TRI-COUNTY REGIONAL VOCATIONAL TECHNICAL HIGH SCHOOL

147 POND ST
FRANKLIN, MA 02038

STORMWATER MANAGEMENT REPORT

Submitted to:
Town of Franklin Conservation Commission
Massachusetts Department of Environmental Protection

Prepared for:
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147 Pond St
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March, 2024

TRI-COUNTY VOCATIONAL HIGH SCHOOL
STORMWATER MANAGEMENT NARRATIVE
FRANKLIN, MA

March 2024

Introduction

The existing Tri-County Regional Vocational school site is located at 147 Pond Street in Franklin. The existing school building, constructed in 1977, is a multi-level steel framed, masonry clad building of approximately 285,000 square feet. The site is approximately 60.3 acres. There have been no additions.

The property is abutted by single family residences to the North and West. A larger condominium complex is located to the South/Southeast of the existing site. An open, wooded lot owned by the Town's Affordable Housing Trust is located to the east. The existing site has frontage along both Pond and Old West Central Street. The site slopes downgradient 80-100 feet in height from north/northeast to south/west, with the high point northeast of the property and the low point(s) at the bordering vegetated wetlands resource areas along the south and west portions of the site. All proposed development will occur on the northern/eastern sides of the wetlands delineation.

The Tri-County High School development will include a new, compact, three-story, rectangular design fitting into the available buildable area into the sloping behind the existing school. The building will be located on a newly created level area and will be accessed by both the existing driveway and a new access drive from the existing access road. The main entrance will be the focal point of the new entrance drive; framed by the three-story vertical stair tower and sloping roof of the library/learning commons. The proposed site includes reconfigured athletic fields, parking/drive aisles, pedestrian connectivity (via sidewalks), landscaping, new utilities and a proposed stormwater management system designed in accordance with the Massachusetts DEP Stormwater Standards, as well as the Town of Franklin Stormwater Bylaw.

Soils:
Soils on the site consist of a mix of hydrological "C", and "D" Soils. The soils resource report, and test pit results conducted on January 16 and March 12, 2024 are located in the Appendix of this report (Note: Two separate reports are included by OTO, Project geotechnical engineers). Soils were generally found to be glacial till with low hydraulic conductivity results (K values < 1ft/day based on infiltrometer testing). Groundwater elevations fluctuated between 3'-9' depending on locations.

Existing Stormwater Management:
The site is 60.3± acres in size, with the existing school building, constructed in 1977, a multi-level steel framed, masonry clad building of approximately 285,000 square feet and existing athletic fields. The existing stormwater management on the property consists solely of stormwater conveyance with a series of catch basins and drainage manholes, excluding any use of Best Management Practices (BMPs) throughout the site to meet the MassDEP Stormwater Standards for stormwater. The site does not include mitigation for stormwater quantity or quality.

Proposed Stormwater Management System:
The proposed post-development stormwater management system consists of a series of catch basins/drain manholes/water quality units that convey site run-off to one of four (4) underground detention and/or infiltration systems. Detention system #1 is located to the east of the proposed school building within the rear driveway, Detention system #2 is located Southeast of the proposed school building and east of the parking lot area, Infiltration system #3 is located west of the new building within the new front parking lot, and Infiltration system #4 is located within a new parking lot near the site entrance. The underground systems ultimately discharge to existing wetland resource

areas and the project's Point of Analysis. It should be noted that underground lined detention systems are being proposed in earthwork cut areas that are within the determined maximum groundwater elevations; as such infiltration requirements for these areas will not be met.

Methodology/ Procedure

Objective:
The objective of the stormwater management for the site is to improve mitigation of stormwater quality and treatment of any increase in peak storm runoff rates due to the construction of the proposed project. Outlined below are the numerous stormwater best management practices (BMP's) proposed to be used.

Proposed Stormwater Control Systems:
The following are the proposed Best Management Practices (BMP's) stormwater control systems to be used on the site to mitigate an increase in peak stormwater runoff and improve water quality:

Subsurface Structures (Infiltration Chambers): Subsurface structures are underground systems that capture runoff (Detention system), and gradually infiltrate it into the groundwater. There are a number of underground infiltration systems that can be installed to enhance groundwater recharge. Subsurface structures are constructed to store stormwater temporarily and percolate into the underlying soil. They are feasible only where the soil is adequately permeable and the maximum water table and/or elevation is sufficiently low. They can be used to control the quantity as well as quality of stormwater runoff, if properly designed and constructed. The structures serve as storage chambers for captured stormwater, while the soil matrix provides treatment.

Subsurface Detention system (Lined): Subsurface Detention structures are underground systems that capture runoff and gradually discharge it to stormwater conveyance systems to reflect pre-existing run-off conditions. Infiltration is prohibited for these systems as the soil maximum water table and/or elevation is not low enough to create the required minimum separation. They can be used to control the quantity as well as quality of stormwater runoff, if properly designed and constructed. The structures serve as storage chambers for captured stormwater.

Deep Sump Catch Basins: A deep sump catch basin (also known as oil and grease or hooded catch basins) acts as underground retention systems designed to remove trash, debris, and coarse sediment from stormwater runoff, and serve as temporary spill containment devices for floatables such as oil and grease that provides pretreatment. A 25% TSS removal is awarded to the deep sump catch basin when used as pre-treatment.

Water Quality Units (WQUs): Water Quality Units are a flow-through structure with a settling or separation unit to remove sediments and other pollutants. They typically use the power of swirling or flowing water to separate floatables and coarser sediments, are typically designed and manufactured by private businesses, and come in different sizes to accommodate different design storms and flow conditions. Since proprietary separators can be placed in almost any location on a site, they are particularly useful when either site constraints prevent the use of other stormwater techniques or as part of a larger treatment train. Generally, they are placed below ground and contain inspection and access ports so that they may be inspected and cleaned.

Watershed Routing

Below is a summary of the various existing and proposed watersheds with a brief narrative describing the routing. The descriptions of the watersheds are depicted in sketches EX-WS and P-WS located in the Appendix.

Existing Watersheds:

Ex-Watershed-1: This watershed consists mainly of the northern portion of the existing school building, northern Athletic Fields, and a portion of the western satellite parking area. Stormwater runoff from this watershed to the wetlands on the southern portion of the site (POA-3).

Ex-Watershed-2: This watershed consists mainly of the existing school building including the main entrance and concrete walkways, eastern side of the baseball field, and a portion of the satellite parking lot adjacent to the west portion of the existing school building connected to the access road. Stormwater runoff from this watershed to the wetlands on the southwestern portion of the site (POA-2) to run off to POA-3.

Ex-Watershed-3: This watershed consists of the southern section of the main parking lot consisting mainly of asphalt and green space. Stormwater runoff from this watershed to the wetlands on the southwestern portion of the site (POA-2) to run off to POA-3.

Ex-Watershed-4: This watershed consists of the northern section of the main parking lot and a portion of the access driveway. Stormwater runoff from this watershed to the wetlands on the southwestern portion of the site (POA-2) to run off to POA-3.

Ex-Watershed-5: This watershed consists mainly of the southern section of the rear parking lot and the south side of the existing building. Stormwater runoff from this watershed to the wetlands on the southern portion of the site (POA-1) to run off to POA-3.

Ex-Watershed-7: This watershed consists mainly of the wetland tributary area west of the main parking lot field parallel with the access road to the school campus. Stormwater runoff from this watershed to the wetlands on the southwestern portion of the site (POA-2) to run off to POA-3.

Ex-Watershed-8: This watershed consists mainly of the wetland tributary area south of the main parking lot field adjacent with the access road to the school campus. Stormwater runoff from this watershed to the wetlands on the southern portion of the site (POA-1) to run off to POA-3.

Ex-Watershed-9: This watershed consists mainly of the west side of the existing solar field area to the east of the rear parking lot of the existing building. Stormwater runoff from this watershed to the wetlands just south of the solar fields of the site (POA-4).

Ex-Watershed-10: This watershed consists mainly of the east side of the existing solar field area to the east of the rear parking lot of the existing building. Stormwater runoff from this watershed to the wetlands just south of the solar fields of the site (POA-5).

Ex-Watershed-12: This watershed consists of mainly campus areas to the north and the northwest of the site consisting of mainly undeveloped wooded area. Stormwater runoff from this watershed to the wetlands just south of the solar fields of the site (POA).

Proposed Watersheds (PWS):

PR-Watershed-1: This watershed consists of the proposed northern portion of the school building and the rear drive aisle of the proposed development. Stormwater runoff is conveyed through roof leaders and underground piping to BMP #1 (east of the proposed school building) before discharging to BMP-2 and then to the existing stormwater conveyance system to POA-1.

PR-Watershed-2: This watershed consists of the proposed school building and the south side drive aisle and parking lot adjacent to the south side of the proposed building. Stormwater runoff is conveyed through roof leaders, catch basins, and underground piping to BMP #2 (south of the proposed school building) before discharging to the existing stormwater conveyance system to POA-1.

PR-Watershed-3: This watershed consists of the new front parking area/access driveway to the west of the site and bus drop off aisle and landscape area. The stormwater from this watershed is captured via catch basins, drain manholes and BMP#3 prior to discharging to the wetlands (POA-2) through a 15" culvert.

PR-Watershed-4: This watershed consists of the parking lot east and south of the grass athletic fields. The stormwater from this watershed is captured via catch basins, drain manholes prior to discharging to the wetlands (POA-2) through a 24" culvert.

PR-Watershed-5: This watershed consists of grassed athletic fields to the north of the site. The stormwater from this watershed sheet flows inlets to an existing 30" RCP drain line and through existing stormwater conveyance system to POA.

PR-Watershed-6: This watershed consists of area west of the main drive aisle. The stormwater from this watershed is captured via catch basins, drain manholes and directed to BMP#4 prior to discharging to the southwest wetlands (POA-2) through a 24" culvert.

PR-Watershed-7: This watershed consists of the proposed areas east of the baseball field and existing wetland resource areas. The stormwater from this watershed is picked up via inlets and underdrains and directed to the bordering vegetated wetlands to the south depicted as POA-1.

PR-Watershed-8: This watershed consists of the proposed areas west baseball field and wetland tributary area. The stormwater from this watershed is picked up via inlets and underdrains and directed to the bordering vegetated wetlands to the south depicted as POA-2.

PR-Watershed-9: This watershed consists of the parking lot west and south of the athletic fields,. The stormwater from this watershed is captured via catch basins, drain manholes and directed to BMP#4 prior to discharging to the wetlands (POA-2) through a 24" culvert.

PR-Watershed-10: This watershed consists of mainly of areas to remain untouched in the proposed development scheme found to the northwest and west of the site consisting of mainly wooded area and moss. Stormwater runoff from this watershed to the wetlands just south of the solar fields of the site (POA-3).

Analysis:

The analysis was based on the pre and post development peak discharge rates at the points of analysis. The proposed construction of the Tri-County High School will result in a slight increase in impervious area, therefore the proposed stormwater management system will be designed to mitigate any increase in the rate of runoff and improve stormwater quality.

Results/ Summary

Results of Analysis:
Through the use of the HydroCAD Software, the curve numbers, times of concentrations, and peak discharge rates were determined for both the existing conditions and the proposed conditions. The results of the study shows that both the post-development peak rates of runoff are equal or less than the existing rates.

As shown in Tables below the post development peak rates of runoff from the site will be mitigated.

Existing	Area (ac)	% Imp
POA-1	6.5	54.6
POA-2	9.3	56.5
POA-3	32.6	42.5
POA-4	2.6	28.4
POA-5	4.0	24.9
POA	60.3	28.5

Proposed	Area (ac)	% Imp
POA-1	11.0	61.2
POA-2	12.4	47.7
POA-3	38.1	39.2
POA	60.3	28.7

Existing Q	2-year	10-year	25-year	100-year
POA-1	14.62	25.55	32.48	43.20
POA-2	19.85	35.27	45.00	59.99
POA-3	61.75	116.11	150.93	204.88
POA-4	3.78	7.60	10.07	13.91
POA-5	4.16	8.69	11.67	16.31
POA	78.31	156.95	208.56	289.25

Proposed Q	2-year	10-year	25-year	100-year
POA-1	14.40	23.71	31.78	42.26
POA-2	11.26	33.3	44.28	56.46
POA-3	41.43	96.14	129.28	172.11
POA	60.79	139	188.35	259.1

Peak WSE	25-year	100-year	Qin-25	Qout-25	BMP	Product	Quantities (chambers)	Total Available Storage (cf)	Invert
BMP-1	374.33	375.17	26.74	9.16	Detention	4' StormTrap	7 x 14	32781	371.33
BMP-2	374.8	375.6	19.1	12.67	Detention	4' StormTrap	6 x 7*	14049	371.83
BMP-3	360.02	361.06	17.84	6.73	Infiltration	MC-3500	8 x 22*	32819	357.25
BMP-4	340.3	341.13	24.54	23.21	Infiltration	MC-3500	6 x 20	22539	336.75
*BMP-3 and BMP-4 includes storage from 1" over impervious surfaces tributary to BMP									

Stormwater Management Standards

The Department of Environmental Protection has implemented the Stormwater Management Standards as of November 18, 1996 and updated them in April 2008. The standards met are described below and in the Stormwater Management Form as provided by DEP.

Standard #1: Untreated Stormwater

The project is designed so that stormwater conveyances (outfalls/discharges) do not discharge untreated stormwater into, or cause erosion to, wetlands or waters.

Therefore Standard #1 is met.

Standard #2: Post-development peak discharge rates

The proposed project will result in a slight increase in impervious area. The proposed stormwater management system has been designed so that there is no increase in post construction discharge rates from the site. See Tables above.

Therefore Standard #2 is met.

Standard #3: Recharge to groundwater

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post- development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Soil types have been identified based on the information contained in the Soil Report. We have determined that the soils are consistent with Hydrologic soil type "C", and "D" which requires runoff to be infiltrated (as listed in the table below) from new impervious areas.

The proposed development will result in an increase in impervious area in the "C" and "D" soil areas. To be conservative, the calculations for required recharge volumes are based on the required inches of runoff for the new impervious area per soil area.

Hydrologic Group Volume to Recharge (x Total Impervious Area)	
Hydrologic Group	Volume to Recharge x Total Impervious Area
A	0.60 inches of runoff
B	0.35 inches of runoff
C	0.25 inches of runoff
D	0.10 inches of runoff

Required Recharge Volumes:

"C" Soils

Infiltration Rate: 0.25 inches of runoff
Proposed Site New Impervious Area in "C" Soils: 723,010 sf
723,010 sf x 0.25 x (1/12) = 15,063 cf

"D" Soils

Infiltration Rate: 0.10 inches of runoff
Proposed Site New Impervious Area in "D" Soils: 0 sf
0 sf x 0.10 x (1/12) = 0 cf

Total required recharge volume: 15,063 cf

Proposed Recharge Volume:

BMP #3 = 9,029 cf
BMP #4 = 12,822

Total provided recharge volume: 21,851 cf

Drawdown Time (Assuming "C" soils):

BMP-3 (maximum time 72 hours)= 9029 cf / (0.52 in/hr x 9575 sf / 12 in/ft) = 21.76 hours
BMP-4 (maximum time 72 hours)= 12822 cf / (0.52 in/hr x 6598 sf / 12 in/ft) = 44.85 hours

Therefore Standard #3 is met.

Standard #4: TSS removal

The BMP's selected to remove TSS from impervious areas for this include: Area Drains, Catch Basins, Outlet Control Structures, Water Quality Units, and Subsurface Structures.

PR-Watershed-1:
Initial TSS=1.00
Catch Basin: (1.00)(1.00-0.25)= 0.75 TSS
Water Quality Unit:(0.75)(1.00-0.80)=0.15
Total TSS Removal= 85%

PR-Watershed-2:
Initial TSS=1.00
Catch Basin: (1.00)(1.00-0.25)= 0.75 TSS
Water Quality Unit:(0.75)(1.00-0.80)=0.15
Total TSS Removal= 85%

PR-Watershed-3:
Initial TSS=1.00
Catch Basin: (1.00)(1.00-0.25)= 0.75 TSS
Water Quality Unit:(0.75)(1.00-0.80)=0.15
Infiltration System: (0.15)(1.00-0.80)=0.03
Total TSS Removal= 97%

PR-Watershed-4:
Initial TSS=1.00
Catch Basin: (1.00)(1.00-0.25)= 0.75 TSS
Water Quality Unit:(0.75)(1.00-0.80)=0.15
Infiltration System: (0.15)(1.00-0.80)=0.03
Total TSS Removal= 97%

PR-Watershed-5:
Initial TSS=1.00
Catch Basin: (1.00)(1.00-0.25)= 0.75 TSS
Water Quality Unit:(0.75)(1.00-0.80)=0.15
Infiltration System: (0.15)(1.00-0.80)=0.03
Total TSS Removal= 97%

PR-Watershed-6:
Initial TSS=1.00
Catch Basin: (1.00)(1.00-0.25)= 0.75 TSS
Water Quality Unit:(0.75)(1.00-0.80)=0.15
Infiltration System: (0.15)(1.00-0.80)=0.03
Total TSS Removal= 97%

PR-Watershed-9:
Initial TSS=1.00
Catch Basin: (1.00)(1.00-0.25)= 0.75 TSS
Water Quality Unit:(0.75)(1.00-0.80)=0.15
Infiltration System: (0.15)(1.00-0.80)=0.03
Total TSS Removal= 97%

Therefore Standard #4 is met.

Standard #5: Higher potential pollutant loads

The project site does not contain Land Uses with Higher Potential Pollutant Loads.

Therefore Standard #5 is met.

Standard #6: Protection of critical areas

The site is not located within a critical area

Therefore Standard #6 is met.

Standard #7: Redevelopment projects

The project is considered Redevelopment and New Construction and all of the Standards will be met.

Therefore Standard #7 is met.

Standard #8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

Soil Erosion and Sediment Control Plan:
The objectives of the Soil Erosion and Sediment Control Plan are to control erosion at its source with temporary control structures, minimize the runoff from areas of disturbance, and de-concentrate and distribute stormwater runoff through natural vegetation before discharge to critical zones such as streams or wetlands. Soil erosion control does not begin with the perimeter sediment trap. It begins at the source of the sediment, the disturbed land areas, and extends down to the control structure.

The Soil Erosion and Sediment Control Plan will be enacted in order to protect the resource areas during construction. The erosion control devices will remain in place until all exposed areas have been stabilized with vegetation or impervious surfaces.

The objective of the Soil Erosion & Sediment Control Plan that will be enacted on site is to control the vulnerability of the soil to the erosion process or the capability of moving water to detach soil particles during the construction phase(s).

The erosion and sediment control plan to be in place during the construction phase is detailed within the NOI narrative (under separate cover).

Therefore Standard #8 is met.

Standard #9: Operation/maintenance plan

An operation and maintenance plan for both construction and post-development stormwater controls has been developed. The plan includes owner(s); parties responsible for operation and maintenance; schedule for inspection and maintenance; routine and non-routine maintenance tasks. A copy of the O&M is included in the Appendix.

Therefore Standard #9 is met.

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

It is not anticipated that there will be any Illicit discharges for the project.

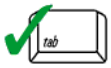
Therefore Standard #10 is met.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

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



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

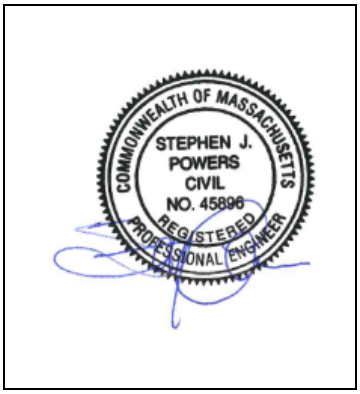
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



03/20/2024
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of “country drainage” versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☒ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☒ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☒ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☐ Name of the stormwater management system owners;
- ☐ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

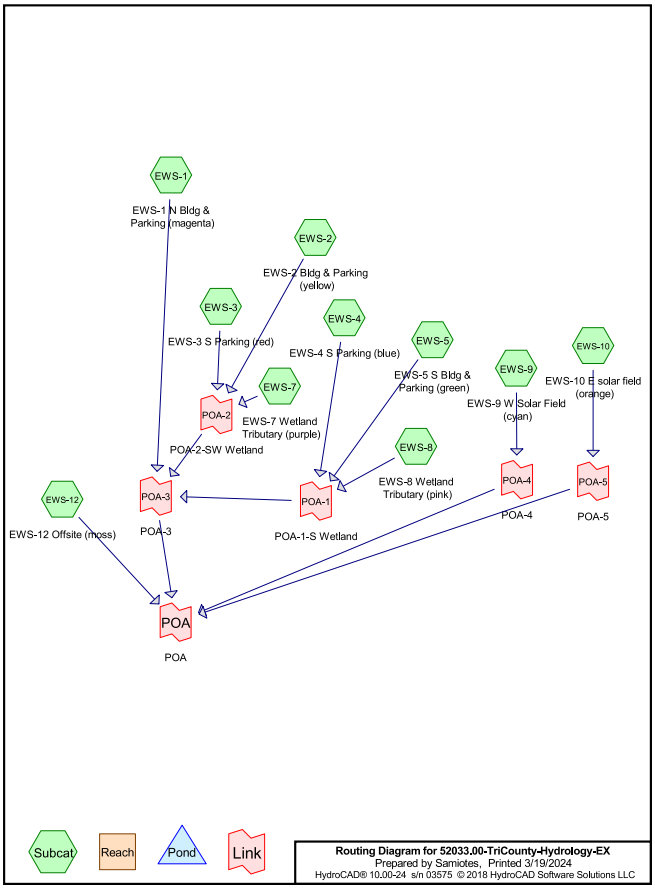
☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

TABLE OF APPENDICES

APPENDIX 1:
EXISTING HYDROLOGICAL CALCULATIONS



Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
18.568	74	>75% Grass cover, Good, HSG C (EWS-1, EWS-10, EWS-12, EWS-2, EWS-3, EWS-4, EWS-5, EWS-7, EWS-8, EWS-9)
0.804	87	Dirt roads, HSG C (EWS-1, EWS-12, EWS-2, EWS-8, EWS-9)
12.530	98	Paved parking & bldg, HSG C (EWS-1, EWS-12, EWS-2, EWS-5)
4.672	98	Paved parking, HSG C (EWS-10, EWS-3, EWS-4, EWS-7, EWS-9)
23.733	70	Woods, Good, HSG C (EWS-1, EWS-10, EWS-12, EWS-7, EWS-8, EWS-9)
60.307	**79**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EWS-1: EWS-1 N Bldg & Runoff Area=732,784 sf 30.08% Impervious Runoff Depth=1.60"
Flow Length=228' Tc=9.0 min CN=81 Runoff=28.26 cfs 2.237 af

Subcatchment EWS-10: EWS-10 E solar field Runoff Area=172,814 sf 24.86% Impervious Runoff Depth=1.46"
Flow Length=852' Tc=24.2 min CN=79 Runoff=4.16 cfs 0.482 af

Subcatchment EWS-12: EWS-12 Offsite (moss) Runoff Area=920,820 sf 7.66% Impervious Runoff Depth=1.09"
Flow Length=514' Tc=18.8 min CN=73 Runoff=17.49 cfs 1.914 af

Subcatchment EWS-2: EWS-2 Bldg & Parking Runoff Area=233,176 sf 68.92% Impervious Runoff Depth=2.41"
Flow Length=313' Tc=9.9 min CN=91 Runoff=13.03 cfs 1.075 af

Subcatchment EWS-3: EWS-3 S Parking (red) Runoff Area=85,697 sf 67.06% Impervious Runoff Depth=2.32"
Tc=6.0 min CN=90 Runoff=5.28 cfs 0.380 af

Subcatchment EWS-4: EWS-4 S Parking (blue) Runoff Area=76,086 sf 79.65% Impervious Runoff Depth=2.60"
Tc=6.0 min CN=93 Runoff=5.14 cfs 0.378 af

Subcatchment EWS-5: EWS-5 S Bldg & Runoff Area=125,759 sf 74.91% Impervious Runoff Depth=2.50"
Tc=6.0 min CN=92 Runoff=8.25 cfs 0.602 af

Subcatchment EWS-7: EWS-7 Wetland Runoff Area=86,263 sf 12.40% Impervious Runoff Depth=1.14"
Flow Length=221' Tc=10.1 min CN=74 Runoff=2.20 cfs 0.189 af

Subcatchment EWS-8: EWS-8 Wetland Tributary Runoff Area=81,652 sf 0.00% Impervious Runoff Depth=1.03"
Flow Length=269' Tc=12.0 min CN=72 Runoff=1.73 cfs 0.161 af

Subcatchment EWS-9: EWS-9 W Solar Field Runoff Area=111,937 sf 28.40% Impervious Runoff Depth=1.60"
Flow Length=547' Tc=13.3 min CN=81 Runoff=3.78 cfs 0.342 af

Link POA: POA Inflow=78.31 cfs 7.760 af
Primary=78.31 cfs 7.760 af

Link POA-1: POA-1-S Wetland Inflow=14.62 cfs 1.142 af
Primary=14.62 cfs 1.142 af

Link POA-2: POA-2-SW Wetland Inflow=19.85 cfs 1.643 af
Primary=19.85 cfs 1.643 af

Link POA-3: POA-3 Inflow=61.75 cfs 5.022 af
Primary=61.75 cfs 5.022 af

Link POA-4: POA-4 Inflow=3.78 cfs 0.342 af
Primary=3.78 cfs 0.342 af

Link POA-5: POA-5 Inflow=4.16 cfs 0.482 af
Primary=4.16 cfs 0.482 af

Total Runoff Area = 60.307 ac Runoff Volume = 7.760 af Average Runoff Depth = 1.54"
71.47% Pervious = 43.105 ac 28.53% Impervious = 17.203 ac

Summary for Subcatchment EWS-1: EWS-1 N Bldg & Parking (magenta)

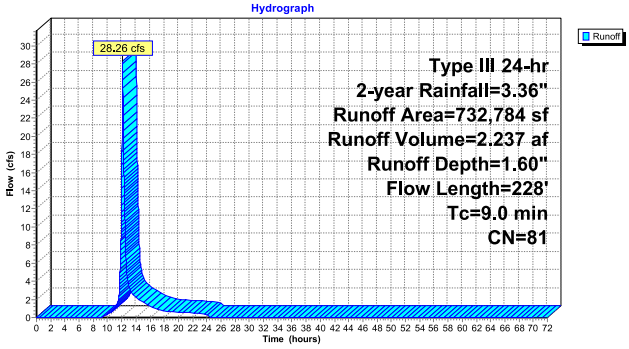
Runoff = 28.26 cfs @ 12.13 hrs, Volume= 2.237 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
*	220,393	98	Paved parking & bldg, HSG C
	413,613	74	>75% Grass cover, Good, HSG C
	84,772	70	Woods, Good, HSG C
	14,006	87	Dirt roads, HSG C
	732,784	81	Weighted Average
	512,391		69.92% Pervious Area
	220,393		30.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0130	0.12		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
2.3	178	0.0343	1.30		**Shallow Concentrated Flow, SCF 178 FT** Short Grass Pasture Kv= 7.0 fps
9.0	228	Total			

Subcatchment EWS-1: EWS-1 N Bldg & Parking (magenta)



Summary for Subcatchment EWS-10: EWS-10 E solar field (orange)

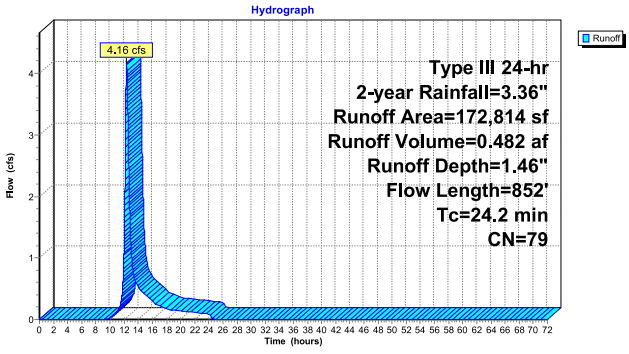
Runoff = 4.16 cfs @ 12.34 hrs, Volume= 0.482 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
42,967	98	Paved parking, HSG C
105,590	74	>75% Grass cover, Good, HSG C
24,257	70	Woods, Good, HSG C
172,814	79	Weighted Average
129,847		75.14% Pervious Area
42,967		24.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, SHEET FLOW 50 FT** Grass: Short n= 0.150 P2= 3.20"
4.3	281	0.0240	1.08		**Shallow Concentrated Flow, SCF 281 FT** Short Grass Pasture Kv= 7.0 fps
13.1	440	0.0125	0.56		**Shallow Concentrated Flow, SCF 440 FT WOODS** Woodland Kv= 5.0 fps
1.2	81	0.0270	1.15		**Shallow Concentrated Flow, SCF 81 FT** Short Grass Pasture Kv= 7.0 fps
24.2	852	Total			

Subcatchment EWS-10: EWS-10 E solar field (orange)



Summary for Subcatchment EWS-12: EWS-12 Offsite (moss)

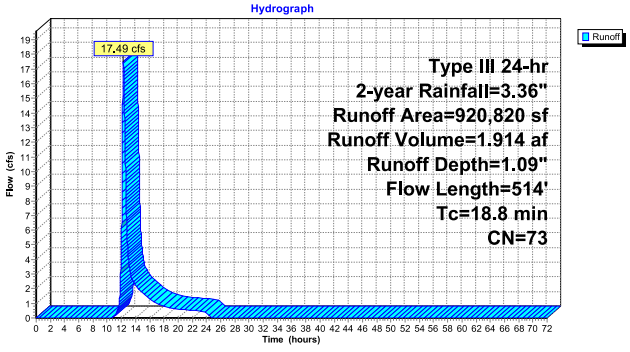
Runoff = 17.49 cfs @ 12.28 hrs, Volume= 1.914 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
*	70,511	98	Paved parking & bldg, HSG C
	54,978	74	>75% Grass cover, Good, HSG C
	786,189	70	Woods, Good, HSG C
	9,142	87	Dirt roads, HSG C
	920,820	73	Weighted Average
	850,309		92.34% Pervious Area
	70,511		7.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
5.0	414	0.0760	1.38		**Shallow Concentrated Flow, SCF 414 FT WOODS** Woodland Kv= 5.0 fps
18.8	514	Total			

Subcatchment EWS-12: EWS-12 Offsite (moss)



Summary for Subcatchment EWS-2: EWS-2 Bldg & Parking (yellow)

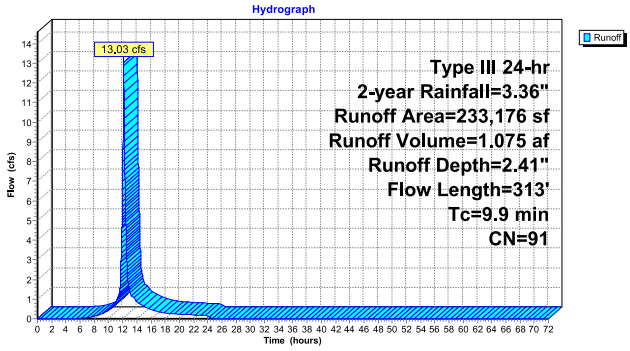
Runoff = 13.03 cfs @ 12.13 hrs, Volume= 1.075 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
*	160,713	98	Paved parking & bldg, HSG C
	67,283	74	>75% Grass cover, Good, HSG C
	5,180	87	Dirt roads, HSG C
	233,176	91	Weighted Average
	72,463		31.08% Pervious Area
	160,713		68.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0134	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
2.7	130	0.0134	0.81		**Shallow Concentrated Flow, SCF 130 FT** Short Grass Pasture Kv= 7.0 fps
0.6	133	0.0324	3.65		**Shallow Concentrated Flow, SCF 133 FT PAVED** Paved Kv= 20.3 fps
9.9	313	Total			

Subcatchment EWS-2: EWS-2 Bldg & Parking (yellow)



Summary for Subcatchment EWS-3: EWS-3 S Parking (red)

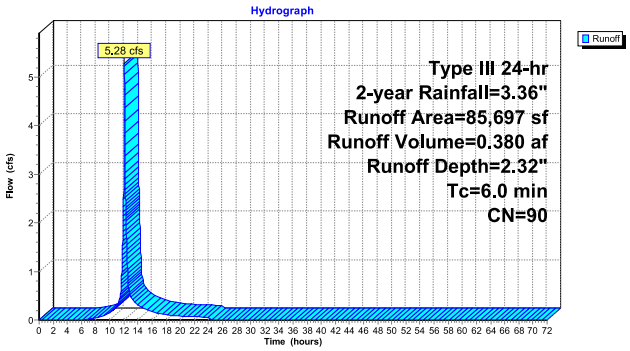
Runoff = 5.28 cfs @ 12.09 hrs, Volume= 0.380 af, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
57,471	98	Paved parking, HSG C
28,226	74	>75% Grass cover, Good, HSG C
85,697	90	Weighted Average
28,226		32.94% Pervious Area
57,471		67.06% Impervious Area

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

Subcatchment EWS-3: EWS-3 S Parking (red)



Summary for Subcatchment EWS-4: EWS-4 S Parking (blue)

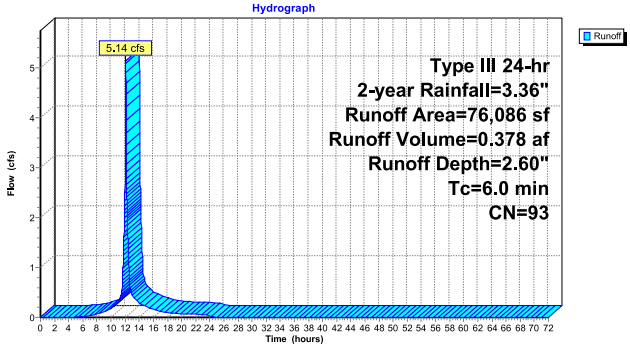
Runoff = 5.14 cfs @ 12.09 hrs, Volume= 0.378 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
60,601	98	Paved parking, HSG C
15,485	74	>75% Grass cover, Good, HSG C
76,086	93	Weighted Average
15,485		20.35% Pervious Area
60,601		79.65% Impervious Area

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

Subcatchment EWS-4: EWS-4 S Parking (blue)



Summary for Subcatchment EWS-5: EWS-5 S Bldg & Parking (green)

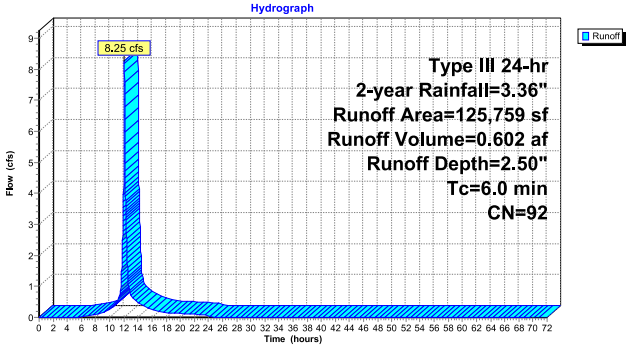
Runoff = 8.25 cfs @ 12.09 hrs, Volume= 0.602 af, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
*	94,210	98	Paved parking & bldg, HSG C
	31,549	74	>75% Grass cover, Good, HSG C
	125,759	92	Weighted Average
	31,549		25.09% Pervious Area
	94,210		74.91% Impervious Area

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

Subcatchment EWS-5: EWS-5 S Bldg & Parking (green)



Summary for Subcatchment EWS-7: EWS-7 Wetland Tributary (purple)

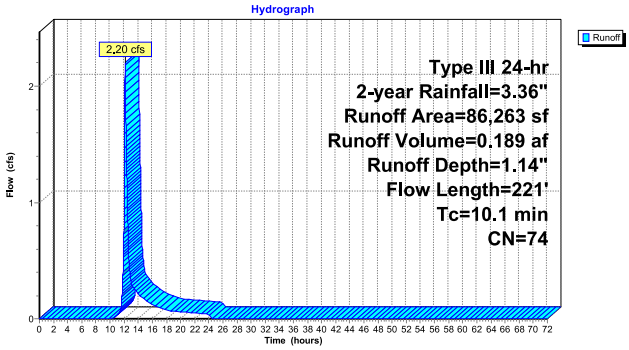
Runoff = 2.20 cfs @ 12.15 hrs, Volume= 0.189 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
10,693	98	Paved parking, HSG C
6,146	74	>75% Grass cover, Good, HSG C
69,424	70	Woods, Good, HSG C
86,263	74	Weighted Average
75,570		87.60% Pervious Area
10,693		12.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	13	0.0460	0.16		**Sheet Flow, SHEET 13 FT** Grass: Short n= 0.150 P2= 3.20"
7.1	87	0.2370	0.20		**Sheet Flow, SHEET 87 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	121	0.0660	1.28		**Shallow Concentrated Flow, SCF 121 FT** Woodland Kv= 5.0 fps
10.1	221	Total			

Subcatchment EWS-7: EWS-7 Wetland Tributary (purple)



Summary for Subcatchment EWS-8: EWS-8 Wetland Tributary (pink)

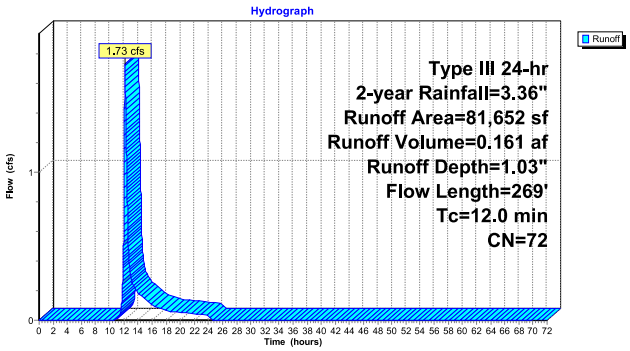
Runoff = 1.73 cfs @ 12.18 hrs, Volume= 0.161 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
6,940	74	>75% Grass cover, Good, HSG C
68,992	70	Woods, Good, HSG C
5,720	87	Dirt roads, HSG C
81,652	72	Weighted Average
81,652		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.1230	0.16		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	169	0.1240	1.76		**Shallow Concentrated Flow, SCF 169 FT** Woodland Kv= 5.0 fps
12.0	269	Total			

Subcatchment EWS-8: EWS-8 Wetland Tributary (pink)



Summary for Subcatchment EWS-9: EWS-9 W Solar Field (cyan)

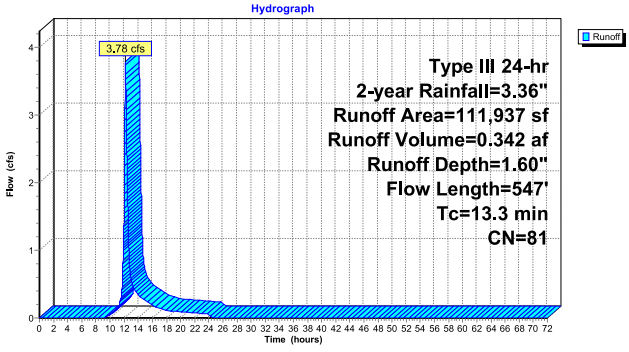
Runoff = 3.78 cfs @ 12.19 hrs, Volume= 0.342 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
31,792	98	Paved parking, HSG C
79,016	74	>75% Grass cover, Good, HSG C
170	70	Woods, Good, HSG C
959	87	Dirt roads, HSG C
111,937	81	Weighted Average
80,145		71.60% Pervious Area
31,792		28.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0280	0.17		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
8.4	497	0.0200	0.99		**Shallow Concentrated Flow, SCF 497 FT** Short Grass Pasture Kv= 7.0 fps
13.3	547	Total			

Subcatchment EWS-9: EWS-9 W Solar Field (cyan)

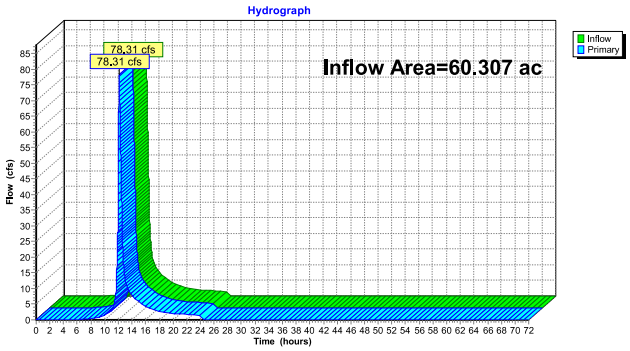


Summary for Link POA: POA

Inflow Area = 60.307 ac, 28.53% Impervious, Inflow Depth = 1.54" for 2-year event
Inflow = 78.31 cfs @ 12.13 hrs, Volume= 7.760 af
Primary = 78.31 cfs @ 12.13 hrs, Volume= 7.760 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA: POA

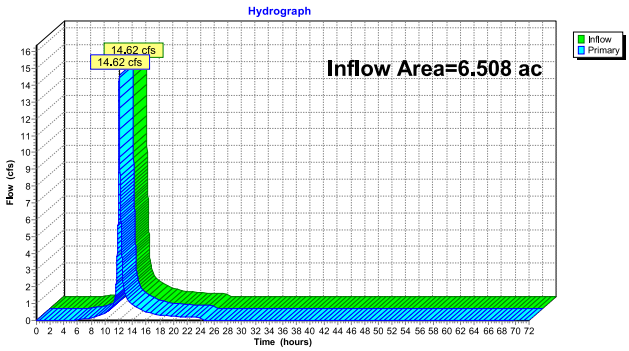


Summary for Link POA-1: POA-1-S Wetland

Inflow Area = 6.508 ac, 54.61% Impervious, Inflow Depth = 2.10" for 2-year event
Inflow = 14.62 cfs @ 12.09 hrs, Volume= 1.142 af
Primary = 14.62 cfs @ 12.09 hrs, Volume= 1.142 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-1: POA-1-S Wetland

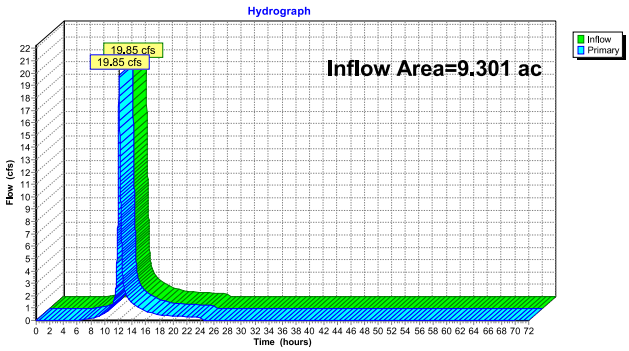


Summary for Link POA-2: POA-2-SW Wetland

Inflow Area = 9.301 ac, 56.49% Impervious, Inflow Depth = 2.12" for 2-year event
Inflow = 19.85 cfs @ 12.12 hrs, Volume= 1.643 af
Primary = 19.85 cfs @ 12.12 hrs, Volume= 1.643 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-2: POA-2-SW Wetland

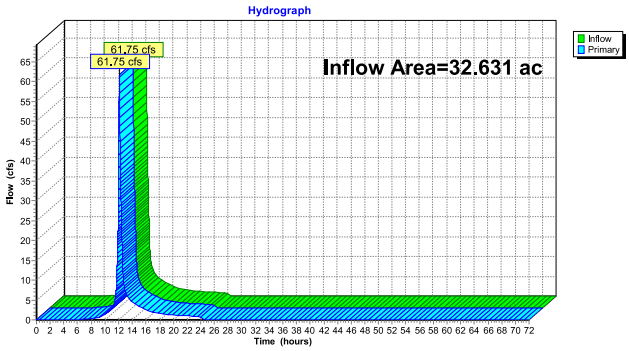


Summary for Link POA-3: POA-3

Inflow Area = 32.631 ac, 42.50% Impervious, Inflow Depth = 1.85" for 2-year event
Inflow = 61.75 cfs @ 12.12 hrs, Volume= 5.022 af
Primary = 61.75 cfs @ 12.12 hrs, Volume= 5.022 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-3: POA-3

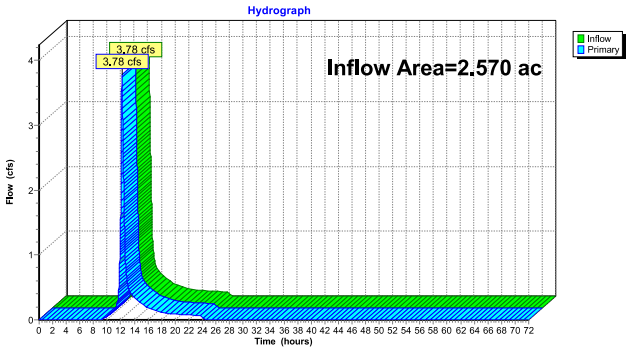


Summary for Link POA-4: POA-4

Inflow Area = 2.570 ac, 28.40% Impervious, Inflow Depth = 1.60" for 2-year event
Inflow = 3.78 cfs @ 12.19 hrs, Volume= 0.342 af
Primary = 3.78 cfs @ 12.19 hrs, Volume= 0.342 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-4: POA-4

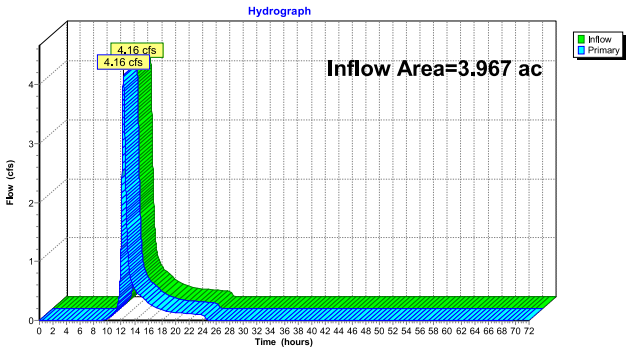


Summary for Link POA-5: POA-5

Inflow Area = 3.967 ac, 24.86% Impervious, Inflow Depth = 1.46" for 2-year event
Inflow = 4.16 cfs @ 12.34 hrs, Volume= 0.482 af
Primary = 4.16 cfs @ 12.34 hrs, Volume= 0.482 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-5: POA-5



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EWS-1: EWS-1 N Bldg & Runoff Area=732,784 sf 30.08% Impervious Runoff Depth=3.19"
Flow Length=228' Tc=9.0 min CN=81 Runoff=56.69 cfs 4.471 af

