STORMWATER ANALYSIS AND DRAINAGE REPORT

Southern Tier Property
85 Edgartown-Vineyard Haven Road
Oak Bluffs, Massachusetts

Prepared for:

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December 8, 2022

Revised: September 27, 2023

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1.0 STORMWATER AND DRAINAGE NARRATIVE

This Stormwater Analysis and Drainage Report provides a summary of the stormwater management system for the proposed Southern Tier Affordable Housing Development project located at 85 Edgartown-Vineyard Haven Road in Oak Bluffs, Massachusetts. The purpose of this report is to describe the pre- and post-development site conditions and the practices to be used for reducing stormwater discharges and pollutants during and after construction. The proposed project has been developed to incorporate a series of stormwater infiltration and green stormwater infrastructure (GSI) practices into the overall site and landscape design. The design includes natural practices such as vegetated bioretention areas and swales, as well as a water quality unit to provide filtration and underground chambers to store and infiltrate runoff generated within the development area.

The parcel is currently undeveloped woodland, the majority of which is within a Zone II Wellhead Protection Area and a Natural Heritage Priority Habitat area. The project design follows the guidelines established in the Martha's Vineyard Commission (MVC) Water Quality Management Policy, MVC Site Design and Landscape Policy, and the Coastal Stormwater Management Through Green Infrastructure Handbook produced by the EPA. The proposed project is not subject to the requirements of the Massachusetts Stormwater Handbook (revised in January 2008), including the ten associated Stormwater Standards; however, the project was designed in compliance with these requirements to the maximum extent practicable.

The overall goal of the proposed stormwater management design is to mimic the existing hydrologic properties of the site through the use of thoughtful grading, natural swales, GSI practices and underground recharge chambers, to ensure that all applicable water quality and groundwater recharge standards are met and that peak rates of runoff are attenuated during the range of design storms. Refer to **Section 2.0 – Drainage Design Methodology and Analysis** and **Section 3.0 – Analysis of Massachusetts Stormwater Standards** for detailed information about the proposed design. The proposed stormwater controls will be maintained appropriately during regular operation of the site, per the Operation and Maintenance Plan (**Appendix H**), as well as during construction as indicated on the Drawings.

1.1 Existing Conditions

The proposed project site is undeveloped with no identified environmental contamination or hydrologic concerns. The site, designated as Lot 31 of tax assessor map 50, is a 7.78-acre parcel located on the north side of Edgartown Vineyard Haven Road, directly east of the existing ice arena and YMCA of Martha's Vineyard property. Martha's Vineyard High School is located across Edgartown Vineyard Haven Road . The northern properly boundary abuts undeveloped lands held by the Martha's Vineyard Land Bank Commission, known as Southern Woodlands Reservation. The project site is currently covered in coastal woodlands. Except for the southerly portion, the entire project site is mapped as Priority Habitat (PH 121) for the State-Threatened Species, Imperial Moth (*Eacles imperialis*). The majority of the project site also falls within a Zone II Wellhead Protection Area, with the exception of the southeast corner.

The topography of the project site varies between 111 feet at the high point of the existing forested knoll to 87 feet in the southeast corner. The site generally drains in all directions from the peak of the existing forested knoll, as depicted on the Existing Conditions Plan (Sheet C-3) and the Drainage Area Maps (**Appendix B**).

1.1.1 Soils

Based on a desktop study performed using the United States Department of Agriculture Natural Resource Conservation Service (USDA NRCS) Web Soil Survey, the project site soils are comprised predominantly of Riverhead sandy loam (288B), with a smaller area of Carver loamy coarse sand (259A) in the northeast corner of the site. Both are well-drained soils formed in glacial outwash or glaciofluvial environments, and both are characterized under NRCS Hydrologic Soil Group A.

On-site soil testing was conducted by Schofield, Barbini & Hoehn Inc. (SBH) on September 28, 2020 in the northern portion of the site, and on August 27, 2021 in the southern portion. Horsley Witten Group (HWG) conducted additional soil testing on March 22, 2023 in the southeast corner of the site. The HWG test holes are located on the plans. These three days of soil testing cover most of the project site, and generally confirms the soil types found in the Web Soil Survey desktop study. The topsoil and subsoil horizons were classified as loamy sand and sandy loam. With the exception of the test hole located at a higher elevation along the forested knoll (SBH Test Hole 3), a relatively low-permeability soil layer was encountered starting at roughly 24 inches deep and extending to approximately 60 inches below the ground surface. This soil layer was classified as a Sandy Loam to Silt Loam, which is indicative of the glaciofluvial depositional environment identified in the published soil maps. Beneath this soil layer and consistent with the soil maps, sand and gravel outwash material was encountered to depths ranging from 10 to 12 feet. No indication of seasonal high groundwater was observed in any of the test holes.

Percolation tests conducted within the sandy outwash material yielded results ranging from 2 to 5 minutes per inch, depending on location. Conservatively, the Rawl's Rate of the native sandy soil (8.27 inches per hour) was used for design of the Underground Recharge Chambers 1, 3, and 4. A design rate of 15 inches per hour was used for Underground Recharge Chambers 2 (URC-2), which is located in the southeast corner of the site where HWG performed test pits. A percolation test in HWG test hole 1 resulted in an infiltration rate of less than 2 min/in. The design rate was calculated as 50% of 30 inches per hour. For the design of the proposed bioretention areas, a rate of 2.41 inches per hour (Loamy Sand) was selected to account for the bioretention soil. The background soils information for the project site can be found in **Appendix A** of this report.

Table 1: Rawls Infiltration Rates

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate Inches/Hour
Sand	A	8.27
Loamy Sand	A	2.41
Sandy Loam	B	1.02
Loam	B	0.52
Silt Loam	C	0.27
Sandy Clay Loam	C	0.17
Clay Loam	D	0.09
Silty Clay Loam	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

Source: Rawls, Brakensiek and Saxton, 1982.

1.1.2 Stormwater Management

There is no existing stormwater management on site. Due to the underlying soils and undeveloped condition of the site, very little stormwater runoff is generated. The ridge in the middle of the site creates runoff discharge in all directions, including to the Edgartown-Vineyard Haven Road.

1.1.3 Drainage Area

The existing drainage area is 7.62 acres (331,850 sf) with the following land cover:

Table 2: Existing Land Coverage

Coverage	Area (sq ft)	Area (acres)	%
Paved	1,695	0.039	0.5%
Gravel	2,140	0.049	0.6%
Roof	0	0.000	0%
Water	0	0.000	0%
Woods	328,025	7.530	98.9%
Grass	0	0.000	0%
TOTAL	331,860	7.618	100%

The site generally drains from the knoll in the northeast of the site in all directions. The drainage area map for existing conditions is provided in **Appendix B.**

1.1.4 Priority Habitat of Rare Species

According to the most recent version of the *Massachusetts Natural Heritage Atlas* (15^{th} Edition, August 1, 2021), the project site occurs within *Priority Habitat of Rare Species* (PH 121) as designated by the Massachusetts Natural Heritage and Endangered Species Program (NHESP). In response to a MESA Information Request, NHESP has indicated that this designation is due to the presence of the state-threatened, Imperial Moth (*Eacles imperialis*) According to the NHESP Fact Sheet, primary habitat for this species includes pitch pine (*Pinus rigida*), and the priority habitat mapping appears to follow the dense areas of concentrated pitch pine growth. The MESA Project Review narrative prepared by Horsley Witten Group in September 2022 is included in **Appendix G**.

1.2 Proposed Conditions

The Applicant proposes to construct the following:

- Twelve (12) multi-family buildings, as follows:
  - Buildings 1-4 & 6: Six two-bedroom units
  - Buildings 5 & 7-11: Two 1-Bedroom and one 3-bedroom units (3 units)
  - Building 12: Twelve 2 Bedroom units
- One central community building (Building 13), and common green space;
- All roof areas equipped with gutters and downspouts to convey stormwater runoff directly to underground recharge systems via drain pipes;
- Approximately 1,450 linear feet of paved access driveways with attached paved or gravel parking lots (90 total spaces including ADA accessible spaces);
- ADA accessible sidewalks, comprised primarily of stabilized stone dust with select areas of cement concrete;
- Landscaped areas, open spaces, and solar-powered lighting;
- Underground electric/communication and public water utility infrastructure;
- Gravity Sewer collection system connecting to existing pump station
- Utility extensions and stubs for potential future development project by the Town of Oak Bluffs, including water, underground electric/communication, and sanitary sewer;

The proposed development envelope is limited to approximately 4.58 acres of the 7.78-acre property. A future roadway corridor (0.7 acres) is proposed along the easterly property line, which would provide access to the potential Oak Bluffs development project to the north. In addition to the large protected open space area proposed in the north of the property, natural oak-pine woodland corridors will be preserved to the extent possible along Edgartown-Vineyard Haven Road as well as the westerly property line toward the YMCA property.

Due to the subject property's designation as Priority Habitat for the Imperial Moth, the proposed development envelope was selected based upon close coordination with the Natural Heritage & Endangered Species Program (NHESP) of the MA Division of Fisheries & Wildlife. The proposed project will permanently protect 1.87 acres in the northerly portion of the property, which is comprised of a mixed oak-pine forest surrounding a natural knoll. The final design is based upon the Applicant's desire to protect as much existing land as possible in accordance with MVC's Open Space Preservation Policy, while still creating a pedestrian-oriented affordable housing community that fits within the unique character of Martha's Vineyard. As documented in a letter dated October 20, 2022, the MA Division of Fisheries & Wildlife has determined that the proposed development will not "result in a Take of state-listed species", subject to a set of project conditions (see letter in **Appendix G**).

1.2.1 Stormwater Management

The proposed stormwater management includes a GSI approach to capture, treat, infiltrate, and detain runoff, when applicable and to the maximum extent practicable, by using the following BMPs.

Bioretention Areas (BIO AREA)

A bioretention area (also referred to as a "rain garden" or a "biofilter") is a stormwater management practice used to treat stormwater runoff using a conditioned planting soil bed or "filter" media and plants to filter runoff captured in a shallow depression. The method combines physical filtering and adsorption with bio-geochemical processes to remove pollutants. The system consists of an inflow component, a pretreatment element, an overflow structure, and shallow ponding area.

Underground Recharge Chambers (URC)

Underground recharge chambers are intended to store and infiltrate stormwater collected from surrounding drainage areas. The proposed bioretention areas are equipped with grated drain inlets to direct surface stormwater to the subsurface recharge systems. Treated stormwater is infiltrated directly into the ground, mimicking pre-development conditions. Use of stormwater recharge chambers provides an effective and low-maintenance means of storing excess stormwater, allowing it to infiltrate and recharge groundwater.

Rain Guardian Inlets

Rain Guardian "Fortress" pretreatment structures are proposed as the inlet to the majority of stormwater bioretention areas, which are designed to filter sediment from the incoming stormwater runoff using a screen system. Due to the lack of a sump for sediment storage, these structures require more frequent cleaning as described in the Stormwater Operation and Maintenance Plan.

Sediment Forebay

A sediment forebay is also provided for pretreatment of the surface water runoff from the proposed pavement surfaces in the southern portion of the development, to allow sediment to settle from the incoming stormwater runoff prior to conveyance to the adjacent bioretention area.

Water Quality Unit

Water Quality Units are proprietary pretreatment devices designed to filter out sediment and debris by reducing velocity and directing flow during a series of chambers. Debris and sediment accumulate within the structure before the flow is directed to an infiltration practice, like underground recharge chambers.

1.2.2 Drainage Area

The proposed drainage area is 7.62 acres (331,860 sf) with the following land cover:

Table 3: Proposed Land Coverage

Coverage	Area (sq ft)	Area (acres)	%
Paved	66,989	1.538	20.2%
Gravel	-	0.000	0.0%
Roof	30,815	0.707	9.3%
Water	4,356	0.100	1.4%
Woods	130,768	3.002	39.4%
Grass	98,922	2.271	29.8%
TOTAL	331,850	7.618	100%

The proposed site drainage is divided into 20 subcatchments. Pre- and Post-Development Drainage maps can be found in **Appendix B** and the routing of all drainage areas can be found in the HydroCAD modeling in **Appendix D.**

2.0 DRAINAGE DESIGN METHODOLOGY AND ANALYSIS

The drainage design was completed by performing the following series of tasks:

- Site soil evaluation. See Section 1.1.1 and **Appendix A** for the description of soils and infiltration rates based on NRCS data and results from the on-site soils investigations conducted by Schofield, Barbini & Hoehn Inc. on September 28, 2020 and August 27, 2021.
- Delineation of existing and proposed drainage areas (**Appendix B**)
- Sizing the bioretention areas (**Appendix C**)
- Modeling the proposed drainage and infiltration system with HydroCAD® software (**Appendix D**)
- Recharge Calculations (**Appendix E**)
- Pollutant Removal Calculations (**Appendix F**)
- Operations and Maintenance Manual (**Appendix H**)

The proposed stormwater management system has been designed in accordance with MVC guidelines and the Massachusetts Stormwater Handbook to the maximum extent practicable, to accomplish the following major objectives:

- To capture and treat, the "first flush" water quality volume (WQV, the first one-inch of stormwater runoff) from the impervious surfaces to provide water quality treatment for the proposed development. This treatment is achieved with a combination of aboveground treatment practices and underground recharge chambers.
- To provide groundwater recharge in conformance with the Massachusetts Department of Environmental Protection groundwater recharge criteria.
- To evaluate runoff discharging off-site from the post-development conditions at the study points located along the site periphery to ensure no flooding or erosion will occur.

These objectives are met using the following stormwater management measures:

- GSI practices, as described in Section 1.2.1, sized to provide water quality treatment for the roads, walkways, and parking area runoff. Each practice is designed with overflow structures to convey runoff from larger storm events into proposed underground recharge chambers.
- Underground recharge chambers sized to retain and infiltrate onsite runoff to the maximum extent practicable. Storage is provided for stormwater management to maintain or reduce predevelopment rates of runoff.

The proposed stormwater management system was designed to accommodate pre-development site hydrologic conditions as well reduce stormwater pollution from the proposed site conditions. Stormwater runoff rate and volume was evaluated for the WQV, 2-year, 10-year, 25-year and 100-year Type III, 24-hour storm events for both pre-development and post-development conditions. Per MVC requirements, the stormwater management system was sized to treat the one-inch of runoff from the site, prevent erosive conditions during the 10-year storm event, and designed to detain runoff from the 25-year storm event. In addition, the peak discharge impact from the 100-year storm was also evaluated to ensure no offsite flooding or erosion occurs.

Pre- and post-development conditions were modeled using HydroCAD software, which combines USDA Soil Conservation Service hydrology and hydraulic techniques (commonly known as SCS TR-55 and TR-20) to generate hydrographs (See **Appendix B** for both "Pre-development" and "Post-development" Drainage Area Maps). Rainfall amounts for the specified storm recurrence intervals are based on the 90th percentile precipitation estimates from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Point Precipitation Frequency Estimates for the area (accessed September 2022).

Table 4: Peak Flow and Volume Comparison

SP1	ROAD					
Event	***Pre-development***		***Post-development***		**Change**	
	Flow, *cfs*	Volume, *a-f*	Flow, *cfs*	Volume, *a-f*	Flow, *cfs*	Volume, *a-f*
2-yr	0.11	0.012	0.21	0.017	0.10	0.005
10-yr	0.16	0.021	0.31	0.030	0.15	0.009
25-yr	0.19	0.040	0.38	0.047	0.19	0.007
100-yr	0.40	0.088	3.63	0.153	3.23	0.065

**Note: The minor increases in the proposed condition are considered negligible and are generally a result of the change in pervious ground cover from woods to grass.

The post-development flow rate in the 100-year storm is distributed across the site's frontage, thereby minimizing the rate at any single location and preventing erosion or offsite flooding. A controlled, low velocity outlet is incorporated for the URC system overflow during this storm event. The URC system is sized to completely retain and infiltrate runoff from paved areas during the 25-year storm event.

SP2	SOUTHEAST					
Event	***Pre-development***		***Post-development***		**Change**	
	Flow, *cfs*	Volume, *a-f*	Flow, *cfs*	Volume, *a-f*	Flow	Volume
2-yr	0.00	0.000	0.00	0.000	0.00	0.000
10-yr	0.02	0.015	0.01	0.009	-0.01	-0.006
25-yr	0.13	0.051	0.06	0.034	-0.07	-0.017
100-yr	0.79	0.145	0.52	0.103	-0.27	-0.042

SP3	WEST					
Event	***Pre-development***		***Post-development***		**Change**	
	Flow, *cfs*	Volume, *a-f*	Flow, *cfs*	Volume, *a-f*	Flow	Volume
2-yr	0.00	0.000	0.01	0.001	0.01	0.001
10-yr	0.01	0.008	0.02	0.006	0.01	-0.002
25-yr	0.06	0.040	0.08	0.011	0.02	-0.029
100-yr	0.55	0.131	2.86	0.078	2.31	-0.053

**Note: The minor increases in the proposed condition are considered negligible and are generally a result of the change in pervious ground cover from woods to grass.

*Note: The post-development flow rate in the 100-year storm is controlled by a low velocity outlet incorporated into the URC system. The URC system is sized to completely retain and infiltrate runoff from the 25-year storm event.

Table 4, Continued

SP4	NORTHWEST					
Event	***Pre-development***		***Post-development***		**Change**	
	Flow, *cfs*	Volume, *a-f*	Flow, *cfs*	Volume, *a-f*	Flow	Volume
2-yr	0.00	0.000	0.05	0.005	0.05	0.005
10-yr	0.01	0.006	0.07	0.015	0.06	0.009
25-yr	0.05	0.030	0.11	0.032	0.06	0.002
100-yr	0.44	0.097	0.45	0.074	0.01	-0.023

**Note: The minor increases in the proposed condition are considered negligible and are generally a result of the change in pervious ground cover from woods to grass.

*Note: The post-development flow rate in the 100-year storm is controlled by a low velocity outlet incorporated into the URC system. The URC system is sized to completely retain and infiltrate runoff from the 25-year storm event.

SP5	NORTH					
Event	***Pre-development***		***Post-development***		**Change**	
	Flow, *cfs*	Volume, *a-f*	Flow, *cfs*	Volume, *a-f*	Flow	Volume
2-yr	0.00	0.000	0.00	0.000	0.00	0.000
10-yr	0.00	0.003	0.00	0.003	0.00	0.000
25-yr	0.02	0.013	0.02	0.013	0.00	0.000
100-yr	0.20	0.044	0.20	0.044	0.00	0.000

ALL	***ALL COMBINED***					
Event	***Pre-development***		***Post-development***		**Change**	
	Flow, *cfs*	Volume, *a-f*	Flow, *cfs*	Volume, *a-f*	Flow	Volume
2-yr	0.11	0.012	0.27	0.023	0.16	0.011
10-yr	0.20	0.053	0.41	0.063	0.21	0.010
25-yr	0.45	0.174	0.65	0.137	0.20	-0.037
100-yr	2.38	0.505	7.66	0.452	5.28	-0.053

3.0 CONSTRUCTION ACTIVITIES

Construction activities will involve site preparation and earthwork necessary for construction of the proposed project. These activities primarily include the following:

- Erosion control installation
- Clearing and grubbing of existing vegetation within the proposed limits of work
- Excavation stockpiling, and hauling of excavated topsoil, and subsoils
- Rough grading of all disturbed areas
- Construction of new housing units
- Construction of stormwater management system
- Installation of utilities
- Paving
- Finish grading, final site stabilization and landscaping

Erosion and sediment control (ESC) measures will be installed per the construction plans and specifications prior to commencement of any soil disturbing activities. ESC measures will remain in place until final site stabilization is complete. Topsoil will be separated from the remaining soil and stockpiled on-site for use during site finish grading. The stockpiled topsoil will be protected to prevent erosion and sedimentation. Refer to **Section 5.0 – Construction Phase Pollutant Controls** for more detailed guidelines to be followed during construction.

4.0 ANALYSIS OF MASSACHUSETTS STORMWATER STANDARDS

The Massachusetts Stormwater Standards were revised in February 2008 to include ten stormwater management standards, established jointly by the DEP and the Office of Coastal Zone Management, and published in the 2008 update of the Stormwater Management Handbook. Projects that are within the jurisdiction of the Wetlands Protection Act Regulations, 310 CMR 10.00 are subjected to these Stormwater Management Standards. For this Project, adherence to the Handbook is not required as the Project is not within the jurisdiction of the Wetlands Protection Act.

The Massachusetts Stormwater Handbook, Volume 1 Chapter 1, provides ten Stormwater Management Standards, which have been reproduced below. The stormwater management systems proposed for this project were designed to comply with these standards to the maximum extent practicable.

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

No new untreated stormwater will discharge to wetland areas. The proposed GSI practices and underground recharge chambers have been sized to exceed the water quality volume (WQV) storage requirements. Stormwater runoff will flow through the GSI practices before being infiltrated or reaching the site's study points.

Standard 2: Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.

Discharge rates for pre- and post-development were calculated using HydroCAD® 2010, a SCS-TR20 based stormwater modeling computer program (**Appendix D**).

The existing site is 99% wooded, therefore any landcover changes (i.e., woods to grass) result in an increase in runoff. Post-development peak discharge rates increase up 0.19 cfs above pre-development rates for the 2-, 10-, 25-year storms for SP1-4. SP 5 remains undisturbed and the pre- and post-development flow rates are equal.

The peak discharge rates for the 100-year storm increase, but HW has assessed the flooding and erosion potential of these events and provided low velocity outlets and distributed runoff discharge locations to address these issues. A summary table of these precipitation events is provided **Table 4**.

Standard 3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management

system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The proposed project was designed with low impact development techniques and green stormwater infrastructure (GSI) practices to mimic the groundwater recharge potential of the site under existing, undeveloped conditions. The majority of stormwater runoff generated is being directed to bioretention systems and underground recharge chambers to recharge groundwater as required by Standard 3. The project recharges far more than required. See **Appendix E** for recharge calculations.

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

- **Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;**
- **Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and**
- **Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook**

For infiltration of stormwater runoff from land uses with higher potential pollutant loads, discharges to the ground within an area with a rapid infiltration rate (greater than 2.4 inches per hour), a Zone II or Interim Wellhead Protection Area, and discharges to the ground near any of the following critical areas: Special Resource Waters, Outstanding Resource Waters, bathing beaches, shellfish growing areas, or cold-water fisheries, at least 44% of the total suspended solids must be removed prior to discharge to the infiltration structure.

The stormwater management pretreatment and treatment systems for the sites have been selected and sized for the most removal of the average annual load of TSS possible. These removal rates were obtained from the MA Stormwater Handbook and based on the use of a pretreatment practice for each GSI (sediment forebay or Rain Guardian Fortress units).

Sediment Forebay or Rain Guardian Fortress:	Recommended design rate:	25%
Bioretention:	Recommended design rate:	90% for 1” WQV
	Assumed design rate: 50% (min.) for ½” WQV	
Underground Rechargers:	Recommended design rate:	80%
Contech Stormceptor 450i:	Recommended design rate:	80% (min.)

As the entirety of the site is a rapid infiltration area, and most of the site is a Zone II area, all practices have been designed to remove greater than 44% TSS via a combination of a pretreatment device (Sediment Forebay or Rain Guardian Fortress) and a bioretention area sized to capture at least the ½-inch WQV.

TSS calculations are provided in **Appendix F.** The proposed Operation and Maintenance Plan was developed to ensure that the stormwater system continues to function as it was designed into the future.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

Not applicable.

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

A majority of the project site is located within a Zone II Wellhead Protection Area, and the design incorporates a variety of approved source control and pollution prevention measures to ensure that all stormwater is properly treated prior to infiltration. See Standard 3 for more information on TSS removal.

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6.

Not applicable.

Standard 8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

An Erosion and Sediment Control Plan is included in the design plans, and a Construction Phase Pollutant Prevention Plan is included in this Report. Silt fence and/or silt socks are proposed at the limit of work; silt socks are proposed along the downgradient edges of the area of disturbance. Disturbed areas will be stabilized with seeding and/or erosion control blankets, if necessary, as soon as possible to minimize erosion and sedimentation. A Stormwater Pollution Plan (SWPPP) is required as part of the NPDES Construction General Permit and will be submitted prior to construction.

The contractor will be required to establish erosion controls prior to beginning any other project-related work. The Erosion and Sediment Control Plan will also establish the limit of work, beyond which the contractor will not be allowed to perform any project work. It is the contractor's responsibility to monitor and correct erosion control practices throughout the duration of the project. Erosion control measures will not be removed until the project reaches completion as directed by the project engineer or landscape architect.

Standard 9: A Long-Term Operation and Maintenance Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

An Operation and Maintenance Plan (O&M) is provided with specific needs for each best management practice. See **Appendix H**.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

There will be no illicit discharges to the proposed system. The Long-Term Pollution Prevention Plan provided includes measures to prevent illicit discharges.

5.0 CONSTRUCTION PHASE POLLUTION PREVENTION PLAN

A phased approach will be used to reduce erosion and increase sediment control during the construction period. Perimeter controls and sediment settling devices will be installed during construction to minimize sediment movement in stormwater and to protect the adjacent property.

5.1 Structural Practices

The following are the structural practices that will be implemented as part of the construction activity.

- Silt Fence & Sediment Silt Sock Barrier will be installed prior to commencement of construction. This type of practice creates erosion control barriers to intercept sediment in diffuse runoff. The Town will be informed upon installation so that it may inspect these barriers prior to construction. Portions of the erosion control barriers will be replaced and/or repaired as necessary to prevent erosion. Barriers will be installed parallel to land slope at the perimeter of the work site. In addition, silt fence barriers will be installed around the bioretention areas during construction.

- Silt Sacks (or approved equivalent) will be installed at identified existing catch basins and structure following construction of the proposed catch basins to prevent sedimentation during the any additional construction. The Silt Sack will be replaced and disposed of off-site if damage is observed.

- Stormwater Management areas will be graded to within one foot of design elevations until the site is fully stabilized to capture sediment during construction. Heavy equipment will not be allowed to operate on the surface location where the systems are planned because soil compaction would adversely impact their long-term performance. Silt fence will be utilized around the perimeter of the bioretention systems during construction. Light earth-moving equipment will be used for excavation and construction of the systems. All excavated materials from the area will be removed and disposed of in an approved location. All bioretention areas will be inspected at least once every seven calendar days and immediately after storm events by the Site Superintendent.

- Slope Stabilization will be installed immediately upon obtaining final grades as shown on the project site plans. Areas that fail to stabilize will be re-graded to final grade and stabilized, as necessary. Amount of land disturbed will be minimized to reduce potential for erosion and sedimentation. Stabilization measures shall be initiated within 14 days following the end of construction at each portion of the site and as soon as practicable.

The entire stormwater management system will be inspected upon completion of construction. Sediment will be removed from all elements of the stormwater management system. All control measures must be installed and maintained in accordance with manufacturer's specifications, good engineering practices, and in accordance with this report (every seven-calendar days and after storm events). If inspections show that a control has failed or been installed incorrectly, the Contractor must replace or modify it within 24 hours.

5.2 Stabilization Practices

The amount of land disturbed during construction will be minimized to reduce the potential for erosion and sedimentation. Prompt surface stabilization will be practiced thereby controlling erosion in areas where disturbances cannot be avoided during construction. Stabilization measures will be initiated within 14 days following the end of construction at each portion of the site. Exceptions to this requirement will be allowed allowable when snow cover prevents the initiation of stabilization within 14 days, in which case such measures shall be undertaken as soon as possible.

Stabilization measures that may be used during construction are described below:

- Temporary Seeding – Temporary seeding of disturbed surfaces with fast-growing grasses (annual rye) to provide greater resistance to stormwater runoff and/or wind erosion for areas where construction has temporarily ceased.

- Permanent Seeding – Permanent seeding of surfaces with vegetation, including but not limited to grass, trees, bushes, and shrubs, to stabilize the soil. Establishing a permanent and sustainable ground cover at a site stabilizes the soil while reducing the sediment content in runoff.

- Permanent Planting – the contractor shall install and adequately establish all planting as required at the completion of the project.

- Mulching/Hydro mulching – hydro mulch will be placed on the soil surface to cover and hold in place disturbed soils.

Temporary seeding or other soil stabilization measures will be provided where construction activities have ceased at the site. Topsoil stockpiles will be temporarily seeded or covered to prevent erosion and will be surrounded with silt fence. When the site's final grade has been established, permanent vegetation will be planted on the disturbed areas. The vegetation will consist of grass, shrubs, bushes, and trees.

5.3 Other Types of Controls

Additional controls/practices will be undertaken to reduce pollution in stormwater runoff flows which include, but are not limited to, control of off-site mud tracking from construction site, dust suppression, proper sanitary waste disposal, earthwork procedures timed and conducted in manners aimed to minimize erosion and sedimentation, snow removal plans, proper management of waste materials, proper management of hazardous waste, proper material stockpiling, and spill prevention and control measures.

- Dust Suppression – Water sprays shall be used to control dust during extended dry periods during construction.

- Sanitary Wastes – All sanitary wastes will be collected from the portable units by a licensed sanitary waste management contractor (as required by local regulations).

- Earthwork – The exposure of disturbed surfaces to stormwater and potential stormwater erosion will be minimized by well-organized earthwork procedures. Stabilization procedures shall be undertaken in accordance with this report. Grubbing during wet seasons will be avoided if feasible.

- Snow Removal Plan – Plowed snow collected from the parking areas will be deposited onto free draining, pervious surfaces, away from the site's drainage conveyance structures to maximize infiltration. Snowmelt runoff that is not infiltrated will be directed to the site's stormwater management system. Snow is not to be plowed or piled onto the stormwater management facilities.

- Waste Materials – Dumpsters rented from a licensed solid waste management company will be used to store solid waste and debris that cannot be recycled, reused, or salvaged. The dumpsters will meet all local and state solid waste management regulations. Dumpsters will be covered when refuse is not being directly deposited or withdrawn from them. Potentially hazardous wastes will be separated from normal wastes, including segregation of storage areas and proper labeling of containers. Removal of all waste from the site will be performed by licensed contractors in accordance with applicable regulatory requirements and disposed of at either local or regional approved facilities. Waste materials will not be buried on-site. All site personnel will be instructed regarding the correct procedures for waste disposal. Notices stating these procedures will be posted at the site. Solvents and flushing materials used during construction and pre-operational cleaning will be provided, handled, managed, and removed by the contractor for appropriate off-site disposal.

- Hazardous Waste Materials – Any disposal of hazardous materials will be completed using the required paperwork. Copies will be provided to the Engineer and to the Town.

- Spill Prevention and Control Measures – To minimize the risk of spills or other accidental exposure of materials and substances to stormwater runoff, the following material management practices will be used throughout the project:

    - An effort will be made to store only enough products required to do the job.
    - All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
    - Products will be kept in their original containers with the original manufacturer's label.
    - Substances will not be mixed with one another unless recommended by the manufacturer.
    - Whenever possible, the maximum amount of a product will be used before disposing of the container.
    - Manufacturers' recommendations for proper use and disposal will be followed.

- The site superintendent will conduct daily inspections to ensure proper use and disposal of materials.

To reduce the risk associated with hazardous materials used on the site, the following practices will be used:

- Products will be kept in original containers unless they are not resealable.
- Original labels and material safety data sheets will be retained and kept on-site; they contain important product information.
- If surplus product must be disposed of, manufacturers' or local and state recommended methods for proper disposal will be followed.

- Materials List - Materials or substances listed below are expected to be present on-site during construction:

- Concrete	- Fertilizers
- Asphalt	- Petroleum Based Products
- Paints (enamel and latex)	- Cleaning Solvents
- Metal Studs	- Wood
- Concrete	- Tar
- Sealants	- Adhesives

The following product-specific practices will be followed on-site:

- Petroleum Products - All on-site vehicles will be monitored for leaks and receive preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which area clearly labeled. Any asphalt substances used on-site will be applied according to the manufacturers' recommendations.

- Fertilizers – Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater. Products will be stored in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

- Paints – All containers will be tightly sealed and stored indoors when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to the manufacturers' instructions or state and local regulations.

- Concrete Trucks – Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site.

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted, and site personnel will be made aware of the procedures and location of the information and cleanup supplies.

- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but not be limited to, brooms, dustpans, mops, rags, gloves, goggles, speedi-dry, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

- All spills will be cleaned up immediately after discovery. Spills large enough to reach the storm water system will be reported to the National Response Center at 1-800-424-8802.

- The spill area will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

- Spills of toxic or hazardous material will be reported to the appropriate state or local government agency, regardless of the size.

- The site superintendent responsible for the day-to-day site operations will be the spill prevention and clean-up coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the on-site office trailer.

6.0 STORMWATER OPERATION AND MAINTENANCE PLAN

All stormwater management measures and controls identified in this Drainage Report shall be operated and maintained appropriately during the construction phase of the project and during regular operation of the site in the post-construction period as required on the construction drawings and a separate Stormwater Management Maintenance Plan (**Appendix H**).

7.0 REFERENCES

1. MADEP (Massachusetts Department of Environmental Protection). 2008. Massachusetts Stormwater Standards Manual.

2. NOAA's National Weather Service: Hydrometeorological Design Studies Center, Precipitation Frequency Data Server for Atlas 14 Point Precipitation Frequency Estimates: MA https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ma

3. Northeast Regional Climate Center and Natural Resources Conservation Service. 2010-2018. Extreme Precipitation for New York and New England. Version 1.12. http://precip.eas.cornell.edu/

APPENDIX A

Site Soil Evaluations Memo

NRCS Soils Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for
Dukes County, Massachusetts

March 18, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map (Southern Tier Soils Report)

Map Scale: 1:4,660 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 200, 400, 800, 1200

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dukes County, Massachusetts
Survey Area Data: Version 18, Sep 2, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Nov 5, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Southern Tier Soils Report)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
259B	Carver loamy coarse sand, 3 to 8 percent slopes	18.1	19.2%
259C	Carver loamy coarse sand, 8 to 15 percent slopes	25.6	27.2%
288A	Riverhead sandy loam, 0 to 3 percent slopes	13.3	14.1%
288B	Riverhead sandy loam, 3 to 8 percent slopes	36.5	38.8%
602	Urban land	0.7	0.7%
Totals for Area of Interest		**94.2**	**100.0%**

Map Unit Descriptions (Southern Tier Soils Report)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dukes County, Massachusetts

259B—Carver loamy coarse sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y07t
Elevation: 0 to 240 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Carver, loamy coarse sand, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carver, Loamy Coarse Sand

Setting

Landform: Moraines, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, tread
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material
A - 3 to 7 inches: loamy coarse sand
E - 7 to 10 inches: coarse sand
Bw1 - 10 to 15 inches: coarse sand
Bw2 - 15 to 28 inches: coarse sand
BC - 28 to 32 inches: coarse sand
C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield

Percent of map unit: 10 percent
Landform: Outwash terraces, outwash plains, kame terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Merrimac

Percent of map unit: 3 percent
Landform: Kame terraces, outwash deltas, outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mashpee

Percent of map unit: 2 percent
Landform: Terraces, depressions, drainageways
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

259C—Carver loamy coarse sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2y07v
Elevation: 0 to 250 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Carver, loamy coarse sand, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carver, Loamy Coarse Sand

Setting

Landform: Moraines, outwash plains
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material
A - 3 to 7 inches: loamy coarse sand
E - 7 to 10 inches: coarse sand
Bw1 - 10 to 15 inches: coarse sand
Bw2 - 15 to 28 inches: coarse sand
BC - 28 to 32 inches: coarse sand
C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield

Percent of map unit: 10 percent
Landform: Kame terraces, outwash deltas, outwash terraces, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kame terraces, outwash deltas, outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Eskers, kames, outwash deltas, outwash terraces, moraines, outwash plains, kame terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

288A—Riverhead sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 98y1
Elevation: 0 to 110 feet
Mean annual precipitation: 41 to 48 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 175 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Riverhead and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over loose sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 4 inches: sandy loam
H2 - 4 to 16 inches: sandy loam
H3 - 16 to 24 inches: loamy sand

H4 - 24 to 60 inches: stratified sand and gravel

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F149BY006NY - Well Drained Outwash
Hydric soil rating: No

Minor Components

Tisbury

Percent of map unit: 5 percent
Hydric soil rating: No

Klej

Percent of map unit: 5 percent
Hydric soil rating: No

Haven

Percent of map unit: 5 percent
Hydric soil rating: No

Canton

Percent of map unit: 5 percent
Hydric soil rating: No

288B—Riverhead sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 98y2
Elevation: 0 to 130 feet
Mean annual precipitation: 41 to 48 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 175 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Riverhead and similar soils: 80 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting

Landform: Outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over loose sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 4 inches: sandy loam
H2 - 4 to 16 inches: sandy loam
H3 - 16 to 24 inches: loamy sand
H4 - 24 to 60 inches: stratified sand and gravel

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F149BY006NY - Well Drained Outwash
Hydric soil rating: No

Minor Components

Klej

Percent of map unit: 5 percent
Hydric soil rating: No

Carver

Percent of map unit: 5 percent
Hydric soil rating: No

Haven

Percent of map unit: 5 percent
Hydric soil rating: No

Tisbury

Percent of map unit: 5 percent
Hydric soil rating: No

602—Urban land

Map Unit Setting

National map unit symbol: 98y6
Frost-free period: 175 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Excavated and filled land

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Percolation Test Results

Soil Percolation Test Results

Schofield Barbini & Hoehn Inc.

