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June 28th, 2021

Stormwater Management Report

Site Location:
Edgewater Filtration Facility
East Hampton, Connecticut

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1.0 INTRODUCTION

Connecticut Water Company proposes to develop the existing 2.5-acre lot at 204 Edgewater Circle for the new water filtration facility in East Hampton Connecticut. The facility will include chemical treatment, atmospheric storage, and a booster pumping station. The proposed work includes demolition of the existing site features, construction of new filtration facility features, and associated site work. Site improvements will include a 20' wide paved access driveway, new fencing and guardrails, access to existing wells on site, access to the existing adjacent stormwater basins on the lot, new utilities, and associated stormwater management system. This project will allow Connecticut Water Company to utilize their filtration facility to meet current and future needs. Work associated with this project will include but not be limited to paving, grading and installation of drainage infrastructure.

A portion of the northwest corner of the site is within an inland wetland area defined by the Connecticut Inland Wetlands and Watercourses Act (IWWA). Some work will occur within the 100-foot wetland buffer as defined by the Town of East Hampton Inland Wetlands and Watercourses Agency Regulations. NRCS soil mapping describes the area as being Nipmuck-Brookfield complex, 15 to 45 percent slopes, (Appendix B).

2.0 DESIGN METHODOLOGIES

All storm drainage has been designed in accordance with the State of Connecticut, Department of Transportation, Drainage Manual and the DEEP Connecticut Stormwater Quality Manual. Pre-development and post-development conditions were modelled using HydroCAD software. The proposed design mitigates peak flows for the 2-year, 10-year, 25-year, 50-year, and 100-year 24-hour storm events. A minimum time of concentration of 6 minutes was used for all hydraulic calculations. Precipitation records for each design storm are taken from the NOAA Atlas 14 Precipitation Frequency Data Server for East Hampton, CT. Stormwater calculations are performed based on TR-55 design methodology.

The proposed project will create no new untreated discharges. Impervious area will be inceased in comparison with existing conditions. Stormwater runoff generated from the new paved parking and driveway areas will be treated prior to discharge to the wetland resource area. HydroCAD modeling of the site is provided in Attachment D.

The proposed drainage system consists of a series of deep sump catch basins which capture and convey stormwater through underground drainage culverts and drain manholes. The runoff from the impervious areas on site is piped to an infiltration basin with a sediment forebay. The infiltration basin on site is designed to have the capacity to control the 100-year frequency design storm. The Pre-Development and Post-Development Hydrograph Analysis and a table summarizing peak discharges can be found in attachment D.

Due to the increase in impervious area, the Groundwater Recharge Volume for the site is 1,741 cubic feet. The available volume from the infiltration basin on site is 1,810 cubic feet. This reflects the amount of volume available in the infiltration basins below the elevation of any outlet device. This reflects the amount of volume available in the infiltration basins below the elevation of any outlet device. See Attachment E for all recharge and water quality volume calculations and a sediment forebay sizing calculation.

The Infiltration rate used for the site was based on site soils that have been characterized as belonging to Hydrologic Soil Group B, verified by NRCS Soil Mapping and onsite test pits (Attachment B). Infiltration areas are required to have a maximum drawdown time of 48 hours. The infiltration area hydrographs in the HydroCAD model in Attachment D show that this requirement is achieved.

Necessary erosion and sedimentation control measures will be utilized during construction. These measures will include compost filter tubes, catch basin protection, and a stabilized construction entrance, as depicted on the site plans.

3.0 PRE-DEVELOPMENT SITE CONDITIONS

The pre-development site area is comprised of wooded and grassed areas. The property is graded such that all storm runoff flows overland to the adjacent wetland resource area to the northwest section of the property (Discharge Point "A" on Figure-1 Attachment D).

4.0 POST-DEVELOPMENT SITE CONDITIONS

The post-development hydraulic analysis is comprised of four (4) subcatchment areas as shown on Figure-2 in Attachment D.

Proposed site runoff will be captured by deep sump catch basins. Roof runoff from subcatchment A-3 is collected by the catch basins on site and is piped to the Infiltration Basin. Roof run off from subcatchment A-2 runs into swale on the south side of the building.

Prior to entering the infiltration basin, pre-treatment shall occur through the use of 4'-deep sumps catch basins and sediment forebay system. Stormwater improvements achieved with the proposed drainage design are summarized as follows:

- Reduction in peak rate of runoff
- Promotion of infiltration of runoff and groundwater recharge
- Removal of sediment and Total Suspended Solids (TSS)
- Outlet protection of proposed stormwater discharges for protection of adjacent inland wetlands.

5.0 EROSION & SEDIMENTATION CONTROL MEASURES

In order to protect the adjacent inland wetland from construction related activities, a Soil Erosion and Sediment Control Plan has been developed in accordance with the latest State of Connecticut Guidelines for Soil Erosion and Sediment Control. This plan will be implemented prior to the start of any site disturbance and will involve the combined use of perimeter silt fencing, hay bale barriers, and an anti-tracking pad. Additional measures will involve tree protection and temporary soil stockpiling of stripped topsoil. Refer to Specification 01 57 19 for Erosion and Sedimentation Control Plan.

Once a construction schedule has been established a person shall be named and will be responsible for implementation of sediment and erosion control measures. This responsibility includes the acquisition of materials, installation, and maintenance of erosion and sediment structures, the communication and detailed explanation to all people involved in the site work of the requirements and objective of the erosion and sediment control measures. In the event the applicant is not owner of the property, the current owner shall have all the responsibilities listed in this paragraph and shall submit a working phone number for contact at time of application for permits.

Weston and Sampson Engineers, Inc. ((860) 513-1473) located at 712 Brook Street, Suite 103, Rocky Hill, Connecticut, 06067 shall be notified of any proposed alteration to the erosion and sediment control plan, prior to altering, in order to ensure the feasibility of the addition, subtraction, or change in the plan.

An Operation and Maintenance Plan (O&M Plan) has been prepared for the proposed stormwater management system. This O&M Plan is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. This plan provides guidelines for when the stormwater system should be cleaned, and associated record keeping and can be found in Attachment F.

6.0 SUMMARY

A Pre & Post Development analysis (Attachment D) has been performed to show that the total peak flow rate for the 2- to 100-year design storms has not increased over that of pre-development. A summary of the (total) pre and post-development peak flow rates is shown below in Table 1:

2-year, 24-hour storm		10-year, 24-hour storm		25-year, 24-hour storm		50-year, 24-hour storm		100-year, 24-hour storm	
Peak Flow (cfs) (Pre)	**Peak Flow (cfs) (Post)**	Peak Flow (cfs) (Pre)	**Peak Flow (cfs) (Post)**	Peak Flow (cfs) (Pre)	**Peak Flow (cfs) (Post)**	Peak Flow (cfs) (Pre)	**Peak Flow (cfs) (Post)**	Peak Flow (cfs) (Pre)	**Peak Flow (cfs) (Post)**
0.49	**0.44**	2.05	**1.58**	3.25	**2.70**	4.21	**3.35**	5.30	**4.00**

It can be seen from the results in Table 1, that the proposed Stormwater Management System will effectively serve to mitigate the effects of the proposed site improvements. The post-development peak flows for the various design storms are below that of pre-development.

ATTACHMENT A

Locus Map

250 125 0 250

SCALE 1"= 250'

LOCUS MAP

Weston & Sampson

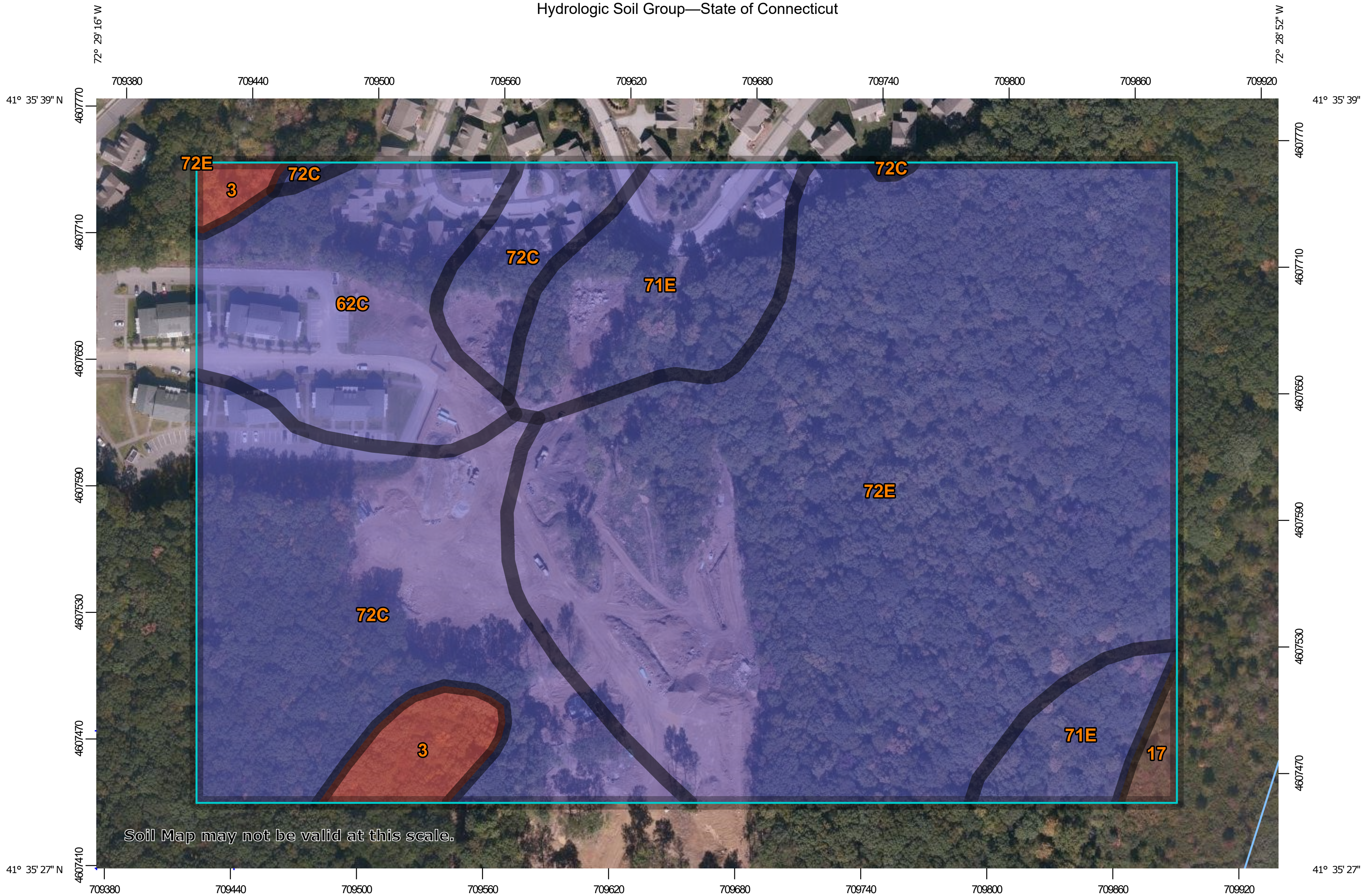
Weston & Sampson Engineers, Inc.

55 Walkers Brook Drive, Suite 100, Reading MA 01867

ATTACHMENT B

NRCS Soils Map, Soils Report, & HSG Classifications

Hydrologic Soil Group—State of Connecticut



Map Scale: 1:2,570 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N 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 1:12,000.

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: State of Connecticut
Survey Area Data: Version 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Sep 3, 2019—Oct 22, 2019

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
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	1.0	2.9%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	B/D	0.3	0.7%
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	B	3.8	10.9%
71E	Nipmuck-Brimfield-Rock outcrop complex, 15 to 45 percent slopes	B	3.8	10.8%
72C	Nipmuck-Brookfield complex, 3 to 15 percent slopes, very rocky	B	8.1	23.1%
72E	Nipmuck-Brookfield complex, 15 to 45 percent slopes, very rocky	B	18.1	51.6%
Totals for Area of Interest			**35.1**	**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

ATTACHMENT C

Test Pit Summary & Logs

GeoInsight
ENVIRONMENTAL STRATEGY & ENGINEERING

GEOTECHNICAL ENGINEERING ASSESSMENT REPORT
PROPOSED EDGEWATER TREATMENT FACILITY
204 EDGWATER CIRCLE
EAST HAMPTON, CONNECTICUT

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PROPOSED EDGEWATER TREATMENT FACILITY
204 EDGWATER CIRCLE
EAST HAMPTON, CONNECTICUT

1.0 INTRODUCTION

GeoInsight, Inc. (GeoInsight) prepared this geotechnical engineering assessment report for Weston & Sampson (W&S) regarding planned construction of a new treatment building and water storage tank at the property located at 204 Edgewater Circle in East Hampton, Connecticut (the Site; see Figure 1). Included herein is our understanding of the project and our assessment of subsurface conditions as they relate to foundation design and earthwork construction for the proposed project. Our services were performed in general accordance with a Scope of Services dated February 26, 2021 and approval by W&S. This report is subject to the Limitations included herein.

1.1 PROJECT INFORMATION

Our understanding of the proposed project is based upon review of a plan titled *Layout and Grading Plan*, dated March 11, 2021 and prepared by W&S. GeoInsight also discussed the proposed project with W&S and the pre-cast concrete tank manufacturer DN Tanks via conference call to further understand the proposed water storage tank (WST) design and construction.

The Site is located on the east side of Edgewater Circle and is currently an undeveloped property. Topography at the Site slopes moderately-steeply downward from west to east, from approximately elevation (El.) 550 feet along Edgewater Circle to approximately El. 505 feet in the eastern portion of the Site. Mapped wetlands are located in the northeastern portion of the Site, and two stormwater detention basins are present in the southern portion of the Site. The *Layout and Grading Plan* identifies "exposed ledge" in the northern and southern portions of the Site.

We understand the proposed project generally consists of developing the central portion of the Site with a new water treatment facility. The proposed construction includes a new single-story, 3,000 square-foot treatment facility building in the central portion of the Site with a finished floor elevation at El. 525.5 feet, and a new 42-feet diameter WST with a floor elevation equal to the proposed treatment building at El. 525.5 feet. The WST is planned to be a pre-cast concrete tank. The WST is planned to be constructed into the existing sloping hillside, with the elevation of new soil backfill on the west side of the WST at El. 539 feet, and sloping gradually upward to the west towards Edgewater Circle. Additional Site development is planned to include two site retaining walls, permanent soil slopes with maximum steepness of not more than approximately 3 horizontal to 1 vertical, a vehicle access road, and ancillary utilities.

2.0 SUBSURFACE EXPLORATION PROGRAM

GeoInsight performed a geotechnical subsurface exploration program at the Site on March 25 and 26, 2021 that consisted of drilling a total of nine geotechnical soil borings, identified as B-1 through B-9. The borings were drilled by SITE, LLC using a CME 55 LCX ATV-mounted drill rig and hollow-stem augers.

The boring locations were selected based upon the layout of proposed new structures as shown on the *Layout and Grading Plan* referenced herein. The boring locations were established in the field using a handheld global positioning system unit. Approximate boring locations are shown on Figure 1.

The borings were advanced to depths of approximately 10.5 to 22 feet below ground surface (bgs). Split-barrel sampling via the Standard Penetration Test (SPT, American Society for Testing and Materials [ASTM] International D-1586-18) was conducted from ground surface to 4 feet bgs, from 5 to 7 feet bgs, and at 5-feet intervals thereafter to the termination depths of the borings. The summation of the blows necessary to collect the 6-inch to 18-inch depth interval of each SPT sample is called the Standard Penetration Number, which is used as an indicator of the soils' inherent *in situ* density.

GeoInsight oversaw the investigations, collected representative soil samples, measured apparent groundwater levels, and prepared boring logs. The final boring logs are included as Appendix A. Stratification lines shown on the boring logs represent approximate boundaries between soil types encountered. The actual transitions will likely be more gradual and may vary over short distances.

3.0 SUBSURFACE CONDITIONS

3.1 GENERAL

The profile and the soil conditions outlined below highlight the major subsurface stratifications at the Site. The individual boring logs should be consulted for detailed descriptions of the subsurface conditions encountered at each exploration location. When reviewing the exploration records and the subsurface profile, it should be understood that soil conditions might vary between and away from the boring locations. The findings of this report are less likely to apply to areas not investigated as a function of increased distance away from the specific subsurface exploration locations. Variations in subsurface conditions are possible laterally and with depth that are not identified on the boring logs or otherwise in this report.

3.2 OVERBURDEN SOILS

Overburden soil conditions at the Site consisted of a surficial organic topsoil layer underlain by a shallow layer of fill or reworked native soil, a native sandy till layer, and weathered bedrock. The subsurface layers encountered are described below in order of increasing depth below surface.

Surficial Materials: Ground surface at each of the borings consisted of approximately 2 to 6 inches of organic topsoil.

Fill/Reworked Native Soil: A shallow layer of existing fill or reworked native soil was encountered at each of the borings below the surficial topsoil layer. The fill/reworked native soil layer was observed to depths ranging from approximately 2 to 4 feet bgs, with the exception of boring B-4, where the fill was observed to approximately 7 feet bgs. The fill/reworked native soil layer was generally described as very loose to loose, brown or brown/orange, fine to medium sand with little to trace amounts of gravel, little to trace amounts of silt, and trace amounts of fine organic roots or "woody" material. Occasionally the soil contained greater than "little" amounts of gravel or silt.

Native Till: A native till layer was encountered at each of the borings below the fill/reworked native soil layer, to depths ranging from approximately 8 to 22 feet bgs. B-4 and B-5 terminated with in the till layer at 22 feet bgs, and therefore the total depth of the layer was not determined at those locations. The native till layer was generally described as medium dense to very dense, brown or brown/orange, fine to medium sand, with some to little amounts of gravel and little to trace amounts of silt. Many of the borings were drilled past apparent cobbles or boulders within the till layer, based upon observations of the soil resistance to drilling and grinding of augers.

Weathered Bedrock: A layer of apparent weathered bedrock was encountered below the till layer at six of the borings. Where encountered, the weathered bedrock was observed to approximately 2.3 to 5.5 feet thick. The weathered bedrock samples recovered from the SPTs was generally described as gray weathered rock.

3.3 REFUSAL SURFACES

Seven of the nine total borings terminated upon encountering auger refusal on presumed intact bedrock, at depths ranging from approximately 10.5 to 21.5 feet bgs. B-4 and B-5 terminated within the till layer at 22 feet bgs and did not encounter bedrock. The drilling refusal elevation trends indicated that apparent intact bedrock generally slopes downward from west to east, from approximately El. 524 feet to El. 491 feet in the proposed development area, with some deeper or shallower variations.

Bedrock cores were not collected from the refusal surfaces to definitively determine whether the refusal surfaces were in fact intact bedrock (versus boulders or intermediate weathered-fresh bedrock) or to determine Site-specific bedrock characteristics. Based upon the 1971 Bedrock Geologic Map of the Moodus Quadrangle, Connecticut, bedrock underlying the Site consists of (Ob) gray or rust-stained Brimfield Schist.

3.4 GROUNDWATER

Groundwater was observed at five of the nine boring locations shortly after completion of drilling, at depths ranging from approximately 2.5 to 21 feet bgs, which corresponds to approximately El. 510.2 feet to El. 504 feet.

Groundwater may be shallower or deeper during seasonal periods different than those at the time of subsurface explorations, and generally will fluctuate due to season, temperature, precipitation, nearby underground utilities, and construction activity in the area. Additionally, water may travel on top of the weathered or intact bedrock surfaces after rain events or during seasonally wet periods. Water levels during and following construction may vary from the groundwater measurements reported herein.

4.0 GEOTECHNICAL EVALUATION

4.1 GENERAL

Subsurface Conditions, Foundation System Selection and Suitable Subgrades

Subsurface conditions at the Site generally consisted of a shallow layer of existing fill/reworked native soil underlain by a native sandy till layer, weathered bedrock and apparent intact bedrock. The Site is suitable to support the proposed new treatment building and WST on conventional soil-supported foundations bearing on the native till or weathered bedrock, or compacted structural fill or crushed stone placed above native till or weathered bedrock, after over-excavation of existing fill/reworked native soil from below the structure footprints and foundation bearing zones. The native till or weathered bedrock, or compacted structural fill or crushed stone placed over these materials, should be considered the suitable bearing stratum for supporting the new treatment building and WST foundation and slabs.

Over-excavation of existing fill/reworked native soil of up to approximately 4 feet should be expected from below the proposed treatment building footprint for preparation of suitable subgrades. Within the proposed WST footprint, subgrades at the target tank foundation bearing elevation are generally expected to consist of suitable native till subgrades; however, up to approximately 1 to 2 feet of existing fill/reworked native soil may be present in the eastern outer edge of the foundation that will require over-excavation and replacement (refer to the subsurface cross section shown on Figure 1). Existing fill/reworked native soil requiring over-excavation from below the treatment building and WST footprints will generally be identifiable based upon the relatively looser/softer material as compared to the native till, and presence of minor amounts of roots and/or woody material.

Proposed Site retaining walls may be supported on suitable prepared existing fill/reworked native soil, on native till or weathered bedrock, or compacted structural fill or crushed stone placed above these materials. Preparation of retaining wall subgrades should generally consist of compacting the existing materials present after stripping of surficial topsoil and placement of retaining wall base materials as required by the retaining wall design engineer. If fill is required to achieve the retaining wall base design elevation, then fill placed to raise grades should consist of compacted structural fill or crushed stone.

Weathered or intact bedrock is not expected to be encountered within the expected excavation depths for construction of the treatment building, WST, or site retaining walls; however, these materials could be encountered during construction for deeper utilities, if planned.

Water Storage Tank Geotechnical Considerations

The proposed WST is planned to be constructed into the existing sloping hillside. Based upon the WST floor at El. 525.5 feet and proposed finished exterior grades on the west side of the WST at El. 539 feet and gradually sloping upward, an unbalanced lateral earth pressure equivalent to at least 13.5 feet is planned. Design of the WST should consider the lateral earth pressures associated with the planned unbalanced earth loading, including the effects of sloping ground surface. Additionally, the proposed access driveway is planned at approximately 15 feet from the western exterior wall of the WST and the eastern edge of the access road, and therefore vehicle traffic loading on the WST sidewalls should be considered in the design of the WST.

Site Retaining Walls

In order to achieve finished Site grades, two retaining walls are planned. The retaining walls are planned to be located in the western portion of the proposed development area (extending southeast from the proposed WST and southwest of the proposed treatment building) and in the eastern portion of the proposed development area. The western-area retaining wall is planned to have a maximum height of 6 feet, and the eastern-area retaining wall is planned to have a maximum height of approximately 15.4 feet. Additionally, the *Layout and Grading Plan* identifies a temporary crane pad to be located at the top of the eastern-area retaining wall where the wall is up to approximately 12 feet in height. A global stability assessment related to the eastern-area retaining wall should be performed, and the findings of the global stability assessment should be incorporated into the retaining wall design, as applicable.

5.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

5.1 TREATMENT BUILDING

5.1.1 FOUNDATION TYPE AND DESIGN CRITERIA

The Site is suitable for supporting the proposed treatment building on conventional shallow spread and continuous footing foundations. With proper Site preparation, the proposed treatment building may be supported on continuous and spread footings bearing directly on prepared native till or weathered bedrock, or on compacted structural fill or crushed stone placed over these materials.

The recommended maximum net allowable bearing pressure for the soil bearing conditions described above is 5,000 pounds per square foot (psf), provided footing subgrades are properly prepared. Settlement of properly constructed, soil-supported foundations is estimated to be on the order of 1 inch or less, and differential settlement should be less than 0. 5 inches between adjacent columns or over 40 feet (for continuous footings).

The recommended allowable bearing pressure presented above is related to isolated shallow spread footings directly underlying slabs having a minimum width of at least 3 feet and strip footings placed at depths of at least 3.5 feet having a width of at least 2 feet. The minimum width of strip footings directly below the slab, if present, should also be at least 3 feet.

Lateral loads imparted to foundations may be resisted by friction between the bottoms of footings and supporting subgrades, and by passive earth pressure against the sides of the foundation. A friction coefficient of 0.50 and an equivalent fluid unit weight of 200 pounds per cubic foot (pcf) against the sides of footings should be used for design of resisting walls.

The geotechnical design recommendations presented above assume that footings placed near the tops of descending slopes will be at least 5 feet laterally from the top of the slope to the outside footing edge, the adjacent slope will be not be steeper than 2 horizontal to 1 vertical (2H:1V), and soils comprising the slope and below the footing will be at least 120 pcf in total density.

5.1.2 SLAB-ON-GRADE DESIGN CRITERIA

We recommend designing the lowest floor treatment building slab as a soil-supported slab-on-grade bearing directly on a minimum 12 inches of compacted structural fill placed above prepared native till or weathered bedrock. A modulus of subgrade reaction of 275 pounds per cubic inch (pci) may be used for the slab design, assuming proper subgrade compaction, which is based upon floor loading consisting of relatively small/localized floor slab loads.

Concrete slabs should be constructed with concrete having a minimum compressive strength of 3,500 pounds per square inch and be at least 4 inches thick; increased thickness should be used in higher traffic areas or where slab performance is more critical. The final thickness of the slab should be determined by the structural engineer based upon design loading conditions. The slab concrete should be underlain by a vapor barrier (depending upon the slab concrete curing techniques used), reinforced at least with heavy gauge welded wire fabric, and include proper construction joints to control the occurrence of shrinkage cracks. We recommend slabs be specifically jointed around columns and walls to permit soil-supported slabs and shallow foundations to move differentially. Where the potential exists for localized heavy floor loads, it is advisable that anticipated loading conditions be addressed with: a thickened concrete section; the use of additional steel reinforcement within the slab; the use of haunched slab areas below zones of anticipated concentrated floor loads to distribute the weight; the addition of fibers into the concrete mix; and/or slab subgrade strengthening, such as the use of geosynthetics.

5.1.3 PERMANENT WATER DRAINAGE

The proposed treatment building is planned to be constructed with a soil-supported floor slab at El. 525.5 feet. Based upon the proposed finished floor elevation and recorded groundwater levels at the Site, foundation perimeter drains and floor slab underdrains are not necessary. However, an impervious cover should be placed at the exterior ground surface adjacent to the proposed building to reduce infiltration of surface runoff directly adjacent to the foundation. The near-surface Site soils are considered to have relatively moderate frost susceptibility.

5.2 WATER STORAGE TANK

5.2.1 WATER STORAGE TANK FOUNDATION DESIGN CRITERIA

Subsurface conditions are suitable to support the proposed WST on shallow reinforced concrete slab/mat foundation. The proposed WST may be supported on a flexible membrane (or other manufacturer-required floor slab cover materials) underlain by a minimum 4-inch thick (or thicker if required by the structural design) slab-on-grade. The slab should be thickened/haunched at the tank edge to support the tank walls and cover/dome. Suitable bearing subgrades for supporting the slab and haunched edges consist of prepared native till (gravelly sand) or weathered bedrock, or compacted structural fill or crushed stone placed over these materials. The actual thickness of the slab and haunched edge should be determined by the structural engineer based upon tank loading and foundation support recommendations herein.

The recommended maximum net allowable soil bearing pressure for design of the tank foundation is 6,000 psf. The estimated tank center and edge settlements are less than 1 inch and less than 0.75 inches, respectively.

The minimum width of the perimeter haunched edge should be 18 inches. The haunched edge should embedded at least 18 inches below the adjacent exterior finished grade.

A subgrade modulus of 40 pci may be used for the design of the tank slab/mat, which is based upon the slab/mat having a diameter of approximately 42 feet.

A friction coefficient of 0.50 along the tank foundation and supporting prepared subgrades should be used for sliding resistance.

Frost protection for the WST foundation should be achieved by use of turned-down edges along the outside perimeter of the tank to the regional depth of freezing (3.5 feet below adjacent finished ground surface) with appropriate vertical insulation. Alternatively, frost protection could be achieved using a shorter depth of vertical insulation in combination with insulation installed laterally/outward from the outside perimeter of the tank. If lateral rigid insulation is selected for frost protection, then we recommend the rigid insulation consist of the following, at a minimum:

- 2 inch-thick extruded Type IV polystyrene (rigid insulation, nominal R-value of 5.0 per inch) having a minimum density of 1.6 pounds per cubic foot;
- rigid insulation should be placed vertically along the outside perimeter of the tank foundation starting at 6 inches below finished ground surface or at the base of the pavement section and extend to 18 inches bgs; and
- rigid insulation should be placed laterally at a depth of 18 inches bgs for a distance of at least 54 inches.

5.2.2 PERMANENT WATER DRAINAGE

The proposed WST is planned to be constructed with the tank slab/mat at El. 525.5 feet, and the western exterior wall of the WST is planned to be backfilled with soil to El. 539 feet, with ground surface sloping gradually upward to the west. We recommend construction of a perimeter drain around the buried portion of the WST to mitigate hydrostatic pressure on the WST, which (if water were allowed to collect at the outside of the WST) would contribute to lateral forces on the WST and decrease sliding stability of the WST.

The perimeter drain should be installed adjacent to and along the outside edge of the WST perimeter foundation slab/mat, at 12 inches laterally from the outside edge of the foundation slab/mat. The perimeter drain system should be constructed using perforated pipe surrounded by clean stone, which is enveloped in non-woven filter fabric. The highest invert elevation of the drain should be at the bottom of the slab/mat, and the perimeter drain should be sloped to allow for gravity drainage to approved receptors or discharge locations. Cleanouts for the perimeter drain system should be installed approximately every 100 feet. All horizontal and vertical joint connections for the perimeter drain system should include sweep elbows.

5.3 MECHANICALLY-STABILIZED EARTH RETAINING WALLS

5.3.1 MSE WALL FOUNDATION DESIGN CRITERIA

With proper Site preparation, the proposed MSE retaining walls may be supported on prepared suitable existing fill/reworked native soil, on native till or weathered bedrock, or on compacted structural fill or crushed stone placed over these materials.

The recommended maximum net allowable bearing pressure for the soil bearing conditions described above is 4,000 psf, provided footing subgrades are properly prepared. Settlement of properly constructed, soil-supported foundations is estimated to be on the order of 1 inch or less, and differential settlement should be less than 0.5 inches over 40 feet.

5.4 SEISMIC DESIGN CRITERIA AND LIQUEFACTION SUSCEPTIBILITY

BUILDING CODE REFERENCE	SITE CLASSIFICATION
2015 International Building Code	C[1]
DESIGN PARAMETER	**RECOMMENDED DESIGN VALUE**
Maximum considered short period spectral response acceleration (S_{MS})	0.21
Maximum considered 1-second spectral response acceleration (S_{M1})	0.11
Design short period spectral response acceleration (S_{DS})	0.14
Design 1-second spectral response acceleration (S_{D1})	0.07

Notes:

1. The Site Classification is based upon the soil profile observed to a maximum depth of approximately 22 feet bgs, and assumes similar soil or bedrock conditions are present below 22 feet bgs.
2. Based upon the subsurface conditions encountered in the borings, the Site is not considered susceptible to liquefaction in the event of an earthquake within the depths explored.

5.5 LATERAL EARTH PRESSURES

The lateral earth pressures provided in this section are intended to be applied to design of the proposed WST. The proposed treatment building is understood to be a slab-on-grade lowest floor and therefore unbalanced loads on foundation walls are not expected. Site retaining walls are understood to be MSE walls, and therefore the recommendations included in this section should not be applied to design of Site retaining walls.

The WST exterior walls should be designed to resist lateral pressures generated by soil backfill materials and any temporary or permanent surcharge loads. At-rest conditions should be used for the design of walls that are not free to deflect or rotate. Walls that are free to deflect or rotate may be designed using active conditions. We assume that adequate drainage systems will be installed adjacent the WST foundation, and thus hydrostatic forces have not been accounted for in the values provided herein. If drainage systems are not included in the design, the lateral pressures provided herein should be modified accordingly.

The proposed WST is expected to include upward-sloping backfill on one side of the AST, with the slope of the backfill at a maximum steepness of approximately 2 horizontal to 1 vertical (approx. 26.6 deg from horizontal). The WST sidewall should be designed to resist the lateral earth pressures associated with the sloping backfill as well as any vehicle surcharge loads. The following parameters are based upon vertical pre-cast concrete walls constructed with backfill sloping upward at 26.6 degrees from horizontal and vertical walls constructed with level backfill, and based upon use of compacted structural fill as defined in Section 6.4, which is assumed to have a minimum angle of internal friction of 34 degrees:

	Static Condition		
	Active	At-Rest	Passive
Ultimate Coefficient of Lateral Earth Pressure – 2H:1V Upward Slope Angle	0.40	0.64	*--
Ultimate Coefficient of Lateral Earth Pressure – Horizontal/Level Backfill	0.26	0.44	6.8
* Use horizontal/level backfill value			

Seismic lateral earth pressure coefficients are provided in the following table. The active and at-rest earth pressure coefficients assume the wall will not be allowed to displace during a seismic event.

	Seismic Condition		
	Active	At-Rest	Passive
Ultimate Coefficient of Lateral Earth Pressure – 2H:1V Upward Slope Angle	0.67	0.67	6.0*
* Based upon horizontal/level backfill.			

For calculation of lateral earth pressures, we recommend using a total unit weight of structural fill of 135 pounds per cubic foot. The passive pressure coefficient assumes backfill in front of the base of the wall will consist of compacted structural fill. Passive pressure should be ignored for the zone of soils that is subject to frost. A factor of safety of 2.0 should be applied to the passive earth pressure coefficient to determine the allowable passive earth pressure coefficient.

The access roadway is planned to the west side of the proposed WST. Based upon the planned WST and grading configuration, and proximity of the access road curb to the western wall of the WST, we recommend a lateral earth pressure be applied to the face of the wall as shown in Diagram 1, below, which is based upon a 250 psf vertical vehicle surcharge over the nearest access road driving lane (at approximately 14 feet from the exterior wall of the WST).

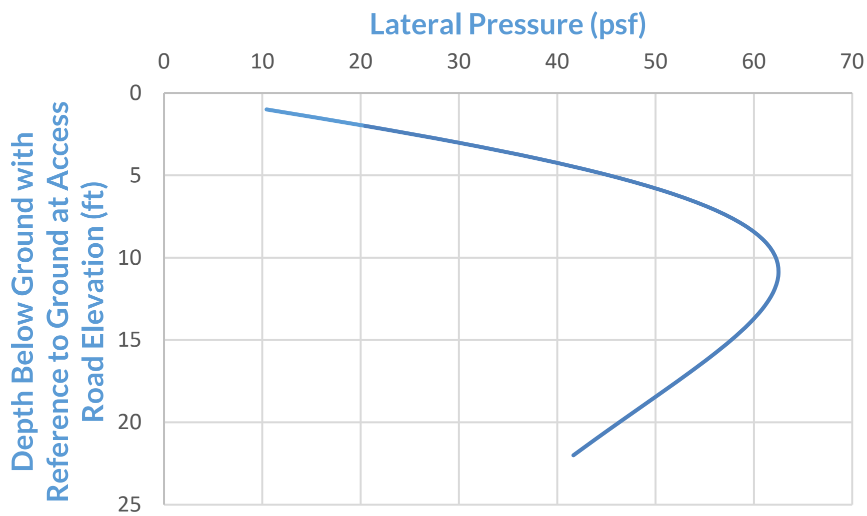


Diagram 1 – Lateral Earth Pressure Due to Uniform 250 psf Traffic Load

Consideration should be given to the magnitude of wall movement that is required to develop active and passive earth pressure conditions. For active earth pressure to develop, Δ/H (horizontal movement of the top of the wall divided by height of wall) of 0.001 to 0.002 should be expected. For passive pressure to develop, Δ/H of 0.01 to 0.02 should be expected.