Subcatchment EWS-10: EWS-10 E solar field Runoff Area=172,814 sf 24.86% Impervious Runoff Depth=3.00"
Flow Length=852' Tc=24.2 min CN=79 Runoff=8.69 cfs 0.992 af

Subcatchment EWS-12: EWS-12 Offsite (moss) Runoff Area=920,820 sf 7.66% Impervious Runoff Depth=2.46"
Flow Length=514' Tc=18.8 min CN=73 Runoff=41.93 cfs 4.337 af

Subcatchment EWS-2: EWS-2 Bldg & Parking Runoff Area=233,176 sf 68.92% Impervious Runoff Depth=4.21"
Flow Length=313' Tc=9.9 min CN=91 Runoff=22.16 cfs 1.876 af

Subcatchment EWS-3: EWS-3 S Parking (red) Runoff Area=85,697 sf 67.06% Impervious Runoff Depth=4.10"
Tc=6.0 min CN=90 Runoff=9.09 cfs 0.672 af

Subcatchment EWS-4: EWS-4 S Parking (blue) Runoff Area=76,086 sf 79.65% Impervious Runoff Depth=4.42"
Tc=6.0 min CN=93 Runoff=8.49 cfs 0.644 af

Subcatchment EWS-5: EWS-5 S Bldg & Runoff Area=125,759 sf 74.91% Impervious Runoff Depth=4.31"
Tc=6.0 min CN=92 Runoff=13.82 cfs 1.038 af

Subcatchment EWS-7: EWS-7 Wetland Runoff Area=86,263 sf 12.40% Impervious Runoff Depth=2.55"
Flow Length=221' Tc=10.1 min CN=74 Runoff=5.13 cfs 0.421 af

Subcatchment EWS-8: EWS-8 Wetland Tributary Runoff Area=81,652 sf 0.00% Impervious Runoff Depth=2.38"
Flow Length=269' Tc=12.0 min CN=72 Runoff=4.25 cfs 0.371 af

Subcatchment EWS-9: EWS-9 W Solar Field Runoff Area=111,937 sf 28.40% Impervious Runoff Depth=3.19"
Flow Length=547' Tc=13.3 min CN=81 Runoff=7.60 cfs 0.683 af

Link POA: POA Inflow=156.95 cfs 15.505 af
Primary=156.95 cfs 15.505 af

Link POA-1: POA-1-S Wetland Inflow=25.55 cfs 2.053 af
Primary=25.55 cfs 2.053 af

Link POA-2: POA-2-SW Wetland Inflow=35.27 cfs 2.969 af
Primary=35.27 cfs 2.969 af

Link POA-3: POA-3 Inflow=116.11 cfs 9.493 af
Primary=116.11 cfs 9.493 af

Link POA-4: POA-4 Inflow=7.60 cfs 0.683 af
Primary=7.60 cfs 0.683 af

Link POA-5: POA-5 Inflow=8.69 cfs 0.992 af
Primary=8.69 cfs 0.992 af

Total Runoff Area = 60.307 ac Runoff Volume = 15.505 af Average Runoff Depth = 3.09"
71.47% Pervious = 43.105 ac 28.53% Impervious = 17.203 ac

Summary for Subcatchment EWS-1: EWS-1 N Bldg & Parking (magenta)

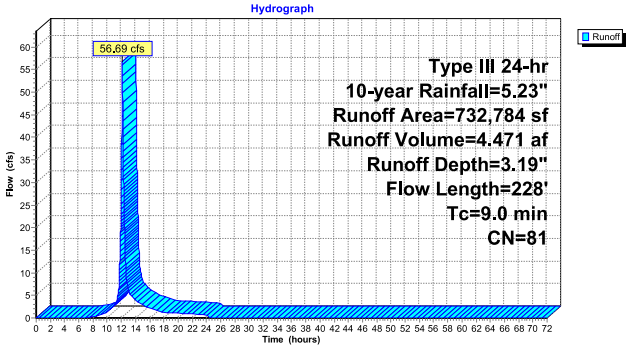
Runoff = 56.69 cfs @ 12.13 hrs, Volume= 4.471 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
*	220,393	98	Paved parking & bldg, HSG C
	413,613	74	>75% Grass cover, Good, HSG C
	84,772	70	Woods, Good, HSG C
	14,006	87	Dirt roads, HSG C
	732,784	81	Weighted Average
	512,391		69.92% Pervious Area
	220,393		30.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0130	0.12		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
2.3	178	0.0343	1.30		**Shallow Concentrated Flow, SCF 178 FT** Short Grass Pasture Kv= 7.0 fps
9.0	228	Total			

Subcatchment EWS-1: EWS-1 N Bldg & Parking (magenta)



Summary for Subcatchment EWS-10: EWS-10 E solar field (orange)

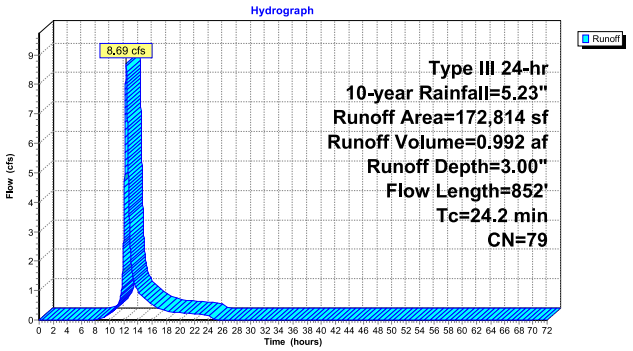
Runoff = 8.69 cfs @ 12.34 hrs, Volume= 0.992 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
42,967	98	Paved parking, HSG C
105,590	74	>75% Grass cover, Good, HSG C
24,257	70	Woods, Good, HSG C
172,814	79	Weighted Average
129,847		75.14% Pervious Area
42,967		24.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, SHEET FLOW 50 FT** Grass: Short n= 0.150 P2= 3.20"
4.3	281	0.0240	1.08		**Shallow Concentrated Flow, SCF 281 FT** Short Grass Pasture Kv= 7.0 fps
13.1	440	0.0125	0.56		**Shallow Concentrated Flow, SCF 440 FT WOODS** Woodland Kv= 5.0 fps
1.2	81	0.0270	1.15		**Shallow Concentrated Flow, SCF 81 FT** Short Grass Pasture Kv= 7.0 fps
24.2	852	Total			

Subcatchment EWS-10: EWS-10 E solar field (orange)



Summary for Subcatchment EWS-12: EWS-12 Offsite (moss)

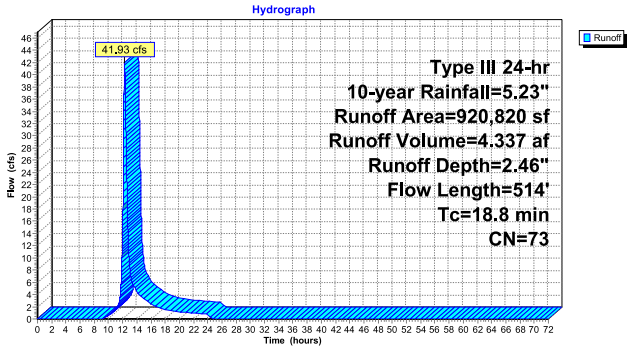
Runoff = 41.93 cfs @ 12.26 hrs, Volume= 4.337 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
*	70,511	98	Paved parking & bldg, HSG C
	54,978	74	>75% Grass cover, Good, HSG C
	786,189	70	Woods, Good, HSG C
	9,142	87	Dirt roads, HSG C
	920,820	73	Weighted Average
	850,309		92.34% Pervious Area
	70,511		7.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
5.0	414	0.0760	1.38		**Shallow Concentrated Flow, SCF 414 FT WOODS** Woodland Kv= 5.0 fps
18.8	514	Total			

Subcatchment EWS-12: EWS-12 Offsite (moss)



Summary for Subcatchment EWS-2: EWS-2 Bldg & Parking (yellow)

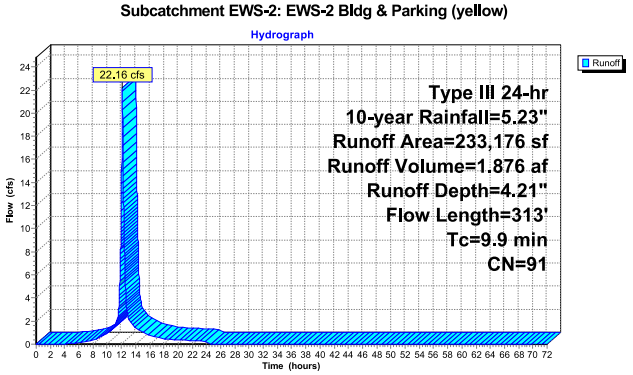
Runoff = 22.16 cfs @ 12.13 hrs, Volume= 1.876 af, Depth= 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
*	160,713	98	Paved parking & bldg, HSG C
	67,283	74	>75% Grass cover, Good, HSG C
	5,180	87	Dirt roads, HSG C
	233,176	91	Weighted Average
	72,463		31.08% Pervious Area
	160,713		68.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0134	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
2.7	130	0.0134	0.81		**Shallow Concentrated Flow, SCF 130 FT** Short Grass Pasture Kv= 7.0 fps
0.6	133	0.0324	3.65		**Shallow Concentrated Flow, SCF 133 FT PAVED** Paved Kv= 20.3 fps
9.9	313	Total			

Subcatchment EWS-2: EWS-2 Bldg & Parking (yellow)



Summary for Subcatchment EWS-3: EWS-3 S Parking (red)

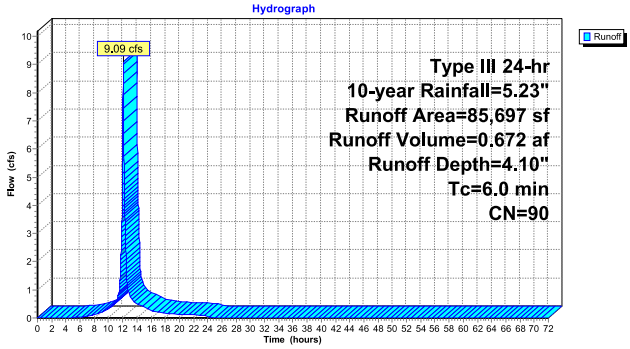
Runoff = 9.09 cfs @ 12.08 hrs, Volume= 0.672 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
57,471	98	Paved parking, HSG C
28,226	74	>75% Grass cover, Good, HSG C
85,697	90	Weighted Average
28,226		32.94% Pervious Area
57,471		67.06% Impervious Area

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

Subcatchment EWS-3: EWS-3 S Parking (red)



Summary for Subcatchment EWS-4: EWS-4 S Parking (blue)

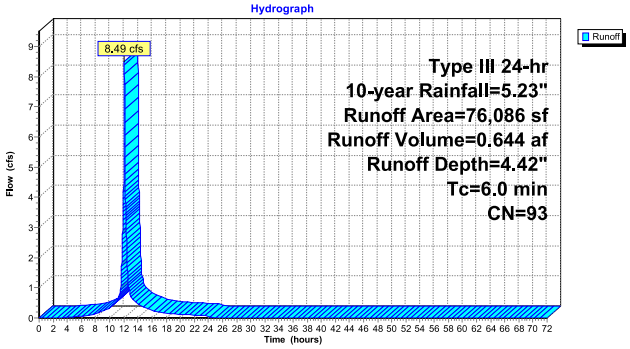
Runoff = 8.49 cfs @ 12.08 hrs, Volume= 0.644 af, Depth= 4.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
60,601	98	Paved parking, HSG C
15,485	74	>75% Grass cover, Good, HSG C
76,086	93	Weighted Average
15,485		20.35% Pervious Area
60,601		79.65% Impervious Area

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

Subcatchment EWS-4: EWS-4 S Parking (blue)



Summary for Subcatchment EWS-5: EWS-5 S Bldg & Parking (green)

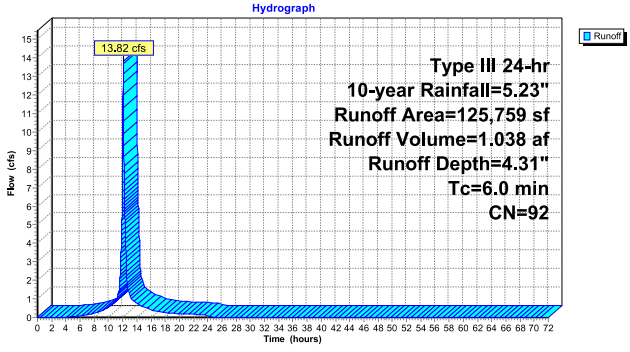
Runoff = 13.82 cfs @ 12.08 hrs, Volume= 1.038 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
* 94,210	98	Paved parking & bldg, HSG C
31,549	74	>75% Grass cover, Good, HSG C
125,759	92	Weighted Average
31,549		25.09% Pervious Area
94,210		74.91% Impervious Area

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

Subcatchment EWS-5: EWS-5 S Bldg & Parking (green)



Summary for Subcatchment EWS-7: EWS-7 Wetland Tributary (purple)

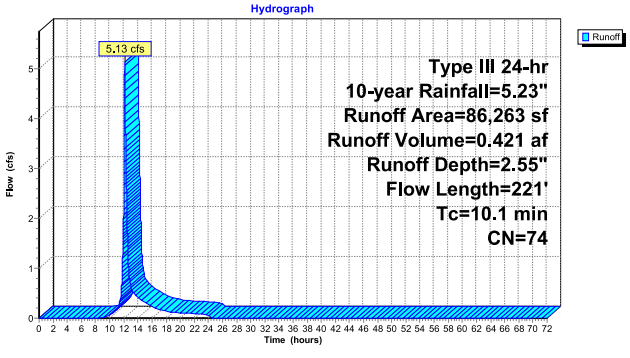
Runoff = 5.13 cfs @ 12.14 hrs, Volume= 0.421 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
10,693	98	Paved parking, HSG C
6,146	74	>75% Grass cover, Good, HSG C
69,424	70	Woods, Good, HSG C
86,263	74	Weighted Average
75,570		87.60% Pervious Area
10,693		12.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	13	0.0460	0.16		**Sheet Flow, SHEET 13 FT** Grass: Short n= 0.150 P2= 3.20"
7.1	87	0.2370	0.20		**Sheet Flow, SHEET 87 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	121	0.0660	1.28		**Shallow Concentrated Flow, SCF 121 FT** Woodland Kv= 5.0 fps
10.1	221	Total			

Subcatchment EWS-7: EWS-7 Wetland Tributary (purple)



Summary for Subcatchment EWS-8: EWS-8 Wetland Tributary (pink)

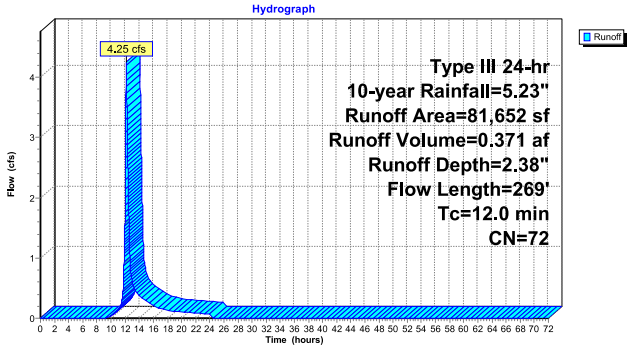
Runoff = 4.25 cfs @ 12.17 hrs, Volume= 0.371 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
6,940	74	>75% Grass cover, Good, HSG C
68,992	70	Woods, Good, HSG C
5,720	87	Dirt roads, HSG C
81,652	72	Weighted Average
81,652		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.1230	0.16		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	169	0.1240	1.76		**Shallow Concentrated Flow, SCF 169 FT** Woodland Kv= 5.0 fps
12.0	269	Total			

Subcatchment EWS-8: EWS-8 Wetland Tributary (pink)



Summary for Subcatchment EWS-9: EWS-9 W Solar Field (cyan)

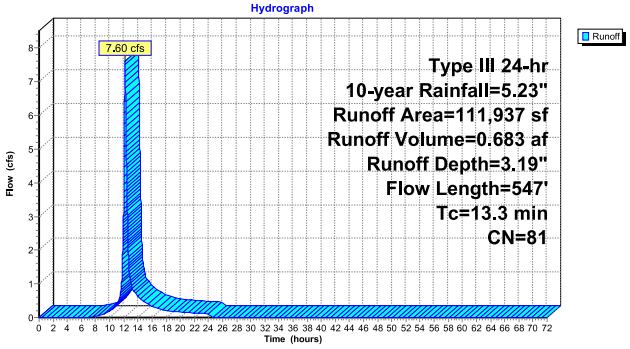
Runoff = 7.60 cfs @ 12.18 hrs, Volume= 0.683 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
31,792	98	Paved parking, HSG C
79,016	74	>75% Grass cover, Good, HSG C
170	70	Woods, Good, HSG C
959	87	Dirt roads, HSG C
111,937	81	Weighted Average
80,145		71.60% Pervious Area
31,792		28.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0280	0.17		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
8.4	497	0.0200	0.99		**Shallow Concentrated Flow, SCF 497 FT** Short Grass Pasture Kv= 7.0 fps
13.3	547	Total			

Subcatchment EWS-9: EWS-9 W Solar Field (cyan)

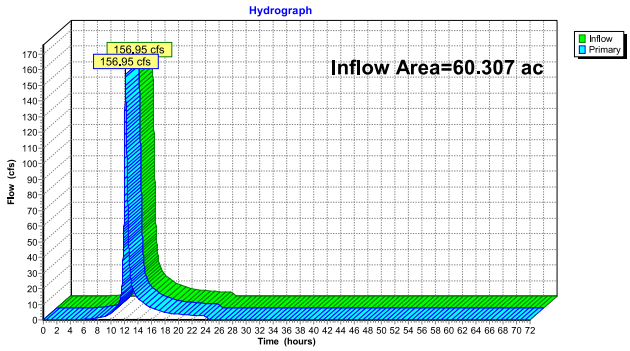


Summary for Link POA: POA

Inflow Area = 60.307 ac, 28.53% Impervious, Inflow Depth = 3.09" for 10-year event
Inflow = 156.95 cfs @ 12.13 hrs, Volume= 15.505 af
Primary = 156.95 cfs @ 12.13 hrs, Volume= 15.505 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA: POA

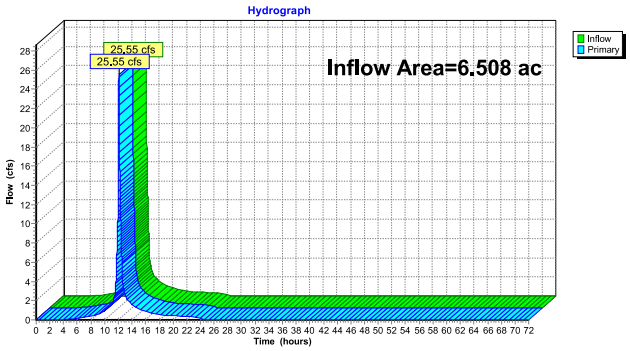


Summary for Link POA-1: POA-1-S Wetland

Inflow Area = 6.508 ac, 54.61% Impervious, Inflow Depth = 3.79" for 10-year event
Inflow = 25.55 cfs @ 12.09 hrs, Volume= 2.053 af
Primary = 25.55 cfs @ 12.09 hrs, Volume= 2.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-1: POA-1-S Wetland

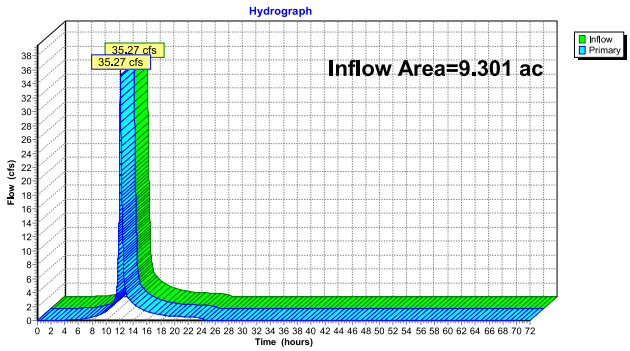


Summary for Link POA-2: POA-2-SW Wetland

Inflow Area = 9.301 ac, 56.49% Impervious, Inflow Depth = 3.83" for 10-year event
Inflow = 35.27 cfs @ 12.12 hrs, Volume= 2.969 af
Primary = 35.27 cfs @ 12.12 hrs, Volume= 2.969 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-2: POA-2-SW Wetland

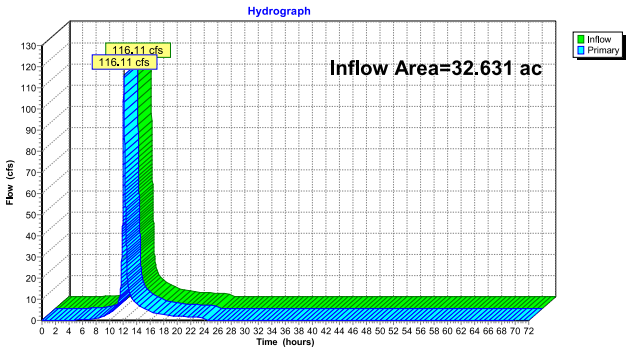


Summary for Link POA-3: POA-3

Inflow Area = 32.631 ac, 42.50% Impervious, Inflow Depth = 3.49" for 10-year event
Inflow = 116.11 cfs @ 12.12 hrs, Volume= 9.493 af
Primary = 116.11 cfs @ 12.12 hrs, Volume= 9.493 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-3: POA-3

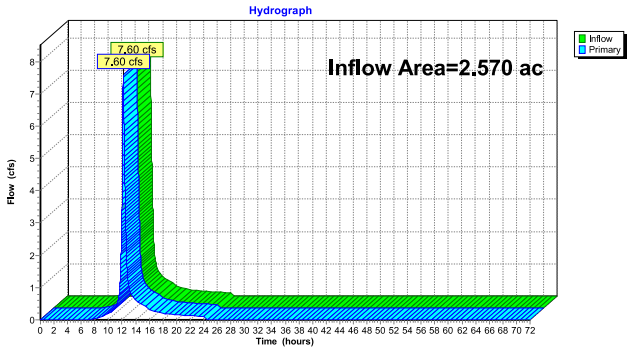


Summary for Link POA-4: POA-4

Inflow Area = 2.570 ac, 28.40% Impervious, Inflow Depth = 3.19" for 10-year event
Inflow = 7.60 cfs @ 12.18 hrs, Volume= 0.683 af
Primary = 7.60 cfs @ 12.18 hrs, Volume= 0.683 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-4: POA-4

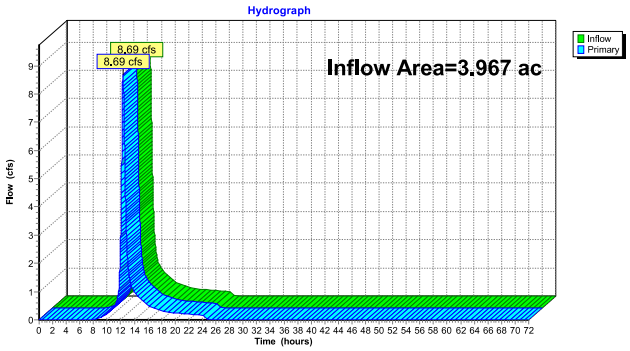


Summary for Link POA-5: POA-5

Inflow Area = 3.967 ac, 24.86% Impervious, Inflow Depth = 3.00" for 10-year event
Inflow = 8.69 cfs @ 12.34 hrs, Volume= 0.992 af
Primary = 8.69 cfs @ 12.34 hrs, Volume= 0.992 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-5: POA-5



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EWS-1: EWS-1 N Bldg & Runoff Area=732,784 sf 30.08% Impervious Runoff Depth=4.25"
Flow Length=228' Tc=9.0 min CN=81 Runoff=75.08 cfs 5.958 af

Subcatchment EWS-10: EWS-10 E solar field Runoff Area=172,814 sf 24.86% Impervious Runoff Depth=4.04"
Flow Length=852' Tc=24.2 min CN=79 Runoff=11.67 cfs 1.335 af

Subcatchment EWS-12: EWS-12 Offsite (moss) Runoff Area=920,820 sf 7.66% Impervious Runoff Depth=3.42"
Flow Length=514' Tc=18.8 min CN=73 Runoff=58.72 cfs 6.031 af

Subcatchment EWS-2: EWS-2 Bldg & Parking Runoff Area=233,176 sf 68.92% Impervious Runoff Depth=5.35"
Flow Length=313' Tc=9.9 min CN=91 Runoff=27.82 cfs 2.386 af

Subcatchment EWS-3: EWS-3 S Parking (red) Runoff Area=85,697 sf 67.06% Impervious Runoff Depth=5.24"
Tc=6.0 min CN=90 Runoff=11.46 cfs 0.858 af

Subcatchment EWS-4: EWS-4 S Parking (blue) Runoff Area=76,086 sf 79.65% Impervious Runoff Depth=5.58"
Tc=6.0 min CN=93 Runoff=10.56 cfs 0.812 af

Subcatchment EWS-5: EWS-5 S Bldg & Runoff Area=125,759 sf 74.91% Impervious Runoff Depth=5.46"
Tc=6.0 min CN=92 Runoff=17.26 cfs 1.314 af

Subcatchment EWS-7: EWS-7 Wetland Runoff Area=86,263 sf 12.40% Impervious Runoff Depth=3.52"
Flow Length=221' Tc=10.1 min CN=74 Runoff=7.12 cfs 0.582 af

Subcatchment EWS-8: EWS-8 Wetland Tributary Runoff Area=81,652 sf 0.00% Impervious Runoff Depth=3.32"
Flow Length=269' Tc=12.0 min CN=72 Runoff=5.99 cfs 0.519 af

Subcatchment EWS-9: EWS-9 W Solar Field Runoff Area=111,937 sf 28.40% Impervious Runoff Depth=4.25"
Flow Length=547' Tc=13.3 min CN=81 Runoff=10.07 cfs 0.910 af

Link POA: POA Inflow=208.56 cfs 20.705 af
Primary=208.56 cfs 20.705 af

Link POA-1: POA-1-S Wetland Inflow=32.48 cfs 2.645 af
Primary=32.48 cfs 2.645 af

Link POA-2: POA-2-SW Wetland Inflow=45.00 cfs 3.826 af
Primary=45.00 cfs 3.826 af

Link POA-3: POA-3 Inflow=150.93 cfs 12.429 af
Primary=150.93 cfs 12.429 af

Link POA-4: POA-4 Inflow=10.07 cfs 0.910 af
Primary=10.07 cfs 0.910 af

Link POA-5: POA-5 Inflow=11.67 cfs 1.335 af
Primary=11.67 cfs 1.335 af

Total Runoff Area = 60.307 ac Runoff Volume = 20.705 af Average Runoff Depth = 4.12"
71.47% Pervious = 43.105 ac 28.53% Impervious = 17.203 ac

Summary for Subcatchment EWS-1: EWS-1 N Bldg & Parking (magenta)

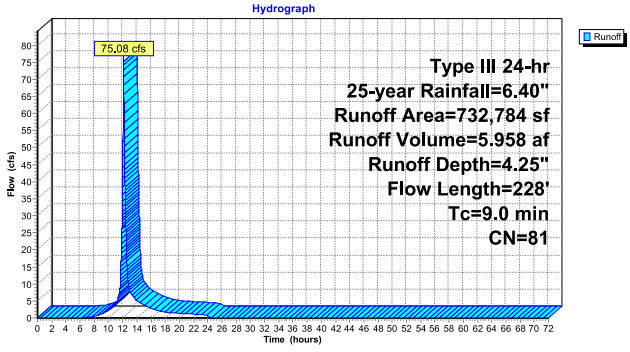
Runoff = 75.08 cfs @ 12.13 hrs, Volume= 5.958 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
*	220,393	98	Paved parking & bldg, HSG C
	413,613	74	>75% Grass cover, Good, HSG C
	84,772	70	Woods, Good, HSG C
	14,006	87	Dirt roads, HSG C
	732,784	81	Weighted Average
	512,391		69.92% Pervious Area
	220,393		30.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0130	0.12		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
2.3	178	0.0343	1.30		**Shallow Concentrated Flow, SCF 178 FT** Short Grass Pasture Kv= 7.0 fps
9.0	228	Total			

Subcatchment EWS-1: EWS-1 N Bldg & Parking (magenta)



Summary for Subcatchment EWS-10: EWS-10 E solar field (orange)

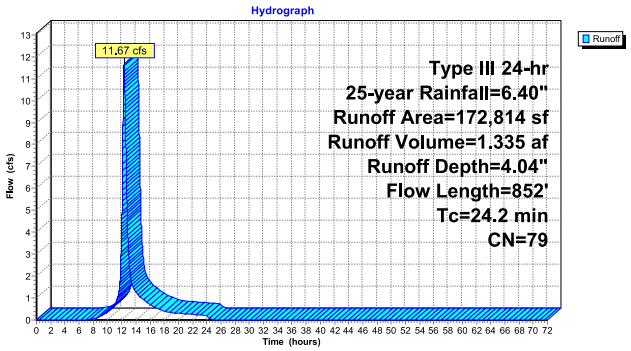
Runoff = 11.67 cfs @ 12.34 hrs, Volume= 1.335 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
42,967	98	Paved parking, HSG C
105,590	74	>75% Grass cover, Good, HSG C
24,257	70	Woods, Good, HSG C
172,814	79	Weighted Average
129,847		75.14% Pervious Area
42,967		24.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, SHEET FLOW 50 FT** Grass: Short n= 0.150 P2= 3.20"
4.3	281	0.0240	1.08		**Shallow Concentrated Flow, SCF 281 FT** Short Grass Pasture Kv= 7.0 fps
13.1	440	0.0125	0.56		**Shallow Concentrated Flow, SCF 440 FT WOODS** Woodland Kv= 5.0 fps
1.2	81	0.0270	1.15		**Shallow Concentrated Flow, SCF 81 FT** Short Grass Pasture Kv= 7.0 fps
24.2	852	Total			

Subcatchment EWS-10: EWS-10 E solar field (orange)



Summary for Subcatchment EWS-12: EWS-12 Offsite (moss)

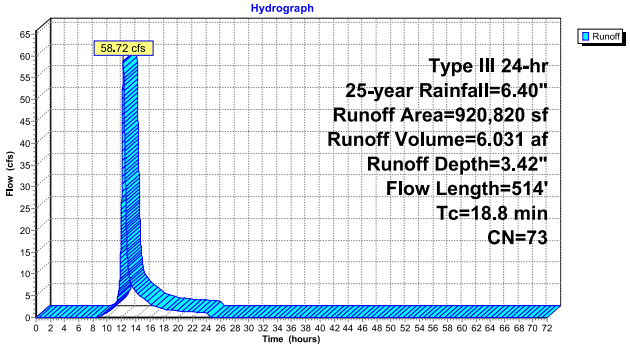
Runoff = 58.72 cfs @ 12.26 hrs, Volume= 6.031 af, Depth= 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
*	70,511	98	Paved parking & bldg, HSG C
	54,978	74	>75% Grass cover, Good, HSG C
	786,189	70	Woods, Good, HSG C
	9,142	87	Dirt roads, HSG C
	920,820	73	Weighted Average
	850,309		92.34% Pervious Area
	70,511		7.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
5.0	414	0.0760	1.38		**Shallow Concentrated Flow, SCF 414 FT WOODS** Woodland Kv= 5.0 fps
18.8	514	Total			

Subcatchment EWS-12: EWS-12 Offsite (moss)



Summary for Subcatchment EWS-2: EWS-2 Bldg & Parking (yellow)

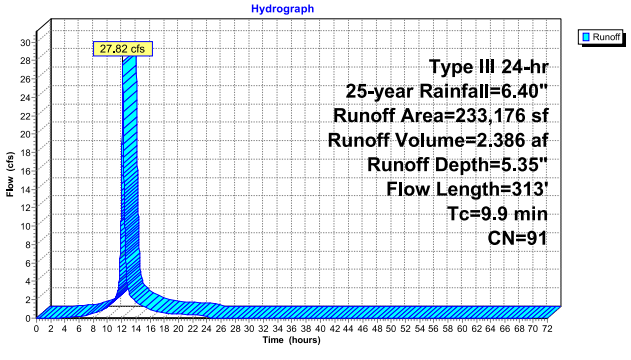
Runoff = 27.82 cfs @ 12.13 hrs, Volume= 2.386 af, Depth= 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
*	160,713	98	Paved parking & bldg, HSG C
	67,283	74	>75% Grass cover, Good, HSG C
	5,180	87	Dirt roads, HSG C
	233,176	91	Weighted Average
	72,463		31.08% Pervious Area
	160,713		68.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0134	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
2.7	130	0.0134	0.81		**Shallow Concentrated Flow, SCF 130 FT** Short Grass Pasture Kv= 7.0 fps
0.6	133	0.0324	3.65		**Shallow Concentrated Flow, SCF 133 FT PAVED** Paved Kv= 20.3 fps
9.9	313	Total			

Subcatchment EWS-2: EWS-2 Bldg & Parking (yellow)



Summary for Subcatchment EWS-3: EWS-3 S Parking (red)

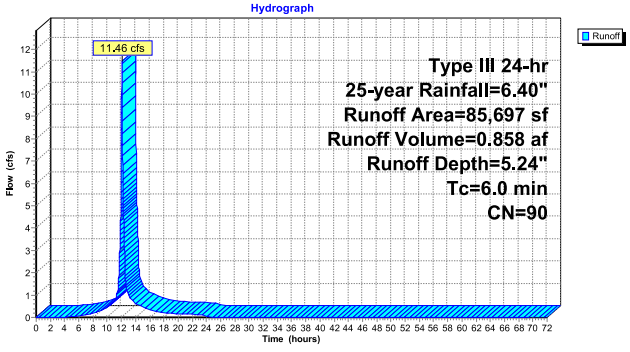
Runoff = 11.46 cfs @ 12.08 hrs, Volume= 0.858 af, Depth= 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
	57,471	98	Paved parking, HSG C
	28,226	74	>75% Grass cover, Good, HSG C
	85,697	90	Weighted Average
	28,226		32.94% Pervious Area
	57,471		67.06% Impervious Area

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

Subcatchment EWS-3: EWS-3 S Parking (red)



Summary for Subcatchment EWS-4: EWS-4 S Parking (blue)

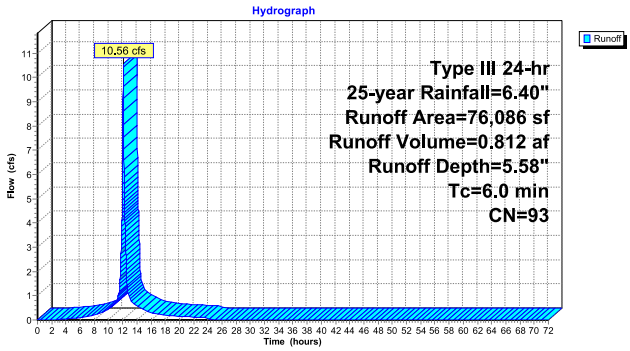
Runoff = 10.56 cfs @ 12.08 hrs, Volume= 0.812 af, Depth= 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
60,601	98	Paved parking, HSG C
15,485	74	>75% Grass cover, Good, HSG C
76,086	93	Weighted Average
15,485		20.35% Pervious Area
60,601		79.65% Impervious Area

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

Subcatchment EWS-4: EWS-4 S Parking (blue)



Summary for Subcatchment EWS-5: EWS-5 S Bldg & Parking (green)

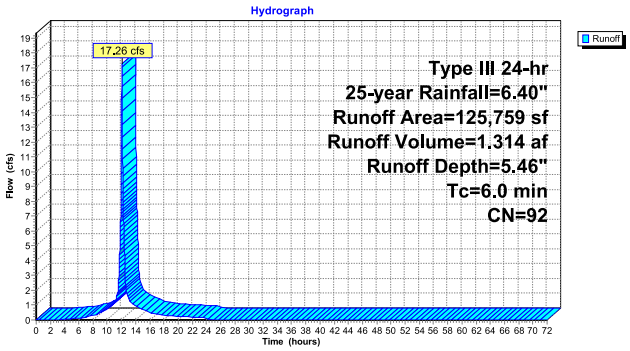
Runoff = 17.26 cfs @ 12.08 hrs, Volume= 1.314 af, Depth= 5.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
* 94,210	98	Paved parking & bldg, HSG C
31,549	74	>75% Grass cover, Good, HSG C
125,759	92	Weighted Average
31,549		25.09% Pervious Area
94,210		74.91% Impervious Area

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

Subcatchment EWS-5: EWS-5 S Bldg & Parking (green)



Summary for Subcatchment EWS-7: EWS-7 Wetland Tributary (purple)

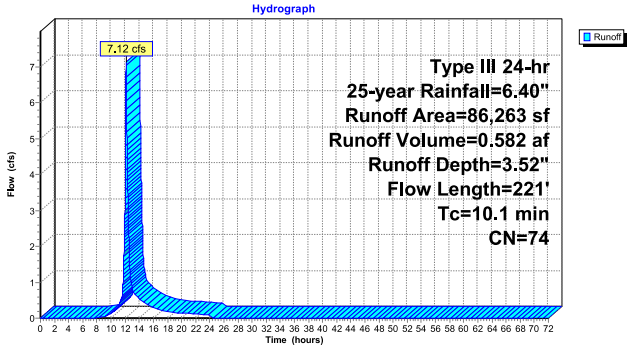
Runoff = 7.12 cfs @ 12.14 hrs, Volume= 0.582 af, Depth= 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
10,693	98	Paved parking, HSG C
6,146	74	>75% Grass cover, Good, HSG C
69,424	70	Woods, Good, HSG C
86,263	74	Weighted Average
75,570		87.60% Pervious Area
10,693		12.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	13	0.0460	0.16		**Sheet Flow, SHEET 13 FT** Grass: Short n= 0.150 P2= 3.20"
7.1	87	0.2370	0.20		**Sheet Flow, SHEET 87 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	121	0.0660	1.28		**Shallow Concentrated Flow, SCF 121 FT** Woodland Kv= 5.0 fps
10.1	221	Total			

Subcatchment EWS-7: EWS-7 Wetland Tributary (purple)



Summary for Subcatchment EWS-8: EWS-8 Wetland Tributary (pink)

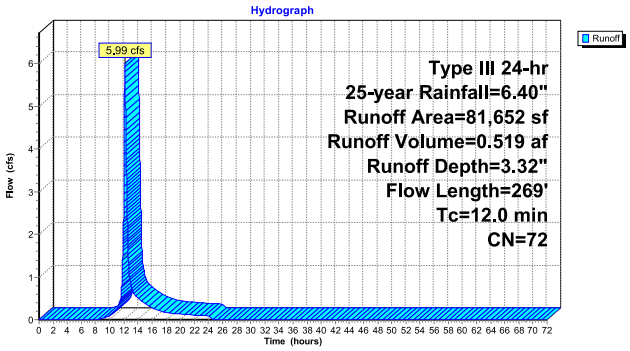
Runoff = 5.99 cfs @ 12.17 hrs, Volume= 0.519 af, Depth= 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
6,940	74	>75% Grass cover, Good, HSG C
68,992	70	Woods, Good, HSG C
5,720	87	Dirt roads, HSG C
81,652	72	Weighted Average
81,652		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.1230	0.16		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	169	0.1240	1.76		**Shallow Concentrated Flow, SCF 169 FT** Woodland Kv= 5.0 fps
12.0	269	Total			

Subcatchment EWS-8: EWS-8 Wetland Tributary (pink)



Summary for Subcatchment EWS-9: EWS-9 W Solar Field (cyan)

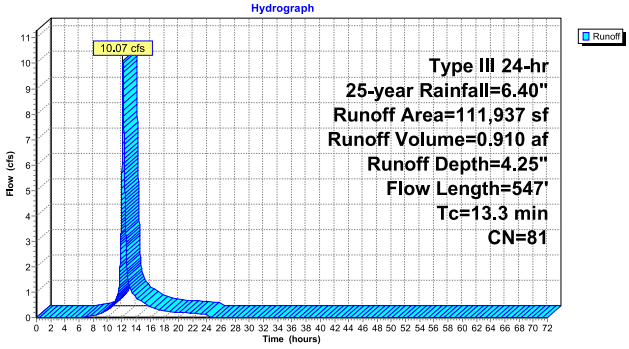
Runoff = 10.07 cfs @ 12.18 hrs, Volume= 0.910 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
31,792	98	Paved parking, HSG C
79,016	74	>75% Grass cover, Good, HSG C
170	70	Woods, Good, HSG C
959	87	Dirt roads, HSG C
111,937	81	Weighted Average
80,145		71.60% Pervious Area
31,792		28.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0280	0.17		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
8.4	497	0.0200	0.99		**Shallow Concentrated Flow, SCF 497 FT** Short Grass Pasture Kv= 7.0 fps
13.3	547	Total			

Subcatchment EWS-9: EWS-9 W Solar Field (cyan)

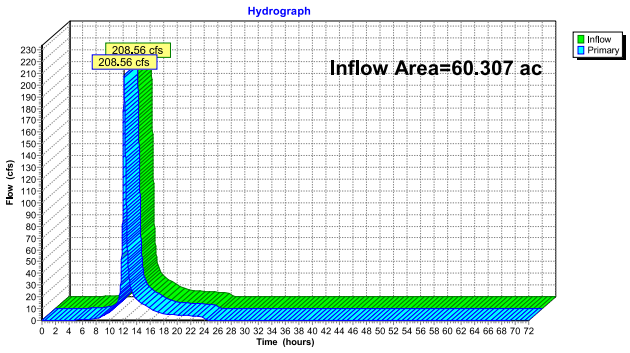


Summary for Link POA: POA

Inflow Area = 60.307 ac, 28.53% Impervious, Inflow Depth = 4.12" for 25-year event
Inflow = 208.56 cfs @ 12.13 hrs, Volume= 20.705 af
Primary = 208.56 cfs @ 12.13 hrs, Volume= 20.705 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA: POA

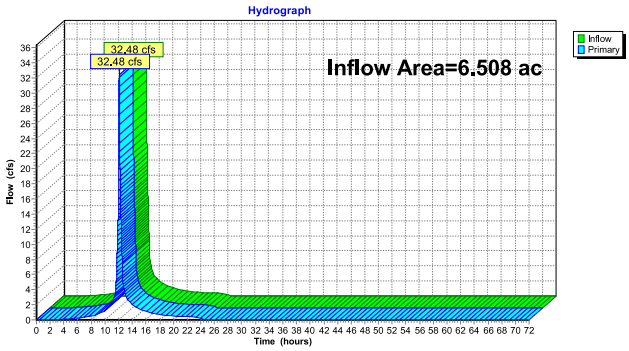


Summary for Link POA-1: POA-1-S Wetland

Inflow Area = 6.508 ac, 54.61% Impervious, Inflow Depth = 4.88" for 25-year event
Inflow = 32.48 cfs @ 12.09 hrs, Volume= 2.645 af
Primary = 32.48 cfs @ 12.09 hrs, Volume= 2.645 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-1: POA-1-S Wetland

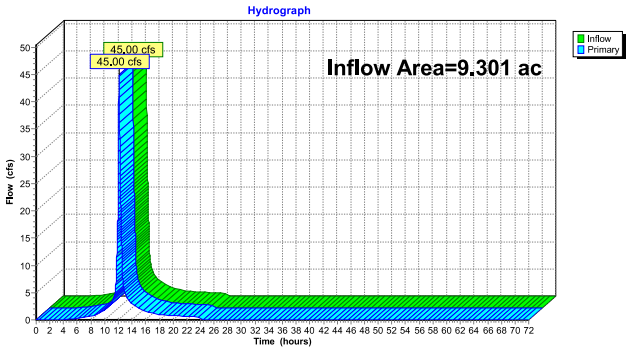


Summary for Link POA-2: POA-2-SW Wetland

Inflow Area = 9.301 ac, 56.49% Impervious, Inflow Depth = 4.94" for 25-year event
Inflow = 45.00 cfs @ 12.12 hrs, Volume= 3.826 af
Primary = 45.00 cfs @ 12.12 hrs, Volume= 3.826 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-2: POA-2-SW Wetland

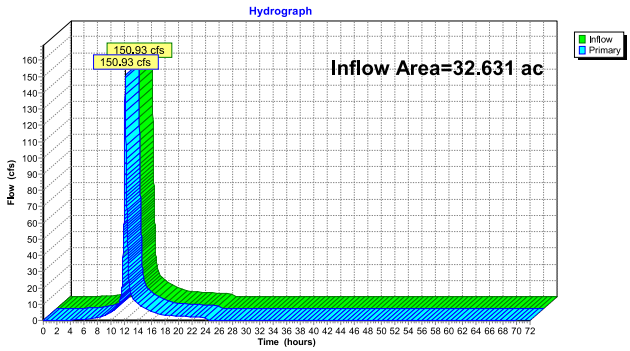


Summary for Link POA-3: POA-3

Inflow Area = 32.631 ac, 42.50% Impervious, Inflow Depth = 4.57" for 25-year event
Inflow = 150.93 cfs @ 12.12 hrs, Volume= 12.429 af
Primary = 150.93 cfs @ 12.12 hrs, Volume= 12.429 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-3: POA-3

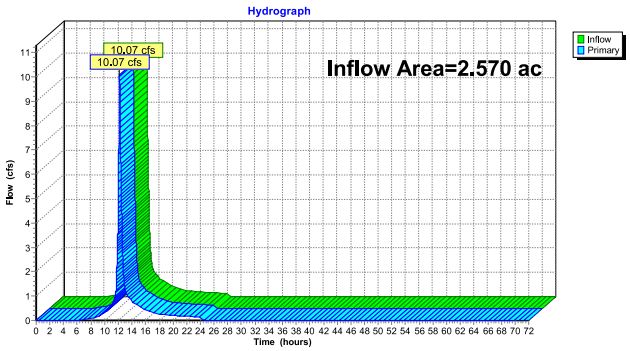


Summary for Link POA-4: POA-4

Inflow Area = 2.570 ac, 28.40% Impervious, Inflow Depth = 4.25" for 25-year event
Inflow = 10.07 cfs @ 12.18 hrs, Volume= 0.910 af
Primary = 10.07 cfs @ 12.18 hrs, Volume= 0.910 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-4: POA-4

