15 hrs, Volume= 3,494 cf
Primary = 2.02 cfs @ 12.15 hrs, Volume= 4,271 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 223.94' @ 12.15 hrs Surf.Area= 1,346 sf Storage= 1,798 cf

Plug-Flow detention time= 132.0 min calculated for 7,765 cf (96% of inflow)
Center-of-Mass det. time= 110.0 min (945.1 - 835.1)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**2.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.08 cfs @ 12.15 hrs HW=223.94' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=2.02 cfs @ 12.15 hrs HW=223.94' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 2.02 cfs @ 2.40 fps)

Summary for Pond DS2: DRY SWALE (2) 5'x90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 1.57" for 25-Year Prov County RI event
Inflow = 2.02 cfs @ 12.15 hrs, Volume= 4,271 cf
Outflow = 0.91 cfs @ 12.44 hrs, Volume= 4,271 cf, Atten= 55%, Lag= 17.4 min
Discarded = 0.07 cfs @ 12.44 hrs, Volume= 2,279 cf
Primary = 0.84 cfs @ 12.44 hrs, Volume= 1,992 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 223.80' @ 12.44 hrs Surf.Area= 1,255 sf Storage= 1,619 cf

Plug-Flow detention time= 165.4 min calculated for 4,271 cf (100% of inflow)
Center-of-Mass det. time= 165.3 min (945.9 - 780.6)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**1.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.07 cfs @ 12.44 hrs HW=223.80' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.84 cfs @ 12.44 hrs HW=223.80' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.84 cfs @ 1.93 fps)

Summary for Pond DS3: DRY SWALE (3) 6'x106'

Inflow Area = 38,042 sf, 42.77% Impervious, Inflow Depth = 2.88" for 25-Year Prov County RI event
Inflow = 2.94 cfs @ 12.09 hrs, Volume= 9,145 cf
Outflow = 2.86 cfs @ 12.11 hrs, Volume= 9,038 cf, Atten= 3%, Lag= 1.2 min
Discarded = 0.07 cfs @ 12.11 hrs, Volume= 3,475 cf
Primary = 2.79 cfs @ 12.11 hrs, Volume= 5,563 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 219.76' @ 12.11 hrs Surf.Area= 1,150 sf Storage= 1,280 cf

Plug-Flow detention time= 98.8 min calculated for 9,035 cf (99% of inflow)
Center-of-Mass det. time= 92.0 min (929.4 - 837.4)

Volume	Invert	Avail.Storage	Storage Description
#1	216.00'	1,574 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.00	632	0.0	0	0
219.00	632	33.0	626	626
219.10	632	100.0	63	689
220.00	1,336	100.0	886	1,574

Device	Routing	Invert	Outlet Devices
#1	Discarded	216.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 119.00'
#2	Primary	219.50'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.07 cfs @ 12.11 hrs HW=219.76' (Free Discharge)
1=Exfiltration (Controls 0.07 cfs)

Primary OutFlow Max=2.79 cfs @ 12.11 hrs HW=219.76' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Weir Controls 2.79 cfs @ 1.78 fps)

Summary for Pond Pervious Pavers: True Grid Pervious

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 3.87" for 25-Year Prov County RI event
Inflow = 1.78 cfs @ 12.13 hrs, Volume= 6,118 cf
Outflow = 0.35 cfs @ 12.61 hrs, Volume= 6,118 cf, Atten= 80%, Lag= 28.8 min
Discarded = 0.35 cfs @ 12.61 hrs, Volume= 6,118 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 222.03' @ 12.61 hrs Surf.Area= 5,200 sf Storage= 1,771 cf

Plug-Flow detention time= 34.6 min calculated for 6,118 cf (100% of inflow)
Center-of-Mass det. time= 34.6 min (850.9 - 816.2)

Volume	Invert	Avail.Storage	Storage Description
#1	221.00'	6,890 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
221.00	5,200	0.0	0	0
223.00	5,200	33.0	3,432	3,432
223.50	5,200	33.0	858	4,290
224.00	5,200	100.0	2,600	6,890

