Project Narrative and Stormwater Management Report

Union Fire District of S. Kingstown
Station 7: Matunuck
5,500± Sq. Ft. Fire Station &
1,890± Sq. Ft. Emergency Medical Services Building

Located at
49 Matunuck School House Road
South Kingstown, Rhode Island
AP 86-2, Lot 32

Prepared for:
Union Fire District of South Kingstown
131 Asa Pond Road
Wakefield, RI 02879

Submission Date:
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Submitted by:

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1 INTRODUCTION
On behalf of the Union Fire District of South Kingstown, Joe Casali Engineering, Inc. (JCE) has prepared the following Project Narrative and Stormwater Management Report to identify existing and proposed site conditions related to the design and construction of a new 5,500± square foot Fire Station and an auxiliary 1,890± square foot Emergency Medical Services Building to replace the existing Matunuck Fire Station (Station 7), located at 49 Matunuck School House Road in South Kingstown, Rhode Island.

2 SITE LOCATION AND PHYSICAL DESCRIPTION
According to a March 2014 Class I Property Line Survey and Class III Topographic Survey performed by Pinch Land Surveying of Wakefield, RI, the total area of AP 86-2, Lot 32 is approximately 31,718.75 square feet (0.73 acres). Lot 32 is comprised of the existing fire station and associated parking lot. The remainder of the parcel is undeveloped. The subject parcel is bound by Matunuck School House Road to the south, AP 80-3, Lot 11 to the east (vacant farmland), Lot 29 to the north (multiple residential dwellings), and Lot 28 to the west (single-family dwelling), as shown below in Figure 1 – Locus Map.

Figure 1 - Locus Map
NOT TO SCALE
2.1 Soil Classification

According to Web Soil Survey (WSS) operated by the US Department of Agriculture Natural Resources Conservation Service (NRCS), produced by the National Cooperative Soil Survey, the soils on-site consist of Narragansett very stony silt loam, 0 to 8 percent slopes (NbB) and Ninigret fine sandy loam, 0 to 3 percent slopes (Nt). NbB soils generally consist of coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or granite. These soils are generally well drained and have a hydrologic soil group B. Nt soils consist of coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite. These soils are also classified as prime farmland and belong to hydrologic soil group C.

![Soil Map](image)

**Figure 2 - Soils Map**

Soil evaluations, witnessed by RIDEM, were performed by Natural Resource Services, Inc. in September 2013. Test pits were advanced with an excavator and were observed and logged by a Class IV Soil Evaluator in addition to being witnessed by RIDEM. Three (3) test holes were completed at the approximate locations shown on the plan in Appendix A.
Soil evaluations revealed a water table depth at ten feet for two of the test holes. One test hole consisted of human transported material and therefore the seasonal high groundwater table could not be determined.

2.2 Flood Zone Classification

The site is located on the Flood Insurance Rate Map for the Washington County, Rhode Island, Map Number 44009C0193J, effective date October 16, 2013. Based on this FEMA Flood Insurance Rate Map, the subject property and all adjacent properties, are identified as lying within FEMA Flood Zone X - areas determined to be outside the 0.2% annual-chance flood elevation.

2.3 Wetland Resources

According to a Freshwater Wetland Site Inspection completed by Natural Resource Services, Inc. (NRS) on September 23, 2013 (Appendix B), there are no regulated wetland features present on the subject property or adjacent to the site that would incur any setbacks onto the lot.

2.4 Zoning

According to the Town of South Kingstown Zoning Maps, the site is currently zoned as GI (Government and Institutional) District. The purpose of this district is to recognize the extent of public and semipublic land holdings and to provide guidance to utilization of
these lands should they be sold or otherwise transferred to private ownership. In general, the GI Zoning District does not have any dimensional requirements.

2.5 Easements
Based on a March 2014 Class I Property Survey performed by Pinch Land Surveying, there are no known easements located on the subject parcel.

2.6 Utilities
*Water:* There is an existing 12” water main located within Matunuck School House Road, owned and maintained by South Kingstown Water Division.

*Sewer:* Public sewers are not available in this area.

*Electric/Communications:* Telephone and electric services run overhead along the north side of Matunuck School House Road.

3 PROPOSED DEVELOPMENT OF LAND

3.1 General
The proposed project includes the construction of a new 5,500± square foot Fire Station (Station 7 Matunuck) and an auxiliary 1,890± square foot Emergency Medical Services Building to replace the existing fire station with associated improvements to the property for parking, site drainage, and wastewater treatment. The fire station is proposed to include a 3,750 sq. ft. main floor, consisting of the fire truck bays, offices and sleeping quarters, and a 1,750 sq. ft. basement storage area. The existing on-site cesspool will be abandoned, and a new innovative/alternative septic system will be installed. Two (2) underground infiltration chamber systems are proposed to treat stormwater runoff to provide water quality treatment to impervious areas associated with the new parking lot areas and rooftop areas. In addition, a new domestic water service will be provided to each building.

Per the Town Zoning Ordinance, public service buildings require one parking spaces per 350 square feet of floor area. The proposed buildings consist of a total of 5,640 sq. ft. of floor area (excluding closet/storage and utility spaces). Accordingly, per Zoning, a total of 16 parking spaces are required to service the site. However, based on the programmatic needs of Union Fire, the proposed rescue facility will house two (2) employees max.; the proposed fire station will house six (6) employees max.; with two (2) visitor spaces for a total programmatic need of ten (10) parking spaces. As currently designed, twelve (12) total parking spaces are proposed, slightly exceeding the programmatic needs of UFD, but slightly less than required per the Town’s Zoning Ordinance. In addition, driveway aisles
are slightly less in width than required per the South Kingstown Zoning Ordinance (24-feet required; 20-feet proposed). Given the tight geometry of the site and building code requirements, the building width has been minimized to the maximum extent practicable, to provide as much area for parking and travel aisles as possible. Parking stalls adjacent to the narrow driveway location have been widened to 10-feet to allow for added maneuvering area.

Given the awkward and tight geometry of the site, we have prepared several figures showing various vehicle turning templates navigating through the site. While we understand these are only models and may not necessarily represent real world conditions, it is important to note that this proposed facility is a public safety facility and most of the traffic navigating through the site is employees and staff of Union Fire District. There is generally little to no visitor traffic daily. Figures with the proposed site layout and various turning templates are included in Appendix C.

The site design has taken into consideration the neighboring property to the west by minimizing earthwork adjacent to the existing stand of mature arborvitae trees, maintaining the existing screening to the maximum extent practicable. In addition, the proposed fire station has been sited further back on the site when compared to the existing condition to reduce view of the station from the neighboring property. Landscaping has been provided through the site; however, given this is a public safety facility, the design generally does not meet the requirements of the South Kingstown Land Development Regulations. A detailed breakdown of landscaping waiver requests is provided on the Site Plans.

3.2 Utilities

Water: A new domestic water service will be provided to the new building from the existing 12-inch main within Matunuck School House Road.

Sewer: Sewer discharge will be handled by a new Onsite Wastewater Treatment System (OWTS). Each structure will discharge effluent to their own respective septic tank. The Fire Station building will have a 1,500 gallon two-compartment tank and the EMS building will have a 1,000 gallon two-compartment tank, each complete with an effluent filter within the outlet. Both septic tanks will direct effluent to a 1,000 gallon single compartment recirculation tank where effluent will be pumped through an Orenco Advantex Pre-Treatment Pod, reducing wastewater strength prior to dispersal. The pre-treatment system will also be configured to recirculate treated effluent back into the recirculation tank, creating an environment essential to promote nitrogen reduction. Final dispersal will be via a Geomatrix GST 6218 leach field system located under the pavement, north of the EMS building. Due to the leach field being beneath an impermeable surface, the system will incorporate the Geomatrix SoilAir System to enhance aeration.
Electric/Communications: Electric and telecommunications exist along Matunuck School House Road. Existing connections are proposed to be utilized to service the new buildings.

3.3 Drainage
Stormwater runoff from the new rooftops and pavement are proposed to be routed to one of two (2) underground infiltration systems that will ultimately discharge to an existing drainage system within Matunuck School House Road or offsite to the north, mimicking existing conditions. A small above-ground basin is proposed at the rear to treat and infiltrate runoff from the northern-most parking/paved area. Soil erosion and sedimentation controls are proposed throughout the duration of construction to protect the adjacent roadway and properties. Additional details are provided in Sections 5 and 6 below.

4 PERMIT REQUIREMENTS

4.1 Town of South Kingstown Permit Requirements

4.1.1 Planning Board of Review
The project will need to be reviewed and approved by the Planning Board of Review through the Development Plan Review process. The project will require two (2) stages of review: Technical Review Committee Meeting/Approval; and Development Plan Review Approval. Anticipated waiver requests include landscape relief, as detailed on the Landscape Plans.

4.1.2 Zoning Board
The project will require review and approval by the Zoning Board for several instances of dimensional relief from the requirements of the South Kingstown Zoning Ordinance, including the following:

- Article 7, Section 708: Width of Access Driveways: Access driveways shall not be less than twenty-four feet wide for two-way traffic.
  - Required = 24-feet; Proposed = 20-feet; Relief Requested = 4 feet.
- Article 7, Section 711: Minimum Off-Street Parking Requirements:
  - Required: 16 spaces; Proposed = 12 spaces; Relief Requested = 4 spaces.

4.1.3 South Kingstown Water Department
The proposed domestic water service design will require review and approval by the South Kingstown Water Department.
4.1.4 Building Permit
A Building Permit will be required from the Town of South Kingstown Building Official for construction of the proposed addition.

4.2 State of Rhode Island Permit Requirements

4.2.1 Rhode Island Department of Environmental Management (RIDEM)
The proposed OWTS system will need to be approved by the Rhode Island Department of Environmental Management’s (RIDEM) Office of Water Resources, OWTS Division. In addition, the stormwater management design will require submission of a Construction Stormwater Application (also known as a Groundwater Discharge Permit) from RIDEM’s Office of Water Resources.

4.2.2 Rhode Island Coastal Resources Management Council (RICRMC)
The project site lies within the RICRMC’s Special Area Management Plan (SAMP) for the Salt Ponds Region. However, upon review of Title 650 – Coastal Resources Management Council, Chapter 20 – Coastal Management Program, Part 3 – Salt Pond Region Special Area Management Plan (650-RICR-20-00-3) and based on discussions with the RICRMC, the proposed project does not propose a “watershed activity” requiring an application with the RICRMC. Specifically, the development does not create more than 40,000 sq. ft. of total impervious surface and does not proposed a septic system discharging greater than 2,000 gallons per day. Accordingly, review and approval from the RICRMC is not required.

5 STORMWATER MANAGEMENT PLAN

5.1 General
The proposed development is subject to the requirements of the Rhode Island Stormwater Design and Installation Standards Manual (RISDISM), implemented in December 2010, amended March 2015, by both the Rhode Island Department of Environmental Management (RIDEM) and the Rhode Island Coastal Resources Management Council (CRMC). As the site currently lies, there is no stormwater management system servicing the site. In general, the majority of the stormwater runoff from the site sheet flows to the north towards grassed and wooded areas. A small portion of the front driveway sheet flows towards the Matunuck School House Road shoulder to the south and east of the project area.

The site’s proposed stormwater management system has been designed to generally mimic existing conditions. The stormwater management design adheres to all State (RIDEM), and local (Town of South Kingstown) standards and provides attenuation of peak
stormwater runoff rates for the 1-, 2-, 10-, 25- and 100-year storm events while improving the quality of stormwater leaving the site. In addition, the design goes further and attenuates total stormwater runoff volumes for the 1-, 2-, 10-, 25- and 100-year storm events via implementation of infiltrating UICs and an above-ground infiltration basin.

The proposed Stormwater Management Plan improves the overall quality of stormwater leaving the site by using Best Management Practices (BMPs). These water quality BMPs incorporate low-impact development techniques, including two (2) underground infiltration systems and an above-ground infiltration basin. Pre-treatment has been included with the BMP designs to help reduce overall maintenance and to extend the design life of the BMPs. Pre-treatment practices include an isolator row within each individual Underground Infiltration Chamber (UIC) system and a pea gravel diaphragm and sediment forebay up-gradient of the infiltration basin.

5.2 Standard 1: LID Planning and Design Strategies

Low Impact Development (LID) site planning and design strategies must be used to the maximum extent practicable.

Standard Met

LID practices, which include installation of structural stormwater management systems including infiltration chambers and above-grade infiltration basins, have been included in the design. The proposed systems will provide the necessary water quality treatment using infiltration below the pavement and within landscaped areas. In addition, the proposed drainage patterns closely mimic that of the existing conditions.

5.3 Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub-watershed to maintain base flow at pre-development recharge levels to the maximum extent practicable.

Standard Met

Groundwater recharge is provided within the proposed underground infiltration systems and within the infiltration basin to be located on-site. All calculations were completed in accordance with Section 3.3.2 of the RISDISM using the following formula:

\[ Re_v = (1")(F)(I)/12 \]

Based on the results from the soil evaluations, a recharge factor of 0.35 was used for Hydrologic Soil Group B. As shown in Table 1 below, the required groundwater recharge volumes for the site are dramatically exceeded.
Table 1 - Recharge Requirements

<table>
<thead>
<tr>
<th>Subwatershed</th>
<th>2B</th>
<th>1B/1C</th>
<th>1D/1E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment System</td>
<td>UIC #1</td>
<td>UIC #2</td>
<td>Inf. Basin</td>
</tr>
<tr>
<td>Impervious Area (SF)</td>
<td>3,413</td>
<td>12,910</td>
<td>6,208</td>
</tr>
<tr>
<td>Recharge Factor (in)</td>
<td>0.35</td>
<td>0.35</td>
<td>0.35</td>
</tr>
<tr>
<td>Required Recharge Volume (CF)</td>
<td>100</td>
<td>377</td>
<td>181</td>
</tr>
<tr>
<td>Provided Recharge Volume (CF)</td>
<td>834</td>
<td>3,698</td>
<td>668</td>
</tr>
<tr>
<td>Recharge Requirement Met</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Notes: 1. Refer to Proposed Watershed Map located in Appendix G for BMP locations.
2. Based on Routing Analysis of WQV, the entire volume is infiltrated.
3. Recharge Volumes are calculated as the Static Storage Volume.
5. Static Storage Volume (Basin) = Volume below Spillway

5.4 Standard 3: Water Quality

The stormwater runoff from the site must be treated prior to discharge.

Standard Met

Based on the RISDM, the site is not considered a redevelopment, therefore only 100% of all disturbed impervious areas must be treated for water quality. Stormwater runoff associated with the front and side driveways, parking lot area between the two buildings, and the fire station rooftop area are treated by two (2) UIC systems. Stormwater runoff from the rear parking lot area and the EMS building rooftop are treated by a proposed infiltration basin. Water Quality Volume (WQv) is met through isolator rows for the UIC systems and via a sediment forebay for the infiltration basin system. Calculations were completed in accordance with Section 3.3.3 of the RISDM using the following formula:

\[ WQ_v = (1\text{”})(I)/12 \text{ in/ft} \]

Tables 2 and 3 below provide sizing calculations for the Water Quality Volume (WQv) of the pretreatment area and the treatment area, respectively. Water quality calculations are included in Appendix I. As shown in Tables 2 and 3 below, the required water quality volumes for the site are dramatically exceeded.
Table 2: Water Quality - Pretreatment Area Requirements

<table>
<thead>
<tr>
<th>Subwatershed</th>
<th>2B</th>
<th>1B</th>
<th>1E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment System</td>
<td>Isolator Row</td>
<td>Isolator Row</td>
<td>Sed. Forebay</td>
</tr>
<tr>
<td>Impervious Area (SF)</td>
<td>3,413</td>
<td>9,160 (no roof)</td>
<td>4,318 (no roof)</td>
</tr>
<tr>
<td>Required WQ(V) (CF)</td>
<td>284</td>
<td>763</td>
<td>353</td>
</tr>
<tr>
<td>Required Static Volume (CF) for Pretreatment (25% of WQ(V))</td>
<td>71</td>
<td>191</td>
<td>88</td>
</tr>
<tr>
<td>Pretreatment Volume Provided (CF)</td>
<td>834</td>
<td>956</td>
<td>132</td>
</tr>
<tr>
<td>Provided Static Storage Volume for Infiltration System (CF)</td>
<td>834</td>
<td>3,698</td>
<td>668</td>
</tr>
</tbody>
</table>

Notes: 1. Isolator Row added to Infiltration Chambers for Pretreatment.
3. Static Storage Volume (Basin) = Volume below Spillway.

Table 3: Water Quality – Treatment Area Requirements

<table>
<thead>
<tr>
<th>Subwatershed</th>
<th>2B</th>
<th>1B/1C</th>
<th>1D/1E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment System</td>
<td>UIC #1</td>
<td>UIC #2</td>
<td>Inf. Basin</td>
</tr>
<tr>
<td>Impervious Area (SF)</td>
<td>3,413</td>
<td>12,910</td>
<td>6,208</td>
</tr>
<tr>
<td>Required Water Quality Volume (CF)</td>
<td>284</td>
<td>1,076</td>
<td>517</td>
</tr>
<tr>
<td>Provided Static Storage Volume for Treatment (CF)</td>
<td>834</td>
<td>3,698</td>
<td>668</td>
</tr>
</tbody>
</table>

Notes: 1. Refer to Proposed Watershed Map located in Appendix G for watershed locations.

As shown in Tables 1 through 3 above, the site’s proposed stormwater management system greatly exceeds the requirements for groundwater recharge volume, water quality pretreatment volume and water quality treatment volume. This is in accordance with all RISDISM and Town of South Kingstown Standards, and ultimately helps eliminate or reduce impacts to down-gradient watershed areas and the Salt Pond Area SAMP for all design storm events.

5.5 Standard 4: Conveyance and Natural Channel Protection

This standard is designed to prevent erosive flow within natural channels and drainage ways.
Standard Met

The proposed project has been designed to reduce both peak stormwater rates and the volume of stormwater leaving the site and entering into the storm system for all storm events, up to and including the 100-yr design storm event. Accordingly, the design meets the requirements for conveyance and natural channel protection.

5.6 Standard 5: Overbank Flood Protection

Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 1-, 10-, and 100-year, Type III design storm events.

Standard Met

As presented in Section 6 below, reductions in peak stormwater runoff rates and total stormwater runoff volumes have been achieved for all design storm events. By implementing a series of infiltrating stormwater management practices, a significant volume of stormwater is injected back into the groundwater table, resulting in significant reductions in rates and volumes leaving the project site. Backup calculations are provided in Appendices F and H.

5.7 Standard 6: Redevelopment and Infill Projects

For redevelopment sites with 40% or more existing impervious surface coverage and infill sites, only Standards 2, 3, and 7-11 must be addressed.

Standard Not Met

As shown below, the proposed site improvements are not considered a redevelopment:

<table>
<thead>
<tr>
<th>Existing Site Area</th>
<th>Existing Impervious Area</th>
<th>Percent Impervious</th>
<th>Redevelopment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>31,719</td>
<td>9,365</td>
<td>29.5%</td>
<td>NO</td>
</tr>
</tbody>
</table>

5.8 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 quality.

Standard Met

Soil erosion and pollution control measures including a straw wattle and a crushed stone construction accesses are proposed during construction.
5.9 **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.

A stormwater LUHPPL is defined by the following land uses and activities:

1. Areas within an industrial site (as defined in RIPDES Rule 31(b)(15)) that are the location of activities subject to the RIPDES Multi-Sector General Permit (except where a No Exposure Certification for Exclusion from RIPDES Stormwater Permitting has been executed);
2. Auto fueling facilities (i.e., gas stations);
3. Exterior vehicle service, maintenance and equipment cleaning areas;
4. Road salt storage and loading areas (if exposed to rainfall); and
5. Outdoor storage and loading/unloading of hazardous substances.

*Standard Not Met*

The subject site does not meet the definition of a LUHPPL, as it does not maintain or require a RIPDES Multi-Sector General Permit.

5.10 **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.

*Standard Met*

There are no known existing illicit discharges at the site nor are any proposed as part of this project.

5.11 **Standard 10: Construction and Erosion Sedimentation Control**

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

*Standard Met*

Erosion control practices have been employed to avoid and minimize impacts to abutting properties. Detailed notes have been included in the plans to ensure effective implementation of erosion and sedimentation controls, which include a straw wattle around the perimeter of the site and a crushed stone construction access at the entrances to the site. The soil erosion and sedimentation control measures will be installed prior to the initiation of construction activities and maintained throughout construction. Once established, these measures will be monitored daily until construction activities are complete. The silt fence line will serve as the strict limits of disturbance for the project. No alterations, including
vegetative clearing or surface disturbance, will occur beyond this line. The limits of clearing, grading, and disturbance will be kept to a minimum within the proposed area of construction. All areas outside of these limits, as depicted on the project site plans, will remain undisturbed, in a completely natural condition.

5.12 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.

Standard Met
A long-term Stormwater Operation and Maintenance Plan has been prepared for the development in accordance with the Manual and is provided under separate cover.

6 DRAINAGE ANALYSIS

6.1 Methodology
A comparative pre- versus post-development hydrologic analysis was performed using the Soil Conservation Service, Technical Release 20 and 55 (TR-20 and TR-55) methodology. The 1-, 2-, 10-, 25-, and 100-year storm events were modeled for a 24-hour, Type III storm utilizing HydroCAD version 10.00. HydroCAD modeling reports for the existing and proposed conditions can be found in Appendices F and H, respectively.