Land Surveying • Civil Engineering

12 Surveyor's Lane. Box 339
Vineyard Haven, Mass.
508-693-2781
www.sbhinc.net
dhoehn@sbhinc.net

MV 12130

September 28, 2020

Oak Bluffs Resident Homesite Committee
PO Box 1941
Oak Bluffs, MA 02557

Re: Soil testing - Oak Bluffs Assessor Parcel 50-31 - Edgartown-Vineyard Haven Road

Dear Mr. Crossland:

On September 28, 2020, Schofield, Barbini, and Hoehn, Inc. performed a soils investigation at the above referenced property. Four deep observation holes were excavated by backhoe and the following soil conditions were found:

Test Hole 1:	0"-5"	Loamy f-m SAND (topsoil)
	5"-29"	Sandy LOAM with Gravel to Stones
	29"-68"	(subsoil) Sandy LOAM to Silt LOAM
	68"-128"	(unsuitable) Loamy SAND with Gravel

Groundwater was not encountered at a depth of 128". A design percolation rate of two minutes per inch was determined for the material below 68".

Test Hole 2:	0"-5"	Loamy f-m SAND (topsoil)
	5"-26"	Sandy LOAM with Gravel (subsoil)
	26"-58"	Sandy LOAM to Silt LOAM
	58"-132"	(unsuitable) SAND with Gravel

Groundwater was not encountered at a depth of 132". A design percolation rate of two minutes per inch was determined for the material below 58".

MV 12130
Page 2

Test Hole 3:	0"-5"	Loamy f-m SAND (topsoil)
	5"-33"	Sandy LOAM (subsoil)
	33"-132"	SAND with Gravel to Cobbles

Groundwater was not encountered at a depth of 132". A design percolation rate of two minutes per inch was determined for the material below 33".

Test Hole 2 :	0"-5"	Loamy f-m SAND (topsoil)
	5"-27"	Sandy LOAM with Gravel (subsoil)
	27"-72"	Sandy LOAM to Silt LOAM (unsuitable)
	72"-138"	SAND with Gravel

Groundwater was not encountered at a depth of 138". A design percolation rate of five minutes per inch was determined for the material below 72".

This investigation was witnessed by Megan Lancaster, agent for the Oak Bluffs Board of Health.

Based on this investigation and experience in the area, it is our opinion that the soils encountered are suitable for the construction of a waste water disposal facility on this property. If a disposal facility is design and constructed based on the soils found in Test Holes 1, 2, and 4, it is imperative that the design engineer inspect excavation of the facility at time of construction to insure that it is constructed below unsuitable materials or other appropriate measures are taken.

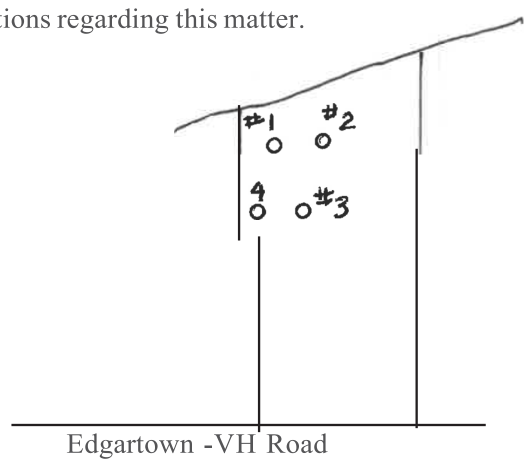
As plans for the property develop, additional soil testing may be warranted in order to allow for the most efficient system design.

Please feel free to contact me if you have any questions regarding this matter.

Sincerely,

Original Signed

Christopher P. Alley
Project Manager



Schofield, Barbini & Hoehn Inc.
Land Surveying Civil Engineering
SB&H
12 Surveyor's Lane, Box 339
Vineyard Haven, Mass.
508-693-2781
www.sbhinc.net
dhoehn@sbhinc.net

MV 12130

August 30, 2021

Oak Bluffs Affordable Housing Committee
PO Box 1941
Oak Bluffs, MA 02557

Re: Additional soil testing
Oak Bluffs Assessor Parcel 50-31 – Edgartown-Vineyard Haven Road

Dear Mr. Crossland:

To augment the soils investigation of September 2020 performed at the northwest corner of locus, on August 27, 2021, Schofield, Barbini, and Hoehn, Inc. performed additional soils investigations at the southeast corner of the above referenced property, outside of the Farm Neck Well Zone II. Four deep observation holes were excavated by backhoe and the following soil conditions were found:

Test Hole 5:	0"-4"	Loamy SAND (topsoil)
	4"-27"	Loamy fine to medium SAND (subsoil)
	27"-66"	Fine Sandy LOAM to Silt LOAM (unsuitable)
	66"-126"	Medium to coarse SAND

Groundwater was not encountered at a depth of 126". A design percolation rate of five minutes per inch was determined for the material below 66".

Test Hole 6 :	0"-4"	Loamy SAND (topsoil)
	4"-25"	Loamy fine to medium SAND (subsoil)
	25"-54"	Sandy LOAM to Silt LOAM (unsuitable)
	54"-120"	Medium to coarse SAND

Groundwater was not encountered at a depth of 120". A design percolation rate of five minutes per inch was determined for the material below 54".

Test Hole 7:	0"-4"	Loamy SAND (topsoil)
	4"-26"	Loamy fine to medium SAND (subsoil)
	26"-60"	Fine Sandy LOAM to Silt LOAM (unsuitable)
	60"-120"	Medium to coarse SAND

Groundwater was not encountered at a depth of 120". A design percolation rate of two minutes per inch was determined for the material below 60".

Test Hole 8 :	0"-4"	Loamy SAND (topsoil)
	4"-30"	Loamy fine to medium SAND (subsoil)
	30"-120"	Medium SAND

Groundwater was not encountered at a depth of 120". A design percolation rate of five minutes per inch was determined for the material below 30".

This investigation was witnessed by Garrett Albiston, agent for the Oak Bluffs Board of Health.

Based on this investigation and experience in the area, it is our opinion that the soils encountered are suitable for the construction of a waste water disposal facility on this property. If a disposal facility is design and constructed based on the soils found in Test Holes 5, 6, and 7, it is imperative that the design engineer inspect excavation of the facility at time of construction to insure that it is constructed below unsuitable materials or other appropriate measures are taken.

As plans for the property develop, additional soil testing may be warranted in order to allow for the most efficient system design.

Please feel free to contact me if you have any questions regarding this matter.

Sincerely,

Christopher P. Alley
Project Manager

Commonwealth of Massachusetts

City/Town of Oak Bluffs

Horsley Witten Test Pits

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review

Deep Observation Hole Number: 1 (Hole #) | 3/22/23 (Date) | 840A (Time) | 45F Sun (Weather) | 41º25'07.03"N (Latitude) | 70º35'25.67"W (Longitude)

1. Land Use: Parking area (e.g. woodland, agricultural field, vacant lot, etc.) | Scrub oak & pine (Vegetation) | Few (Surface Stones (e.g. cobbles, stones, boulders, etc.)) | 3-8% (Slope (%))

Description of Location: at edge of parking area west of barn/shed

2. Soil Parent Material: Eolian over loose sandy glaciofluvial | Outwash plain (Landform) | Shoulder (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances From: Open Water Body > 200 feet | Drainage Way > 200 feet | Wetlands > 200 feet
Property Line 25 feet | Drinking Water Well > 200 feet | Other ____ feet

4. Unsuitable Materials Present: ☑ Yes ☐ No If Yes: ☐ Disturbed Soil ☑ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If Yes: ____ Depth weeping from pit ____ Depth standing water in hole

Soil Log

Depth (in)	Soil Horizon/ Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles/Stones			
0-4	Fill										
4-72	C1	G-MS	2.5Y 7/6				20	10	SG	L	
72-122	C2	G-MS	2.5Y 8/4				15	10	SG	L	

Additional Notes: No groundwater features observed

Perc test performed at 36"

Commonwealth of Massachusetts

City/Town of Oak Bluffs

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review

Deep Observation Hole Number: 2 (Hole #) | 3/22/23 (Date) | 910A (Time) | 45F Sun (Weather) | 41º25'05.09"N (Latitude) | 70º35'26.43"W (Longitude)

1. Land Use: Vacant (e.g. woodland, agricultural field, vacant lot, etc.) | Scrub oak & pine (Vegetation) | Few (Surface Stones (e.g. cobbles, stones, boulders, etc.)) | 3-8% (Slope (%))

Description of Location: south corner of lot

2. Soil Parent Material: Eolian over loose sandy glaciofluvial | Outwash plain (Landform) | Shoulder (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances From: Open Water Body > 200 feet | Drainage Way > 200 feet | Wetlands > 200 feet

Property Line 20 feet | Drinking Water Well > 200 feet | Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☑ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If Yes: ______ Depth weeping from pit ______ Depth standing water in hole

Soil Log

Depth (in)	Soil Horizon/ Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles/Stones			
0-4	A	LS	10YR 2/2						G	Fr	
4-20	Bw	LS	10YR 5/6						M	Fr	
20-72	C1	MS	2.5Y 6/4						SG	L	
72-120	C2	MS	2.5Y 8/4						SG	L	

Additional Notes: No groundwater features observed

Commonwealth of Massachusetts

City/Town of Oak Bluffs

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review

Deep Observation Hole Number: 3 (Hole #) | 3/22/23 (Date) | 945A (Time) | 45F Sun (Weather) | 41º25'05.62"N (Latitude) | 70º35'28.85"W (Longitude)

1. Land Use: Vacant (e.g. woodland, agricultural field, vacant lot, etc.) | Scrub oak & pine (Vegetation) | Few (Surface Stones (e.g. cobbles, stones, boulders, etc.)) | 3-8% (Slope (%))

Description of Location: center south of lot

2. Soil Parent Material: Eolian over loose sandy glaciofluvial | Outwash plain (Landform) | Shoulder (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances From: Open Water Body > 200 feet | Drainage Way > 200 feet | Wetlands > 200 feet
Property Line 40 feet | Drinking Water Well > 200 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☑ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If Yes: ____ Depth weeping from pit ____ Depth standing water in hole

Soil Log

Depth (in)	Soil Horizon/ Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles/Stones			
0-4	A	SL	10YR 2/2						G	Fr	
4-30	Bw	SL	10YR 5/8						M	Fr	
30-60	C	SL	5Y 8/2						M	Fr	
60-120	2C	MS	2.5Y 7/4						SG	L	

Additional Notes: No groundwater features observed

Perc test performed at 72"

Commonwealth of Massachusetts

City/Town of Oak Bluffs

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review

Deep Observation Hole Number: 4 (Hole #) 3/22/23 (Date) 1110A (Time) 50F Sun (Weather) 41º25'06.45"N (Latitude) 70º35'26.82"W (Longitude)

1. Land Use: Vacant (e.g. woodland, agricultural field, vacant lot, etc.) Scrub oak & pine (Vegetation) Few (Surface Stones (e.g. cobbles, stones, boulders, etc.)) 3-8% (Slope (%))

Description of Location: southeast of lot

2. Soil Parent Material: Eolian over loose sandy glaciofluvial Outwash plain (Landform) Shoulder (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances From: Open Water Body > 200 feet Drainage Way > 200 feet Wetlands > 200 feet
Property Line 55 feet Drinking Water Well > 200 feet Other feet

4. Unsuitable Materials Present: ☐ Yes ☑ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If Yes: ____ Depth weeping from pit ____ Depth standing water in hole

Soil Log

Depth (in)	Soil Horizon/ Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles/Stones			
0-6	A	LS	7.5YR 2/1						G	VFr	
6-20	Bw	LS	10YR 5/6						M	VFr	
20-48	C1	MS	2.5Y 6/6						SG	L	
48-120	C2	MS	2.5Y 7/4						SG	L	

Additional Notes: No groundwater features observed

Commonwealth of Massachusetts

City/Town of Oak Bluffs

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review

Deep Observation Hole Number: 5 (Hole #) | 3/22/23 (Date) | 1210P (Time) | 50F Sun (Weather) | 41º25'07.49"N (Latitude) | 70º35'26.44"W (Longitude)

1. Land Use: Vacant (e.g. woodland, agricultural field, vacant lot, etc.) | Scrub oak & pine (Vegetation) | Few (Surface Stones (e.g. cobbles, stones, boulders, etc.)) | 3-8% (Slope (%))

Description of Location: east edge of lot

2. Soil Parent Material: Eolian over loose sandy glaciofluvial | Outwash plain (Landform) | Shoulder (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances From: Open Water Body > 200 feet | Drainage Way > 200 feet | Wetlands > 200 feet
Property Line 60 feet | Drinking Water Well > 200 feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☑ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If Yes: ____ Depth weeping from pit ____ Depth standing water in hole

Soil Log

Depth (in)	Soil Horizon/ Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles/Stones			
0-3	A	LS	10YR 4/3						G	VFr	
3-24	Bw	LS	10YR 5/8						M	VFr	
24-40	C1	LS	2.5Y 5/6						M	VFr	
40-84	C2	MS	2.5Y 5/6						SG	L	
84-120	C3	MS	2.5Y 8/4						SG	L	

Additional Notes: No groundwater features observed

Commonwealth of Massachusetts
City/Town of Oak Bluffs
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

tab

return

A. Site Information

Southern Tier Housing Development
Owner Name

85 Edgartown-Vineyard Haven Road
Street Address or Lot #

Oak Bluffs	MA	
City/Town	State	Zip Code

Contact Person (if different from Owner)	Telephone Number

B. Test Results

	Date	Time	Date	Time
	3/22/23	1010A	3/22/23	1040A
Observation Hole #	1		3	
Depth of Perc	36"		72"	
Start Pre-Soak	1013A		1046A	
End Pre-Soak	1028A			
Time at 12”	1028A			
Time at 9”	1033A			
Time at 6”	1039A			
Time (9”-6”)	6 min			
Rate (Min./Inch)	< 2 min/in		< 2 min/in	
	Test Passed: ☒		Test Passed: ☒	
	Test Failed: ☐		Test Failed: ☐	

MCL (Horsley Witten Group)
Test Performed By:

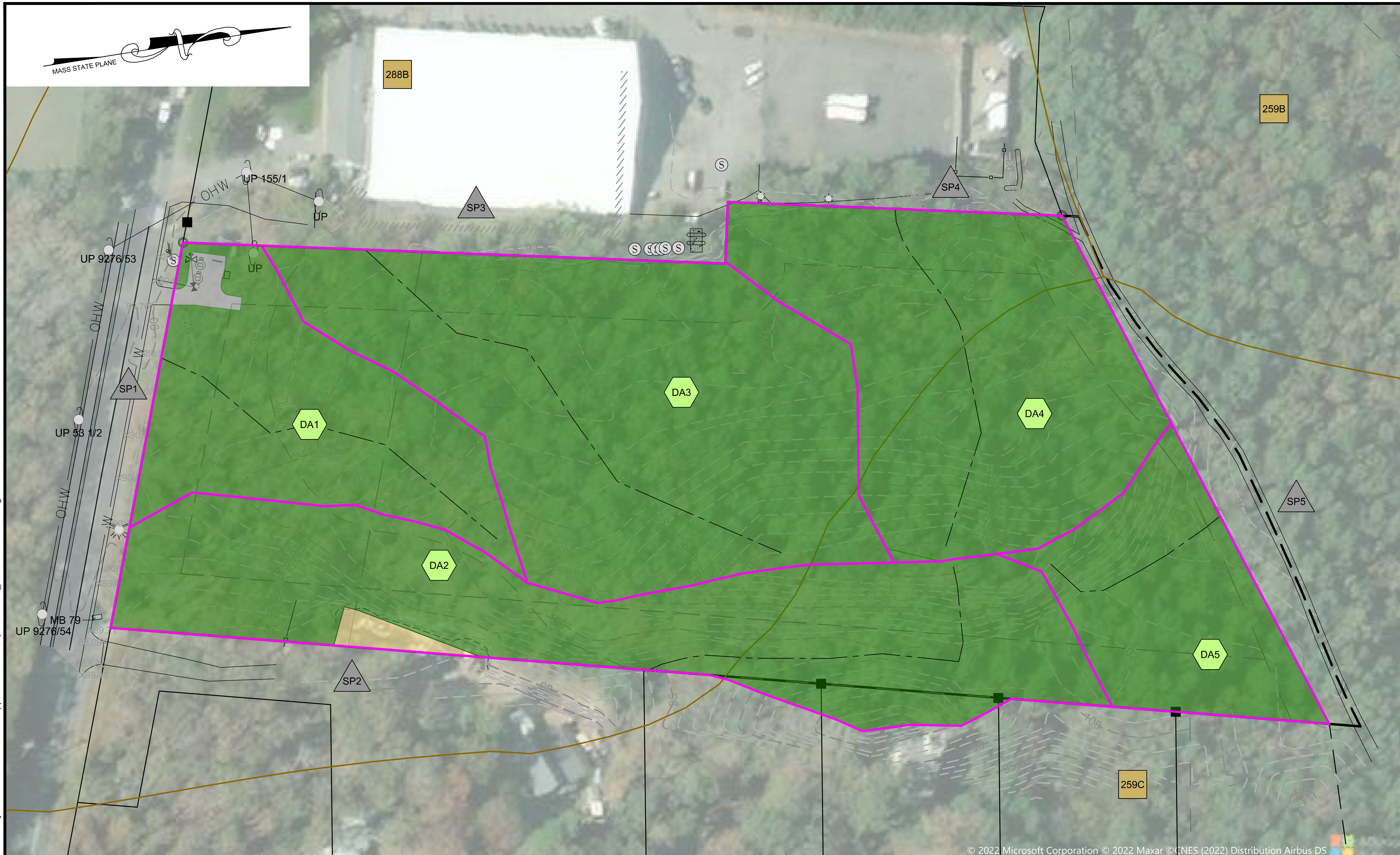
Town Health Agent
Board of Health Witness

Comments:

Could not saturate TP 3

APPENDIX B

Drainage Area Maps



GRAPHIC SCALE

80 0 40 80 160

(in feet)

1 INCH = 80 FEET

LEGEND

DRAINAGE AREA BOUNDARY — WOODS, WATER, ROOFTOP, GRASS, PAVEMENT

IMP. AREA / TOTAL AREA (SQUARE FEET) — 5,000 / 15,000

DA1 DRAINAGE AREA

SP1 STUDY POINT

P1 POND

SOIL BOUNDARY

TIME OF CONCENTRATION FLOW PATH

5' MAJOR CONTOUR

1' MINOR CONTOUR

SOIL TYPES

288B	RIVERHEAD SANDY LOAM (HSG A)
259B	CARVER LOAMY COARSE SAND (HSG A)
259C	CARVER LOAMY COARSE SAND (HSG A)

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
90 Route 6A Sandwich, MA 02563
horsleywittengroup.com

Date: 8/11/23
Design By: EWH
Drawn By: EWH
Checked By: ML

Plan Set:
SOUTHERN TIER PERMIT PLANS
85 EDGARTOWN-VINEYARD HAVEN ROAD
OAK BLUFFS, MASSACHUSETTS

Plan Title:
EXISTING DRAINAGE AREA MAP

Prepared For:
Affirmative Investments, Inc.
33 Union St, 2nd Floor
Boston, MA 02108
Phone:-
Fax: ---

Project Number: 22008

Sheet Number: 1 of 2

GRAPHIC SCALE

80 0 40 80 160

(in feet)

1 INCH = 80 FEET

LEGEND

DRAINAGE AREA BOUNDARY

WOODS

WATER

ROOFTOP

GRASS

PAVEMENT

IMP. AREA 5,000

TOTAL AREA 15,000

(SQUARE FEET)

DA1 DRAINAGE AREA

SP1 STUDY POINT

P1 POND

SOIL BOUNDARY

TIME OF CONCENTRATION FLOW PATH

SOIL TYPES

288B	RIVERHEAD SANDY LOAM (HSG A)
259B	CARVER LOAMY COARSE SAND (HSG A)
259C	CARVER LOAMY COARSE SAND (HSG A)

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
90 Route 6A Sandwich, MA 02563
horsleywittengroup.com

Date: 8/11/23

Design By: EWH

Drawn By: EWH

Checked By: ML

Plan Set: SOUTHERN TIER PERMIT PLANS
85 EDGARTOWN-VINEYARD HAVEN ROAD
OAK BLUFFS, MASSACHUSETTS

Plan Title: PROPOSED DRAINAGE AREA MAP

Prepared For:
Affirmative Investments, Inc.
33 Union St, 2nd Floor
Boston, MA 02108
Phone: ---
Fax: ---

Project Number: 22008

APPENDIX C

Water Quality Volume Sizing Calculations

Project: Southern Tier Housing **Project No:** 22008
Project Location: Oak Bluffs, MA

Calculated By: EWH
Checked By: RAC
Date : 8/11/2023

Instructions: Enter values in [ ] cells only. All other cells are formul
and do not need to be edited. See cell comments for descriptions and formulas

NOTE: NOT INCLUDING ROOFS

Water Quality Volume (WQv)
Based upon 1-inch of rainfall times the contributing impervious area contributing impervious area

WQv (cf) = (1" rainfall/12) * Imp. Area (sf)

Storm Type: 0.5 ***Inch***

Site	DA	Description	% Imp.	Drainage Area		Imp. Area		WQv Required*	WQv required
			%	sf	ac	sf	ac	cf	af
	1B	Southwest parking	80%	8,555	0.20	6,837	0.16	285	0.007
	1D	West Buildings	6%	13,957	0.32	857	0.02	36	0.001
	2B	Entrance (South)	56%	13,810	0.32	7,700	0.18	321	0.007
	2C	Entrance (North)	62%	9,470	0.22	5,825	0.13	243	0.006
	3B	West Parking (South)	93%	10,420	0.24	9,665	0.22	403	0.009
	3C	West Parking (North)	52%	12,262	0.28	6,369	0.15	265	0.006
	3D	Main Road 1	67%	7,760	0.18	5,222	0.12	218	0.005
	3E	Main Road 2	46%	6,965	0.16	3,220	0.07	134	0.003
	4B	North Parking	40%	29,580	0.68	11,930	0.27	497	0.011
		TOTALS		112,779	0.20	57,625	0.16	2,401	0.055

Horsley Witten Group
Sustainable Environmental Solutions

Project: Southern Tier Housing **Project No:** 22008
Project Location: Oak Bluffs, MA

Calculated By: EWH
Checked By: RAC

Instructions: Enter values in [ ] cells only. All other cells are formul
and do not need to be edited. See cell comments for descriptions and formulas

NOTE: NOT INCLUDING ROOFS

Bioretention Sizing Calculations

Sizing Equations: Bioretention

Required Surface Area (sf) = (WQv) (df) / [(k) (hf + df) (tf)]
Where: df = Filter bed depth (ft) k = Coefficient of permeability of filter media (ft/day)
hf = Ave. height of water above filter bed (ft) tf = Design filter bed drain time (days)

BIORETENTION SIZING:

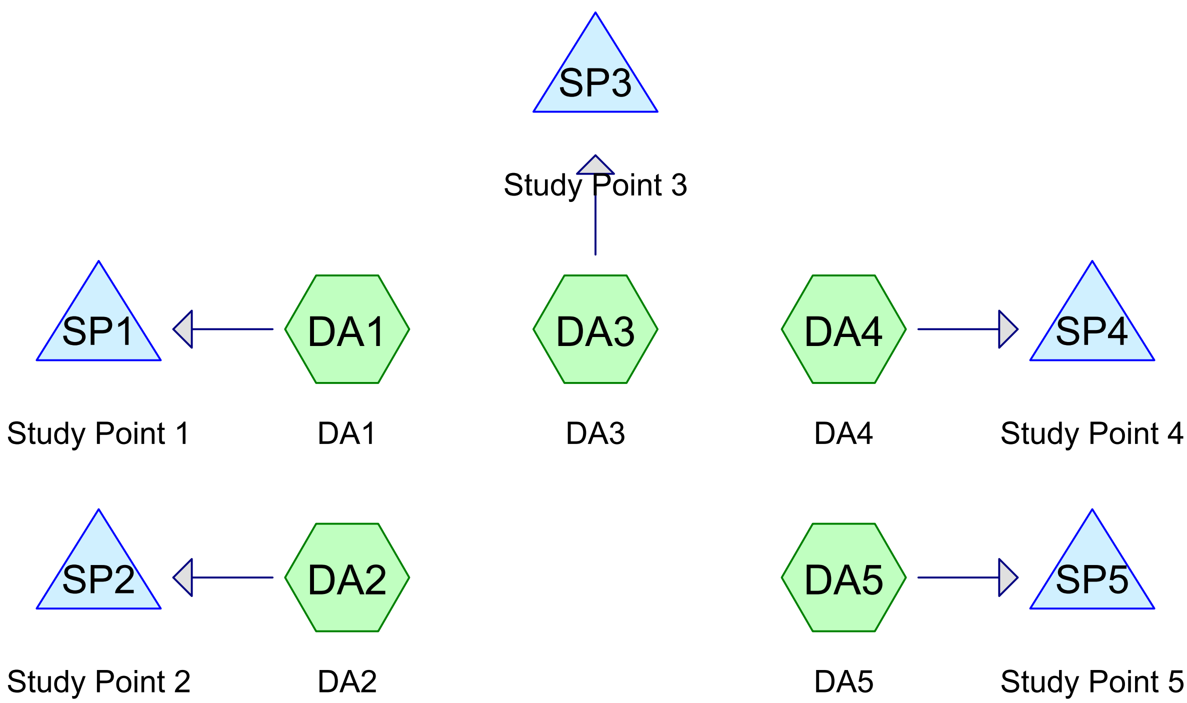
Bio Area	Drainage Area Name	WQv Required (af)	df (ft)	K (ft/day)	hmax- Height of water above filter (in.)	hf=avg of above (ft)	tf (days)	Surface Area Required (sf)	Surface Area Provided (sf)	Sediment Forebay Required 10% WQv (cf)	Sediment Forebay Provided (cf)	WQV Treatment Provided (af)
Bio 3	Southwest parking	0.007	2.50	1	6	0.25	1.67	155	730	28	N/A	0.031
Bio 4	West Buildings	0.001	2.50	1	6	0.25	1.67	19	180	4	N/A	0.008
Bio 1	Entrance (South)	0.007	2.50	1	6	0.25	1.67	175	420	32	N/A	0.018
Bio 2	Entrance (North)	0.006	2.50	1	6	0.25	1.67	132	480	24	N/A	0.020
Bio 5	West Parking (South)	0.009	2.50	1	12	0.5	1.67	201	385	40	N/A	0.018
Bio 6	West Parking (North)	0.006	2.50	1	9	0.375	1.67	138	285	27	N/A	0.013
Bio 7	Main Road 1	0.005	2.50	1	6	0.25	1.67	118	444	22	N/A	0.019
Bio 8	Main Road 2	0.003	2.50	1	6	0.25	1.67	73	300	13	N/A	0.013
Bio 9	North Parking	0.011	2.50	1	6	0.25	1.67	271	525	50	N/A	0.022
	TOTALS	0.055						1282	3749	240	0	0.160
					Percentage of Treatment Provided				**292%**		**0%**	**290%**

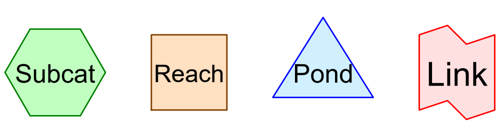
APPENDIX D

HydroCAD® Drainage Calculations

EXISTING CONDITIONS
2-YEAR EVENT
10-YEAR EVENT
25-YEAR EVENT
100-YEAR EVENT

PROPOSED CONDITIONS
2-YEAR EVENT
10-YEAR EVENT
25-YEAR EVENT
100-YEAR EVENT





Routing Diagram for 22008-PRE
Prepared by Horsley Witten Inc, Printed 8/8/2023
HydroCAD® 10.20-3c s/n 01445 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR NOAA+	Type III 24-hr		Default	24.00	1	3.89	2
2	10-YR NOAA+	Type III 24-hr		Default	24.00	1	5.70	2
3	25-YR NOAA+	Type III 24-hr		Default	24.00	1	7.01	2
4	100-YR NOAA+	Type III 24-hr		Default	24.00	1	9.09	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.049	96	Gravel surface, HSG A (DA2)
0.039	98	Paved parking, HSG A (DA1)
7.530	30	Woods, Good, HSG A (DA1, DA2, DA3, DA4, DA5)
7.618	**31**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
7.618	HSG A	DA1, DA2, DA3, DA4, DA5
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
7.618		**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=45,575 sf 3.72% Impervious Runoff Depth=0.14"
Flow Length=335' Tc=17.6 min CN=30/98 Runoff=0.11 cfs 0.012 af

Subcatchment DA2: DA2 Runoff Area=84,435 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=340' Tc=12.7 min CN=32/0 Runoff=0.00 cfs 0.000 af

Subcatchment DA3: DA3 Runoff Area=97,230 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=450' Tc=18.5 min CN=30/0 Runoff=0.00 cfs 0.000 af

Subcatchment DA4: DA4 Runoff Area=72,160 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=310' Tc=13.7 min CN=30/0 Runoff=0.00 cfs 0.000 af

Subcatchment DA5: DA5 Runoff Area=32,460 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=170' Tc=11.3 min CN=30/0 Runoff=0.00 cfs 0.000 af

Pond SP1: Study Point 1 Inflow=0.11 cfs 0.012 af
Primary=0.11 cfs 0.012 af

Pond SP2: Study Point 2 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Pond SP3: Study Point 3 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Pond SP4: Study Point 4 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Pond SP5: Study Point 5 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 7.618 ac Runoff Volume = 0.012 af Average Runoff Depth = 0.02"
99.49% Pervious = 7.580 ac 0.51% Impervious = 0.039 ac

Summary for Subcatchment DA1: DA1

Runoff = 0.11 cfs @ 12.23 hrs, Volume= 0.012 af, Depth= 0.14"
Routed to Pond SP1 : Study Point 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
1,695	98	Paved parking, HSG A
43,880	30	Woods, Good, HSG A
45,575	33	Weighted Average
43,880	30	96.28% Pervious Area
1,695	98	3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	95	0.0500	0.12		**Sheet Flow, A to B**
					Woods: Light underbrush n= 0.400 P2= 3.89"
4.6	240	0.0300	0.87		**Shallow Concentrated Flow, B to C**
					Woodland Kv= 5.0 fps
17.6	335	Total			

Summary for Subcatchment DA2: DA2

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond SP2 : Study Point 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
2,140	96	Gravel surface, HSG A
82,295	30	Woods, Good, HSG A
84,435	32	Weighted Average
84,435	32	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	80	0.1300	0.17		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
5.0	260	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
12.7	340	Total			

Summary for Subcatchment DA3: DA3

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond SP3 : Study Point 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
97,230	30	Woods, Good, HSG A
97,230	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0700	0.14		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
6.7	350	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
18.5	450	Total			

Summary for Subcatchment DA4: DA4

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond SP4 : Study Point 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
72,160	30	Woods, Good, HSG A
72,160	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.1000	0.16		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
3.5	210	0.0400	1.00		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
13.7	310	Total			

Summary for Subcatchment DA5: DA5

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond SP5 : Study Point 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
32,460	30	Woods, Good, HSG A
32,460	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	90	0.0900	0.15		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
11.3	170	Total			

Summary for Pond SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.046 ac,	3.72% Impervious,	Inflow Depth =	0.14"	for 2-YR NOAA+ event
Inflow =	0.11 cfs @	12.23 hrs,	Volume=	0.012 af	
Primary =	0.11 cfs @	12.23 hrs,	Volume=	0.012 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.938 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR NOAA+ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR NOAA+ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.657 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR NOAA+ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	0.745 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 2-YR NOAA+ event	
Inflow =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=45,575 sf 3.72% Impervious Runoff Depth=0.25"
Flow Length=335' Tc=17.6 min CN=30/98 Runoff=0.16 cfs 0.021 af

Subcatchment DA2: DA2 Runoff Area=84,435 sf 0.00% Impervious Runoff Depth=0.09"
Flow Length=340' Tc=12.7 min CN=32/0 Runoff=0.02 cfs 0.015 af

Subcatchment DA3: DA3 Runoff Area=97,230 sf 0.00% Impervious Runoff Depth=0.04"
Flow Length=450' Tc=18.5 min CN=30/0 Runoff=0.01 cfs 0.008 af

Subcatchment DA4: DA4 Runoff Area=72,160 sf 0.00% Impervious Runoff Depth=0.04"
Flow Length=310' Tc=13.7 min CN=30/0 Runoff=0.01 cfs 0.006 af

Subcatchment DA5: DA5 Runoff Area=32,460 sf 0.00% Impervious Runoff Depth=0.04"
Flow Length=170' Tc=11.3 min CN=30/0 Runoff=0.00 cfs 0.003 af

Pond SP1: Study Point 1 Inflow=0.16 cfs 0.021 af
Primary=0.16 cfs 0.021 af

Pond SP2: Study Point 2 Inflow=0.02 cfs 0.015 af
Primary=0.02 cfs 0.015 af

Pond SP3: Study Point 3 Inflow=0.01 cfs 0.008 af
Primary=0.01 cfs 0.008 af

Pond SP4: Study Point 4 Inflow=0.01 cfs 0.006 af
Primary=0.01 cfs 0.006 af

Pond SP5: Study Point 5 Inflow=0.00 cfs 0.003 af
Primary=0.00 cfs 0.003 af

Total Runoff Area = 7.618 ac Runoff Volume = 0.053 af Average Runoff Depth = 0.08"
99.49% Pervious = 7.580 ac 0.51% Impervious = 0.039 ac

Summary for Subcatchment DA1: DA1

Runoff = 0.16 cfs @ 12.23 hrs, Volume= 0.021 af, Depth= 0.25"
Routed to Pond SP1 : Study Point 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
1,695	98	Paved parking, HSG A
43,880	30	Woods, Good, HSG A
45,575	33	Weighted Average
43,880	30	96.28% Pervious Area
1,695	98	3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	95	0.0500	0.12		**Sheet Flow, A to B**
					Woods: Light underbrush n= 0.400 P2= 3.89"
4.6	240	0.0300	0.87		**Shallow Concentrated Flow, B to C**
					Woodland Kv= 5.0 fps
17.6	335	Total			

Summary for Subcatchment DA2: DA2

Runoff = 0.02 cfs @ 15.28 hrs, Volume= 0.015 af, Depth= 0.09"
Routed to Pond SP2 : Study Point 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
2,140	96	Gravel surface, HSG A
82,295	30	Woods, Good, HSG A
84,435	32	Weighted Average
84,435	32	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	80	0.1300	0.17		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
5.0	260	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
12.7	340	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.01 cfs @ 17.19 hrs, Volume= 0.008 af, Depth= 0.04"
Routed to Pond SP3 : Study Point 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
97,230	30	Woods, Good, HSG A
97,230	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0700	0.14		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
6.7	350	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
18.5	450	Total			

Summary for Subcatchment DA4: DA4

Runoff = 0.01 cfs @ 17.13 hrs, Volume= 0.006 af, Depth= 0.04"
Routed to Pond SP4 : Study Point 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
72,160	30	Woods, Good, HSG A
72,160	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.1000	0.16		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
3.5	210	0.0400	1.00		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
13.7	310	Total			

Summary for Subcatchment DA5: DA5

Runoff = 0.00 cfs @ 17.09 hrs, Volume= 0.003 af, Depth= 0.04"
Routed to Pond SP5 : Study Point 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
32,460	30	Woods, Good, HSG A
32,460	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	90	0.0900	0.15		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
11.3	170	Total			

Summary for Pond SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.046 ac,	3.72% Impervious, Inflow Depth = 0.25"	for 10-YR NOAA+ event	
Inflow =	0.16 cfs @	12.23 hrs, Volume=	0.021 af	
Primary =	0.16 cfs @	12.23 hrs, Volume=	0.021 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.938 ac,	0.00% Impervious,	Inflow Depth = 0.09"	for 10-YR NOAA+ event	
Inflow =	0.02 cfs @	15.28 hrs,	Volume=	0.015 af	
Primary =	0.02 cfs @	15.28 hrs,	Volume=	0.015 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth = 0.04" for 10-YR NOAA+ event
Inflow = 0.01 cfs @ 17.19 hrs, Volume= 0.008 af
Primary = 0.01 cfs @ 17.19 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.657 ac,	0.00% Impervious, Inflow Depth =	0.04"	for 10-YR NOAA+ event
Inflow =	0.01 cfs @	17.13 hrs, Volume=	0.006 af	
Primary =	0.01 cfs @	17.13 hrs, Volume=	0.006 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.745 ac, 0.00% Impervious, Inflow Depth = 0.04" for 10-YR NOAA+ event
Inflow = 0.00 cfs @ 17.09 hrs, Volume= 0.003 af
Primary = 0.00 cfs @ 17.09 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1 Runoff Area=45,575 sf 3.72% Impervious Runoff Depth=0.46"
Flow Length=335' Tc=17.6 min CN=30/98 Runoff=0.19 cfs 0.040 af

Subcatchment DA2: DA2 Runoff Area=84,435 sf 0.00% Impervious Runoff Depth=0.32"
Flow Length=340' Tc=12.7 min CN=32/0 Runoff=0.13 cfs 0.051 af

Subcatchment DA3: DA3 Runoff Area=97,230 sf 0.00% Impervious Runoff Depth=0.21"
Flow Length=450' Tc=18.5 min CN=30/0 Runoff=0.06 cfs 0.040 af

Subcatchment DA4: DA4 Runoff Area=72,160 sf 0.00% Impervious Runoff Depth=0.21"
Flow Length=310' Tc=13.7 min CN=30/0 Runoff=0.05 cfs 0.030 af

Subcatchment DA5: DA5 Runoff Area=32,460 sf 0.00% Impervious Runoff Depth=0.21"
Flow Length=170' Tc=11.3 min CN=30/0 Runoff=0.02 cfs 0.013 af

