HOWARD STEIN HUDSON
Engineers + Planners

SUPPLEMENTAL DATA REPORT

Proposed Age Restricted Housing Development

797 Boston Road

Groton, Massachusetts

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Contents

Existing Conditions

The subject site is located at 797 Boston Road in Groton, MA. The site consists of one corner parcel totaling 117,594 square feet (2.7 acres). The subject site is located within the Residential-Agricultural zoning district and the Water Resources Protection Overlay District III, located at the signalized intersection of Forge Village Road (Route 225) and Boston Road (Route 119) in Groton. Residential abutters, commercial spaces, and small businesses surround this property on all sides.

The existing topography has a 1-5% grade sloping from northwest to the east and southeast, with elevations ranging from 269 to 260 feet, allowing runoff to cultivate on the southeast side of the property. The property previously had a wooden barn with gravel access from both Boston Road and Forge Village Road. This barn has since been removed and has gravel sections and remnants of where the structure used to remain on the site. The property is primarily cleared of trees except for a small section of woods near the intersection of Forge and Boston Road and adjacent to the residential abutters to the east.

The site has soil categorized as Quonset Sandy Loam, corresponding to Hydrologic Group A. Soil testing conducted on site confirms this soil type. The existing property has no impervious surfaces other than the remaining gravel sections and a small section of concrete which is to be removed. Additionally, the site does not feature any stormwater treatment and most of the site flows downhill towards an existing depression onsite adjacent to the eastern abutter.

The existing electricity is overhead, connecting from a utility pole located on Forge Village Road to the north side of the site. The underground water line connection is also from Forge Village Road connecting to the north side of the property. No sewerage connection exists for the site as it is located just outside the sewer district improvements.

The site hydrology is simple with the edge of the watershed starting at the back of the existing sidewalk at the intersection of Forge Village Road and Boston Road and flowing down and across the site to the southeast where it eventually enters the existing depression at the bottom corner of the site prior to overflowing to the eastern abutters downslope denoted as Analysis Point #1 (AP1).

Proposed Conditions

The project calls for the construction of two-twelve (12) unit age restricted housing buildings with associated parking, utilities, drainage, and amenities. The project is comprised of two, two-story buildings, each with 12 one-bedroom units and 12 two-bedroom units. The units are proposed at 50% affordability per the requirements of age restricted housing in Groton. A proposed driveway will be

constructed in a one-way direction entering and exiting onto Forge Village Road (Route 225). Parking and impervious surfaces are increased from the existing condition but remain under the impervious requirements with the addition of porous pavement

The site access is a one-way driveway which will loop off and back onto Forge Village Road (Route 225) in a counterclockwise direction through the parking for the development. The development proposes 36 parking spaces, including 4 accessible spaces, along the driveway near the building entrances located on either side of the parking areas. The proposed impervious surface will increase to 22%± and comply with the Town of Groton requirements. Green space will be created surrounding each of the buildings, with a large open space on the west side of the parcel creating a buffer between the proposed residential units and the existing signalized intersection. The existing wooded areas at the intersection of Boston Road and Forge Village Road will remain intact and the woodland adjacent to the eastern abutters will remain primarily intact with some small adjustment to accommodate the proposed dumpster and parking lot grading to tie back into the existing topography. Pedestrian access will be improved around the site with entryways on the sides and front of the buildings facing the parking lot and driveway. Additionally, sidewalk connections have been proposed along Boston Road and Forge Village Road to improve pedestrian connectivity from this development.

All stormwater onsite is routed and infiltrated into the ground through a single section of porous pavement located through the parking section of the development. The driveway and parking spaces infiltrate through the top of the porous pavement. The stormwater from the roofs of the two buildings flows through roof drains to the subbase of the porous pavement for infiltration into the ground. The site also accepts stormwater from Forge Village Road which flows through a Rain Guardian Foxhole and is collected by a yard drain. There are other yard drains that collect stormwater from grassed areas around the two proposed buildings. All stormwater collected from yard drains is also piped to the subbase of the porous pavement for infiltration. Any potential overflow will be captured via a perforated underdrain overflow within the porous pavement system and be directed towards the existing low point onsite and eventually to Analysis Point #1.

Stormwater Management Standards

Standard 1: No new untreated discharges

The Massachusetts Stormwater Handbook requires that the project demonstrates that no new stormwater conveyances (e.g. outfalls) discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The proposed project will not discharge stormwater directly to, or cause erosion in, wetlands or water of the Commonwealth and will treat stormwater prior to discharge or infiltration.

BMP's have been proposed to treat stormwater collected from the paved areas. The overflow discharges have been designed to outlet to flared end sections with riprap to minimize any erosion. There are no vegetated wetlands present on the site. In the 2-year storm event there is no discharge from the BMPs so the need to determine a stormwater discharge velocity is not applicable.

Standard 2: Post-development peak discharge rates not to exceed pre-development peak discharge rates.

Post-development peak discharge rates and total runoff volumes do not exceed the pre-development peak discharge rates and total runoff volumes for all storm events. The proposed condition reduces rates by collecting and controlling the stormwater runoff within the porous pavement stormwater management system.

Storm Event	2-year	10-year	25-year	100-year
Pre-Development Rates (cfs) AP1	0.00	2.18	4.49	7.26
Volume (cf)	0.00	3,483	9,576	20,740
Post-Development Rates (cfs) AP1	0.00	0.00	0.28	2.65
Volume (cf)	0.00	0.00	471	4,989
Rate Reductions (cfs)	**0.00**	**-2.18**	**-4.21**	**-4.61**
Volume Reductions (cf)	**0.00**	**-3,483**	**-9,105**	**-15,751**

Standard 3: Minimize or eliminate loss of annual recharge to groundwater.

Groundwater recharge will be accomplished by directing stormwater runoff from impervious surfaces to designed areas of infiltration into the ground. As shown in the table summary for Standard 2, the project decreases the total volume of runoff for all storm events. This reduction in volume is generated by collecting, treating, and infiltrating a significant portion of the proposed impervious surfaces created on site through the porous pavement.

Recharge Volume Requirement:

Rv = F x impervious area

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 (including porous sections) and rooftop area

Recharge volume for the entire site:

Soil A:

Rv=0.60 in * 45,408 sf (see note above) * 1 ft / 12 in **= 2,270 cf recharge**

Soil B:

No B soils were found on site.

Soil C:

No C soils were found on site.

Soil D:

No D soils were found on site.

Total recharge required:

Rv= **2,270 cf total recharge required**

Total recharge provided:

Porous Pavement = 5,185 cf below outlet

Existing Site Depression= 4,588 cf below outlet

Total site recharge provided = 9,773 cf recharge volume > 2,270 cf required

Drawdown Within 72 Hours

Porous Pavement: 5,185 cf / [(2.41 in/hr)(1 ft/12 in)(10,986 sf)] = **2.4 hours < 72 hours, OK**

Infiltration Basin: 4,588 cf / [(2.41 in/hr)(1 ft/12 in)(2,056 sf)] = **11.1 hours < 72 hours, OK**

Water Quality Volume

Calculated as V*wq* = (Dwq/12 inches/foot) * (A*imp* * 43,560 square feet/acre), where:

V*wq* = required water quality volume (in cubic feet)

D*wq* = water quality depth: one-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hour or greater; ½ inch for discharges near or to other areas.

Aimp = impervious area (in sf)

Aimp = Impervious Area of Subcatchments = 45,408 sf

Dwq = 1 inch

*Vwq = (1 inch / 12 inches / foot) * (45,408 sf) = 3,784 cf*

Total Water Quality Volumes from proposed BMP's = 5,185 cf + 4,588 cf = 9,773 cf

9,773 cf > 3,784 cf OK

Porous Pavement:

Porous pavement = (1 inch / 12 inches / foot) * (44,467 sf) =3,706 cf

Volume provided below outlet = 5,185 cf

5,185 cf > 3,706 cf OK

Infiltration Basin:

Porous pavement = (1 inch / 12 inches / foot) * (941 sf) = 78 cf

Volume provided below outlet = 4,588 cf

4,588 cf > 78 cf OK

*This section of impervious sidewalk which flows overland towards the existing infiltration basin is considered clean

Ferguson Rain Guardian Foxhole:

Ferguson Rain Guardian Foxhole rated for 88% removal up to 0.25 cfs
Ferguson Rain Guardian Foxhole rated for 79% removal up to 0.50 cfs

Flow rate associated with Ferguson Rain Guardian Foxhole:
Q = (qu)*(A)*(WQV), where:
Q = Peak flow rate associated with first 1-inch of runoff
qu = the unit peak discharge, in csm/in (774 csm/in for Tc associated with 6 minutes)
A = impervious surface drainage area (in square miles) = 10,426 sf = 0.000374 square miles
WQV = water quality volume in watershed inches

Q = (774 csm/in)*(0.000374 square miles)*(1 inch)
Q = 0.29 CFS

Required Capacity = 0.29 CFS
Ferguson Turret 79% Removal Capacity = 0.50 CFS

0.50 CFS > 0.29 CFS, OK 79% Pretreatment

Annual Sediment Volume

Per Town of Groton Stormwater Regulations, all pretreatment devices should be designed to hold an annual sediment loading.

Required Capacity = A_s * (500 lb/Acre-Storm / 90 lb/ft^3) * 10 storms/year

A_s = Area to be sanded (acres) = 0.19

Required Capacity = **10.5 ft^3**

Sediment Forebay Capacity = **23 ft^3**

23 ft^3 > 10.5 ft^3 OK

Standard 4: Stormwater management system to remove 80% of the average annual load of Total Suspended Solids (TSS)

The stormwater management system is designed to remove >80% annual total suspended solids (TSS) from the proposed onsite impervious.

The stormwater management system is designed to remove 80% of the average annual total suspended solids (TSS) from the proposed development.

TSS Removal Calculation

Treatment Train #1: to Porous Pavement

- Porous Pavement: 80% TSS Removal with incorporated treatment course.

  100% * 80% = **80%**
  100% - 80% = 20%

TSS Removal of the proposed drainage = 80%

Treatment Train #2: Foxhole to Porous Pavement

- Foxhole Pretreatment: 79% (See Flow Based Calcs)

  100% * 79% = 79%
  100% - 79% = 21%

- Porous Pavement: 80% TSS Removal with incorporated Pre-Treatment

  21% * 80% = 16.8%
  21% - 16.8% = 4.2%

TSS Removal of the proposed drainage = 95.8%

Treatment Train #3: Overland Flow to Infiltration Basin

- Infiltration: 80%

  100% * 80% = 80%
  100% - 80% = 20%

TSS Removal of the proposed drainage = 80%

Site-wide Weighted TSS Removal Calculation

- Treatment Train #1

  Percentage of Site Impervious = 34,041 sf / 45,408 sf = 75%

  Weighted TSS Removal = 80% * 75% = 60%

- Treatment Train #2

  Percentage of Site Impervious = 10,426 sf / 45,408 sf = 23%

  Weighted TSS Removal = 95.8% * 23% = 22%

- Treatment Train #3

  Percentage of Site Impervious = 941 sf / 45,408 sf = 2%

  Weighted TSS Removal = 80% * 2% = 1.6%

Total Site-Wide TSS Removal = 60% + 22% + 1.6% = 83.6%

Standard 5: Land uses with higher potential pollutant loads.

The proposed development is not considered a land use that generally produces higher potential pollutant loads.

Standard 6: Stormwater discharges to critical areas

This site is not located within or adjacent to a Critical Area.

Standard 7: Redevelopment projects

The project is not considered a redevelopment project.

Standard 8: Control construction-related impacts

The project will install erosion and sediment controls prior to any earthwork activity. Erosion control barriers will be placed down slope from the proposed construction and along Forge Village Road to prevent roadway intrusion, to prevent erosion and sedimentation into the surrounding areas. The barriers will be maintained and inspected periodically during construction; sediment buildup will be removed, and any damaged barrier will be replaced as needed. See site plan SWPPP once submitted.

Standard 9: Long-term operation and maintenance plan

See Appendix A for the operation and maintenance requirements of the stormwater management system.

Standard 10: No illicit discharges

An illicit discharge compliance statement will be provided by the property owner under separate cover.

Appendix A: Operation and Maintenance Plan

Porous Pavement

System Owner: 119 Partners LLC (Or Future Owner)
(Per DEP Stormwater Structural BMP's Vol 2)

In most porous pavement designs, the pavement itself acts as pretreatment to the stone reservoir below. Consequently, frequent cleaning and maintenance of the pavement surface is critical to prevent clogging. To keep the surface clean, frequent vacuum sweeping along with jet washing of asphalt and concrete pavement is required. No winter sanding shall be conducted on the porous surface. As discussed, designs that include an "overflow edge" provide a backup in case the surface clogs. If the surface clogs, stormwater will flow over the surface and into the trench, where some infiltration and treatment will occur. For proper maintenance:

- Post signs identifying porous pavement areas.
- Minimize salt use during winter months. If drinking water sources are located nearby (see setbacks), porous pavements may not be allowed.
- No winter sanding is allowed.
- Keep landscaped areas well maintained to prevent soil from being transported onto the pavement.
- Clean the surface using vacuum sweeping machines monthly. For paving stones, periodically add joint material (sand) to replace material that has been transported.
- Regularly monitor the paving surface to make sure it drains properly after storms.
- Never reseal or repave with impermeable materials.
- Inspect the surface annually for deterioration or spalling.
- Periodically reseed grass pavers to fill in bare spots.
- Attach rollers to the bottoms of snowplows to prevent them from catching on the edges of grass pavers and some paving stones.

Date	Inspector	Condition	Maintenance Performed*

***Evidence of maintenance (i.e. receipts) must be provided.**

Ferguson Rain Guardian Foxhole

System Owner: 119 Partners LLC (Or Future Owner)
(Per DEP Stormwater Structural BMP's Vol 2)

Depending on the characteristics of the contributing watershed and seasonal variation, common maintenance needs include periodic removal of accumulated leaves (and other organic debris) and garbage from the top grate and sediment and fine debris from the concrete dry filter box. The Rain Guardian will have surface trash removed monthly via handpicking and shall be cleaned at least four times per year. More frequent cleanings may be needed, and the unit shall be checked for debris, clogging, and sediment levels after each rain event.

If sediment accumulates beyond an acceptable level in the system, it will be necessary to remove. This can be done by manual removal with a shovel or mechanical device. The filter screen can be cleaned manually through brushing or with pressurized water.

Date	Inspector	Condition	Maintenance Performed*

***Evidence of maintenance (i.e. receipts) must be provided**

Yard Drains

System Owner: 119 Partners LLC (Or Future Owner)
(Per DEP Stormwater Structural BMP's Vol 2)

See Manufacturer Specification*

Date	Inspector	Condition	Maintenance Performed*

***Evidence of maintenance (i.e. receipts) must be provided**

Sediment Forebay

System Owner: 119 Partners, LLC (Or Future Owner)
(Per DEP Stormwater Structural BMP's Vol 2)

In many cases, a landscaping contractor working elsewhere on the site can complete maintenance tasks. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments.

Inspect and clean out the sediment forebay to assure that sediments and associated pollutants are cleaned out. Frequently removing accumulated sediments will make it less likely that sediments will be resuspended. At a minimum, inspect the sediment forebays monthly and clean them out at least four times a year.

Mow the grass areas and keep the grass height no greater than 6 inches. Check for signs of rilling and gullying and repair as needed. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or resodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while the seeds germinate and develop roots.

Date	Inspector	Condition	Maintenance Performed*

Infiltration Basin

System Owner: Dunstable Ledge, LLC
(Per DEP Stormwater Structural BMP's Vol 2)

In many cases, a landscaping contractor working elsewhere on the site can complete maintenance tasks. Inspect the basin and outlet structure to ensure no structural damage has occurred and that they are functioning properly and up to design standards.

Inspection and preventive maintenance is required at least twice per year, and after each major storm event. Note how long water remains standing in the basin after a storm. If water remains standing after 48 to 72 hours after a storm, the infiltration basin may be clogged.

At least twice per year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings, accumulated organic matter, trash and debris at this time.

Remove sediment from the basin as necessary when the basin is dry. Use light equipment when removing the top layer, as to not compact the underlying soil. Use deep tilling to break and remove any clogged surfaces and revegetate immediately.

Important items to check during inspections include:

- Signs of differential settlement
- Cracking
- Erosion
- Leakage in the embankments
- Tree growth on the embankments
- Condition of rip rap
- Sediment accumulation
- Health of vegetation, turf

Date	Inspector	Condition	Maintenance Performed*

***Evidence of maintenance (i.e. receipts) must be provided**

Riprap at Flared End Sections

System Owner: 119 Partners, LLC (Or Future Owner)

Riprap is pertinent to the protection of slopes and other areas subject to erosion by the flow of stormwater. Proper maintenance helps to reduce the impact of erosion and ensure the longevity of slope stability.

Riprap shall be checked at least annually and after every major storm event for displaced stones, slumping, and erosion at edges, especially downstream or downslope. If riprap has been damaged, it should be repaired immediately before further damage occurs.

Woody vegetation should be removed from the rock riprap annually. Tree roots and other debris can aid in dislodging riprap and causing erosion.