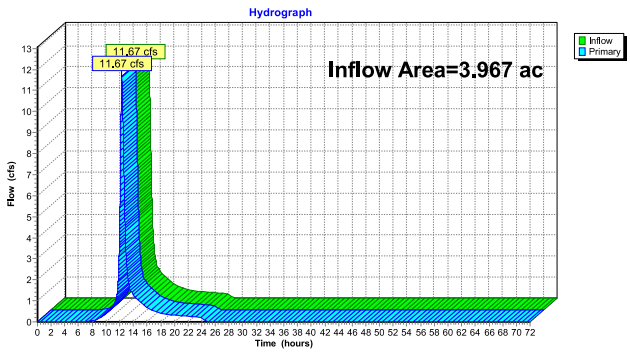


Summary for Link POA-5: POA-5

Inflow Area = 3.967 ac, 24.86% Impervious, Inflow Depth = 4.04" for 25-year event
Inflow = 11.67 cfs @ 12.34 hrs, Volume= 1.335 af
Primary = 11.67 cfs @ 12.34 hrs, Volume= 1.335 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-5: POA-5



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EWS-1: EWS-1 N Bldg & Runoff Area=732,784 sf 30.08% Impervious Runoff Depth=5.93"
Flow Length=228' Tc=9.0 min CN=81 Runoff=103.53 cfs 8.315 af

Subcatchment EWS-10: EWS-10 E solar field Runoff Area=172,814 sf 24.86% Impervious Runoff Depth=5.69"
Flow Length=852' Tc=24.2 min CN=79 Runoff=16.31 cfs 1.883 af

Subcatchment EWS-12: EWS-12 Offsite (moss) Runoff Area=920,820 sf 7.66% Impervious Runoff Depth=4.99"
Flow Length=514' Tc=18.8 min CN=73 Runoff=85.55 cfs 8.786 af

Subcatchment EWS-2: EWS-2 Bldg & Parking Runoff Area=233,176 sf 68.92% Impervious Runoff Depth=7.12"
Flow Length=313' Tc=9.9 min CN=91 Runoff=36.45 cfs 3.177 af

Subcatchment EWS-3: EWS-3 S Parking (red) Runoff Area=85,697 sf 67.06% Impervious Runoff Depth=7.00"
Tc=6.0 min CN=90 Runoff=15.07 cfs 1.148 af

Subcatchment EWS-4: EWS-4 S Parking (blue) Runoff Area=76,086 sf 79.65% Impervious Runoff Depth=7.36"
Tc=6.0 min CN=93 Runoff=13.73 cfs 1.071 af

Subcatchment EWS-5: EWS-5 S Bldg & Runoff Area=125,759 sf 74.91% Impervious Runoff Depth=7.24"
Tc=6.0 min CN=92 Runoff=22.52 cfs 1.742 af

Subcatchment EWS-7: EWS-7 Wetland Runoff Area=86,263 sf 12.40% Impervious Runoff Depth=5.10"
Flow Length=221' Tc=10.1 min CN=74 Runoff=10.29 cfs 0.842 af

Subcatchment EWS-8: EWS-8 Wetland Tributary Runoff Area=81,652 sf 0.00% Impervious Runoff Depth=4.87"
Flow Length=269' Tc=12.0 min CN=72 Runoff=8.79 cfs 0.761 af

Subcatchment EWS-9: EWS-9 W Solar Field Runoff Area=111,937 sf 28.40% Impervious Runoff Depth=5.93"
Flow Length=547' Tc=13.3 min CN=81 Runoff=13.91 cfs 1.270 af

Link POA: POA Inflow=289.25 cfs 28.995 af
Primary=289.25 cfs 28.995 af

Link POA-1: POA-1-S Wetland Inflow=43.20 cfs 3.574 af
Primary=43.20 cfs 3.574 af

Link POA-2: POA-2-SW Wetland Inflow=59.99 cfs 5.167 af
Primary=59.99 cfs 5.167 af

Link POA-3: POA-3 Inflow=204.88 cfs 17.057 af
Primary=204.88 cfs 17.057 af

Link POA-4: POA-4 Inflow=13.91 cfs 1.270 af
Primary=13.91 cfs 1.270 af

Link POA-5: POA-5 Inflow=16.31 cfs 1.883 af
Primary=16.31 cfs 1.883 af

Total Runoff Area = 60.307 ac Runoff Volume = 28.995 af Average Runoff Depth = 5.77"
71.47% Pervious = 43.105 ac 28.53% Impervious = 17.203 ac

Summary for Subcatchment EWS-1: EWS-1 N Bldg & Parking (magenta)

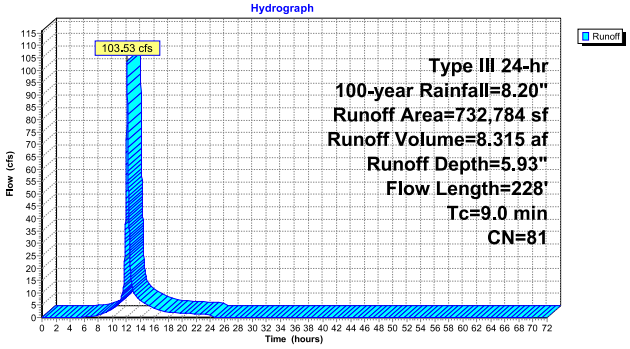
Runoff = 103.53 cfs @ 12.12 hrs, Volume= 8.315 af, Depth= 5.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
*	220,393	98	Paved parking & bldg, HSG C
	413,613	74	>75% Grass cover, Good, HSG C
	84,772	70	Woods, Good, HSG C
	14,006	87	Dirt roads, HSG C
	732,784	81	Weighted Average
	512,391		69.92% Pervious Area
	220,393		30.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0130	0.12		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
2.3	178	0.0343	1.30		**Shallow Concentrated Flow, SCF 178 FT** Short Grass Pasture Kv= 7.0 fps
9.0	228	Total			

Subcatchment EWS-1: EWS-1 N Bldg & Parking (magenta)



Summary for Subcatchment EWS-10: EWS-10 E solar field (orange)

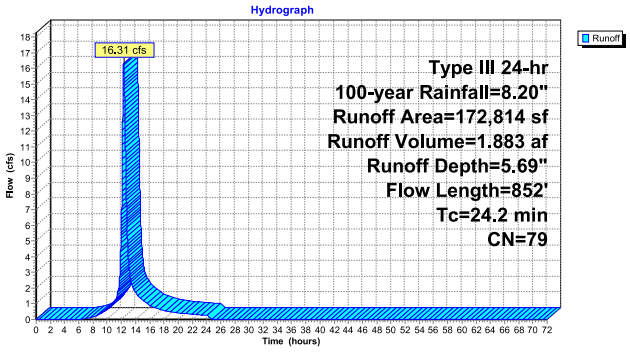
Runoff = 16.31 cfs @ 12.34 hrs, Volume= 1.883 af, Depth= 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

Area (sf)	CN	Description
42,967	98	Paved parking, HSG C
105,590	74	>75% Grass cover, Good, HSG C
24,257	70	Woods, Good, HSG C
172,814	79	Weighted Average
129,847		75.14% Pervious Area
42,967		24.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, SHEET FLOW 50 FT** Grass: Short n= 0.150 P2= 3.20"
4.3	281	0.0240	1.08		**Shallow Concentrated Flow, SCF 281 FT** Short Grass Pasture Kv= 7.0 fps
13.1	440	0.0125	0.56		**Shallow Concentrated Flow, SCF 440 FT WOODS** Woodland Kv= 5.0 fps
1.2	81	0.0270	1.15		**Shallow Concentrated Flow, SCF 81 FT** Short Grass Pasture Kv= 7.0 fps
24.2	852	Total			

Subcatchment EWS-10: EWS-10 E solar field (orange)



Summary for Subcatchment EWS-12: EWS-12 Offsite (moss)

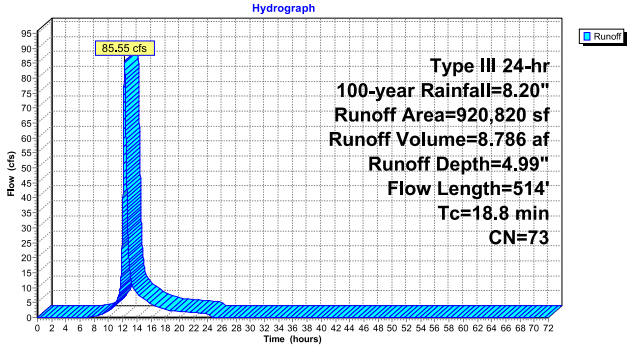
Runoff = 85.55 cfs @ 12.26 hrs, Volume= 8.786 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
*	70,511	98	Paved parking & bldg, HSG C
	54,978	74	>75% Grass cover, Good, HSG C
	786,189	70	Woods, Good, HSG C
	9,142	87	Dirt roads, HSG C
	920,820	73	Weighted Average
	850,309		92.34% Pervious Area
	70,511		7.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
5.0	414	0.0760	1.38		**Shallow Concentrated Flow, SCF 414 FT WOODS** Woodland Kv= 5.0 fps
18.8	514	Total			

Subcatchment EWS-12: EWS-12 Offsite (moss)



Summary for Subcatchment EWS-2: EWS-2 Bldg & Parking (yellow)

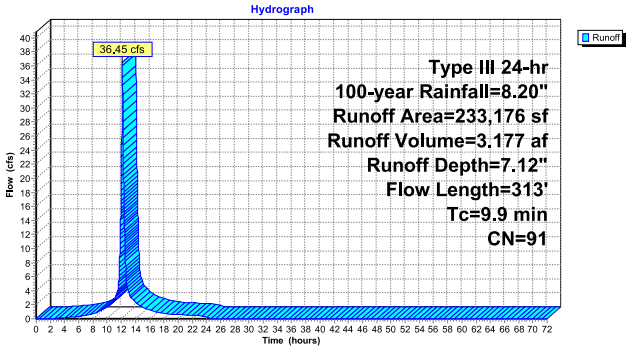
Runoff = 36.45 cfs @ 12.13 hrs, Volume= 3.177 af, Depth= 7.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
*	160,713	98	Paved parking & bldg, HSG C
	67,283	74	>75% Grass cover, Good, HSG C
	5,180	87	Dirt roads, HSG C
	233,176	91	Weighted Average
	72,463		31.08% Pervious Area
	160,713		68.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0134	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
2.7	130	0.0134	0.81		**Shallow Concentrated Flow, SCF 130 FT** Short Grass Pasture Kv= 7.0 fps
0.6	133	0.0324	3.65		**Shallow Concentrated Flow, SCF 133 FT PAVED** Paved Kv= 20.3 fps
9.9	313	Total			

Subcatchment EWS-2: EWS-2 Bldg & Parking (yellow)



Summary for Subcatchment EWS-3: EWS-3 S Parking (red)

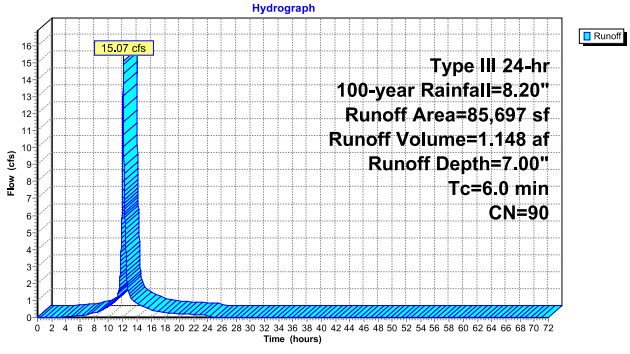
Runoff = 15.07 cfs @ 12.08 hrs, Volume= 1.148 af, Depth= 7.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
	57,471	98	Paved parking, HSG C
	28,226	74	>75% Grass cover, Good, HSG C
	85,697	90	Weighted Average
	28,226		32.94% Pervious Area
	57,471		67.06% Impervious Area

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

Subcatchment EWS-3: EWS-3 S Parking (red)



Summary for Subcatchment EWS-4: EWS-4 S Parking (blue)

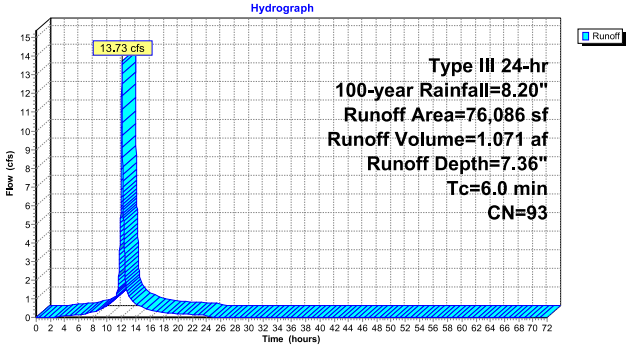
Runoff = 13.73 cfs @ 12.08 hrs, Volume= 1.071 af, Depth= 7.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
	60,601	98	Paved parking, HSG C
	15,485	74	>75% Grass cover, Good, HSG C
	76,086	93	Weighted Average
	15,485		20.35% Pervious Area
	60,601		79.65% Impervious Area

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

Subcatchment EWS-4: EWS-4 S Parking (blue)



Summary for Subcatchment EWS-5: EWS-5 S Bldg & Parking (green)

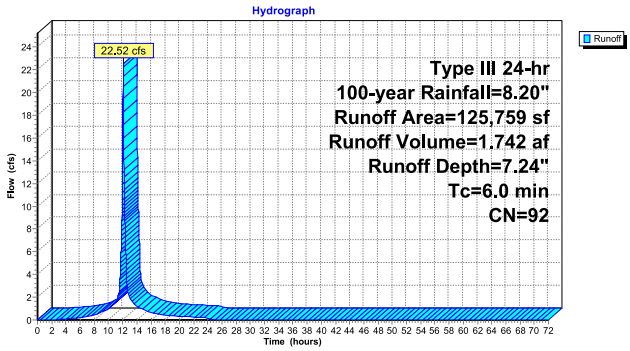
Runoff = 22.52 cfs @ 12.08 hrs, Volume= 1.742 af, Depth= 7.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
*	94,210	98	Paved parking & bldg, HSG C
	31,549	74	>75% Grass cover, Good, HSG C
	125,759	92	Weighted Average
	31,549		25.09% Pervious Area
	94,210		74.91% Impervious Area

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

Subcatchment EWS-5: EWS-5 S Bldg & Parking (green)



Summary for Subcatchment EWS-7: EWS-7 Wetland Tributary (purple)

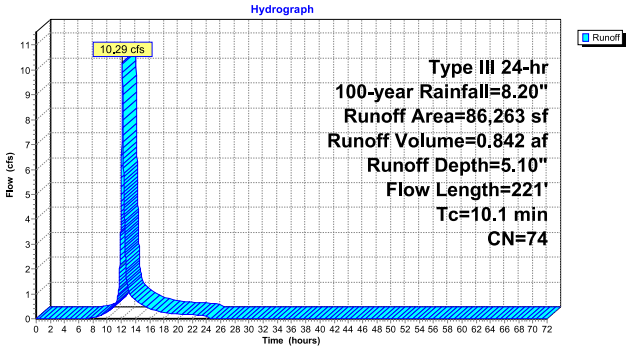
Runoff = 10.29 cfs @ 12.14 hrs, Volume= 0.842 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
	10,693	98	Paved parking, HSG C
	6,146	74	>75% Grass cover, Good, HSG C
	69,424	70	Woods, Good, HSG C
	86,263	74	Weighted Average
	75,570		87.60% Pervious Area
	10,693		12.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	13	0.0460	0.16		**Sheet Flow, SHEET 13 FT** Grass: Short n= 0.150 P2= 3.20"
7.1	87	0.2370	0.20		**Sheet Flow, SHEET 87 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	121	0.0660	1.28		**Shallow Concentrated Flow, SCF 121 FT** Woodland Kv= 5.0 fps
10.1	221	Total			

Subcatchment EWS-7: EWS-7 Wetland Tributary (purple)



Summary for Subcatchment EWS-8: EWS-8 Wetland Tributary (pink)

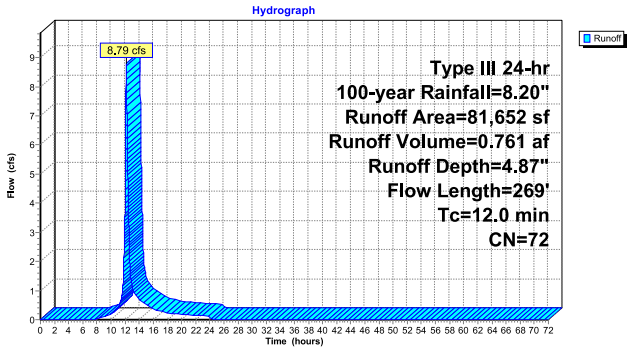
Runoff = 8.79 cfs @ 12.17 hrs, Volume= 0.761 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
	6,940	74	>75% Grass cover, Good, HSG C
	68,992	70	Woods, Good, HSG C
	5,720	87	Dirt roads, HSG C
	81,652	72	Weighted Average
	81,652		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.1230	0.16		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
1.6	169	0.1240	1.76		**Shallow Concentrated Flow, SCF 169 FT** Woodland Kv= 5.0 fps
12.0	269	Total			

Subcatchment EWS-8: EWS-8 Wetland Tributary (pink)



Summary for Subcatchment EWS-9: EWS-9 W Solar Field (cyan)

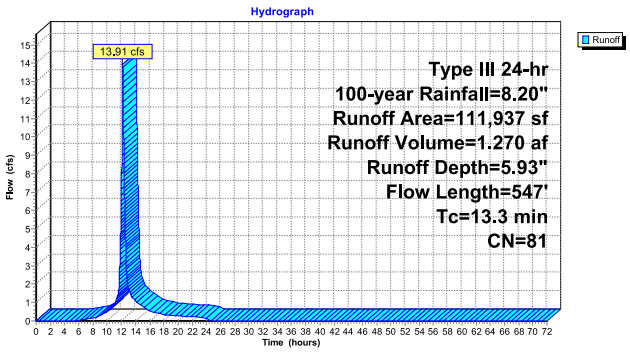
Runoff = 13.91 cfs @ 12.18 hrs, Volume= 1.270 af, Depth= 5.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
	31,792	98	Paved parking, HSG C
	79,016	74	>75% Grass cover, Good, HSG C
	170	70	Woods, Good, HSG C
	959	87	Dirt roads, HSG C
	111,937	81	Weighted Average
	80,145		71.60% Pervious Area
	31,792		28.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0280	0.17		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
8.4	497	0.0200	0.99		**Shallow Concentrated Flow, SCF 497 FT** Short Grass Pasture Kv= 7.0 fps
13.3	547	Total			

Subcatchment EWS-9: EWS-9 W Solar Field (cyan)

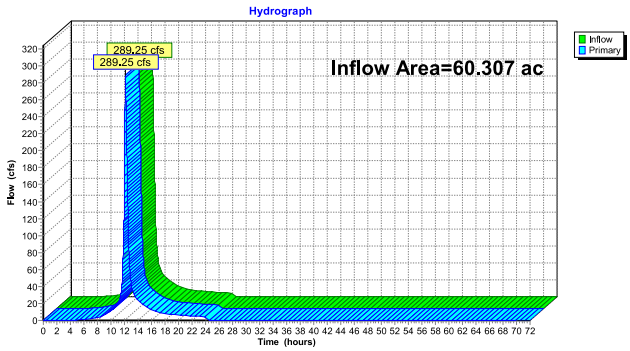


Summary for Link POA: POA

Inflow Area = 60.307 ac, 28.53% Impervious, Inflow Depth = 5.77" for 100-year event
Inflow = 289.25 cfs @ 12.14 hrs, Volume= 28.995 af
Primary = 289.25 cfs @ 12.14 hrs, Volume= 28.995 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA: POA

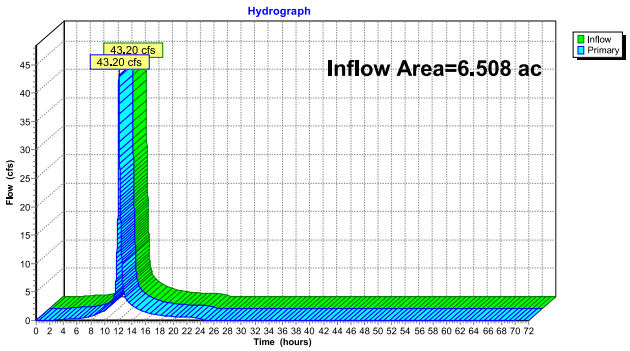


Summary for Link POA-1: POA-1-S Wetland

Inflow Area = 6.508 ac, 54.61% Impervious, Inflow Depth = 6.59" for 100-year event
Inflow = 43.20 cfs @ 12.09 hrs, Volume= 3.574 af
Primary = 43.20 cfs @ 12.09 hrs, Volume= 3.574 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-1: POA-1-S Wetland

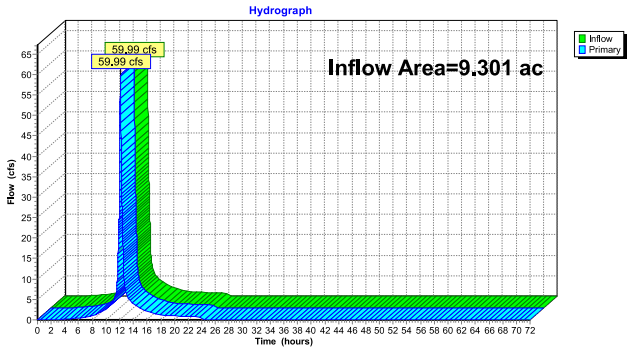


Summary for Link POA-2: POA-2-SW Wetland

Inflow Area = 9.301 ac, 56.49% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 59.99 cfs @ 12.12 hrs, Volume= 5.167 af
Primary = 59.99 cfs @ 12.12 hrs, Volume= 5.167 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-2: POA-2-SW Wetland

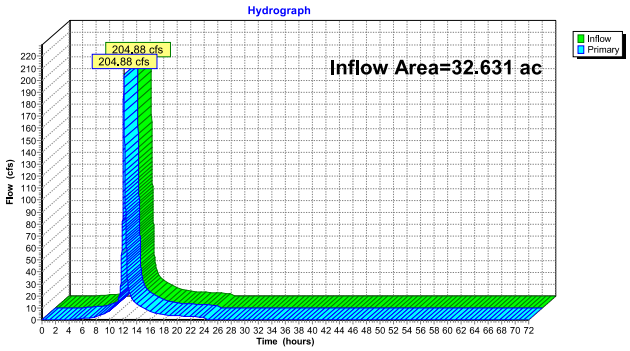


Summary for Link POA-3: POA-3

Inflow Area = 32.631 ac, 42.50% Impervious, Inflow Depth = 6.27" for 100-year event
Inflow = 204.88 cfs @ 12.11 hrs, Volume= 17.057 af
Primary = 204.88 cfs @ 12.11 hrs, Volume= 17.057 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-3: POA-3

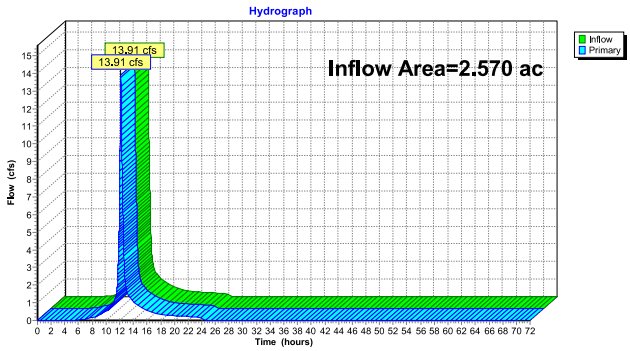


Summary for Link POA-4: POA-4

Inflow Area = 2.570 ac, 28.40% Impervious, Inflow Depth = 5.93" for 100-year event
Inflow = 13.91 cfs @ 12.18 hrs, Volume= 1.270 af
Primary = 13.91 cfs @ 12.18 hrs, Volume= 1.270 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-4: POA-4

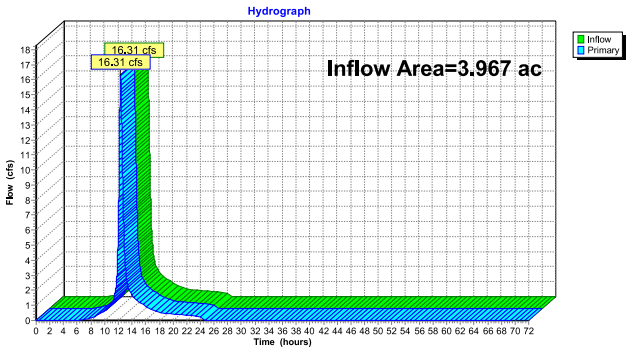


Summary for Link POA-5: POA-5

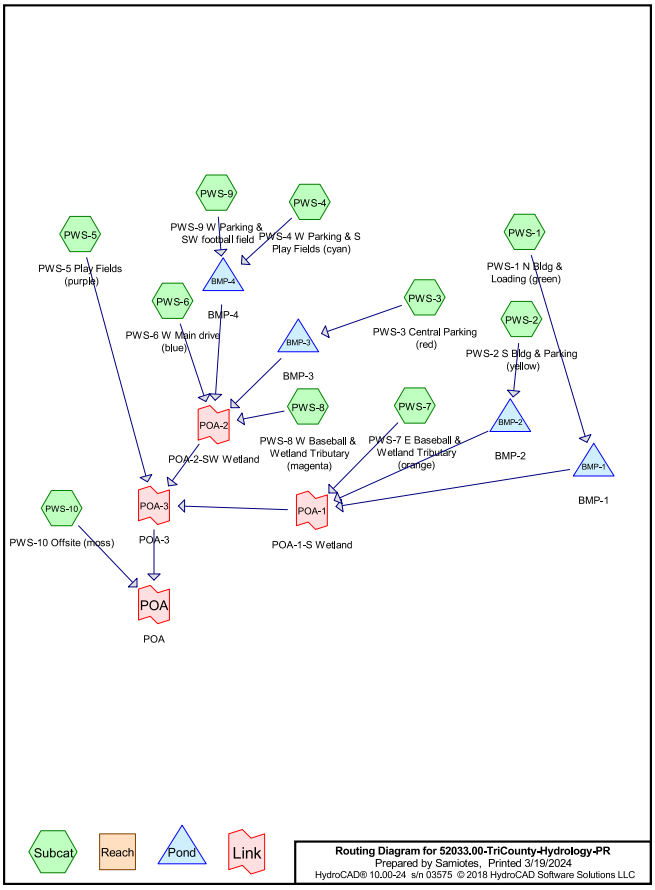
Inflow Area = 3.967 ac, 24.86% Impervious, Inflow Depth = 5.69" for 100-year event
Inflow = 16.31 cfs @ 12.34 hrs, Volume= 1.883 af
Primary = 16.31 cfs @ 12.34 hrs, Volume= 1.883 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-5: POA-5



APPENDIX 2:
PROPOSED HYDROLOGICAL CALCULATIONS



Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
20.069	74	>75% Grass cover, Good, HSG C (PWS-1, PWS-10, PWS-3, PWS-4, PWS-5, PWS-6, PWS-7, PWS-8, PWS-9)
0.715	98	>75% Grass cover, Good, HSG C (PWS-2)
0.772	87	Dirt roads, HSG C (PWS-10, PWS-5, PWS-7, PWS-8)
8.594	98	Paved parking & bldg, HSG C (PWS-10, PWS-3, PWS-4, PWS-5)
8.004	98	Paved parking, HSG C (PWS-1, PWS-2, PWS-6, PWS-7, PWS-8, PWS-9)
22.173	70	Woods, Good, HSG C (PWS-10, PWS-5, PWS-7, PWS-8)
60.327	**80**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PWS-1: PWS-1 N Bldg & Runoff Area=190,648 sf 82.91% Impervious Runoff Depth=2.70"
Tc=6.0 min CN=94 Runoff=13.22 cfs 0.984 af

Subcatchment PWS-10: PWS-10 Offsite (moss) Runoff Area=966,901 sf 10.71% Impervious Runoff Depth=1.14"
Flow Length=514' Tc=18.8 min CN=74 Runoff=19.55 cfs 2.117 af

Subcatchment PWS-2: PWS-2 S Bldg & Runoff Area=134,413 sf 100.00% Impervious Runoff Depth=3.13"
Flow Length=144' Tc=6.4 min CN=98 Runoff=9.94 cfs 0.804 af

Subcatchment PWS-3: PWS-3 Central Parking Runoff Area=129,963 sf 73.32% Impervious Runoff Depth=2.50"
Tc=6.0 min CN=92 Runoff=8.53 cfs 0.622 af

Subcatchment PWS-4: PWS-4 W Parking & S Runoff Area=148,576 sf 52.28% Impervious Runoff Depth=2.06"
Flow Length=575' Tc=13.0 min CN=87 Runoff=6.57 cfs 0.585 af

Subcatchment PWS-5: PWS-5 Play Fields Runoff Area=638,715 sf 15.31% Impervious Runoff Depth=1.39"
Flow Length=564' Tc=13.3 min CN=78 Runoff=18.58 cfs 1.701 af

Subcatchment PWS-6: PWS-6 W Main drive Runoff Area=38,889 sf 53.00% Impervious Runoff Depth=2.06"
Flow Length=504' Tc=9.5 min CN=87 Runoff=1.91 cfs 0.153 af

Subcatchment PWS-7: PWS-7 E Baseball & Runoff Area=155,054 sf 0.97% Impervious Runoff Depth=1.09"
Flow Length=562' Tc=16.2 min CN=73 Runoff=3.13 cfs 0.322 af

Subcatchment PWS-8: PWS-8 W Baseball & Runoff Area=142,499 sf 4.34% Impervious Runoff Depth=1.14"
Flow Length=248' Tc=11.2 min CN=74 Runoff=3.51 cfs 0.312 af

Subcatchment PWS-9: PWS-9 W Parking & SW Runoff Area=82,198 sf 71.81% Impervious Runoff Depth=2.41"
Flow Length=575' Tc=11.0 min CN=91 Runoff=4.44 cfs 0.379 af

Pond BMP-1: BMP-1 Peak Elev=372.81' Storage=12,101 cf Inflow=13.22 cfs 0.984 af
Outflow=5.45 cfs 0.984 af

Pond BMP-2: BMP-2 Peak Elev=373.46' Storage=5,720 cf Inflow=9.94 cfs 0.804 af
Outflow=5.92 cfs 0.804 af

Pond BMP-3: BMP-3 Peak Elev=358.61' Storage=13,839 cf Inflow=8.53 cfs 0.622 af
Discarded=0.06 cfs 0.307 af Primary=1.57 cfs 0.316 af Outflow=1.63 cfs 0.622 af

Pond BMP-4: BMP-4 Peak Elev=339.41' Storage=15,939 cf Inflow=10.92 cfs 0.963 af
Discarded=0.04 cfs 0.220 af Primary=6.72 cfs 0.610 af Outflow=6.76 cfs 0.830 af

Link POA: POA Inflow=60.79 cfs 7.318 af
Primary=60.79 cfs 7.318 af

Link POA-1: POA-1-S Wetland Inflow=14.40 cfs 2.110 af
Primary=14.40 cfs 2.110 af

Link POA-2: POA-2-SW Wetland Inflow=11.26 cfs 1.391 af
Primary=11.26 cfs 1.391 af

Link POA-3: POA-3 Inflow=41.43 cfs 5.202 af
Primary=41.43 cfs 5.202 af

Total Runoff Area = 60.327 ac Runoff Volume = 7.979 af Average Runoff Depth = 1.59"
71.30% Pervious = 43.014 ac 28.70% Impervious = 17.313 ac

Summary for Subcatchment PWS-1: PWS-1 N Bldg & Loading (green)

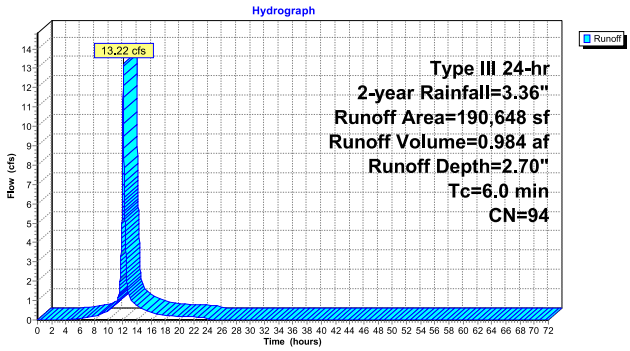
Runoff = 13.22 cfs @ 12.08 hrs, Volume= 0.984 af, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
158,071	98	Paved parking, HSG C
32,577	74	>75% Grass cover, Good, HSG C
190,648	94	Weighted Average
32,577		17.09% Pervious Area
158,071		82.91% Impervious Area

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

Subcatchment PWS-1: PWS-1 N Bldg & Loading (green)



Summary for Subcatchment PWS-10: PWS-10 Offsite (moss)

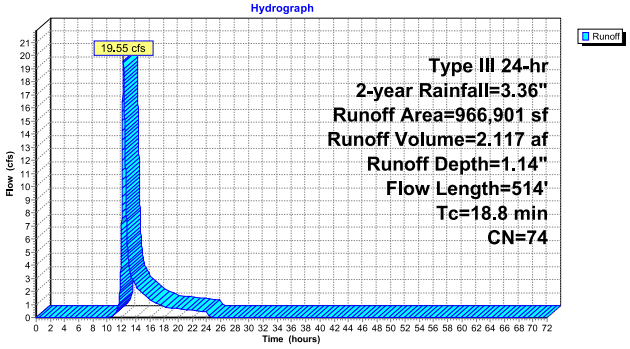
Runoff = 19.55 cfs @ 12.28 hrs, Volume= 2.117 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
*	103,577	98	Paved parking & bldg, HSG C
	90,398	74	>75% Grass cover, Good, HSG C
	765,125	70	Woods, Good, HSG C
	7,801	87	Dirt roads, HSG C
	966,901	74	Weighted Average
	863,324		89.29% Pervious Area
	103,577		10.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
5.0	414	0.0760	1.38		**Shallow Concentrated Flow, SCF 414 FT WOODS** Woodland Kv= 5.0 fps
18.8	514	Total			

Subcatchment PWS-10: PWS-10 Offsite (moss)



Summary for Subcatchment PWS-2: PWS-2 S Bldg & Parking (yellow)

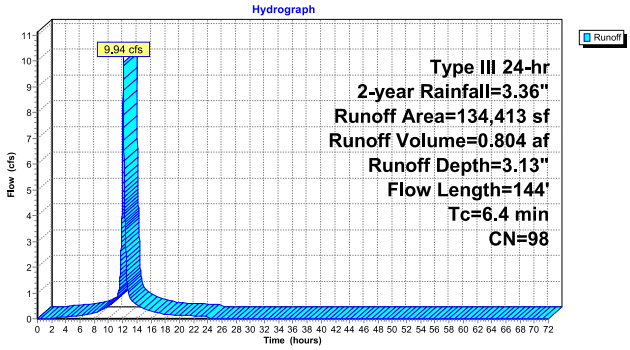
Runoff = 9.94 cfs @ 12.09 hrs, Volume= 0.804 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
	103,259	98	Paved parking, HSG C
*	31,154	98	>75% Grass cover, Good, HSG C
	134,413	98	Weighted Average
	134,413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0250	0.16		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.6	41	0.0250	1.11		**Shallow Concentrated Flow, SCF 41 FT** Short Grass Pasture Kv= 7.0 fps
0.7	53	0.0038	1.25		**Shallow Concentrated Flow, SCF 53 FT** Paved Kv= 20.3 fps
6.4	144	Total			

Subcatchment PWS-2: PWS-2 S Bldg & Parking (yellow)



Summary for Subcatchment PWS-3: PWS-3 Central Parking (red)

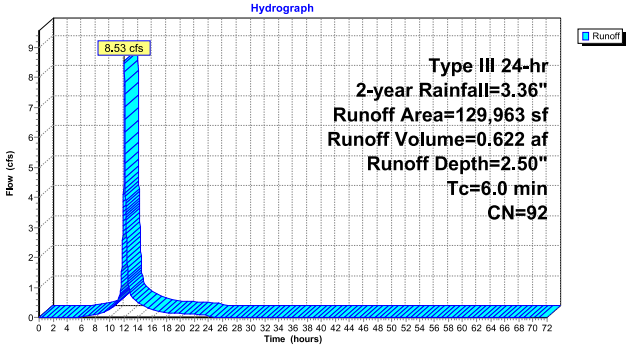
Runoff = 8.53 cfs @ 12.09 hrs, Volume= 0.622 af, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
*	95,293	98	Paved parking & bldg, HSG C
	34,670	74	>75% Grass cover, Good, HSG C
	129,963	92	Weighted Average
	34,670		26.68% Pervious Area
	95,293		73.32% Impervious Area

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

Subcatchment PWS-3: PWS-3 Central Parking (red)



Summary for Subcatchment PWS-4: PWS-4 W Parking & S Play Fields (cyan)

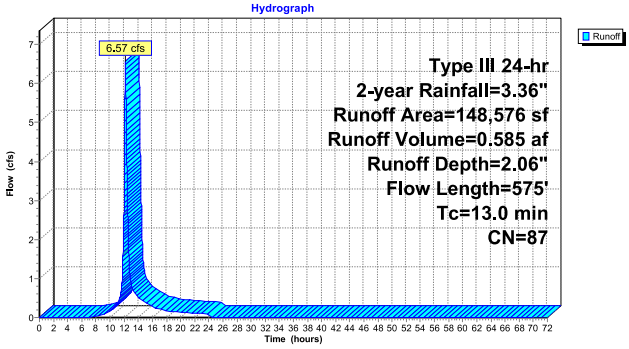
Runoff = 6.57 cfs @ 12.18 hrs, Volume= 0.585 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
*	77,679	98	Paved parking & bldg, HSG C
	70,897	74	>75% Grass cover, Good, HSG C
	148,576	87	Weighted Average
	70,897		47.72% Pervious Area
	77,679		52.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0060	0.09		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.9	120	0.1090	2.31		**Shallow Concentrated Flow, SCF 120 FT** Short Grass Pasture Kv= 7.0 fps
3.0	405	0.0120	2.22		**Shallow Concentrated Flow, SCF 405 FT** Paved Kv= 20.3 fps
13.0	575	Total			

Subcatchment PWS-4: PWS-4 W Parking & S Play Fields (cyan)



Summary for Subcatchment PWS-5: PWS-5 Play Fields (purple)

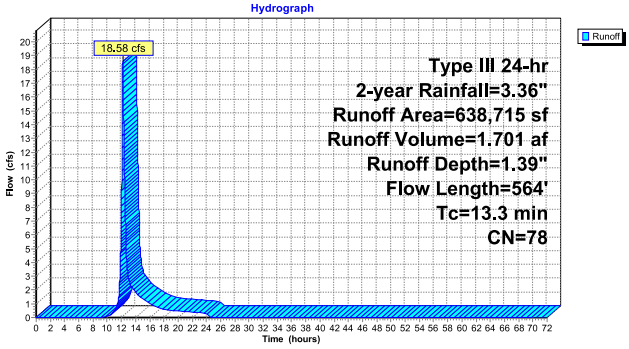
Runoff = 18.58 cfs @ 12.19 hrs, Volume= 1.701 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
*	97,804	98	Paved parking & bldg, HSG C
	460,660	74	>75% Grass cover, Good, HSG C
	65,535	70	Woods, Good, HSG C
	14,716	87	Dirt roads, HSG C
	638,715	78	Weighted Average
	540,911		84.69% Pervious Area
	97,804		15.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0120	0.12		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.20"
6.4	514	0.0370	1.35		**Shallow Concentrated Flow, SHALLOW** Short Grass Pasture Kv= 7.0 fps
13.3	564	Total			

Subcatchment PWS-5: PWS-5 Play Fields (purple)



Summary for Subcatchment PWS-6: PWS-6 W Main drive (blue)

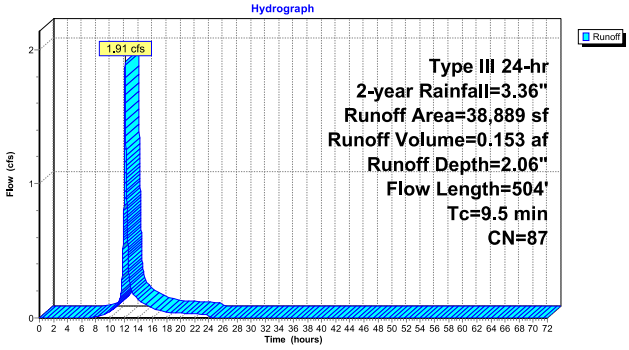
Runoff = 1.91 cfs @ 12.13 hrs, Volume= 0.153 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
	20,613	98	Paved parking, HSG C
	18,276	74	>75% Grass cover, Good, HSG C
	38,889	87	Weighted Average
	18,276		47.00% Pervious Area
	20,613		53.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
1.8	198	0.0680	1.83		**Shallow Concentrated Flow, SCF 198 FT** Short Grass Pasture Kv= 7.0 fps
1.2	256	0.0300	3.52		**Shallow Concentrated Flow, SCF 256 FT** Paved Kv= 20.3 fps
9.5	504	Total			

Subcatchment PWS-6: PWS-6 W Main drive (blue)



Summary for Subcatchment PWS-7: PWS-7 E Baseball & Wetland Tributary (orange)

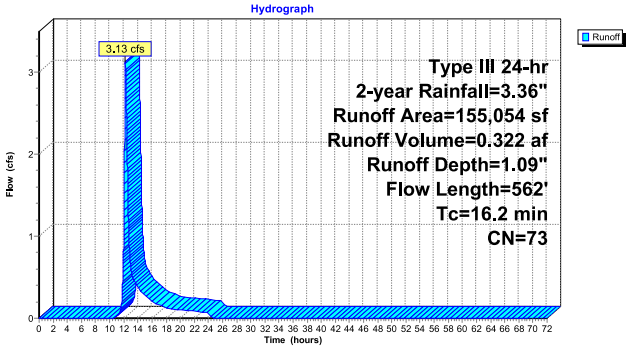
Runoff = 3.13 cfs @ 12.24 hrs, Volume= 0.322 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

	Area (sf)	CN	Description
	1,497	98	Paved parking, HSG C
	80,421	74	>75% Grass cover, Good, HSG C
	67,324	70	Woods, Good, HSG C
	5,812	87	Dirt roads, HSG C
	155,054	73	Weighted Average
	153,557		99.03% Pervious Area
	1,497		0.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
7.3	258	0.0070	0.59		**Shallow Concentrated Flow, SCF 258 FT** Short Grass Pasture Kv= 7.0 fps
2.4	254	0.1230	1.75		**Shallow Concentrated Flow, SCF 254 FT** Woodland Kv= 5.0 fps
16.2	562	Total			

Subcatchment PWS-7: PWS-7 E Baseball & Wetland Tributary (orange)



Summary for Subcatchment PWS-8: PWS-8 W Baseball & Wetland Tributary (magenta)

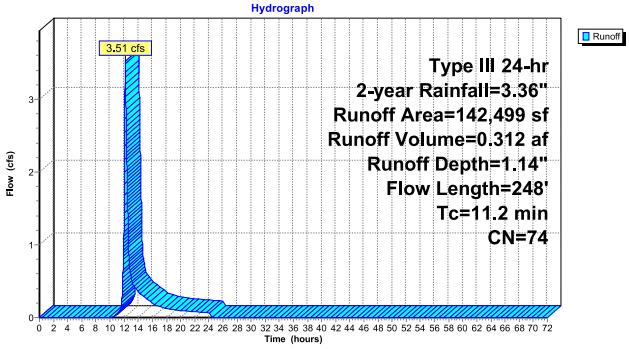
Runoff = 3.51 cfs @ 12.16 hrs, Volume= 0.312 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
6,188	98	Paved parking, HSG C
63,139	74	>75% Grass cover, Good, HSG C
67,878	70	Woods, Good, HSG C
5,294	87	Dirt roads, HSG C
142,499	74	Weighted Average
136,311		95.66% Pervious Area
6,188		4.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
4.7	198	0.0100	0.70		**Shallow Concentrated Flow, SCF 198 FT** Short Grass Pasture Kv= 7.0 fps
11.2	248	Total			

Subcatchment PWS-8: PWS-8 W Baseball & Wetland Tributary (magenta)



Summary for Subcatchment PWS-9: PWS-9 W Parking & SW football field

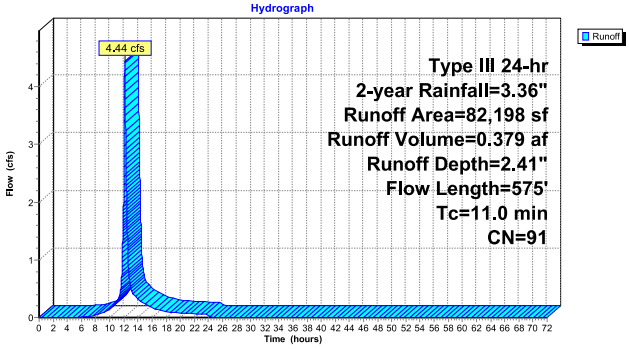
Runoff = 4.44 cfs @ 12.15 hrs, Volume= 0.379 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.36"

Area (sf)	CN	Description
59,027	98	Paved parking, HSG C
23,171	74	>75% Grass cover, Good, HSG C
82,198	91	Weighted Average
23,171		28.19% Pervious Area
59,027		71.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0110	0.12		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.9	120	0.1090	2.31		**Shallow Concentrated Flow, SCF 120 FT** Short Grass Pasture Kv= 7.0 fps
3.0	405	0.0120	2.22		**Shallow Concentrated Flow, SCF 405 FT** Paved Kv= 20.3 fps
11.0	575	Total			

