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November 21, 2024

Town of Ledyard
Planning & Zoning Commission
741 Colonel Ledyard Highway
Ledyard, CT 06339-1511

Attn: Marcelle Wood, Chairman Planning and Zoning Commission

RE: Response to October 10, 2024 Hearing Comments from Trinkaus Engineering, LLC
Gales Ferry Intermodal
1761 and 1737 Route 12, Gales Ferry, Connecticut
Commission Number 45JC206

Dear Mr Wood,

On behalf of our client, Gales Ferry Intermodal, LLC, Loureiro Engineering Associates Inc. (LEA) has prepared this letter in response the comments from Trinkaus Engineering, LLC (Trinkaus) at the October 10, 2024 hearing. This document presents the paraphrased comments in italic followed by LEA's response in vertical roman text.

The temporary stormwater basins shown at an elevation in bedrock after blasting. Nothing shown for the start of the program.

At the start of the project, the excavation of overburden soils will be underway. The lower portion of the excavation area is expected to have 25-30-feet of overburden soils, which will clearly provide more than adequate room for the contractor to establish the first temporary sediment basin for the project. The general location would generally replicate the final location shown on the drawings, albeit the temporary basin will be at a higher elevation. The volume computations are included in the drawing set to facilitate this situation. It is noteworthy that the overblasting will extend down to elevation 5, which is well below the entrance elevation. Bedrock will not be exposed at the entrance to the excavation near the railroad tracks, as this will be in overburden. This further contains runoff and sediment inside the excavation area during the initial excavation process, so multiple lines of protection are provided.

Specific details are included in the Stormwater Pollution Control Plan (SWPCP) prepared for this Site in accordance with the Connecticut Department of Energy & Environmental Protection's (DEEP) Construction Stormwater Permit (Attached), which registration will be completed after local approval of the project.

Need higher more robust soil erosion control for > 5 acres of disturbance.

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Each work phase is equipped with adequately sized sediment basins. Surface treatments will be applied as needed during construction including the use of woodchips generated from the site. Surface treatments including Intermittent mulch socks will be installed throughout the areas opened up to grading to mitigate significant erosion during the overburden stripping process. Stormwater will initially be confined to the work area and subject to natural infiltration and/or dewatering as needed after significant storm events then treated prior to discharge into the existing area of infiltration.

As the first phase excavation concludes, the working floor will be further filled with existing soils derived from the overburden removal process to ensure that similar infiltrative capacities can be established. The sediment basin within the phase will be fully established and the surface will be stabilized with crushed stone to mitigate erosion. The next phase will be accomplished similarly with the working floor within the next phase at a lower elevation than the first phase elevation thereby always containing stormwater within the active phase.

Further details are provided in the SWPCP.

Post development used 75-80 for gravel roads as a CN, should be impervious at 98.

The model used to analyze stormwater for this project is based upon Technical Release -55 (TR-55), which specifies the CN value for various surface finishes. Gravel roads have a selective range from 75-91 in this published document. The value selected in our analysis is appropriate for this site with these soil condition. However, the point is moot because the gravel road in the final site plan is only 1.3% of the overall finished surface. As such, the impact of the CN value for such an insignificant percentage of the site is not appreciable.

Reference was made to 30-inches of backfill over the bedrock and the impedance to drainage.

It is noteworthy that the 34-inches of backfill placed above the final bedrock surface is limited to the benches along the bedrock slope only. The excavation floor has 11 to 36-feet of backfill over the bedrock surface, which backfill is comprised of soil and stone that was previously removed from this site. Consequently, any soil conditions after the project is completed will clearly replicate or exceed the existing conditions since the same material will be used. Further, this material has a proven record of drainage performance.

Reference was made to moving all the equipment into Phase 1 to facilitate the next phases of the project.

Only the primary crusher will be located within Phase 1. This was selectively designed specifically to mitigate vehicular transport trip distance and hence mitigate the potential generation of dust derived from the site.

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Reference was made to active excavation with a grassed surface in the finished phases.

The finished phases will be surfaced with crushed stone, like businesses and homes may have in a landscaped bed, to provide surficial stabilization while offering a durable surface that may be traversed with vehicles and equipment. Once all the excavation is completed, the stone will either be removed or incorporated into the backfill process. Subsoil will be applied thereover, covered by topsoil, then the area will be seeded.

Reference was made to the inability of the basins to infiltrate due to bedrock.

The final basins are not located in bedrock. The finished grade within the excavation floor is 11 to 36-feet above the bedrock floor below and the backfill used is soil derived from the site. Infiltration on this site has been demonstrated over the years of development and the same performance can be expected of the reconstructed floor area.

Runoff volume is increased

The runoff volume will increase. However, the peak discharge, which is the measure utilized to evaluate flood conditions and erosion potential will decrease. Industry designs to a "no net increase in peak runoff". The decrease in peak enhances the water quality ultimately produced at the site. Reducing the surficial slope of this site from 40% to 1 ½% significantly reduces the erosive nature of the surface. The design currently reduces the peak discharge significantly in all locations.

Trees on the benches won't grow due to lack of deep soil.

The specified species were selected by a Licensed Landscape Architect with the understanding of the soil limitations. This entire hill is currently treed with the exception of the power line right-of-way. In walking the access trails one can observe full tree growth throughout the crest, where there are areas of exposed bedrock. Trees along the crest have demonstrated the ability to grow to maturity on this site in very shallow depths to bedrock. There will be some deadloss, as expected at any construction site.

Concern was expressed about water bleeding out of the bedrock

This hill is underlain with competent bedrock and the topography drops in all directions, north, east, south and west. The recharge zone for this hillside is the hill itself. As such, by removing a portion of the hill, the recharge zone is reduced even further from an already very tiny recharge zone. This hill will not be artesian fed as evidenced by the local topography. Consequently, bleeding bedrock surfaces will be inconsequential as further described by the Geologist's testimony.

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Wants a detailed phasing plan showing all the basins as the project progresses – This heightened level of detail is included in the SWPCP, which is typically prepared after local approvals in pursuit of the DEEP Construction Stormwater Permit registration. It is important to recognize the contractor's ability to locate basins as needed to progress the work based on site conditions, which may result in slight locational changes as the phases progress.

Sediment will block the infiltration capacity in the basins

Infiltration basins are used regularly throughout the country as a successful means to manage and retain stormwater. They do need to be maintained to infiltrate stormwater at the designed rate. Once construction is completed, the basins are cleaned out and seeded and they function as intended. This is a standard practice all over the country and not special to this project. Maintenance of the basins will be required and is critical to their function. It is noteworthy that these basins will likely be short-lived, and the goal of this project is to create buildable land for future development. New stormwater features would be applied to any new development.

Sincerely,

LOUREIRO ENGINEERING ASSOCIATES, INC.

George F. Andrews Jr., P.E., L.E.P.
Principal Engineer, Civil Engineering

Attachment

Stormwater Pollution Control Plan

Industrial Site Preparation

Gales Ferry, Connecticut

November 14, 2024

Prepared for

Gales Ferry Intermodal, LLC

549 South Street

Quincy, MA 02169

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Loureiro Engineering Associates, Inc.

100 Northwest Drive • Plainville, CT 06062 • 860.747.6181 • Fax 860.747.8822 • www.Loureiro.com

An Employee-Owned Company

Comm. No. 045JC2.06

STORMWATER POLLUTION CONTROL PLAN

Industrial Site Preparation
Gales Ferry, Connecticut

November 14, 2024

Prepared for

Gales Ferry Intermodal LLC
549 South Street
Quincy, MA 02169

Prepared by

LOUREIRO ENGINEERING ASSOCIATES, INC.
100 Northwest Drive
Plainville, Connecticut 06062

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Table of Contents

ACRONYMS

AMSL	Above Mean Sea level
CL&P	Connecticut Light and Power
DEEP	Connecticut Department of Energy and Environmental Protection
DOT	Connecticut Department of Transportation
GP	General Permit for the Discharge of Stormwater Associated with Construction Activities
NDDB	Natural Diversity Database
SWPCP	Stormwater Pollution Control Plan

1. INTRODUCTION

Loureiro Engineering Associates, Inc. (LEA) was retained by Gales Ferry Intermodal LLC to prepare a Stormwater Pollution Control Plan (SWPCP) in support of construction activities associated with site regrading and preparation for future industrial development, located at 1737 & 1761 Route 12 in Gales Ferry, Connecticut (the "Site").

This SWPCP has been prepared to provide the appropriate information and guidance to ensure that stormwater discharges associated with construction activities conducted at the Site are properly managed in compliance with the Connecticut Department of Energy and Environmental Protection (DEEP) *General Permit for the Discharge of Stormwater Associated with Construction Activities* (GP). This GP was reissued on December 31, 2020 and expires on December 30, 2025. A copy of the GP containing various conditions applicable to the project is included as Appendix A. A copy of the Site's GP Registration Certificate is provided in Appendix B. This SWPCP is prepared to address stormwater pollution caused by soil erosion and sedimentation during and after the proposed construction activities performed at the Site.

1.1 Authorization Under General Permit

The current GP authorizes construction activities and associated stormwater and dewatering wastewater discharges on a site, as defined in the GP, with a total disturbance of one or more acres of land area on a site. Construction projects disturbing five acres or more that are required to receive municipal approval are considered to be "Locally Approvable" and must submit a registration to the DEEP and have a Qualified Professional Engineer or Qualified Soil Erosion and Sediment Control Professional prepare a SWPCP that addresses the construction erosion and sediment control and post-construction measures required in the general permit. The plan must also be reviewed and certified by a qualified professional for compliance with the general permit. The conditions required for the proposed construction activities at the Site, including this SWPCP, are expected to be met for authorization under the GP.

1.2 Existing Conditions

The subject property is approximately 165 acres (ac) and is located in the Industrial zone (I). The property is the site of the former DOW Chemical manufacturing facility and has been an industrial use for years. A portion of the property is currently used for the manufacturing of Styrofoam products by Americas Styrenics, a tenant of the property. The DOW Chemical facilities at the property terminated their manufacturing existence in 2011 and the former DOW Chemical manufacturing buildings have been removed from the property. The property has rail service with

a rail siding and waterfront with an existing pier. The Site is comprised of approximately 75 acres of wooded hillside in the southern portion of the property.

The property has inland wetlands as well as Allyn's Pond. One wetland referenced as the Z series wetland located to the east of the proposed grading activities will be eliminated. Wetlands referenced as the X and Y series may be impacted by the proposed activities due to the removal of a portion of the contributing watershed due to the proposed grading. Wetland mitigation was proposed and approved by the Town of Ledyard Inland Wetlands and Watercourses Commission.

The eastern boundary of the Site is bordered by woods extending to Route 12. The western boundary is railroad tracks owned by the Providence and Worcester Railroad Company, and the Thames River. The northern boundary includes the American Styrenics facility. The southern boundary is bordered by woods and a 200' wide CL&P electric transmission right-of-way.

The portion of the Site upon which the activities are proposed is currently undeveloped, with unpaved roads providing the only access to higher elevations of the Site. The area of the Site is currently wooded or densely brushed, with zero percent (%) impervious coverage.

Access to the Site is currently along Route 12. The existing conditions, including the topography of the Site and adjacent parcels are included in the drawing set under the drawings "Property and Topographic Survey".

1.3 Natural Diversity Database (NDDB)

In accordance with the requirements of the GP, the Site was evaluated with respect to NDDB review maps prepared by the DEEP to determine the presence of any Endangered and Threatened Species (also referred to as 'listed species') at the Site. Figure 2 titled, "NDDB Areas for Ledyard, CT", includes the Site Location along with specified areas that are designated with State and Federal Listed Species or as Critical Habitat. As depicted on Figure 2, the Site is located near the Thames River, an area where listed species have been identified. A Request for NDDB State Listed Species Review was filed online and a determination was generated under determination number 202308990. The determination noted several State Special Concern fish species. While construction activities associated with this project will not disturb or discharge directly to the Thames River, best management practices shall be followed to minimize impact to and loss of preferred habitat for listed species. If a listed species is encountered at the Site during construction activities, the DEEP will be immediately notified, and all necessary additional action(s) shall be taken to ensure compliance with section 3(b)(2) of the GP.

1.4 Historic Preservation Review

A historic site, known as Fort Decatur, is located on the Site immediately to the east of the transmission line right-of-way. The services of Heritage Consultants were retained to investigate the site to (i) determine its historical significance and (ii) develop a cultural resource plan for the protection and preservation of the historic resources located in that area. That investigation has resulted in the publication of a report entitled "Phase 1A/1B Cultural Resource Assessment & Reconnaissance Surveys of the Gales Ferry Intermodal Project, Ledyard, Connecticut Prepared For: Gales Ferry Intermodal, LLC 549 South Street, Quincy, Massachusetts 02165". The plan for the proposed construction activities on the Site has been modified through the development phase to incorporate the recommendations of Heritage Consultants. The report has been reviewed with the Connecticut State Historic Preservation Office (SHPO) to avoid/limit impacts to the archaeological resources and visual impacts to this recognized historic property. As part of preservation efforts, 3.44 acres of the Site containing the remnants of Fort Decatur and other archeological resources will be donated to The Archaeological Conservancy and will therefore not be impacted by proposed construction activities.

2. DESCRIPTION OF ACTIVITIES

The proposed work includes approximately 42 acres of regrading and rock blasting of the Site to provide space for future industrial development. Change in elevation of the Site will range from 30 feet to 190 feet between existing and new conditions. No new structures are included in the construction activities proposed in this plan. An overall small percentage of disconnected impervious areas will be added by the exposure of bedrock. Final conditions will include grassed open space, vegetated rock benches, and a new stormwater management system.

The following sections present additional details for the new construction activities. The new site conditions are depicted in the drawing set under Drawing C-5.

2.1 Nature of Construction Activity

The following activities will be performed as part of construction activities:

- Prior to the initiation of construction activities, temporary erosion and sedimentation control measures will be installed along the limits of areas to-be disturbed, including inlet filters and double rows of mulch socks where wetlands are downgradient of work.
- Vegetation will be cleared and grubbed within limits of the Site and will either be used for temporary erosion control or transferred off-site.
- Removal and stockpiling of overburden material within 5 phase areas
- Blasting, excavation, and removal of rock to designated elevations
- Backfilling with stockpiled overburden material and installation of new stormwater drainage system
- Final stabilization measures including installation of topsoil and seeding
- Removal of temporary erosion and sedimentation control measures.

The selection of a contractor or contractors will be made prior to the start of construction activities. The contractor(s) will be provided with a copy of this narrative and they will be responsible for the development of a detailed construction sequencing plan.

2.2 Estimates of Areas to be Disturbed

Proposed construction activities will result in the disturbance of approximately 42 acres of the Site. The construction activities will be completed in 5 phases as detailed in Section 3. The limits of the area to be disturbed as part of construction activities are depicted on Drawing C-5.

2.3 Post-Construction Runoff

The redeveloped Site and overall property is divided into eleven (11) subcatchment areas. Subcatchments 1, 2, 5, 7, and 11 will remain unchanged under new conditions. All other subcatchments will include open grass and graded rock areas that will drain to new stormwater basins. These basins will be connected with a pipe and manhole system that will discharge to the western wetlands. The Site work will result in an increase in impervious area for the property, increasing from zero percent (%) to 5.2 percent impervious for the Site. The complete system is depicted in the drawing Proposed Drainage Area (Drawing DA2).

The full on-site water quality volume (WQV) is required to be retained on-site since none of the Site is currently developed with impervious coverage, as indicated in Section 5(b)(2)(C)(i) of the GP. The first 1.3 inches of rainfall over the 44.7 acre runoff area results in a total stormwater retention requirement of 10,550 cubic-feet (CF). As flow from rock benches will enter grassed areas with low slopes before reaching infiltration basins, exposed impervious rock areas meet impervious disconnection criteria defined in the 2023 Connecticut Stormwater Quality Manual ("the Manual"). Each subcatchment was analyzed to determine its respective WQV. Low-level outlets were then designed to be above the WQV storage elevation, meaning that WQVs will be fully retained and infiltrated on-site without discharging to the points of compliance (POCs). Additionally, the infiltration basins were sized to ensure no increase in runoff occurs from the overall site into downgradient receiving areas, up to the 100-year-storm. Using HydroCAD, runoff was analyzed and compared from existing to new conditions. Appendix C contains calculations demonstrating compliance with Section 5(b)(2)(C)(i) of the GP.

In accordance with Section 5(b)(2)(C)(ii) if the GP, the drainage system was designed to route to a hydrodynamic separator prior to discharge. The hydrodynamic separator will facilitate sediment and floatables removal from the stormwater runoff. Calculations for the hydrodynamic separator, manufactured by Contech, are provided in Appendix C.

2.4 Post-Construction Conditions

The proposed post-construction conditions that will exist following the implementation of the construction activities contemplated under this document are presented on Drawing 2, New Drainage Areas. This drawing is described in greater detail in the following section of this SWPCP. The accompanying drawing set meets the intent and requirements of mapping required depicting the post-construction conditions at the Site.

2.5 Receiving Waters

The majority of the Site currently has no existing drainage or stormwater management features. The wetlands to the northeast and west are connected by metal or concrete culverts, flowing to the south and then to the west towards the Thames River. The wooded area of the Site currently is a hill that flows north or south from its peak. Flow downslope to the south flows offsite, while flow downslope to the north flows towards the wetland system or Thames River. Through available survey information and field visitation, the wetland system has no ultimate outlet discharge to the Thames River. Drawing 1, Existing Drainage Area, depicts the 4 existing drainage areas as described. Following construction activities, stormwater generated at the Site will continue to flow to the wetlands in a manner similar to that described above. The receiving areas for the Site are depicted in the attached Site Location Map (Figure 1).

3. CONSTRUCTION SEQUENCING AND CONTROLS

Construction activities will be phased into 5 individual phases in an effort to reduce the amount of disturbed areas at any given time. It is anticipated that all construction activities will require 5-10 years to complete. As construction activities are expected to be conducted on an on-again, off-again basis, long-term soil erosion controls will be implemented and are outlined in Section 3.1 and the drawing set. The construction activities conducted will be similar for each phase, and the establishment of soil erosion and sedimentation controls during initial phases will further aid in controlling erosion and runoff from upgradient and subsequent phases. The limits of the 5 phases are depicted on Drawing C-5.

3.1 Erosion and Sediment Control Sequencing

The following sequencing is a general overview of soil erosion and sediment control during construction activities. The contractor(s) will be responsible for maintaining control of soil erosion and sediment if sequencing is altered, or if the sequencing outlined below is insufficient for soil erosion and sediment control during construction activities.

- Prior to the initiation of construction activities, temporary erosion and sedimentation control measures will be installed along the limits of areas to-be disturbed, including inlet filters and double rows of mulch socks where wetlands are downgradient of work.
- Vegetation will be cleared and grubbed within the Phase 1 limits of the Site and will either be used for temporary erosion control or transferred off-site.
- Existing topsoil within Phase 1 will be stripped and stockpiled at the A1 stockpile area in a designated topsoil stockpile. Following initial removal of topsoil, EarthGuard soil stabilizer shall be applied to the exposed subsoil. Overburden material will then be removed incrementally. As subsequent lifts of subsoil are excavated, EarthGuard will be reapplied. Excavated overburden material will be transferred to the A1 stockpile area in a separate stockpile, or off-site.
- Temporary sediment basins and water bars will be installed concurrently with progression of overburden removal.
- Blasting, excavation, and removal of rock will be performed in identified rock removal zone.
- Excavation areas will be backfilled with stockpiled overburden material. New drainage system infrastructure will be installed concurrently with backfilling.
- Once subgrade elevations have been achieved, crushed stone surfacing will be applied to achieve temporary stabilization of work area.

- The previous steps will be repeated for the Phase 2, Phase 3, and Phase 4 work areas. Work within the phase 5 work area shall be done concurrently with Phase 1 work and Phase 2 work. Move from one phase to the next after temporary stabilization of the previous phase. Only Phases 1 & 2 will receive crushed stone surfacing to facilitate stabilized access to other phase areas.
- Final stabilization will be performed for all disturbed surfaces, working generally from southeast of the Site to the Site access point. Apply soil restoration to vegetated areas as appropriate.

The contractor will be provided with copies of permits, plans and approvals, including this SWPCP, which will specify the conditions containing limitations on how work is to be performed. It will be the responsibility of the contractor to independently review each permit, plan and/or approval and address the conditions for performing the work. The contractor will be responsible for providing continuous supervision of their respective work and to ensure the supervision is well versed in the conditions of each permit, plan and/or approval. In addition, the contractor will be responsible for complying with all conditions of each permit, plan or approval as it relates to their work. The owner, as the registrant, must provide adequate access to periodically visit the Site, to verify conformance with conditions, as well as to periodically audit the records of the contractor to ensure adequacy.

3.2 Site Disturbance

This section presents a summary description of the planned activities that will result in disturbance of the Site. It is fully expected that upon the selection of the Contractor, that Contractor will be provided with a copy of this narrative and that the Contractor will be responsible for the development of a detailed construction sequencing plan. The Contractor will have the obligation to ensure that the sediment and erosion control measures as stated herein are adhered to. While it is the responsibility of each contractor performing duties related to stormwater, and soil erosion and sediments control as part of the Site development project to comply with the terms and conditions of the *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities*, each should take particular notice of provisions related to stabilization of disturbed surfaces. Specifically:

- Perimeter controls will be actively maintained until final stabilization of those portions of the Site upgradient of the perimeter control has been established;

- Wherever practicable, site construction activities shall be phased to avoid the disturbance of over ten acres at one time;

- Where construction activities have permanently ceased or have temporarily been suspended for more than seven days, or when final grades are reached in any portion of the Site, stabilization practices shall be implemented within three days;

- Areas that will remain disturbed but inactive for at least thirty days shall receive temporary seeding or application of EarthGuard soil stabilizer in accordance with the current State of Connecticut Soil Erosion and Sediment Control Guidelines;

- Areas that will remain disturbed beyond the planting season shall receive long-term, non-vegetative stabilization sufficient to protect the Site through the winter; and

- In all cases, stabilization measures shall be implemented as soon as possible in accordance with the current State of Connecticut Soil Erosion and Sediment Control Guidelines.

3.2.1 Initial Erosion Control Installation

The primary initial erosion control features will include installation of silt fences, hay bales, and/or mulch socks/berms along the perimeter of the portion of the Site where construction activities will occur, and around all inlets downgradient of the Site. A double row of 18" mulch socks will be installed upslope of the wetlands adjacent to the Site entrance. 18" mulch socks will also be installed along the slope during preparation of Phase 1 along all area tributary to phases to be disturbed. In addition, an anti-tracking pad will be constructed along the Site access point. The locations of proposed soil erosion controls and anti-tracking pads are depicted on Drawing C-6.

3.2.2 Clearing and Grubbing

Proposed construction activities will take place on an existing wooded slope. As part of Phase I activities, these trees will be cleared and chipped. Chipped woody debris can be used as temporary erosion control or disposed off-site.

3.3 **Control Measures**

The contractor shall ensure that grading and related earthwork activities are conducted in accordance with the following specific operating conditions.

3.3.1 Erosion Controls

The contractor shall install all erosion controls as depicted on the accompanying drawing set. Additional erosion controls may be required based upon the stage of development and the conditions of surface stabilization. The contractor shall install additional erosion controls as

needed to mitigate soil erosion and to control sedimentation. Run-on/run-off controls shall be consistent with the 2023 Connecticut Guidelines for Soil Erosion and Sediment Control.

3.3.2 Inlet Protection

Due to the presence of existing stormwater structures on and around the Site, the contractor shall ensure proper inlet and outlet protection (hay bales, silt socks, drop inlet protection, etc.) for these structures is implemented and maintained.

3.3.3 Wetland Protection

Where site disturbance occurs within 50 feet upgradient of wetlands or waters as defined in Section 2 of the GP, the contractor shall install a double row of sediment barriers between the disturbed area and any downgradient wetland or waters.

3.3.4 Temporary Sediment Traps

In accordance with Section 5(b)(2)(A)(iii), for points of discharge from disturbed areas with a total contributing drainage area of over five acres, a temporary sediment basin shall be designed and installed. Each separate phase of this project will be equipped with a phase specific sediment basin serving the respective area. The sediment basins have been designed in accordance with the 2023 Connecticut Guidelines for Soil Erosion and Sediment Control. Each sediment basin will be equipped with adequate storage for a full-year of sediment and an outlet system designed to maximize the efficiency of the basin and pass the 25-year recurrence interval storm event. The related computations for the basin sizing, outlet system and outlet protection are included in Appendix C.

3.3.5 Dust Controls

The contractor shall minimize wind erosion and dust transport by ensuring that all necessary dust controls (watering, salts, mulch, woodchips, etc.) are implemented and maintained at all times during periods of construction and operation. Dust monitoring will also be provided as needed based upon primary points of activity and weather conditions expected for working hours.

3.3.6 Anti-Tracking

The contractor shall employ anti-tracking measures (street sweepers, anti-tracking pads, etc.) at the Site to ensure that vehicles that have entered the construction area do not track soils onto a public roadway at any time. Anti-tracking pads are to be established at a minimum 20-foot width

and 100-foot length at the Site access, using a 6-inch subgrade of stone (CT DOT No. 3 Spec. M.01.01) set over a geotextile fabric.

3.4 Stabilization Practices

Both temporary and permanent stabilization practices shall be implemented throughout the project to minimize erosion of soil from the disturbed portion(s) of the Site. Temporary and permanent stabilization measures (mulching and seeding) are proposed to provide protection against erosion during and after construction. Existing vegetation shall be preserved to the maximum extent practicable. When construction activities have permanently ceased or have been temporarily suspended for more than 7 days, or when interim or final grades are reached in any portion of the site, stabilization practices shall be implemented within 3 days. The stabilization practices to be implemented during the construction of the proposed development are as follows:

3.4.1 Temporary Vegetative Cover

All exposed areas that will be inactive for more than 30 days, but less than one year, and which have not yet reached finished grades shall receive a temporary vegetative cover during the planting season of March 15 to October 1. Note that planting between June 15 and August 1 will require watering as necessary to promote growth. This temporary vegetative cover shall consist of perennial rye grass. The rye grass shall be planted at a rate of l pound per 1,000 square feet. Also, fertilizer shall be applied at a rate of 7.5 pounds per 1,000 square feet of 10-10-10 or equivalent and limestone shall be applied at a rate of 45 pounds per 1,000 square feet. Seed bed preparation and seeding shall be conducted as outlined in the State of Connecticut Soil Erosion and Sediment Control Guidelines.