5.6 PAVEMENT DESIGN

Pavement design parameters (i.e., traffic loading, serviceability factors, etc.) were not provided for design of pavements. Therefore, the pavement designs provided herein are based upon assumptions made using engineering judgment and experience with similar developments.

We recommend the pavement grading design consider provisions for preventing water (surface or irrigation) from entering the pavement section in order to reduce the likelihood of accelerated pavement deterioration. This could be accomplished by sealing the interface between the asphalt edge and adjacent curbing, and using edge drains.

In order to minimize the downward seepage of surface water into the base course, we recommend requiring the filling/sealing of all joints at pavement/curb interfaces, as well as all pavement cracks, which might form in the early life of the pavement. This should be done as an on-going maintenance activity using a hot-applied, “rubberized” asphaltic sealant, or equivalent material. In particular, the need to apply a sealant should be assessed following normal shrinkage of the asphaltic concrete away from the curbs and other features, which may occur several months after pavement installation.

The recommended pavement section included herein is designed to support post-construction traffic only, and is not designed to support construction traffic. Soil subgrade conditions are presumed to remain as encountered in the borings, without deleterious effects (increased silt, mud, or moisture content), due to equipment traffic during construction. It will be important to evaluate subgrade conditions in the field during construction and re-compact, undercut, or stabilize if necessary, to achieve clean and stable subgrade conditions.

Upon completion of proper subgrade preparation, the following minimum pavement section is recommended for normal parking and driveway areas; reference is made to materials described in the *State of Connecticut Department of Transportation (CT DOT) Standard Specifications for Roads, Bridges and Incidental Construction, Form 818*.

LAYER AND MATERIAL TYPE	THICKNESS (INCHES)
Bituminous Finish Course (CT DOT Section 4.06 & M.04, Class 2 or 3)	1.5 inches
Bituminous Binder Course (CT DOT Section 4.06 & M.04, Class 1 or 2)	2.5 inches
Crushed or Processed Gravel Base Course (CT DOT Section 3.02 & M.02.03/06, Grading C or Section 3.04 & M.05.01)	6 inches
Dense Graded Sand and Gravel Subbase (CT DOT Section 2.12 & M.02.02/06 Grading B)	6 inches

5.7 PERMANENT SOIL SLOPES

Permanent slopes steeper than 3H:1V should be protected with suitable erosion control blankets. Permanent slopes with a steepness ranging between 3H:1V and 2H:1V should be protected with three-dimensional, non-degradable erosion control fabric. The use of erosion control fabric or blankets must also include a program of loam, seed, and fertilizer placement to ensure that consistently lush vegetated growth becomes well-established within the network of the slope face reinforcement. Permanent soil slopes should be inclined no steeper than 2H:1V, unless the slopes are specifically designed for increase steepness (which may require use of select materials, internal reinforcement, and/or other stabilizing measures).

Grades should gently slope away from building and WST foundations and provide the minimum 3.5 feet of soil cover for protection of foundation subgrades from frost penetration. Where possible/practicable, interceptor swales should be installed along the tops of slopes to minimize the flow of runoff traveling down the slopes. Additional interceptor swales could be beneficial at strategic locations throughout the slope to reduce the volume and velocity of runoff traveling down the slopes, depending upon the height of the slopes and the size of the contributory area up-slope.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 INITIAL SITE PREPARATION

Initial Site preparation should commence with stripping of topsoil, vegetation, and underlying rooty/organic subsoil from proposed building, WST, retaining wall and pavement areas. Stripping depths will likely vary across the Site and should be adjusted as needed to remove vegetation and root systems.

Tree removal should be performed during initial Site preparation. Care should be taken to remove root systems from the proposed building, WST, retaining wall and pavement areas. Materials disturbed during removal of stumps should be undercut to prevent creating soft pockets of soil that may be difficult to relocate later.

Inorganic soils removed during Site stripping operations could be used for final Site grading outside the proposed building, WST, retaining wall and pavement areas. Care should be exercised to separate organic materials from non-organic material to avoid mixing with fill planned for reuse.

6.2 SUBGRADE PREPARATION

GeoInsight should be retained to provide construction oversight of foundation, floor slab, retaining wall, and pavement subgrade preparation. Subgrades should be prepared and reviewed as follows.

Treatment Building Footing and Slab Subgrades, and Water Storage Tank Slab/Mat Subgrades: The treatment building footing subgrades and WST slab/mat foundation subgrades will generally consist of prepared native till or weathered bedrock, or compacted structural fill or crushed stone placed above prepared native till or weathered bedrock. The treatment building slab subgrades will generally consist of a minimum 12 inches of compacted structural fill placed over prepared native till or weathered bedrock.

Existing fill/reworked native soil is not suitable to remain in placed below the treatment building or WST foundation footprints or their bearing zones, and should be completely over-excavated to expose the native till or weathered bedrock, and be replaced with compacted structural fill or crushed stone to achieve the design footing, slab/mat, or slab bearing elevations. The bearing zones are defined as the zone below the structures within the lateral limits of the 1 horizontal to 1 vertical (1H:1V) lines extending down and away from the bottom outside edges of footings or the mat/slab, to the top of suitable subgrades.

Existing fill/reworked native soil requiring over-excavation from below the treatment building and WST footprints will generally be identifiable based upon the relatively looser/softer material as compared to the native till, and presence of minor amounts of roots and/or woody material. Over-excavation and replacement depths are expected to range from approximately 0 to 4 feet from below the treatment building footings, and are expected to be a maximum of approximately 1 to 2 feet below the eastern outer edge of the WST (the western and central portions of the WST footprint are not expected to have existing fill/reworked native soil at the target bearing elevation; refer to Figure 1).

Following excavation to achieve design footing, mat/slab, and slab subgrades and/or over-excavation of unsuitable soils, where present, the exposed native till or weathered bedrock subgrades should be proof-rolled with at least six passes (three each way in perpendicular directions) of a minimum 10-ton vibratory roller in open areas, or a 1-ton vibratory roller or large plate compactor in trenches. Exposed subgrades present after stripping of surficial topsoil and subsoil (where present) should be proof-rolled as described above prior to placing new fill.

During the proof-rolling process, the subgrades should be reviewed to identify soft or unstable areas. Unsuitable/unstable areas should be over-excavated to more competent material and be replaced with compacted structural fill or crushed stone, as needed. Where over-excavation is necessary, the extent of over-excavation should include the foundation bearing zones (refer to Diagram 2). Following proof-rolling, compacted structural fill or crushed stone may be placed in the footing bearing zones or below the mat/slab to achieve design footing, mat/slab, or slab subgrades, as needed.

Care must be taken to avoid disturbing the prepared subgrades by keeping construction traffic off the subgrade to the extent practical. Excavated subgrades should not be left exposed overnight unless the forecast calls for above-freezing, clear conditions.

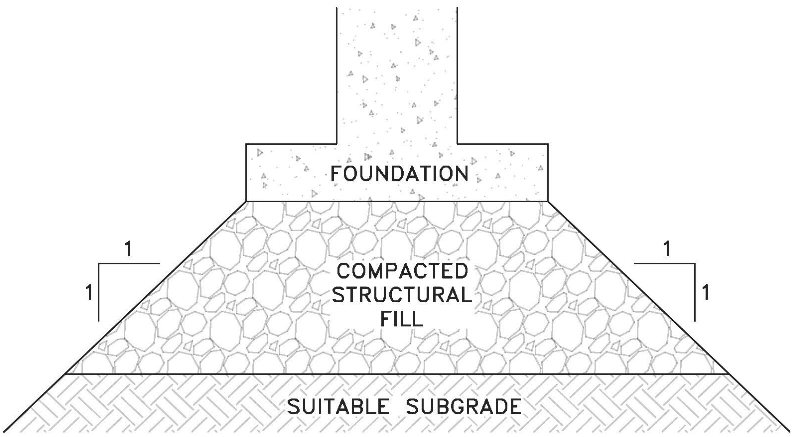


Diagram 2 – Minimum Foundation Bearing Zone

Retaining Walls: MSE retaining wall subgrades are expected to consist of prepared suitable existing fill/reworked native soil, on native till or weathered bedrock, or compacted structural fill or crushed stone placed over these materials.

Existing fill/reworked native soil is expected to be suitable to remain in place below MSE retaining walls, provided the existing fill/reworked native soil is:

- granular and relatively well-graded;
- free of organic material greater than 5 percent by weight, and soft, compressible or otherwise deleterious materials;
- thoroughly proof-rolled;
- reviewed by the project geotechnical engineer or his/her representative and confirmed to be consistent with the fill observed in the borings; and
- firm, dry and stable after proof-rolling.

Unsuitable existing fill/reworked native soil should be over-excavated to reach suitable existing fill/reworked native soil, native till, or weathered bedrock, and should be replaced with compacted structural fill or crushed stone to achieve the retaining wall bearing elevations. Where over-excavation and replacement of unsuitable existing fill/reworked native soil is necessary, the lateral extents of over-excavation should include the foundation bearing zone, which (for the retaining wall) should be considered the 1H:1V lines extending down and away from the bottom outside edge of the retaining wall bearing/levelling layer.

Care must be taken to avoid disturbing the prepared subgrades by keeping construction traffic off the subgrade to the extent practical. Excavated subgrades should not be left exposed overnight unless the forecast calls for above-freezing, clear conditions.

Pavement Areas: Pavement subgrades, expected to consist of prepared suitable existing fill/reworked native soil, native till, or weathered bedrock, should be proof-rolled with a minimum 10-ton vibratory roller providing at least six passes (three each way in perpendicular directions). Unstable areas should be over-excavated to more competent material and replaced with compacted common fill or structural fill, as needed. Subsequent compacted common fill or structural fill may be placed, as necessary, to achieve design pavement subgrades. Care must be taken to avoid disturbing the prepared subgrades by keeping construction traffic off the subgrade to the extent practical. Excavated subgrades should not be left exposed overnight unless the forecast calls for above-freezing, clear conditions.

6.3 CONSTRUCTION DEWATERING

Based upon groundwater levels at the depths observed in the borings, significant construction dewatering is not anticipated for construction of the proposed foundations or relatively shallow subsurface utilities at the Site. However, dewatering could be required to remove surface water runoff or precipitation that accumulates within excavations and does not quickly infiltrate.

In general, it should be practicable to accomplish construction dewatering, where required, through sumps and open pumping methods. The contractor should be required to maintain groundwater at least 2 feet below excavation subgrades in order to minimize bearing surface disturbance.

The use of crushed stone at the base of excavations will facilitate dewatering, if necessary. Crushed stone, if used, should be wrapped in a geotextile filter fabric, such as Mirafi 140N, or equal.

Surface water runoff should be directed away from excavations to reduce potential dewatering efforts and protect subgrades from becoming soft and unstable. Temporary detention ponds, trenches, ditches, and other groundwater or stormwater control systems should be carefully planned and designed so as not to conflict with new areas to be excavated and/or backfilled.

6.4 FILL AND BACKFILL

Soil Reuse: Based upon the composition of the on-site soils as encountered in the borings, the near-surface inorganic soils will be suitable for reuse as common fill provided the soils intended for reuse are properly managed, stockpiled, protected, dried, moisture conditioned, etc., in order to facilitate achievement of efficient and adequate compaction during replacement.

The on-site soils are not expected to be suitable for reuse as structural fill in their current state, due to the relatively high percentage of fine-grained material in the soils. Blending of the on-site inorganic soils with coarse imported borrow will be necessary for achieving a well-blended mix meeting structural fill gradation criteria.

General: Soils approved for reuse by qualified personnel should be segregated and stockpiled. Prior to reuse, grain-size distribution testing will be required for proposed fill soils in order to evaluate their suitability for reuse. The moisture-density relationship (Proctor Test) of soil confirmed for reuse as fill will be required to provide compaction criteria for use during fill placement.

Compacted structural fill should be used as new fill or backfill below proposed building foundations and below floor slabs, below the proposed WST slab/mat foundation subgrades, as backfill around the perimeter of the WST, and below site retaining walls. Compacted structural fill below proposed foundations (treatment building and WST) and site retaining walls should extend to the lateral limits defined by a 1H:1V line sloped down and away from the bottom outside edge of foundations or the WST slab/mat to the top of suitable soil, as described in Section 6.2 (see Diagram 2). Crushed stone may be used in lieu of structural fill at the direction of the project geotechnical engineer or his/her representative where subgrades become saturated and over-excavation of saturated soils is not feasible. Crushed stone, if used, should be wrapped in a geotextile filter fabric, such as Mirafi 140N or equivalent, to reduce the potential for migration of fine-grained particles into the voids present within the stone.

Walls should be backfilled evenly on both sides to the extent practical. Temporary bracing should be specified if unrestrained walls are permitted to be backfilled.

Bedding placed below utilities should be in accordance with the local utility or manufacturer requirements. In general, utilities may be supported by compacted structural fill, or other suitable pipe bedding materials. Fill placed as backfill for utilities below building or WST foundations/floor slabs should consist of compacted structural fill. Elsewhere, fill placed as backfill for utilities may consist of compacted common fill after the pipe is surrounded by proper bedding soil.

Structural Fill: Structural fill should be free of organic, frozen, or other deleterious material and should conform to the following gradation specification, which is based upon CTDOT Item M.02.06, Grading B.

STRUCTURAL FILL	
Sieve Size	**Percent Passing**
5 inches	100
3.5 inches	90-100
1.5 inches	55-95
0.25-inch	25-60
No. 10	10-45
No. 40	5-25
No. 100	0-10
No. 200	0-5

Structural fill should be placed in loose lifts not exceeding 12 inches in thickness for self-propelled vibratory rollers and 8 inches for vibratory plate compactors. Structural fill placed within footing/foundation bearing zones (treatment building, WST and retaining wall) and below floor slabs should be compacted to at least 95 percent of the maximum dry density determined by ASTM D 1557, Method C.

Common Fill: Excavated inorganic soil from the Site may be selectively reused as common fill provided it is inorganic, free of deleterious materials, and can be adequately compacted. Common fill should consist of soil free from frozen soil, debris, or other deleterious material. The maximum particle size is recommended to be 8 inches, and no more than 30 percent by weight should pass the No. 200 sieve. Common fill may be used to achieve finished grades outside of: the treatment building and WST footprints, footing slab/mat bearing zones, retaining wall foundation bearing zones, and reinforced earth zone associated with retaining walls. Common fill may be placed below pavements to achieve the design pavement section subgrades, provided the common fill used for this purpose is consistent with the on-Site granular subgrades, particularly with regard to the percentage of fine-grained particles, and those areas are not within areas requiring structural fill or select MSE retaining wall backfill. Common fill should be placed in loose lifts not exceeding 12 inches in thickness for self-propelled vibratory rollers and 8 inches for vibratory plate compactors, and compacted to at least 92 percent of the maximum dry density determined by ASTM D 1557, Method C.

6.5 TEMPORARY EXCAVATIONS

Excavations should be cut to a stable slope or be temporarily braced, depending upon the excavation depths and the subsurface conditions encountered. Temporary construction slopes should be designed in compliance with applicable governing regulations including the Occupational Safety and Health Administration (OSHA). Based upon the soil samples recovered from the borings, the near-surface soils should be considered OSHA Type C soils. Temporary excavations should be sloped at not steeper than 1.5H:1V for excavations to a maximum depth of 20 feet bgs under dry, dewatered conditions.

Stockpiles should be placed at a distance away from the top of the excavation that is equal to at least the depth of the excavation. Surface drainage should be controlled to avoid flow of surface water into the excavations. Construction slopes should be reviewed for signs of mass movement, such as tension cracks near the crest or bulging at the toe. If potential stability problems are observed, work should cease, and the project geotechnical engineer should be contacted immediately. The responsibility for excavation safety and stability of temporary construction slopes should lie solely with the contractor.

The use of a temporary support of excavation (SOE) system may be necessary for construction of the WST. The SOE system should be designed by a Professional Engineer licensed in the State of Connecticut.

7.0 ADDITIONAL ENGINEERING SUPPORT

7.1 FINAL DESIGN REVIEW

We recommend that GeoInsight be retained to perform a general review of the foundation and earthwork plans and specifications prepared from the recommendations presented in this report in order to verify that our recommendations are properly interpreted and implemented. Our report has been written in a guideline recommendation format and is not necessarily appropriate for direct use as a specification without being reworded consistent with a specification-type format. This report should, however, be made a part of the project documents and available to prospective contractors for informational purposes.

7.2 CONSTRUCTION SERVICES

We recommend GeoInsight be retained to provide construction observation services during the earthwork phases of construction. Construction testing services will also be necessary for the project, and should be performed by a qualified construction materials testing company. The purpose of our participation will be to verify our design assumptions in the field, particularly those regarding bearing surface identification, confirmation of proper subgrade preparation, removal and replacement of existing unsuitable materials, and potential reuse of on-Site materials. Our understanding of Site subsurface conditions and construction objectives will allow engineering input in a timely manner if subsurface conditions are found to vary from those anticipated and a design change or a change in earthwork procedures is required. When construction oversight is provided by the geotechnical engineering firm that conducted the investigation, the resulting continuity of knowledge significantly benefits the efficiency of construction, promotes a higher quality of work, and best preserves investment in the project.

The evaluation of Site conditions that may be encountered during construction requires engineering judgment and interpretation. For this reason, if we are not retained during construction, we cannot assume responsibility for misinterpretation of our recommendations, or for unfavorable performance of structures such as foundations, floor slabs, or pavements as a result of work performed or judgments rendered by others without our express approval.

7.3 GENERAL CONSTRUCTION MONITORING AND TESTING GUIDELINES

Prior to initiating compaction operations, we recommend representative samples of the structural fill/backfill material to be used and acceptable exposed in-place soils be collected and tested to determine their compaction and classification characteristics. The maximum dry density, optimum moisture content, and gradation characteristics should be determined. These tests are needed for compaction quality control of the structural fill/backfill and existing soils, and to determine if the fill/backfill material is acceptable. Visual review and approval of undisturbed native soil subgrades may be appropriate, if such an approach is approved by the project geotechnical engineer.

A representative number of in-place field density tests should then be performed in the compacted existing soils (to confirm proof-rolling efforts for foundation, slab, and pavement subgrades) and then also in each lift of structural fill or backfill to confirm the required degree of compaction has been obtained. We recommend the following minimum density testing frequencies.

Recommended Field Density Test Frequencies	
Area	**Recommended Minimum Density Test Frequency**
Floor Slab Subgrade Soils	One test per 10,000 square feet (sf; minimum of two tests) in compacted existing soils to confirm successful proof-rolling efforts
Floor Slab Fill Soils	One test per 3,000 sf (minimum of two tests) in each lift of structural fill within the area of the planned buildings or the WST
Individual Column Footings	One test per 50 sf of bearing surface
Continuous (Strip) Footings	One test per 50 lineal feet of bearing surface
Footings	One test per 3,000 sf (minimum of two tests) in each lift of structural fill within the area of the planned buildings or the WST
Pavement Soils	One test per 10,000 sf of compacted existing soils and in each lift of structural fill
Retaining Wall Soils	One test per 50 lineal feet of bearing surface and in each lift of structural fill within the area of the planned retaining walls

8.0 LIMITATIONS

GeoInsight provided the recommendations contained within this report based upon an evaluation of subsurface conditions observed and/or reported and their relation to proposed construction, as documented in the report text and attached materials. The evaluations described and recommendations made in this report pertain to the specific areas explored. GeoInsight believes the subsurface explorations and evaluations described herein were performed in a manner consistent with the services that would have been provided by other geotechnical professionals under similar circumstances. However, given the variable nature of native soil deposits and rock formations, we cannot represent that the subsurface conditions identified in the boring logs and described in this report are exact, nor can we guarantee that our interpolation between or extrapolation from subsurface exploration locations is completely representative of actual conditions.

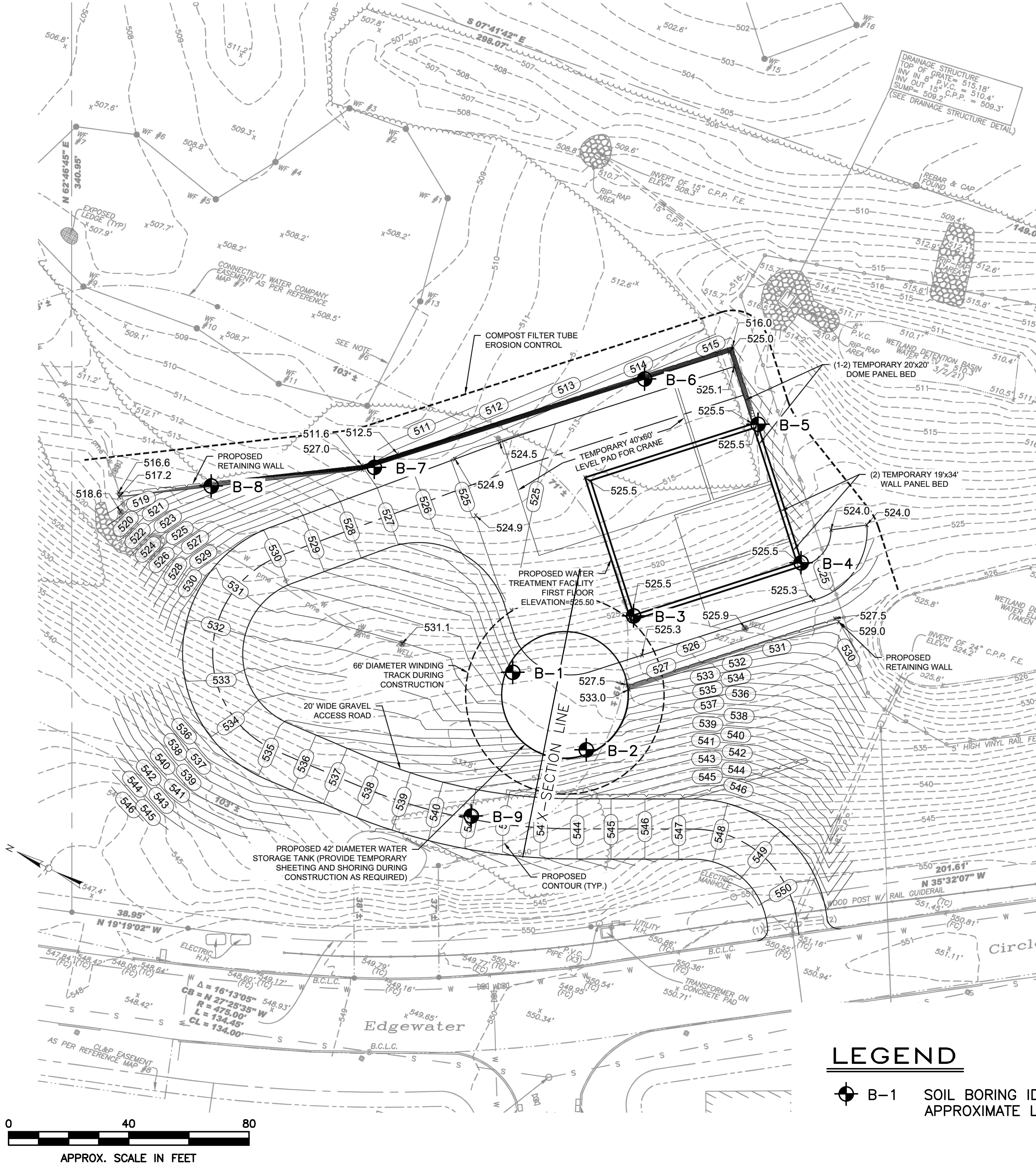
Participation by the geotechnical engineer should be considered an important aspect of successfully completing foundation and earthwork construction aspects of the project. In particular, if the geotechnical engineer is not engaged by the project team to perform regular foundation and earthwork inspections, it should be understood that there may be missed opportunities to recognize unexpected conditions in a timely manner that may otherwise allow for corrective actions to be implemented at minimum cost.

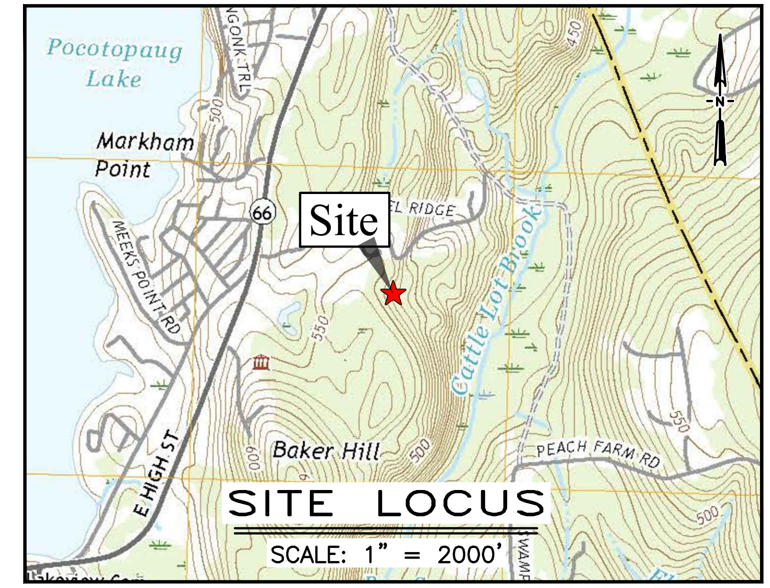
Should additional information become available regarding the proposed Site development that is significantly different from that described in this report, or should subsurface conditions be found during construction that vary significantly from those observed during the subsurface explorations and summarized in this report, GeoInsight should be given the opportunity to evaluate the data and modify its recommendations, if warranted.

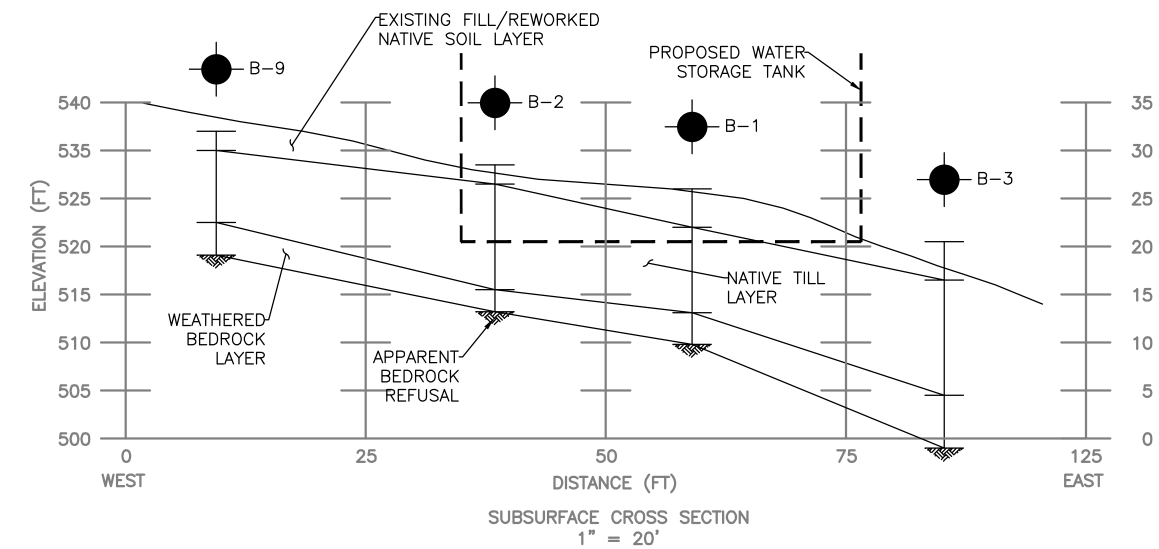
This report and the recommendations included herein were based upon the project information known to us at the time our reporting, as defined by the Project Information section herein. If the project is altered or additional project details are developed after preparation of this report, GeoInsight should be contacted to review the project changes and/or additional details and to evaluate whether modifications to our recommendations are warranted. In particular, changes to proposed structure footprints, Site or structure elevations and/or structure loads may require modifications to the recommendations included herein.

This report has been prepared for specific application to the Site located at located at 204 Edgewater Circle in East Hampton, Connecticut. No other warranty, expressed, or implied, is made. In addition, this report was prepared exclusively for W&S and the associated design and construction team. The use of this report by other parties without written consent from GeoInsight is hereby prohibited.

FIGURE







NOTES:

1. THIS PLAN WAS BASED UPON A PLAN TITLED "LAYOUT AND GRADING PLAN," PREPARED BY WESTON & SAMPSON AND DATED MARCH 11, 2021, AND USGS TOPOGRAPHIC QUADRANGLE: MOODUS, CONNECTICUT DATED 2021.

LEGEND

B-1 SOIL BORING IDENTIFICATION AND APPROXIMATE LOCATION

CLIENT: WESTON & SAMPSON			
PROJECT: PROPOSED EDGEWATER TREATMENT FACILITY, 204 EDGEWATER CIR., EAST HAMPTON, CT			
TITLE: SUBSURFACE EXPLORATION PLAN & SITE LOCUS			
DESIGNED: BTN	DRAWN: BTN	CHECKED: MCP	APPROVED: MCP
SCALE: AS SHOWN	DATE: 4/16/21	FILE NO.: 11222D001	PROJECT NO.: 11222

FIGURE NO.: 1

GeoInsight

PLOT DATE: 4-15-21
FILE: P:\11222 Edgewater Circle East Hampton CT\11222D001.dwg

APPENDIX A

GEOINSIGHT BORING LOGS

SOIL BORING LOG

GeoInsight® Environmental Strategy & Engineering

Client: Weston & Sampson	**Boring Identification:** B-1	
Project: Proposed Edgewater Treatment Facility		**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN	**Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan	
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 531.0 ft (+/- 0.5 ft)	**Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/25/2021	**Date Completed:** 3/25/2021

DRILLING METHOD	SAMPLER	GROUNDWATER MEASUREMENTS			
		Date	**Depth (ft)**	**Reference**	**Stabilization**
Vehicle: ATV Mounted	**Type:** SS / Auto	03/25/2021	Not encountered	Ground Surface	N/A
Model: CME 55 LCX	**Hammer (lb):** 140			off	
Method: Hollow Stem Auger	**Fall (in):** 30				

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/18	0 - 2	1	6 inches of TOPSOIL.	**TOPSOIL**		
				3	S1. Loose, brown, fine to medium SAND, little Gravel and Silt, trace Roots, damp to moist.	**REWORKED NATIVE**		
1				3				
				3				
2	S2	24/16	2 - 4	2	S2. Loose, brown to orange, fine to medium SAND, little Silt, trace Gravel and Roots, damp to moist.			
				3				
3				2				
				2				
4						**NATIVE SAND/TILL**		
5	S3	24/14	5 - 7	4	S3. Medium dense, brown to orange, fine to medium SAND, some Gravel, trace Silt, damp.			
				12				
6				15				
				13				
7								
8					Note: Augured past apparent boulder from 7 to 8.5 feet.			
9								
10	S4	24/21	10 - 12	10	S4. Dense, brown to orange, fine to coarse SAND, some Gravel, little Silt, damp.			
				14				
11				17				
				9				
12								
13					Note: Augured into top of possible weathered bedrock at 12.9 feet. Auger cuttings color change to gray.	**WEATHERED BEDROCK**		
14								
15	S5	2/2	15 - 15.3	50 for 2"	S5. Very dense, gray, weathered BEDROCK, damp.			
16					End of boring at 16.2 feet. Auger refusal encountered.			
17								
18								
19								
20								
21								
22								

GRANULAR SOILS		COHESIVE SOILS		NOTES
Blows/ft.	**Density**	**Blows/ft.**	**Consistency**	
0-4	V. LOOSE	<2	V. SOFT	
5-10	LOOSE	2-4	SOFT	
11-30	M. DENSE	4-8	M. STIFF	
31-50	DENSE	8-15	STIFF	
>50	V. DENSE	15-30	V. STIFF	
		>30	HARD	

SOIL BORING LOG

GeoInsight — Environmental Strategy & Engineering

Client: Weston & Sampson	**Boring Identification:** B-2	
Project: Proposed Edgewater Treatment Facility		**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN	**Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan	
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 533.5 ft (+/- 0.5 ft)	**Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/25/2021	**Date Completed:** 3/25/2021

DRILLING METHOD	SAMPLER
Vehicle: ATV Mounted	**Type:** SS / Auto
Model: CME 55 LCX	**Hammer (lb):** 140
Method: Hollow Stem Auger	**Fall (in):** 30

GROUNDWATER MEASUREMENTS

Date	Depth (ft)	Reference	Stabilization
03/25/2021	Not encountered	Ground Surface	N/A

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/14	0 - 2	1	4 inches of TOPSOIL.	TOPSOIL		
				3	S1. Loose, brown, fine to medium SAND, little Gravel and Silt, trace Roots and Wood material, damp to moist.	REWORKED NATIVE		
1				7				
				10				
2	S2	24/16	2 - 4	14	S2. Medium dense, brown to orange, fine to medium SAND, little Gravel, trace Silt, damp to moist.	NATIVE SAND/TILL		
				12				
3				10				
				7				
4					Note: Augured past apparent boulder from 4 to 5 feet.			
5	S3	5/5	5 - 5.5	50 for 5"	S3. Very dense, orange, fine to medium SAND, some Gravel, little Silt, damp.			
6								
7								
8								
9								
10	S4	2/2	10 - 10.3	50 for 2"	S4. Very dense, orange, fine to medium, some Gravel, little Silt, damp.			
11								
12								
13					Note: Augured into top of possible weathered bedrock at 13.0 feet. Auger cuttings color change to gray.	WEATHERED BEDROCK		
14								
15	S5	3/3	15 - 15.3	50 for 3"	S5. Very dense, gray, weathered BEDROCK, damp.			
16					End of boring at 15.3 feet. Spoon refusal encountered.			
17								
18								
19								
20								
21								
22								

GRANULAR SOILS Blows/ft.	Density	COHESIVE SOILS Blows/ft.	Consistency	NOTES
0-4	V. LOOSE	<2	V. SOFT	
5-10	LOOSE	2-4	SOFT	
11-30	M. DENSE	4-8	M. STIFF	
31-50	DENSE	8-15	STIFF	
>50	V. DENSE	15-30	V. STIFF	
		>30	HARD	

SOIL BORING LOG

GeoInsight Environmental Strategy & Engineering

Client: Weston & Sampson	**Boring Identification:** B-3	
Project: Proposed Edgewater Treatment Facility		**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN	**Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan	
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 525.5 ft (+/- 0.5 ft)	**Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/25/2021	**Date Completed:** 3/25/2021

DRILLING METHOD	SAMPLER
Vehicle: ATV Mounted	**Type:** SS / Auto
Model: CME 55 LCX	**Hammer (lb):** 140
Method: Hollow Stem Auger	**Fall (in):** 30

GROUNDWATER MEASUREMENTS

Date	Depth (ft)	Reference	Stabilization
03/25/2021	Not encountered	Ground Surface	N/A

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/17	0 - 2	1	4 inches of TOPSOIL.	TOPSOIL		
				2	S1. Loose, brown to orange, fine to medium SAND, little Gravel, trace Silt, Roots and Wood material, damp to moist.	REWORKED NATIVE		
1				3				
				3				
2	S2	24/17	2 - 4	2	S2. Loose, brown to orange, fine to medium SAND, little Silt, trace Gravel and Roots, damp to moist.			
				2				
3				3				
				2				
4						NATIVE SAND/TILL		
5	S3	24/15	5 - 7	4	S3. Medium dense, orange to brown, fine to medium SAND, little Gravel and Silt, damp.			
				11				
6				12				
				7				
7								
8								
9								
10	S4	24/21	10 - 12	10	S4. Dense, orange, fine to coarse SAND, some Gravel, trace Silt, damp.			
				15				
11				16				
				15				
12								
13					Note: Augured past apparent cobble from 13 to 13.5 feet.			
14								
15	S5A	12/12	15 - 17	21	S5A. Dense, orange, fine to coarse SAND, some Gravel, trace Silt, damp.			
				17				
16	S5B	12/12		16	S5B. Dense, orange to gray, Weathered BEDROCK, damp.	WEATHERED BEDROCK		
				17				
17								
18								
19					Note: Augured material got denser at 19.5 feet.			
20	S6	2/2	20 - 20.25	50 for 2"	S6. Very dense, gray, Weathered BEDROCK, damp.			
21								
22					End of boring at 21.5 feet. Auger and spoon refusal encountered.			