As shown in the following sections, the proposed stormwater management system has been designed to attenuate peak stormwater runoff rates and reduce stormwater volumes leaving the site for the 1-, 2-, 10-, 25- and 100-year design storm events.

6.2 Existing Conditions
The existing site consists of two (2) subwatersheds discharging to two (2) off-site design points further described as a lower gradient wooded/grasses area (DP-1) and a drainage swale along the north side of Matunuck School House Road (DP-2). The existing site contains the Union Fire District Station 7 and associated paved parking lot. An Existing Conditions Watershed Map is included in Appendix E.

Design Point 1 – Lower Gradient

Watershed 1: Consists of the majority of the existing station’s rooftop and a portion of the site’s paved parking areas; the remainder of this watershed area consists of grassed/wooded areas to the north of the existing station. This watershed area consists of a total of 107,101
sq. ft. of area, primarily grassed/wooded and therefore has been assigned a $T_c$ of 7.9 minutes and a composite CN Runoff Number of 66. Runoff from this area sheet flows to lower grade to the north and east of the project area (Design Point 1).

**Design Point 2 – Matunuck School House Road**

*Watershed 2:* Consists of a small portion of the existing station’s rooftop and a portion of the site’s paved parking areas; the remainder of this watershed area consists of grasses/wooded areas to the west and east of the existing station. This watershed area consists of a total of 31,405 sq. ft. of area, primarily impervious and therefore has been assigned a $T_c$ of 6 minutes and a composite CN Runoff Number of 86. Runoff from this area sheet flows to a drainage swale along the north side of Matunuck School House Road (Design Point 2).

### 6.3 Proposed Conditions

Proposed drainage conditions very closely mimic existing conditions. Under proposed conditions stormwater runoff from the subject site will continue to discharge to the two (2) off-site design points further described as a lower gradient wooded/grasses area (DP-1) and a drainage swale along the north side of Matunuck School House Road (DP-2). The stormwater runoff associated with the proposed driveway to the south of the proposed fire station will also be directed to UIC #1. The stormwater runoff associated with the parking lot to the west and north of the proposed fire station will be conveyed to UIC #2. The roof drains associated with the proposed fire station will discharge via underground piping to the proposed UIC #2. Stormwater runoff associated with the remaining parking lot to the rear of the site will sheet flow to the north towards the proposed sediment forebay and infiltration basin. The roof drains associated with the proposed emergency medical services (EMS) building will discharge via underground piping to the proposed infiltration basin. The drainage systems will treat stormwater runoff pollutants and reduce peak stormwater runoff rates and volumes. These conditions are shown in detail on the Proposed Conditions Watershed Map included in Appendix G.

**Design Point 1 – Lower Gradient**

*Subwatershed 1A:* Consists of the 74,128 sq. ft. area containing a portion of the residential properties to the west of the site. This watershed area has been assigned a $T_c$ of 7.9 minutes and a composite CN Runoff Number of 63. Runoff from this area sheet flows to lower grade to the north of the project area (Design Point 1).

*Subwatershed 1B:* Consists of the 13,552 sq. ft. area containing an access driveway, a portion of the parking lot area and a new landscaped area to the west and north of the new
fire station. Stormwater runoff associated with this subwatershed is captured within a double catch basin and conveyed to UIC #2. Excess stormwater from this system overflows and sheet flows to Design Point 1, mimicking existing conditions. Due to the improvements proposed, Subwatershed 1B has been assigned a minimum Time of Concentration (Tc) of 6.0 minutes and a Composite Runoff Number (CN) of 88.

Subwatershed 1C: Consists of the 3,750 sq. ft. area containing the rooftop area associated with the proposed fire station. Stormwater runoff associated with the new rooftop will discharge via underground piping to the proposed UIC #2. The UIC system has been designed to allow excess stormwater to overflow and sheet flows to Design Point 1, mimicking existing conditions. UIC #2 has been designed to completely capture up to and including the 100-yr design storm event; only overflowing during larger storm events. Subwatershed 1C has been assigned a minimum Time of Concentration (Tc) of 6.0 minutes and a Composite Runoff Number (CN) of 98.

Subwatershed 1D: Consists of the 1,890 sq. ft. area containing the rooftop area associated with the proposed EMS building. Stormwater runoff associated with the new rooftop will discharge via underground piping to the proposed infiltration basin. The system has been designed to allow excess stormwater to overflow and sheet flow to Design Point 1, mimicking existing conditions. The infiltration basin has been designed to completely capture up to and including the 100-yr design storm event; only overflowing during larger storm events. Subwatershed 1D has been assigned a minimum Time of Concentration (Tc) of 6.0 minutes and a Composite Runoff Number (CN) of 98.

Subwatershed 1E: Consists of the 12,230 sq. ft. area containing a portion of the rear parking lot area and the grassed area to the rear of the site. Stormwater runoff associated with this subwatershed is conveyed to the pea gravel diaphragm, the sediment forebay, and the infiltration basin. Excess stormwater from this system overflows and sheet flows to Design Point 1, mimicking existing conditions. Due to the improvements proposed, Subwatershed 1E has been assigned a minimum Time of Concentration (Tc) of 6.0 minutes and a Composite Runoff Number (CN) of 74.

Design Point 2 – Matunuck School House Road

Subwatershed 2A: Consists of 28,791 sq. ft. of grassed/wooded areas to the west of the project site. This watershed area has been assigned a minimum Tc of 6 minutes and a CN of 85. Runoff from this area sheet flows to a drainage swale along the north side of Matunuck School House Road (Design Point 2).
Subwatershed 2B: Consists of 4,165 sq. ft. of the driveway entrance for the project site. This watershed area has been assigned a minimum $T_c$ of 6 minutes and a CN of 91. Runoff from this area is captured within a catch basin and conveyed to UIC #1. Excess stormwater overflows the system and sheet flows to a drainage swale along the north side of Matunuck School House Road (Design Point 2).

6.4 Results

A runoff analysis of the pre- and post-construction conditions was completed using the TR-20 methodology and is summarized in Table 4 below. Supporting calculations for the pre- and post-construction conditions are included in Appendices F and H respectively.

Table 4: Watershed Data

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<tr>
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<th>Area (SF)</th>
<th>CN</th>
<th>$T_c$ (min.)</th>
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<td>Watershed 2</td>
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<td><strong>Proposed Conditions</strong></td>
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<tr>
<td>Subwatershed 1A</td>
<td>74,128</td>
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<td>7.9</td>
</tr>
<tr>
<td>Subwatershed 1B</td>
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<td>Subwatershed 1D</td>
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<td>Subwatershed 2A</td>
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<td><strong>Proposed Total</strong></td>
<td><strong>138,506</strong></td>
<td>73</td>
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</table>

**Delta (∆)**: 0 +2 --

Note: Minimum $T_c$ = 6 minutes; CN averages are weighted averages.

As shown in Table 4 above, the overall watershed area remains unchanged when comparing existing to proposed conditions. However, due to the implementation of additional impervious area associated with the proposed fire station and EMS buildings, the CN value has increased slightly.
Table 5: Stormwater Runoff Discharge

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<tr>
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<th>Peak Discharge (cfs) to Design Point</th>
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<td>1-Year</td>
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<tr>
<td>Existing DP #1</td>
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<td>Proposed DP #1</td>
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<td>ΔQ</td>
<td>-0.43</td>
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<tr>
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<td>Proposed DP #2</td>
<td>1.02</td>
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<tr>
<td>ΔQ</td>
<td>-0.15</td>
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</table>

As shown in Table 5, the peak stormwater runoff rates realized at Design Point 1 and 2 have been reduced for all design storm events. This has been achieved via the implementation of three infiltrating stormwater management practices and will ultimately ensure there are no negative impacts resulting to down-gradient properties.

Table 6: Stormwater Total Runoff Volume

<table>
<thead>
<tr>
<th></th>
<th>Total Runoff Volume (cf) to Design Point</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1-yr</td>
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<tr>
<td>Existing DP #1</td>
<td>3,648</td>
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<td>-1,705</td>
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<td>Existing DP #2</td>
<td>3,687</td>
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<td>Proposed DP #2</td>
<td>3,214</td>
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<td>ΔV</td>
<td>-473</td>
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</table>

As shown in Table 6, the total stormwater runoff volumes realized at Design Point 1 and 2 have been reduced for all design storm events. This has been achieved via the implementation of three infiltrating stormwater management practices and will ultimately ensure there are no negative impacts resulting to down-gradient properties.
7 CONCLUSIONS

As shown in Tables 5 through 6 above, the proposed improvements have been designed to minimize impacts of the proposed site development by attenuating peak storm water runoff rates and volumes for the 1-, 2-, 10-, 25-, and 100-year design storm events. The stormwater management system design results in dramatic decreases in peak stormwater flows and total runoff volumes to the two (2) off-site design points further described as a lower gradient wooded/grasses area (DP-1) and a drainage swale along the north side of Matunuck School House Road (DP-2).

The proposed Stormwater Management Plan improves the overall quality of stormwater leaving the site by using Best Management Practices (BMPs). These water quality BMPs incorporate low-impact development techniques, including two (2) underground infiltration systems and an above-ground infiltration basin. Pre-treatment has been included with the BMP designs to help reduce overall maintenance and to extend the design life of the BMPs. Pre-treatment practices include an isolator row within each individual Underground Infiltration Chamber (UIC) system and a pea gravel diaphragm and sediment forebay up-gradient of the infiltration basin.

The proposed site’s UIC #1 has been designed to infiltrate all stormwater generated from the site for up to and including the 25-year design storm event. UIC #2 has been designed to infiltrate all stormwater runoff generated from the site up to and including the 10-year design storm, while the infiltration basin infiltrates up to the 2-year design storm. In addition, the overall drainage system possesses enough capacity to reduce the peak flows and volumes for the 1-, 2-, 10-, 25- and 100-year design storm events. The result is a significant improvement in the quality of stormwater leaving the site and a dramatic reduction in stormwater runoff rates and volumes to down-gradient watershed areas and the Salt Pond Area SAMP for all design storm events.
Appendix A

Soil Evaluations
prepared by Natural Resource Services, Inc., September 2013
## Site Evaluation Form

### Part A - Soil Profile Description

<table>
<thead>
<tr>
<th>TH / Horizon</th>
<th>Depth</th>
<th>Horizon Boundaries</th>
<th>Soil Colors</th>
<th>Re-Dox Description</th>
<th>Ab. S. Con.</th>
<th>Texture</th>
<th>Structure</th>
<th>Consistence</th>
<th>Soil Category</th>
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### TH 2

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</tbody>
</table>

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**Soil Class:** Ice Contact - D  
**Total Depth of each Test Hole:** 112"  
**Depth to Groundwater Seepage:** 210"  
**Estimated Seasonal High Water Table:** 110", 210"  
**Depth to Impervious or Limiting Layer:** >112"  

**Comments:**
Property Owner: The Union Fire District
Property Location: 49 Matunuck Schoolhouse Rd., South Kingstown, RI
Date of Test Hole: 9-23-13
Soil Evaluator: Edward J. Avizinis
Weather: Sunny 60's

<table>
<thead>
<tr>
<th>TH</th>
<th>Horizon</th>
<th>Depth</th>
<th>Horizon Boundaries</th>
<th>Soil Colors</th>
<th>Re-Dox Description</th>
<th>Ab. S. Con.</th>
<th>Texture</th>
<th>Structure</th>
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</table>

Soil Class: HTM
Depth to Groundwater Seepage: 
Estimated Seasonal High Water Table: 

Total Depth of each Test Hole: 90'
Depth to Impervious or Limiting Layer: > 90'
Comments: It appears the station was constructed on a fill pile
Part B

Site Evaluation - to be completed by Class II or III Designer or Soil Evaluator

Please use the area below to locate:
1. Test holes
2. Approximate direction of due north
3. Offsets from test holes to fixed points such as street, utility pole, or other permanent, marked object

Key:
- Approximate location of test holes
- Estimated gradient and direction of slope
- Approximate direction of due north

1. Relief and Slope: 0 - 3%
2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes: YES [ ] NO [ ] If yes, locate on above sketch.
3. Presence of existing or proposed private drinking water wells within 200 feet of test holes: YES [ ] NO [ ] If yes, locate on above sketch.
4. Public drinking water wells within 500 feet of test holes: YES [ ] NO [ ] If yes, locate on above sketch.
5. Is site within the watershed of a public drinking water reservoir or other critical area defined in SD 19.00? YES [ ] NO [ ]
6. Has soil been excavated from or fill deposited on site? YES [ ] NO [ ] If yes, locate on above sketch.
7. Site's potential for flooding or ponding: NONE [ ] SLIGHT [ ] MODERATE [ ] SEVERE [ ]
8. Landscape position: lawn
9. Vegetation: lawn
10. Indicate approximate location of property lines and roadways.
11. Additional comments, site constraints or additional information regarding site: 

Certification
The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by:

Part B prepared by:

FOR OFFICE USE ONLY
Decision: Approved (SD 26.00(f)(1) [ ] Not in compliance, or more information required (SD 26.00(f)(2) [ ] Disclaimed (SD 27.00(f)(3) [ ]
Comments:

Signature Authorized Agent Date

revised 5/8/01
APPLICATION NUMBER: 1332-1133
STREET: 49 Matunuck Schoolhouse Road
CITY/TOWN: South Kingstown
PLAT/LOT: 86-2 32

O'Rourke
INSPECTOR:
09/23/2013
INSPECTION DATE:

类型的inspection:
Dry Season Inspection for Soil

FINDINGS/COMMENTS

TH1 = 10
TH2 = 10
TH3 = 0

RESULTS OF INSPECTION/ACTION REQUIRED

☐ CONSTRUCTION - DESIGNER MUST INSPECT/APPROVE PRIOR TO DEM INSPECTION
☐ Bottom inspected
☐ Cover inspected
☐ Correct items listed
☐ (RFA) Address items listed and call for re-inspection.
☐ (ASB) Designer must submit As-Builts
☐ (RPREQ) Redesign required. Submit new application.
☐ (RFAD) Stop Construction. Contact OWTS office. DO NOT CONTINUE.
☐ (COC) Designer submit COC
☐ (O&M) O&M agreement and permit must be recorded in Land Evidence Records.
☐ (Fee) A $100.00 fee is required before re-inspection.
☐ Inspection waived

Signature of Inspector 

SITE TESTING
☐ Soil Evaluation - Concur
☐ Soil Evaluation - Do not concur
☐ Soil Evaluation - Inconclusive
☐ Alteration Test Hole - Verified
☐ Alteration Test Hole - Unacceptable
☐ Ledge Test
☐ Fill Tests
☐ Repair Test Hole
Appendix B

Freshwater Wetland Determination Letter,
prepared by Natural Resource Services, Inc., October 2013
9 October 2013

Joe Casali Engineering, Inc.
300 Post Road
Warwick, RI 02888

RE: Wetland consulting services
    A.P. 86-2, Lot 32
    South Kingstown, RI

Dear Mr. Casali,

Natural Resource Services, Inc. (NRS) has completed its site inspection of the above referenced property. The purpose of this visit was to determine whether or not state regulated freshwater wetlands were present on or immediately adjacent to the subject property. The opinions expressed in this letter are based upon my site visit on September 23, 2013 and my professional understanding of the Rhode Island Coastal Resources Management Program. All opinions expressed by NRS are subject to review and confirmation from the CRMC before being considered final.

The property is currently the site of the local fire department which is located on the south side of the lot adjacent to Matunuck Schoolhouse Road. The remainder of the lot is maintained lawn. In my opinion, there are no regulated wetland features present on the lot or near the lot that would incur any setbacks onto the lot as determined by my site visit on September 23, 2013.

It is important to note however, that the lot is within the Salt Ponds Special Area Management Plan and classified as “Lands of Critical Concern”. This may have implications in regards to the design of the potential OWTS. Please do not hesitate to contact me if you have any questions.

Truly yours,

Edward J. Avizinis
Wetland Biologist/Soil Scientist

NRS file #13-177
Appendix C

Site Layout with Vehicle Turning Templates
UNION FIRE DISTRICT OF S. KINGSTOWN
STATION 7 MATUNUCK
49 MATUNUCK SCHOOLHOUSE ROAD
S. KINGSTOWN, RHODE ISLAND
AP 86-2, LOT 32

EXISTING
SINGLE-FAMILY
DWELLING
723 SF

EXISTING
GARAGE
729 SF

12" WATER MAIN

WATER S/O

WIRE FENCE

FORD F-150

F-150 Regular Cab 4x4 STYLESIDE 8'
Overall Length: 193.3088
Overall Width: 79.7566
Overall Body Height: 6.9175
Min Body Ground Clearance: 7.3388
Track Width: 6.5750
Lock-to-lock time: 4.005
Curb to Curb Turning Radius: 23.6008

SCALE (FEET)
0 10 20 30 40 50 60 70 80

1 INCH = 20 FT

DESIGNED BY:
DRD

DRAWN BY:
DRD

CHECKED BY:
JAC

DATE:
JUNE 2021

PROJECT NO:
09-31c

REVISIONS:

PRELIMINARY, NOT FOR CONSTRUCTION

JOE CASALI  ENGINEERING, Inc.
Civil ∙ Site Development ∙ Transportation
Drainage ∙ Wetlands ∙ ISDS ∙ Traffic ∙ Floodplain
300 Post Road, Warwick, RI 02888

Preliminary Set

09-31c Station 7 - Matunuck
ACAD
Jul. 30, 2021 9:55am
Q:\09-31 Union Fire Station\09-31c Station 7 - Matunuck\ACAD\Union Fire - Station 7 Matunuck \[Working Preliminary Set\].dwg
Appendix D

Architectural Plans, prepared by Aharonian and Associates, Inc.
Appendix E

Existing Condition Watershed Map
Appendix F

Existing Condition HydroCAD Calculations
Routing Diagram for Station 7 Matunuck - Existing - R1
Prepared by (enter your company name here), Printed 7/30/2021
HydroCAD® 10.10-4a s/n 03396 © 2020 HydroCAD Software Solutions LLC

Subcat Reach Pond Link

Watershed 1
W1

Watershed 2
W2

Lower Gradient
DP-1

Matunuck School House Road
DP-2
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<th>Event#</th>
<th>Event Name</th>
<th>Storm Type</th>
<th>Curve Mode</th>
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<tr>
<td>103,489</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B (W1, W2)</td>
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<tr>
<td>20,154</td>
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<td>Paved parking &amp; Roadways, HSG B (W2)</td>
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</table>
**Summary for Subcatchment W1: Watershed 1**

Runoff = 0.73 cfs @ 12.16 hrs, Volume = 3,648 cf, Depth = 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,411</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>7,404</td>
<td>98</td>
<td>Paved parking, HSG B</td>
</tr>
<tr>
<td>93,286</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>107,101</td>
<td>66</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>93,286</td>
<td>61</td>
<td>87.10% Pervious Area</td>
</tr>
<tr>
<td>13,815</td>
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<td>12.90% Impervious Area</td>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
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<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<tbody>
<tr>
<td>6.2</td>
<td>100</td>
<td>0.0600</td>
<td>0.27</td>
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<td><strong>Sheet Flow, SEG A</strong></td>
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<tr>
<td></td>
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<td>Grass: Short n= 0.150 P2= 3.30&quot;</td>
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<td>1.7</td>
<td>355</td>
<td>0.0560</td>
<td>3.55</td>
<td></td>
<td><strong>Shallow Concentrated Flow, SEG B</strong></td>
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<td>Grasped Waterway Kv= 15.0 fps</td>
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**Subcatchment W1: Watershed 1**

**Type III 24-hr 1-Year Rainfall=2.70"**
Runoff Area=107,101 sf
Runoff Volume=3,648 cf
Runoff Depth=0.41"
Flow Length=455'
Tc=7.9 min
CN=66
Summary for Subcatchment W2: Watershed 2

Runoff = 1.17 cfs @ 12.09 hrs, Volume= 3,687 cf, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
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<tbody>
<tr>
<td>1,048</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>* 20,154</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>31,405</td>
<td>86</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>32.49% Pervious Area</td>
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<td>21,202</td>
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<th>Tc (min)</th>
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<th>Capacity (cfs)</th>
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<tbody>
<tr>
<td>1.0</td>
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<td>1.33</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
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<tr>
<td>3.5</td>
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<td>0.0380</td>
<td>3.96</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
</tr>
<tr>
<td>4.5</td>
<td>904</td>
<td>Total</td>
<td>Increased to minimum Tc = 6.0 min</td>
<td></td>
<td></td>
</tr>
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</table>

Subcatchment W2: Watershed 2

Type III 24-hr 1-Year Rainfall=2.70"
Runoff Area=31,405 sf
Runoff Volume=3,687 cf
Runoff Depth=1.41"
Flow Length=904'
Tc=6.0 min
CN=86
Summary for Link DP-1: Lower Gradient

Inflow Area = 107,101 sf, 12.90% Impervious, Inflow Depth = 0.41" for 1-Year event
Inflow = 0.73 cfs @ 12.16 hrs, Volume = 3,648 cf
Primary = 0.73 cfs @ 12.16 hrs, Volume = 3,648 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Link DP-1: Lower Gradient
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 31,405 sf, 67.51% Impervious, Inflow Depth = 1.41" for 1-Year event
Inflow = 1.17 cfs @ 12.09 hrs, Volume = 3,687 cf
Primary = 1.17 cfs @ 12.09 hrs, Volume = 3,687 cf, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs

Link DP-2: Matunuck School House Road

Hydrograph

Inflow Area = 31,405 sf
Summary for Subcatchment W1: Watershed 1

Runoff = 1.51 cfs @ 12.14 hrs, Volume= 6,195 cf, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
<tr>
<th>Area (sf)</th>
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<tbody>
<tr>
<td>6,411</td>
<td>98</td>
<td>Roofs, HSG B</td>
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<tr>
<td>7,404</td>
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<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
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<td>107,101</td>
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<td>61</td>
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<td>98</td>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<tbody>
<tr>
<td>6.2</td>
<td>100</td>
<td>0.0600</td>
<td>0.27</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
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<td>Grass: Short n= 0.150 P2= 3.30&quot;</td>
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<tr>
<td>1.7</td>
<td>355</td>
<td>0.0560</td>
<td>3.55</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Grassed Waterway Kv= 15.0 fps</td>
</tr>
<tr>
<td>7.9</td>
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<td></td>
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<td>Total</td>
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Subcatchment W1: Watershed 1

Hydrograph

Type III 24-hr 2-Year Rainfall=3.30"
Runoff Area=107,101 sf
Runoff Volume=6,195 cf
Runoff Depth=0.69"
Flow Length=455'
Tc=7.9 min
CN=66
Summary for Subcatchment W2: Watershed 2

Runoff = 1.59 cfs @ 12.09 hrs, Volume= 5,031 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
<tr>
<th>Area (sf)</th>
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<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1,048</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>* 20,154</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
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<tr>
<td>31,405</td>
<td>86</td>
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<td>21,202</td>
<td>98</td>
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<table>
<thead>
<tr>
<th>Tc</th>
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<th>Velocity</th>
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<tr>
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<td>Sheet Flow, SEG A</td>
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<tr>
<td></td>
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<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
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<tr>
<td>3.5</td>
<td>827</td>
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<td>3.96</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
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<td>Paved Kv= 20.3 fps</td>
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<tr>
<td>4.5</td>
<td>904</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
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Subcatchment W2: Watershed 2

Type III 24-hr 2-Year Rainfall=3.30"
Runoff Area=31,405 sf
Runoff Volume=5,031 cf
Runoff Depth=1.92"
Flow Length=904'
Tc=6.0 min
CN=86
Summary for Link DP-1: Lower Gradient

Inflow Area = 107,101 sf, 12.90% Impervious, Inflow Depth = 0.69" for 2-Year event
Inflow = 1.51 cfs @ 12.14 hrs, Volume = 6,195 cf
Primary = 1.51 cfs @ 12.14 hrs, Volume = 6,195 cf, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs

Link DP-1: Lower Gradient

Inflow Area = 107,101 sf
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 31,405 sf, 67.51% Impervious, Inflow Depth = 1.92" for 2-Year event
Inflow = 1.59 cfs @ 12.09 hrs, Volume= 5,031 cf
Primary = 1.59 cfs @ 12.09 hrs, Volume= 5,031 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Link DP-2: Matunuck School House Road

Inflow Area=31,405 sf
Summary for Subcatchment W1: Watershed 1

Runoff = 4.21 cfs @ 12.12 hrs, Volume= 14,815 cf, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

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<tr>
<td>6,411</td>
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<tr>
<td>7,404</td>
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<th>Tc (min)</th>
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<td>0.27</td>
<td></td>
<td>Sheet Flow, SEG A</td>
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<tr>
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<td></td>
<td></td>
<td>Grass: Short n= 0.150 P2= 3.30&quot;</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grassed Waterway Kv= 15.0 fps</td>
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</table>

7.9 455 Total

Subcatchment W1: Watershed 1

Type III 24-hr 10-Year Rainfall=4.90"
Runoff Area=107,101 sf
Runoff Volume=14,815 cf
Runoff Depth=1.66"
Flow Length=455'
Tc=7.9 min
CN=66
Summary for Subcatchment W2: Watershed 2

Runoff = 2.75 cfs @ 12.09 hrs, Volume= 8,829 cf, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

<table>
<thead>
<tr>
<th>Area (sf)</th>
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<td>0.0200</td>
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<td></td>
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<td>904</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W2: Watershed 2

Type III 24-hr 10-Year Rainfall=4.90"
Runoff Area=31,405 sf
Runoff Volume=8,829 cf
Runoff Depth=3.37"
Flow Length=904'
Tc=6.0 min
CN=86
Summary for Link DP-1: Lower Gradient

Inflow Area = 107,101 sf, 12.90% Impervious, Inflow Depth = 1.66" for 10-Year event
Inflow = 4.21 cfs @ 12.12 hrs, Volume = 14,815 cf
Primary = 4.21 cfs @ 12.12 hrs, Volume = 14,815 cf, Attenuation = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs

Inflow Area = 107,101 sf
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 31,405 sf, 67.51% Impervious, Inflow Depth = 3.37" for 10-Year event
Inflow = 2.75 cfs @ 12.09 hrs, Volume= 8,829 cf
Primary = 2.75 cfs @ 12.09 hrs, Volume= 8,829 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Link DP-2: Matunuck School House Road

Inflow Area=31,405 sf
Summary for Subcatchment W1: Watershed 1

Runoff = 6.58 cfs @ 12.12 hrs, Volume= 22,443 cf, Depth= 2.51" 

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs 
Type III 24-hr  25-Year Rainfall=6.10"

<table>
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<td>0.27</td>
<td></td>
<td><strong>Sheet Flow, SEG A</strong></td>
</tr>
<tr>
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<td>1.7</td>
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<td>3.55</td>
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<td><strong>Shallow Concentrated Flow, SEG B</strong></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Grassed Waterway Kv= 15.0 fps</td>
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</table>

7.9 455 Total

Subcatchment W1: Watershed 1

Type III 24-hr 25-Year Rainfall=6.10"
Runoff Area=107,101 sf
Runoff Volume=22,443 cf
Runoff Depth=2.51"
Flow Length=455'
Tc=7.9 min
CN=66
Summary for Subcatchment W2: Watershed 2

Runoff = 3.63 cfs @ 12.09 hrs, Volume= 11,789 cf, Depth= 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

<table>
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<th>Description</th>
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<tr>
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</tr>
<tr>
<td>* 20,154</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>31,405</td>
<td>86</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>32.49% Pervious Area</td>
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<td>21,202</td>
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<td>67.51% Impervious Area</td>
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<th>Capacity (cfs)</th>
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<td></td>
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<td></td>
<td>SEG B</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>4.5</td>
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<td>Total, Increased to minimum Tc = 6.0 min</td>
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Subcatchment W2: Watershed 2

Type III 24-hr 25-Year Rainfall=6.10"
Runoff Area=31,405 sf
Runoff Volume=11,789 cf
Runoff Depth=4.50"
Flow Length=904'
Tc=6.0 min
CN=86
Summary for Link DP-1: Lower Gradient

Inflow Area = 107,101 sf, 12.90% Impervious, Inflow Depth = 2.51” for 25-Year event
Inflow = 6.58 cfs @ 12.12 hrs, Volume= 22,443 cf
Primary = 6.58 cfs @ 12.12 hrs, Volume= 22,443 cf, Attenuation= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Link DP-1: Lower Gradient

Inflow Area=107,101 sf
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 31,405 sf, 67.51% Impervious, Inflow Depth = 4.50" for 25-Year event
Inflow = 3.63 cfs @ 12.09 hrs, Volume= 11,789 cf
Primary = 3.63 cfs @ 12.09 hrs, Volume= 11,789 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Summary for Subcatchment W1: Watershed 1

Runoff = 12.22 cfs @ 12.12 hrs, Volume= 40,949 cf, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

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<td>87.10% Pervious Area</td>
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<th>Capacity (cfs)</th>
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<td>Grass: Short n= 0.150 P2= 3.30&quot;</td>
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<td>1.7</td>
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<td>Grassed Waterway Kv= 15.0 fps</td>
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7.9 455 Total

Subcatchment W1: Watershed 1

Hydrograph

Type III 24-hr 100-Year Rainfall=8.70"
Runoff Area=107,101 sf
Runoff Volume=40,949 cf
Runoff Depth=4.59"
Flow Length=455'
Tc=7.9 min
CN=66
Summary for Subcatchment W2: Watershed 2

Runoff = 5.52 cfs @ 12.09 hrs, Volume= 18,350 cf, Depth= 7.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

<table>
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<th>Area (sf)</th>
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<th>Description</th>
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<td>1,048</td>
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<td>Roofs, HSG B</td>
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<tr>
<td>* 20,154</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
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<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
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<tr>
<td>31,405</td>
<td>86</td>
<td>Weighted Average</td>
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<tr>
<td>21,202</td>
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<td>67.51% Impervious Area</td>
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<table>
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<th>Tc (min)</th>
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<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<tr>
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<td>77</td>
<td>0.0200</td>
<td>1.33</td>
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<td>Sheet Flow, SEG A</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
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<td>3.5</td>
<td>827</td>
<td>0.0380</td>
<td>3.96</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
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<td>Paved Kv= 20.3 fps</td>
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<td>4.5</td>
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<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
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</table>

Subcatchment W2: Watershed 2

Type III 24-hr 100-Year Rainfall=8.70"
Runoff Area=31,405 sf
Runoff Volume=18,350 cf
Runoff Depth=7.01"
Flow Length=904'
Tc=6.0 min
CN=86
Summary for Link DP-1: Lower Gradient

Inflow Area = 107,101 sf, 12.90% Impervious, Inflow Depth = 4.59" for 100-Year event
Inflow = 12.22 cfs @ 12.12 hrs, Volume= 40,949 cf
Primary = 12.22 cfs @ 12.12 hrs, Volume= 40,949 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Link DP-1: Lower Gradient

Inflow Area=107,101 sf
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 31,405 sf, 67.51% Impervious, Inflow Depth = 7.01" for 100-Year event
Inflow = 5.52 cfs @ 12.09 hrs, Volume= 18,350 cf
Primary = 5.52 cfs @ 12.09 hrs, Volume= 18,350 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Inflow Area=31,405 sf
Appendix G

Proposed Condition Watershed Map
LEGEND

WATERSHED BOUNDARY LINE
TIME OF CONCENTRATION LINE
UNDERGROUND TIME OF CONCENTRATION LINE

WATERSHED 1A
AREA = 74,128 SF
TC = 7.9 MIN.
CN = 93

WATERSHED 1B
AREA = 13,552 SF
TC = 6.0 MIN.
CN = 86

WATERSHED 1C
AREA = 3,750 SF
TC = 6.0 MIN.
CN = 98

WATERSHED 1D
AREA = 1,890 SF
TC = 6.0 MIN.
CN = 98

WATERSHED 1E
AREA = 12,230 SF
TC = 6.0 MIN.
CN = 74

WATERSHED 1F
AREA = 4,165 SF
TC = 6.0 MIN.
CN = 91

WATERSHED 1G
AREA = 28,791 SF
TC = 6.0 MIN.
CN = 85

PROPOSED
EMERGENCY
SPILLWAY

PROPOSED
INfiltration
BASIN

PROPOSED
SEDIMENT
FOREBAY

PROPOSED
UIC #1

PROPOSED
UIC #2

OVERALL WATERSHED
AREA = 138,506 SF

WATERSHED MAP

SCALE (FEET)

0 40 80 120 160 200 240 280 320

1 INCH = 80 FT

STORMWATER
REPORT

JOE CASALI  ENGINEERING, Inc.
Civil ∙ Site Development ∙ Transportation
Drainage ∙ Wetlands ∙ ISDS ∙ Traffic ∙ Floodplain
300 Post Road, Warwick, RI 02888

UNION FIRE DISTRICT OF S. KINGSTOWN
STATION 7, MATUNUCK
49 MATUNUCK SCHOOLHOUSE ROAD
SOUTH KINGSTOWN, RHODE ISLAND
AP 86-2, LOT 32
OF 1

Q:
09-31 Union Fire Station
09-31c Station 7 - Matunuck
Drainage
Watershed Maps
Union Fire - Station 7 Matunuck [Watershed Map] - R1A.dwg
Jul. 29, 2021 4:09pm

APPROVED

DATE:
JULY 2021

PROJECT NO:
09-31c

REVISIONS:
NO.

DRAWN BY:
SD

CHECKED BY:
JAC

DESIGNED BY:
SD

UNION FIRE DISTRICT OF S. KINGSTOWN
STATION 7, MATUNUCK
49 MATUNUCK SCHOOLHOUSE ROAD
SOUTH KINGSTOWN, RHODE ISLAND
AP 86-2, LOT 32
OF 1

Q:
09-31 Union Fire Station
09-31c Station 7 - Matunuck
Drainage
Watershed Maps
Union Fire - Station 7 Matunuck [Watershed Map] - R1A.dwg
Jul. 29, 2021 4:09pm

APPROVED

DATE:
JULY 2021

PROJECT NO:
09-31c

REVISIONS:
NO.

DRAWN BY:
SD

CHECKED BY:
JAC

DESIGNED BY:
SD
Appendix H

Proposed Condition HydroCAD Calculations
## Rainfall Events Listing (selected events)

<table>
<thead>
<tr>
<th>Event#</th>
<th>Event Name</th>
<th>Storm Type</th>
<th>Curve Mode</th>
<th>Duration (hours)</th>
<th>B/B</th>
<th>Depth (inches)</th>
<th>AMC</th>
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<td>2-Year</td>
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<td>5</td>
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### Area Listing (all nodes)

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<tr>
<th>Area (sq-ft)</th>
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<th>Description</th>
<th>Subcatchment-numbers</th>
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<tbody>
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<tr>
<td>20,953</td>
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<td>Paved parking &amp; Roadways, HSG B</td>
<td>W2A, W2B</td>
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<td>Paved parking, HSG B</td>
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<td>Roofs, HSG B</td>
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<td><strong>138,506</strong></td>
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<td><strong>TOTAL AREA</strong></td>
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### Soil Listing (all nodes)

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<tr>
<td>0</td>
<td>HSG D</td>
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<tr>
<td>0</td>
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<td><strong>138,506</strong></td>
<td><strong>TOTAL AREA</strong></td>
<td><strong>TOTAL AREA</strong></td>
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</tbody>
</table>
Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.30 cfs @ 12.19 hrs, Volume= 1,943 cf, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall= 2.70"

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<td>&gt;75% Grass cover, Good, HSG B</td>
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<td>74,128</td>
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<td>Weighted Average</td>
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<td>70,292</td>
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<td>94.83% Pervious Area</td>
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<td>5.17% Impervious Area</td>
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<th>Capacity (cfs)</th>
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<td>Sheet Flow, SEG A</td>
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<td>Grass: Short n= 0.150 P2= 3.30&quot;</td>
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<td>1.7</td>
<td>355</td>
<td>0.0560</td>
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<tr>
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<td></td>
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<td>Grassed Waterway Kv= 15.0 fps</td>
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7.9 455 Total

Subcatchment W1A: Watershed 1A

Type III 24-hr 1-Year Rainfall= 2.70"
Runoff Area= 74,128 sf
Runoff Volume= 1,943 cf
Runoff Depth= 0.31"
Flow Length= 455'
Tc= 7.9 min
CN= 63
Summary for Subcatchment W1B: Watershed 1B

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 1,591 cf, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

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<td>13,552</td>
<td>86</td>
<td>Weighted Average</td>
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<tr>
<td>4,392</td>
<td>61</td>
<td>32.41% Pervious Area</td>
</tr>
<tr>
<td>9,160</td>
<td>98</td>
<td>67.59% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc  (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
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<td>Paved Kv= 20.3 fps</td>
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</table>

1.1 Total, Increased to minimum Tc = 6.0 min

Subcatchment W1B: Watershed 1B

Type III 24-hr 1-Year Rainfall=2.70"
Runoff Area=13,552 sf
Runoff Volume=1,591 cf
Runoff Depth=1.41"
Flow Length=204'
Tc=6.0 min
CN=86
Summary for Subcatchment W1C: Watershed 1C

Runoff = 0.22 cfs @ 12.09 hrs, Volume = 772 cf, Depth = 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
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<th>Description</th>
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<tr>
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<td>100.00% Impervious Area</td>
</tr>
</tbody>
</table>

Tc = 6.0 min

Subcatchment W1C: Watershed 1C

Hydrograph

Type III 24-hr 1-Year Rainfall=2.70"
Runoff Area=3,750 sf
Runoff Volume=772 cf
Runoff Depth=2.47"
Tc=6.0 min
CN=98
Summary for Subcatchment W1D: Watershed 1D

Runoff = 0.11 cfs @ 12.09 hrs, Volume = 389 cf, Depth = 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs
Type III 24-hr 1-Year Rainfall = 2.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,890</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>1,890</td>
<td>98</td>
<td>100.00% Impervious Area</td>
</tr>
</tbody>
</table>

Tc = 6.0 min

Subcatchment W1D: Watershed 1D

Hydrograph

Type III 24-hr 1-Year Rainfall = 2.70"
Runoff Area = 1,890 sf
Runoff Volume = 389 cf
Runoff Depth = 2.47"
Tc = 6.0 min
CN = 98
Summary for Subcatchment W1E: Watershed 1E

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 738 cf, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,318</td>
<td>98</td>
<td>Paved parking, HSG B</td>
</tr>
<tr>
<td>7,912</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>12,230</td>
<td>74</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>7,912</td>
<td>61</td>
<td>64.69% Pervious Area</td>
</tr>
<tr>
<td>4,318</td>
<td>98</td>
<td>35.31% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8</td>
<td>100</td>
<td>0.0100</td>
<td>2.03</td>
<td></td>
<td>Shallow Concentrated Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
</tr>
<tr>
<td>0.2</td>
<td>17</td>
<td>0.0100</td>
<td>1.50</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grassed Waterway Kv= 15.0 fps</td>
</tr>
</tbody>
</table>

| 1.0      | 117           |               |                   |                | Total, Increased to minimum Tc = 6.0 min |

Subcatchment W1E: Watershed 1E

Hydrograph

Type III 24-hr 1-Year Rainfall=2.70"
Runoff Area=12,230 sf
Runoff Volume=738 cf
Runoff Depth=0.72"
Flow Length=117'
Slope=0.0100 '/'
Tc=6.0 min
CN=74
Summary for Subcatchment W2A: Watershed 2A

Runoff = 1.02 cfs @ 12.09 hrs, Volume = 3,214 cf, Depth = 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,048</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>* 17,540</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>28,791</td>
<td>85</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>35.44% Pervious Area</td>
</tr>
<tr>
<td>18,588</td>
<td>98</td>
<td>64.56% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>77</td>
<td>0.0200</td>
<td>1.33</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Smooth surfaces</td>
<td></td>
<td>n = 0.011 P2 = 3.30&quot;</td>
</tr>
<tr>
<td>3.5</td>
<td>827</td>
<td>0.0380</td>
<td>3.96</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Paved</td>
<td></td>
<td>Kv = 20.3 fps</td>
</tr>
<tr>
<td>4.5</td>
<td>904</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W2A: Watershed 2A

Type III 24-hr 1-Year Rainfall=2.70"
Runoff Area = 28,791 sf
Runoff Volume = 3,214 cf
Runoff Depth = 1.34"
Flow Length = 904'
Tc = 6.0 min
CN = 85
Summary for Subcatchment W2B: Watershed 2B

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 622 cf, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,413</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>4,165</td>
<td>91</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>18.06% Pervious Area</td>
</tr>
<tr>
<td>3,413</td>
<td>98</td>
<td>81.94% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Entry,</td>
</tr>
</tbody>
</table>

Subcatchment W2B: Watershed 2B

Hydrograph

Type III 24-hr 1-Year Rainfall=2.70"
Runoff Area=4,165 sf
Runoff Volume=622 cf
Runoff Depth=1.79"
Tc=6.0 min
CN=91
Summary for Pond 3P: Sediment Forebay

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 0.58" for 1-Year event
Inflow = 0.14 cfs @ 12.11 hrs, Volume= 589 cf
Outflow = 0.07 cfs @ 12.47 hrs, Volume= 453 cf, Atten= 54%, Lag= 21.3 min
Primary = 0.07 cfs @ 12.47 hrs, Volume= 453 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 86.26' @ 12.45 hrs  Surf.Area= 266 sf  Storage= 137 cf

Plug-Flow detention time= 146.6 min calculated for 452 cf (77% of inflow)
Center-of-Mass det. time= 54.4 min (965.0 - 910.7 )

Volume Invert Avail.Storage Storage Description
#1 85.50' 208 cf Custom Stage Data (Prismatic) Listed below (Recalc)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>85.50</td>
<td>95</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>86.50</td>
<td>320</td>
<td>208</td>
<td>208</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 86.25' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.06 cfs @ 12.47 hrs HW=86.26' (Free Discharge)
↑1=Sharp-Crested Rectangular Weir (Weir Controls 0.06 cfs @ 0.31 fps)

Inflow Area=12,230 sf
Peak Elev=86.26'
Storage=137 cf
**Summary for Pond 4P: UIC #1 MC-3500**

Inflow Area = 4,165 sf, 81.94% Impervious, Inflow Depth = 1.79” for 1-Year event

<table>
<thead>
<tr>
<th>Inflow</th>
<th>Outflow</th>
<th>Discarded</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.20 cfs @ 12.09 hrs, Volume= 622 cf</td>
<td>0.02 cfs @ 12.77 hrs, Volume= 622 cf, Atten= 88%, Lag= 41.0 min</td>
<td>0.02 cfs @ 12.77 hrs, Volume= 622 cf</td>
<td>0.00 cfs @ 0.00 hrs, Volume= 0 cf</td>
</tr>
</tbody>
</table>