Date	Inspector	Condition	Maintenance Performed*

Appendix B: Erosion and Sediment Control Notes and Construction General Sequence

Erosion and Sediment Control Notes

A. Erosion and sediment control measures must be installed prior to the start of construction and maintained and upgraded as necessary during construction by the contractor. It is the contractor's responsibility to inspect and install additional control measures as needed during construction.
B. All catch basins receiving drainage from the project site must be provided with a catch basin filter.
C. Stabilization of all re-graded and soil stockpile areas must be maintained during all phases of construction.
D. Sediment removed from erosion and sediment control devices must be properly removed and disposed. All damaged erosion controls must be removed and replaced.
E. The contractor is responsible for implementing the erosion and sediment control plan. This includes the installation and maintenance of control measures, informing all parties engaged on the construction site of the requirements and objectives of the plan, and notifying the proper city agency of any transfer of this responsibility.
F. The contractor shall be responsible for controlling wind erosion and dust throughout the life of his contract. Dust control may include, but is not limited to, sprinkling of water on exposed soils and street sweeping adjacent roadways.
G. If final grading is to be delayed for more than 21 days after land disturbance activities cease, temporary vegetation or mulch shall be used to stabilize soils within 14 days of the last disturbance.
H. If a disturbed area will be exposed for greater than one year, permanent grasses or other approved cover must be installed.
I. The contractor must keep on-site at all times additional silt fence and hay bales for the installation at the direction of the engineer or the city to mitigate any emergency condition.
J. The construction fencing and erosion and sediment controls as shown may not be practical during all stages of construction. Earthwork activity on-site must be done in a manner such that runoff is directed to a sediment control device or infiltrated to the ground.
K. Demolition and construction debris must be properly contained and disposed of.
L. Disposal of all demolished materials is the responsibility of the contractor and must be hauled off-site in accordance with all federal, state and local requirements.

General Construction Sequence

1. Install erosion and sediment controls prior to starting any earthworks activity.
2. Begin clearing, grubbing and demolition.
3. Begin road grading and utility installations.
4. Construct building foundation.
5. Install site furnishings.
6. Install landscaping.
7. Erosion and sediment controls shall be maintained until permanent cover is established.

Appendix C: Rain Guardian Foxhole

RAIN GUARDIAN TURRET AND FOXHOLE
ENGINEERING PROPERTIES

RAIN GUARDIAN TURRET:

Turret Flow Rate Capacity:

Outflow is possible through three locations. Please note the vertical filter within the chamber was assumed to be 100% clogged because its primary function is to allow the chamber to dry out between rain events.

1) Filter overflow – water can pass between the top of the filter and the bottom of the metal grate; calculated using the continuity equation (i.e. Q=V*A)

2) Grate overflow – water can pass through the top metal grate beyond the vertical filter wall; calculated using an orifice equation (i.e. $Q=0.0108*A*\sqrt{d}$)

3) High volume overflow – water can overtop the front debris wall onto the splash pad; calculated using a standard broad crested weir equation (i.e. Q=C*L*H^(3/2))

Filter overflow – 0.45 CFS

Grate overflow – 2.59 CFS

Emergency overflow - 0.41 CFS

TOTAL: 3.45 CFS

Turret Internal Storage Vol: (i.e. storage capacity below the top of the filter wall): **4.02 ft^3**

RAIN GUARDIAN FOXHOLE:

Below are the flow and storage data for the Rain Guardian Foxhole with an inlet, middle, and outlet (i.e. 6' top lid). (the addition of mid section (for longer units) would improve the sediment storage capacity).

Foxhole Flow Rate Capacity:
Outflow is possible through three locations. Please note the vertical filter within the chamber was assumed to be 100% clogged because its primary function is to allow the chamber to dry out between rain events.

1) Filter overflow – water can pass between the top of the filter and the bottom of the metal grate; calculated using the continuity equation (i.e. Q=V*A)

2) Grate overflow – water can pass through the top metal grate beyond the vertical filter wall; calculated using an orifice equation (i.e. $Q=0.0108*A*\sqrt{d}$)

3) High volume overflow – water can overtop the front debris wall onto the splash pad; calculated using a standard broad crested weir equation (i.e. $Q=C*L*H^{(3/2)}$)

Filter overflow – 0.30 CFS

Grate overflow – 2.69 CFS

Emergency overflow - 0.52 CFS

TOTAL: **3.51 CFS**

Foxhole Internal Storage Volume (i.e. storage capacity below the top of the filter wall):

Inlet + Outlet: 2.0 ft^3

Middle: 2.65 ft^3

TOTAL: **4.65 ft^3**

MODULAR CONCRETE DRY FILTER BOX

DROP-IN SPECIFICATION

November 2022

The following specification is a sample guideline to be customized by the engineer as needed for preparing a site-specific specification. This information is provided for reference purposes only and is not intended as a warranty or guarantee.

DROP-IN SPECIFICATION

MODULAR CONCRETE DRY FILTER BOX FOR SURFACE BMPS

1. AUTHORIZED PRODUCTS
   1.1. The modular concrete dry filter box shall be a Rain Guardian Foxhole Pretreatment Chamber (U.S. Patent Nos. 8,501,016 and 8,858,804).

2. AUTHORIZED SUPPLIERS
   2.1. Minnesota, Alaska, and Hawaii
      2.1.1. Anoka Conservation District
      1318 McKay Dr. NE, Suite 300
      Ham Lake, MN 55304
      (763) 434-2030 ext. 15
      AnokaSWCD.org | RainGuardian.biz
   2.2. Wisconsin
      2.2.1. Anoka Conservation District
      1318 McKay Dr. NE, Suite 300
      Ham Lake, MN 55304
      (763) 434-2030 ext. 15
      AnokaSWCD.org | RainGuardian.biz
      2.2.2. Ferguson Enterprises, LLC doing business as Ferguson Waterworks
      12500 Jefferson Avenue
      Newport News, VA 23602
   2.3. Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, and Wyoming
      2.3.1. Ferguson Enterprises, LLC doing business as Ferguson Waterworks
      12500 Jefferson Avenue
      Newport News, VA 23602

3. AUTHORIZED MANUFACTURERS
   3.1. Stoneworks Architectural Precast/Cast Stone
   11555 205th Ave. NW
   Elk River, MN 55330
   (763) 633-2200
   stoneworksap.com

4. INTRODUCTION
   4.1. Scope
      4.1.1. This specification details requirements for proper design, installation, and maintenance of a modular concrete dry filter box for surface stormwater best management practices (BMP).

4.2. Product Summary

4.2.1. A modular concrete dry filter box is a pretreatment structure installed at grade with a curb-cut or curb inlet opening that allows water to enter a high performance modular biofiltration system, bioretention, rain garden, bioswale, or similar stormwater BMP.

4.2.2. The modularity of the box (i.e. inlet, middle, and outlet sections) allows for variable box lengths to span desired distances.

4.2.3. The box includes a removable, load-bearing lid that allows nearby surface elevations (e.g. sidewalk, trail, or boulevard) to be maintained.

4.2.4. The box provides a stable inlet, reduces runoff velocities, and captures gross pollutants; therefore, simplifying the recurring sediment removal and surface erosion common with turf, rip rap, or smooth concrete inlet aprons.

4.2.5. Capturing sediment within the box helps extend the life of a downstream primary treatment BMP by reducing the sediment load and internal scour/erosion.

4.2.6. Modular concrete dry filter boxes can be installed on both new and existing projects where there are concerns about inlet stability and/or maintenance issues.

5. SPECIFICATIONS

5.1. Functional components of the modular concrete dry filter box must include the components listed below and meet the standards in Table 1.

5.1.1. Top grate

5.1.1.1. Top grate mechanically separates larger debris pieces (e.g. leaf litter and garbage) from stormwater runoff, thereby increasing storage space for sediment and finer debris within the unit. In addition, the top grate of the box must minimally support pedestrian foot traffic loads for maintenance purposes.

5.1.2. Impermeable side walls

5.1.2.1. Impermeable side walls which, when connected to a water permeable filter sidewall, create a debris and sediment trap. Chamber therefore allows heavier solids to settle and collect in an easy to clean location. The side walls also contain flow, thereby preventing inlet erosion.

5.1.3. Water permeable filter sidewall

5.1.3.1. The water permeable filter sidewall is independently connected to the impermeable side walls. The permeable filter allows for the box to dry out between runoff events, easing maintenance by preventing the need to remove sediment/debris in a slurry state. It also prevents anoxic conditions and habitat for mosquito reproduction.

5.1.4. Impermeable debris walls

5.1.4.1. Impermeable debris walls capture floatables when BMP is filled to capacity (e.g. leaf litter and seeds) and prevent transfer of floatables between the inlet and BMP.

5.1.5. High volume overflow points

5.1.5.1. The modular concrete dry filter box must provide for high volume overflow during large storm events such that water within the structure does not overtop the sidewalls, which would reduce the box's ability to retain floatables and maintain a stable inlet. The overflow points also ensure stormwater will not bypass the BMP until it reaches capacity.

5.1.6. Splash pad

5.1.6.1. The box should include a splash pad downstream of the principal (permeable filter wall) and emergency overflow (concrete weir) points to reduce scouring below the box (i.e. within the aggregate base and BMP soil).

5.1.7. Top lid

5.1.7.1. Each inlet/outlet combination and each middle section shall have a fiber reinforced plastic (FRP) composite lid with concentrated load capacity of 11,200 lbs.

5.1.8. All components must be easy to clean without specialized equipment.

Table 1: Modular concrete dry filter box standards.

MODULAR SECTION	PROPERTY OF STRUCTURE(S)	VALUE OR METHOD
Inlet, Middle, and Outlet	Steel reinforced, cold joint secured monolithic concrete structure, weight and standard exterior dimensions	INLET - 875 lbs. 2'-8.25"L x 2'-11"W x 1'-7"H MIDDLE - 965 lbs. 3'-0.5"L x 2'-11"W x 1'-7"H OUTLET - 730 lbs. 2'-6"L x 2'-11"W x 1'-7"H
Inlet, Middle, and Outlet	Concrete minimum compressive strength	4,500 psi at 28 days
Inlet, Middle, and Outlet	Concrete air entrained	5-8.5% by volume
Inlet, Middle, and Outlet	Manufactured and designed standard	ASTM C858

6. DELIVERY, STORAGE, AND HANDLING
   - 6.1. Delivery
     - 6.1.1. Delivery of a modular concrete dry filter box must be from an authorized supplier.
     - 6.1.2. Reasonable accommodations should be made to protect all materials from damage during delivery. Shipments should be inspected upon arrival to insure no damage occurred during transportation. Any damage found after delivery will be the responsibility of the contractor.
   - 6.2. Storage and Handling
     - 6.2.1. Storage prior to installation should occur on smooth surfaces, free from dirt, mud, and debris. Boxes are designed to persist in all seasons so temperature and precipitation should not be a problem.

7. INSTALLATION
   - 7.1. A modular concrete dry filter box should rest on a level, solid base to prevent settling. A well-draining aggregate base material (minimum 6" thickness) should be compacted to 95% percent standard proctor. The aggregate base should have a surface area equal to or larger than the modular concrete dry filter box base.
   - 7.2. The aggregate base location and distance behind the curb depends on site considerations but considerations should include bioretention basin side slopes and inlet slope to promote water flow into the unit.
   - 7.3. The monolithic box sections (i.e. inlet, middle, and outlet) include a 4" concrete base to provide a foundation for the chamber structure and to supply a splash pad for water entering the unit.
   - 7.4. Excavation at the unit installation location should ensure sufficient depth for the 6" aggregate base, modular concrete dry filter box base, and ponding depth of the bioretention practice. For example, if the ponding depth of the basin is

designed to be 9” and the modular concrete dry filter box base is 4”, then soil should be excavated to 1’-7” (9” ponding depth, 6” aggregate base, 4” filter box base).

7.5. Set inlet first, followed by middle section(s), and finally the outlet on the prepared aggregate base. Position outlet piece so primary outlet aligns with toe of basin side slope to avoid soil interference with removable filter wall.

7.6. Secure modular pieces at each joint using provided galvanized tie rods.

7.7. Install water permeable filter, top grate(s), and top lid(s).

7.8. Stormwater is most commonly directed into the box via a curb-cut or concrete inlet. Said inlet should be framed from the back of the curb to the unit inlet prior to pouring. Top elevations of the framing should match the top of the curb on the street side and the top of the filter box at the inlet to the box. Expansion joint material should be used between the concrete curb and modular concrete dry filter box.

7.9. Side curbs of the poured inlet must have an insurmountable profile to prevent water flow from overtopping the downstream side of the inlet.

7.10. The slope of the inlet from the gutter to the filter box must be large enough to promote the inflow of water to the filter box.

8. OPERATION

8.1. Items below assume proper installation of the modular concrete dry filter box based on design guidelines.

8.1.1. Stormwater entering the box via a curb-cut or concrete inlet must pass through the top grate. The grate provides for mechanical sorting of larger debris such as leaves and garbage.

8.1.2. Once in the box, the vertical, permeable filter wall allows for settling within the box and filtration of stormwater through the permeable filter screen. Should the filter screen clog or the unit fill, maintenance will be required.

8.1.3. As the box and BMP fill, the water level rises and the top debris walls of the box restrict floatable debris from entering or exiting the BMP.

8.1.4. Cold climate suitability

8.1.4.1. During winter, modular concrete dry filter boxes will likely become buried in snow and ice which is no different from any other inlet type. Runoff will likely continue to enter the box beneath the snow or when an open pathway is formed during snowmelt. When properly designed and installed, modular concrete dry filter boxes will not shift or separate from the inlet as the ground freezes and thaws.

9. MAINTENANCE

9.1. Depending on the characteristics of the contributing watershed and seasonal variation, common maintenance needs include periodic removal of accumulated leaves (and other organic debris) and garbage from the top grate and sediment and fine debris from the modular concrete dry filter box. Contributing watersheds with high sediment concentrations may require up to monthly or twice monthly visits to satisfy maintenance needs.

9.2. If sediment accumulates beyond an acceptable level in the system, it will be necessary to remove. This can be done by manual removal with a shovel or vacuum device. The filter screen can be cleaned manually through brushing or with pressurized water.

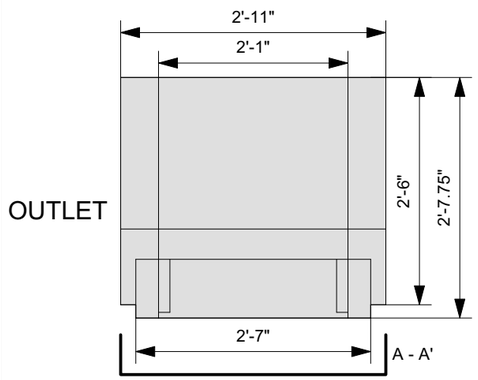
10. PAYMENT

10.1. Payment of modular concrete dry filter boxes shall be based on a per unit price and may or may not include delivery of the box to the project site. The contractor is responsible for determining the style/configuration of box needed.

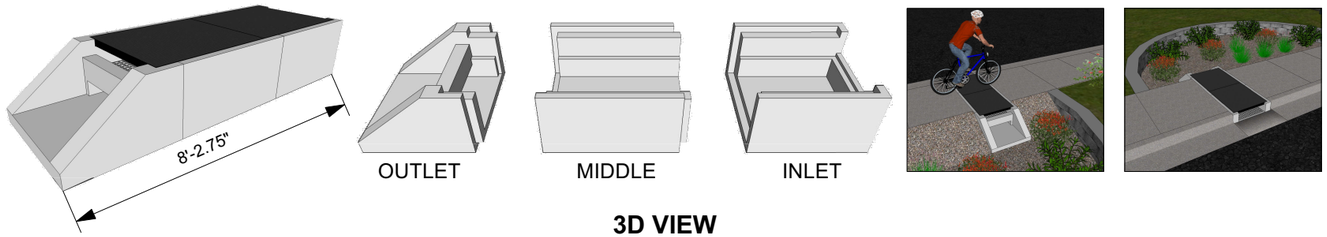
10.2. Total cost will be provided by the distributor based on unit costs requested delivery fees, handling fees, and associated taxes.