GRANULAR SOILS		COHESIVE SOILS	
Blows/ft.	Density	Blows/ft.	Consistency
0-4	V. LOOSE	<2	V. SOFT
5-10	LOOSE	2-4	SOFT
11-30	M. DENSE	4-8	M. STIFF
31-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF
		>30	HARD

NOTES

SOIL BORING LOG

Client: Weston & Sampson	**Boring Identification:** B-4
Project: Proposed Edgewater Treatment Facility	**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN / **Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 525.0 ft (+/- 0.5 ft) / **Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/26/2021 / **Date Completed:** 3/26/2021

DRILLING METHOD	SAMPLER
Vehicle: ATV Mounted	**Type:** SS / Auto
Model: CME 55 LCX	**Hammer (lb):** 140
Method: Hollow Stem Auger	**Fall (in):** 30

GROUNDWATER MEASUREMENTS

Date	Depth (ft)	Reference	Stabilization
03/26/2021	~21	Ground Surface	After Drilling

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/12	0 - 2	1	5 inches of TOPSOIL.	TOPSOIL		
1				1	S1. Loose, brown to orange, fine to medium SAND, little Gravel and Silt, trace Roots, damp.	REWORKED NATIVE		
				5				
2				3				
	S2	24/12	2 - 4	8	S2. Loose, brown to orange, fine to medium SAND, little Gravel, trace Silt, damp.			
3				7				
				3				
4				2				
5	S3	24/16	5 - 7	1	S3. Very loose, brown, fine to medium SAND, some Silt, trace Gravel, Roots, and Wood material, damp.			
6				2				
				2				
7				4				
8						NATIVE SAND/TILL		
9								
10	S4	24/24	10 - 12	10	S4. Dense, brown to orange, fine to medium SAND, little Gravel, trace Silt, damp.			
11				18				
				14				
12				11				
13								
14								
15	S5	24/22	15 - 17	19	S5. Dense, brown to orange, fine to coarse SAND, some Gravel, trace Silt, damp to moist.			
16				28				
				19				
17				19				
18								
19								
20	S6	24/14	20 - 22	29	S6. Very dense, brown to orange, fine to coarse SAND, some Gravel, trace Silt, moist to wet.			
21				35				
				52				
22				55				
					End of boring at 22 feet. Refusal not encountered.			

GRANULAR SOILS		COHESIVE SOILS	
Blows/ft.	Density	Blows/ft.	Consistency
0-4	V. LOOSE	<2	V. SOFT
5-10	LOOSE	2-4	SOFT
11-30	M. DENSE	4-8	M. STIFF
31-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF

NOTES

SOIL BORING LOG

GeoInsight
Environmental Strategy & Engineering

Client: Weston & Sampson	**Boring Identification:** B-5	
Project: Proposed Edgewater Treatment Facility		**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN	**Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan	
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 516.0 ft (+/- 0.5 ft)	**Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/25/2021	**Date Completed:** 3/25/2021

DRILLING METHOD	SAMPLER
Vehicle: ATV Mounted	**Type:** SS / Auto
Model: CME 55 LCX	**Hammer (lb):** 140
Method: Hollow Stem Auger	**Fall (in):** 30

GROUNDWATER MEASUREMENTS

Date	Depth (ft)	Reference	Stabilization
03/25/2021	~11	Ground Surface	After Drilling

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/15	0 - 2	1	6 inches of TOPSOIL.	TOPSOIL		
1				2	S1. Loose, brown, fine to medium SAND, little Gravel and Silt, trace Wood material, damp.	REWORKED NATIVE		
				5				
				5				
2	S2	24/19	2 - 4	3	S2. Loose, brown, fine to medium SAND, little Silt, trace Gravel, damp.			
3				3				
				3				
				3				
4						NATIVE SAND/TILL		
5	S3	24/22	5 - 7	7	S3. Dense, brown to orange, fine to medium SAND, some Gravel, trace Silt, damp.			
6				15				
				18				
				15				
7								
8								
9					Note: Augured past apparent cobble from 9 - 9.5 feet.			
10	S4	24/24	10 - 12	13	S4. Dense, orange to gray, fine to medium SAND, some Gravel, little Silt, moist to wet.			
11				19				
				21				
				21				
12								
13								
14								
15	S5	24/11	15 - 17	5	S5. Dense, brown to orange, fine to medium SAND, some Gravel, trace Silt, wet.			
16				21				
				15				
				17				
17								
18					Note: Augured past apparent cobble from 18 - 19 feet.			
19								
20	S6	24/12	20 - 22	6	S6. Medium dense, brown to orange, fine to medium SAND, trace Gravel and Silt, wet.			
21				11				
				10				
				12				
22					End of boring at 22 feet. Refusal not encountered.			

GRANULAR SOILS		COHESIVE SOILS	
Blows/ft.	Density	Blows/ft.	Consistency
0-4	V. LOOSE	<2	V. SOFT
5-10	LOOSE	2-4	SOFT
11-30	M. DENSE	4-8	M. STIFF
31-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF

NOTES

SOIL BORING LOG

GeoInsight
Environmental Strategy & Engineering

Client: Weston & Sampson	**Boring Identification:** B-6	
Project: Proposed Edgewater Treatment Facility		**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN	**Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan	
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 513.0 ft (+/- 0.5 ft)	**Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/25/2021	**Date Completed:** 3/25/2021

DRILLING METHOD	SAMPLER	GROUNDWATER MEASUREMENTS			
		Date	**Depth (ft)**	**Reference**	**Stabilization**
Vehicle: ATV Mounted	**Type:** SS / Auto	03/25/2021	~9	Ground Surface	N/A
Model: CME 55 LCX	**Hammer (lb):** 140				
Method: Hollow Stem Auger	**Fall (in):** 30				

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/9	0 - 2	1	2 inches of TOPSOIL.	TOPSOIL		
				2	S1. Very loose, brown, fine to medium SAND and SILT, little Gravel, trace Roots and Wood material, damp to moist.	REWORKED NATIVE		
1				1				
				2				
2	S2	24/14	2 - 4	2	S2. Loose, brown, fine to medium SAND and SILT, some Gravel, trace Roots, damp to moist.			
				3				
3				6		NATIVE SAND/TILL		
				8				
4					Note: Augured past apparent boulder from 4 to 5 feet.			
5	S3	24/19	5 - 7	12	S3. Dense, brown to orange, fine to medium SAND, some Gravel, trace Silt, damp.			
				19				
6				24				
				19				
7								
8					Note: Augured into top of possible weathered bedrock at 8 feet.	WEATHERED BEDROCK		
9								
10	S4	1/1	10	50 for 1"	S4. Very dense, gray, Weathered BEDROCK, moist to wet.			
					End of boring at 10.5 feet. Spoon and auger refusal encountered.			
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

GRANULAR SOILS		COHESIVE SOILS		NOTES
Blows/ft.	**Density**	**Blows/ft.**	**Consistency**	
0-4	V. LOOSE	<2	V. SOFT	
5-10	LOOSE	2-4	SOFT	
11-30	M. DENSE	4-8	M. STIFF	
31-50	DENSE	8-15	STIFF	
>50	V. DENSE	15-30	V. STIFF	
		>30	HARD	

SOIL BORING LOG

GeoInsight Environmental Strategy & Engineering

Client: Weston & Sampson	**Boring Identification:** B-7	
Project: Proposed Edgewater Treatment Facility		**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN	**Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan	
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 511.5 ft (+/- 0.5 ft)	**Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/26/2021	**Date Completed:** 3/26/2021

DRILLING METHOD	SAMPLER	GROUNDWATER MEASUREMENTS			
		Date	**Depth (ft)**	**Reference**	**Stabilization**
Vehicle: ATV Mounted	**Type:** SS / Auto	03/26/2021	2.5	Ground Surface	After Drilling
Model: CME 55 LCX	**Hammer (lb):** 140				
Method: Hollow Stem Auger	**Fall (in):** 30				

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/7	0 - 2	4	6 inches of TOPSOIL.	TOPSOIL		
1				2	S1. Very loose, brown, fine to coarse SAND, some Gravel, little Silt, trace Roots, damp to moist.	REWORKED NATIVE		
				2				
2				2				
	S2	24/12	2 - 4	1	S2. Medium dense, brown, fine to medium SAND, some Gravel, little Silt, trace Roots, moist to wet.	NATIVE SAND/TILL		
3				4				
				9				
4				10				
5	S3	24/12	5 - 7	10	S3. Dense, brown, fine to medium SAND, some Gravel, wet.			
6				25				
				18				
7				12				
8								
9								
10	S4	24/11	10 - 12	17	S4. Dense, brown to orange, fine to medium SAND, some Gravel, trace Silt, wet.			
11				22				
				15				
12				12				
13					Note: Augured past apparent cobble from 13 to 13.5 feet.			
14								
15	S5	24/17	15 - 17	11	S5. Medium dense, gray to orange, fine to medium SAND, trace Gravel and Silt, wet.			
16				13				
				13				
17				13				
18					Note: Augured into top of possible weathered bedrock at 18 feet.	WEATHERED BEDROCK		
19								
20	S6	2/1	20 - 20.3	50 for 2"	S6. Very dense, gray to orange, Weathered BEDROCK, moist to wet.			
21					End of boring at 20.3 feet. Spoon refusal encountered.			
22								

GRANULAR SOILS		COHESIVE SOILS		NOTES
Blows/ft.	**Density**	**Blows/ft.**	**Consistency**	
0-4	V. LOOSE	<2	V. SOFT	
5-10	LOOSE	2-4	SOFT	
11-30	M. DENSE	4-8	M. STIFF	
31-50	DENSE	8-15	STIFF	
>50	V. DENSE	15-30	V. STIFF	

SOIL BORING LOG

GeoInsight — Environmental Strategy & Engineering

Client: Weston & Sampson	**Boring Identification:** B-8	
Project: Proposed Edgewater Treatment Facility		**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN	**Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan	
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 515.5 ft (+/- 0.5 ft)	**Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/26/2021	**Date Completed:** 3/26/2021

DRILLING METHOD	SAMPLER	GROUNDWATER MEASUREMENTS			
		Date	**Depth (ft)**	**Reference**	**Stabilization**
Vehicle: ATV Mounted	**Type:** SS / Auto	03/26/2021	5.3	Ground Surface	After Drilling
Model: CME 55 LCX	**Hammer (lb):** 140				
Method: Hollow Stem Auger	**Fall (in):** 30				

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/12	0 - 2	2	4 inches of TOPSOIL.	TOPSOIL		
				11	S1. Medium dense, brown, fine to coarse SAND, some Gravel, little Silt, trace Roots, damp.	REWORKED NATIVE		
1				15				
				4				
2	S2	24/20	2 - 4	2	S2. Very loose, brown, fine to medium SAND, some Silt, little Gravel, trace Roots, damp to moist.			
				2				
3				2				
				2				
4						NATIVE SAND/TILL		
5	S3	17/12	5 - 6.4	12	S3. Very dense, brown to orange, fine to coarse SAND, some Gravel, little Silt, moist to wet.			
				19				
6				50 for 5"				
7								
8								
9								
10	S4	24/11	10 - 12	21	S4. Dense, orange to gray, fine to medium SAND, some Gravel, trace Silt, wet.			
				35				
11				12				
				12				
12								
13								
					End of boring at 13.5 feet. Auger refusal encountered.			
14								
15								
16								
17								
18								
19								
20								
21								
22								

GRANULAR SOILS		COHESIVE SOILS		NOTES
Blows/ft.	**Density**	**Blows/ft.**	**Consistency**	
0-4	V. LOOSE	<2	V. SOFT	
5-10	LOOSE	2-4	SOFT	
11-30	M. DENSE	4-8	M. STIFF	
31-50	DENSE	8-15	STIFF	
>50	V. DENSE	15-30	V. STIFF	

SOIL BORING LOG

GeoInsight — Environmental Strategy & Engineering

Client: Weston & Sampson	**Boring Identification:** B-9	
Project: Proposed Edgewater Treatment Facility		**Sheet:** 1 of 1
Location: 204 Edgewater Circle, East Hampton, Connecticut	**Checked By:** BTN	**Project #:** 11222-000
Drilling Company: SITE, LLC	**Boring Location:** See Site Plan	
Foreman: Johnny DeAngelis	**Ground Surface Elevation:** 537.0 ft (+/- 0.5 ft)	**Datum:** NAD 83
GeoInsight Engineer/Geologist: AHF	**Date Started:** 3/26/2021	**Date Completed:** 3/26/2021

DRILLING METHOD	SAMPLER
Vehicle: ATV Mounted	**Type:** SS / Auto
Model: CME 55 LCX	**Hammer (lb):** 140
Method: Hollow Stem Auger	**Fall (in):** 30

GROUNDWATER MEASUREMENTS

Date	Depth (ft)	Reference	Stabilization
03/26/2021	Not Encountered	Ground Surface	After Drilling

DEPTH (ft)	#	Pen/Rec (in)	Depth (ft)	Blows/6"	SAMPLE DESCRIPTION	STRATUM DESCRIPTION	FIELD SCREENING (ppm)	NOTE
0	S1	24/8	0 - 2	2	3 inches of TOPSOIL.	TOPSOIL		
1				3	S1. Loose, brown, fine to medium SAND and SILT, little Gravel, trace Roots, damp to moist.	REWORKED NATIVE		
				5				
2				5				
	S2	24/17	2 - 4	7	S2. Medium dense, brown to orange, fine to medium SAND, some Silt, little Gravel, damp.	NATIVE SAND/TILL		
3				6				
				8				
4				5				
5	S3	24/17	5 - 7	20	S3. Medium dense, brown to orange, fine to medium SAND, some Gravel, little Silt, damp.			
6				16				
				14				
7				9				
8								
9								
10					Note: Augured past possible top of weathered bedrock at 9.5 feet.	WEATHERED BEDROCK		
	S4	1/1	10 - 10.1	50 for 1"	S4. Very dense, light gray, Weathered BEDROCK, damp.			
11								
12								
13					End of boring at 12.9 feet. Auger refusal encountered.			
14								
15								
16								
17								
18								
19								
20								
21								
22								

GRANULAR SOILS		COHESIVE SOILS		NOTES
Blows/ft.	Density	Blows/ft.	Consistency	
0-4	V. LOOSE	<2	V. SOFT	
5-10	LOOSE	2-4	SOFT	
11-30	M. DENSE	4-8	M. STIFF	
31-50	DENSE	8-15	STIFF	
>50	V. DENSE	15-30	V. STIFF	

ATTACHMENT D

Pre-Development, and Post-Development HydroCAD Reports

NOAA Atlas 14, Volume 10, Version 3
Location name: Town of East Hampton, Connecticut, USA*
Latitude: 41.5927°, Longitude: -72.4848°
Elevation: 523.11 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	**2**	**5**	**10**	**25**	**50**	**100**	**200**	**500**	**1000**
5-min	**0.335** (0.259-0.422)	**0.406** (0.314-0.512)	**0.522** (0.403-0.660)	**0.618** (0.474-0.787)	**0.751** (0.558-0.996)	**0.851** (0.621-1.15)	**0.955** (0.677-1.34)	**1.07** (0.721-1.53)	**1.24** (0.804-1.84)	**1.38** (0.873-2.08)
10-min	**0.474** (0.367-0.597)	**0.575** (0.445-0.725)	**0.740** (0.571-0.936)	**0.876** (0.672-1.11)	**1.06** (0.791-1.41)	**1.21** (0.879-1.63)	**1.35** (0.960-1.90)	**1.52** (1.02-2.17)	**1.76** (1.14-2.60)	**1.96** (1.24-2.95)
15-min	**0.558** (0.432-0.703)	**0.676** (0.523-0.853)	**0.869** (0.670-1.10)	**1.03** (0.791-1.31)	**1.25** (0.931-1.66)	**1.42** (1.03-1.92)	**1.59** (1.13-2.23)	**1.79** (1.20-2.56)	**2.07** (1.34-3.06)	**2.30** (1.46-3.47)
30-min	**0.761** (0.590-0.959)	**0.923** (0.714-1.16)	**1.19** (0.916-1.50)	**1.41** (1.08-1.79)	**1.71** (1.27-2.26)	**1.93** (1.41-2.62)	**2.17** (1.54-3.04)	**2.44** (1.64-3.49)	**2.82** (1.83-4.17)	**3.14** (1.98-4.72)
60-min	**0.965** (0.748-1.22)	**1.17** (0.905-1.47)	**1.50** (1.16-1.90)	**1.78** (1.37-2.27)	**2.16** (1.61-2.87)	**2.45** (1.79-3.32)	**2.75** (1.95-3.86)	**3.09** (2.08-4.42)	**3.57** (2.31-5.28)	**3.97** (2.51-5.98)
2-hr	**1.27** (0.993-1.59)	**1.53** (1.19-1.91)	**1.95** (1.52-2.45)	**2.30** (1.78-2.90)	**2.78** (2.08-3.66)	**3.14** (2.31-4.22)	**3.52** (2.52-4.92)	**3.96** (2.68-5.63)	**4.62** (3.00-6.78)	**5.17** (3.28-7.73)
3-hr	**1.48** (1.16-1.85)	**1.78** (1.39-2.22)	**2.26** (1.76-2.83)	**2.66** (2.07-3.35)	**3.21** (2.42-4.22)	**3.62** (2.68-4.86)	**4.06** (2.92-5.66)	**4.58** (3.10-6.47)	**5.36** (3.49-7.82)	**6.02** (3.83-8.94)
6-hr	**1.89** (1.50-2.34)	**2.27** (1.79-2.81)	**2.88** (2.27-3.59)	**3.39** (2.66-4.24)	**4.09** (3.11-5.35)	**4.62** (3.44-6.16)	**5.18** (3.75-7.18)	**5.85** (3.98-8.20)	**6.86** (4.48-9.93)	**7.72** (4.93-11.4)
12-hr	**2.36** (1.88-2.90)	**2.84** (2.26-3.49)	**3.62** (2.87-4.47)	**4.27** (3.37-5.30)	**5.17** (3.95-6.70)	**5.83** (4.37-7.73)	**6.55** (4.77-9.01)	**7.41** (5.06-10.3)	**8.70** (5.70-12.5)	**9.79** (6.27-14.3)
24-hr	**2.77** (2.23-3.39)	**3.37** (2.71-4.13)	**4.36** (3.49-5.35)	**5.18** (4.12-6.38)	**6.30** (4.85-8.12)	**7.13** (5.38-9.39)	**8.03** (5.90-11.0)	**9.13** (6.26-12.6)	**10.8** (7.11-15.4)	**12.2** (7.86-17.7)
2-day	**3.11** (2.53-3.78)	**3.84** (3.11-4.67)	**5.04** (4.07-6.13)	**6.03** (4.83-7.37)	**7.39** (5.74-9.48)	**8.39** (6.39-11.0)	**9.49** (7.05-13.0)	**10.9** (7.48-14.9)	**13.1** (8.61-18.4)	**15.0** (9.63-21.5)
3-day	**3.38** (2.76-4.08)	**4.18** (3.40-5.06)	**5.49** (4.45-6.66)	**6.57** (5.30-8.01)	**8.06** (6.30-10.3)	**9.16** (7.01-12.0)	**10.4** (7.74-14.1)	**11.9** (8.21-16.2)	**14.3** (9.47-20.1)	**16.5** (10.6-23.5)
4-day	**3.63** (2.97-4.37)	**4.47** (3.66-5.40)	**5.86** (4.77-7.09)	**7.02** (5.67-8.53)	**8.60** (6.74-11.0)	**9.76** (7.50-12.7)	**11.0** (8.26-15.0)	**12.7** (8.76-17.2)	**15.3** (10.1-21.4)	**17.5** (11.3-24.9)
7-day	**4.31** (3.55-5.16)	**5.26** (4.33-6.30)	**6.81** (5.58-8.19)	**8.10** (6.59-9.78)	**9.87** (7.77-12.5)	**11.2** (8.62-14.5)	**12.6** (9.45-17.0)	**14.4** (9.99-19.4)	**17.2** (11.4-23.9)	**19.6** (12.7-27.8)
10-day	**4.99** (4.13-5.96)	**6.00** (4.96-7.17)	**7.64** (6.29-9.16)	**9.01** (7.36-10.8)	**10.9** (8.59-13.7)	**12.3** (9.48-15.8)	**13.8** (10.3-18.4)	**15.6** (10.9-21.0)	**18.5** (12.3-25.6)	**20.9** (13.6-29.5)
20-day	**7.15** (5.97-8.48)	**8.23** (6.86-9.77)	**10.0** (8.31-11.9)	**11.5** (9.46-13.7)	**13.5** (10.7-16.7)	**15.0** (11.6-19.0)	**16.6** (12.4-21.7)	**18.4** (12.9-24.5)	**21.0** (14.1-28.8)	**23.2** (15.1-32.3)
30-day	**8.98** (7.54-10.6)	**10.1** (8.46-11.9)	**11.9** (9.95-14.1)	**13.4** (11.1-16.0)	**15.5** (12.4-19.1)	**17.1** (13.3-21.4)	**18.8** (13.9-24.1)	**20.5** (14.4-27.0)	**22.8** (15.3-31.1)	**24.6** (16.1-34.2)
45-day	**11.3** (9.50-13.2)	**12.4** (10.5-14.6)	**14.3** (12.0-16.9)	**15.9** (13.2-18.8)	**18.1** (14.4-22.0)	**19.8** (15.3-24.5)	**21.4** (15.9-27.2)	**23.0** (16.3-30.2)	**25.1** (16.9-33.9)	**26.6** (17.3-36.7)
60-day	**13.2** (11.2-15.4)	**14.4** (12.1-16.9)	**16.3** (13.7-19.2)	**18.0** (15.0-21.2)	**20.2** (16.2-24.5)	**22.0** (17.1-27.1)	**23.7** (17.5-29.8)	**25.2** (17.9-32.9)	**27.1** (18.3-36.5)	**28.3** (18.5-39.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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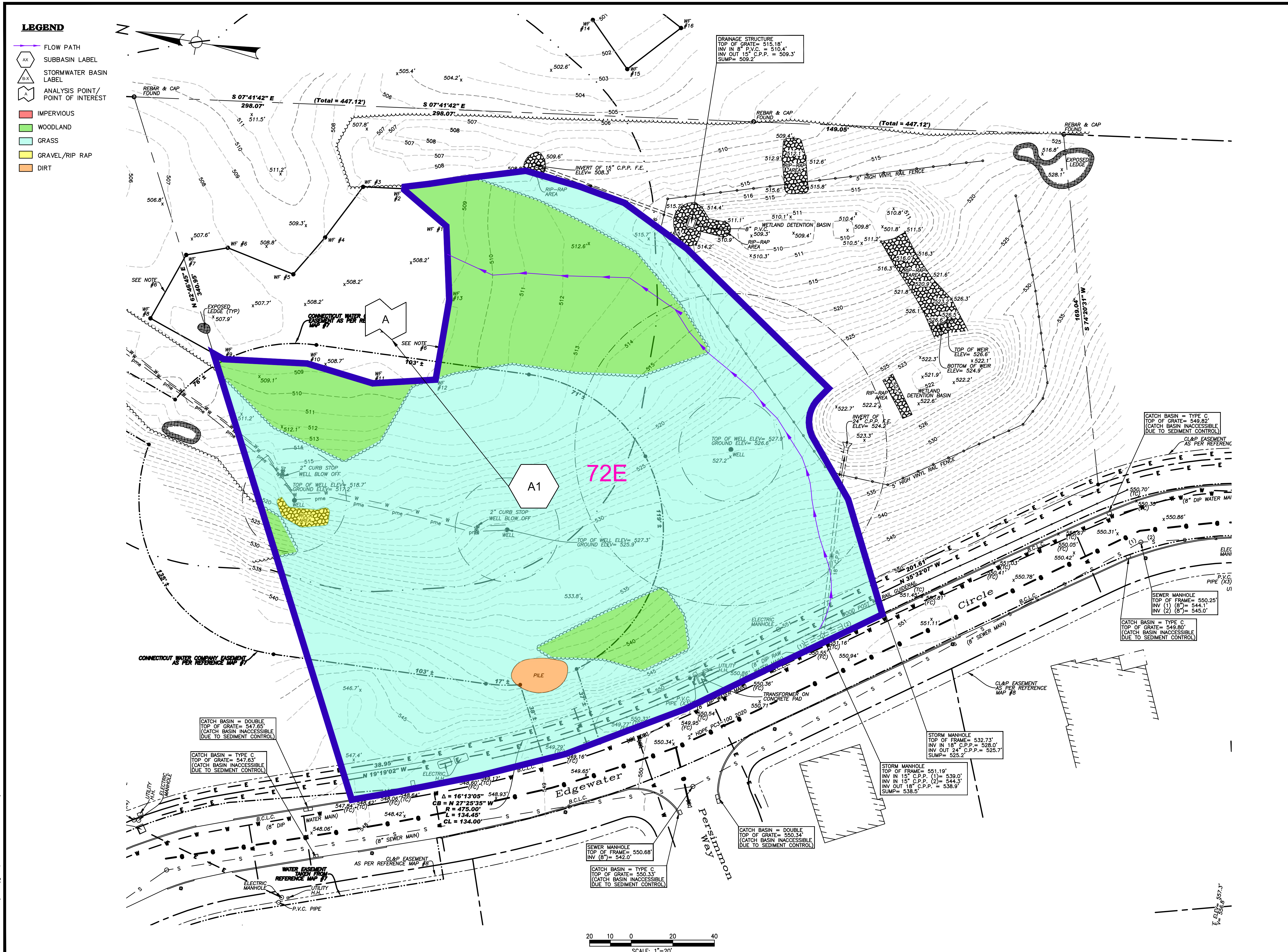
PF graphical



Project:

ConnecticutWater

CONNECTICUT WATER COMPANY
93 WEST MAIN STREET
CLINTON, CT 06413

EDGEWATER FILTRATION FACILITY

204 EDGEWATER CIRCLE
EAST HAMPTON, CT 06424

Weston & Sampson

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Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PERMITTING

Scale: AS SHOWN

Date: 05/ 05/ 2021

Drawn By: REB

Reviewed By: JMJ

Approved By: JIP

W&S Project No.: ENG21 - 0129

W&S File No.:

Drawing Title:

EXISTING HYDROLOGIC MAP

Sheet Number:

FIG-1

Rev. 2.0 Date: July 2020

Project:

ConnecticutWater

CONNECTICUT WATER COMPANY
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CLINTON, CT 06413

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Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PERMITTING

Scale: AS SHOWN

Date: 06/ 28/ 2021

Drawn By: REB

Reviewed By: JIP

Approved By: JMJ

W&S Project No.: ENG21 - 0129

W&S File No.:

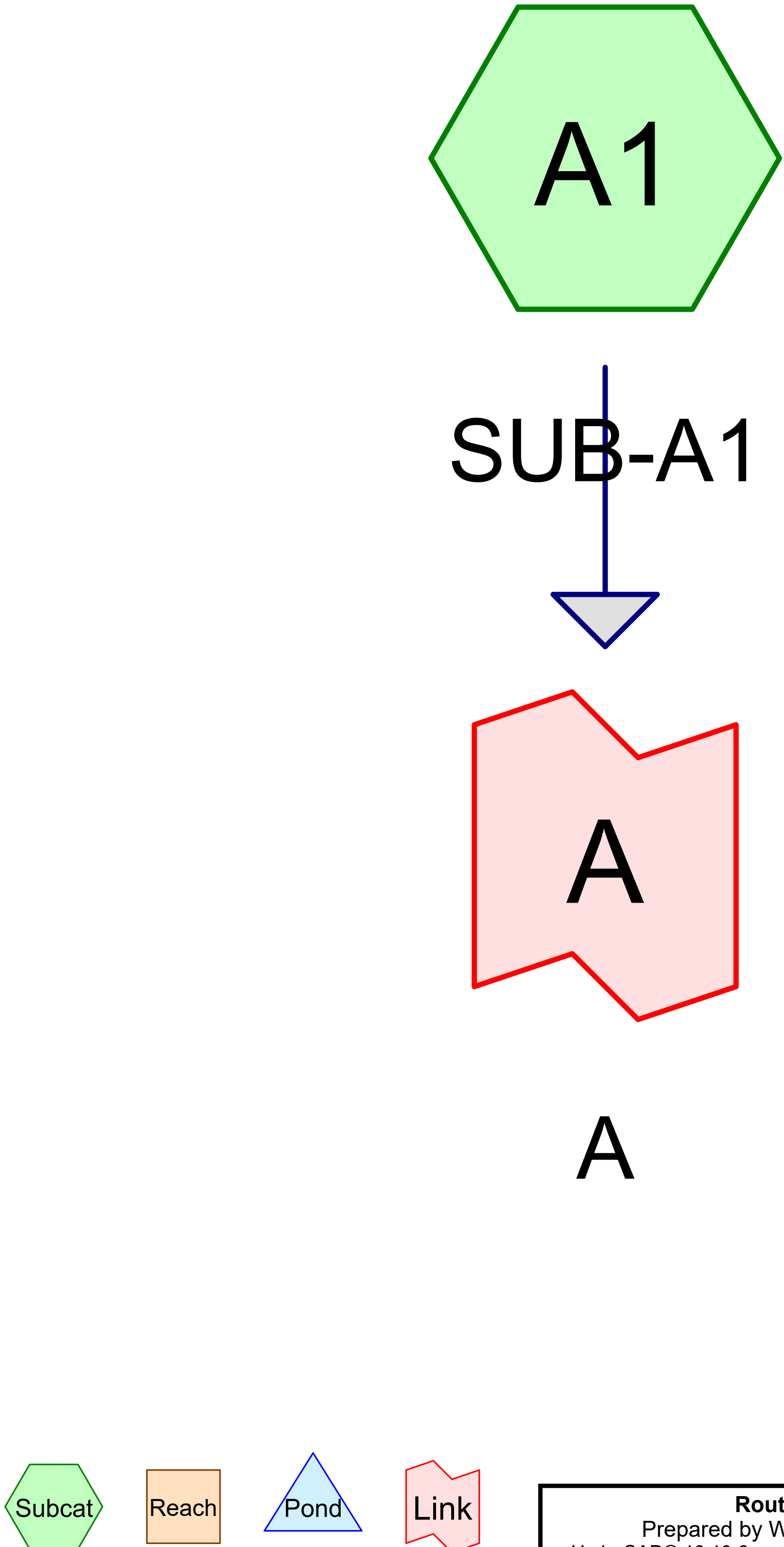
Drawing Title:

PROPOSED HYDROLOGIC MAP

Sheet Number:

FIG-2

Rev. 2.0 Date: July 2020



Routing Diagram for HYDRO-EX
Prepared by Weston & Sampson, Printed 6/25/2021
HydroCAD® 10.10-3a s/n 00455 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.37	2
2	10-year	Type III 24-hr		Default	24.00	1	5.18	2
3	25-year	Type III 24-hr		Default	24.00	1	6.30	2
4	50-year	Type III 24-hr		Default	24.00	1	7.13	2
5	100-year	Type III 24-hr		Default	24.00	1	8.03	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
46,290	61	>75% Grass cover, Good, HSG B (A1)
358	86	Fallow, bare soil, HSG B (A1)
200	96	Gravel surface, HSG B (A1)
12,748	55	Woods, Good, HSG B (A1)
59,596	**60**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
59,596	HSG B	A1
0	HSG C	
0	HSG D	
0	Other	
59,596		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	46,290	0	0	0	46,290	>75% Grass cover, Good	
0	358	0	0	0	358	Fallow, bare soil	
0	200	0	0	0	200	Gravel surface	
0	12,748	0	0	0	12,748	Woods, Good	
0	**59,596**	**0**	**0**	**0**	**59,596**	**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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=59,596 sf 0.00% Impervious Runoff Depth=0.48"
Flow Length=294' Tc=6.0 min CN=60 Runoff=0.49 cfs 2,367 cf

Link A: A Inflow=0.49 cfs 2,367 cf
Primary=0.49 cfs 2,367 cf

Total Runoff Area = 59,596 sf Runoff Volume = 2,367 cf Average Runoff Depth = 0.48"
100.00% Pervious = 59,596 sf 0.00% Impervious = 0 sf

Summary for Subcatchment A1: SUB-A1

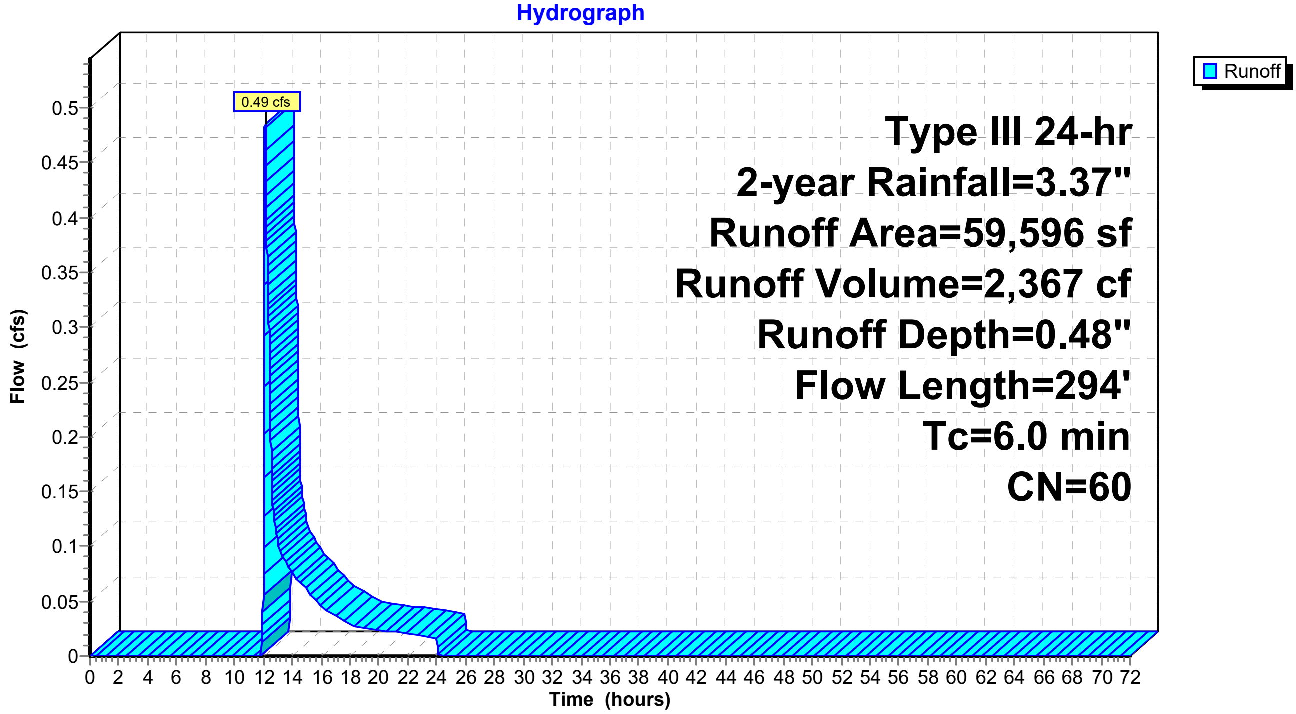
Runoff = 0.49 cfs @ 12.12 hrs, Volume= 2,367 cf, Depth= 0.48"