Subcatchment PWS-9: PWS-9 W Parking & SW football field



Summary for Pond BMP-1: BMP-1

Inflow Area = 4.377 ac, 82.91% Impervious, Inflow Depth = 2.70" for 2-year event
Inflow = 13.22 cfs @ 12.08 hrs, Volume= 0.984 af
Outflow = 5.45 cfs @ 12.29 hrs, Volume= 0.984 af, Atten= 59%, Lag= 12.5 min
Primary = 5.45 cfs @ 12.29 hrs, Volume= 0.984 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 372.81' @ 12.29 hrs Surf.Area= 9,552 sf Storage= 12,101 cf

Plug-Flow detention time= 82.1 min calculated for 0.984 af (100% of inflow)
Center-of-Mass det. time= 81.8 min (867.3 - 785.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	371.33'	0 cf	**48.27'W x 197.88'L x 4.67'H Field A** 44,574 cf Overall - 44,574 cf Embedded = 0 cf x 40.0% Voids
#2A	371.33'	32,781 cf	**StormTrap ST1 SingleTrap 4-0** x 98 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 98 Chambers in 7 Rows 48.27' x 196.88' Core + 0.00' x 0.50' Border = 48.27' x 197.88' System
		32,781 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	371.33'	**21.0" Round Culvert** L= 163.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 371.33' / 370.51' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 2.41 sf
#2	Device 1	371.33'	**15.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	374.83'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=5.45 cfs @ 12.29 hrs HW=372.81' (Free Discharge)
└**1=Culvert** (Passes 5.45 cfs of 7.46 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 5.45 cfs @ 4.44 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond BMP-1: BMP-1 - Chamber Wizard Field A

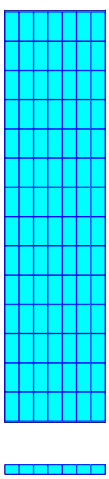
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

14 Chambers/Row x 14.06' Long = 196.88' Row Length +6.0" Border x 2 = 197.88' Base Length
7 Rows x 82.7" Wide = 48.27' Base Width
56.0" Chamber Height = 4.67' Field Height

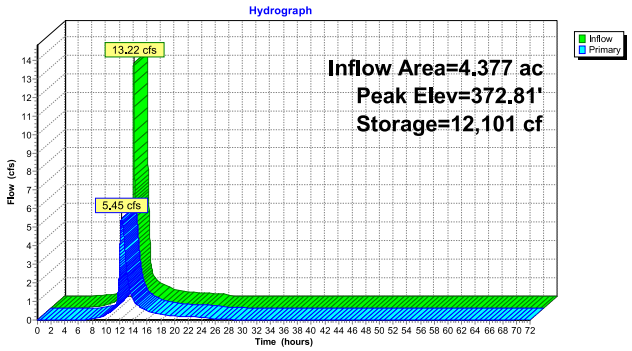
98 Chambers x 334.5 cf = 32,781.1 cf Chamber Storage
98 Chambers x 452.5 cf + 225.3 cf Border = 44,574.1 cf Displacement

Chamber Storage = 32,781.1 cf = 0.753 af
Overall Storage Efficiency = 73.5%
Overall System Size = 197.88' x 48.27' x 4.67'

98 Chambers (plus border)
1,650.9 cy Field



Pond BMP-1: BMP-1



Summary for Pond BMP-2: BMP-2

Inflow Area = 3.086 ac,100.00% Impervious, Inflow Depth = 3.13" for 2-year event
Inflow = 9.94 cfs @ 12.09 hrs, Volume= 0.804 af
Outflow = 5.92 cfs @ 12.20 hrs, Volume= 0.804 af, Atten= 40%, Lag= 6.5 min
Primary = 5.92 cfs @ 12.20 hrs, Volume= 0.804 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 373.46' @ 12.20 hrs Surf.Area= 4,114 sf Storage= 5,720 cf

Plug-Flow detention time= 35.8 min calculated for 0.804 af (100% of inflow)
Center-of-Mass det. time= 36.0 min (791.7 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	371.83'	0 cf	**41.38'W x 99.44'L x 4.67'H Field A** 19,200 cf Overall - 19,200 cf Embedded = 0 cf x 40.0% Voids
#2A	371.83'	14,049 cf	**StormTrap ST1 SingleTrap 4-0** x 42 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 42 Chambers in 6 Rows 41.38' x 98.44' Core + 0.00' x 0.50' Border = 41.38' x 99.44' System
		14,049 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	371.83'	**18.0" Round Culvert** L= 83.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 371.83' / 370.58' S= 0.0151 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	371.83'	**15.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	374.33'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=5.92 cfs @ 12.20 hrs HW=373.46' (Free Discharge)
└**1=Culvert** (Passes 5.92 cfs of 7.97 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 5.92 cfs @ 4.82 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond BMP-2: BMP-2 - Chamber Wizard Field A

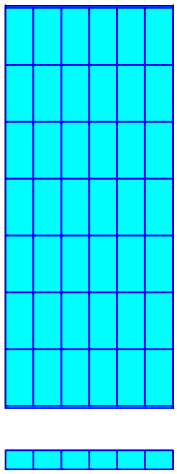
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

7 Chambers/Row x 14.06' Long = 98.44' Row Length +6.0" Border x 2 = 99.44' Base Length
6 Rows x 82.7" Wide = 41.38' Base Width
56.0" Chamber Height = 4.67' Field Height

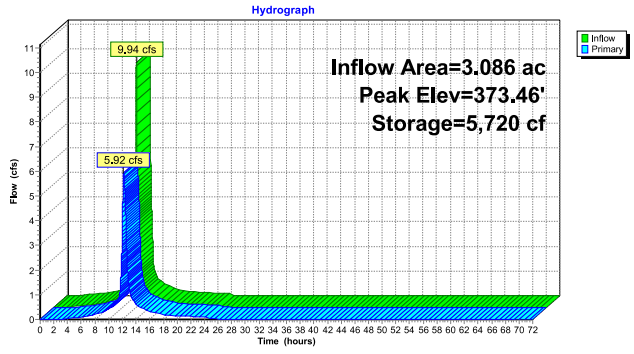
42 Chambers x 334.5 cf = 14,049.1 cf Chamber Storage
42 Chambers x 452.5 cf + 193.1 cf Border = 19,199.7 cf Displacement

Chamber Storage = 14,049.1 cf = 0.323 af
Overall Storage Efficiency = 73.2%
Overall System Size = 99.44' x 41.38' x 4.67'

42 Chambers (plus border)
711.1 cy Field



Pond BMP-2: BMP-2



Summary for Pond BMP-3: BMP-3

Inflow Area = 2.984 ac, 73.32% Impervious, Inflow Depth = 2.50" for 2-year event
Inflow = 8.53 cfs @ 12.09 hrs, Volume= 0.622 af
Outflow = 1.63 cfs @ 12.53 hrs, Volume= 0.622 af, Atten= 81%, Lag= 26.6 min
Discarded = 0.06 cfs @ 8.15 hrs, Volume= 0.307 af
Primary = 1.57 cfs @ 12.53 hrs, Volume= 0.316 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 358.61' @ 12.53 hrs Surf.Area= 9,575 sf Storage= 13,839 cf

Plug-Flow detention time= 785.1 min calculated for 0.622 af (100% of inflow)
Center-of-Mass det. time= 785.0 min (1,581.0 - 796.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	356.50'	13,229 cf	**58.58'W x 163.44'L x 5.50'H Field A** 52,662 cf Overall - 19,590 cf Embedded = 33,072 cf x 40.0% Voids
#2A	357.25'	19,590 cf	**ADS_StormTech MC-3500 d +Cap** x 176 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 176 Chambers in 8 Rows Cap Storage= +14.9 cf x 2 x 8 rows = 238.4 cf
		32,819 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	**15.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 358.00' / 357.25' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Discarded	356.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 8.15 hrs HW=356.56' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.57 cfs @ 12.53 hrs HW=358.61' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.57 cfs @ 3.88 fps)

Pond BMP-3: BMP-3 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 8 rows = 238.4 cf

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

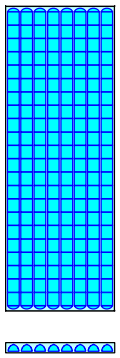
22 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 161.44' Row Length +12.0" End Stone x 2 = 163.44' Base Length
8 Rows x 77.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 58.58' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

176 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 8 Rows = 19,589.9 cf Chamber Storage

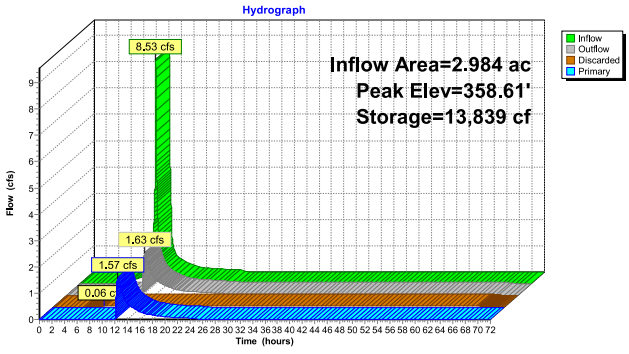
52,661.7 cf Field - 19,589.9 cf Chambers = 33,071.8 cf Stone x 40.0% Voids = 13,228.7 cf Stone Storage

Chamber Storage + Stone Storage = 32,818.7 cf = 0.753 af
Overall Storage Efficiency = 62.3%
Overall System Size = 163.44' x 58.58' x 5.50'

176 Chambers
1,950.4 cy Field
1,224.9 cy Stone



Pond BMP-3: BMP-3



Summary for Pond BMP-4: BMP-4

Inflow Area = 5.298 ac, 59.24% Impervious, Inflow Depth = 2.18" for 2-year event
Inflow = 10.92 cfs @ 12.16 hrs, Volume= 0.963 af
Outflow = 6.76 cfs @ 12.35 hrs, Volume= 0.830 af, Atten= 38%, Lag= 11.0 min
Discarded = 0.04 cfs @ 8.21 hrs, Volume= 0.220 af
Primary = 6.72 cfs @ 12.35 hrs, Volume= 0.610 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 339.41' @ 12.35 hrs Surf.Area= 6,598 sf Storage= 15,939 cf

Plug-Flow detention time= 521.7 min calculated for 0.830 af (86% of inflow)
Center-of-Mass det. time= 460.5 min (1,276.8 - 816.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	336.00'	9,166 cf	**44.25'W x 149.10'L x 5.50'H Field A** 36,287 cf Overall - 13,373 cf Embedded = 22,914 cf x 40.0% Voids
#2A	336.75'	13,373 cf	**ADS_StormTech MC-3500 d +Cap** x 120 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 120 Chambers in 6 Rows Cap Storage= +14.9 cf x 2 x 6 rows = 178.8 cf
		22,539 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	336.75'	**24.0" Round Culvert** L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 336.75' / 336.46' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	338.75'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	336.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 8.21 hrs HW=336.06' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=6.71 cfs @ 12.35 hrs HW=339.41' (Free Discharge)
└**1=Culvert** (Passes 6.71 cfs of 18.13 cfs potential flow)
└**2=Sharp-Crested Rectangular Weir** (Weir Controls 6.71 cfs @ 2.65 fps)

Pond BMP-4: BMP-4 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 6 rows = 178.8 cf

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

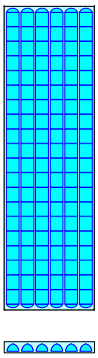
20 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 147.10' Row Length +12.0" End Stone x 2 = 149.10' Base Length
6 Rows x 77.0" Wide + 9.0" Spacing x 5 + 12.0" Side Stone x 2 = 44.25' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

120 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 6 Rows = 13,373.0 cf Chamber Storage

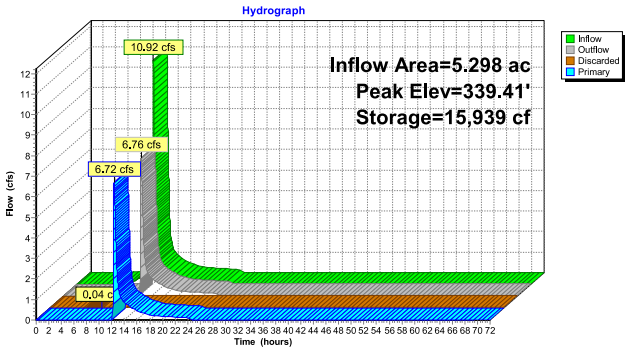
36,287.2 cf Field - 13,373.0 cf Chambers = 22,914.2 cf Stone x 40.0% Voids = 9,165.7 cf Stone Storage

Chamber Storage + Stone Storage = 22,538.7 cf = 0.517 af
Overall Storage Efficiency = 62.1%
Overall System Size = 149.10' x 44.25' x 5.50'

120 Chambers
1,344.0 cy Field
848.7 cy Stone



Pond BMP-4: BMP-4

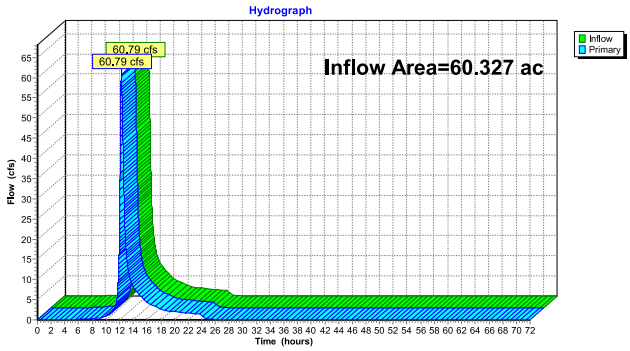


Summary for Link POA: POA

Inflow Area = 60.327 ac, 28.70% Impervious, Inflow Depth = 1.46" for 2-year event
Inflow = 60.79 cfs @ 12.26 hrs, Volume= 7.318 af
Primary = 60.79 cfs @ 12.26 hrs, Volume= 7.318 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA: POA

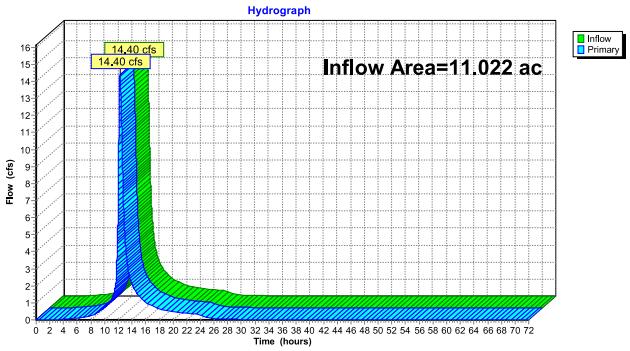


Summary for Link POA-1: POA-1-S Wetland

Inflow Area = 11.022 ac, 61.23% Impervious, Inflow Depth = 2.30" for 2-year event
Inflow = 14.40 cfs @ 12.23 hrs, Volume= 2.110 af
Primary = 14.40 cfs @ 12.23 hrs, Volume= 2.110 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-1: POA-1-S Wetland

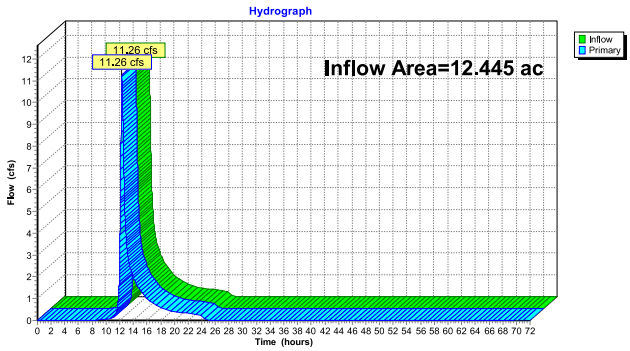


Summary for Link POA-2: POA-2-SW Wetland

Inflow Area = 12.445 ac, 47.74% Impervious, Inflow Depth = 1.34" for 2-year event
Inflow = 11.26 cfs @ 12.33 hrs, Volume= 1.391 af
Primary = 11.26 cfs @ 12.33 hrs, Volume= 1.391 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-2: POA-2-SW Wetland

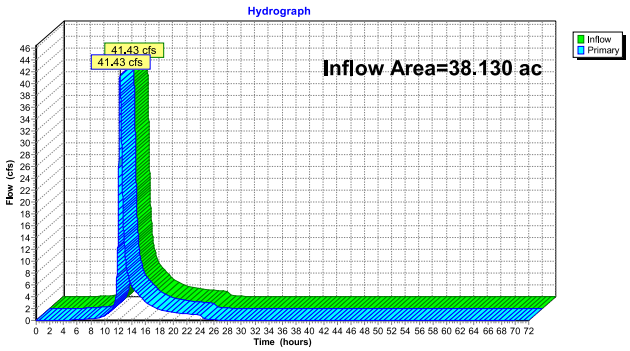


Summary for Link POA-3: POA-3

Inflow Area = 38.130 ac, 39.17% Impervious, Inflow Depth = 1.64" for 2-year event
Inflow = 41.43 cfs @ 12.24 hrs, Volume= 5.202 af
Primary = 41.43 cfs @ 12.24 hrs, Volume= 5.202 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-3: POA-3



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PWS-1: PWS-1 N Bldg & Runoff Area=190,648 sf 82.91% Impervious Runoff Depth=4.54"
Tc=6.0 min CN=94 Runoff=21.57 cfs 1.654 af

Subcatchment PWS-10: PWS-10 Offsite (moss) Runoff Area=966,901 sf 10.71% Impervious Runoff Depth=2.55"
Flow Length=514' Tc=18.8 min CN=74 Runoff=45.70 cfs 4.715 af

Subcatchment PWS-2: PWS-2 S Bldg & Runoff Area=134,413 sf 100.00% Impervious Runoff Depth=4.99"
Flow Length=144' Tc=6.4 min CN=98 Runoff=15.58 cfs 1.284 af

Subcatchment PWS-3: PWS-3 Central Parking Runoff Area=129,963 sf 73.32% Impervious Runoff Depth=4.31"
Tc=6.0 min CN=92 Runoff=14.28 cfs 1.073 af

Subcatchment PWS-4: PWS-4 W Parking & S Runoff Area=148,576 sf 52.28% Impervious Runoff Depth=3.78"
Flow Length=575' Tc=13.0 min CN=87 Runoff=11.89 cfs 1.076 af

Subcatchment PWS-5: PWS-5 Play Fields Runoff Area=638,715 sf 15.31% Impervious Runoff Depth=2.91"
Flow Length=564' Tc=13.3 min CN=78 Runoff=39.61 cfs 3.553 af

Subcatchment PWS-6: PWS-6 W Main drive Runoff Area=38,889 sf 53.00% Impervious Runoff Depth=3.78"
Flow Length=504' Tc=9.5 min CN=87 Runoff=3.45 cfs 0.282 af

Subcatchment PWS-7: PWS-7 E Baseball & Runoff Area=155,054 sf 0.97% Impervious Runoff Depth=2.46"
Flow Length=562' Tc=16.2 min CN=73 Runoff=7.49 cfs 0.730 af

Subcatchment PWS-8: PWS-8 W Baseball & Runoff Area=142,499 sf 4.34% Impervious Runoff Depth=2.55"
Flow Length=248' Tc=11.2 min CN=74 Runoff=8.20 cfs 0.695 af

Subcatchment PWS-9: PWS-9 W Parking & SW Runoff Area=82,198 sf 71.81% Impervious Runoff Depth=4.21"
Flow Length=575' Tc=11.0 min CN=91 Runoff=7.55 cfs 0.661 af

Pond BMP-1: BMP-1 Peak Elev=373.72' Storage=19,565 cf Inflow=21.57 cfs 1.654 af
Outflow=7.84 cfs 1.653 af

Pond BMP-2: BMP-2 Peak Elev=374.41' Storage=9,049 cf Inflow=15.58 cfs 1.284 af
Outflow=8.54 cfs 1.284 af

Pond BMP-3: BMP-3 Peak Elev=359.43' Storage=19,981 cf Inflow=14.28 cfs 1.073 af
Discarded=0.06 cfs 0.320 af Primary=5.30 cfs 0.753 af Outflow=5.36 cfs 1.072 af

Pond BMP-4: BMP-4 Peak Elev=340.03' Storage=18,498 cf Inflow=19.30 cfs 1.737 af
Discarded=0.04 cfs 0.227 af Primary=17.77 cfs 1.376 af Outflow=17.81 cfs 1.603 af

Link POA: POA Inflow=139.00 cfs 15.041 af
Primary=139.00 cfs 15.041 af

Link POA-1: POA-1-S Wetland Inflow=23.71 cfs 3.668 af
Primary=23.71 cfs 3.668 af

Link POA-2: POA-2-SW Wetland Inflow=33.30 cfs 3.105 af
Primary=33.30 cfs 3.105 af

Link POA-3: POA-3 Inflow=96.14 cfs 10.326 af
Primary=96.14 cfs 10.326 af

Total Runoff Area = 60.327 ac Runoff Volume = 15.723 af Average Runoff Depth = 3.13"
71.30% Pervious = 43.014 ac 28.70% Impervious = 17.313 ac

Summary for Subcatchment PWS-1: PWS-1 N Bldg & Loading (green)

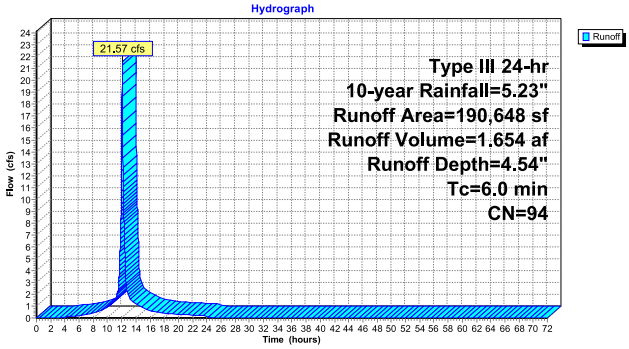
Runoff = 21.57 cfs @ 12.08 hrs, Volume= 1.654 af, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
158,071	98	Paved parking, HSG C
32,577	74	>75% Grass cover, Good, HSG C
190,648	94	Weighted Average
32,577		17.09% Pervious Area
158,071		82.91% Impervious Area

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

Subcatchment PWS-1: PWS-1 N Bldg & Loading (green)



Summary for Subcatchment PWS-10: PWS-10 Offsite (moss)

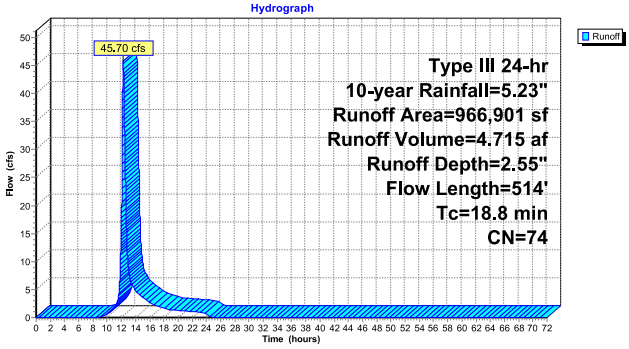
Runoff = 45.70 cfs @ 12.26 hrs, Volume= 4.715 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
*	103,577	98	Paved parking & bldg, HSG C
	90,398	74	>75% Grass cover, Good, HSG C
	765,125	70	Woods, Good, HSG C
	7,801	87	Dirt roads, HSG C
	966,901	74	Weighted Average
	863,324		89.29% Pervious Area
	103,577		10.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
5.0	414	0.0760	1.38		**Shallow Concentrated Flow, SCF 414 FT WOODS** Woodland Kv= 5.0 fps
18.8	514	Total			

Subcatchment PWS-10: PWS-10 Offsite (moss)



Summary for Subcatchment PWS-2: PWS-2 S Bldg & Parking (yellow)

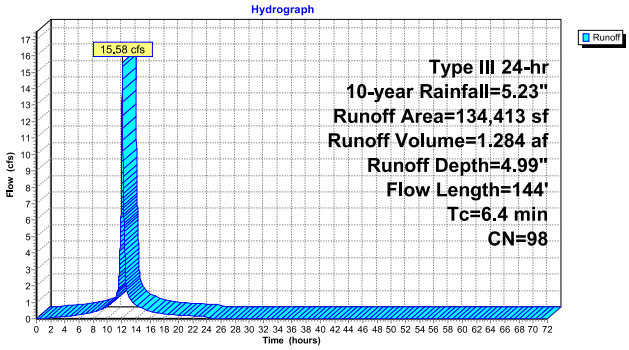
Runoff = 15.58 cfs @ 12.09 hrs, Volume= 1.284 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
	103,259	98	Paved parking, HSG C
*	31,154	98	>75% Grass cover, Good, HSG C
	134,413	98	Weighted Average
	134,413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0250	0.16		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.6	41	0.0250	1.11		**Shallow Concentrated Flow, SCF 41 FT** Short Grass Pasture Kv= 7.0 fps
0.7	53	0.0038	1.25		**Shallow Concentrated Flow, SCF 53 FT** Paved Kv= 20.3 fps
6.4	144	Total			

Subcatchment PWS-2: PWS-2 S Bldg & Parking (yellow)



Summary for Subcatchment PWS-3: PWS-3 Central Parking (red)

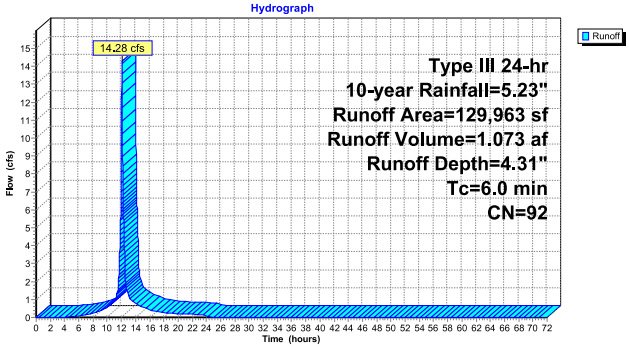
Runoff = 14.28 cfs @ 12.08 hrs, Volume= 1.073 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
*	95,293	98	Paved parking & bldg, HSG C
	34,670	74	>75% Grass cover, Good, HSG C
	129,963	92	Weighted Average
	34,670		26.68% Pervious Area
	95,293		73.32% Impervious Area

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

Subcatchment PWS-3: PWS-3 Central Parking (red)



Summary for Subcatchment PWS-4: PWS-4 W Parking & S Play Fields (cyan)

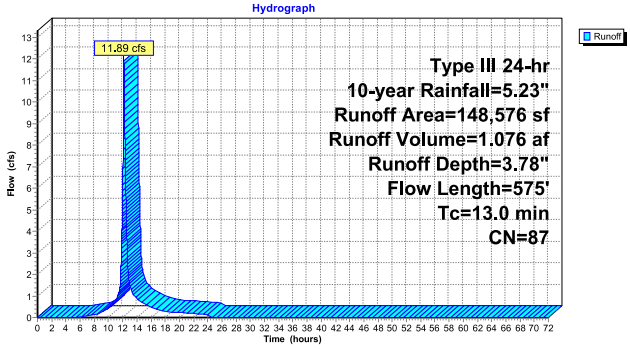
Runoff = 11.89 cfs @ 12.18 hrs, Volume= 1.076 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
*	77,679	98	Paved parking & bldg, HSG C
	70,897	74	>75% Grass cover, Good, HSG C
	148,576	87	Weighted Average
	70,897		47.72% Pervious Area
	77,679		52.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0060	0.09		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.9	120	0.1090	2.31		**Shallow Concentrated Flow, SCF 120 FT** Short Grass Pasture Kv= 7.0 fps
3.0	405	0.0120	2.22		**Shallow Concentrated Flow, SCF 405 FT** Paved Kv= 20.3 fps
13.0	575	Total			

Subcatchment PWS-4: PWS-4 W Parking & S Play Fields (cyan)



Summary for Subcatchment PWS-5: PWS-5 Play Fields (purple)

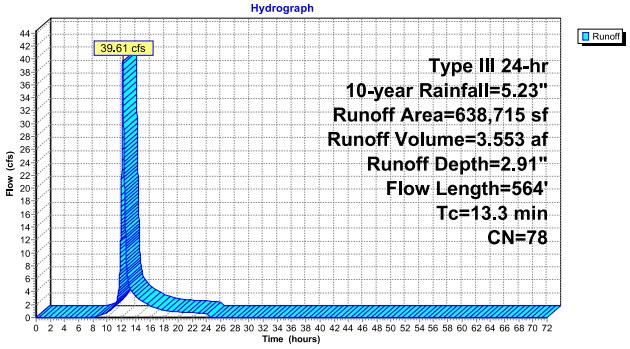
Runoff = 39.61 cfs @ 12.19 hrs, Volume= 3.553 af, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
*	97,804	98	Paved parking & bldg, HSG C
	460,660	74	>75% Grass cover, Good, HSG C
	65,535	70	Woods, Good, HSG C
	14,716	87	Dirt roads, HSG C
	638,715	78	Weighted Average
	540,911		84.69% Pervious Area
	97,804		15.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0120	0.12		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.20"
6.4	514	0.0370	1.35		**Shallow Concentrated Flow, SHALLOW** Short Grass Pasture Kv= 7.0 fps
13.3	564	Total			

Subcatchment PWS-5: PWS-5 Play Fields (purple)



Summary for Subcatchment PWS-6: PWS-6 W Main drive (blue)

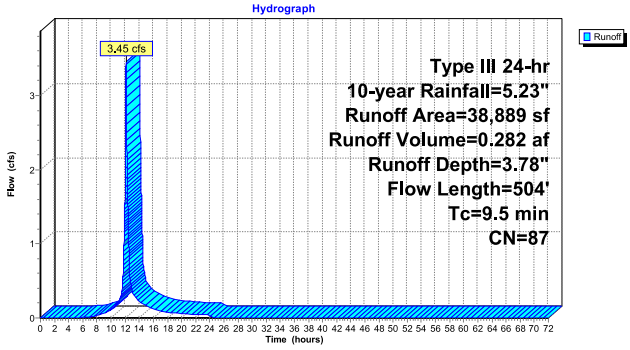
Runoff = 3.45 cfs @ 12.13 hrs, Volume= 0.282 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
	20,613	98	Paved parking, HSG C
	18,276	74	>75% Grass cover, Good, HSG C
	38,889	87	Weighted Average
	18,276		47.00% Pervious Area
	20,613		53.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
1.8	198	0.0680	1.83		**Shallow Concentrated Flow, SCF 198 FT** Short Grass Pasture Kv= 7.0 fps
1.2	256	0.0300	3.52		**Shallow Concentrated Flow, SCF 256 FT** Paved Kv= 20.3 fps
9.5	504	Total			

Subcatchment PWS-6: PWS-6 W Main drive (blue)



Summary for Subcatchment PWS-7: PWS-7 E Baseball & Wetland Tributary (orange)

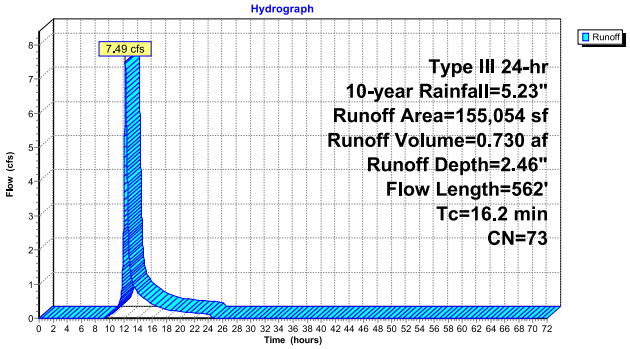
Runoff = 7.49 cfs @ 12.22 hrs, Volume= 0.730 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

	Area (sf)	CN	Description
	1,497	98	Paved parking, HSG C
	80,421	74	>75% Grass cover, Good, HSG C
	67,324	70	Woods, Good, HSG C
	5,812	87	Dirt roads, HSG C
	155,054	73	Weighted Average
	153,557		99.03% Pervious Area
	1,497		0.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
7.3	258	0.0070	0.59		**Shallow Concentrated Flow, SCF 258 FT** Short Grass Pasture Kv= 7.0 fps
2.4	254	0.1230	1.75		**Shallow Concentrated Flow, SCF 254 FT** Woodland Kv= 5.0 fps
16.2	562	Total			

Subcatchment PWS-7: PWS-7 E Baseball & Wetland Tributary (orange)



Summary for Subcatchment PWS-8: PWS-8 W Baseball & Wetland Tributary (magenta)

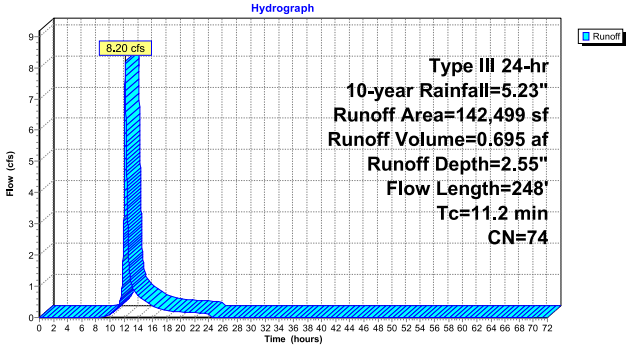
Runoff = 8.20 cfs @ 12.16 hrs, Volume= 0.695 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
6,188	98	Paved parking, HSG C
63,139	74	>75% Grass cover, Good, HSG C
67,878	70	Woods, Good, HSG C
5,294	87	Dirt roads, HSG C
142,499	74	Weighted Average
136,311		95.66% Pervious Area
6,188		4.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
4.7	198	0.0100	0.70		**Shallow Concentrated Flow, SCF 198 FT** Short Grass Pasture Kv= 7.0 fps
11.2	248	Total			

Subcatchment PWS-8: PWS-8 W Baseball & Wetland Tributary (magenta)



Summary for Subcatchment PWS-9: PWS-9 W Parking & SW football field

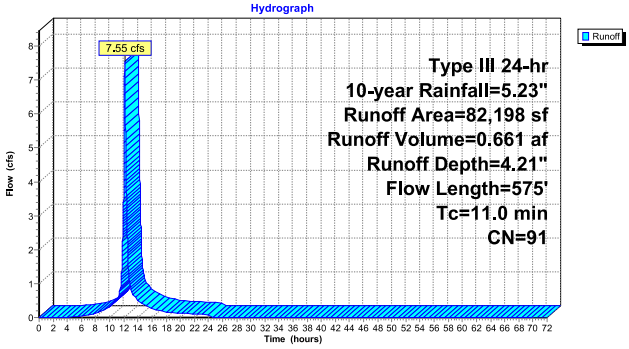
Runoff = 7.55 cfs @ 12.15 hrs, Volume= 0.661 af, Depth= 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.23"

Area (sf)	CN	Description
59,027	98	Paved parking, HSG C
23,171	74	>75% Grass cover, Good, HSG C
82,198	91	Weighted Average
23,171		28.19% Pervious Area
59,027		71.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0110	0.12		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.9	120	0.1090	2.31		**Shallow Concentrated Flow, SCF 120 FT** Short Grass Pasture Kv= 7.0 fps
3.0	405	0.0120	2.22		**Shallow Concentrated Flow, SCF 405 FT** Paved Kv= 20.3 fps
11.0	575	Total			

Subcatchment PWS-9: PWS-9 W Parking & SW football field



Summary for Pond BMP-1: BMP-1

Inflow Area = 4.377 ac, 82.91% Impervious, Inflow Depth = 4.54" for 10-year event
Inflow = 21.57 cfs @ 12.08 hrs, Volume= 1.654 af
Outflow = 7.84 cfs @ 12.33 hrs, Volume= 1.653 af, Atten= 64%, Lag= 15.0 min
Primary = 7.84 cfs @ 12.33 hrs, Volume= 1.653 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 373.72' @ 12.33 hrs Surf.Area= 9,552 sf Storage= 19,565 cf

Plug-Flow detention time= 67.7 min calculated for 1.653 af (100% of inflow)
Center-of-Mass det. time= 67.5 min (839.7 - 772.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	371.33'	0 cf	**48.27'W x 197.88'L x 4.67'H Field A** 44,574 cf Overall - 44,574 cf Embedded = 0 cf x 40.0% Voids
#2A	371.33'	32,781 cf	**StormTrap ST1 SingleTrap 4-0** x 98 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 98 Chambers in 7 Rows 48.27' x 196.88' Core + 0.00' x 0.50' Border = 48.27' x 197.88' System
		32,781 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	371.33'	**21.0" Round Culvert** L= 163.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 371.33' / 370.51' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 2.41 sf
#2	Device 1	371.33'	**15.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	374.83'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=7.84 cfs @ 12.33 hrs HW=373.72' (Free Discharge)
└**1=Culvert** (Passes 7.84 cfs of 11.76 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 7.84 cfs @ 6.39 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond BMP-1: BMP-1 - Chamber Wizard Field A

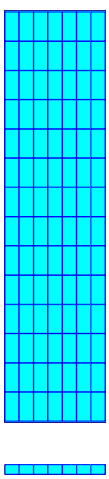
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

14 Chambers/Row x 14.06' Long = 196.88' Row Length +6.0" Border x 2 = 197.88' Base Length
7 Rows x 82.7" Wide = 48.27' Base Width
56.0" Chamber Height = 4.67' Field Height

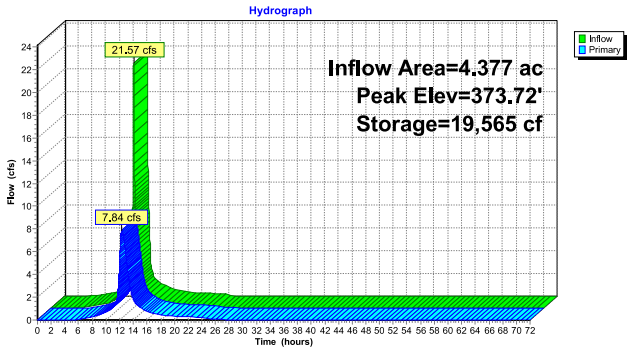
98 Chambers x 334.5 cf = 32,781.1 cf Chamber Storage
98 Chambers x 452.5 cf + 225.3 cf Border = 44,574.1 cf Displacement

Chamber Storage = 32,781.1 cf = 0.753 af
Overall Storage Efficiency = 73.5%
Overall System Size = 197.88' x 48.27' x 4.67'

98 Chambers (plus border)
1,650.9 cy Field



Pond BMP-1: BMP-1



Summary for Pond BMP-2: BMP-2

Inflow Area = 3.086 ac,100.00% Impervious, Inflow Depth = 4.99" for 10-year event
Inflow = 15.58 cfs @ 12.09 hrs, Volume= 1.284 af
Outflow = 8.54 cfs @ 12.21 hrs, Volume= 1.284 af, Atten= 45%, Lag= 7.5 min
Primary = 8.54 cfs @ 12.21 hrs, Volume= 1.284 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 374.41' @ 12.21 hrs Surf.Area= 4,114 sf Storage= 9,049 cf

Plug-Flow detention time= 30.6 min calculated for 1.284 af (100% of inflow)
Center-of-Mass det. time= 30.5 min (778.2 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	371.83'	0 cf	**41.38'W x 99.44'L x 4.67'H Field A** 19,200 cf Overall - 19,200 cf Embedded = 0 cf x 40.0% Voids
#2A	371.83'	14,049 cf	**StormTrap ST1 SingleTrap 4-0** x 42 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 42 Chambers in 6 Rows 41.38' x 98.44' Core + 0.00' x 0.50' Border = 41.38' x 99.44' System
		14,049 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	371.83'	**18.0" Round Culvert** L= 83.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 371.83' / 370.58' S= 0.0151 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	371.83'	**15.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	374.33'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=8.53 cfs @ 12.21 hrs HW=374.41' (Free Discharge)
└**1=Culvert** (Passes 8.53 cfs of 11.50 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 8.25 cfs @ 6.73 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.27 cfs @ 0.90 fps)

Pond BMP-2: BMP-2 - Chamber Wizard Field A

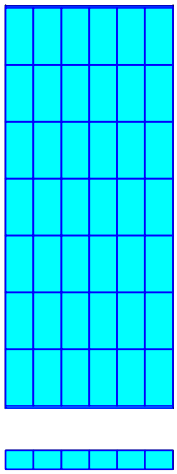
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

7 Chambers/Row x 14.06' Long = 98.44' Row Length +6.0" Border x 2 = 99.44' Base Length
6 Rows x 82.7" Wide = 41.38' Base Width
56.0" Chamber Height = 4.67' Field Height

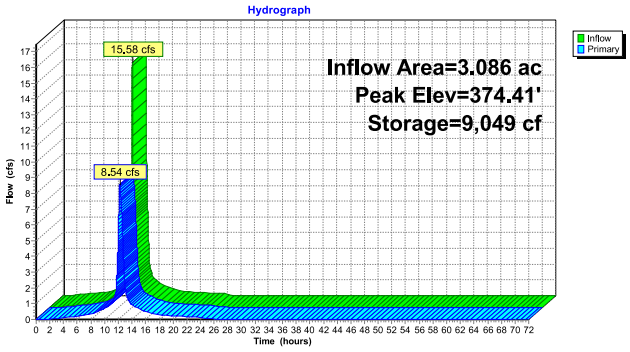
42 Chambers x 334.5 cf = 14,049.1 cf Chamber Storage
42 Chambers x 452.5 cf + 193.1 cf Border = 19,199.7 cf Displacement

Chamber Storage = 14,049.1 cf = 0.323 af
Overall Storage Efficiency = 73.2%
Overall System Size = 99.44' x 41.38' x 4.67'

42 Chambers (plus border)
711.1 cy Field



Pond BMP-2: BMP-2



Summary for Pond BMP-3: BMP-3

Inflow Area = 2.984 ac, 73.32% Impervious, Inflow Depth = 4.31" for 10-year event
Inflow = 14.28 cfs @ 12.08 hrs, Volume= 1.073 af
Outflow = 5.36 cfs @ 12.33 hrs, Volume= 1.072 af, Atten= 62%, Lag= 14.4 min
Discarded = 0.06 cfs @ 6.21 hrs, Volume= 0.320 af
Primary = 5.30 cfs @ 12.33 hrs, Volume= 0.753 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 359.43' @ 12.33 hrs Surf.Area= 9,575 sf Storage= 19,981 cf

Plug-Flow detention time= 493.4 min calculated for 1.072 af (100% of inflow)
Center-of-Mass det. time= 493.3 min (1,274.6 - 781.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	356.50'	13,229 cf	**58.58'W x 163.44'L x 5.50'H Field A** 52,662 cf Overall - 19,590 cf Embedded = 33,072 cf x 40.0% Voids
#2A	357.25'	19,590 cf	**ADS_StormTech MC-3500 d +Cap** x 176 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 176 Chambers in 8 Rows Cap Storage= +14.9 cf x 2 x 8 rows = 238.4 cf
		32,819 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	**15.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 358.00' / 357.25' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Discarded	356.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 6.21 hrs HW=356.56' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=5.30 cfs @ 12.33 hrs HW=359.43' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.30 cfs @ 4.32 fps)

Pond BMP-3: BMP-3 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 8 rows = 238.4 cf

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

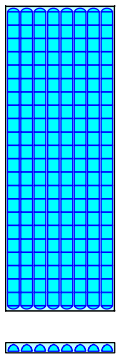
22 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 161.44' Row Length +12.0" End Stone x 2 = 163.44' Base Length
8 Rows x 77.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 58.58' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

176 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 8 Rows = 19,589.9 cf Chamber Storage

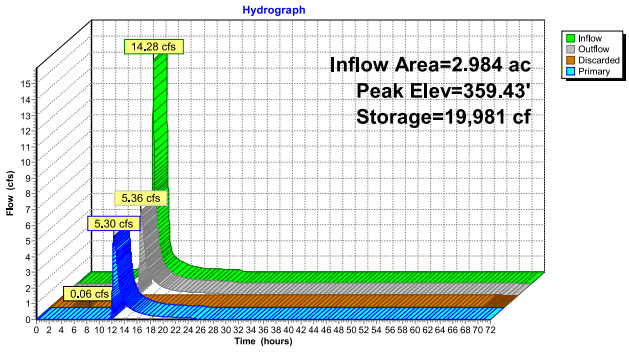
52,661.7 cf Field - 19,589.9 cf Chambers = 33,071.8 cf Stone x 40.0% Voids = 13,228.7 cf Stone Storage

Chamber Storage + Stone Storage = 32,818.7 cf = 0.753 af
Overall Storage Efficiency = 62.3%
Overall System Size = 163.44' x 58.58' x 5.50'

176 Chambers
1,950.4 cy Field
1,224.9 cy Stone



Pond BMP-3: BMP-3



Summary for Pond BMP-4: BMP-4

Inflow Area = 5.298 ac, 59.24% Impervious, Inflow Depth = 3.93" for 10-year event
Inflow = 19.30 cfs @ 12.16 hrs, Volume= 1.737 af
Outflow = 17.81 cfs @ 12.22 hrs, Volume= 1.603 af, Atten= 8%, Lag= 3.2 min
Discarded = 0.04 cfs @ 6.29 hrs, Volume= 0.227 af
Primary = 17.77 cfs @ 12.22 hrs, Volume= 1.376 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 340.03' @ 12.22 hrs Surf.Area= 6,598 sf Storage= 18,498 cf

Plug-Flow detention time= 292.4 min calculated for 1.603 af (92% of inflow)
Center-of-Mass det. time= 252.8 min (1,052.7 - 800.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	336.00'	9,166 cf	**44.25'W x 149.10'L x 5.50'H Field A** 36,287 cf Overall - 13,373 cf Embedded = 22,914 cf x 40.0% Voids
#2A	336.75'	13,373 cf	**ADS_StormTech MC-3500 d +Cap** x 120 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 120 Chambers in 6 Rows Cap Storage= +14.9 cf x 2 x 6 rows = 178.8 cf
		22,539 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	336.75'	**24.0" Round Culvert** L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 336.75' / 336.46' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	338.75'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	336.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 6.29 hrs HW=336.06' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=17.75 cfs @ 12.22 hrs HW=340.03' (Free Discharge)
└**1=Culvert** (Passes 17.75 cfs of 22.85 cfs potential flow)
└**2=Sharp-Crested Rectangular Weir** (Weir Controls 17.75 cfs @ 3.70 fps)

Pond BMP-4: BMP-4 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 6 rows = 178.8 cf