Pond SP1: Study Point 1 Inflow=0.19 cfs 0.040 af
Primary=0.19 cfs 0.040 af

Pond SP2: Study Point 2 Inflow=0.13 cfs 0.051 af
Primary=0.13 cfs 0.051 af

Pond SP3: Study Point 3 Inflow=0.06 cfs 0.040 af
Primary=0.06 cfs 0.040 af

Pond SP4: Study Point 4 Inflow=0.05 cfs 0.030 af
Primary=0.05 cfs 0.030 af

Pond SP5: Study Point 5 Inflow=0.02 cfs 0.013 af
Primary=0.02 cfs 0.013 af

Total Runoff Area = 7.618 ac Runoff Volume = 0.174 af Average Runoff Depth = 0.27"
99.49% Pervious = 7.580 ac 0.51% Impervious = 0.039 ac

Summary for Subcatchment DA1: DA1

Runoff = 0.19 cfs @ 12.23 hrs, Volume= 0.040 af, Depth= 0.46"
Routed to Pond SP1 : Study Point 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
1,695	98	Paved parking, HSG A
43,880	30	Woods, Good, HSG A
45,575	33	Weighted Average
43,880	30	96.28% Pervious Area
1,695	98	3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	95	0.0500	0.12		**Sheet Flow, A to B**
					Woods: Light underbrush n= 0.400 P2= 3.89"
4.6	240	0.0300	0.87		**Shallow Concentrated Flow, B to C**
					Woodland Kv= 5.0 fps
17.6	335	Total			

Summary for Subcatchment DA2: DA2

Runoff = 0.13 cfs @ 12.55 hrs, Volume= 0.051 af, Depth= 0.32"
Routed to Pond SP2 : Study Point 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
2,140	96	Gravel surface, HSG A
82,295	30	Woods, Good, HSG A
84,435	32	Weighted Average
84,435	32	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	80	0.1300	0.17		**Sheet Flow, A to B**
					Woods: Light underbrush n= 0.400 P2= 3.89"
5.0	260	0.0300	0.87		**Shallow Concentrated Flow, B to C**
					Woodland Kv= 5.0 fps
12.7	340	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.06 cfs @ 13.96 hrs, Volume= 0.040 af, Depth= 0.21"
Routed to Pond SP3 : Study Point 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
97,230	30	Woods, Good, HSG A
97,230	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0700	0.14		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
6.7	350	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
18.5	450	Total			

Summary for Subcatchment DA4: DA4

Runoff = 0.05 cfs @ 13.88 hrs, Volume= 0.030 af, Depth= 0.21"
Routed to Pond SP4 : Study Point 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
72,160	30	Woods, Good, HSG A
72,160	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.1000	0.16		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
3.5	210	0.0400	1.00		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
13.7	310	Total			

Summary for Subcatchment DA5: DA5

Runoff = 0.02 cfs @ 13.85 hrs, Volume= 0.013 af, Depth= 0.21"
Routed to Pond SP5 : Study Point 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
32,460	30	Woods, Good, HSG A
32,460	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	90	0.0900	0.15		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
11.3	170	Total			

Summary for Pond SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.046 ac,	3.72% Impervious,	Inflow Depth = 0.46"	for 25-YR NOAA+ event	
Inflow =	0.19 cfs @	12.23 hrs,	Volume=	0.040 af	
Primary =	0.19 cfs @	12.23 hrs,	Volume=	0.040 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.938 ac,	0.00% Impervious, Inflow Depth = 0.32"	for 25-YR NOAA+ event	
Inflow =	0.13 cfs @	12.55 hrs, Volume=	0.051 af	
Primary =	0.13 cfs @	12.55 hrs, Volume=	0.051 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth = 0.21" for 25-YR NOAA+ event
Inflow = 0.06 cfs @ 13.96 hrs, Volume= 0.040 af
Primary = 0.06 cfs @ 13.96 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.657 ac, 0.00% Impervious, Inflow Depth = 0.21" for 25-YR NOAA+ event
Inflow = 0.05 cfs @ 13.88 hrs, Volume= 0.030 af
Primary = 0.05 cfs @ 13.88 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.745 ac, 0.00% Impervious, Inflow Depth = 0.21" for 25-YR NOAA+ event
Inflow = 0.02 cfs @ 13.85 hrs, Volume= 0.013 af
Primary = 0.02 cfs @ 13.85 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: DA1	Runoff Area=45,575 sf 3.72% Impervious Runoff Depth=1.01" Flow Length=335' Tc=17.6 min CN=30/98 Runoff=0.40 cfs 0.088 af
Subcatchment DA2: DA2	Runoff Area=84,435 sf 0.00% Impervious Runoff Depth=0.90" Flow Length=340' Tc=12.7 min CN=32/0 Runoff=0.79 cfs 0.145 af
Subcatchment DA3: DA3	Runoff Area=97,230 sf 0.00% Impervious Runoff Depth=0.70" Flow Length=450' Tc=18.5 min CN=30/0 Runoff=0.55 cfs 0.131 af
Subcatchment DA4: DA4	Runoff Area=72,160 sf 0.00% Impervious Runoff Depth=0.70" Flow Length=310' Tc=13.7 min CN=30/0 Runoff=0.44 cfs 0.097 af
Subcatchment DA5: DA5	Runoff Area=32,460 sf 0.00% Impervious Runoff Depth=0.70" Flow Length=170' Tc=11.3 min CN=30/0 Runoff=0.20 cfs 0.044 af
Pond SP1: Study Point 1	Inflow=0.40 cfs 0.088 af Primary=0.40 cfs 0.088 af
Pond SP2: Study Point 2	Inflow=0.79 cfs 0.145 af Primary=0.79 cfs 0.145 af
Pond SP3: Study Point 3	Inflow=0.55 cfs 0.131 af Primary=0.55 cfs 0.131 af
Pond SP4: Study Point 4	Inflow=0.44 cfs 0.097 af Primary=0.44 cfs 0.097 af
Pond SP5: Study Point 5	Inflow=0.20 cfs 0.044 af Primary=0.20 cfs 0.044 af

Total Runoff Area = 7.618 ac Runoff Volume = 0.505 af Average Runoff Depth = 0.80"
99.49% Pervious = 7.580 ac 0.51% Impervious = 0.039 ac

Summary for Subcatchment DA1: DA1

Runoff = 0.40 cfs @ 12.41 hrs, Volume= 0.088 af, Depth= 1.01"
Routed to Pond SP1 : Study Point 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
1,695	98	Paved parking, HSG A
43,880	30	Woods, Good, HSG A
45,575	33	Weighted Average
43,880	30	96.28% Pervious Area
1,695	98	3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	95	0.0500	0.12		**Sheet Flow, A to B**
					Woods: Light underbrush n= 0.400 P2= 3.89"
4.6	240	0.0300	0.87		**Shallow Concentrated Flow, B to C**
					Woodland Kv= 5.0 fps
17.6	335	Total			

Summary for Subcatchment DA2: DA2

Runoff = 0.79 cfs @ 12.38 hrs, Volume= 0.145 af, Depth= 0.90"
Routed to Pond SP2 : Study Point 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
2,140	96	Gravel surface, HSG A
82,295	30	Woods, Good, HSG A
84,435	32	Weighted Average
84,435	32	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	80	0.1300	0.17		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
5.0	260	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
12.7	340	Total			

Summary for Subcatchment DA3: DA3

Runoff = 0.55 cfs @ 12.52 hrs, Volume= 0.131 af, Depth= 0.70"
Routed to Pond SP3 : Study Point 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
97,230	30	Woods, Good, HSG A
97,230	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0700	0.14		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
6.7	350	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
18.5	450	Total			

Summary for Subcatchment DA4: DA4

Runoff = 0.44 cfs @ 12.46 hrs, Volume= 0.097 af, Depth= 0.70"
Routed to Pond SP4 : Study Point 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
72,160	30	Woods, Good, HSG A
72,160	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.1000	0.16		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
3.5	210	0.0400	1.00		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
13.7	310	Total			

Summary for Subcatchment DA5: DA5

Runoff = 0.20 cfs @ 12.42 hrs, Volume= 0.044 af, Depth= 0.70"
Routed to Pond SP5 : Study Point 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
32,460	30	Woods, Good, HSG A
32,460	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	90	0.0900	0.15		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
11.3	170	Total			

Summary for Pond SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.046 ac, 3.72% Impervious, Inflow Depth = 1.01" for 100-YR NOAA+ event
Inflow = 0.40 cfs @ 12.41 hrs, Volume= 0.088 af
Primary = 0.40 cfs @ 12.41 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.938 ac,	0.00% Impervious,	Inflow Depth = 0.90"	for 100-YR NOAA+ event	
Inflow =	0.79 cfs @	12.38 hrs,	Volume=	0.145 af	
Primary =	0.79 cfs @	12.38 hrs,	Volume=	0.145 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth = 0.70" for 100-YR NOAA+ event
Inflow = 0.55 cfs @ 12.52 hrs, Volume= 0.131 af
Primary = 0.55 cfs @ 12.52 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.657 ac, 0.00% Impervious, Inflow Depth = 0.70" for 100-YR NOAA+ event
Inflow = 0.44 cfs @ 12.46 hrs, Volume= 0.097 af
Primary = 0.44 cfs @ 12.46 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min

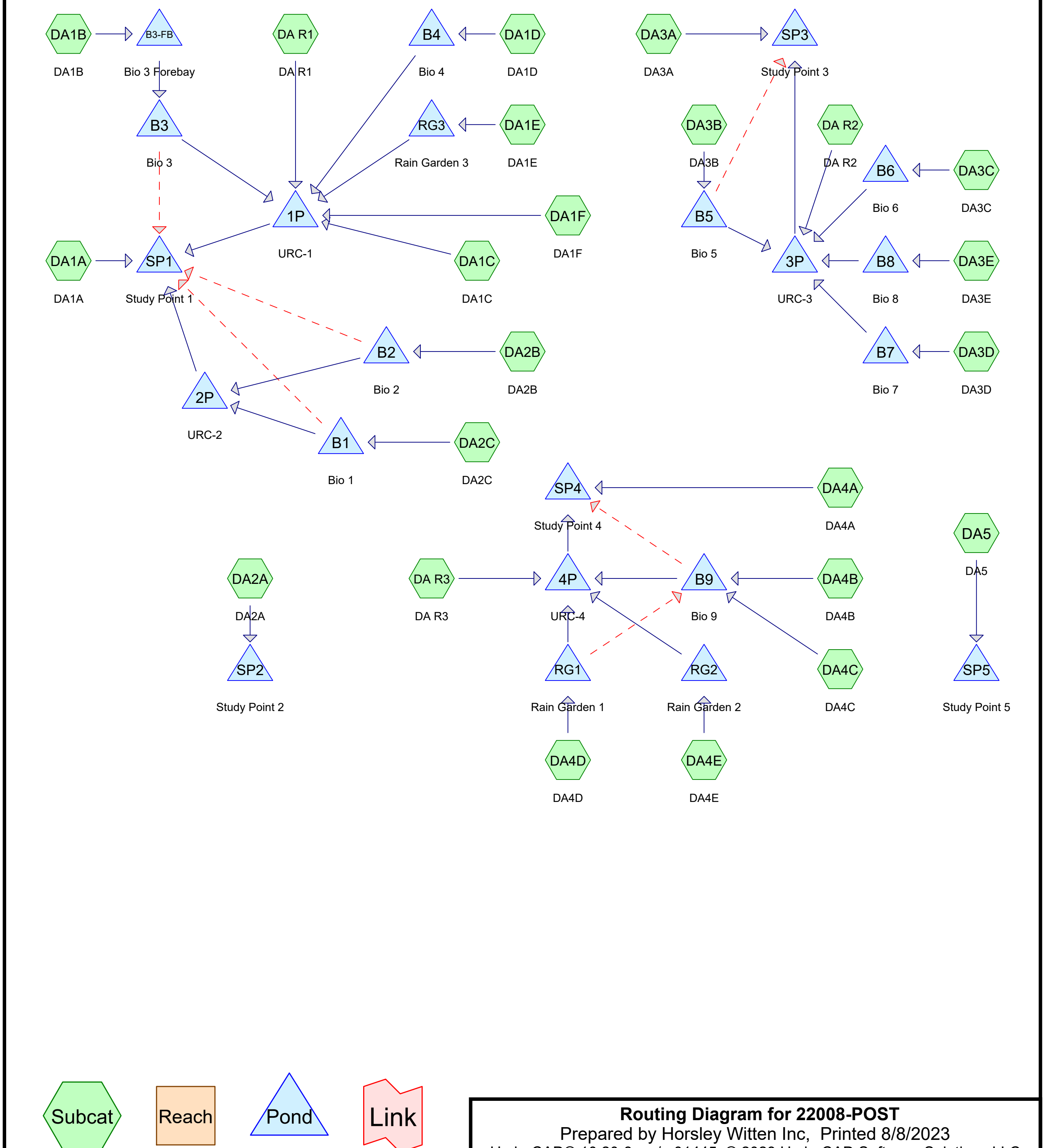
Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	0.745 ac,	0.00% Impervious,	Inflow Depth = 0.70"	for 100-YR NOAA+ event	
Inflow =	0.20 cfs @	12.42 hrs,	Volume=	0.044 af	
Primary =	0.20 cfs @	12.42 hrs,	Volume=	0.044 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs



Routing Diagram for 22008-POST
Prepared by Horsley Witten Inc, Printed 8/8/2023
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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR NOAA+	Type III 24-hr		Default	24.00	1	3.89	2
2	10-YR NOAA+	Type III 24-hr		Default	24.00	1	5.70	2
3	25-YR NOAA+	Type III 24-hr		Default	24.00	1	7.01	2
4	100-YR NOAA+	Type III 24-hr		Default	24.00	1	9.09	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.271	39	>75% Grass cover, Good, HSG A (DA1A, DA1B, DA1C, DA1D, DA1E, DA1F, DA2A, DA2B, DA2C, DA3A, DA3B, DA3C, DA3D, DA3E, DA4A, DA4B, DA4C, DA4D, DA4E)
1.538	98	Paved parking, HSG A (DA1A, DA1B, DA1C, DA1D, DA1E, DA1F, DA2B, DA2C, DA3A, DA3B, DA3C, DA3D, DA3E, DA4A, DA4B, DA4C)
0.117	98	Unconnected roofs, HSG A (DA R1)
0.117	98	Unconnected roofs, HSG A (DA 1C) (DA R2)
0.149	98	Unconnected roofs, HSG A (DA 1D) (DA R2)
0.045	98	Unconnected roofs, HSG A (DA 3C) (DA R3)
0.188	98	Unconnected roofs, HSG A (DA4B) (DA R3)
0.045	98	Unconnected roofs, HSG A (DA4C) (DA R3)
0.044	98	Unconnected roofs, HSG A [DA4A] (DA R3)
0.100	98	Water Surface, HSG A (DA1B, DA1D, DA1E, DA2B, DA2C, DA3B, DA3C, DA3D, DA3E, DA4B, DA4D, DA4E)
3.002	30	Woods, Good, HSG A (DA1A, DA2A, DA3D, DA3E, DA4A, DA4D, DA4E, DA5)
7.615	**54**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
7.615	HSG A	DA R1, DA R2, DA R3, DA1A, DA1B, DA1C, DA1D, DA1E, DA1F, DA2A, DA2B, DA2C, DA3A, DA3B, DA3C, DA3D, DA3E, DA4A, DA4B, DA4C, DA4D, DA4E, DA5
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
7.615		**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA R1: DA R1	Runoff Area=5,087 sf 100.00% Impervious Runoff Depth=3.66" Tc=5.0 min CN=0/98 Runoff=0.46 cfs 0.036 af
Subcatchment DA R2: DA R2	Runoff Area=11,570 sf 100.00% Impervious Runoff Depth=3.66" Tc=5.0 min CN=0/98 Runoff=1.04 cfs 0.081 af
Subcatchment DA R3: DA R3	Runoff Area=14,012 sf 100.00% Impervious Runoff Depth=3.66" Tc=5.0 min CN=0/98 Runoff=1.26 cfs 0.098 af
Subcatchment DA1A: DA1A	Runoff Area=17,433 sf 14.14% Impervious Runoff Depth=0.52" Flow Length=145' Tc=6.8 min CN=34/98 Runoff=0.21 cfs 0.017 af
Subcatchment DA1B: DA1B	Runoff Area=8,555 sf 79.92% Impervious Runoff Depth=2.93" Tc=5.0 min CN=39/98 Runoff=0.62 cfs 0.048 af
Subcatchment DA1C: DA1C	Runoff Area=7,607 sf 9.07% Impervious Runoff Depth=0.36" Tc=5.0 min CN=39/98 Runoff=0.06 cfs 0.005 af
Subcatchment DA1D: DA1D	Runoff Area=7,334 sf 11.69% Impervious Runoff Depth=0.46" Tc=5.0 min CN=39/98 Runoff=0.08 cfs 0.006 af
Subcatchment DA1E: DA1E	Runoff Area=12,883 sf 22.74% Impervious Runoff Depth=0.86" Tc=5.0 min CN=39/98 Runoff=0.26 cfs 0.021 af
Subcatchment DA1F: DA1F	Runoff Area=5,955 sf 86.48% Impervious Runoff Depth=3.17" Tc=5.0 min CN=39/98 Runoff=0.46 cfs 0.036 af
Subcatchment DA2A: DA2A	Runoff Area=67,560 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=340' Tc=12.7 min CN=31/0 Runoff=0.00 cfs 0.000 af
Subcatchment DA2B: DA2B	Runoff Area=13,810 sf 55.76% Impervious Runoff Depth=2.05" Tc=5.0 min CN=39/98 Runoff=0.69 cfs 0.054 af
Subcatchment DA2C: DA2C	Runoff Area=9,470 sf 61.51% Impervious Runoff Depth=2.26" Tc=5.0 min CN=39/98 Runoff=0.53 cfs 0.041 af
Subcatchment DA3A: DA3A	Runoff Area=6,755 sf 1.70% Impervious Runoff Depth=0.10" Tc=5.0 min CN=39/98 Runoff=0.01 cfs 0.001 af
Subcatchment DA3B: DA3B	Runoff Area=10,420 sf 92.75% Impervious Runoff Depth=3.39" Tc=5.0 min CN=39/98 Runoff=0.87 cfs 0.068 af
Subcatchment DA3C: DA3C	Runoff Area=10,317 sf 61.73% Impervious Runoff Depth=2.27" Tc=5.0 min CN=39/98 Runoff=0.57 cfs 0.045 af
Subcatchment DA3D: DA3D	Runoff Area=7,760 sf 67.29% Impervious Runoff Depth=2.46" Tc=5.0 min CN=37/98 Runoff=0.47 cfs 0.037 af

Subcatchment DA3E: DA3E
Runoff Area=6,965 sf 46.23% Impervious Runoff Depth=1.69"
Tc=5.0 min CN=35/98 Runoff=0.29 cfs 0.023 af

Subcatchment DA4A: DA4A
Runoff Area=33,643 sf 1.97% Impervious Runoff Depth=0.07"
Flow Length=310' Tc=11.8 min CN=33/98 Runoff=0.05 cfs 0.005 af

Subcatchment DA4B: DA4B
Runoff Area=21,390 sf 55.77% Impervious Runoff Depth=2.05"
Tc=5.0 min CN=39/98 Runoff=1.08 cfs 0.084 af

Subcatchment DA4C: DA4C
Runoff Area=7,932 sf 17.60% Impervious Runoff Depth=0.67"
Tc=5.0 min CN=39/98 Runoff=0.13 cfs 0.010 af

Subcatchment DA4D: DA4D
Runoff Area=6,588 sf 3.19% Impervious Runoff Depth=0.12"
Tc=5.0 min CN=34/98 Runoff=0.02 cfs 0.001 af

Subcatchment DA4E: DA4E
Runoff Area=6,193 sf 1.61% Impervious Runoff Depth=0.06"
Tc=5.0 min CN=34/98 Runoff=0.01 cfs 0.001 af

Subcatchment DA5: DA5
Runoff Area=32,460 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=170' Tc=11.3 min CN=30/0 Runoff=0.00 cfs 0.000 af

Pond 1P: URC-1
Peak Elev=89.76' Storage=1,627 cf Inflow=1.77 cfs 0.113 af
Discarded=0.27 cfs 0.113 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.113 af

Pond 2P: URC-2
Peak Elev=81.91' Storage=567 cf Inflow=1.16 cfs 0.047 af
Discarded=0.34 cfs 0.047 af Primary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.047 af

Pond 3P: URC-3
Peak Elev=90.13' Storage=2,751 cf Inflow=3.15 cfs 0.179 af
Discarded=0.48 cfs 0.179 af Primary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.179 af

Pond 4P: URC-4
Peak Elev=89.11' Storage=1,787 cf Inflow=2.41 cfs 0.156 af
Discarded=0.48 cfs 0.156 af Primary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.156 af

Pond B1: Bio 1
Peak Elev=89.10' Storage=173 cf Inflow=0.53 cfs 0.041 af
Discarded=0.02 cfs 0.023 af Primary=0.49 cfs 0.018 af Secondary=0.00 cfs 0.000 af Outflow=0.52 cfs 0.041 af

Pond B2: Bio 2
Peak Elev=89.10' Storage=176 cf Inflow=0.69 cfs 0.054 af
Discarded=0.02 cfs 0.026 af Primary=0.67 cfs 0.029 af Secondary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.054 af

Pond B3: Bio 3
Peak Elev=94.05' Storage=156 cf Inflow=0.60 cfs 0.047 af
Discarded=0.02 cfs 0.021 af Primary=0.57 cfs 0.026 af Secondary=0.00 cfs 0.000 af Outflow=0.59 cfs 0.047 af

Pond B3-FB: Bio 3 Forebay
Peak Elev=94.42' Storage=70 cf Inflow=0.62 cfs 0.048 af
16.0" x 6.0" Box Culvert n=0.011 L=5.0' S=0.0140 '/' Outflow=0.60 cfs 0.047 af

Pond B4: Bio 4
Peak Elev=94.53' Storage=59 cf Inflow=0.08 cfs 0.006 af
Discarded=0.01 cfs 0.006 af Primary=0.05 cfs 0.001 af Outflow=0.06 cfs 0.006 af

Pond B5: Bio 5
Peak Elev=94.19' Storage=256 cf Inflow=0.87 cfs 0.068 af
Discarded=0.02 cfs 0.026 af Primary=0.84 cfs 0.042 af Secondary=0.00 cfs 0.000 af Outflow=0.86 cfs 0.068 af

Pond B6: Bio 6 Peak Elev=96.24' Storage=132 cf Inflow=0.57 cfs 0.045 af
Discarded=0.01 cfs 0.017 af Primary=0.56 cfs 0.028 af Outflow=0.57 cfs 0.045 af

Pond B7: Bio 7 Peak Elev=101.12' Storage=159 cf Inflow=0.47 cfs 0.037 af
Discarded=0.02 cfs 0.020 af Primary=0.44 cfs 0.017 af Outflow=0.46 cfs 0.037 af

Pond B8: Bio 8 Peak Elev=99.89' Storage=68 cf Inflow=0.29 cfs 0.023 af
Discarded=0.01 cfs 0.011 af Primary=0.28 cfs 0.012 af Outflow=0.29 cfs 0.023 af

Pond B9: Bio 9 Peak Elev=94.18' Storage=244 cf Inflow=1.20 cfs 0.094 af
Discarded=0.03 cfs 0.036 af Primary=1.16 cfs 0.058 af Secondary=0.00 cfs 0.000 af Outflow=1.18 cfs 0.094 af

Pond RG1: Rain Garden 1 Peak Elev=101.14' Storage=12 cf Inflow=0.02 cfs 0.001 af
Discarded=0.01 cfs 0.001 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.001 af

Pond RG2: Rain Garden 2 Peak Elev=101.54' Storage=3 cf Inflow=0.01 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond RG3: Rain Garden 3 Peak Elev=96.58' Storage=86 cf Inflow=0.26 cfs 0.021 af
Discarded=0.01 cfs 0.012 af Primary=0.24 cfs 0.009 af Outflow=0.26 cfs 0.021 af

Pond SP1: Study Point 1 Inflow=0.21 cfs 0.017 af
Primary=0.21 cfs 0.017 af

Pond SP2: Study Point 2 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Pond SP3: Study Point 3 Inflow=0.01 cfs 0.001 af
Primary=0.01 cfs 0.001 af

Pond SP4: Study Point 4 Inflow=0.05 cfs 0.005 af
Primary=0.05 cfs 0.005 af

Pond SP5: Study Point 5 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 7.615 ac Runoff Volume = 0.718 af Average Runoff Depth = 1.13"
69.25% Pervious = 5.273 ac 30.75% Impervious = 2.342 ac

Summary for Subcatchment DA R1: DA R1

Runoff = 0.46 cfs @ 12.07 hrs, Volume= 0.036 af, Depth= 3.66"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
5,087	98	Unconnected roofs, HSG A
5,087	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 min**

Summary for Subcatchment DA R2: DA R2

Runoff = 1.04 cfs @ 12.07 hrs, Volume= 0.081 af, Depth= 3.66"
Routed to Pond 3P : URC-3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

	Area (sf)	CN	Description
*	5,093	98	Unconnected roofs, HSG A (DA 1C)
*	6,477	98	Unconnected roofs, HSG A (DA 1D)
	11,570	98	Weighted Average
	11,570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA R3: DA R3

Runoff = 1.26 cfs @ 12.07 hrs, Volume= 0.098 af, Depth= 3.66"
Routed to Pond 4P : URC-4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

	Area (sf)	CN	Description
*	1,945	98	Unconnected roofs, HSG A (DA 3C)
*	8,190	98	Unconnected roofs, HSG A (DA4B)
*	1,940	98	Unconnected roofs, HSG A (DA4C)
*	1,937	98	Unconnected roofs, HSG A [DA4A]
	14,012	98	Weighted Average
	14,012	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1A: DA1A

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 0.52"
Routed to Pond SP1 : Study Point 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
2,465	98	Paved parking, HSG A
7,702	30	Woods, Good, HSG A
7,266	39	>75% Grass cover, Good, HSG A
17,433	43	Weighted Average
14,968	34	85.86% Pervious Area
2,465	98	14.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 min**
1.0	90	0.0200	1.48		**Sheet Flow, A TO B** Smooth surfaces n= 0.011 P2= 3.89"
0.8	55	0.0500	1.12		**Shallow Concentrated Flow, B TO C** Woodland Kv= 5.0 fps
6.8	145	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.62 cfs @ 12.07 hrs, Volume= 0.048 af, Depth= 2.93"
Routed to Pond B3-FB : Bio 3 Forebay

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
6,110	98	Paved parking, HSG A
727	98	Water Surface, HSG A
1,718	39	>75% Grass cover, Good, HSG A
8,555	86	Weighted Average
1,718	39	20.08% Pervious Area
6,837	98	79.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1C: DA1C

Runoff = 0.06 cfs @ 12.07 hrs, Volume= 0.005 af, Depth= 0.36"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
690	98	Paved parking, HSG A
6,917	39	>75% Grass cover, Good, HSG A
7,607	44	Weighted Average
6,917	39	90.93% Pervious Area
690	98	9.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1D: DA1D

Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Depth= 0.46"
Routed to Pond B4 : Bio 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
677	98	Paved parking, HSG A
180	98	Water Surface, HSG A
6,477	39	>75% Grass cover, Good, HSG A
7,334	46	Weighted Average
6,477	39	88.31% Pervious Area
857	98	11.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1E: DA1E

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 0.021 af, Depth= 0.86"
Routed to Pond RG3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
2,630	98	Paved parking, HSG A
300	98	Water Surface, HSG A
9,953	39	>75% Grass cover, Good, HSG A
12,883	52	Weighted Average
9,953	39	77.26% Pervious Area
2,930	98	22.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1F: DA1F

Runoff = 0.46 cfs @ 12.07 hrs, Volume= 0.036 af, Depth= 3.17"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
5,150	98	Paved parking, HSG A
805	39	>75% Grass cover, Good, HSG A
5,955	90	Weighted Average
805	39	13.52% Pervious Area
5,150	98	86.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA2A: DA2A

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond SP2 : Study Point 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
58,243	30	Woods, Good, HSG A
9,317	39	>75% Grass cover, Good, HSG A
67,560	31	Weighted Average
67,560	31	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	80	0.1300	0.17		**Sheet Flow, A to B**
					Woods: Light underbrush n= 0.400 P2= 3.89"
5.0	260	0.0300	0.87		**Shallow Concentrated Flow, B to C**
					Woodland Kv= 5.0 fps
12.7	340	Total			

Summary for Subcatchment DA2B: DA2B

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 0.054 af, Depth= 2.05"
Routed to Pond B2 : Bio 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
7,280	98	Paved parking, HSG A
420	98	Water Surface, HSG A
6,110	39	>75% Grass cover, Good, HSG A
13,810	72	Weighted Average
6,110	39	44.24% Pervious Area
7,700	98	55.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA2C: DA2C

Runoff = 0.53 cfs @ 12.07 hrs, Volume= 0.041 af, Depth= 2.26"
Routed to Pond B1 : Bio 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
5,345	98	Paved parking, HSG A
480	98	Water Surface, HSG A
3,645	39	>75% Grass cover, Good, HSG A
9,470	75	Weighted Average
3,645	39	38.49% Pervious Area
5,825	98	61.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3A: DA3A

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 0.001 af, Depth= 0.10"
Routed to Pond SP3 : Study Point 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
115	98	Paved parking, HSG A
6,640	39	>75% Grass cover, Good, HSG A
6,755	40	Weighted Average
6,640	39	98.30% Pervious Area
115	98	1.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3B: DA3B

Runoff = 0.87 cfs @ 12.07 hrs, Volume= 0.068 af, Depth= 3.39"
Routed to Pond B5 : Bio 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
9,280	98	Paved parking, HSG A
385	98	Water Surface, HSG A
755	39	>75% Grass cover, Good, HSG A
10,420	94	Weighted Average
755	39	7.25% Pervious Area
9,665	98	92.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3C: DA3C

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 0.045 af, Depth= 2.27"
Routed to Pond B6 : Bio 6

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
6,084	98	Paved parking, HSG A
285	98	Water Surface, HSG A
3,948	39	>75% Grass cover, Good, HSG A
10,317	75	Weighted Average
3,948	39	38.27% Pervious Area
6,369	98	61.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3D: DA3D

Runoff = 0.47 cfs @ 12.07 hrs, Volume= 0.037 af, Depth= 2.46"
Routed to Pond B7 : Bio 7

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
4,778	98	Paved parking, HSG A
444	98	Water Surface, HSG A
590	30	Woods, Good, HSG A
1,948	39	>75% Grass cover, Good, HSG A
7,760	78	Weighted Average
2,538	37	32.71% Pervious Area
5,222	98	67.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3E: DA3E

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 0.023 af, Depth= 1.69"
Routed to Pond B8 : Bio 8

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
2,920	98	Paved parking, HSG A
300	98	Water Surface, HSG A
1,610	30	Woods, Good, HSG A
2,135	39	>75% Grass cover, Good, HSG A
6,965	64	Weighted Average
3,745	35	53.77% Pervious Area
3,220	98	46.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4A: DA4A

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.005 af, Depth= 0.07"
Routed to Pond SP4 : Study Point 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
664	98	Paved parking, HSG A
23,694	30	Woods, Good, HSG A
9,285	39	>75% Grass cover, Good, HSG A
33,643	34	Weighted Average
32,979	33	98.03% Pervious Area
664	98	1.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	60	0.1700	0.18		**Sheet Flow, A to B**
					Woods: Light underbrush n= 0.400 P2= 3.89"
3.2	40	0.0400	0.21		**Sheet Flow, B TO C**
					Grass: Short n= 0.150 P2= 3.89"
3.1	210	0.0500	1.12		**Shallow Concentrated Flow, C TO D**
					Woodland Kv= 5.0 fps
11.8	310	Total			

Summary for Subcatchment DA4B: DA4B

Runoff = 1.08 cfs @ 12.07 hrs, Volume= 0.084 af, Depth= 2.05"
Routed to Pond B9 : Bio 9

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
11,405	98	Paved parking, HSG A
525	98	Water Surface, HSG A
9,460	39	>75% Grass cover, Good, HSG A
21,390	72	Weighted Average
9,460	39	44.23% Pervious Area
11,930	98	55.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4C: DA4C

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 0.010 af, Depth= 0.67"
Routed to Pond B9 : Bio 9

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
1,396	98	Paved parking, HSG A
6,536	39	>75% Grass cover, Good, HSG A
7,932	49	Weighted Average
6,536	39	82.40% Pervious Area
1,396	98	17.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4D: DA4D

Runoff = 0.02 cfs @ 12.07 hrs, Volume= 0.001 af, Depth= 0.12"
Routed to Pond RG1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
210	98	Water Surface, HSG A
3,192	30	Woods, Good, HSG A
3,186	39	>75% Grass cover, Good, HSG A
6,588	37	Weighted Average
6,378	34	96.81% Pervious Area
210	98	3.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4E: DA4E

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 0.001 af, Depth= 0.06"
Routed to Pond RG2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
3,277	30	Woods, Good, HSG A
2,816	39	>75% Grass cover, Good, HSG A
100	98	Water Surface, HSG A
6,193	35	Weighted Average
6,093	34	98.39% Pervious Area
100	98	1.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA5: DA5

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond SP5 : Study Point 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR NOAA+ Rainfall=3.89"

Area (sf)	CN	Description
32,460	30	Woods, Good, HSG A
32,460	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	90	0.0900	0.15		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
11.3	170	Total			

Summary for Pond 1P: URC-1

Inflow Area = 1.089 ac, 45.45% Impervious, Inflow Depth = 1.24" for 2-YR NOAA+ event
Inflow = 1.77 cfs @ 12.08 hrs, Volume= 0.113 af
Outflow = 0.27 cfs @ 11.74 hrs, Volume= 0.113 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.27 cfs @ 11.74 hrs, Volume= 0.113 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.76' @ 12.55 hrs Surf.Area= 1,435 sf Storage= 1,627 cf

Plug-Flow detention time= 36.6 min calculated for 0.113 af (100% of inflow)
Center-of-Mass det. time= 36.6 min (785.3 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	87.90'	1,704 cf	**22.75'W x 63.06'L x 5.50'H Field A**
			7,890 cf Overall - 2,728 cf Embedded = 5,162 cf x 33.0% Voids
#2A	88.65'	2,728 cf	**ADS_StormTech MC-3500 d +Cap** x 24 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
			24 Chambers in 3 Rows
			Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
#3	92.00'	5 cf	**2.00'D x 1.45'H Vertical Cone/Cylinder**-Impervious
		4,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.45'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	87.90'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.40'	**24.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 11.74 hrs HW=87.96' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=87.90' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: URC-1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 3 rows = 89.4 cf

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

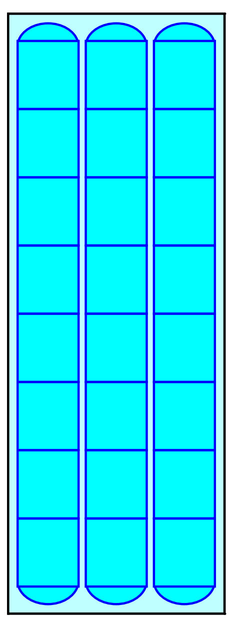
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

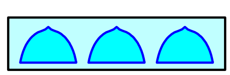
24 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 2,728.2 cf Chamber Storage

7,890.4 cf Field - 2,728.2 cf Chambers = 5,162.1 cf Stone x 33.0% Voids = 1,703.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,431.8 cf = 0.102 af
Overall Storage Efficiency = 56.2%
Overall System Size = 63.06' x 22.75' x 5.50'

24 Chambers
292.2 cy Field
191.2 cy Stone





Summary for Pond 2P: URC-2

Inflow Area = 0.534 ac, 58.10% Impervious, Inflow Depth = 1.05" for 2-YR NOAA+ event
Inflow = 1.16 cfs @ 12.08 hrs, Volume= 0.047 af
Outflow = 0.34 cfs @ 11.91 hrs, Volume= 0.047 af, Atten= 71%, Lag= 0.0 min
Discarded = 0.34 cfs @ 11.91 hrs, Volume= 0.047 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 81.91' @ 12.37 hrs Surf.Area= 983 sf Storage= 567 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 11.8 min (748.2 - 736.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.75'	1,183 cf	**15.58'W x 63.06'L x 5.50'H Field A** 5,405 cf Overall - 1,819 cf Embedded = 3,586 cf x 33.0% Voids
#2A	81.50'	1,819 cf	**ADS_StormTech MC-3500 d +Cap** x 16 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 16 Chambers in 2 Rows Cap Storage= 14.9 cf x 2 x 2 rows = 59.6 cf
		3,002 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	86.25'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	80.75'	**15.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	86.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.34 cfs @ 11.91 hrs HW=80.81' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=80.75' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: URC-2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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

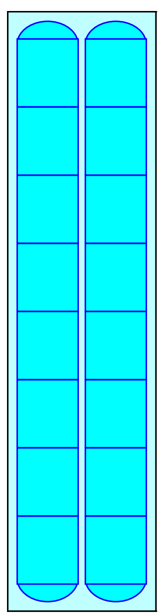
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

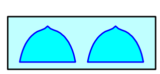
16 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,818.8 cf Chamber Storage

5,404.8 cf Field - 1,818.8 cf Chambers = 3,585.9 cf Stone x 33.0% Voids = 1,183.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,002.2 cf = 0.069 af
Overall Storage Efficiency = 55.5%
Overall System Size = 63.06' x 15.58' x 5.50'