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 91.98’ @ 12.77 hrs Surf.Area= 289 sf Storage= 227 cf

Plug-Flow detention time= 81.3 min calculated for 621 cf (100% of inflow)

Center-of-Mass det. time= 81.1 min (890.1 - 809.0)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>90.50’</td>
<td>370 cf</td>
<td><strong>8.42’W x 34.38’L x 5.50’H Field A</strong> 1,592 cf Overall - 470 cf Embedded = 1,122 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>91.25’</td>
<td>470 cf</td>
<td><strong>ADS_StormTech MC-3500 d +Cap x 4 Inside #1</strong> Effective Size= 70.4”W x 45.0”H =&gt; 15.33 sf x 7.17”L = 110.0 cf Overall Size= 77.0”W x 45.0”H x 7.50”L with 0.33’ Overlap Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

840 cf Total Available Storage

Storage Group A created with Chamber Wizard

<table>
<thead>
<tr>
<th>Device</th>
<th>Routing</th>
<th>Invert</th>
<th>Outlet Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Discarded</td>
<td>90.50’</td>
<td><strong>2.410 in/hr Exfiltration over Wetted area</strong></td>
</tr>
<tr>
<td>#2</td>
<td>Primary</td>
<td>95.95’</td>
<td><strong>2.5” x 2.5” Horiz. Orifice/Grate X 6.00 columns</strong>X 6 rows C= 0.600 Limited to weir flow at low heads</td>
</tr>
</tbody>
</table>

**Discarded OutFlow** Max=0.02 cfs @ 12.77 hrs HW=91.98’ (Free Discharge)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=90.50’ (Free Discharge)
Pond 4P: UIC #1 MC-3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)

Effective Size = 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 1 rows = 29.8 cf

4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0' End Stone x 2 = 34.38' Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

4 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 469.6 cf Chamber Storage

1,591.5 cf Field - 469.6 cf Chambers = 1,121.9 cf Stone x 33.0% Voids = 370.2 cf Stone Storage

Chamber Storage + Stone Storage = 839.8 cf = 0.019 af
Overall Storage Efficiency = 52.8%
Overall System Size = 34.38' x 8.42' x 5.50'

4 Chambers
58.9 cy Field
41.6 cy Stone
Pond 4P: UIC #1 MC-3500

Inflow Area=4,165 sf
Peak Elev=91.98'
Storage=227 cf
Summary for Pond 5P: Infiltration Basin

Inflow Area = 14,120 sf, 43.97% Impervious, Inflow Depth = 0.72" for 1-Year event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 842 cf
Outflow = 0.02 cfs @ 14.71 hrs, Volume= 842 cf, Atten= 80%, Lag= 157.4 min
Discarded = 0.02 cfs @ 14.71 hrs, Volume= 842 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 85.26' @ 14.71 hrs Surf.Area= 382 sf Storage= 222 cf
Plug-Flow detention time= 106.4 min calculated for 840 cf (100% of inflow)
Center-of-Mass det. time= 106.2 min ( 976.6 - 870.3 )

Volume Invert Avail.Storage Storage Description
#1 84.50' 905 cf Custom Stage Data (Conic) Listed below (Recalc)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>84.50</td>
<td>212</td>
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<td>0</td>
<td>212</td>
</tr>
<tr>
<td>85.50</td>
<td>446</td>
<td>322</td>
<td>322</td>
<td>454</td>
</tr>
<tr>
<td>86.50</td>
<td>732</td>
<td>583</td>
<td>905</td>
<td>753</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Discarded 84.50' 2.410 in/hr Exfiltration over Wetted area
#2 Primary 86.15' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.02 cfs @ 14.71 hrs HW=85.26' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=84.50' (Free Discharge)
2=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
Pond 5P: Infiltration Basin

Inflow Area=14,120 sf
Peak Elev=85.26'
Storage=222 cf
Summary for Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area = 13,552 sf, 67.59% Impervious, Inflow Depth = 1.41" for 1-Year event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 1,591 cf
Outflow = 0.05 cfs @ 13.05 hrs, Volume= 635 cf, Atten= 90%, Lag= 57.2 min
Primary = 0.05 cfs @ 13.05 hrs, Volume= 635 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 85.02' @ 13.05 hrs Surf.Area= 350 sf Storage= 959 cf

Plug-Flow detention time= 289.5 min calculated for 635 cf (40% of inflow)
Center-of-Mass det. time= 166.0 min (996.2 - 830.1)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>80.00'</td>
<td>617 cf</td>
<td>8.42'W x 41.55'L x 7.00'H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,448 cf Overall - 580 cf Embedded = 1,868 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>81.75'</td>
<td>580 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 5 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Primary 85.00' 4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.03 cfs @ 13.05 hrs HW=85.02' (Free Discharge)

↑=Sharp-Crested Rectangular Weir (Weir Controls 0.03 cfs @ 0.45 fps)
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0'' End Stone x 2 = 41.55' Base Length
1 Rows x 77.0" Wide + 12.0'' Side Stone x 2 = 8.42' Base Width
21.0'' Stone Base + 45.0'' Chamber Height + 18.0'' Stone Cover = 7.00' Field Height

5 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 579.6 cf Chamber Storage

2,448.0 cf Field - 579.6 cf Chambers = 1,868.4 cf Stone x 33.0% Voids = 616.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,196.1 cf = 0.027 af
Overall Storage Efficiency = 48.9%
Overall System Size = 41.55' x 8.42' x 7.00'

5 Chambers
90.7 cy Field
69.2 cy Stone
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area=13,552 sf
Peak Elev=85.02'
Storage=959 cf
Summary for Pond 11P: UIC #2 MC-3500 4.0' stone

Inflow Area = 17,302 sf, 74.62% Impervious, Inflow Depth = 0.98" for 1-Year event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 1,407 cf
Outflow = 0.04 cfs @ 11.75 hrs, Volume= 1,406 cf, Atten= 84%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.75 hrs, Volume= 1,406 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 78.63' @ 14.90 hrs  Surf.Area= 647 sf  Storage= 294 cf

Plug-Flow detention time= 71.5 min calculated for 1,404 cf (100% of inflow)
Center-of-Mass det. time= 71.4 min ( 938.0 - 866.6 )

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>77.25'</td>
<td>1,701 cf</td>
<td>15.58'W x 41.55'L x 9.75'H Field A</td>
</tr>
<tr>
<td>#2A</td>
<td>81.25'</td>
<td>1,159 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 10 Inside #1</td>
</tr>
</tbody>
</table>

6,313 cf Overall - 1,159 cf Embedded = 5,154 cf x 33.0% Voids

Effective Size= 70.4''W x 45.0''H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0''W x 45.0''H x 7.50'L with 0.33' Overlap
10 Chambers in 2 Rows
Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf

2,860 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Discarded 77.25' 2.410 in/hr Exfiltration over Surface area
#2 Primary 86.45' 4.0'' x 18.0'' Horiz. Orifice/Grate C=0.600
Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 11.75 hrs  HW=77.35' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs  HW=77.25' (Free Discharge)
↑2=Orifice/Grate (Controls 0.00 cfs)
Pond 11P: UIC #2 MC-3500 4.0' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)

Effective Size = 70.4" W x 45.0" H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0" W x 45.0" H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 2 rows = 59.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55' Base Length
2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width
48.0" Stone Base + 45.0" Chamber Height + 24.0" Stone Cover = 9.75' Field Height

10 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,159.1 cf Chamber Storage

6,313.0 cf Field - 1,159.1 cf Chambers = 5,153.9 cf Stone x 33.0% Voids = 1,700.8 cf Stone Storage

Chamber Storage + Stone Storage = 2,859.9 cf = 0.066 af
Overall Storage Efficiency = 45.3%
Overall System Size = 41.55' x 15.58' x 9.75'

10 Chambers
233.8 cy Field
190.9 cy Stone
Pond 11P: UIC #2 MC-3500 4.0’ stone

Hydrograph

Inflow Area=17,302 sf
Peak Elev=78.63’
Storage=294 cf
Summary for Pond 12P: Pea gravel Diaphragm

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 0.72" for 1-Year event
Inflow = 0.21 cfs @ 12.10 hrs, Volume= 738 cf
Outflow = 0.14 cfs @ 12.11 hrs, Volume= 589 cf, Atten= 32%, Lag= 0.6 min
Primary = 0.14 cfs @ 12.11 hrs, Volume= 589 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 86.95' @ 12.10 hrs  Surf.Area= 114 sf  Storage= 73 cf
Plug-Flow detention time= 120.3 min calculated for 589 cf (80% of inflow)
Center-of-Mass det. time= 37.1 min ( 910.7 - 873.6 )

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 85.00'</td>
<td>75 cf</td>
<td>Custom Stage Data (Prismatic) Listed below (Recalc) 228 cf Overall x 33.0% Voids</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>85.00</td>
<td>114</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>87.00</td>
<td>114</td>
<td>228</td>
<td>228</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 86.94' 38.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.09 cfs @ 12.11 hrs HW=86.95' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 0.09 cfs @ 0.29 fps)
Pond 12P: Pea gravel Diaphragm

Inflow Area=12,230 sf
Peak Elev=86.95'
Storage=73 cf
Summary for Link DP-1: Lower Gradient

Inflow Area = 105,550 sf, 21.75% Impervious, Inflow Depth = 0.22\" for 1-Year event
Inflow = 0.30 cfs @ 12.19 hrs, Volume= 1,943 cf
Primary = 0.30 cfs @ 12.19 hrs, Volume= 1,943 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 32,956 sf, 66.76% Impervious, Inflow Depth = 1.17" for 1-Year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 3,214 cf
Primary = 1.02 cfs @ 12.09 hrs, Volume= 3,214 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Link DP-2: Matunuck School House Road

Inflow Area=32,956 sf
Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.76 cfs @ 12.15 hrs, Volume= 3,489 cf, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,836</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>74,128</td>
<td>63</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>94.83% Pervious Area</td>
</tr>
<tr>
<td>3,836</td>
<td>98</td>
<td>5.17% Impervious Area</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2</td>
<td>100</td>
<td>0.0600</td>
<td>0.27</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>n= 0.150</td>
<td>Grass: Short</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P2= 3.30&quot;</td>
<td></td>
</tr>
<tr>
<td>1.7</td>
<td>355</td>
<td>0.0560</td>
<td>3.55</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Kv= 15.0 fps</td>
<td>Grassed Waterway</td>
</tr>
</tbody>
</table>

Subcatchment W1A: Watershed 1A

**Type III 24-hr 2-Year Rainfall=3.30"**
Runoff Area=74,128 sf
Runoff Volume=3,489 cf
Runoff Depth=0.56"
Flow Length=455'
Tc=7.9 min
CN=63

Hydrograph
Summary for Subcatchment W1B: Watershed 1B

Runoff = 0.69 cfs @ 12.09 hrs, Volume=2,171 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,160</td>
<td>98</td>
<td>Paved parking, HSG B</td>
</tr>
<tr>
<td>4,392</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>13,552</td>
<td>86</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>4,392</td>
<td>61</td>
<td>32.41% Pervious Area</td>
</tr>
<tr>
<td>9,160</td>
<td>98</td>
<td>67.59% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0.7</td>
<td>100</td>
<td>0.0800</td>
<td>2.43</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Smooth surfaces</td>
<td></td>
<td>- n= 0.011 P2= 3.30&quot;</td>
</tr>
<tr>
<td>0.4</td>
<td>104</td>
<td>0.0500</td>
<td>4.54</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Paved</td>
<td></td>
<td>- Kv= 20.3 fps</td>
</tr>
</tbody>
</table>

1.1 204 Total, Increased to minimum Tc = 6.0 min

Subcatchment W1B: Watershed 1B

Hydrograph

Type III 24-hr 2-Year Rainfall=3.30"
Runoff Area=13,552 sf
Runoff Volume=2,171 cf
Runoff Depth=1.92"
Flow Length=204'
Tc=6.0 min
CN=86
Summary for Subcatchment W1C: Watershed 1C

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 958 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,750</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>3,750</td>
<td>98</td>
<td>100.00% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Entry,</td>
</tr>
</tbody>
</table>

Subcatchment W1C: Watershed 1C

Hydrograph

Type III 24-hr 2-Year Rainfall=3.30"
Runoff Area=3,750 sf
Runoff Volume=958 cf
Runoff Depth=3.07"
Tc=6.0 min
CN=98
Summary for Subcatchment W1D: Watershed 1D

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 483 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,890</td>
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<td>Roofs, HSG B</td>
</tr>
<tr>
<td>1,890</td>
<td>98</td>
<td>100.00% Impervious Area</td>
</tr>
</tbody>
</table>

Tc = 6.0 min

Direct Entry,

Subcatchment W1D: Watershed 1D

Type III 24-hr 2-Year Rainfall=3.30"
Runoff Area=1,890 sf
Runoff Volume=483 cf
Runoff Depth=3.07"
Tc=6.0 min
CN=98
Summary for Subcatchment W1E: Watershed 1E

Runoff = 0.34 cfs @ 12.10 hrs, Volume= 1,125 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,318</td>
<td>98</td>
<td>Paved parking, HSG B</td>
</tr>
<tr>
<td>7,912</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>12,230</td>
<td>74</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>7,912</td>
<td>61</td>
<td>64.69% Pervious Area</td>
</tr>
<tr>
<td>4,318</td>
<td>98</td>
<td>35.31% Impervious Area</td>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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<tbody>
<tr>
<td>0.8</td>
<td>100</td>
<td>0.0100</td>
<td>2.03</td>
<td></td>
<td>Shallow Concentrated Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved</td>
<td>Kv= 20.3 fps</td>
</tr>
<tr>
<td>0.2</td>
<td>17</td>
<td>0.0100</td>
<td>1.50</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grassed Waterway</td>
<td>Kv= 15.0 fps</td>
</tr>
</tbody>
</table>

1.0 117 Total, Increased to minimum Tc = 6.0 min

Subcatchment W1E: Watershed 1E

Type III 24-hr 2-Year Rainfall=3.30"
Runoff Area=12,230 sf
Runoff Volume=1,125 cf
Runoff Depth=1.10"
Flow Length=117'
Slope=0.0100 '/'
Tc=6.0 min
CN=74
Summary for Subcatchment W2A: Watershed 2A

Runoff = 1.40 cfs @ 12.09 hrs, Volume= 4,423 cf, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
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<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1,048</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>17,540</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>28,791</td>
<td>85</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>35.44% Pervious Area</td>
</tr>
<tr>
<td>18,588</td>
<td>98</td>
<td>64.56% Impervious Area</td>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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<tbody>
<tr>
<td>1.0</td>
<td>77</td>
<td>0.0200</td>
<td>1.33</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
</tr>
<tr>
<td>3.5</td>
<td>827</td>
<td>0.0380</td>
<td>3.96</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
</tr>
<tr>
<td>4.5</td>
<td>904</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W2A: Watershed 2A

Hydrograph

Type III 24-hr 2-Year Rainfall=3.30"
Runoff Area=28,791 sf
Runoff Volume=4,423 cf
Runoff Depth=1.84"
Flow Length=904'
Tc=6.0 min
CN=85
Summary for Subcatchment W2B: Watershed 2B

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 816 cf, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,413</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>4,165</td>
<td>91</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>18.06% Pervious Area</td>
</tr>
<tr>
<td>3,413</td>
<td>98</td>
<td>81.94% Impervious Area</td>
</tr>
</tbody>
</table>

Tc=6.0 min, Length= Direct Entry,
Slope=,
Velocity=,
Capacity=
Description

Subcatchment W2B: Watershed 2B

Type III 24-hr 2-Year Rainfall=3.30"
Runoff Area=4,165 sf
Runoff Volume=816 cf
Runoff Depth=2.35"
Tc=6.0 min
CN=91
Summary for Pond 3P: Sediment Forebay

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 0.98" for 2-Year event
Inflow = 0.31 cfs @ 12.10 hrs, Volume= 1,000 cf
Outflow = 0.28 cfs @ 12.17 hrs, Volume= 859 cf, Atten= 12%, Lag= 3.9 min
Primary = 0.28 cfs @ 12.17 hrs, Volume= 859 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 86.27' @ 12.15 hrs  Surf.Area= 269 sf  Storage= 141 cf

Plug-Flow detention time= 90.3 min calculated for 859 cf (86% of inflow)
Center-of-Mass det. time= 26.4 min (905.1 - 878.7)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>85.50'</td>
<td>208 cf</td>
<td>Custom Stage Data (Prismatic) listed below (Recalc)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>85.50</td>
<td>95</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>86.50</td>
<td>320</td>
<td>208</td>
<td>208</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 86.25' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max= 0.24 cfs @ 12.17 hrs HW= 86.27’ (Free Discharge)
1= Sharp-Crested Rectangular Weir (Weir Controls 0.24 cfs @ 0.50 fps)

Pond 3P: Sediment Forebay

Inflow Area= 12,230 sf
Peak Elev= 86.27’
Storage= 141 cf
Summary for Pond 4P: UIC #1 MC-3500

Inflow Area = 4,165 sf, 81.94% Impervious, Inflow Depth = 2.35" for 2-Year event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 816 cf
Outflow = 0.03 cfs @ 12.93 hrs, Volume= 816 cf, Atten= 90%, Lag= 50.4 min
Discarded = 0.03 cfs @ 12.93 hrs, Volume= 816 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 92.43' @ 12.93 hrs  Surf.Area= 289 sf  Storage= 321 cf

Plug-Flow detention time= 111.8 min calculated for 815 cf (100% of inflow)
Center-of-Mass det. time= 111.7 min (913.0 - 801.3)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>90.50'</td>
<td>370 cf</td>
<td>8.42'W x 34.38'L x 5.50'H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,592 cf Overall - 470 cf Embedded = 1,122 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>91.25'</td>
<td>470 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 4 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>840 cf Total Available Storage</td>
</tr>
</tbody>
</table>

Storage Group A created with Chamber Wizard

<table>
<thead>
<tr>
<th>Device</th>
<th>Routing</th>
<th>Invert</th>
<th>Outlet Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Discarded</td>
<td>90.50'</td>
<td>2.410 in/hr Exfiltration over Wetted area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.5&quot; x 2.5&quot; Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Limited to weir flow at low heads</td>
</tr>
</tbody>
</table>

Discarded OutFlow Max=0.03 cfs @ 12.93 hrs HW=92.43' (Free Discharge)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=90.50' (Free Discharge)
Pond 4P: UIC #1 MC-3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size = 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 1 rows = 29.8 cf

4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

4 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 469.6 cf Chamber Storage

1,591.5 cf Field - 469.6 cf Chambers = 1,121.9 cf Stone x 33.0% Voids = 370.2 cf Stone Storage

Chamber Storage + Stone Storage = 839.8 cf = 0.019 af
Overall Storage Efficiency = 52.8%
Overall System Size = 34.38' x 8.42' x 5.50'

4 Chambers
58.9 cy Field
41.6 cy Stone
Pond 4P: UIC #1 MC-3500

Inflow Area=4,165 sf
Peak Elev=92.43'
Storage=321 cf
**Summary for Pond 5P: Infiltration Basin**

Inflow Area = 14,120 sf, 43.97% Impervious, Inflow Depth = 1.14” for 2-Year event

| Inflow | 0.38 cfs @ 12.16 hrs, Volume= 1,342 cf |
| Outflow | 0.03 cfs @ 14.54 hrs, Volume= 1,342 cf, Atten= 92%, Lag= 142.9 min |
| Discarded | 0.03 cfs @ 14.54 hrs, Volume= 1,342 cf |
| Primary | 0.00 cfs @ 0.00 hrs, Volume= 0 cf |

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 85.86’ @ 14.54 hrs  Surf.Area= 542 sf  Storage= 501 cf

Plug-Flow detention time= 186.5 min calculated for 1,339 cf (100% of inflow)
Center-of-Mass det. time= 186.4 min (1,037.8 - 851.3)

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<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
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<tbody>
<tr>
<td>#1</td>
<td>84.50’</td>
<td>905 cf</td>
<td>Custom Stage Data (Conic) Listed below (Recalc)</td>
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<td>84.50</td>
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<td>0</td>
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<td>212</td>
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<tr>
<td>85.50</td>
<td>446</td>
<td>322</td>
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<td>454</td>
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<td>86.50</td>
<td>732</td>
<td>583</td>
<td>905</td>
<td>753</td>
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Device Routing | Invert | Outlet Devices |
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</tr>
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<tbody>
<tr>
<td>#1 Discarded</td>
<td>84.50’</td>
<td>2.410 in/hr Exfiltration over Wetted area</td>
</tr>
<tr>
<td>#2 Primary</td>
<td>86.15’</td>
<td>20.0’ long Sharp-Crested Rectangular Weir 2 End Contraction(s)</td>
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</tbody>
</table>

**Discarded OutFlow** Max=0.03 cfs @ 14.54 hrs  HW=85.86’ (Free Discharge)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs  HW=84.50’ (Free Discharge)
Pond 5P: Infiltration Basin