3.4.2 Temporary Stabilization

Temporary stabilization during construction activities will mainly consist of the application of EarthGuard, manufactured by LCS Environmental Products, or an approved equal. EarthGuard is a hydraulically applied soil stabilizing product that can be applied directly on bare soil, also aiding in dust control. EarthGuard can also be used in conjunction with temporary vegetative cover for long-term stabilization in areas where construction activities may be suspended. It is expected that EarthGuard will be applied to subsoil, following excavation of the topsoil in a phase. EarthGuard will then be immediately reapplied as subsequent lifts of subsoil are excavated. EarthGuard will provide effective stabilization for the large areas of disturbed soils that will results from construction activities. In addition to EarthGuard, Posi-Lock

spray-applied membrane will be used to stabilize stockpiles of excavated overburden. Posi-Lock is effective for multiple years and will provide stabilization for stockpiles before they are reused for backfilling. Information including application rates, installation instructions, and best management practices for EarthGuard and Posi-Lock are included in Appendix C.

Once subgrade elevations are achieved in Phases 1 & 2, a 2" crushed stone layer will be installed on top of a 6" processed aggregate layer to provide interim site stabilization. This stone layer will provide stabilization while allowing heavy vehicle access to other phases. In Phases 3, 4, & 5, temporary vegetative cover or EarthGuard shall be used once subgrade elevations are achieved.

3.4.3 Permanent Vegetative Cover

Once the planting season begins, temporary stabilization measures shall be removed, and slopes shall be prepared and seeded. Seeding shall only occur between March 15 and June 1 and August 15 and October 31. Permanent seed mixture shall be applied within 7 days after establishment of final grades.

3.4.4 Vegetative Cover Irrigation

If needed to establish vegetation during dry summer months, a temporary irrigation system shall be installed on side slopes to allow watering, without operating equipment on steep areas. The Contractor will be responsible for designing, installing, and maintaining the temporary irrigation system throughout the duration of the project. The Contractor must also monitor the system and shut it down as necessary, to prevent excess water from running off the site or causing erosion.

3.4.5 Permanent Mulch for Seed

Straw mulch will be installed on all disturbed surfaces with slopes not exceeding 10%, after placement of final cover, to minimize erosion and allow growth of permanent vegetative cover.

3.5 **Site Restoration**

As development of the Site progresses, final restoration activities will occur. The restoration activities will consist of the installation of a topsoil layer over the temporary crushed stone stabilization layer. Final vegetative cover will then be applied. Soil erosion and sediment controls

will be maintained as described above and will not be removed until such a time as disturbed areas are paved or a suitable vegetative cover has been established.

3.6 Dewatering Wastewaters

Should excavation dewatering become necessary for this project, there shall be no discharge directly into wetlands, watercourse, or storm sewer structures. Proper methods and devices shall be utilized to the extent permitted by law, such as pumping water into a temporary pumping settling basin or temporary sediment trap, providing surge protection at the inlet and outlet of pumps, floating the intake of the pump, or other methods to minimize and retain the suspended solids. If a pumping operation causes turbidity problems, the operation shall cease until feasible means of controlling turbidity (e.g., discharge to the sanitary sewer) are determined and implemented.

The use of a temporary fractionalization tank is proposed during the initial overburden removal process in Phase 1. If water accumulated in the temporary sediment basin becomes inhibitive to construction activities, dewatering will be conducted to allow for construction activities to continue. The fractionalization tank will be pumped through an outlet hose filter bag or weir tank before discharging adjacent to the Site entrance. The minimum tank volume shall be equal to the maximum flow rate in gallons per minute (GPM) multiplied by 90 minutes minimum retention time. Total tank volume can be achieved with multiple tanks in parallel.

3.7 Other Controls

Good housekeeping will be maintained to minimize impacts of protected areas by pollutants, soil, and sediment.

3.7.1 Waste Disposal

The following BMPs shall be implemented to minimize the discharge of litter, debris, construction materials, hardened concrete waste, or similar materials to waters of the State.

- Construction waste will be removed from the Site and disposed of legally.
- Waste will be removed from the site as soon as practical.
- Containers will be appropriate for the material stored.
- Where necessary, containers will be sealed/covered to prevent waste from escaping the container.

- Containers will only be located where approved by the engineer or regulatory agency.

- Waste storage areas shall be located, designed, and operated to prevent polluted runoff from leaving the waste storage area.

3.7.2 Washout Areas

Washout of applicators, containers, vehicles, and equipment for concrete, paint, and other materials shall be conducted in a designed washout area. There shall be no surface discharge of washout wastewaters from this area. To eliminate overflows during rainfall or after snowmelt all wash water shall be directed into a pit. This area shall be at least 100 feet from any stream, wetland, or other sensitive resource. The area shall be completely self-contained and clearly marked.

In addition, dumping of liquid wastes in storm sewers is prohibited. All wastes including hardened concrete waste from washouts shall be disposed of legally at an off-site location. At least once per week, all containers or pits used for washout should be inspected for structural integrity, adequate holding capacity, and to check for leaks or overflows. If any deficiencies are discovered, corrective action shall be taken immediately. Washout areas shall be emptied when levels reach ½ the height of the container or pit.

3.7.3 Transporter Practices

The Contractor shall instruct the transporters of soil and/or sediment of best management practices for the transportation of such soil (proper tarping of hauling dump bodies, removing loose material from dump body, etc.).

3.7.4 Spill Control Practices

The following practices shall be implemented during construction activities to mitigate spills of material and prevent their release to the waters of the State.

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

- All chemical and petroleum products stored on site shall be stored within an impermeable containment system free of gaps and cracks. Containment system must also be able to hold 110% of the volume of the largest container, or 10% of the total volume of all containers, depending on whichever is larger.

- All chemicals and petroleum products in containers less than 100 gallons shall be stored under a roofed area. Double-walled containers do not require roofing or containment systems.

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

- Spills will be cleaned up immediately after discovery.

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

4. POST-CONSTRUCTION STORMWATER MANAGEMENT

As discussed in Section 2.3, post-construction drainage structures have been designed in accordance with Sections 5(b)(2)(C)(i) and (ii) of the GP. As aforementioned, Appendix C contains all associated calculations and information in compliance with Section 5(b)(2)(C)(i) and (ii).

Due to the size and retention requirements of the site, infiltration basins were designed to capture and treat runoff from the developed Site. The basins will allow suspended sediment to be settled and captured before stormwater is discharged to the hydrodynamic separator. As the basins will have a loam surface following completion of construction activities, an infiltration rate of 0.5 inches per hour (in/hr) was used in drainage calculations, in accordance with the Manual. The basin's size and infiltration capacity maximize the retained volume of runoff and minimizes peak-flows to the POCs. The proposed basins are designed to completely drain within 48 hours following a storm event.

Post-construction stormwater controls will also include the installation of a flared end section and plunge pool to reduce velocity of surface flow into the surrounding wetlands. Due to the size of the Site, swales are to be installed on across the Site to direct runoff into the basin areas. These horizontal swales slope at a minimum of 1.0 percent and will dissipate the velocity of stormwater runoff, eliminating the potential for stormwater to erode or channel along the landscaped surface of the Site and creating a controlled conveyance of stormwater that will discharge to the basins. All swales will be underlain by a non-woven geotextile fabric to minimize erosion. These stormwater controls are depicted on Drawing C-8 & C-9.

5. INSPECTIONS AND MAINTENANCE AND RECORDS

This section of the SWPCP contains a summary of the required inspections to be performed during and following construction and until a *Notice of Termination* is submitted to the permittee by the CT DEEP. This section also describes the inspection logs/report forms and procedures that are required to be prepared to comply with the various *General Permit* requirements. It should be noted that the permittee and the site contractors retained by the permittee will be held responsible for the maintenance and integrity of all soil erosion and sediment controls during and after the construction activities are completed.

5.1 Plan Implementation Inspections

All inspections of the Site must be performed in a manner consistent with the requirements of Section 5(b)(4)(A) and (B) of the *General Permit* which shall include for each phase of construction (1) an initial inspection to be conducted within the first 90 days of the start of construction by a qualified SE&SC professional or Professional Engineer to ensure that the SWPCP is in compliance with the *General Permit* and that all the initial site control measures have been properly implemented and (2) follow-up routine inspections that will confirm that the site control measures comply with the requirements of the SWPCP until a *Notice of Termination* is submitted to the permittee by the CT DEEP. Based on the aforementioned timelines associated with the phasing for construction activities, an initial inspection shall be conducted within the first 30 days of the inspection with subsequent inspections taking place thereafter.

The personnel to conduct the above inspections must be qualified by the CT DEEP as someone who is not an employee of the permittee or registrant, and has no ownership interest of any kind in the project. In addition, the 'qualified' inspector shall be an individual possessing either (1) a professional license or certification by a professional organization recognized by the commissioner related to agronomy, civil engineering, landscape architecture, soil science, and two years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and commercial construction projects in accordance with the *Guidelines*; or (2) five years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and commercial construction projects in accordance with the Guidelines; or (3) certification by the Connecticut Department of Transportation (DOT). The inspector may be the same person that provided the Plan Review Certification required under Section 5(b)(11) of the *General Permit*.

5.2 Routine Inspections

The routine inspections must be conducted at least once per week and within 24-hours of the end of a storm event that generates a discharge. For storms that end on a weekend, holiday or other time after which normal working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms equal to or greater than 0.5 inches. For storms less than 0.5 inches, an inspection shall occur immediately upon the start of the subsequent normal working hours.

Where the Site has been temporarily stabilized, such inspections shall be conducted at least weekly until final stabilization has been achieved. The permittee shall also provide a suitable rain gauge at or in close proximity of the Site to document the rainfall amounts. In general, the qualified inspector shall inspect, at a minimum, the following items:

- Disturbed areas of the construction activity that have not been finally stabilized,
- all erosion and sedimentation controls,
- all structural control measures,
- all soil stockpile areas, and
- all washout areas and locations where vehicles enter or exit the Site.

These areas shall be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to the receiving waters. Locations where vehicles enter or exit the Site shall be inspected for evidence of off-site sediment tracking.

A written report summarizing the scope and results of each inspection shall be prepared and retained by the permittee as part of this SWPCP. A blank routine inspection log is provided in Appendix E for the use of the inspector. It contains the name and title of the person conducting the inspection, the date of the inspection, the weather conditions including the amount of rainfall observed on the rainfall gauge, major observations relating to the erosion and sedimentation controls and the implementation of this plan, a description of the stormwater discharge(s) from the Site and any recommended actions to be taken by the permittee or the contractor to improve the Site conditions. A statement at the bottom of the form is provided to indicate if the Site is either in compliance or out of compliance with the terms and conditions of the SWPCP.

The inspection log/report shall be signed by both the inspector and an authorized representative of the permittee in accordance with the requirements of “Certification of Documents” per Section

5(i) of the *General Permit* and shall be made and retained as part of the SWPCP for at least three years after the date of inspection.

Based on the results of the routine inspections, and if the Site is considered out of compliance with the SWPCP, all non-engineered corrective actions as defined in the *Guidelines* shall be implemented on-site within 24 hours and incorporated into a revised SWPCP within three calendar days following the inspection. All engineered corrective actions (as defined in the above referenced *Guidelines*) shall be implemented on-site within seven days and incorporated into a revised SWPCP within ten calendar days following the inspection, unless otherwise specified in the *Guidelines* or approved by the Commissioner of the CT DEEP. During the period when corrective actions are being developed and have not yet been fully implemented, interim measures shall be implemented to minimize the potential for the discharge of pollutants from the site.

5.3 Maintenance

Maintenance will be necessary throughout the project to mitigate potential soil erosion and sedimentation. Maintenance activities shall be performed on all aspects of the work as needed to maintain the soil erosion and sedimentation controls as defined herein and as added throughout the project due to needs as they arise. Maintenance will entail replacing or repairing the controls designated in this SWPCP to their original function. Maintenance may also include the installation of additional erosion control measures as needed to adequately mitigate potential erosion or sedimentation.

At a minimum, the following controls will require regular maintenance:

- Temporary sedimentation basins.
- Diversion ditches, berms, swales.
- Site entrance and exit anti-tracking controls.
- Silt fencing and hay bales.
- All checks and siltation barriers.

5.4 Post-Construction Inspections

Once all post-construction stormwater measures have been installed in accordance with the plans and cleaned of any construction sediment or debris, the registrant shall contact an independent third-party qualified soil erosion and sediment control professional and/or a qualified professional engineer, as appropriate, who will inspect the Site to confirm compliance with the post-construction stormwater measures. This person(s) shall not be an employee of the permittee and

shall have no ownership interest of any kind in the project. A report shall be prepared and certified in accordance with Sections 6(*a*) and (*b*) of the general permit to indicate compliance with this requirement on the Notice of Termination form.

The final stabilization inspection shall be conducted once the Site has been stabilized for at least one full growing season in the year following the end of construction. The registrant shall have the Site inspected by a qualified inspector to confirm final stabilization is maintained. The registrant shall indicate compliance with this requirement on the Notice of Termination form.

5.5 Reporting and Record Retention

Upon the completion of a weekly, pre-rainfall, post-rainfall, or post-construction inspection, a brief report shall be prepared detailing the scope of the inspection, the name and qualifications of the inspector(s), the date of the inspection, observations affecting the SWPCP, and corrective actions required to ensure proper operation of erosion and pollution control measures. Qualified personnel must sign this report.

Copies of blank Inspection Report Forms identified above are included in Appendix E. The completed records of inspection must be maintained as part of the plan for a period of at least five years.

The report must include a statement that the site is either in compliance or out of compliance with the terms and conditions of the SWPCP. Upon learning of a violation of a condition of this general permit, a contractor shall immediately take all reasonable action to determine the cause of such violation, correct and mitigate the results of such violation, prevent further such violation, and report in writing such violation and such corrective action to the commissioner within five days of the contractor's learning of such violation. Such information shall be filed in accordance with the certification requirements prescribed in Section 6(h) of the general permit.

The site contractor shall retain an updated copy of this plan at the Site from the date construction is initiated at the Site until the date construction at the Site is completed.

Upon completion of construction for site authorized by the *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities*, this plan shall be kept as an appendix to the SWPPP for a period of at least five years from the date of completion of construction.

6. CERTIFICATIONS

This section describes the necessary certifications for this plan. Refer to Appendix F for executed certifications.

6.1 Registrant Certification

The registrant and any other individual or individuals responsible for preparing the registration certifies to the following statement:

I hereby certify that I am making this certification in connection with a registration under such general permit, submitted to the commissioner by Gales Ferry Intermodal LLC for an activity located at 1761 Route 12, Gales Ferry, Connecticut and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the Site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(b)(8)(B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law.

6.2 Professional Engineer Certification

The professional engineer responsible for the preparation, planning and design of the Stormwater Pollution Control Plan and stormwater management systems shall provide the following certification.

I hereby certify that I am a professional engineer licensed in the State of Connecticut. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by Gales Ferry Intermodal LLC for an activity located at 1761 Route 12, Gales Ferry, Connecticut. I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the project or activity covered by this certification. I further certify, based on such review and on the standard of care for such projects, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, the Stormwater Quality

Manual, as amended, and the conditions of the general permit, and that the controls required for such Plan are appropriate for the Site. I further certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement in this certification may subject me to sanction by the Department and/or be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law.

6.3 Contractor Certification

The Plan shall include the following certification signed by each contractor and subcontractor identified in the Plan as described above:

I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the Site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including, but not limited to, the requirements of the SWPCP prepared for the Site.

The certification shall include the name and title of the person providing the signature; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the Site; and the date the certification is made. A blank certification statement to be signed by each individual employee of any Contractor performing duties related to stormwater, soil erosion, and sediment control as part of the project is included as Appendix E to this SWPCP.

6.4 Certification of Documents

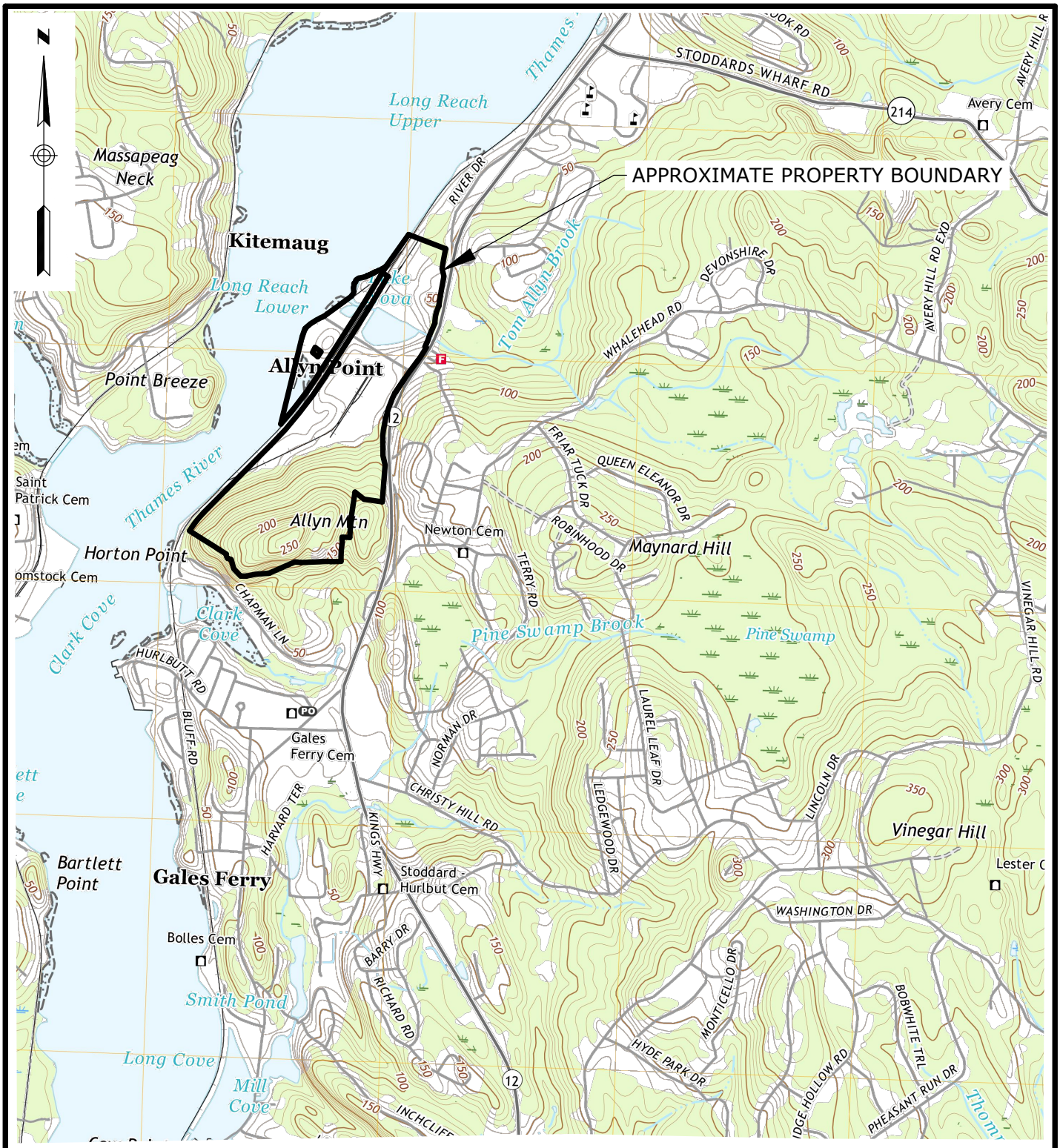
Unless otherwise specified in this general permit, any document, including but not limited to any notice, information or report, which is submitted to the commissioner under this general permit shall be signed by the permittee, or a duly authorized representative of the permittee, and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with section 22a-6 of the Connecticut General Statutes, pursuant to section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute.

7. TERMINATION REQUIREMENTS

At the completion of the construction project, a Notice of Termination (See Appendix G) must be filed with the DEEP. The project shall be considered complete after all post-construction measures are installed, cleaned and functioning and the Site has been stabilized for at least three months following the cessation of construction activities. The Site is considered stabilized when there is no active erosion or sedimentation present and no disturbed areas remain exposed for all phases. A post-construction inspection will be completed by a qualified professional to inspect the Site to confirm compliance with the post-construction stormwater measures. Once the Site has been stabilized for at least three months, a qualified inspector shall inspect the Site to confirm final stabilization.

FIGURES



MAP REFERENCE:

SECTION OF THE USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP FOR UNCASVILLE, CT; MAP VERSION DATE 2021.

Loureiro
Engineering • Construction • EH&S • Energy
Waste • Facility Services • Laboratory

Loureiro Engineering Associates, Inc.
100 Fort Hill Road • Groton, Connecticut 06340
Phone: 860-448-0400 • Fax: 860-448-0899
An Employee Owned Company • www.Loureiro.com

DRAINAGE REPORT
ATTACHMENT A
SITE LOCATION MAP

INDUSTRIAL SITE PREPARATION PLAN
1761 ROUTE 12, GALES FERRY, CT

PREPARED FOR:

GALES FERRY INTERMODAL LLC
549 SOUTH STREET, QUINCY, MA

SCALE	COMM. NO.	DATE
1" = 2,000'±	045JC2.06	9/28/2023

1

Natural Diversity Data Base Areas

LEDYARD, CT

June 2024

State and Federal Listed Species

Critical Habitat

Town Boundary

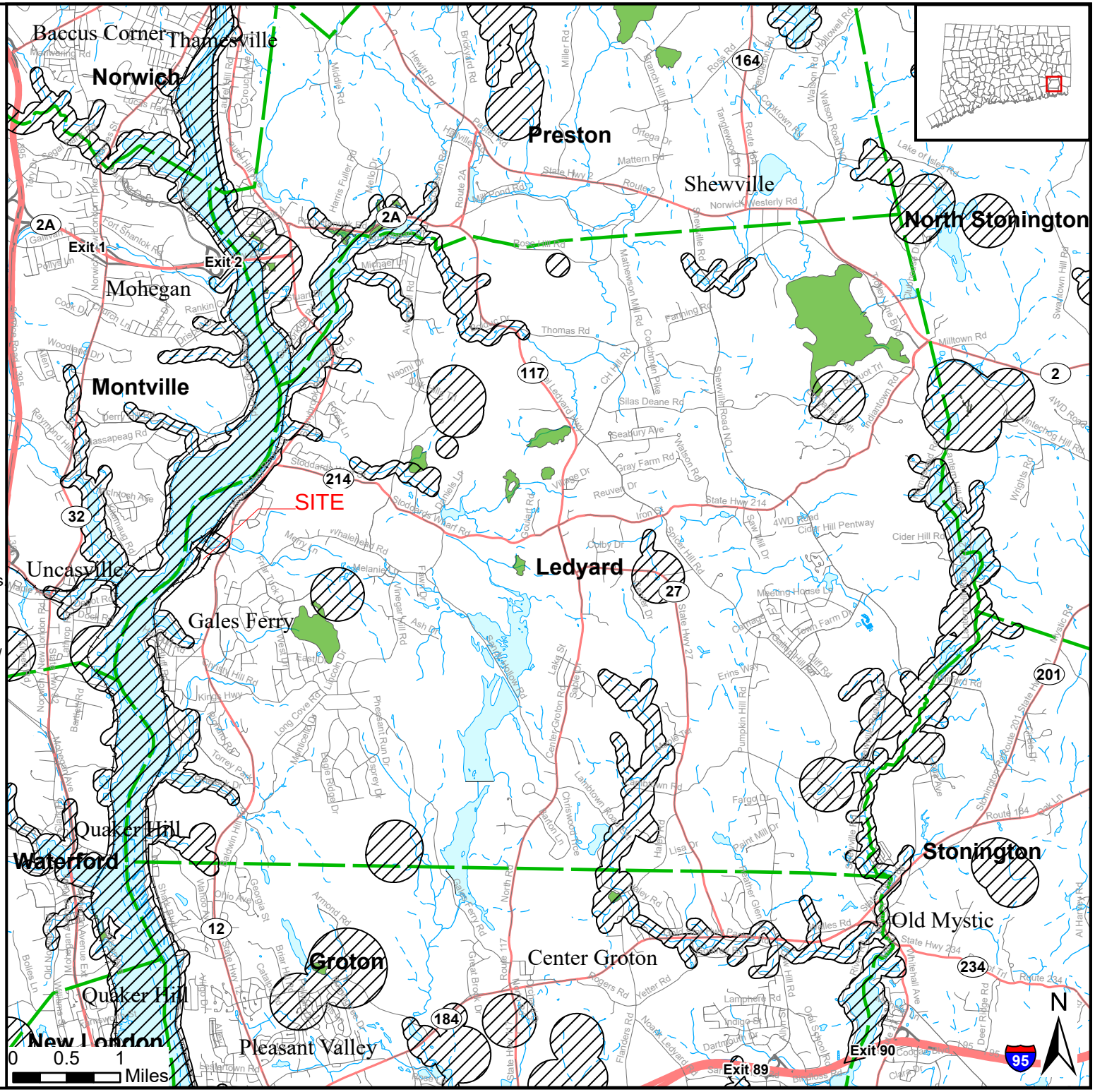
NOTE: This map shows known locations of State and Federal Listed Species and Critical Habitats. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDB) from a variety of data sources . Exact locations of species have been buffered to produce the generalized locations.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas If the project is within a hatched area there may be a potential conflict with a listed species. For more information, use DEEP ezFile https://filings.deep.ct.gov/DEEPPortal/ to submit a Request for Natural Diversity Data Base State Listed Species Review or Site Assessment. More detailed instructions are provided along with the request form on our website. https://portal.ct.gov/deep-nddbrequest

Use the CTECO Interactive Map Viewers at http://cteco.uconn.edu to more precisely search for and locate a site and to view aerial imagery with NDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St, Hartford, CT 06106
email: deep.nddbrequest@ct.gov
Phone: (860) 424-3011

Connecticut Department of Energy & Environmental Protection



DRAWINGS

MAP REFERENCES

1.) "RIGHT OF WAY AND TRACK MAP OPERATED BY THE NORWICH AND WORCESTER R.R. CO. OPERATED BY THE NEW YORK NEW HAVEN AND HARTFORD R.R. CO. FROM WORCESTER TO GROTON STATION 3379+20 TO STATION 3405+60 TOWN OF LEDYARD, STATE OF CONN." SCALE 1"=50' DATE: JUNE 30, 1915 REVISED THROUGH OCTOBER 9, 1947. OFFICE OF VALUATION ENGINEER, BOSTON MASS. MAP NO. V.5063 / 129.