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 2-year Rainfall=3.37"

Area (sf)	CN	Description
12,748	55	Woods, Good, HSG B
200	96	Gravel surface, HSG B
358	86	Fallow, bare soil, HSG B
46,290	61	>75% Grass cover, Good, HSG B
59,596	60	Weighted Average
59,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	16	0.0700	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.16"
1.3	34	0.3500	0.43		**Sheet Flow, Sheet 2** Grass: Short n= 0.150 P2= 3.16"
0.1	33	0.2700	8.37		**Shallow Concentrated Flow, Shallow 1** Unpaved Kv= 16.1 fps
0.1	40	0.1000	6.42		**Shallow Concentrated Flow, Shallow 2** Paved Kv= 20.3 fps
0.1	29	0.3100	8.96		**Shallow Concentrated Flow, Shallow 3** Unpaved Kv= 16.1 fps
2.1	142	0.0500	1.12		**Shallow Concentrated Flow, Shallow 4** Woodland Kv= 5.0 fps
0.9					**Direct Entry, Min Tc=0.1 hrs**
6.0	294	Total			

Subcatchment A1: SUB-A1

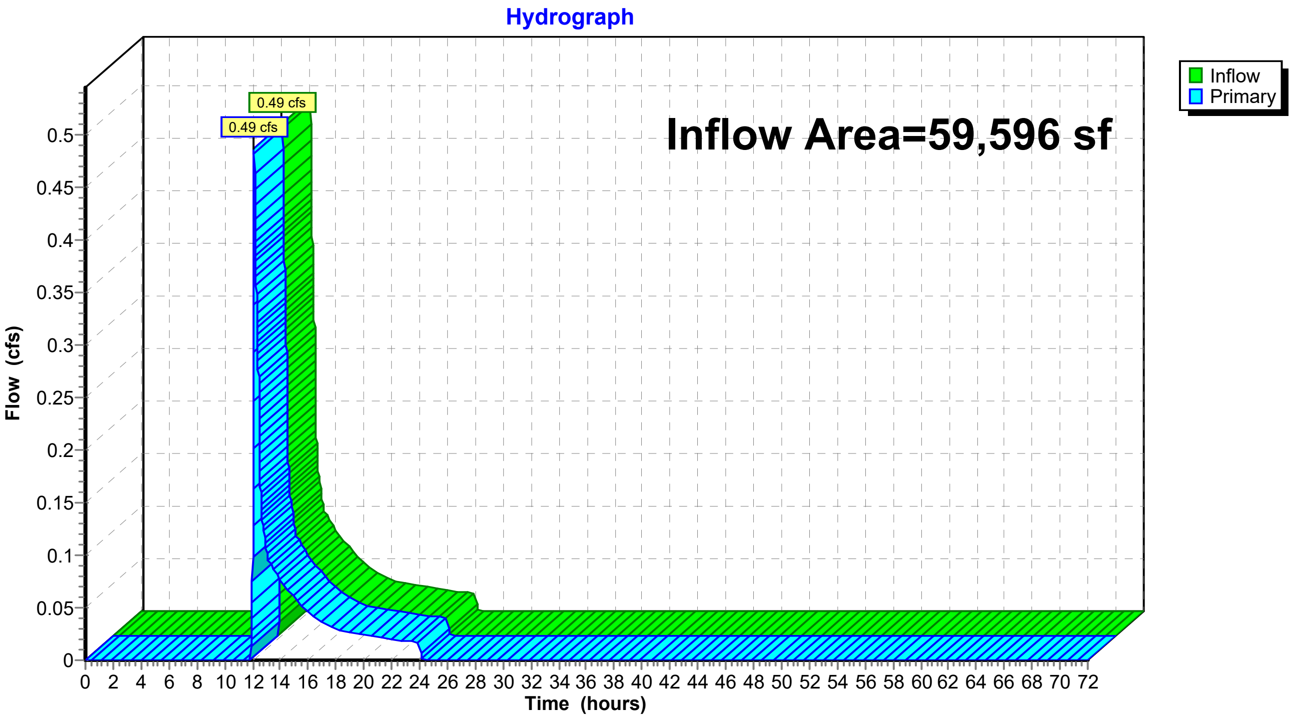


Summary for Link A: A

Inflow Area = 59,596 sf, 0.00% Impervious, Inflow Depth = 0.48" for 2-year event
Inflow = 0.49 cfs @ 12.12 hrs, Volume= 2,367 cf
Primary = 0.49 cfs @ 12.12 hrs, Volume= 2,367 cf, Atten= 0%, Lag= 0.0 min

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

Link A: A



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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=59,596 sf 0.00% Impervious Runoff Depth=1.41"
Flow Length=294' Tc=6.0 min CN=60 Runoff=2.05 cfs 6,990 cf

Link A: A Inflow=2.05 cfs 6,990 cf
Primary=2.05 cfs 6,990 cf

Total Runoff Area = 59,596 sf Runoff Volume = 6,990 cf Average Runoff Depth = 1.41"
100.00% Pervious = 59,596 sf 0.00% Impervious = 0 sf

Summary for Subcatchment A1: SUB-A1

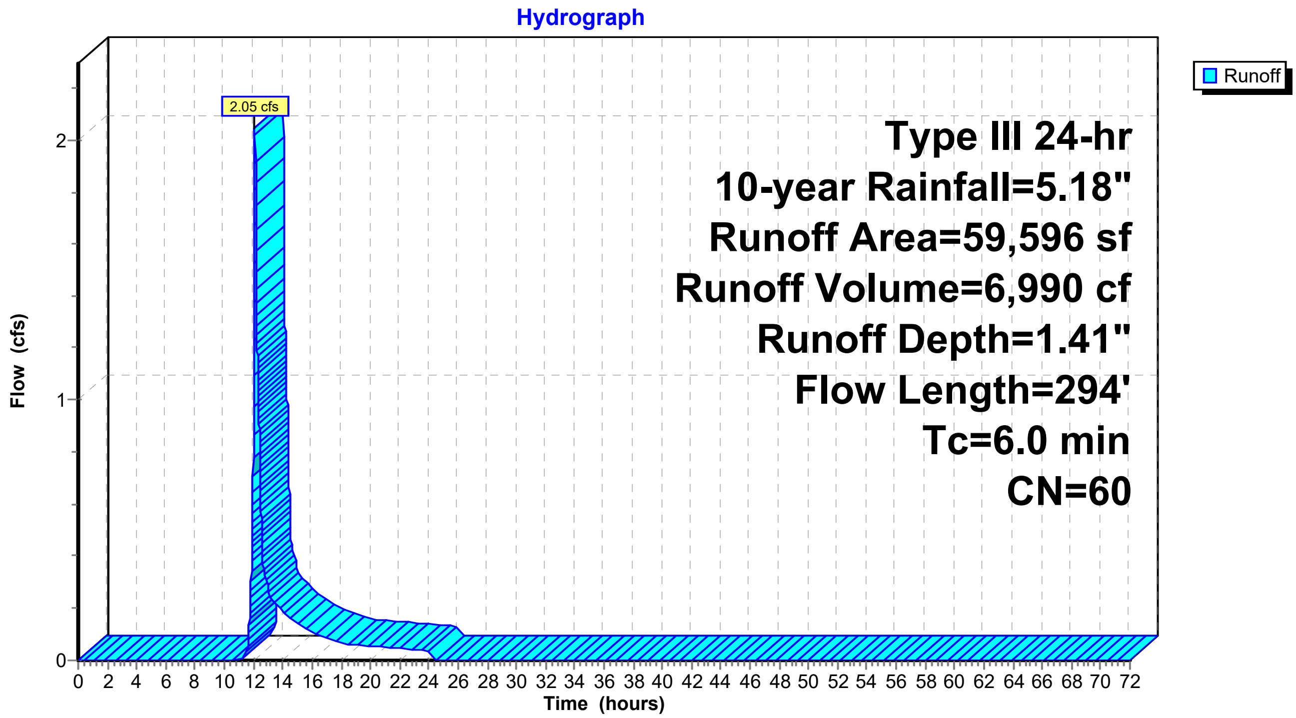
Runoff = 2.05 cfs @ 12.10 hrs, Volume= 6,990 cf, Depth= 1.41"

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 10-year Rainfall=5.18"

Area (sf)	CN	Description
12,748	55	Woods, Good, HSG B
200	96	Gravel surface, HSG B
358	86	Fallow, bare soil, HSG B
46,290	61	>75% Grass cover, Good, HSG B
59,596	60	Weighted Average
59,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	16	0.0700	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.16"
1.3	34	0.3500	0.43		**Sheet Flow, Sheet 2** Grass: Short n= 0.150 P2= 3.16"
0.1	33	0.2700	8.37		**Shallow Concentrated Flow, Shallow 1** Unpaved Kv= 16.1 fps
0.1	40	0.1000	6.42		**Shallow Concentrated Flow, Shallow 2** Paved Kv= 20.3 fps
0.1	29	0.3100	8.96		**Shallow Concentrated Flow, Shallow 3** Unpaved Kv= 16.1 fps
2.1	142	0.0500	1.12		**Shallow Concentrated Flow, Shallow 4** Woodland Kv= 5.0 fps
0.9					**Direct Entry, Min Tc=0.1 hrs**
6.0	294	Total			

Subcatchment A1: SUB-A1

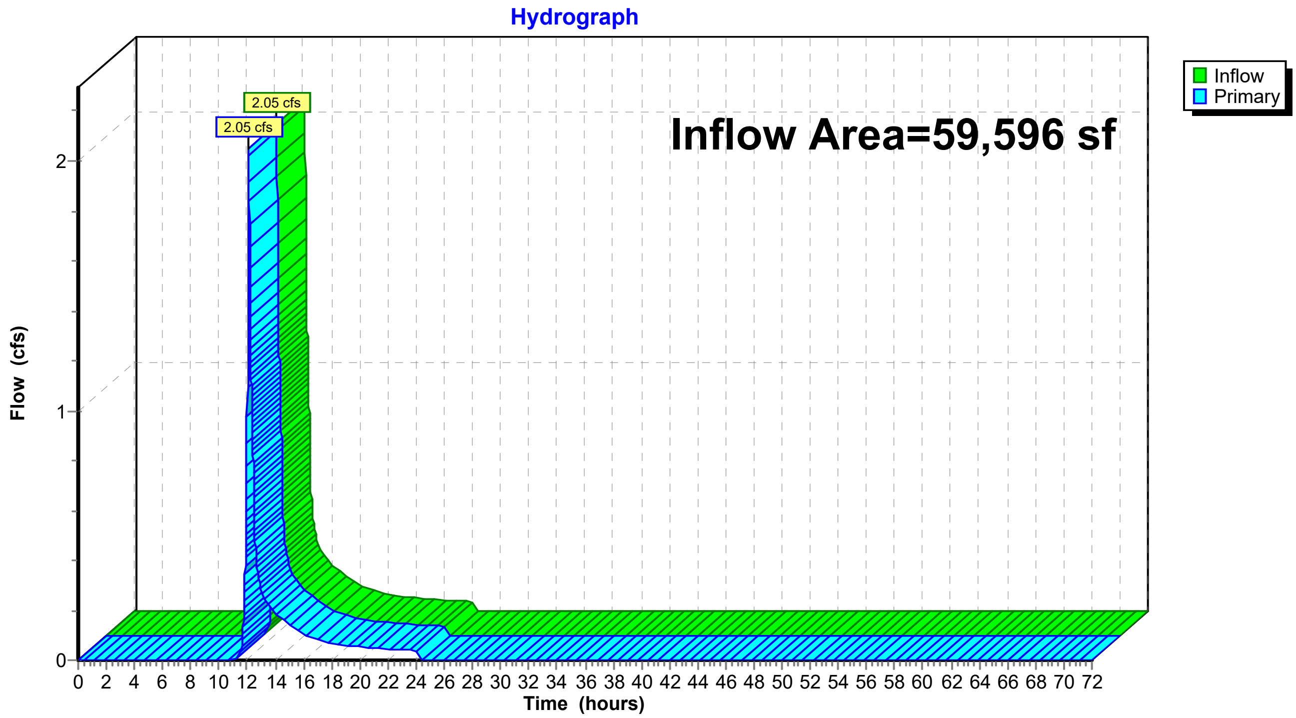


Summary for Link A: A

Inflow Area = 59,596 sf, 0.00% Impervious, Inflow Depth = 1.41" for 10-year event
Inflow = 2.05 cfs @ 12.10 hrs, Volume= 6,990 cf
Primary = 2.05 cfs @ 12.10 hrs, Volume= 6,990 cf, Atten= 0%, Lag= 0.0 min

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

Link A: A



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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=59,596 sf 0.00% Impervious Runoff Depth=2.12"
Flow Length=294' Tc=6.0 min CN=60 Runoff=3.25 cfs 10,531 cf

Link A: A Inflow=3.25 cfs 10,531 cf
Primary=3.25 cfs 10,531 cf

Total Runoff Area = 59,596 sf Runoff Volume = 10,531 cf Average Runoff Depth = 2.12"
100.00% Pervious = 59,596 sf 0.00% Impervious = 0 sf

Summary for Subcatchment A1: SUB-A1

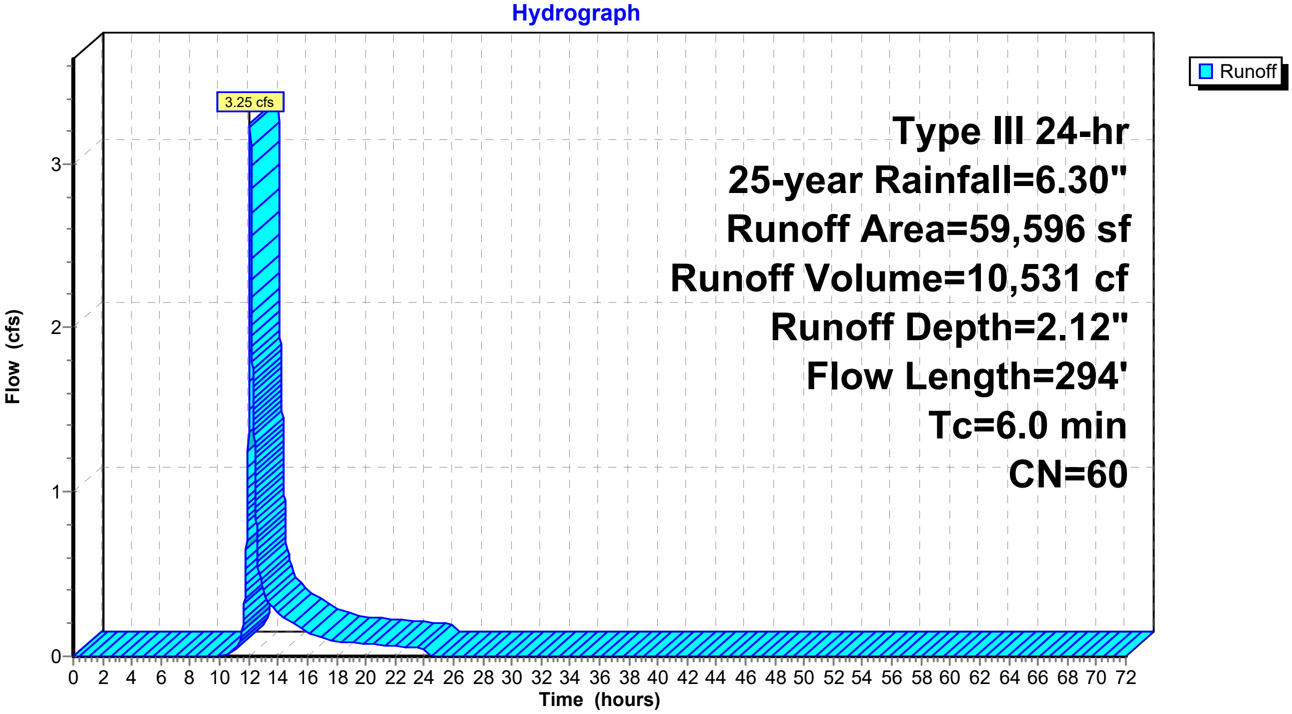
Runoff = 3.25 cfs @ 12.10 hrs, Volume= 10,531 cf, Depth= 2.12"

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 25-year Rainfall=6.30"

Area (sf)	CN	Description
12,748	55	Woods, Good, HSG B
200	96	Gravel surface, HSG B
358	86	Fallow, bare soil, HSG B
46,290	61	>75% Grass cover, Good, HSG B
59,596	60	Weighted Average
59,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	16	0.0700	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.16"
1.3	34	0.3500	0.43		**Sheet Flow, Sheet 2** Grass: Short n= 0.150 P2= 3.16"
0.1	33	0.2700	8.37		**Shallow Concentrated Flow, Shallow 1** Unpaved Kv= 16.1 fps
0.1	40	0.1000	6.42		**Shallow Concentrated Flow, Shallow 2** Paved Kv= 20.3 fps
0.1	29	0.3100	8.96		**Shallow Concentrated Flow, Shallow 3** Unpaved Kv= 16.1 fps
2.1	142	0.0500	1.12		**Shallow Concentrated Flow, Shallow 4** Woodland Kv= 5.0 fps
0.9					**Direct Entry, Min Tc=0.1 hrs**
6.0	294	Total			

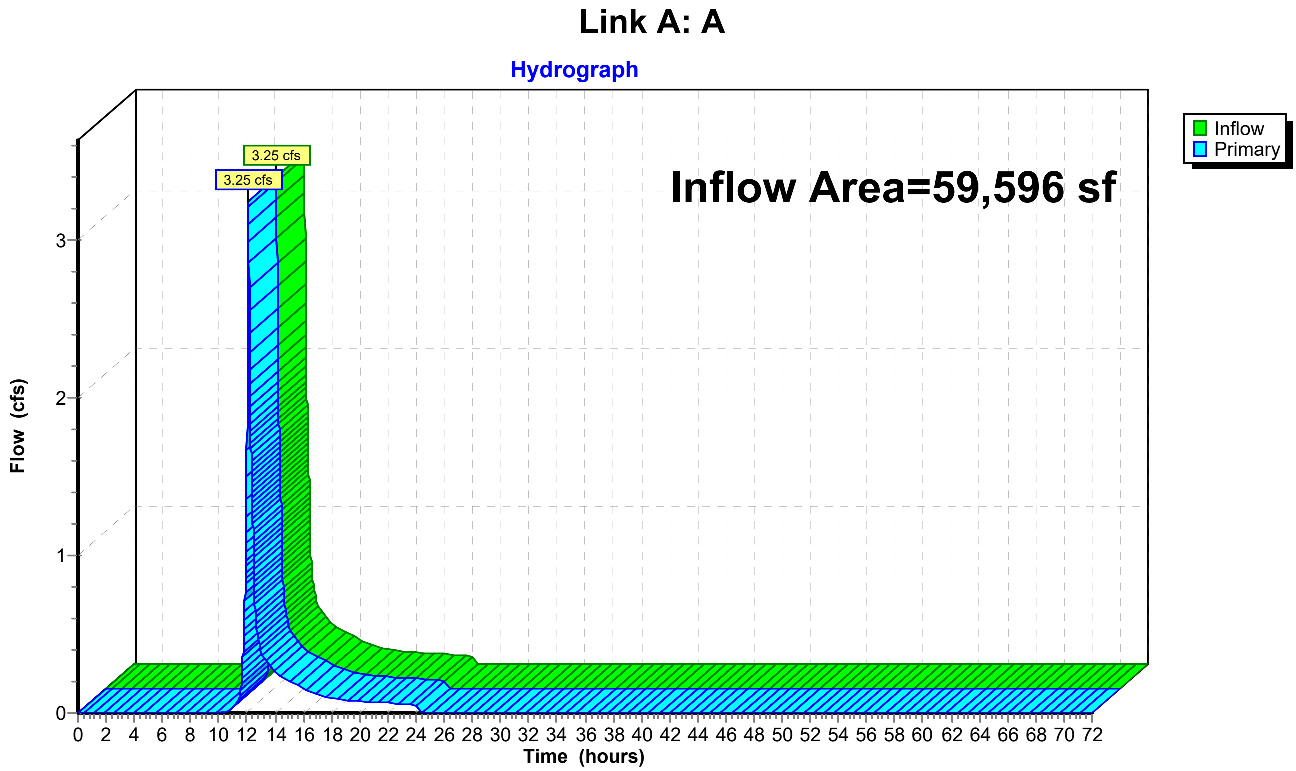
Subcatchment A1: SUB-A1



Summary for Link A: A

Inflow Area = 59,596 sf, 0.00% Impervious, Inflow Depth = 2.12" for 25-year event
Inflow = 3.25 cfs @ 12.10 hrs, Volume= 10,531 cf
Primary = 3.25 cfs @ 12.10 hrs, Volume= 10,531 cf, Atten= 0%, Lag= 0.0 min

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



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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=59,596 sf 0.00% Impervious Runoff Depth=2.70"
Flow Length=294' Tc=6.0 min CN=60 Runoff=4.21 cfs 13,389 cf

Link A: A Inflow=4.21 cfs 13,389 cf
Primary=4.21 cfs 13,389 cf

Total Runoff Area = 59,596 sf Runoff Volume = 13,389 cf Average Runoff Depth = 2.70"
100.00% Pervious = 59,596 sf 0.00% Impervious = 0 sf

Summary for Subcatchment A1: SUB-A1

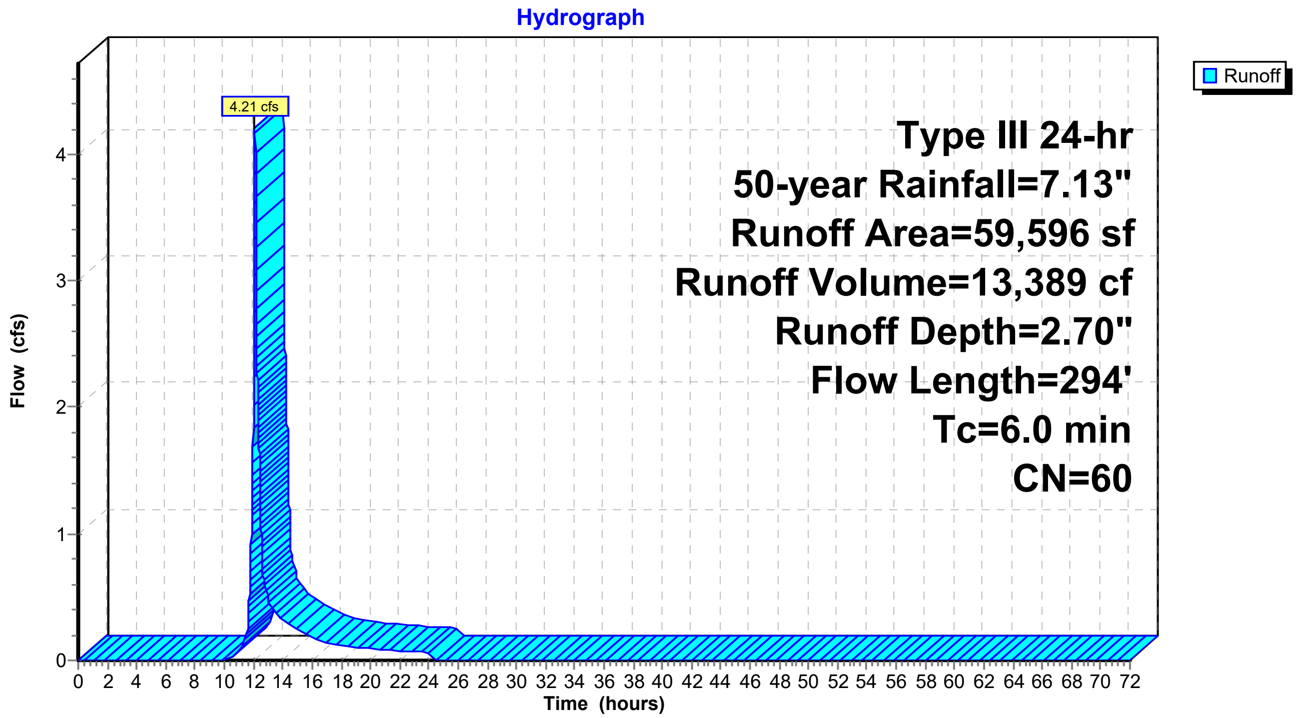
Runoff = 4.21 cfs @ 12.09 hrs, Volume= 13,389 cf, Depth= 2.70"

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 50-year Rainfall=7.13"

Area (sf)	CN	Description
12,748	55	Woods, Good, HSG B
200	96	Gravel surface, HSG B
358	86	Fallow, bare soil, HSG B
46,290	61	>75% Grass cover, Good, HSG B
59,596	60	Weighted Average
59,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	16	0.0700	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.16"
1.3	34	0.3500	0.43		**Sheet Flow, Sheet 2** Grass: Short n= 0.150 P2= 3.16"
0.1	33	0.2700	8.37		**Shallow Concentrated Flow, Shallow 1** Unpaved Kv= 16.1 fps
0.1	40	0.1000	6.42		**Shallow Concentrated Flow, Shallow 2** Paved Kv= 20.3 fps
0.1	29	0.3100	8.96		**Shallow Concentrated Flow, Shallow 3** Unpaved Kv= 16.1 fps
2.1	142	0.0500	1.12		**Shallow Concentrated Flow, Shallow 4** Woodland Kv= 5.0 fps
0.9					**Direct Entry, Min Tc=0.1 hrs**
6.0	294	Total			

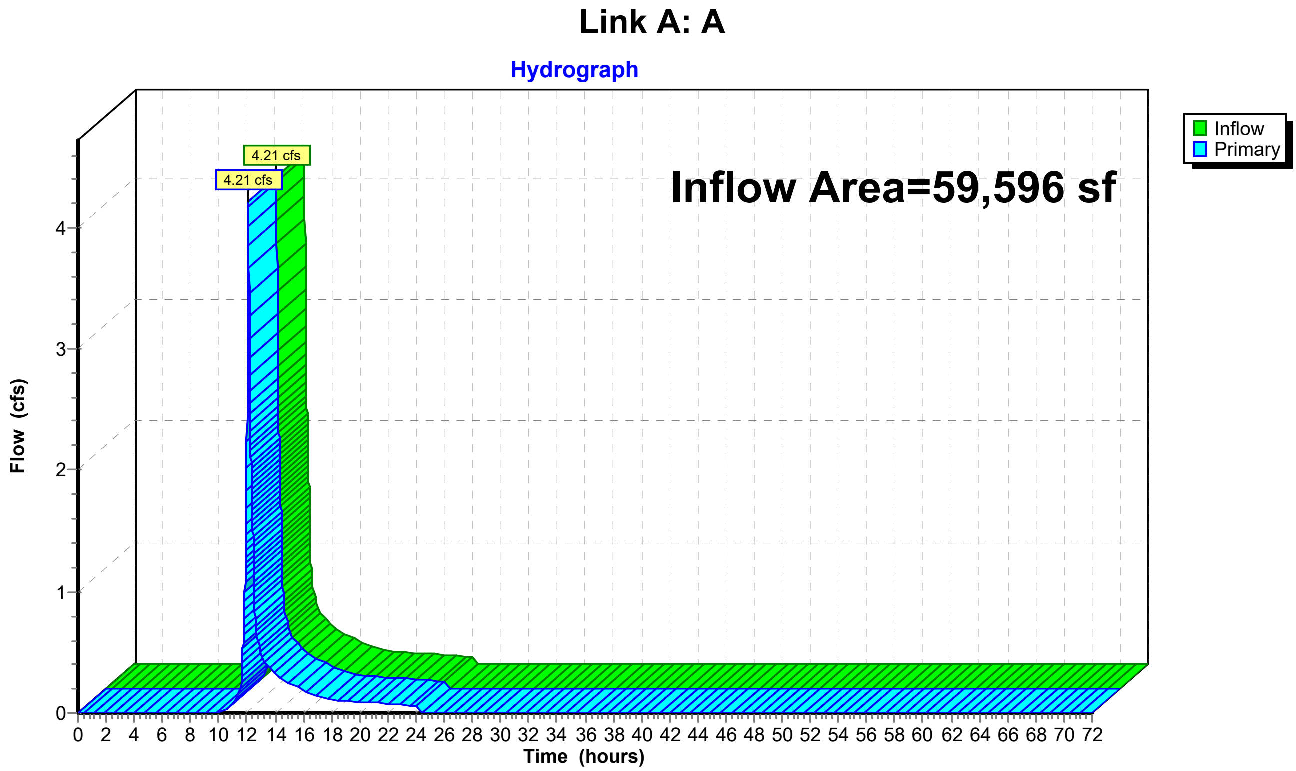
Subcatchment A1: SUB-A1



Summary for Link A: A

Inflow Area = 59,596 sf, 0.00% Impervious, Inflow Depth = 2.70" for 50-year event
Inflow = 4.21 cfs @ 12.09 hrs, Volume= 13,389 cf
Primary = 4.21 cfs @ 12.09 hrs, Volume= 13,389 cf, Atten= 0%, Lag= 0.0 min

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



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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=59,596 sf 0.00% Impervious Runoff Depth=3.36"
Flow Length=294' Tc=6.0 min CN=60 Runoff=5.30 cfs 16,666 cf

Link A: A Inflow=5.30 cfs 16,666 cf
Primary=5.30 cfs 16,666 cf

Total Runoff Area = 59,596 sf Runoff Volume = 16,666 cf Average Runoff Depth = 3.36"
100.00% Pervious = 59,596 sf 0.00% Impervious = 0 sf

Summary for Subcatchment A1: SUB-A1

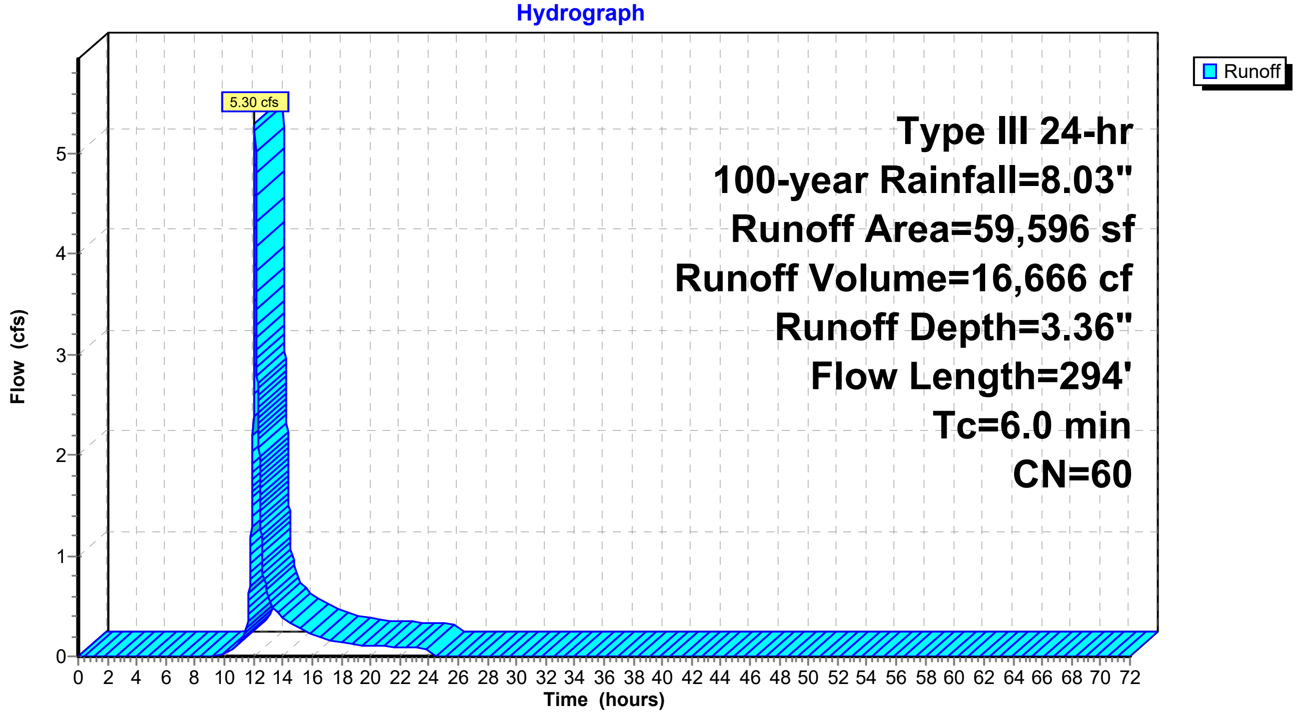
Runoff = 5.30 cfs @ 12.09 hrs, Volume= 16,666 cf, Depth= 3.36"

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=8.03"

Area (sf)	CN	Description
12,748	55	Woods, Good, HSG B
200	96	Gravel surface, HSG B
358	86	Fallow, bare soil, HSG B
46,290	61	>75% Grass cover, Good, HSG B
59,596	60	Weighted Average
59,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	16	0.0700	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.16"
1.3	34	0.3500	0.43		**Sheet Flow, Sheet 2** Grass: Short n= 0.150 P2= 3.16"
0.1	33	0.2700	8.37		**Shallow Concentrated Flow, Shallow 1** Unpaved Kv= 16.1 fps
0.1	40	0.1000	6.42		**Shallow Concentrated Flow, Shallow 2** Paved Kv= 20.3 fps
0.1	29	0.3100	8.96		**Shallow Concentrated Flow, Shallow 3** Unpaved Kv= 16.1 fps
2.1	142	0.0500	1.12		**Shallow Concentrated Flow, Shallow 4** Woodland Kv= 5.0 fps
0.9					**Direct Entry, Min Tc=0.1 hrs**
6.0	294	Total			