RAIN GUARDIAN™ FOXHOLE

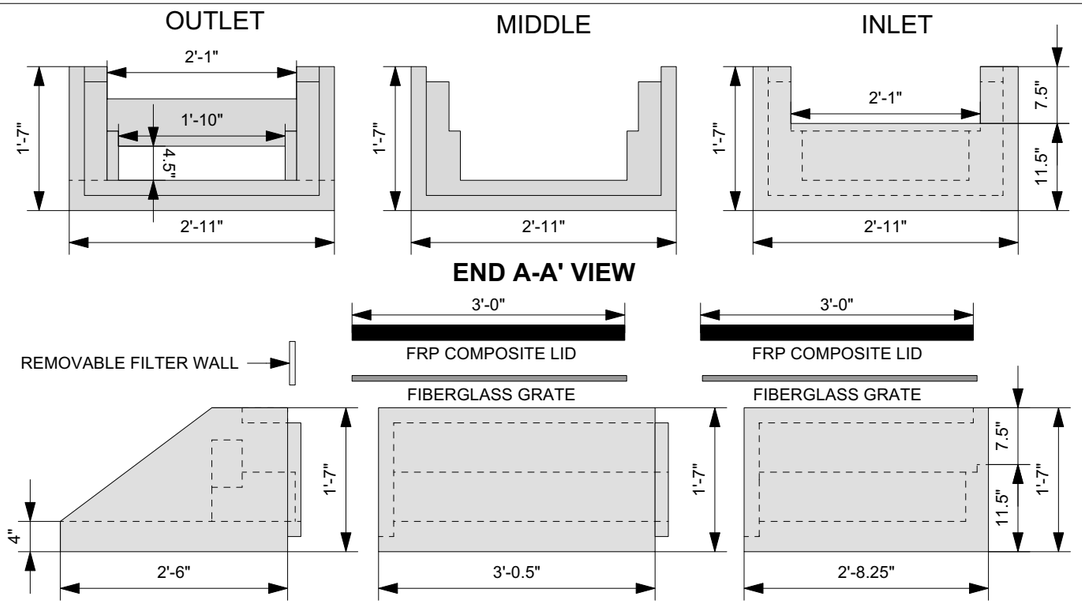
TYPICAL DETAIL



PLAN VIEW

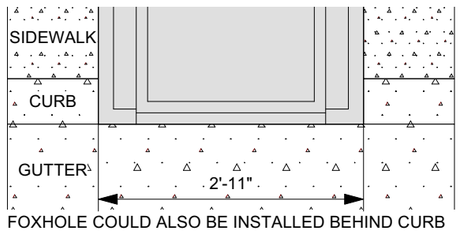


3D VIEW



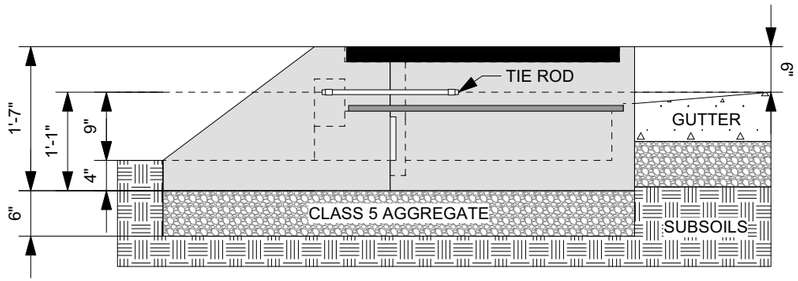
END A-A' VIEW

ELEVATION VIEW



FOXHOLE COULD ALSO BE INSTALLED BEHIND CURB

INSTALLED PLAN VIEW - INLET ONLY



INSTALLED ELEVATION VIEW - INLET/OUTLET ONLY

SPECIFICATIONS

1. STEEL REINFORCED, COLD JOINT SECURED MONOLITHIC CONCRETE STRUCTURES (INLET 875 LBS, MIDDLE 965 LBS, AND OUTLET 730 LBS). CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,500 PSI AT 28 DAYS. CONCRETE AIR ENTRAINED (5% TO 8.5% BY VOLUME). MANUFACTURED AND DESIGNED TO ASTM C858.
2. 2-POINT PICK USING RECESSED LIFTING POCKETS WITH A STANDARD HOOK.
3. FIBERGLASS GRATE (11 LBS/PIECE).
4. FRP COMPOSITE LID (38 LBS/PIECE) WITH CONCENTRATED LOAD CAPACITY OF 11,200 LBS.

INSTALLATION NOTES

1. INSTALL A CLASS 5 BASE (COMPACTED TO 95% STANDARD PROCTOR). IT IS CRITICAL THAT THE CLASS 5 BASE IS EVEN TO ENSURE THE FOXHOLE PIECES ALIGN VERTICALLY SUCH THAT THE TOP LIDS LAY FLUSH WITH THE TOP OF THE FOXHOLE PIECES AND ADJACENT BOULEVARD, SIDEWALK, OR PATH. THE DISTANCE FROM THE BACK OF THE CURB MAY VARY BASED ON SITE CONDITIONS. EXCAVATE 1' 7" BELOW THE GUTTERLINE ELEVATION (I.E. THE BIORETENTION OVERFLOW ELEVATION) TO ACCOMMODATE THE 9" PONDING DEPTH, 6" CLASS 5 AGGREGATE, AND 4" RAIN GUARDIAN FOXHOLE BASE (INCLUDED). THEREFORE, THE TOP OF THE CLASS 5 COMPACTED BASE IS PRECISELY 1' 1" BELOW THE GUTTERLINE ELEVATION. THE TOP OF THE RAIN GUARDIAN FOXHOLE INLET POINT WILL BE 7-1/2" ABOVE THE TOP OF THE CONCRETE BASE AND 1-1/2" BELOW THE GUTTERLINE ELEVATION TO ACCOMMODATE A SLOPED INLET FROM THE GUTTER TO THE RAIN GUARDIAN FOXHOLE.

2. SET RAIN GUARDIAN FOXHOLE INLET FIRST, FOLLOWED BY MIDDLE SECTION(S), AND FINALLY THE OUTLET ON THE PREPARED CLASS 5 BASE. POSITION RAIN GUARDIAN FOXHOLE OUTLET PIECE SO PRIMARY OUTLET ALIGNS WITH TOE OF BASIN SIDE SLOPE TO AVOID SOIL INTERFERENCE WITH REMOVABLE FILTER WALL.

3. SECURE MODULAR FOXHOLE PIECES AT EACH JOINT USING PROVIDED GALVANIZED TIE RODS.

4. INSTALL EXPANSION/CONTRACTION JOINT MATERIAL OR A SHEET OF POLY TO SERVE AS A BOND BREAK BETWEEN RAIN GUARDIAN FOXHOLE AND CONCRETE INLET BEFORE POURING INLET.

5. REMOVABLE FILTER WALL SHOULD BE INSTALLED WITH FILTER FABRIC FACING THE RAIN GUARDIAN FOXHOLE INLET.

RAIN GUARDIAN
U.S. PATENT NOS. 8,501,016 AND 8,858,804
PRETREATMENT FOR BIORETENTION
Rain Gardens • Swales • Filtration Basins • Infiltration Basins
www.RainGuardian.biz

RAIN GUARDIAN FOXHOLE
MODULAR PRETREATMENT CHAMBER
BIORETENTION PONDING DEPTH: 9"
TYPICAL DETAIL

REVISION HISTORY

REV	BY	DATE	DESCRIPTION
A	MDH	11/16/2022	MODULAR FOXHOLE
SCALE		VARIABLE	
U.S. PATENT NOS.		8,501,016 AND 8,858,804	

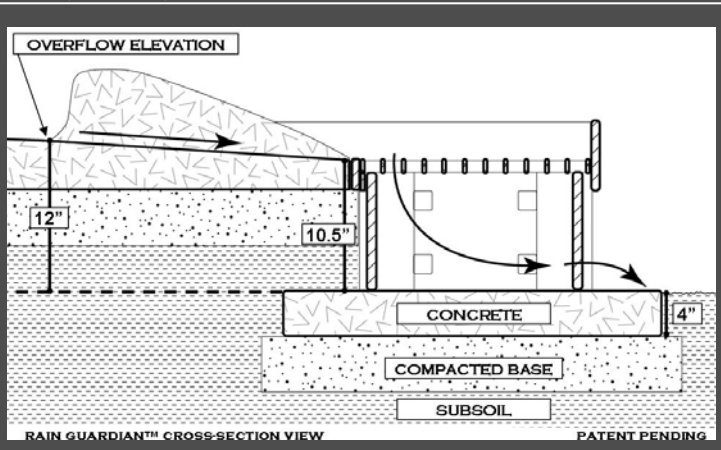
DEVELOPED BY:
ANOKA CONSERVATION DISTRICT

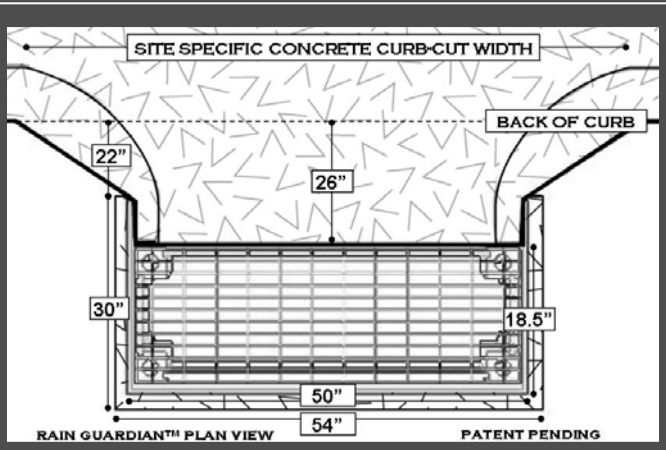
MANUFACTURED BY:
Stoneworks
ARCHITECTURAL PRECAST / CAST STONE
NATIONAL PRECAST CONCRETE ASSOCIATION CERTIFIED PLANT

Rain Guardian™ Installation

1318 McKay Dr. NE, Suite 300
Ham Lake, MN 55304
(763) 434-2030 (M-F 8:00-4:30)
www.AnokaSWCD.org

Overview



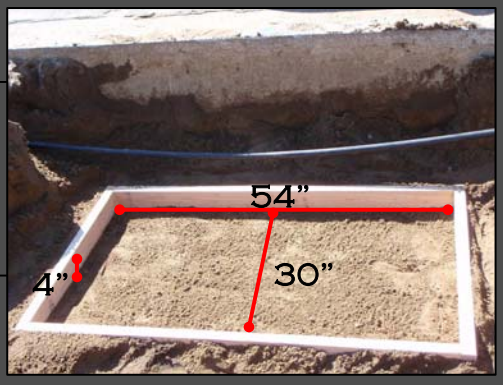


Slab dimensions, distance from curb, and chamber elevation varies with site conditions. The top of the metal grate, however, should be 1.5" - 2" below the gutter and the concrete slab should extend well beyond the filter wall to serve as a splash dissipater.

Concrete Base

Excavate 16" below the downstream gutter elevation (i.e. the rain garden overflow elevation) to accommodate the 4" concrete base. Therefore, the top of the concrete base is 12" below the rain garden overflow elevation.

The concrete base is set 22" from the back of the existing curb and centered on the proposed curb-cut. The concrete is then poured into a wooden frame with interior dimensions of 54"L x 30"W x 4"H.



Rebar is placed diagonally after 2" of concrete have been poured to provide reinforcement of the concrete base.

Rain Guardian Placement and Securing



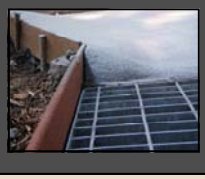
Rain Guardian placement is set 26" from the back of the existing curb. Ensure the concrete base extends at least 4" beyond the filter wall to serve as a splash dissipater. Apply adhesive to base of Rain Guardian and position on concrete base. Use additional adhesive around base of interior to establish water-tight seal. Using pilot holes in corner posts, drill 3/16" holes into concrete with 6 1/2" masonry bit and hammer drill. Secure with 1/4" x 5" masonry screws (provided).

Curb-cut and Apron

When pouring the concrete inlet, ensure the carriage bolts on the Rain Guardian are surrounded by at least 2" of concrete on all sides. The top of the Rain Guardian grate will be 10.5" above the top of the concrete base and 1.5" below the rain garden overflow elevation to accommodate a sloped apron from the gutter to the Rain Guardian.

Fill void between existing curb and Rain Guardian. Install framing to prepare for curb-cut and apron installation. Sides of apron should be raised significantly to blend into curb and match top height of Rain Guardian side debris wall.

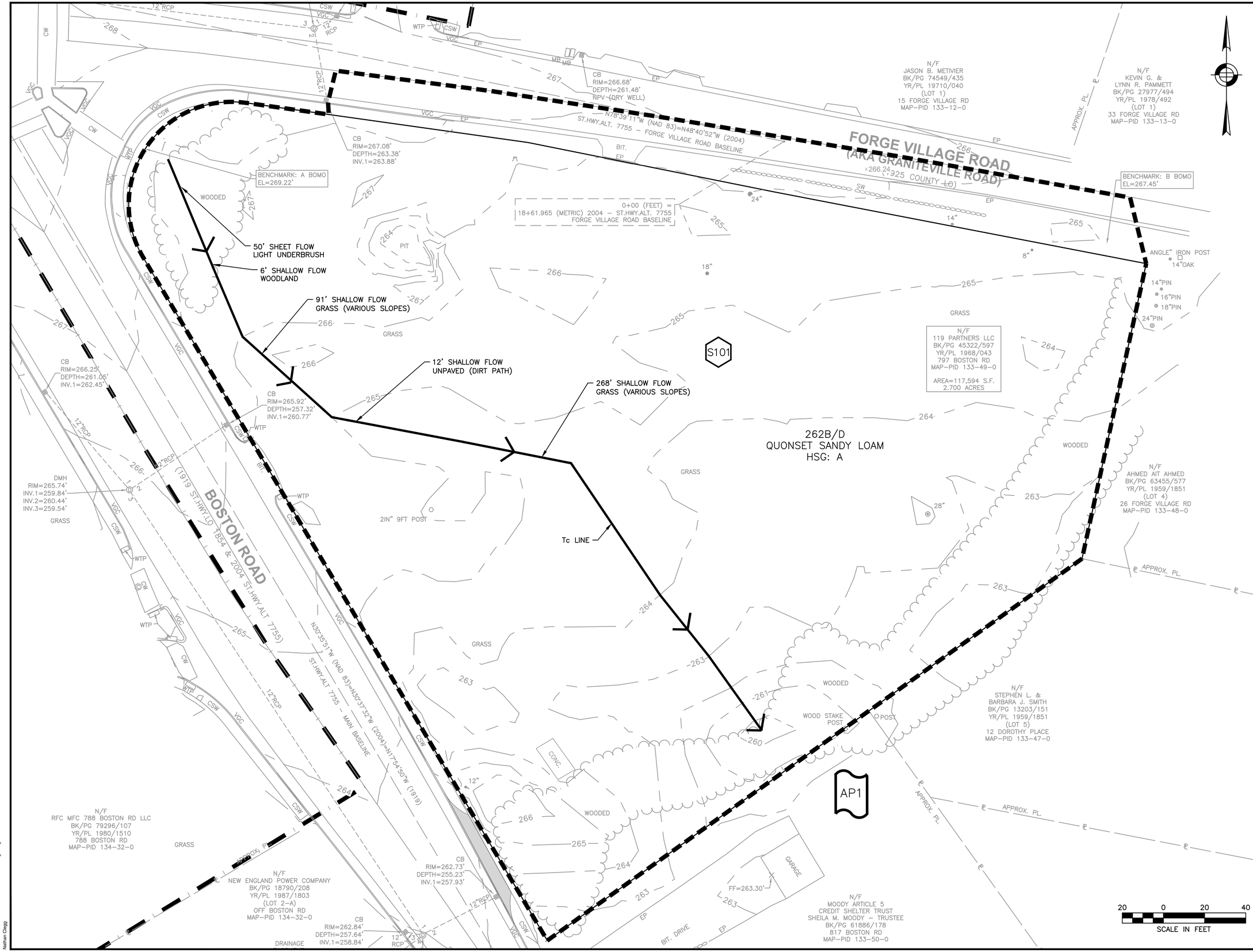





Maintenance

Sediment, leaves, and grass clippings trapped inside the chamber are easily removed by the landowner with a shovel. The drop-in filter wall can be either swept clean or rinsed with a garden hose to maintain optimal filtration capacity.

Appendix D: Pre and Post Drainage Maps



HOWARD STEIN HUDSON
114 Turnpike Road, Suite 2C
Chelmsford, MA 01824
www.hshassoc.com

PREPARED FOR:

119 PARTNERS LLC
11 SUMMER STREET SUITE 8
CHELMSFORD, MA 01824

PROPOSED AGE RESTRICTED HOUSING DEVELOPMENT
797 BOSTON ROAD
GROTON, MA 01450

REVISIONS:

NO	BY	DATE	DESCRIPTION
1	KF	04/17/24	REV. PER PEER REVIEW

DRAINAGE PLAN

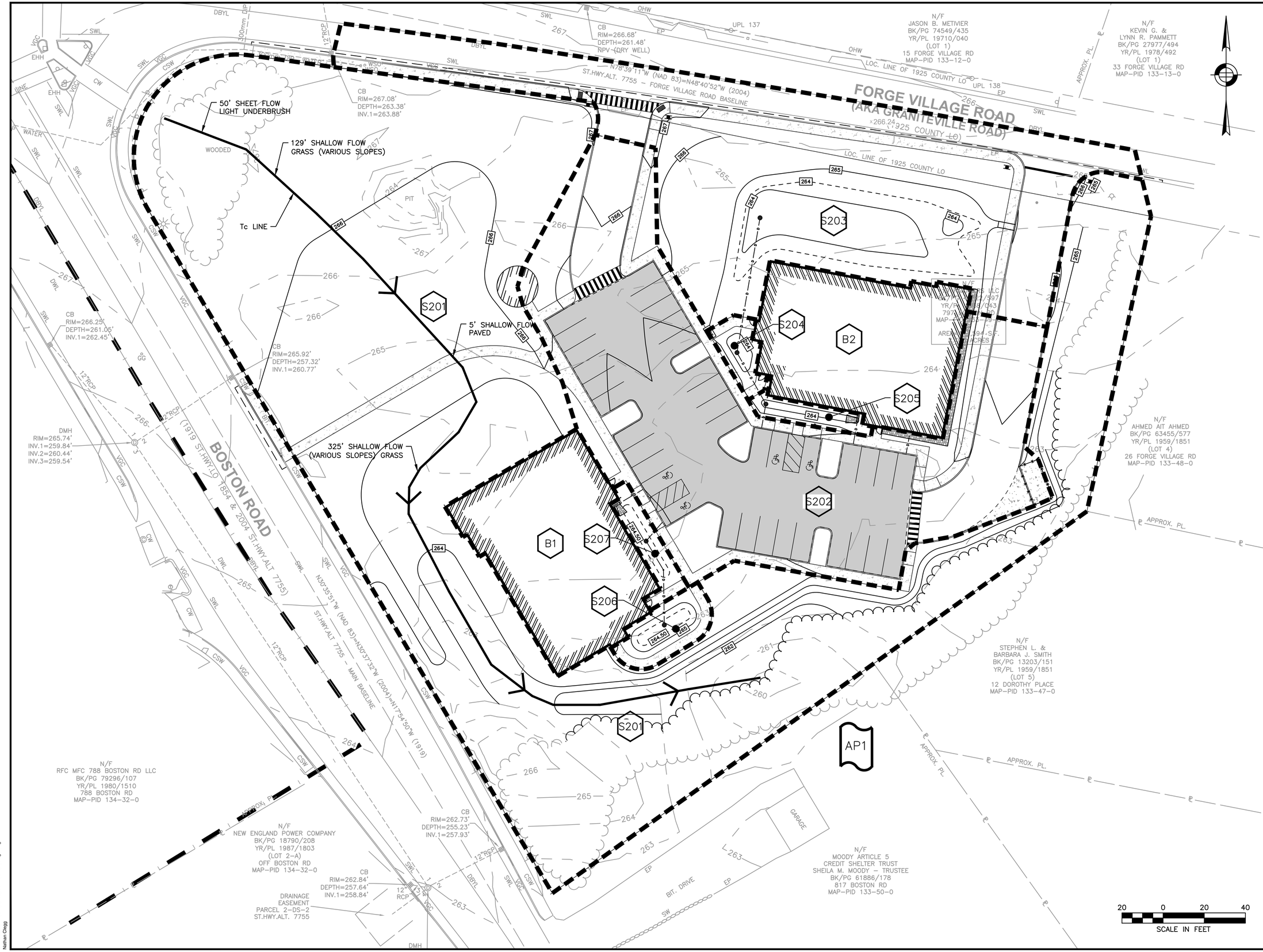
PRE-CONDITION DRAINAGE PLAN

DATE:	2/16/2024
PROJECT NUMBER:	17267
DESIGNED BY:	NC
DRAWN BY:	NC
CHECKED BY:	KE

1

SHEET 1 OF 2

4/17/2024 L:\17267\CURRENT\17267 Drainage.dwg
Nathan Clegg



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REVISIONS:

NO	BY	DATE	DESCRIPTION
1	KF	04/17/24	REV. PER PEER REVIEW

DRAINAGE PLAN

POST-CONDITION DRAINAGE PLAN

DATE:	2/16/2024
PROJECT NUMBER:	17267
DESIGNED BY:	NC
DRAWN BY:	NC
CHECKED BY:	KE

4/17/2024 L:\17267\CURRENT\17267 Drainage.dwg
Nelson Clegg

Appendix E: Cut/Fill Analysis

Cut/Fill Report

Generated: 2024-04-17 14:14:13
By user: nclegg
Drawing: L:\17267\CURRENT\L:\17267\CURRENT\17267 Cut Fill.dwg

Volume Summary

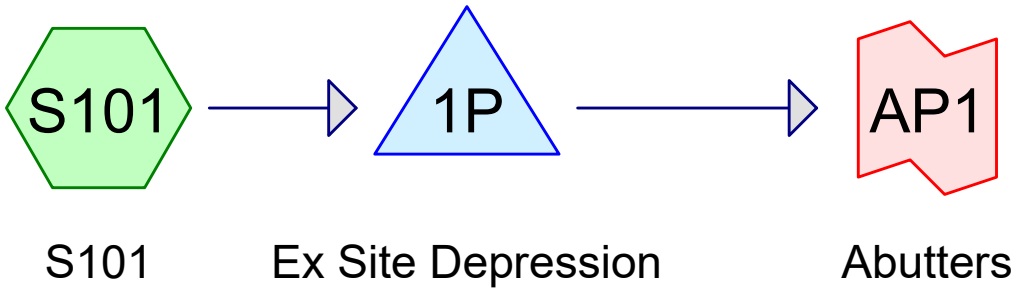
Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Cut Fill Analysis	full	1.000	1.000	88845.36	386.11	2004.32	1618.21<Fill>

Totals

	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	88845.36	386.11	2004.32	1618.21<Fill>

* Value adjusted by cut or fill factor other than 1.0

Appendix F: HydroCAD Report



Subcat Reach Pond Link

Routing Diagram for Groton 40B Pre Drainage
Prepared by Howard Stein Hudson Associates, Printed 4/17/2024

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 4253 MA Rowley Essex County
Rainfall events imported from "NRCS-Rain.txt" for 4114 MA Groton Middlesex County North
Rainfall events imported from "Groton 40B Post Drainage.hcp"
Rainfall events imported from "Groton 40B Post Drainage.hcp"

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.15	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.86	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.92	2
4	100-Year	Type III 24-hr		Default	24.00	1	7.56	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
6,365	72	Dirt roads, HSG A (S101)
98,934	68	Open space, such as lawns, parks, and cemeteries, HSG A (S101)
5,875	98	Paved parking, HSG A (S101)
16,689	30	Woods and forest, HSG A (S101)
127,863	**65**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
127,863	HSG A	S101
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
127,863		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
6,365	0	0	0	0	6,365	Dirt roads
98,934	0	0	0	0	98,934	Open space, such as lawns, parks, and cemeteries
5,875	0	0	0	0	5,875	Paved parking
16,689	0	0	0	0	16,689	Woods and forest
127,863	**0**	**0**	**0**	**0**	**127,863**	**TOTAL AREA**

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Rainfall events imported from "NRCS-Rain.txt" for 4253 MA Rowley Essex County
2		Rainfall events imported from "NRCS-Rain.txt" for 4114 MA Groton Middlesex County North
3		Rainfall events imported from "Groton 40B Post Drainage.hcp"
4		Rainfall events imported from "Groton 40B Post Drainage.hcp"

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S101: S101 Runoff Area=127,863 sf 4.59% Impervious Runoff Depth>0.57"
Flow Length=427' Tc=24.9 min CN=65 Runoff=0.95 cfs 6,090 cf

Pond 1P: Ex Site Depression Peak Elev=261.37' Storage=2,130 cf Inflow=0.95 cfs 6,090 cf
Discarded=0.18 cfs 5,656 cf Primary=0.00 cfs 0 cf Outflow=0.18 cfs 5,656 cf

Link AP1: Abutters Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 127,863 sf Runoff Volume = 6,090 cf Average Runoff Depth = 0.57"
95.41% Pervious = 121,988 sf 4.59% Impervious = 5,875 sf

Summary for Subcatchment S101: S101

Runoff = 0.95 cfs @ 12.44 hrs, Volume= 6,090 cf, Depth> 0.57"
Routed to Pond 1P : Ex Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
*	98,934	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	16,689	30	Woods and forest, HSG A
	5,875	98	Paved parking, HSG A
	6,365	72	Dirt roads, HSG A
	127,863	65	Weighted Average
	121,988		95.41% Pervious Area
	5,875		4.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0110	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.2	6	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	37	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	54	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.3	187	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	38	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	43	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.9	427	Total			

Summary for Pond 1P: Ex Site Depression

Inflow Area = 127,863 sf, 4.59% Impervious, Inflow Depth > 0.57" for 2-Year event
Inflow = 0.95 cfs @ 12.44 hrs, Volume= 6,090 cf
Outflow = 0.18 cfs @ 14.27 hrs, Volume= 5,656 cf, Atten= 81%, Lag= 110.1 min
Discarded = 0.18 cfs @ 14.27 hrs, Volume= 5,656 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP1 : Abutters

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 261.37' @ 14.27 hrs Surf.Area= 3,306 sf Storage= 2,130 cf

Plug-Flow detention time= 162.0 min calculated for 5,656 cf (93% of inflow)
Center-of-Mass det. time= 127.6 min (1,037.6 - 910.0)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	5,422 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.00	215	0	0
261.00	2,056	1,136	1,136
262.00	5,425	3,741	4,876
262.10	5,500	546	5,422

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	262.00'	**120.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.18 cfs @ 14.27 hrs HW=261.37' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=260.00' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Link AP1: Abutters

Inflow Area = 127,863 sf, 4.59% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S101: S101 Runoff Area=127,863 sf 4.59% Impervious Runoff Depth>1.55"
Flow Length=427' Tc=24.9 min CN=65 Runoff=3.10 cfs 16,527 cf

Pond 1P: Ex Site Depression Peak Elev=262.04' Storage=5,073 cf Inflow=3.10 cfs 16,527 cf
Discarded=0.30 cfs 11,188 cf Primary=2.18 cfs 3,483 cf Outflow=2.48 cfs 14,671 cf

Link AP1: Abutters Inflow=2.18 cfs 3,483 cf
Primary=2.18 cfs 3,483 cf

Total Runoff Area = 127,863 sf Runoff Volume = 16,527 cf Average Runoff Depth = 1.55"
95.41% Pervious = 121,988 sf 4.59% Impervious = 5,875 sf

Summary for Subcatchment S101: S101

Runoff = 3.10 cfs @ 12.38 hrs, Volume= 16,527 cf, Depth> 1.55"
Routed to Pond 1P : Ex Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	98,934	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	16,689	30	Woods and forest, HSG A
	5,875	98	Paved parking, HSG A
	6,365	72	Dirt roads, HSG A
	127,863	65	Weighted Average
	121,988		95.41% Pervious Area
	5,875		4.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0110	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.2	6	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	37	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	54	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.3	187	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	38	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	43	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.9	427	Total			

Summary for Pond 1P: Ex Site Depression

Inflow Area = 127,863 sf, 4.59% Impervious, Inflow Depth > 1.55" for 10-Year event
Inflow = 3.10 cfs @ 12.38 hrs, Volume= 16,527 cf
Outflow = 2.48 cfs @ 12.66 hrs, Volume= 14,671 cf, Atten= 20%, Lag= 17.2 min
Discarded = 0.30 cfs @ 12.65 hrs, Volume= 11,188 cf
Primary = 2.18 cfs @ 12.66 hrs, Volume= 3,483 cf
Routed to Link AP1 : Abutters

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 262.04' @ 12.67 hrs Surf.Area= 5,452 sf Storage= 5,073 cf

Plug-Flow detention time= 165.4 min calculated for 14,671 cf (89% of inflow)
Center-of-Mass det. time= 113.4 min (989.9 - 876.5)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	5,422 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.00	215	0	0
261.00	2,056	1,136	1,136
262.00	5,425	3,741	4,876
262.10	5,500	546	5,422

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	262.00'	**120.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.30 cfs @ 12.65 hrs HW=262.03' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=1.96 cfs @ 12.66 hrs HW=262.03' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.96 cfs @ 0.49 fps)

Summary for Link AP1: Abutters

Inflow Area = 127,863 sf, 4.59% Impervious, Inflow Depth = 0.33" for 10-Year event
Inflow = 2.18 cfs @ 12.66 hrs, Volume= 3,483 cf
Primary = 2.18 cfs @ 12.66 hrs, Volume= 3,483 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S101: S101 Runoff Area=127,863 sf 4.59% Impervious Runoff Depth>2.28"
Flow Length=427' Tc=24.9 min CN=65 Runoff=4.70 cfs 24,292 cf

Pond 1P: Ex Site Depression Peak Elev=262.06' Storage=5,192 cf Inflow=4.70 cfs 24,292 cf
Discarded=0.31 cfs 12,173 cf Primary=4.49 cfs 9,576 cf Outflow=4.79 cfs 21,750 cf

Link AP1: Abutters Inflow=4.49 cfs 9,576 cf
Primary=4.49 cfs 9,576 cf

Total Runoff Area = 127,863 sf Runoff Volume = 24,292 cf Average Runoff Depth = 2.28"
95.41% Pervious = 121,988 sf 4.59% Impervious = 5,875 sf

Summary for Subcatchment S101: S101

Runoff = 4.70 cfs @ 12.37 hrs, Volume= 24,292 cf, Depth> 2.28"
Routed to Pond 1P : Ex Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

	Area (sf)	CN	Description
*	98,934	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	16,689	30	Woods and forest, HSG A
	5,875	98	Paved parking, HSG A
	6,365	72	Dirt roads, HSG A
	127,863	65	Weighted Average
	121,988		95.41% Pervious Area
	5,875		4.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0110	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.2	6	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	37	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	54	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.3	187	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	38	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	43	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.9	427	Total			

Summary for Pond 1P: Ex Site Depression

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 127,863 sf, 4.59% Impervious, Inflow Depth > 2.28" for 25-Year event
Inflow = 4.70 cfs @ 12.37 hrs, Volume= 24,292 cf
Outflow = 4.79 cfs @ 12.46 hrs, Volume= 21,750 cf, Atten= 0%, Lag= 5.4 min
Discarded = 0.31 cfs @ 12.45 hrs, Volume= 12,173 cf
Primary = 4.49 cfs @ 12.46 hrs, Volume= 9,576 cf
Routed to Link AP1 : Abutters

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 262.06' @ 12.46 hrs Surf.Area= 5,468 sf Storage= 5,192 cf

Plug-Flow detention time= 121.3 min calculated for 21,704 cf (89% of inflow)
Center-of-Mass det. time= 72.6 min (937.6 - 865.0)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	5,422 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.00	215	0	0
261.00	2,056	1,136	1,136
262.00	5,425	3,741	4,876
262.10	5,500	546	5,422

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	262.00'	**120.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.31 cfs @ 12.45 hrs HW=262.06' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=4.40 cfs @ 12.46 hrs HW=262.06' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 4.40 cfs @ 0.64 fps)

Summary for Link AP1: Abutters

Inflow Area = 127,863 sf, 4.59% Impervious, Inflow Depth = 0.90" for 25-Year event
Inflow = 4.49 cfs @ 12.46 hrs, Volume= 9,576 cf
Primary = 4.49 cfs @ 12.46 hrs, Volume= 9,576 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S101: S101 Runoff Area=127,863 sf 4.59% Impervious Runoff Depth>3.52"
Flow Length=427' Tc=24.9 min CN=65 Runoff=7.41 cfs 37,535 cf

Pond 1P: Ex Site Depression Peak Elev=262.08' Storage=5,312 cf Inflow=7.41 cfs 37,535 cf
Discarded=0.31 cfs 13,291 cf Primary=7.26 cfs 20,740 cf Outflow=7.57 cfs 34,031 cf

Link AP1: Abutters Inflow=7.26 cfs 20,740 cf
Primary=7.26 cfs 20,740 cf

Total Runoff Area = 127,863 sf Runoff Volume = 37,535 cf Average Runoff Depth = 3.52"
95.41% Pervious = 121,988 sf 4.59% Impervious = 5,875 sf

Summary for Subcatchment S101: S101

Runoff = 7.41 cfs @ 12.36 hrs, Volume= 37,535 cf, Depth> 3.52"
Routed to Pond 1P : Ex Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

	Area (sf)	CN	Description
*	98,934	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	16,689	30	Woods and forest, HSG A
	5,875	98	Paved parking, HSG A
	6,365	72	Dirt roads, HSG A
	127,863	65	Weighted Average
	121,988		95.41% Pervious Area
	5,875		4.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0110	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.2	6	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	37	0.0110	0.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.9	54	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.3	187	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	38	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	43	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.9	427	Total			

Summary for Pond 1P: Ex Site Depression

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 127,863 sf, 4.59% Impervious, Inflow Depth > 3.52" for 100-Year event
Inflow = 7.41 cfs @ 12.36 hrs, Volume= 37,535 cf
Outflow = 7.57 cfs @ 12.36 hrs, Volume= 34,031 cf, Atten= 0%, Lag= 0.4 min
Discarded = 0.31 cfs @ 12.36 hrs, Volume= 13,291 cf
Primary = 7.26 cfs @ 12.36 hrs, Volume= 20,740 cf
Routed to Link AP1 : Abutters

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 262.08' @ 12.36 hrs Surf.Area= 5,485 sf Storage= 5,312 cf

Plug-Flow detention time= 84.2 min calculated for 33,960 cf (90% of inflow)
Center-of-Mass det. time= 39.8 min (892.2 - 852.4)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	5,422 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.00	215	0	0
261.00	2,056	1,136	1,136
262.00	5,425	3,741	4,876
262.10	5,500	546	5,422

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	262.00'	**120.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.31 cfs @ 12.36 hrs HW=262.08' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=7.16 cfs @ 12.36 hrs HW=262.08' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 7.16 cfs @ 0.75 fps)