2.) "RIGHT OF WAY AND TRACK MAP OPERATED BY THE NORWICH AND WORCESTER R.R. CO. OPERATED BY THE NEW YORK NEW HAVEN AND HARTFORD R.R. CO. FROM WORCESTER TO GROTON STATION 3405+60 TO STATION 32+00. TOWN OF LEDYARD, STATE OF CONN." SCALE 1"=50' DATE: JUNE 30, 1915, OFFICE OF VALUATION ENGINEER, BOSTON MASS. MAP NO. V.5063 / 130.

3.) "RIGHT OF WAY AND TRACK MAP OPERATED BY THE NORWICH AND WORCESTER R.R. CO. OPERATED BY THE NEW YORK NEW HAVEN AND HARTFORD R.R. CO. FROM WORCESTER TO GROTON STATION 32+00 TO STATION 58+40 TOWN OF LEDYARD, STATE OF CONN." SCALE 1"=50' DATE: JUNE 30, 1915 REVISED THROUGH APRIL 11, 1951, OFFICE OF VALUATION ENGINEER, BOSTON MASS. MAP NO. V.5063 / 131.

4.) "RIGHT OF WAY AND TRACK MAP OPERATED BY THE NORWICH AND WORCESTER R.R. CO. OPERATED BY THE NEW YORK NEW HAVEN AND HARTFORD R.R. CO. FROM WORCESTER TO GROTON STATION 58+40 TO STATION 84+80 TOWN OF LEDYARD, STATE OF CONN." SCALE 1"=50' DATE: JUNE 30, 1915 REVISED THROUGH APRIL 11, 1951, OFFICE OF VALUATION ENGINEER, BOSTON MASS. MAP NO. V.5063 / 132.

MAP REFERENCES–CONTINUED

5.) "NORWICH AND WORCESTER RAILROAD REAL ESTATE & RIGHT OF WAY DEPARTMENT LAND IN LEDYARD, CONN. TO BE CONVEYED TO THE DOW CHEMICAL COMPANY" SCALE 1"=200' DATE: SEPTEMBER 1950 REVISED THROUGH OCTOBER 1950. ON FILE AS MAP NO. 8A.

6.) "LOCATION OF THE RIGHT OF WAY OF THE CONNECTICUT LIGHT & POWER COMPANY ACROSS THE PROPERTY OF THE DOW CHEMICAL COMPANY, TOWN OF LEDYARD, COUNTY OF NEW LONDON, STATE OF CONNECTICUT" SCALE 1"=200' DATE: APRIL 17, 1951.

7.) "MAP OF PROPERTY OWNED BY THE DOW CHEMICAL COMPANY LOCATED AT ALLYN'S POINT ON THE WEST SIDE OF ROUTE 12 AND EAST OF THE NEW YORK NEW HAVEN & HARTFORD RAILROAD CO. LEDYARD, CONN." SCALE: 1"=100' DATE: JULY 1952 REVISED AUGUST 1953, G.L. BILDERBECK CONSULTING ENGINEERS, NEW LONDON, CONN.

8.) "MAP SHOWING PROPERTY OWNED BY DOW CHEMICAL COMPANY, ALLYN'S POINT, LEDYARD, CONN." SCALE: 1"=100' DATE : DECEMBER 1953, G.L. BILDERBECK, CONSULTING ENGINEERS, NEW LONDON, CONN, ON FILE AS MAP NO. 43A.

MAP REFERENCES–CONTINUED

9.) "CONNECTICUT STATE HIGHWAY DEPARTMENT RIGHT OF WAY MAP TOWN OF LEDYARD NORWICH–GROTON ROAD FROM ALLYN'S BROOK NORTHERLY TO LEDARD–PRESTON TOWN LINE" SCALE 1"=40' DATE: NOVEMBER 5, 1957, SHEETS 1 THROUGH 3 OF 9 PROJECT NUMBER: 71–16. THESE MAPS SUPERSEDE PROJECT 71–05. SHEET 3 REVISED AUGUST 25, 1967.

10.) "CONNECTICUT STATE HIGHWAY DEPARTMENT RIGHT OF WAY MAP TOWN OF LEDYARD GROTON–NORWICH ROAD GALES FERRY ROAD TO ALLYN'S BROOK" SCALE 1"=40' DATE: NOVEMBER 5, 1957, SHEETS 1 THROUGH 4 OF 4. PROJECT NUMBER 71–15. THESE MAPS SUPERSEDE PROJECT 71–04. SHEET 1 REVISED THROUGH MAY 17, 2004.

11.) "PLAN SHOWING LANDS NOW AND FORMALLY OF H. WINTHROP HURLBUTT LEDYARD, CONNECTICUT" SCALE 1"=100' DATE: OCTOBER 1964, GEORGE H. DIETER, LAND SURVEYOR, ON FILE AS MAP # 226.

12.) "PLAN OF PROPERTY TO BE CONVEYED TO THE TOWN OF LEDYARD BY THE DOW CHEMICAL COMPANY, TOWN OF LEDYARD, CONN." SCALE: 1"=100' DATE: APRIL 1972, CHANDLER, PALMER & KING, NORWICH, CONN.

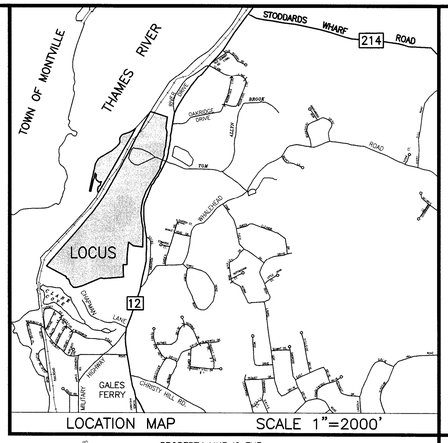
MAP REFERENCES–CONTINUED

13.) "PLAN SHOWING PARCELS OF LAND WITH BUILDINGS PROPERTY OF JAMES L. LEWIS AND ALICE L. LEWIS, PENTWAY AT WEST END CHAPMAN LANE LEDYARD, CONNECTICUT" SCALE 1"=20' DATE JUNE 1976, GEORGE H. DIETER, LAND SURVEYOR, ON FILE AS MAP # 672.

14.) "TOPOGRAPHICAL PLAN, PLAN OF A PORTION OF DOW CHEMICAL CO. ALLYN'S POINT PLANT GALES FERRY, CONN." SCALE: 1"=40' DATE: JULY 9, 1984 REVISIONS THROUGH AUGUST 28, 1984, CHANDLER, PALMER & KING, NORWICH, CONN.

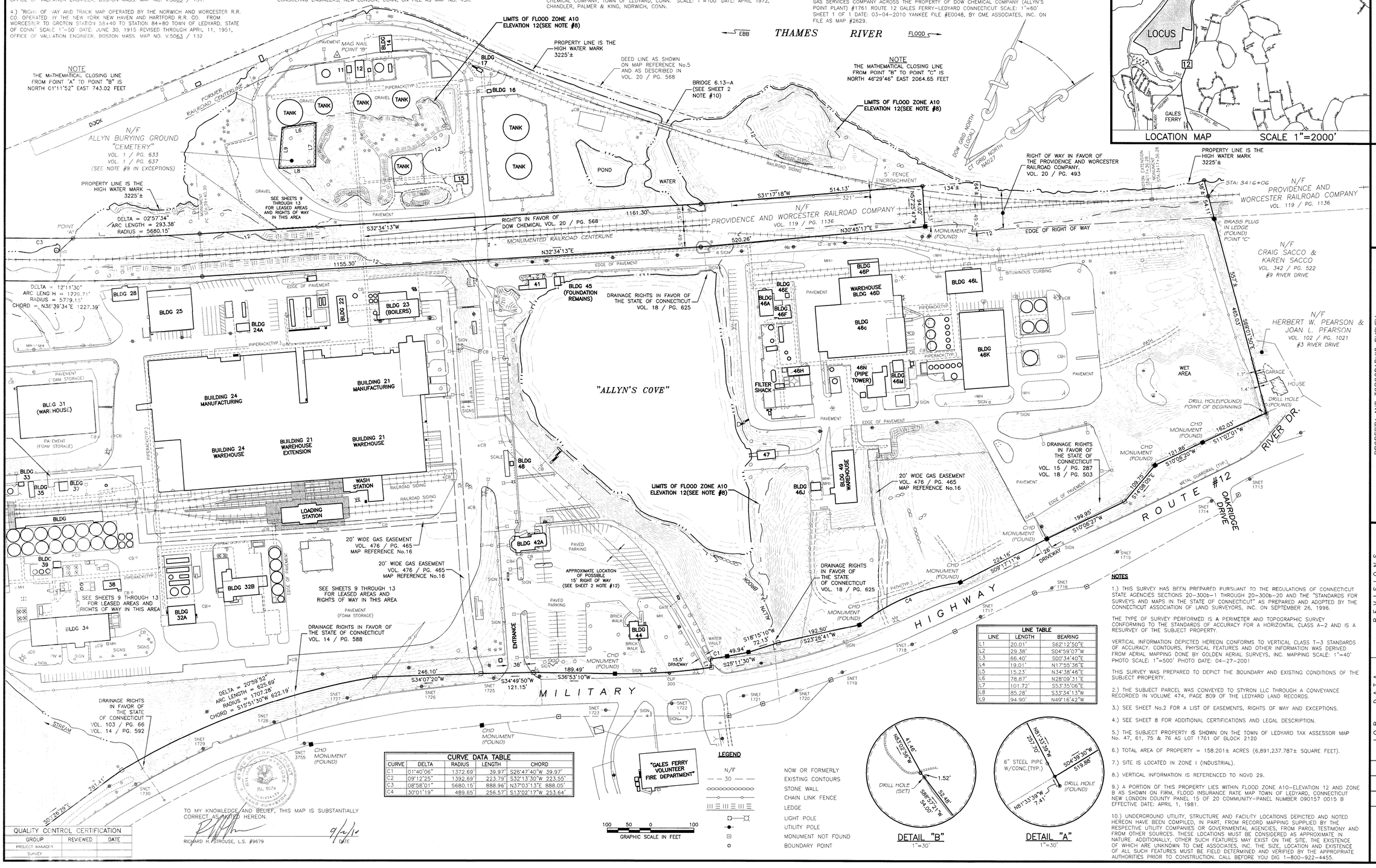
15.) "MONUMENTED PROPERTY SURVEY MAP DEPICTING LAND OF GALES FERRY MARINA, INC. A PORTION OF LAND OF JAMES L. LEWIS AND LUCILLE A LUPINACCI, CHAPMAN LANE, GALES FERRY, LEDYARD, CONNECTICUT" SCALE: 1"=40' DATE: MARCH 26, 1994 REVISED APRIL 19, 1994, DAVID L. STEIN, LAND SURVEYOR, WESTBROOK, CONNECTICUT, ON FILE AS MAP #1753.

16.) COMPILATION PLAN MAP SHOWING EASEMENT AREA TO BE GRANTED TO THE YANKEE GAS SERVICES COMPANY ACROSS THE PROPERTY OF DOW CHEMICAL COMPANY (ALLYN'S POINT PLANT) #1761 ROUTE 12 GALES FERRY–LEDYARD CONNECTICUT SCALE: 1"=60' SHEET 1 OF 1 DATE: 03–04–2010 YANKEE FILE #E0048, BY CME ASSOCIATES, INC. ON FILE AS MAP #2629.



CME Associates, Inc.
CME
32 Crabtree Lane, Woodstock, CT 06281
55 Main Street, Suite 340 Norwich, CT 06360
333 East River Drive, East Hartford, CT 06108
50 Elm Street, Southbridge, MA 01550
Phone 888-291-3227
www.cmeengineering.com

PROPERTY AND TOPOGRAPHIC SURVEY
PREPARED FOR
STYRON LLC
"ALLYN'S POINT PLANT"
#1737 & 1761 MILITARY HIGHWAY – ROUTE 12, GALES FERRY
LEDYARD, CONNECTICUT



CURVE DATA TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C1	01°40'06"	1372.69'	39.97'	S26°47'40"W 39.97'
C2	09°12'25"	1392.69'	223.79'	S32°13'30"W 223.55'
C3	08°58'01"	5680.15'	888.96'	N37°03'13"E 888.05'
C4	30°01'19"	489.65'	256.57'	S13°02'17"W 253.64'

LINE TABLE		
LINE	LENGTH	BEARING
L1	20.01'	S62°12'50"E
L2	29.38'	S04°59'07"W
L3	66.40'	S00°34'40"E
L4	19.01'	N17°55'36"E
L5	15.23'	N34°38'46"E
L6	78.87'	N28°09'31"E
L7	101.72'	S53°35'06"E
L8	85.28'	S33°34'13"W
L9	94.90'	N49°16'42"W

DETAIL "B"
1"=30'

DETAIL "A"
1"=30'

LEGEND

N/F	NOW OR FORMERLY
30	EXISTING CONTOURS
	STONE WALL
	CHAIN LINK FENCE
	LEDGE
	LIGHT POLE
	UTILITY POLE
	MONUMENT NOT FOUND
	BOUNDARY POINT

100 50 0 100
GRAPHIC SCALE IN FEET

NOTES

1.) THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20–300b–1 THROUGH 20–300b–20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS PREPARED AND ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996.

THE TYPE OF SURVEY PERFORMED IS A PERIMETER AND TOPOGRAPHIC SURVEY CONFORMING TO THE STANDARDS OF ACCURACY FOR A HORIZONTAL CLASS A–2 AND IS A RESURVEY OF THE SUBJECT PROPERTY.

VERTICAL INFORMATION DEPICTED HEREON CONFORMS TO VERTICAL CLASS T–3 STANDARDS OF ACCURACY. CONTOURS, PHYSICAL FEATURES AND OTHER INFORMATION WAS DERIVED FROM AERIAL MAPPING DONE BY GOLDEN AERIAL SURVEYS, INC. MAPPING SCALE: 1"=40' PHOTO SCALE: 1"=500' PHOTO DATE: 04–27–2001

THIS SURVEY WAS PREPARED TO DEPICT THE BOUNDARY AND EXISTING CONDITIONS OF THE SUBJECT PROPERTY.

2.) THE SUBJECT PARCEL WAS CONVEYED TO STYRON LLC THROUGH A CONVEYANCE RECORDED IN VOLUME 474, PAGE 809 OF THE LEDYARD LAND RECORDS.

3.) SEE SHEET No.2 FOR A LIST OF EASEMENTS, RIGHTS OF WAY AND EXCEPTIONS.

4.) SEE SHEET 8 FOR ADDITIONAL CERTIFICATIONS AND LEGAL DESCRIPTION.

5.) THE SUBJECT PROPERTY IS SHOWN ON THE TOWN OF LEDYARD TAX ASSESSOR MAP No. 47, 61, 75 & 76 AS LOT 1761 OF BLOCK 2120

6.) TOTAL AREA OF PROPERTY = 158.201± ACRES (6,891,237.787± SQUARE FEET).

7.) SITE IS LOCATED IN ZONE I (INDUSTRIAL).

8.) VERTICAL INFORMATION IS REFERENCED TO NGVD 29.

9.) A PORTION OF THIS PROPERTY LIES WITHIN FLOOD ZONE A10–ELEVATION 12 AND ZONE B AS SHOWN ON FIRM, FLOOD INSURANCE RATE MAP TOWN OF LEDYARD, CONNECTICUT NEW LONDON COUNTY PANEL 15 OF 20 COMMUNITY–PANEL NUMBER 090157 0015 B EFFECTIVE DATE: APRIL 1, 1981

10.) UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED AND NOTED HEREON HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING SUPPLIED BY THE RESPECTIVE UTILITY COMPANIES OR GOVERNMENTAL AGENCIES, FROM PAROL TESTIMONY AND FROM OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE. THE EXISTENCE OF WHICH ARE UNKNOWN TO CME ASSOCIATES, INC. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1–800–922–4455.

TO MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

RICHARD H. PSTROUSE, L.S. #9679 — DATE 9/2/10

QUALITY CONTROL CERTIFICATION		
GROUP	REVIEWED	DATE
PROJECT MANAGER		
SURVEY		

REVISIONS			
NO.	DATE	DESCRIPTION	BY

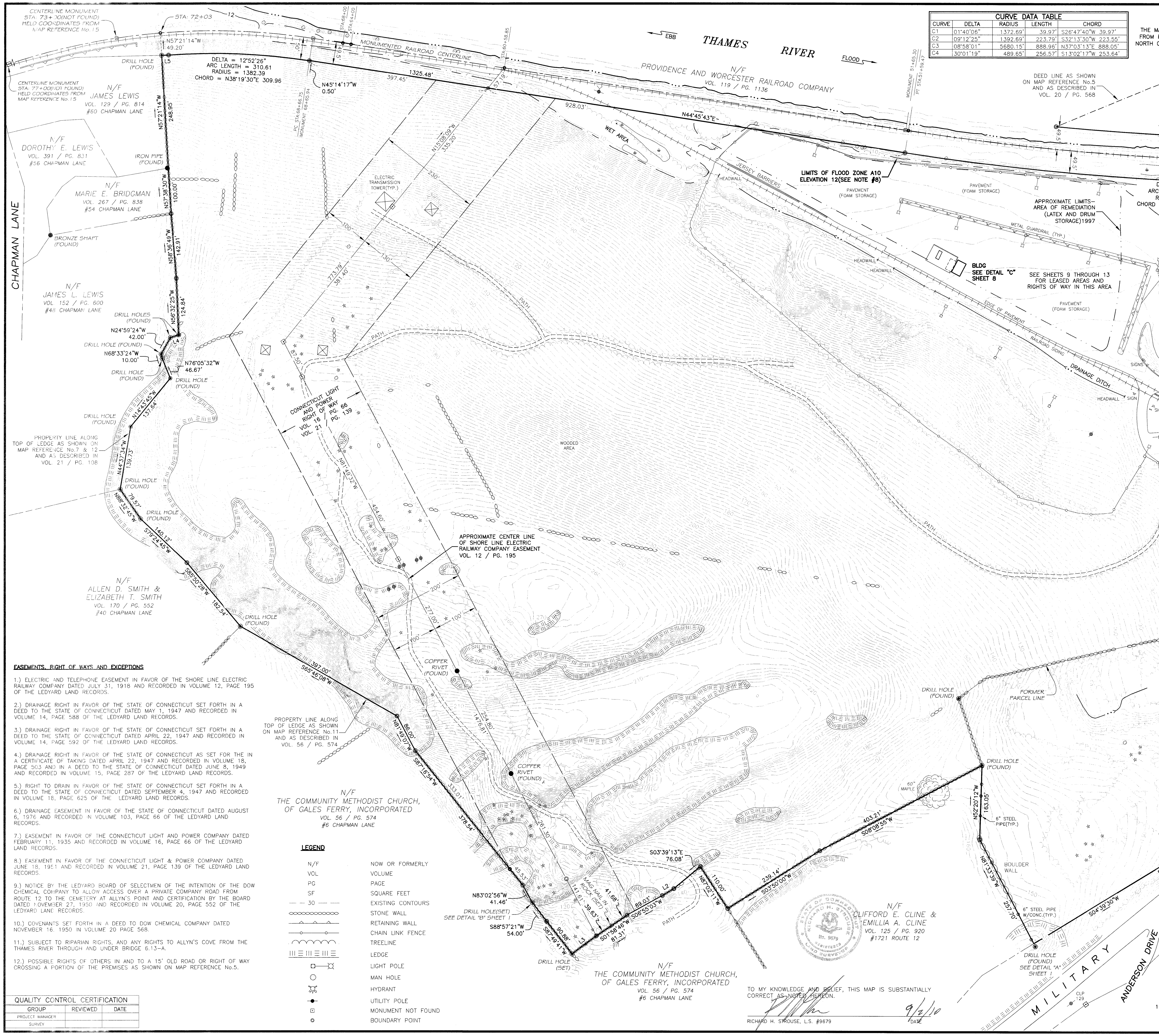
JOB DATA	
PROJECT	2010063 DOW
BOOK NO.	4173
DESIGNED	CB
DRAWN	RHS
CHECKED	
COGO FILE	2010063 CB 4-21-2010
FILE	2010063 BNDL.dwg

DATE: SEPT. 2, 2010

SCALE: 1" = 100'

PROJECT: #2010063

SHEET 1 OF 13



N/F
THE COMMUNITY METHODIST CHURCH,
OF GALES FERRY, INCORPORATED
VOL. 56 / PG. 574
#6 CHAPMAN LANE

N/F
THE COMMUNITY METHODIST CHURCH,
OF GALES FERRY, INCORPORATED
VOL. 56 / PG. 574
#6 CHAPMAN LANE

CURVE DATA TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C1	01°40'06"	1372.69'	39.97'	S26°47'40"W 39.97'
C2	09°12'25"	1392.69'	223.79'	S32°13'30"W 223.55'
C3	08°58'01"	5680.15'	888.96'	N37°03'13"E 888.05'
C4	30°01'19"	489.65'	256.57'	S13°02'17"W 253.64'

EASEMENTS, RIGHT OF WAYS AND EXCEPTIONS

1.) ELECTRIC AND TELEPHONE EASEMENT IN FAVOR OF THE SHORE LINE ELECTRIC RAILWAY COMPANY DATED JULY 31, 1918 AND RECORDED IN VOLUME 12, PAGE 195 OF THE LEDYARD LAND RECORDS.

2.) DRAINAGE RIGHT IN FAVOR OF THE STATE OF CONNECTICUT SET FORTH IN A DEED TO THE STATE OF CONNECTICUT DATED MAY 1, 1947 AND RECORDED IN VOLUME 14, PAGE 588 OF THE LEDYARD LAND RECORDS.

3.) DRAINAGE RIGHT IN FAVOR OF THE STATE OF CONNECTICUT SET FORTH IN A DEED TO THE STATE OF CONNECTICUT DATED APRIL 22, 1947 AND RECORDED IN VOLUME 14, PAGE 592 OF THE LEDYARD LAND RECORDS.

4.) DRAINAGE RIGHT IN FAVOR OF THE STATE OF CONNECTICUT AS SET FOR THE IN A CERTIFICATE OF TAKING DATED APRIL 22, 1947 AND RECORDED IN VOLUME 18, PAGE 503 AND IN A DEED TO THE STATE OF CONNECTICUT DATED JUNE 8, 1949 AND RECORDED IN VOLUME 15, PAGE 287 OF THE LEDYARD LAND RECORDS.

5.) RIGHT TO DRAIN IN FAVOR OF THE STATE OF CONNECTICUT SET FORTH IN A DEED TO THE STATE OF CONNECTICUT DATED SEPTEMBER 4, 1947 AND RECORDED IN VOLUME 18, PAGE 625 OF THE LEDYARD LAND RECORDS.

6.) DRAINAGE EASEMENT IN FAVOR OF THE STATE OF CONNECTICUT DATED AUGUST 6, 1976 AND RECORDED IN VOLUME 103, PAGE 66 OF THE LEDYARD LAND RECORDS.

7.) EASEMENT IN FAVOR OF THE CONNECTICUT LIGHT AND POWER COMPANY DATED FEBRUARY 11, 1935 AND RECORDED IN VOLUME 16, PAGE 66 OF THE LEDYARD LAND RECORDS.

8.) EASEMENT IN FAVOR OF THE CONNECTICUT LIGHT & POWER COMPANY DATED JUNE 18, 1951 AND RECORDED IN VOLUME 21, PAGE 139 OF THE LEDYARD LAND RECORDS.

9.) NOTICE BY THE LEDYARD BOARD OF SELECTMEN OF THE INTENTION OF THE DOW CHEMICAL COMPANY TO ALLOW ACCESS OVER A PRIVATE COMPANY ROAD FROM ROUTE 12 TO THE CEMETERY AT ALLYN'S POINT AND CERTIFICATION BY THE BOARD DATED NOVEMBER 27, 1950 AND RECORDED IN VOLUME 20, PAGE 552 OF THE LEDYARD LAND RECORDS.

10.) COVENANTS SET FORTH IN A DEED TO DOW CHEMICAL COMPANY DATED NOVEMBER 16, 1950 IN VOLUME 20 PAGE 568.

11.) SUBJECT TO RIPARIAN RIGHTS, AND ANY RIGHTS TO ALLYN'S COVE FROM THE THAMES RIVER THROUGH AND UNDER BRIDGE 6.13-A.

12.) POSSIBLE RIGHTS OF OTHERS IN AND TO A 15' OLD ROAD OR RIGHT OF WAY CROSSING A PORTION OF THE PREMISES AS SHOWN ON MAP REFERENCE No.5.