16 Chambers
200.2 cy Field
132.8 cy Stone





Summary for Pond 3P: URC-3

Inflow Area = 1.080 ac, 76.64% Impervious, Inflow Depth = 1.99" for 2-YR NOAA+ event
Inflow = 3.15 cfs @ 12.08 hrs, Volume= 0.179 af
Outflow = 0.48 cfs @ 11.74 hrs, Volume= 0.179 af, Atten= 85%, Lag= 0.0 min
Discarded = 0.48 cfs @ 11.74 hrs, Volume= 0.179 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP3 : Study Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 90.13' @ 12.54 hrs Surf.Area= 2,530 sf Storage= 2,751 cf

Plug-Flow detention time= 37.5 min calculated for 0.179 af (100% of inflow)
Center-of-Mass det. time= 37.5 min (782.3 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	88.35'	2,956 cf	**29.92'W x 84.57'L x 5.50'H Field A** 13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 33.0% Voids
#2A	89.10'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 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 44 Chambers in 4 Rows Cap Storage= 14.9 cf x 2 x 4 rows = 119.2 cf
#3	93.50'	1 cf	**2.00'D x 0.40'H Vertical Cone/Cylinder**-Impervious
		7,915 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.90'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	88.35'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.85'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.48 cfs @ 11.74 hrs HW=88.41' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.35' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: URC-3 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 4 rows = 119.2 cf

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

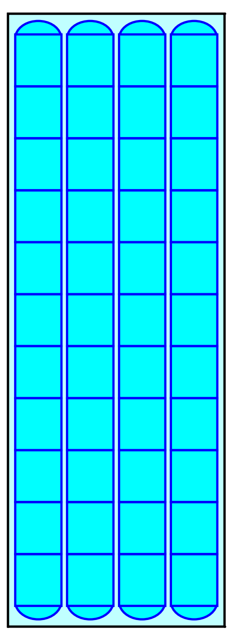
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

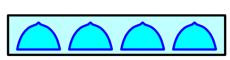
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 33.0% Voids = 2,956.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,913.3 cf = 0.182 af
Overall Storage Efficiency = 56.9%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Summary for Pond 4P: URC-4

Inflow Area = 1.288 ac, 49.27% Impervious, Inflow Depth = 1.46" for 2-YR NOAA+ event
Inflow = 2.41 cfs @ 12.08 hrs, Volume= 0.156 af
Outflow = 0.48 cfs @ 11.80 hrs, Volume= 0.156 af, Atten= 80%, Lag= 0.0 min
Discarded = 0.48 cfs @ 11.80 hrs, Volume= 0.156 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP4 : Study Point 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.11' @ 12.49 hrs Surf.Area= 2,530 sf Storage= 1,787 cf

Plug-Flow detention time= 20.4 min calculated for 0.156 af (100% of inflow)
Center-of-Mass det. time= 20.4 min (767.5 - 747.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	87.80'	2,956 cf	**29.92'W x 84.57'L x 5.50'H Field A** 13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 33.0% Voids
#2A	88.55'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 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 44 Chambers in 4 Rows Cap Storage= 14.9 cf x 2 x 4 rows = 119.2 cf
#3	93.00'	1 cf	**2.00'D x 0.35'H Vertical Cone/Cylinder**
		7,914 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.35'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	87.80'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.30'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.48 cfs @ 11.80 hrs HW=87.86' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=87.80' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: URC-4 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 4 rows = 119.2 cf

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

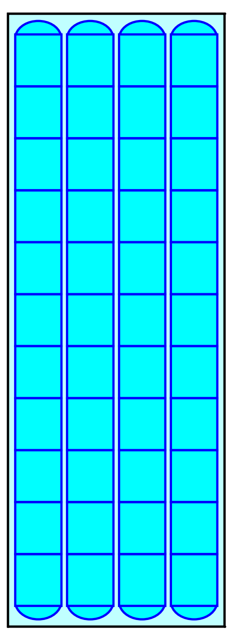
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

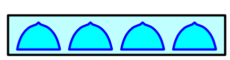
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 33.0% Voids = 2,956.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,913.3 cf = 0.182 af
Overall Storage Efficiency = 56.9%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Summary for Pond B1: Bio 1

Inflow Area = 0.217 ac, 61.51% Impervious, Inflow Depth = 2.26" for 2-YR NOAA+ event
Inflow = 0.53 cfs @ 12.07 hrs, Volume= 0.041 af
Outflow = 0.52 cfs @ 12.08 hrs, Volume= 0.041 af, Atten= 2%, Lag= 0.9 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.023 af
Primary = 0.49 cfs @ 12.08 hrs, Volume= 0.018 af
Routed to Pond 2P : URC-2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.10' @ 12.08 hrs Surf.Area= 390 sf Storage= 173 cf

Plug-Flow detention time= 38.0 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 38.0 min (791.9 - 753.9)

Volume	Invert	Avail.Storage	Storage Description
#1	88.50'	658 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.50	170	0	0
89.00	370	135	135
89.50	470	210	345
90.00	750	305	650
90.01	750	8	658

Device	Routing	Invert	Outlet Devices
#0	Secondary	90.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	89.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	88.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Secondary	90.00'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=89.10' (Free Discharge)
└—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.49 cfs @ 12.08 hrs HW=89.10' TW=81.53' (Dynamic Tailwater)
└—**1=Orifice/Grate** (Weir Controls 0.49 cfs @ 1.04 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.50' TW=0.00' (Dynamic Tailwater)
└—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B2: Bio 2

Inflow Area = 0.317 ac, 55.76% Impervious, Inflow Depth = 2.05" for 2-YR NOAA+ event
Inflow = 0.69 cfs @ 12.07 hrs, Volume= 0.054 af
Outflow = 0.69 cfs @ 12.08 hrs, Volume= 0.054 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.026 af
Primary = 0.67 cfs @ 12.08 hrs, Volume= 0.029 af
  Routed to Pond 2P : URC-2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
  Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.10' @ 12.08 hrs Surf.Area= 360 sf Storage= 176 cf

Plug-Flow detention time= 37.6 min calculated for 0.054 af (100% of inflow)
Center-of-Mass det. time= 37.6 min (792.1 - 754.5)

Volume	Invert	Avail.Storage	Storage Description
#1	88.50'	585 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.50	220	0	0
89.00	340	140	140
90.00	540	440	580
90.01	540	5	585

Device	Routing	Invert	Outlet Devices
#0	Secondary	90.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	88.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	89.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	90.00'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=89.10' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.67 cfs @ 12.08 hrs HW=89.10' TW=81.52' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Weir Controls 0.67 cfs @ 1.04 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.50' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B3: Bio 3

Inflow Area = 0.196 ac, 79.92% Impervious, Inflow Depth = 2.89" for 2-YR NOAA+ event
Inflow = 0.60 cfs @ 12.09 hrs, Volume= 0.047 af
Outflow = 0.59 cfs @ 12.10 hrs, Volume= 0.047 af, Atten= 2%, Lag= 1.0 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.021 af
Primary = 0.57 cfs @ 12.10 hrs, Volume= 0.026 af
Routed to Pond 1P : URC-1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.05' @ 12.10 hrs Surf.Area= 338 sf Storage= 156 cf

Plug-Flow detention time= 36.4 min calculated for 0.047 af (100% of inflow)
Center-of-Mass det. time= 36.4 min (798.5 - 762.1)

Volume	Invert	Avail.Storage	Storage Description
#1	93.40'	793 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.40	150	0	0
94.00	320	141	141
94.15	380	53	194
95.00	700	459	652
95.10	1,000	85	737
95.11	10,000	55	793

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.40'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	91.50'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 91.50' / 90.90' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	93.90'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	95.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=94.05' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.57 cfs @ 12.10 hrs HW=94.05' TW=89.09' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.57 cfs of 5.41 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.57 cfs @ 1.25 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.40' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B3-FB: Bio 3 Forebay

Inflow Area = 0.196 ac, 79.92% Impervious, Inflow Depth = 2.93" for 2-YR NOAA+ event
Inflow = 0.62 cfs @ 12.07 hrs, Volume= 0.048 af
Outflow = 0.60 cfs @ 12.09 hrs, Volume= 0.047 af, Atten= 2%, Lag= 1.0 min
Primary = 0.60 cfs @ 12.09 hrs, Volume= 0.047 af
Routed to Pond B3 : Bio 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.42' @ 12.09 hrs Surf.Area= 224 sf Storage= 70 cf

Plug-Flow detention time= 17.4 min calculated for 0.047 af (99% of inflow)
Center-of-Mass det. time= 9.6 min (762.1 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.90'	443 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.90	70	0	0
94.00	80	7	7
94.15	150	17	25
94.39	180	40	64
95.00	1,060	378	443

Device	Routing	Invert	Outlet Devices
#1	Primary	94.15'	**16.0" W x 6.0" H Box Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.15' / 94.08' S= 0.0140 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.67 sf

Primary OutFlow Max=0.60 cfs @ 12.09 hrs HW=94.42' TW=94.04' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.60 cfs @ 1.67 fps)

Summary for Pond B4: Bio 4

Inflow Area = 0.168 ac, 11.69% Impervious, Inflow Depth = 0.46" for 2-YR NOAA+ event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af
Outflow = 0.06 cfs @ 12.13 hrs, Volume= 0.006 af, Atten= 24%, Lag= 3.9 min
Discarded = 0.01 cfs @ 12.13 hrs, Volume= 0.006 af
Primary = 0.05 cfs @ 12.13 hrs, Volume= 0.001 af
Routed to Pond 1P : URC-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.53' @ 12.13 hrs Surf.Area= 156 sf Storage= 59 cf

Plug-Flow detention time= 42.1 min calculated for 0.006 af (100% of inflow)
Center-of-Mass det. time= 42.1 min (820.3 - 778.3)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	155 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	70	0	0
94.50	150	55	55
95.00	250	100	155

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	94.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	93.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.50' / 92.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.13 hrs HW=94.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.05 cfs @ 12.13 hrs HW=94.53' TW=89.22' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.05 cfs of 2.75 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.55 fps)

Summary for Pond B5: Bio 5

Inflow Area = 0.239 ac, 92.75% Impervious, Inflow Depth = 3.39" for 2-YR NOAA+ event
Inflow = 0.87 cfs @ 12.07 hrs, Volume= 0.068 af
Outflow = 0.86 cfs @ 12.08 hrs, Volume= 0.068 af, Atten= 2%, Lag= 0.8 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.026 af
Primary = 0.84 cfs @ 12.08 hrs, Volume= 0.042 af
Routed to Pond 3P : URC-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP3 : Study Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.19' @ 12.08 hrs Surf.Area= 318 sf Storage= 256 cf

Plug-Flow detention time= 63.6 min calculated for 0.068 af (100% of inflow)
Center-of-Mass det. time= 63.6 min (815.5 - 751.9)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	1,335 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.00	120	0	0
94.00	280	200	200
94.50	380	165	365
95.00	1,250	408	773
95.10	10,000	562	1,335

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	94.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	95.09'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#4	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=94.19' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.84 cfs @ 12.08 hrs HW=94.19' TW=89.44' (Dynamic Tailwater)
4=Culvert (Passes 0.84 cfs of 2.57 cfs potential flow)
2=Orifice/Grate (Weir Controls 0.84 cfs @ 1.42 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.00' TW=0.00' (Dynamic Tailwater)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond B6: Bio 6

Inflow Area = 0.237 ac, 61.73% Impervious, Inflow Depth = 2.27" for 2-YR NOAA+ event
Inflow = 0.57 cfs @ 12.07 hrs, Volume= 0.045 af
Outflow = 0.57 cfs @ 12.08 hrs, Volume= 0.045 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.017 af
Primary = 0.56 cfs @ 12.08 hrs, Volume= 0.028 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 96.24' @ 12.08 hrs Surf.Area= 219 sf Storage= 132 cf

Plug-Flow detention time= 48.3 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 48.3 min (802.2 - 753.9)

Volume	Invert	Avail.Storage	Storage Description
#1	95.35'	287 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.35	90	0	0
96.00	170	85	85
96.60	290	138	222
96.70	1,000	65	287

Device	Routing	Invert	Outlet Devices
#1	Discarded	95.35'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	96.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	95.10'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 95.10' / 94.10' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=96.24' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.56 cfs @ 12.08 hrs HW=96.24' TW=89.43' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.56 cfs of 2.39 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.56 cfs @ 1.24 fps)

Summary for Pond B7: Bio 7

Inflow Area = 0.178 ac, 67.29% Impervious, Inflow Depth = 2.46" for 2-YR NOAA+ event
Inflow = 0.47 cfs @ 12.07 hrs, Volume= 0.037 af
Outflow = 0.46 cfs @ 12.09 hrs, Volume= 0.037 af, Atten= 2%, Lag= 1.0 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.020 af
Primary = 0.44 cfs @ 12.09 hrs, Volume= 0.017 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.12' @ 12.09 hrs Surf.Area= 329 sf Storage= 159 cf

Plug-Flow detention time= 38.8 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 38.8 min (791.2 - 752.4)

Volume	Invert	Avail.Storage	Storage Description
#1	100.50'	864 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.50	180	0	0
101.00	300	120	120
101.60	440	222	342
101.70	10,000	522	864

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	101.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	96.96'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 96.96' / 96.04' S= 0.0460 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=101.12' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.44 cfs @ 12.09 hrs HW=101.12' TW=89.46' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.44 cfs of 7.24 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.44 cfs @ 1.14 fps)

Summary for Pond B8: Bio 8

Inflow Area = 0.160 ac, 46.23% Impervious, Inflow Depth = 1.69" for 2-YR NOAA+ event
Inflow = 0.29 cfs @ 12.07 hrs, Volume= 0.023 af
Outflow = 0.29 cfs @ 12.08 hrs, Volume= 0.023 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.011 af
Primary = 0.28 cfs @ 12.08 hrs, Volume= 0.012 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 99.89' @ 12.08 hrs Surf.Area= 170 sf Storage= 68 cf

Plug-Flow detention time= 34.7 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 34.7 min (786.5 - 751.9)

Volume	Invert	Avail.Storage	Storage Description
#1	99.30'	674 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.30	60	0	0
100.00	190	88	88
100.30	290	72	159
100.40	10,000	515	674

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.30'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	99.80'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	99.30'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.30' / 98.30' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=99.89' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.28 cfs @ 12.08 hrs HW=99.89' TW=89.43' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.28 cfs of 1.00 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.28 cfs @ 0.98 fps)

Summary for Pond B9: Bio 9

Inflow Area = 0.673 ac, 45.45% Impervious, Inflow Depth = 1.68" for 2-YR NOAA+ event
Inflow = 1.20 cfs @ 12.07 hrs, Volume= 0.094 af
Outflow = 1.18 cfs @ 12.08 hrs, Volume= 0.094 af, Atten= 1%, Lag= 0.8 min
Discarded = 0.03 cfs @ 12.08 hrs, Volume= 0.036 af
Primary = 1.16 cfs @ 12.08 hrs, Volume= 0.058 af
Routed to Pond 4P : URC-4
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP4 : Study Point 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.18' @ 12.08 hrs Surf.Area= 449 sf Storage= 244 cf

Plug-Flow detention time= 35.3 min calculated for 0.094 af (100% of inflow)
Center-of-Mass det. time= 35.3 min (791.4 - 756.1)

Volume	Invert	Avail.Storage	Storage Description
#1	93.50'	1,258 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.50	260	0	0
94.00	410	168	168
94.50	520	233	400
95.00	760	320	720
95.10	10,000	538	1,258

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	94.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	95.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Primary	90.85'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.85' / 90.25' S= 0.0120 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.08 hrs HW=94.18' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.16 cfs @ 12.08 hrs HW=94.18' TW=88.68' (Dynamic Tailwater)
└—**4=Culvert** (Passes 1.16 cfs of 6.36 cfs potential flow)
  └—**2=Orifice/Grate** (Weir Controls 1.16 cfs @ 1.38 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.50' TW=0.00' (Dynamic Tailwater)
└—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG1: Rain Garden 1

Inflow Area = 0.151 ac, 3.19% Impervious, Inflow Depth = 0.12" for 2-YR NOAA+ event
Inflow = 0.02 cfs @ 12.07 hrs, Volume= 0.001 af
Outflow = 0.01 cfs @ 12.36 hrs, Volume= 0.001 af, Atten= 69%, Lag= 17.3 min
Discarded = 0.01 cfs @ 12.36 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 4P : URC-4
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond B9 : Bio 9

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.14' @ 12.36 hrs Surf.Area= 105 sf Storage= 12 cf

Plug-Flow detention time= 11.7 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 11.7 min (763.3 - 751.6)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	1,361 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.00	66	0	0
101.50	208	69	69
102.00	368	144	213
103.00	952	660	873
103.50	1,000	488	1,361

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	101.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	103.40'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Primary	101.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 101.00' / 100.00' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.36 hrs HW=101.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' TW=87.80' (Dynamic Tailwater)
└─**4=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' TW=93.50' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG2: Rain Garden 2

Inflow Area = 0.142 ac, 1.61% Impervious, Inflow Depth = 0.06" for 2-YR NOAA+ event
Inflow = 0.01 cfs @ 12.07 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 12.21 hrs, Volume= 0.001 af, Atten= 52%, Lag= 8.1 min
Discarded = 0.00 cfs @ 12.21 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 4P : URC-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.54' @ 12.21 hrs Surf.Area= 77 sf Storage= 3 cf

Plug-Flow detention time= 4.6 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 4.6 min (756.2 - 751.6)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	747 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	70	0	0
102.00	160	58	58
102.50	500	165	223
102.60	10,000	525	747

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	102.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.21 hrs HW=101.54' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.50' TW=87.80' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG3: Rain Garden 3

Inflow Area = 0.296 ac, 22.74% Impervious, Inflow Depth = 0.86" for 2-YR NOAA+ event
Inflow = 0.26 cfs @ 12.07 hrs, Volume= 0.021 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 2%, Lag= 0.9 min
Discarded = 0.01 cfs @ 12.09 hrs, Volume= 0.012 af
Primary = 0.24 cfs @ 12.09 hrs, Volume= 0.009 af
Routed to Pond 1P : URC-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 96.58' @ 12.09 hrs Surf.Area= 252 sf Storage= 86 cf

Plug-Flow detention time= 38.4 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 38.3 min (802.4 - 764.0)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	720 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	70	0	0
96.50	200	68	68
96.90	450	130	198
97.00	10,000	522	720

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	96.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	95.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.50' / 94.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.09 hrs HW=96.58' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.24 cfs @ 12.09 hrs HW=96.58' TW=89.01' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.24 cfs of 2.89 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.24 cfs @ 0.94 fps)

Summary for Pond SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.023 ac, 42.60% Impervious, Inflow Depth = 0.10" for 2-YR NOAA+ event
Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af
Primary = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.551 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR NOAA+ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.235 ac,	67.23% Impervious,	Inflow Depth = 0.01"	for 2-YR NOAA+ event
Inflow =	0.01 cfs @	12.07 hrs, Volume=	0.001 af	
Primary =	0.01 cfs @	12.07 hrs, Volume=	0.001 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.061 ac, 31.54% Impervious, Inflow Depth = 0.03" for 2-YR NOAA+ event
Inflow = 0.05 cfs @ 12.15 hrs, Volume= 0.005 af
Primary = 0.05 cfs @ 12.15 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	0.745 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 2-YR NOAA+ event
Inflow =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA R1: DA R1 Runoff Area=5,087 sf 100.00% Impervious Runoff Depth=5.46"
Tc=5.0 min CN=0/98 Runoff=0.68 cfs 0.053 af

Subcatchment DA R2: DA R2 Runoff Area=11,570 sf 100.00% Impervious Runoff Depth=5.46"
Tc=5.0 min CN=0/98 Runoff=1.54 cfs 0.121 af

Subcatchment DA R3: DA R3 Runoff Area=14,012 sf 100.00% Impervious Runoff Depth=5.46"
Tc=5.0 min CN=0/98 Runoff=1.86 cfs 0.146 af

Subcatchment DA1A: DA1A Runoff Area=17,433 sf 14.14% Impervious Runoff Depth=0.91"
Flow Length=145' Tc=6.8 min CN=34/98 Runoff=0.31 cfs 0.030 af

Subcatchment DA1B: DA1B Runoff Area=8,555 sf 79.92% Impervious Runoff Depth=4.44"
Tc=5.0 min CN=39/98 Runoff=0.91 cfs 0.073 af

Subcatchment DA1C: DA1C Runoff Area=7,607 sf 9.07% Impervious Runoff Depth=0.83"
Tc=5.0 min CN=39/98 Runoff=0.09 cfs 0.012 af

Subcatchment DA1D: DA1D Runoff Area=7,334 sf 11.69% Impervious Runoff Depth=0.96"
Tc=5.0 min CN=39/98 Runoff=0.11 cfs 0.013 af

Subcatchment DA1E: DA1E Runoff Area=12,883 sf 22.74% Impervious Runoff Depth=1.52"
Tc=5.0 min CN=39/98 Runoff=0.39 cfs 0.038 af

Subcatchment DA1F: DA1F Runoff Area=5,955 sf 86.48% Impervious Runoff Depth=4.77"
Tc=5.0 min CN=39/98 Runoff=0.68 cfs 0.054 af

Subcatchment DA2A: DA2A Runoff Area=67,560 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=340' Tc=12.7 min CN=31/0 Runoff=0.01 cfs 0.009 af

Subcatchment DA2B: DA2B Runoff Area=13,810 sf 55.76% Impervious Runoff Depth=3.21"
Tc=5.0 min CN=39/98 Runoff=1.02 cfs 0.085 af

Subcatchment DA2C: DA2C Runoff Area=9,470 sf 61.51% Impervious Runoff Depth=3.50"
Tc=5.0 min CN=39/98 Runoff=0.77 cfs 0.063 af

Subcatchment DA3A: DA3A Runoff Area=6,755 sf 1.70% Impervious Runoff Depth=0.45"
Tc=5.0 min CN=39/98 Runoff=0.02 cfs 0.006 af

Subcatchment DA3B: DA3B Runoff Area=10,420 sf 92.75% Impervious Runoff Depth=5.09"
Tc=5.0 min CN=39/98 Runoff=1.28 cfs 0.102 af

Subcatchment DA3C: DA3C Runoff Area=10,317 sf 61.73% Impervious Runoff Depth=3.51"
Tc=5.0 min CN=39/98 Runoff=0.85 cfs 0.069 af

Subcatchment DA3D: DA3D Runoff Area=7,760 sf 67.29% Impervious Runoff Depth=3.76"
Tc=5.0 min CN=37/98 Runoff=0.69 cfs 0.056 af

Subcatchment DA3E: DA3E Runoff Area=6,965 sf 46.23% Impervious Runoff Depth=2.63"
Tc=5.0 min CN=35/98 Runoff=0.43 cfs 0.035 af

Subcatchment DA4A: DA4A Runoff Area=33,643 sf 1.97% Impervious Runoff Depth=0.23"
Flow Length=310' Tc=11.8 min CN=33/98 Runoff=0.07 cfs 0.015 af

Subcatchment DA4B: DA4B Runoff Area=21,390 sf 55.77% Impervious Runoff Depth=3.21"
Tc=5.0 min CN=39/98 Runoff=1.58 cfs 0.131 af

Subcatchment DA4C: DA4C Runoff Area=7,932 sf 17.60% Impervious Runoff Depth=1.26"
Tc=5.0 min CN=39/98 Runoff=0.19 cfs 0.019 af

Subcatchment DA4D: DA4D Runoff Area=6,588 sf 3.19% Impervious Runoff Depth=0.32"
Tc=5.0 min CN=34/98 Runoff=0.03 cfs 0.004 af

Subcatchment DA4E: DA4E Runoff Area=6,193 sf 1.61% Impervious Runoff Depth=0.24"
Tc=5.0 min CN=34/98 Runoff=0.01 cfs 0.003 af

Subcatchment DA5: DA5 Runoff Area=32,460 sf 0.00% Impervious Runoff Depth=0.04"
Flow Length=170' Tc=11.3 min CN=30/0 Runoff=0.00 cfs 0.003 af

Pond 1P: URC-1 Peak Elev=91.18' Storage=3,083 cf Inflow=2.70 cfs 0.190 af
Discarded=0.27 cfs 0.190 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.190 af

Pond 2P: URC-2 Peak Elev=82.88' Storage=1,296 cf Inflow=1.73 cfs 0.088 af
Discarded=0.34 cfs 0.088 af Primary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.088 af

Pond 3P: URC-3 Peak Elev=91.31' Storage=4,972 cf Inflow=4.67 cfs 0.295 af
Discarded=0.48 cfs 0.295 af Primary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.295 af

Pond 4P: URC-4 Peak Elev=89.94' Storage=3,446 cf Inflow=3.57 cfs 0.254 af
Discarded=0.48 cfs 0.254 af Primary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.254 af

Pond B1: Bio 1 Peak Elev=89.13' Storage=186 cf Inflow=0.77 cfs 0.063 af
Discarded=0.02 cfs 0.029 af Primary=0.74 cfs 0.035 af Secondary=0.00 cfs 0.000 af Outflow=0.76 cfs 0.063 af

Pond B2: Bio 2 Peak Elev=89.13' Storage=187 cf Inflow=1.02 cfs 0.085 af
Discarded=0.02 cfs 0.032 af Primary=0.99 cfs 0.053 af Secondary=0.00 cfs 0.000 af Outflow=1.01 cfs 0.085 af

Pond B3: Bio 3 Peak Elev=94.09' Storage=171 cf Inflow=0.87 cfs 0.072 af
Discarded=0.02 cfs 0.026 af Primary=0.84 cfs 0.046 af Secondary=0.00 cfs 0.000 af Outflow=0.86 cfs 0.072 af

Pond B3-FB: Bio 3 Forebay Peak Elev=94.50' Storage=93 cf Inflow=0.91 cfs 0.073 af
16.0" x 6.0" Box Culvert n=0.011 L=5.0' S=0.0140 '/' Outflow=0.87 cfs 0.072 af

Pond B4: Bio 4 Peak Elev=94.55' Storage=62 cf Inflow=0.11 cfs 0.013 af
Discarded=0.01 cfs 0.009 af Primary=0.10 cfs 0.004 af Outflow=0.11 cfs 0.013 af

Pond B5: Bio 5 Peak Elev=94.25' Storage=275 cf Inflow=1.28 cfs 0.102 af
Discarded=0.02 cfs 0.030 af Primary=1.25 cfs 0.072 af Secondary=0.00 cfs 0.000 af Outflow=1.27 cfs 0.102 af

Pond B6: Bio 6 Peak Elev=96.29' Storage=141 cf Inflow=0.85 cfs 0.069 af
Discarded=0.01 cfs 0.020 af Primary=0.83 cfs 0.049 af Outflow=0.84 cfs 0.069 af

Pond B7: Bio 7 Peak Elev=101.16' Storage=171 cf Inflow=0.69 cfs 0.056 af
Discarded=0.02 cfs 0.025 af Primary=0.66 cfs 0.031 af Outflow=0.68 cfs 0.056 af

Pond B8: Bio 8 Peak Elev=99.92' Storage=72 cf Inflow=0.43 cfs 0.035 af
Discarded=0.01 cfs 0.013 af Primary=0.41 cfs 0.022 af Outflow=0.42 cfs 0.035 af

Pond B9: Bio 9 Peak Elev=94.23' Storage=269 cf Inflow=1.77 cfs 0.150 af
Discarded=0.03 cfs 0.043 af Primary=1.72 cfs 0.108 af Secondary=0.00 cfs 0.000 af Outflow=1.75 cfs 0.150 af

Pond RG1: Rain Garden 1 Peak Elev=101.22' Storage=21 cf Inflow=0.03 cfs 0.004 af
Discarded=0.01 cfs 0.004 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.004 af

Pond RG2: Rain Garden 2 Peak Elev=101.58' Storage=6 cf Inflow=0.01 cfs 0.003 af
Discarded=0.00 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.003 af

Pond RG3: Rain Garden 3 Peak Elev=96.61' Storage=93 cf Inflow=0.39 cfs 0.038 af
Discarded=0.01 cfs 0.017 af Primary=0.37 cfs 0.020 af Outflow=0.38 cfs 0.038 af

Pond SP1: Study Point 1 Inflow=0.31 cfs 0.030 af
Primary=0.31 cfs 0.030 af

Pond SP2: Study Point 2 Inflow=0.01 cfs 0.009 af
Primary=0.01 cfs 0.009 af

Pond SP3: Study Point 3 Inflow=0.02 cfs 0.006 af
Primary=0.02 cfs 0.006 af

Pond SP4: Study Point 4 Inflow=0.07 cfs 0.015 af
Primary=0.07 cfs 0.015 af

Pond SP5: Study Point 5 Inflow=0.00 cfs 0.003 af
Primary=0.00 cfs 0.003 af

Total Runoff Area = 7.615 ac Runoff Volume = 1.140 af Average Runoff Depth = 1.80"
69.25% Pervious = 5.273 ac 30.75% Impervious = 2.342 ac

Summary for Subcatchment DA R1: DA R1

Runoff = 0.68 cfs @ 12.07 hrs, Volume= 0.053 af, Depth= 5.46"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
5,087	98	Unconnected roofs, HSG A
5,087	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 min**

Summary for Subcatchment DA R2: DA R2

Runoff = 1.54 cfs @ 12.07 hrs, Volume= 0.121 af, Depth= 5.46"
Routed to Pond 3P : URC-3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

	Area (sf)	CN	Description
*	5,093	98	Unconnected roofs, HSG A (DA 1C)
*	6,477	98	Unconnected roofs, HSG A (DA 1D)
	11,570	98	Weighted Average
	11,570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA R3: DA R3

Runoff = 1.86 cfs @ 12.07 hrs, Volume= 0.146 af, Depth= 5.46"
Routed to Pond 4P : URC-4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

	Area (sf)	CN	Description
*	1,945	98	Unconnected roofs, HSG A (DA 3C)
*	8,190	98	Unconnected roofs, HSG A (DA4B)
*	1,940	98	Unconnected roofs, HSG A (DA4C)
*	1,937	98	Unconnected roofs, HSG A [DA4A]
	14,012	98	Weighted Average
	14,012	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1A: DA1A

Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 0.91"
Routed to Pond SP1 : Study Point 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
2,465	98	Paved parking, HSG A
7,702	30	Woods, Good, HSG A
7,266	39	>75% Grass cover, Good, HSG A
17,433	43	Weighted Average
14,968	34	85.86% Pervious Area
2,465	98	14.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 min**
1.0	90	0.0200	1.48		**Sheet Flow, A TO B**
					Smooth surfaces n= 0.011 P2= 3.89"
0.8	55	0.0500	1.12		**Shallow Concentrated Flow, B TO C**
					Woodland Kv= 5.0 fps
6.8	145	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 0.91 cfs @ 12.07 hrs, Volume= 0.073 af, Depth= 4.44"
Routed to Pond B3-FB : Bio 3 Forebay

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
6,110	98	Paved parking, HSG A
727	98	Water Surface, HSG A
1,718	39	>75% Grass cover, Good, HSG A
8,555	86	Weighted Average
1,718	39	20.08% Pervious Area
6,837	98	79.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1C: DA1C

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 0.83"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
690	98	Paved parking, HSG A
6,917	39	>75% Grass cover, Good, HSG A
7,607	44	Weighted Average
6,917	39	90.93% Pervious Area
690	98	9.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1D: DA1D

Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.013 af, Depth= 0.96"
Routed to Pond B4 : Bio 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
677	98	Paved parking, HSG A
180	98	Water Surface, HSG A
6,477	39	>75% Grass cover, Good, HSG A
7,334	46	Weighted Average
6,477	39	88.31% Pervious Area
857	98	11.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1E: DA1E

Runoff = 0.39 cfs @ 12.07 hrs, Volume= 0.038 af, Depth= 1.52"
Routed to Pond RG3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
2,630	98	Paved parking, HSG A
300	98	Water Surface, HSG A
9,953	39	>75% Grass cover, Good, HSG A
12,883	52	Weighted Average
9,953	39	77.26% Pervious Area
2,930	98	22.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1F: DA1F

Runoff = 0.68 cfs @ 12.07 hrs, Volume= 0.054 af, Depth= 4.77"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
5,150	98	Paved parking, HSG A
805	39	>75% Grass cover, Good, HSG A
5,955	90	Weighted Average
805	39	13.52% Pervious Area
5,150	98	86.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA2A: DA2A

Runoff = 0.01 cfs @ 15.65 hrs, Volume= 0.009 af, Depth= 0.07"
Routed to Pond SP2 : Study Point 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
58,243	30	Woods, Good, HSG A
9,317	39	>75% Grass cover, Good, HSG A
67,560	31	Weighted Average
67,560	31	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	80	0.1300	0.17		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
5.0	260	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
12.7	340	Total			

Summary for Subcatchment DA2B: DA2B

Runoff = 1.02 cfs @ 12.07 hrs, Volume= 0.085 af, Depth= 3.21"
Routed to Pond B2 : Bio 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
7,280	98	Paved parking, HSG A
420	98	Water Surface, HSG A
6,110	39	>75% Grass cover, Good, HSG A
13,810	72	Weighted Average
6,110	39	44.24% Pervious Area
7,700	98	55.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA2C: DA2C

Runoff = 0.77 cfs @ 12.07 hrs, Volume= 0.063 af, Depth= 3.50"
Routed to Pond B1 : Bio 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
5,345	98	Paved parking, HSG A
480	98	Water Surface, HSG A
3,645	39	>75% Grass cover, Good, HSG A
9,470	75	Weighted Average
3,645	39	38.49% Pervious Area
5,825	98	61.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3A: DA3A

Runoff = 0.02 cfs @ 12.33 hrs, Volume= 0.006 af, Depth= 0.45"
Routed to Pond SP3 : Study Point 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
115	98	Paved parking, HSG A
6,640	39	>75% Grass cover, Good, HSG A
6,755	40	Weighted Average
6,640	39	98.30% Pervious Area
115	98	1.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3B: DA3B

Runoff = 1.28 cfs @ 12.07 hrs, Volume= 0.102 af, Depth= 5.09"
Routed to Pond B5 : Bio 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
9,280	98	Paved parking, HSG A
385	98	Water Surface, HSG A
755	39	>75% Grass cover, Good, HSG A
10,420	94	Weighted Average
755	39	7.25% Pervious Area
9,665	98	92.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3C: DA3C

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.069 af, Depth= 3.51"
Routed to Pond B6 : Bio 6

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
6,084	98	Paved parking, HSG A
285	98	Water Surface, HSG A
3,948	39	>75% Grass cover, Good, HSG A
10,317	75	Weighted Average
3,948	39	38.27% Pervious Area
6,369	98	61.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3D: DA3D

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 0.056 af, Depth= 3.76"
Routed to Pond B7 : Bio 7

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
4,778	98	Paved parking, HSG A
444	98	Water Surface, HSG A
590	30	Woods, Good, HSG A
1,948	39	>75% Grass cover, Good, HSG A
7,760	78	Weighted Average
2,538	37	32.71% Pervious Area
5,222	98	67.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3E: DA3E

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 0.035 af, Depth= 2.63"
Routed to Pond B8 : Bio 8

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
2,920	98	Paved parking, HSG A
300	98	Water Surface, HSG A
1,610	30	Woods, Good, HSG A
2,135	39	>75% Grass cover, Good, HSG A
6,965	64	Weighted Average
3,745	35	53.77% Pervious Area
3,220	98	46.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4A: DA4A

Runoff = 0.07 cfs @ 12.15 hrs, Volume= 0.015 af, Depth= 0.23"
Routed to Pond SP4 : Study Point 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
664	98	Paved parking, HSG A
23,694	30	Woods, Good, HSG A
9,285	39	>75% Grass cover, Good, HSG A
33,643	34	Weighted Average
32,979	33	98.03% Pervious Area
664	98	1.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	60	0.1700	0.18		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
3.2	40	0.0400	0.21		**Sheet Flow, B TO C** Grass: Short n= 0.150 P2= 3.89"
3.1	210	0.0500	1.12		**Shallow Concentrated Flow, C TO D** Woodland Kv= 5.0 fps
11.8	310	Total			

Summary for Subcatchment DA4B: DA4B

Runoff = 1.58 cfs @ 12.07 hrs, Volume= 0.131 af, Depth= 3.21"
Routed to Pond B9 : Bio 9

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
11,405	98	Paved parking, HSG A
525	98	Water Surface, HSG A
9,460	39	>75% Grass cover, Good, HSG A
21,390	72	Weighted Average
9,460	39	44.23% Pervious Area
11,930	98	55.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4C: DA4C

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 0.019 af, Depth= 1.26"
Routed to Pond B9 : Bio 9

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
1,396	98	Paved parking, HSG A
6,536	39	>75% Grass cover, Good, HSG A
7,932	49	Weighted Average
6,536	39	82.40% Pervious Area
1,396	98	17.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4D: DA4D

Runoff = 0.03 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 0.32"
Routed to Pond RG1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
210	98	Water Surface, HSG A
3,192	30	Woods, Good, HSG A
3,186	39	>75% Grass cover, Good, HSG A
6,588	37	Weighted Average
6,378	34	96.81% Pervious Area
210	98	3.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4E: DA4E

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 0.003 af, Depth= 0.24"
Routed to Pond RG2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
3,277	30	Woods, Good, HSG A
2,816	39	>75% Grass cover, Good, HSG A
100	98	Water Surface, HSG A
6,193	35	Weighted Average
6,093	34	98.39% Pervious Area
100	98	1.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA5: DA5

Runoff = 0.00 cfs @ 17.09 hrs, Volume= 0.003 af, Depth= 0.04"
Routed to Pond SP5 : Study Point 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR NOAA+ Rainfall=5.70"

Area (sf)	CN	Description
32,460	30	Woods, Good, HSG A
32,460	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	90	0.0900	0.15		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
11.3	170	Total			