**Hydrograph**

- **Inflow Area**: 14,120 sf
- **Peak Elev**: 85.86'
- **Storage**: 501 cf

*Time (hours)*

*Flow (cfs)*

- 0.42
- 0.4
- 0.38
- 0.36
- 0.34
- 0.32
- 0.3
- 0.28
- 0.26
- 0.24
- 0.22
- 0.2
- 0.18
- 0.16
- 0.14
- 0.12
- 0.1
- 0.08
- 0.06
- 0.04
- 0.02
- 0.00
Summary for Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area = 13,552 sf, 67.59% Impervious, Inflow Depth = 1.92" for 2-Year event
Inflow = 0.69 cfs @ 12.09 hrs, Volume= 2,171 cf
Outflow = 0.32 cfs @ 12.32 hrs, Volume= 1,201 cf, Atten= 53%, Lag= 13.7 min
Primary = 0.32 cfs @ 12.32 hrs, Volume= 1,201 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 85.08' @ 12.30 hrs Surf.Area= 350 sf Storage= 969 cf

Plug-Flow detention time= 206.6 min calculated for 1,199 cf (55% of inflow)
Center-of-Mass det. time= 96.8 min (918.0 - 821.2)

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<th>Storage Description</th>
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<tbody>
<tr>
<td>#1A</td>
<td>80.00'</td>
<td>617 cf</td>
<td>8.42'W x 41.55'L x 7.00'H Field A</td>
</tr>
<tr>
<td>#2A</td>
<td>81.75'</td>
<td>580 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 5 Inside #1</td>
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</tbody>
</table>

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf

1,196 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Primary 85.00' 4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.29 cfs @ 12.32 hrs HW=85.08' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 0.29 cfs @ 0.91 fps)
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)

Effective Size = 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 1 rows = 29.8 cf

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55'
Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
21.0" Stone Base + 45.0" Chamber Height + 18.0" Stone Cover = 7.00' Field Height

5 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 579.6 cf Chamber Storage

2,448.0 cf Field - 579.6 cf Chambers = 1,868.4 cf Stone x 33.0% Voids = 616.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,196.1 cf = 0.027 af
Overall Storage Efficiency = 48.9%
Overall System Size = 41.55' x 8.42' x 7.00'

5 Chambers
90.7 cy Field
69.2 cy Stone
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75’ stone

Inflow Area=13,552 sf
Peak Elev=85.08’
Storage=969 cf
Summary for Pond 11P: UIC #2 MC-3500 4.0' stone

Inflow Area = 17,302 sf, 74.62% Impervious, Inflow Depth = 1.50" for 2-Year event
Inflow = 0.42 cfs @ 12.32 hrs, Volume = 2,159 cf
Outflow = 0.04 cfs @ 11.70 hrs, Volume = 2,159 cf, Atten= 91%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.70 hrs, Volume = 2,159 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume = 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 81.28' @ 15.67 hrs Surf.Area= 647 sf Storage= 868 cf

Plug-Flow detention time= 234.0 min calculated for 2,155 cf (100% of inflow)
Center-of-Mass det. time= 233.9 min (1,079.8 - 846.0 )

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<th>Storage Description</th>
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</thead>
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<tr>
<td>#1A</td>
<td>77.25'</td>
<td>1,701 cf</td>
<td>15.58&quot;W x 41.55'L x 9.75'H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6,313 cf Overall - 1,159 cf Embedded = 5,154 cf x 33.0% Voids</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ADS_StormTech MC-3500 d +Cap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td>#2A</td>
<td>81.25'</td>
<td>1,159 cf</td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 Chambers in 2 Rows</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf</td>
</tr>
</tbody>
</table>

2,860 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Discarded 77.25' 2.410 in/hr Exfiltration over Surface area
#2 Primary 86.45' 4.0" x 18.0" Horiz. Orifice/Grate C= 0.600

Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 11.70 hrs HW=77.36' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=77.25' (Free Discharge)
↑2=Orifice/Grate (Controls 0.00 cfs)
Pond 11P: UIC #2 MC-3500 4.0' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55' Base Length
2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width
48.0" Stone Base + 45.0" Chamber Height + 24.0" Stone Cover = 9.75' Field Height

10 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,159.1 cf Chamber Storage

6,313.0 cf Field - 1,159.1 cf Chambers = 5,153.9 cf Stone x 33.0% Voids = 1,700.8 cf Stone Storage

Chamber Storage + Stone Storage = 2,859.9 cf = 0.066 af
Overall Storage Efficiency = 45.3%
Overall System Size = 41.55' x 15.58' x 9.75'

10 Chambers
233.8 cy Field
190.9 cy Stone
Pond 11P: UIC #2 MC-3500 4.0’ stone

Hydrograph

Inflow Area=17,302 sf
Peak Elev=81.28'
Storage=868 cf
Summary for Pond 12P: Pea gravel Diaphragm

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 1.10" for 2-Year event
Inflow = 0.34 cfs @ 12.10 hrs, Volume= 1,125 cf
Outflow = 0.31 cfs @ 12.10 hrs, Volume= 1,000 cf, Atten= 8%, Lag= 0.1 min
Primary = 0.31 cfs @ 12.10 hrs, Volume= 1,000 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 86.96' @ 12.10 hrs  Surf.Area= 114 sf  Storage= 74 cf

Plug-Flow detention time= 71.1 min calculated for 998 cf (89% of inflow)
Center-of-Mass det. time= 18.6 min (878.7 - 860.2)

Volume Invert Avail.Storage Storage Description
#1 85.00' 75 cf Custom Stage Data (Prismatic) listed below (Recalc)

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<tr>
<td>85.00</td>
<td>114</td>
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<tr>
<td>87.00</td>
<td>114</td>
<td>228</td>
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Device Routing Invert Outlet Devices
#1 Primary 86.94' 38.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.29 cfs @ 12.10 hrs HW=86.96’ (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 0.29 cfs @ 0.44 fps)
Pond 12P: Pea gravel Diaphragm

Hydrograph

Inflow Area=12,230 sf
Peak Elev=86.96'
Storage=74 cf

Time (hours)

Flow (cfs)

0.38
0.36
0.34
0.32
0.30
0.28
0.26
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
Summary for Link DP-1: Lower Gradient

- Inflow Area = 105,550 sf, 21.75% Impervious, Inflow Depth = 0.40" for 2-Year event
- Inflow = 0.76 cfs @ 12.15 hrs, Volume= 3,489 cf
- Primary = 0.76 cfs @ 12.15 hrs, Volume= 3,489 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Link DP-1: Lower Gradient

![Hydrograph](image-url)
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 32,956 sf, 66.76% Impervious, Inflow Depth = 1.61" for 2-Year event
Inflow = 1.40 cfs @ 12.09 hrs, Volume= 4,423 cf
Primary = 1.40 cfs @ 12.09 hrs, Volume= 4,423 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Summary for Subcatchment W1A: Watershed 1A

Runoff = 2.46 cfs @ 12.12 hrs, Volume= 8,932 cf, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

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

<table>
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<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
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<tbody>
<tr>
<td>3,836</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>74,128</td>
<td>63</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>94.83% Pervious Area</td>
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<tr>
<td>3,836</td>
<td>98</td>
<td>5.17% Impervious Area</td>
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<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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<tr>
<td>6.2</td>
<td>100</td>
<td>0.0600</td>
<td>0.27</td>
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<td>Sheet Flow, SEG A</td>
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<tr>
<td></td>
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<td>Grass: Short n = 0.150 P2 = 3.30&quot;</td>
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<td>1.7</td>
<td>355</td>
<td>0.0560</td>
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<td>Shallow Concentrated Flow, SEG B</td>
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<td>Grassed Waterway Kv = 15.0 fps</td>
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Subcatchment W1A: Watershed 1A

Hydrograph

Type III 24-hr 10-Year Rainfall=4.90"
Runoff Area=74,128 sf
Runoff Volume=8,932 cf
Runoff Depth=1.45"
Flow Length=455'
Tc=7.9 min
CN=63
Summary for Subcatchment W1B: Watershed 1B

Runoff = 1.19 cfs @ 12.09 hrs, Volume= 3,810 cf, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

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<td>Paved parking, HSG B</td>
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<tr>
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<td>&gt;75% Grass cover, Good, HSG B</td>
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<td>13,552</td>
<td>86</td>
<td>Weighted Average</td>
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<tr>
<td>4,392</td>
<td>61</td>
<td>32.41% Pervious Area</td>
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<tr>
<td>9,160</td>
<td>98</td>
<td>67.59% Impervious Area</td>
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<table>
<thead>
<tr>
<th>Tc (min)</th>
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<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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<tr>
<td>0.7</td>
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<td>0.0800</td>
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<td>Sheet Flow, SEG A</td>
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<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
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<tr>
<td>0.4</td>
<td>104</td>
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<td>Shallow Concentrated Flow, SEG B</td>
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<td>Paved Kv= 20.3 fps</td>
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<tr>
<td>1.1</td>
<td>204</td>
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<td>Total, Increased to minimum Tc = 6.0 min</td>
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Subcatchment W1B: Watershed 1B

Type III 24-hr 10-Year Rainfall=4.90"
Runoff Area=13,552 sf
Runoff Volume=3,810 cf
Runoff Depth=3.37"
Flow Length=204'
Tc=6.0 min
CN=86

Hydrograph
Summary for Subcatchment W1C: Watershed 1C

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 1,457 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

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<td>Roofs, HSG B</td>
</tr>
<tr>
<td>3,750</td>
<td>98</td>
<td>100.00% Impervious Area</td>
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</tbody>
</table>

Direct Entry,

Subcatchment W1C: Watershed 1C

Hydrograph

Type III 24-hr 10-Year Rainfall=4.90"
Runoff Area=3,750 sf
Runoff Volume=1,457 cf
Runoff Depth=4.66"
Tc=6.0 min
CN=98
Runoff $= 0.20$ cfs @ 12.09 hrs, Volume $= 734$ cf, Depth $= 4.66''$

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span $= 0.00-28.00$ hrs, dt $= 0.05$ hrs

Type III 24-hr 10-Year Rainfall $= 4.90''$

### Summary for Subcatchment W1D: Watershed 1D

- **Runoff Area**: 1,890 sf
- **Runoff Volume**: 734 cf
- **Runoff Depth**: 4.66"
- **Tc**: 6.0 min
- **CN**: 98

#### Table:

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<th>Area (sf)</th>
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<tr>
<td>1,890</td>
<td>98</td>
<td>100.00% Impervious Area</td>
</tr>
</tbody>
</table>

#### Hydrograph:

- **Type III 24-hr 10-Year Rainfall**: 4.90"
- **Runoff Area**: 1,890 sf
- **Runoff Volume**: 734 cf
- **Runoff Depth**: 4.66"
- **Tc**: 6.0 min
- **CN**: 98
Summary for Subcatchment W1E: Watershed 1E

Runoff = 0.73 cfs @ 12.10 hrs, Volume = 2,329 cf, Depth = 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs
Type III 24-hr 10-Year Rainfall = 4.90"

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<td>Paved parking, HSG B</td>
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<tr>
<td>7,912</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>12,230</td>
<td>74</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>7,912</td>
<td>61</td>
<td>64.69% Pervious Area</td>
</tr>
<tr>
<td>4,318</td>
<td>98</td>
<td>35.31% Impervious Area</td>
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<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<td>0.0100</td>
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<td>Shallow Concentrated Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved Kv = 20.3 fps</td>
</tr>
<tr>
<td>0.2</td>
<td>17</td>
<td>0.0100</td>
<td>1.50</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grassed Waterway Kv = 15.0 fps</td>
</tr>
<tr>
<td>1.0</td>
<td>117</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W1E: Watershed 1E

Hydrograph

Type III 24-hr 10-Year Rainfall = 4.90"
Runoff Area = 12,230 sf
Runoff Volume = 2,329 cf
Runoff Depth = 2.28"
Flow Length = 117'
Slope = 0.0100 '/'
Tc = 6.0 min
CN = 74
Summary for Subcatchment W2A: Watershed 2A

Runoff = 2.46 cfs @ 12.09 hrs, Volume = 7,859 cf, Depth = 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,048</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>*</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>28,791</td>
<td>85</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>35.44% Pervious Area</td>
</tr>
<tr>
<td>18,588</td>
<td>98</td>
<td>64.56% Impervious Area</td>
</tr>
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<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>77</td>
<td>0.0200</td>
<td>1.33</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Smooth surfaces</td>
<td>n = 0.011</td>
<td>P2 = 3.30&quot;</td>
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<tr>
<td>3.5</td>
<td>827</td>
<td>0.0380</td>
<td>3.96</td>
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<td>Shallow Concentrated Flow, SEG B</td>
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<td></td>
<td>Paved</td>
<td>Kv = 20.3 fps</td>
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</tr>
<tr>
<td>4.5</td>
<td>904</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W2A: Watershed 2A

Type III 24-hr 10-Year Rainfall=4.90"
Runoff Area=28,791 sf
Runoff Volume=7,859 cf
Runoff Depth=3.28"
Flow Length=904'
Tc=6.0 min
CN=85
Summary for Subcatchment W2B: Watershed 2B

Runoff = 0.41 cfs @ 12.09 hrs, Volume = 1,348 cf, Depth = 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,413</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>4,165</td>
<td>91</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>18.06% Pervious Area</td>
</tr>
<tr>
<td>3,413</td>
<td>98</td>
<td>81.94% Impervious Area</td>
</tr>
</tbody>
</table>

Tc = 6.0 min

Direct Entry,

Subcatchment W2B: Watershed 2B

Hydrograph

Type III 24-hr 10-Year Rainfall=4.90"
Runoff Area=4,165 sf
Runoff Volume=1,348 cf
Runoff Depth=3.89"
Tc=6.0 min
CN=91
Summary for Pond 3P: Sediment Forebay

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 2.22" for 10-Year event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 2,262 cf
Outflow = 0.73 cfs @ 12.10 hrs, Volume= 2,135 cf, Attenuation= 1%, Lag= 0.2 min
Primary = 0.73 cfs @ 12.10 hrs, Volume= 2,135 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 86.30' @ 12.10 hrs Surf.Area= 275 sf Storage= 148 cf
Plug-Flow detention time= 39.3 min calculated for 2,135 cf (94% of inflow)
Center-of-Mass det. time= 9.6 min (854.4 - 844.7)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>85.50'</td>
<td>208 cf</td>
<td>Custom Stage Data (Prismatic) Listed below (Recalc)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>85.50</td>
<td>95</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>86.50</td>
<td>320</td>
<td>208</td>
<td>208</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 86.25' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.72 cfs @ 12.10 hrs HW=86.30' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 0.72 cfs @ 0.73 fps)

Pond 3P: Sediment Forebay

Hydrograph

Inflow Area=12,230 sf
Peak Elev=86.30'
Storage=148 cf
Summary for Pond 4P: UIC #1 MC-3500

Inflow Area = 4,165 sf, 81.94% Impervious, Inflow Depth = 3.89" for 10-Year event
Inflow = 0.41 cfs @ 12.09 hrs, Volume= 1,348 cf
Outflow = 0.03 cfs @ 13.15 hrs, Volume= 1,348 cf, Atten= 92%, Lag= 63.7 min
Discarded = 0.03 cfs @ 13.15 hrs, Volume= 1,348 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 93.90' @ 13.15 hrs  Surf.Area= 289 sf  Storage= 597 cf
Plug-Flow detention time= 184.3 min calculated for 1,346 cf (100% of inflow)
Center-of-Mass det. time= 184.0 min (971.5 - 787.5)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
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</thead>
<tbody>
<tr>
<td>#1A</td>
<td>90.50'</td>
<td>370 cf</td>
<td>8.42'W x 34.38'L x 5.50'H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,592 cf Overall - 470 cf Embedded = 1,122 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>91.25'</td>
<td>470 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 4 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

840 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Discarded 90.50' 2.410 in/hr Exfiltration over Wetted area
#2 Primary 95.95' 2.5" x 2.5" Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600
Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 13.15 hrs HW=93.90' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=90.50' (Free Discharge)
2=Orifice/Grate (Controls 0.00 cfs)
Pond 4P: UIC #1 MC-3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d + Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)

Effective Size = 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 1 rows = 29.8 cf

4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

4 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 469.6 cf Chamber Storage

1,591.5 cf Field - 469.6 cf Chambers = 1,121.9 cf Stone x 33.0% Voids = 370.2 cf Stone Storage

Chamber Storage + Stone Storage = 839.8 cf = 0.019 af
Overall Storage Efficiency = 52.8%
Overall System Size = 34.38' x 8.42' x 5.50'

4 Chambers
58.9 cy Field
41.6 cy Stone
Pond 4P: UIC #1 MC-3500

- Inflow Area: 4,165 sf
- Peak Elev: 93.90'
- Storage: 597 cf

Hydrograph with inflow and outflow data shown over time.

Flow (cfs)

0.44 cfs
0.42 cfs
0.40 cfs
0.38 cfs
0.36 cfs
0.34 cfs
0.32 cfs
0.30 cfs
0.28 cfs
0.26 cfs
0.24 cfs
0.22 cfs
0.20 cfs
0.18 cfs
0.16 cfs
0.14 cfs
0.12 cfs
0.10 cfs
0.08 cfs
0.06 cfs
0.04 cfs
0.02 cfs
0.00 cfs

Time (hours)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
Summary for Pond 5P: Infiltration Basin

Inflow Area = 14,120 sf, 43.97% Impervious, Inflow Depth = 2.44" for 10-Year event
Inflow = 0.93 cfs @ 12.10 hrs, Volume= 2,870 cf
Outflow = 0.61 cfs @ 12.21 hrs, Volume= 2,827 cf, Atten= 34%, Lag= 6.7 min
Discarded = 0.04 cfs @ 12.20 hrs, Volume= 1,882 cf
Primary = 0.58 cfs @ 12.21 hrs, Volume= 945 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 86.19' @ 12.20 hrs Surf.Area= 636 sf Storage= 694 cf

Plug-Flow detention time= 155.2 min calculated for 2,822 cf (98% of inflow)
Center-of-Mass det. time= 146.6 min (973.8 - 827.2)

Volume Invert Avail.Storage Storage Description
#1 84.50' 905 cf Custom Stage Data (Conic) Listed below (Recalc)

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<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>84.50</td>
<td>212</td>
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<td>0</td>
<td>212</td>
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<tr>
<td>85.50</td>
<td>446</td>
<td>322</td>
<td>322</td>
<td>454</td>
</tr>
<tr>
<td>86.50</td>
<td>732</td>
<td>583</td>
<td>905</td>
<td>753</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Discarded 84.50' 2.410 in/hr Exfiltration over Wetted area
#2 Primary 86.15' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.04 cfs @ 12.20 hrs HW=86.19' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.55 cfs @ 12.21 hrs HW=86.19' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Weir Controls 0.55 cfs @ 0.66 fps)
Pond 5P: Infiltration Basin

Inflow Area=14,120 sf
Peak Elev=86.19'
Storage=694 cf
Summary for Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area = 13,552 sf, 67.59% Impervious, Inflow Depth = 3.37" for 10-Year event
Inflow = 1.19 cfs @ 12.09 hrs, Volume= 3,810 cf
Outflow = 1.18 cfs @ 12.09 hrs, Volume= 2,893 cf, Atten= 1%, Lag= 0.0 min
Primary = 1.18 cfs @ 12.09 hrs, Volume= 2,893 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 85.20' @ 12.09 hrs Surf.Area= 350 sf Storage= 986 cf

Plug-Flow detention time= 131.1 min calculated for 2,887 cf (76% of inflow)
Center-of-Mass det. time= 48.1 min ( 853.4 - 805.2 )

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>80.00'</td>
<td>617 cf</td>
<td>8.42'W x 41.55'L x 7.00'H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,448 cf Overall - 580 cf Embedded = 1,868 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>81.75'</td>
<td>580 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 5 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

1,196 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Primary 85.00' 4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.15 cfs @ 12.09 hrs HW=85.20' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 1.15 cfs @ 1.46 fps)
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d + Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size = 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 1 rows = 29.8 cf

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55' Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
21.0" Stone Base + 45.0" Chamber Height + 18.0" Stone Cover = 7.00' Field Height

5 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 579.6 cf Chamber Storage

2,448.0 cf Field - 579.6 cf Chambers = 1,868.4 cf Stone x 33.0% Voids = 616.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,196.1 cf = 0.027 af
Overall Storage Efficiency = 48.9%
Overall System Size = 41.55' x 8.42' x 7.00'

5 Chambers
90.7 cy Field
69.2 cy Stone
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area=13,552 sf
Peak Elev=85.20'
Storage=986 cf
Summary for Pond 11P: UIC #2 MC-3500 4.0’ stone

Inflow Area = 17,302 sf, 74.62% Impervious, Inflow Depth = 3.02” for 10-Year event
Inflow = 1.58 cfs @ 12.09 hrs, Volume = 4,350 cf
Outflow = 0.04 cfs @ 11.40 hrs, Volume = 2,497 cf, Atten = 98%, Lag = 0.0 min
Discarded = 0.04 cfs @ 11.40 hrs, Volume = 2,497 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume = 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 86.12’ @ 17.38 hrs Surf.Area= 647 sf Storage= 2,672 cf

Plug-Flow detention time= 392.8 min calculated for 2,497 cf (57% of inflow)
Center-of-Mass det. time= 275.5 min (1,093.7 - 818.2)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>77.25’</td>
<td>1,701 cf</td>
<td>15.58’W x 41.55’L x 9.75’H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6,313 cf Overall - 1,159 cf Embedded = 5,154 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>81.25’</td>
<td>1,159 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 10 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4”W x 45.0”H =&gt; 15.33 sf x 7.17”L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0”W x 45.0”H x 7.50”L with 0.33’ Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 Chambers in 2 Rows</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf</td>
</tr>
</tbody>
</table>