LEGEND

N/F	NOW OR FORMERLY
VOL	VOLUME
PG	PAGE
SF	SQUARE FEET
— — 30 — —	EXISTING CONTOURS
(symbol)	STONE WALL
(symbol)	RETAINING WALL
(symbol)	CHAIN LINK FENCE
(symbol)	TREELINE
(symbol)	LEDGE
(symbol)	LIGHT POLE
(symbol)	MAN HOLE
(symbol)	HYDRANT
(symbol)	UTILITY POLE
(symbol)	MONUMENT NOT FOUND
(symbol)	BOUNDARY POINT

QUALITY CONTROL CERTIFICATION		
GROUP	REVIEWED	DATE
PROJECT MANAGER		
SURVEY		

TO MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

RICHARD H. STROUSE, L.S. #9879 — 9/2/10 — DATE

LINE TABLE		
LINE	LENGTH	BEARING
L1	20.01'	S62°12'50"E
L2	29.38'	S04°59'07"W
L3	66.40'	S00°34'40"E
L4	19.01'	N17°55'36"E
L5	7.16'	N34°38'46"E

CME Associates, Inc.
32 Crabtree Lane, Woodstock, CT 06281
55 Main Street, Suite 340 Norwich, CT 06360
333 East River Drive, East Hartford, CT 06108
50 Elm Street, Southbridge, MA 01550
Phone 888-291-3227
www.cmeengineering.com

PROPERTY AND TOPOGRAPHIC SURVEY
PREPARED FOR
STYRON LLC
"ALLYN'S POINT PLANT"
#1737 & 1761 MILITARY HIGHWAY – ROUTE 12, GALES FERRY
LEDYARD, CONNECTICUT

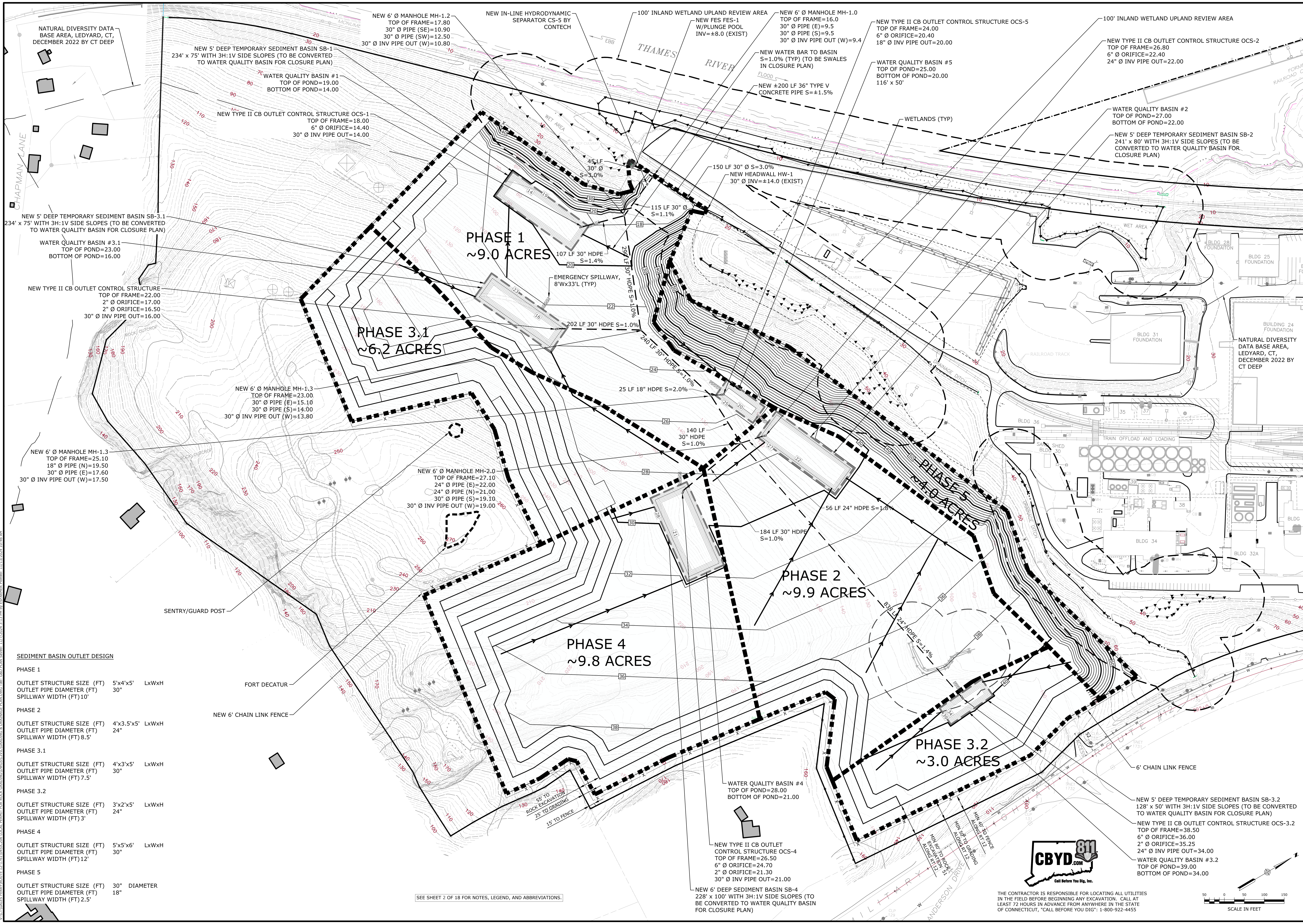
REVISIONS			
NO.	DATE	DESCRIPTION	BY

JOB DATA	
PROJECT	2010063 DOW
BOOK NO.	4173
DESIGNED	
DRAWN	CB
CHECKED	RHS
COGO FILE	2010063 CB 4-21-2010
FILE	2010063 BND.dwg

DATE: SEPT. 2, 2010

SCALE: 1" = 100'

PROJECT: #2010063


NATURAL DIVERSITY DATA BASE AREA, LEDYARD, CT, DECEMBER 2022 BY CT DEEP
NEW 5' DEEP TEMPORARY SEDIMENT BASIN SB-1 234' x 75' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
WATER QUALITY BASIN #1 TOP OF POND=19.00 BOTTOM OF POND=14.00
NEW TYPE II CB OUTLET CONTROL STRUCTURE OCS-1 TOP OF FRAME=18.00 6" Ø ORIFICE=14.40 30" Ø INV PIPE OUT=14.00
NEW 6' Ø MANHOLE MH-1.2 TOP OF FRAME=17.80 30" Ø PIPE (SE)=10.90 30" Ø PIPE (SW)=12.50 30" Ø INV PIPE OUT (W)=10.80
NEW IN-LINE HYDRODYNAMIC SEPARATOR CS-5 BY CONTECH
100' INLAND WETLAND UPLAND REVIEW AREA
NEW FES FES-1 W/PLUNGE POOL INV=±8.0 (EXIST)
NEW 6' Ø MANHOLE MH-1.0 TOP OF FRAME=16.0 30" Ø PIPE (E)=9.5 30" Ø PIPE (S)=9.5 30" Ø INV PIPE OUT (W)=9.4
NEW WATER BAR TO BASIN S=1.0% (TYP) (TO BE SWALES IN CLOSURE PLAN)
NEW ±200 LF 36" TYPE V CONCRETE PIPE S=±1.5%
NEW TYPE II CB OUTLET CONTROL STRUCTURE OCS-5 TOP OF FRAME=24.00 6" Ø ORIFICE=20.40 18" Ø INV PIPE OUT=20.00
WATER QUALITY BASIN #5 TOP OF POND=25.00 BOTTOM OF POND=20.00 116' x 50'
100' INLAND WETLAND UPLAND REVIEW AREA
NEW TYPE II CB OUTLET CONTROL STRUCTURE OCS-2 TOP OF FRAME=26.80 6" Ø ORIFICE=22.40 24" Ø INV PIPE OUT=22.00
WETLANDS (TYP)
WATER QUALITY BASIN #2 TOP OF POND=27.00 BOTTOM OF POND=22.00
NEW 5' DEEP TEMPORARY SEDIMENT BASIN SB-2 241' x 80' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
THAMES RIVER
45 LF 30" Ø S=3.0%
150 LF 30" Ø S=3.0%
NEW HEADWALL HW-1 30" Ø INV=±14.0 (EXIST)
115 LF 30" Ø S=1.1%
NEW 5' DEEP TEMPORARY SEDIMENT BASIN SB-3.1 234' x 75' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
WATER QUALITY BASIN #3.1 TOP OF POND=23.00 BOTTOM OF POND=16.00
PHASE 1 ~9.0 ACRES
107 LF 30" HDPE S=1.4%
291 LF 30" HDPE S=1.0%
EMERGENCY SPILLWAY, 8'Wx33'L (TYP)
NEW TYPE II CB OUTLET CONTROL STRUCTURE TOP OF FRAME=22.00 2" Ø ORIFICE=17.00 2" Ø ORIFICE=16.50 30" Ø INV PIPE OUT=16.00
202 LF 30" HDPE S=1.0%
PHASE 3.1 ~6.2 ACRES
240 LF 30" HDPE S=1.0%
NEW 6' Ø MANHOLE MH-1.3 TOP OF FRAME=23.00 30" Ø PIPE (E)=15.10 30" Ø PIPE (S)=14.00 30" Ø INV PIPE OUT (W)=13.80
25 LF 18" HDPE S=2.0%
140 LF 30" HDPE S=1.0%
NEW 6' Ø MANHOLE MH-1.3 TOP OF FRAME=25.10 18" Ø PIPE (N)=19.50 30" Ø PIPE (E)=17.60 30" Ø INV PIPE OUT (W)=17.50
NEW 6' Ø MANHOLE MH-2.0 TOP OF FRAME=27.10 24" Ø PIPE (E)=22.00 24" Ø PIPE (N)=21.00 30" Ø PIPE (S)=19.10 30" Ø INV PIPE OUT (W)=19.00
PHASE 5 ~4.0 ACRES
56 LF 24" HDPE S=1.8%
184 LF 30" HDPE S=1.0%
PHASE 2 ~9.9 ACRES
838 LF 24" HDPE S=1.4%
NATURAL DIVERSITY DATA BASE AREA, LEDYARD, CT, DECEMBER 2022 BY CT DEEP
BLDG 28 FOUNDATION
BLDG 25 FOUNDATION
BLDG 31 FOUNDATION
BUILDING 24 FOUNDATION
RAILROAD TRACK
DRAINAGE DITCH
TRAIN OFFLOAD AND LOADING
BLDG 36
BLDG 34
BLDG 32A
WET AREA
SENTRY/GUARD POST
PHASE 4 ~9.8 ACRES
FORT DECATUR
NEW 6' CHAIN LINK FENCE
PHASE 3.2 ~3.0 ACRES
6' CHAIN LINK FENCE
WATER QUALITY BASIN #4 TOP OF POND=28.00 BOTTOM OF POND=21.00
NEW 5' DEEP TEMPORARY SEDIMENT BASIN SB-3.2 128' x 50' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
NEW TYPE II CB OUTLET CONTROL STRUCTURE OCS-3.2 TOP OF FRAME=38.50 6" Ø ORIFICE=36.00 2" Ø ORIFICE=35.25 24" Ø INV PIPE OUT=34.00
WATER QUALITY BASIN #3.2 TOP OF POND=39.00 BOTTOM OF POND=34.00
NEW TYPE II CB OUTLET CONTROL STRUCTURE OCS-4 TOP OF FRAME=26.50 6" Ø ORIFICE=24.70 2" Ø ORIFICE=21.30 30" Ø INV PIPE OUT=21.00
NEW 6' DEEP SEDIMENT BASIN SB-4 228' x 100' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
55' TO ROCK EXCAVATION
25' TO GRADING
15' TO FENCE
CHAPMAN LANE
ANDERSON DRIVE
SCALE IN FEET

SEDIMENT BASIN OUTLET DESIGN

PHASE 1

OUTLET STRUCTURE SIZE (FT) 5'x4'x5' LxWxH
OUTLET PIPE DIAMETER (FT) 30"
SPILLWAY WIDTH (FT) 10'

PHASE 2

OUTLET STRUCTURE SIZE (FT) 4'x3.5'x5' LxWxH
OUTLET PIPE DIAMETER (FT) 24"
SPILLWAY WIDTH (FT) 8.5'

PHASE 3.1

OUTLET STRUCTURE SIZE (FT) 4'x3'x5' LxWxH
OUTLET PIPE DIAMETER (FT) 30"
SPILLWAY WIDTH (FT) 7.5'

PHASE 3.2

OUTLET STRUCTURE SIZE (FT) 3'x2'x5' LxWxH
OUTLET PIPE DIAMETER (FT) 24"
SPILLWAY WIDTH (FT) 3'

PHASE 4

OUTLET STRUCTURE SIZE (FT) 5'x5'x6' LxWxH
OUTLET PIPE DIAMETER (FT) 30"
SPILLWAY WIDTH (FT) 12'

PHASE 5

OUTLET STRUCTURE SIZE (FT) 30" DIAMETER
OUTLET PIPE DIAMETER (FT) 18"
SPILLWAY WIDTH (FT) 2.5'

SEE SHEET 2 OF 18 FOR NOTES, LEGEND, AND ABBREVIATIONS.

CBYD 811 Call Before You Dig, Inc.

THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES IN THE FIELD BEFORE BEGINNING ANY EXCAVATION. CALL AT LEAST 72 HOURS IN ADVANCE FROM ANYWHERE IN THE STATE OF CONNECTICUT, "CALL BEFORE YOU DIG": 1-800-922-4455

REV.	DESCRIPTION OF REVISION	DATE	APPR.
1	PER COMMENTS AND COORDINATION WITH APPLICANT	09/25/2024	GFA
2	PER COMMENTS	11/13/2024	GFA

Loureiro Engineering Associates, Inc.

SCALE	COMM. NO.	DRAWN BY	DATE	APPROVED BY	DATE
1"=100'	0453C2.06	ESF	03/28/2024	SRM	03/28/2024

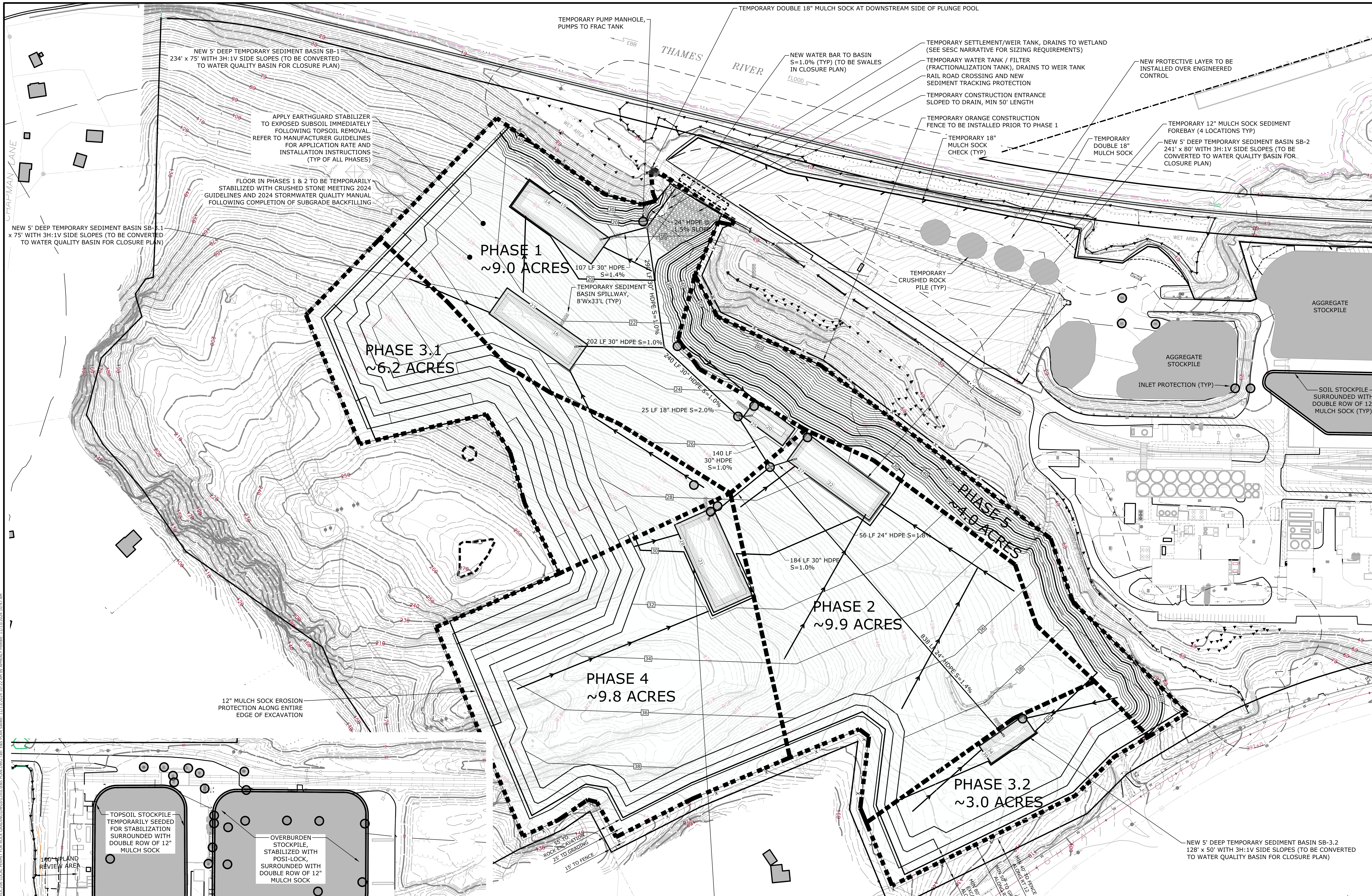
INDUSTRIAL SITE PREPARATION PLAN: GRADING AND DRAINAGE PLAN

GALES FERRY INTERMODAL
1737 & 1761 ROUTE 12, GALES FERRY, CT 06335

GALES FERRY INTERMODAL LLC
549 SOUTH STREET, QUINCY, MA 02169

DRAWING C-5

SHEET NO. 8 NO. OF SHEETS 18


TEMPORARY PUMP MANHOLE, PUMPS TO FRAC TANK
TEMPORARY DOUBLE 18" MULCH SOCK AT DOWNSTREAM SIDE OF PLUNGE POOL
THAMES RIVER
NEW 5' DEEP TEMPORARY SEDIMENT BASIN SB-1 234' x 75' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
NEW WATER BAR TO BASIN S=1.0% (TYP) (TO BE SWALES IN CLOSURE PLAN)
TEMPORARY SETTLEMENT/WEIR TANK, DRAINS TO WETLAND (SEE SESC NARRATIVE FOR SIZING REQUIREMENTS)
TEMPORARY WATER TANK / FILTER (FRACTIONALIZATION TANK), DRAINS TO WEIR TANK
RAIL ROAD CROSSING AND NEW SEDIMENT TRACKING PROTECTION
TEMPORARY CONSTRUCTION ENTRANCE SLOPED TO DRAIN, MIN 50' LENGTH
TEMPORARY ORANGE CONSTRUCTION FENCE TO BE INSTALLED PRIOR TO PHASE 1
NEW PROTECTIVE LAYER TO BE INSTALLED OVER ENGINEERED CONTROL
TEMPORARY 12" MULCH SOCK SEDIMENT FOREBAY (4 LOCATIONS TYP)
NEW 5' DEEP TEMPORARY SEDIMENT BASIN SB-2 241' x 80' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
TEMPORARY 18" MULCH SOCK CHECK (TYP)
TEMPORARY DOUBLE 18" MULCH SOCK
APPLY EARTHGUARD STABILIZER TO EXPOSED SUBSOIL IMMEDIATELY FOLLOWING TOPSOIL REMOVAL. REFER TO MANUFACTURER GUIDELINES FOR APPLICATION RATE AND INSTALLATION INSTRUCTIONS (TYP OF ALL PHASES)
FLOOR IN PHASES 1 & 2 TO BE TEMPORARILY STABILIZED WITH CRUSHED STONE MEETING 2024 GUIDELINES AND 2024 STORMWATER QUALITY MANUAL FOLLOWING COMPLETION OF SUBGRADE BACKFILLING
NEW 5' DEEP TEMPORARY SEDIMENT BASIN SB-3.1 x 75' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
CHAPMAN LANE
PHASE 1 ~9.0 ACRES
24" HDPE @ 1.5% SLOPE
107 LF 30" HDPE S=1.4%
TEMPORARY SEDIMENT BASIN SPILLWAY, 8'Wx33'L (TYP)
202 LF 30" HDPE S=1.0%
240 LF 30" HDPE S=1.0%
25 LF 18" HDPE S=2.0%
140 LF 30" HDPE S=1.0%
56 LF 24" HDPE S=1.8%
184 LF 30" HDPE S=1.0%
838 LF 24" HDPE S=1.4%
TEMPORARY CRUSHED ROCK PILE (TYP)
AGGREGATE STOCKPILE
AGGREGATE STOCKPILE
INLET PROTECTION (TYP)
SOIL STOCKPILE SURROUNDED WITH DOUBLE ROW OF 12" MULCH SOCK (TYP)
WET AREA
PHASE 3.1 ~6.2 ACRES
PHASE 5 ~4.0 ACRES
PHASE 2 ~9.9 ACRES
PHASE 4 ~9.8 ACRES
PHASE 3.2 ~3.0 ACRES
12" MULCH SOCK EROSION PROTECTION ALONG ENTIRE EDGE OF EXCAVATION
TOPSOIL STOCKPILE TEMPORARILY SEEDED FOR STABILIZATION SURROUNDED WITH DOUBLE ROW OF 12" MULCH SOCK
OVERBURDEN STOCKPILE, STABILIZED WITH POSI-LOCK, SURROUNDED WITH DOUBLE ROW OF 12" MULCH SOCK
100' UPLAND REVIEW AREA
INLET PROTECTION (TYP)
55' TO ROCK EXCAVATION
25' TO GRADING
15' TO FENCE
MIN 80' TO ROCK EXCAVATION ALONG RT 12
MIN 50' TO GRADING ALONG RT 12
MIN 40' TO FENCE ALONG RT 12
NEW 5' DEEP TEMPORARY SEDIMENT BASIN SB-3.2 128' x 50' WITH 3H:1V SIDE SLOPES (TO BE CONVERTED TO WATER QUALITY BASIN FOR CLOSURE PLAN)
SCALE IN FEET
50 0 50 100 150

INDIVIDUAL RESPONSIBLE FOR MONITORING THE PLAN WITH WHOM AN INSPECTOR FOR THE TOWN MAY CONTACT ROUTINELY:
CHASE DAVIS, REPRESENTATIVE OF GALES FERRY INTERMODAL, LLC, SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL EROSION AND SEDIMENT CONTROL MEASURES IN CONJUNCTION WITH THE EXCAVATION AND EXTRACTION OPERATIONS.
549 SOUTH STREET, QUINCY, MASSACHUSETTS, 02169
(781) 789-9397
cdavis@jaycashman.com

EROSION AND SEDIMENT CONTROL PLAN

CHAIRMAN/VICE CHAIRMAN OF THE ZONING COMMISSION OR ITS AGENT

DATE

PZC PERMIT # __________ DATE OF APPROVAL __________ EXPIRATION DATE __________

PZC CHAIRMAN OR SECRETARY DATE

IWWC PERMIT # __________ DATE OF APPROVAL __________

IWWC CHAIRMAN DATE

REV.	DESCRIPTION OF REVISION	DATE	APPR.
2	PER COMMENTS	11/13/2024	GFA
1	PER COMMENTS AND COORDINATION WITH APPLICANT	09/25/2024	GFA

STATE OF CONNECTICUT GEORGE F. ANDREWS, JR. No. 19286 LICENSED PROFESSIONAL ENGINEER

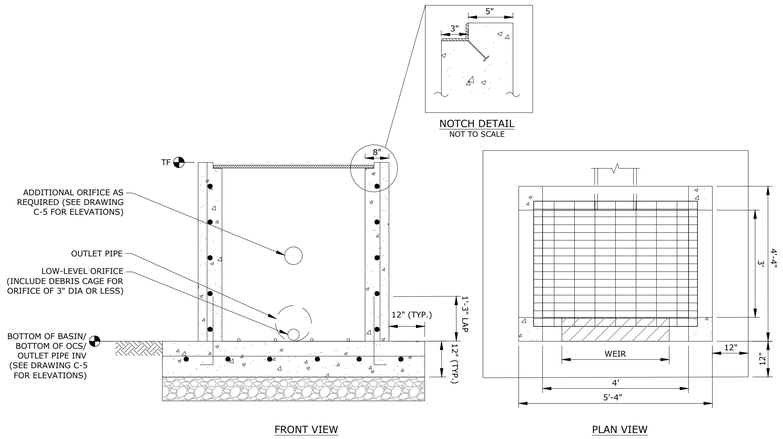
Loureiro
Engineering • Construction • EH&S • Energy Waste • Facility Services • Laboratory
Loureiro Engineering Associates, Inc.
100 Northwest Drive • Plainville, Connecticut 06062
Phone: 860-747-6181 • Fax: 860-747-8822
An Employee Owned Company • www.Loureiro.com

SCALE 1"=100'
COMM. NO. 045IC2.06
DRAWN BY ESF DATE 03/28/2024
APPROVED BY SRM DATE 03/28/2024

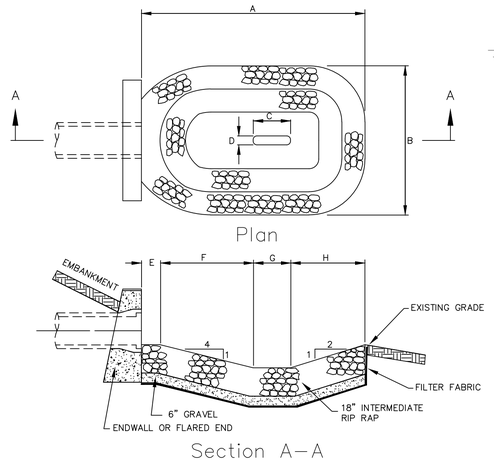
INDUSTRIAL SITE PREPARATION PLAN: SOIL EROSION & SEDIMENT CONTROL AND PHASING

GALES FERRY INTERMODAL
1737 & 1761 ROUTE 12, GALES FERRY, CT 06335
PREPARED FOR:
GALES FERRY INTERMODAL LLC
549 SOUTH STREET, QUINCY, MA 02169

DRAWING C-6
SHEET NO. 10 NO. OF SHEETS 18

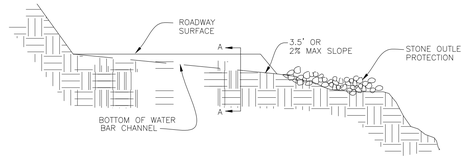


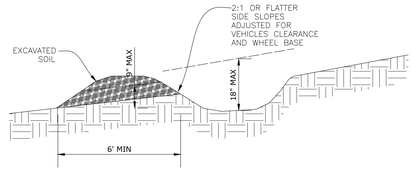
TYPICAL WATER QUALITY BASIN OUTLET CONTROL STRUCTURE
NOT TO SCALE



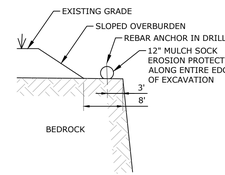
PIPE SIZE	A	B	C	D	E	F	G	H
15"	10'	7'	1 1/2'	1'	1'	4 1/2'	1 1/2'	3'
18"	12'	8'	2'	1'	1'	5'	2'	4'
21"	13'	9'	2 1/2'	1 1/2'	1'	7'	2 1/2'	4 1/2'
24"	17'	10'	2 1/2'	1 1/2'	1'	8'	2 1/2'	5 1/2'
30"	20'	13'	3'	2'	2'	9'	3'	6'
36"	22'	16'	3 1/2'	2'	2'	9 1/2'	3 1/2'	7'