Summary for Pond 1P: URC-1

Inflow Area = 1.089 ac, 45.45% Impervious, Inflow Depth = 2.10" for 10-YR NOAA+ event
Inflow = 2.70 cfs @ 12.08 hrs, Volume= 0.190 af
Outflow = 0.27 cfs @ 11.65 hrs, Volume= 0.190 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.27 cfs @ 11.65 hrs, Volume= 0.190 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 91.18' @ 12.85 hrs Surf.Area= 1,435 sf Storage= 3,083 cf

Plug-Flow detention time= 81.1 min calculated for 0.190 af (100% of inflow)
Center-of-Mass det. time= 81.1 min (832.6 - 751.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	87.90'	1,704 cf	**22.75'W x 63.06'L x 5.50'H Field A**
			7,890 cf Overall - 2,728 cf Embedded = 5,162 cf x 33.0% Voids
#2A	88.65'	2,728 cf	**ADS_StormTech MC-3500 d +Cap** x 24 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
			24 Chambers in 3 Rows
			Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
#3	92.00'	5 cf	**2.00'D x 1.45'H Vertical Cone/Cylinder**-Impervious
		4,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.45'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	87.90'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.40'	**24.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 11.65 hrs HW=87.96' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=87.90' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: URC-1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 3 rows = 89.4 cf

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

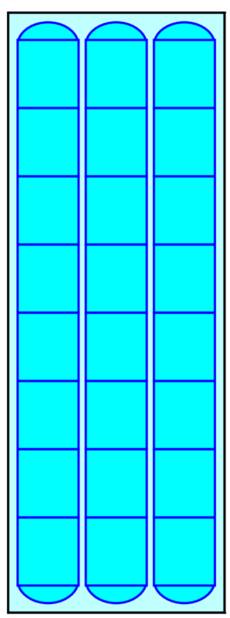
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

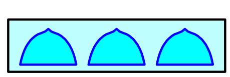
24 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 2,728.2 cf Chamber Storage

7,890.4 cf Field - 2,728.2 cf Chambers = 5,162.1 cf Stone x 33.0% Voids = 1,703.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,431.8 cf = 0.102 af
Overall Storage Efficiency = 56.2%
Overall System Size = 63.06' x 22.75' x 5.50'

24 Chambers
292.2 cy Field
191.2 cy Stone





Summary for Pond 2P: URC-2

Inflow Area = 0.534 ac, 58.10% Impervious, Inflow Depth = 1.97" for 10-YR NOAA+ event
Inflow = 1.73 cfs @ 12.08 hrs, Volume= 0.088 af
Outflow = 0.34 cfs @ 11.78 hrs, Volume= 0.088 af, Atten= 80%, Lag= 0.0 min
Discarded = 0.34 cfs @ 11.78 hrs, Volume= 0.088 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 82.88' @ 12.50 hrs Surf.Area= 983 sf Storage= 1,296 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 26.3 min (767.8 - 741.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.75'	1,183 cf	**15.58'W x 63.06'L x 5.50'H Field A** 5,405 cf Overall - 1,819 cf Embedded = 3,586 cf x 33.0% Voids
#2A	81.50'	1,819 cf	**ADS_StormTech MC-3500 d +Cap** x 16 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 16 Chambers in 2 Rows Cap Storage= 14.9 cf x 2 x 2 rows = 59.6 cf
		3,002 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	86.25'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	80.75'	**15.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	86.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.34 cfs @ 11.78 hrs HW=80.81' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=80.75' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: URC-2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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

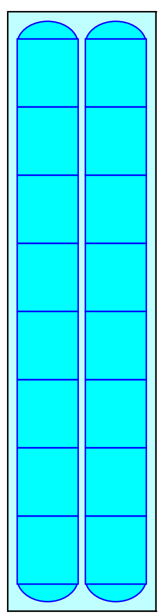
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

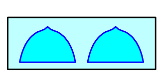
16 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,818.8 cf Chamber Storage

5,404.8 cf Field - 1,818.8 cf Chambers = 3,585.9 cf Stone x 33.0% Voids = 1,183.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,002.2 cf = 0.069 af
Overall Storage Efficiency = 55.5%
Overall System Size = 63.06' x 15.58' x 5.50'

16 Chambers
200.2 cy Field
132.8 cy Stone





Summary for Pond 3P: URC-3

Inflow Area = 1.080 ac, 76.64% Impervious, Inflow Depth = 3.28" for 10-YR NOAA+ event
Inflow = 4.67 cfs @ 12.08 hrs, Volume= 0.295 af
Outflow = 0.48 cfs @ 11.65 hrs, Volume= 0.295 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.48 cfs @ 11.65 hrs, Volume= 0.295 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP3 : Study Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 91.31' @ 12.69 hrs Surf.Area= 2,530 sf Storage= 4,972 cf

Plug-Flow detention time= 73.6 min calculated for 0.295 af (100% of inflow)
Center-of-Mass det. time= 73.6 min (817.2 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	88.35'	2,956 cf	**29.92'W x 84.57'L x 5.50'H Field A**
			13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 33.0% Voids
#2A	89.10'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 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
			44 Chambers in 4 Rows
			Cap Storage= 14.9 cf x 2 x 4 rows = 119.2 cf
#3	93.50'	1 cf	**2.00'D x 0.40'H Vertical Cone/Cylinder**-Impervious
		7,915 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.90'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	88.35'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.85'	**24.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.48 cfs @ 11.65 hrs HW=88.41' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.35' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: URC-3 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 4 rows = 119.2 cf

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

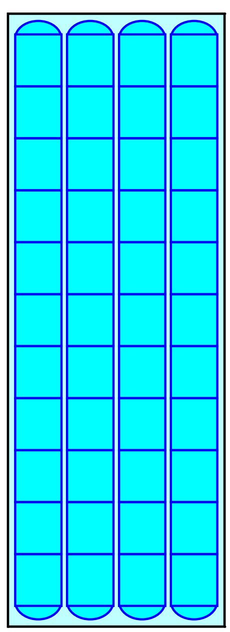
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

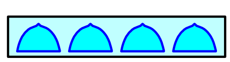
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 33.0% Voids = 2,956.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,913.3 cf = 0.182 af
Overall Storage Efficiency = 56.9%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Summary for Pond 4P: URC-4

Inflow Area = 1.288 ac, 49.27% Impervious, Inflow Depth = 2.37" for 10-YR NOAA+ event
Inflow = 3.57 cfs @ 12.08 hrs, Volume= 0.254 af
Outflow = 0.48 cfs @ 11.70 hrs, Volume= 0.254 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.48 cfs @ 11.70 hrs, Volume= 0.254 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP4 : Study Point 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.94' @ 12.58 hrs Surf.Area= 2,530 sf Storage= 3,446 cf

Plug-Flow detention time= 44.5 min calculated for 0.254 af (100% of inflow)
Center-of-Mass det. time= 44.5 min (793.6 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	87.80'	2,956 cf	**29.92'W x 84.57'L x 5.50'H Field A**
			13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 33.0% Voids
#2A	88.55'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 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
			44 Chambers in 4 Rows
			Cap Storage= 14.9 cf x 2 x 4 rows = 119.2 cf
#3	93.00'	1 cf	**2.00'D x 0.35'H Vertical Cone/Cylinder**
		7,914 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.35'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	87.80'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.30'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.48 cfs @ 11.70 hrs HW=87.86' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=87.80' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: URC-4 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 4 rows = 119.2 cf

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

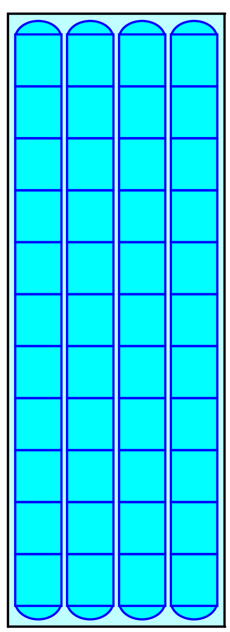
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

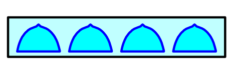
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 33.0% Voids = 2,956.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,913.3 cf = 0.182 af
Overall Storage Efficiency = 56.9%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Summary for Pond B1: Bio 1

Inflow Area = 0.217 ac, 61.51% Impervious, Inflow Depth = 3.50" for 10-YR NOAA+ event
Inflow = 0.77 cfs @ 12.07 hrs, Volume= 0.063 af
Outflow = 0.76 cfs @ 12.08 hrs, Volume= 0.063 af, Atten= 2%, Lag= 0.8 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.029 af
Primary = 0.74 cfs @ 12.08 hrs, Volume= 0.035 af
Routed to Pond 2P : URC-2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.13' @ 12.08 hrs Surf.Area= 396 sf Storage= 186 cf

Plug-Flow detention time= 36.0 min calculated for 0.063 af (100% of inflow)
Center-of-Mass det. time= 36.0 min (790.0 - 754.0)

Volume	Invert	Avail.Storage	Storage Description
#1	88.50'	658 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.50	170	0	0
89.00	370	135	135
89.50	470	210	345
90.00	750	305	650
90.01	750	8	658

Device	Routing	Invert	Outlet Devices
#0	Secondary	90.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	89.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	88.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Secondary	90.00'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=89.13' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.74 cfs @ 12.08 hrs HW=89.13' TW=81.96' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Weir Controls 0.74 cfs @ 1.19 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.50' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B2: Bio 2

Inflow Area = 0.317 ac, 55.76% Impervious, Inflow Depth = 3.21" for 10-YR NOAA+ event
Inflow = 1.02 cfs @ 12.07 hrs, Volume= 0.085 af
Outflow = 1.01 cfs @ 12.08 hrs, Volume= 0.085 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.032 af
Primary = 0.99 cfs @ 12.08 hrs, Volume= 0.053 af
Routed to Pond 2P : URC-2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.13' @ 12.08 hrs Surf.Area= 367 sf Storage= 187 cf

Plug-Flow detention time= 35.0 min calculated for 0.085 af (100% of inflow)
Center-of-Mass det. time= 35.0 min (791.3 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1	88.50'	585 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.50	220	0	0
89.00	340	140	140
90.00	540	440	580
90.01	540	5	585

Device	Routing	Invert	Outlet Devices
#0	Secondary	90.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	88.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	89.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	90.00'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=89.13' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.99 cfs @ 12.08 hrs HW=89.13' TW=81.94' (Dynamic Tailwater)
└—**2=Orifice/Grate** (Weir Controls 0.99 cfs @ 1.19 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.50' TW=0.00' (Dynamic Tailwater)
└—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B3: Bio 3

Inflow Area = 0.196 ac, 79.92% Impervious, Inflow Depth = 4.40" for 10-YR NOAA+ event
Inflow = 0.87 cfs @ 12.09 hrs, Volume= 0.072 af
Outflow = 0.86 cfs @ 12.11 hrs, Volume= 0.072 af, Atten= 1%, Lag= 0.9 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.026 af
Primary = 0.84 cfs @ 12.11 hrs, Volume= 0.046 af
Routed to Pond 1P : URC-1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.09' @ 12.11 hrs Surf.Area= 355 sf Storage= 171 cf

Plug-Flow detention time= 33.2 min calculated for 0.072 af (100% of inflow)
Center-of-Mass det. time= 33.2 min (789.2 - 756.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.40'	793 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.40	150	0	0
94.00	320	141	141
94.15	380	53	194
95.00	700	459	652
95.10	1,000	85	737
95.11	10,000	55	793

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.40'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	91.50'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 91.50' / 90.90' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	93.90'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	95.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=94.09' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.83 cfs @ 12.11 hrs HW=94.09' TW=89.75' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.83 cfs of 5.46 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.83 cfs @ 1.42 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.40' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B3-FB: Bio 3 Forebay

Inflow Area = 0.196 ac, 79.92% Impervious, Inflow Depth = 4.44" for 10-YR NOAA+ event
Inflow = 0.91 cfs @ 12.07 hrs, Volume= 0.073 af
Outflow = 0.87 cfs @ 12.09 hrs, Volume= 0.072 af, Atten= 5%, Lag= 1.4 min
Primary = 0.87 cfs @ 12.09 hrs, Volume= 0.072 af
Routed to Pond B3 : Bio 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.50' @ 12.09 hrs Surf.Area= 340 sf Storage= 93 cf

Plug-Flow detention time= 12.7 min calculated for 0.072 af (99% of inflow)
Center-of-Mass det. time= 7.3 min (756.0 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1	93.90'	443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.90	70	0	0
94.00	80	7	7
94.15	150	17	25
94.39	180	40	64
95.00	1,060	378	443

Device	Routing	Invert	Outlet Devices
#1	Primary	94.15'	**16.0" W x 6.0" H Box Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.15' / 94.08' S= 0.0140 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.67 sf

Primary OutFlow Max=0.87 cfs @ 12.09 hrs HW=94.50' TW=94.09' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.87 cfs @ 2.47 fps)

Summary for Pond B4: Bio 4

Inflow Area = 0.168 ac, 11.69% Impervious, Inflow Depth = 0.96" for 10-YR NOAA+ event
Inflow = 0.11 cfs @ 12.07 hrs, Volume= 0.013 af
Outflow = 0.11 cfs @ 12.08 hrs, Volume= 0.013 af, Atten= 1%, Lag= 0.8 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.009 af
Primary = 0.10 cfs @ 12.08 hrs, Volume= 0.004 af
Routed to Pond 1P : URC-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.55' @ 12.08 hrs Surf.Area= 159 sf Storage= 62 cf

Plug-Flow detention time= 48.7 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 48.7 min (869.1 - 820.5)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	155 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	70	0	0
94.50	150	55	55
95.00	250	100	155

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	94.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	93.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.50' / 92.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=94.55' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.10 cfs @ 12.08 hrs HW=94.55' TW=89.57' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.10 cfs of 2.80 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.71 fps)

Summary for Pond B5: Bio 5

Inflow Area = 0.239 ac, 92.75% Impervious, Inflow Depth = 5.09" for 10-YR NOAA+ event
Inflow = 1.28 cfs @ 12.07 hrs, Volume= 0.102 af
Outflow = 1.27 cfs @ 12.08 hrs, Volume= 0.102 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.030 af
Primary = 1.25 cfs @ 12.08 hrs, Volume= 0.072 af
Routed to Pond 3P : URC-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP3 : Study Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.25' @ 12.08 hrs Surf.Area= 329 sf Storage= 275 cf

Plug-Flow detention time= 52.9 min calculated for 0.102 af (100% of inflow)
Center-of-Mass det. time= 52.9 min (799.1 - 746.2)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	1,335 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.00	120	0	0
94.00	280	200	200
94.50	380	165	365
95.00	1,250	408	773
95.10	10,000	562	1,335

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	94.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	95.09'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#4	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=94.25' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.25 cfs @ 12.08 hrs HW=94.25' TW=89.97' (Dynamic Tailwater)
└─**4=Culvert** (Passes 1.25 cfs of 2.74 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 1.25 cfs @ 1.62 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B6: Bio 6

Inflow Area = 0.237 ac, 61.73% Impervious, Inflow Depth = 3.51" for 10-YR NOAA+ event
Inflow = 0.85 cfs @ 12.07 hrs, Volume= 0.069 af
Outflow = 0.84 cfs @ 12.08 hrs, Volume= 0.069 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.020 af
Primary = 0.83 cfs @ 12.08 hrs, Volume= 0.049 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 96.29' @ 12.08 hrs Surf.Area= 227 sf Storage= 141 cf

Plug-Flow detention time= 39.7 min calculated for 0.069 af (100% of inflow)
Center-of-Mass det. time= 39.8 min (793.7 - 753.9)

Volume	Invert	Avail.Storage	Storage Description
#1	95.35'	287 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.35	90	0	0
96.00	170	85	85
96.60	290	138	222
96.70	1,000	65	287

Device	Routing	Invert	Outlet Devices
#1	Discarded	95.35'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	96.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	95.10'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 95.10' / 94.10' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=96.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.83 cfs @ 12.08 hrs HW=96.29' TW=89.95' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.83 cfs of 2.47 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.83 cfs @ 1.41 fps)

Summary for Pond B7: Bio 7

Inflow Area = 0.178 ac, 67.29% Impervious, Inflow Depth = 3.76" for 10-YR NOAA+ event
Inflow = 0.69 cfs @ 12.07 hrs, Volume= 0.056 af
Outflow = 0.68 cfs @ 12.09 hrs, Volume= 0.056 af, Atten= 2%, Lag= 0.9 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.025 af
Primary = 0.66 cfs @ 12.09 hrs, Volume= 0.031 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.16' @ 12.09 hrs Surf.Area= 337 sf Storage= 171 cf

Plug-Flow detention time= 36.9 min calculated for 0.056 af (100% of inflow)
Center-of-Mass det. time= 36.9 min (787.7 - 750.9)

Volume	Invert	Avail.Storage	Storage Description
#1	100.50'	864 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.50	180	0	0
101.00	300	120	120
101.60	440	222	342
101.70	10,000	522	864

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	101.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	96.96'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 96.96' / 96.04' S= 0.0460 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=101.16' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.66 cfs @ 12.09 hrs HW=101.16' TW=89.99' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.66 cfs of 7.27 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.66 cfs @ 1.31 fps)

Summary for Pond B8: Bio 8

Inflow Area = 0.160 ac, 46.23% Impervious, Inflow Depth = 2.63" for 10-YR NOAA+ event
Inflow = 0.43 cfs @ 12.07 hrs, Volume= 0.035 af
Outflow = 0.42 cfs @ 12.08 hrs, Volume= 0.035 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.013 af
Primary = 0.41 cfs @ 12.08 hrs, Volume= 0.022 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 99.92' @ 12.08 hrs Surf.Area= 175 sf Storage= 72 cf

Plug-Flow detention time= 32.7 min calculated for 0.035 af (100% of inflow)
Center-of-Mass det. time= 32.7 min (788.7 - 756.0)

Volume	Invert	Avail.Storage	Storage Description
#1	99.30'	674 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.30	60	0	0
100.00	190	88	88
100.30	290	72	159
100.40	10,000	515	674

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.30'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	99.80'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	99.30'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.30' / 98.30' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=99.92' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.41 cfs @ 12.08 hrs HW=99.92' TW=89.95' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.41 cfs of 1.08 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.41 cfs @ 1.12 fps)

Summary for Pond B9: Bio 9

Inflow Area = 0.673 ac, 45.45% Impervious, Inflow Depth = 2.68" for 10-YR NOAA+ event
Inflow = 1.77 cfs @ 12.07 hrs, Volume= 0.150 af
Outflow = 1.75 cfs @ 12.08 hrs, Volume= 0.150 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.03 cfs @ 12.08 hrs, Volume= 0.043 af
Primary = 1.72 cfs @ 12.08 hrs, Volume= 0.108 af
Routed to Pond 4P : URC-4
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP4 : Study Point 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.23' @ 12.08 hrs Surf.Area= 461 sf Storage= 269 cf

Plug-Flow detention time= 29.6 min calculated for 0.150 af (100% of inflow)
Center-of-Mass det. time= 29.6 min (791.2 - 761.7)

Volume	Invert	Avail.Storage	Storage Description
#1	93.50'	1,258 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.50	260	0	0
94.00	410	168	168
94.50	520	233	400
95.00	760	320	720
95.10	10,000	538	1,258

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	94.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	95.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Primary	90.85'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.85' / 90.25' S= 0.0120 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.08 hrs HW=94.23' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.72 cfs @ 12.08 hrs HW=94.23' TW=89.06' (Dynamic Tailwater)
└─**4=Culvert** (Passes 1.72 cfs of 6.42 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 1.72 cfs @ 1.57 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.50' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG1: Rain Garden 1

Inflow Area = 0.151 ac, 3.19% Impervious, Inflow Depth = 0.32" for 10-YR NOAA+ event
Inflow = 0.03 cfs @ 12.07 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.42 hrs, Volume= 0.004 af, Atten= 74%, Lag= 21.0 min
Discarded = 0.01 cfs @ 12.42 hrs, Volume= 0.004 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 4P : URC-4
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond B9 : Bio 9

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.22' @ 12.42 hrs Surf.Area= 128 sf Storage= 21 cf

Plug-Flow detention time= 18.0 min calculated for 0.004 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (901.4 - 883.4)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	1,361 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.00	66	0	0
101.50	208	69	69
102.00	368	144	213
103.00	952	660	873
103.50	1,000	488	1,361

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	101.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	103.40'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Primary	101.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 101.00' / 100.00' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.42 hrs HW=101.22' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' TW=87.80' (Dynamic Tailwater)
└─**4=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' TW=93.50' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG2: Rain Garden 2

Inflow Area = 0.142 ac, 1.61% Impervious, Inflow Depth = 0.24" for 10-YR NOAA+ event
Inflow = 0.01 cfs @ 12.07 hrs, Volume= 0.003 af
Outflow = 0.00 cfs @ 12.30 hrs, Volume= 0.003 af, Atten= 64%, Lag= 14.1 min
Discarded = 0.00 cfs @ 12.30 hrs, Volume= 0.003 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 4P : URC-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.58' @ 12.30 hrs Surf.Area= 85 sf Storage= 6 cf

Plug-Flow detention time= 5.6 min calculated for 0.003 af (100% of inflow)
Center-of-Mass det. time= 5.6 min (939.9 - 934.3)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	747 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	70	0	0
102.00	160	58	58
102.50	500	165	223
102.60	10,000	525	747

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	102.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.30 hrs HW=101.58' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.50' TW=87.80' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG3: Rain Garden 3

Inflow Area = 0.296 ac, 22.74% Impervious, Inflow Depth = 1.52" for 10-YR NOAA+ event
Inflow = 0.39 cfs @ 12.07 hrs, Volume= 0.038 af
Outflow = 0.38 cfs @ 12.08 hrs, Volume= 0.038 af, Atten= 2%, Lag= 0.9 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.017 af
Primary = 0.37 cfs @ 12.08 hrs, Volume= 0.020 af
Routed to Pond 1P : URC-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 96.61' @ 12.08 hrs Surf.Area= 268 sf Storage= 93 cf

Plug-Flow detention time= 36.9 min calculated for 0.038 af (100% of inflow)
Center-of-Mass det. time= 36.8 min (823.4 - 786.6)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	70	0	0
96.50	200	68	68
96.90	450	130	198
97.00	10,000	522	720

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	96.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	95.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.50' / 94.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=96.61' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.37 cfs @ 12.08 hrs HW=96.61' TW=89.57' (Dynamic Tailwater)
└—**3=Culvert** (Passes 0.37 cfs of 2.95 cfs potential flow)
  └—**2=Orifice/Grate** (Weir Controls 0.37 cfs @ 1.08 fps)

Summary for Pond SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	2.023 ac,	42.60% Impervious,	Inflow Depth = 0.18"	for 10-YR NOAA+ event
Inflow =	0.31 cfs @	12.09 hrs, Volume=	0.030 af	
Primary =	0.31 cfs @	12.09 hrs, Volume=	0.030 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.551 ac,	0.00% Impervious,	Inflow Depth = 0.07"	for 10-YR NOAA+ event	
Inflow =	0.01 cfs @	15.65 hrs,	Volume=	0.009 af	
Primary =	0.01 cfs @	15.65 hrs,	Volume=	0.009 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.235 ac, 67.23% Impervious, Inflow Depth = 0.06" for 10-YR NOAA+ event
Inflow = 0.02 cfs @ 12.33 hrs, Volume= 0.006 af
Primary = 0.02 cfs @ 12.33 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.061 ac, 31.54% Impervious, Inflow Depth = 0.09" for 10-YR NOAA+ event
Inflow = 0.07 cfs @ 12.15 hrs, Volume= 0.015 af
Primary = 0.07 cfs @ 12.15 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.745 ac, 0.00% Impervious, Inflow Depth = 0.04" for 10-YR NOAA+ event
Inflow = 0.00 cfs @ 17.09 hrs, Volume= 0.003 af
Primary = 0.00 cfs @ 17.09 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA R1: DA R1 Runoff Area=5,087 sf 100.00% Impervious Runoff Depth=6.77"
Tc=5.0 min CN=0/98 Runoff=0.83 cfs 0.066 af

Subcatchment DA R2: DA R2 Runoff Area=11,570 sf 100.00% Impervious Runoff Depth=6.77"
Tc=5.0 min CN=0/98 Runoff=1.89 cfs 0.150 af

Subcatchment DA R3: DA R3 Runoff Area=14,012 sf 100.00% Impervious Runoff Depth=6.77"
Tc=5.0 min CN=0/98 Runoff=2.29 cfs 0.182 af

Subcatchment DA1A: DA1A Runoff Area=17,433 sf 14.14% Impervious Runoff Depth=1.33"
Flow Length=145' Tc=6.8 min CN=34/98 Runoff=0.38 cfs 0.044 af

Subcatchment DA1B: DA1B Runoff Area=8,555 sf 79.92% Impervious Runoff Depth=5.57"
Tc=5.0 min CN=39/98 Runoff=1.13 cfs 0.091 af

Subcatchment DA1C: DA1C Runoff Area=7,607 sf 9.07% Impervious Runoff Depth=1.32"
Tc=5.0 min CN=39/98 Runoff=0.17 cfs 0.019 af

Subcatchment DA1D: DA1D Runoff Area=7,334 sf 11.69% Impervious Runoff Depth=1.47"
Tc=5.0 min CN=39/98 Runoff=0.20 cfs 0.021 af

Subcatchment DA1E: DA1E Runoff Area=12,883 sf 22.74% Impervious Runoff Depth=2.14"
Tc=5.0 min CN=39/98 Runoff=0.56 cfs 0.053 af

Subcatchment DA1F: DA1F Runoff Area=5,955 sf 86.48% Impervious Runoff Depth=5.96"
Tc=5.0 min CN=39/98 Runoff=0.85 cfs 0.068 af

Subcatchment DA2A: DA2A Runoff Area=67,560 sf 0.00% Impervious Runoff Depth=0.26"
Flow Length=340' Tc=12.7 min CN=31/0 Runoff=0.06 cfs 0.034 af

Subcatchment DA2B: DA2B Runoff Area=13,810 sf 55.76% Impervious Runoff Depth=4.12"
Tc=5.0 min CN=39/98 Runoff=1.31 cfs 0.109 af

Subcatchment DA2C: DA2C Runoff Area=9,470 sf 61.51% Impervious Runoff Depth=4.46"
Tc=5.0 min CN=39/98 Runoff=0.98 cfs 0.081 af

Subcatchment DA3A: DA3A Runoff Area=6,755 sf 1.70% Impervious Runoff Depth=0.87"
Tc=5.0 min CN=39/98 Runoff=0.08 cfs 0.011 af

Subcatchment DA3B: DA3B Runoff Area=10,420 sf 92.75% Impervious Runoff Depth=6.34"
Tc=5.0 min CN=39/98 Runoff=1.59 cfs 0.126 af

Subcatchment DA3C: DA3C Runoff Area=10,317 sf 61.73% Impervious Runoff Depth=4.48"
Tc=5.0 min CN=39/98 Runoff=1.07 cfs 0.088 af

Subcatchment DA3D: DA3D Runoff Area=7,760 sf 67.29% Impervious Runoff Depth=4.76"
Tc=5.0 min CN=37/98 Runoff=0.86 cfs 0.071 af

Subcatchment DA3E: DA3E Runoff Area=6,965 sf 46.23% Impervious Runoff Depth=3.40"
Tc=5.0 min CN=35/98 Runoff=0.53 cfs 0.045 af

Subcatchment DA4A: DA4A Runoff Area=33,643 sf 1.97% Impervious Runoff Depth=0.50"
Flow Length=310' Tc=11.8 min CN=33/98 Runoff=0.11 cfs 0.032 af

Subcatchment DA4B: DA4B Runoff Area=21,390 sf 55.77% Impervious Runoff Depth=4.12"
Tc=5.0 min CN=39/98 Runoff=2.02 cfs 0.169 af

Subcatchment DA4C: DA4C Runoff Area=7,932 sf 17.60% Impervious Runoff Depth=1.83"
Tc=5.0 min CN=39/98 Runoff=0.28 cfs 0.028 af

Subcatchment DA4D: DA4D Runoff Area=6,588 sf 3.19% Impervious Runoff Depth=0.64"
Tc=5.0 min CN=34/98 Runoff=0.03 cfs 0.008 af

Subcatchment DA4E: DA4E Runoff Area=6,193 sf 1.61% Impervious Runoff Depth=0.54"
Tc=5.0 min CN=34/98 Runoff=0.03 cfs 0.006 af

Subcatchment DA5: DA5 Runoff Area=32,460 sf 0.00% Impervious Runoff Depth=0.21"
Flow Length=170' Tc=11.3 min CN=30/0 Runoff=0.02 cfs 0.013 af

Pond 1P: URC-1 Peak Elev=93.45' Storage=4,436 cf Inflow=3.52 cfs 0.258 af
Discarded=0.27 cfs 0.255 af Primary=0.24 cfs 0.003 af Outflow=0.52 cfs 0.258 af

Pond 2P: URC-2 Peak Elev=83.84' Storage=1,964 cf Inflow=2.22 cfs 0.123 af
Discarded=0.34 cfs 0.123 af Primary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.123 af

Pond 3P: URC-3 Peak Elev=92.60' Storage=6,852 cf Inflow=5.81 cfs 0.386 af
Discarded=0.48 cfs 0.386 af Primary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.386 af

Pond 4P: URC-4 Peak Elev=90.70' Storage=4,872 cf Inflow=4.52 cfs 0.333 af
Discarded=0.48 cfs 0.333 af Primary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.333 af

Pond B1: Bio 1 Peak Elev=89.16' Storage=195 cf Inflow=0.98 cfs 0.081 af
Discarded=0.02 cfs 0.032 af Primary=0.94 cfs 0.049 af Secondary=0.00 cfs 0.000 af Outflow=0.97 cfs 0.081 af

Pond B2: Bio 2 Peak Elev=89.16' Storage=196 cf Inflow=1.31 cfs 0.109 af
Discarded=0.02 cfs 0.034 af Primary=1.28 cfs 0.074 af Secondary=0.00 cfs 0.000 af Outflow=1.30 cfs 0.109 af

Pond B3: Bio 3 Peak Elev=94.12' Storage=181 cf Inflow=1.07 cfs 0.091 af
Discarded=0.02 cfs 0.028 af Primary=1.03 cfs 0.062 af Secondary=0.00 cfs 0.000 af Outflow=1.05 cfs 0.091 af

Pond B3-FB: Bio 3 Forebay Peak Elev=94.56' Storage=116 cf Inflow=1.13 cfs 0.091 af
16.0" x 6.0" Box Culvert n=0.011 L=5.0' S=0.0140 '/' Outflow=1.07 cfs 0.091 af

Pond B4: Bio 4 Peak Elev=94.57' Storage=66 cf Inflow=0.20 cfs 0.021 af
Discarded=0.01 cfs 0.011 af Primary=0.18 cfs 0.010 af Outflow=0.19 cfs 0.021 af

Pond B5: Bio 5 Peak Elev=94.28' Storage=287 cf Inflow=1.59 cfs 0.126 af
Discarded=0.02 cfs 0.031 af Primary=1.55 cfs 0.095 af Secondary=0.00 cfs 0.000 af Outflow=1.57 cfs 0.126 af

Pond B6: Bio 6 Peak Elev=96.32' Storage=149 cf Inflow=1.07 cfs 0.088 af
Discarded=0.01 cfs 0.021 af Primary=1.05 cfs 0.067 af Outflow=1.06 cfs 0.088 af

Pond B7: Bio 7 Peak Elev=101.19' Storage=180 cf Inflow=0.86 cfs 0.071 af
Discarded=0.02 cfs 0.027 af Primary=0.83 cfs 0.043 af Outflow=0.85 cfs 0.071 af

Pond B8: Bio 8 Peak Elev=99.94' Storage=76 cf Inflow=0.53 cfs 0.045 af
Discarded=0.01 cfs 0.015 af Primary=0.51 cfs 0.030 af Outflow=0.52 cfs 0.045 af

Pond B9: Bio 9 Peak Elev=94.28' Storage=290 cf Inflow=2.30 cfs 0.196 af
Discarded=0.03 cfs 0.044 af Primary=2.25 cfs 0.152 af Secondary=0.00 cfs 0.000 af Outflow=2.28 cfs 0.196 af

Pond RG1: Rain Garden 1 Peak Elev=101.47' Storage=62 cf Inflow=0.03 cfs 0.008 af
Discarded=0.01 cfs 0.008 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Pond RG2: Rain Garden 2 Peak Elev=101.94' Storage=48 cf Inflow=0.03 cfs 0.006 af
Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

Pond RG3: Rain Garden 3 Peak Elev=96.64' Storage=101 cf Inflow=0.56 cfs 0.053 af
Discarded=0.02 cfs 0.019 af Primary=0.53 cfs 0.033 af Outflow=0.55 cfs 0.053 af

Pond SP1: Study Point 1 Inflow=0.38 cfs 0.047 af
Primary=0.38 cfs 0.047 af

Pond SP2: Study Point 2 Inflow=0.06 cfs 0.034 af
Primary=0.06 cfs 0.034 af

Pond SP3: Study Point 3 Inflow=0.08 cfs 0.011 af
Primary=0.08 cfs 0.011 af

Pond SP4: Study Point 4 Inflow=0.11 cfs 0.032 af
Primary=0.11 cfs 0.032 af

Pond SP5: Study Point 5 Inflow=0.02 cfs 0.013 af
Primary=0.02 cfs 0.013 af

Total Runoff Area = 7.615 ac Runoff Volume = 1.515 af Average Runoff Depth = 2.39"
69.25% Pervious = 5.273 ac 30.75% Impervious = 2.342 ac

Summary for Subcatchment DA R1: DA R1

Runoff = 0.83 cfs @ 12.07 hrs, Volume= 0.066 af, Depth= 6.77"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
5,087	98	Unconnected roofs, HSG A
5,087	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 min**

Summary for Subcatchment DA R2: DA R2

Runoff = 1.89 cfs @ 12.07 hrs, Volume= 0.150 af, Depth= 6.77"
Routed to Pond 3P : URC-3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

	Area (sf)	CN	Description
*	5,093	98	Unconnected roofs, HSG A (DA 1C)
*	6,477	98	Unconnected roofs, HSG A (DA 1D)
	11,570	98	Weighted Average
	11,570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA R3: DA R3

Runoff = 2.29 cfs @ 12.07 hrs, Volume= 0.182 af, Depth= 6.77"
Routed to Pond 4P : URC-4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

	Area (sf)	CN	Description
*	1,945	98	Unconnected roofs, HSG A (DA 3C)
*	8,190	98	Unconnected roofs, HSG A (DA4B)
*	1,940	98	Unconnected roofs, HSG A (DA4C)
*	1,937	98	Unconnected roofs, HSG A [DA4A]
	14,012	98	Weighted Average
	14,012	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1A: DA1A

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 1.33"
Routed to Pond SP1 : Study Point 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
2,465	98	Paved parking, HSG A
7,702	30	Woods, Good, HSG A
7,266	39	>75% Grass cover, Good, HSG A
17,433	43	Weighted Average
14,968	34	85.86% Pervious Area
2,465	98	14.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 min**
1.0	90	0.0200	1.48		**Sheet Flow, A TO B**
					Smooth surfaces n= 0.011 P2= 3.89"
0.8	55	0.0500	1.12		**Shallow Concentrated Flow, B TO C**
					Woodland Kv= 5.0 fps
6.8	145	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 1.13 cfs @ 12.07 hrs, Volume= 0.091 af, Depth= 5.57"
Routed to Pond B3-FB : Bio 3 Forebay

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
6,110	98	Paved parking, HSG A
727	98	Water Surface, HSG A
1,718	39	>75% Grass cover, Good, HSG A
8,555	86	Weighted Average
1,718	39	20.08% Pervious Area
6,837	98	79.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1C: DA1C

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 1.32"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
690	98	Paved parking, HSG A
6,917	39	>75% Grass cover, Good, HSG A
7,607	44	Weighted Average
6,917	39	90.93% Pervious Area
690	98	9.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1D: DA1D

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 1.47"
Routed to Pond B4 : Bio 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
677	98	Paved parking, HSG A
180	98	Water Surface, HSG A
6,477	39	>75% Grass cover, Good, HSG A
7,334	46	Weighted Average
6,477	39	88.31% Pervious Area
857	98	11.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1E: DA1E

Runoff = 0.56 cfs @ 12.08 hrs, Volume= 0.053 af, Depth= 2.14"
Routed to Pond RG3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
2,630	98	Paved parking, HSG A
300	98	Water Surface, HSG A
9,953	39	>75% Grass cover, Good, HSG A
12,883	52	Weighted Average
9,953	39	77.26% Pervious Area
2,930	98	22.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1F: DA1F

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.068 af, Depth= 5.96"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
5,150	98	Paved parking, HSG A
805	39	>75% Grass cover, Good, HSG A
5,955	90	Weighted Average
805	39	13.52% Pervious Area
5,150	98	86.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA2A: DA2A

Runoff = 0.06 cfs @ 12.94 hrs, Volume= 0.034 af, Depth= 0.26"
Routed to Pond SP2 : Study Point 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
58,243	30	Woods, Good, HSG A
9,317	39	>75% Grass cover, Good, HSG A
67,560	31	Weighted Average
67,560	31	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	80	0.1300	0.17		**Sheet Flow, A to B**
					Woods: Light underbrush n= 0.400 P2= 3.89"
5.0	260	0.0300	0.87		**Shallow Concentrated Flow, B to C**
					Woodland Kv= 5.0 fps
12.7	340	Total			

Summary for Subcatchment DA2B: DA2B

Runoff = 1.31 cfs @ 12.07 hrs, Volume= 0.109 af, Depth= 4.12"
Routed to Pond B2 : Bio 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
7,280	98	Paved parking, HSG A
420	98	Water Surface, HSG A
6,110	39	>75% Grass cover, Good, HSG A
13,810	72	Weighted Average
6,110	39	44.24% Pervious Area
7,700	98	55.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA2C: DA2C