2,860 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Discarded 77.25’ 2.410 in/hr Exfiltration over Surface area
#2 Primary 86.45’ 4.0” x 18.0” Horiz. Orifice/Grate C= 0.600
Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 11.40 hrs HW=77.35’ (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=77.25’ (Free Discharge)
2=Orifice/Grate (Controls 0.00 cfs)
Pond 11P: UIC #2 MC-3500 4.0' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d + Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55'

Base Length

2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width

48.0" Stone Base + 45.0" Chamber Height + 24.0" Stone Cover = 9.75' Field Height

10 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,159.1 cf Chamber Storage

6,313.0 cf Field - 1,159.1 cf Chambers = 5,153.9 cf Stone x 33.0% Voids = 1,700.8 cf Stone Storage

Chamber Storage + Stone Storage = 2,859.9 cf = 0.066 af
Overall Storage Efficiency = 45.3%
Overall System Size = 41.55' x 15.58' x 9.75'

10 Chambers
233.8 cy Field
190.9 cy Stone
Pond 11P: UIC #2 MC-3500 4.0' stone

Inflow Area=17,302 sf
Peak Elev=86.12'
Storage=2,672 cf
Summary for Pond 12P: Pea gravel Diaphragm

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 2.28" for 10-Year event
Inflow = 0.73 cfs @ 12.10 hrs, Volume= 2,329 cf
Outflow = 0.73 cfs @ 12.09 hrs, Volume= 2,262 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.73 cfs @ 12.09 hrs, Volume= 2,262 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 86.97' @ 12.09 hrs Surf.Area= 114 sf Storage= 74 cf

Plug-Flow detention time= 22.3 min calculated for 2,258 cf (97% of inflow)
Center-of-Mass det. time= 6.3 min (844.7 - 838.4)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>85.00'</td>
<td>75 cf</td>
<td>Custom Stage Data (Prismatic), listed below (Recalc) 228 cf Overall x 33.0% Voids</td>
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</table>

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>85.00</td>
<td>114</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>87.00</td>
<td>114</td>
<td>228</td>
<td>228</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 86.94' 38.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.70 cfs @ 12.09 hrs HW=86.97' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 0.70 cfs @ 0.58 fps)
Station 7 Matunuck - Proposed - R1A
Prepared by {enter your company name here}
HydroCAD® 10.10-4a  s/n 03396 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 10-Year Rainfall=4.90"
Printed 7/30/2021

Pond 12P: Pea gravel Diaphragm

Hydrograph

Inflow Area=12,230 sf
Peak Elev=86.97'
Storage=74 cf
Summary for Link DP-1: Lower Gradient

Inflow Area = 105,550 sf, 21.75% Impervious, Inflow Depth = 1.12" for 10-Year event
Inflow = 2.78 cfs @ 12.16 hrs, Volume = 9,877 cf
Primary = 2.78 cfs @ 12.16 hrs, Volume = 9,877 cf, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs

Link DP-1: Lower Gradient

Inflow Area = 105,550 sf
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 32,956 sf, 66.76% Impervious, Inflow Depth = 2.86" for 10-Year event
Inflow = 2.46 cfs @ 12.09 hrs, Volume= 7,859 cf
Primary = 2.46 cfs @ 12.09 hrs, Volume= 7,859 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Inflow Area=32,956 sf
Summary for Subcatchment W1A: Watershed 1A

Runoff = 4.00 cfs @ 12.12 hrs, Volume= 13,878 cf, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,836</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>74,128</td>
<td>63</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>94.83% Pervious Area</td>
</tr>
<tr>
<td>3,836</td>
<td>98</td>
<td>5.17% Impervious Area</td>
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<table>
<thead>
<tr>
<th>Tc</th>
<th>Length</th>
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<th>Velocity</th>
<th>Capacity</th>
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<tbody>
<tr>
<td>6.2</td>
<td>100</td>
<td>0.0600</td>
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<td>Sheet Flow, SEG A</td>
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<tr>
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<td>Grass: Short  n= 0.150  P2= 3.30&quot;</td>
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<tr>
<td>1.7</td>
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<td>Shallow Concentrated Flow, SEG B</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>Grassed Waterway  Kv= 15.0 fps</td>
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</tbody>
</table>

Subcatchment W1A: Watershed 1A

Hydrograph

Type III 24-hr 25-Year Rainfall=6.10"
Runoff Area=74,128 sf
Runoff Volume=13,878 cf
Runoff Depth=2.25"
Flow Length=455'
Tc=7.9 min
CN=63
Summary for Subcatchment W1B: Watershed 1B

Runoff = 1.57 cfs @ 12.09 hrs, Volume= 5,087 cf, Depth= 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

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<tr>
<th>Area (sf)</th>
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<th>Description</th>
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<td>Paved parking, HSG B</td>
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<tr>
<td>4,392</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>13,552</td>
<td>86</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>4,392</td>
<td>61</td>
<td>32.41% Pervious Area</td>
</tr>
<tr>
<td>9,160</td>
<td>98</td>
<td>67.59% Impervious Area</td>
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<th>Tc (min)</th>
<th>Length (feet)</th>
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<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<tr>
<td>0.7</td>
<td>100</td>
<td>0.0800</td>
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<td>Sheet Flow, SEG A</td>
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<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
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<tr>
<td>0.4</td>
<td>104</td>
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<td>4.54</td>
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<td>Shallow Concentrated Flow, SEG B</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
</tr>
</tbody>
</table>

1.1 204 Total, Increased to minimum Tc = 6.0 min

Subcatchment W1B: Watershed 1B

Type III 24-hr 25-Year Rainfall=6.10"
Runoff Area=13,552 sf
Runoff Volume=5,087 cf
Runoff Depth=4.50"
Flow Length=204'
Tc=6.0 min
CN=86
Summary for Subcatchment W1C: Watershed 1C

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 1,832 cf, Depth= 5.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

<table>
<thead>
<tr>
<th>Area (sf)</th>
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<th>Description</th>
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<tbody>
<tr>
<td>3,750</td>
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<td>Roofs, HSG B</td>
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<tr>
<td>3,750</td>
<td>98</td>
<td>100.00% Impervious Area</td>
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<table>
<thead>
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<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<tbody>
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<td>6.0</td>
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<td>Direct Entry,</td>
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</table>

Subcatchment W1C: Watershed 1C

Hydrograph

Type III 24-hr 25-Year Rainfall=6.10"
Runoff Area=3,750 sf
Runoff Volume=1,832 cf
Runoff Depth=5.86"
Tc=6.0 min
CN=98
Summary for Subcatchment W1D: Watershed 1D

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 923 cf, Depth= 5.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

<table>
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<td>Roofs, HSG B</td>
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<tr>
<td>1,890</td>
<td>98</td>
<td>100.00% Impervious Area</td>
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</table>

**Direct Entry,**

Subcatchment W1D: Watershed 1D

**Hydrograph**

- Type III 24-hr 25-Year Rainfall=6.10"
- Runoff Area=1,890 sf
- Runoff Volume=923 cf
- Runoff Depth=5.86"
- Tc=6.0 min
- CN=98
Summary for Subcatchment W1E: Watershed 1E

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 3,332 cf, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr  25-Year Rainfall=6.10"

<table>
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<th>Area (sf)</th>
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<th>Description</th>
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<td>4,318</td>
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<td>Paved parking, HSG B</td>
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<tr>
<td>7,912</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
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<tr>
<td>12,230</td>
<td>74</td>
<td>Weighted Average</td>
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<tr>
<td>7,912</td>
<td>61</td>
<td>64.69% Pervious Area</td>
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<tr>
<td>4,318</td>
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<td>35.31% Impervious Area</td>
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<td>Paved    Kv= 20.3 fps</td>
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<tr>
<td>0.2</td>
<td>17</td>
<td>0.0100</td>
<td>1.50</td>
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<td>Shallow Concentrated Flow, SEG B</td>
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<td></td>
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<td></td>
<td></td>
<td>Grassed Waterway Kv= 15.0 fps</td>
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</table>

1.0 117 Total, Increased to minimum Tc = 6.0 min

Subcatchment W1E: Watershed 1E

Type III 24-hr 25-Year Rainfall=6.10"
Runoff Area=12,230 sf
Runoff Volume=3,332 cf
Runoff Depth=3.27"
Flow Length=117'
Slope=0.0100 '/'
Tc=6.0 min
CN=74
Summary for Subcatchment W2A: Watershed 2A

Runoff = 3.27 cfs @ 12.09 hrs, Volume= 10,549 cf, Depth= 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

<table>
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<th>Area (sf)</th>
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<td>Roofs, HSG B</td>
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<td>17,540</td>
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<td>Paved parking &amp; Roadways, HSG B</td>
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<tr>
<td>10,203</td>
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<td>&gt;75% Grass cover, Good, HSG B</td>
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<tr>
<td>28,791</td>
<td>85</td>
<td>Weighted Average</td>
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<tr>
<td>10,203</td>
<td>61</td>
<td>35.44% Pervious Area</td>
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<tr>
<td>18,588</td>
<td>98</td>
<td>64.56% Impervious Area</td>
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<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
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<tbody>
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<td>Sheet Flow, SEG A</td>
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<td></td>
<td></td>
<td></td>
<td>Smooth surfaces</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>n= 0.011 P2= 3.30&quot;</td>
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<tr>
<td>3.5</td>
<td>827</td>
<td>0.0380</td>
<td>3.96</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
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<tr>
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<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
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</tbody>
</table>

4.5 904 Total, Increased to minimum Tc = 6.0 min

Subcatchment W2A: Watershed 2A

Hydrograph

Type III 24-hr 25-Year Rainfall=6.10"
Runoff Area=28,791 sf
Runoff Volume=10,549 cf
Runoff Depth=4.40"
Flow Length=904'
Tc=6.0 min
CN=85
Summary for Subcatchment W2B: Watershed 2B

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 1,755 cf, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.10"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
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<tbody>
<tr>
<td>* 3,413</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
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<tr>
<td>4,165</td>
<td>91</td>
<td>Weighted Average</td>
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<tr>
<td>752</td>
<td>61</td>
<td>18.06% Pervious Area</td>
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<tr>
<td>3,413</td>
<td>98</td>
<td>81.94% Impervious Area</td>
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Tc Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)
6.0

Direct Entry,

Subcatchment W2B: Watershed 2B

Type III 24-hr 25-Year Rainfall=6.10"
Runoff Area=4,165 sf
Runoff Volume=1,755 cf
Runoff Depth=5.06"
Tc=6.0 min
CN=91
Summary for Pond 3P: Sediment Forebay

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 3.21" for 25-Year event
Inflow = 1.05 cfs @ 12.09 hrs, Volume = 3,271 cf
Outflow = 1.05 cfs @ 12.10 hrs, Volume = 3,136 cf, Atten= 1%, Lag= 0.2 min
Primary = 1.05 cfs @ 12.10 hrs, Volume = 3,136 cf

Routing by Stor-Ind method, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs / 3
Peak Elev= 86.31' @ 12.10 hrs  Surf.Area = 278 sf  Storage = 152 cf

Plug-Flow detention time = 31.1 min calculated for 3,136 cf (96% of inflow)
Center-of-Mass det. time = 8.3 min (841.1 - 832.9)

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<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
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<tbody>
<tr>
<td>#1</td>
<td>85.50'</td>
<td>208 cf</td>
<td>Custom Stage Data (Prismatic)</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>85.50</td>
<td>95</td>
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<td>0</td>
</tr>
<tr>
<td>86.50</td>
<td>320</td>
<td>208</td>
<td>208</td>
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Device Routing Invert Outlet Devices
#1 Primary 86.25’ 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.03 cfs @ 12.10 hrs HW=86.31' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 1.03 cfs @ 0.82 fps)

Pond 3P: Sediment Forebay

Inflow Area=12,230 sf
Peak Elev=86.31'
Storage=152 cf
## Summary for Pond 4P: UIC #1 MC-3500

Inflow Area = 4,165 sf, 81.94% Impervious, Inflow Depth = 5.06" for 25-Year event

<table>
<thead>
<tr>
<th>Inflow</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.52 cfs @ 12.09 hrs</td>
<td>1,755 cf</td>
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</table>

<table>
<thead>
<tr>
<th>Outflow</th>
<th>Volume</th>
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</thead>
<tbody>
<tr>
<td>0.04 cfs @ 13.15 hrs</td>
<td>1,755 cf, Atten=92%, Lag=63.6 min</td>
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<table>
<thead>
<tr>
<th>Discarded</th>
<th>Volume</th>
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<tbody>
<tr>
<td>0.04 cfs @ 13.15 hrs</td>
<td>1,755 cf</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 cfs @ 0.00 hrs</td>
<td>0 cf</td>
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</tbody>
</table>

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 95.70' @ 13.15 hrs  Surf.Area= 289 sf  Storage= 811 cf

Plug-Flow detention time= 220.2 min calculated for 1,751 cf (100% of inflow)
Center-of-Mass det. time= 220.1 min (1,000.6 - 780.5)

<table>
<thead>
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<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
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<tr>
<td>#1A 90.50'</td>
<td>370 cf</td>
<td>8.42'W x 34.38'L x 5.50'H Field A</td>
<td></td>
</tr>
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</table>

1,592 cf Overall - 470 cf Embedded = 1,122 cf x 33.0% Voids

ADS_StormTech MC-3500 d +Cap x 4 Inside #1
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf

| #2A 91.25' | 470 cf |

| Storage Group A created with Chamber Wizard |

<table>
<thead>
<tr>
<th>Device Routing</th>
<th>Invert</th>
<th>Outlet Devices</th>
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</thead>
<tbody>
<tr>
<td>#1 Discarded</td>
<td>90.50'</td>
<td>2.410 in/hr Exfiltration over Wetted area</td>
</tr>
<tr>
<td>#2 Primary</td>
<td>95.95'</td>
<td>2.5&quot; x 2.5&quot; Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600</td>
</tr>
</tbody>
</table>

| Discarded OutFlow | Max=0.04 cfs @ 13.15 hrs HW=95.70' (Free Discharge) |
| Primary OutFlow   | Max=0.00 cfs @ 0.00 hrs HW=90.50' (Free Discharge) |

1=Exfiltration (Exfiltration Controls 0.04 cfs)

2=Orifice/Grate (Controls 0.00 cfs)
Pond 4P: UIC #1 MC-3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf

4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38'
Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

4 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 469.6 cf Chamber Storage

1,591.5 cf Field - 469.6 cf Chambers = 1,121.9 cf Stone x 33.0% Voids = 370.2 cf Stone Storage

Chamber Storage + Stone Storage = 839.8 cf = 0.019 af
Overall Storage Efficiency = 52.8%
Overall System Size = 34.38' x 8.42' x 5.50'

4 Chambers
58.9 cy Field
41.6 cy Stone
Pond 4P: UIC #1 MC-3500

Inflow Area=4,165 sf
Peak Elev=95.70'
Storage=811 cf
Summary for Pond 5P: Infiltration Basin

Inflow Area = 14,120 sf, 43.97% Impervious, Inflow Depth = 3.45" for 25-Year event
Inflow = 1.30 cfs @ 12.09 hrs, Volume= 4,060 cf
Outflow = 1.28 cfs @ 12.10 hrs, Volume= 4,013 cf, Atten= 2%, Lag= 0.2 min
Discarded = 0.04 cfs @ 12.10 hrs, Volume= 2,036 cf
Primary = 1.24 cfs @ 12.10 hrs, Volume= 1,977 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 86.22' @ 12.10 hrs  Surf.Area= 645 sf  Storage= 713 cf

Plug-Flow detention time= 111.0 min calculated for 4,006 cf (99% of inflow)
Center-of-Mass det. time= 104.4 min ( 923.6 - 819.2 )

<table>
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<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
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<tbody>
<tr>
<td>#1</td>
<td>84.50'</td>
<td>905 cf</td>
<td>Custom Stage Data (Conic) Listed below (Recalc)</td>
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<table>
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<td>(cubic-feet)</td>
<td>(cubic-feet)</td>
<td>(sq-ft)</td>
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<td>454</td>
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<td>86.50</td>
<td>732</td>
<td>583</td>
<td>905</td>
<td>753</td>
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</tbody>
</table>

Device Routing Invert Outlet Devices

| #1 Discarded | 84.50' | 2.410 in/hr Exfiltration over Wetted area |
| #2 Primary   | 86.15' | 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |

Discarded OutFlow Max=0.04 cfs @ 12.10 hrs  HW=86.22'  (Free Discharge)
1=Exfiltration  (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.23 cfs @ 12.10 hrs  HW=86.22'  (Free Discharge)
2=Sharp-Crested Rectangular Weir (Weir Controls 1.23 cfs @ 0.87 fps)
Pond 5P: Infiltration Basin

Inflow Area=14,120 sf
Peak Elev=86.22'
Storage=713 cf
Summary for Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area = 13,552 sf, 67.59% Impervious, Inflow Depth = 4.50" for 25-Year event
Inflow = 1.57 cfs @ 12.09 hrs, Volume= 5,087 cf
Outflow = 1.55 cfs @ 12.09 hrs, Volume= 4,115 cf, Atten= 1%, Lag= 0.2 min
Primary = 1.55 cfs @ 12.09 hrs, Volume= 4,115 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 85.24' @ 12.09 hrs Surf.Area= 350 sf Storage= 991 cf
Plug-Flow detention time= 114.6 min calculated for 4,108 cf (81% of inflow)
Center-of-Mass det. time= 41.9 min (839.0 - 797.1)

<table>
<thead>
<tr>
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<th>Avail.Storage</th>
<th>Storage Description</th>
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<tbody>
<tr>
<td>#1A</td>
<td>80.00'</td>
<td>617 cf</td>
<td>842'W x 41.55'L x 7.00'H Field A</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>2,448 cf Overall - 580 cf Embedded = 1,868 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>81.75'</td>
<td>580 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 5 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
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<td></td>
<td>Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

1,196 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Primary 85.00' 4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.51 cfs @ 12.09 hrs HW=85.24' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 1.51 cfs @ 1.60 fps)
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55' Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
21.0" Stone Base + 45.0" Chamber Height + 18.0" Stone Cover = 7.00' Field Height

5 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 579.6 cf Chamber Storage

2,448.0 cf Field - 579.6 cf Chambers = 1,868.4 cf Stone x 33.0% Voids = 616.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,196.1 cf = 0.027 af
Overall Storage Efficiency = 48.9%
Overall System Size = 41.55' x 8.42' x 7.00'

5 Chambers
90.7 cy Field
69.2 cy Stone
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area=13,552 sf
Peak Elev=85.24'
Storage=991 cf
Summary for Pond 11P: UIC #2 MC-3500 4.0' stone

Inflow Area = 17,302 sf, 74.62% Impervious, Inflow Depth = 4.12" for 25-Year event
Inflow = 2.05 cfs @ 12.09 hrs, Volume= 5,947 cf
Outflow = 0.41 cfs @ 12.57 hrs, Volume= 3,870 cf, Atten= 80%, Lag= 28.6 min
Discarded = 0.04 cfs @ 11.10 hrs, Volume= 2,589 cf
Primary = 0.38 cfs @ 12.57 hrs, Volume= 1,282 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 86.54' @ 12.55 hrs Surf.Area= 647 sf Storage= 2,762 cf
Plug-Flow detention time= 286.0 min calculated for 3,864 cf (65% of inflow)
Center-of-Mass det. time= 183.7 min (993.8 - 810.0)

Volume | Invert | Avail.Storage | Storage Description |
--------|--------|--------------|---------------------|
#1A     | 77.25' | 1,701 cf     | 15.58'W x 41.55'L x 9.75'H Field A |
         |        |              | 6,313 cf Overall - 1,159 cf Embedded = 5,154 cf x 33.0% Voids |
         |        |              | ADS_StormTech MC-3500 d +Capx 10 Inside #1 |
         |        |              | Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf |
         |        |              | Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap |
         |        |              | 10 Chambers in 2 Rows |
         |        |              | Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf |
#2A     | 81.25' | 1,159 cf     | 2,860 cf Total Available Storage |

Storage Group A created with Chamber Wizard

Device | Routing | Invert | Outlet Devices |
--------|---------|--------|----------------|
#1      | Discarded | 77.25' | 2.410 in/hr Exfiltration over Surface area |
#2      | Primary  | 86.45' | 4.0" x 18.0" Horiz. Orifice/Grate C= 0.600 |

Discarded OutFlow Max=0.04 cfs @ 11.10 hrs HW=77.35’ (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.30 cfs @ 12.57 hrs HW=86.54’ (Free Discharge)
2=Orifice/Grate (Weir Controls 0.30 cfs @ 0.96 fps)
Pond 11P: UIC #2 MC-3500 4.0’ stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)

Effective Size = 70.4”W x 45.0”H => 15.33 sf x 7.17’L = 110.0 cf

Overall Size = 77.0”W x 45.0”H x 7.50’L with 0.33’ Overlap

Cap Storage = +14.9 cf x 2 x 2 rows = 59.6 cf

77.0” Wide + 9.0” Spacing = 86.0” C-C Row Spacing

5 Chambers/Row x 7.17’ Long +1.85’ Cap Length x 2 = 39.55’ Row Length +12.0” End Stone x 2 = 41.55’ Base Length

2 Rows x 77.0” Wide + 9.0” Spacing x 1 + 12.0” Side Stone x 2 = 15.58’ Base Width

48.0” Stone Base + 45.0” Chamber Height + 24.0” Stone Cover = 9.75’ Field Height

10 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,159.1 cf Chamber Storage