PLUNGE POOL
NOT TO SCALE

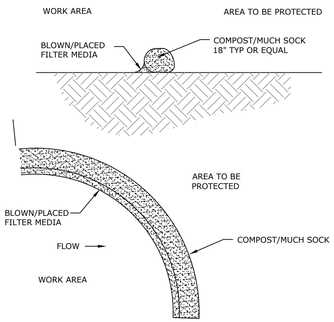




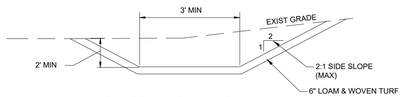
WATER BAR DETAIL
NOT TO SCALE



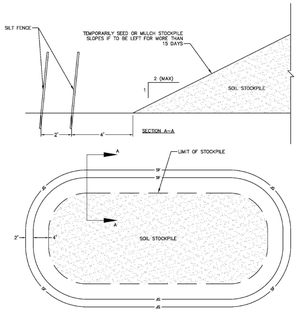
SEDIMENT PROTECTIN AT TOP OF EXCAVATION
NOT TO SCALE



COMPOST/MULCH SOCK DETAIL
NOT TO SCALE



GRASSED DRAINAGE SWALE
NOT TO SCALE



TEMPORARY SOIL STOCKPILE DETAIL
NOT TO SCALE

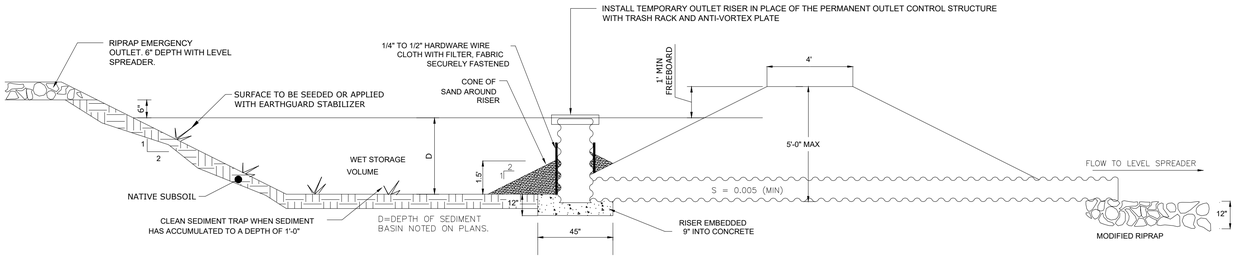
SOIL RESTORATION REQUIREMENTS DURING CONSTRUCTION ACTIVITY			
TYPE OF SOIL DISTURBANCE	**SOIL RESTORATION REQUIREMENT**		**COMMENTS/EXAMPLES**
NO SOIL DISTURBANCE	RESTORATION NOT PERMITTED		PRESERVATION OF NATURAL FEATURES
MINIMAL SOIL DISTURBANCE	RESTORATION NOT REQUIRED		CLEARING AND GRUBBING
AREAS WHERE TOPSOIL IS STRIPPED ONLY - NO CHANGE IN GRADE	HYDROLOGIC SOIL GROUP A & B	HYDROLOGIC SOIL GROUP C & D	PROTECT AREA FROM ANY ONGOING CONSTRUCTION ACTIVITIES.
	APPLY 6 INCHES OF TOPSOIL	AERATE* AND APPLY 6 INCHES OF TOPSOIL	
AREAS OF CUT OR FILL	HYDROLOGIC SOIL GROUP A & B	HYDROLOGIC SOIL GROUP C & D	-
	AERATE* AND APPLY 6 INCHES OF TOPSOIL	APPLY FULL SOIL RESTORATION (DECOMPACTION AND COMPOST ENHANCEMENT)	
HEAVY TRAFFIC AREAS ON SITE (ESPECIALLY IN A ZONE 5-25 FEET AROUND BUILDINGS BUT NOT WITHIN A 5 FOOT PERIMETER AROUND FOUNDATION WALLS)	APPLY FULL SOIL RESTORATION (DECOMPACTION AND COMPOST ENHANCEMENT)		-
AREAS WHERE RUNOFF REDUCTION AND/OR INFILTRATION PRACTICES ARE APPLIED	RESTORATION NOT REQUIRED, BUT MAY BE APPLIED TO ENHANCE THE REDUCTION SPECIFIED FOR APPROPRIATE PRACTICES.		KEEP CONSTRUCTION EQUIPMENT FROM CROSSING THESE AREAS. TO PROTECT NEWLY INSTALLED BMP FROM ANY ONGOING CONSTRUCTION ACTIVITIES. CONSTRUCT A FENCE AROUND BMP.
REDEVELOPMENT PROJECTS	SOIL RESTORATION IS REQUIRED ON REDEVELOPMENT PROJECTS IN AREAS WHERE EXISTING IMPERVIOUS AREA WILL BE CONVERTED TO PERVIOUS AREA.		-

* AERATION INCLUDES THE USE OF MACHINES SUCH AS TRACTOR-DRAWN IMPLEMENTS WITH COULTERS MAKING A NARROW SLIT IN THE SOIL, A ROLLER WITH MANY SPIKES MAKING INDENTATIONS IN THE SOIL, OR PRONGS WHICH FUNCTION LIKE A MINI-SUBSOILER.

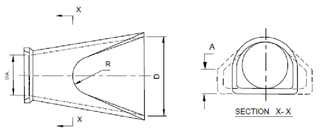
SOIL RESTORATION NOTES:
1. SOIL RESTORATION IS TO BE APPLIED TO PROPOSED VEGETATED AREAS WHERE ANY HEAVY CONSTRUCTION VEHICLE HAS BEEN OR OVER COMPACTION HAS OCCURRED AND FINAL STABILIZATION IS TO BEGIN. THIS IS GENERALLY APPLIED IN THE CLEANUP, SITE RESTORATION, AND LANDSCAPING PHASE OF CONSTRUCTION FOLLOWED BY THE PERMANENT ESTABLISHMENT OF AN APPROPRIATE GROUND COVER TO MAINTAIN THE SOIL STRUCTURE. SOIL RESTORATION MEASURES SHOULD BE APPLIED OVER AND ADJACENT TO ANY RUNOFF REDUCTION PRACTICES TO ACHIEVE DESIGN PERFORMANCE.
2. AT THE END OF THE PROJECT AN INSPECTOR SHOULD BE ABLE TO PUSH A 3/8" METAL BAR 12 INCHES INTO THE SOIL JUST WITH BODY WEIGHT. THIS SHOULD NOT BE PERFORMED WITHIN THE DRIP LINE OF ANY EXISTING TREES OR OVER UTILITY INSTALLATIONS THAT ARE WITHIN 24 INCHES OF THE SURFACE.
3. TO MAINTAIN SOIL RESTORATION, KEEP THE SITE FREE OF VEHICULAR AND FOOT TRAFFIC OR OTHER WEIGHT LOADS.

SOIL RESTORATION PROCEDURE:
DURING PERIODS OF RELATIVELY LOW TO MODERATE SUBSOIL MOISTURE, THE DISTURBED SUBSOILS ARE RETURNED TO ROUGH GRADE AND THE FOLLOWING SOIL RESTORATION STEPS APPLIED:
1. APPLY 3 INCHES OF COMPOST OVER SUBSOIL. THE COMPOST SHALL BE WELL DECOMPOSED (MATURED AT LEAST 3 MONTHS), WEED-FREE, ORGANIC MATTER. IT SHALL BE AEROBICALLY COMPOSTED, POSSESS NO OBJECTIONABLE ODORS, AND CONTAIN LESS THAN 1%, BY DRY WEIGHT, OF MAN-MADE FOREIGN MATTER. FOR "PARTICLE SIZE" 100% WILL PASS THE 1/2" SIEVE.
2. NOTE: ALL BIOSOLIDS COMPOST PRODUCED (OR APPROVED FOR IMPORTATION) MUST MEET CT DEEP'S REQUIREMENTS. TILL COMPOST INTO SUBSOIL TO A DEPTH OF AT LEAST 12 INCHES USING A CAT-MOUNTED RIPPER, TRACTOR MOUNTED DISC, OR TILLER, TO MIX AND CIRCULATE AIR AND COMPOST INTO THE SUBSOIL.
3. ROCK-PICK UNTIL UPLIFTED STONE/ROCK MATERIALS OF FOUR INCHES AND LARGER SIZE ARE CLEANED OFF THE SITE.
4. APPLY TOPSOIL TO A DEPTH OF 6 INCHES.
5. VEGETATE AS REQUIRED BY THE SEEDING PLAN. USE APPROPRIATE GROUND COVER WITH DEEP ROOTS TO MAINTAIN THE SOIL STRUCTURE.
6. TOPSOIL MAY BE MANUFACTURED AS A MIXTURE OR A MINERAL COMPONENT AND ORGANIC MATERIAL SUCH AS COMPOST.

SOIL RESTORATION
NOT TO SCALE



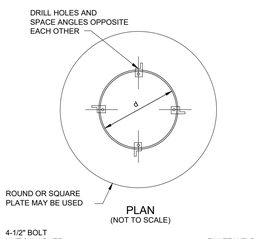
SECTION THROUGH SEDIMENT BASIN AND RISER
NOT TO SCALE



DIA	A	B	C	D	E	R
12"	4"	2'-0"	4'-0 1/2"	2'-0"	1'	2"
15"	4"	2'-3"	3'-1/8"	2'-6"	1'	11"
18"	9"	2'-3"	3'-1/8"	3'-0"	1'	1'-1"
24"	9 1/2"	2'-7 1/2"	2'-6"	4'-0"	1'	1'-6"
30"	12"	4'-6"	5'-7 3/4"	5'-0"	2 1/2'	1'-11"
36"	15"	5'-3"	5'-10 3/4"	6'-0"	4"	2'-5"
42"	21"	5'-3"	5'-11"	6'-0"	4 1/2"	2'-7"
48"	24"	6'-9"	7'-2"	7'-0"	5"	3'-1"
54"	27"	6'-9"	7'-11"	7'-0"	5 1/2"	3'-4"
60"	30"	6'-9"	8'-3"	8'-0"	6"	3'-8"

OULVERT END SECTIONS CONFORM TO AASHTO-M170 CLASS III, MASSACHUSETTS STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES SECTION M5.02.2.
ASTM AND CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION M.08.01-22.
OULVERT END SECTIONS AVAILABLE WITH BELL JOINT (OUTLET) OR SPIGOT JOINT (INLET)

TYPICAL FLARED END SECTION
NOT TO SCALE

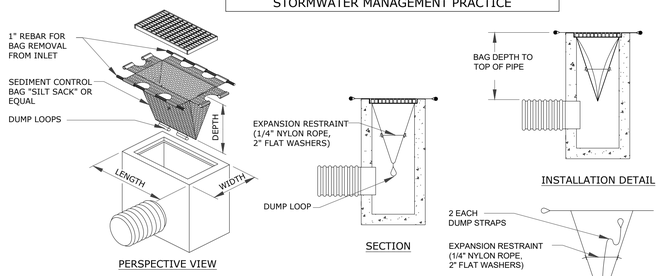


INLET DIA INCHES	d BARREL DIA INCHES	H DIA INCHES
12	6	6
12	8	6
15	10	6
15	12	7
18	12	6
24	15	7 1/2
24	18	10
* 30	18	8 1/2
* 30	24	13 1/2
* 36	24	12

* USE ANGLE IRON STIFFEFERS ON PLATE AS SPECIFIED

TYPICAL ANTI-VORTEX WITH TRASH AND SAFETY GUARD FOR SEDIMENT BASIN OUTLET RISER
NOT TO SCALE

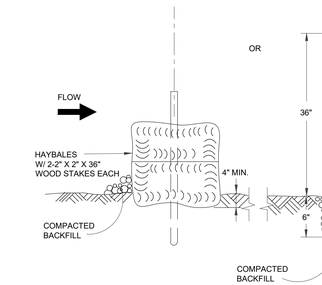
GEOTEXTILE, FILTER FABRIC, OR SILT FENCE FABRIC PLACED UNDER INLET GRATE IS NOT AN ACCEPTABLE STORMWATER MANAGEMENT PRACTICE



NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE CORRECT SIZE DEVICE FOR EACH INLET. FOR NON-STANDARD CATCH BASINS AND INLETS, THE CONTRACTOR SHALL MEASURE DIMENSIONS IN THE FIELD AND ORDER THE APPROPRIATE SIZE(S).
2. THE INLET SEDIMENT CONTROL DEVICE SHALL BE OF HIGH FLOW DESIGN (200 GAL/MIN/FT), AS PER THE MANUFACTURER'S SPECS.
3. THE SEDIMENT CONTROL DEVICE SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND CLEANED AND MAINTAINED A MINIMUM ONCE PER MONTH OR WITHIN THE 48 HOURS FOLLOWING A STORM EVENT. THE FILTER SHALL BE REPLACED OR CLEANED WHEN THE BAG BECOMES HALF FULL. THE FILTER SHALL BE CLEANED IN A MANNER WHICH ENSURES THAT ALL SEDIMENT REMAINS ON SITE.
4. SUBSTITUTION OF A SHEET OF FILTER FABRIC PLACED OVER THE OPENING OF THE INLET IS NOT APPROVED.
5. RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS, SIZE OF FILTER INLET SACK TO BE DETERMINED BY MANUFACTURER.
6. THE FILTER DEVICE SHALL BE MANUFACTURED BY ACF ENVIRONMENTAL OR APPROVED EQUAL.

CATCH BASIN FILTER (SILT SACK) INLET PROTECTION
NOT TO SCALE



TYPICAL SEDIMENT BARRIER DETAIL

SCALE: NONE

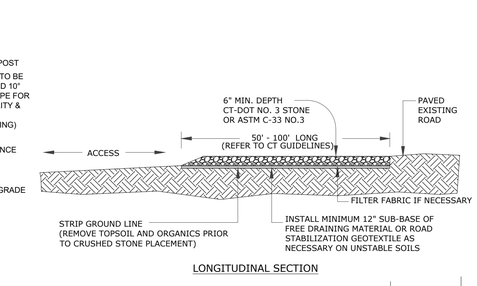
INSTALLATION NOTES FOR HAY BALES:
1. PLACE HAY BALES ON CONTOUR AND WITH LAST HAY BALES UPSLOPE TO THAT TOP OF LAST SEVERAL HAY BALES ARE HIGHER THAN LINE OF HAY BALES.
2. EXCAVATE TRENCH 4" MIN. AND PLACE FILL UPSLOPE OF TRENCH
3. PLACE HAY BALE AND STAKE FIRST STAKE AT ANGLE TOWARDS FIRST BAKE. STAKES ARE 18" MIN. INTO GROUND.
4. WEDGE LOOSE HAY BETWEEN BALES.
5. BACKFILL & COMPACT EXCAVATED FILL ALONG UPHILL SIDE OF HAY BALE.

PZC PERMIT # _____ DATE OF APPROVAL _____ EXPIRATION DATE _____

_____ _____
PZC CHAIRMAN OR SECRETARY DATE

IWWC PERMIT #_____ DATE OF APPROVAL _____

_____ _____
IWWC CHAIRMAN DATE



NOTE: ALL ANTI-TRACKING PADS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH 2002 CT GUIDELINES FOR SOIL EROSION & SEDIMENT CONTROL, AS AMENDED.

ANTI-TRACKING PAD DETAIL
NOT TO SCALE

PARTIAL/SECTION VIEW

REV.	DESCRIPTION OF REVISION	DATE	APPR.
2	PER COMMENTS	11/13/2024	GFA
1	PER COMMENTS AND COORDINATION WITH APPLICANT	09/25/2024	GFA

STATE OF CONNECTICUT — GEORGE F. ANDERSON — No. 19281 — LICENSED PROFESSIONAL ENGINEER

Loureiro Engineering Associates, Inc.
Science • Collaboration • Solutions
Water • Facility Services • Laboratory
100 Northfield Street, Suite 360 Greenwich, CT 06830
Phone: 860-747-0181 • Fax: 860-747-0822
An Employee Owned Company • www.Loureiro.com

SCALE: AS NOTED
CONN. NO.: 04-SC-2.06
DRAWN BY: SRM
DATE: 03/28/2024
APPROVED BY: GFA
DATE: 03/28/2024

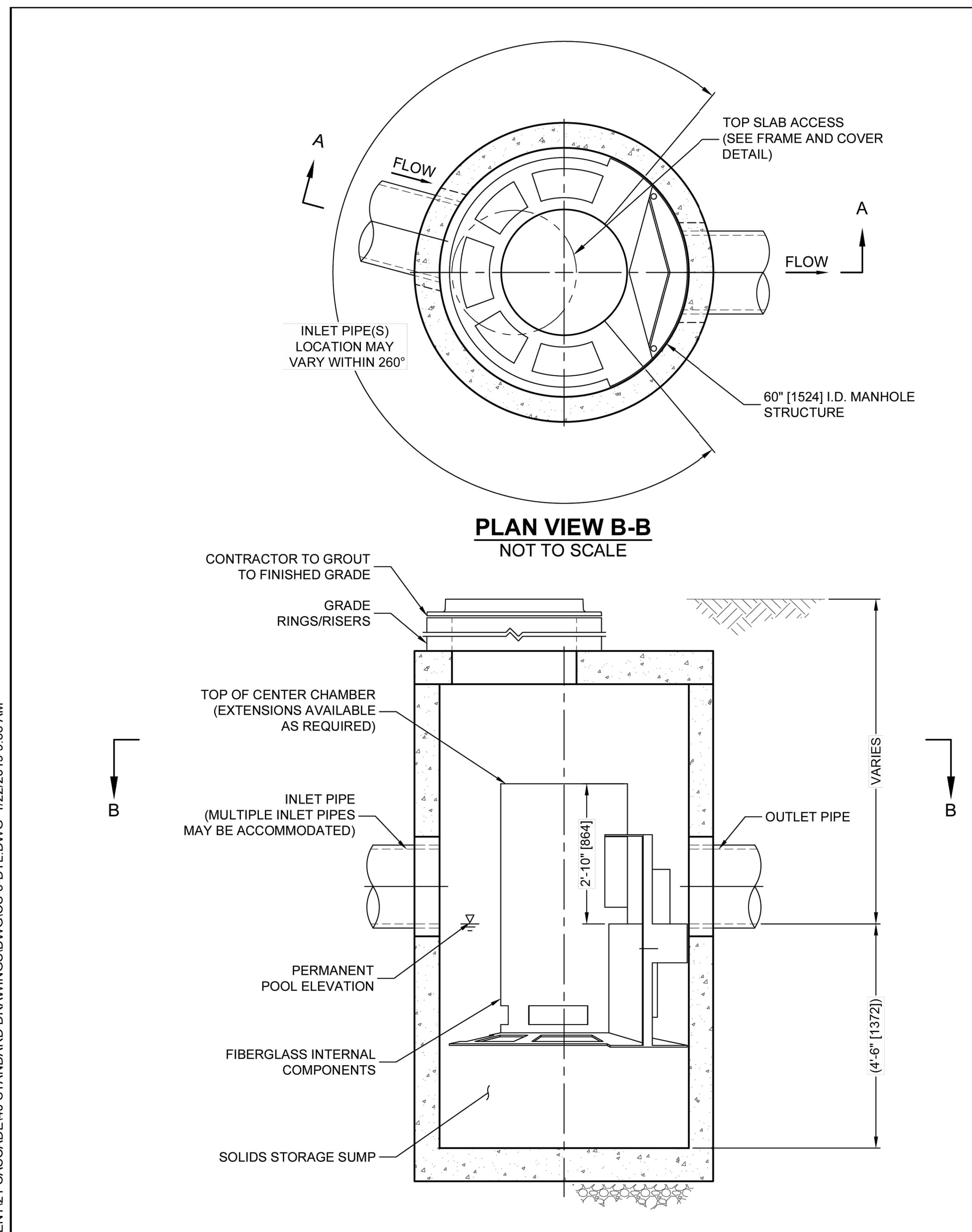
INDUSTRIAL SITE PREPARATION PLAN:
DETAILS

GALES FERRY INTERMODAL
1737 & 1761 ROUTE 12, GALES FERRY, CT 06335
PREPARED FOR:
GALES FERRY INTERMODAL LLC
549 SOUTH STREET, QUINCY, MA 02169

DRAWING
C-8

SHEET NO. 13 NO. OF SHEETS 18

V:\CT\GALES FERRY\ROUTE 12-1761\04SC206 LOCAL PERMIT FOR ROCK GRADING\DWGS\CIVIL\DETAILS.DWG Tab: DETAILS 2 Saved: 11/7/2024 3:13 PM By: ESPARMER Plotted: 11/13/2024 10:47 AM



PLAN VIEW B-B
NOT TO SCALE

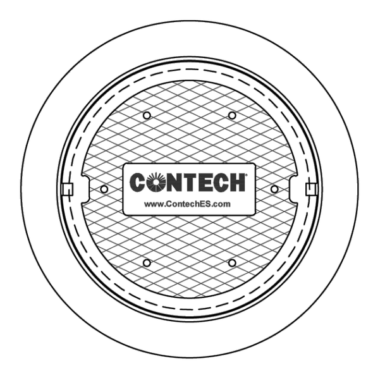
ELEVATION A-A
NOT TO SCALE

CASCADE separator™

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-5 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

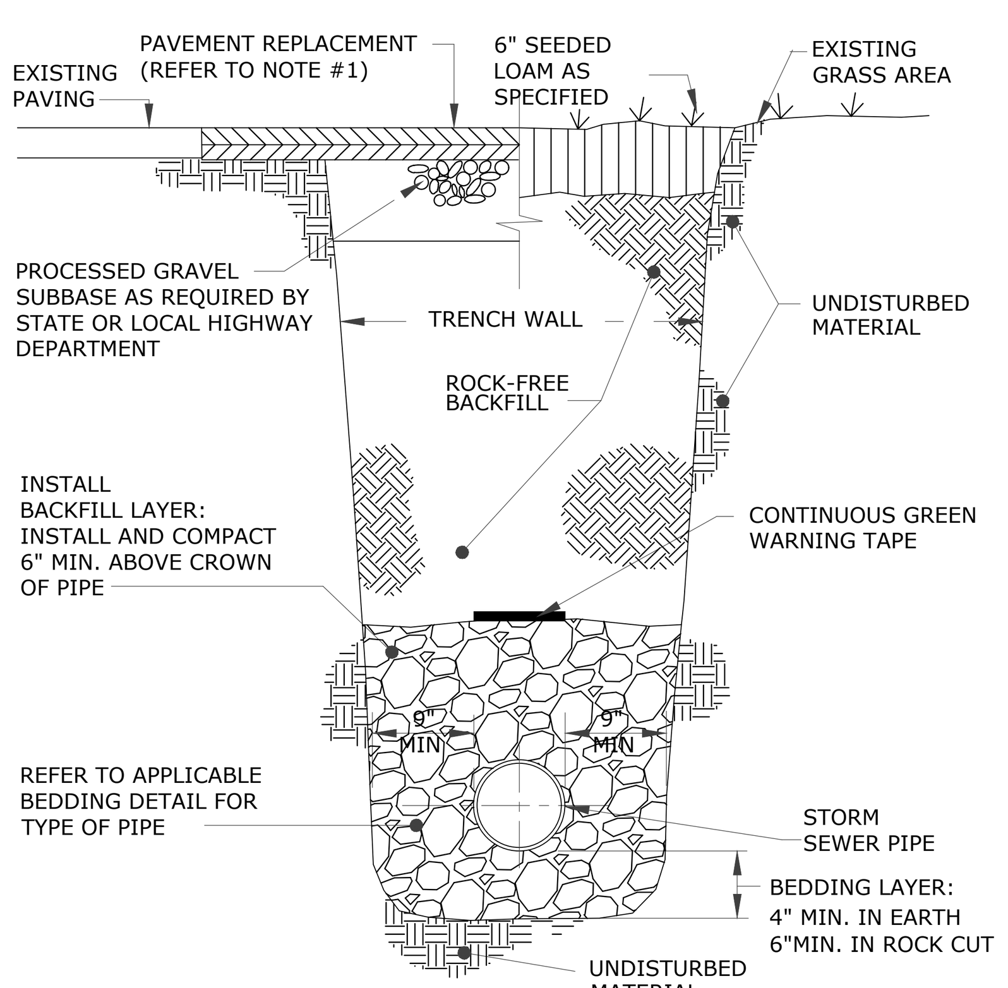
STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
NOTES / SPECIAL REQUIREMENTS:			

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

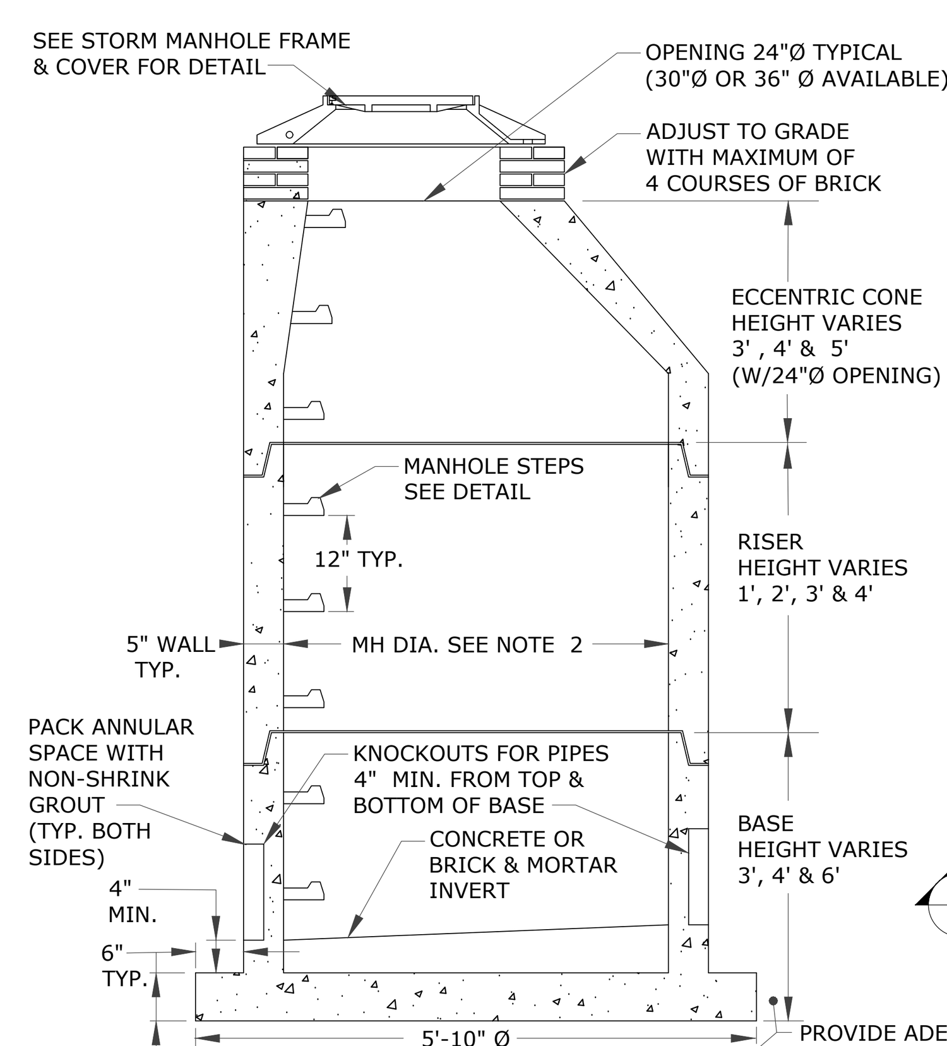
CS-5
CASCADE SEPARATOR
STANDARD DETAIL



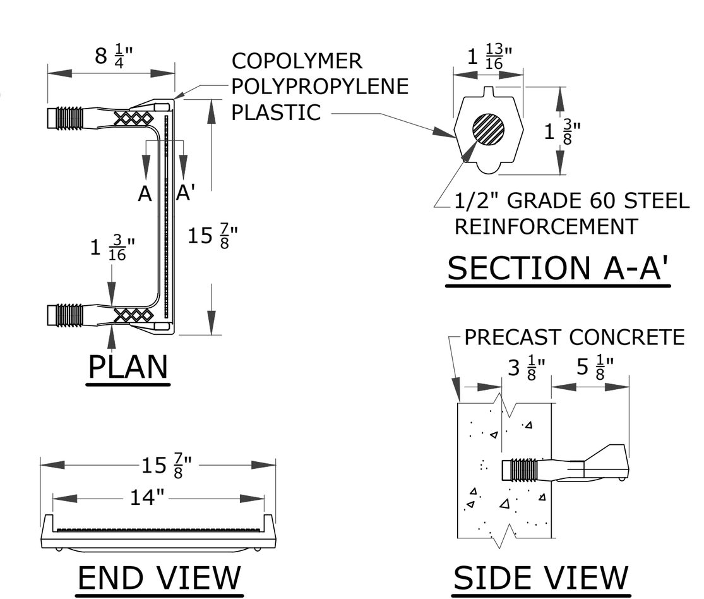
NOTES:
1. REFER TO STATE AND/OR LOCAL HIGHWAY DEPARTMENT SPECIFICATIONS FOR SPECIFIC PAVING REQUIREMENTS WHERE APPLICABLE.
2. MATERIAL USED IN BEDDING, HAUNCHING, AND BACKFILL SHALL BE AS SPECIFIED IN THE ARTICLE M.02.01 OF CT DOT FORM 817 STANDARD.
3. DEEP FOUNDATIONS: WHERE SPECIAL DEEP FOUNDATIONS ARE REQUIRED, BECAUSE OF VERY SOFT SOIL FOUNDATION, CRUSHED STONE OR PROCESSED GRAVEL SHALL BE USED TO A POINT 24" DEEPER THAN FLOW LINE OF PIPE. ADDITIONAL FOUNDATION DEPTH BELOW THIS POINT MAY BE OTHER SELECTED MATERIAL, AS SPECIFIED AND AS REQUIRED BY THE ENGINEER IN THE FIELD.
4. SEE TYPICAL PIPE TRENCH BEDDING DETAILS FOR ADDITIONAL INFORMATION.