Runoff = 0.98 cfs @ 12.07 hrs, Volume= 0.081 af, Depth= 4.46"
Routed to Pond B1 : Bio 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
5,345	98	Paved parking, HSG A
480	98	Water Surface, HSG A
3,645	39	>75% Grass cover, Good, HSG A
9,470	75	Weighted Average
3,645	39	38.49% Pervious Area
5,825	98	61.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3A: DA3A

Runoff = 0.08 cfs @ 12.12 hrs, Volume= 0.011 af, Depth= 0.87"
Routed to Pond SP3 : Study Point 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
115	98	Paved parking, HSG A
6,640	39	>75% Grass cover, Good, HSG A
6,755	40	Weighted Average
6,640	39	98.30% Pervious Area
115	98	1.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3B: DA3B

Runoff = 1.59 cfs @ 12.07 hrs, Volume= 0.126 af, Depth= 6.34"
Routed to Pond B5 : Bio 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
9,280	98	Paved parking, HSG A
385	98	Water Surface, HSG A
755	39	>75% Grass cover, Good, HSG A
10,420	94	Weighted Average
755	39	7.25% Pervious Area
9,665	98	92.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3C: DA3C

Runoff = 1.07 cfs @ 12.07 hrs, Volume= 0.088 af, Depth= 4.48"
Routed to Pond B6 : Bio 6

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
6,084	98	Paved parking, HSG A
285	98	Water Surface, HSG A
3,948	39	>75% Grass cover, Good, HSG A
10,317	75	Weighted Average
3,948	39	38.27% Pervious Area
6,369	98	61.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3D: DA3D

Runoff = 0.86 cfs @ 12.07 hrs, Volume= 0.071 af, Depth= 4.76"
Routed to Pond B7 : Bio 7

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
4,778	98	Paved parking, HSG A
444	98	Water Surface, HSG A
590	30	Woods, Good, HSG A
1,948	39	>75% Grass cover, Good, HSG A
7,760	78	Weighted Average
2,538	37	32.71% Pervious Area
5,222	98	67.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3E: DA3E

Runoff = 0.53 cfs @ 12.07 hrs, Volume= 0.045 af, Depth= 3.40"
Routed to Pond B8 : Bio 8

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
2,920	98	Paved parking, HSG A
300	98	Water Surface, HSG A
1,610	30	Woods, Good, HSG A
2,135	39	>75% Grass cover, Good, HSG A
6,965	64	Weighted Average
3,745	35	53.77% Pervious Area
3,220	98	46.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4A: DA4A

Runoff = 0.11 cfs @ 12.45 hrs, Volume= 0.032 af, Depth= 0.50"
Routed to Pond SP4 : Study Point 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
664	98	Paved parking, HSG A
23,694	30	Woods, Good, HSG A
9,285	39	>75% Grass cover, Good, HSG A
33,643	34	Weighted Average
32,979	33	98.03% Pervious Area
664	98	1.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	60	0.1700	0.18		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
3.2	40	0.0400	0.21		**Sheet Flow, B TO C** Grass: Short n= 0.150 P2= 3.89"
3.1	210	0.0500	1.12		**Shallow Concentrated Flow, C TO D** Woodland Kv= 5.0 fps
11.8	310	Total			

Summary for Subcatchment DA4B: DA4B

Runoff = 2.02 cfs @ 12.07 hrs, Volume= 0.169 af, Depth= 4.12"
Routed to Pond B9 : Bio 9

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
11,405	98	Paved parking, HSG A
525	98	Water Surface, HSG A
9,460	39	>75% Grass cover, Good, HSG A
21,390	72	Weighted Average
9,460	39	44.23% Pervious Area
11,930	98	55.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4C: DA4C

Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.028 af, Depth= 1.83"
Routed to Pond B9 : Bio 9

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
1,396	98	Paved parking, HSG A
6,536	39	>75% Grass cover, Good, HSG A
7,932	49	Weighted Average
6,536	39	82.40% Pervious Area
1,396	98	17.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4D: DA4D

Runoff = 0.03 cfs @ 12.07 hrs, Volume= 0.008 af, Depth= 0.64"
Routed to Pond RG1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
210	98	Water Surface, HSG A
3,192	30	Woods, Good, HSG A
3,186	39	>75% Grass cover, Good, HSG A
6,588	37	Weighted Average
6,378	34	96.81% Pervious Area
210	98	3.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4E: DA4E

Runoff = 0.03 cfs @ 12.34 hrs, Volume= 0.006 af, Depth= 0.54"
Routed to Pond RG2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
3,277	30	Woods, Good, HSG A
2,816	39	>75% Grass cover, Good, HSG A
100	98	Water Surface, HSG A
6,193	35	Weighted Average
6,093	34	98.39% Pervious Area
100	98	1.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA5: DA5

Runoff = 0.02 cfs @ 13.85 hrs, Volume= 0.013 af, Depth= 0.21"
Routed to Pond SP5 : Study Point 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR NOAA+ Rainfall=7.01"

Area (sf)	CN	Description
32,460	30	Woods, Good, HSG A
32,460	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	90	0.0900	0.15		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
11.3	170	Total			

Summary for Pond 1P: URC-1

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=20)

Inflow Area = 1.089 ac, 45.45% Impervious, Inflow Depth = 2.84" for 25-YR NOAA+ event
Inflow = 3.52 cfs @ 12.09 hrs, Volume= 0.258 af
Outflow = 0.52 cfs @ 12.73 hrs, Volume= 0.258 af, Atten= 85%, Lag= 38.6 min
Discarded = 0.27 cfs @ 11.50 hrs, Volume= 0.255 af
Primary = 0.24 cfs @ 12.73 hrs, Volume= 0.003 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 93.45' @ 12.73 hrs Surf.Area= 1,435 sf Storage= 4,436 cf

Plug-Flow detention time= 126.2 min calculated for 0.258 af (100% of inflow)
Center-of-Mass det. time= 126.2 min (881.7 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	87.90'	1,704 cf	**22.75'W x 63.06'L x 5.50'H Field A** 7,890 cf Overall - 2,728 cf Embedded = 5,162 cf x 33.0% Voids
#2A	88.65'	2,728 cf	**ADS_StormTech MC-3500 d +Cap** x 24 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 24 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
#3	92.00'	5 cf	**2.00'D x 1.45'H Vertical Cone/Cylinder**-Impervious
		4,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.45'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	87.90'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.40'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 11.50 hrs HW=87.96' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.22 cfs @ 12.73 hrs HW=93.45' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Weir Controls 0.22 cfs @ 0.72 fps)

Pond 1P: URC-1 - 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 3 rows = 89.4 cf

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

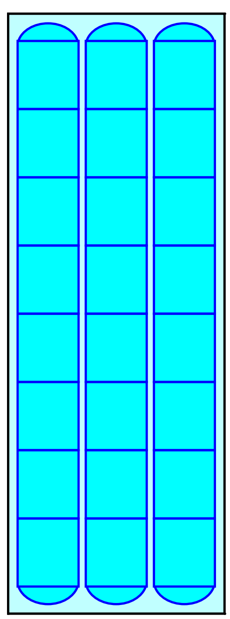
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

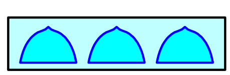
24 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 2,728.2 cf Chamber Storage

7,890.4 cf Field - 2,728.2 cf Chambers = 5,162.1 cf Stone x 33.0% Voids = 1,703.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,431.8 cf = 0.102 af
Overall Storage Efficiency = 56.2%
Overall System Size = 63.06' x 22.75' x 5.50'

24 Chambers
292.2 cy Field
191.2 cy Stone





Summary for Pond 2P: URC-2

Inflow Area = 0.534 ac, 58.10% Impervious, Inflow Depth = 2.76" for 25-YR NOAA+ event
Inflow = 2.22 cfs @ 12.08 hrs, Volume= 0.123 af
Outflow = 0.34 cfs @ 11.73 hrs, Volume= 0.123 af, Atten= 85%, Lag= 0.0 min
Discarded = 0.34 cfs @ 11.73 hrs, Volume= 0.123 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 83.84' @ 12.56 hrs Surf.Area= 983 sf Storage= 1,964 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 41.0 min (787.0 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.75'	1,183 cf	**15.58'W x 63.06'L x 5.50'H Field A** 5,405 cf Overall - 1,819 cf Embedded = 3,586 cf x 33.0% Voids
#2A	81.50'	1,819 cf	**ADS_StormTech MC-3500 d +Cap** x 16 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 16 Chambers in 2 Rows Cap Storage= 14.9 cf x 2 x 2 rows = 59.6 cf
		3,002 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	86.25'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	80.75'	**15.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	86.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.34 cfs @ 11.73 hrs HW=80.82' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=80.75' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: URC-2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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

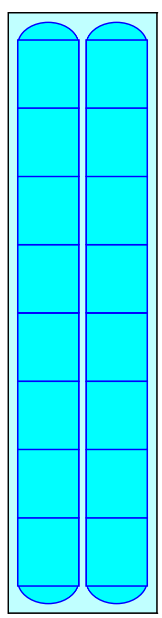
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

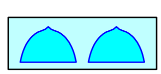
16 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,818.8 cf Chamber Storage

5,404.8 cf Field - 1,818.8 cf Chambers = 3,585.9 cf Stone x 33.0% Voids = 1,183.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,002.2 cf = 0.069 af
Overall Storage Efficiency = 55.5%
Overall System Size = 63.06' x 15.58' x 5.50'

16 Chambers
200.2 cy Field
132.8 cy Stone





Summary for Pond 3P: URC-3

Inflow Area = 1.080 ac, 76.64% Impervious, Inflow Depth = 4.29" for 25-YR NOAA+ event
Inflow = 5.81 cfs @ 12.08 hrs, Volume= 0.386 af
Outflow = 0.48 cfs @ 11.51 hrs, Volume= 0.386 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.48 cfs @ 11.51 hrs, Volume= 0.386 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP3 : Study Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 92.60' @ 12.94 hrs Surf.Area= 2,530 sf Storage= 6,852 cf

Plug-Flow detention time= 106.4 min calculated for 0.386 af (100% of inflow)
Center-of-Mass det. time= 106.3 min (851.3 - 745.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	88.35'	2,956 cf	**29.92'W x 84.57'L x 5.50'H Field A**
			13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 33.0% Voids
#2A	89.10'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 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
			44 Chambers in 4 Rows
			Cap Storage= 14.9 cf x 2 x 4 rows = 119.2 cf
#3	93.50'	1 cf	**2.00'D x 0.40'H Vertical Cone/Cylinder**-Impervious
		7,915 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.90'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	88.35'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.85'	**24.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.48 cfs @ 11.51 hrs HW=88.41' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.35' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: URC-3 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 4 rows = 119.2 cf

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

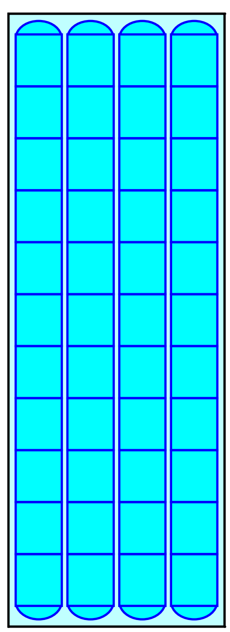
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

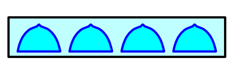
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 33.0% Voids = 2,956.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,913.3 cf = 0.182 af
Overall Storage Efficiency = 56.9%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Summary for Pond 4P: URC-4

Inflow Area = 1.288 ac, 49.27% Impervious, Inflow Depth = 3.11" for 25-YR NOAA+ event
Inflow = 4.52 cfs @ 12.08 hrs, Volume= 0.333 af
Outflow = 0.48 cfs @ 11.65 hrs, Volume= 0.333 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.48 cfs @ 11.65 hrs, Volume= 0.333 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP4 : Study Point 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 90.70' @ 12.77 hrs Surf.Area= 2,530 sf Storage= 4,872 cf

Plug-Flow detention time= 68.4 min calculated for 0.333 af (100% of inflow)
Center-of-Mass det. time= 68.3 min (821.5 - 753.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	87.80'	2,956 cf	**29.92'W x 84.57'L x 5.50'H Field A**
			13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 33.0% Voids
#2A	88.55'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 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
			44 Chambers in 4 Rows
			Cap Storage= 14.9 cf x 2 x 4 rows = 119.2 cf
#3	93.00'	1 cf	**2.00'D x 0.35'H Vertical Cone/Cylinder**
		7,914 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.35'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	87.80'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.30'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.48 cfs @ 11.65 hrs HW=87.86' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=87.80' TW=0.00' (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: URC-4 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 4 rows = 119.2 cf

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

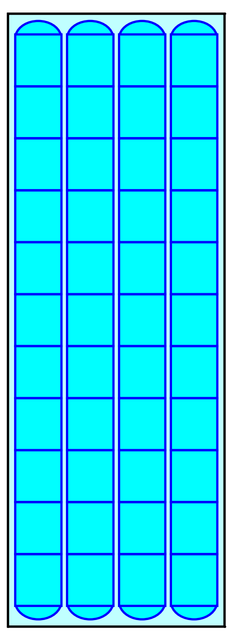
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

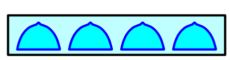
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 33.0% Voids = 2,956.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,913.3 cf = 0.182 af
Overall Storage Efficiency = 56.9%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Summary for Pond B1: Bio 1

Inflow Area = 0.217 ac, 61.51% Impervious, Inflow Depth = 4.46" for 25-YR NOAA+ event
Inflow = 0.98 cfs @ 12.07 hrs, Volume= 0.081 af
Outflow = 0.97 cfs @ 12.08 hrs, Volume= 0.081 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.032 af
Primary = 0.94 cfs @ 12.08 hrs, Volume= 0.049 af
Routed to Pond 2P : URC-2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.16' @ 12.08 hrs Surf.Area= 401 sf Storage= 195 cf

Plug-Flow detention time= 34.1 min calculated for 0.081 af (100% of inflow)
Center-of-Mass det. time= 34.1 min (788.6 - 754.5)

Volume	Invert	Avail.Storage	Storage Description
#1	88.50'	658 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.50	170	0	0
89.00	370	135	135
89.50	470	210	345
90.00	750	305	650
90.01	750	8	658

Device	Routing	Invert	Outlet Devices
#0	Secondary	90.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	89.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	88.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Secondary	90.00'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=89.16' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.94 cfs @ 12.08 hrs HW=89.16' TW=82.35' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Weir Controls 0.94 cfs @ 1.29 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.50' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B2: Bio 2

Inflow Area = 0.317 ac, 55.76% Impervious, Inflow Depth = 4.12" for 25-YR NOAA+ event
Inflow = 1.31 cfs @ 12.07 hrs, Volume= 0.109 af
Outflow = 1.30 cfs @ 12.08 hrs, Volume= 0.109 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.034 af
Primary = 1.28 cfs @ 12.08 hrs, Volume= 0.074 af
Routed to Pond 2P : URC-2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.16' @ 12.08 hrs Surf.Area= 371 sf Storage= 196 cf

Plug-Flow detention time= 31.8 min calculated for 0.109 af (100% of inflow)
Center-of-Mass det. time= 31.8 min (789.4 - 757.6)

Volume	Invert	Avail.Storage	Storage Description
#1	88.50'	585 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.50	220	0	0
89.00	340	140	140
90.00	540	440	580
90.01	540	5	585

Device	Routing	Invert	Outlet Devices
#0	Secondary	90.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	88.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	89.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	90.00'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=89.16' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.27 cfs @ 12.08 hrs HW=89.16' TW=82.32' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Weir Controls 1.27 cfs @ 1.29 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.50' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B3: Bio 3

Inflow Area = 0.196 ac, 79.92% Impervious, Inflow Depth = 5.53" for 25-YR NOAA+ event
Inflow = 1.07 cfs @ 12.10 hrs, Volume= 0.091 af
Outflow = 1.05 cfs @ 12.11 hrs, Volume= 0.091 af, Atten= 1%, Lag= 0.8 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.028 af
Primary = 1.03 cfs @ 12.11 hrs, Volume= 0.062 af
Routed to Pond 1P : URC-1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.12' @ 12.11 hrs Surf.Area= 366 sf Storage= 181 cf

Plug-Flow detention time= 30.9 min calculated for 0.091 af (100% of inflow)
Center-of-Mass det. time= 30.9 min (784.4 - 753.6)

Volume	Invert	Avail.Storage	Storage Description
#1	93.40'	793 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.40	150	0	0
94.00	320	141	141
94.15	380	53	194
95.00	700	459	652
95.10	1,000	85	737
95.11	10,000	55	793

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.40'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	91.50'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 91.50' / 90.90' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	93.90'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	95.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=94.12' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.03 cfs @ 12.11 hrs HW=94.12' TW=90.36' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.03 cfs of 5.50 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 1.03 cfs @ 1.52 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.40' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B3-FB: Bio 3 Forebay

Inflow Area = 0.196 ac, 79.92% Impervious, Inflow Depth = 5.57" for 25-YR NOAA+ event
Inflow = 1.13 cfs @ 12.07 hrs, Volume= 0.091 af
Outflow = 1.07 cfs @ 12.10 hrs, Volume= 0.091 af, Atten= 6%, Lag= 1.6 min
Primary = 1.07 cfs @ 12.10 hrs, Volume= 0.091 af
Routed to Pond B3 : Bio 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.56' @ 12.10 hrs Surf.Area= 425 sf Storage= 116 cf

Plug-Flow detention time= 10.7 min calculated for 0.091 af (99% of inflow)
Center-of-Mass det. time= 6.3 min (753.6 - 747.2)

Volume	Invert	Avail.Storage	Storage Description
#1	93.90'	443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.90	70	0	0
94.00	80	7	7
94.15	150	17	25
94.39	180	40	64
95.00	1,060	378	443

Device	Routing	Invert	Outlet Devices
#1	Primary	94.15'	**16.0" W x 6.0" H Box Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.15' / 94.08' S= 0.0140 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.67 sf

Primary OutFlow Max=1.06 cfs @ 12.10 hrs HW=94.56' TW=94.11' (Dynamic Tailwater)
└—**1=Culvert** (Barrel Controls 1.06 cfs @ 2.60 fps)

Summary for Pond B4: Bio 4

Inflow Area = 0.168 ac, 11.69% Impervious, Inflow Depth = 1.47" for 25-YR NOAA+ event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.19 cfs @ 12.10 hrs, Volume= 0.021 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.01 cfs @ 12.10 hrs, Volume= 0.011 af
Primary = 0.18 cfs @ 12.10 hrs, Volume= 0.010 af
Routed to Pond 1P : URC-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.57' @ 12.10 hrs Surf.Area= 164 sf Storage= 66 cf

Plug-Flow detention time= 43.6 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 43.6 min (872.4 - 828.8)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	155 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	70	0	0
94.50	150	55	55
95.00	250	100	155

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	94.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	93.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.50' / 92.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.10 hrs HW=94.57' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.18 cfs @ 12.10 hrs HW=94.57' TW=90.26' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.18 cfs of 2.85 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.18 cfs @ 0.85 fps)

Summary for Pond B5: Bio 5

Inflow Area = 0.239 ac, 92.75% Impervious, Inflow Depth = 6.34" for 25-YR NOAA+ event
Inflow = 1.59 cfs @ 12.07 hrs, Volume= 0.126 af
Outflow = 1.57 cfs @ 12.08 hrs, Volume= 0.126 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.031 af
Primary = 1.55 cfs @ 12.08 hrs, Volume= 0.095 af
Routed to Pond 3P : URC-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP3 : Study Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.28' @ 12.08 hrs Surf.Area= 337 sf Storage= 287 cf

Plug-Flow detention time= 46.0 min calculated for 0.126 af (100% of inflow)
Center-of-Mass det. time= 46.1 min (789.8 - 743.7)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	1,335 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.00	120	0	0
94.00	280	200	200
94.50	380	165	365
95.00	1,250	408	773
95.10	10,000	562	1,335

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	94.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	95.09'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#4	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=94.28' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.55 cfs @ 12.08 hrs HW=94.28' TW=90.41' (Dynamic Tailwater)
└─**4=Culvert** (Passes 1.55 cfs of 2.84 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 1.55 cfs @ 1.74 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B6: Bio 6

Inflow Area = 0.237 ac, 61.73% Impervious, Inflow Depth = 4.48" for 25-YR NOAA+ event
Inflow = 1.07 cfs @ 12.07 hrs, Volume= 0.088 af
Outflow = 1.06 cfs @ 12.08 hrs, Volume= 0.088 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.021 af
Primary = 1.05 cfs @ 12.08 hrs, Volume= 0.067 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 96.32' @ 12.08 hrs Surf.Area= 234 sf Storage= 149 cf

Plug-Flow detention time= 33.6 min calculated for 0.088 af (100% of inflow)
Center-of-Mass det. time= 33.6 min (788.0 - 754.4)

Volume	Invert	Avail.Storage	Storage Description
#1	95.35'	287 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.35	90	0	0
96.00	170	85	85
96.60	290	138	222
96.70	1,000	65	287

Device	Routing	Invert	Outlet Devices
#1	Discarded	95.35'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	96.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	95.10'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 95.10' / 94.10' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=96.32' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.05 cfs @ 12.08 hrs HW=96.32' TW=90.40' (Dynamic Tailwater)
└─**3=Culvert** (Passes 1.05 cfs of 2.53 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 1.05 cfs @ 1.53 fps)

Summary for Pond B7: Bio 7

Inflow Area = 0.178 ac, 67.29% Impervious, Inflow Depth = 4.76" for 25-YR NOAA+ event
Inflow = 0.86 cfs @ 12.07 hrs, Volume= 0.071 af
Outflow = 0.85 cfs @ 12.09 hrs, Volume= 0.071 af, Atten= 2%, Lag= 0.9 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.027 af
Primary = 0.83 cfs @ 12.09 hrs, Volume= 0.043 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.19' @ 12.09 hrs Surf.Area= 343 sf Storage= 180 cf

Plug-Flow detention time= 35.0 min calculated for 0.071 af (100% of inflow)
Center-of-Mass det. time= 35.1 min (785.8 - 750.8)

Volume	Invert	Avail.Storage	Storage Description
#1	100.50'	864 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.50	180	0	0
101.00	300	120	120
101.60	440	222	342
101.70	10,000	522	864

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	101.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	96.96'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 96.96' / 96.04' S= 0.0460 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=101.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.82 cfs @ 12.09 hrs HW=101.19' TW=90.44' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.82 cfs of 7.30 cfs potential flow)
　└─**2=Orifice/Grate** (Weir Controls 0.82 cfs @ 1.41 fps)

Summary for Pond B8: Bio 8

Inflow Area = 0.160 ac, 46.23% Impervious, Inflow Depth = 3.40" for 25-YR NOAA+ event
Inflow = 0.53 cfs @ 12.07 hrs, Volume= 0.045 af
Outflow = 0.52 cfs @ 12.08 hrs, Volume= 0.045 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.015 af
Primary = 0.51 cfs @ 12.08 hrs, Volume= 0.030 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 99.94' @ 12.08 hrs Surf.Area= 178 sf Storage= 76 cf

Plug-Flow detention time= 29.9 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 29.9 min (789.2 - 759.3)

Volume	Invert	Avail.Storage	Storage Description
#1	99.30'	674 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.30	60	0	0
100.00	190	88	88
100.30	290	72	159
100.40	10,000	515	674

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.30'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	99.80'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	99.30'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.30' / 98.30' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=99.94' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.51 cfs @ 12.08 hrs HW=99.94' TW=90.38' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.51 cfs of 1.13 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.51 cfs @ 1.20 fps)

Summary for Pond B9: Bio 9

Inflow Area = 0.673 ac, 45.45% Impervious, Inflow Depth = 3.50" for 25-YR NOAA+ event
Inflow = 2.30 cfs @ 12.07 hrs, Volume= 0.196 af
Outflow = 2.28 cfs @ 12.09 hrs, Volume= 0.196 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.03 cfs @ 12.09 hrs, Volume= 0.044 af
Primary = 2.25 cfs @ 12.09 hrs, Volume= 0.152 af
Routed to Pond 4P : URC-4
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP4 : Study Point 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.28' @ 12.09 hrs Surf.Area= 471 sf Storage= 290 cf

Plug-Flow detention time= 24.5 min calculated for 0.196 af (100% of inflow)
Center-of-Mass det. time= 24.5 min (789.1 - 764.6)

Volume	Invert	Avail.Storage	Storage Description
#1	93.50'	1,258 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.50	260	0	0
94.00	410	168	168
94.50	520	233	400
95.00	760	320	720
95.10	10,000	538	1,258

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	94.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	95.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Primary	90.85'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.85' / 90.25' S= 0.0120 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.09 hrs HW=94.28' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.25 cfs @ 12.09 hrs HW=94.28' TW=89.39' (Dynamic Tailwater)
└─**4=Culvert** (Passes 2.25 cfs of 6.47 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 2.25 cfs @ 1.72 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.50' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG1: Rain Garden 1

Inflow Area = 0.151 ac, 3.19% Impervious, Inflow Depth = 0.64" for 25-YR NOAA+ event
Inflow = 0.03 cfs @ 12.07 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 13.69 hrs, Volume= 0.008 af, Atten= 68%, Lag= 97.3 min
Discarded = 0.01 cfs @ 13.69 hrs, Volume= 0.008 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 4P : URC-4
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond B9 : Bio 9

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.47' @ 13.69 hrs Surf.Area= 199 sf Storage= 62 cf

Plug-Flow detention time= 56.1 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 56.1 min (950.6 - 894.6)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	1,361 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.00	66	0	0
101.50	208	69	69
102.00	368	144	213
103.00	952	660	873
103.50	1,000	488	1,361

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	101.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	103.40'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Primary	101.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 101.00' / 100.00' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 13.69 hrs HW=101.47' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' TW=87.80' (Dynamic Tailwater)
└─**4=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' TW=93.50' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG2: Rain Garden 2

Inflow Area = 0.142 ac, 1.61% Impervious, Inflow Depth = 0.54" for 25-YR NOAA+ event
Inflow = 0.03 cfs @ 12.34 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 14.49 hrs, Volume= 0.006 af, Atten= 68%, Lag= 128.8 min
Discarded = 0.01 cfs @ 14.49 hrs, Volume= 0.006 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 4P : URC-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.94' @ 14.49 hrs Surf.Area= 149 sf Storage= 48 cf

Plug-Flow detention time= 59.4 min calculated for 0.006 af (100% of inflow)
Center-of-Mass det. time= 59.4 min (985.3 - 925.8)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	747 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	70	0	0
102.00	160	58	58
102.50	500	165	223
102.60	10,000	525	747

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	102.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 14.49 hrs HW=101.94' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.50' TW=87.80' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG3: Rain Garden 3

Inflow Area = 0.296 ac, 22.74% Impervious, Inflow Depth = 2.14" for 25-YR NOAA+ event
Inflow = 0.56 cfs @ 12.08 hrs, Volume= 0.053 af
Outflow = 0.55 cfs @ 12.10 hrs, Volume= 0.053 af, Atten= 2%, Lag= 0.8 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.019 af
Primary = 0.53 cfs @ 12.10 hrs, Volume= 0.033 af
Routed to Pond 1P : URC-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 96.64' @ 12.10 hrs Surf.Area= 287 sf Storage= 101 cf

Plug-Flow detention time= 31.2 min calculated for 0.053 af (100% of inflow)
Center-of-Mass det. time= 31.3 min (825.6 - 794.4)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	720 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	70	0	0
96.50	200	68	68
96.90	450	130	198
97.00	10,000	522	720

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	96.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	95.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.50' / 94.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=96.64' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.53 cfs @ 12.10 hrs HW=96.64' TW=90.18' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.53 cfs of 3.02 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.53 cfs @ 1.22 fps)

Summary for Pond SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.023 ac, 42.60% Impervious, Inflow Depth = 0.28" for 25-YR NOAA+ event
Inflow = 0.38 cfs @ 12.09 hrs, Volume= 0.047 af
Primary = 0.38 cfs @ 12.09 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.551 ac, 0.00% Impervious, Inflow Depth = 0.26" for 25-YR NOAA+ event
Inflow = 0.06 cfs @ 12.94 hrs, Volume= 0.034 af
Primary = 0.06 cfs @ 12.94 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.235 ac, 67.23% Impervious, Inflow Depth = 0.11" for 25-YR NOAA+ event
Inflow = 0.08 cfs @ 12.12 hrs, Volume= 0.011 af
Primary = 0.08 cfs @ 12.12 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.061 ac, 31.54% Impervious, Inflow Depth = 0.19" for 25-YR NOAA+ event
Inflow = 0.11 cfs @ 12.45 hrs, Volume= 0.032 af
Primary = 0.11 cfs @ 12.45 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.745 ac, 0.00% Impervious, Inflow Depth = 0.21" for 25-YR NOAA+ event
Inflow = 0.02 cfs @ 13.85 hrs, Volume= 0.013 af
Primary = 0.02 cfs @ 13.85 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA R1: DA R1 Runoff Area=5,087 sf 100.00% Impervious Runoff Depth=8.85"
Tc=5.0 min CN=0/98 Runoff=1.08 cfs 0.086 af

Subcatchment DA R2: DA R2 Runoff Area=11,570 sf 100.00% Impervious Runoff Depth=8.85"
Tc=5.0 min CN=0/98 Runoff=2.46 cfs 0.196 af

Subcatchment DA R3: DA R3 Runoff Area=14,012 sf 100.00% Impervious Runoff Depth=8.85"
Tc=5.0 min CN=0/98 Runoff=2.98 cfs 0.237 af

Subcatchment DA1A: DA1A Runoff Area=17,433 sf 14.14% Impervious Runoff Depth=2.20"
Flow Length=145' Tc=6.8 min CN=34/98 Runoff=0.69 cfs 0.073 af

Subcatchment DA1B: DA1B Runoff Area=8,555 sf 79.92% Impervious Runoff Depth=7.40"
Tc=5.0 min CN=39/98 Runoff=1.51 cfs 0.121 af

Subcatchment DA1C: DA1C Runoff Area=7,607 sf 9.07% Impervious Runoff Depth=2.30"
Tc=5.0 min CN=39/98 Runoff=0.39 cfs 0.033 af

Subcatchment DA1D: DA1D Runoff Area=7,334 sf 11.69% Impervious Runoff Depth=2.49"
Tc=5.0 min CN=39/98 Runoff=0.40 cfs 0.035 af

Subcatchment DA1E: DA1E Runoff Area=12,883 sf 22.74% Impervious Runoff Depth=3.28"
Tc=5.0 min CN=39/98 Runoff=0.96 cfs 0.081 af

Subcatchment DA1F: DA1F Runoff Area=5,955 sf 86.48% Impervious Runoff Depth=7.88"
Tc=5.0 min CN=39/98 Runoff=1.12 cfs 0.090 af

Subcatchment DA2A: DA2A Runoff Area=67,560 sf 0.00% Impervious Runoff Depth=0.80"
Flow Length=340' Tc=12.7 min CN=31/0 Runoff=0.52 cfs 0.103 af

Subcatchment DA2B: DA2B Runoff Area=13,810 sf 55.76% Impervious Runoff Depth=5.66"
Tc=5.0 min CN=39/98 Runoff=1.84 cfs 0.150 af

Subcatchment DA2C: DA2C Runoff Area=9,470 sf 61.51% Impervious Runoff Depth=6.08"
Tc=5.0 min CN=39/98 Runoff=1.36 cfs 0.110 af

Subcatchment DA3A: DA3A Runoff Area=6,755 sf 1.70% Impervious Runoff Depth=1.77"
Tc=5.0 min CN=39/98 Runoff=0.26 cfs 0.023 af

Subcatchment DA3B: DA3B Runoff Area=10,420 sf 92.75% Impervious Runoff Depth=8.33"
Tc=5.0 min CN=39/98 Runoff=2.08 cfs 0.166 af

Subcatchment DA3C: DA3C Runoff Area=10,317 sf 61.73% Impervious Runoff Depth=6.09"
Tc=5.0 min CN=39/98 Runoff=1.48 cfs 0.120 af

Subcatchment DA3D: DA3D Runoff Area=7,760 sf 67.29% Impervious Runoff Depth=6.42"
Tc=5.0 min CN=37/98 Runoff=1.17 cfs 0.095 af

Subcatchment DA3E: DA3E Runoff Area=6,965 sf 46.23% Impervious Runoff Depth=4.74"
Tc=5.0 min CN=35/98 Runoff=0.75 cfs 0.063 af

Subcatchment DA4A: DA4A Runoff Area=33,643 sf 1.97% Impervious Runoff Depth=1.15"
Flow Length=310' Tc=11.8 min CN=33/98 Runoff=0.45 cfs 0.074 af

Subcatchment DA4B: DA4B Runoff Area=21,390 sf 55.77% Impervious Runoff Depth=5.66"
Tc=5.0 min CN=39/98 Runoff=2.85 cfs 0.232 af

Subcatchment DA4C: DA4C Runoff Area=7,932 sf 17.60% Impervious Runoff Depth=2.91"
Tc=5.0 min CN=39/98 Runoff=0.52 cfs 0.044 af

Subcatchment DA4D: DA4D Runoff Area=6,588 sf 3.19% Impervious Runoff Depth=1.35"
Tc=5.0 min CN=34/98 Runoff=0.15 cfs 0.017 af

Subcatchment DA4E: DA4E Runoff Area=6,193 sf 1.61% Impervious Runoff Depth=1.23"
Tc=5.0 min CN=34/98 Runoff=0.12 cfs 0.015 af

Subcatchment DA5: DA5 Runoff Area=32,460 sf 0.00% Impervious Runoff Depth=0.70"
Flow Length=170' Tc=11.3 min CN=30/0 Runoff=0.20 cfs 0.044 af

Pond 1P: URC-1 Peak Elev=93.45' Storage=4,436 cf Inflow=5.14 cfs 0.381 af
Discarded=0.27 cfs 0.307 af Primary=3.10 cfs 0.075 af Outflow=3.37 cfs 0.381 af

Pond 2P: URC-2 Peak Elev=86.25' Storage=3,002 cf Inflow=3.13 cfs 0.187 af
Discarded=0.34 cfs 0.182 af Primary=0.53 cfs 0.005 af Outflow=0.88 cfs 0.187 af

Pond 3P: URC-3 Peak Elev=93.90' Storage=7,915 cf Inflow=7.80 cfs 0.539 af
Discarded=0.48 cfs 0.484 af Primary=2.71 cfs 0.055 af Outflow=3.19 cfs 0.539 af

Pond 4P: URC-4 Peak Elev=93.32' Storage=7,914 cf Inflow=6.26 cfs 0.478 af
Discarded=0.48 cfs 0.477 af Primary=0.05 cfs 0.000 af Outflow=0.53 cfs 0.478 af

Pond B1: Bio 1 Peak Elev=89.19' Storage=211 cf Inflow=1.36 cfs 0.110 af
Discarded=0.02 cfs 0.036 af Primary=1.32 cfs 0.074 af Secondary=0.00 cfs 0.000 af Outflow=1.34 cfs 0.110 af

Pond B2: Bio 2 Peak Elev=89.20' Storage=211 cf Inflow=1.84 cfs 0.150 af
Discarded=0.02 cfs 0.037 af Primary=1.81 cfs 0.113 af Secondary=0.00 cfs 0.000 af Outflow=1.83 cfs 0.150 af

Pond B3: Bio 3 Peak Elev=94.16' Storage=197 cf Inflow=1.39 cfs 0.121 af
Discarded=0.02 cfs 0.031 af Primary=1.36 cfs 0.090 af Secondary=0.00 cfs 0.000 af Outflow=1.38 cfs 0.121 af

Pond B3-FB: Bio 3 Forebay Peak Elev=94.65' Storage=160 cf Inflow=1.51 cfs 0.121 af
16.0" x 6.0" Box Culvert n=0.011 L=5.0' S=0.0140 '/' Outflow=1.39 cfs 0.121 af

Pond B4: Bio 4 Peak Elev=94.61' Storage=73 cf Inflow=0.40 cfs 0.035 af
Discarded=0.01 cfs 0.013 af Primary=0.39 cfs 0.022 af Outflow=0.40 cfs 0.035 af

Pond B5: Bio 5 Peak Elev=94.34' Storage=307 cf Inflow=2.08 cfs 0.166 af
Discarded=0.02 cfs 0.033 af Primary=2.04 cfs 0.133 af Secondary=0.00 cfs 0.000 af Outflow=2.06 cfs 0.166 af

Pond B6: Bio 6 Peak Elev=96.37' Storage=162 cf Inflow=1.48 cfs 0.120 af
Discarded=0.01 cfs 0.022 af Primary=1.46 cfs 0.098 af Outflow=1.47 cfs 0.120 af

Pond B7: Bio 7 Peak Elev=101.23' Storage=195 cf Inflow=1.17 cfs 0.095 af
Discarded=0.02 cfs 0.031 af Primary=1.14 cfs 0.065 af Outflow=1.16 cfs 0.095 af

Pond B8: Bio 8 Peak Elev=99.97' Storage=82 cf Inflow=0.75 cfs 0.063 af
Discarded=0.01 cfs 0.016 af Primary=0.73 cfs 0.047 af Outflow=0.75 cfs 0.063 af

Pond B9: Bio 9 Peak Elev=94.36' Storage=329 cf Inflow=3.37 cfs 0.276 af
Discarded=0.03 cfs 0.046 af Primary=3.31 cfs 0.230 af Secondary=0.00 cfs 0.000 af Outflow=3.34 cfs 0.276 af