6,313.0 cf Field - 1,159.1 cf Chambers = 5,153.9 cf Stone x 33.0% Voids = 1,700.8 cf Stone Storage

Chamber Storage + Stone Storage = 2,859.9 cf = 0.066 af

Overall Storage Efficiency = 45.3%

Overall System Size = 41.55’ x 15.58’ x 9.75’

10 Chambers
233.8 cy Field
190.9 cy Stone
Pond 11P: UIC #2 MC-3500 4.0' stone

Inflow Area=17,302 sf
Peak Elev=86.54'
Storage=2,762 cf

Hydrograph

Flow (cfs)

Time (hours)
Summary for Pond 12P: Pea gravel Diaphragm

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 3.27" for 25-Year event
Inflow = 1.06 cfs @ 12.09 hrs, Volume = 3,332 cf
Outflow = 1.05 cfs @ 12.09 hrs, Volume = 3,271 cf, Atten = 0%, Lag = 0.0 min
Primary = 1.05 cfs @ 12.09 hrs, Volume = 3,271 cf

Routing by Stor-Ind method, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs / 2
Peak Elev = 86.98' @ 12.09 hrs Surf.Area = 114 sf Storage = 75 cf

Plug-Flow detention time = 15.4 min calculated for 3,271 cf (98% of inflow)
Center-of-Mass det. time = 4.8 min (832.9 - 828.1)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>85.00'</td>
<td>75 cf</td>
<td>Custom Stage Data (Prismatic), listed below (Recalc) 228 cf Overall x 33.0% Voids</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>85.00</td>
<td>114</td>
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<td>0</td>
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<tr>
<td>87.00</td>
<td>114</td>
<td>228</td>
<td>228</td>
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</tbody>
</table>

Device Routing Invert Outlet Devices

#1 Primary 86.94' 38.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.03 cfs @ 12.09 hrs HW=86.98' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 1.03 cfs @ 0.66 fps)
Pond 12P: Pea gravel Diaphragm

Hydrograph

Inflow Area=12,230 sf
Peak Elev=86.98'
Storage=75 cf
Summary for Link DP-1: Lower Gradient

Inflow Area = 105,550 sf, 21.75% Impervious, Inflow Depth = 1.95" for 25-Year event
Inflow = 5.22 cfs @ 12.12 hrs, Volume= 17,136 cf
Primary = 5.22 cfs @ 12.12 hrs, Volume= 17,136 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Inflow Area=105,550 sf
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 32,956 sf, 66.76% Impervious, Inflow Depth = 3.84" for 25-Year event
Inflow = 3.27 cfs @ 12.09 hrs, Volume = 10,549 cf
Primary = 3.27 cfs @ 12.09 hrs, Volume = 10,549 cf, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs

Inflow Area = 32,956 sf.
Summary for Subcatchment W1A: Watershed 1A

Runoff = 7.77 cfs @ 12.12 hrs, Volume=26,110 cf, Depth=4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span=0.00-28.00 hrs, dt=0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,836</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>74,128</td>
<td>63</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>94.83% Pervious Area</td>
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<tr>
<td>3,836</td>
<td>98</td>
<td>5.17% Impervious Area</td>
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</table>

Tc Length Slope Velocity Capacity Description
---|---|---|---|---|---|
6.2 | 100 | 0.0600 | 0.27 | Sheet Flow, SEG A
Grass: Short n=0.150 P2=3.30"
1.7 | 355 | 0.0560 | 3.55 | Shallow Concentrated Flow, SEG B
Grassed Waterway Kv=15.0 fps

Subcatchment W1A: Watershed 1A

Hydrograph

Type III 24-hr 100-Year Rainfall=8.70"
Runoff Area=74,128 sf
Runoff Volume=26,110 cf
Runoff Depth=4.23"
Flow Length=455'
Tc=7.9 min
CN=63
Summary for Subcatchment W1B: Watershed 1B

Runoff = 2.38 cfs @ 12.09 hrs, Volume= 7,918 cf, Depth= 7.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

<table>
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<th>Area (sf)</th>
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<tbody>
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<td>9,160</td>
<td>98</td>
<td>Paved parking, HSG B</td>
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<tr>
<td>4,392</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>13,552</td>
<td>86</td>
<td>Weighted Average</td>
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<tr>
<td>9,160</td>
<td>98</td>
<td>67.59% Impervious Area</td>
</tr>
<tr>
<td>4,392</td>
<td>61</td>
<td>32.41% Pervious Area</td>
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<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<td>Sheet Flow, SEG A</td>
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<td>Smooth surfaces</td>
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<tr>
<td></td>
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<td>n= 0.011</td>
<td></td>
<td>P2= 3.30&quot;</td>
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<tr>
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<td>104</td>
<td>0.0500</td>
<td>4.54</td>
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<td>Shallow Concentrated Flow, SEG B</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Paved</td>
<td></td>
<td>Kv= 20.3 fps</td>
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</tbody>
</table>

1.1 204 Total, Increased to minimum Tc = 6.0 min

Subcatchment W1B: Watershed 1B

Hydrograph

Type III 24-hr
100-Year Rainfall=8.70"
Runoff Area=13,552 sf
Runoff Volume=7,918 cf
Runoff Depth=7.01"
Flow Length=204'
Tc=6.0 min
CN=86
Summary for Subcatchment W1C: Watershed 1C

Runoff = 0.72 cfs @ 12.09 hrs, Volume= 2,644 cf, Depth= 8.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
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<tbody>
<tr>
<td>3,750</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>3,750</td>
<td>98</td>
<td>100.00% Impervious Area</td>
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<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<tbody>
<tr>
<td>6.0</td>
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<td>Direct Entry,</td>
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Subcatchment W1C: Watershed 1C

Hydrograph

Type III 24-hr 100-Year Rainfall=8.70"
Runoff Area=3,750 sf
Runoff Volume=2,644 cf
Runoff Depth=8.46"
Tc=6.0 min
CN=98
Summary for Subcatchment W1D: Watershed 1D

Runoff = 0.36 cfs @ 12.09 hrs, Volume= 1,332 cf, Depth= 8.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

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<td>1,890</td>
<td>98</td>
<td>100.00% Impervious Area</td>
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</table>

Tc = 6.0 min, Length = , Slope = , Velocity = , Capacity = , Description =

Subcatchment W1D: Watershed 1D

Type III 24-hr 100-Year Rainfall=8.70"
Runoff Area=1,890 sf
Runoff Volume=1,332 cf
Runoff Depth=8.46"
Tc=6.0 min
CN=98
Summary for Subcatchment W1E: Watershed 1E

Runoff = 1.78 cfs @ 12.09 hrs, Volume= 5,663 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

<table>
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<tbody>
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<td>Paved parking, HSG B</td>
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<tr>
<td>7,912</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>12,230</td>
<td>74</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>4,318</td>
<td>98</td>
<td>35.31% Impervious Area</td>
</tr>
<tr>
<td>7,912</td>
<td>61</td>
<td>64.69% Pervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
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<td>Shallow Concentrated Flow, SEG A</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
</tr>
<tr>
<td>0.2</td>
<td>17</td>
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<td>1.50</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Grassed Waterway Kv= 15.0 fps</td>
</tr>
<tr>
<td>1.0</td>
<td>117</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W1E: Watershed 1E

Type III 24-hr 100-Year Rainfall=8.70"
Runoff Area=12,230 sf
Runoff Volume=5,663 cf
Runoff Depth=5.56"
Flow Length=117'
Slope=0.0100 '/'
Tc=6.0 min
CN=74
Summary for Subcatchment W2A: Watershed 2A

Runoff = 5.00 cfs @ 12.09 hrs, Volume= 16,532 cf, Depth= 6.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

<table>
<thead>
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<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>* 17,540</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>28,791</td>
<td>85</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>35.44% Pervious Area</td>
</tr>
<tr>
<td>18,588</td>
<td>98</td>
<td>64.56% Impervious Area</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1.0</td>
<td>77</td>
<td>0.0200</td>
<td>1.33</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
<td></td>
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</tr>
<tr>
<td>3.5</td>
<td>827</td>
<td>0.0380</td>
<td>3.96</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
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<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
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</tr>
<tr>
<td>4.5</td>
<td>904</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W2A: Watershed 2A

Type III 24-hr 100-Year Rainfall=8.70"
Runoff Area=28,791 sf
Runoff Volume=16,532 cf
Runoff Depth=6.89"
Flow Length=904'
Tc=6.0 min
CN=85
Summary for Subcatchment W2B: Watershed 2B

Runoff = 0.77 cfs @ 12.09 hrs, Volume= 2,643 cf, Depth= 7.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,413</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>4,165</td>
<td>91</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>18.06% Pervious Area</td>
</tr>
<tr>
<td>3,413</td>
<td>98</td>
<td>81.94% Impervious Area</td>
</tr>
</tbody>
</table>

Tc Length Slope Velocity Capacity Description
(min) (feet) (ft/ft) (ft/sec) (cfs)
6.0

Direct Entry,

Subcatchment W2B: Watershed 2B

Type III 24-hr 100-Year Rainfall=8.70"
Runoff Area=4,165 sf
Runoff Volume=2,643 cf
Runoff Depth=7.62"
Tc=6.0 min
CN=91
Summary for Pond 3P: Sediment Forebay

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 5.48" for 100-Year event
Inflow = 1.78 cfs @ 12.09 hrs, Volume= 5,587 cf
Outflow = 1.77 cfs @ 12.09 hrs, Volume= 5,452 cf, Atten= 1%, Lag= 0.2 min
Primary = 1.77 cfs @ 12.09 hrs, Volume= 5,452 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 86.34' @ 12.09 hrs Surf.Area= 284 sf Storage= 159 cf

Plug-Flow detention time= 20.3 min calculated for 5,442 cf (97% of inflow)
Center-of-Mass det. time= 6.3 min (823.6 - 817.2)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>85.50'</td>
<td>208 cf</td>
<td>Custom Stage Data (Prismatic), Listed below (Recalc)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>85.50</td>
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<td>0</td>
</tr>
<tr>
<td>86.50</td>
<td>320</td>
<td>208</td>
<td>208</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 86.25' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.74 cfs @ 12.09 hrs HW=86.34' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 1.74 cfs @ 0.98 fps)

Inflow Area=12,230 sf
Peak Elev=86.34'
Storage=159 cf
### Summary for Pond 4P: UIC #1 MC-3500

Inflow Area = 4,165 sf, 81.94% Impervious, Inflow Depth = 7.62" for 100-Year event

<table>
<thead>
<tr>
<th>Inflow</th>
<th>0.77 cfs @ 12.09 hrs, Volume=</th>
<th>2,643 cf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outflow</td>
<td>0.52 cfs @ 12.19 hrs, Volume=</td>
<td>2,612 cf, Atten= 32%, Lag= 6.2 min</td>
</tr>
<tr>
<td>Discarded</td>
<td>0.04 cfs @ 12.20 hrs, Volume=</td>
<td>2,105 cf</td>
</tr>
<tr>
<td>Primary</td>
<td>0.48 cfs @ 12.19 hrs, Volume=</td>
<td>506 cf</td>
</tr>
</tbody>
</table>

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 95.97' @ 12.20 hrs Surf.Area= 289 sf Storage= 837 cf

Plug-Flow detention time= 193.7 min calculated for 2,607 cf (99% of inflow)
Center-of-Mass det. time= 186.0 min (956.3 - 770.3)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail. Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>90.50'</td>
<td>370 cf</td>
<td>8.42'W x 34.38'L x 5.50'H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,592 cf Overall - 470 cf Embedded = 1,122 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>91.25'</td>
<td>470 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 4 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

840 cf Total Available Storage

Storage Group A created with Chamber Wizard

<table>
<thead>
<tr>
<th>Device</th>
<th>Routing</th>
<th>Invert</th>
<th>Outlet Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Discarded</td>
<td>90.50'</td>
<td>2.410 in/hr Exfiltration over Wetted area</td>
</tr>
<tr>
<td>#2</td>
<td>Primary</td>
<td>95.95'</td>
<td>2.5&quot; x 2.5&quot; Horiz. Orifice/Grate X 6.00 columns X 6 rows C= 0.600</td>
</tr>
</tbody>
</table>

Limited to weir flow at low heads

**Discarded OutFlow** Max=0.04 cfs @ 12.20 hrs HW=95.97' (Free Discharge)

**Primary OutFlow** Max=0.30 cfs @ 12.19 hrs HW=95.97' (Free Discharge)

(Exfiltration Controls 0.04 cfs)

(Weir Controls 0.30 cfs @ 0.47 fps)
Pond 4P: UIC #1 MC-3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d + Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)

Effective Size = 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 1 rows = 29.8 cf

4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38'
Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

4 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 469.6 cf Chamber Storage

1,591.5 cf Field - 469.6 cf Chambers = 1,121.9 cf Stone x 33.0% Voids = 370.2 cf Stone Storage

Chamber Storage + Stone Storage = 839.8 cf = 0.019 af
Overall Storage Efficiency = 52.8%
Overall System Size = 34.38' x 8.42' x 5.50'

4 Chambers
58.9 cy Field
41.6 cy Stone
Pond 4P: UIC #1 MC-3500

Inflow Area=4,165 sf
Peak Elev=95.97'
Storage=837 cf
Summary for Pond 5P: Infiltration Basin

Inflow Area = 14,120 sf, 43.97% Impervious, Inflow Depth = 5.77" for 100-Year event
Inflow = 2.13 cfs @ 12.09 hrs, Volume = 6,784 cf
Outflow = 2.10 cfs @ 12.10 hrs, Volume = 6,588 cf, Atten= 2%, Lag= 0.3 min
Discarded = 0.04 cfs @ 12.10 hrs, Volume = 2,290 cf
Primary = 2.06 cfs @ 12.10 hrs, Volume = 4,298 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 86.25' @ 12.10 hrs Surf.Area= 654 sf Storage= 731 cf

Plug-Flow detention time= 82.6 min calculated for 6,588 cf (97% of inflow)
Center-of-Mass det. time= 65.5 min ( 872.7 - 807.2 )

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>84.50'</td>
<td>905 cf</td>
<td>Custom Stage Data (Conic) Listed below (Recalc)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>84.50</td>
<td>212</td>
<td>0</td>
<td>0</td>
<td>212</td>
</tr>
<tr>
<td>85.50</td>
<td>446</td>
<td>322</td>
<td>322</td>
<td>454</td>
</tr>
<tr>
<td>86.50</td>
<td>732</td>
<td>583</td>
<td>905</td>
<td>753</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices

#1 Discarded 84.50' 2.410 in/hr Exfiltration over Wetted area
#2 Primary 86.15' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.04 cfs @ 12.10 hrs HW=86.25' (Free Discharge)

Primary OutFlow Max=2.03 cfs @ 12.10 hrs HW=86.25' (Free Discharge)
Pond 5P: Infiltration Basin

Hydrograph

Inflow Area=14,120 sf
Peak Elev=86.25'
Storage=731 cf
Summary for Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area = 13,552 sf, 67.59% Impervious, Inflow Depth = 7.01" for 100-Year event
Inflow = 2.38 cfs @ 12.09 hrs, Volume= 7,918 cf
Outflow = 2.36 cfs @ 12.09 hrs, Volume= 6,960 cf, Atten= 1%, Lag= 0.1 min
Primary = 2.36 cfs @ 12.09 hrs, Volume= 6,960 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 85.32' @ 12.09 hrs Surf.Area= 350 sf Storage= 1,002 cf

Plug-Flow detention time= 88.5 min calculated for 6,948 cf (88% of inflow)
Center-of-Mass det. time= 33.9 min (819.0 - 785.0)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>80.00'</td>
<td>617 cf</td>
<td>8.42'W x 41.55'L x 7.00'H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2,448 cf Overall - 580 cf Embedded = 1,868 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>81.75'</td>
<td>580 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 5 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

1,196 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Primary 85.00’ 4.0’ long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.30 cfs @ 12.09 hrs HW=85.32’ (Free Discharge)
—we=Sharp-Crested Rectangular Weir (Weir Controls 2.30 cfs @ 1.84 fps)
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55'
Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
21.0" Stone Base + 45.0" Chamber Height + 18.0" Stone Cover = 7.00' Field Height

5 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 579.6 cf Chamber Storage

2,448.0 cf Field - 579.6 cf Chambers = 1,868.4 cf Stone x 33.0% Voids = 616.6 cf Stone Storage
Chamber Storage + Stone Storage = 1,196.1 cf = 0.027 af
Overall Storage Efficiency = 48.9%
Overall System Size = 41.55' x 8.42' x 7.00'

5 Chambers
90.7 cy Field
69.2 cy Stone
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area=13,552 sf
Peak Elev=85.32'
Storage=1,002 cf
Summary for Pond 11P: UIC #2 MC-3500 4.0' stone

Inflow Area = 17,302 sf, 74.62% Impervious, Inflow Depth = 6.66" for 100-Year event
Inflow   = 3.08 cfs @ 12.09 hrs, Volume= 9,604 cf
Outflow  = 1.80 cfs @ 12.10 hrs, Volume= 7,237 cf, Atten= 42%, Lag= 0.7 min
Discarded = 0.04 cfs @ 10.20 hrs, Volume= 2,756 cf
Primary  = 1.76 cfs @ 12.10 hrs, Volume= 4,481 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 86.99' @ 12.10 hrs  Surf.Area= 647 sf  Storage= 2,857 cf
Plug-Flow detention time= 178.0 min calculated for 7,237 cf (75% of inflow)
Center-of-Mass det. time= 93.7 min (890.9 - 797.3)

Volume Invert Avail.Storage Storage Description
#1A 77.25' 1,701 cf 15.58'W x 41.55'L x 9.75'H Field A
6,313 cf Overall - 1,159 cf Embedded = 5,154 cf x 33.0% Voids
ADS_StormTech MC-3500 d +Cap x 10 Inside #1
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
10 Chambers in 2 Rows
Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf
#2A 81.25' 1,159 cf 2,860 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Discarded 77.25' 2.410 in/hr Exfiltration over Surface area
#2 Primary 86.45' 4.0" x 18.0" Horiz. Orifice/Grate C= 0.600
Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 10.20 hrs  HW=77.35' (Free Discharge)
↑↑1=Exfiltration (Exfiltration Controls 0.04 cfs)
Primary OutFlow Max=1.76 cfs @ 12.10 hrs  HW=86.99' (Free Discharge)
↑↑2=Orifice/Grate (Orifice Controls 1.76 cfs @ 3.52 fps)
Pond 11P: UIC #2 MC-3500 4.0' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0'' End Stone x 2 = 41.55' Base Length
2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width
48.0" Stone Base + 45.0" Chamber Height + 24.0" Stone Cover = 9.75' Field Height

10 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,159.1 cf Chamber Storage

6,313.0 cf Field - 1,159.1 cf Chambers = 5,153.9 cf Stone x 33.0% Voids = 1,700.8 cf Stone Storage

Chamber Storage + Stone Storage = 2,859.9 cf = 0.066 af
Overall Storage Efficiency = 45.3%
Overall System Size = 41.55' x 15.58' x 9.75'

10 Chambers
233.8 cy Field
190.9 cy Stone
Pond 11P: UIC #2 MC-3500 4.0’ stone

Inflow Area=17,302 sf
Peak Elev=86.99’
Storage=2,857 cf
Summary for Pond 12P: Pea gravel Diaphragm

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 5.56" for 100-Year event  
Inflow = 1.78 cfs @ 12.09 hrs, Volume= 5,663 cf  
Outflow = 1.78 cfs @ 12.09 hrs, Volume= 5,587 cf, Atten= 0%, Lag= 0.0 min  
Primary = 1.78 cfs @ 12.09 hrs, Volume= 5,587 cf  

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2  
Peak Elev= 87.00' @ 12.09 hrs Surf.Area= 114 sf Storage= 75 cf  
Plug-Flow detention time= 12.4 min calculated for 5,577 cf (98% of inflow)  
Center-of-Mass det. time= 4.4 min ( 817.2 - 812.9 )  

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
</table>
| #1     | 85.00' | 75 cf         | **Custom Stage Data (Prismatic)** Listed below (Recalc)  
228 cf Overall x 33.0% Voids  

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Surf.Area</th>
<th>Inc.Store</th>
<th>Cum.Store</th>
</tr>
</thead>
<tbody>
<tr>
<td>(feet)</td>
<td>(sq-ft)</td>
<td>(cubic-feet)</td>
<td>(cubic-feet)</td>
</tr>
<tr>
<td>85.00</td>
<td>114</td>
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<td>0</td>
</tr>
<tr>
<td>87.00</td>
<td>114</td>
<td>228</td>
<td>228</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices  
#1 Primary 86.94' 38.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)  

Primary OutFlow Max=1.74 cfs @ 12.09 hrs HW=87.00' (Free Discharge)  
1=Sharp-Crested Rectangular Weir (Weir Controls 1.74 cfs @ 0.79 fps)
Pond 12P: Pea gravel Diaphragm

Inflow Area=12,230 sf
Peak Elev=87.00'
Storage=75 cf
Summary for Link DP-1: Lower Gradient