TYPICAL STORM SEWER TRENCH DETAIL
NOT TO SCALE

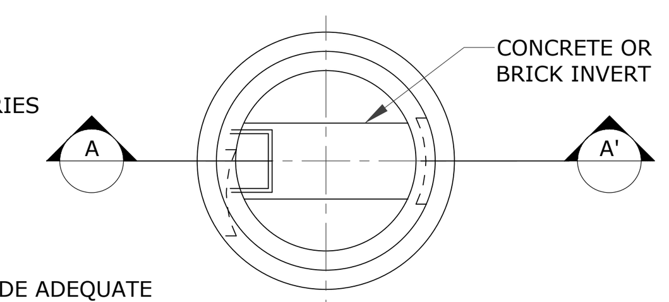
References: Previous Loureiro standards, updated with 2023 CT Guidelines for Erosion and Sediment Control, DEEP Bulletin 34 and MDC Standard Details 2017 and CT DOT 2017 standards.



SECTION A-A'



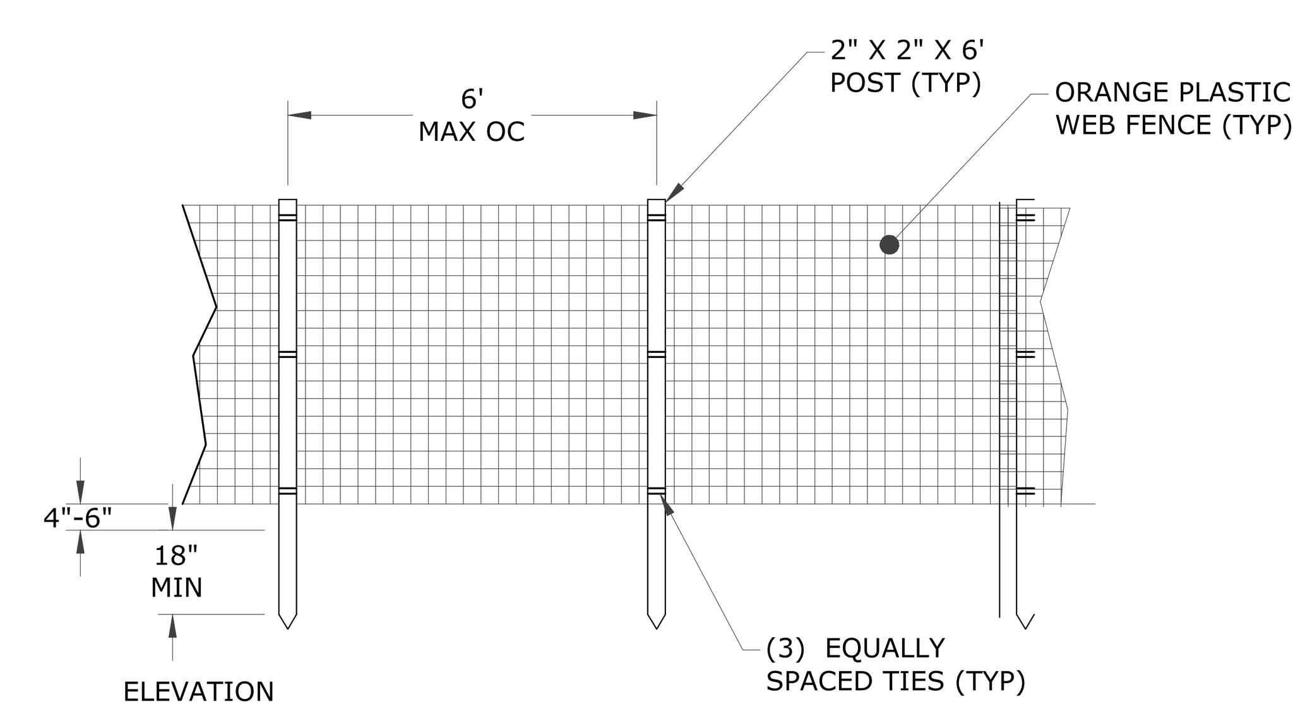
COPOLYMER POLYPROPYLENE PLASTIC STEEL REINFORCED MANHOLE STEP FOR CONCRETE MANHOLES



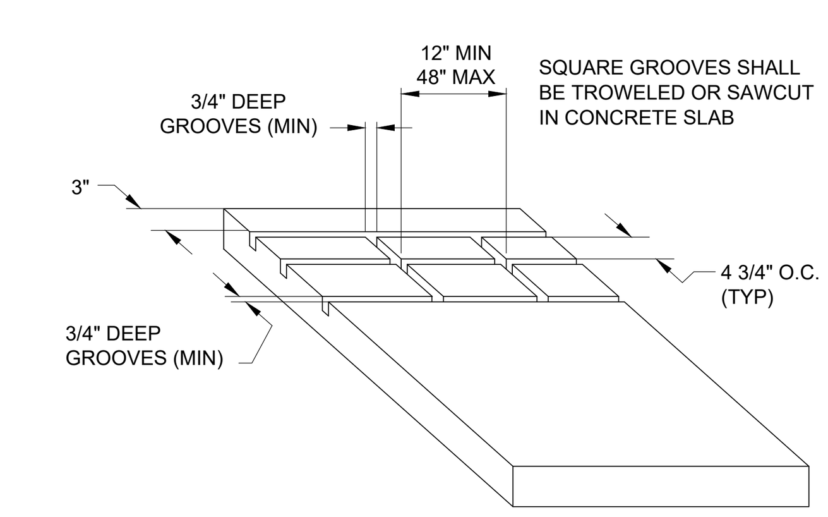
PLAN

NOTES:
1. PRECAST CONCRETE MANHOLE COMPONENTS SHALL CONFORM TO CTDOT STANDARD SHEET HW-507_10 AS AMENDED.
2. 4', 5' OR 6' PRECAST CONCRETE BASE DIAMETERS MAY BE USED WHEN REQUIRED DUE TO SIZE OR NUMBER OF PIPES AT THE MANHOLE. PRECAST REDUCERS WILL BE PLACED ABOVE THE 5' AND 6' BASES AS DIRECTED BY THE ENGINEER. WALL THICKNESS SHALL INCREASE 1" FOR EACH 1' OF INSIDE DIAMETER INCREASE.
3. JOINT SEALANT SHALL BE BUTYL RUBBER MASTIC TYPE SEAL THAT CONFORMS TO LATEST AASHTO SPECIFICATION M-198 & MEETS FEDERAL SPECIFICATION SS-S-0021(210-A).
4. REINFORCING STEEL DEFORMED BARS ARE NOT SHOWN AND SHALL CONFORM TO LATEST CTDOT STANDARDS & SUPPLEMENTAL AND ASTM SPECIFICATION A615, GRADE 60, MINIMUM COVER 2", UNLESS OTHERWISE NOTED.
5. ALL PIPE OPENINGS SHALL BE CLOSED USING MATERIALS WHICH CONFORM TO STATE OF CT STANDARD SPECIFICATIONS SECTION M.08.02.
6. REINFORCING STEEL WELDED WIRE FABRIC SHALL CONFORM TO LATEST ASTM SPECIFICATION A185.
7. CONCRETE COMPRESSIVE STRENGTH SHALL BE MINIMUM 4000 PSI AT 28 DAYS, SELF COMPACTING CONCRETE MIX.
8. MANHOLE STEPS SHALL MEET LATEST OSHA REGULATIONS, (29 CFR 1910.27), SECTION 16 OF ASTM SPECIFICATION C478 AND SECTION 10 OF ASTM SPECIFICATION C497.
9. WHEN SPECIFIED, MANHOLES ARE TO BE COATED WITH BAY OIL, "EBONY".
10. METHOD OF MANUFACTURE SHALL BE WET CAST.
11. BASE SECTION IS MONOLITHIC.
12. MANHOLE INTERIOR DIAMETER:
 4'-0" FOR 8" TO 36" PIPE DIAMETERS
 5'-0" FOR 42" PIPE DIAMETER
 6'-0" FOR 48" PIPE DIAMETER.

STANDARD PRECAST CONCRETE STORM MANHOLE DETAIL
NOT TO SCALE



CONSTRUCTION FENCE DETAIL
NOT TO SCALE



FUELING PAD POSITIVE LIMITING BARRIER DETAIL
NOT TO SCALE

PZC PERMIT # __________ DATE OF APPROVAL _________ EXPIRATION DATE ___________
PZC CHAIRMAN OR SECRETARY DATE
IWWC PERMIT #__________ DATE OF APPROVAL _______________
IWWC CHAIRMAN DATE

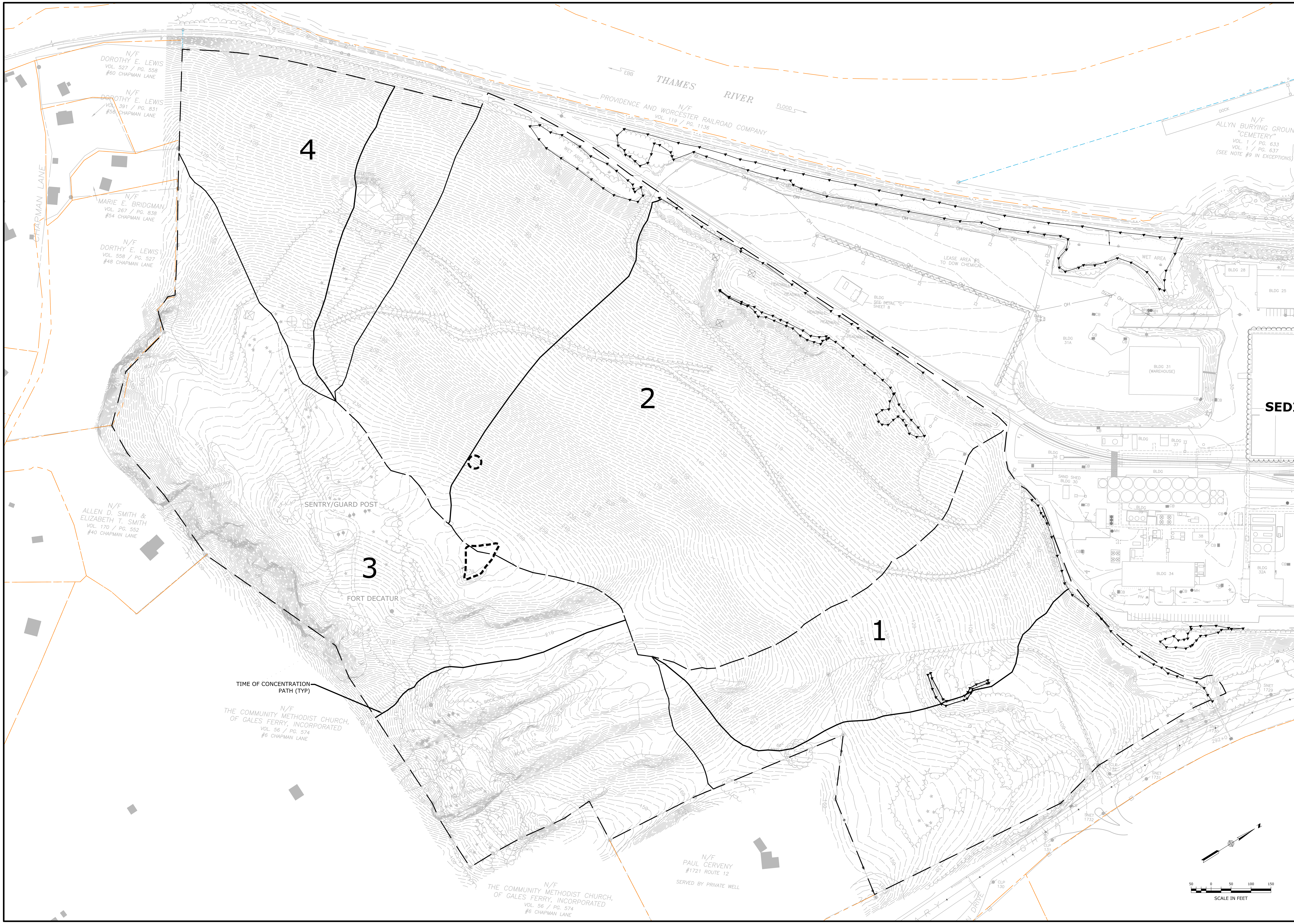
REV.	DESCRIPTION OF REVISION	DATE	APPR.
2	PER COMMENTS	11/13/2024	GFA
1	PER COMMENTS AND COORDINATION WITH APPLICANT	09/25/2024	GFA

Loureiro
Loureiro Engineering Associates, Inc.
An Employee Owned Company

SCALE AS NOTED
COMM. NO. 045JC2.06
DRAWN BY SRM DATE 03/28/2024
APPROVED BY GFA DATE 03/28/2024

INDUSTRIAL SITE PREPARATION PLAN: DETAILS 2
GALES FERRY INTERMODAL
1737 & 1761 ROUTE 12, GALES FERRY, CT 06335
PREPARED FOR
GALES FERRY INTERMODAL LLC
549 SOUTH STREET, QUINCY, MA 02169

DRAWING C-9
SHEET NO. 14 NO. OF SHEETS 18



THAMES RIVER
N/F PROVIDENCE AND WORCESTER RAILROAD COMPANY VOL. 119 / PG. 1136
N/F DOROTHY E. LEWIS VOL. 527 / PG. 558 #60 CHAPMAN LANE
N/F DOROTHY E. LEWIS VOL. 391 / PG. 831 #56 CHAPMAN LANE
N/F MARIE E. BRIDGMAN VOL. 267 / PG. 838 #54 CHAPMAN LANE
N/F DORTHY E. LEWIS VOL. 558 / PG. 527 #48 CHAPMAN LANE
N/F ALLEN D. SMITH & ELIZABETH T. SMITH VOL. 170 / PG. 552 #40 CHAPMAN LANE
CHAPMAN LANE
N/F ALLYN BURYING GROUND "CEMETERY" VOL. 1 / PG. 633 VOL. 1 / PG. 637 (SEE NOTE #9 IN EXCEPTIONS)
4
2
3
1
SENTRY/GUARD POST
FORT DECATUR
TIME OF CONCENTRATION PATH (TYP)
N/F THE COMMUNITY METHODIST CHURCH, OF GALES FERRY, INCORPORATED VOL. 56 / PG. 574 #6 CHAPMAN LANE
N/F PAUL CERVENY #1721 ROUTE 12 SERVED BY PRIVATE WELL
WET AREA
LEASE AREA TO DOW CHEMICAL
BLDG 31 (WAREHOUSE)
BLDG 34
SEDI
SCALE IN FEET
50 0 50 100 150

REV.	DESCRIPTION OF REVISION	DATE	APPR.

STAMP

Loureiro
Engineering • Construction • EH&S • Energy
Waste • Facility Services • Laboratory

Loureiro Engineering Associates, Inc.
100 Northwest Drive • Plainville, Connecticut 06062
Phone: 860-747-6181 • Fax: 860-747-8822
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SCALE	COMM. NO.	DRAWN BY	DATE	APPROVED BY	DATE
1"=100'	0453C2.06	APH	9/28/2023	GFA	9/28/2023

EXISTING DRAINAGE AREAS

GALES FERRY INTERMODAL
1737 & 1761 ROUTE 12, GALES FERRY, CT 06335
PREPARED FOR
GALES FERRY INTERMODAL LLC
549 SOUTH STREET, QUINCY, MA 02169

DRAWING 1

SHEET NO. 1 NO. OF SHEETS 2

NEW DRAINAGE AREAS

GALES FERRY INTERMODAL
1737 & 1761 ROUTE 12, GALES FERRY, CT 06335

PREPARED FOR:

GALES FERRY INTERMODAL LLC
549 SOUTH STREET, QUINCY, MA 02169

REV.	DESCRIPTION OF REVISION	DATE	APPR.

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SCALE 1"=100'	COMM. NO. 045JC2.06
DRAWN BY APH	DATE 9/28/2023
APPROVED BY GFA	DATE 9/28/2023

DRAWING 2

SHEET NO. 2 NO. OF SHEETS 2

V:\CT\GALES FERRY\ROUTE 12-1761\045JC206 LOCAL PERMIT FOR ROCK GRADING\DWGS\CIVIL\NON PLANSET DWG\DRAINAGE AREAS.DWG Tab: NEW Saved: 9/25/2024 4:35 PM Plotted: 9/25/2024 5:02 PM

APPENDIX A

General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities

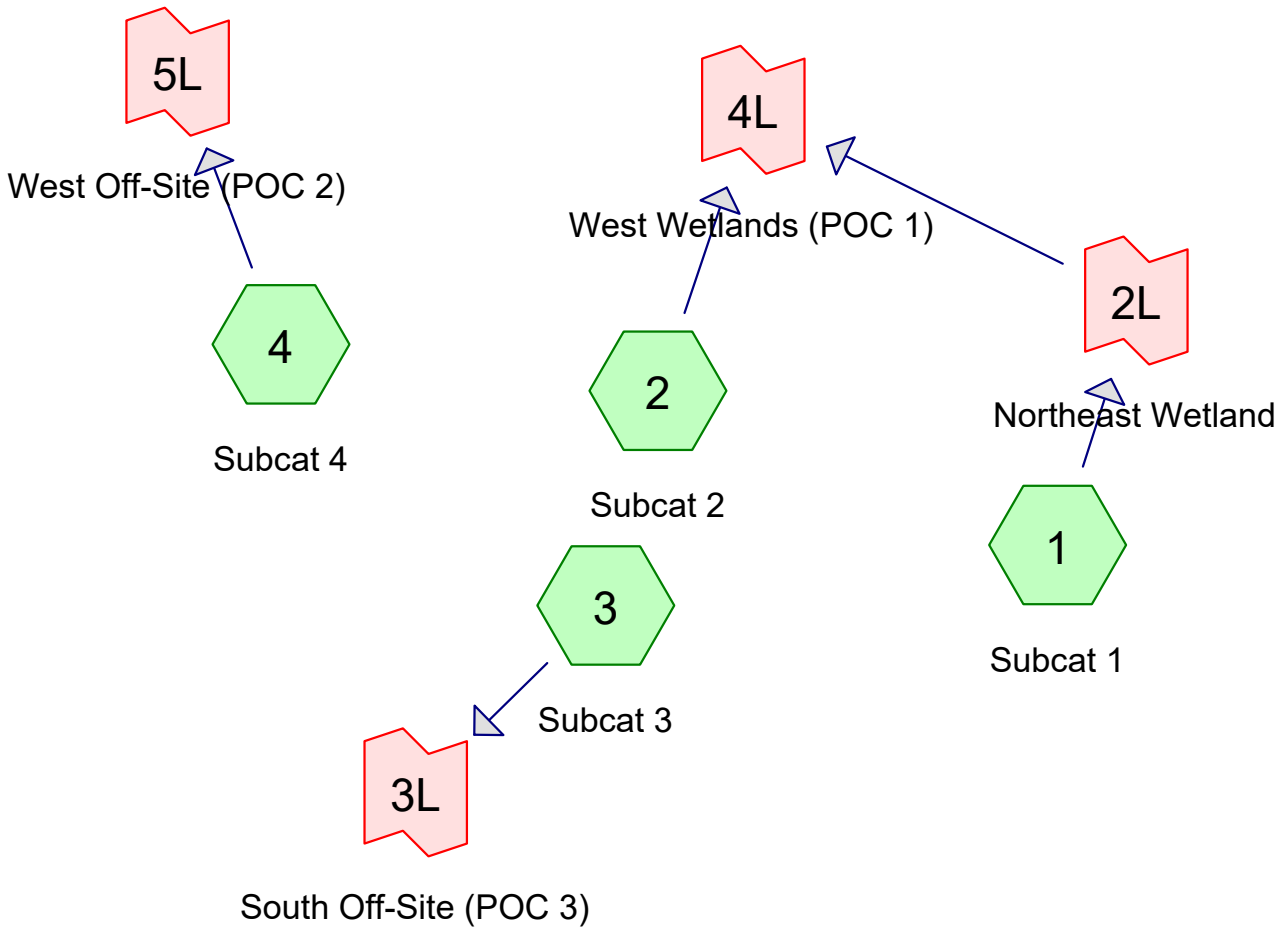
(Intentionally Excluded from Stormwater Pollution Control Plan)

APPENDIX B

General Permit Registration Form

APPENDIX C

Stormwater Treatment Structures and Calculations



Subcat Reach Pond Link

Routing Diagram for Existing Conditions

Prepared by Loureiro Engineering Assoc, Inc, Printed 9/25/2024

Project Notes

Defined 5 rainfall events from CT-Gales Ferry-1761 Route 12_DEPTHS IDF
Defined 5 rainfall events from CT-Gales Ferry-1761 Route 12_DEPTHS IDF

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	NOAA 24-hr	D	Default	24.00	1	3.46	2
2	10-yr	NOAA 24-hr	D	Default	24.00	1	5.12	2
3	25-yr	NOAA 24-hr	D	Default	24.00	1	6.15	2
4	50-yr	NOAA 24-hr	D	Default	24.00	1	6.92	2
5	100-yr	NOAA 24-hr	D	Default	24.00	1	7.74	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
76,636	30	Brush, Good, HSG A (1, 2, 4)
4,103	48	Brush, Good, HSG B (1, 2)
120,327	73	Brush, Good, HSG D (2, 3, 4)
14,375	72	Dirt roads, HSG A (1, 2)
3,886	89	Dirt roads, HSG D (2, 3)
11,764	76	Gravel roads, HSG A (2, 4)
81,857	91	Gravel roads, HSG D (2, 3, 4)
2	0	Woods, Good (4)
1,411,426	30	Woods, Good, HSG A (1, 2, 4)
16,034	55	Woods, Good, HSG B (1)
1,544,730	77	Woods, Good, HSG D (1, 2, 3, 4)
3,285,140	**56**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
1,514,200	HSG A	1, 2, 4
20,137	HSG B	1, 2
0	HSG C	
1,750,801	HSG D	1, 2, 3, 4
2	Other	4
3,285,140		**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	Subcatchment Numbers
76,636	4,103	0	120,327	0	201,065	Brush, Good	1, 2, 3, 4
14,375	0	0	3,886	0	18,261	Dirt roads	1, 2, 3
11,764	0	0	81,857	0	93,621	Gravel roads	2, 3, 4
1,411,426	16,034	0	1,544,730	2	2,972,192	Woods, Good	1, 2, 3, 4
1,514,200	**20,137**	**0**	**1,750,801**	**2**	**3,285,140**	**TOTAL AREA**	