Device	Routing	Invert	Outlet Devices
#1	Discarded	221.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 216.00'
#2	Primary	223.70'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.35 cfs @ 12.61 hrs HW=222.03' (Free Discharge)
1=Exfiltration (Controls 0.35 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=221.00' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Subcatchment SC-A1_prop: Subcat PROPOSED A1

Runoff = 5.19 cfs @ 12.09 hrs, Volume= 16,077 cf, Depth= 5.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Prov County RI Rainfall=8.70"

Area (sf)	CN	Description
3,725	98	Roofs, HSG A
11,783	39	>75% Grass cover, Good, HSG A
4,500	96	Gravel surface, HSG A
12,546	98	Paved parking, HSG A
5,488	30	Woods, Good, HSG A
38,042	70	Weighted Average
21,771		57.23% Pervious Area
16,271		42.77% Impervious Area

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

Summary for Subcatchment SC-A2_prop: Subcat PROPOSED A2

Runoff = 4.55 cfs @ 12.09 hrs, Volume= 14,092 cf, Depth= 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Prov County RI Rainfall=8.70"

Area (sf)	CN	Description
1,662	98	Roofs, HSG A
12,586	98	Paved parking, HSG A
52	30	Woods, Good, HSG A
12,266	39	>75% Grass cover, Good, HSG A
1,843	98	Paved parking, HSG B
4,157	61	>75% Grass cover, Good, HSG B
32,566	71	Weighted Average
16,475		50.59% Pervious Area
16,091		49.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	42	0.0950	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.30"
0.4	89	0.0400	4.06		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
4.2	131	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment SC-B1_prop: Subcat PROPOSED B1

Runoff = 2.84 cfs @ 12.12 hrs, Volume= 9,930 cf, Depth= 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Prov County RI Rainfall=8.70"

Area (sf)	CN	Description
2,678	96	Gravel surface, HSG A
4,509	98	Paved parking, HSG A
862	98	Roofs, HSG A
5,200	98	Unconnected pavement, HSG A
1,477	30	Woods, Good, HSG A
4,080	39	>75% Grass cover, Good, HSG A
75	96	Gravel surface, HSG B
81	61	>75% Grass cover, Good, HSG B
18,962	80	Weighted Average
8,391		44.25% Pervious Area
10,570		55.75% Impervious Area
5,200		49.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	30	0.0200	0.06		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.4	74	0.0270	3.34		**Shallow Concentrated Flow, SCF-1** Paved Kv= 20.3 fps
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
9.0	170	Total			

Summary for Subcatchment SC-B2_prop: Subcat PROPOSED B2

Runoff = 0.15 cfs @ 12.15 hrs, Volume= 916 cf, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Prov County RI Rainfall=8.70"

Area (sf)	CN	Description
2,312	39	>75% Grass cover, Good, HSG A
467	98	Roofs, HSG A
7,642	30	Woods, Good, HSG A
10,421	35	Weighted Average
9,954		95.52% Pervious Area
467		4.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.30"
0.6	55	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.1	105	Total			

Summary for Reach DP 1: DESIGN POINT 1

Inflow Area = 70,607 sf, 45.83% Impervious, Inflow Depth = 3.22" for 100-Year Prov County RI event
Inflow = 7.28 cfs @ 12.14 hrs, Volume= 18,947 cf
Outflow = 7.28 cfs @ 12.14 hrs, Volume= 18,947 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP 2: DESIGN POINT2

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 0.00" for 100-Year Prov County RI event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP3: DESIGN POINT 3

Inflow Area = 10,421 sf, 4.48% Impervious, Inflow Depth = 1.06" for 100-Year Prov County RI event
Inflow = 0.15 cfs @ 12.15 hrs, Volume= 916 cf
Outflow = 0.15 cfs @ 12.15 hrs, Volume= 916 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond DS1: DRY SWALE (1) 5' x 90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 5.19" for 100-Year Prov County RI event
Inflow = 4.55 cfs @ 12.09 hrs, Volume= 14,092 cf
Outflow = 4.11 cfs @ 12.13 hrs, Volume= 13,667 cf, Atten= 10%, Lag= 2.3 min
Discarded = 0.08 cfs @ 12.13 hrs, Volume= 3,929 cf
Primary = 4.03 cfs @ 12.13 hrs, Volume= 9,738 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 224.18' @ 12.13 hrs Surf.Area= 1,425 sf Storage= 2,139 cf