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

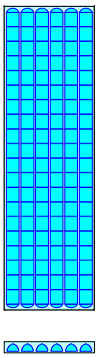
20 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 147.10' Row Length +12.0" End Stone x 2 = 149.10' Base Length
6 Rows x 77.0" Wide + 9.0" Spacing x 5 + 12.0" Side Stone x 2 = 44.25' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

120 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 6 Rows = 13,373.0 cf Chamber Storage

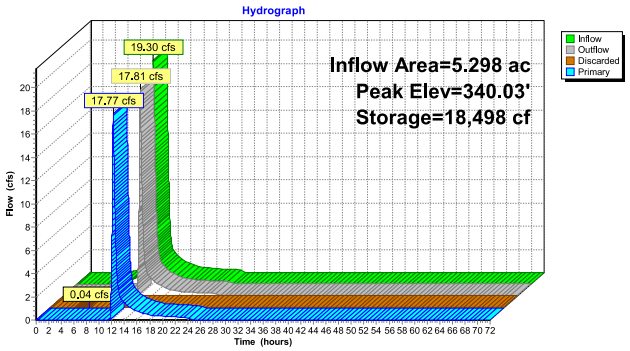
36,287.2 cf Field - 13,373.0 cf Chambers = 22,914.2 cf Stone x 40.0% Voids = 9,165.7 cf Stone Storage

Chamber Storage + Stone Storage = 22,538.7 cf = 0.517 af
Overall Storage Efficiency = 62.1%
Overall System Size = 149.10' x 44.25' x 5.50'

120 Chambers
1,344.0 cy Field
848.7 cy Stone



Pond BMP-4: BMP-4

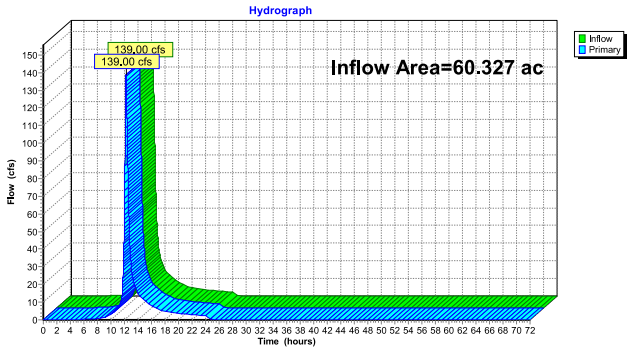


Summary for Link POA: POA

Inflow Area = 60.327 ac, 28.70% Impervious, Inflow Depth = 2.99" for 10-year event
Inflow = 139.00 cfs @ 12.22 hrs, Volume= 15.041 af
Primary = 139.00 cfs @ 12.22 hrs, Volume= 15.041 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA: POA

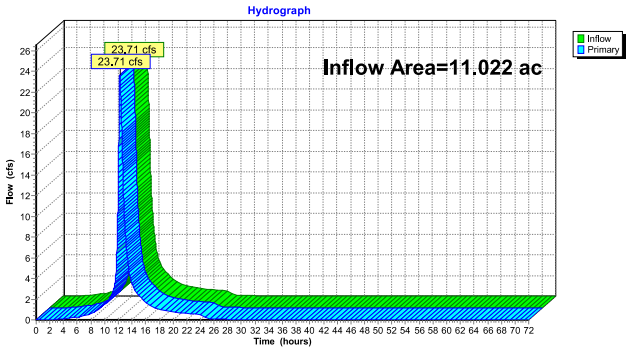


Summary for Link POA-1: POA-1-S Wetland

Inflow Area = 11.022 ac, 61.23% Impervious, Inflow Depth = 3.99" for 10-year event
Inflow = 23.71 cfs @ 12.22 hrs, Volume= 3.668 af
Primary = 23.71 cfs @ 12.22 hrs, Volume= 3.668 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-1: POA-1-S Wetland

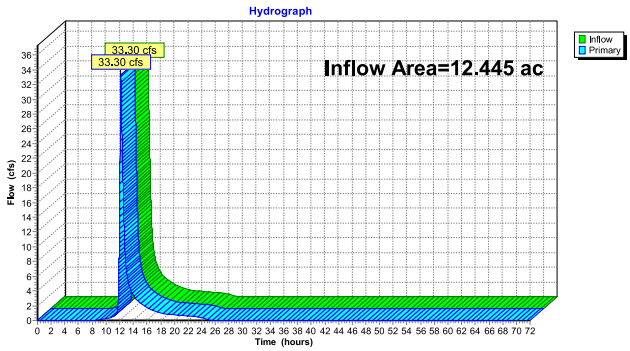


Summary for Link POA-2: POA-2-SW Wetland

Inflow Area = 12.445 ac, 47.74% Impervious, Inflow Depth = 2.99" for 10-year event
Inflow = 33.30 cfs @ 12.19 hrs, Volume= 3.105 af
Primary = 33.30 cfs @ 12.19 hrs, Volume= 3.105 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-2: POA-2-SW Wetland

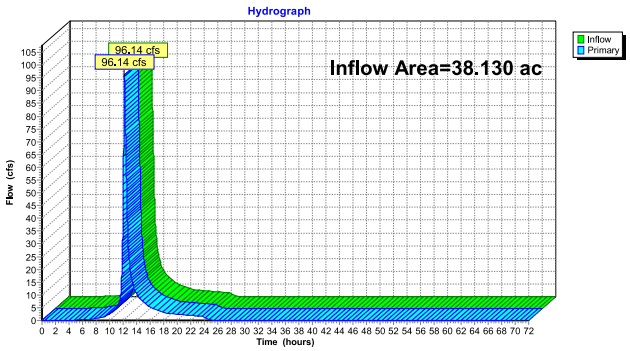


Summary for Link POA-3: POA-3

Inflow Area = 38.130 ac, 39.17% Impervious, Inflow Depth = 3.25" for 10-year event
Inflow = 96.14 cfs @ 12.19 hrs, Volume= 10.326 af
Primary = 96.14 cfs @ 12.19 hrs, Volume= 10.326 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-3: POA-3



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PWS-1: PWS-1 N Bldg & Runoff Area=190,648 sf 82.91% Impervious Runoff Depth=5.69"
Tc=6.0 min CN=94 Runoff=26.74 cfs 2.076 af

Subcatchment PWS-10: PWS-10 Offsite (moss) Runoff Area=966,901 sf 10.71% Impervious Runoff Depth=3.52"
Flow Length=514' Tc=18.8 min CN=74 Runoff=63.51 cfs 6.519 af

Subcatchment PWS-2: PWS-2 S Bldg & Runoff Area=134,413 sf 100.00% Impervious Runoff Depth=6.16"
Flow Length=144' Tc=6.4 min CN=98 Runoff=19.10 cfs 1.584 af

Subcatchment PWS-3: PWS-3 Central Parking Runoff Area=129,963 sf 73.32% Impervious Runoff Depth=5.46"
Tc=6.0 min CN=92 Runoff=17.84 cfs 1.358 af

Subcatchment PWS-4: PWS-4 W Parking & S Runoff Area=148,576 sf 52.28% Impervious Runoff Depth=4.90"
Flow Length=575' Tc=13.0 min CN=87 Runoff=15.22 cfs 1.393 af

Subcatchment PWS-5: PWS-5 Play Fields Runoff Area=638,715 sf 15.31% Impervious Runoff Depth=3.93"
Flow Length=564' Tc=13.3 min CN=78 Runoff=53.48 cfs 4.807 af

Subcatchment PWS-6: PWS-6 W Main drive Runoff Area=38,889 sf 53.00% Impervious Runoff Depth=4.90"
Flow Length=504' Tc=9.5 min CN=87 Runoff=4.42 cfs 0.365 af

Subcatchment PWS-7: PWS-7 E Baseball & Runoff Area=155,054 sf 0.97% Impervious Runoff Depth=3.42"
Flow Length=562' Tc=16.2 min CN=73 Runoff=10.50 cfs 1.015 af

Subcatchment PWS-8: PWS-8 W Baseball & Runoff Area=142,499 sf 4.34% Impervious Runoff Depth=3.52"
Flow Length=248' Tc=11.2 min CN=74 Runoff=11.38 cfs 0.961 af

Subcatchment PWS-9: PWS-9 W Parking & SW Runoff Area=82,198 sf 71.81% Impervious Runoff Depth=5.35"
Flow Length=575' Tc=11.0 min CN=91 Runoff=9.47 cfs 0.841 af

Pond BMP-1: BMP-1 Peak Elev=374.33' Storage=24,571 cf Inflow=26.74 cfs 2.076 af
Outflow=9.10 cfs 2.076 af

Pond BMP-2: BMP-2 Peak Elev=374.80' Storage=10,426 cf Inflow=19.10 cfs 1.584 af
Outflow=12.67 cfs 1.584 af

Pond BMP-3: BMP-3 Peak Elev=360.02' Storage=23,936 cf Inflow=17.84 cfs 1.358 af
Discarded=0.06 cfs 0.325 af Primary=6.73 cfs 1.033 af Outflow=6.79 cfs 1.358 af

Pond BMP-4: BMP-4 Peak Elev=340.30' Storage=19,336 cf Inflow=24.54 cfs 2.234 af
Discarded=0.04 cfs 0.229 af Primary=23.21 cfs 1.870 af Outflow=23.25 cfs 2.100 af

Link POA: POA Inflow=188.35 cfs 20.230 af
Primary=188.35 cfs 20.230 af

Link POA-1: POA-1-S Wetland Inflow=31.78 cfs 4.676 af
Primary=31.78 cfs 4.676 af

Link POA-2: POA-2-SW Wetland Inflow=44.28 cfs 4.229 af
Primary=44.28 cfs 4.229 af

Link POA-3: POA-3 Inflow=129.28 cfs 13.712 af
Primary=129.28 cfs 13.712 af

Total Runoff Area = 60.327 ac Runoff Volume = 20.920 af Average Runoff Depth = 4.16"
71.30% Pervious = 43.014 ac 28.70% Impervious = 17.313 ac

Summary for Subcatchment PWS-1: PWS-1 N Bldg & Loading (green)

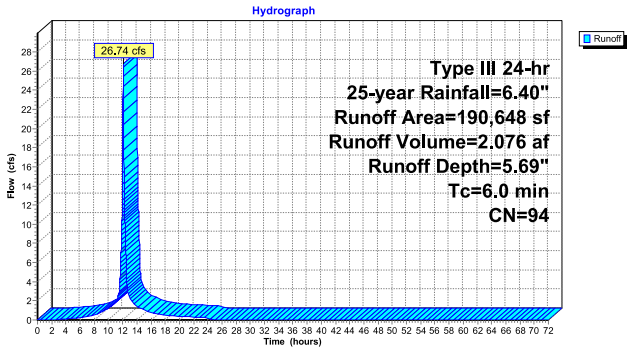
Runoff = 26.74 cfs @ 12.08 hrs, Volume= 2.076 af, Depth= 5.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
158,071	98	Paved parking, HSG C
32,577	74	>75% Grass cover, Good, HSG C
190,648	94	Weighted Average
32,577		17.09% Pervious Area
158,071		82.91% Impervious Area

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

Subcatchment PWS-1: PWS-1 N Bldg & Loading (green)



Summary for Subcatchment PWS-10: PWS-10 Offsite (moss)

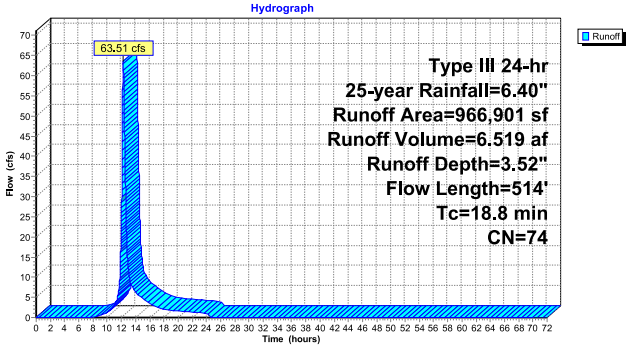
Runoff = 63.51 cfs @ 12.26 hrs, Volume= 6.519 af, Depth= 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
*	103,577	98	Paved parking & bldg, HSG C
	90,398	74	>75% Grass cover, Good, HSG C
	765,125	70	Woods, Good, HSG C
	7,801	87	Dirt roads, HSG C
	966,901	74	Weighted Average
	863,324		89.29% Pervious Area
	103,577		10.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
5.0	414	0.0760	1.38		**Shallow Concentrated Flow, SCF 414 FT WOODS** Woodland Kv= 5.0 fps
18.8	514	Total			

Subcatchment PWS-10: PWS-10 Offsite (moss)



Summary for Subcatchment PWS-2: PWS-2 S Bldg & Parking (yellow)

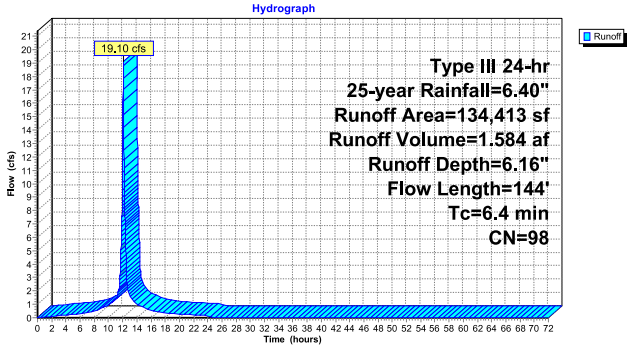
Runoff = 19.10 cfs @ 12.09 hrs, Volume= 1.584 af, Depth= 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
	103,259	98	Paved parking, HSG C
*	31,154	98	>75% Grass cover, Good, HSG C
	134,413	98	Weighted Average
	134,413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0250	0.16		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.6	41	0.0250	1.11		**Shallow Concentrated Flow, SCF 41 FT** Short Grass Pasture Kv= 7.0 fps
0.7	53	0.0038	1.25		**Shallow Concentrated Flow, SCF 53 FT** Paved Kv= 20.3 fps
6.4	144	Total			

Subcatchment PWS-2: PWS-2 S Bldg & Parking (yellow)



Summary for Subcatchment PWS-3: PWS-3 Central Parking (red)

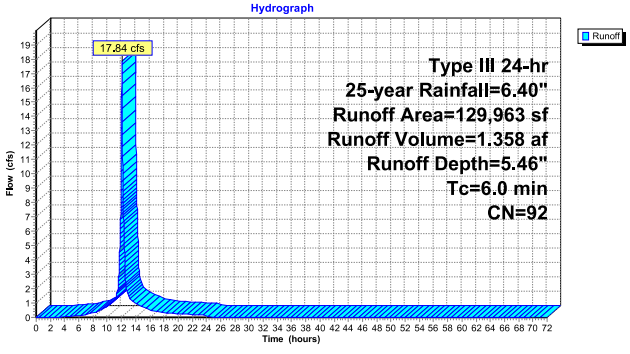
Runoff = 17.84 cfs @ 12.08 hrs, Volume= 1.358 af, Depth= 5.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
*	95,293	98	Paved parking & bldg, HSG C
	34,670	74	>75% Grass cover, Good, HSG C
	129,963	92	Weighted Average
	34,670		26.68% Pervious Area
	95,293		73.32% Impervious Area

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

Subcatchment PWS-3: PWS-3 Central Parking (red)



Summary for Subcatchment PWS-4: PWS-4 W Parking & S Play Fields (cyan)

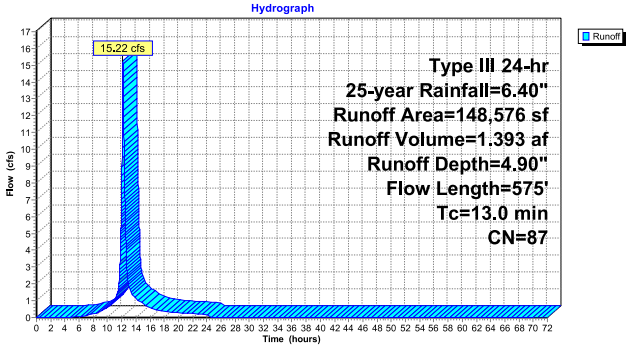
Runoff = 15.22 cfs @ 12.17 hrs, Volume= 1.393 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
*	77,679	98	Paved parking & bldg, HSG C
	70,897	74	>75% Grass cover, Good, HSG C
	148,576	87	Weighted Average
	70,897		47.72% Pervious Area
	77,679		52.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0060	0.09		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.9	120	0.1090	2.31		**Shallow Concentrated Flow, SCF 120 FT** Short Grass Pasture Kv= 7.0 fps
3.0	405	0.0120	2.22		**Shallow Concentrated Flow, SCF 405 FT** Paved Kv= 20.3 fps
13.0	575	Total			

Subcatchment PWS-4: PWS-4 W Parking & S Play Fields (cyan)



Summary for Subcatchment PWS-5: PWS-5 Play Fields (purple)

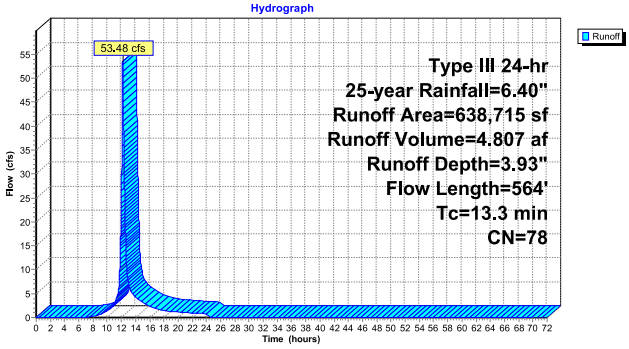
Runoff = 53.48 cfs @ 12.18 hrs, Volume= 4.807 af, Depth= 3.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
*	97,804	98	Paved parking & bldg, HSG C
	460,660	74	>75% Grass cover, Good, HSG C
	65,535	70	Woods, Good, HSG C
	14,716	87	Dirt roads, HSG C
	638,715	78	Weighted Average
	540,911		84.69% Pervious Area
	97,804		15.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0120	0.12		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.20"
6.4	514	0.0370	1.35		**Shallow Concentrated Flow, SHALLOW** Short Grass Pasture Kv= 7.0 fps
13.3	564	Total			

Subcatchment PWS-5: PWS-5 Play Fields (purple)



Summary for Subcatchment PWS-6: PWS-6 W Main drive (blue)

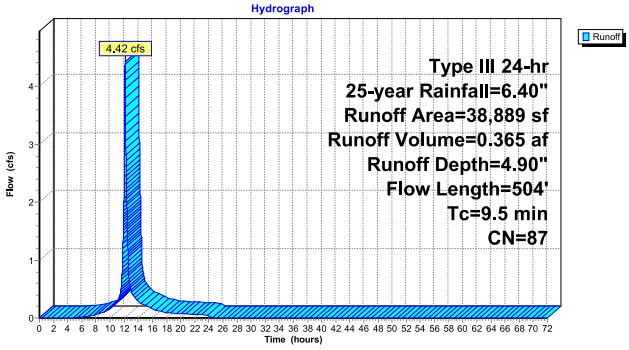
Runoff = 4.42 cfs @ 12.13 hrs, Volume= 0.365 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
	20,613	98	Paved parking, HSG C
	18,276	74	>75% Grass cover, Good, HSG C
	38,889	87	Weighted Average
	18,276		47.00% Pervious Area
	20,613		53.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
1.8	198	0.0680	1.83		**Shallow Concentrated Flow, SCF 198 FT** Short Grass Pasture Kv= 7.0 fps
1.2	256	0.0300	3.52		**Shallow Concentrated Flow, SCF 256 FT** Paved Kv= 20.3 fps
9.5	504	Total			

Subcatchment PWS-6: PWS-6 W Main drive (blue)



Summary for Subcatchment PWS-7: PWS-7 E Baseball & Wetland Tributary (orange)

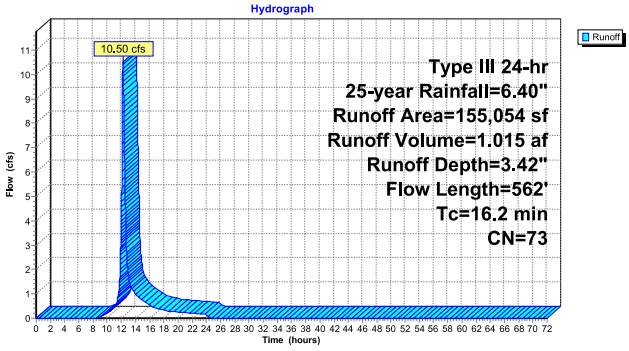
Runoff = 10.50 cfs @ 12.22 hrs, Volume= 1.015 af, Depth= 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

	Area (sf)	CN	Description
	1,497	98	Paved parking, HSG C
	80,421	74	>75% Grass cover, Good, HSG C
	67,324	70	Woods, Good, HSG C
	5,812	87	Dirt roads, HSG C
	155,054	73	Weighted Average
	153,557		99.03% Pervious Area
	1,497		0.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
7.3	258	0.0070	0.59		**Shallow Concentrated Flow, SCF 258 FT** Short Grass Pasture Kv= 7.0 fps
2.4	254	0.1230	1.75		**Shallow Concentrated Flow, SCF 254 FT** Woodland Kv= 5.0 fps
16.2	562	Total			

Subcatchment PWS-7: PWS-7 E Baseball & Wetland Tributary (orange)



Summary for Subcatchment PWS-8: PWS-8 W Baseball & Wetland Tributary (magenta)

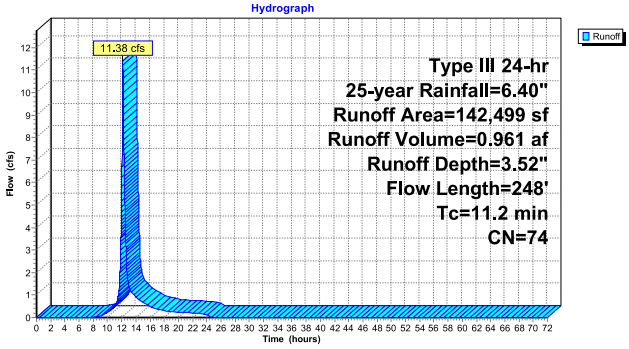
Runoff = 11.38 cfs @ 12.16 hrs, Volume= 0.961 af, Depth= 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
6,188	98	Paved parking, HSG C
63,139	74	>75% Grass cover, Good, HSG C
67,878	70	Woods, Good, HSG C
5,294	87	Dirt roads, HSG C
142,499	74	Weighted Average
136,311		95.66% Pervious Area
6,188		4.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
4.7	198	0.0100	0.70		**Shallow Concentrated Flow, SCF 198 FT** Short Grass Pasture Kv= 7.0 fps
11.2	248	Total			

Subcatchment PWS-8: PWS-8 W Baseball & Wetland Tributary (magenta)



Summary for Subcatchment PWS-9: PWS-9 W Parking & SW football field

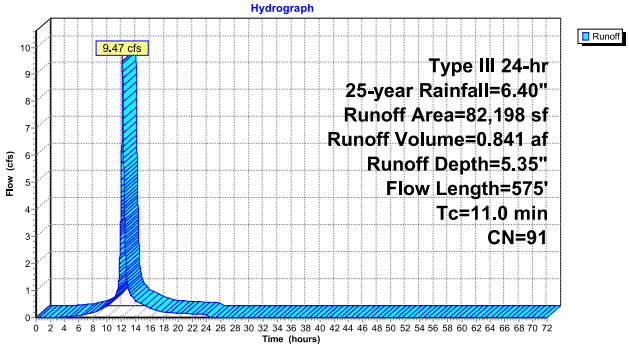
Runoff = 9.47 cfs @ 12.15 hrs, Volume= 0.841 af, Depth= 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.40"

Area (sf)	CN	Description
59,027	98	Paved parking, HSG C
23,171	74	>75% Grass cover, Good, HSG C
82,198	91	Weighted Average
23,171		28.19% Pervious Area
59,027		71.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0110	0.12		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.9	120	0.1090	2.31		**Shallow Concentrated Flow, SCF 120 FT** Short Grass Pasture Kv= 7.0 fps
3.0	405	0.0120	2.22		**Shallow Concentrated Flow, SCF 405 FT** Paved Kv= 20.3 fps
11.0	575	Total			

Subcatchment PWS-9: PWS-9 W Parking & SW football field



Summary for Pond BMP-1: BMP-1

Inflow Area = 4.377 ac, 82.91% Impervious, Inflow Depth = 5.69" for 25-year event
Inflow = 26.74 cfs @ 12.08 hrs, Volume= 2.076 af
Outflow = 9.10 cfs @ 12.36 hrs, Volume= 2.076 af, Atten= 66%, Lag= 16.3 min
Primary = 9.10 cfs @ 12.36 hrs, Volume= 2.076 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 374.33' @ 12.36 hrs Surf.Area= 9,552 sf Storage= 24,571 cf

Plug-Flow detention time= 63.0 min calculated for 2.075 af (100% of inflow)
Center-of-Mass det. time= 63.2 min (830.0 - 766.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	371.33'	0 cf	**48.27'W x 197.88'L x 4.67'H Field A** 44,574 cf Overall - 44,574 cf Embedded = 0 cf x 40.0% Voids
#2A	371.33'	32,781 cf	**StormTrap ST1 SingleTrap 4-0** x 98 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 98 Chambers in 7 Rows 48.27' x 196.88' Core + 0.00' x 0.50' Border = 48.27' x 197.88' System
		32,781 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	371.33'	**21.0" Round Culvert** L= 163.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 371.33' / 370.51' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 2.41 sf
#2	Device 1	371.33'	**15.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	374.83'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=9.10 cfs @ 12.36 hrs HW=374.33' (Free Discharge)
└**1=Culvert** (Passes 9.10 cfs of 14.01 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 9.10 cfs @ 7.42 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond BMP-1: BMP-1 - Chamber Wizard Field A

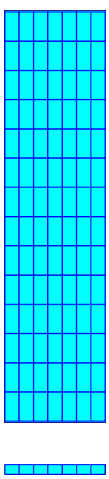
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

14 Chambers/Row x 14.06' Long = 196.88' Row Length +6.0" Border x 2 = 197.88' Base Length
7 Rows x 82.7" Wide = 48.27' Base Width
56.0" Chamber Height = 4.67' Field Height

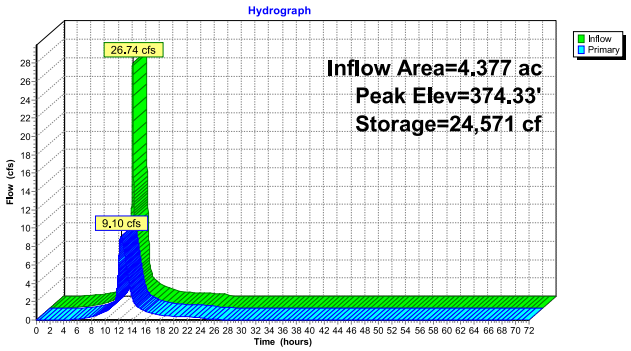
98 Chambers x 334.5 cf = 32,781.1 cf Chamber Storage
98 Chambers x 452.5 cf + 225.3 cf Border = 44,574.1 cf Displacement

Chamber Storage = 32,781.1 cf = 0.753 af
Overall Storage Efficiency = 73.5%
Overall System Size = 197.88' x 48.27' x 4.67'

98 Chambers (plus border)
1,650.9 cy Field



Pond BMP-1: BMP-1



Summary for Pond BMP-2: BMP-2

Inflow Area = 3.086 ac,100.00% Impervious, Inflow Depth = 6.16" for 25-year event
Inflow = 19.10 cfs @ 12.09 hrs, Volume= 1.584 af
Outflow = 12.67 cfs @ 12.18 hrs, Volume= 1.584 af, Atten= 34%, Lag= 5.4 min
Primary = 12.67 cfs @ 12.18 hrs, Volume= 1.584 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 374.80' @ 12.18 hrs Surf.Area= 4,114 sf Storage= 10,426 cf

Plug-Flow detention time= 28.2 min calculated for 1.584 af (100% of inflow)
Center-of-Mass det. time= 28.1 min (772.6 - 744.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	371.83'	0 cf	**41.38'W x 99.44'L x 4.67'H Field A** 19,200 cf Overall - 19,200 cf Embedded = 0 cf x 40.0% Voids
#2A	371.83'	14,049 cf	**StormTrap ST1 SingleTrap 4-0** x 42 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 42 Chambers in 6 Rows 41.38' x 98.44' Core + 0.00' x 0.50' Border = 41.38' x 99.44' System
		14,049 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	371.83'	**18.0" Round Culvert** L= 83.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 371.83' / 370.58' S= 0.0151 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	371.83'	**15.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	374.33'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=12.67 cfs @ 12.18 hrs HW=374.80' (Free Discharge)
↑**1=Culvert** (Inlet Controls 12.67 cfs @ 7.17 fps)
↑**2=Orifice/Grate** (Passes < 9.04 cfs potential flow)
↑**3=Sharp-Crested Rectangular Weir** (Passes < 4.09 cfs potential flow)

Pond BMP-2: BMP-2 - Chamber Wizard Field A

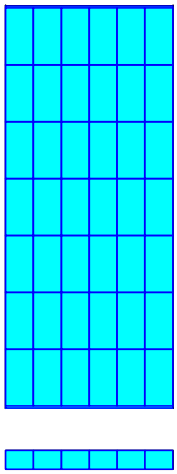
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

7 Chambers/Row x 14.06' Long = 98.44' Row Length +6.0" Border x 2 = 99.44' Base Length
6 Rows x 82.7" Wide = 41.38' Base Width
56.0" Chamber Height = 4.67' Field Height

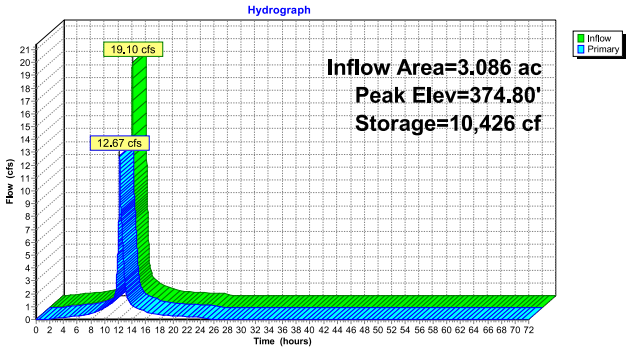
42 Chambers x 334.5 cf = 14,049.1 cf Chamber Storage
42 Chambers x 452.5 cf + 193.1 cf Border = 19,199.7 cf Displacement

Chamber Storage = 14,049.1 cf = 0.323 af
Overall Storage Efficiency = 73.2%
Overall System Size = 99.44' x 41.38' x 4.67'

42 Chambers (plus border)
711.1 cy Field



Pond BMP-2: BMP-2



Summary for Pond BMP-3: BMP-3

Inflow Area = 2.984 ac, 73.32% Impervious, Inflow Depth = 5.46" for 25-year event
Inflow = 17.84 cfs @ 12.08 hrs, Volume= 1.358 af
Outflow = 6.79 cfs @ 12.32 hrs, Volume= 1.358 af, Atten= 62%, Lag= 14.0 min
Discarded = 0.06 cfs @ 5.23 hrs, Volume= 0.325 af
Primary = 6.73 cfs @ 12.32 hrs, Volume= 1.033 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 360.02' @ 12.32 hrs Surf.Area= 9,575 sf Storage= 23,936 cf

Plug-Flow detention time= 407.2 min calculated for 1.358 af (100% of inflow)
Center-of-Mass det. time= 407.1 min (1,182.4 - 775.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	356.50'	13,229 cf	**58.58'W x 163.44'L x 5.50'H Field A** 52,662 cf Overall - 19,590 cf Embedded = 33,072 cf x 40.0% Voids
#2A	357.25'	19,590 cf	**ADS_StormTech MC-3500 d +Cap** x 176 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 176 Chambers in 8 Rows Cap Storage= +14.9 cf x 2 x 8 rows = 238.4 cf
		32,819 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	**15.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 358.00' / 357.25' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Discarded	356.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 5.23 hrs HW=356.56' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=6.73 cfs @ 12.32 hrs HW=360.02' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.73 cfs @ 5.48 fps)

Pond BMP-3: BMP-3 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 8 rows = 238.4 cf

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

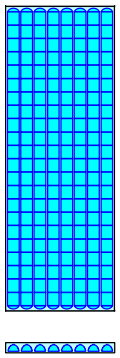
22 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 161.44' Row Length +12.0" End Stone x 2 = 163.44' Base Length
8 Rows x 77.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 58.58' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

176 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 8 Rows = 19,589.9 cf Chamber Storage

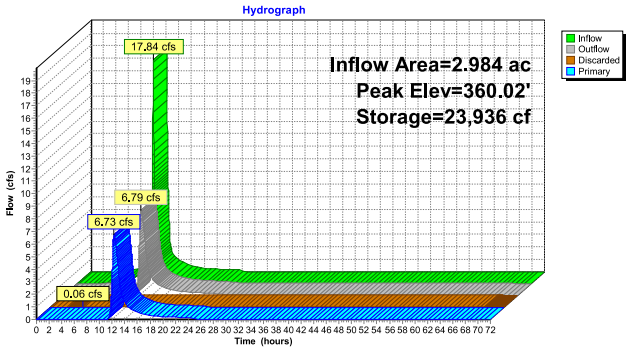
52,661.7 cf Field - 19,589.9 cf Chambers = 33,071.8 cf Stone x 40.0% Voids = 13,228.7 cf Stone Storage

Chamber Storage + Stone Storage = 32,818.7 cf = 0.753 af
Overall Storage Efficiency = 62.3%
Overall System Size = 163.44' x 58.58' x 5.50'

176 Chambers
1,950.4 cy Field
1,224.9 cy Stone



Pond BMP-3: BMP-3



Summary for Pond BMP-4: BMP-4

Inflow Area = 5.298 ac, 59.24% Impervious, Inflow Depth = 5.06" for 25-year event
Inflow = 24.54 cfs @ 12.16 hrs, Volume= 2.234 af
Outflow = 23.25 cfs @ 12.20 hrs, Volume= 2.100 af, Atten= 5%, Lag= 2.5 min
Discarded = 0.04 cfs @ 5.37 hrs, Volume= 0.229 af
Primary = 23.21 cfs @ 12.20 hrs, Volume= 1.870 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 340.30' @ 12.20 hrs Surf.Area= 6,598 sf Storage= 19,336 cf

Plug-Flow detention time= 233.2 min calculated for 2.100 af (94% of inflow)
Center-of-Mass det. time= 200.3 min (993.5 - 793.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	336.00'	9,166 cf	**44.25'W x 149.10'L x 5.50'H Field A** 36,287 cf Overall - 13,373 cf Embedded = 22,914 cf x 40.0% Voids
#2A	336.75'	13,373 cf	**ADS_StormTech MC-3500 d +Cap** x 120 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 120 Chambers in 6 Rows Cap Storage= +14.9 cf x 2 x 6 rows = 178.8 cf
		22,539 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	336.75'	**24.0" Round Culvert** L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 336.75' / 336.46' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	338.75'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	336.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 5.37 hrs HW=336.06' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=23.19 cfs @ 12.20 hrs HW=340.30' (Free Discharge)
└**1=Culvert** (Passes 23.19 cfs of 24.13 cfs potential flow)
└**2=Sharp-Crested Rectangular Weir** (Weir Controls 23.19 cfs @ 4.07 fps)

Pond BMP-4: BMP-4 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 6 rows = 178.8 cf

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

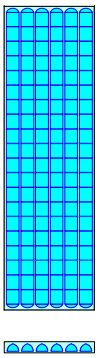
20 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 147.10' Row Length +12.0" End Stone x 2 = 149.10' Base Length
6 Rows x 77.0" Wide + 9.0" Spacing x 5 + 12.0" Side Stone x 2 = 44.25' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

120 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 6 Rows = 13,373.0 cf Chamber Storage

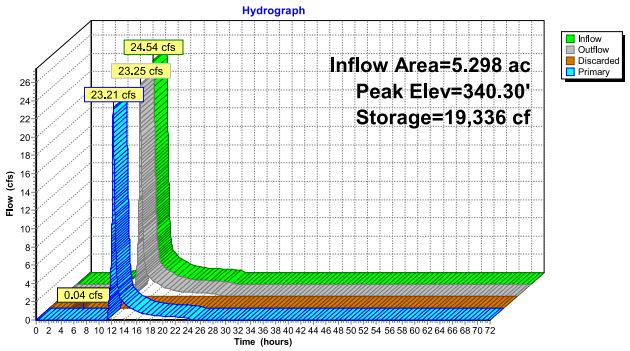
36,287.2 cf Field - 13,373.0 cf Chambers = 22,914.2 cf Stone x 40.0% Voids = 9,165.7 cf Stone Storage

Chamber Storage + Stone Storage = 22,538.7 cf = 0.517 af
Overall Storage Efficiency = 62.1%
Overall System Size = 149.10' x 44.25' x 5.50'

120 Chambers
1,344.0 cy Field
848.7 cy Stone



Pond BMP-4: BMP-4

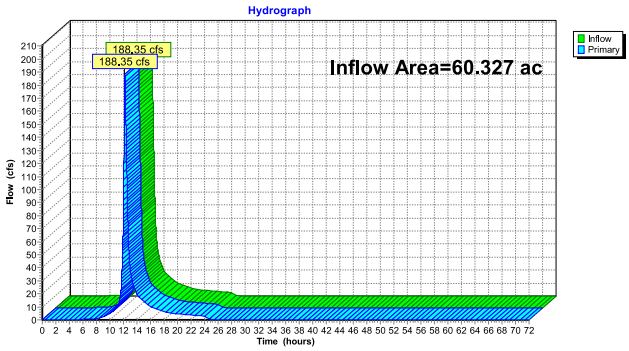


Summary for Link POA: POA

Inflow Area = 60.327 ac, 28.70% Impervious, Inflow Depth = 4.02" for 25-year event
Inflow = 188.35 cfs @ 12.21 hrs, Volume= 20.230 af
Primary = 188.35 cfs @ 12.21 hrs, Volume= 20.230 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA: POA

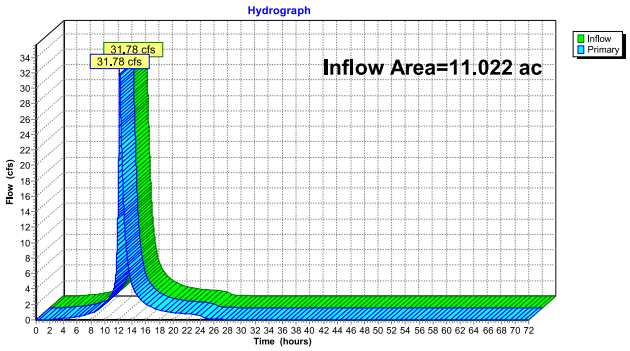


Summary for Link POA-1: POA-1-S Wetland

Inflow Area = 11.022 ac, 61.23% Impervious, Inflow Depth = 5.09" for 25-year event
Inflow = 31.78 cfs @ 12.21 hrs, Volume= 4.676 af
Primary = 31.78 cfs @ 12.21 hrs, Volume= 4.676 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-1: POA-1-S Wetland

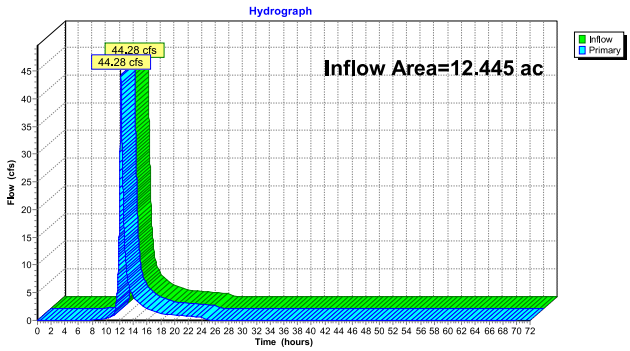


Summary for Link POA-2: POA-2-SW Wetland

Inflow Area = 12.445 ac, 47.74% Impervious, Inflow Depth = 4.08" for 25-year event
Inflow = 44.28 cfs @ 12.18 hrs, Volume= 4.229 af
Primary = 44.28 cfs @ 12.18 hrs, Volume= 4.229 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-2: POA-2-SW Wetland

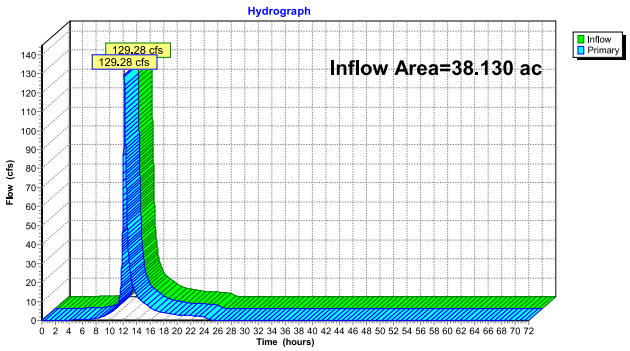


Summary for Link POA-3: POA-3

Inflow Area = 38.130 ac, 39.17% Impervious, Inflow Depth = 4.32" for 25-year event
Inflow = 129.28 cfs @ 12.19 hrs, Volume= 13.712 af
Primary = 129.28 cfs @ 12.19 hrs, Volume= 13.712 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-3: POA-3



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PWS-1: PWS-1 N Bldg & Runoff Area=190,648 sf 82.91% Impervious Runoff Depth=7.48"
Tc=6.0 min CN=94 Runoff=34.63 cfs 2.728 af

Subcatchment PWS-10: PWS-10 Offsite (moss) Runoff Area=966,901 sf 10.71% Impervious Runoff Depth=5.10"
Flow Length=514' Tc=18.8 min CN=74 Runoff=91.87 cfs 9.443 af

Subcatchment PWS-2: PWS-2 S Bldg & Runoff Area=134,413 sf 100.00% Impervious Runoff Depth=7.96"
Flow Length=144' Tc=6.4 min CN=98 Runoff=24.50 cfs 2.047 af

Subcatchment PWS-3: PWS-3 Central Parking Runoff Area=129,963 sf 73.32% Impervious Runoff Depth=7.24"
Tc=6.0 min CN=92 Runoff=23.27 cfs 1.800 af

Subcatchment PWS-4: PWS-4 W Parking & S Runoff Area=148,576 sf 52.28% Impervious Runoff Depth=6.64"
Flow Length=575' Tc=13.0 min CN=87 Runoff=20.32 cfs 1.889 af

Subcatchment PWS-5: PWS-5 Play Fields Runoff Area=638,715 sf 15.31% Impervious Runoff Depth=5.58"
Flow Length=564' Tc=13.3 min CN=78 Runoff=75.23 cfs 6.814 af

Subcatchment PWS-6: PWS-6 W Main drive Runoff Area=38,889 sf 53.00% Impervious Runoff Depth=6.64"
Flow Length=504' Tc=9.5 min CN=87 Runoff=5.90 cfs 0.494 af

Subcatchment PWS-7: PWS-7 E Baseball & Runoff Area=155,054 sf 0.97% Impervious Runoff Depth=4.99"
Flow Length=562' Tc=16.2 min CN=73 Runoff=15.30 cfs 1.479 af

Subcatchment PWS-8: PWS-8 W Baseball & Runoff Area=142,499 sf 4.34% Impervious Runoff Depth=5.10"
Flow Length=248' Tc=11.2 min CN=74 Runoff=16.45 cfs 1.392 af

Subcatchment PWS-9: PWS-9 W Parking & SW Runoff Area=82,198 sf 71.81% Impervious Runoff Depth=7.12"
Flow Length=575' Tc=11.0 min CN=91 Runoff=12.42 cfs 1.120 af

Pond BMP-1: BMP-1 Peak Elev=375.17' Storage=31,488 cf Inflow=34.63 cfs 2.728 af
Outflow=13.18 cfs 2.728 af

Pond BMP-2: BMP-2 Peak Elev=375.60' Storage=13,237 cf Inflow=24.50 cfs 2.047 af
Outflow=14.78 cfs 2.047 af

Pond BMP-3: BMP-3 Peak Elev=361.06' Storage=29,221 cf Inflow=23.27 cfs 1.800 af
Discarded=0.06 cfs 0.331 af Primary=8.74 cfs 1.469 af Outflow=8.80 cfs 1.800 af

Pond BMP-4: BMP-4 Peak Elev=341.13' Storage=21,558 cf Inflow=32.54 cfs 3.009 af
Discarded=0.04 cfs 0.232 af Primary=27.80 cfs 2.642 af Outflow=27.84 cfs 2.874 af

Link POA: POA Inflow=259.10 cfs 28.508 af
Primary=259.10 cfs 28.508 af

Link POA-1: POA-1-S Wetland Inflow=42.26 cfs 6.254 af
Primary=42.26 cfs 6.254 af

Link POA-2: POA-2-SW Wetland Inflow=56.46 cfs 5.997 af
Primary=56.46 cfs 5.997 af

Link POA-3: POA-3 Inflow=172.11 cfs 19.065 af
Primary=172.11 cfs 19.065 af

Total Runoff Area = 60.327 ac Runoff Volume = 29.206 af Average Runoff Depth = 5.81"
71.30% Pervious = 43.014 ac 28.70% Impervious = 17.313 ac

Summary for Subcatchment PWS-1: PWS-1 N Bldg & Loading (green)

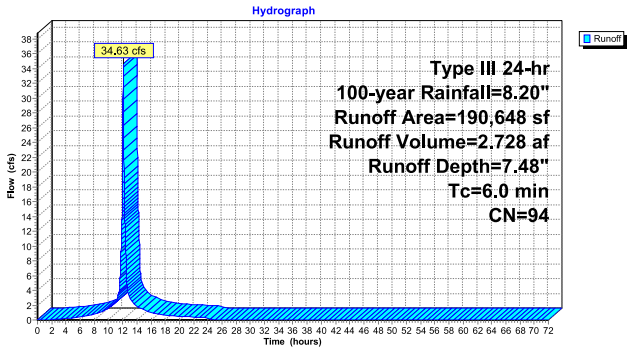
Runoff = 34.63 cfs @ 12.08 hrs, Volume= 2.728 af, Depth= 7.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

Area (sf)	CN	Description
158,071	98	Paved parking, HSG C
32,577	74	>75% Grass cover, Good, HSG C
190,648	94	Weighted Average
32,577		17.09% Pervious Area
158,071		82.91% Impervious Area