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=0.12"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=0.23 cfs 6,596 cf

Subcatchment 2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=0.12"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=0.47 cfs 12,875 cf

Subcatchment 3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=1.47"
Flow Length=691' Tc=42.4 min CN=78 Runoff=15.37 cfs 109,967 cf

Subcatchment 4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=0.19"
Flow Length=846' Tc=13.2 min CN=50 Runoff=0.31 cfs 5,831 cf

Link 2L: Northeast Wetland Inflow=0.23 cfs 6,596 cf
Primary=0.23 cfs 6,596 cf

Link 3L: South Off-Site (POC 3) Inflow=15.37 cfs 109,967 cf
Primary=15.37 cfs 109,967 cf

Link 4L: West Wetlands (POC 1) Inflow=0.69 cfs 19,471 cf
Primary=0.69 cfs 19,471 cf

Link 5L: West Off-Site (POC 2) Inflow=0.31 cfs 5,831 cf
Primary=0.31 cfs 5,831 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 135,268 cf Average Runoff Depth = 0.49"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=2.55 cfs 32,920 cf

Subcatchment2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=5.74 cfs 64,257 cf

Subcatchment3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=2.81"
Flow Length=691' Tc=42.4 min CN=78 Runoff=30.07 cfs 210,922 cf

Subcatchment4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=0.74"
Flow Length=846' Tc=13.2 min CN=50 Runoff=3.92 cfs 23,259 cf

Link 2L: Northeast Wetland Inflow=2.55 cfs 32,920 cf
Primary=2.55 cfs 32,920 cf

Link 3L: South Off-Site (POC 3) Inflow=30.07 cfs 210,922 cf
Primary=30.07 cfs 210,922 cf

Link 4L: West Wetlands (POC 1) Inflow=7.91 cfs 97,177 cf
Primary=7.91 cfs 97,177 cf

Link 5L: West Off-Site (POC 2) Inflow=3.92 cfs 23,259 cf
Primary=3.92 cfs 23,259 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 331,357 cf Average Runoff Depth = 1.21"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=1.00"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=5.50 cfs 56,718 cf

Subcatchment2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=1.00"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=12.83 cfs 110,708 cf

Subcatchment3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=3.71"
Flow Length=691' Tc=42.4 min CN=78 Runoff=39.67 cfs 278,224 cf

Subcatchment4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=1.22"
Flow Length=846' Tc=13.2 min CN=50 Runoff=7.82 cfs 38,155 cf

Link 2L: Northeast Wetland Inflow=5.50 cfs 56,718 cf
Primary=5.50 cfs 56,718 cf

Link 3L: South Off-Site (POC 3) Inflow=39.67 cfs 278,224 cf
Primary=39.67 cfs 278,224 cf

Link 4L: West Wetlands (POC 1) Inflow=17.51 cfs 167,426 cf
Primary=17.51 cfs 167,426 cf

Link 5L: West Off-Site (POC 2) Inflow=7.82 cfs 38,155 cf
Primary=7.82 cfs 38,155 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 483,804 cf Average Runoff Depth = 1.77"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=1.36"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=8.28 cfs 77,432 cf

Subcatchment 2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=1.36"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=19.44 cfs 151,139 cf

Subcatchment 3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=4.40"
Flow Length=691' Tc=42.4 min CN=78 Runoff=46.96 cfs 329,989 cf

Subcatchment 4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=1.62"
Flow Length=846' Tc=13.2 min CN=50 Runoff=11.18 cfs 50,859 cf

Link 2L: Northeast Wetland Inflow=8.28 cfs 77,432 cf
Primary=8.28 cfs 77,432 cf

Link 3L: South Off-Site (POC 3) Inflow=46.96 cfs 329,989 cf
Primary=46.96 cfs 329,989 cf

Link 4L: West Wetlands (POC 1) Inflow=26.55 cfs 228,571 cf
Primary=26.55 cfs 228,571 cf

Link 5L: West Off-Site (POC 2) Inflow=11.18 cfs 50,859 cf
Primary=11.18 cfs 50,859 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 609,419 cf Average Runoff Depth = 2.23"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=1.79"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=11.62 cfs 101,811 cf

Subcatchment 2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=1.79"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=27.45 cfs 198,724 cf

Subcatchment 3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=5.15"
Flow Length=691' Tc=42.4 min CN=78 Runoff=54.78 cfs 386,124 cf

Subcatchment 4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=2.09"
Flow Length=846' Tc=13.2 min CN=50 Runoff=15.08 cfs 65,619 cf

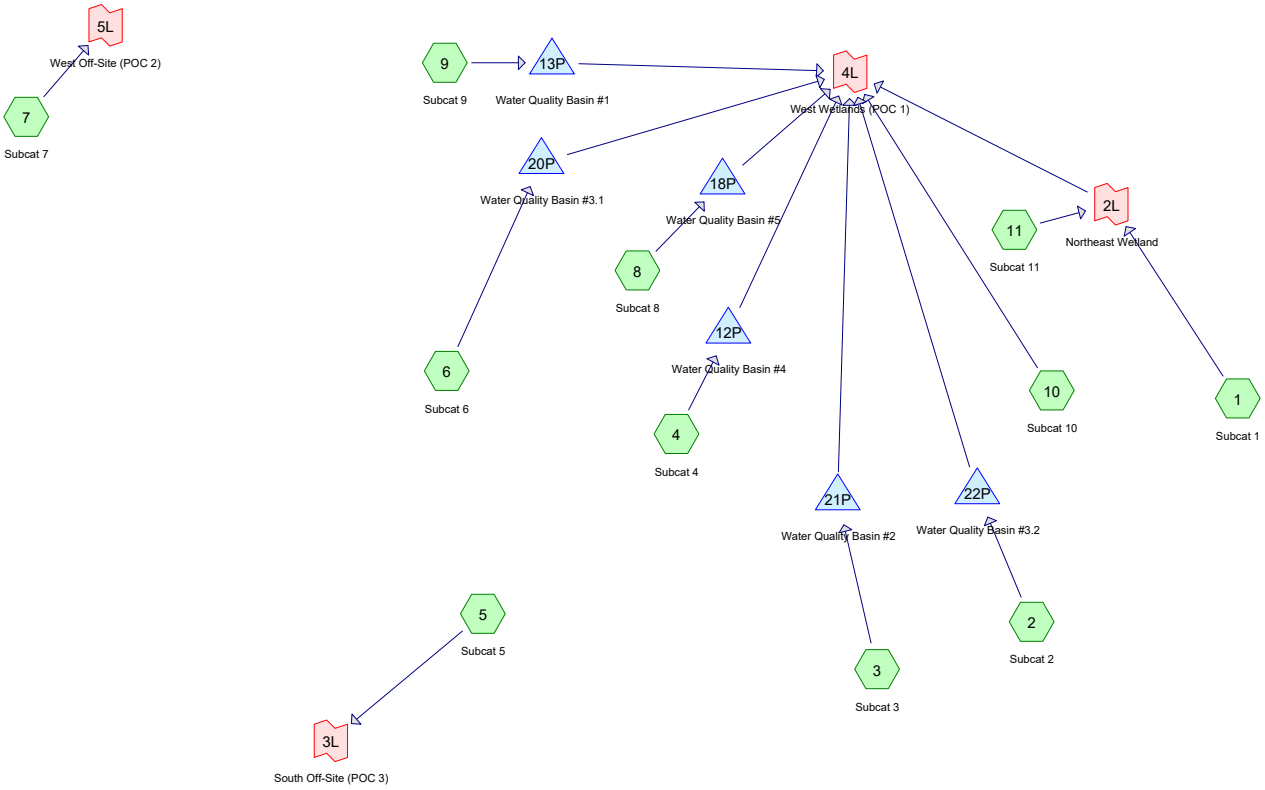
Link 2L: Northeast Wetland Inflow=11.62 cfs 101,811 cf
Primary=11.62 cfs 101,811 cf

Link 3L: South Off-Site (POC 3) Inflow=54.78 cfs 386,124 cf
Primary=54.78 cfs 386,124 cf

Link 4L: West Wetlands (POC 1) Inflow=37.44 cfs 300,535 cf
Primary=37.44 cfs 300,535 cf

Link 5L: West Off-Site (POC 2) Inflow=15.08 cfs 65,619 cf
Primary=15.08 cfs 65,619 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 752,278 cf Average Runoff Depth = 2.75"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf



Subcat Reach Pond Link

Routing Diagram for New Conditions

Prepared by Loureiro Engineering Assoc, Inc, Printed 9/25/2024

Project Notes

Defined 5 rainfall events from CT-Gales Ferry-1761 Route 12_DEPTHS IDF
Defined 5 rainfall events from CT-Gales Ferry-1761 Route 12_DEPTHS IDF

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	NOAA 24-hr	D	Default	24.00	1	3.46	2
2	10-yr	NOAA 24-hr	D	Default	24.00	1	5.12	2
3	25-yr	NOAA 24-hr	D	Default	24.00	1	6.15	2
4	50-yr	NOAA 24-hr	D	Default	24.00	1	6.92	2
5	100-yr	NOAA 24-hr	D	Default	24.00	1	7.74	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
883,042	39	>75% Grass cover, Good, HSG A (1, 2, 3, 4, 6, 8, 9, 10, 11)
400,892	80	>75% Grass cover, Good, HSG D (2, 3, 4, 6)
76,598	30	Brush, Good, HSG A (1, 7, 11)
4,094	48	Brush, Good, HSG B (1, 11)
118,932	73	Brush, Good, HSG D (5, 6, 7)
1,022	72	Dirt roads, HSG A (1)
2,922	89	Dirt roads, HSG D (5)
9,853	76	Gravel roads, HSG A (7)
72,185	91	Gravel roads, HSG D (5, 7)
39,655	96	Gravel surface, HSG A (2, 3, 4, 8, 9, 10, 11)
24,103	98	Unconnected pavement, HSG A (2, 9)
145,671	98	Unconnected pavement, HSG D (3, 4, 5, 6)
453,950	30	Woods, Good, HSG A (1, 2, 7, 10, 11)
16,017	55	Woods, Good, HSG B (1)
704,815	77	Woods, Good, HSG D (1, 2, 3, 4, 5, 6, 7)
329,560	86	Woods/grass comb., Poor, HSG D (2, 3, 4, 6, 9)
3,283,311	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
1,488,222	HSG A	1, 2, 3, 4, 6, 7, 8, 9, 10, 11
20,111	HSG B	1, 11
0	HSG C	
1,774,978	HSG D	1, 2, 3, 4, 5, 6, 7, 9
0	Other	
3,283,311		**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
883,042	0	0	400,892	0	1,283,934	>75% Grass cover, Good	
76,598	4,094	0	118,932	0	199,624	Brush, Good	
1,022	0	0	2,922	0	3,944	Dirt roads	
9,853	0	0	72,185	0	82,038	Gravel roads	
39,655	0	0	0	0	39,655	Gravel surface	
24,103	0	0	145,671	0	169,774	Unconnected pavement	
453,950	16,017	0	704,815	0	1,174,782	Woods, Good	
0	0	0	329,560	0	329,560	Woods/grass comb., Poor	
1,488,222	**20,111**	**0**	**1,774,978**	**0**	**3,283,311**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	12P	21.00	19.10	184.0	0.0103	0.012	0.0	30.0	0.0
2	13P	14.00	12.50	107.0	0.0140	0.012	0.0	30.0	0.0
3	18P	20.00	19.50	25.0	0.0200	0.013	0.0	18.0	0.0
4	20P	16.00	13.80	202.0	0.0109	0.013	0.0	30.0	0.0
5	21P	22.00	21.00	56.0	0.0179	0.013	0.0	24.0	0.0
6	22P	34.00	22.00	838.0	0.0143	0.013	0.0	24.0	0.0

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=0.03"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=0.01 cfs 341 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=0.55"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=1.11 cfs 6,954 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=0.14"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=0.24 cfs 6,240 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=1.75"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=10.83 cfs 70,122 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=1.47"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=10.95 cfs 76,511 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=1.40"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=8.06 cfs 47,326 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=0.14"
Flow Length=815' Tc=28.4 min CN=48 Runoff=0.17 cfs 4,036 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=0.05"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=0.01 cfs 423 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=0.08"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=0.04 cfs 1,360 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=0.06"
Flow Length=335' Tc=16.8 min CN=44 Runoff=0.01 cfs 248 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.00 cfs 0 cf

Pond 12P: Water Quality Basin #4 Peak Elev=24.41' Storage=45,819 cf Inflow=10.83 cfs 70,122 cf
Discarded=0.47 cfs 51,826 cf Primary=0.18 cfs 18,296 cf Outflow=0.65 cfs 70,122 cf

Pond 13P: Water Quality Basin #1 Peak Elev=14.02' Storage=212 cf Inflow=0.04 cfs 1,360 cf
Discarded=0.04 cfs 1,360 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,360 cf

Pond 18P: Water Quality Basin #5 Peak Elev=20.04' Storage=69 cf Inflow=0.01 cfs 423 cf
Discarded=0.01 cfs 423 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 423 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=19.19' Storage=27,462 cf Inflow=8.06 cfs 47,326 cf
Discarded=0.30 cfs 26,031 cf Primary=0.32 cfs 21,295 cf Outflow=0.62 cfs 47,326 cf

Pond 21P: Water Quality Basin #2 Peak Elev=22.14' Storage=1,502 cf Inflow=0.24 cfs 6,240 cf
Discarded=0.12 cfs 6,240 cf Primary=0.00 cfs 0 cf Outflow=0.12 cfs 6,240 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=35.48' Storage=3,700 cf Inflow=1.11 cfs 6,954 cf
Discarded=0.06 cfs 5,821 cf Primary=0.04 cfs 1,133 cf Outflow=0.10 cfs 6,954 cf

Link 2L: Northeast Wetland Inflow=0.01 cfs 341 cf
Primary=0.01 cfs 341 cf

Link 3L: South Off-Site (POC 3) Inflow=10.95 cfs 76,511 cf
Primary=10.95 cfs 76,511 cf

Link 4L: West Wetlands (POC 1) Inflow=0.56 cfs 41,313 cf
Primary=0.56 cfs 41,313 cf

Link 5L: West Off-Site (POC 2) Inflow=0.17 cfs 4,036 cf
Primary=0.17 cfs 4,036 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 213,561 cf Average Runoff Depth = 0.78"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

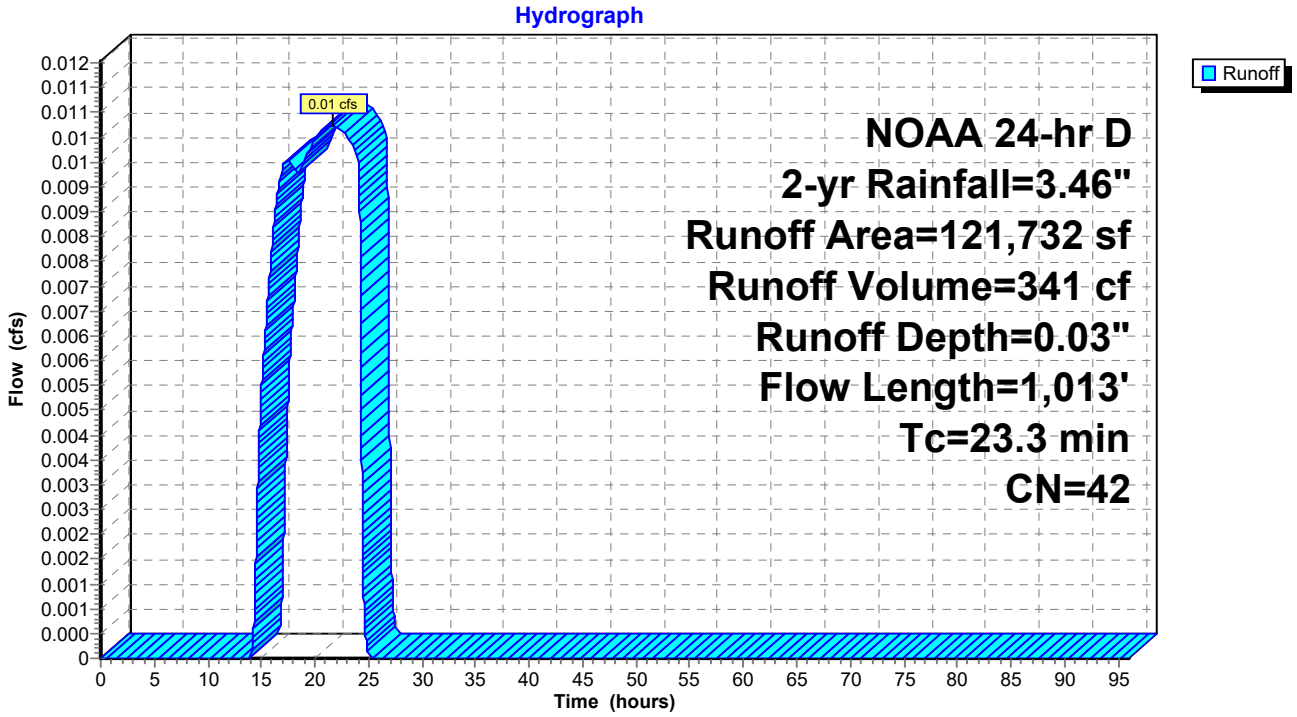
Runoff = 0.01 cfs @ 21.62 hrs, Volume= 341 cf, Depth= 0.03"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

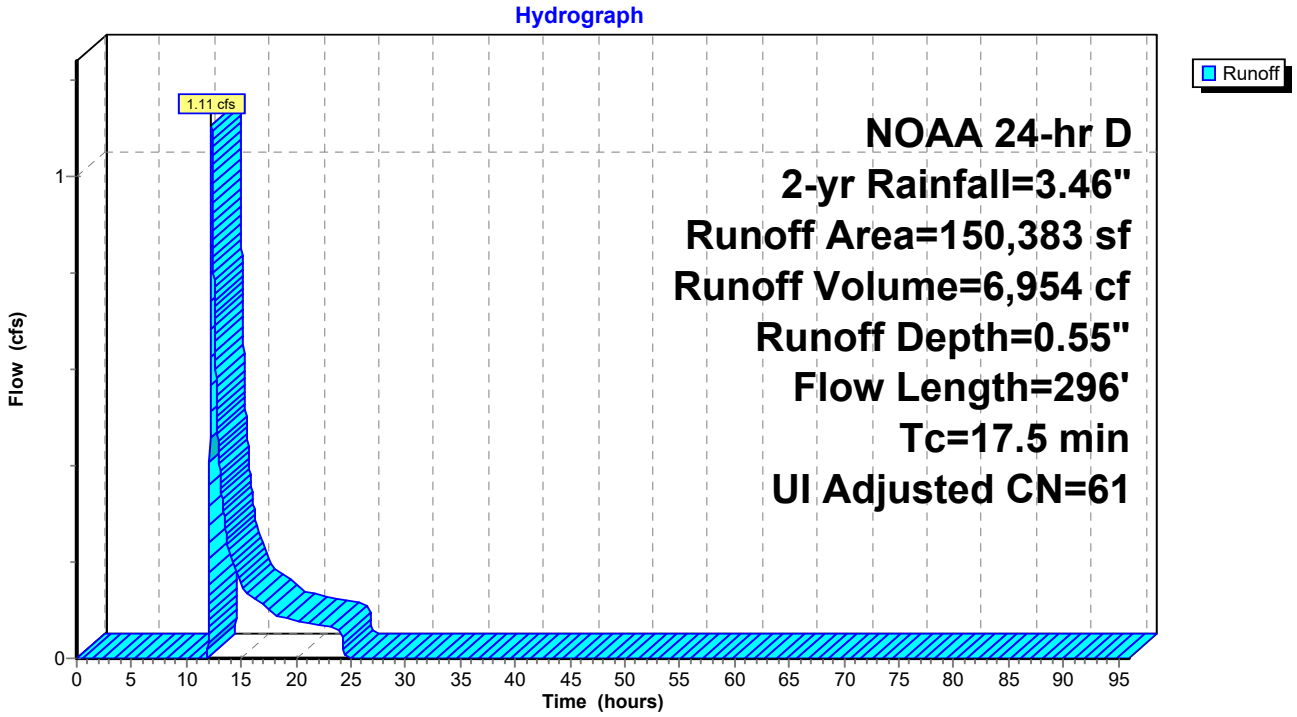
Runoff = 1.11 cfs @ 12.31 hrs, Volume= 6,954 cf, Depth= 0.55"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

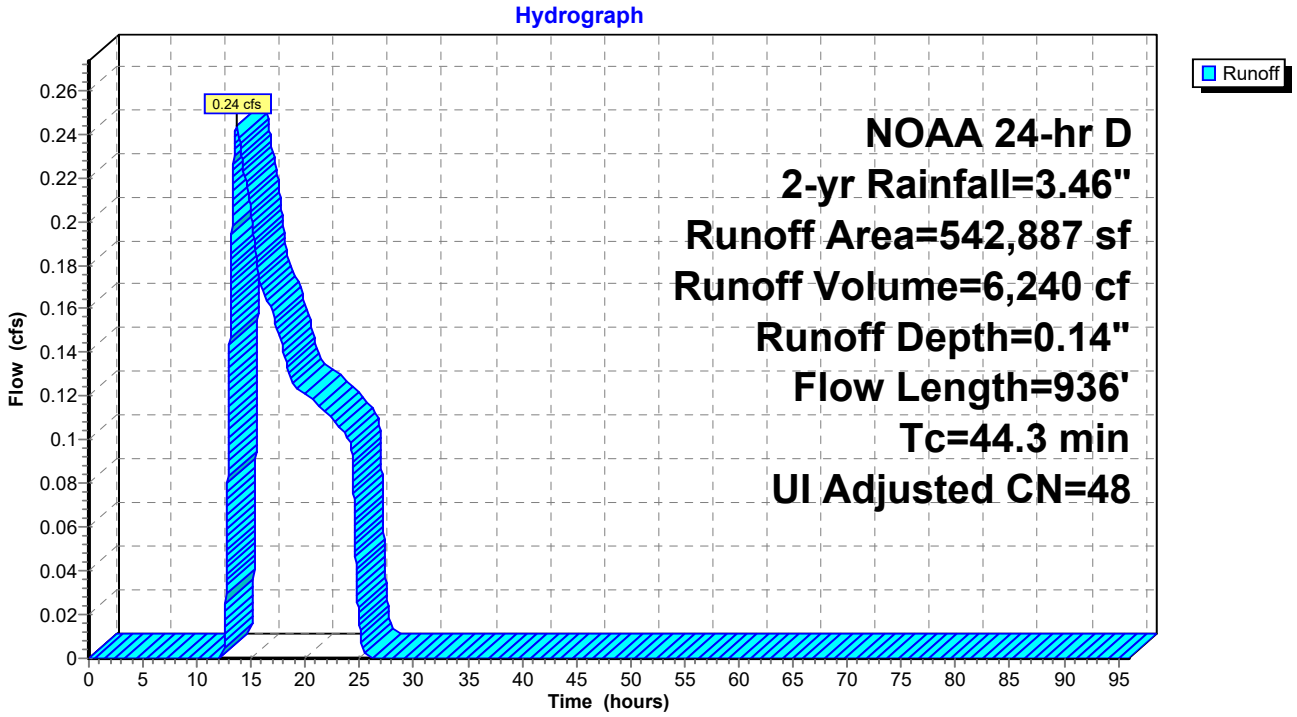
Runoff = 0.24 cfs @ 13.73 hrs, Volume= 6,240 cf, Depth= 0.14"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

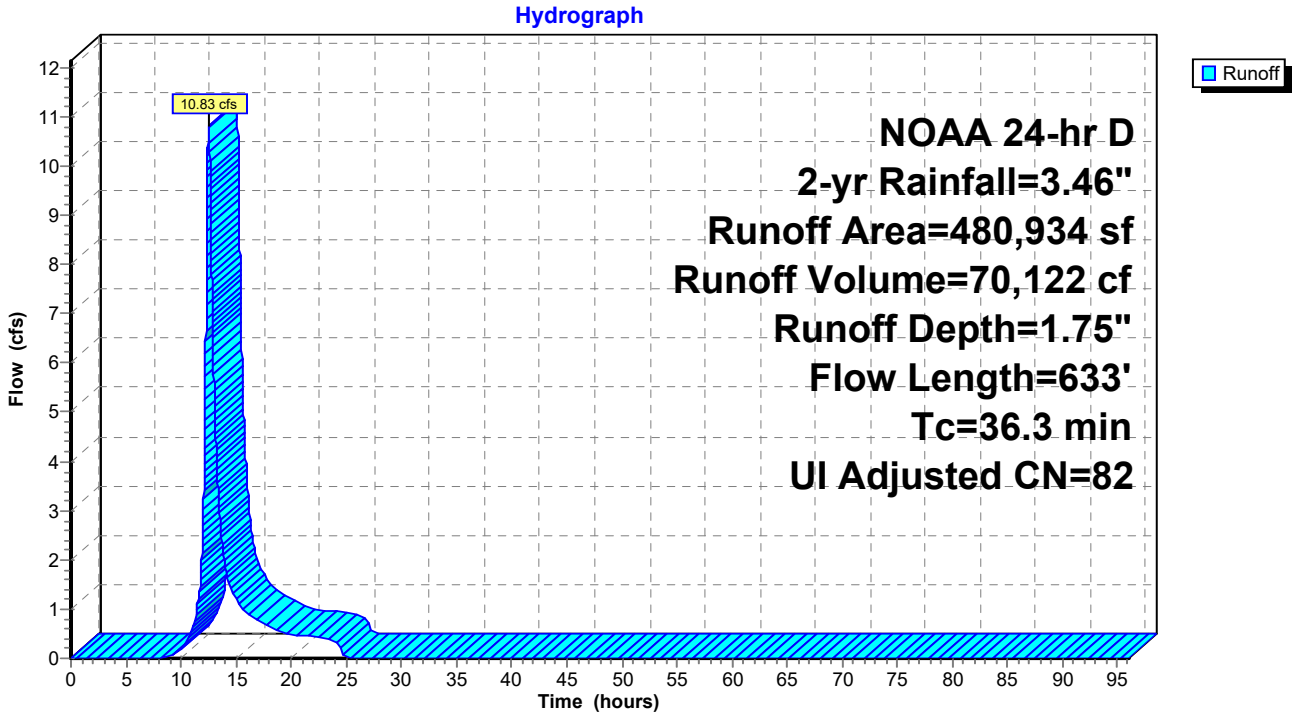
Runoff = 10.83 cfs @ 12.50 hrs, Volume= 70,122 cf, Depth= 1.75"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