Plug-Flow detention time= 84.6 min calculated for 13,662 cf (97% of inflow)
Center-of-Mass det. time= 67.3 min (886.4 - 819.1)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**2.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.08 cfs @ 12.13 hrs HW=224.18' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=4.02 cfs @ 12.13 hrs HW=224.18' (Free Discharge)
└**2=Sharp-Crested Rectangular Weir** (Weir Controls 4.02 cfs @ 3.16 fps)

Summary for Pond DS2: DRY SWALE (2) 5'x90'

Inflow Area = 32,566 sf, 49.41% Impervious, Inflow Depth = 3.59" for 100-Year Prov County RI event
Inflow = 4.03 cfs @ 12.13 hrs, Volume= 9,738 cf
Outflow = 3.28 cfs @ 12.20 hrs, Volume= 9,731 cf, Atten= 19%, Lag= 4.3 min
Discarded = 0.08 cfs @ 12.20 hrs, Volume= 2,905 cf
Primary = 3.20 cfs @ 12.20 hrs, Volume= 6,826 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 224.22' @ 12.20 hrs Surf.Area= 1,433 sf Storage= 2,192 cf

Plug-Flow detention time= 96.1 min calculated for 9,728 cf (100% of inflow)
Center-of-Mass det. time= 95.8 min (883.6 - 787.7)

Volume	Invert	Avail.Storage	Storage Description
#1	219.00'	3,373 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.00	450	0.0	0	0
222.50	450	33.0	520	520
222.51	450	100.0	4	524
223.50	1,056	100.0	745	1,270
224.00	1,386	100.0	611	1,880
225.00	1,600	100.0	1,493	3,373

Device	Routing	Invert	Outlet Devices
#1	Discarded	219.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	223.50'	**1.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.08 cfs @ 12.20 hrs HW=224.22' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=3.19 cfs @ 12.20 hrs HW=224.22' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 3.19 cfs @ 3.27 fps)

Summary for Pond DS3: DRY SWALE (3) 6'x106'

Inflow Area = 38,042 sf, 42.77% Impervious, Inflow Depth = 5.07" for 100-Year Prov County RI event
Inflow = 5.19 cfs @ 12.09 hrs, Volume= 16,077 cf
Outflow = 5.08 cfs @ 12.11 hrs, Volume= 15,902 cf, Atten= 2%, Lag= 1.0 min
Discarded = 0.07 cfs @ 12.11 hrs, Volume= 3,781 cf
Primary = 5.01 cfs @ 12.11 hrs, Volume= 12,121 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 219.88' @ 12.11 hrs Surf.Area= 1,244 sf Storage= 1,423 cf

Plug-Flow detention time= 60.9 min calculated for 15,902 cf (99% of inflow)
Center-of-Mass det. time= 54.3 min (875.5 - 821.1)

Volume	Invert	Avail.Storage	Storage Description
#1	216.00'	1,574 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.00	632	0.0	0	0
219.00	632	33.0	626	626
219.10	632	100.0	63	689
220.00	1,336	100.0	886	1,574

Device	Routing	Invert	Outlet Devices
#1	Discarded	216.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 119.00'
#2	Primary	219.50'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.07 cfs @ 12.11 hrs HW=219.88' (Free Discharge)
1=Exfiltration (Controls 0.07 cfs)

Primary OutFlow Max=5.00 cfs @ 12.11 hrs HW=219.88' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Weir Controls 5.00 cfs @ 2.21 fps)

Summary for Pond Pervious Pavers: True Grid Pervious

Inflow Area = 18,962 sf, 55.75% Impervious, Inflow Depth = 6.28" for 100-Year Prov County RI event
Inflow = 2.84 cfs @ 12.12 hrs, Volume= 9,930 cf
Outflow = 0.41 cfs @ 12.72 hrs, Volume= 9,930 cf, Atten= 86%, Lag= 35.5 min
Discarded = 0.41 cfs @ 12.72 hrs, Volume= 9,930 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 222.99' @ 12.72 hrs Surf.Area= 5,200 sf Storage= 3,413 cf