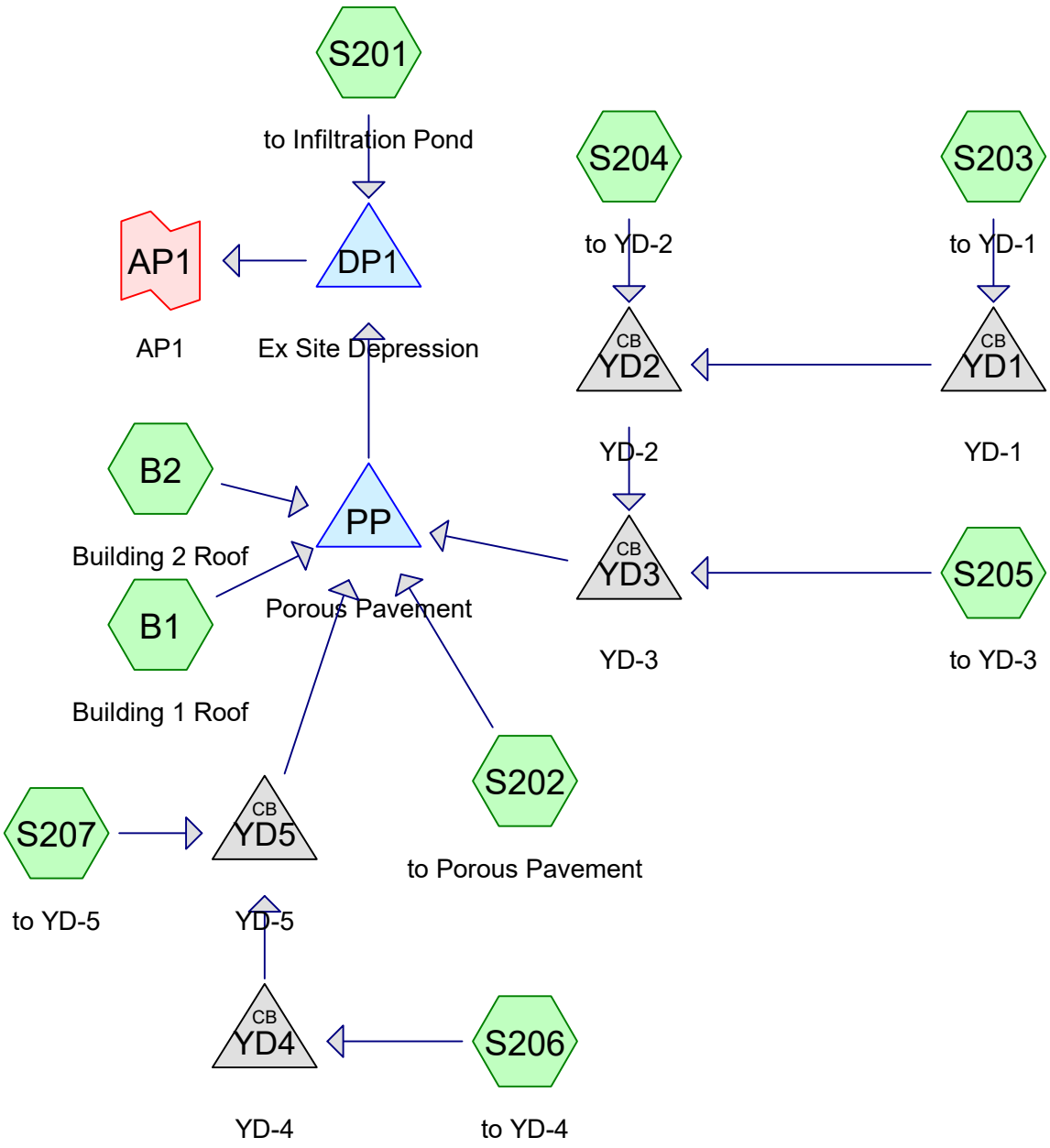
Summary for Link AP1: Abutters

Inflow Area = 127,863 sf, 4.59% Impervious, Inflow Depth = 1.95" for 100-Year event
Inflow = 7.26 cfs @ 12.36 hrs, Volume= 20,740 cf
Primary = 7.26 cfs @ 12.36 hrs, Volume= 20,740 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Stage-Area-Storage for Pond 1P: Ex Site Depression

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
260.00	215	0
260.05	307	13
260.10	399	31
260.15	491	53
260.20	583	80
260.25	675	111
260.30	767	147
260.35	859	188
260.40	951	233
260.45	1,043	283
260.50	1,136	338
260.55	1,228	397
260.60	1,320	460
260.65	1,412	529
260.70	1,504	602
260.75	1,596	679
260.80	1,688	761
260.85	1,780	848
260.90	1,872	939
260.95	1,964	1,035
261.00	2,056	1,136
261.05	2,224	1,243
261.10	2,393	1,358
261.15	2,561	1,482
261.20	2,730	1,614
261.25	2,898	1,755
261.30	3,067	1,904
261.35	3,235	2,061
261.40	3,404	2,227
261.45	3,572	2,402
261.50	3,741	2,585
261.55	3,909	2,776
261.60	4,077	2,976
261.65	4,246	3,184
261.70	4,414	3,400
261.75	4,583	3,625
261.80	4,751	3,858
261.85	4,920	4,100
261.90	5,088	4,350
261.95	5,257	4,609
262.00	5,425	4,876
262.05	5,463	5,148
262.10	**5,500**	**5,422**



Subcat Reach Pond Link

Routing Diagram for Groton 40B Post Drainage

Prepared by Howard Stein Hudson Associates, Printed 4/17/2024

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 4253 MA Rowley Essex County
Rainfall events imported from "NRCS-Rain.txt" for 4114 MA Groton Middlesex County North
Rainfall events imported from "TP-40-Rain.txt" for 444 MA Middlesex

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.15	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.86	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.92	2
4	100-Year	Type III 24-hr		Default	24.00	1	7.56	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
6,949	98	Concrete, HSG A (S201, S202, S203, S204, S206, S207)
68,804	68	Open space, such as lawns, parks, and cemeteries, HSG A (S201, S202, S203, S204, S205, S206, S207)
24,983	98	Paved parking, HSG A (S202, S203)
13,476	98	Roofs, HSG A (B1, B2, S201, S202)
13,651	43	Woods and forest that is selectively cleared, HSG A (S201)
127,863	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
127,863	HSG A	B1, B2, S201, S202, S203, S204, S205, S206, S207
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
127,863		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
6,949	0	0	0	0	6,949	Concrete
68,804	0	0	0	0	68,804	Open space, such as lawns, parks, and cemeteries
24,983	0	0	0	0	24,983	Paved parking
13,476	0	0	0	0	13,476	Roofs
13,651	0	0	0	0	13,651	Woods and forest that is selectively cleared
127,863	**0**	**0**	**0**	**0**	**127,863**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	PP	262.05	261.75	60.0	0.0050	0.013	0.0	4.0	0.0	
2	YD1	261.50	261.18	65.0	0.0049	0.013	0.0	12.0	0.0	
3	YD2	261.18	261.04	28.0	0.0050	0.013	0.0	12.0	0.0	
4	YD3	261.04	260.99	10.0	0.0050	0.013	0.0	12.0	0.0	
5	YD4	262.50	262.31	39.0	0.0049	0.013	0.0	6.0	0.0	
6	YD5	262.31	262.25	12.0	0.0050	0.013	0.0	6.0	0.0	

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Rainfall events imported from "NRCS-Rain.txt" for 4253 MA Rowley Essex County
2		Rainfall events imported from "NRCS-Rain.txt" for 4114 MA Groton Middlesex County North
3		Rainfall events imported from "TP-40-Rain.txt" for 444 MA Middlesex

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment B1: Building 1 Roof Runoff Area=6,581 sf 100.00% Impervious Runoff Depth>2.92"
Tc=6.0 min CN=98 Runoff=0.45 cfs 1,599 cf

Subcatchment B2: Building 2 Roof Runoff Area=6,581 sf 100.00% Impervious Runoff Depth>2.92"
Tc=6.0 min CN=98 Runoff=0.45 cfs 1,599 cf

Subcatchment S201: to Infiltration Pond Runoff Area=64,556 sf 1.46% Impervious Runoff Depth>0.49"
Flow Length=509' Tc=26.1 min CN=63 Runoff=0.38 cfs 2,650 cf

Subcatchment S202: to Porous Pavement Runoff Area=24,239 sf 83.36% Impervious Runoff Depth>1.19"
Tc=790.0 min CN=93 Runoff=0.10 cfs 2,404 cf

Subcatchment S203: to YD-1 Runoff Area=22,809 sf 45.71% Impervious Runoff Depth>1.50"
Tc=6.0 min CN=82 Runoff=0.90 cfs 2,845 cf

Subcatchment S204: to YD-2 Runoff Area=627 sf 30.62% Impervious Runoff Depth>1.17"
Tc=6.0 min CN=77 Runoff=0.02 cfs 61 cf

Subcatchment S205: to YD-3 Runoff Area=605 sf 0.00% Impervious Runoff Depth>0.70"
Tc=6.0 min CN=68 Runoff=0.01 cfs 36 cf

Subcatchment S206: to YD-4 Runoff Area=1,101 sf 33.88% Impervious Runoff Depth>1.24"
Tc=6.0 min CN=78 Runoff=0.04 cfs 113 cf

Subcatchment S207: to YD-5 Runoff Area=764 sf 14.27% Impervious Runoff Depth>0.90"
Tc=6.0 min CN=72 Runoff=0.02 cfs 57 cf

Pond DP1: Ex Site Depression Peak Elev=260.88' Storage=754 cf Inflow=0.38 cfs 2,650 cf
Discarded=0.10 cfs 2,587 cf Primary=0.00 cfs 0 cf Outflow=0.10 cfs 2,587 cf

Pond PP: Porous Pavement Peak Elev=261.08' Storage=937 cf Inflow=1.88 cfs 8,714 cf
Discarded=0.65 cfs 8,706 cf Primary=0.00 cfs 0 cf Outflow=0.65 cfs 8,706 cf

Pond YD1: YD-1 Peak Elev=262.15' Inflow=0.90 cfs 2,845 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=0.90 cfs 2,845 cf

Pond YD2: YD-2 Peak Elev=261.85' Inflow=0.92 cfs 2,906 cf
12.0" Round Culvert n=0.013 L=28.0' S=0.0050 '/' Outflow=0.92 cfs 2,906 cf

Pond YD3: YD-3 Peak Elev=261.65' Inflow=0.93 cfs 2,941 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=0.93 cfs 2,941 cf

Pond YD4: YD-4 Peak Elev=262.65' Inflow=0.04 cfs 113 cf
6.0" Round Culvert n=0.013 L=39.0' S=0.0049 '/' Outflow=0.04 cfs 113 cf

Pond YD5: YD-5 Peak Elev=262.47' Inflow=0.05 cfs 171 cf
6.0" Round Culvert n=0.013 L=12.0' S=0.0050 '/' Outflow=0.05 cfs 171 cf

Link AP1: AP1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 127,863 sf Runoff Volume = 11,364 cf Average Runoff Depth = 1.07"
64.49% Pervious = 82,455 sf 35.51% Impervious = 45,408 sf

Summary for Subcatchment B1: Building 1 Roof

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 1,599 cf, Depth> 2.92"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (sf)	CN	Description
6,581	98	Roofs, HSG A
6,581		100.00% Impervious Area

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

Summary for Subcatchment B2: Building 2 Roof

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 1,599 cf, Depth> 2.92"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (sf)	CN	Description
6,581	98	Roofs, HSG A
6,581		100.00% Impervious Area

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

Summary for Subcatchment S201: to Infiltration Pond

Runoff = 0.38 cfs @ 12.48 hrs, Volume= 2,650 cf, Depth> 0.49"
Routed to Pond DP1 : Ex Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
*	13,651	43	Woods and forest that is selectively cleared, HSG A
*	49,964	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	755	98	Concrete, HSG A
	186	98	Roofs, HSG A
	64,556	63	Weighted Average
	63,615		98.54% Pervious Area
	941		1.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.7	70	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	59	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.5	275	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	50	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.1	509	Total			

Summary for Subcatchment S202: to Porous Pavement

Runoff = 0.10 cfs @ 21.96 hrs, Volume= 2,404 cf, Depth> 1.19"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
	16,526	98	Paved parking, HSG A
*	4,034	68	Open space, such as lawns, parks, and cemeteries, HSG A
	128	98	Roofs, HSG A
*	3,551	98	Concrete, HSG A
	24,239	93	Weighted Average
	4,034		16.64% Pervious Area
	20,205		83.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
790.0					**Direct Entry, Extended TC based on 41" Section**

Summary for Subcatchment S203: to YD-1

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 2,845 cf, Depth> 1.50"
Routed to Pond YD1 : YD-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
*	12,383	68	Open space, such as lawns, parks, and cemeteries, HSG A
	8,457	98	Paved parking, HSG A
*	1,969	98	Concrete, HSG A
	22,809	82	Weighted Average
	12,383		54.29% Pervious Area
	10,426		45.71% Impervious Area

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

Summary for Subcatchment S204: to YD-2

Runoff = 0.02 cfs @ 12.10 hrs, Volume= 61 cf, Depth> 1.17"
Routed to Pond YD2 : YD-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
*	435	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	192	98	Concrete, HSG A
	627	77	Weighted Average
	435		69.38% Pervious Area
	192		30.62% Impervious Area

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

Summary for Subcatchment S205: to YD-3

Runoff = 0.01 cfs @ 12.11 hrs, Volume= 36 cf, Depth> 0.70"
Routed to Pond YD3 : YD-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
*	605	68	Open space, such as lawns, parks, and cemeteries, HSG A
	605		100.00% Pervious Area

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

Summary for Subcatchment S206: to YD-4

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 113 cf, Depth> 1.24"
Routed to Pond YD4 : YD-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
*	728	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	373	98	Concrete, HSG A
	1,101	78	Weighted Average
	728		66.12% Pervious Area
	373		33.88% Impervious Area

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

Summary for Subcatchment S207: to YD-5

Runoff = 0.02 cfs @ 12.10 hrs, Volume= 57 cf, Depth> 0.90"
Routed to Pond YD5 : YD-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.15"

	Area (sf)	CN	Description
*	655	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	109	98	Concrete, HSG A
	764	72	Weighted Average
	655		85.73% Pervious Area
	109		14.27% Impervious Area

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

Summary for Pond DP1: Ex Site Depression

Inflow Area = 127,863 sf, 35.51% Impervious, Inflow Depth > 0.25" for 2-Year event
Inflow = 0.38 cfs @ 12.48 hrs, Volume= 2,650 cf
Outflow = 0.10 cfs @ 13.81 hrs, Volume= 2,587 cf, Atten= 74%, Lag= 79.7 min
Discarded = 0.10 cfs @ 13.81 hrs, Volume= 2,587 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link ap1 : AP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 260.88' @ 13.81 hrs Surf.Area= 1,740 sf Storage= 754 cf

Plug-Flow detention time= 103.3 min calculated for 2,587 cf (98% of inflow)
Center-of-Mass det. time= 91.4 min (1,011.4 - 920.0)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	5,979 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
260.00	214	0	0	214
261.00	2,056	978	978	2,059
262.00	5,432	3,610	4,588	5,442
262.25	5,700	1,391	5,979	5,718

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	262.00'	**70.0' 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=0.10 cfs @ 13.81 hrs HW=260.88' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=260.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PP: Porous Pavement

Inflow Area = 63,307 sf, 70.24% Impervious, Inflow Depth > 1.65" for 2-Year event
Inflow = 1.88 cfs @ 12.09 hrs, Volume= 8,714 cf
Outflow = 0.65 cfs @ 12.39 hrs, Volume= 8,706 cf, Atten= 65%, Lag= 17.8 min
Discarded = 0.65 cfs @ 12.39 hrs, Volume= 8,706 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond DP1 : Ex Site Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 261.08' @ 12.39 hrs Surf.Area= 10,986 sf Storage= 937 cf

Plug-Flow detention time= 5.5 min calculated for 8,706 cf (100% of inflow)
Center-of-Mass det. time= 5.0 min (915.0 - 910.0)

Volume	Invert	Avail.Storage	Storage Description
#1	260.87'	13,002 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.87	10,986	0.0	0	0
260.88	10,986	40.0	44	44
262.37	10,986	40.0	6,548	6,592
262.38	10,986	15.0	16	6,608
262.62	10,986	15.0	395	7,004
262.63	10,986	40.0	44	7,048
263.63	10,986	40.0	4,394	11,442
263.64	10,986	25.0	27	11,469
263.96	10,986	25.0	879	12,348
263.97	10,986	15.0	16	12,365
264.29	10,986	15.0	527	12,892
264.30	10,986	100.0	110	13,002

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.87'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 257.75' Phase-In= 0.01'
#2	Primary	262.05'	**4.0" Round Culvert X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 262.05' / 261.75' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.65 cfs @ 12.39 hrs HW=261.08' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.65 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=260.87' TW=260.00' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond YD1: YD-1

Inflow Area = 22,809 sf, 45.71% Impervious, Inflow Depth > 1.50" for 2-Year event
Inflow = 0.90 cfs @ 12.09 hrs, Volume= 2,845 cf
Outflow = 0.90 cfs @ 12.09 hrs, Volume= 2,845 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.90 cfs @ 12.09 hrs, Volume= 2,845 cf
Routed to Pond YD2 : YD-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.15' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 261.50' / 261.18' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.89 cfs @ 12.09 hrs HW=262.15' TW=261.84' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.89 cfs @ 2.34 fps)

Summary for Pond YD2: YD-2

Inflow Area = 23,436 sf, 45.31% Impervious, Inflow Depth > 1.49" for 2-Year event
Inflow = 0.92 cfs @ 12.09 hrs, Volume= 2,906 cf
Outflow = 0.92 cfs @ 12.09 hrs, Volume= 2,906 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.92 cfs @ 12.09 hrs, Volume= 2,906 cf
Routed to Pond YD3 : YD-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 261.85' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.18'	**12.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 261.18' / 261.04' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.90 cfs @ 12.09 hrs HW=261.84' TW=261.64' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.90 cfs @ 2.32 fps)

Summary for Pond YD3: YD-3

Inflow Area = 24,041 sf, 44.17% Impervious, Inflow Depth > 1.47" for 2-Year event
Inflow = 0.93 cfs @ 12.09 hrs, Volume= 2,941 cf
Outflow = 0.93 cfs @ 12.09 hrs, Volume= 2,941 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 12.09 hrs, Volume= 2,941 cf
Routed to Pond PP : Porous Pavement

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 261.65' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.04'	**12.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 261.04' / 260.99' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.91 cfs @ 12.09 hrs HW=261.64' TW=260.98' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.91 cfs @ 2.65 fps)

Summary for Pond YD4: YD-4

Inflow Area = 1,101 sf, 33.88% Impervious, Inflow Depth > 1.24" for 2-Year event
Inflow = 0.04 cfs @ 12.10 hrs, Volume= 113 cf
Outflow = 0.04 cfs @ 12.10 hrs, Volume= 113 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 12.10 hrs, Volume= 113 cf
Routed to Pond YD5 : YD-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 262.65' @ 12.10 hrs
Flood Elev= 264.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	262.50'	**6.0" Round Culvert** L= 39.0' Ke= 0.500 Inlet / Outlet Invert= 262.50' / 262.31' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.03 cfs @ 12.10 hrs HW=262.64' TW=262.47' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.03 cfs @ 1.11 fps)