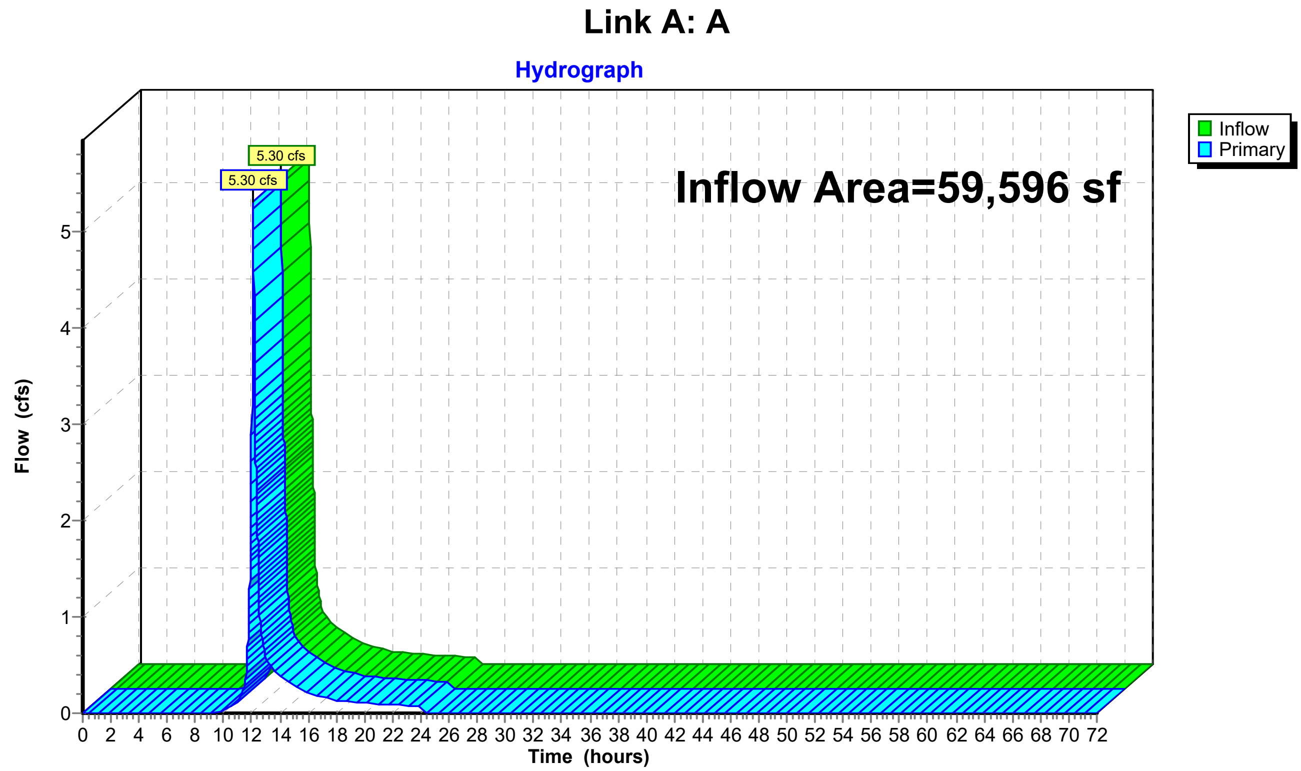
Subcatchment A1: SUB-A1

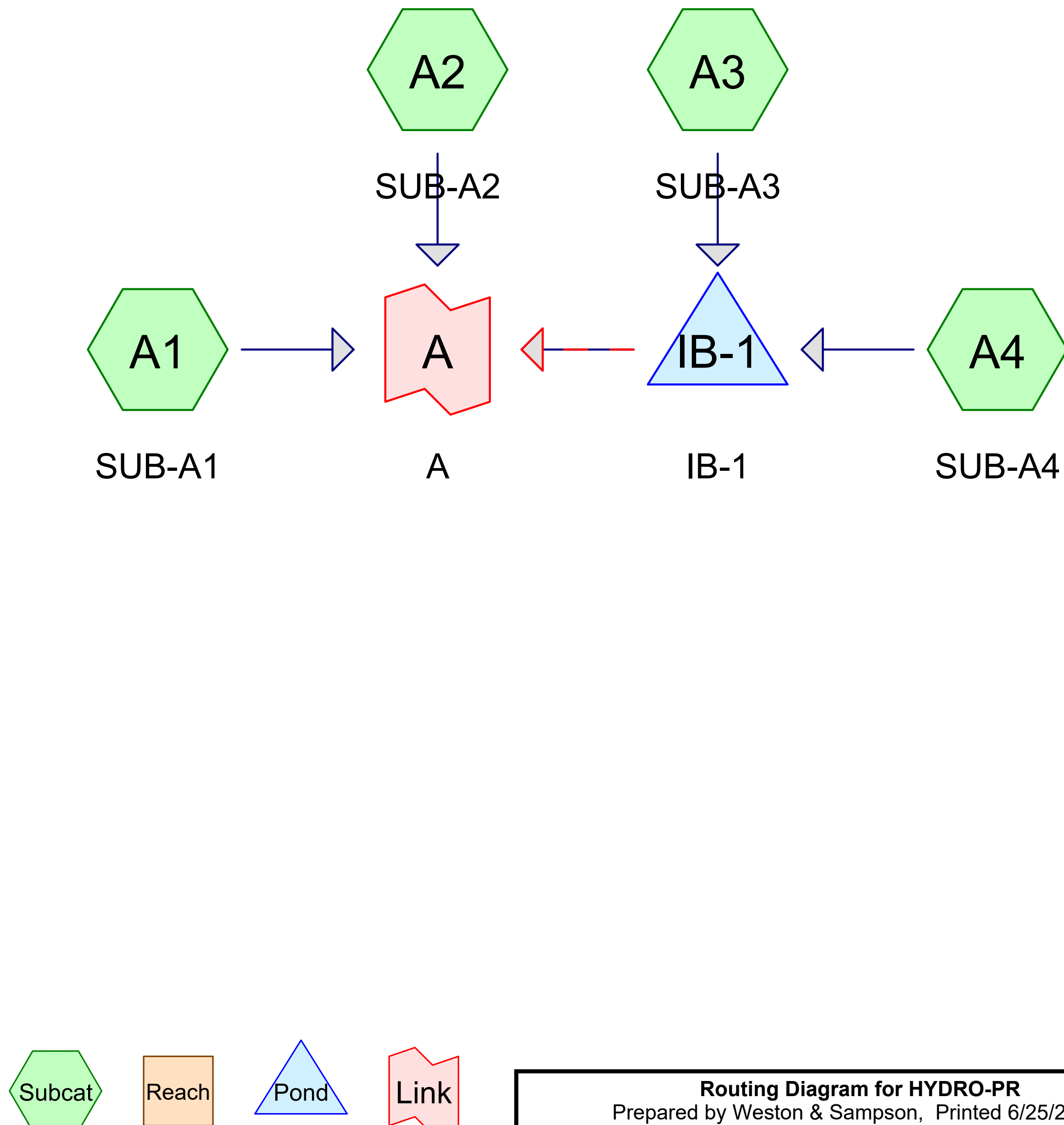


Summary for Link A: A

Inflow Area = 59,596 sf, 0.00% Impervious, Inflow Depth = 3.36" for 100-year event
Inflow = 5.30 cfs @ 12.09 hrs, Volume= 16,666 cf
Primary = 5.30 cfs @ 12.09 hrs, Volume= 16,666 cf, Atten= 0%, Lag= 0.0 min

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





Routing Diagram for HYDRO-PR
Prepared by Weston & Sampson, Printed 6/25/2021
HydroCAD® 10.10-3a s/n 00455 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.37	2
2	10-year	Type III 24-hr		Default	24.00	1	5.18	2
3	25-year	Type III 24-hr		Default	24.00	1	6.30	2
4	50-year	Type III 24-hr		Default	24.00	1	7.13	2
5	100-year	Type III 24-hr		Default	24.00	1	8.03	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
37,530	61	>75% Grass cover, Good, HSG B (A1, A4)
994	96	Gravel surface, HSG A (A1, A4)
14,504	98	Paved parking, HSG B (A1, A4)
3,860	98	Roofs, HSG B (A2, A3)
2,708	55	Woods, Good, HSG B (A1)
59,596	**73**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
994	HSG A	A1, A4
58,602	HSG B	A1, A2, A3, A4
0	HSG C	
0	HSG D	
0	Other	
59,596		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	37,530	0	0	0	37,530	>75% Grass cover, Good	
994	0	0	0	0	994	Gravel surface	
0	14,504	0	0	0	14,504	Paved parking	
0	3,860	0	0	0	3,860	Roofs	
0	2,708	0	0	0	2,708	Woods, Good	
994	**58,602**	**0**	**0**	**0**	**59,596**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	IB-1	514.06	513.96	16.0	0.0062	0.012	8.0	0.0	0.0

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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=21,807 sf 7.02% Impervious Runoff Depth=0.64"
Tc=6.0 min CN=64 Runoff=0.30 cfs 1,164 cf

SubcatchmentA2: SUB-A2 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=98 Runoff=0.15 cfs 505 cf

SubcatchmentA3: SUB-A3 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=98 Runoff=0.15 cfs 505 cf

SubcatchmentA4: SUB-A4 Runoff Area=33,929 sf 38.24% Impervious Runoff Depth=1.21"
Tc=6.0 min CN=75 Runoff=1.07 cfs 3,423 cf

Pond IB-1: IB-1 Peak Elev=514.22' Storage=2,000 cf Inflow=1.21 cfs 3,927 cf
Discarded=0.04 cfs 3,344 cf Primary=0.06 cfs 583 cf Secondary=0.00 cfs 0 cf Outflow=0.11 cfs 3,927 cf

Link A: A Inflow=0.44 cfs 2,251 cf
Primary=0.44 cfs 2,251 cf

Total Runoff Area = 59,596 sf Runoff Volume = 5,596 cf Average Runoff Depth = 1.13"
69.19% Pervious = 41,232 sf 30.81% Impervious = 18,364 sf

Summary for Subcatchment A1: SUB-A1

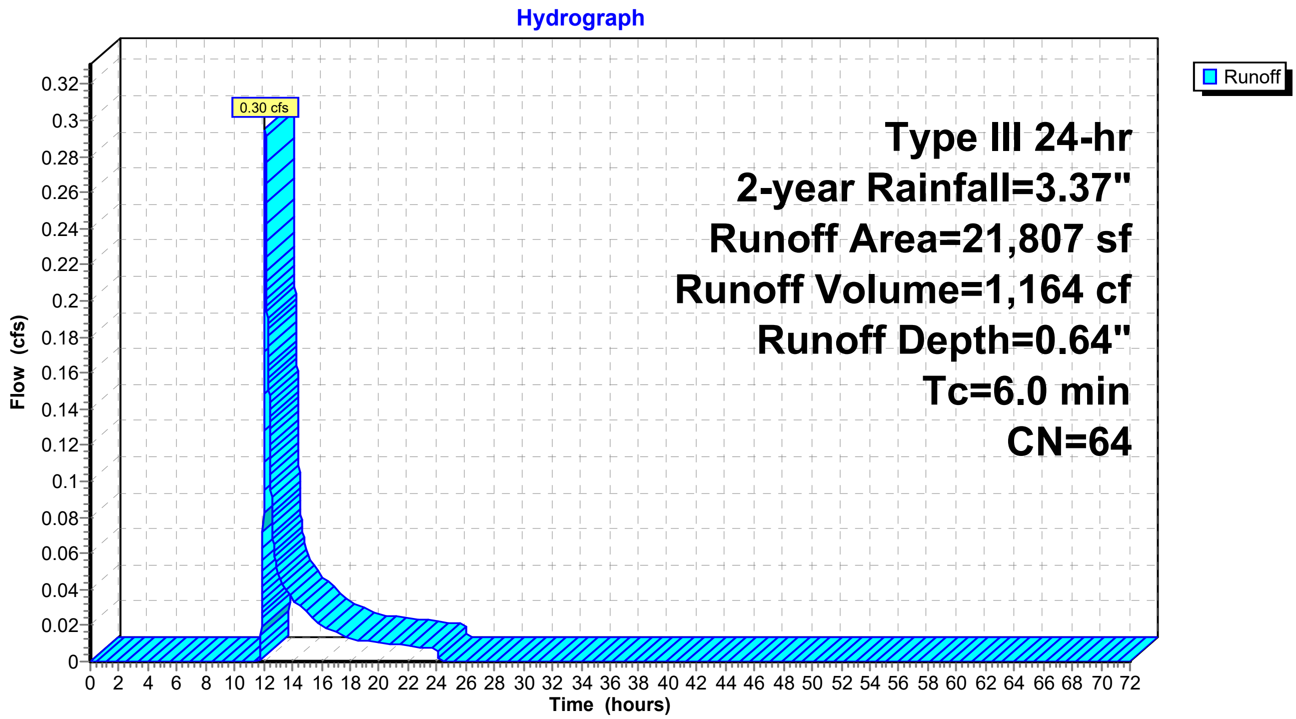
Runoff = 0.30 cfs @ 12.11 hrs, Volume= 1,164 cf, Depth= 0.64"

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 2-year Rainfall=3.37"

Area (sf)	CN	Description
2,708	55	Woods, Good, HSG B
16,816	61	>75% Grass cover, Good, HSG B
1,530	98	Paved parking, HSG B
753	96	Gravel surface, HSG A
21,807	64	Weighted Average
20,277		92.98% Pervious Area
1,530		7.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A1: SUB-A1



Summary for Subcatchment A2: SUB-A2

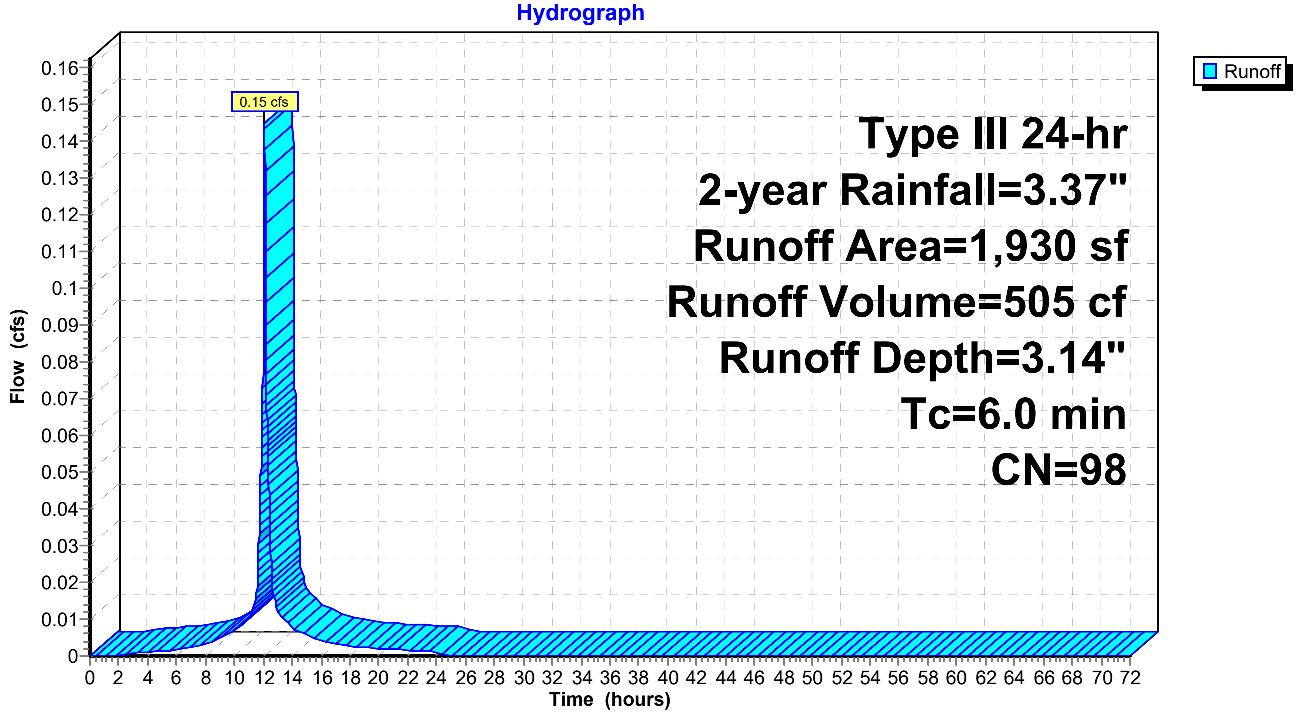
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 505 cf, Depth= 3.14"

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=3.37"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A2: SUB-A2



Summary for Subcatchment A3: SUB-A3

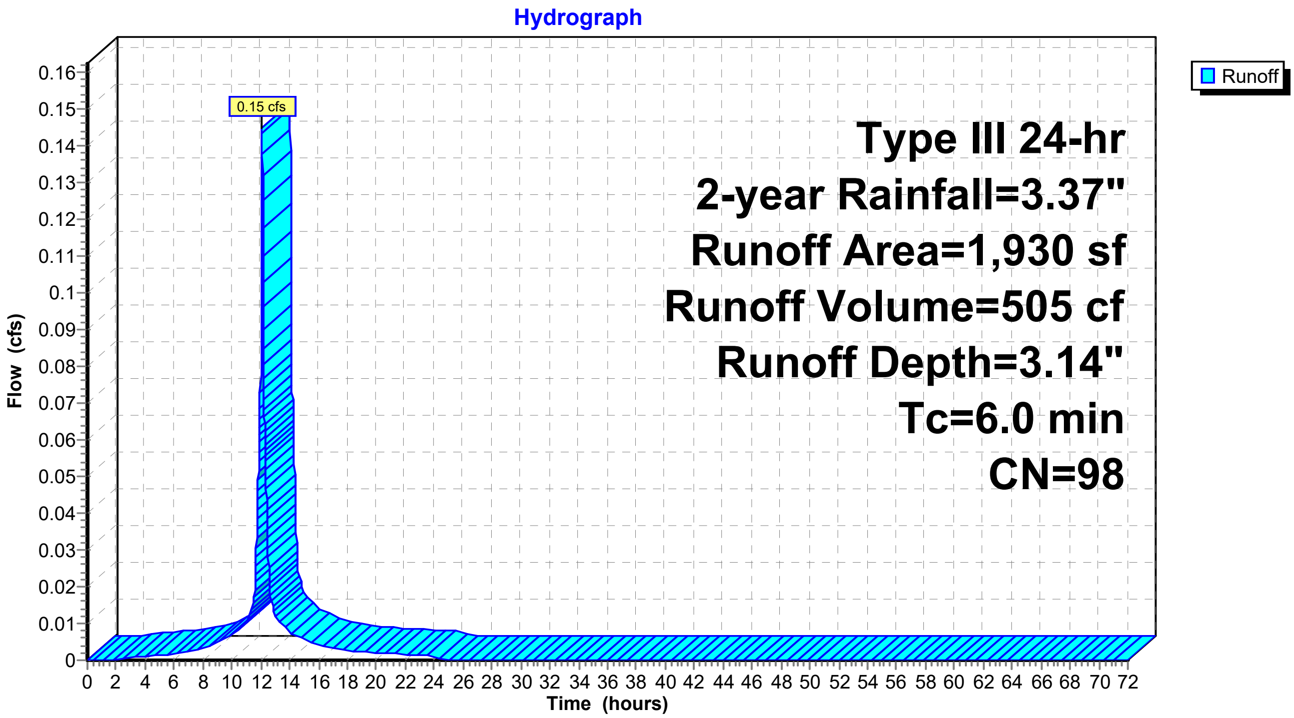
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 505 cf, Depth= 3.14"

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=3.37"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A3: SUB-A3



Summary for Subcatchment A4: SUB-A4

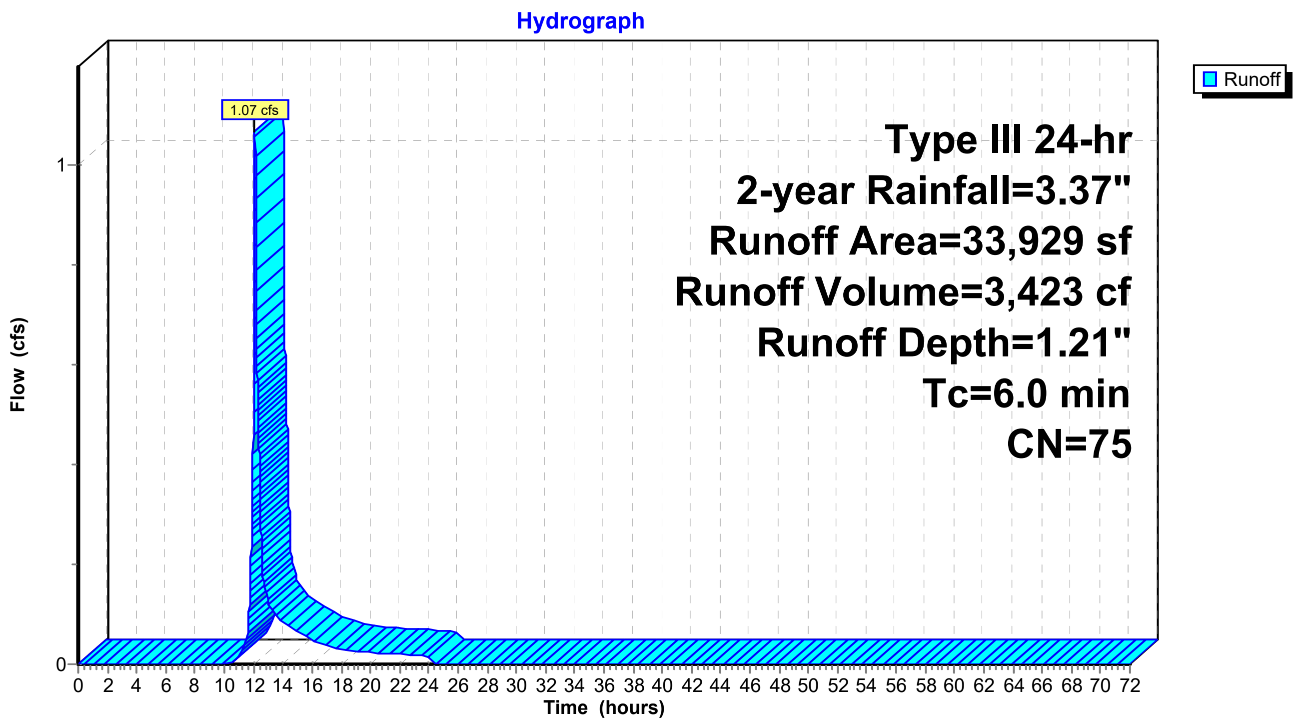
Runoff = 1.07 cfs @ 12.09 hrs, Volume= 3,423 cf, Depth= 1.21"

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 2-year Rainfall=3.37"

Area (sf)	CN	Description
20,714	61	>75% Grass cover, Good, HSG B
12,974	98	Paved parking, HSG B
241	96	Gravel surface, HSG A
33,929	75	Weighted Average
20,955		61.76% Pervious Area
12,974		38.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A4: SUB-A4



Summary for Pond IB-1: IB-1

Inflow Area = 35,859 sf, 41.56% Impervious, Inflow Depth = 1.31" for 2-year event
Inflow = 1.21 cfs @ 12.09 hrs, Volume= 3,927 cf
Outflow = 0.11 cfs @ 13.63 hrs, Volume= 3,927 cf, Atten= 91%, Lag= 92.4 min
Discarded = 0.04 cfs @ 13.63 hrs, Volume= 3,344 cf
Primary = 0.06 cfs @ 13.63 hrs, Volume= 583 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 514.22' @ 13.63 hrs Surf.Area= 1,229 sf Storage= 2,000 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 540.5 min (1,383.3 - 842.8)

Volume	Invert	Avail.Storage	Storage Description
#1	511.00'	6,163 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
511.00	170	0	0	170
512.00	400	277	277	407
513.00	715	550	827	733
514.00	1,130	915	1,741	1,162
515.00	1,615	1,365	3,107	1,664
516.00	2,175	1,888	4,995	2,245
516.50	2,500	1,168	6,163	2,581

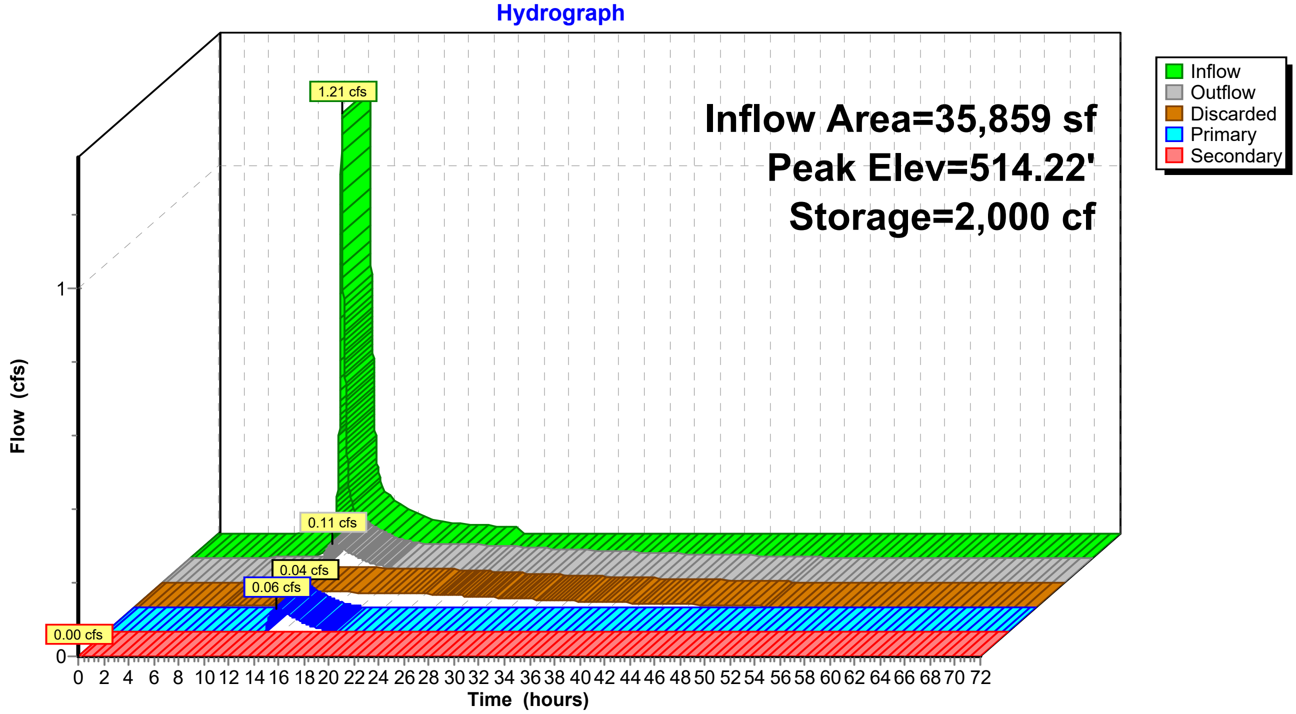
Device	Routing	Invert	Outlet Devices
#1	Primary	514.06'	**8.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 514.06' / 513.96' S= 0.0062 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	516.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Discarded	511.00'	**1.020 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 508.00'

Discarded OutFlow Max=0.04 cfs @ 13.63 hrs HW=514.22' (Free Discharge)
└─**3=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.06 cfs @ 13.63 hrs HW=514.22' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.06 cfs @ 1.48 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=511.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond IB-1: IB-1

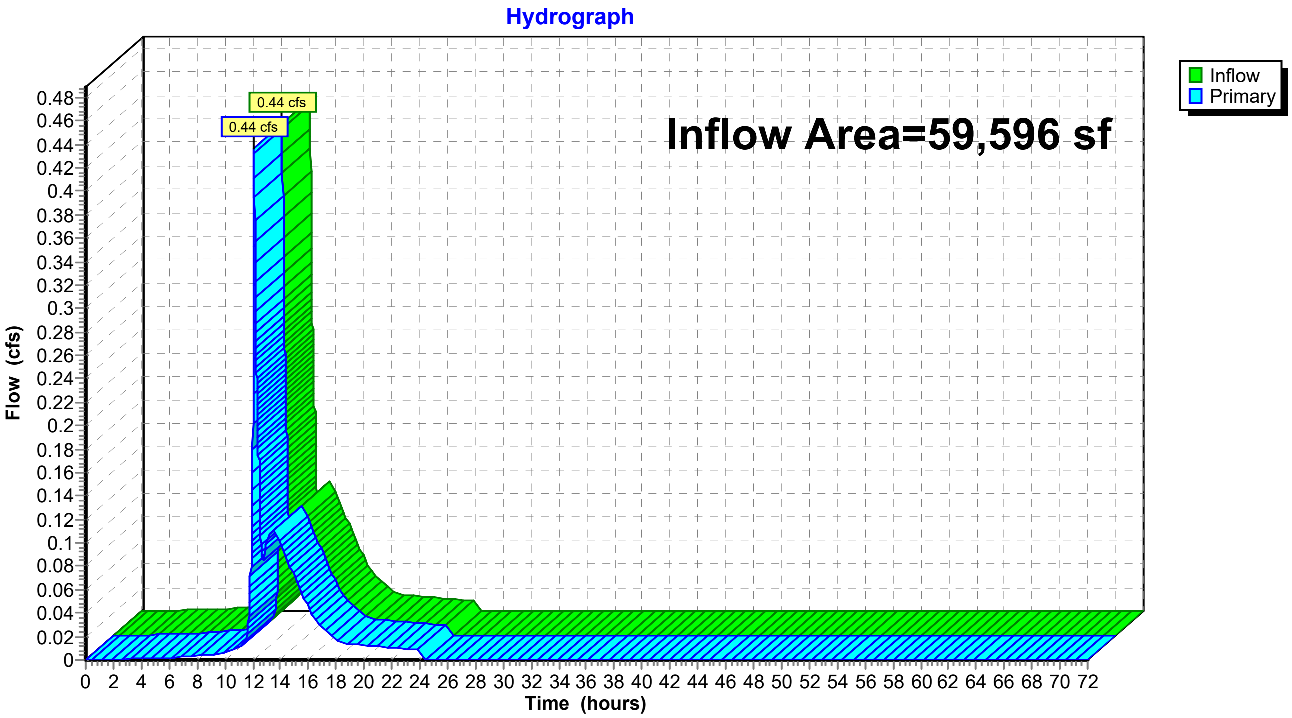

Hydrograph
1.21 cfs
Inflow Area=35,859 sf
Peak Elev=514.22'
Storage=2,000 cf
Inflow
Outflow
Discarded
Primary
Secondary
0.11 cfs
0.04 cfs
0.06 cfs
0.00 cfs
Flow (cfs)
1
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Summary for Link A: A

Inflow Area = 59,596 sf, 30.81% Impervious, Inflow Depth = 0.45" for 2-year event
Inflow = 0.44 cfs @ 12.10 hrs, Volume= 2,251 cf
Primary = 0.44 cfs @ 12.10 hrs, Volume= 2,251 cf, Atten= 0%, Lag= 0.0 min

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

Link A: A



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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=21,807 sf 7.02% Impervious Runoff Depth=1.70"
Tc=6.0 min CN=64 Runoff=0.95 cfs 3,087 cf

SubcatchmentA2: SUB-A2 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=4.94"
Tc=6.0 min CN=98 Runoff=0.22 cfs 795 cf

SubcatchmentA3: SUB-A3 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=4.94"
Tc=6.0 min CN=98 Runoff=0.22 cfs 795 cf

SubcatchmentA4: SUB-A4 Runoff Area=33,929 sf 38.24% Impervious Runoff Depth=2.60"
Tc=6.0 min CN=75 Runoff=2.37 cfs 7,340 cf

Pond IB-1: IB-1 Peak Elev=514.88' Storage=2,915 cf Inflow=2.59 cfs 8,135 cf
Discarded=0.06 cfs 3,848 cf Primary=0.92 cfs 4,287 cf Secondary=0.00 cfs 0 cf Outflow=0.98 cfs 8,135 cf

Link A: A Inflow=1.58 cfs 8,169 cf
Primary=1.58 cfs 8,169 cf

Total Runoff Area = 59,596 sf Runoff Volume = 12,017 cf Average Runoff Depth = 2.42"
69.19% Pervious = 41,232 sf 30.81% Impervious = 18,364 sf

Summary for Subcatchment A1: SUB-A1

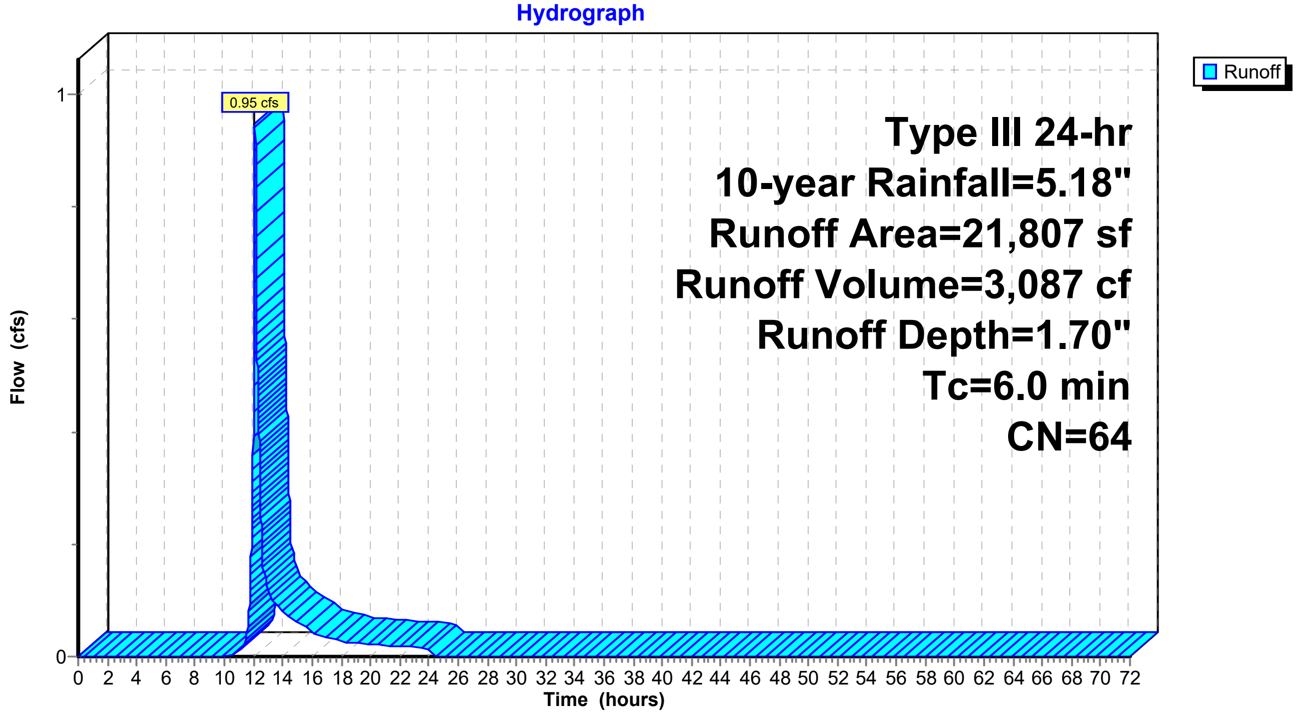
Runoff = 0.95 cfs @ 12.10 hrs, Volume= 3,087 cf, Depth= 1.70"

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 10-year Rainfall=5.18"

Area (sf)	CN	Description
2,708	55	Woods, Good, HSG B
16,816	61	>75% Grass cover, Good, HSG B
1,530	98	Paved parking, HSG B
753	96	Gravel surface, HSG A
21,807	64	Weighted Average
20,277		92.98% Pervious Area
1,530		7.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A1: SUB-A1