Plug-Flow detention time= 66.3 min calculated for 9,927 cf (100% of inflow)
Center-of-Mass det. time= 66.3 min (868.8 - 802.6)

Volume	Invert	Avail.Storage	Storage Description
#1	221.00'	6,890 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
221.00	5,200	0.0	0	0
223.00	5,200	33.0	3,432	3,432
223.50	5,200	33.0	858	4,290
224.00	5,200	100.0	2,600	6,890

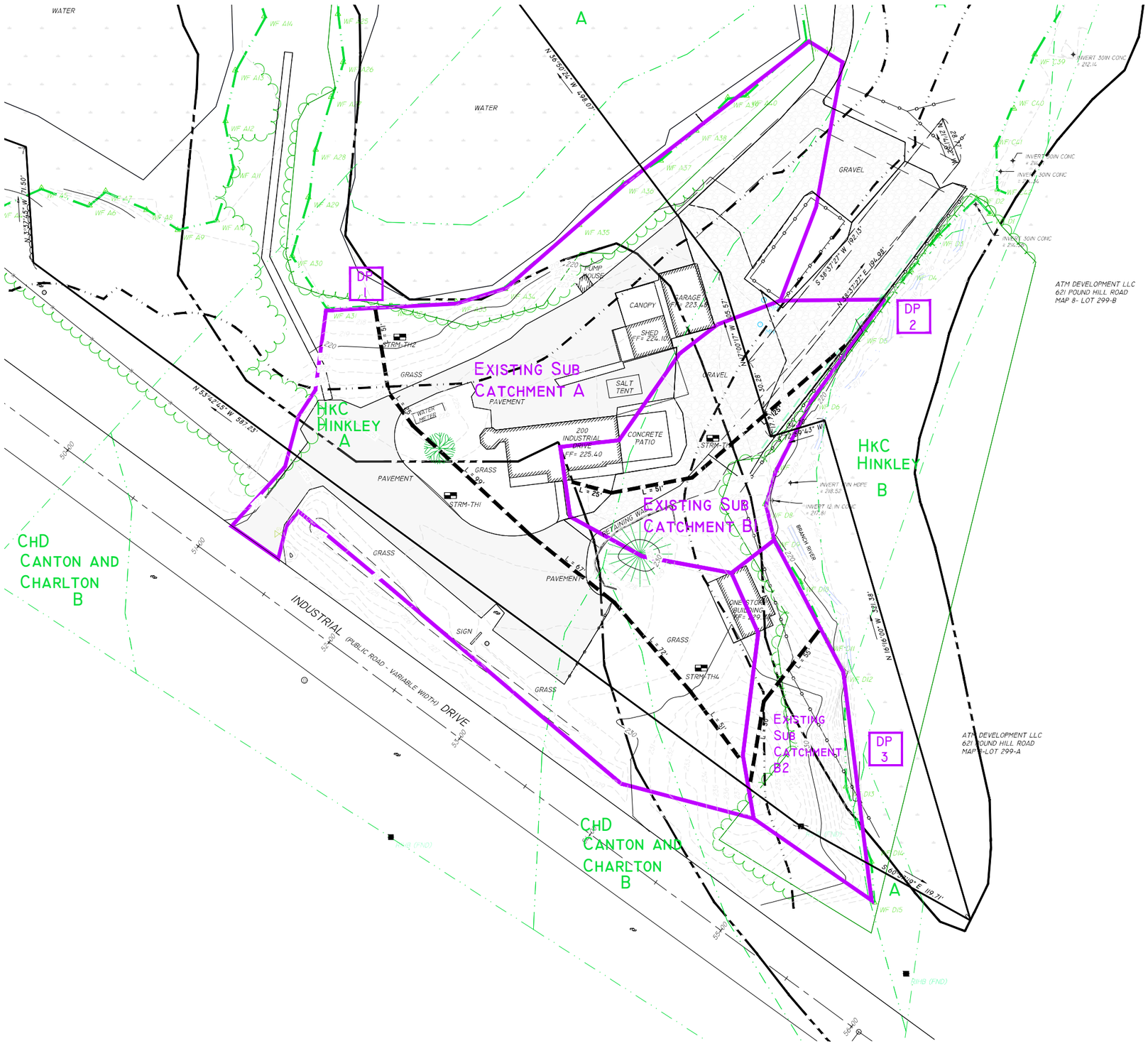
Device	Routing	Invert	Outlet Devices
#1	Discarded	221.00'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 216.00'
#2	Primary	223.70'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.41 cfs @ 12.72 hrs HW=222.99' (Free Discharge)
1=Exfiltration (Controls 0.41 cfs)