Pond RG1: Rain Garden 1 Peak Elev=101.57' Storage=83 cf Inflow=0.15 cfs 0.017 af
Discarded=0.01 cfs 0.012 af Primary=0.09 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.017 af

Pond RG2: Rain Garden 2 Peak Elev=102.06' Storage=68 cf Inflow=0.12 cfs 0.015 af
Discarded=0.01 cfs 0.009 af Primary=0.08 cfs 0.005 af Outflow=0.09 cfs 0.015 af

Pond RG3: Rain Garden 3 Peak Elev=96.70' Storage=120 cf Inflow=0.96 cfs 0.081 af
Discarded=0.02 cfs 0.021 af Primary=0.93 cfs 0.060 af Outflow=0.95 cfs 0.081 af

Pond SP1: Study Point 1 Inflow=3.63 cfs 0.153 af
Primary=3.63 cfs 0.153 af

Pond SP2: Study Point 2 Inflow=0.52 cfs 0.103 af
Primary=0.52 cfs 0.103 af

Pond SP3: Study Point 3 Inflow=2.86 cfs 0.078 af
Primary=2.86 cfs 0.078 af

Pond SP4: Study Point 4 Inflow=0.45 cfs 0.074 af
Primary=0.45 cfs 0.074 af

Pond SP5: Study Point 5 Inflow=0.20 cfs 0.044 af
Primary=0.20 cfs 0.044 af

Total Runoff Area = 7.615 ac Runoff Volume = 2.209 af Average Runoff Depth = 3.48"
69.25% Pervious = 5.273 ac 30.75% Impervious = 2.342 ac

Summary for Subcatchment DA R1: DA R1

Runoff = 1.08 cfs @ 12.07 hrs, Volume= 0.086 af, Depth= 8.85"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
5,087	98	Unconnected roofs, HSG A
5,087	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 min**

Summary for Subcatchment DA R2: DA R2

Runoff = 2.46 cfs @ 12.07 hrs, Volume= 0.196 af, Depth= 8.85"
Routed to Pond 3P : URC-3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

	Area (sf)	CN	Description
*	5,093	98	Unconnected roofs, HSG A (DA 1C)
*	6,477	98	Unconnected roofs, HSG A (DA 1D)
	11,570	98	Weighted Average
	11,570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA R3: DA R3

Runoff = 2.98 cfs @ 12.07 hrs, Volume= 0.237 af, Depth= 8.85"
Routed to Pond 4P : URC-4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

	Area (sf)	CN	Description
*	1,945	98	Unconnected roofs, HSG A (DA 3C)
*	8,190	98	Unconnected roofs, HSG A (DA4B)
*	1,940	98	Unconnected roofs, HSG A (DA4C)
*	1,937	98	Unconnected roofs, HSG A [DA4A]
	14,012	98	Weighted Average
	14,012	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1A: DA1A

Runoff = 0.69 cfs @ 12.11 hrs, Volume= 0.073 af, Depth= 2.20"
Routed to Pond SP1 : Study Point 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
2,465	98	Paved parking, HSG A
7,702	30	Woods, Good, HSG A
7,266	39	>75% Grass cover, Good, HSG A
17,433	43	Weighted Average
14,968	34	85.86% Pervious Area
2,465	98	14.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 min**
1.0	90	0.0200	1.48		**Sheet Flow, A TO B**
					Smooth surfaces n= 0.011 P2= 3.89"
0.8	55	0.0500	1.12		**Shallow Concentrated Flow, B TO C**
					Woodland Kv= 5.0 fps
6.8	145	Total			

Summary for Subcatchment DA1B: DA1B

Runoff = 1.51 cfs @ 12.07 hrs, Volume= 0.121 af, Depth= 7.40"
Routed to Pond B3-FB : Bio 3 Forebay

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
6,110	98	Paved parking, HSG A
727	98	Water Surface, HSG A
1,718	39	>75% Grass cover, Good, HSG A
8,555	86	Weighted Average
1,718	39	20.08% Pervious Area
6,837	98	79.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1C: DA1C

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 2.30"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
690	98	Paved parking, HSG A
6,917	39	>75% Grass cover, Good, HSG A
7,607	44	Weighted Average
6,917	39	90.93% Pervious Area
690	98	9.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1D: DA1D

Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.035 af, Depth= 2.49"
Routed to Pond B4 : Bio 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
677	98	Paved parking, HSG A
180	98	Water Surface, HSG A
6,477	39	>75% Grass cover, Good, HSG A
7,334	46	Weighted Average
6,477	39	88.31% Pervious Area
857	98	11.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1E: DA1E

Runoff = 0.96 cfs @ 12.08 hrs, Volume= 0.081 af, Depth= 3.28"
Routed to Pond RG3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
2,630	98	Paved parking, HSG A
300	98	Water Surface, HSG A
9,953	39	>75% Grass cover, Good, HSG A
12,883	52	Weighted Average
9,953	39	77.26% Pervious Area
2,930	98	22.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA1F: DA1F

Runoff = 1.12 cfs @ 12.07 hrs, Volume= 0.090 af, Depth= 7.88"
Routed to Pond 1P : URC-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
5,150	98	Paved parking, HSG A
805	39	>75% Grass cover, Good, HSG A
5,955	90	Weighted Average
805	39	13.52% Pervious Area
5,150	98	86.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA2A: DA2A

Runoff = 0.52 cfs @ 12.41 hrs, Volume= 0.103 af, Depth= 0.80"
Routed to Pond SP2 : Study Point 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
58,243	30	Woods, Good, HSG A
9,317	39	>75% Grass cover, Good, HSG A
67,560	31	Weighted Average
67,560	31	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	80	0.1300	0.17		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
5.0	260	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
12.7	340	Total			

Summary for Subcatchment DA2B: DA2B

Runoff = 1.84 cfs @ 12.07 hrs, Volume= 0.150 af, Depth= 5.66"
Routed to Pond B2 : Bio 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
7,280	98	Paved parking, HSG A
420	98	Water Surface, HSG A
6,110	39	>75% Grass cover, Good, HSG A
13,810	72	Weighted Average
6,110	39	44.24% Pervious Area
7,700	98	55.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA2C: DA2C

Runoff = 1.36 cfs @ 12.07 hrs, Volume= 0.110 af, Depth= 6.08"
Routed to Pond B1 : Bio 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
5,345	98	Paved parking, HSG A
480	98	Water Surface, HSG A
3,645	39	>75% Grass cover, Good, HSG A
9,470	75	Weighted Average
3,645	39	38.49% Pervious Area
5,825	98	61.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3A: DA3A

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.023 af, Depth= 1.77"
Routed to Pond SP3 : Study Point 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
115	98	Paved parking, HSG A
6,640	39	>75% Grass cover, Good, HSG A
6,755	40	Weighted Average
6,640	39	98.30% Pervious Area
115	98	1.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3B: DA3B

Runoff = 2.08 cfs @ 12.07 hrs, Volume= 0.166 af, Depth= 8.33"
Routed to Pond B5 : Bio 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
9,280	98	Paved parking, HSG A
385	98	Water Surface, HSG A
755	39	>75% Grass cover, Good, HSG A
10,420	94	Weighted Average
755	39	7.25% Pervious Area
9,665	98	92.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3C: DA3C

Runoff = 1.48 cfs @ 12.07 hrs, Volume= 0.120 af, Depth= 6.09"
Routed to Pond B6 : Bio 6

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
6,084	98	Paved parking, HSG A
285	98	Water Surface, HSG A
3,948	39	>75% Grass cover, Good, HSG A
10,317	75	Weighted Average
3,948	39	38.27% Pervious Area
6,369	98	61.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3D: DA3D

Runoff = 1.17 cfs @ 12.07 hrs, Volume= 0.095 af, Depth= 6.42"
Routed to Pond B7 : Bio 7

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
4,778	98	Paved parking, HSG A
444	98	Water Surface, HSG A
590	30	Woods, Good, HSG A
1,948	39	>75% Grass cover, Good, HSG A
7,760	78	Weighted Average
2,538	37	32.71% Pervious Area
5,222	98	67.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA3E: DA3E

Runoff = 0.75 cfs @ 12.07 hrs, Volume= 0.063 af, Depth= 4.74"
Routed to Pond B8 : Bio 8

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
2,920	98	Paved parking, HSG A
300	98	Water Surface, HSG A
1,610	30	Woods, Good, HSG A
2,135	39	>75% Grass cover, Good, HSG A
6,965	64	Weighted Average
3,745	35	53.77% Pervious Area
3,220	98	46.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4A: DA4A

Runoff = 0.45 cfs @ 12.25 hrs, Volume= 0.074 af, Depth= 1.15"
Routed to Pond SP4 : Study Point 4

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
664	98	Paved parking, HSG A
23,694	30	Woods, Good, HSG A
9,285	39	>75% Grass cover, Good, HSG A
33,643	34	Weighted Average
32,979	33	98.03% Pervious Area
664	98	1.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	60	0.1700	0.18		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
3.2	40	0.0400	0.21		**Sheet Flow, B TO C** Grass: Short n= 0.150 P2= 3.89"
3.1	210	0.0500	1.12		**Shallow Concentrated Flow, C TO D** Woodland Kv= 5.0 fps
11.8	310	Total			

Summary for Subcatchment DA4B: DA4B

Runoff = 2.85 cfs @ 12.07 hrs, Volume= 0.232 af, Depth= 5.66"
Routed to Pond B9 : Bio 9

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
11,405	98	Paved parking, HSG A
525	98	Water Surface, HSG A
9,460	39	>75% Grass cover, Good, HSG A
21,390	72	Weighted Average
9,460	39	44.23% Pervious Area
11,930	98	55.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4C: DA4C

Runoff = 0.52 cfs @ 12.08 hrs, Volume= 0.044 af, Depth= 2.91"
Routed to Pond B9 : Bio 9

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
1,396	98	Paved parking, HSG A
6,536	39	>75% Grass cover, Good, HSG A
7,932	49	Weighted Average
6,536	39	82.40% Pervious Area
1,396	98	17.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4D: DA4D

Runoff = 0.15 cfs @ 12.11 hrs, Volume= 0.017 af, Depth= 1.35"
Routed to Pond RG1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
210	98	Water Surface, HSG A
3,192	30	Woods, Good, HSG A
3,186	39	>75% Grass cover, Good, HSG A
6,588	37	Weighted Average
6,378	34	96.81% Pervious Area
210	98	3.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA4E: DA4E

Runoff = 0.12 cfs @ 12.11 hrs, Volume= 0.015 af, Depth= 1.23"
Routed to Pond RG2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
3,277	30	Woods, Good, HSG A
2,816	39	>75% Grass cover, Good, HSG A
100	98	Water Surface, HSG A
6,193	35	Weighted Average
6,093	34	98.39% Pervious Area
100	98	1.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MIN**

Summary for Subcatchment DA5: DA5

Runoff = 0.20 cfs @ 12.42 hrs, Volume= 0.044 af, Depth= 0.70"
Routed to Pond SP5 : Study Point 5

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR NOAA+ Rainfall=9.09"

Area (sf)	CN	Description
32,460	30	Woods, Good, HSG A
32,460	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	90	0.0900	0.15		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.89"
1.5	80	0.0300	0.87		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
11.3	170	Total			

Summary for Pond 1P: URC-1

Inflow Area = 1.089 ac, 45.45% Impervious, Inflow Depth = 4.20" for 100-YR NOAA+ event
Inflow = 5.14 cfs @ 12.09 hrs, Volume= 0.381 af
Outflow = 3.37 cfs @ 12.19 hrs, Volume= 0.381 af, Atten= 34%, Lag= 6.3 min
Discarded = 0.27 cfs @ 11.23 hrs, Volume= 0.307 af
Primary = 3.10 cfs @ 12.19 hrs, Volume= 0.075 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 93.45' @ 12.18 hrs Surf.Area= 1,435 sf Storage= 4,436 cf

Plug-Flow detention time= 108.9 min calculated for 0.381 af (100% of inflow)
Center-of-Mass det. time= 108.8 min (872.0 - 763.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	87.90'	1,704 cf	**22.75'W x 63.06'L x 5.50'H Field A**
			7,890 cf Overall - 2,728 cf Embedded = 5,162 cf x 33.0% Voids
#2A	88.65'	2,728 cf	**ADS_StormTech MC-3500 d +Cap** x 24 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
			24 Chambers in 3 Rows
			Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
#3	92.00'	5 cf	**2.00'D x 1.45'H Vertical Cone/Cylinder**-Impervious
		4,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.45'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	87.90'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.40'	**24.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 11.23 hrs HW=87.96' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.23 cfs @ 12.19 hrs HW=93.45' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Weir Controls 0.23 cfs @ 0.73 fps)

Pond 1P: URC-1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 3 rows = 89.4 cf

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

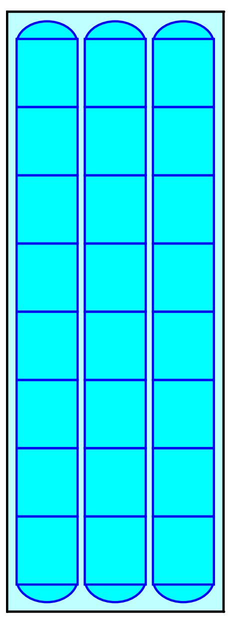
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

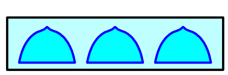
24 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 2,728.2 cf Chamber Storage

7,890.4 cf Field - 2,728.2 cf Chambers = 5,162.1 cf Stone x 33.0% Voids = 1,703.5 cf Stone Storage

Chamber Storage + Stone Storage = 4,431.8 cf = 0.102 af
Overall Storage Efficiency = 56.2%
Overall System Size = 63.06' x 22.75' x 5.50'

24 Chambers
292.2 cy Field
191.2 cy Stone





Summary for Pond 2P: URC-2

Inflow Area = 0.534 ac, 58.10% Impervious, Inflow Depth = 4.19" for 100-YR NOAA+ event
Inflow = 3.13 cfs @ 12.08 hrs, Volume= 0.187 af
Outflow = 0.88 cfs @ 12.43 hrs, Volume= 0.187 af, Atten= 72%, Lag= 21.1 min
Discarded = 0.34 cfs @ 11.67 hrs, Volume= 0.182 af
Primary = 0.53 cfs @ 12.43 hrs, Volume= 0.005 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 86.25' @ 12.42 hrs Surf.Area= 983 sf Storage= 3,002 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 64.9 min (819.1 - 754.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.75'	1,183 cf	**15.58'W x 63.06'L x 5.50'H Field A** 5,405 cf Overall - 1,819 cf Embedded = 3,586 cf x 33.0% Voids
#2A	81.50'	1,819 cf	**ADS_StormTech MC-3500 d +Cap** x 16 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 16 Chambers in 2 Rows Cap Storage= 14.9 cf x 2 x 2 rows = 59.6 cf
		3,002 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	86.25'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	80.75'	**15.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	86.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.34 cfs @ 11.67 hrs HW=80.81' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.16 cfs @ 12.43 hrs HW=86.25' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.16 cfs @ 0.63 fps)

Pond 2P: URC-2 - 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

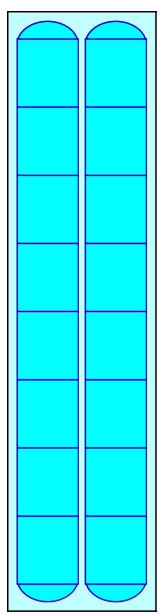
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
2 Rows x 77.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 15.58' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

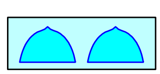
16 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 2 Rows = 1,818.8 cf Chamber Storage

5,404.8 cf Field - 1,818.8 cf Chambers = 3,585.9 cf Stone x 33.0% Voids = 1,183.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,002.2 cf = 0.069 af
Overall Storage Efficiency = 55.5%
Overall System Size = 63.06' x 15.58' x 5.50'

16 Chambers
200.2 cy Field
132.8 cy Stone





Summary for Pond 3P: URC-3

Inflow Area = 1.080 ac, 76.64% Impervious, Inflow Depth = 5.99" for 100-YR NOAA+ event
Inflow = 7.80 cfs @ 12.08 hrs, Volume= 0.539 af
Outflow = 3.19 cfs @ 12.28 hrs, Volume= 0.539 af, Atten= 59%, Lag= 12.3 min
Discarded = 0.48 cfs @ 11.25 hrs, Volume= 0.484 af
Primary = 2.71 cfs @ 12.28 hrs, Volume= 0.055 af
Routed to Pond SP3 : Study Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 93.90' @ 12.27 hrs Surf.Area= 2,530 sf Storage= 7,915 cf

Plug-Flow detention time= 115.1 min calculated for 0.539 af (100% of inflow)
Center-of-Mass det. time= 115.1 min (862.7 - 747.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	88.35'	2,956 cf	**29.92'W x 84.57'L x 5.50'H Field A**
			13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 33.0% Voids
#2A	89.10'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 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
			44 Chambers in 4 Rows
			Cap Storage= 14.9 cf x 2 x 4 rows = 119.2 cf
#3	93.50'	1 cf	**2.00'D x 0.40'H Vertical Cone/Cylinder**-Impervious
		7,915 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.90'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	88.35'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.85'	**24.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads

Discarded OutFlow Max=0.48 cfs @ 11.25 hrs HW=88.41' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.23 cfs @ 12.28 hrs HW=93.90' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Weir Controls 0.23 cfs @ 0.73 fps)

Pond 3P: URC-3 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 4 rows = 119.2 cf

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

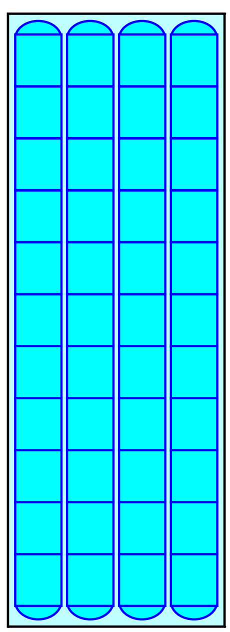
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

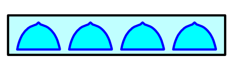
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 33.0% Voids = 2,956.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,913.3 cf = 0.182 af
Overall Storage Efficiency = 56.9%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Summary for Pond 4P: URC-4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=3)

Inflow Area = 1.288 ac, 49.27% Impervious, Inflow Depth = 4.45" for 100-YR NOAA+ event
Inflow = 6.26 cfs @ 12.08 hrs, Volume= 0.478 af
Outflow = 0.53 cfs @ 13.12 hrs, Volume= 0.478 af, Atten= 91%, Lag= 62.6 min
Discarded = 0.48 cfs @ 12.68 hrs, Volume= 0.477 af
Primary = 0.05 cfs @ 13.12 hrs, Volume= 0.000 af
Routed to Pond SP4 : Study Point 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 93.32' @ 13.12 hrs Surf.Area= 2,533 sf Storage= 7,914 cf

Plug-Flow detention time= 124.9 min calculated for 0.477 af (100% of inflow)
Center-of-Mass det. time= 124.8 min (882.2 - 757.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	87.80'	2,956 cf	**29.92'W x 84.57'L x 5.50'H Field A** 13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 33.0% Voids
#2A	88.55'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 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 44 Chambers in 4 Rows Cap Storage= 14.9 cf x 2 x 4 rows = 119.2 cf
#3	93.00'	1 cf	**2.00'D x 0.35'H Vertical Cone/Cylinder**
		7,914 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	93.35'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	87.80'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	93.30'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.48 cfs @ 12.68 hrs HW=93.01' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.05 cfs @ 13.12 hrs HW=93.32' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.40 fps)

Pond 4P: URC-4 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-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 4 rows = 119.2 cf

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

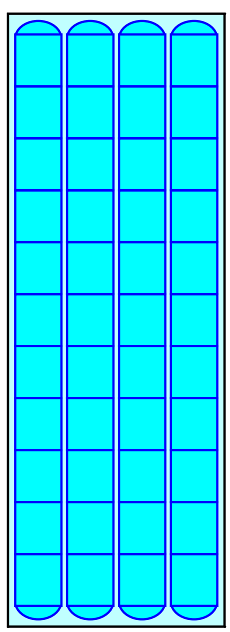
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

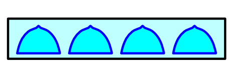
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 33.0% Voids = 2,956.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,913.3 cf = 0.182 af
Overall Storage Efficiency = 56.9%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Summary for Pond B1: Bio 1

Inflow Area = 0.217 ac, 61.51% Impervious, Inflow Depth = 6.08" for 100-YR NOAA+ event
Inflow = 1.36 cfs @ 12.07 hrs, Volume= 0.110 af
Outflow = 1.34 cfs @ 12.08 hrs, Volume= 0.110 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.036 af
Primary = 1.32 cfs @ 12.08 hrs, Volume= 0.074 af
Routed to Pond 2P : URC-2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.19' @ 12.08 hrs Surf.Area= 409 sf Storage= 211 cf

Plug-Flow detention time= 30.8 min calculated for 0.110 af (100% of inflow)
Center-of-Mass det. time= 30.8 min (786.1 - 755.2)

Volume	Invert	Avail.Storage	Storage Description
#1	88.50'	658 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.50	170	0	0
89.00	370	135	135
89.50	470	210	345
90.00	750	305	650
90.01	750	8	658

Device	Routing	Invert	Outlet Devices
#0	Secondary	90.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	89.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	88.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#3	Secondary	90.00'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=89.19' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.32 cfs @ 12.08 hrs HW=89.19' TW=83.08' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Weir Controls 1.32 cfs @ 1.44 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.50' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B2: Bio 2

Inflow Area = 0.317 ac, 55.76% Impervious, Inflow Depth = 5.66" for 100-YR NOAA+ event
Inflow = 1.84 cfs @ 12.07 hrs, Volume= 0.150 af
Outflow = 1.83 cfs @ 12.08 hrs, Volume= 0.150 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.037 af
Primary = 1.81 cfs @ 12.08 hrs, Volume= 0.113 af
Routed to Pond 2P : URC-2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 89.20' @ 12.08 hrs Surf.Area= 380 sf Storage= 211 cf

Plug-Flow detention time= 26.0 min calculated for 0.150 af (100% of inflow)
Center-of-Mass det. time= 26.0 min (785.1 - 759.1)

Volume	Invert	Avail.Storage	Storage Description
#1	88.50'	585 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.50	220	0	0
89.00	340	140	140
90.00	540	440	580
90.01	540	5	585

Device	Routing	Invert	Outlet Devices
#0	Secondary	90.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	88.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	89.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	90.00'	**5.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=89.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.81 cfs @ 12.08 hrs HW=89.20' TW=83.04' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Weir Controls 1.81 cfs @ 1.45 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.50' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B3: Bio 3

Inflow Area = 0.196 ac, 79.92% Impervious, Inflow Depth = 7.37" for 100-YR NOAA+ event
Inflow = 1.39 cfs @ 12.10 hrs, Volume= 0.121 af
Outflow = 1.38 cfs @ 12.12 hrs, Volume= 0.121 af, Atten= 1%, Lag= 0.8 min
Discarded = 0.02 cfs @ 12.12 hrs, Volume= 0.031 af
Primary = 1.36 cfs @ 12.12 hrs, Volume= 0.090 af
Routed to Pond 1P : URC-1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP1 : Study Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.16' @ 12.12 hrs Surf.Area= 384 sf Storage= 197 cf

Plug-Flow detention time= 26.6 min calculated for 0.121 af (100% of inflow)
Center-of-Mass det. time= 26.6 min (777.7 - 751.1)

Volume	Invert	Avail.Storage	Storage Description
#1	93.40'	793 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.40	150	0	0
94.00	320	141	141
94.15	380	53	194
95.00	700	459	652
95.10	1,000	85	737
95.11	10,000	55	793

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.40'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	91.50'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 91.50' / 90.90' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#3	Device 2	93.90'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	95.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 12.12 hrs HW=94.16' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.36 cfs @ 12.12 hrs HW=94.16' TW=91.84' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.36 cfs of 5.56 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 1.36 cfs @ 1.67 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.40' TW=0.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B3-FB: Bio 3 Forebay

Inflow Area = 0.196 ac, 79.92% Impervious, Inflow Depth = 7.40" for 100-YR NOAA+ event
Inflow = 1.51 cfs @ 12.07 hrs, Volume= 0.121 af
Outflow = 1.39 cfs @ 12.10 hrs, Volume= 0.121 af, Atten= 8%, Lag= 1.9 min
Primary = 1.39 cfs @ 12.10 hrs, Volume= 0.121 af
Routed to Pond B3 : Bio 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.65' @ 12.10 hrs Surf.Area= 556 sf Storage= 160 cf

Plug-Flow detention time= 8.5 min calculated for 0.121 af (100% of inflow)
Center-of-Mass det. time= 5.3 min (751.1 - 745.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.90'	443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.90	70	0	0
94.00	80	7	7
94.15	150	17	25
94.39	180	40	64
95.00	1,060	378	443

Device	Routing	Invert	Outlet Devices
#1	Primary	94.15'	**16.0" W x 6.0" H Box Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.15' / 94.08' S= 0.0140 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.67 sf

Primary OutFlow Max=1.39 cfs @ 12.10 hrs HW=94.65' TW=94.16' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.39 cfs @ 2.79 fps)

Summary for Pond B4: Bio 4

Inflow Area = 0.168 ac, 11.69% Impervious, Inflow Depth = 2.49" for 100-YR NOAA+ event
Inflow = 0.40 cfs @ 12.08 hrs, Volume= 0.035 af
Outflow = 0.40 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.01 cfs @ 12.09 hrs, Volume= 0.013 af
Primary = 0.39 cfs @ 12.09 hrs, Volume= 0.022 af
Routed to Pond 1P : URC-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.61' @ 12.09 hrs Surf.Area= 173 sf Storage= 73 cf

Plug-Flow detention time= 32.5 min calculated for 0.035 af (100% of inflow)
Center-of-Mass det. time= 32.5 min (863.5 - 831.0)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	155 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	70	0	0
94.50	150	55	55
95.00	250	100	155

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	94.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	93.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.50' / 92.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.09 hrs HW=94.61' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.39 cfs @ 12.09 hrs HW=94.61' TW=91.38' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.39 cfs of 2.96 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.39 cfs @ 1.10 fps)

Summary for Pond B5: Bio 5

Inflow Area = 0.239 ac, 92.75% Impervious, Inflow Depth = 8.33" for 100-YR NOAA+ event
Inflow = 2.08 cfs @ 12.07 hrs, Volume= 0.166 af
Outflow = 2.06 cfs @ 12.08 hrs, Volume= 0.166 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.02 cfs @ 12.08 hrs, Volume= 0.033 af
Primary = 2.04 cfs @ 12.08 hrs, Volume= 0.133 af
Routed to Pond 3P : URC-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP3 : Study Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.34' @ 12.08 hrs Surf.Area= 348 sf Storage= 307 cf

Plug-Flow detention time= 37.7 min calculated for 0.166 af (100% of inflow)
Center-of-Mass det. time= 37.7 min (778.8 - 741.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	1,335 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.00	120	0	0
94.00	280	200	200
94.50	380	165	365
95.00	1,250	408	773
95.10	10,000	562	1,335

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	94.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	95.09'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#4	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.08 hrs HW=94.34' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.03 cfs @ 12.08 hrs HW=94.34' TW=91.24' (Dynamic Tailwater)
└─**4=Culvert** (Passes 2.03 cfs of 2.98 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 2.03 cfs @ 1.91 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.00' TW=0.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B6: Bio 6

Inflow Area = 0.237 ac, 61.73% Impervious, Inflow Depth = 6.09" for 100-YR NOAA+ event
Inflow = 1.48 cfs @ 12.07 hrs, Volume= 0.120 af
Outflow = 1.47 cfs @ 12.08 hrs, Volume= 0.120 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.022 af
Primary = 1.46 cfs @ 12.08 hrs, Volume= 0.098 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 96.37' @ 12.08 hrs Surf.Area= 244 sf Storage= 162 cf

Plug-Flow detention time= 26.5 min calculated for 0.120 af (100% of inflow)
Center-of-Mass det. time= 26.6 min (781.7 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1	95.35'	287 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.35	90	0	0
96.00	170	85	85
96.60	290	138	222
96.70	1,000	65	287

Device	Routing	Invert	Outlet Devices
#1	Discarded	95.35'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	96.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	95.10'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 95.10' / 94.10' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=96.37' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.46 cfs @ 12.08 hrs HW=96.37' TW=91.24' (Dynamic Tailwater)
└—**3=Culvert** (Passes 1.46 cfs of 2.62 cfs potential flow)
  └—**2=Orifice/Grate** (Weir Controls 1.46 cfs @ 1.71 fps)

Summary for Pond B7: Bio 7

Inflow Area = 0.178 ac, 67.29% Impervious, Inflow Depth = 6.42" for 100-YR NOAA+ event
Inflow = 1.17 cfs @ 12.07 hrs, Volume= 0.095 af
Outflow = 1.16 cfs @ 12.09 hrs, Volume= 0.095 af, Atten= 2%, Lag= 0.8 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.031 af
Primary = 1.14 cfs @ 12.09 hrs, Volume= 0.065 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.23' @ 12.09 hrs Surf.Area= 354 sf Storage= 195 cf

Plug-Flow detention time= 31.8 min calculated for 0.095 af (100% of inflow)
Center-of-Mass det. time= 31.9 min (782.7 - 750.9)

Volume	Invert	Avail.Storage	Storage Description
#1	100.50'	864 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.50	180	0	0
101.00	300	120	120
101.60	440	222	342
101.70	10,000	522	864

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	101.00'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	96.96'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 96.96' / 96.04' S= 0.0460 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=101.23' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.13 cfs @ 12.09 hrs HW=101.23' TW=91.30' (Dynamic Tailwater)
└─**3=Culvert** (Passes 1.13 cfs of 7.34 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 1.13 cfs @ 1.57 fps)

Summary for Pond B8: Bio 8

Inflow Area = 0.160 ac, 46.23% Impervious, Inflow Depth = 4.74" for 100-YR NOAA+ event
Inflow = 0.75 cfs @ 12.07 hrs, Volume= 0.063 af
Outflow = 0.75 cfs @ 12.08 hrs, Volume= 0.063 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.01 cfs @ 12.08 hrs, Volume= 0.016 af
Primary = 0.73 cfs @ 12.08 hrs, Volume= 0.047 af
Routed to Pond 3P : URC-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 99.97' @ 12.08 hrs Surf.Area= 185 sf Storage= 82 cf

Plug-Flow detention time= 24.2 min calculated for 0.063 af (100% of inflow)
Center-of-Mass det. time= 24.2 min (787.3 - 763.1)

Volume	Invert	Avail.Storage	Storage Description
#1	99.30'	674 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.30	60	0	0
100.00	190	88	88
100.30	290	72	159
100.40	10,000	515	674

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.30'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	99.80'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	99.30'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.30' / 98.30' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.08 hrs HW=99.97' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.73 cfs @ 12.08 hrs HW=99.97' TW=91.26' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.73 cfs of 1.24 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.73 cfs @ 1.36 fps)

Summary for Pond B9: Bio 9

Inflow Area = 0.673 ac, 45.45% Impervious, Inflow Depth = 4.92" for 100-YR NOAA+ event
Inflow = 3.37 cfs @ 12.07 hrs, Volume= 0.276 af
Outflow = 3.34 cfs @ 12.08 hrs, Volume= 0.276 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.03 cfs @ 12.08 hrs, Volume= 0.046 af
Primary = 3.31 cfs @ 12.08 hrs, Volume= 0.230 af
Routed to Pond 4P : URC-4
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond SP4 : Study Point 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 94.36' @ 12.08 hrs Surf.Area= 489 sf Storage= 329 cf

Plug-Flow detention time= 19.0 min calculated for 0.276 af (100% of inflow)
Center-of-Mass det. time= 19.0 min (786.6 - 767.6)

Volume	Invert	Avail.Storage	Storage Description
#1	93.50'	1,258 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.50	260	0	0
94.00	410	168	168
94.50	520	233	400
95.00	760	320	720
95.10	10,000	538	1,258

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	94.00'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	95.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Primary	90.85'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.85' / 90.25' S= 0.0120 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.08 hrs HW=94.36' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=3.30 cfs @ 12.08 hrs HW=94.36' TW=90.00' (Dynamic Tailwater)
4=Culvert (Passes 3.30 cfs of 6.56 cfs potential flow)
2=Orifice/Grate (Weir Controls 3.30 cfs @ 1.96 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.50' TW=0.00' (Dynamic Tailwater)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond RG1: Rain Garden 1

Inflow Area = 0.151 ac, 3.19% Impervious, Inflow Depth = 1.35" for 100-YR NOAA+ event
Inflow = 0.15 cfs @ 12.11 hrs, Volume= 0.017 af
Outflow = 0.10 cfs @ 12.26 hrs, Volume= 0.017 af, Atten= 29%, Lag= 9.0 min
Discarded = 0.01 cfs @ 12.26 hrs, Volume= 0.012 af
Primary = 0.09 cfs @ 12.26 hrs, Volume= 0.005 af
Routed to Pond 4P : URC-4
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond B9 : Bio 9

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.57' @ 12.26 hrs Surf.Area= 230 sf Storage= 83 cf

Plug-Flow detention time= 51.8 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 51.8 min (936.3 - 884.4)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	1,361 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.00	66	0	0
101.50	208	69	69
102.00	368	144	213
103.00	952	660	873
103.50	1,000	488	1,361

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 4	101.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	103.40'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Primary	101.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 101.00' / 100.00' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.26 hrs HW=101.57' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.09 cfs @ 12.26 hrs HW=101.57' TW=91.32' (Dynamic Tailwater)
└─**4=Culvert** (Passes 0.09 cfs of 0.93 cfs potential flow)
　└─**2=Orifice/Grate** (Weir Controls 0.09 cfs @ 0.85 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' TW=93.50' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG2: Rain Garden 2

Inflow Area = 0.142 ac, 1.61% Impervious, Inflow Depth = 1.23" for 100-YR NOAA+ event
Inflow = 0.12 cfs @ 12.11 hrs, Volume= 0.015 af
Outflow = 0.09 cfs @ 12.28 hrs, Volume= 0.015 af, Atten= 27%, Lag= 10.4 min
Discarded = 0.01 cfs @ 12.28 hrs, Volume= 0.009 af
Primary = 0.08 cfs @ 12.28 hrs, Volume= 0.005 af
Routed to Pond 4P : URC-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 102.06' @ 12.28 hrs Surf.Area= 201 sf Storage= 68 cf

Plug-Flow detention time= 56.2 min calculated for 0.015 af (100% of inflow)
Center-of-Mass det. time= 56.2 min (957.7 - 901.5)

Volume	Invert	Avail.Storage	Storage Description
#1	101.50'	747 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.50	70	0	0
102.00	160	58	58
102.50	500	165	223
102.60	10,000	525	747

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	102.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.28 hrs HW=102.06' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.08 cfs @ 12.28 hrs HW=102.06' TW=91.47' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Weir Controls 0.08 cfs @ 0.80 fps)

Summary for Pond RG3: Rain Garden 3

Inflow Area = 0.296 ac, 22.74% Impervious, Inflow Depth = 3.28" for 100-YR NOAA+ event
Inflow = 0.96 cfs @ 12.08 hrs, Volume= 0.081 af
Outflow = 0.95 cfs @ 12.09 hrs, Volume= 0.081 af, Atten= 1%, Lag= 0.8 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.021 af
Primary = 0.93 cfs @ 12.09 hrs, Volume= 0.060 af
Routed to Pond 1P : URC-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 96.70' @ 12.09 hrs Surf.Area= 326 sf Storage= 120 cf

Plug-Flow detention time= 22.6 min calculated for 0.081 af (100% of inflow)
Center-of-Mass det. time= 22.6 min (822.5 - 799.9)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	70	0	0
96.50	200	68	68
96.90	450	130	198
97.00	10,000	522	720

Device	Routing	Invert	Outlet Devices
#1	Discarded	96.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 3	96.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	95.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.50' / 94.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=96.70' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.93 cfs @ 12.09 hrs HW=96.70' TW=91.35' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.93 cfs of 3.17 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.93 cfs @ 1.47 fps)

Summary for Pond SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.023 ac, 42.60% Impervious, Inflow Depth = 0.91" for 100-YR NOAA+ event
Inflow = 3.63 cfs @ 12.19 hrs, Volume= 0.153 af
Primary = 3.63 cfs @ 12.19 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.551 ac, 0.00% Impervious, Inflow Depth = 0.80" for 100-YR NOAA+ event
Inflow = 0.52 cfs @ 12.41 hrs, Volume= 0.103 af
Primary = 0.52 cfs @ 12.41 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP3: Study Point 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.235 ac, 67.23% Impervious, Inflow Depth = 0.76" for 100-YR NOAA+ event
Inflow = 2.86 cfs @ 12.28 hrs, Volume= 0.078 af
Primary = 2.86 cfs @ 12.28 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP4: Study Point 4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.061 ac, 31.54% Impervious, Inflow Depth = 0.43" for 100-YR NOAA+ event
Inflow = 0.45 cfs @ 12.25 hrs, Volume= 0.074 af
Primary = 0.45 cfs @ 12.25 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Pond SP5: Study Point 5

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.745 ac, 0.00% Impervious, Inflow Depth = 0.70" for 100-YR NOAA+ event
Inflow = 0.20 cfs @ 12.42 hrs, Volume= 0.044 af
Primary = 0.20 cfs @ 12.42 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

APPENDIX E

Groundwater Recharge Calculations

Horsley Witten Group
Sustainable Environmental Solutions

Project Name:	Southern Tier Housing
Project No:	22008
Calculated by:	EWH
Checked:	RAC
Date:	8/11/2023

STANDARD 3-RECHARGE REQUIREMENTS

TOTAL DRAINAGE AREA	331,845	sf
	7.62	acres
TOTAL IMPERVIOUS AREA	102,160	sf
	2.35	acres
TOTAL IMPERVIOUS TO RECHARGE	98,916	sf
	2.27	acres
% IMPERVIOUS TO BE RECHARGED	96.8	%

SOIL TYPE	A	
RECHARGE VOLUME REQUIRED (Rv)	**5,110**	cft
INFILTRATION RATE	8.27	in/hr
BOTTOM SURFACE AREA OF CHAMBERS	7,480	sf
ESTIMATED DRAWDOWN TIME FOR Rv*	**0.99**	**hr**
*Must be less than 72 HRS		

RECHARGE VOLUMES		
RAINFALL	1	in
URC-1 VOLUME	2700	cf
URC-2 VOLUME	1800	cf
URC-3 VOLUME	5000	cf
URC-4 VOLUME	5000	cf
TOTAL RECHARGE VOLUME PROVIDED	**14500**	**cf**
TOTAL RECHARGE VOLUME REQUIRED	**5110**	**cf**

Soil Type	Target Depth (in)	Target Depth (ft)
A	0.6	0.05
B	0.35	0.029
C	0.25	0.021
D	0.1	0.008

Rawls Table

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate Inches/Hour
Sand	A	8.27
Loamy Sand	A	2.41
Sandy Loam	B	1.02
Loam	B	0.52
Silt Loam	C	0.27
Sandy Clay	C	0.17
Clay Loam	D	0.09
Silty Clay	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

Calculate *Required Recharge Volume*.[7] The *Required Recharge Volume* equals a depth of runoff corresponding to the soil type times the impervious areas covering that soil type at the post-development site.

$$Rv = F \times \text{impervious area} \qquad \textbf{Equation (1)}$$

Rv = *Required Recharge Volume*, expressed in Ft^3, cubic yards, or acre-feet
F = Target Depth Factor associated with each Hydrologic Soil Group
Impervious Area = pavement and rooftop area on site

To determine whether an infiltration BMP will drain within 72 hours, the following formula must be used[21]:

$$Time_{drawdown} = \frac{Rv}{(K)(Bottom\ Area)}$$

Where:
Rv = Storage Volume
K = Saturated Hydraulic Conductivity For "Static" and "Simple Dynamic" Methods, use Rawls Rate (see Table 2.3.3). For "Dynamic Field" Method, use 50% of the in-situ saturatec hydraulic conductivity.
Bottom Area = Bottom Area of Recharge Structure[22]

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20 The drawdown analysis also assumes that the water table does not fluctuate during the draw down period.