Summary for Subcatchment A2: SUB-A2

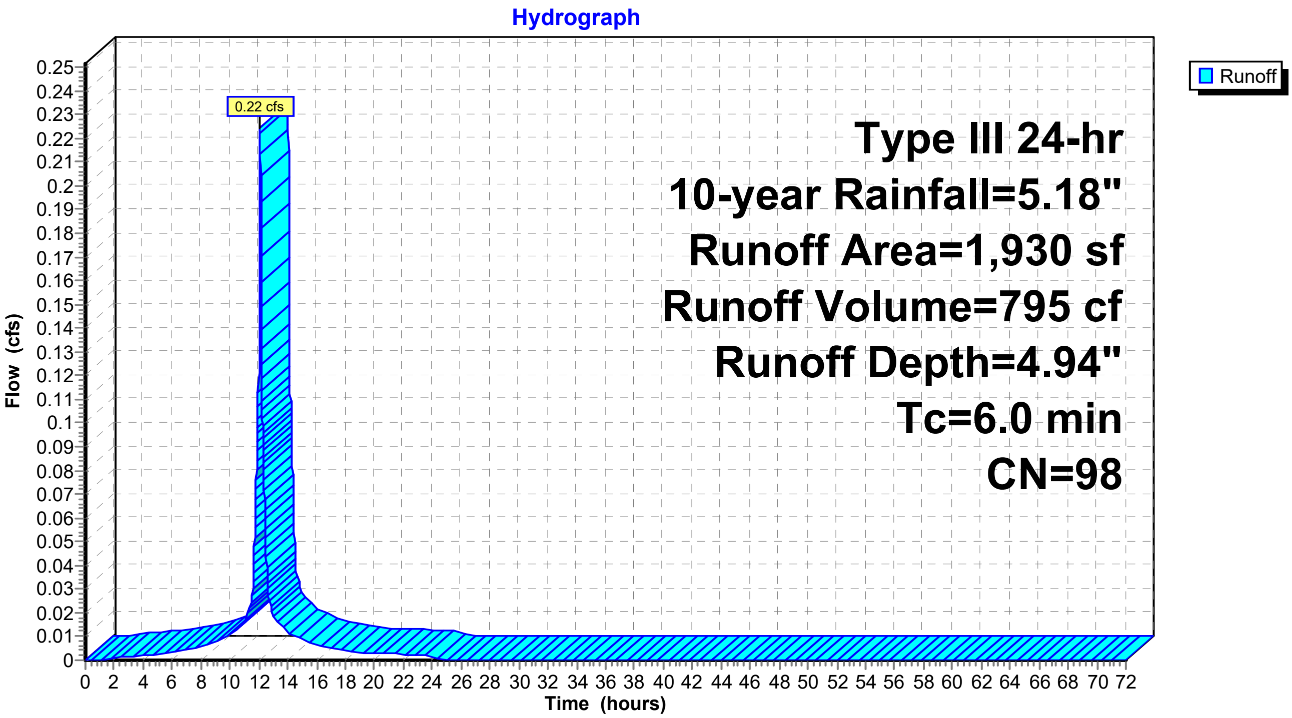
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 795 cf, Depth= 4.94"

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=5.18"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A2: SUB-A2



Summary for Subcatchment A3: SUB-A3

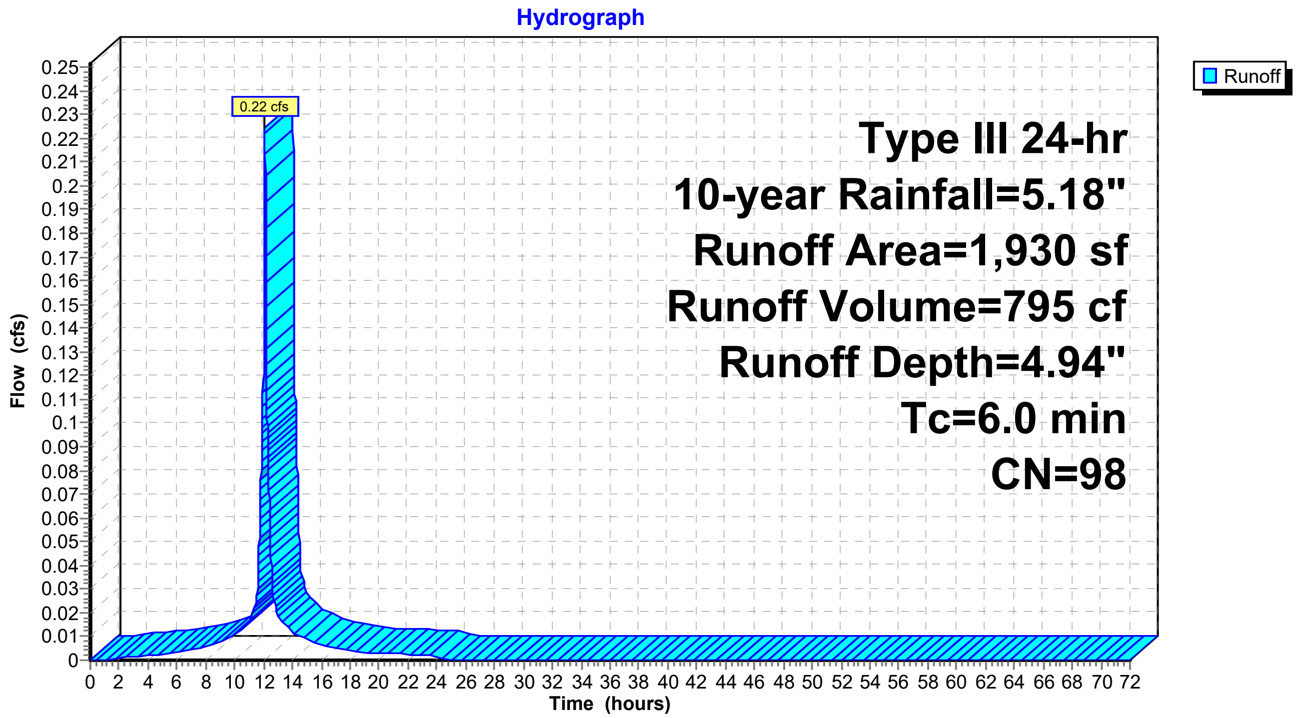
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 795 cf, Depth= 4.94"

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=5.18"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A3: SUB-A3



Summary for Subcatchment A4: SUB-A4

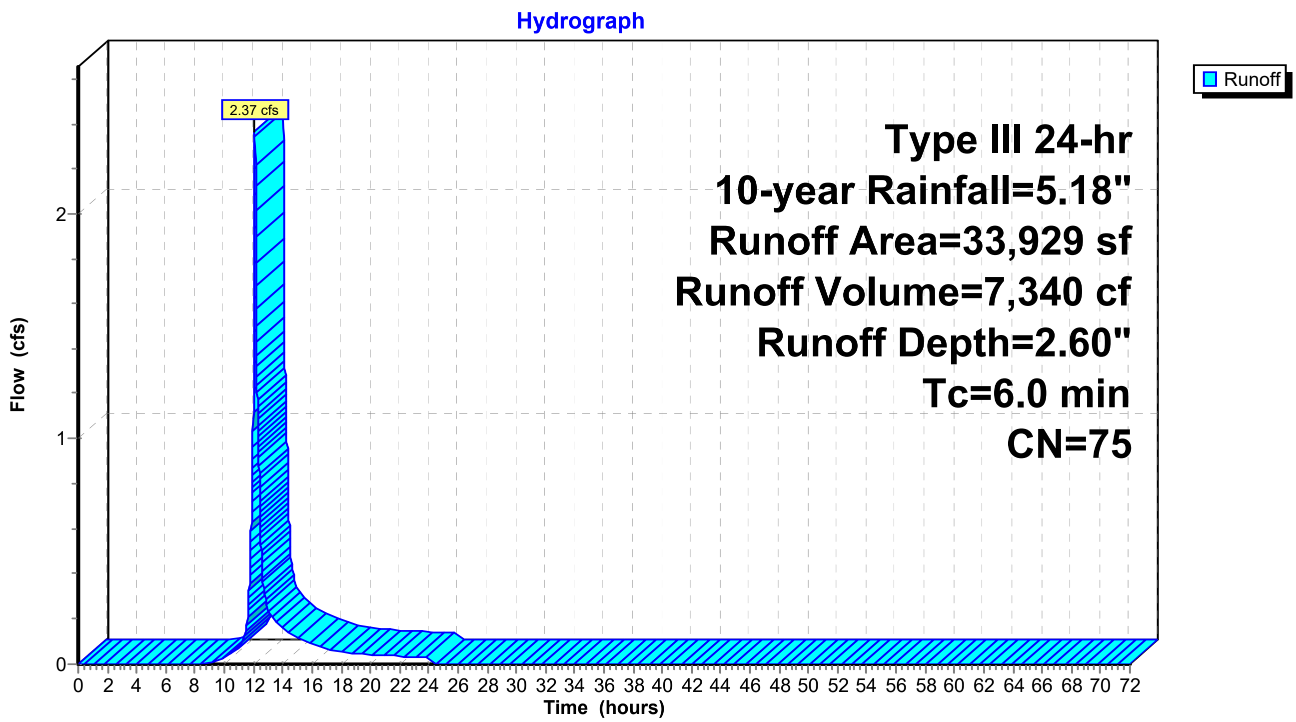
Runoff = 2.37 cfs @ 12.09 hrs, Volume= 7,340 cf, Depth= 2.60"

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 10-year Rainfall=5.18"

Area (sf)	CN	Description
20,714	61	>75% Grass cover, Good, HSG B
12,974	98	Paved parking, HSG B
241	96	Gravel surface, HSG A
33,929	75	Weighted Average
20,955		61.76% Pervious Area
12,974		38.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A4: SUB-A4



Summary for Pond IB-1: IB-1

Inflow Area = 35,859 sf, 41.56% Impervious, Inflow Depth = 2.72" for 10-year event
Inflow = 2.59 cfs @ 12.09 hrs, Volume= 8,135 cf
Outflow = 0.98 cfs @ 12.36 hrs, Volume= 8,135 cf, Atten= 62%, Lag= 16.5 min
Discarded = 0.06 cfs @ 12.36 hrs, Volume= 3,848 cf
Primary = 0.92 cfs @ 12.36 hrs, Volume= 4,287 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 514.88' @ 12.36 hrs Surf.Area= 1,552 sf Storage= 2,915 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 310.3 min (1,135.1 - 824.8)

Volume	Invert	Avail.Storage	Storage Description
#1	511.00'	6,163 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
511.00	170	0	0	170
512.00	400	277	277	407
513.00	715	550	827	733
514.00	1,130	915	1,741	1,162
515.00	1,615	1,365	3,107	1,664
516.00	2,175	1,888	4,995	2,245
516.50	2,500	1,168	6,163	2,581

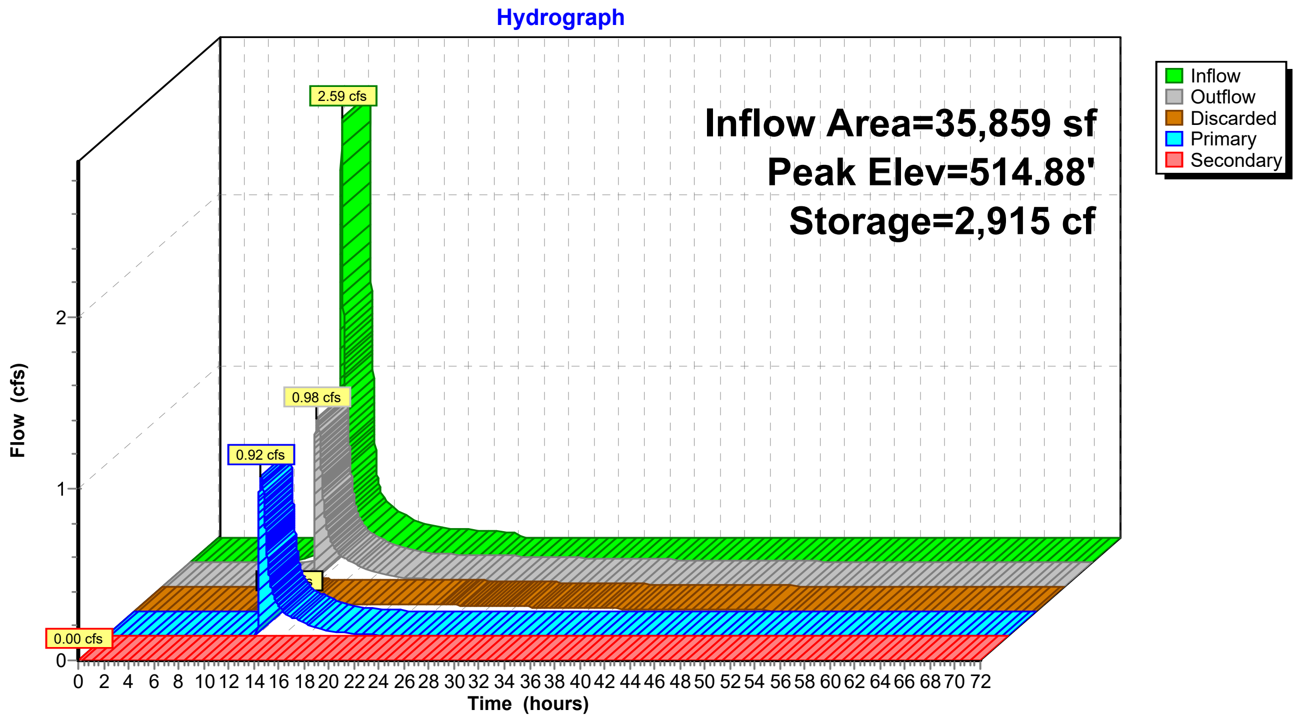
Device	Routing	Invert	Outlet Devices
#1	Primary	514.06'	**8.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 514.06' / 513.96' S= 0.0062 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	516.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Discarded	511.00'	**1.020 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 508.00'

Discarded OutFlow Max=0.06 cfs @ 12.36 hrs HW=514.88' (Free Discharge)
└─**3=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.92 cfs @ 12.36 hrs HW=514.88' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.92 cfs @ 2.65 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=511.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond IB-1: IB-1

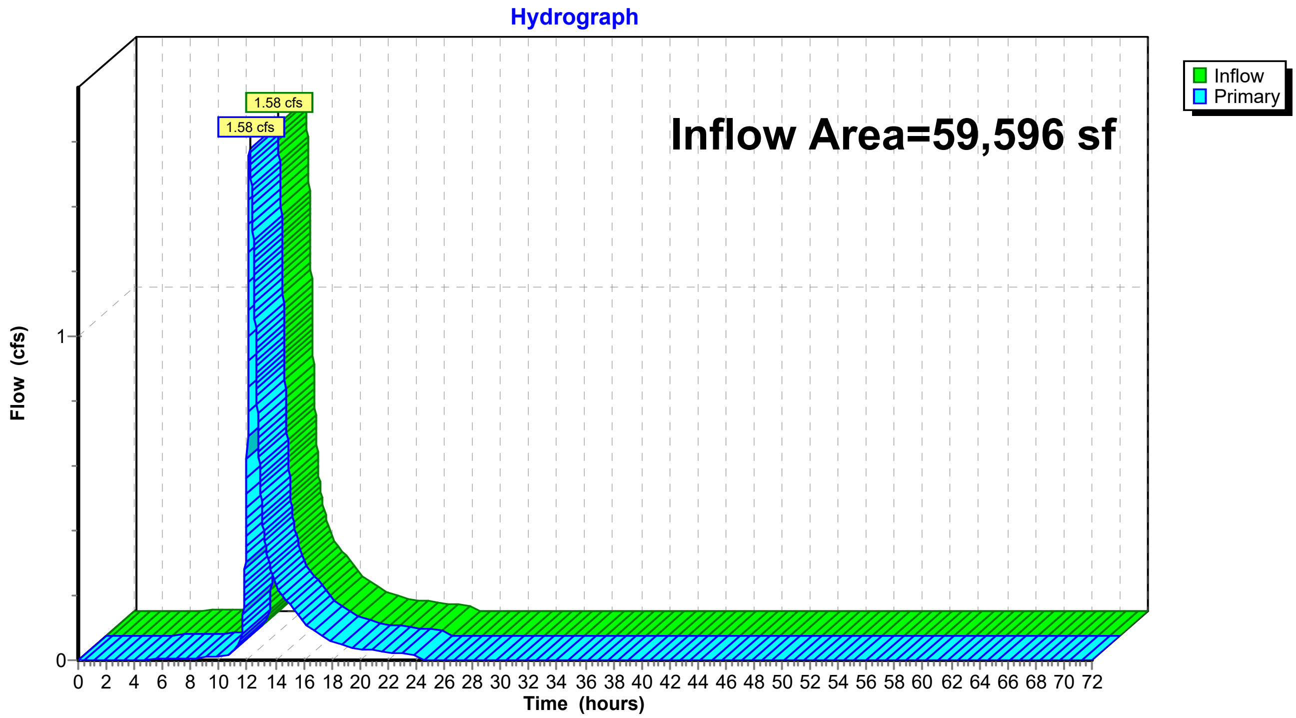

Hydrograph
Inflow Area=35,859 sf
Peak Elev=514.88'
Storage=2,915 cf
2.59 cfs
0.98 cfs
0.92 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
2
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Summary for Link A: A

Inflow Area = 59,596 sf, 30.81% Impervious, Inflow Depth = 1.64" for 10-year event
Inflow = 1.58 cfs @ 12.15 hrs, Volume= 8,169 cf
Primary = 1.58 cfs @ 12.15 hrs, Volume= 8,169 cf, Atten= 0%, Lag= 0.0 min

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

Link A: A



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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=21,807 sf 7.02% Impervious Runoff Depth=2.48"
Tc=6.0 min CN=64 Runoff=1.42 cfs 4,506 cf

SubcatchmentA2: SUB-A2 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=6.06"
Tc=6.0 min CN=98 Runoff=0.27 cfs 975 cf

SubcatchmentA3: SUB-A3 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=6.06"
Tc=6.0 min CN=98 Runoff=0.27 cfs 975 cf

SubcatchmentA4: SUB-A4 Runoff Area=33,929 sf 38.24% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=75 Runoff=3.23 cfs 10,007 cf

Pond IB-1: IB-1 Peak Elev=515.38' Storage=3,763 cf Inflow=3.51 cfs 10,982 cf
Discarded=0.07 cfs 4,028 cf Primary=1.32 cfs 6,954 cf Secondary=0.00 cfs 0 cf Outflow=1.39 cfs 10,982 cf

Link A: A Inflow=2.70 cfs 12,435 cf
Primary=2.70 cfs 12,435 cf

Total Runoff Area = 59,596 sf Runoff Volume = 16,463 cf Average Runoff Depth = 3.31"
69.19% Pervious = 41,232 sf 30.81% Impervious = 18,364 sf

Summary for Subcatchment A1: SUB-A1

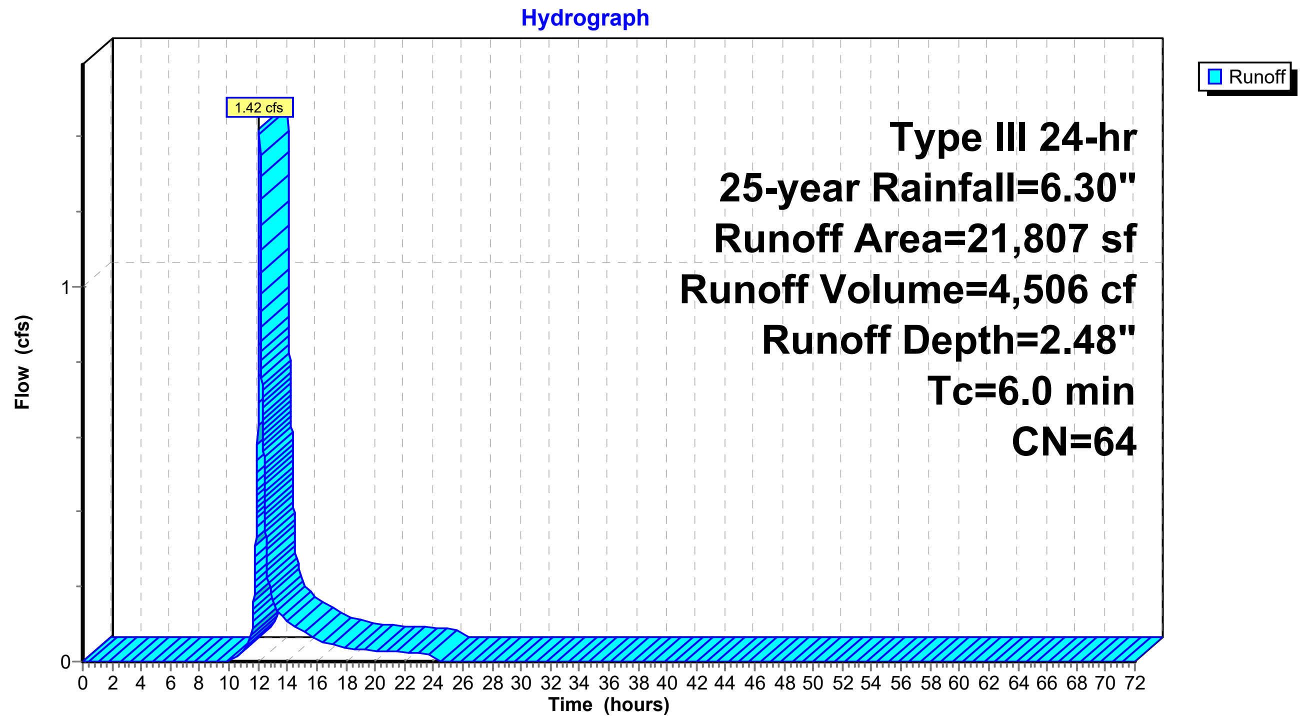
Runoff = 1.42 cfs @ 12.09 hrs, Volume= 4,506 cf, Depth= 2.48"

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 25-year Rainfall=6.30"

Area (sf)	CN	Description
2,708	55	Woods, Good, HSG B
16,816	61	>75% Grass cover, Good, HSG B
1,530	98	Paved parking, HSG B
753	96	Gravel surface, HSG A
21,807	64	Weighted Average
20,277		92.98% Pervious Area
1,530		7.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A1: SUB-A1



Summary for Subcatchment A2: SUB-A2

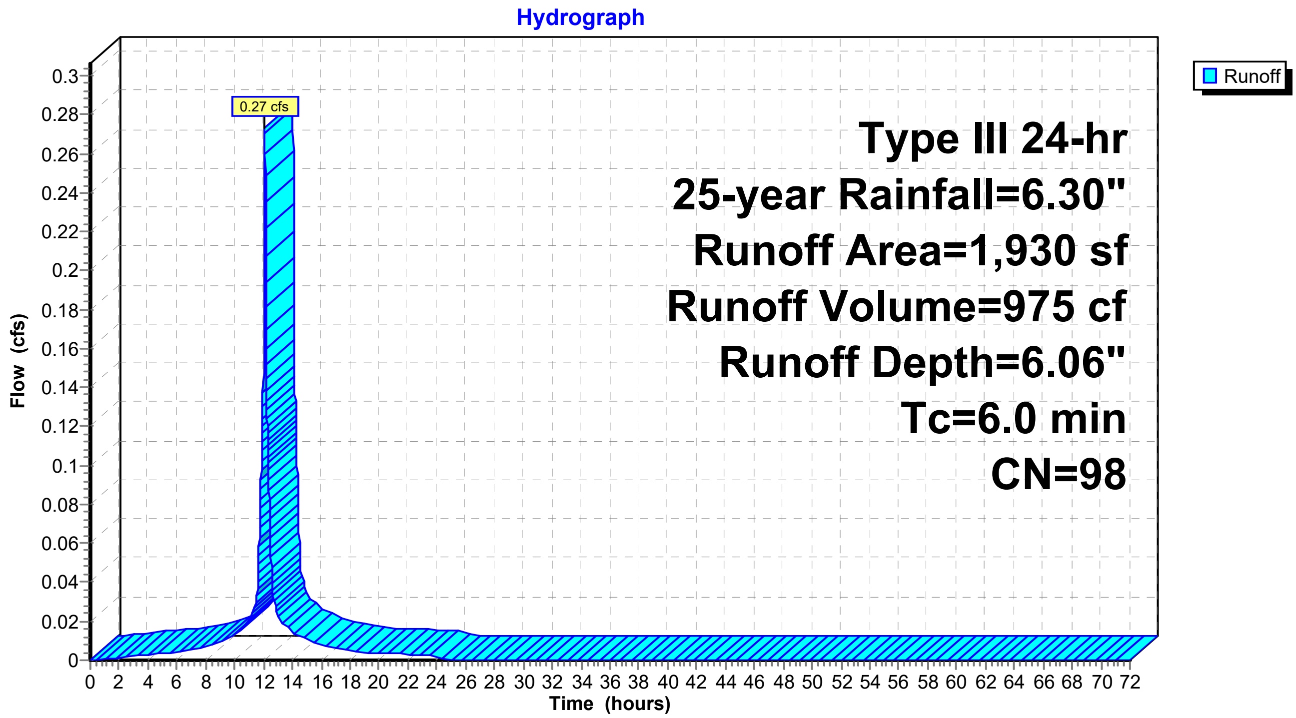
Runoff = 0.27 cfs @ 12.08 hrs, Volume= 975 cf, Depth= 6.06"

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 25-year Rainfall=6.30"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A2: SUB-A2



Summary for Subcatchment A3: SUB-A3

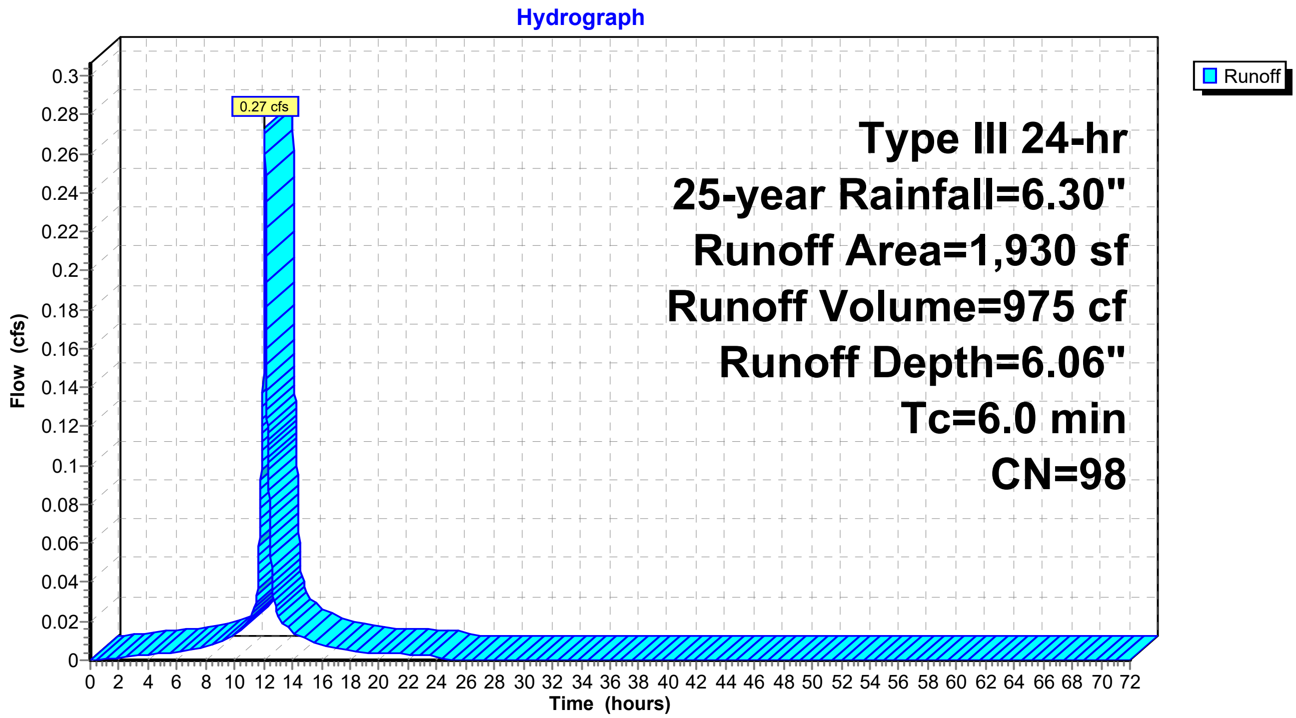
Runoff = 0.27 cfs @ 12.08 hrs, Volume= 975 cf, Depth= 6.06"

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 25-year Rainfall=6.30"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A3: SUB-A3



Summary for Subcatchment A4: SUB-A4

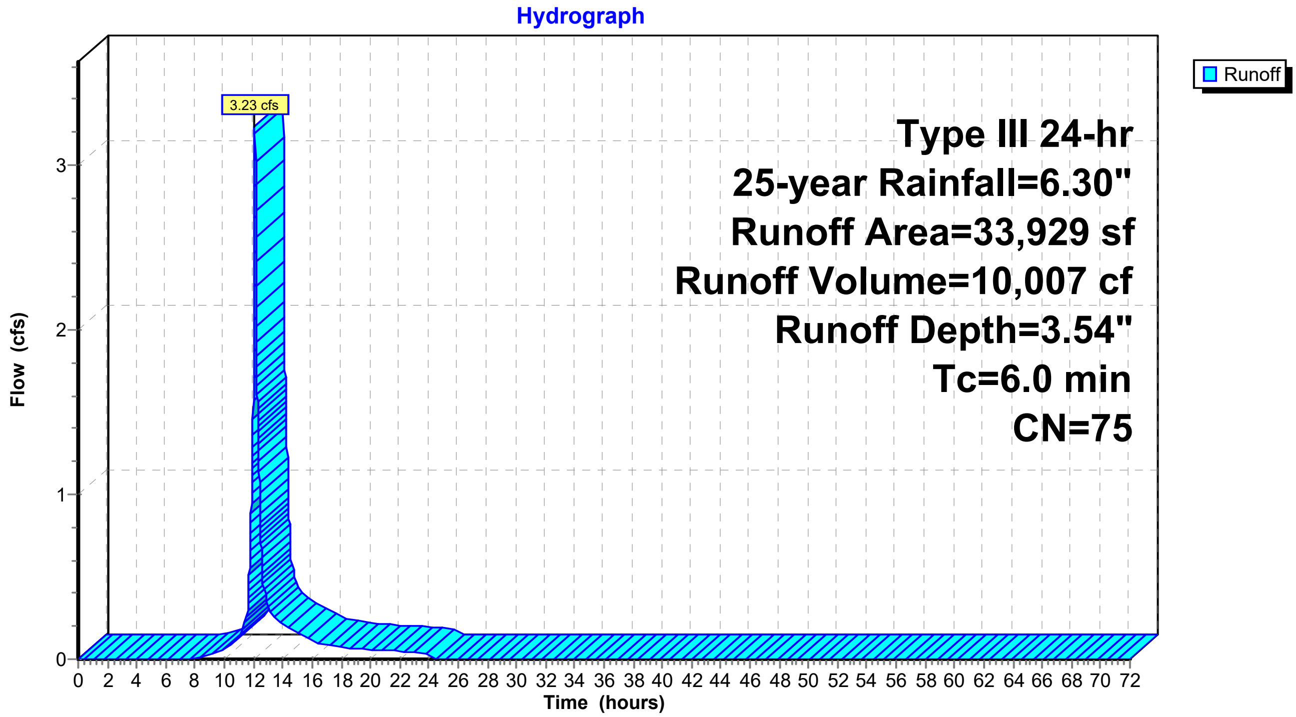
Runoff = 3.23 cfs @ 12.09 hrs, Volume= 10,007 cf, Depth= 3.54"

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 25-year Rainfall=6.30"

Area (sf)	CN	Description
20,714	61	>75% Grass cover, Good, HSG B
12,974	98	Paved parking, HSG B
241	96	Gravel surface, HSG A
33,929	75	Weighted Average
20,955		61.76% Pervious Area
12,974		38.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A4: SUB-A4



Summary for Pond IB-1: IB-1

Inflow Area =	35,859 sf, 41.56% Impervious,	Inflow Depth = 3.67"	for 25-year event
Inflow =	3.51 cfs @ 12.09 hrs, Volume=	10,982 cf	
Outflow =	1.39 cfs @ 12.34 hrs, Volume=	10,982 cf,	Atten= 60%, Lag= 14.9 min
Discarded =	0.07 cfs @ 12.34 hrs, Volume=	4,028 cf	
Primary =	1.32 cfs @ 12.34 hrs, Volume=	6,954 cf	
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 515.38' @ 12.34 hrs Surf.Area= 1,819 sf Storage= 3,763 cf

Plug-Flow detention time= 243.7 min calculated for 10,980 cf (100% of inflow)
Center-of-Mass det. time= 243.9 min (1,061.1 - 817.2)

Volume	Invert	Avail.Storage	Storage Description
#1	511.00'	6,163 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
511.00	170	0	0	170
512.00	400	277	277	407
513.00	715	550	827	733
514.00	1,130	915	1,741	1,162
515.00	1,615	1,365	3,107	1,664
516.00	2,175	1,888	4,995	2,245
516.50	2,500	1,168	6,163	2,581

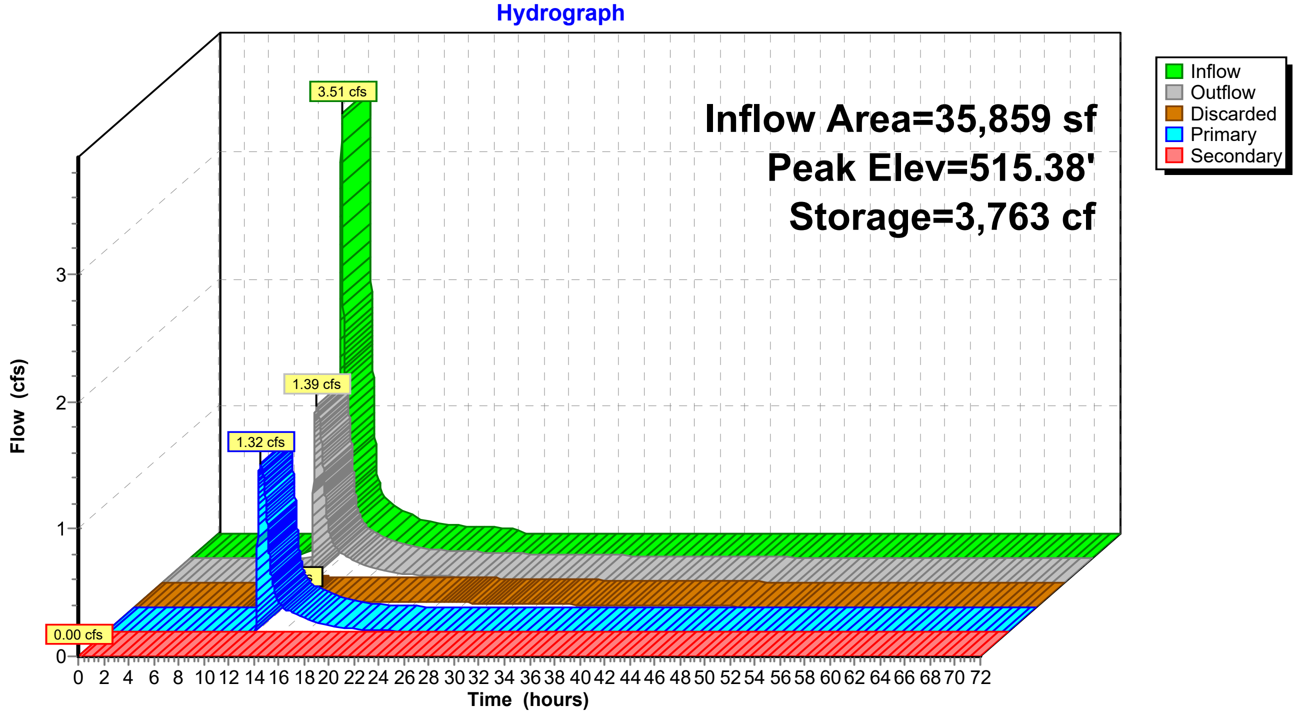
Device	Routing	Invert	Outlet Devices
#1	Primary	514.06'	**8.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 514.06' / 513.96' S= 0.0062 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	516.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Discarded	511.00'	**1.020 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 508.00'