Summary for Pond YD5: YD-5

Inflow Area = 1,865 sf, 25.84% Impervious, Inflow Depth > 1.10" for 2-Year event
Inflow = 0.05 cfs @ 12.10 hrs, Volume= 171 cf
Outflow = 0.05 cfs @ 12.10 hrs, Volume= 171 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 12.10 hrs, Volume= 171 cf
Routed to Pond PP : Porous Pavement

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.47' @ 12.10 hrs
Flood Elev= 264.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	262.31'	**6.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 262.31' / 262.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.05 cfs @ 12.10 hrs HW=262.47' TW=260.98' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.05 cfs @ 1.37 fps)

Summary for Link AP1: AP1

Inflow Area = 127,863 sf, 35.51% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment B1: Building 1 Roof Runoff Area=6,581 sf 100.00% Impervious Runoff Depth>4.62"
Tc=6.0 min CN=98 Runoff=0.70 cfs 2,534 cf

Subcatchment B2: Building 2 Roof Runoff Area=6,581 sf 100.00% Impervious Runoff Depth>4.62"
Tc=6.0 min CN=98 Runoff=0.70 cfs 2,534 cf

Subcatchment S201: to Infiltration Pond Runoff Area=64,556 sf 1.46% Impervious Runoff Depth>1.41"
Flow Length=509' Tc=26.1 min CN=63 Runoff=1.37 cfs 7,590 cf

Subcatchment S202: to Porous Pavement Runoff Area=24,239 sf 83.36% Impervious Runoff Depth>2.07"
Tc=790.0 min CN=93 Runoff=0.16 cfs 4,184 cf

Subcatchment S203: to YD-1 Runoff Area=22,809 sf 45.71% Impervious Runoff Depth>2.95"
Tc=6.0 min CN=82 Runoff=1.77 cfs 5,610 cf

Subcatchment S204: to YD-2 Runoff Area=627 sf 30.62% Impervious Runoff Depth>2.50"
Tc=6.0 min CN=77 Runoff=0.04 cfs 131 cf

Subcatchment S205: to YD-3 Runoff Area=605 sf 0.00% Impervious Runoff Depth>1.78"
Tc=6.0 min CN=68 Runoff=0.03 cfs 90 cf

Subcatchment S206: to YD-4 Runoff Area=1,101 sf 33.88% Impervious Runoff Depth>2.59"
Tc=6.0 min CN=78 Runoff=0.08 cfs 238 cf

Subcatchment S207: to YD-5 Runoff Area=764 sf 14.27% Impervious Runoff Depth>2.09"
Tc=6.0 min CN=72 Runoff=0.04 cfs 133 cf

Pond DP1: Ex Site Depression Peak Elev=261.68' Storage=3,068 cf Inflow=1.37 cfs 7,590 cf
Discarded=0.23 cfs 7,075 cf Primary=0.00 cfs 0 cf Outflow=0.23 cfs 7,075 cf

Pond PP: Porous Pavement Peak Elev=261.50' Storage=2,754 cf Inflow=3.37 cfs 15,454 cf
Discarded=0.74 cfs 15,440 cf Primary=0.00 cfs 0 cf Outflow=0.74 cfs 15,440 cf

Pond YD1: YD-1 Peak Elev=262.55' Inflow=1.77 cfs 5,610 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=1.77 cfs 5,610 cf

Pond YD2: YD-2 Peak Elev=262.22' Inflow=1.81 cfs 5,741 cf
12.0" Round Culvert n=0.013 L=28.0' S=0.0050 '/' Outflow=1.81 cfs 5,741 cf

Pond YD3: YD-3 Peak Elev=261.96' Inflow=1.84 cfs 5,831 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=1.84 cfs 5,831 cf

Pond YD4: YD-4 Peak Elev=262.72' Inflow=0.08 cfs 238 cf
6.0" Round Culvert n=0.013 L=39.0' S=0.0049 '/' Outflow=0.08 cfs 238 cf

Pond YD5: YD-5 Peak Elev=262.56' Inflow=0.12 cfs 371 cf
6.0" Round Culvert n=0.013 L=12.0' S=0.0050 '/' Outflow=0.12 cfs 371 cf

Link AP1: AP1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 127,863 sf Runoff Volume = 23,044 cf Average Runoff Depth = 2.16"
64.49% Pervious = 82,455 sf 35.51% Impervious = 45,408 sf

Summary for Subcatchment B1: Building 1 Roof

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 2,534 cf, Depth> 4.62"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

Area (sf)	CN	Description
6,581	98	Roofs, HSG A
6,581		100.00% Impervious Area

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

Summary for Subcatchment B2: Building 2 Roof

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 2,534 cf, Depth> 4.62"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

Area (sf)	CN	Description
6,581	98	Roofs, HSG A
6,581		100.00% Impervious Area

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

Summary for Subcatchment S201: to Infiltration Pond

Runoff = 1.37 cfs @ 12.40 hrs, Volume= 7,590 cf, Depth> 1.41"
Routed to Pond DP1 : Ex Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	13,651	43	Woods and forest that is selectively cleared, HSG A
*	49,964	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	755	98	Concrete, HSG A
	186	98	Roofs, HSG A
	64,556	63	Weighted Average
	63,615		98.54% Pervious Area
	941		1.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.7	70	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	59	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.5	275	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	50	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.1	509	Total			

Summary for Subcatchment S202: to Porous Pavement

Runoff = 0.16 cfs @ 21.95 hrs, Volume= 4,184 cf, Depth> 2.07"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	16,526	98	Paved parking, HSG A
*	4,034	68	Open space, such as lawns, parks, and cemeteries, HSG A
	128	98	Roofs, HSG A
*	3,551	98	Concrete, HSG A
	24,239	93	Weighted Average
	4,034		16.64% Pervious Area
	20,205		83.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
790.0					**Direct Entry, Extended TC based on 41" Section**

Summary for Subcatchment S203: to YD-1

Runoff = 1.77 cfs @ 12.09 hrs, Volume= 5,610 cf, Depth> 2.95"
Routed to Pond YD1 : YD-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	12,383	68	Open space, such as lawns, parks, and cemeteries, HSG A
	8,457	98	Paved parking, HSG A
*	1,969	98	Concrete, HSG A
	22,809	82	Weighted Average
	12,383		54.29% Pervious Area
	10,426		45.71% Impervious Area

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

Summary for Subcatchment S204: to YD-2

Runoff = 0.04 cfs @ 12.09 hrs, Volume= 131 cf, Depth> 2.50"
Routed to Pond YD2 : YD-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	435	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	192	98	Concrete, HSG A
	627	77	Weighted Average
	435		69.38% Pervious Area
	192		30.62% Impervious Area

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

Summary for Subcatchment S205: to YD-3

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 90 cf, Depth> 1.78"
Routed to Pond YD3 : YD-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	605	68	Open space, such as lawns, parks, and cemeteries, HSG A
	605		100.00% Pervious Area

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

Summary for Subcatchment S206: to YD-4

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 238 cf, Depth> 2.59"
Routed to Pond YD4 : YD-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	728	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	373	98	Concrete, HSG A
	1,101	78	Weighted Average
	728		66.12% Pervious Area
	373		33.88% Impervious Area

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

Summary for Subcatchment S207: to YD-5

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 133 cf, Depth> 2.09"
Routed to Pond YD5 : YD-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	655	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	109	98	Concrete, HSG A
	764	72	Weighted Average
	655		85.73% Pervious Area
	109		14.27% Impervious Area

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

Summary for Pond DP1: Ex Site Depression

Inflow Area = 127,863 sf, 35.51% Impervious, Inflow Depth > 0.71" for 10-Year event
Inflow = 1.37 cfs @ 12.40 hrs, Volume= 7,590 cf
Outflow = 0.23 cfs @ 13.88 hrs, Volume= 7,075 cf, Atten= 83%, Lag= 88.7 min
Discarded = 0.23 cfs @ 13.88 hrs, Volume= 7,075 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link ap1 : AP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 261.68' @ 13.88 hrs Surf.Area= 4,188 sf Storage= 3,068 cf

Plug-Flow detention time= 177.6 min calculated for 7,075 cf (93% of inflow)
Center-of-Mass det. time= 143.9 min (1,026.8 - 883.0)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	5,979 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
260.00	214	0	0	214
261.00	2,056	978	978	2,059
262.00	5,432	3,610	4,588	5,442
262.25	5,700	1,391	5,979	5,718

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	262.00'	**70.0' 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=0.23 cfs @ 13.88 hrs HW=261.68' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=260.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PP: Porous Pavement

Inflow Area = 63,307 sf, 70.24% Impervious, Inflow Depth > 2.93" for 10-Year event
Inflow = 3.37 cfs @ 12.09 hrs, Volume= 15,454 cf
Outflow = 0.74 cfs @ 12.51 hrs, Volume= 15,440 cf, Atten= 78%, Lag= 25.3 min
Discarded = 0.74 cfs @ 12.51 hrs, Volume= 15,440 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond DP1 : Ex Site Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 261.50' @ 12.51 hrs Surf.Area= 10,986 sf Storage= 2,754 cf

Plug-Flow detention time= 16.5 min calculated for 15,408 cf (100% of inflow)
Center-of-Mass det. time= 16.0 min (914.4 - 898.4)

Volume	Invert	Avail.Storage	Storage Description
#1	260.87'	13,002 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.87	10,986	0.0	0	0
260.88	10,986	40.0	44	44
262.37	10,986	40.0	6,548	6,592
262.38	10,986	15.0	16	6,608
262.62	10,986	15.0	395	7,004
262.63	10,986	40.0	44	7,048
263.63	10,986	40.0	4,394	11,442
263.64	10,986	25.0	27	11,469
263.96	10,986	25.0	879	12,348
263.97	10,986	15.0	16	12,365
264.29	10,986	15.0	527	12,892
264.30	10,986	100.0	110	13,002

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.87'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 257.75' Phase-In= 0.01'
#2	Primary	262.05'	**4.0" Round Culvert X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 262.05' / 261.75' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.74 cfs @ 12.51 hrs HW=261.50' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.74 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=260.87' TW=260.00' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond YD1: YD-1

Inflow Area = 22,809 sf, 45.71% Impervious, Inflow Depth > 2.95" for 10-Year event
Inflow = 1.77 cfs @ 12.09 hrs, Volume= 5,610 cf
Outflow = 1.77 cfs @ 12.09 hrs, Volume= 5,610 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.77 cfs @ 12.09 hrs, Volume= 5,610 cf
Routed to Pond YD2 : YD-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.55' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 261.50' / 261.18' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.74 cfs @ 12.09 hrs HW=262.54' TW=262.20' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.74 cfs @ 2.65 fps)

Summary for Pond YD2: YD-2

Inflow Area = 23,436 sf, 45.31% Impervious, Inflow Depth > 2.94" for 10-Year event
Inflow = 1.81 cfs @ 12.09 hrs, Volume= 5,741 cf
Outflow = 1.81 cfs @ 12.09 hrs, Volume= 5,741 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.09 hrs, Volume= 5,741 cf
Routed to Pond YD3 : YD-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.22' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.18'	**12.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 261.18' / 261.04' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 12.09 hrs HW=262.20' TW=261.94' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.78 cfs @ 2.76 fps)

Summary for Pond YD3: YD-3

Inflow Area = 24,041 sf, 44.17% Impervious, Inflow Depth > 2.91" for 10-Year event
Inflow = 1.84 cfs @ 12.09 hrs, Volume= 5,831 cf
Outflow = 1.84 cfs @ 12.09 hrs, Volume= 5,831 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.84 cfs @ 12.09 hrs, Volume= 5,831 cf
Routed to Pond PP : Porous Pavement

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 261.96' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.04'	**12.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 261.04' / 260.99' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.81 cfs @ 12.09 hrs HW=261.94' TW=261.18' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.81 cfs @ 3.18 fps)

Summary for Pond YD4: YD-4

Inflow Area = 1,101 sf, 33.88% Impervious, Inflow Depth > 2.59" for 10-Year event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 238 cf
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 238 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.09 hrs, Volume= 238 cf
Routed to Pond YD5 : YD-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 262.72' @ 12.09 hrs
Flood Elev= 264.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	262.50'	**6.0" Round Culvert** L= 39.0' Ke= 0.500 Inlet / Outlet Invert= 262.50' / 262.31' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.07 cfs @ 12.09 hrs HW=262.72' TW=262.56' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.07 cfs @ 1.30 fps)

Summary for Pond YD5: YD-5

Inflow Area = 1,865 sf, 25.84% Impervious, Inflow Depth > 2.39" for 10-Year event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 371 cf
Outflow = 0.12 cfs @ 12.09 hrs, Volume= 371 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 12.09 hrs, Volume= 371 cf
Routed to Pond PP : Porous Pavement

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.56' @ 12.09 hrs
Flood Elev= 264.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	262.31'	**6.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 262.31' / 262.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.12 cfs @ 12.09 hrs HW=262.56' TW=261.18' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.12 cfs @ 1.70 fps)

Summary for Link AP1: AP1

Inflow Area = 127,863 sf, 35.51% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment B1: Building 1 Roof Runoff Area=6,581 sf 100.00% Impervious Runoff Depth>5.68"
Tc=6.0 min CN=98 Runoff=0.86 cfs 3,114 cf

Subcatchment B2: Building 2 Roof Runoff Area=6,581 sf 100.00% Impervious Runoff Depth>5.68"
Tc=6.0 min CN=98 Runoff=0.86 cfs 3,114 cf

Subcatchment S201: to Infiltration Pond Runoff Area=64,556 sf 1.46% Impervious Runoff Depth>2.11"
Flow Length=509' Tc=26.1 min CN=63 Runoff=2.13 cfs 11,336 cf

Subcatchment S202: to Porous Pavement Runoff Area=24,239 sf 83.36% Impervious Runoff Depth>2.63"
Tc=790.0 min CN=93 Runoff=0.20 cfs 5,314 cf

Subcatchment S203: to YD-1 Runoff Area=22,809 sf 45.71% Impervious Runoff Depth>3.91"
Tc=6.0 min CN=82 Runoff=2.33 cfs 7,433 cf

Subcatchment S204: to YD-2 Runoff Area=627 sf 30.62% Impervious Runoff Depth>3.41"
Tc=6.0 min CN=77 Runoff=0.06 cfs 178 cf

Subcatchment S205: to YD-3 Runoff Area=605 sf 0.00% Impervious Runoff Depth>2.56"
Tc=6.0 min CN=68 Runoff=0.04 cfs 129 cf

Subcatchment S206: to YD-4 Runoff Area=1,101 sf 33.88% Impervious Runoff Depth>3.51"
Tc=6.0 min CN=78 Runoff=0.10 cfs 322 cf

Subcatchment S207: to YD-5 Runoff Area=764 sf 14.27% Impervious Runoff Depth>2.93"
Tc=6.0 min CN=72 Runoff=0.06 cfs 186 cf

Pond DP1: Ex Site Depression Peak Elev=262.01' Storage=4,666 cf Inflow=2.13 cfs 11,336 cf
Discarded=0.30 cfs 9,820 cf Primary=0.28 cfs 471 cf Outflow=0.59 cfs 10,291 cf

Pond PP: Porous Pavement Peak Elev=261.79' Storage=4,025 cf Inflow=4.31 cfs 19,790 cf
Discarded=0.79 cfs 19,774 cf Primary=0.00 cfs 0 cf Outflow=0.79 cfs 19,774 cf

Pond YD1: YD-1 Peak Elev=263.03' Inflow=2.33 cfs 7,433 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=2.33 cfs 7,433 cf

Pond YD2: YD-2 Peak Elev=262.55' Inflow=2.39 cfs 7,611 cf
12.0" Round Culvert n=0.013 L=28.0' S=0.0050 '/' Outflow=2.39 cfs 7,611 cf

Pond YD3: YD-3 Peak Elev=262.15' Inflow=2.43 cfs 7,740 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=2.43 cfs 7,740 cf

Pond YD4: YD-4 Peak Elev=262.77' Inflow=0.10 cfs 322 cf
6.0" Round Culvert n=0.013 L=39.0' S=0.0049 '/' Outflow=0.10 cfs 322 cf

Pond YD5: YD-5 Peak Elev=262.61' Inflow=0.16 cfs 508 cf
6.0" Round Culvert n=0.013 L=12.0' S=0.0050 '/' Outflow=0.16 cfs 508 cf

Link AP1: AP1

Inflow=0.28 cfs 471 cf
Primary=0.28 cfs 471 cf

Total Runoff Area = 127,863 sf Runoff Volume = 31,126 cf Average Runoff Depth = 2.92"
64.49% Pervious = 82,455 sf 35.51% Impervious = 45,408 sf

Summary for Subcatchment B1: Building 1 Roof

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 3,114 cf, Depth> 5.68"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

Area (sf)	CN	Description
6,581	98	Roofs, HSG A
6,581		100.00% Impervious Area

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

Summary for Subcatchment B2: Building 2 Roof

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 3,114 cf, Depth> 5.68"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

Area (sf)	CN	Description
6,581	98	Roofs, HSG A
6,581		100.00% Impervious Area

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

Summary for Subcatchment S201: to Infiltration Pond

Runoff = 2.13 cfs @ 12.39 hrs, Volume= 11,336 cf, Depth> 2.11"
Routed to Pond DP1 : Ex Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

	Area (sf)	CN	Description
*	13,651	43	Woods and forest that is selectively cleared, HSG A
*	49,964	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	755	98	Concrete, HSG A
	186	98	Roofs, HSG A
	64,556	63	Weighted Average
	63,615		98.54% Pervious Area
	941		1.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.7	70	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	59	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.5	275	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	50	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.1	509	Total			

Summary for Subcatchment S202: to Porous Pavement

Runoff = 0.20 cfs @ 21.95 hrs, Volume= 5,314 cf, Depth> 2.63"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