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

Subcatchment PWS-1: PWS-1 N Bldg & Loading (green)



Summary for Subcatchment PWS-10: PWS-10 Offsite (moss)

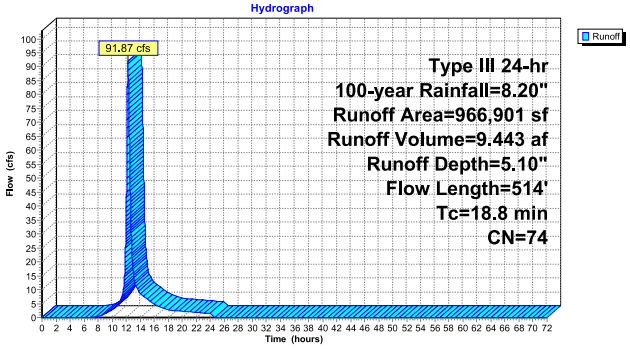
Runoff = 91.87 cfs @ 12.26 hrs, Volume= 9.443 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
*	103,577	98	Paved parking & bldg, HSG C
	90,398	74	>75% Grass cover, Good, HSG C
	765,125	70	Woods, Good, HSG C
	7,801	87	Dirt roads, HSG C
	966,901	74	Weighted Average
	863,324		89.29% Pervious Area
	103,577		10.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0600	0.12		**Sheet Flow, SHEET 100 FT WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
5.0	414	0.0760	1.38		**Shallow Concentrated Flow, SCF 414 FT WOODS** Woodland Kv= 5.0 fps
18.8	514	Total			

Subcatchment PWS-10: PWS-10 Offsite (moss)



Summary for Subcatchment PWS-2: PWS-2 S Bldg & Parking (yellow)

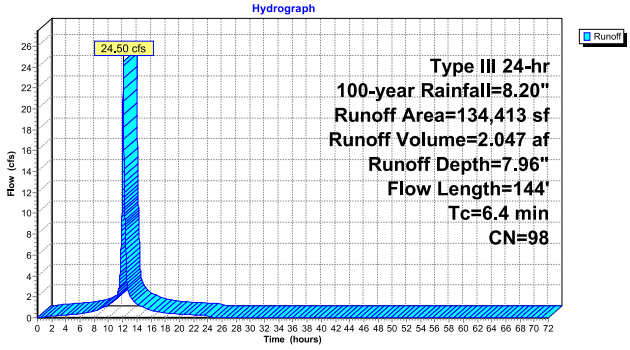
Runoff = 24.50 cfs @ 12.09 hrs, Volume= 2.047 af, Depth= 7.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
	103,259	98	Paved parking, HSG C
*	31,154	98	>75% Grass cover, Good, HSG C
	134,413	98	Weighted Average
	134,413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0250	0.16		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.6	41	0.0250	1.11		**Shallow Concentrated Flow, SCF 41 FT** Short Grass Pasture Kv= 7.0 fps
0.7	53	0.0038	1.25		**Shallow Concentrated Flow, SCF 53 FT** Paved Kv= 20.3 fps
6.4	144	Total			

Subcatchment PWS-2: PWS-2 S Bldg & Parking (yellow)



Summary for Subcatchment PWS-3: PWS-3 Central Parking (red)

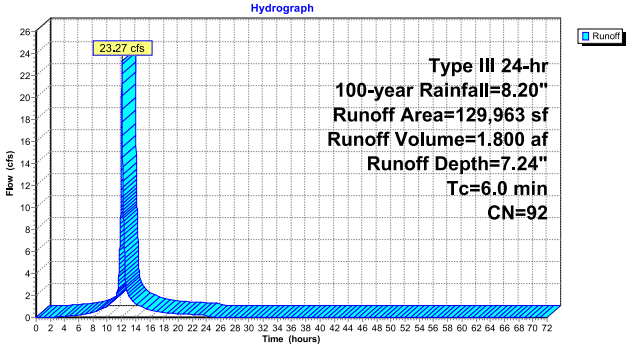
Runoff = 23.27 cfs @ 12.08 hrs, Volume= 1.800 af, Depth= 7.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
*	95,293	98	Paved parking & bldg, HSG C
	34,670	74	>75% Grass cover, Good, HSG C
	129,963	92	Weighted Average
	34,670		26.68% Pervious Area
	95,293		73.32% Impervious Area

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

Subcatchment PWS-3: PWS-3 Central Parking (red)



Summary for Subcatchment PWS-4: PWS-4 W Parking & S Play Fields (cyan)

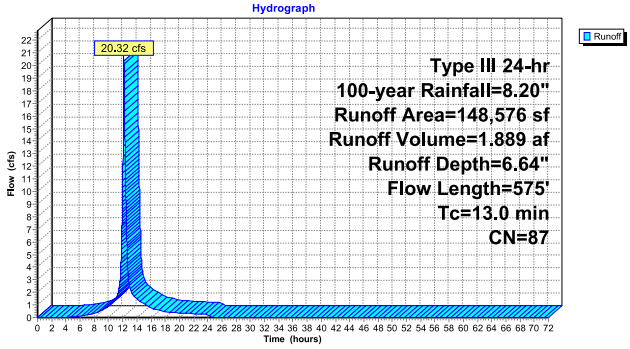
Runoff = 20.32 cfs @ 12.17 hrs, Volume= 1.889 af, Depth= 6.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
*	77,679	98	Paved parking & bldg, HSG C
	70,897	74	>75% Grass cover, Good, HSG C
	148,576	87	Weighted Average
	70,897		47.72% Pervious Area
	77,679		52.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0060	0.09		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.9	120	0.1090	2.31		**Shallow Concentrated Flow, SCF 120 FT** Short Grass Pasture Kv= 7.0 fps
3.0	405	0.0120	2.22		**Shallow Concentrated Flow, SCF 405 FT** Paved Kv= 20.3 fps
13.0	575	Total			

Subcatchment PWS-4: PWS-4 W Parking & S Play Fields (cyan)



Summary for Subcatchment PWS-5: PWS-5 Play Fields (purple)

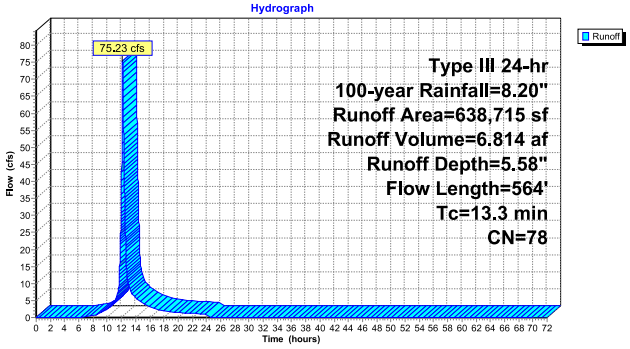
Runoff = 75.23 cfs @ 12.18 hrs, Volume= 6.814 af, Depth= 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

	Area (sf)	CN	Description
*	97,804	98	Paved parking & bldg, HSG C
	460,660	74	>75% Grass cover, Good, HSG C
	65,535	70	Woods, Good, HSG C
	14,716	87	Dirt roads, HSG C
	638,715	78	Weighted Average
	540,911		84.69% Pervious Area
	97,804		15.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0120	0.12		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.20"
6.4	514	0.0370	1.35		**Shallow Concentrated Flow, SHALLOW** Short Grass Pasture Kv= 7.0 fps
13.3	564	Total			

Subcatchment PWS-5: PWS-5 Play Fields (purple)



Summary for Subcatchment PWS-6: PWS-6 W Main drive (blue)

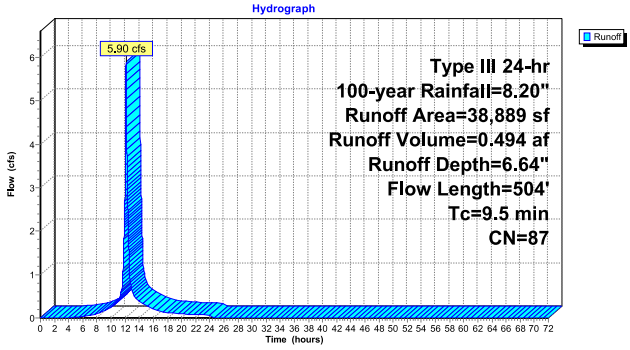
Runoff = 5.90 cfs @ 12.13 hrs, Volume= 0.494 af, Depth= 6.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

Area (sf)	CN	Description
20,613	98	Paved parking, HSG C
18,276	74	>75% Grass cover, Good, HSG C
38,889	87	Weighted Average
18,276		47.00% Pervious Area
20,613		53.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
1.8	198	0.0680	1.83		**Shallow Concentrated Flow, SCF 198 FT** Short Grass Pasture Kv= 7.0 fps
1.2	256	0.0300	3.52		**Shallow Concentrated Flow, SCF 256 FT** Paved Kv= 20.3 fps
9.5	504	Total			

Subcatchment PWS-6: PWS-6 W Main drive (blue)



Summary for Subcatchment PWS-7: PWS-7 E Baseball & Wetland Tributary (orange)

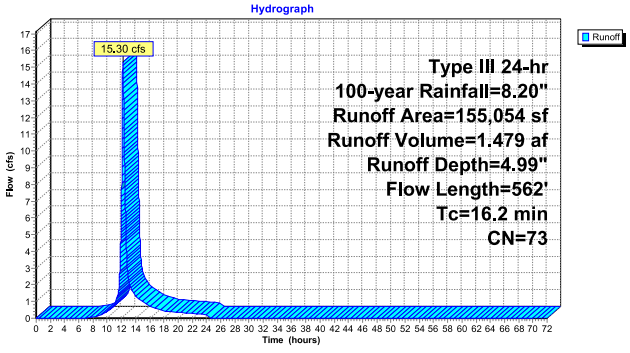
Runoff = 15.30 cfs @ 12.22 hrs, Volume= 1.479 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

Area (sf)	CN	Description
1,497	98	Paved parking, HSG C
80,421	74	>75% Grass cover, Good, HSG C
67,324	70	Woods, Good, HSG C
5,812	87	Dirt roads, HSG C
155,054	73	Weighted Average
153,557		99.03% Pervious Area
1,497		0.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
7.3	258	0.0070	0.59		**Shallow Concentrated Flow, SCF 258 FT** Short Grass Pasture Kv= 7.0 fps
2.4	254	0.1230	1.75		**Shallow Concentrated Flow, SCF 254 FT** Woodland Kv= 5.0 fps
16.2	562	Total			

Subcatchment PWS-7: PWS-7 E Baseball & Wetland Tributary (orange)



Summary for Subcatchment PWS-8: PWS-8 W Baseball & Wetland Tributary (magenta)

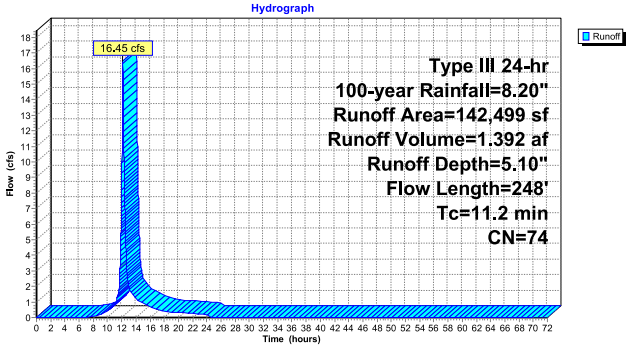
Runoff = 16.45 cfs @ 12.16 hrs, Volume= 1.392 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

Area (sf)	CN	Description
6,188	98	Paved parking, HSG C
63,139	74	>75% Grass cover, Good, HSG C
67,878	70	Woods, Good, HSG C
5,294	87	Dirt roads, HSG C
142,499	74	Weighted Average
136,311		95.66% Pervious Area
6,188		4.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0140	0.13		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
4.7	198	0.0100	0.70		**Shallow Concentrated Flow, SCF 198 FT** Short Grass Pasture Kv= 7.0 fps
11.2	248	Total			

Subcatchment PWS-8: PWS-8 W Baseball & Wetland Tributary (magenta)



Summary for Subcatchment PWS-9: PWS-9 W Parking & SW football field

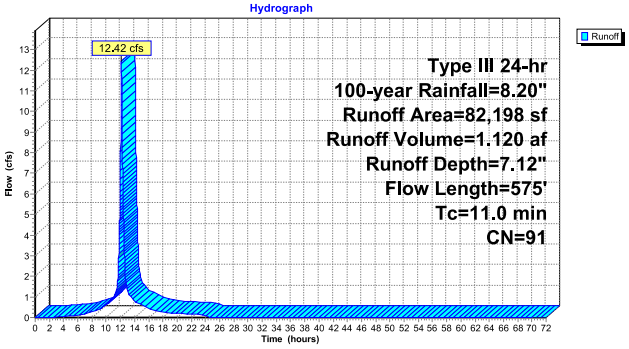
Runoff = 12.42 cfs @ 12.14 hrs, Volume= 1.120 af, Depth= 7.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.20"

Area (sf)	CN	Description
59,027	98	Paved parking, HSG C
23,171	74	>75% Grass cover, Good, HSG C
82,198	91	Weighted Average
23,171		28.19% Pervious Area
59,027		71.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0110	0.12		**Sheet Flow, SHEET 50 FT** Grass: Short n= 0.150 P2= 3.20"
0.9	120	0.1090	2.31		**Shallow Concentrated Flow, SCF 120 FT** Short Grass Pasture Kv= 7.0 fps
3.0	405	0.0120	2.22		**Shallow Concentrated Flow, SCF 405 FT** Paved Kv= 20.3 fps
11.0	575	Total			

Subcatchment PWS-9: PWS-9 W Parking & SW football field



Summary for Pond BMP-1: BMP-1

Inflow Area = 4.377 ac, 82.91% Impervious, Inflow Depth = 7.48" for 100-year event
Inflow = 34.63 cfs @ 12.08 hrs, Volume= 2.728 af
Outflow = 13.18 cfs @ 12.31 hrs, Volume= 2.728 af, Atten= 62%, Lag= 13.8 min
Primary = 13.18 cfs @ 12.31 hrs, Volume= 2.728 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 375.17' @ 12.31 hrs Surf.Area= 9,552 sf Storage= 31,488 cf

Plug-Flow detention time= 58.6 min calculated for 2.728 af (100% of inflow)
Center-of-Mass det. time= 58.4 min (819.2 - 760.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	371.33'	0 cf	**48.27'W x 197.88'L x 4.67'H Field A** 44,574 cf Overall - 44,574 cf Embedded = 0 cf x 40.0% Voids
#2A	371.33'	32,781 cf	**StormTrap ST1 SingleTrap 4-0** x 98 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 98 Chambers in 7 Rows 48.27' x 196.88' Core + 0.00' x 0.50' Border = 48.27' x 197.88' System
		32,781 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	371.33'	**21.0" Round Culvert** L= 163.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 371.33' / 370.51' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 2.41 sf
#2	Device 1	371.33'	**15.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	374.83'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=13.17 cfs @ 12.31 hrs HW=375.17' (Free Discharge)
└**1=Culvert** (Passes 13.17 cfs of 16.62 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 10.60 cfs @ 8.64 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 2.57 cfs @ 1.91 fps)

Pond BMP-1: BMP-1 - Chamber Wizard Field A

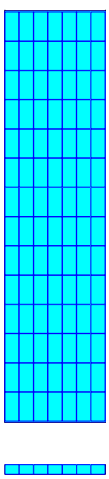
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

14 Chambers/Row x 14.06' Long = 196.88' Row Length +6.0" Border x 2 = 197.88' Base Length
7 Rows x 82.7" Wide = 48.27' Base Width
56.0" Chamber Height = 4.67' Field Height

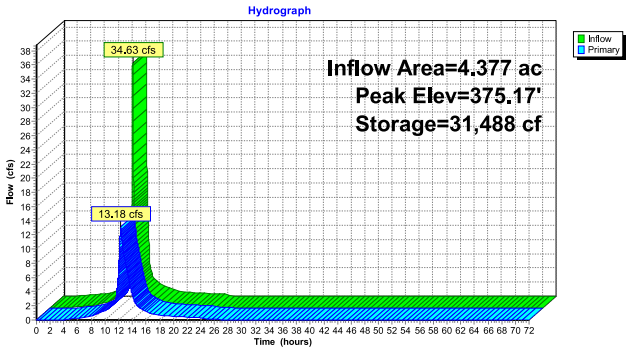
98 Chambers x 334.5 cf = 32,781.1 cf Chamber Storage
98 Chambers x 452.5 cf + 225.3 cf Border = 44,574.1 cf Displacement

Chamber Storage = 32,781.1 cf = 0.753 af
Overall Storage Efficiency = 73.5%
Overall System Size = 197.88' x 48.27' x 4.67'

98 Chambers (plus border)
1,650.9 cy Field



Pond BMP-1: BMP-1



Summary for Pond BMP-2: BMP-2

Inflow Area = 3.086 ac,100.00% Impervious, Inflow Depth = 7.96" for 100-year event
Inflow = 24.50 cfs @ 12.09 hrs, Volume= 2.047 af
Outflow = 14.78 cfs @ 12.19 hrs, Volume= 2.047 af, Atten= 40%, Lag= 6.4 min
Primary = 14.78 cfs @ 12.19 hrs, Volume= 2.047 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 375.60' @ 12.19 hrs Surf.Area= 4,114 sf Storage= 13,237 cf

Plug-Flow detention time= 25.6 min calculated for 2.047 af (100% of inflow)
Center-of-Mass det. time= 25.5 min (766.8 - 741.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	371.83'	0 cf	**41.38'W x 99.44'L x 4.67'H Field A** 19,200 cf Overall - 19,200 cf Embedded = 0 cf x 40.0% Voids
#2A	371.83'	14,049 cf	**StormTrap ST1 SingleTrap 4-0** x 42 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 42 Chambers in 6 Rows 41.38' x 98.44' Core + 0.00' x 0.50' Border = 41.38' x 99.44' System
		14,049 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	371.83'	**18.0" Round Culvert** L= 83.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 371.83' / 370.58' S= 0.0151 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	371.83'	**15.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	374.33'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=14.78 cfs @ 12.19 hrs HW=375.60' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.78 cfs @ 8.36 fps)
└**2=Orifice/Grate** (Passes < 10.48 cfs potential flow)
└**3=Sharp-Crested Rectangular Weir** (Passes < 17.49 cfs potential flow)

Pond BMP-2: BMP-2 - Chamber Wizard Field A

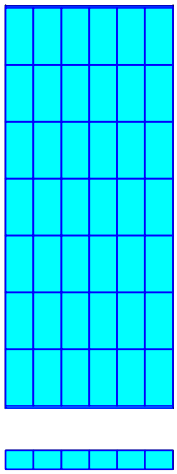
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

7 Chambers/Row x 14.06' Long = 98.44' Row Length +6.0" Border x 2 = 99.44' Base Length
6 Rows x 82.7" Wide = 41.38' Base Width
56.0" Chamber Height = 4.67' Field Height

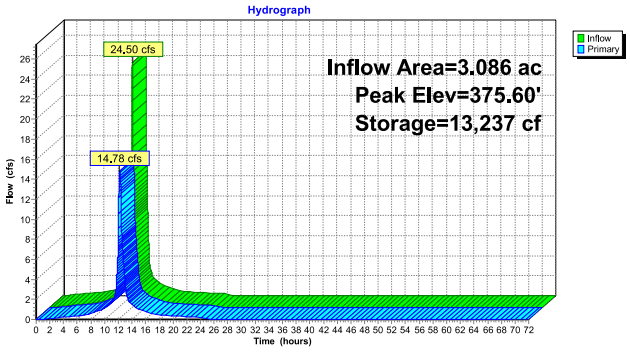
42 Chambers x 334.5 cf = 14,049.1 cf Chamber Storage
42 Chambers x 452.5 cf + 193.1 cf Border = 19,199.7 cf Displacement

Chamber Storage = 14,049.1 cf = 0.323 af
Overall Storage Efficiency = 73.2%
Overall System Size = 99.44' x 41.38' x 4.67'

42 Chambers (plus border)
711.1 cy Field



Pond BMP-2: BMP-2



Summary for Pond BMP-3: BMP-3

Inflow Area = 2.984 ac, 73.32% Impervious, Inflow Depth = 7.24" for 100-year event
Inflow = 23.27 cfs @ 12.08 hrs, Volume= 1.800 af
Outflow = 8.80 cfs @ 12.32 hrs, Volume= 1.800 af, Atten= 62%, Lag= 14.0 min
Discarded = 0.06 cfs @ 4.21 hrs, Volume= 0.331 af
Primary = 8.74 cfs @ 12.32 hrs, Volume= 1.469 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 361.06' @ 12.32 hrs Surf.Area= 9,575 sf Storage= 29,221 cf

Plug-Flow detention time= 326.4 min calculated for 1.800 af (100% of inflow)
Center-of-Mass det. time= 326.2 min (1,094.7 - 768.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	356.50'	13,229 cf	**58.58'W x 163.44'L x 5.50'H Field A** 52,662 cf Overall - 19,590 cf Embedded = 33,072 cf x 40.0% Voids
#2A	357.25'	19,590 cf	**ADS_StormTech MC-3500 d +Cap** x 176 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 176 Chambers in 8 Rows Cap Storage= +14.9 cf x 2 x 8 rows = 238.4 cf
		32,819 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	**15.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 358.00' / 357.25' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Discarded	356.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 4.21 hrs HW=356.56' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=8.74 cfs @ 12.32 hrs HW=361.06' (Free Discharge)
└**1=Culvert** (Barrel Controls 8.74 cfs @ 7.12 fps)

Pond BMP-3: BMP-3 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 8 rows = 238.4 cf

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

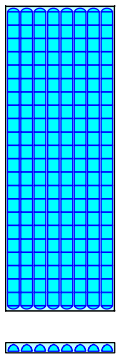
22 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 161.44' Row Length +12.0" End Stone x 2 = 163.44' Base Length
8 Rows x 77.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 58.58' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

176 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 8 Rows = 19,589.9 cf Chamber Storage

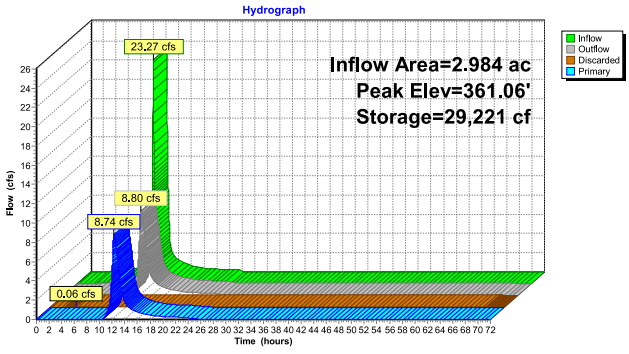
52,661.7 cf Field - 19,589.9 cf Chambers = 33,071.8 cf Stone x 40.0% Voids = 13,228.7 cf Stone Storage

Chamber Storage + Stone Storage = 32,818.7 cf = 0.753 af
Overall Storage Efficiency = 62.3%
Overall System Size = 163.44' x 58.58' x 5.50'

176 Chambers
1,950.4 cy Field
1,224.9 cy Stone



Pond BMP-3: BMP-3



Summary for Pond BMP-4: BMP-4

Inflow Area = 5.298 ac, 59.24% Impervious, Inflow Depth = 6.81" for 100-year event
Inflow = 32.54 cfs @ 12.16 hrs, Volume= 3.009 af
Outflow = 27.84 cfs @ 12.24 hrs, Volume= 2.874 af, Atten= 14%, Lag= 4.6 min
Discarded = 0.04 cfs @ 4.39 hrs, Volume= 0.232 af
Primary = 27.80 cfs @ 12.24 hrs, Volume= 2.642 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 341.13' @ 12.24 hrs Surf.Area= 6,598 sf Storage= 21,558 cf

Plug-Flow detention time= 179.3 min calculated for 2.874 af (96% of inflow)
Center-of-Mass det. time= 154.0 min (939.4 - 785.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	336.00'	9,166 cf	**44.25'W x 149.10'L x 5.50'H Field A** 36,287 cf Overall - 13,373 cf Embedded = 22,914 cf x 40.0% Voids
#2A	336.75'	13,373 cf	**ADS_StormTech MC-3500 d +Cap** x 120 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 120 Chambers in 6 Rows Cap Storage= +14.9 cf x 2 x 6 rows = 178.8 cf
		22,539 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	336.75'	**24.0" Round Culvert** L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 336.75' / 336.46' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	338.75'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	336.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 4.39 hrs HW=336.06' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=27.80 cfs @ 12.24 hrs HW=341.13' (Free Discharge)
└**1=Culvert** (Inlet Controls 27.80 cfs @ 8.85 fps)
└**2=Sharp-Crested Rectangular Weir** (Passes 27.80 cfs of 42.25 cfs potential flow)

Pond BMP-4: BMP-4 - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 6 rows = 178.8 cf

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

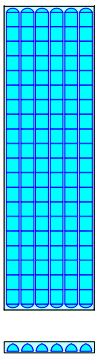
20 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 147.10' Row Length +12.0" End Stone x 2 = 149.10' Base Length
6 Rows x 77.0" Wide + 9.0" Spacing x 5 + 12.0" Side Stone x 2 = 44.25' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

120 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 6 Rows = 13,373.0 cf Chamber Storage

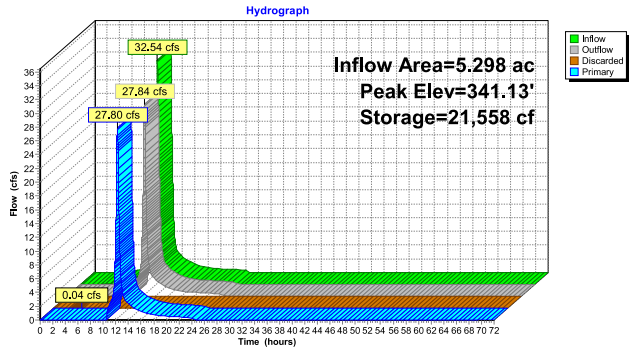
36,287.2 cf Field - 13,373.0 cf Chambers = 22,914.2 cf Stone x 40.0% Voids = 9,165.7 cf Stone Storage

Chamber Storage + Stone Storage = 22,538.7 cf = 0.517 af
Overall Storage Efficiency = 62.1%
Overall System Size = 149.10' x 44.25' x 5.50'

120 Chambers
1,344.0 cy Field
848.7 cy Stone



Pond BMP-4: BMP-4

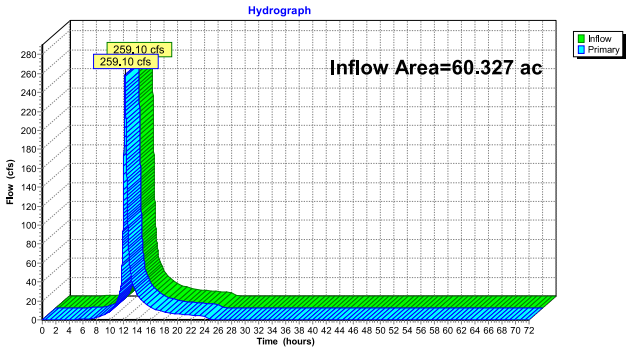


Summary for Link POA: POA

Inflow Area = 60.327 ac, 28.70% Impervious, Inflow Depth = 5.67" for 100-year event
Inflow = 259.10 cfs @ 12.22 hrs, Volume= 28.508 af
Primary = 259.10 cfs @ 12.22 hrs, Volume= 28.508 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA: POA

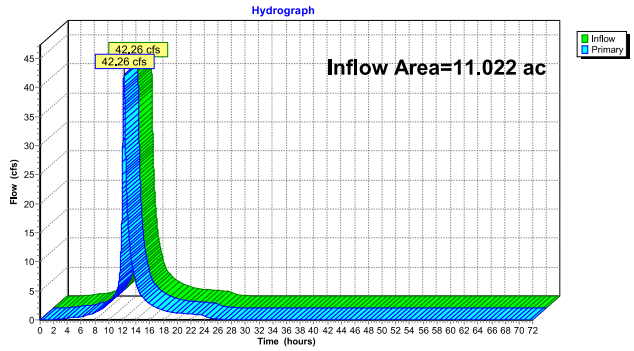


Summary for Link POA-1: POA-1-S Wetland

Inflow Area = 11.022 ac, 61.23% Impervious, Inflow Depth = 6.81" for 100-year event
Inflow = 42.26 cfs @ 12.24 hrs, Volume= 6.254 af
Primary = 42.26 cfs @ 12.24 hrs, Volume= 6.254 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-1: POA-1-S Wetland

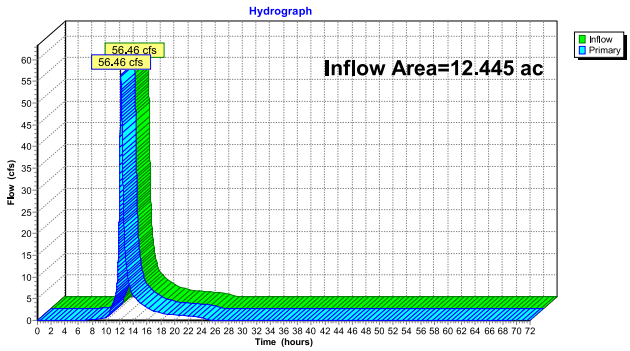


Summary for Link POA-2: POA-2-SW Wetland

Inflow Area = 12.445 ac, 47.74% Impervious, Inflow Depth = 5.78" for 100-year event
Inflow = 56.46 cfs @ 12.17 hrs, Volume= 5.997 af
Primary = 56.46 cfs @ 12.17 hrs, Volume= 5.997 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-2: POA-2-SW Wetland

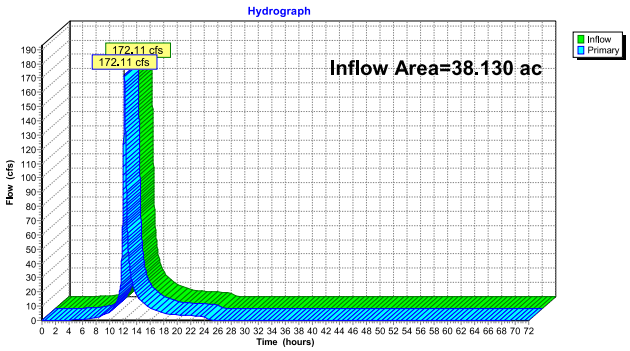


Summary for Link POA-3: POA-3

Inflow Area = 38.130 ac, 39.17% Impervious, Inflow Depth = 6.00" for 100-year event
Inflow = 172.11 cfs @ 12.19 hrs, Volume= 19.065 af
Primary = 172.11 cfs @ 12.19 hrs, Volume= 19.065 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POA-3: POA-3



APPENDIX 3:
SOIL REPORT

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

DRAFT

J3487-01-06
March 15, 2024

Tri-County Regional Vocational Technical High School
c/o DRA Architects
260 Charles Street, Suite 300
Waltham, MA 02453

Attn: Vladimir Lyubetsky

Delivered via email: VLyubetsky@draws.com
cc: Daniel Glazer via email: DGlazer@draws.com

Re: Test Pit Investigations (Existing Solar Field)
Tri-County Regional Vocational Technical High School
147 Pond Street
Franklin, Massachusetts

Dear Mr. Lyubetsky:

O'Reilly Talbot & Okun Associates, Inc. (OTO) is pleased to provide this letter report summarizing our investigations of soil and groundwater conditions for the design of stormwater management systems for the proposed Tri-County Regional Vocational Technical High School project. The new school will be located to the east (rear) of the existing school. The site is located at 147 Pond Street in Franklin, Massachusetts. A Site Locus is provided as Figure 1. This report is subject to the attached limitations.

GENERAL INFORMATION

The project includes demolition of the existing school and construction of a new school building, a small garage to the east of the new school, renovated athletic fields, parking lots and access roads, and a concession building for the new athletic fields.

The site presently contains the existing school building, asphalt paved parking lots (primarily in the southern and eastern portions of the Site) and access roads surrounding the existing school building. In addition, athletic fields are located to the northwest, and a solar field is located in the eastern portion of the Site.

Project plans call for the construction of a new school building in the eastern portion of the Site (area of the existing solar field and east parking lot). The new school building will be a slab on grade structure with a first-floor slab at elevation 380, which is several feet above existing grade in the western portion of the proposed building (area of the existing east parking lot) and near or below existing grade in the eastern portion (existing solar field area).

The project will include stormwater management systems to handle stormwater runoff generated on impervious surfaces associated with the new school. We understand that

these systems will be designed to function as either infiltration or detention systems (or a combination of both) depending on soil and groundwater conditions.

This report addresses explorations performed within or near the two proposed systems in the eastern portion of the site (east of the new school building footprint) and within the existing solar field.

SUBSURFACE EXPLORATIONS AND TESTING

Seven test pits (designated TP-106, -107, -110, -111, -114, -115, and -116) were performed at or near locations selected by the project civil engineer and within or near the proposed stormwater management systems. Locations were slightly adjusted in the field to allow access and to avoid damaging the existing solar field infrastructure. Additional explorations were performed in the vicinity of select test pit locations due to subsurface conditions observed within the test pits.

The test pits were performed on March 12, 2024 by Hersee Excavating of Stoughton, Massachusetts. Test pits were excavated using a John Deere 75G excavator equipped with a 0.5 cubic yard bucket.

Test pits TP-106, -107, and -116 were performed in the central/eastern portion of the solar field (location of eastern stormwater management system) and extended to a depth of between 7.5 to 12 feet. TP-107 encountered refusal upon bedrock at between 5 to 7.5 feet, and TP-116 encountered bedrock refusal at 10 feet. TP-110 and TP-111 were performed in the southeast portion of the solar field (location of southeastern stormwater management system), and in the vicinity of an existing stormwater basin. These test pits encountered refusal upon bedrock at between 3 to 5 feet below existing ground surface. Test pits TP-114 and TP-115 were performed along the north side of the solar field and extended to 10 feet below existing ground surface. Approximate test pit locations are shown on the attached Site Plan (Figure 2).

An OTO geotechnical engineer logged the test pits. Soil conditions are discussed below and are shown on the attached test pit logs.

Subsurface Conditions

Test Pits and Soil Conditions

Soil conditions in the test pits generally consisted of surficial layers of topsoil and organics/non-engineered fill (where encountered), followed by sandy glacial till. The presence and thickness of the fill layer varied across the Site. The fill thickness generally varied between 1.5 to 4 feet and consisted of silty sand containing various amounts of organics (roots) and topsoil layers at some locations. However, we note that the fill layer encountered in TP-106 contained significant amounts (>80 percent) of organics (wood, roots, and stumps) and extended beyond the maximum depth explored (12 feet). This highly organic fill layer was also encountered within the upper 4 feet of TP-116, and pockets were observed within the near surface fill in TP-107. We note that the lateral extent of the organic soils could not be determined during this phase of explorations due to limitations imposed by the existing solar field. Based upon the variability observed within

these test pits and our understanding of the solar field construction process, the presence of organic soils appears to be variable across the Site and additional areas of organic soils may be present.

Glacial till soils were encountered beneath the surficial soil layers. The till appeared to be relatively dense and consisted of fine sand or fine to medium sand with various amounts of coarse sand and gravel, and approximately 10 to 30 percent silt. Numerous cobbles and boulders of varying sizes were observed in the test pits. Test pits TP-114 and TP-115 terminated within the glacial till layer at a depth of 10 feet.

Bedrock was encountered beneath the glacial till soils in test pits TP-107, TP-110, TP-111, and TP-116. The bedrock consisted of granite, and appeared to be relatively intact with little to no weathered layer observed. In test pits TP-107 and TP-116, located in the central/eastern portion of the Site, bedrock was encountered at a depth of between 5 to 7.5 feet and 10 feet, respectively. At test pits TP-110 and TP-111, located in the southeastern portion of the Site, bedrock was encountered at a depth of between 3.5 to 5 feet and 3 to 4.5 feet, respectively. We note that bedrock outcrops were observed at the ground surface in the southern portion of the solar field. Based upon our explorations, site observations, and information provided to OTO, we note that the bedrock surface appears to be relatively shallow across much of the southern portion of the Site. In addition, we note that the depth to bedrock may vary considerably across relatively short distances.

Groundwater/Estimated Seasonal High Groundwater

Water Seepage Layers

Water seepage was observed at 1.5 feet in TP-114 and at 3.5 feet in TP-106, TP-115 and TP-116. However, soils below these seepage layers did not appear saturated. These seepage layers appear to consist of a water layer perched on silty soil layers or upon the dense glacial till soils.

Groundwater and Redoximorphic Features

Groundwater and saturated soils were observed within the pits at a depth of 3 feet in TP-107 and TP-110; at 4 feet in TP-111; at 8.5 feet in TP-114 and -115, and at 6.5 feet in TP-116.

Redoximorphic features indicating high groundwater were observed in each test pit except for TP-106 (none observed due to presence of organic fill). Other redoximorphic features were observed within some of the test pits. However, these appeared to be inconsistent and limited to areas around the water seepage perched on the near surface soils. Therefore, these near-surface features likely are not indications of high groundwater.

A summary of the test pits is provided in Table 1, including approximate ground surface elevation, depth to groundwater, and depth/elevation to the Estimated Seasonal High Groundwater Table (ESHGWT). Additional observations and notes are included in the attached test pit logs.

Table 1
Test Pit Information / ESHGWT

Test Pit ID	Ground Surface Elev.	Depth To		ESHGWT Depth / Elev.
		Groundwater	Redoximorphic Features	
Central/East Portion of Existing Solar Field (Eastern Stormwater System)				
TP-106	385.0’	N/E	N/E	N/A
TP-107	381.5’	3.0’	2.0’	2.0’ / 379.5’
TP-116	383.0’	6.5’	6.5’	6.5’ / 376.5’
Southeastern Portion of Existing Solar Field (Southeastern Stormwater System)				
TP-110	380.0’	3.0’	1.5’	1.5’ / 378.5’
TP-111	378.0’	4.0’	2.7’	2.7’ / 375.3’
North Portion of Existing Solar Field				
TP-114	390.3’	8.5’	8.5’	8.5’ / 381.8’
TP-115	386.3’	8.5’	8.5’	8.5’ / 377.8’

Notes:
1. “N/A” = Not Applicable (no signs of ESHGWT)
2. “N/E” = Not Encountered (or could not be determined)
3. “ESHGWT” = Estimated Seasonal High Groundwater Table

SUMMARY AND CONCLUSIONS

Based on the dense nature of near surface glacial till soils and the presence of a relatively shallow groundwater table and bedrock surface, conditions are not favorable for stormwater infiltration.

We appreciated the opportunity to be of service on this project. If you have any questions, please contact the undersigned.

Sincerely yours,
O'Reilly, Talbot & Okun Associates, Inc.

DRAFT

Attachments: Limitations, Site Locus, Site Plan, Test Pit Logs & Photographs

LIMITATIONS

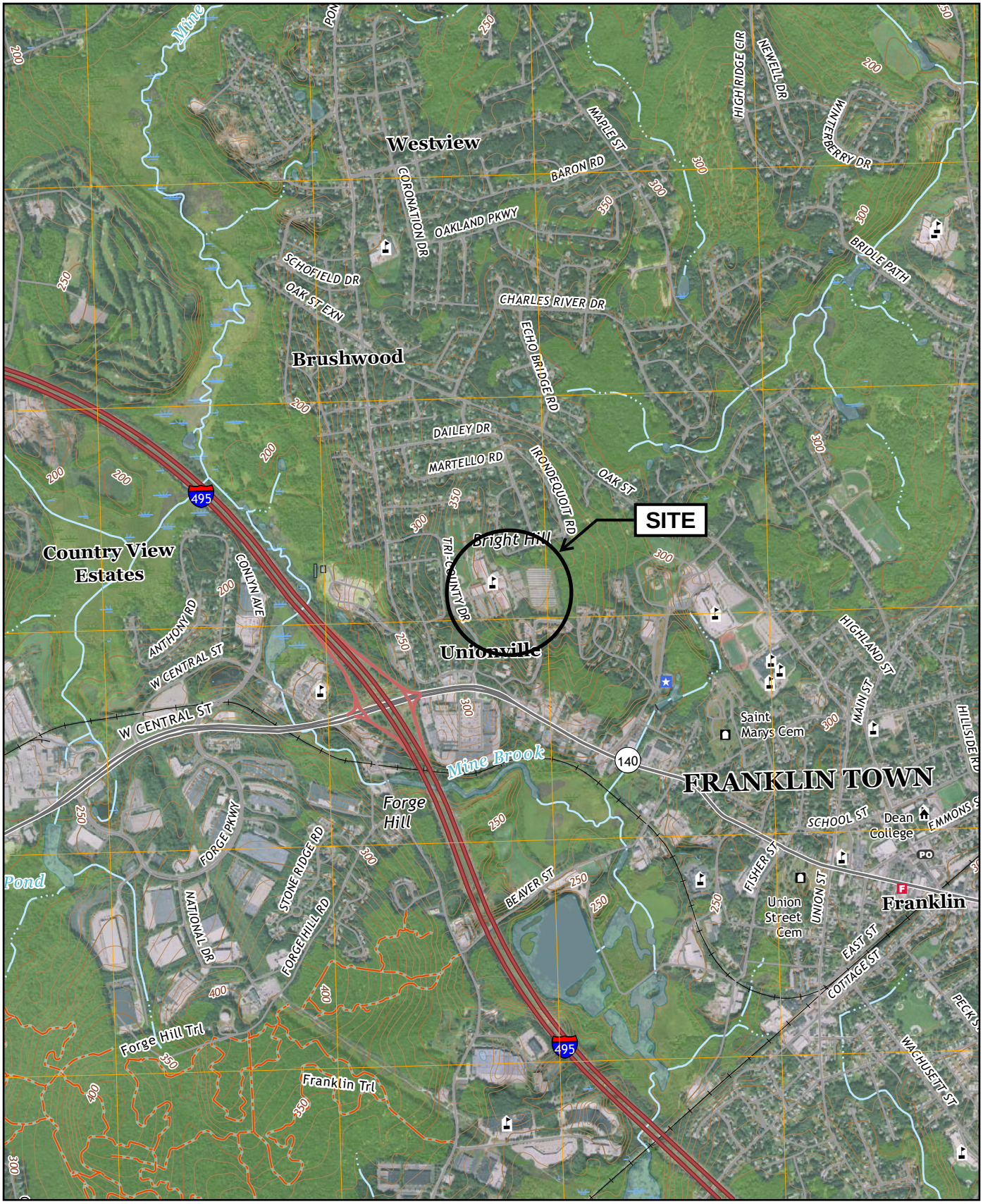
1. The observations presented in this report were made under the conditions described herein. The conclusions presented in this report were based solely upon the services described in the report and not on scientific tasks or procedures beyond the scope of the project or the time and budgetary constraints imposed by the client. The work described in this report was carried out in accordance with the Statement of Terms and Conditions attached to our proposal.

2. The analysis and recommendations submitted in this report are based in part upon the data obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it may be necessary to reevaluate the recommendations of this report.

3. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.

4. In the event that any changes in the nature, design or location of the proposed structures are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by O'Reilly, Talbot & Okun Associates Inc. It is recommended that we be retained to provide a general review of final plans and specifications.

5. Our report was prepared for the exclusive benefit of our client. Reliance upon the report and its conclusions is not made to third parties or future property owners.