Inflow Area = 105,550 sf, 21.75% Impervious, Inflow Depth = 3.97" for 100-Year event
Inflow = 11.74 cfs @ 12.12 hrs, Volume= 34,889 cf
Primary = 11.74 cfs @ 12.12 hrs, Volume= 34,889 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 32,956 sf, 66.76% Impervious, Inflow Depth = 6.20" for 100-Year event
Inflow = 4.97 cfs @ 12.09 hrs, Volume= 17,038 cf
Primary = 4.97 cfs @ 12.09 hrs, Volume= 17,038 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Link DP-2: Matunuck School House Road

Inflow Area=32,956 sf
Appendix I

Water Quality HydroCAD Calculations
### Rainfall Events Listing (selected events)

<table>
<thead>
<tr>
<th>Event#</th>
<th>Event Name</th>
<th>Storm Type</th>
<th>Curve</th>
<th>Mode</th>
<th>Duration (hours)</th>
<th>B/B</th>
<th>Depth (inches)</th>
<th>AMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WQV</td>
<td>Type III 24-hr</td>
<td>Default</td>
<td>24.00</td>
<td>1</td>
<td>1.20</td>
<td>2</td>
<td></td>
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</table>
### Area Listing (all nodes)

<table>
<thead>
<tr>
<th>Area</th>
<th>CN</th>
<th>Description</th>
<th>Subcatchment-numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>93,551</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
<td>(W1A, W1B, W1E, W2A, W2B)</td>
</tr>
<tr>
<td>20,953</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
<td>(W2A, W2B)</td>
</tr>
<tr>
<td>13,478</td>
<td>98</td>
<td>Paved parking, HSG B</td>
<td>(W1B, W1E)</td>
</tr>
<tr>
<td>10,524</td>
<td>98</td>
<td>Roofs, HSG B</td>
<td>(W1A, W1C, W1D, W2A)</td>
</tr>
<tr>
<td><strong>138,506</strong></td>
<td><strong>73</strong></td>
<td><strong>TOTAL AREA</strong></td>
<td></td>
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<tr>
<td>Area (sq-ft)</td>
<td>Soil Group</td>
<td>Subcatchment Numbers</td>
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<td>-------------</td>
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<tr>
<td>0</td>
<td>HSG A</td>
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<td>HSG C</td>
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<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>138,506</td>
<td>TOTAL AREA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary for Subcatchment W1A: Watershed 1A

Runoff = 0.00 cfs @ 23.99 hrs, Volume = 1 cf, Depth = 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs
Type III 24-hr WQV Rainfall = 1.20"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,836</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>74,128</td>
<td>63</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>70,292</td>
<td>61</td>
<td>94.83% Pervious Area</td>
</tr>
<tr>
<td>3,836</td>
<td>98</td>
<td>5.17% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2</td>
<td>100</td>
<td>0.0600</td>
<td>0.27</td>
<td></td>
<td><strong>Sheet Flow, SEG A</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grass: Short n = 0.150 P2 = 3.30&quot;</td>
</tr>
<tr>
<td>1.7</td>
<td>355</td>
<td>0.0560</td>
<td>3.55</td>
<td></td>
<td><strong>Shallow Concentrated Flow, SEG B</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grassed Waterway Kv = 15.0 fps</td>
</tr>
</tbody>
</table>

Subcatchment W1A: Watershed 1A

Hydrograph

Type III 24-hr
WQV Rainfall = 1.20"
Runoff Area = 74,128 sf
Runoff Volume = 1 cf
Runoff Depth = 0.00"
Flow Length = 455'
Tc = 7.9 min
CN = 63
Summary for Subcatchment W1B: Watershed 1B

Runoff = 0.10 cfs @ 12.10 hrs, Volume= 345 cf, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,160</td>
<td>98</td>
<td>Paved parking, HSG B</td>
</tr>
<tr>
<td>4,392</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>13,552</td>
<td>86</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>4,392</td>
<td>61</td>
<td>32.41% Pervious Area</td>
</tr>
<tr>
<td>9,160</td>
<td>98</td>
<td>67.59% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7</td>
<td>100</td>
<td>0.0800</td>
<td>2.43</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
</tr>
<tr>
<td>0.4</td>
<td>104</td>
<td>0.0500</td>
<td>4.54</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
</tr>
<tr>
<td>1.1</td>
<td>204</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W1B: Watershed 1B

Type III 24-hr WQV Rainfall=1.20"
Runoff Area=13,552 sf
Runoff Volume=345 cf
Runoff Depth=0.31"
Flow Length=204'
Tc=6.0 min
CN=86
Summary for Subcatchment W1C: Watershed 1C

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 308 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,750</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>3,750</td>
<td>98</td>
<td>100.00% Impervious Area</td>
</tr>
</tbody>
</table>

Tc=6.0 min

Direct Entry,

Subcatchment W1C: Watershed 1C

Type III 24-hr WQV Rainfall=1.20"
Runoff Area=3,750 sf
Runoff Volume=308 cf
Runoff Depth=0.99"
Tc=6.0 min
CN=98
Summary for Subcatchment W1D: Watershed 1D

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 155 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,890</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>1,890</td>
<td>98</td>
<td>100.00% Impervious Area</td>
</tr>
</tbody>
</table>

Tc | Length | Slope | Velocity | Capacity | Description |
---|--------|-------|----------|----------|-------------|
6.0 | (min)  | (feet) | (ft/ft)  | (ft/sec) | (cfs)  |

Direct Entry,

Subcatchment W1D: Watershed 1D

Hydrograph

Type III 24-hr WQV Rainfall=1.20"
Runoff Area=1,890 sf
Runoff Volume=155 cf
Runoff Depth=0.99"
Tc=6.0 min
CN=98
Summary for Subcatchment W1E: Watershed 1E

Runoff = 0.00 cfs @ 12.42 hrs, Volume= 63 cf, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,318</td>
<td>98</td>
<td>Paved parking, HSG B</td>
</tr>
<tr>
<td>7,912</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>12,230</td>
<td>74</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>7,912</td>
<td>61</td>
<td>64.69% Pervious Area</td>
</tr>
<tr>
<td>4,318</td>
<td>98</td>
<td>35.31% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc</th>
<th>Length</th>
<th>Slope</th>
<th>Velocity</th>
<th>Capacity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8</td>
<td>100</td>
<td>0.0100</td>
<td>2.03</td>
<td></td>
<td>Shallow Concentrated Flow, SEG A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paved Kv= 20.3 fps</td>
</tr>
<tr>
<td>0.2</td>
<td>17</td>
<td>0.0100</td>
<td>1.50</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grassed Waterway Kv= 15.0 fps</td>
</tr>
<tr>
<td>1.0</td>
<td>117</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W1E: Watershed 1E

Hydrograph

Type III 24-hr WQV Rainfall=1.20"
Runoff Area=12,230 sf
Runoff Volume=63 cf
Runoff Depth=0.06"
Flow Length=117'
Slope=0.0100 '/'
Tc=6.0 min
CN=74
Summary for Subcatchment W2A: Watershed 2A

Runoff = 0.18 cfs @ 12.11 hrs, Volume= 659 cf, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,048</td>
<td>98</td>
<td>Roofs, HSG B</td>
</tr>
<tr>
<td>* 17,540</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>28,791</td>
<td>85</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>10,203</td>
<td>61</td>
<td>35.44% Pervious Area</td>
</tr>
<tr>
<td>18,588</td>
<td>98</td>
<td>64.56% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>77</td>
<td>0.0200</td>
<td>1.33</td>
<td></td>
<td>Sheet Flow, SEG A</td>
</tr>
<tr>
<td>* 3.5</td>
<td>827</td>
<td>0.0380</td>
<td>3.96</td>
<td></td>
<td>Shallow Concentrated Flow, SEG B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Smooth surfaces n= 0.011 P2= 3.30&quot;</td>
</tr>
<tr>
<td>4.5</td>
<td>904</td>
<td></td>
<td></td>
<td></td>
<td>Total, Increased to minimum Tc = 6.0 min</td>
</tr>
</tbody>
</table>

Subcatchment W2A: Watershed 2A

Type III 24-hr WQV Rainfall=1.20"
Runoff Area=28,791 sf
Runoff Volume=659 cf
Runoff Depth=0.27"
Flow Length=904'
Tc=6.0 min
CN=85
Summary for Subcatchment W2B: Watershed 2B

Runoff = 0.05 cfs @ 12.10 hrs, Volume= 175 cf, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Type III 24-hr WQV Rainfall=1.20"

<table>
<thead>
<tr>
<th>Area (sf)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>* 3,413</td>
<td>98</td>
<td>Paved parking &amp; Roadways, HSG B</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>&gt;75% Grass cover, Good, HSG B</td>
</tr>
<tr>
<td>4,165</td>
<td>91</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>752</td>
<td>61</td>
<td>18.06% Pervious Area</td>
</tr>
<tr>
<td>3,413</td>
<td>98</td>
<td>81.94% Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Entry,</td>
</tr>
</tbody>
</table>

Subcatchment W2B: Watershed 2B

Hydrograph

Type III 24-hr
WQV Rainfall=1.20"
Runoff Area=4,165 sf
Runoff Volume=175 cf
Runoff Depth=0.50"
Tc=6.0 min
CN=91
Summary for Pond 3P: Sediment Forebay

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 0.00" for WQV 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
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 85.50' @ 0.00 hrs  Surf.Area= 95 sf  Storage= 0 cf

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

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>85.50'</td>
<td>208 cf</td>
<td>Custom Stage Data (Prismatic) Listed below (Recalc)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>85.50</td>
<td>95</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>86.50</td>
<td>320</td>
<td>208</td>
<td>208</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 86.25' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary Outflow Max=0.00 cfs @ 0.00 hrs HW=85.50' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3P: Sediment Forebay

Inflow Area=12,230 sf
Peak Elev=85.50'
Storage=0 cf
Summary for Pond 4P: UIC #1 MC-3500

Inflow Area = 4,165 sf, 81.94% Impervious, Inflow Depth = 0.50" for WQV event
Inflow = 0.05 cfs @ 12.10 hrs, Volume= 175 cf
Outflow = 0.02 cfs @ 12.44 hrs, Volume= 175 cf, Atten= 67%, Lag= 20.8 min
Discarded = 0.02 cfs @ 12.44 hrs, Volume= 175 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 90.85' @ 12.44 hrs  Surf.Area= 289 sf  Storage= 33 cf
Plug-Flow detention time= 13.1 min calculated for 175 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min ( 858.4 - 845.6 )

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>90.50'</td>
<td>370 cf</td>
<td>8.42'W x 34.38'L x 5.50'H Field A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,592 cf Overall - 470 cf Embedded = 1,122 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>91.25'</td>
<td>470 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 4 Inside #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective Size= 70.4&quot;W x 45.0&quot;H =&gt; 15.33 sf x 7.17'L = 110.0 cf</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall Size= 77.0&quot;W x 45.0&quot;H x 7.50'L with 0.33' Overlap</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

840 cf Total Available Storage

Storage Group A created with Chamber Wizard

<table>
<thead>
<tr>
<th>Device</th>
<th>Routing</th>
<th>Invert</th>
<th>Outlet Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Discarded</td>
<td>90.50'</td>
<td><strong>2.410 in/hr Exfiltration over Wetted area</strong></td>
</tr>
<tr>
<td>#2</td>
<td>Primary</td>
<td>95.95'</td>
<td><strong>2.5&quot; x 2.5&quot; Horiz. Orifice/Grate X 6.00 columns</strong> X 6 rows C= 0.600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Limited to weir flow at low heads</td>
</tr>
</tbody>
</table>

**Discarded OutFlow** Max=0.02 cfs @ 12.44 hrs  HW=90.85'  (Free Discharge)
**1=Exfiltration**  (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs  HW=90.50'  (Free Discharge)
**2=Orifice/Grate** ( Controls 0.00 cfs)
Pond 4P: UIC #1 MC-3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)

Effective Size = 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 1 rows = 29.8 cf

4 Chambers/Row x 7.17' Long + 1.85' Cap Length x 2 = 32.38' Row Length + 12.0' End Stone x 2 = 34.38' Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

4 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 469.6 cf Chamber Storage
1,591.5 cf Field - 469.6 cf Chambers = 1,121.9 cf Stone x 33.0% Voids = 370.2 cf Stone Storage

Chamber Storage + Stone Storage = 839.8 cf = 0.019 af
Overall Storage Efficiency = 52.8%
Overall System Size = 34.38' x 8.42' x 5.50'

4 Chambers
58.9 cy Field
41.6 cy Stone
Pond 4P: UIC #1 MC-3500

Hydrograph

Inflow Area=4,165 sf
Peak Elev=90.85'
Storage=33 cf
Summary for Pond 5P: Infiltration Basin

Inflow Area = 14,120 sf, 43.97% Impervious, Inflow Depth = 0.13" for WQV event
Inflow = 0.05 cfs @ 12.09 hrs, Volume= 155 cf
Outflow = 0.01 cfs @ 12.42 hrs, Volume= 155 cf, Atten= 71%, Lag= 20.1 min
Discarded = 0.01 cfs @ 12.42 hrs, Volume= 155 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 84.64' @ 12.42 hrs  Surf.Area= 240 sf  Storage= 32 cf

Plug-Flow detention time= 15.2 min calculated for 155 cf (100% of inflow)
Center-of-Mass det. time= 15.3 min (797.3 - 782.0)

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>84.50'</td>
<td>905 cf</td>
<td>Custom Stage Data (Conic) Listed below (Recalc)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>84.50</td>
<td>212</td>
<td>0</td>
<td>0</td>
<td>212</td>
</tr>
<tr>
<td>85.50</td>
<td>446</td>
<td>322</td>
<td>322</td>
<td>454</td>
</tr>
<tr>
<td>86.50</td>
<td>732</td>
<td>583</td>
<td>905</td>
<td>753</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Discarded 84.50' 2.410 in/hr Exfiltration over Wetted area
#2 Primary 86.15' 20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.01 cfs @ 12.42 hrs HW=84.64' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=84.50' (Free Discharge)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
Pond 5P: Infiltration Basin

Inflow Area=14,120 sf
Peak Elev=84.64'
Storage=32 cf
Summary for Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area = 13,552 sf, 67.59% Impervious, Inflow Depth = 0.31" for WQV event
Inflow = 0.10 cfs @ 12.10 hrs, Volume= 345 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 82.30' @ 24.40 hrs Surf.Area= 350 sf Storage= 345 cf

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

<table>
<thead>
<tr>
<th>Volume</th>
<th>Invert</th>
<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>80.00’</td>
<td>617 cf</td>
<td>8.42”W x 41.55”L x 7.00”H Field A 2,448 cf Overall - 580 cf Embedded = 1,868 cf x 33.0% Voids</td>
</tr>
<tr>
<td>#2A</td>
<td>81.75’</td>
<td>580 cf</td>
<td>ADS_StormTech MC-3500 d +Cap x 5 Inside #1 Effective Size= 70.4”W x 45.0”H =&gt; 15.33 sf x 7.17”L = 110.0 cf Overall Size= 77.0”W x 45.0”H x 7.50”L with 0.33’ Overlap Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf</td>
</tr>
</tbody>
</table>

1,196 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device Routing Invert Outlet Devices
#1 Primary 85.00’ 4.0’ Long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=80.00’ (Free Discharge)
1=Sharp-Crested Rectangular Weir( Controls 0.00 cfs)
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 1 rows = 29.8 cf

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55'
Base Length
1 Rows x 77.0" Wide + 12.0" Side Stone x 2 = 8.42' Base Width
21.0" Stone Base + 45.0" Chamber Height + 18.0" Stone Cover = 7.00' Field Height

5 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 1 Rows = 579.6 cf Chamber Storage

2,448.0 cf Field - 579.6 cf Chambers = 1,868.4 cf Stone x 33.0% Voids = 616.6 cf Stone Storage

Chamber Storage + Stone Storage = 1,196.1 cf = 0.027 af
Overall Storage Efficiency = 48.9%
Overall System Size = 41.55' x 8.42' x 7.00'

5 Chambers
90.7 cy Field
69.2 cy Stone
Pond 8P: UIC #2 iSOLATOR ROW MC-3500 1.75' stone

Inflow Area=13,552 sf
Peak Elev=82.30'
Storage=345 cf
Summary for Pond 11P: UIC #2 MC-3500 4.0’ stone

Inflow Area = 17,302 sf, 74.62% Impervious, Inflow Depth = 0.21” for WQV event
Inflow = 0.09 cfs @ 12.09 hrs, Volume= 308 cf
Outflow = 0.04 cfs @ 12.05 hrs, Volume= 308 cf, Atten= 61%, Lag= 0.0 min
Discarded = 0.04 cfs @ 12.05 hrs, Volume= 308 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 77.49’ @ 12.32 hrs  Surf.Area= 647 sf  Storage= 52 cf

Plug-Flow detention time= 12.6 min calculated for 308 cf (100% of inflow)
Center-of-Mass det. time= 12.7 min ( 794.7 - 782.0 )

<table>
<thead>
<tr>
<th>Volume</th>
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<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1A</td>
<td>77.25’</td>
<td>1,701 cf</td>
<td><strong>15.58’W x 41.55’L x 9.75’H Field A</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6,313 cf Overall - 1,159 cf Embedded = 5,154 cf x 33.0% Voids</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>ADS_StormTech MC-3500 d +Cap x 10 Inside #1</strong></td>
</tr>
<tr>
<td>#2A</td>
<td>81.25’</td>
<td>1,159 cf</td>
<td><strong>Effective Size= 70.4”W x 45.0”H =&gt; 15.33 sf x 7.17’L = 110.0 cf</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Overall Size= 77.0”W x 45.0”H x 7.50’L with 0.33’ Overlap</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>10 Chambers in 2 Rows</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Cap Storage= +14.9 cf x 2 x 2 rows = 59.6 cf</strong></td>
</tr>
</tbody>
</table>

2,860 cf  Total Available Storage

Storage Group A created with Chamber Wizard

Device | Routing | Invert | Outlet Devices |
--------|---------|--------|----------------|
#1      | Discarded | 77.25’ | 2.410 in/hr Exfiltration over Surface area |
#2      | Primary   | 86.45’ | 4.0” x 18.0” Horiz. Orifice/Grate C= 0.600 |

Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.05 hrs  HW=77.37’ (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs  HW=77.25’ (Free Discharge)
↑2=Orifice/Grate ( Controls 0.00 cfs)
Pond 11P: UIC #2 MC-3500 4.0' stone - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d + Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)

Effective Size = 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size = 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage = +14.9 cf x 2 x 2 rows = 59.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

5 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 39.55' Row Length +12.0" End Stone x 2 = 41.55' Base Length
2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width
48.0" Stone Base + 45.0" Chamber Height + 24.0" Stone Cover = 9.75' Field Height

10 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,159.1 cf Chamber Storage

6,313.0 cf Field - 1,159.1 cf Chambers = 5,153.9 cf Stone x 33.0% Voids = 1,700.8 cf Stone Storage

Chamber Storage + Stone Storage = 2,859.9 cf = 0.066 af
Overall Storage Efficiency = 45.3%
Overall System Size = 41.55' x 15.58' x 9.75'

10 Chambers
233.8 cy Field
190.9 cy Stone
Pond 11P: UIC #2 MC-3500 4.0’ stone

Hydrograph

Inflow Area=17,302 sf
Peak Elev=77.49`
Storage=52 cf
Summary for Pond 12P: Pea gravel Diaphragm

Inflow Area = 12,230 sf, 35.31% Impervious, Inflow Depth = 0.06" for WQV event
Inflow = 0.00 cfs @ 12.42 hrs, Volume= 63 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 86.67' @ 24.40 hrs Surf.Area= 114 sf Storage= 63 cf

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

<table>
<thead>
<tr>
<th>Volume</th>
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<th>Avail.Storage</th>
<th>Storage Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>85.00'</td>
<td>75 cf</td>
<td>Custom Stage Data (Prismatic), listed below (Recalc)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>228 cf Overall x 33.0% Voids</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Surf.Area</th>
<th>Inc.Store</th>
<th>Cum.Store</th>
</tr>
</thead>
<tbody>
<tr>
<td>(feet)</td>
<td>(sq-ft)</td>
<td>(cubic-feet)</td>
<td>(cubic-feet)</td>
</tr>
<tr>
<td>85.00</td>
<td>114</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>87.00</td>
<td>114</td>
<td>228</td>
<td>228</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 86.94’ 38.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.00’ (Free Discharge)
1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
Pond 12P: Pea gravel Diaphragm

Inflow Area = 12,230 sf
Peak Elev = 86.67'
Storage = 63 cf
Summary for Link DP-1: Lower Gradient

Inflow Area = 105,550 sf, 21.75% Impervious, Inflow Depth = 0.00" for WQV event
Inflow = 0.00 cfs @ 23.99 hrs, Volume= 1 cf
Primary = 0.00 cfs @ 23.99 hrs, Volume= 1 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

Inflow Area=105,550 sf
Summary for Link DP-2: Matunuck School House Road

Inflow Area = 32,956 sf, 66.76% Impervious, Inflow Depth = 0.24" for WQV event
Inflow = 0.18 cfs @ 12.11 hrs, Volume = 659 cf
Primary = 0.18 cfs @ 12.11 hrs, Volume = 659 cf, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-28.00 hrs, dt = 0.05 hrs

Link DP-2: Matunuck School House Road

Inflow Area = 32,956 sf