21 In some cases, the infiltration structure may be designed to treat the *Required Water Quality Volume* and/or to attenuate peak discharges in addition to infiltrating the *Required Recharge Volume*. In that event, the storage volume of the structure must be used in the formula for determining drawdown time in place of the *Required Recharge Volume*.

APPENDIX F

Pollutant Removal Calculations

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: DA1B to URC 1

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Sediment Forebay	**0.25**	**1.00**	**0.25**	**0.75**
Bioretention Area Assumed TSS Removal for 0.5" WQV	**0.50**	**0.75**	**0.38**	**0.38**
Subsurface Infiltration Structure	**0.80**	**0.38**	**0.30**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**

Total TSS Removal = 93%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Southern Tier - Oak Bluffs, MA**
Prepared By: **EWH**
Date: **8/11/2023**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: DA1C to URC 1

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Grass Channel	0.50	1.00	0.50	0.50
Subsurface Infiltration Structure	0.80	0.50	0.40	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10

Total TSS Removal = **90%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Southern Tier - Oak Bluffs, MA
Prepared By: EWH
Date: 8/11/2023

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: DA1D to URC 1

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Rain Guardian Pretreatment Structure	**0.50**	**1.00**	**0.50**	**0.50**
Bioretention Area Assumed TSS Removal for 0.5" WQV	**0.50**	**0.50**	**0.25**	**0.25**
Subsurface Infiltration Structure	**0.80**	**0.25**	**0.20**	**0.05**
	0.00	**0.05**	**0.00**	**0.05**
	0.00	**0.05**	**0.00**	**0.05**

Total TSS Removal = 95%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Southern Tier - Oak Bluffs, MA**
Prepared By: **EWH**
Date: **8/11/2023**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: DA1F to URC 1

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Proprietary Treatment Practice	0.00	1.00	0.00	1.00
Subsurface Infiltration Structure	0.80	1.00	0.80	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20

Total TSS Removal = 80%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Southern Tier - Oak Bluffs, MA
Prepared By: EWH
Date: 8/11/2023

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: DA2C to URC2

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Rain Guardian Pretreatment Structure/ Grass Channel	**0.25**	**1.00**	**0.25**	**0.75**
Bioretention Area Assumed TSS Removal for 0.5" WQV	**0.50**	**0.75**	**0.38**	**0.38**
Subsurface Infiltration Structure	**0.80**	**0.38**	**0.30**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**

Total TSS Removal = 93%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Southern Tier - Oak Bluffs, MA**
Prepared By: **EWH**
Date: **8/11/2023**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: DA2B to URC2

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Rain Guardian Pretreatment Structure/ Grass Channel	**0.25**	**1.00**	**0.25**	**0.75**
Bioretention Area Assumed TSS Removal for 0.5" WQV	**0.50**	**0.75**	**0.38**	**0.38**
Subsurface Infiltration Structure	**0.80**	**0.38**	**0.30**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**

Total TSS Removal = 93%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Southern Tier - Oak Bluffs, MA**
Prepared By: **EWH**
Date: **8/11/2023**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: DA3B, DA3C, DA3D, DA3E to URC 3

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Rain Guardian Pretreatment Structure	**0.25**	**1.00**	**0.25**	**0.75**
Bioretention Area Assumed TSS Removal for 0.5" WQV	**0.50**	**0.75**	**0.38**	**0.38**
Subsurface Infiltration Structure	**0.80**	**0.38**	**0.30**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**

Total TSS Removal = 93%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Southern Tier - Oak Bluffs, MA**
Prepared By: **EWH**
Date: **8/11/2023**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

TSS Removal Calculation Worksheet

Location: DA4B to URC 4

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Rain Guardian Pretreatment Structure	0.25	1.00	0.25	0.75
Bioretention Area Assumed TSS Removal for 0.5" WQV	0.50	0.75	0.38	0.38
Subsurface Infiltration Structure	0.80	0.38	0.30	0.08
	0.00	0.08	0.00	0.08
	0.00	0.08	0.00	0.08

Total TSS Removal = 93%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Southern Tier - Oak Bluffs, MA
Prepared By: EWH
Date: 8/11/2023

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

Brief Stormceptor Sizing Report - WQU

Project Information & Location			
Project Name	85 Edgartown-Vineyard Haven Rd	**Project Number**	735249
City	Oak Bluffs	**State/ Province**	Massachusetts
Country	United States of America	**Date**	12/8/2022
Designer Information		**EOR Information (optional)**	
Name	Dave Adams	**Name**	
Company	Contech Engineered Solutions	**Company**	Horsley Witten Group
Phone #	207-885-6191	**Phone #**	
Email	dave.adams@conteches.com	**Email**	

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQU
Target TSS Removal (%)	80
TSS Removal (%) Provided	95
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	95
STC 900	97
STC 1200	97
STC 1800	98
STC 2400	98
STC 3600	98
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	100

Stormceptor®

CONTECH ENGINEERED SOLUTIONS
A QUIKRETE® COMPANY

Sizing Details

Drainage Area	
Total Area (acres)	0.27
Imperviousness %	60.0

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	

Rainfall	
Station Name	EDGARTOWN
State/Province	Massachusetts
Station ID #	2501
Years of Records	7
Latitude	41°13'48"N
Longitude	70°18'36"W

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	0.00000

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

OK-110		
Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

APPENDIX G

MESA Project Review Narrative & Determination

MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

October 20, 2022

David Ennis, Affirmative Investments, Inc.
33 Union Street, 2nd Floor
Boston, MA 02108

RE:	Applicant:	David Ennis, Affirmative Investments, Inc. (in collaboration with the Island Housing Trust)
	Location:	85 Edgartown Vineyard Haven Road, Oak Bluffs **ASSESSOR'S MAP 50, PARCEL 31; BOOK 350/PAGE 190, BOOK 320/PAGE 52, DUKES COUNTRY REGISTRY OF DEEDS**
	Project Description:	Construction of Planned Residential Development
	NHESP File No.:	**21-40189**

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Review Checklist with the site plan entitled PLANNED RESIDENTIAL DEVELOPMENT SOUTHERN TIER PROPERTY OAK BLUFFS, MASSACHUSETTS ("Site Plan with Area Summary," 1 sheet; dated July 15, 2022, revised through October 12, 2022; prepared by Horsley Witten Group, Inc.; the "Plan") and supporting documentation for review pursuant to the MA Endangered Species Act Regulations (321 CMR 10.18).

The MESA is administered by the Division, and prohibits the Take of state-listed species. The Take of state-listed species is defined as "in reference to animals...harm...kill...disrupt the nesting, breeding, feeding or migratory activity...and in reference to plants...collect, pick, kill, transplant, cut or process...Disruption of nesting, breeding, feeding, or migratory activity may result from, but is not limited to, the modification, degradation, or destruction of Habitat" of state-listed species (321 CMR 10.02).

The Division has determined that this project, as currently proposed, will occur **within** the actual habitat of the Imperial Moth (*Eacles imperialis*), state-listed as "Threatened." This species and its habitats are protected in accordance with the rare species provisions of the MESA. A Fact Sheet for these species can be found on our website, www.mass.gov/nhesp.

The project, as proposed, includes the construction of a planned affordable residential housing development ("Southern Tier Property"), utilities, landscaping and associated site work resulting in ±4.95 acres of habitat disturbance (hereinafter, the "Work"; labeled "Area A" on the Plan) on a ±7.78-acre parcel owned by the Oak Bluffs Resident Homesite Committee. As an integral part of the project, the Applicant has proposed to permanently protect ±1.87 acres of the property (labeled "Protected Open Space" on the Plan) as open space and state-listed species habitat through fee transfer or donation of a conservation restriction to a qualified conservation entity.

Area A (Southern Tier Property):
Based on the information provided and the information contained in our database, the Division finds that this project, as currently proposed, **must be conditioned** in order to avoid a prohibited Take of state-listed species (321 CMR 10.18(2)(a)). To avoid a prohibited Take of state-listed species, the following conditions must be met:

1. Recordation: Prior to the Start of Work, the Applicant shall record this determination letter and the Plan in the Dukes County Registry of Deeds so as to become a record part of the chain of title for the property. Prior to the start of Work, the Applicant shall provide the Division with written proof of said recordation.

2. Symbolic Fencing: Prior to the start of Work, symbolic fencing shall be erected along the "Limit of Work (Phase I & II)" shown on the Plan and maintained throughout the construction period. No work or activity shall occur on the property outside the "Limit of Work (Phase I & II)" shown on the Plan.

3. Monumentation: Prior to the start of Work, the Applicant shall submit a plan to permanently monument the "Protected Open Space" shown on the Plan. Prior to the start of Work or as otherwise approved by the Division, monumentation shall be installed pursuant to the Division-approved plan. Said monumentation shall be maintained in good condition and repaired or replaced, as necessary.

4. Compliance Report: Within thirty (30) days of the completion of work or as otherwise approved by the Division, the Applicant shall submit written confirmation to the Division documenting compliance with the conditions outlined herein.

5. Habitat Protection: Within one (1) year of the start of Work and prior to recording any instrument to transfer or protect the "Protected Open Space" shown on the Plan, the Applicant shall provide the Division with a plan for permanently protecting the "Protected Open Space" as open space and state-listed species habitat pursuant to Article 97 provisions.

Provided the above-noted conditions are fully implemented and there are no changes to the Plan, this project will not result in a Take of state-listed species. This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond the "Limit of Work (Phase I & II)" shown on the Plan may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Area B and Future Residential Housing Project (Southern Woodland Reservation):
The Applicant and the Island Housing Trust have disclosed that, at some future time, an access road on the property (labeled "Area B" on the Plan) as well as additional affordable residential housing on land immediately north of the property presently owned by the Martha's Vineyard Land Bank ("Southern Woodland Reservation") may be proposed.

The Division notes that any future projects or activities proposed on and adjacent to the property which are (a) located outside of the approved "Limit of Work (Phase I & II)" shown on the Plan, (b) not exempt from review pursuant to 321 CMR 10.14, and (c) located within mapped Priority Habitat as indicated in the Massachusetts Natural Heritage Atlas, will require review by the Division pursuant to MESA. Furthermore, 321 CMR 10.16 provides that projects shall not be segmented or phased to evade or defer the review requirements under MESA. If the Division determines, based on the considerations provided for in 321 CMR 10.16, that a future proposed project or activity is part of a larger common project or scheme, it may evaluate the cumulative impacts of the existing and proposed segments of the common project when reviewing the future proposed project or activity pursuant to MESA.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Jesse Leddick, Chief of Regulatory Review, at (508) 389-6386 or jesse.leddick@mass.gov.

Sincerely,

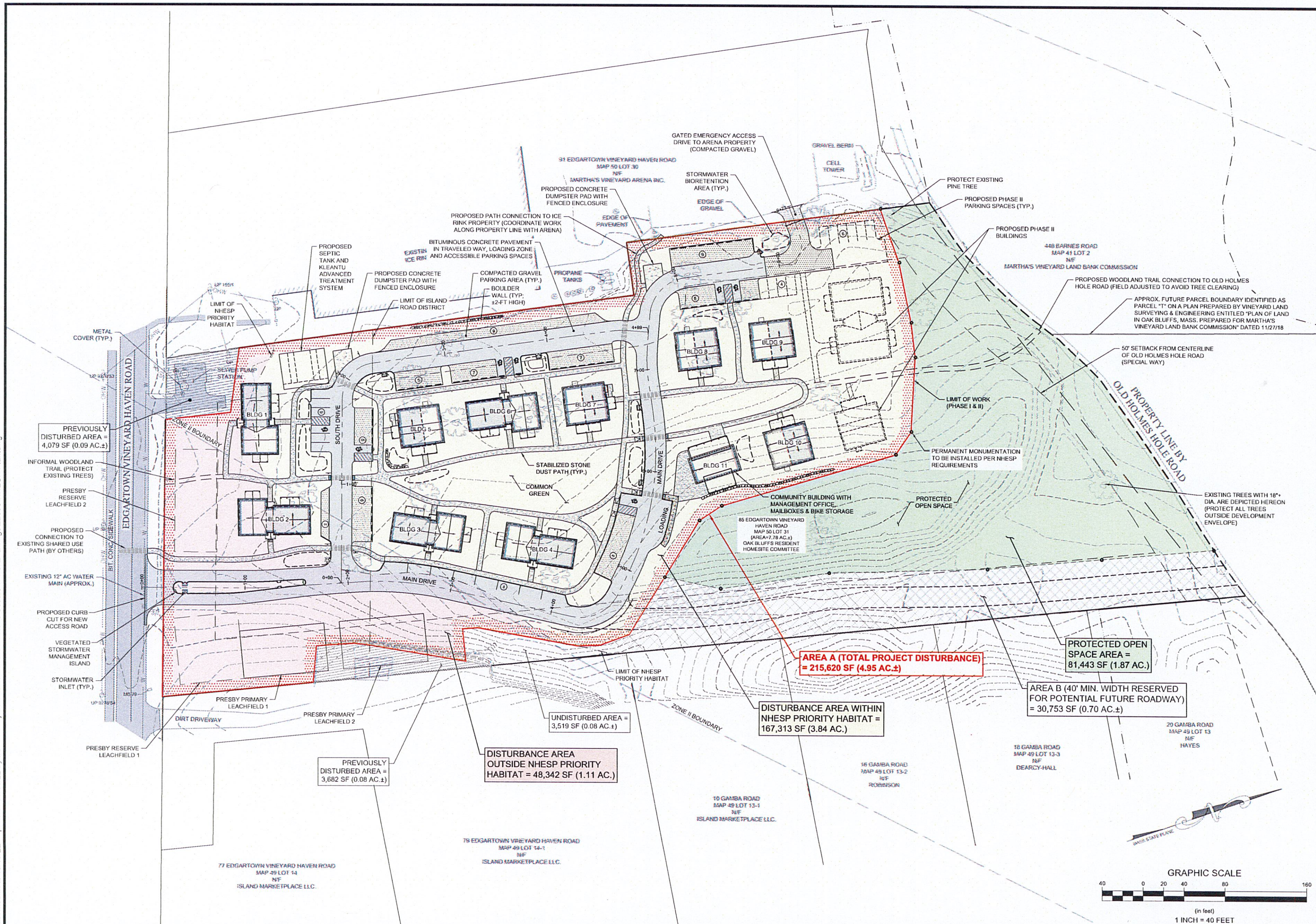
Everose Schlüter, Ph.D., Assistant Director
Massachusetts Division of Fisheries & Wildlife

On this 20th day of October, 2022, before me, the undersigned notary public, personally appeared Everose Schlüter, Assistant Director, proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached document, and who swore or affirmed to me that the contents of the document are truthful and accurate to the best of his/her knowledge and belief.

EMILY MELISSA HOLT
MY COMM. EXPIRES JULY 12, 2024
NOTARY PUBLIC
COMMONWEALTH OF MASSACHUSETTS

Emily Melissa Holt, Notary Public
My Commission Expires: July 12, 2024

cc: Derrill Bazzy and Phillippe Jordi, Island Housing Trust
Deborah Potter, Oak Bluffs Town Administrator
Amy Ball, Horsley Witten Group, Inc.



Revisions

Rev.	Date	By	Appr.	Description
1	10/12/22	ML	AB	MINOR REVISIONS

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
90 Route 6A
Sandwich, MA 02563
508-833-6600 voice
508-833-3150 fax

Date: JULY 15, 2022 | Designed By: ML/EH | Drawn By: EH | Checked By: JF

Plan Set: PLANNED RESIDENTIAL DEVELOPMENT
SOUTHERN TIER PROPERTY
OAK BLUFFS, MASSACHUSETTS

Plan Title: SITE PLAN WITH AREA SUMMARY

Prepared For:
Affirmative Investments, Inc.
33 Union St, 2nd Floor
Boston, MA 02108
Phone: -
Fax: -

Survey Provided By:
Horsley Witten Group, Inc.
90 Route 6A
Sandwich, MA 02563
Phone: (508) 833-6600
Fax: (508) 833-3150
Dated: February 10, 2022

Registration

Project Number: 22008 | Sheet: 1 of 1
Sheet Number: C - 1

last modified: 10/13/22   printed: 10/13/22 by ml   H:\Projects\2022\22008 Oak Bluffs Southern Tier\Drawings\22008 NHESP Plan.dwg

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

MESA Project Review

Planned Residential Development Southern Tier Property

Oak Bluffs, Massachusetts

September 2022

Prepared for:

Affirmative Investments
33 Union Street, 2nd Floor
Boston, MA 02108

and

Island Housing Trust
21 Mechanic Street
Vineyard Haven, MA 02568

Prepared By:

Horsley Witten Group, Inc.
90 Route 6A
Sandwich, MA 02563

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

September 8, 2022

Mr. Jesse Leddick
Natural Heritage and End. Species Program
MA Division of Fisheries and Wildlife
One Rabbit Hill Road
Westborough, MA 01581

Re: MESA Project Review – Planned Residential Development, “Southern Tier” Property
Assessor’s Map 50, Parcel 31, 85 Edgartown Vineyard Haven Road, Oak Bluffs, MA
NHESP Tracking No. 21-40189

Dear Mr. Leddick:

On behalf of the Affirmative Investments Inc. (Applicant) and Island Housing Trust, and in accordance with the Massachusetts Endangered Species Act (M.G.L. Ch. 131A) or MESA, the Horsley Witten Group, Inc. (HW) is submitting the enclosed MESA Project Review along with supporting documentation for the proposed affordable housing project at the referenced parcel located off Edgartown Vineyard Haven Road in Oak Bluffs, Massachusetts.

The proposed project involves the construction of an affordable housing development on a portion of a 7.8-ac parcel of forested land. According to the most recent version of the *Massachusetts Natural Heritage Atlas* (15th Edition, August 1, 2021), the project parcel occurs in whole or in part within *Priority Habitat of Rare Species* (PH 121) as designated by the Massachusetts Natural Heritage and Endangered Species Program (NHESP); the site is mapped for the state-Threatened Imperial Moth (*Eacles imperialis)*.

The proposed project has been designed to avoid and minimize impacts to this species and its habitat by limiting site disturbance, permanently protecting a portion of undisturbed habitat, and restoring areas of temporary grading with native species found at the site.

Enclosed please find a completed MESA Project Review Filing Checklist and required documentation and site plans, along with a check for $300.00 made payable to Commonwealth of MA – NHESP, for review as a “simple” project (less than 5 acres of disturbance).

Thank you in advance for your review of this information. Please do not hesitate to contact me directly at (508) 833-6600 or at aball@horsleywitten.com with any questions you may have pertaining to this application.

Sincerely,

Horsley Witten Group, Inc.

A. Ball

Amy M. Ball, PWS, CWS
Senior Project Manager – Senior Ecologist

Enclosures

cc: David Ennis, Affirmative Investments, Inc.
Craig Nicholson, Affirmative Investments, Inc.
Derrill Bazzy, Island Housing Trust
Phillippe Jordi, Island Housing Trust
Deborah Potter, Oak Bluffs Town Administrator

Project Narrative

MESA PROJECT REVIEW

Planned Residential Development Southern Tier Property

Edgartown Vineyard Haven Road, Oak Bluffs, MA
Assessor's Map 50, Parcel 31

Table of Contents

September 2022

1.0 INTRODUCTION AND BACKGROUND

The Town of Oak Bluffs has been working to address the need for low-income housing for year-round residents for a number of years. In 2017, the Town developed a Housing Production Plan (HPP) specifically to address the need for affordable housing in Oak Bluffs with proposed strategies for meeting the housing need. A 2019 Master Plan was created with a focus on affordable housing and studying suitable project locations. The Master Plan aimed to balance the growth of the population and infrastructure on the island with the preservation of the natural environment.

The Town then received a grant from MassHousing, which resulted in the development of the *Town of Oak Bluffs Housing Feasibility Study,* which was completed by RKG Associates, Inc. and Weston and Sampson in March 2020. This feasibility study identified a 7.8-acre town-owned parcel of land identified in the Master Plan as the "Southern Tier" area along Edgartown-Vineyard Haven Road as suitable for housing development. The Master Plan also discussed different development scenarios and project recommendations.

Subsequently, the Town of Oak Bluffs selected the "Southern Tier" property for development of an affordable housing project and issued a Response for Proposals (RFP) for a 60-unit affordable and workforce housing project. In accordance with local regulations, the design necessitates that all wastewater treatment and discharge will be managed onsite, until such time as the Town's wastewater treatment facility may be upgraded.

The proposed Southern Tier project is a result of the Town's planning efforts with the intent of creating a walkable community that is along the Town's bus route and within proximity to nearby recreational facilities and walking paths. The development will occur in two phases, the first phase proposes the construction of 45 units and the second phase proposes 15 units.

The project site is currently undeveloped forested land that is also partially mapped as Priority Habitat (PH 121) for the State-Threatened Species, Imperial Moth (*Eacles imperialis*). The project design aims to preserve a portion of the land as open space and minimize long-term impacts by restoring graded areas with native species compatible with the existing landscape.

2.0 GENERAL SITE DESCRIPTION

The project site is a 7.8-acre parcel owned by the Oak Bluffs Affordable Housing Trust. It is a forested parcel located at 85 Edgartown-Vineyard Haven Road in Oak Bluffs, MA (latitude 41.41955 N; longitude -70.59085 W) (**Attachment A**, Figures 1 and 2). The parcel is identified by the Oak Bluffs Assessor's database as Map 50 Parcel 31.

The western property boundary abuts the Arena and YMCA of Martha's Vineyard. To the east of the site, the property is bounded by residential properties and light industry. Edgartown

Vineyard Haven Road bounds the property to the south and is the main access road to the Site. Across the street, immediately to the south on Edgartown Vineyard Haven Road is Martha's Vineyard High School. The northern property boundary abuts undeveloped lands held by the Martha's Vineyard Land Bank Commission, known as Southern Woodlands Reservation.

Photo 1. View of mixed oak-pitch pine vegetation community at Southern Tier parcel (March 2022).

2.1 FEMA Designation

According to the current FEMA Flood Insurance Rate Map (FEMA FIRM) for Town of Oak Bluffs (Community Panel 25007C0112J, effective date 07/20/2016), the project site is mapped within Zone X: *Areas of Minimal Flood Hazard* (**Attachment A,** Figures 3 and 3A).

2.2 State-listed Rare Species Habitat

According to the most recent version of the *Massachusetts Natural Heritage Atlas* (15th Edition, August 1, 2021), the project site occurs within *Priority Habitat of Rare Species* (PH 121) as designated by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) (**Attachment A**, Figure 4).

In response to a MESA Information Request (Tracking No. 21-40189), NHESP has indicated that this designation is due to the presence of the state-threatened, Imperial Moth (*Eacles imperialis*) (**Attachment B**). According to the NHESP Fact Sheet, primary habitat for this species includes pitch pine (*Pinus rigida*), and the priority habitat mapping appears to follow the dense areas of concentrated pitch pine growth. We understand that other, unaltered habitat at the site also provides habitat for this species.

2.3 Habitat Description

On March 21, 2022, HW ecology staff performed a site visit to assess the general habitat characteristics and to identify any unique features. As noted, the Southern Tier parcel consists of undeveloped forested land with a plant composition comprised of species a canopy of pitch pine and mixed oak (*Quercus alba, Q. velutina, Q. coccinea*). The understory is dominated by black huckleberry (*Gaylussacia baccata*) with patches of sheep laurel (*Kalmia angustifolia*) and lowbush blueberry (*Vaccinium angustifolium*) interspersed with patches of wintergreen (*Gaultheria procumbens*) and trailing arbutus (*Epigaea repens*), and occasional bracken fern (*Pteridium aquilinum*). A sparse shrub layer creates an open landscape. HW observed a small amount of chokeberry (*Aronia* sp.) along the road and occasional scrub oak (*Quercus ilicifolia*); otherwise, the plant community is fairly uniform throughout the site, with variable concentrations of pitch pine and oaks (Photos 1 and 2). Snags and fallen dead trees (boles) as well as narrow wildlife paths are located throughout the site. The duff layer (fallen leaves, small branches) is approximately 4-6 inches.

Photo 2. Alternate view of mixed oak-pitch pine vegetation community.

The topography of the site rises gently from Edgartown-Vineyard Haven Road to the north and from the adjacent YMCA property to the west and is generally flat apart from a linear mound that occupies the eastern central portion of the site (Photo 3). This mounded area slopes gently to the west and south, and slopes more steeply to the east and north of the site leveling out to the to an even plane to the north and northwest of the site where the Old Holmes Hole Road is located.

Photo 3. View of mounded landform in eastern central portion of the site where there is a concentration of pitch pine.

According to the NRCS Soil Survey and MassGIS, the soils underlying the site are classified as Riverhead sandy loam, 0 to 3 percent slopes (288A) in the southern/western portions of the site, while the northern and eastern portions consist of Carver loamy coarse sand, 8 to 15 percent slopes (259C) (**Attachment A**, Figure 5). Using a hand-held auger, HW confirmed that the soils at the site consist of well-drained spodosols that are consistent with the NRCS mapping.

There are two areas of minor existing land disturbance, one in the southwest corner where an existing sewer pump station and access road are located, and the other along the southeastern property line where there is some encroachment from the neighboring property (Photo 4).

Photo 4. Existing sewer pump station and access drive in southwestern corner of site (left) and encroachment of structures and materials along southeastern property line (right).

2.4 Other Considerations

The subject parcel is located within the MassDEP approved Zone II wellhead protection area of Farm Neck Wellfield (see **Attachment A**, Figure 4).

3.0 PROPOSED PROJECT

The project consists of a 60-unit affordable housing development, which will be constructed in two phases. The first phase proposes the construction of 45 units and the second phase (15 units) to be constructed contingent upon upgrades to the town's sewer system. Housing for Phase I will be provided in 10 buildings with an additional office/community building (11 buildings total), associated parking areas, and stormwater management. The access road from Edgartown-Vineyard Haven Road will enter the site in the southeastern corner, then curve toward the central portion of the site, avoiding the mounded landform. Parking and access drives will be located behind the buildings to create a walkable community. In addition to the housing, the design incorporates a central common green space with interior pedestrian pathways and connections to walking trails. A woodland walking trail is proposed to connect to Old Holmes Hole Road, an ancient way (Photo 5).

The concept design is shown on the attached plan prepared by Horsley Witten Group, Inc. (HW) (**Attachment C**).

Photo 5. View of Old Holmes Hole Road located north of the Southern Tier project site.

The project layout concentrates development to the southern and western portions of the site, occupying 212,112 SF (4.87 acres) for the full buildout (both Phases I and II) and allowing for preservation of a portion of the existing habitat 81,590 SF (1.87 ac) of the existing forested habitat as protected open space (Table 1) This land is contiguous with abutting conservation lands (Southern Woodland Reservation). Proposed landscaping will focus on native species supplemented with ornamental landscape plantings and where feasible, temporary grading along roads adjacent to undisturbed forested habitat will be revegetated with similar species, including pitch pine and huckleberry to preserve the long-term habitat surrounding the proposed housing development.

Table 1. Summary of Imperial Moth Habitat Disturbance and Anticipated Mitigation

	Land Area	
	(SF)	(ac)
Total Land (Map 50, Parcel 31)	337,913	7.78
Total Mapped Imperial Moth Habitat	167,024	3.84
Area of Habitat Disturbance (Phases I &2)	215,197	4.87
Mitigation Available		
Habitat Preservation	81,590	1.87

The first phase of the project (45-units) will be serviced with an on-site enhanced innovative/alternative (IA) nitrogen reducing wastewater system (KleanTu®); the system and reserve leach fields are concentrated outside of the Zone II. The project will be on Town water. As noted, construction of the second phase will be predicated on future upgrades to the Towns sewer treatment system, which are not anticipated to occur in the near future (approximately 5-10 years or more). In accordance with the Town RFP, the overall project design also includes potential future development of an access road leading to lands to the north of this site where the Town's 2017 Housing Production Plan and 2019 Master Plan identify the potential for additional housing development. As discussed with NHESP during a meeting on July 19, 2022, this potential future project to the north is separate from the currently proposed Southern Tier plan and this future development is also predicated on long-term upgrades to the Town's wastewater treatment system. The approximate location of this future road is shown along the eastern property line in **Attachment C**.

4.0 HABITAT IMPACTS AND ANTICIPATED MITIGATION

Most of the site is a pitch pine-oak woodland which is a characteristic habitat for the Imperial Moth, and the larvae of this species feeds exclusively on pitch pine trees which is a dominant species at the site, particularly in the central portion and along the mounded landform as seen in the aerial image (see **Attachment A**, Figure 2).

The proposed development will result in a loss of this vegetation and habitat for this State-threatened Imperial Moth. Through discussions with NHESP, the project design has been modified from an earlier iteration where habitat impacts were accounted for only within mapped habitat areas. The modified project plans avoid and minimize impacts to the greatest extent practicable within both mapped habitat and within adjacent interstitial habitat by maintaining total site disturbance of currently unaltered forested habitat to less than five acres and clustering the development to reduce habitat fragmentation. It is anticipated that the project will not result in a regulatory Take of this species with the current design.

The proposed project also provides mitigation measures including habitat preservation of 1.87 acres of the existing pitch pine-oak forest as conservation land to maintain connectivity with the Southern Woodland Reservation, which is also mapped Priority Habitat, as well as incorporating native plantings within the landscape design and restoration plantings to the extent practicable along graded slopes adjacent to undisturbed areas.

Formal preservation of this woodland will maintain connectivity to the Southern Woodlands Reservation and adjacent parcels which are also classified as priority habitat for the Imperial Moth. Placement of this portion of woodland under permanent habitat protection will allow additional protection of an area of contiguous wildlife habitat for a variety of species, including the Imperial Moth, and will further the interests of habitat protection and contribute to the protection of Imperial Moth habitat.

5.0 SUMMARY

The project site consists of approximately 7.8 acres of undeveloped forested land that is fairly uniform in its habitat composition with concentrations of pitch pin in the central and northern sections. The undeveloped forested land provides suitable habitat for the state-listed

Threatened Species, the Imperial Moth. It is anticipated that the proposed housing development project will not result in a regulatory Take of this species, as the disturbance is less than 5 acres. As mitigation for impacting 4.87 acres of priority habitat, the project proponents are looking to preserve 1.87 of the forested woodland in the north/northeast of the site as formal protected open space that will also maintain connectivity to Southern Woodland Reservation and adjacent properties which serve as priority habitat for the Imperial Moth.

6.0 REFERENCES

Affirmative Investments & Island Housing Trust. (2021). *Request for Proposals for Selection of Developer Southern Tier Property Development*.

Oak Bluffs Planning Board Master Plan Update Committee. (2019). *Oak Bluffs Comprehensive Master Plan*.

Request for Proposals for Selection of Developer Southern Tier Property Town of Oak Bluffs Draft. (2021).

RKG Associates Inc & Weston & Sampson (2020). *Feasibility Study of Town-Owned Land Oak Bluffs, Massachusetts.*

Attachment B – NHESP Fact Sheet

Natural Heritage & Endangered Species Program

www.mass.gov/nhesp

Massachusetts Division of Fisheries & Wildlife

Imperial Moth
Eacles imperialis

State Status: **Threatened**
Federal Status: **None**

DESCRIPTION: The Imperial Moth (*Eacles imperialis*) is a large, colorful saturniid moth. The male has a forewing length of 47-59 mm, while the female is even larger, with a forewing length of 58-68 mm (Tuskes et al. 1996). Both the forewing and the hind wing are bright yellow, with purplish to reddish-brown postmedial lines and a variable amount of shading of the same color. As compared to the female, the male often has more shading at the outer wing margins and in the basal area of the wings. Both sexes have a variable amount of dark brown to black speckling on both the forewing and hind wing. Also, both sexes have round, purplish to reddish-brown reniform and subreniform spots on the forewing, the center of each spot filled with gray; as well as a similar discal spot on the hind wing. The head, thorax, and abdomen are the same bright yellow as the wings, with purplish to reddish-brown patches on the thorax and transverse bands on the abdomen.

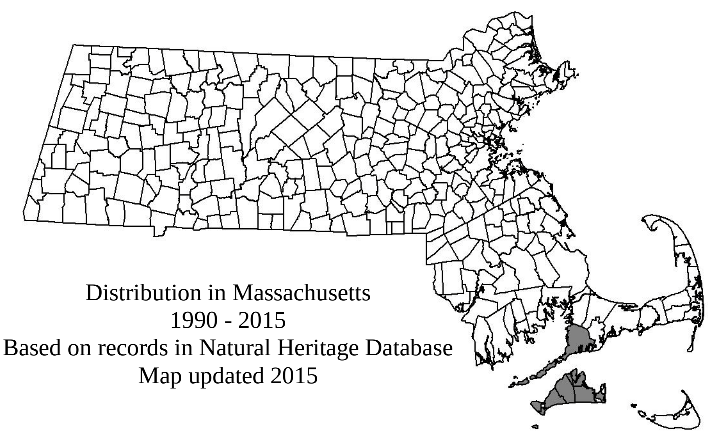
Eacles imperialis, female ▪ From MA: Dukes Co., West Tisbury, adult female collected 18 Jul 2003 by P.Z. Goldstein, L. Raleigh, and T. Simmons, reared from egg, adult emerged 3 Aug 2004

Adult Flight Period in Massachusetts

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HABITAT: In Massachusetts, the Imperial Moth inhabits pitch pine-scrub oak barrens, pitch pine woodland, and pitch pine-oak woodland.

LIFE HISTORY: In Massachusetts, adult Imperial Moths emerge in late June and July, with peak emergence in late July; the flight period ends in early August (Goldstein 2010). Larvae feed almost exclusively on pitch pine (*Pinus rigida*) (Goldstein 2010), although there have been occasional reports of late instar larvae on oaks (*Quercus*). Larvae are fully grown by September, at which time they burrow into the soil and pupate. The pupa overwinters.



Distribution in Massachusetts
1990 - 2015
Based on records in Natural Heritage Database
Map updated 2015

GEOGRAPHIC RANGE: The Imperial Moth is widely distributed in eastern North America, from Massachusetts south to Florida, and west to Nebraska and Texas (Tuskes et al. 1996). It has declined dramatically in New England during the past 100 years, with the only surviving population in the region now restricted to Martha's Vineyard, Massachusetts (Goldstein 2010). Occasionally, individuals that presumably originated from Martha's Vineyard are found on the Elizabeth Islands or the nearby mainland.

STATUS AND THREATS: The Imperial Moth is threatened by habitat loss and fire suppression. Other potential threats include introduced generalist parasitoids, aerial insecticide spraying, clear-cut timber harvest, and light pollution.

Literature Cited

Goldstein, P.Z. 2010. Life history of the Imperial Moth *Eacles imperialis* (Drury) (Saturniidae: Ceratocampinae) in New England, U.S.A.: distribution, decline, and nutritional ecology of a relictual islandic population. *Journal of Research on the Lepidoptera* 42: 34-49.

Tuskes, P.M., J.P. Tuttle, and M.M. Collins. 1996. *The Wild Silk Moths of North America: A Natural History of the Saturniidae of the United States and Canada*. Cornell University Press, Ithaca, New York. 250 pp.

Authored by M.W. Nelson, NHESP Invertebrate Zoologist, April 2015

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

APPENDIX H

Stormwater Operations and Maintenance Manual
(Separate Cover)