0 1000 FEET

0 0.5 1.0 MILES

0 0.5 1 KILOMETERS

1:24,000 SCALE NORTH AMERICAN VERTICAL DATUM OF 1988 10 FOOT CONTOUR INTERVAL

O:\J3400\3487 Tri-County Regional Vocational Technical High School, Franklin MA\06 Design Phase Geotech\Figures\OTO Tri-County Figure 1 - Site Locus (24k scale) Reduced.pdf

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES
293 Bridge Street, Suite 500 Springfield, MA 01103 413.788.6222
www.OTO-ENV.com

TRI-COUNTY REGIONAL VOCATIONAL TECHNICAL HIGH SCHOOL

147 POND STREET
FRANKLIN, MASSACHUSETTS

SITE LOCUS

Topographic Map Quadrants: FRANKLIN, MA

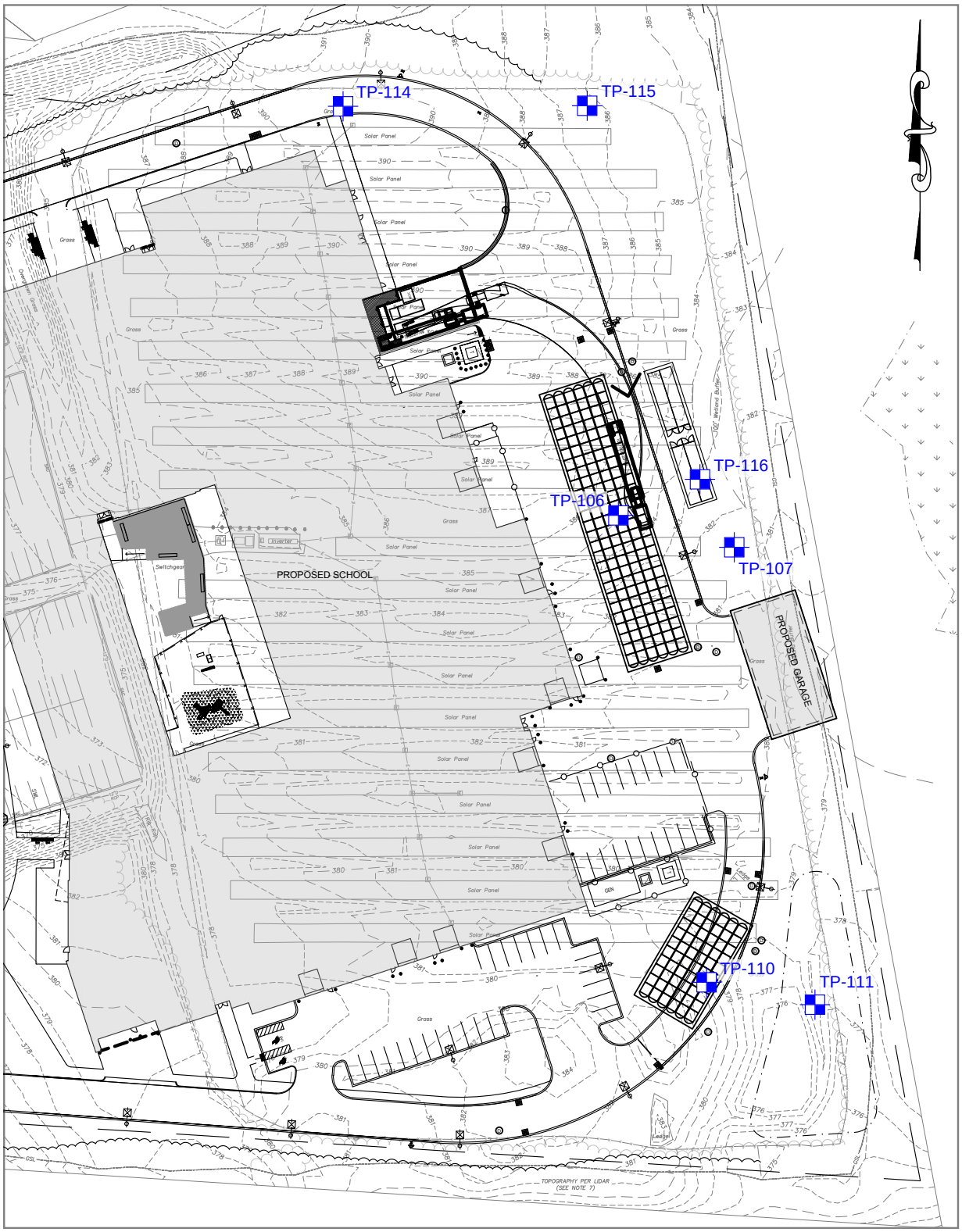
Map Version: 2021

Current As Of: 2021

Date: MARCH 2024

PROJECT No. J3487-01-06

FIGURE No. 1



NOTES:

1. BASE PLAN PROVIDED TO OTO IN ELECTRONIC FORMAT.
2. APPROXIMATE SAMPLE LOCATIONS ARE SHOWN ACCORDING TO TAPED MEASUREMENTS OR "LINE-OF-SIGHT" TAKEN FROM EXISTING SITE FEATURES.
3. ALL DATA IS TO BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHODS USED IN THE DEVELOPMENT OF THIS PLAN

LEGEND:

LOCATION OF TEST PIT PERFORMED BY HERSEE EXCAVATING ON MARCH 12, 2024, OBSERVED BY OTO

SCALE IN FEET
1" = 100'

50' 0' 100'

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES
293 Bridge Street, Suite 500 Springfield, MA 01103 413.788.6222
www.OTO-ENV.com

TRI-COUNTY REGIONAL VOCATIONAL TECHNICAL HIGH SCHOOL
147 POND STREET
FRANKLIN, MASSACHUSETTS

TEST PIT LOCATION PLAN

Designed By: PJC
Drawn By: PJC
Checked By: SMM
Date: 03/15/2024
Revised Date:

PROJECT No.
J3487-01-06

FIGURE No.
2

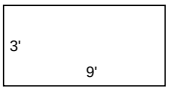
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-106

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	3/12/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Sunny, 36°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	East portion of existing solar field	START TIME	08:00	CAPACITY (cy)	0.5
		FINISH TIME	08:30	GS ELEV. (ft)	385.0
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	12.0

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
	0.0'-3.5': Light gray to brown, fine SAND, some silt, little medium sand,	E	1	M	--	--	
	trace gravel, trace to little organics (roots) moist (SANDY LOAM)		1	S			
2'			5	C			
	Water seepage and wet soils observed at 3.5'						1.
4'	3.5'-12.0': Brown to dark brown, ORGANICS (wood, roots),		1	M	--	--	
	some fine to mediums sand, little silt, wet (ORGANIC FILL)		2	S			
6'			8	C			
8'							
		M					
10'							
	Tree stump encountered at 11.0'						
12'	End of exploration at 12.0'						
14'							
16'							
18'							
20'							
22'							

TEST PIT PLAN



APPROXIMATE VOLUME = 12 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	Yes	
Est. Depth to High GW:	N/A	ft
GW Depth:	3.5	ft
GW Elevation:	381.5	ft
Elapsed Time:	N/A	min

Remarks:
1. Groundwater seepage and wet soils observed at 3.5' (elev. 381.5').
2. Organic fill present to maximum depth explored, no redoximorphic features or other signs of ESHGWT able to be observed within fill.

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-106

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-106

Test pit TP-106

TP-106 spoils pile

TP-106 spoils pile detail - organics

Remarks:	**PROJECT NO.** **3487-01-06**
	LOG OF TEST PIT **TP-106**

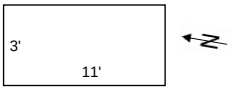
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-107

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	3/12/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Sunny, 36°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	East portion of existing solar field	START TIME	08:35	CAPACITY (cy)	0.5
		FINISH TIME	08:55	GS ELEV. (ft)	381.5
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	7.5

DEPTH (ft)	N — SOIL DESCRIPTION — S	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
	0.0'-3.0': Brown, fine to medium SAND, little silt, trace organics (roots), damp (SANDY ORGANIC FILL)	E	5	C	--	--	
	(woven geotextile fabric approximately 2" below ground surface)						
1'							
2'							
	10% rust mottling (2.5 YR 4/8) at 2'						1.
	Pocket of light brown, medium to coarse sand, trace fine sand, trace silt						
3'	at south end of test pit, depth of 2.5'-3.0'. Heavy rust staining.						
	3.0'-7.0': Light brown to very light brown, fine to medium SAND,		3	C	--	--	
	trace (+) silt, wet (GLACIAL TILL; LOAMY SAND)						2.
	Groundwater seepage observed at 3.3'						
4'							
5'							
6'							
7'							
	Refusal encountered at 5.0' to 7.5' upon bedrock						
8'							
9'							
10'							
11'							

TEST PIT PLAN



APPROXIMATE VOLUME = 8.3 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	Yes
Est. Depth to High GW:	2.0 ft
GW Depth (ft):	3.3
GW Elevation (ft):	378.2
Elapsed Time (min):	N/A

Remarks:
1. Redoximorphic features (approximately 10% rust mottling) observed at 2.0'. Estimate depth to high groundwater at 2.0'
2. Groundwater seepage observed at 3.3' (elev 378.2').

PROJECT NO.

3487-01-06

LOG OF TEST PIT

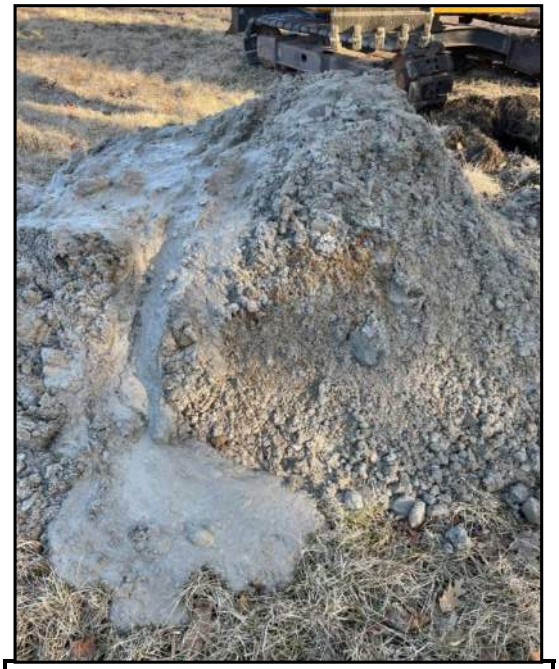
TP-107

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-107

Test pit TP-107

TP-107 spoils pile



TP-107 spoils pile

Remarks:	**PROJECT NO.** **3487-01-06**
	LOG OF TEST PIT **TP-107**

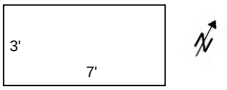
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-110

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	3/12/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Sunny, 42°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	Southeast portion of existing solar field	START TIME	09:15	CAPACITY (cy)	0.5
		FINISH TIME	09:30	GS ELEV. (ft)	380.0
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	5.0

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
	0.0'-0.5': Brown, fine to medium SAND, little silt, trace organics (fine roots), moist (LOAMY SAND)	E	--	--	--	--	
1'	0.5'-1.5': Dark brown, fine to medium SAND, some silt, little to trace organics (roots), moist (LOAMY SAND)						
2'	1.5'-5.0': Light brown, fine SAND and SILT, trace medium sand, trace organics (roots), moist (SANDY LOAM) 10% rust mottling (7.5 YR 4/6) at 1.5'		1 3 5	M S C	--	--	1.
3'	Groundwater seepage observed at 3.0'						2.
4'							
5'	Refusal encountered at 3.5' to 5.0' upon bedrock						
6'							
7'							
8'							
9'							
10'							
11'							

TEST PIT PLAN



APPROXIMATE VOLUME = 3.3 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	Yes	
Est. Depth to High GW:	1.5	ft
GW Depth:	3.0	ft
GW Elevation:	377.0	ft
Elapsed Time:	N/A	min

Remarks:
1. Redoximorphic features (approximately 10% rust mottling) observed at 1.5'. Estimate depth to high groundwater at 1.5'.
2. Groundwater seepage observed at 3.0' (elev 377.0').

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-110

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-110

Test pit TP-110

TP-110 spoils pile

TP-110 spoils pile

Remarks:	**PROJECT NO.** **3487-01-06**
	LOG OF TEST PIT **TP-110**

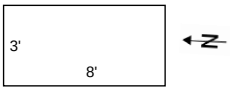
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-111

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	3/12/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Sunny, 42°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	Southeast portion of existing solar field	START TIME	09:35	CAPACITY (cy)	0.5
		FINISH TIME	09:50	GS ELEV. (ft)	378.0
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	4.5

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
0'	0.0'-2.7': Brown to dark brown, fine to medium SAND, some silt, little to trace organics (roots), moist (FILL; LOAMY SAND)	E	--	--	--	--	
3'	2.7'-4.5': Light brown, SILT and fine SAND, moist (SANDY LOAM) 5-10% rust mottling (7.5 YR 4/6) at 2.7'		5	C	--	--	1.
4'	Groundwater seepage observed at 4.0'						2.
	Refusal encountered at 3.0' to 4.5' upon bedrock						

TEST PIT PLAN



APPROXIMATE VOLUME = 3.3 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	Yes	
Est. Depth to High GW:	2.7	ft
GW Depth:	4.0	ft
GW Elevation:	374.0	ft
Elapsed Time:	N/A	min

Remarks:
1. Redoximorphic features (approximately 5-10% rust mottling) observed at 2.7'. Estimate depth to high groundwater at 2.7'.
2. Groundwater seepage observed at 4.0' (elev 374.0').

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-111

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-111

Test pit TP-111

Test pit TP-111

TP-111 spoils pile

Remarks:	**PROJECT NO.** **3487-01-06**
	LOG OF TEST PIT **TP-111**

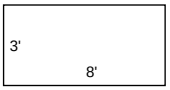
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-114

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	3/12/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Sunny, 45°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	North portion of existing solar field	START TIME	10:40	CAPACITY (cy)	0.5
		FINISH TIME	10:55	GS ELEV. (ft)	390.3
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	10.0

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
1'	0.0'-1.0': Brown, fine to medium SAND and SILT, trace coarse sand, trace gravel, trace organics (fine roots), moist (SANDY LOAM)	E	--	--	--	--	
2'	1.0'-3.5': Light brown, fine to medium SAND, little coarse sand, trace (+) silt, trace gravel, damp (LOAMY SAND)		2	C			1.
	20-30% rust mottling (5 YR 5/8) between 1.0'-3.5'						2.
3'	Water seepage observed at 1.5'						
4'	3.5'-10.0': Light brown to very light gray, fine to medium SAND, little silt, little coarse sand, little gravel, moist (wet at 8.5') (GLACIAL TILL, GRAVELLY LOAMY SAND)		--	--	--	--	
5'	< 5% rust mottling between 3.5'-8.5'						3.
6'		M					
7'							
8'							
9'	Groundwater seepage, wet soils, and side wall caving observed at 8.5'						4.
	10-15% rust mottling (5 YR 5/8) at 8.5'						5.
10'							
11'	End of exploration at 10.0' due to cave in						

TEST PIT PLAN



APPROXIMATE VOLUME = 8.9 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	Yes	
Est. Depth to High GW:	8.5	ft
GW Depth:	8.5	ft
GW Elevation:	381.8	ft
Elapsed Time:	N/A	min

Remarks:

1. Redoximorphic features (approximately 20-30% rust mottling) observed between 1.5'-3.5'.
2. Water seepage observed at 1.5' (elev. 388.8') .
3. Less than 5% redoximorphic features observed between 3.5'-8.5'.
4. Groundwater seepage, wet soils, and side wall caving observed at 8.5' (elev. 381.8').
5. Redoximorphic features (approximately 10-15% rust mottling) observed at 8.5'. Estimate depth to high groundwater at 8.5'.

PROJECT NO.

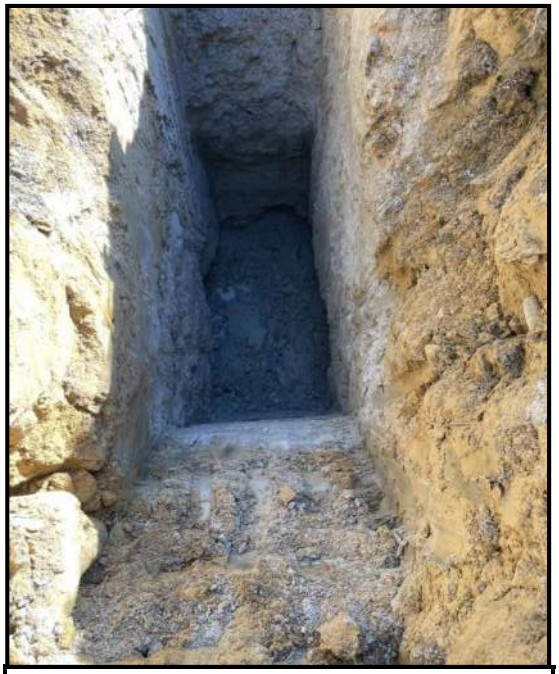
3487-01-06

LOG OF TEST PIT

TP-114

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-114



Test pit TP-114

TP-114 spoils pile

TP-114 spoils pile

Rust mottled soil from TP-114

Remarks:	**PROJECT NO.** **3487-01-06**
	LOG OF TEST PIT **TP-114**

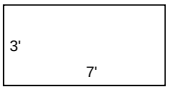
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-115

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	3/12/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Sunny, 46°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	North portion of existing solar field	START TIME	11:10	CAPACITY (cy)	0.5
		FINISH TIME	11:35	GS ELEV. (ft)	386.3
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	10.0

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
	0.0'-1.0': Brown, fine to medium SAND and SILT, trace coarse sand, trace organics (fine roots), moist (SANDY LOAM)	M	--	--	--	--	
1'							
	1.0'-3.5': Brown to light brown, fine to medium SAND, little to trace silt, little to trace coarse sand, trace gravel, moist (LOAMY SAND) 20-30% rust mottling (5 YR 5/8) between 1.0'-3.5'		3 5	S C	--	--	1.
2'							
3'							
	Water seepage observed at 3.5'						2.
	3.5'-10.0': Very light brown to very light gray, fine to medium sand, little coarse sand, little gravel, little silt, moist (GLACIAL TILL; GRAVELLY LOAMY SAND) < 5% rust mottling between 3.5'-8.5'		--	--	--	--	3.
4'							
5'							
6'							
7'							
8'							
	Groundwater seepage, wet soils, and side wall caving observed at 8.5'						4.
9'	10-15% rust mottling (5 YR 5/8) at 8.5'						5.
10'							
	End of exploration at 10.0' due to cave in						
11'							

TEST PIT PLAN



APPROXIMATE VOLUME = 7.8 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	Yes	
Est. Depth to High GW:	8.5	ft
GW Depth:	8.5	ft
GW Elevation:	377.8	ft
Elapsed Time:	N/A	min

Remarks:

1. Redoximorphic features (approximately 20-30% rust mottling) observed between 1.5'-3.5'.
2. Water seepage observed at 3.5' (elev. 382.8') .
3. Less than 5% redoximorphic features observed between 3.5'-8.5'.
4. Groundwater seepage, wet soils, and side wall caving observed at 8.5' (elev. 377.8').
5. Redoximorphic features (approximately 10-15% rust mottling) observed at 8.5'. Estimate depth to high groundwater at 8.5'.

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-115

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-115

Test pit TP-115

TP-115 spoils pile

TP-115 spoils pile

Remarks:	**PROJECT NO.** **3487-01-06**
	LOG OF TEST PIT **TP-115**

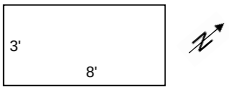
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-116

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	3/12/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Sunny, 48°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	Eastern portion of existing solar field	START TIME	11:45	CAPACITY (cy)	0.5
		FINISH TIME	12:10	GS ELEV. (ft)	383.0
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	10.0

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
	0.0'-4.0': Dark brown to brown, fine to medium SAND,	E	1	L	--	--	
	some to little organics (roots, wood), little silt, moist		2	S			
	(SANDY ORGANIC FILL)						
1'	(woven geotextile fabric approximately 2" below ground surface)						
2'							
3'							
	Water seepage observed at 3.5'						1.
4'							
	4.0'-5.0': Very light brown, fine to medium SAND and SILT, moist	M	--	--	--	--	2.
	(SANDY LOAM)						
	20% rust mottling (5 YR 5/8) between 4.0'-5.0'						
5'							
	5.0'-10.0': Very light brown to very light gray, fine to medium SAND,		--	--	--	--	
	some silt, trace coarse sand, moist (wet and slightly clayey at 6.5')						
	(GLACIAL TILL; SANDY LOAM)						3.
6'	< 5% rust mottling (5 YR 5/8) between 5.0'-6.5'						
	Groundwater seepage, side wall caving, and wet soils observed at 6.5'						4.
	10-15% rust mottling (5 YR 5/8) at 6.5'						5.
7'							
8'							
9'							
10'							
	End of exploration at 10.0' due to cave in						
11'							

TEST PIT PLAN



APPROXIMATE VOLUME = 8.9 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	Yes
Est. Depth to High GW:	6.5 ft
GW Depth (ft):	6.5
GW Elevation (ft):	376.5
Elapsed Time (min):	N/A

Remarks:

1. Water seepage observed at 3.5' (elev. 379.5') .
2. Redoximorphic features (approximately 20% rust mottling) observed between 4.0'-5.0'.
3. Less than 5% redoximorphic features observed between 5.0'-6.5'.
4. Groundwater seepage, wet soils, and side wall caving observed at 6.5' (elev. 376.5').
5. Redoximorphic features (approximately 10-15% rust mottling) observed at 6.5'. Estimate depth to high groundwater at 6.5'.

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-116

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-116

Test pit TP-116

TP-116 spoils pile

TP-116 spoils pile

TP-116 spoils pile with large boulder

Remarks:	**PROJECT NO.** **3487-01-06**
	LOG OF TEST PIT **TP-116**

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

J3487-01-06
February 28, 2024

Tri-County Regional Vocational Technical High School
c/o DRA Architects
260 Charles Street, S
uite 300
Waltham, MA 02453

Attn: Vladimir Lyubetsky

Delivered via email: VLyubetsky@draws.com
cc: Daniel Glazer via email: DGlazer@draws.com

Re: Test Pit Investigations and Infiltration Testing
Tri-County Regional Vocational Technical High School
147 Pond Street
Franklin, Massachusetts

Dear Mr. Lyubetsky:

O'Reilly Talbot & Okun Associates, Inc. (OTO) is pleased to provide this letter report summarizing our investigations of soil and groundwater conditions for the design of stormwater infiltration systems for the proposed Tri-County Regional Vocational Technical High School project. The new school will be located to the east (rear) of the existing school. The site is located at 147 Pond Street in Franklin, Massachusetts. A Site Locus is provided as Figure 1. This report is subject to the attached limitations.

GENERAL INFORMATION

The project includes the new school building, the demolition of the existing school, a small garage to the east of the new school, renovated athletic fields, new parking lots and access roads, and a concession buildings for the new athletic fields.

The site presently contains, the existing school building (which will be demolished after the new school is built, asphalt paved parking lots (primarily in the southern and eastern portions of the Site), and paved access roads surrounding the existing school building. In addition, athletic fields are located to the northwest, and a solar field is located in the east portion of the Site. Smaller landscaped areas are located throughout the Site.

Project plans call for the construction of a new school building in the eastern portion of the Site (area of the existing solar field and east parking lot). The project will also include demolition of the existing building, construction of new parking lots and access roads to the west of the new building, and new landscaped areas and athletic fields.

We understand that the new school building will be a slab on grade structure with a first-floor slab at elevation 380, which is several feet above existing grade in the western portion

of the proposed building (area of the existing east parking lot) and close to existing grade in the eastern portion (existing solar field area).

The project will include five stormwater management systems to handle stormwater generated on the roof of the new building, on sidewalks and other impervious surfaces associated with the new school, and on paved parking areas and access roads. The approximate locations and footprints of these systems are shown on Figure 2. We understand that these systems will be designed to function as either infiltration or detention systems (or a combination of both) depending on soil and groundwater conditions.

This report addresses explorations performed within or near the three systems in the western part of the site (one located within existing athletic fields in the western part of the site, and two located near the footprint of the existing school building in the central part of the site. The remaining two stormwater management structures are located on the east and south sides of the new school building. Since these areas are within the limits of the existing solar field (which is currently active) they are not accessible at this time. The results of testing for the remaining two basins will be provided under separate cover.

SUBSURFACE EXPLORATIONS AND TESTING

Five backhoe test pits (designated TP-101 through TP-105) were performed in the area of proposed pavements in the western portion of the Site. These explorations were performed near locations selected by the project civil engineer. The locations were slightly adjusted to avoid damaging the existing pavements or underground utilities.

The test pits were performed on January 16, 2024 by Hersee Excavating of Stoughton, Massachusetts. Test pits were excavated using a John Deere 75G excavator equipped with a 0.5 cubic yard bucket.

Test pits TP-101 and TP-102 were performed adjacent to the system in the western part of the site and extended to a depth of 11 feet below the ground surface. Test pit TP-103 was performed in a landscaped area near the southern edge of the existing school building and encountered refusal upon bedrock between 1.5 and 5 feet below ground surface, corresponding to an elevation between 353.5 and 357. Test pit TP-104 was performed in the south-central part of the site near the bus lane for the existing school. Bedrock was present in test pit TP-104 at a depth of 6.5 feet, corresponding to an approximate elevation of 350. Test pit TP-105 was performed along an existing utility easement to the south of the existing school, where a new access road will likely be located. Bedrock was encountered at a depth of 3.5 feet at this location, near elevation 315.5. Approximate test pit locations are shown on the attached Site Plan (Figure 2).

An OTO geotechnical engineer logged the test pits and performed the hydraulic conductivity tests. The test pit logs are attached. Hydraulic conductivity (permeability) tests were performed immediately adjacent to three test pits, TP-101, TP-103 and TP-105. The results are discussed below.

SUBSURFACE CONDITIONS

Test Pits and Soil Conditions

Soil conditions in the test pits generally consisted of a surface layer of topsoil (approximately 8 to 14 inches thick), followed by sandy glacial till. The glacial till soils appeared to be dense to very dense and consisted of fine to medium sand with up to 30% coarse sand and gravel, and approximately 10% silt. The test pits either terminated at a depth of 11 feet (TP-101, -102) or encountered refusal upon granite bedrock in test pits TP-103, -104, -105. Numerous cobbles and boulders of varying sizes were observed in the test pits.

Groundwater/Estimated Seasonal High Groundwater

Water seepage was observed at 2.5 and 2 feet below the surface in TP-101 and TP-102, respectively. Soils below this seepage did not appear saturated; therefore, the seepage appears to consist of a water layer perched on the dense glacial till soils.

Saturated soils were encountered in test pit TP-102 at a depth of 8 feet below ground surface (approximate elevation 330.5). Redoximorphic features were observed in TP-102 between 8 to 9 feet and indicate an estimated high ground water depth at 8 feet. No other redoximorphic features or other signs of the estimated seasonal high groundwater table were observed in the test pits. Additional observations and notes are included in the attached test pit logs.

FIELD AND LABORATORY TESTING RESULTS

Field Hydraulic Conductivity Testing

In-Situ hydraulic conductivity (permeability) tests were performed within the glacial till soils observed just below the surface layer within test pits (TP-101, -103, and -105). These tests were performed to provide data for the design of the stormwater infiltration systems. The testing procedure and results are described below.

The hydraulic conductivity tests were performed with a Guelph permeameter using a constant head testing methodology. The Guelph permeameter allows the rate of water recharge into an unsaturated soil to be measured while a constant water head is maintained. Each test was performed by augering a shallow hole into the soil at the base of a test pit. The Guelph apparatus was then inserted, water was added to the apparatus. The change in the rate of water flow from the Guelph apparatus reservoir over time is recorded. These data are then used to measure the coefficient of permeability or hydraulic conductivity. At this site, little or no change in the water level in the reservoir was observed over several minutes, indicating relatively impermeable soils. This is likely a result of the density of the glacial till soils present at the Site.

Each test was performed within the unsaturated natural glacial till layer present at that depth. The hydraulic conductivity (K) values determined by these tests are presented in Table 1.

Table 1
Hydraulic Conductivity Test Results

Test Pit	Test Depth/Elev. (ft)	Soil Conditions	K Value (feet/day)
TP-101	2.0 / 341.0 4.0 / 339.0	Light brown to gray, fine to medium sand, little coarse sand, little gravel, trace silt	< 0.1
TP-103	2.0 / 356.5	Brown, fine to medium sand, some gravel, little coarse sand, trace (+) silt	< 0.1
TP-105	2.0 / 317.0	Light brown, fine to medium sand, some gravel, little coarse sand, trace (+) silt	< 0.1

Based upon these data the hydraulic conductivity within the glacial till appears to be less than 0.1 feet per day. No hydraulic conductivity tests were performed in the remaining test pits since soil conditions were similar and shallow perched water was present in test pit TP-102. We note that conditions in the remaining locations were similar not only in the remaining test pits but also in soil borings performed in other parts of the site. We note that no explorations have been performed to date in the area of the stormwater management systems to the east and south of the new school building.

SUMMARY AND CONCLUSIONS

Based on the very dense nature of near surface glacial till soils, the low hydraulic conductivity test results, the presence of shallow perched water and relatively shallow depth to bedrock, conditions are not favorable for stormwater infiltration.

We appreciated the opportunity to be of service on this project. If you have any questions, please contact the undersigned.

Sincerely yours,
O'Reilly, Talbot & Okun Associates, Inc.

Stephen McLaughlin, EIT
Senior Project Manager

Michael J. Talbot, P.E.
Principal

Pierre J. Carriere, EIT
Engineer I

Attachments: Limitations, Site Locus, Site Plan, Test Pit Logs & Photographs

LIMITATIONS

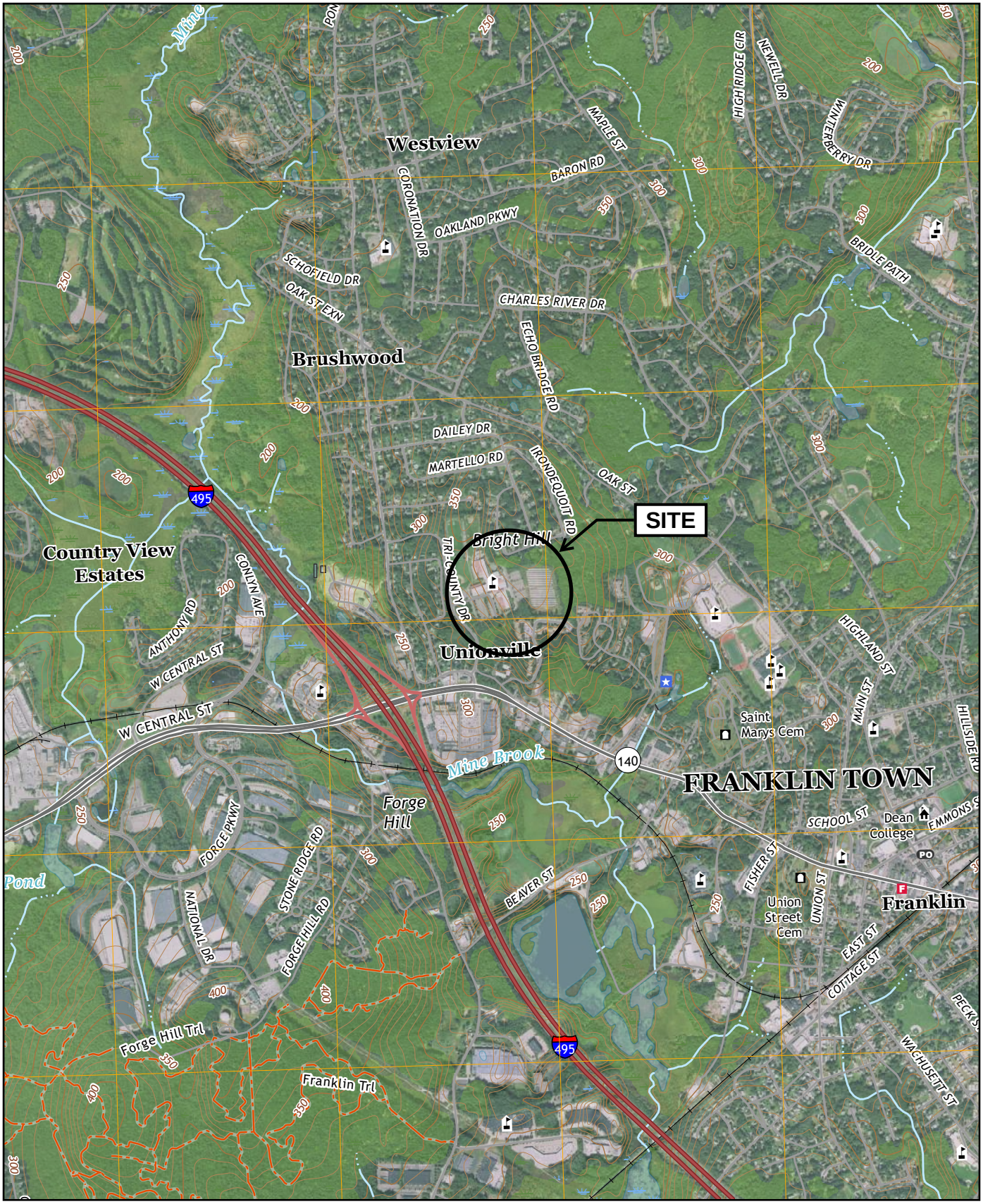
1. The observations presented in this report were made under the conditions described herein. The conclusions presented in this report were based solely upon the services described in the report and not on scientific tasks or procedures beyond the scope of the project or the time and budgetary constraints imposed by the client. The work described in this report was carried out in accordance with the Statement of Terms and Conditions attached to our proposal.

2. The analysis and recommendations submitted in this report are based in part upon the data obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it may be necessary to reevaluate the recommendations of this report.

3. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.

4. In the event that any changes in the nature, design or location of the proposed structures are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by O'Reilly, Talbot & Okun Associates Inc. It is recommended that we be retained to provide a general review of final plans and specifications.

5. Our report was prepared for the exclusive benefit of our client. Reliance upon the report and its conclusions is not made to third parties or future property owners.



0 1000 FEET | 0 0.5 1.0 MILES | 0 0.5 1 KILOMETERS

1:24,000 SCALE NORTH AMERICAN VERTICAL DATUM OF 1988 10 FOOT CONTOUR INTERVAL

O:\J3400\3487 Tri-County Regional Vocational Technical High School, Franklin MA\06 Design Phase Geotech\Test Pits\OTO Tri-County Figure 1 - Site Locus (24k scale) Reduced.pdf

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES
293 Bridge Street, Suite 500 Springfield, MA 01103 413.788.6222
www.OTO-ENV.com

TRI-COUNTY REGIONAL VOCATIONAL TECHNICAL HIGH SCHOOL

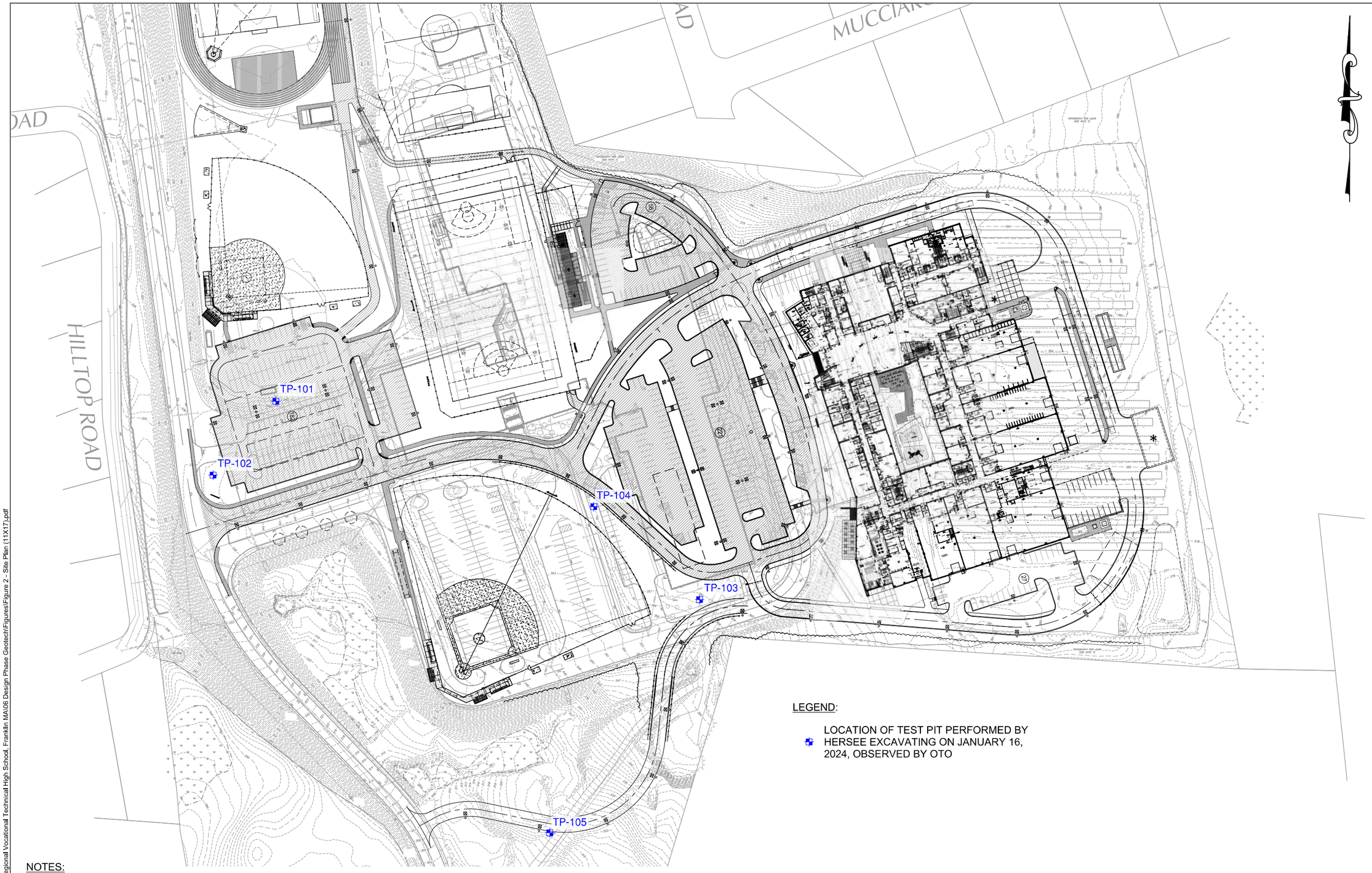
147 POND STREET
FRANKLIN, MASSACHUSETTS

SITE LOCUS

Topographic Map Quadrants: FRANKLIN, MA
Map Version: 2021
Current As Of: 2021
Date: FEBRUARY 2024

PROJECT No. J3487-01-06

FIGURE No. 1



LEGEND:

LOCATION OF TEST PIT PERFORMED BY HERSEE EXCAVATING ON JANUARY 16, 2024, OBSERVED BY OTO

NOTES:

1. BASE PLAN PROVIDED TO OTO IN ELECTRONIC FORMAT.
2. APPROXIMATE SAMPLE LOCATIONS ARE SHOWN ACCORDING TO TAPED MEASUREMENTS TAKEN FROM EXISTING SITE FEATURES OR MOBILE GPS APPLICATIONS
3. ALL DATA IS TO BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHODS USED IN THE DEVELOPMENT OF THIS PLAN

SCALE IN FEET
1" = 150'

0' 75' 150' 300'

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES
293 Bridge Street, Suite 500 Springfield, MA 01103 413.788.6222
www.OTO-ENV.com

DESIGNED BY: PJC
DRAWN BY: PJC
CHECKED BY: SMM
DATE: 02/02/2024
REV. DATE:

TRI-COUNTRY RVTHS TEST PITS

147 POND STREET
FRANKLIN, MASSACHUSETTS

SITE PLAN

PROJECT NO.
J3487-01-06

FIGURE NO.
2

O:\J3400\3487 Tri-County Regional Vocational Technical High School, Franklin MA\06 Design Phase Geotech\Figures\Figure 2 - Site Plan (11X17).pdf

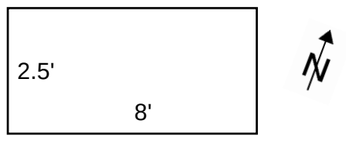
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-101

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	1/16/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Snow, 25°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	South of baseball field right field dugout	START TIME	08:10	CAPACITY (cy)	0.5
		FINISH TIME	08:50	GS ELEV. (ft)	343.0
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	11.0

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
1'	0.0'-1.2': Dark brown, fine to medium SAND and SILT, trace organics (roots), damp (TOPSOIL; SANDY LOAM)	E	0	--	--	--	
2'	1.2'-3.0': Light brown, fine to medium SAND, little coarse sand, little gravel, trace silt, damp (GLACIAL TILL; GRAVELLY LOAMY SAND)	D	2 8	S C	--	--	
							1.
3'	Perched water seepage at 2.5'						2.
4'	3.0'-11.0': Gray, fine to medium SAND, little coarse sand, little gravel, trace (+) silt, damp (GLACIAL TILL; GRAVELLY LOAMY SAND)	M	1 5 10	L S C	--	--	
5'							
6'							
7'							
8'							
9'							
10'							
11'							
	End of exploration at 11.0'						

TEST PIT PLAN



APPROXIMATE VOLUME = 8.1 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	No
GW Depth (ft):	>11'
GW Elevation (ft):	<332
Elapsed Time (min):	N/A

Remarks:

1. Hydraulic conductivity (permeability) test attempted at depths of 2' and 4', immediately adjacent to test pit and using a Guelph permeameter. No change in water level observed in permeameter.
2. Perched water seepage observed at 2.5' (elev 340.5). Depth to groundwater observed to be >11' (< 332).
3. No redoximorphic features or other signs of ESHGWT observed.

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-101

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-101

Test pit TP-101

Test pit TP-101 and topsoil spoils pile

TP-101 spoils pile

Remarks:	PROJECT NO. 3487-01-06
	LOG OF TEST PIT TP-101

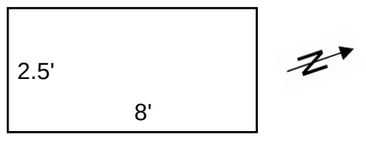
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-102

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	1/16/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Snow, 25°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	Near west entrance to front parking lot from Tri-County Drive	START TIME	09:05	CAPACITY (cy)	0.5
		FINISH TIME	09:40	GS ELEV. (ft)	338.5
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	11.0

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
1'	0.0'-1.0': Very dark brown to dark brown, SILT and fine to medium SAND, trace organics (roots), damp (TOPSOIL; LOAM)	E	0	--	--	--	
2'	1.0'-11.0': Gray, fine to medium SAND, little coarse sand, little gravel, trace (+) silt, damp (GLACIAL TILL; GRAVELLY LOAMY SAND)	M	10	C	--	--	
	Perched water seepage at 2.0'						1.
8'	Wet soils encountered at 8.0'						2., 3.
	20% rust mottling (5 YR 5/8) from 8.0' to 9.0'						
11'	End of exploration at 11.0'						

TEST PIT PLAN



APPROXIMATE VOLUME = 8.1 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	Yes
GW Depth (ft):	8.0
GW Elevation (ft):	330.5
Elapsed Time (min):	N/A

Remarks:

1. Perched water seepage observed at 2.0' (elev 336.5).
2. Groundwater (wet soils) encountered at 8.0' (elev 330.5).
3. Redoximorphic features (20% rust mottling) observed between 8.0' to 9.0'. Estimate high groundwater at 8'. No other redoximorphic features or other signs of ESHGWT observed.

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-102

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-102

Test pit TP-102

TP-102 spoils pile

Remarks:	PROJECT NO. 3487-01-06
	LOG OF TEST PIT TP-102

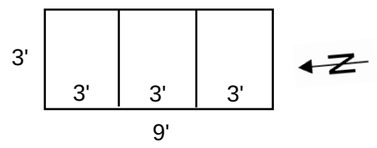
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-103

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	1/16/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Heavy snow, 27°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	Grass area immediately south of existing school building	START TIME	09:55	CAPACITY (cy)	0.5
		FINISH TIME	10:15	GS ELEV. (ft)	358.5
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	5.0

DEPTH (ft)	N S SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
	0.0'-0.7': Very dark brown to brown, fine to medium SAND, some silt, trace coarse sand, trace organics (roots), damp (TOPSOIL; SANDY LOAM)	E	0	--	--	--	
1'	0.7'-5.0': Brown, fine to medium SAND, some gravel, little coarse sand, trace (+) silt, damp (GLACIAL TILL; GRAVELLY LOAMY SAND)	D	3 1 3 8	L M S C	--	--	2.
2'	Bedrock (granite)						
3'							
4'							
5'	Refusal encountered between 1.5' and 5.0' upon bedrock						
6'							
7'							
8'							
9'							
10'							
11'							

TEST PIT PLAN



APPROXIMATE VOLUME = 2.8 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	No
GW Depth (ft):	N/E
GW Elevation (ft):	N/E
Elapsed Time (min):	N/A

Remarks:

1. Hydraulic conductivity (permeability) test attempted at depth of 2', immediately adjacent to south end of test pit and using a Guelph permeameter. No change in water level observed in permeameter.
2. No groundwater or wet/moist soils encountered.
3. No redoximorphic features or other signs of ESHGWT observed. Groundwater observed to be greater than maximum depth explored

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-103

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-103

Test pit TP-103

Test pit TP-103

TP-103 spoils pile

Granite bedrock in TP-103

Remarks:	**PROJECT NO.** **3487-01-06**
	LOG OF TEST PIT **TP-103**

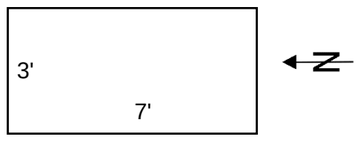
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-104

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	1/16/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Heavy snow, 27°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	Grass area along sidewalk adjacent to existing bus lane	START TIME	10:15	CAPACITY (cy)	0.5
		FINISH TIME	10:45	GS ELEV. (ft)	357.0
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	6.5

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
1'	0.0'-1.0': Very dark brown to dark brown, fine to medium SAND, some silt, little to trace organics (roots, tree roots), trace coarse sand, damp (TOPSOIL; SANDY LOAM)	E	0	--	--	--	
2'	1.0'-6.5': Brown to light brown, fine to medium SAND, little coarse sand, little gravel, trace silt, damp (GLACIAL TILL; GRAVELLY LOAMY SAND)	M	1 2 5	L M C	--	--	
3'							
4'							
5'							
6'	Refusal encountered at 6.5' upon bedrock						
7'							
8'							
9'							
10'							
11'							

TEST PIT PLAN



APPROXIMATE VOLUME = 5.1 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	No
GW Depth (ft):	N/E
GW Elevation (ft):	N/E
Elapsed Time (min):	N/A

Remarks:
1. No groundwater or wet/moist soils encountered.
2. No redoximorphic features or other signs of ESHGWT observed. Groundwater observed to be greater than maximum depth explored

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-104

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-104

Test pit TP-104

TP-104 spoils pile

TP-104 side wall

Remarks:	PROJECT NO. 3487-01-06
	LOG OF TEST PIT TP-104

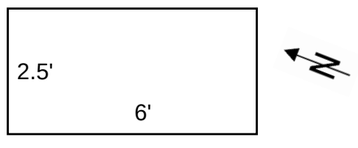
O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF TEST PIT TP-105

PROJECT	Tri-County Regional Vocational Technical High School			CONTRACTOR	Hersee Excavating
JOB NO.	3487-01-06	DATE	1/16/2024	OPERATOR	Scott Hersee
LOCATION	Franklin, MA	WEATHER	Snow, 28°F	BACKHOE	John Deere 75G
TEST PIT LOCATION	Southern portion of site, along utility access road	START TIME	10:50	CAPACITY (cy)	0.5
		FINISH TIME	11:15	GS ELEV. (ft)	319.0
		OTO STAFF	Pierre Carriere	FINAL DEPTH (ft)	3.5

DEPTH (ft)	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDERS/ COBBLES COUNT	BOULDERS/ COBBLES CLASS	SAMPLE NO.	FIELD TEST DATA	REMARKS
1'	0.0'-3.5': Light brown, fine to medium SAND, some gravel, little coarse sand, trace (+) silt, damp (GLACIAL TILL (GRAVELLY LOAMY SAND) (Little to trace organics (roots, tree roots) in top 12"; trace debris (brick) near surface)	M	1 2 5 15	L M S C	--	--	
2'							
3'							
4'	Refusal encountered at 3.5' upon bedrock						
5'							
6'							
7'							
8'							
9'							
10'							
11'							

TEST PIT PLAN



APPROXIMATE VOLUME = 1.9 cy

EXCAVATION EFFORT

Easy	E
Moderate	M
Difficult	D
Very Difficult	V

BOULDER/COBBLE CLASS

Type	Size	Abbr.
Cobble	3" - 6"	C
Small	6" - 18"	S
Medium	18" - 36"	M
Large	36" and Larger	L

PROPORTIONS USED

Term	Relative Quantity
and	35% - 50%
some	20% - 35%
little	10% - 20%
trace	10% or less

GROUNDWATER CONDITIONS

GW Encountered?:	No
GW Depth (ft):	N/E
GW Elevation (ft):	N/E
Elapsed Time (min):	N/A

Remarks:

1. Hydraulic conductivity (permeability) test attempted at depth of 2', immediately adjacent to test pit and using a Guelph permeameter. No change in water level observed in permeameter.
2. No groundwater or wet/moist soils encountered.
3. No redoximorphic features or other signs of ESHGWT observed. Groundwater observed to be greater than maximum depth explored

PROJECT NO.