Discarded OutFlow Max=0.07 cfs @ 12.34 hrs HW=515.38' (Free Discharge)
└─**3=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=1.32 cfs @ 12.34 hrs HW=515.38' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.32 cfs @ 3.78 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=511.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond IB-1: IB-1

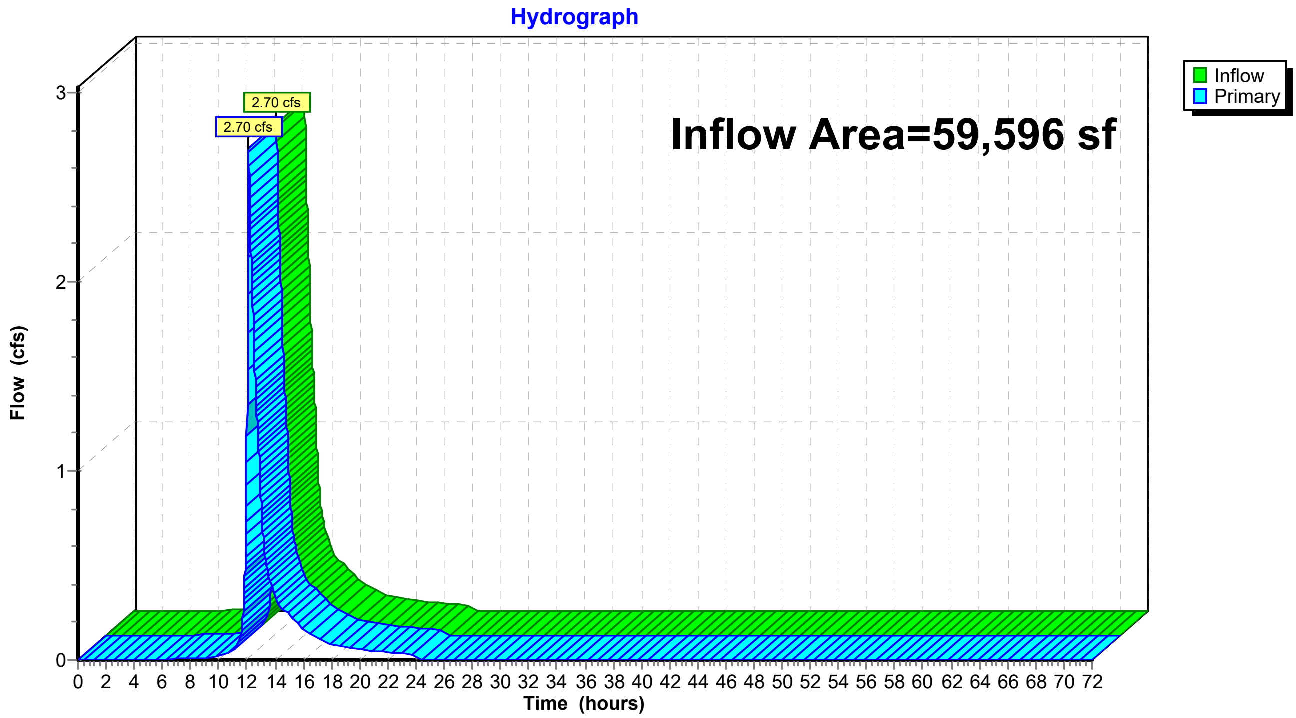

Hydrograph
3.51 cfs
1.39 cfs
1.32 cfs
0.00 cfs
Inflow Area=35,859 sf
Peak Elev=515.38'
Storage=3,763 cf
Inflow
Outflow
Discarded
Primary
Secondary
Flow (cfs)
0
1
2
3
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Summary for Link A: A

Inflow Area = 59,596 sf, 30.81% Impervious, Inflow Depth = 2.50" for 25-year event
Inflow = 2.70 cfs @ 12.11 hrs, Volume= 12,435 cf
Primary = 2.70 cfs @ 12.11 hrs, Volume= 12,435 cf, Atten= 0%, Lag= 0.0 min

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

Link A: A



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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=21,807 sf 7.02% Impervious Runoff Depth=3.10"
Tc=6.0 min CN=64 Runoff=1.80 cfs 5,635 cf

SubcatchmentA2: SUB-A2 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=6.89"
Tc=6.0 min CN=98 Runoff=0.31 cfs 1,108 cf

SubcatchmentA3: SUB-A3 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=6.89"
Tc=6.0 min CN=98 Runoff=0.31 cfs 1,108 cf

SubcatchmentA4: SUB-A4 Runoff Area=33,929 sf 38.24% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=75 Runoff=3.89 cfs 12,057 cf

Pond IB-1: IB-1 Peak Elev=515.74' Storage=4,447 cf Inflow=4.20 cfs 13,165 cf
Discarded=0.07 cfs 4,149 cf Primary=1.54 cfs 9,016 cf Secondary=0.00 cfs 0 cf Outflow=1.61 cfs 13,165 cf

Link A: A Inflow=3.35 cfs 15,759 cf
Primary=3.35 cfs 15,759 cf

Total Runoff Area = 59,596 sf Runoff Volume = 19,908 cf Average Runoff Depth = 4.01"
69.19% Pervious = 41,232 sf 30.81% Impervious = 18,364 sf

Summary for Subcatchment A1: SUB-A1

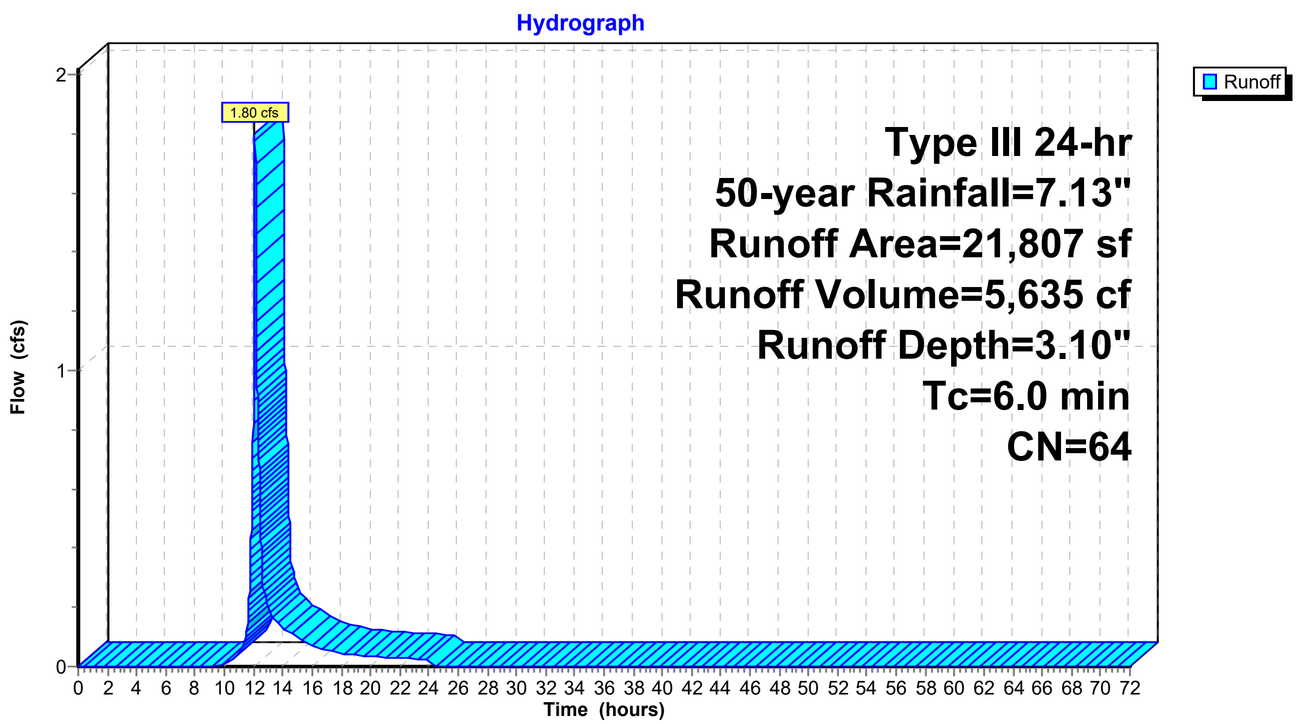
Runoff = 1.80 cfs @ 12.09 hrs, Volume= 5,635 cf, Depth= 3.10"

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 50-year Rainfall=7.13"

Area (sf)	CN	Description
2,708	55	Woods, Good, HSG B
16,816	61	>75% Grass cover, Good, HSG B
1,530	98	Paved parking, HSG B
753	96	Gravel surface, HSG A
21,807	64	Weighted Average
20,277		92.98% Pervious Area
1,530		7.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A1: SUB-A1



Summary for Subcatchment A2: SUB-A2

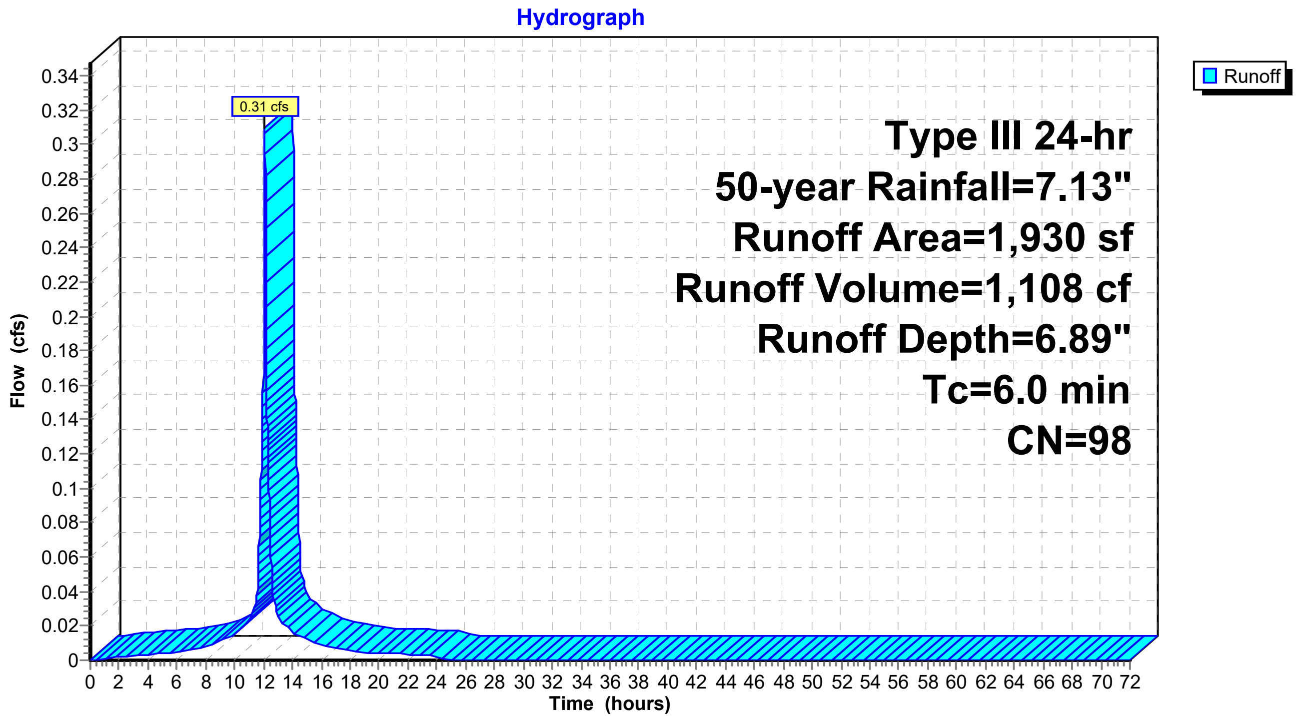
Runoff = 0.31 cfs @ 12.08 hrs, Volume= 1,108 cf, Depth= 6.89"

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 50-year Rainfall=7.13"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A2: SUB-A2



Summary for Subcatchment A3: SUB-A3

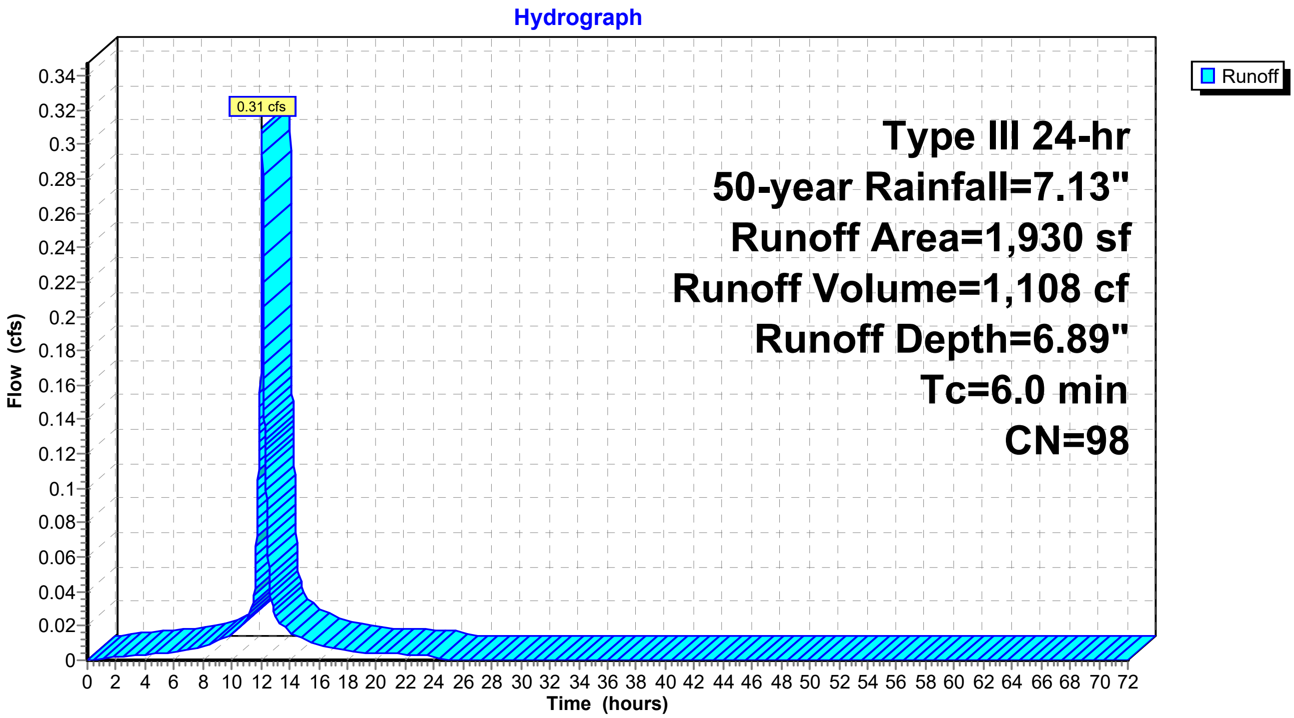
Runoff = 0.31 cfs @ 12.08 hrs, Volume= 1,108 cf, Depth= 6.89"

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 50-year Rainfall=7.13"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A3: SUB-A3



Summary for Subcatchment A4: SUB-A4

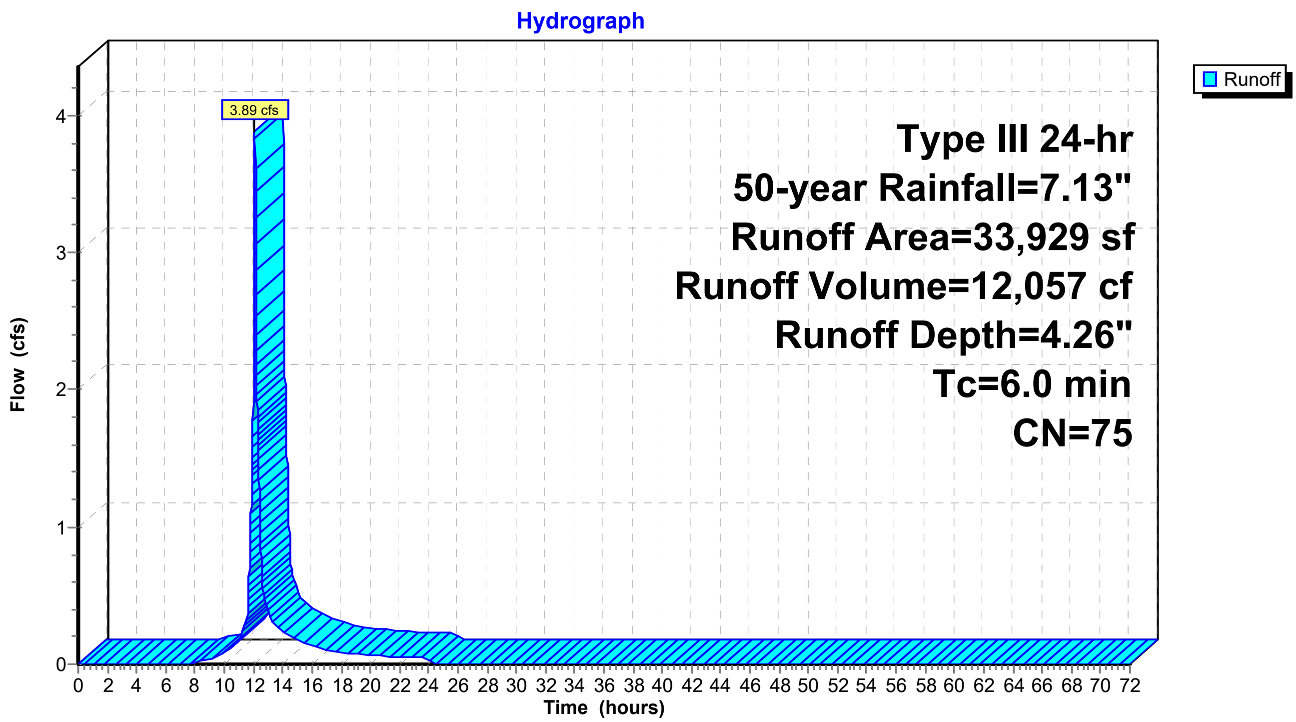
Runoff = 3.89 cfs @ 12.09 hrs, Volume= 12,057 cf, Depth= 4.26"

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 50-year Rainfall=7.13"

Area (sf)	CN	Description
20,714	61	>75% Grass cover, Good, HSG B
12,974	98	Paved parking, HSG B
241	96	Gravel surface, HSG A
33,929	75	Weighted Average
20,955		61.76% Pervious Area
12,974		38.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A4: SUB-A4



Summary for Pond IB-1: IB-1

Inflow Area = 35,859 sf, 41.56% Impervious, Inflow Depth = 4.41" for 50-year event
Inflow = 4.20 cfs @ 12.09 hrs, Volume= 13,165 cf
Outflow = 1.61 cfs @ 12.34 hrs, Volume= 13,165 cf, Atten= 62%, Lag= 15.3 min
Discarded = 0.07 cfs @ 12.34 hrs, Volume= 4,149 cf
Primary = 1.54 cfs @ 12.34 hrs, Volume= 9,016 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 515.74' @ 12.34 hrs Surf.Area= 2,021 sf Storage= 4,447 cf

Plug-Flow detention time= 211.7 min calculated for 13,163 cf (100% of inflow)
Center-of-Mass det. time= 211.9 min (1,024.4 - 812.5)

Volume	Invert	Avail.Storage	Storage Description
#1	511.00'	6,163 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
511.00	170	0	0	170
512.00	400	277	277	407
513.00	715	550	827	733
514.00	1,130	915	1,741	1,162
515.00	1,615	1,365	3,107	1,664
516.00	2,175	1,888	4,995	2,245
516.50	2,500	1,168	6,163	2,581

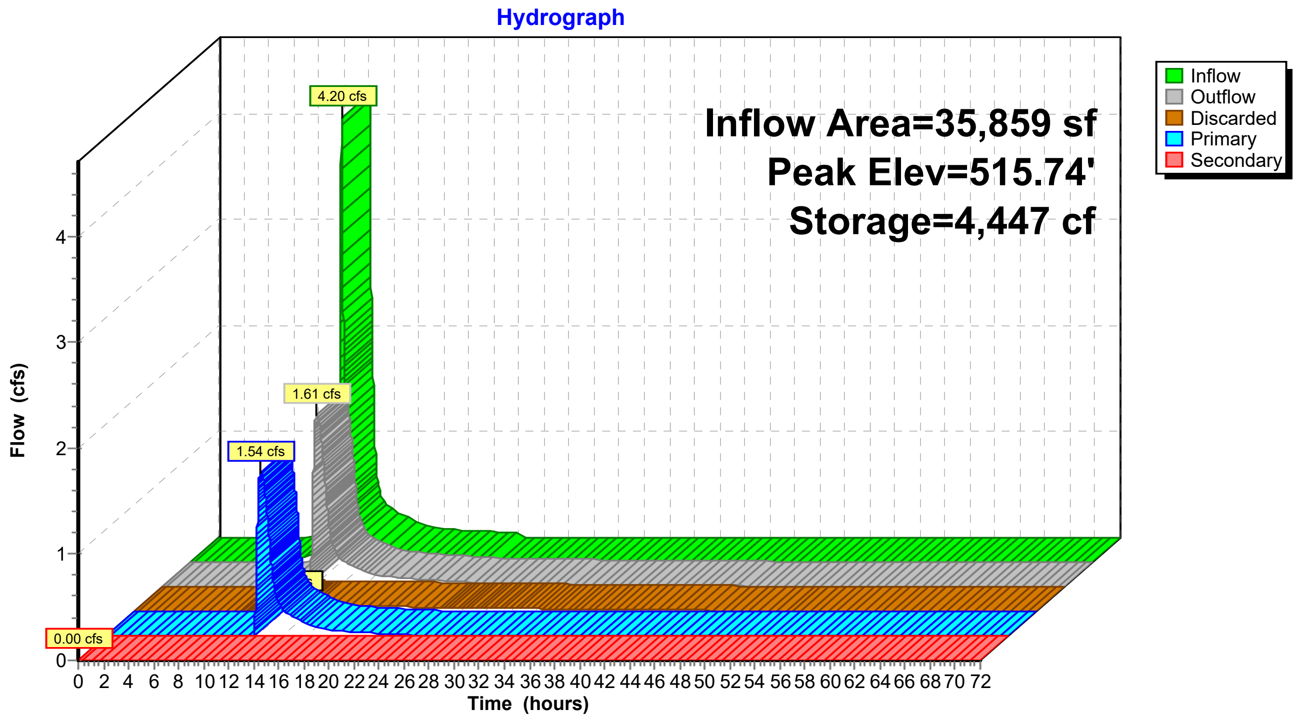
Device	Routing	Invert	Outlet Devices
#1	Primary	514.06'	**8.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 514.06' / 513.96' S= 0.0062 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	516.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Discarded	511.00'	**1.020 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 508.00'

Discarded OutFlow Max=0.07 cfs @ 12.34 hrs HW=515.74' (Free Discharge)
└─**3=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=1.54 cfs @ 12.34 hrs HW=515.74' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.54 cfs @ 4.41 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=511.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

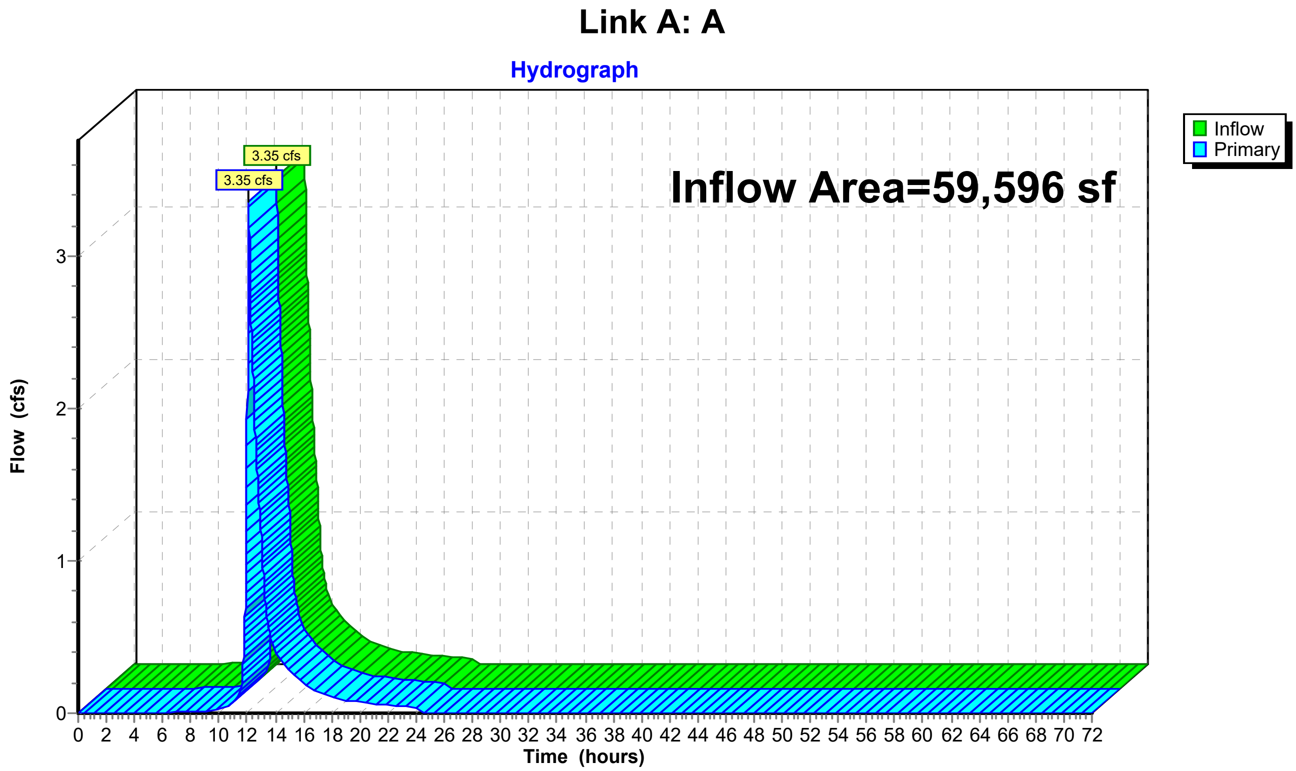
Pond IB-1: IB-1


Hydrograph
4.20 cfs
1.61 cfs
1.54 cfs
0.00 cfs
Inflow Area=35,859 sf
Peak Elev=515.74'
Storage=4,447 cf
Inflow
Outflow
Discarded
Primary
Secondary
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
0 1 2 3 4

Summary for Link A: A

Inflow Area = 59,596 sf, 30.81% Impervious, Inflow Depth = 3.17" for 50-year event
Inflow = 3.35 cfs @ 12.10 hrs, Volume= 15,759 cf
Primary = 3.35 cfs @ 12.10 hrs, Volume= 15,759 cf, Atten= 0%, Lag= 0.0 min

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



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 Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentA1: SUB-A1 Runoff Area=21,807 sf 7.02% Impervious Runoff Depth=3.81"
Tc=6.0 min CN=64 Runoff=2.22 cfs 6,915 cf

SubcatchmentA2: SUB-A2 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=7.79"
Tc=6.0 min CN=98 Runoff=0.35 cfs 1,253 cf

SubcatchmentA3: SUB-A3 Runoff Area=1,930 sf 100.00% Impervious Runoff Depth=7.79"
Tc=6.0 min CN=98 Runoff=0.35 cfs 1,253 cf

SubcatchmentA4: SUB-A4 Runoff Area=33,929 sf 38.24% Impervious Runoff Depth=5.07"
Tc=6.0 min CN=75 Runoff=4.61 cfs 14,331 cf

Pond IB-1: IB-1 Peak Elev=516.10' Storage=5,209 cf Inflow=4.96 cfs 15,584 cf
Discarded=0.08 cfs 4,277 cf Primary=1.73 cfs 11,307 cf Secondary=0.00 cfs 0 cf Outflow=1.82 cfs 15,584 cf

Link A: A Inflow=4.00 cfs 19,475 cf
Primary=4.00 cfs 19,475 cf

Total Runoff Area = 59,596 sf Runoff Volume = 23,752 cf Average Runoff Depth = 4.78"
69.19% Pervious = 41,232 sf 30.81% Impervious = 18,364 sf

Summary for Subcatchment A1: SUB-A1

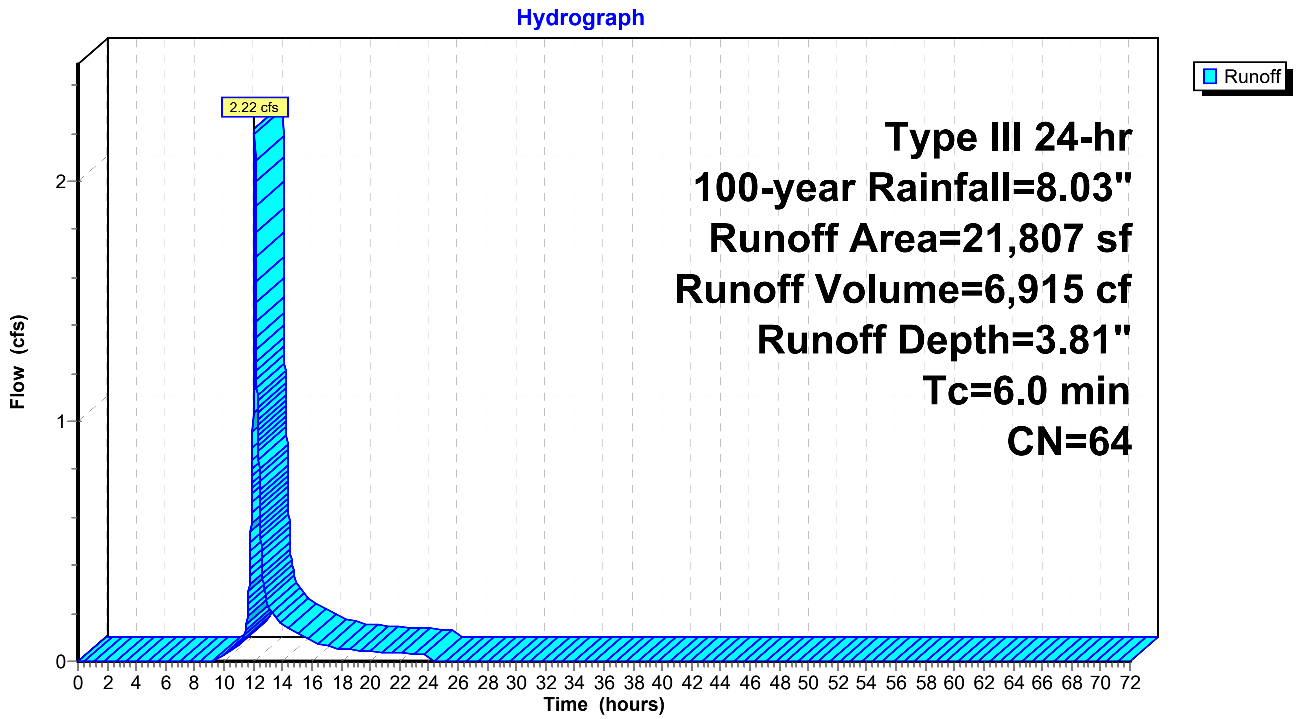
Runoff = 2.22 cfs @ 12.09 hrs, Volume= 6,915 cf, Depth= 3.81"

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=8.03"

Area (sf)	CN	Description
2,708	55	Woods, Good, HSG B
16,816	61	>75% Grass cover, Good, HSG B
1,530	98	Paved parking, HSG B
753	96	Gravel surface, HSG A
21,807	64	Weighted Average
20,277		92.98% Pervious Area
1,530		7.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A1: SUB-A1



Summary for Subcatchment A2: SUB-A2

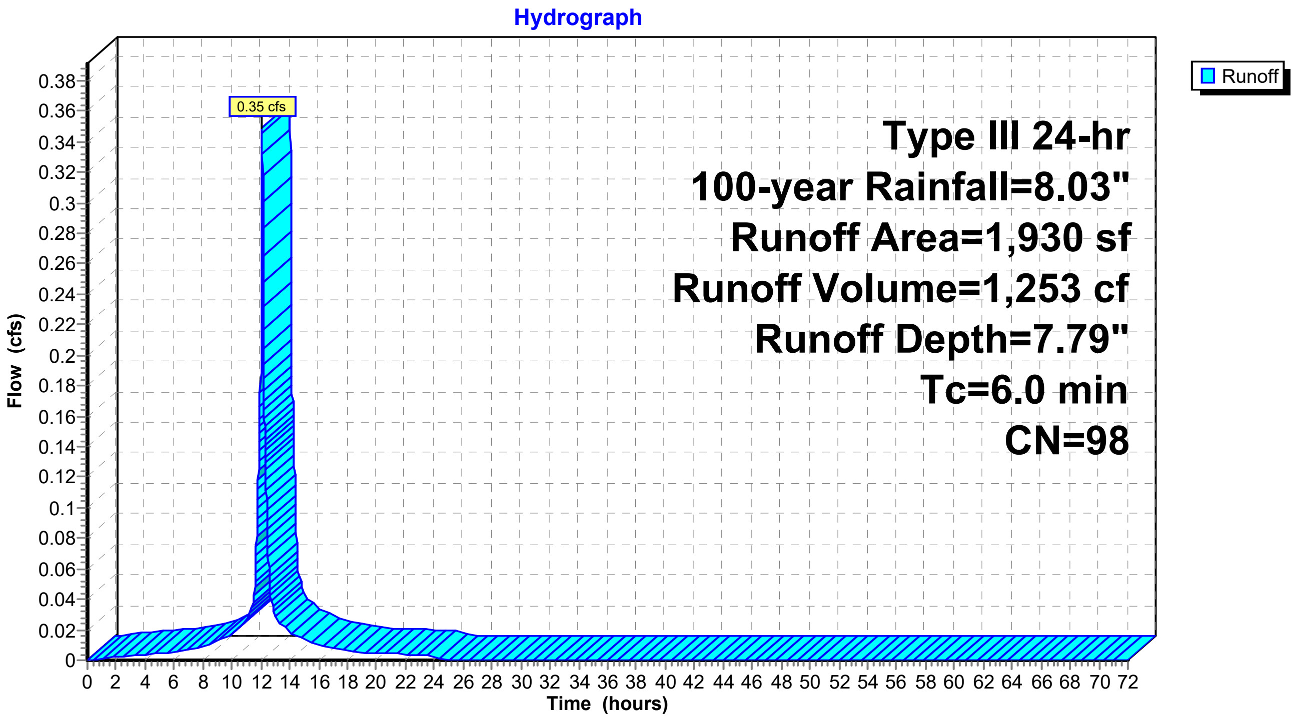
Runoff = 0.35 cfs @ 12.08 hrs, Volume= 1,253 cf, Depth= 7.79"