	Area (sf)	CN	Description
	16,526	98	Paved parking, HSG A
*	4,034	68	Open space, such as lawns, parks, and cemeteries, HSG A
	128	98	Roofs, HSG A
*	3,551	98	Concrete, HSG A
	24,239	93	Weighted Average
	4,034		16.64% Pervious Area
	20,205		83.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
790.0					**Direct Entry, Extended TC based on 41" Section**

Summary for Subcatchment S203: to YD-1

Runoff = 2.33 cfs @ 12.09 hrs, Volume= 7,433 cf, Depth> 3.91"
Routed to Pond YD1 : YD-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

	Area (sf)	CN	Description
*	12,383	68	Open space, such as lawns, parks, and cemeteries, HSG A
	8,457	98	Paved parking, HSG A
*	1,969	98	Concrete, HSG A
	22,809	82	Weighted Average
	12,383		54.29% Pervious Area
	10,426		45.71% Impervious Area

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

Summary for Subcatchment S204: to YD-2

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 178 cf, Depth> 3.41"
Routed to Pond YD2 : YD-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

	Area (sf)	CN	Description
*	435	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	192	98	Concrete, HSG A
	627	77	Weighted Average
	435		69.38% Pervious Area
	192		30.62% Impervious Area

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

Summary for Subcatchment S205: to YD-3

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 129 cf, Depth> 2.56"
Routed to Pond YD3 : YD-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

	Area (sf)	CN	Description
*	605	68	Open space, such as lawns, parks, and cemeteries, HSG A
	605		100.00% Pervious Area

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

Summary for Subcatchment S206: to YD-4

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 322 cf, Depth> 3.51"
Routed to Pond YD4 : YD-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

	Area (sf)	CN	Description
*	728	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	373	98	Concrete, HSG A
	1,101	78	Weighted Average
	728		66.12% Pervious Area
	373		33.88% Impervious Area

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

Summary for Subcatchment S207: to YD-5

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 186 cf, Depth> 2.93"
Routed to Pond YD5 : YD-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.92"

	Area (sf)	CN	Description
*	655	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	109	98	Concrete, HSG A
	764	72	Weighted Average
	655		85.73% Pervious Area
	109		14.27% Impervious Area

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

Summary for Pond DP1: Ex Site Depression

Inflow Area = 127,863 sf, 35.51% Impervious, Inflow Depth > 1.06" for 25-Year event
Inflow = 2.13 cfs @ 12.39 hrs, Volume= 11,336 cf
Outflow = 0.59 cfs @ 13.12 hrs, Volume= 10,291 cf, Atten= 72%, Lag= 43.6 min
Discarded = 0.30 cfs @ 13.12 hrs, Volume= 9,820 cf
Primary = 0.28 cfs @ 13.12 hrs, Volume= 471 cf
Routed to Link ap1 : AP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 262.01' @ 13.12 hrs Surf.Area= 5,447 sf Storage= 4,666 cf

Plug-Flow detention time= 194.6 min calculated for 10,291 cf (91% of inflow)
Center-of-Mass det. time= 150.4 min (1,021.2 - 870.8)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	5,979 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
260.00	214	0	0	214
261.00	2,056	978	978	2,059
262.00	5,432	3,610	4,588	5,442
262.25	5,700	1,391	5,979	5,718

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	262.00'	**70.0' 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=0.30 cfs @ 13.12 hrs HW=262.01' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.28 cfs @ 13.12 hrs HW=262.01' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.28 cfs @ 0.28 fps)

Summary for Pond PP: Porous Pavement

Inflow Area = 63,307 sf, 70.24% Impervious, Inflow Depth > 3.75" for 25-Year event
Inflow = 4.31 cfs @ 12.09 hrs, Volume= 19,790 cf
Outflow = 0.79 cfs @ 12.55 hrs, Volume= 19,774 cf, Atten= 82%, Lag= 27.6 min
Discarded = 0.79 cfs @ 12.55 hrs, Volume= 19,774 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond DP1 : Ex Site Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 261.79' @ 12.55 hrs Surf.Area= 10,986 sf Storage= 4,025 cf

Plug-Flow detention time= 24.8 min calculated for 19,774 cf (100% of inflow)
Center-of-Mass det. time= 24.3 min (917.4 - 893.1)

Volume	Invert	Avail.Storage	Storage Description
#1	260.87'	13,002 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.87	10,986	0.0	0	0
260.88	10,986	40.0	44	44
262.37	10,986	40.0	6,548	6,592
262.38	10,986	15.0	16	6,608
262.62	10,986	15.0	395	7,004
262.63	10,986	40.0	44	7,048
263.63	10,986	40.0	4,394	11,442
263.64	10,986	25.0	27	11,469
263.96	10,986	25.0	879	12,348
263.97	10,986	15.0	16	12,365
264.29	10,986	15.0	527	12,892
264.30	10,986	100.0	110	13,002

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.87'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 257.75' Phase-In= 0.01'
#2	Primary	262.05'	**4.0" Round Culvert X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 262.05' / 261.75' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.79 cfs @ 12.55 hrs HW=261.79' (Free Discharge)
1=Exfiltration (Controls 0.79 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=260.87' TW=260.00' (Dynamic Tailwater)
2=Culvert (Controls 0.00 cfs)

Summary for Pond YD1: YD-1

Inflow Area = 22,809 sf, 45.71% Impervious, Inflow Depth > 3.91" for 25-Year event
Inflow = 2.33 cfs @ 12.09 hrs, Volume= 7,433 cf
Outflow = 2.33 cfs @ 12.09 hrs, Volume= 7,433 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.33 cfs @ 12.09 hrs, Volume= 7,433 cf
Routed to Pond YD2 : YD-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 263.03' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 261.50' / 261.18' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.27 cfs @ 12.09 hrs HW=262.97' TW=262.51' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.27 cfs @ 2.89 fps)

Summary for Pond YD2: YD-2

Inflow Area = 23,436 sf, 45.31% Impervious, Inflow Depth > 3.90" for 25-Year event
Inflow = 2.39 cfs @ 12.09 hrs, Volume= 7,611 cf
Outflow = 2.39 cfs @ 12.09 hrs, Volume= 7,611 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.39 cfs @ 12.09 hrs, Volume= 7,611 cf
Routed to Pond YD3 : YD-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.55' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.18'	**12.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 261.18' / 261.04' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.34 cfs @ 12.09 hrs HW=262.51' TW=262.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.34 cfs @ 2.98 fps)

Summary for Pond YD3: YD-3

Inflow Area = 24,041 sf, 44.17% Impervious, Inflow Depth > 3.86" for 25-Year event
Inflow = 2.43 cfs @ 12.09 hrs, Volume= 7,740 cf
Outflow = 2.43 cfs @ 12.09 hrs, Volume= 7,740 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.43 cfs @ 12.09 hrs, Volume= 7,740 cf
Routed to Pond PP : Porous Pavement

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.15' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.04'	**12.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 261.04' / 260.99' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.38 cfs @ 12.09 hrs HW=262.13' TW=261.33' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.38 cfs @ 3.46 fps)

Summary for Pond YD4: YD-4

Inflow Area = 1,101 sf, 33.88% Impervious, Inflow Depth > 3.51" for 25-Year event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 322 cf
Outflow = 0.10 cfs @ 12.09 hrs, Volume= 322 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.10 cfs @ 12.09 hrs, Volume= 322 cf
Routed to Pond YD5 : YD-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 262.77' @ 12.09 hrs
Flood Elev= 264.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	262.50'	**6.0" Round Culvert** L= 39.0' Ke= 0.500 Inlet / Outlet Invert= 262.50' / 262.31' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.10 cfs @ 12.09 hrs HW=262.76' TW=262.61' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.10 cfs @ 1.37 fps)

Summary for Pond YD5: YD-5

Inflow Area = 1,865 sf, 25.84% Impervious, Inflow Depth > 3.27" for 25-Year event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 508 cf
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 508 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.09 hrs, Volume= 508 cf
Routed to Pond PP : Porous Pavement

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.61' @ 12.09 hrs
Flood Elev= 264.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	262.31'	**6.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 262.31' / 262.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.16 cfs @ 12.09 hrs HW=262.61' TW=261.33' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.16 cfs @ 1.85 fps)

Summary for Link AP1: AP1

Inflow Area = 127,863 sf, 35.51% Impervious, Inflow Depth = 0.04" for 25-Year event
Inflow = 0.28 cfs @ 13.12 hrs, Volume= 471 cf
Primary = 0.28 cfs @ 13.12 hrs, Volume= 471 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment B1: Building 1 Roof Runoff Area=6,581 sf 100.00% Impervious Runoff Depth>7.32"
Tc=6.0 min CN=98 Runoff=1.09 cfs 4,012 cf

Subcatchment B2: Building 2 Roof Runoff Area=6,581 sf 100.00% Impervious Runoff Depth>7.32"
Tc=6.0 min CN=98 Runoff=1.09 cfs 4,012 cf

Subcatchment S201: to Infiltration Pond Runoff Area=64,556 sf 1.46% Impervious Runoff Depth>3.31"
Flow Length=509' Tc=26.1 min CN=63 Runoff=3.42 cfs 17,790 cf

Subcatchment S202: to Porous Pavement Runoff Area=24,239 sf 83.36% Impervious Runoff Depth>3.51"
Tc=790.0 min CN=93 Runoff=0.27 cfs 7,085 cf

Subcatchment S203: to YD-1 Runoff Area=22,809 sf 45.71% Impervious Runoff Depth>5.44"
Tc=6.0 min CN=82 Runoff=3.20 cfs 10,338 cf

Subcatchment S204: to YD-2 Runoff Area=627 sf 30.62% Impervious Runoff Depth>4.87"
Tc=6.0 min CN=77 Runoff=0.08 cfs 254 cf

Subcatchment S205: to YD-3 Runoff Area=605 sf 0.00% Impervious Runoff Depth>3.86"
Tc=6.0 min CN=68 Runoff=0.06 cfs 195 cf

Subcatchment S206: to YD-4 Runoff Area=1,101 sf 33.88% Impervious Runoff Depth>4.98"
Tc=6.0 min CN=78 Runoff=0.14 cfs 457 cf

Subcatchment S207: to YD-5 Runoff Area=764 sf 14.27% Impervious Runoff Depth>4.31"
Tc=6.0 min CN=72 Runoff=0.09 cfs 274 cf

Pond DP1: Ex Site Depression Peak Elev=262.07' Storage=4,947 cf Inflow=3.48 cfs 17,975 cf
Discarded=0.31 cfs 11,189 cf Primary=2.76 cfs 5,174 cf Outflow=3.06 cfs 16,363 cf

Pond PP: Porous Pavement Peak Elev=262.24' Storage=6,015 cf Inflow=5.78 cfs 26,628 cf
Discarded=0.88 cfs 26,421 cf Primary=0.11 cfs 185 cf Outflow=0.99 cfs 26,606 cf

Pond YD1: YD-1 Peak Elev=264.17' Inflow=3.20 cfs 10,338 cf
12.0" Round Culvert n=0.013 L=65.0' S=0.0049 '/' Outflow=3.20 cfs 10,338 cf

Pond YD2: YD-2 Peak Elev=263.25' Inflow=3.28 cfs 10,592 cf
12.0" Round Culvert n=0.013 L=28.0' S=0.0050 '/' Outflow=3.28 cfs 10,592 cf

Pond YD3: YD-3 Peak Elev=262.50' Inflow=3.35 cfs 10,787 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=3.35 cfs 10,787 cf

Pond YD4: YD-4 Peak Elev=262.83' Inflow=0.14 cfs 457 cf
6.0" Round Culvert n=0.013 L=39.0' S=0.0049 '/' Outflow=0.14 cfs 457 cf

Pond YD5: YD-5 Peak Elev=262.68' Inflow=0.23 cfs 731 cf
6.0" Round Culvert n=0.013 L=12.0' S=0.0050 '/' Outflow=0.23 cfs 731 cf

Link AP1: AP1

Inflow=2.76 cfs 5,174 cf
Primary=2.76 cfs 5,174 cf

Total Runoff Area = 127,863 sf Runoff Volume = 44,417 cf Average Runoff Depth = 4.17"
64.49% Pervious = 82,455 sf 35.51% Impervious = 45,408 sf

Summary for Subcatchment B1: Building 1 Roof

Runoff = 1.09 cfs @ 12.09 hrs, Volume= 4,012 cf, Depth> 7.32"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

Area (sf)	CN	Description
6,581	98	Roofs, HSG A
6,581		100.00% Impervious Area

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

Summary for Subcatchment B2: Building 2 Roof

Runoff = 1.09 cfs @ 12.09 hrs, Volume= 4,012 cf, Depth> 7.32"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

Area (sf)	CN	Description
6,581	98	Roofs, HSG A
6,581		100.00% Impervious Area

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

Summary for Subcatchment S201: to Infiltration Pond

Runoff = 3.42 cfs @ 12.38 hrs, Volume= 17,790 cf, Depth> 3.31"
Routed to Pond DP1 : Ex Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

	Area (sf)	CN	Description
*	13,651	43	Woods and forest that is selectively cleared, HSG A
*	49,964	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	755	98	Concrete, HSG A
	186	98	Roofs, HSG A
	64,556	63	Weighted Average
	63,615		98.54% Pervious Area
	941		1.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.7	70	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	59	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	5	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.5	275	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	50	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.1	509	Total			

Summary for Subcatchment S202: to Porous Pavement

Runoff = 0.27 cfs @ 21.95 hrs, Volume= 7,085 cf, Depth> 3.51"
Routed to Pond PP : Porous Pavement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

	Area (sf)	CN	Description
	16,526	98	Paved parking, HSG A
*	4,034	68	Open space, such as lawns, parks, and cemeteries, HSG A
	128	98	Roofs, HSG A
*	3,551	98	Concrete, HSG A
	24,239	93	Weighted Average
	4,034		16.64% Pervious Area
	20,205		83.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
790.0					**Direct Entry, Extended TC based on 41" Section**

Summary for Subcatchment S203: to YD-1

Runoff = 3.20 cfs @ 12.09 hrs, Volume= 10,338 cf, Depth> 5.44"
Routed to Pond YD1 : YD-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

	Area (sf)	CN	Description
*	12,383	68	Open space, such as lawns, parks, and cemeteries, HSG A
	8,457	98	Paved parking, HSG A
*	1,969	98	Concrete, HSG A
	22,809	82	Weighted Average
	12,383		54.29% Pervious Area
	10,426		45.71% Impervious Area

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

Summary for Subcatchment S204: to YD-2

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 254 cf, Depth> 4.87"
Routed to Pond YD2 : YD-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

	Area (sf)	CN	Description
*	435	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	192	98	Concrete, HSG A
	627	77	Weighted Average
	435		69.38% Pervious Area
	192		30.62% Impervious Area

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

Summary for Subcatchment S205: to YD-3

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 195 cf, Depth> 3.86"
Routed to Pond YD3 : YD-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

	Area (sf)	CN	Description
*	605	68	Open space, such as lawns, parks, and cemeteries, HSG A
	605		100.00% Pervious Area

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

Summary for Subcatchment S206: to YD-4

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 457 cf, Depth> 4.98"
Routed to Pond YD4 : YD-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

	Area (sf)	CN	Description
*	728	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	373	98	Concrete, HSG A
	1,101	78	Weighted Average
	728		66.12% Pervious Area
	373		33.88% Impervious Area

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

Summary for Subcatchment S207: to YD-5

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 274 cf, Depth> 4.31"
Routed to Pond YD5 : YD-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.56"

	Area (sf)	CN	Description
*	655	68	Open space, such as lawns, parks, and cemeteries, HSG A
*	109	98	Concrete, HSG A
	764	72	Weighted Average
	655		85.73% Pervious Area
	109		14.27% Impervious Area

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

Summary for Pond DP1: Ex Site Depression

Inflow Area = 127,863 sf, 35.51% Impervious, Inflow Depth > 1.69" for 100-Year event
Inflow = 3.48 cfs @ 12.39 hrs, Volume= 17,975 cf
Outflow = 3.06 cfs @ 12.54 hrs, Volume= 16,363 cf, Atten= 12%, Lag= 9.3 min
Discarded = 0.31 cfs @ 12.54 hrs, Volume= 11,189 cf
Primary = 2.76 cfs @ 12.54 hrs, Volume= 5,174 cf
Routed to Link ap1 : AP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 262.07' @ 12.54 hrs Surf.Area= 5,502 sf Storage= 4,947 cf

Plug-Flow detention time= 141.3 min calculated for 16,329 cf (91% of inflow)
Center-of-Mass det. time= 98.3 min (954.9 - 856.6)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	5,979 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
260.00	214	0	0	214
261.00	2,056	978	978	2,059
262.00	5,432	3,610	4,588	5,442
262.25	5,700	1,391	5,979	5,718

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	262.00'	**70.0' 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=0.31 cfs @ 12.54 hrs HW=262.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=2.73 cfs @ 12.54 hrs HW=262.07' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.73 cfs @ 0.60 fps)

Summary for Pond PP: Porous Pavement

Inflow Area = 63,307 sf, 70.24% Impervious, Inflow Depth > 5.05" for 100-Year event
Inflow = 5.78 cfs @ 12.09 hrs, Volume= 26,628 cf
Outflow = 0.99 cfs @ 12.57 hrs, Volume= 26,606 cf, Atten= 83%, Lag= 28.7 min
Discarded = 0.88 cfs @ 12.56 hrs, Volume= 26,421 cf
Primary = 0.11 cfs @ 12.57 hrs, Volume= 185 cf
Routed to Pond DP1 : Ex Site Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.24' @ 12.56 hrs Surf.Area= 10,986 sf Storage= 6,015 cf

Plug-Flow detention time= 37.2 min calculated for 26,551 cf (100% of inflow)
Center-of-Mass det. time= 36.7 min (923.4 - 886.7)