3487-01-06

LOG OF TEST PIT

TP-105

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

TEST PIT PHOTOGRAPHS TP-105

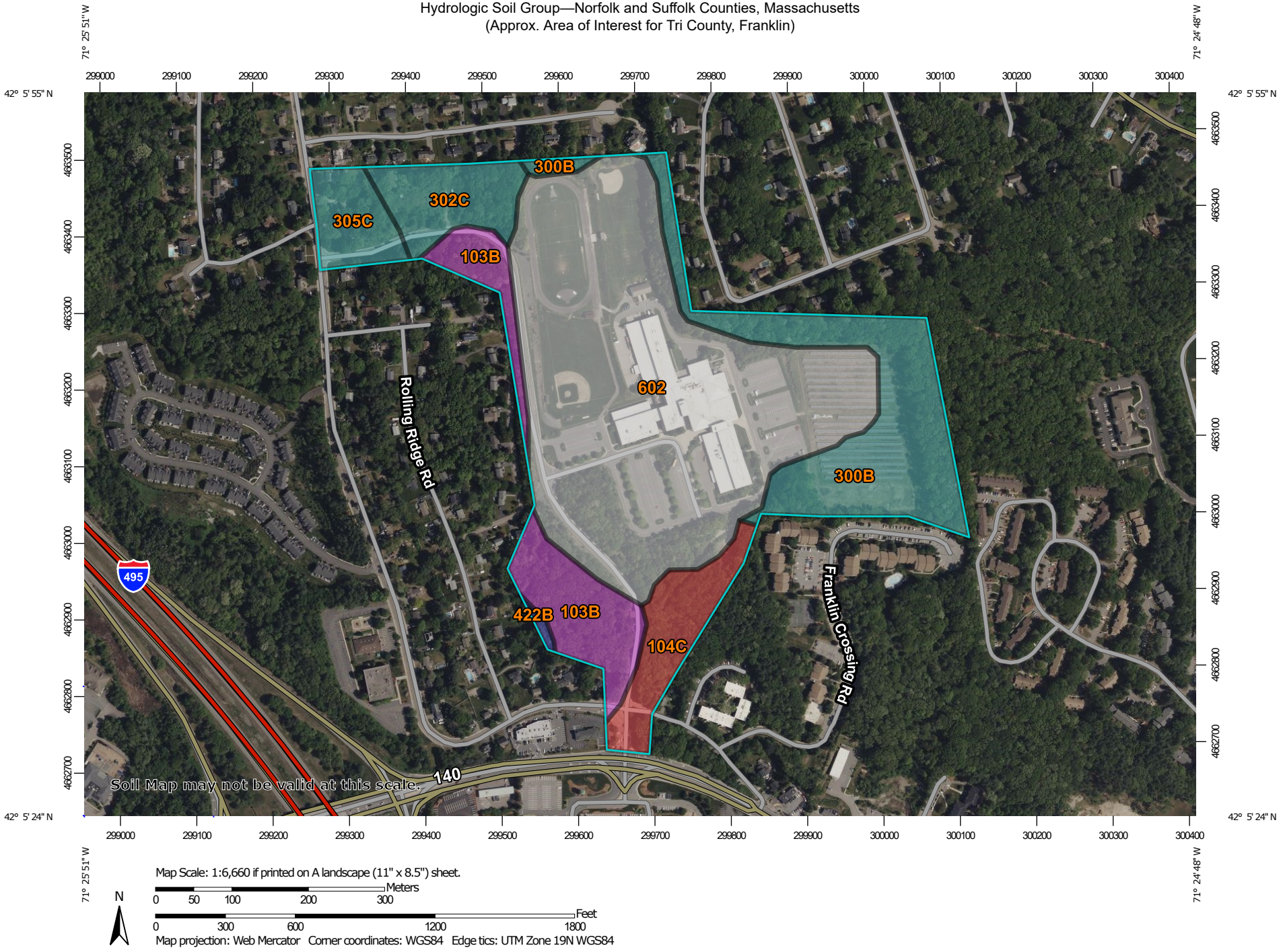
Test pit TP-105

TP-105 spoils pile

Granite boulder from TP-105

Remarks:	PROJECT NO. 3487-01-06
	LOG OF TEST PIT TP-105

Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts
(Approx. Area of Interest for Tri County, Franklin)



Map Scale: 1:6,660 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 19, Sep 10, 2023

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	7.3	10.3%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	D	4.6	6.4%
300B	Montauk fine sandy loam, 3 to 8 percent slopes	C	12.9	18.2%
302C	Montauk fine sandy loam, 8 to 15 percent slopes, extremely stony	C	4.3	6.0%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	3.1	4.3%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	B	0.2	0.3%
602	Urban land, 0 to 15 percent slopes		38.8	54.5%
Totals for Area of Interest			**71.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

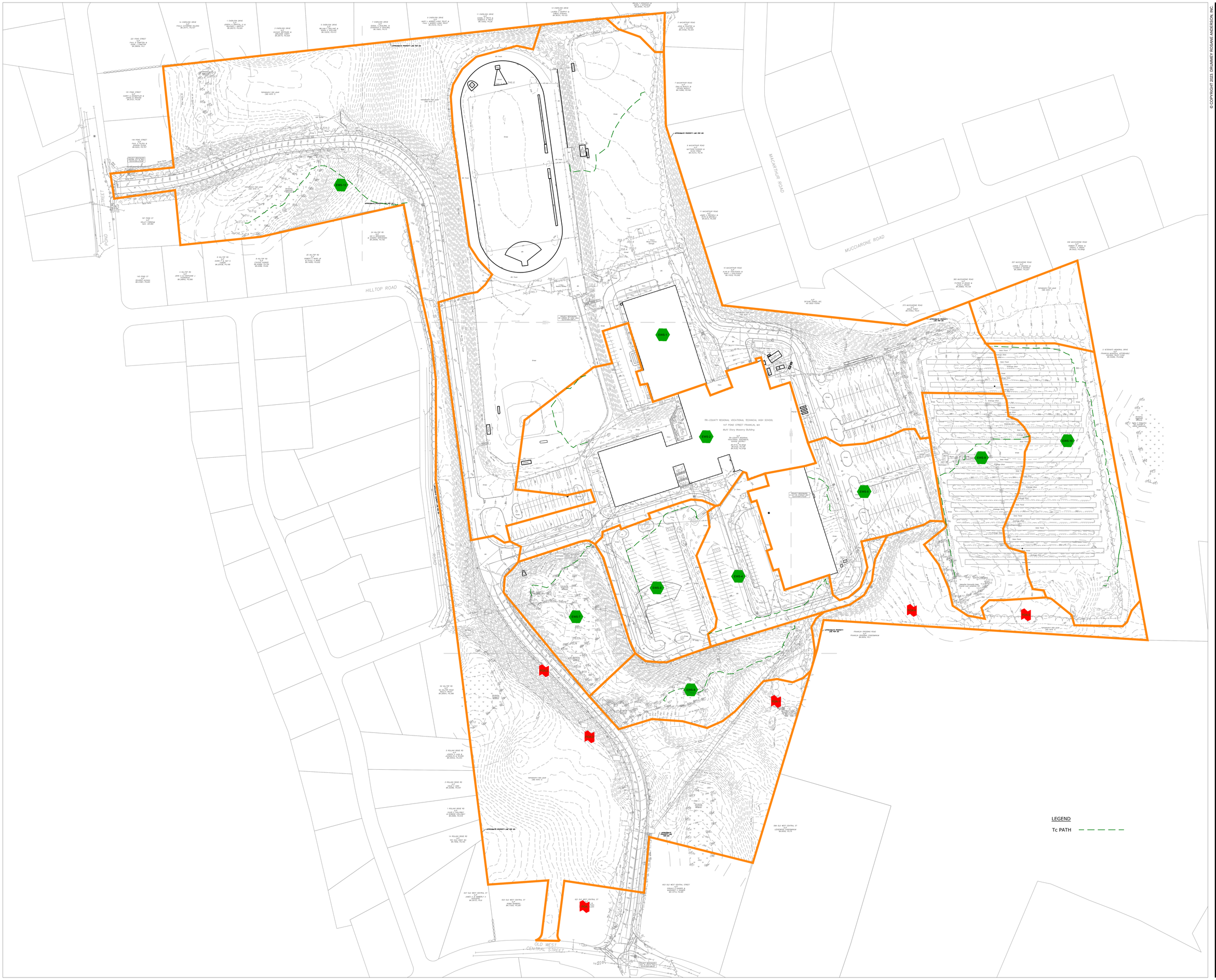
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX 4:
SKETCHES/MAPS



DRA

Drummey Rosane Anderson, Inc.

260 Charles Street
Studio 300
Waltham, MA
02453

225 Oakland Road
Studio 205
South Windsor, CT
06074

Planning | Architecture | Interior Design
Tel: 617.964.1700
www.draws.com

Tri-County Regional Vocational Technical High School

147 Pond St, Franklin, MA 02038

DESIGN DEVELOPMENT COST ESTIMATE SET

3/18/2024

KEY PLAN

PROJECT NORTH | MAGNETIC NORTH

EXISTING WATERSHED MAP

Scale:
Project: 22001.00
Author:
Date: 3/18/2024

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DESIGN DEVELOPMENT COST ESTIMATE SET

3/18/2024

KEY PLAN

B C D E

PROJECT NORTH

MAGNETIC NORTH

PROPOSED WATERSHED MAP

Scale:
Project: 22001.00
Author:
Date: 3/18/2024

APPENDIX 5:
OPERATION AND MAINTENANCE PLAN

Town of Franklin – Tri-County Regional Technical High School
OPERATION AND MAINTENANCE PLAN
March 2024

During Construction the General Contractor shall be responsible for the following:

1. Erosion Control

Erosion control barriers will be placed along down-gradient portion of the site as indicated on the project plans. Additional erosion control barriers will be placed at the limit of work and surrounding temporary soil stockpiles as needed, and in any sensitive areas as work progresses. Filter socks/Silt fence shall be inspected for depth of sediment, tears, to check that the fabric is securely fastened to the fence posts, and to inspect that the fence posts are firmly set in the ground.

Erosion control shall be left in place until directed by the Conservation Commission to remove it.

2. Site Access

Site access for construction equipment will be from the multiple access points at the construction entrances as indicated on the. See E&SC plan.

3. Construction Staging

A construction staging area will be established on the existing woodlands within the site. All construction materials, supplies, trailers and offices, portable toilets, and equipment shall be stored within the limits of the staging area. Temporary trailers and offices may also be located within the developed portion of the site. All temporary stockpiles will be surrounded with straw wattles and silt fencing as required to prevent erosion damages.

4. Site Grading/Site Work

The site grading related site activities may only commence when the site is stable from erosion and all required control measures are in place and functional. Site work during wet periods should be avoided if possible and limited to only those areas that will not have adverse impacts on wetland resource areas.

5. Slope Stabilization

All surfaces and slopes shall be checked after each major storm event and at *least once every 7 calendar days or once every 14 calendar days and within 24 hours of the occurrence of a storm event 0.25 inches or greater* to see that vegetation is in good condition. Any rills or damage from erosion shall be repaired immediately to avoid further damage. If seeps develop on the slopes, the area will be evaluated to determine if the seep will cause an unstable condition and shall be stabilized immediately if necessary. Problems found during the inspections by the General Contractor shall be repaired promptly. Areas requiring re-vegetation shall be replanted immediately or stabilized in a manner acceptable to the Conservation Commission if it is outside of the growing season. Slopes and other exposed surfaces receiving vegetation will be maintained as necessary to support healthy vegetation. If stabilization is required during the non-growing season, straw mulch, or a commercially manufactured blanket must be employed to prevent erosion.

6. Permanent Stabilization

Disturbed portions of the site where construction activities permanently cease shall be stabilized with permanent seed no later than 5 days after the last construction activity. Stabilization shall be done by hydroseeding all graded and exposed areas as soon as possible. If hydroseeding is performed during non-growing season then newly hydroseeded areas shall be covered with a thick layer of straw. Newly seeded areas shall be inspected on a monthly basis and the hay replaced, as required, until the vegetation is well established.

7. Dust and Sediment Control

Catch Basin Filter (silt sacks):

Catch basin / area drain filters (silt sacks) shall be placed at all inlets to drainage structures as structures are installed and prior to pavement removal. Outlet protection work shall be constructed before runoff is allowed to enter the drainage system. Construction and location of catch basin filters shall be as indicated on the Drawings.

Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.

Compost filter sock and silt fence:

Compost filter sock and silt fence shall be installed as indicated on the Drawings. Sock shall be placed in a row with ends tightly abutting the adjacent sock. Each sock shall be securely anchored in place by 2 stakes or re-bars driven through the sock. The first stake in each sock shall be angled toward the previously laid wattle to force the socks together.

Construction Entrance:

The areas of the construction entrance should be cleared of all vegetation, roots, and other objectionable material. The filter fabric should be placed on the subgrade prior to the gravel placement. The gravel shall be placed to the specified dimensions depicted on the plans. See E&SC plan for multiple construction entrances.

The Construction Entrance shall be a minimum of 50-feet in length and 20-feet wide.

Temporary Sediment Basins:

Basins shall be provided, if necessary, by the contractor designed to provide storage for either the calculated volume of runoff from a 2-year, 24-hour storm, or 3,600 cubic feet per acre drained. Erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets are required. The contractor shall remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition

Dust Control:

The Contractor shall employ dust control methods and materials at all times using sprinkled water or other approved means. A mechanical street sweeper shall be utilized to clean the existing paved areas on an as-needed basis.

For emergency control of dust apply water to affected areas. The source of supply and the method of application for water are the responsibility of the contractor.

Implement and maintain stabilization measures (e.g., seeding protected by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydro mulch, gravel) that minimize erosion from exposed portions of the site. Initiate the installation of stabilization measures immediately28 in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days; and complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.

Diversion Swales:

A diversion swale shall be utilized in the interim phase to convey water away from the proposed building.

Check Dams:

Stone check dams shall be utilized within the diversion swales to reduce runoff velocity and erosion while allowing sediments to settle.

Stockpiles:

Locate the piles outside of any natural buffers and away from any stormwater conveyances, drain inlets, and areas where stormwater flow is concentrated; Install a sediment barrier along all downgradient perimeter areas; For piles that will be unused for 14 or more days, provide cover or appropriate temporary stabilization You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or water of the U.S.

Dewatering Practices

Dewatering shall be used to prevent damages, reduce erosion, and control runoff. If necessary, the discharge water generated by the construction dewatering will be directed to a temporary detention basin, or settling basin as permitted by state regulation. The pumping discharge shall not be allowed to enter directly into wetlands. The water from the work areas shall be pumped to a temporary sedimentation and dewatering basin. Approximately 70 percent sedimentation trapping efficiency shall be achieved in sizing the basins to ensure that the basins are adequate to prevent overtopping from dewatering and to provide the required filtering. The outlet from the basin shall be located so as to not cause erosion of the surrounding area. Locations of the temporary sedimentation and dewatering basins are to be selected by the Contractor subject to approval from the Design Engineer/Landscape Architect. At the conclusion of dewatering activities, any and all well casings and equipment will be removed from the site.

If a sediment basin or similar impoundment is installed:
Situate the basin or impoundment outside of any water of the U.S. and any natural buffers
Design the basin or impoundment to provide storage for either:
i. The calculated volume of runoff from a 2-year, 24-hour storm; or ii. 3,600 cubic feet per acre drained.
Calculation are to be provided to Civil Engineer prior to commencement of site construction based on contractor's means and methods plan.

Pollution Prevention Measures

1. Before, during, and after construction, functional erosion and sedimentation controls shall be implemented to prevent the siltation of the wetland areas down-gradient of the site. Wattles, crushed stone, siltation fencing, temporary stabilization and other controls shall be properly maintained and are not to be removed until the site is permanently stabilized. Other controls shall be added as warranted during construction to protect environmentally-sensitive areas. Sufficient extra materials (e.g., wattles and other control materials) shall be stored on site for emergencies.

2. Casting of excavated materials shall be stored away from wetland areas and sensitive land areas.

3. Any stockpiling of loose materials shall be properly stabilized to prevent erosion and siltation. Preventative controls such as hay bales, temporary seeding/mulching and jute covering shall be implemented to prevent such an occurrence.

4. There shall be no flooding, ponding, or flood related damage caused by the project or surface run-off emanating from the project on lands of an abutter, nearby or down-gradient of the site.

5. There shall be no contaminant migration caused by the project to nearby and down-gradient properties, nearby aquifers, and nearby resource areas.

6. The Site Operator shall make sufficient provisions to control any unexpected drainage and erosion conditions that may arise during construction that may create damage on abutting properties. Said control measures are to be implemented at once.

7. During construction flood prevention, erosion, and sedimentation controls shall be in place before the natural ground cover is disturbed. Said controls shall be in place prior to other construction work and shall be monitored and approved by the Site Operator. They shall be properly maintained and are not to be removed until the site is stabilized.

8. The Site Operator shall designate a person or persons to inspect and supervise the drainage and erosion controls for the project. The Conservation Commission shall be notified as to the means to contact said individual or individuals on a 24-hour basis on all working and non-working days of the project. Said means of contact shall include at least 2 separate telephone number of said designated person or persons.

9. There shall be periodic inspection of wattles, and other erosion controls by the Operator's Designee to assure their continued effectiveness.

10. Street sweeping shall be used to keep public ways free and clear of sediment and dirt from the site activities.

Other Control Measures

Waste Materials. All trash and construction debris from the site will be hauled to an approved landfill or recycling facility. No construction waste material will be buried on the site. All personnel will receive instructions regarding the correct procedure for waste disposal. Notices describing these practices will be posted in the construction office. The site superintendent will be responsible for seeing that these procedures are followed. Employee waste and other loose materials will be collected so as to prevent the release of floatables during rainfall events.

Hazardous Waste. No Hazardous materials are expected to be encountered. The mandated State and Local permits for removal of such materials, if located, will be implemented when such materials are encountered.

After Construction the Owner shall be responsible for the following:

General Land Grading and Slopes Stabilization

All surfaces and slopes shall be checked bi-annually to see that vegetation is in good condition. Any rills or damage from erosion shall be repaired immediately to avoid further damage. If seeps develop on the slopes, the area will be evaluated to determine if the seep will cause an unstable condition and shall be stabilized immediately if necessary. Problems found during the inspections by the Owner shall be repaired promptly.

Areas requiring re-vegetation shall be replanted immediately. Slopes and other exposed surfaces receiving vegetation will be maintained as necessary to support healthy vegetation.

Areas of steep slopes (2.5:1 or greater) shall be stabilized using jute mesh or a similar approved erosion blanket.

Erosion Controls

Erosion controls shall not be removed or dismantled without approval from the Engineer or Conservation Commission. Sediment deposits that are removed or left in place after the barriers have been dismantled shall be graded manually to conform to the existing topography and vegetated using seeding or other long term cover as approved in the Landscape Plan. Bare ground that cannot be permanently stabilized within 30 days shall be stabilized by temporary measures.

Street Sweeping

It is proposed that the parking and drive areas be swept with a wet brush street sweeper on a semi-annual basis, with at least two sweepings per year. One sweep shall be done at the end of the winter season (prior to the heavy rains), and the other sweep at the end of autumn (prior to snowfall).

Stormwater Management System

Catch Basins, Area Drains, and Drain Manholes:

The catch basins, drain manholes, roof drains, and area drains shall be inspected quarterly, and cleaned out when sumps are approximately one foot full. The use of "clam shells" for sediment removal shall not be allowed; a vacuum truck shall be the approved method of cleaning. Integrity and functionality of oil hoods shall also be checked at the time of the inspection.

Water Quality Unit (WQU):

Water Quality Unit shall be as follows and per manufacturer's recommendations:

- Units should be inspected and cleaned/emptied post-construction, prior to being put into service.
- Inspect every six months for the first year of operation to determine the oil and sediment accumulation rate. In subsequent years, inspections can be based on first-year observations
- Cleaning is required once the sediment depth reaches 15% of storage capacity (generally taking one year or longer).
- Inspect the unit immediately after an oil, fuel, or chemical spill.
- A licensed waste management company should remove captured petroleum waste products from any oil, chemical, or fuel spills and dispose responsibly.
- Owner to follow the requirements of the manufacturer for maintenance and cleaning of the units with a frequency as noted above, and where the requirements of this Operations and Maintenance Plan are more rigorous than manufacturer's requirements, defer to this Operations and Maintenance Plan.

Infiltration and Detention Systems:

The infiltration systems' inlets and outlets should be inspected twice a year, in spring and fall. Any clogs, debris, or sedimentation should be cleared as required to ensure the inlets and outlets are flowing freely.

The infiltration chambers and inlet and outlet connections should be inspected every 6 months.

Any clogs, sediment, or debris encountered within the infiltration system should be removed using a vacuum truck. The integrity and functionality of the chambers, pipes, and inspection ports should also be checked at the time of the cleaning.

BMP Accessories: Level Spreaders, Outlet Structures, Catch Basin Inserts

Level Spreaders: Inspect level spreaders regularly, especially after large rainfall events. Note and repair any erosion or low spots in the spreader.

Outlet Structure: The preferred approach is to end the outlet pipe at a headwall or flared-end structure with a riprap or bio-engineered splash pad, discharging to a manmade drainage swale that is aligned at no more than a 45-degree angle to a stream channel. Design the outlet point and riprap or bio-engineered splash pad to reduce the energy sufficiently to eliminate a need to install riprap on the bank opposite the outfall point to protect it from scour.

Catch Basin Inserts: Inspect Catch Basin Inserts per the manufacturer's schedule, and especially after large rainfall events. Whoever is responsible for maintenance should explicitly agree to conduct the maintenance per the manufacturer's recommendation and to lawfully dispose of the cleanings or used filtration media.

Snow Storage

Snow shall be stored within snow storage locations on the site. See plan C-1.0 for more detail.

De-Icing Chemicals

De-icing of the vehicular parking areas is done by a sub-contractor who uses typical sand and salt mixture.

Equipment Cleaning

All police equipment shall be washed at Franklin DPW.

INSPECTION REPORT FORM FOR STORM WATER SYSTEM

Project: Tri-County Regional Technical High School - Franklin, MA
147 Pond Street, Franklin, MA

INSPECTOR:_____ DATE:_____

Regular Inspection: ☐
Inspection after Rainfall: ☐ Amount of Rainfall:____inches

BMP	Functioning Correctly	Notes/Action Taken
Water Quality Unit	Y/N	
Outlet Control Structure	Y/N	
Catch Basin	Y/N	
Double Catch Basin	Y/N	
Drainage Manhole	Y/N	
Infiltration system	Y/N	
Flared End Section	Y/N	
Area Drain	Y/N	

Additional Observations: _____

_____

_____

Action Required: _____

_____

_____

To be performed by:_____On or Before:_____

April 2019

STORMTRAP MAINTENANCE MANUAL

1. Introduction

As with any Stormwater system regular inspections are recommended to ensure the long-term function of the system per design. As Stormwater migrates through the system, both sediment and debris could collect or settle within the system invert. Such events would prompt a regular inspection and or maintenance plan. Please call your Authorized StormTrap Representative (877-867-6872) if you have questions regarding the inspection and/or maintenance of the StormTrap system(s). Prior to entry into any underground storm sewer or underground detention systems, appropriate OSHA and local safety regulations and guidelines should be followed.

2. Inspection Schedules

StormTrap Stormwater Management Systems are recommended for inspection whenever the upstream and downstream catch basins and stormwater pipes of the stormwater collection system are inspected and/or maintained. This will economize the cost of the inspection if it is done at the same time the municipal crews are servicing the area.

During the first year of service, StormTrap recommends an accelerated inspection schedule to establish baseline levels of debris and/or sediment within the system. Inspections should be made after each significant rain event or runoff period. We also recommend a quarterly inspection in addition to the event-based inspections for the first 12 months. Based upon the results of the first year of inspections, a more appropriate schedule can be generated.

StormTrap Stormwater Management Systems for a private development are recommended for inspection after construction activities are complete and system is functioning per design and after each major storm water event. Until a cleaning schedule can be established, a quarterly inspection is recommended for the first 12 months. After the first 12 months, a

regular schedule can be implemented. If inspected on a biannual basis, the inspection should be conducted before the stormwater season begins to be sure that everything is functioning properly for the upcoming storm season. If inspected on an annual basis, the inspection should be conducted before the stormwater season begins to be sure that everything is functioning properly for the upcoming storm season.

3. Inspection Process

Inspections should be done such that at least 2-3 days has lapsed since the most recent rain event to allow for complete draining. Visually inspect the system at all manhole locations. Utilizing a sediment pole, measure and document the amount of silt at each manhole location (Figure 1). Inspect each pipe opening to ensure that the silt level or any foreign objects are not blocking the pipes. Be sure to inspect the outlet pipe(s) because this is typically the smallest pipe in the system. It is common that most of the larger materials will be collected upstream of the system in catch basins, and it is therefore important at time of inspections to check these structures for large trash or blockages.

Remove any blockages if you can during the inspection process only if you can do so safely from the top of the system without entering into the system**. Do not go into the system under any circumstances** without proper ventilation equipment and confined space training. Pass any information requiring action onto the appropriate maintenance personnel if you cannot remove the blockages from above during the inspection process. Be sure to describe the location of each manhole and the type of material that needs to be removed.

The sediment level of the system should also be measured and recorded during the inspection process. Recording the sediment level at each manhole is very important in order get a history of sediment that can be graphed over time (i.e. years) in order to estimate when the system will need to be maintained next. It is also important to keep these records to verify that the inspection process was actually performed if anyone asks for your records in the future. ***(Please see Appendix A for reference)***

The sediment level in the underground detention system can be determined from the outside of the system by opening up all the manholes and using a sediment pole to measure the

amount of sediment at each location. Force the stick to the bottom of the system and then remove it and measure the amount of sediment at that location. Again, do not enter into the system under any circumstances without proper ventilation equipment and training. Please see Appendix A for a sample inspection document.

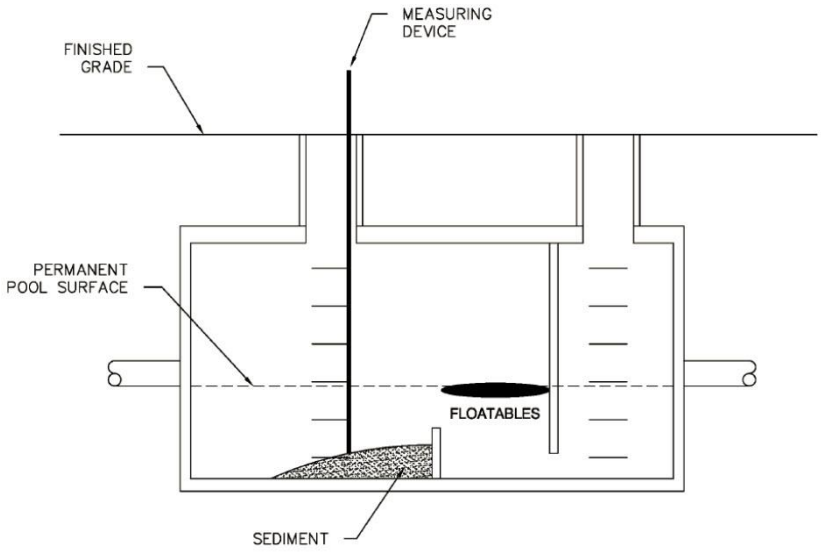


Figure 1. During inspection, measure the distance from finished grade to the top of the sediment inside the system.

4. When to Clean the System

Any blockages should be safely removed as soon as it is safely possible to ensure the StormTrap detention system will fill and drain properly before the next stormwater event.

The dry detention system should be completely cleaned whenever the sediment occupies more than 10% to 15% of the originally designed system's volume. A wet system (sometimes referred to as a wet vault) should be cleaned when the sediment occupies more than 30% or 1/3rd of the originally designed system's volume.

NOTE: Check with your municipality to ensure compliance with local guidelines regarding cleaning criteria, as the allowable sediment before cleaning may different that StormTrap's recommended ranges.

5. How to Clean the StormTrap

StormTrap systems should be completely cleaned back to 100% of the originally designed storage volume whenever the above sediment levels have been reached. Be sure to wait at least 3 days after a stormwater event to be sure that the system is completely drained (if it is a dry detention system), and all the sediments have settled to the bottom of the system (if it is a wet detention system).

There are many maintenance companies that can be contracted to clean your underground stormwater detention systems and water quality units. Please call your StormTrap representative for referrals in your area.

Product Specific Maintenance Recommendations

A. SingleTrap on a Concrete Slab

Maintenance is typically performed using a vacuum truck or jet-vac system. If headroom allows, sediment can be manually gathered near access openings and removed with suction. Shorter systems will require a mobile jet vac system that operates throughout the system to collect and remove sediment.

Sediment should be flushed towards a vacuum hose for thorough removal. For a dry system, remove the manhole cover at the top of the system and lower a vacuum hose into one of the rows of the StormTrap system. If present, open the manhole at the opposite end of the StormTrap and use sewer jetting equipment to force water in the same row from one end of the StormTrap row to the opposite side. The rows of the StormTrap are completely open in one contiguous channel from one end to the other for easy cleaning.

If the system was designed to maintain a permanent pool of water, floatables and any oil should be removed in a separate procedure prior to the removal of all sediment.

The floatable trash is removed first by using a bucket strainer to capture and remove any floating debris.

The floatable oils are then removed off the top of the water by using the vacuum truck to suck off any floatable fluids and liquids.

The next step is to use the vacuum truck to gently remove the clarified water above the sediment layer.

The final step is to clean the sediment for each row as described above. For smaller systems, the vacuum truck can remove all the sediment in the basin without using the sewer jetting equipment because of the smaller space.

B. SingleTrap on Stone

SingleTrap systems on a stone base require a similar cleaning process as a SingleTrap on a concrete slab. However, extra care needs to be taken to make sure the stone base retains levelness. If system headroom allows, manual raking of sediment a debris can be performed. Shorter systems may require jet vac equipment. Adjusting the pressure setting on the jet vac to ensure the stability of the stone base.

Sediment should be flushed towards a vacuum hose for thorough removal. Remove the manhole cover at the top of the system and lower a vacuum hose into one of the rows of the StormTrap system. Access the manhole at the opposite end of the StormTrap and use sewer jetting equipment to force water in the same row from one end of the StormTrap row to the opposite side. The rows of the StormTrap are completely open in one contiguous channel from one end to the other for easy cleaning.

C. DoubleTrap

A DoubleTrap system can be maintained in a similar fashion as a SingleTrap on a concrete slab. Typically, headroom is greater in DoubleTrap systems and access is easier for manual

gathering of sediment and debris. Again, maintenance is typically performed using a vacuum truck or jet-vac system. Sediment can be gathered near access openings and removed with suction. Alternately, a jet vac system that operates throughout the system can be used to remove sediment.

Sediment should be flushed towards a vacuum hose for thorough removal. For a dry system, remove the manhole cover at the top of the system and lower a vacuum hose into one of the rows of the StormTrap system. If present, open the manhole at the opposite end of the StormTrap and use sewer jetting equipment to force water in the same row from one end of the StormTrap row to the opposite side. The rows of the StormTrap are completely open in one contiguous channel from one end to the other for easy cleaning.

If the system was designed to maintain a permanent pool of water, floatables and any oil should be removed in a separate procedure prior to the removal of all sediment.

The floatable trash is removed first by using a bucket strainer to capture and remove any floating debris.

The floatable oils are then removed off the top of the water by using the vacuum truck to suck off any floatable fluids and liquids.

The next step is to use the vacuum truck to gently remove the clarified water above the sediment layer.

The final step is to clean the sediment for each row as described above. For smaller systems, the vacuum truck can remove all the sediment in the basin without using the sewer jetting equipment because of the smaller space.

D. ShallowTrap

A ShallowTrap system can be cleaned in a similar fashion as a Single Trap on a stone base. The headroom limitation will not allow for manual entry removal of sediment. Precautions will need to be taken to ensure the stone base retains levelness. Using a jet vac system to flush out the sediment is the recommended method.

Sediment should be flushed towards a vacuum hose for thorough removal. Remove the manhole cover at the top of the system and lower a vacuum hose into one of the rows of the ShallowTrap system. Access the manhole at the opposite end of the ShallowTrap and use sewer jetting equipment to force water in the same row from one end of the ShallowTrap row to the opposite side. The rows of the ShallowTrap are completely open in one contiguous channel from one end to the other for easy cleaning.

E. SiteSaver

Site Savers have 3 potential components that require maintenance and cleaning. Depending on the specifications of the system, trash nets, oil mats, and sediment removal will all need to be addressed.

Inspections should be done such that a enough time has lapsed since the most recent rain event to allow for a static water condition. Visually inspect the system at all manhole and access opening locations. For debris accumulation, visually inspect the netting or screening basket components (if utilized) to determine the bag or basket capacity. Nets or baskets containing only minor quantities of debris may be retained in place. It is recommended to replace the nets or clean the screening baskets when they appear 1/2 - 2/3 full. Failure to replace nets and/or remove floatables from bypass screening (if applicable) will lead to hydraulic relief, drain down deficiencies, and decrease the long-term functionality of the system.

For sediment accumulation, utilize either a sludge sampler or a sediment pole to measure and document the amount of sediment accumulation. To determine the amount of sediment in the system with a sludge sampler follow the manufacturer's instructions. If utilizing a sediment pole, first insert the pole to the top of the sediment layer and record the depth. Then, insert the pole to the bottom of the system and record the depth. The difference in the two measurements corresponds to the amount of sediment in the system. Finally, inspect the inlet pipe opening to ensure that the silt level or any foreign objects are not blocking the pipe.

Maintenance should be done utilizing proper personal protective equipment such as: safety glasses, hard-hat, gloves, first aid kit, etc. Maintenance should occur only when a sufficient

time has lapsed since the most recent rain event to allow for a static water condition for the duration of the maintenance process.
In the case that only trash and floatables need to be removed, and a netting configuration or a removable screening basket is utilized, a vacuum truck is not required. However, a vacuum truck is required if a fixed screening basket configuration is utilized. If the maintenance event is to include oil removal and or sediment removal a vacuum truck or similar equipment would be needed.

Install a new net assembly by sliding the netting frame down the support frame and ensure the netting lays over the plate assembly such that the netting is not restricted. To order additional disposable nets, contact your local SiteSaver representative. New nets come with tie wraps temporarily holding the net material to the frame component for easy handling and storage. It is not recommended to remove the tie wraps until the net is ready to be installed. The frame is tapered from top (widest part) to bottom, and is also tapered from front (towards the sewer) to back. Cut the tie wraps that secures the netting material to the frame for shipment and lower the net down the guide rails. If debris has accumulated in the net support frame, remove the objects so the new net seats fully in the channel when installed.
When lowering the net, the following details should be exercised when placing the net:

- Watch the lowering to make sure that there are no unexpected entanglements.
- Be careful not to let the toe of the net get caught under the frame when it reaches the bottom of the support frame. This is typically accomplished by holding the toe of the net until after the net has started to prop into place.
- Ensure the netting lays over the plate assembly such that the netting is not restricted.

Access to the netting chamber can be achieved via the square grated opening atop the Site Saver unit. Trash net needs to be removed completely (including the frame) with a service vehicle (crane/hoist/boom truck).

For sediment removal, the SiteSaver is designed with clear access at both the inlet and outlet. A vacuum truck, or similar trailer mounted equipment, can be used to remove the sediment, hydrocarbons, and water within the unit. For more effective removal, it is recommended to use sewer jetting equipment or a spray lance to force the sediment to the vacuum hose. When the floor is sufficiently cleaned, fill the system back to its normal water elevation (to the pipe inverts).

Complete a post maintenance inspection to ensure that all components have been replaced and are properly secured within the SiteSaver device. It is a good practice to take time stamped photographs after every maintenance event to include within maintenance logs. After verifying all components, secure the access openings and ensure proper disposal of all pollutants removed during maintenance per local, state, and federal guidelines.

Proof of inspections and maintenance is the responsibility of the owner. All inspection reports and data should be kept on site or at a location where they will be accessible for years in the future. Some municipalities require these inspection and cleaning reports to be forwarded to the proper governmental permitting agency on an annual basis. Refer to your local and national regulations for any additional maintenance requirements and schedules not contained herein. Inspections should be a part of the standard operating procedure. It is good practice to keep records of rainfall events between maintenance events and the weight of material removed, even if no report is required.

F. Sand Filter

Sand filter beds can crust over and become clogged or partially clogged, for this reason we recommend inspecting the sand filters at least annually. To remove this, the upper layer of clogged and / or hardened sand will need to be broken up with a steel rake or a similar device. After breaking up the top 2-5 inches of contaminated media, the lose sand can be scrapped off and removed via a vacuum truck. Replace and regrade the media with the approved material per the original design.

Various contractors specialize in this work. Maintenance methodologies range from manual replacement and removal to robotic devices that require no human entry into the system. Please consult to local maintenance contractors for additional information.

6. Inspection Reports

Proof of these inspections is the responsibility of the property owner. All inspection reports and data should be kept on site or at a location where they will be accessible for years in the future. Some municipalities require these inspection and cleaning reports to be forwarded to the proper governmental permitting agency on an annual basis.

Refer to your local and national regulations for any additional maintenance requirements and schedules not contained herein. Inspections should be a part of your standard operating procedure. Please see Appendix A for a sample Inspection and Maintenance form.

Appendix A

Sample inspection and maintenance log

Underground Detention System Inspection and Maintenance Checklist

Facility:			
Location/Address:			
Date:	**Time:**	**Weather Conditions:**	**Date of Last Inspection:**
Inspector:		**Title:**	
Rain in Last 48 Hours □ **Yes** □ **No**		**If yes, list amount and timing:**	
Pretreatment: □ **vegetated filter strip** □ **swale** □ **turf grass** □ **forebay** □ **other, specify:**			□ **none**
Site Plan or As-Built Plan Available: □ **Yes** □ **No**			

*Do not enter underground detention chambers to inspect system unless Occupational Safety & Health Administration (OSHA) regulations for confined space entry are followed.
*Follow inspection and maintenance instructions and schedules provided by system manufacturer and installer.
* Properly dispose of all wastes.

Inspection Item		Comment	Action Needed
1. PRETREATMENT			
Sediment has accumulated.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
Trash and debris have accumulated.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
2. INLETS			
Inlets are in poor structural condition.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
Sediment, trash, or debris have accumulated and/or is blocking the inlets.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
3. CHAMBERS			
Sediment accumulation threshold has been reached.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
Trash and debris have accumulated in chambers.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
4. OTHER SYSTEM COMPONENTS			
Structural deterioration is evident.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
5. OUTLETS			
Outlets in poor structural condition.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
Sediment, trash or debris are blocking outlets.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
Erosion is occurring around outlets.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
6. OTHER			
Evidence of ponding water on area draining to system.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
Evidence that water is not being conveyed through the system.	☐**Yes** ☐**No** ☐**N/A**		☐**Yes** ☐**No**
Additional Notes			
Wet weather inspection needed □ **Yes** □ **No**			

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-7200 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS geotextile fabric is placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the chamber's sidewall. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-7200 models as these chambers do not have perforated side walls.

The Isolator Row Plus is designed to capture the "first flush" runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

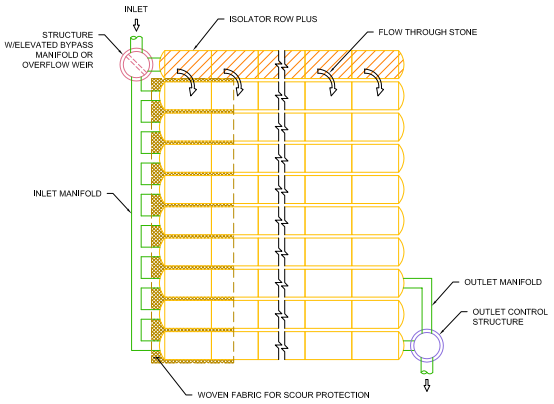
The Isolator Row FLAMP™ (patent pending) is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row PLUS from the manhole opening, ADS PLUS Fabric is shown between the chamber and stone base.

StormTech Isolator Row PLUS with Overflow Spillway (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

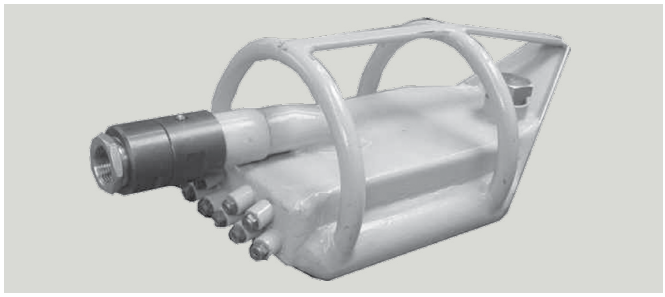
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row Plus, clean-out should be performed.

Maintenance

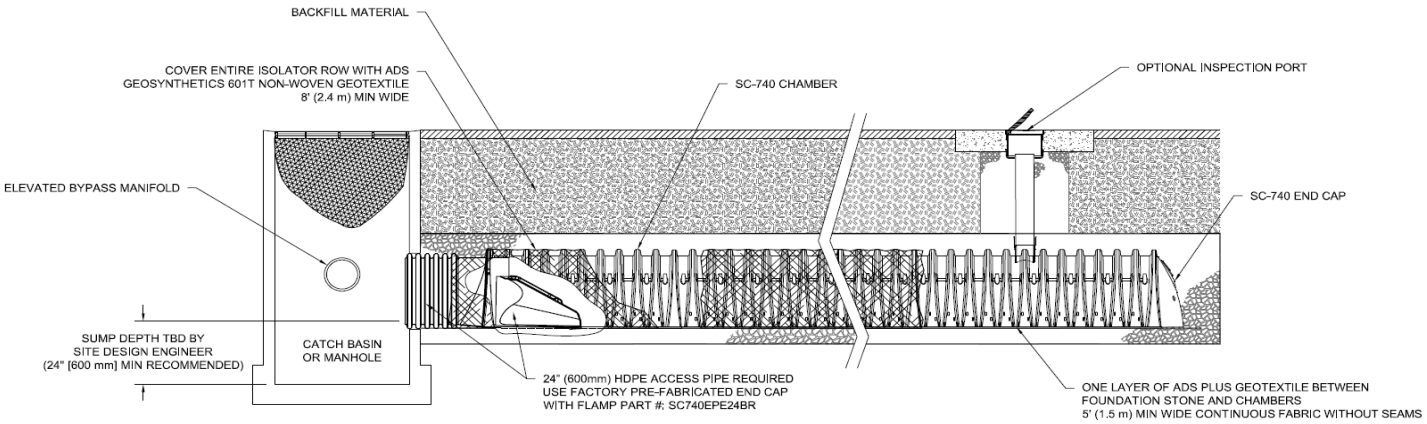
The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row PLUS (*not to scale*)

Note: *Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-7200 chamber models and is not required over the entire Isolator Row PLUS.*



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
- i. Remove lid from floor box frame
- ii. Remove cap from inspection riser
- iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
- iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
- i. Remove cover from manhole at upstream end of Isolator Row Plus
- ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
  1. Mirrors on poles or cameras may be used to avoid a confined space entry
  2. Follow OSHA regulations for confined space entry if entering manhole
- iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
  If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

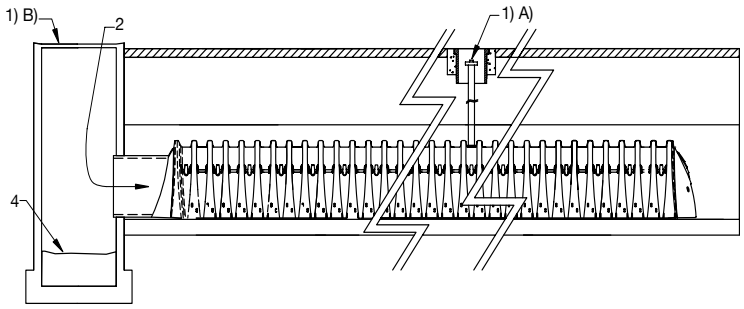
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sedi-ment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row PLUS, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com
800-821-6710

APPENDIX 6:
ILLICIT DISCHARGE COMPLIANCE STATEMENT

ILLICIT DISCHARGE COMPLIANCE STATEMENT

SITE ADDRESS: 147 Pond Street Franklin, MA

OWNER/APPLICANT: Karen Maguire (School Superintendent)

PLAN REFERENCE: Tri-County Regional Technical HS C500-C505 Stormwater Management Plan

DATE: 03/21/2024

As required by Standard 10 of the Massachusetts Stormwater Standards, I, the undersigned, being the authorized owner/responsible party of the above referenced property do hereby certify that no illicit discharges exist on the site and that the stormwater management system, as shown on the above referenced plan, does not contain or permit any illicit discharges to enter the stormwater management system.

Through the implementation of the Long-Term Pollution Prevention Plan and Operation and Maintenance Plan, measures are set forth to prevent illicit discharges from entering the stormwater management drainage system. Further, I certify that the stormwater management system as shown on the referenced plan will be maintained in accordance with the conditions of the Long-Term Pollution Prevention Plan.

NAME: Karen M. Maguire

SIGNED: Karen M. Maguire

DATE: 3/20/24