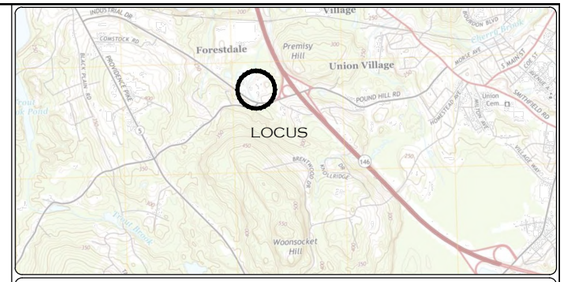
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=221.00' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

APPENDIX B

Watershed Maps



NAD83 RI STATE PLANE



LOCATION (NOT TO SCALE) MAP

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 INCH = 30 FT.

WATERSHED-EXISTING CONDITIONS PLAN

"BEEF BARN"
200 INDUSTRIAL DRIVE, N SMITHFIELD, RI
ASSESSORS MAP 372 LOT 283

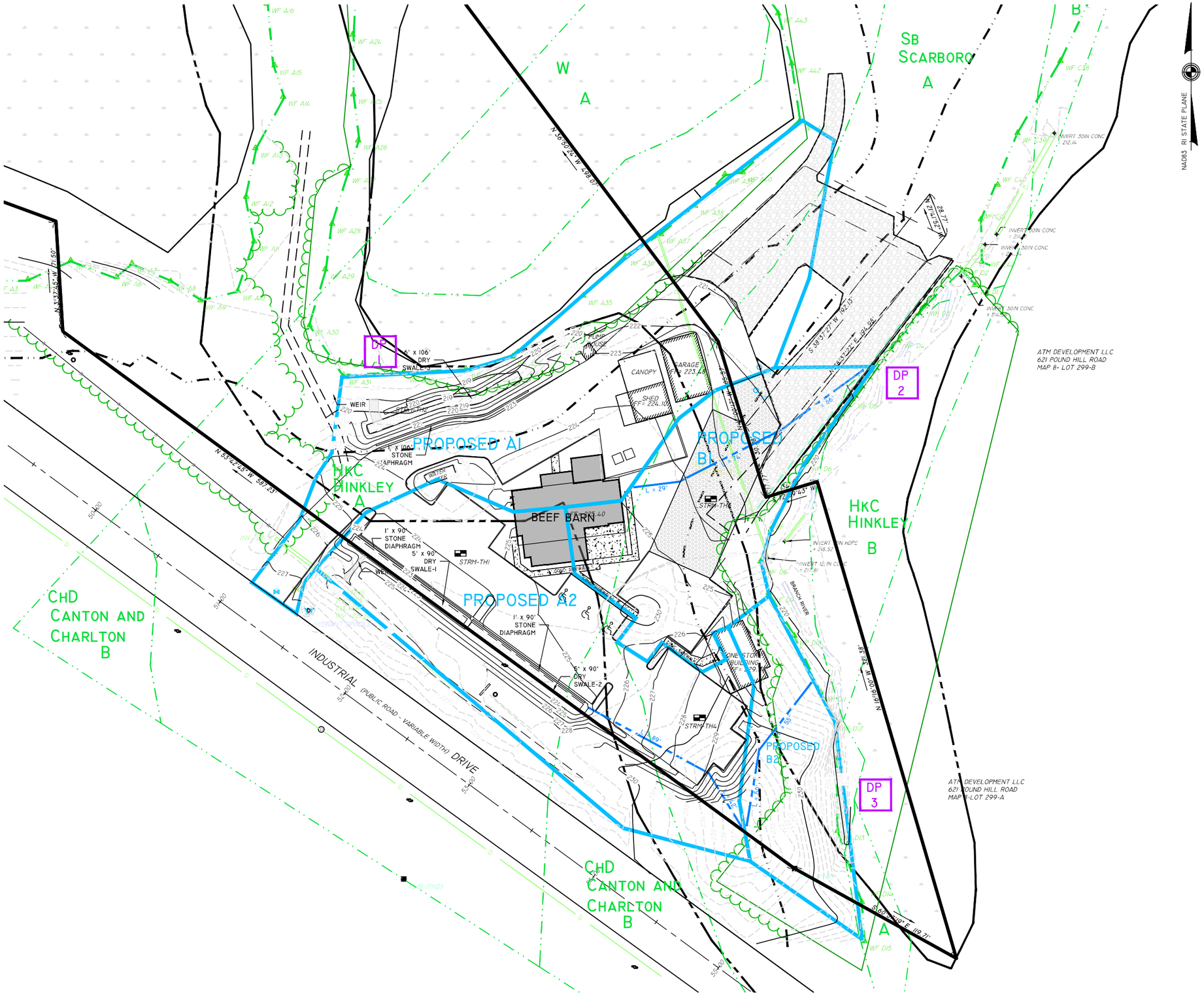
APPLICANT: MARC BRANCHAUD
200 INDUSTRIAL DRIVE, NORTH SMITHFIELD, RI

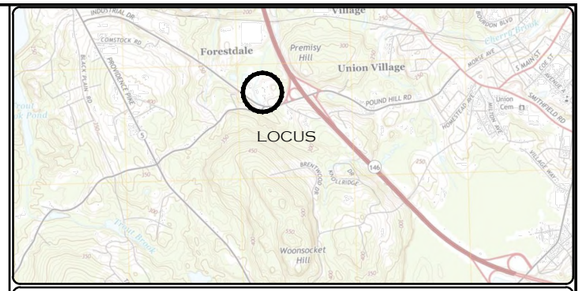
JOB #	SCALE:	DRAWN BY:	DATE:
19-048	1"= 30'	SES	JANUARY 28, 2020

REVISED:

PROFESSIONAL SEAL

InSite Engineering Services, LLC
PROFESSIONAL ENGINEERS | LAND SURVEYORS
Precision. Clarity. Certainty.
InSite Professional Complex, Suite 1
1539 Fall River Avenue Seekonk, MA 02771
Phone: (508) 336-4500 Fax: (508) 336-4558
Web Address: InsiteEngineers.com





LOCATION (NOT TO SCALE) MAP

GENERAL NOTES:

1. LOT SHOWN IS DESIGNATED AS LOT 300 ON ASSESSORS MAP 8.
2. OWNER OF RECORD: - POUND HILL REAL ESTATE CO LLC
   621 POUND HILL ROAD STE 107
   N. SMITHFIELD, RI
4. REFERENCE: DEED BOOK 372- PAGE 283.
5. WETLANDS FLAGGED BY NATURAL RESOURCE SERVICES, INC. ON AUGUST 26, 2019
6. PROPERTY LIES WITHIN A NATURAL HERITAGE AREA AND WITHIN A NON-COMMUNITY WELLHEAD PROTECTION AREA
7. SITE IS LOCATED PARTIALLY WITHIN A FLOOD HAZARD ZONE A (WITHOUT BFE) AS SHOWN ON FIRM PANEL 44007C0156G EFFECTIVE DATE 3/02/2009
8. VERTICAL CONTROL: NAVD 88
   HORIZONTAL CONTROL: RI STATE PLANE COORDINATES NAD83 USFT

GRAPHIC SCALE

50 0 15 30 60 120

(IN FEET)
1 INCH = 30 FT.

WATERSHED - PROPOSED CONDITIONS PLAN

"BEEF BARN"
200 INDUSTRIAL DRIVE, N SMITHFIELD, RI
ASSESSORS MAP 372 LOT 283

APPLICANT: MARC BRANCHAUD
200 INDUSTRIAL DRIVE, NORTH SMITHFIELD, RI

JOB #	SCALE:	DRAWN BY:	DATE:
19-048	1"= 30'	SES	JANUARY 28, 2020

REVISED:

PROFESSIONAL SEAL

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SHEET 2 OF 2