Volume	Invert	Avail.Storage	Storage Description
#1	260.87'	13,002 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.87	10,986	0.0	0	0
260.88	10,986	40.0	44	44
262.37	10,986	40.0	6,548	6,592
262.38	10,986	15.0	16	6,608
262.62	10,986	15.0	395	7,004
262.63	10,986	40.0	44	7,048
263.63	10,986	40.0	4,394	11,442
263.64	10,986	25.0	27	11,469
263.96	10,986	25.0	879	12,348
263.97	10,986	15.0	16	12,365
264.29	10,986	15.0	527	12,892
264.30	10,986	100.0	110	13,002

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.87'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 257.75' Phase-In= 0.01'
#2	Primary	262.05'	**4.0" Round Culvert X 3.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 262.05' / 261.75' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.88 cfs @ 12.56 hrs HW=262.24' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.88 cfs)

Primary OutFlow Max=0.11 cfs @ 12.57 hrs HW=262.24' TW=262.06' (Dynamic Tailwater)
↑—**2=Culvert** (Outlet Controls 0.11 cfs @ 1.01 fps)

Summary for Pond YD1: YD-1

[58] Hint: Peaked 0.67' above defined flood level

Inflow Area = 22,809 sf, 45.71% Impervious, Inflow Depth > 5.44" for 100-Year event
Inflow = 3.20 cfs @ 12.09 hrs, Volume= 10,338 cf
Outflow = 3.20 cfs @ 12.09 hrs, Volume= 10,338 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.20 cfs @ 12.09 hrs, Volume= 10,338 cf
Routed to Pond YD2 : YD-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 264.17' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.50'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 261.50' / 261.18' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.13 cfs @ 12.09 hrs HW=264.07' TW=263.20' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.13 cfs @ 3.99 fps)

Summary for Pond YD2: YD-2

Inflow Area = 23,436 sf, 45.31% Impervious, Inflow Depth > 5.42" for 100-Year event
Inflow = 3.28 cfs @ 12.09 hrs, Volume= 10,592 cf
Outflow = 3.28 cfs @ 12.09 hrs, Volume= 10,592 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.28 cfs @ 12.09 hrs, Volume= 10,592 cf
Routed to Pond YD3 : YD-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 263.25' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.18'	**12.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 261.18' / 261.04' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.21 cfs @ 12.09 hrs HW=263.20' TW=262.48' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.21 cfs @ 4.09 fps)

Summary for Pond YD3: YD-3

Inflow Area = 24,041 sf, 44.17% Impervious, Inflow Depth > 5.38" for 100-Year event
Inflow = 3.35 cfs @ 12.09 hrs, Volume= 10,787 cf
Outflow = 3.35 cfs @ 12.09 hrs, Volume= 10,787 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.35 cfs @ 12.09 hrs, Volume= 10,787 cf
Routed to Pond PP : Porous Pavement

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.50' @ 12.09 hrs
Flood Elev= 263.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	261.04'	**12.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 261.04' / 260.99' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.27 cfs @ 12.09 hrs HW=262.48' TW=261.57' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.27 cfs @ 4.16 fps)

Summary for Pond YD4: YD-4

Inflow Area = 1,101 sf, 33.88% Impervious, Inflow Depth > 4.98" for 100-Year event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 457 cf
Outflow = 0.14 cfs @ 12.09 hrs, Volume= 457 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.09 hrs, Volume= 457 cf
Routed to Pond YD5 : YD-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 262.83' @ 12.09 hrs
Flood Elev= 264.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	262.50'	**6.0" Round Culvert** L= 39.0' Ke= 0.500 Inlet / Outlet Invert= 262.50' / 262.31' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.14 cfs @ 12.09 hrs HW=262.83' TW=262.68' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.14 cfs @ 1.45 fps)

Summary for Pond YD5: YD-5

Inflow Area = 1,865 sf, 25.84% Impervious, Inflow Depth > 4.71" for 100-Year event
Inflow = 0.23 cfs @ 12.09 hrs, Volume= 731 cf
Outflow = 0.23 cfs @ 12.09 hrs, Volume= 731 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.23 cfs @ 12.09 hrs, Volume= 731 cf
Routed to Pond PP : Porous Pavement

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 262.68' @ 12.09 hrs
Flood Elev= 264.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	262.31'	**6.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 262.31' / 262.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.23 cfs @ 12.09 hrs HW=262.68' TW=261.58' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.23 cfs @ 2.03 fps)

Summary for Link AP1: AP1

Inflow Area = 127,863 sf, 35.51% Impervious, Inflow Depth = 0.49" for 100-Year event
Inflow = 2.76 cfs @ 12.54 hrs, Volume= 5,174 cf
Primary = 2.76 cfs @ 12.54 hrs, Volume= 5,174 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Stage-Area-Storage for Pond DP1: Ex Site Depression

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
260.00	214	214	0
260.05	261	261	12
260.10	313	313	26
260.15	370	370	43
260.20	431	432	63
260.25	498	498	86
260.30	568	569	113
260.35	644	645	143
260.40	724	725	178
260.45	809	810	216
260.50	899	900	259
260.55	994	995	306
260.60	1,093	1,094	358
260.65	1,197	1,198	415
260.70	1,305	1,307	478
260.75	1,419	1,421	546
260.80	1,537	1,539	620
260.85	1,659	1,662	700
260.90	1,787	1,790	786
260.95	1,919	1,922	878
261.00	2,056	2,059	978
261.05	2,187	2,190	1,084
261.10	2,321	2,325	1,196
261.15	2,460	2,464	1,316
261.20	2,603	2,607	1,443
261.25	2,749	2,754	1,576
261.30	2,900	2,905	1,718
261.35	3,055	3,060	1,866
261.40	3,213	3,219	2,023
261.45	3,376	3,382	2,188
261.50	3,543	3,549	2,361
261.55	3,714	3,720	2,542
261.60	3,889	3,895	2,732
261.65	4,067	4,074	2,931
261.70	4,250	4,258	3,139
261.75	4,437	4,445	3,356
261.80	4,628	4,636	3,583
261.85	4,823	4,832	3,819
261.90	5,022	5,031	4,065
261.95	5,225	5,234	4,321
262.00	5,432	5,442	4,588
262.05	5,485	5,496	4,861
262.10	5,538	5,551	5,136
262.15	5,592	5,606	5,415
262.20	5,646	5,662	5,695
262.25	**5,700**	**5,718**	**5,979**

Stage-Area-Storage for Pond PP: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
260.87	**10,986**	0
260.92	10,986	220
260.97	10,986	439
261.02	10,986	659
261.07	10,986	879
261.12	10,986	1,099
261.17	10,986	1,318
261.22	10,986	1,538
261.27	10,986	1,758
261.32	10,986	1,977
261.37	10,986	2,197
261.42	10,986	2,417
261.47	10,986	2,637
261.52	10,986	2,856
261.57	10,986	3,076
261.62	10,986	3,296
261.67	10,986	3,516
261.72	10,986	3,735
261.77	10,986	3,955
261.82	10,986	4,175
261.87	10,986	4,394
261.92	10,986	4,614
261.97	10,986	4,834
262.02	10,986	5,054
262.07	10,986	5,273
262.12	10,986	5,493
262.17	10,986	5,713
262.22	10,986	5,932
262.27	10,986	6,152
262.32	10,986	6,372
262.37	10,986	6,592
262.42	10,986	6,674
262.47	10,986	6,756
262.52	10,986	6,839
262.57	10,986	6,921
262.62	10,986	7,004
262.67	10,986	7,223
262.72	10,986	7,443
262.77	10,986	7,663
262.82	10,986	7,882
262.87	10,986	8,102
262.92	10,986	8,322
262.97	10,986	8,542
263.02	10,986	8,761
263.07	10,986	8,981
263.12	10,986	9,201
263.17	10,986	9,420
263.22	10,986	9,640
263.27	10,986	9,860
263.32	10,986	10,080
263.37	10,986	10,299
263.42	10,986	10,519
263.47	10,986	10,739
263.52	10,986	10,959
263.57	10,986	11,178
263.62	10,986	11,398
263.67	10,986	11,552
263.72	10,986	11,689
263.77	10,986	11,826
263.82	10,986	11,964
263.87	10,986	12,101
263.92	10,986	12,238
263.97	10,986	12,365
264.02	10,986	12,447
264.07	10,986	12,530
264.12	10,986	12,612
264.17	10,986	12,694
264.22	10,986	12,777
264.27	10,986	**12,859**

Stage-Area-Storage for Pond YD1: YD-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
261.50	**0**	262.54	0	263.58	0
261.52	0	262.56	0	263.60	0
261.54	0	262.58	0	263.62	0
261.56	0	262.60	0	263.64	0
261.58	0	262.62	0	263.66	0
261.60	0	262.64	0	263.68	0
261.62	0	262.66	0	263.70	0
261.64	0	262.68	0	263.72	0
261.66	0	262.70	0	263.74	0
261.68	0	262.72	0	263.76	0
261.70	0	262.74	0	263.78	0
261.72	0	262.76	0	263.80	0
261.74	0	262.78	0	263.82	0
261.76	0	262.80	0	263.84	0
261.78	0	262.82	0	263.86	0
261.80	0	262.84	0	263.88	0
261.82	0	262.86	0	263.90	0
261.84	0	262.88	0	263.92	0
261.86	0	262.90	0	263.94	0
261.88	0	262.92	0	263.96	0
261.90	0	262.94	0	263.98	0
261.92	0	262.96	0	264.00	0
261.94	0	262.98	0	264.02	0
261.96	0	263.00	0	264.04	0
261.98	0	263.02	0	264.06	0
262.00	0	263.04	0	264.08	0
262.02	0	263.06	0	264.10	0
262.04	0	263.08	0	264.12	0
262.06	0	263.10	0	264.14	0
262.08	0	263.12	0	264.16	0
262.10	0	263.14	0		
262.12	0	263.16	0		
262.14	0	263.18	0		
262.16	0	263.20	0		
262.18	0	263.22	0		
262.20	0	263.24	0		
262.22	0	263.26	0		
262.24	0	263.28	0		
262.26	0	263.30	0		
262.28	0	263.32	0		
262.30	0	263.34	0		
262.32	0	263.36	0		
262.34	0	263.38	0		
262.36	0	263.40	0		
262.38	0	263.42	0		
262.40	0	263.44	0		
262.42	0	263.46	0		
262.44	0	263.48	0		
262.46	0	263.50	0		
262.48	0	263.52	0		
262.50	0	263.54	0		
262.52	0	263.56	0		

Stage-Area-Storage for Pond YD2: YD-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
261.18	**0**	262.22	0	263.26	0
261.20	0	262.24	0	263.28	0
261.22	0	262.26	0	263.30	0
261.24	0	262.28	0	263.32	0
261.26	0	262.30	0	263.34	0
261.28	0	262.32	0	263.36	0
261.30	0	262.34	0	263.38	0
261.32	0	262.36	0	263.40	0
261.34	0	262.38	0	263.42	0
261.36	0	262.40	0	263.44	0
261.38	0	262.42	0	263.46	0
261.40	0	262.44	0	263.48	0
261.42	0	262.46	0	263.50	0
261.44	0	262.48	0		
261.46	0	262.50	0		
261.48	0	262.52	0		
261.50	0	262.54	0		
261.52	0	262.56	0		
261.54	0	262.58	0		
261.56	0	262.60	0		
261.58	0	262.62	0		
261.60	0	262.64	0		
261.62	0	262.66	0		
261.64	0	262.68	0		
261.66	0	262.70	0		
261.68	0	262.72	0		
261.70	0	262.74	0		
261.72	0	262.76	0		
261.74	0	262.78	0		
261.76	0	262.80	0		
261.78	0	262.82	0		
261.80	0	262.84	0		
261.82	0	262.86	0		
261.84	0	262.88	0		
261.86	0	262.90	0		
261.88	0	262.92	0		
261.90	0	262.94	0		
261.92	0	262.96	0		
261.94	0	262.98	0		
261.96	0	263.00	0		
261.98	0	263.02	0		
262.00	0	263.04	0		
262.02	0	263.06	0		
262.04	0	263.08	0		
262.06	0	263.10	0		
262.08	0	263.12	0		
262.10	0	263.14	0		
262.12	0	263.16	0		
262.14	0	263.18	0		
262.16	0	263.20	0		
262.18	0	263.22	0		
262.20	0	263.24	0		

Stage-Area-Storage for Pond YD3: YD-3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
261.04	**0**	262.08	0	263.12	0
261.06	0	262.10	0	263.14	0
261.08	0	262.12	0	263.16	0
261.10	0	262.14	0	263.18	0
261.12	0	262.16	0	263.20	0
261.14	0	262.18	0	263.22	0
261.16	0	262.20	0	263.24	0
261.18	0	262.22	0	263.26	0
261.20	0	262.24	0	263.28	0
261.22	0	262.26	0	263.30	0
261.24	0	262.28	0	263.32	0
261.26	0	262.30	0	263.34	0
261.28	0	262.32	0	263.36	0
261.30	0	262.34	0	263.38	0
261.32	0	262.36	0	263.40	0
261.34	0	262.38	0	263.42	0
261.36	0	262.40	0	263.44	0
261.38	0	262.42	0	263.46	0
261.40	0	262.44	0	263.48	0
261.42	0	262.46	0	263.50	0
261.44	0	262.48	0		
261.46	0	262.50	0		
261.48	0	262.52	0		
261.50	0	262.54	0		
261.52	0	262.56	0		
261.54	0	262.58	0		
261.56	0	262.60	0		
261.58	0	262.62	0		
261.60	0	262.64	0		
261.62	0	262.66	0		
261.64	0	262.68	0		
261.66	0	262.70	0		
261.68	0	262.72	0		
261.70	0	262.74	0		
261.72	0	262.76	0		
261.74	0	262.78	0		
261.76	0	262.80	0		
261.78	0	262.82	0		
261.80	0	262.84	0		
261.82	0	262.86	0		
261.84	0	262.88	0		
261.86	0	262.90	0		
261.88	0	262.92	0		
261.90	0	262.94	0		
261.92	0	262.96	0		
261.94	0	262.98	0		
261.96	0	263.00	0		
261.98	0	263.02	0		
262.00	0	263.04	0		
262.02	0	263.06	0		
262.04	0	263.08	0		
262.06	0	263.10	0		

Stage-Area-Storage for Pond YD4: YD-4

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
262.50	**0**	263.54	0
262.52	0	263.56	0
262.54	0	263.58	0
262.56	0	263.60	0
262.58	0	263.62	0
262.60	0	263.64	0
262.62	0	263.66	0
262.64	0	263.68	0
262.66	0	263.70	0
262.68	0	263.72	0
262.70	0	263.74	0
262.72	0	263.76	0
262.74	0	263.78	0
262.76	0	263.80	0
262.78	0	263.82	0
262.80	0	263.84	0
262.82	0	263.86	0
262.84	0	263.88	0
262.86	0	263.90	0
262.88	0	263.92	0
262.90	0	263.94	0
262.92	0	263.96	0
262.94	0	263.98	0
262.96	0	264.00	0
262.98	0	264.02	0
263.00	0	264.04	0
263.02	0	264.06	0
263.04	0	264.08	0
263.06	0	264.10	0
263.08	0	264.12	0
263.10	0	264.14	0
263.12	0	264.16	0
263.14	0	264.18	0
263.16	0	264.20	0
263.18	0	264.22	0
263.20	0	264.24	0
263.22	0	264.26	0
263.24	0	264.28	0
263.26	0	264.30	0
263.28	0	264.32	0
263.30	0	264.34	0
263.32	0	264.36	0
263.34	0	264.38	0
263.36	0	264.40	0
263.38	0	264.42	0
263.40	0	264.44	0
263.42	0	264.46	0
263.44	0	264.48	0
263.46	0	264.50	0
263.48	0		
263.50	0		
263.52	0		

Stage-Area-Storage for Pond YD5: YD-5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
262.31	**0**	263.35	0	264.39	0
262.33	0	263.37	0	264.41	0
262.35	0	263.39	0	264.43	0
262.37	0	263.41	0	264.45	0
262.39	0	263.43	0	264.47	0
262.41	0	263.45	0	264.49	0
262.43	0	263.47	0		
262.45	0	263.49	0		
262.47	0	263.51	0		
262.49	0	263.53	0		
262.51	0	263.55	0		
262.53	0	263.57	0		
262.55	0	263.59	0		
262.57	0	263.61	0		
262.59	0	263.63	0		
262.61	0	263.65	0		
262.63	0	263.67	0		
262.65	0	263.69	0		
262.67	0	263.71	0		
262.69	0	263.73	0		
262.71	0	263.75	0		
262.73	0	263.77	0		
262.75	0	263.79	0		
262.77	0	263.81	0		
262.79	0	263.83	0		
262.81	0	263.85	0		
262.83	0	263.87	0		
262.85	0	263.89	0		
262.87	0	263.91	0		
262.89	0	263.93	0		
262.91	0	263.95	0		
262.93	0	263.97	0		
262.95	0	263.99	0		
262.97	0	264.01	0		
262.99	0	264.03	0		
263.01	0	264.05	0		
263.03	0	264.07	0		
263.05	0	264.09	0		
263.07	0	264.11	0		
263.09	0	264.13	0		
263.11	0	264.15	0		
263.13	0	264.17	0		
263.15	0	264.19	0		
263.17	0	264.21	0		
263.19	0	264.23	0		
263.21	0	264.25	0		
263.23	0	264.27	0		
263.25	0	264.29	0		
263.27	0	264.31	0		
263.29	0	264.33	0		
263.31	0	264.35	0		
263.33	0	264.37	0		