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=8.03"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A2: SUB-A2



Summary for Subcatchment A3: SUB-A3

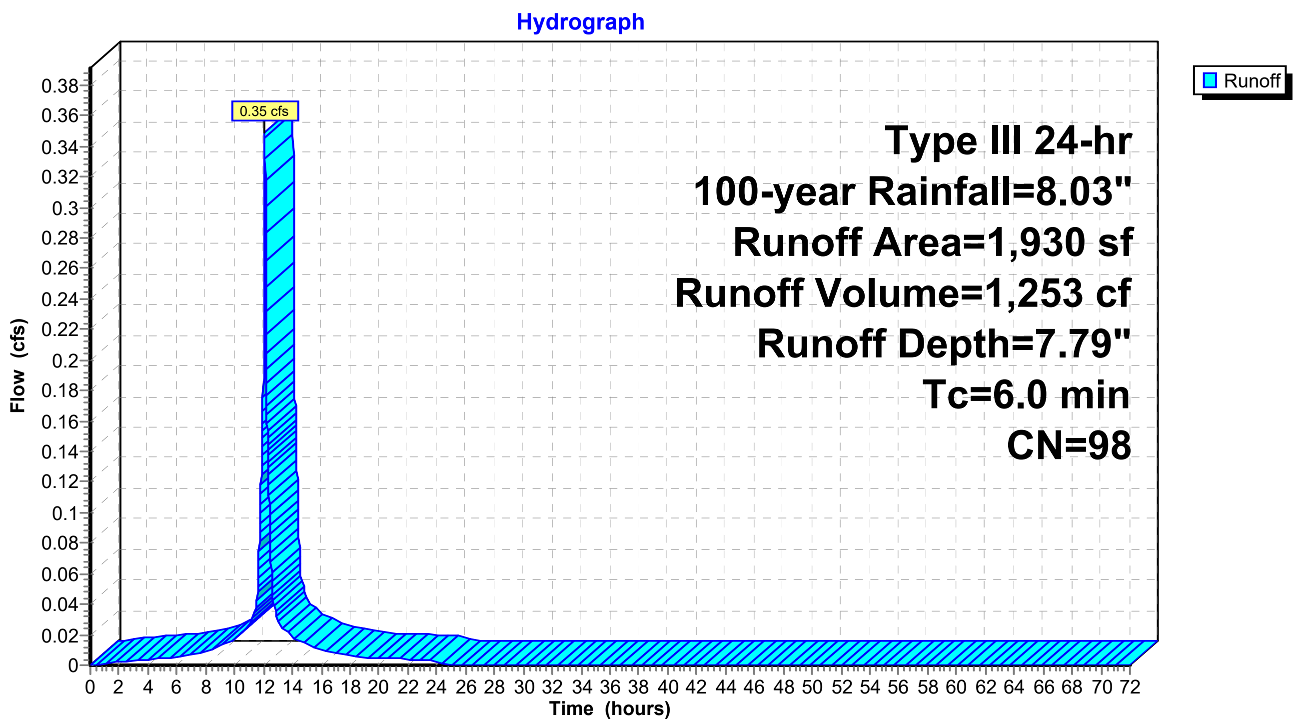
Runoff = 0.35 cfs @ 12.08 hrs, Volume= 1,253 cf, Depth= 7.79"

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=8.03"

Area (sf)	CN	Description
1,930	98	Roofs, HSG B
1,930		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A3: SUB-A3



Summary for Subcatchment A4: SUB-A4

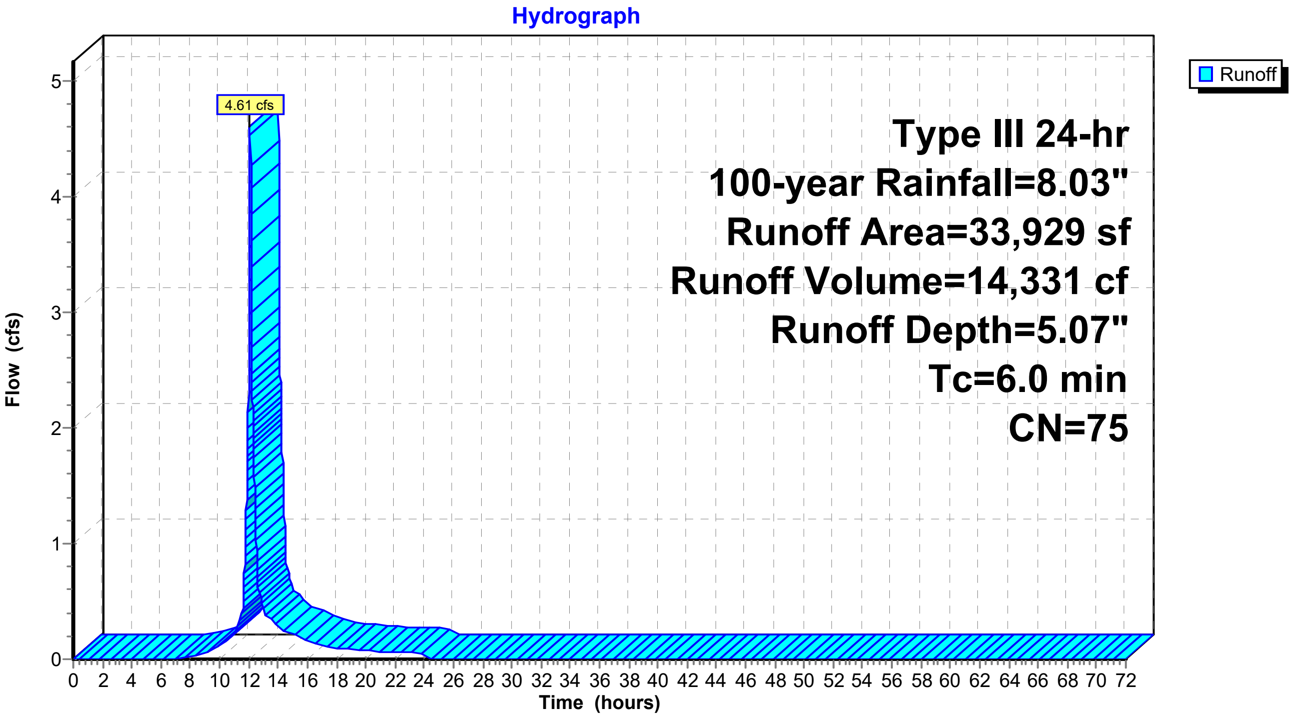
Runoff = 4.61 cfs @ 12.09 hrs, Volume= 14,331 cf, Depth= 5.07"

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=8.03"

Area (sf)	CN	Description
20,714	61	>75% Grass cover, Good, HSG B
12,974	98	Paved parking, HSG B
241	96	Gravel surface, HSG A
33,929	75	Weighted Average
20,955		61.76% Pervious Area
12,974		38.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min Tc=0.1 hrs**

Subcatchment A4: SUB-A4



Summary for Pond IB-1: IB-1

Inflow Area = 35,859 sf, 41.56% Impervious, Inflow Depth = 5.22" for 100-year event
Inflow = 4.96 cfs @ 12.09 hrs, Volume= 15,584 cf
Outflow = 1.82 cfs @ 12.36 hrs, Volume= 15,584 cf, Atten= 63%, Lag= 16.1 min
Discarded = 0.08 cfs @ 12.36 hrs, Volume= 4,277 cf
Primary = 1.73 cfs @ 12.36 hrs, Volume= 11,307 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 516.10' @ 12.36 hrs Surf.Area= 2,236 sf Storage= 5,209 cf

Plug-Flow detention time= 186.8 min calculated for 15,582 cf (100% of inflow)
Center-of-Mass det. time= 187.0 min (995.1 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	511.00'	6,163 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
511.00	170	0	0	170
512.00	400	277	277	407
513.00	715	550	827	733
514.00	1,130	915	1,741	1,162
515.00	1,615	1,365	3,107	1,664
516.00	2,175	1,888	4,995	2,245
516.50	2,500	1,168	6,163	2,581

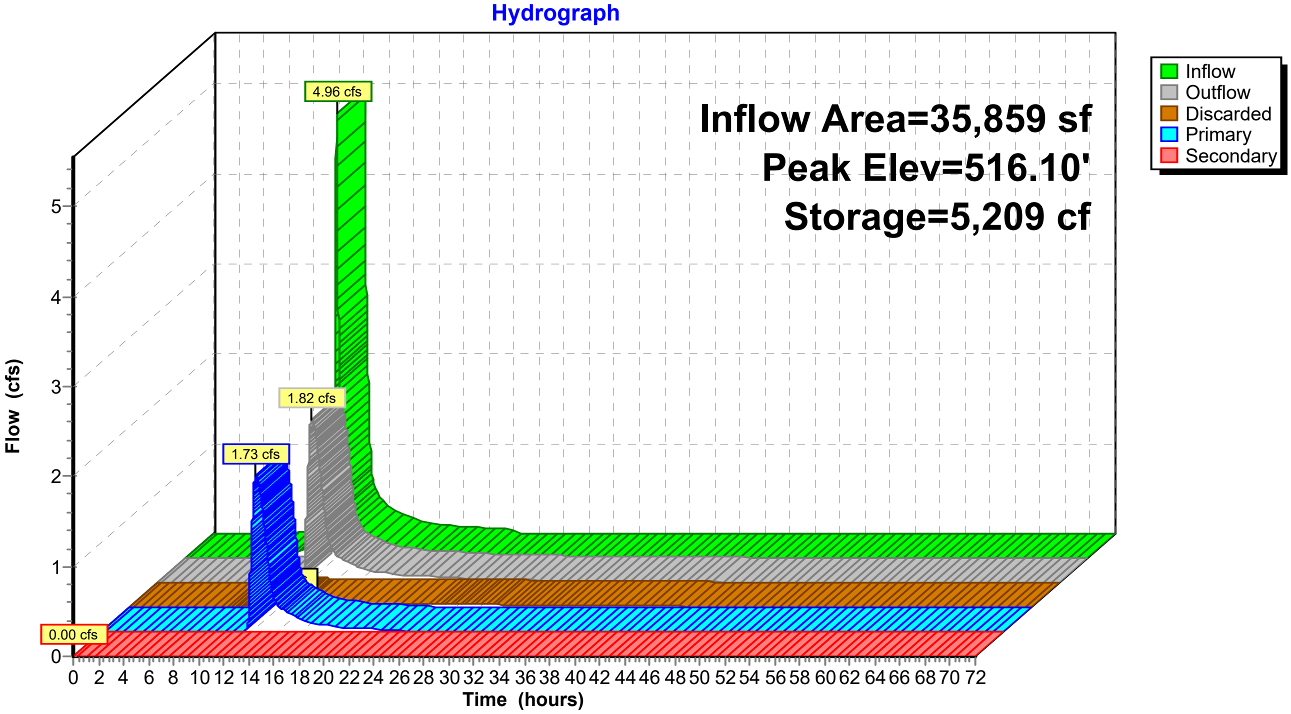
Device	Routing	Invert	Outlet Devices
#1	Primary	514.06'	**8.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 514.06' / 513.96' S= 0.0062 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	516.10'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Discarded	511.00'	**1.020 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 508.00'

Discarded OutFlow Max=0.08 cfs @ 12.36 hrs HW=516.10' (Free Discharge)
└─**3=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=1.73 cfs @ 12.36 hrs HW=516.10' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.73 cfs @ 4.96 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=511.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond IB-1: IB-1

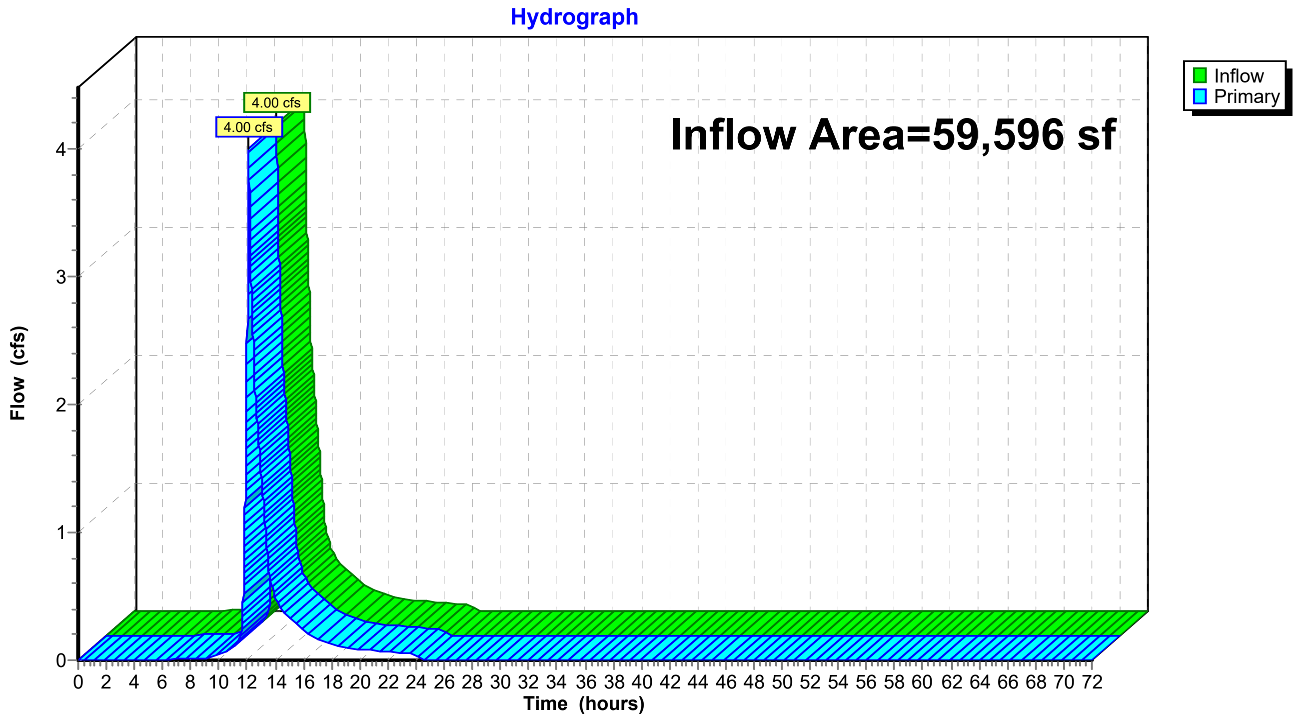

Hydrograph
Inflow Area=35,859 sf
Peak Elev=516.10'
Storage=5,209 cf
4.96 cfs
1.82 cfs
1.73 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Secondary
Flow (cfs)
0
1
2
3
4
5
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Time (hours)

Summary for Link A: A

Inflow Area = 59,596 sf, 30.81% Impervious, Inflow Depth = 3.92" for 100-year event
Inflow = 4.00 cfs @ 12.10 hrs, Volume= 19,475 cf
Primary = 4.00 cfs @ 12.10 hrs, Volume= 19,475 cf, Atten= 0%, Lag= 0.0 min

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

Link A: A



ATTACHMENT E

Stormwater Calculations

Edgewater Filtration Facility
Recharge and Water Quality Volume Calculation
Jun-21

Groundwater recharge volume (GRV)
D = depth of runoff to be recharged (inches)
A = Site area in acres
I = post development site imperviousness (decimal)

GRV (acre-ft) = (D*A*I)/12
GRV = (0.25 * 1.37 * 0.308) / 12 = 0.0088 acre-ft = 379 cubic feet
Provided GRV = 1,810 cubic feet

Water Quality Volume (WQV) (acre-feet) = (1") x (R) x (A) x 1'/12"
R = Volumetric runoff coeficient = 0.05 + 0.009(I)
I = Percent Impervious Cover

A = Site area in acres
I = Percent Impervious Cover = 32.95%
R= 0.05 + 0.009 x 32.95% = 0.35
A = 1.37 acres

WQV = (1") x 0.35 x 1.37 x 1'/12" = 0.04 acre-feet
= 1,741 cubic feet

Location	WQV (cf)	Provided WQ Storage (cf)	Description
Infiltration Basin	1,741	1,810	IB-1

Stage-Area-Storage for Pond IB-1: IB-1

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
511.00	170	170	0
511.02	174	174	3
511.04	177	178	7
511.06	181	181	11
511.08	185	185	14
511.10	189	189	18
511.12	192	193	22
511.14	196	197	26
511.16	200	201	30
511.18	204	205	34
511.20	208	209	38
511.22	212	214	42
511.24	216	218	46
511.26	220	222	51
511.28	225	226	55
511.30	229	231	60
511.32	233	235	64
511.34	237	239	69
511.36	242	244	74
511.38	246	248	79
511.40	250	253	84
511.42	255	257	89
511.44	259	262	94
511.46	264	267	99
511.48	268	271	104
511.50	273	276	110
511.52	278	281	115
511.54	282	286	121
511.56	287	291	127
511.58	292	295	132
511.60	296	300	138
511.62	301	305	144
511.64	306	310	150
511.66	311	315	156
511.68	316	321	163
511.70	321	326	169
511.72	326	331	175
511.74	331	336	182
511.76	336	341	189
511.78	341	347	195
511.80	346	352	202
511.82	351	357	209
511.84	357	363	216
511.86	362	368	224
511.88	367	374	231
511.90	373	379	238
511.92	378	385	246
511.94	383	390	253
511.96	389	396	261
511.98	394	402	269
512.00	400	407	277
512.02	405	413	285

Stage-Area-Storage for Pond IB-1: IB-1 (continued)

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
512.04	411	419	293
512.06	416	424	301
512.08	422	430	310
512.10	427	436	318
512.12	433	441	327
512.14	439	447	336
512.16	444	453	344
512.18	450	459	353
512.20	456	465	362
512.22	462	471	372
512.24	467	477	381
512.26	473	483	390
512.28	479	489	400
512.30	485	495	409
512.32	491	501	419
512.34	497	508	429
512.36	503	514	439
512.38	509	520	449
512.40	515	526	459
512.42	521	533	470
512.44	527	539	480
512.46	534	545	491
512.48	540	552	502
512.50	546	558	513
512.52	552	565	523
512.54	559	572	535
512.56	565	578	546
512.58	572	585	557
512.60	578	591	569
512.62	585	598	580
512.64	591	605	592
512.66	598	612	604
512.68	604	619	616
512.70	611	625	628
512.72	618	632	640
512.74	624	639	653
512.76	631	646	665
512.78	638	653	678
512.80	645	660	691
512.82	652	667	704
512.84	658	675	717
512.86	665	682	730
512.88	672	689	744
512.90	679	696	757
512.92	686	704	771
512.94	694	711	785
512.96	701	718	799
512.98	708	726	813
513.00	715	733	827
513.02	722	741	841
513.04	730	748	856
513.06	737	756	870

Stage-Area-Storage for Pond IB-1: IB-1 (continued)

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
513.08	745	764	885
513.10	752	772	900
513.12	760	779	915
513.14	767	787	931
513.16	775	795	946
513.18	783	803	962
513.20	790	811	977
513.22	798	819	993
513.24	806	827	1,009
513.26	814	835	1,025
513.28	822	843	1,042
513.30	830	851	1,058
513.32	838	860	1,075
513.34	845	868	1,092
513.36	854	876	1,109
513.38	862	884	1,126
513.40	870	893	1,143
513.42	878	901	1,161
513.44	886	910	1,178
513.46	894	918	1,196
513.48	902	927	1,214
513.50	911	935	1,232
513.52	919	944	1,251
513.54	927	952	1,269
513.56	936	961	1,288
513.58	944	970	1,306
513.60	953	978	1,325
513.62	961	987	1,345
513.64	970	996	1,364
513.66	978	1,005	1,383
513.68	987	1,014	1,403
513.70	996	1,023	1,423
513.72	1,004	1,032	1,443
513.74	1,013	1,041	1,463
513.76	1,022	1,050	1,483
513.78	1,031	1,059	1,504
513.80	1,039	1,068	1,525
513.82	1,048	1,077	1,545
513.84	1,057	1,086	1,567
513.86	1,066	1,096	1,588
513.88	1,075	1,105	1,609
513.90	1,084	1,114	1,631
513.92	1,093	1,124	1,653
513.94	1,102	1,133	1,675
513.96	1,112	1,143	1,697
513.98	1,121	1,152	1,719
514.00	1,130	1,162	1,741
514.02	1,139	1,171	1,764
514.04	1,148	1,180	1,787
514.06	1,157	1,189	1,810
514.08	1,166	1,199	1,833
514.10	1,175	1,208	1,857

Storage volume in infiltration basin below lowest outlet

Stage-Area-Storage for Pond IB-1: IB-1 (continued)

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
514.12	1,184	1,217	1,880
514.14	1,193	1,227	1,904
514.16	1,202	1,236	1,928
514.18	1,211	1,245	1,952
514.20	1,220	1,255	1,976
514.22	1,229	1,264	2,001
514.24	1,239	1,274	2,026
514.26	1,248	1,284	2,050
514.28	1,257	1,293	2,076
514.30	1,266	1,303	2,101
514.32	1,276	1,313	2,126
514.34	1,285	1,322	2,152
514.36	1,295	1,332	2,178
514.38	1,304	1,342	2,204
514.40	1,314	1,352	2,230
514.42	1,323	1,362	2,256
514.44	1,333	1,372	2,283
514.46	1,342	1,382	2,309
514.48	1,352	1,392	2,336
514.50	1,362	1,402	2,363
514.52	1,371	1,412	2,391
514.54	1,381	1,422	2,418
514.56	1,391	1,432	2,446
514.58	1,401	1,442	2,474
514.60	1,411	1,452	2,502
514.62	1,421	1,463	2,530
514.64	1,430	1,473	2,559
514.66	1,440	1,483	2,588
514.68	1,450	1,493	2,617
514.70	1,460	1,504	2,646
514.72	1,470	1,514	2,675
514.74	1,481	1,525	2,704
514.76	1,491	1,535	2,734
514.78	1,501	1,546	2,764
514.80	1,511	1,556	2,794
514.82	1,521	1,567	2,825
514.84	1,532	1,578	2,855
514.86	1,542	1,588	2,886
514.88	1,552	1,599	2,917
514.90	1,563	1,610	2,948
514.92	1,573	1,620	2,979
514.94	1,583	1,631	3,011
514.96	1,594	1,642	3,043
514.98	1,604	1,653	3,075
515.00	1,615	1,664	3,107
515.02	1,625	1,675	3,139
515.04	1,636	1,686	3,172
515.06	1,646	1,696	3,205
515.08	1,657	1,707	3,238
515.10	1,667	1,718	3,271
515.12	1,678	1,729	3,304
515.14	1,688	1,740	3,338

Stage-Area-Storage for Pond IB-1: IB-1 (continued)

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
515.16	1,699	1,751	3,372
515.18	1,710	1,762	3,406
515.20	1,720	1,773	3,440
515.22	1,731	1,784	3,475
515.24	1,742	1,795	3,509
515.26	1,753	1,807	3,544
515.28	1,763	1,818	3,580
515.30	1,774	1,829	3,615
515.32	1,785	1,840	3,651
515.34	1,796	1,852	3,686
515.36	1,807	1,863	3,722
515.38	1,818	1,874	3,759
515.40	1,829	1,886	3,795
515.42	1,840	1,897	3,832
515.44	1,851	1,909	3,869
515.46	1,862	1,920	3,906
515.48	1,873	1,932	3,943
515.50	1,885	1,944	3,981
515.52	1,896	1,955	4,019
515.54	1,907	1,967	4,057
515.56	1,918	1,979	4,095
515.58	1,930	1,990	4,133
515.60	1,941	2,002	4,172
515.62	1,952	2,014	4,211
515.64	1,964	2,026	4,250
515.66	1,975	2,038	4,290
515.68	1,987	2,049	4,329
515.70	1,998	2,061	4,369
515.72	2,010	2,073	4,409
515.74	2,021	2,085	4,449
515.76	2,033	2,097	4,490
515.78	2,045	2,110	4,531
515.80	2,056	2,122	4,572
515.82	2,068	2,134	4,613
515.84	2,080	2,146	4,654
515.86	2,092	2,158	4,696
515.88	2,103	2,170	4,738
515.90	2,115	2,183	4,780
515.92	2,127	2,195	4,823
515.94	2,139	2,207	4,865
515.96	2,151	2,220	4,908
515.98	2,163	2,232	4,951
516.00	2,175	2,245	4,995
516.02	2,188	2,258	5,038
516.04	2,200	2,271	5,082
516.06	2,213	2,284	5,126
516.08	2,225	2,297	5,171
516.10	2,238	2,310	5,215
516.12	2,251	2,323	5,260
516.14	2,264	2,336	5,306
516.16	2,277	2,350	5,351
516.18	2,289	2,363	5,397

Stage-Area-Storage for Pond IB-1: IB-1 (continued)

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
516.20	2,302	2,376	5,443
516.22	2,315	2,390	5,489
516.24	2,328	2,403	5,535
516.26	2,341	2,417	5,582
516.28	2,354	2,430	5,629
516.30	2,367	2,444	5,676
516.32	2,380	2,457	5,723
516.34	2,394	2,471	5,771
516.36	2,407	2,484	5,819
516.38	2,420	2,498	5,867
516.40	2,433	2,512	5,916
516.42	2,446	2,525	5,965
516.44	2,460	2,539	6,014
516.46	2,473	2,553	6,063
516.48	2,487	2,567	6,113
516.50	**2,500**	**2,581**	**6,163**

Sediment Forebay Sizing: Infiltration Basin 1 (IB-1)

Forebay Volume:

WQV=1741 cubic feet

Min. Required Volume = 0.1 x WQV

= 0.1 x 1741 cubic feet

Min. Required Volume 174 cuft

Volume Provided Worksheet:

Contour El. (ft)	Area (sqft)	Inc. Volume (cuft)	Cum. Volume (cuft)
513.50	5	0	0
514.00	26	8	8
515.00	82	54	62
516.00	210	146	**208**

Volume Provided **208** cuft

Edgewater Treatment Facility Outlet Protection Calculations

Sediment Forebay:

Type 2: Scour Hole Depression = full pipe rise, m (ft)

d_{50} = $(0.0181\ R_p^2\ /TW)\ (Q/R_p^{2.5})^{1.333}$ **(** $d_{50} = (0.0082R_p^2/TW)\ (Q/R_p^{2.5})^{1.333}$ **)**

$d_{50} = (0.0181 * 1.0^2 / 0.8)\ (2.42/1.0^{2.5})^{1.333}$ d_{50} = 0.073 ft. < 0.42 ft. → Use Modified Riprap

C = $3S_p$ + 6F Basin Length m (ft.)

B = $2S_p$ + 6F Basin Inlet and Outlet Width m (ft.)

C = 3*1 + 6*1 = 9 ft. Basin Length

B = 2*1 + 6*1 = 8 ft. Basin Width

Sediment Forebay Provided: 15 ft. long by 14 ft. wide

Infiltration Basin Outlet Pipe Flared End Section (FE-1) Riprap:

Type A Riprap Apron (Minimum Tailwater Condition) **TW < 0.5 R_p**

$$L_a = \frac{3.26(Q-0.142)}{S_p^{1.5}} + 3.05 \qquad \left(L_a = \frac{1.80(Q-5)}{S_p^{1.5}} + 10 \right)$$

Q = 0.95 cfs TW = min. V=2.93 ft/s

$L_a = (3.26 * (0.95 - 0.142) / 0.66^{1.5}) + 3.05 = 7.93$ ft.

$W_1 = 3S_p = 3 * 0.66 = 2.0$ ft → 3 ft provided

$W_2 = 3S_p + 0.7\ L_a = 3.0 * 0.66 + 0.70 * 7.93 = 7.5$ ft. → 8 ft provided

V < 8.0 ft/s use modified riprap

Grassed Swale Flared End Section (FE-2) Riprap:

Q = 0.58 cfs TW = min. V=8.54 ft/s

$L_a = (3.26 * (0.58 - 0.142) / 0.50^{1.5}) + 3.05 = 7.09$ ft.

$W_1 = 3S_p = 3 * 0.50 = 1.5$ ft → 3 ft provided

$W_2 = 3S_p + 0.7\ L_a = 3.0 * 0.50 + 0.70 * 7.09 = 6.5$ ft. → 8 ft provided

8 ft/s < V < 10.0 ft/s use intermediate riprap

ATTACHMENT F

Operation and Maintenance Plan

1.0 Introduction

The following document has been written to comply with the stormwater guidelines set forth by the Connecticut Department of Energy and Environmental Protection (CT DEEP). The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

2.0 Purpose

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description of each BMP type and an inspection form for each BMP. Connecticut Water Company is the owner and operator of the system and is responsible for its upkeep and maintenance. This work will be funded on an annual basis through the owner's operating budget.

In the event the Owner sells the property, it is the Owner's responsibility to transfer this plan as well as the past three years of operation and maintenance records to the new property owner.

3.0 BMP Description and Locations

3.1 Grassed Areas

There are several grassed areas throughout the site, particularly adjacent to the proposed infiltration basin that will receive stormwater runoff. These grassed areas are intended to slow runoff velocities and promote infiltration of stormwater.

3.2 Infiltration Basin

There is one infiltration basin on site that will receive stormwater on site. This structure also significantly mitigates TSS. The basin will also include a riprap lined sediment forebay for pre-treatment of stormwater prior to entering the infiltration basin.

3.3 Deep Sump Catch Basins

Deep sump catch basins will be located throughout the site and used as pre-treatment before entering the infiltration basin sediment forebay. The deep sump catch basins are designed to remove trash, debris, and coarse sediment from the stormwater runoff.

3.4 Flared End Sections and Rip Rap Aprons

The outlet pipes from the proposed infiltration system and grassed swale are fitted with flared end sections and stone rip-rap aprons to release the water in a controlled manner and prevent scouring and erosion. See section 4.4 for information on flared end sections and rip rap aprons.

4.0 Inspection, Maintenance Checklist and Schedule

4.1 Grassed Areas

All sediment and debris should be removed and disposed of according to local, state, and federal regulations. During the growing season, vegetation should not exceed six inches in height, and should be mowed as necessary. Any grassed areas in close proximity to any areas that use salt in deicing applications should be re-seeded in the spring. Bare spots should be re-seeded as needed.

4.2 Infiltration Basin

The infiltration basin shall be inspected every six months during the first year, and annually thereafter. All accumulated sediment and debris in the infiltration basin should be removed and disposed of according to local, state, and federal regulations. During the growing season, vegetation should not exceed six inches in height in the infiltration basin and should be mowed as necessary. Any grassed areas in close proximity to any areas that use salt in deicing applications should be re-seeded in the spring. Bare spots should be re-seeded as needed.

4.3 Deep Sump Catch Basins

Inspect and/or clean catch basin at least four times per year and at the end of foliage and snow removal seasons. Sediments must be removed whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. The catch basins should be cleaned a minimum of four times per year regardless of the amount of sediment in the basin. Catch basins shall be cleaned with clamshell buckets.

In the event of contamination by a spill or other means, all cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by CT DEEP to accept Solid Waste without any prior approval by CT DEEP. Please note that current

CT DEEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.4 Flared End Section with Rip Rap Apron

Pipe outfalls from stormwater detention basins shall be inspected for plugging or damage and cleaned in March, June, September, and December. Any vegetation, soil or debris that forms a barrier to flow shall be removed. If any soil erosion is noted, erosion shall be repaired, and bare spots shall be armored with stone riprap. All trash, debris, and sediments should be disposed of in accordance with local, state, and federal regulations.

4.5 Inspections and Record Keeping

- An inspection form should be filled out each and every time maintenance work is performed.
- A binder should be kept at the facility that contains all of the completed inspection forms and any other related materials.
- A review of all Operation & Maintenance actions should take place annually to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.
- All operation and maintenance log forms for the last three years, at a minimum, shall be kept on site at the facility.
- The inspection and maintenance schedule may be refined in the future based on the findings and results of this operation and maintenance program or policy.

5.0 Public Safety Features

The onsite stormwater basin will be shielded from public access by fencing.

6.0 Stormwater Management System Owner/Responsible Party

The stormwater management system shall be owned and maintained by the following party or its future designee/assigns:

Connecticut Water Company

93 West Main Street
Clinton, Ct 06413
1-800-286-5700

This operation and Maintenance Plan will be recorded with the registry of deeds so that current and future owners are aware of the requirement for proper operation and maintenance of the onsite stormwater system.

7.0 General Good Housekeeping Practices

All non-hazardous waste shall be stored in designated trash or recycling containers onsite for periodic collection by the local trash collector. Connecticut Water Company shall have maintenance staff who monitor the site for the accumulation of trash. Any trash that is seen onsite shall immediately be collected and placed into designated trash or recycling containers. Connecticut Water Company staff shall make an inspection of the site once per week at minimum.

8.0 Estimated Operations and Maintenance Budget

The estimated budget for annual operations and maintenance of this stormwater system is $2,000 per year.

Edgewater Filtration Facility
Permanent BMP Inspection Checklist

☐ **Grassed Areas**

Frequency: Grassed areas acting as vegetated filter strips should be inspected every six months during the first year and annually thereafter.

Location: ________________________________

Inspected By: ________________ Date: ____________

Observations: _________________________________
____
____

Actions Taken: _________________________________
____
____

Instructions: Inspect grassed area. Mow grass as needed. Remove accumulated trash and debris. Remove sediment and re-seed bare spots as needed. All trash, debris, and sediments should be disposed of in accordance with local, state, and federal regulations.

☐ **Infiltration Basins**

Frequency: The Infiltration Basins should be inspected every six months during the first year and annually thereafter.

Structure No.: ________________________________

Inspected By: ________________ Date: ___________

Observations: _________________________________
____
____

Actions Taken: _________________________________
____
____

Instructions: Inspect grassed area. Mow grass as needed in infiltration basin. Remove accumulated trash and debris. Remove sediment and re-seed bare spots as needed. All trash, debris, and sediments should be disposed of in accordance with local, state, and federal regulations.

☐ **Deep Sump Catch Basins**

Frequency: Inspect and clean deep sump catch basins and oil-grit Separators in March, June, September and December.

Structure Number: ________________________________

Inspected By: ________________ Date: ___________

Observations: ________________________________
____
____

Actions Taken: ________________________________
____
____

Instructions: Clean units four times per year or whenever the depth of the deposits is greater than or equal to one half the depth from the bottom of the invert to the lowest pipe in the structure.

☐ **Flared End Sections with Rip Rap Aprons**

Frequency: Inspect and clean flared end sections and rip rap aprons in March, June, September and December.

Structure Number: ______________________________

Inspected By: ______________ Date: __________

Observations: ______________________________
____
____

Actions Taken: ______________________________
____
____

Instructions: Inspect flared end sections and rip rap for excess sediment build up, debris, and clogging. Remove and dispose all sediment, trash and debris in accordance with local, state, and federal regulations.