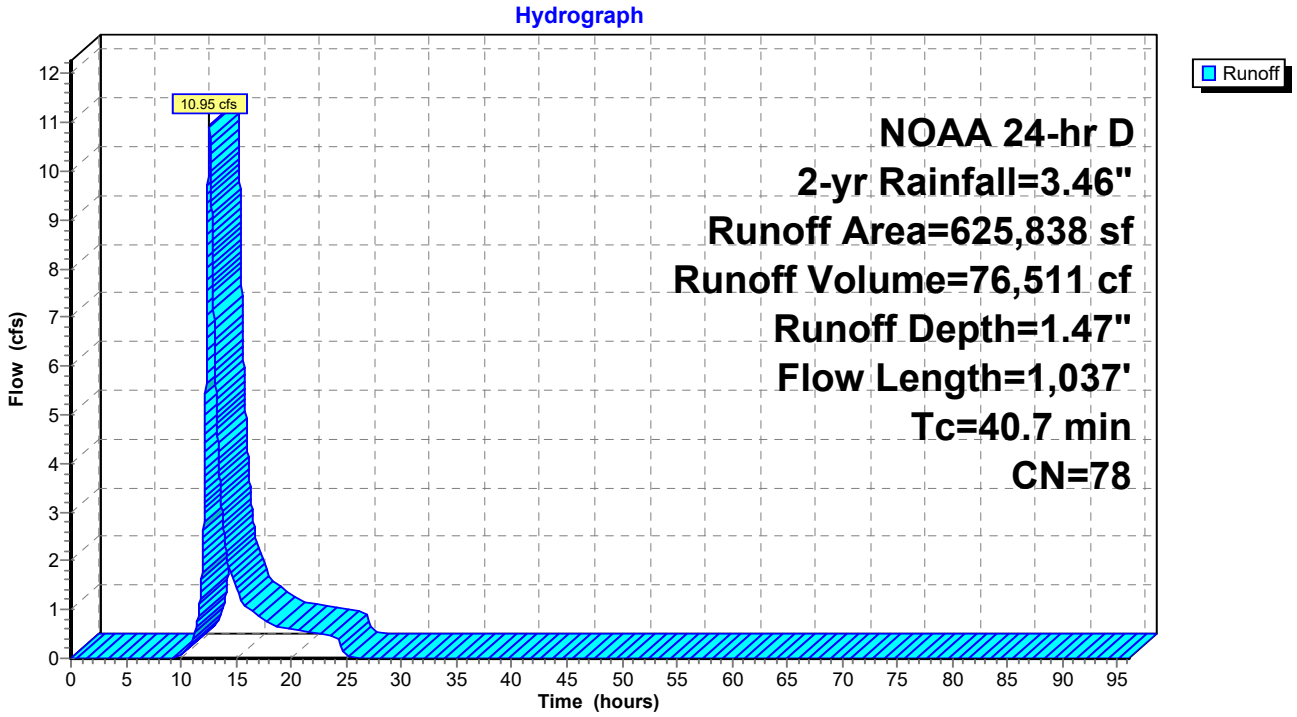
Runoff = 10.95 cfs @ 12.57 hrs, Volume= 76,511 cf, Depth= 1.47"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

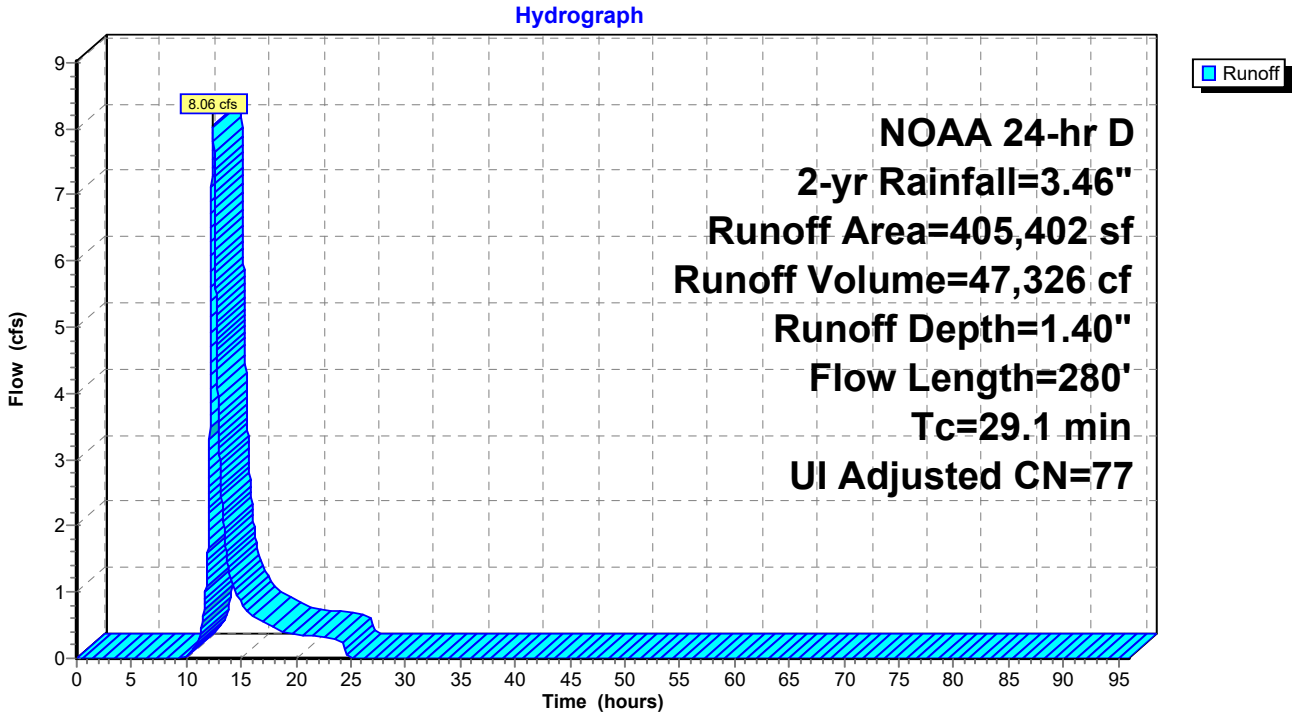
Runoff = 8.06 cfs @ 12.42 hrs, Volume= 47,326 cf, Depth= 1.40"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

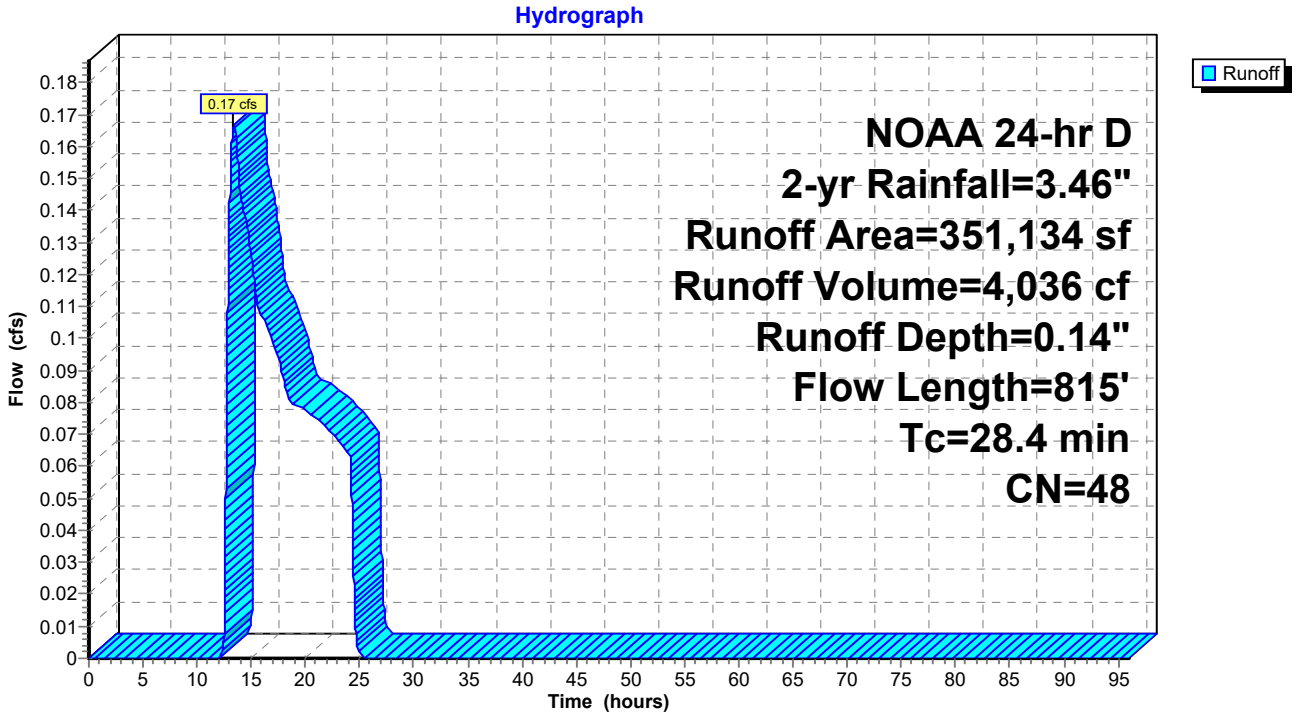
Runoff = 0.17 cfs @ 13.35 hrs, Volume= 4,036 cf, Depth= 0.14"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

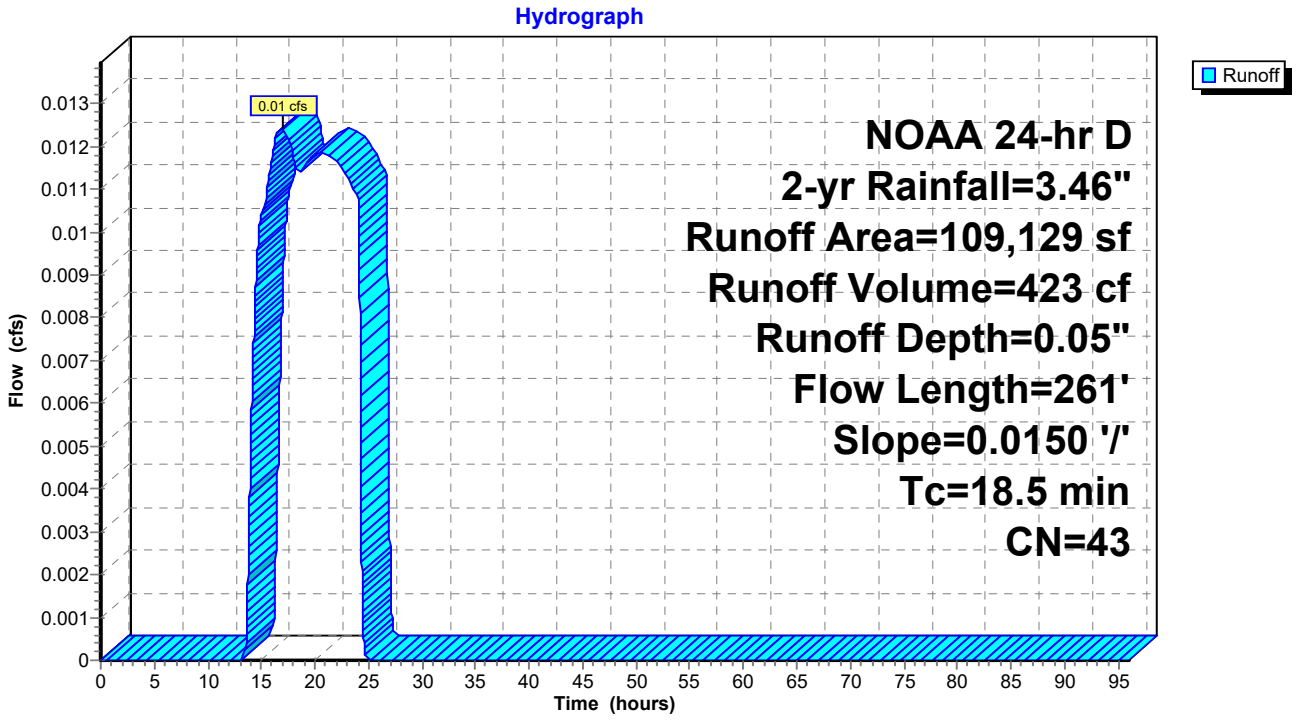
Runoff = 0.01 cfs @ 16.96 hrs, Volume= 423 cf, Depth= 0.05"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

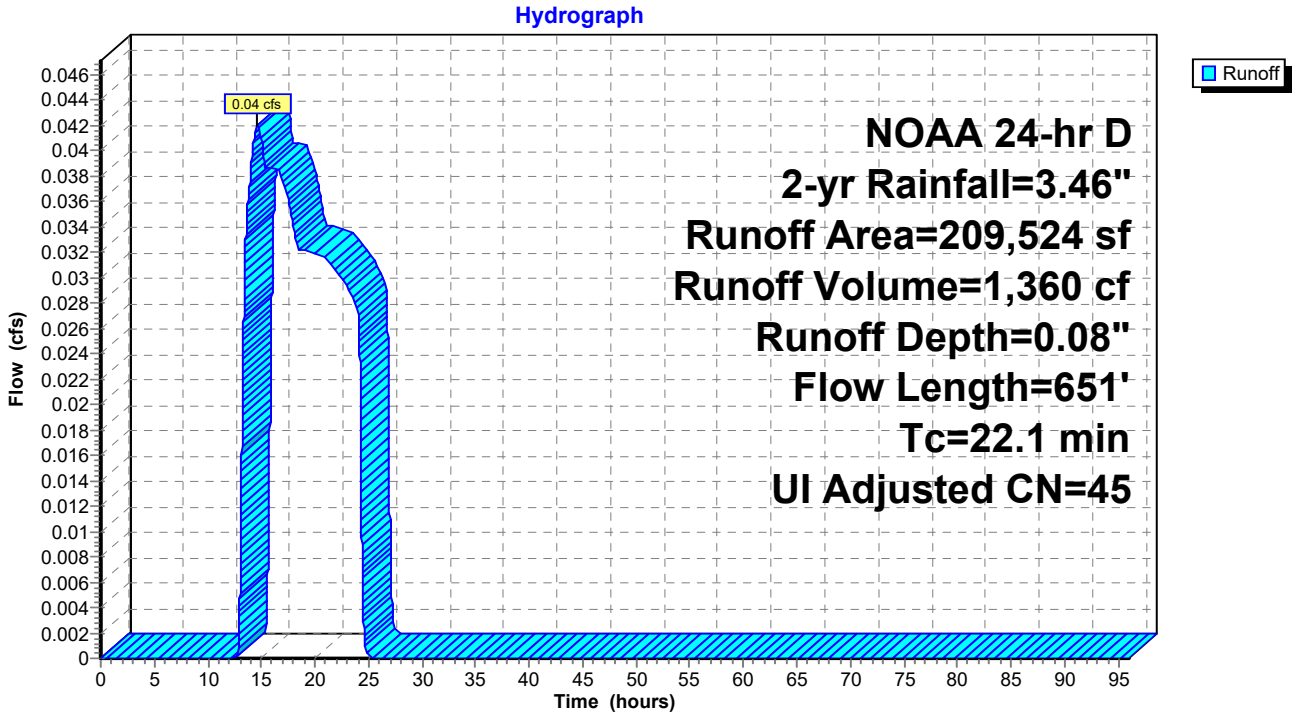
Runoff = 0.04 cfs @ 14.66 hrs, Volume= 1,360 cf, Depth= 0.08"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

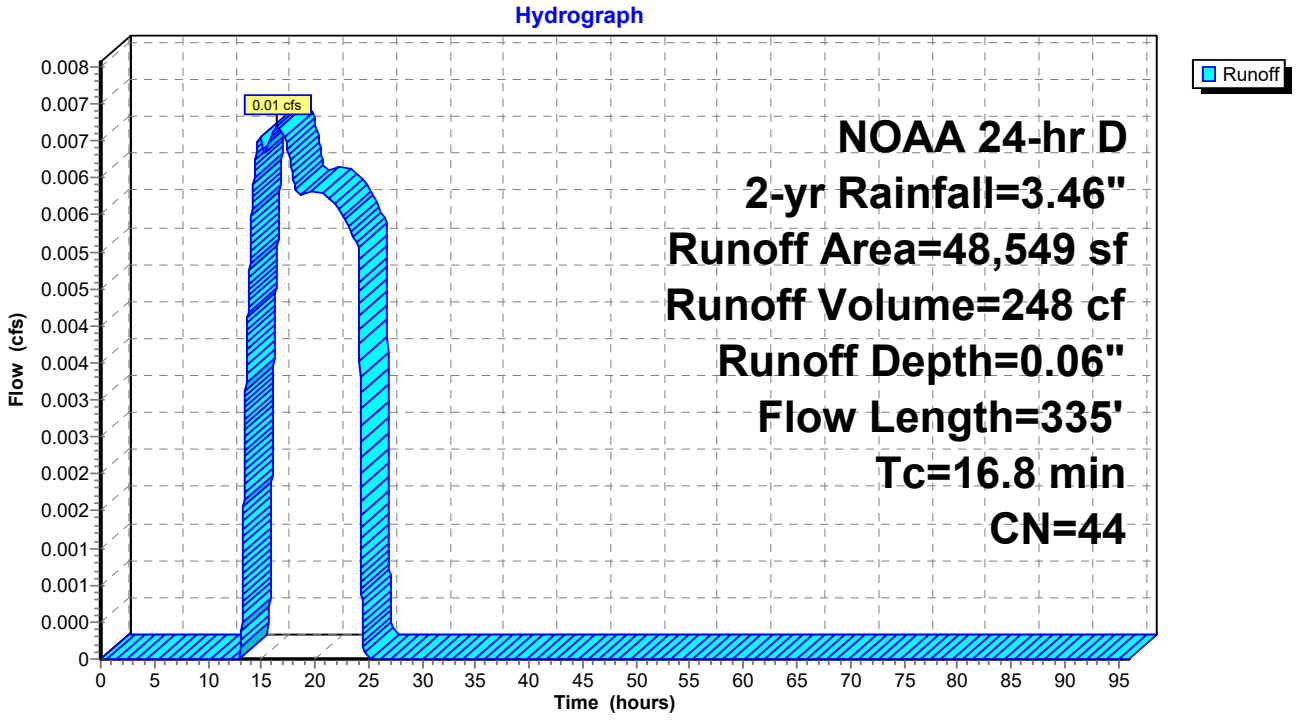
Runoff = 0.01 cfs @ 16.48 hrs, Volume= 248 cf, Depth= 0.06"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

[45] Hint: Runoff=Zero

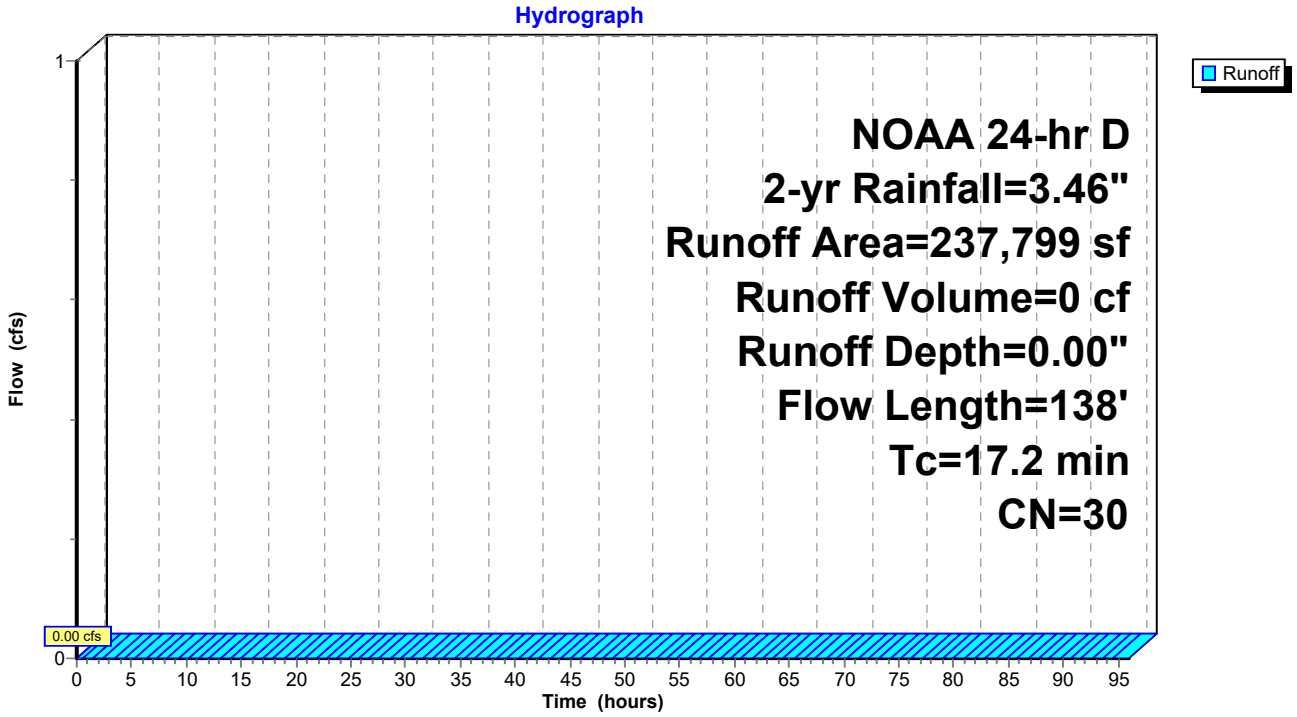
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 1.75" for 2-yr event
Inflow = 10.83 cfs @ 12.50 hrs, Volume= 70,122 cf
Outflow = 0.65 cfs @ 17.80 hrs, Volume= 70,122 cf, Atten= 94%, Lag= 317.9 min
Discarded = 0.47 cfs @ 17.80 hrs, Volume= 51,826 cf
Primary = 0.18 cfs @ 17.80 hrs, Volume= 18,296 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 24.41' @ 17.80 hrs Surf.Area= 16,202 sf Storage= 45,819 cf

Plug-Flow detention time= 919.7 min calculated for 70,114 cf (100% of inflow)
Center-of-Mass det. time= 919.9 min (1,790.7 - 870.8)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

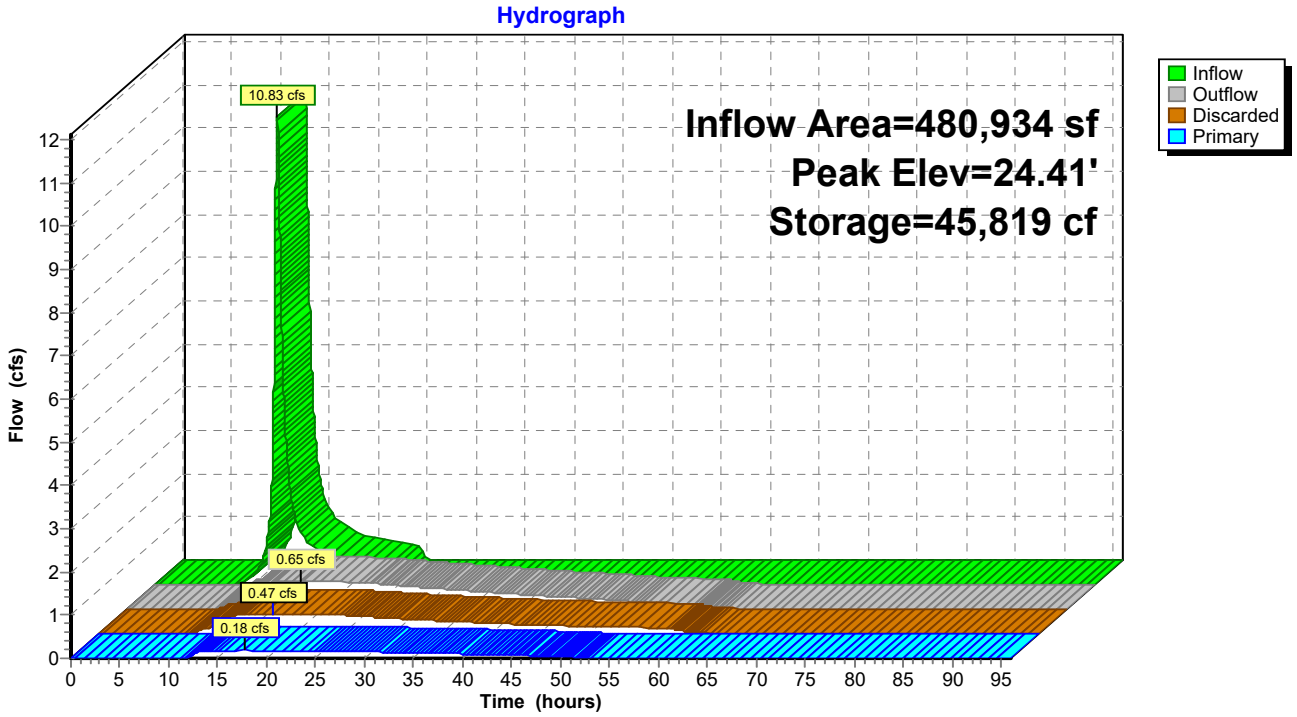
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.47 cfs @ 17.80 hrs HW=24.41' (Free Discharge)
└**3=Exfiltration** (Controls 0.47 cfs)

Primary OutFlow Max=0.18 cfs @ 17.80 hrs HW=24.41' (Free Discharge)
└**1=Culvert** (Passes 0.18 cfs of 34.76 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.38 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 0.08" for 2-yr event
Inflow = 0.04 cfs @ 14.66 hrs, Volume= 1,360 cf
Outflow = 0.04 cfs @ 17.68 hrs, Volume= 1,360 cf, Atten= 16%, Lag= 181.4 min
Discarded = 0.04 cfs @ 17.68 hrs, Volume= 1,360 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 14.02' @ 17.68 hrs Surf.Area= 9,214 sf Storage= 212 cf

Plug-Flow detention time= 100.2 min calculated for 1,360 cf (100% of inflow)
Center-of-Mass det. time= 100.2 min (1,205.3 - 1,105.0)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

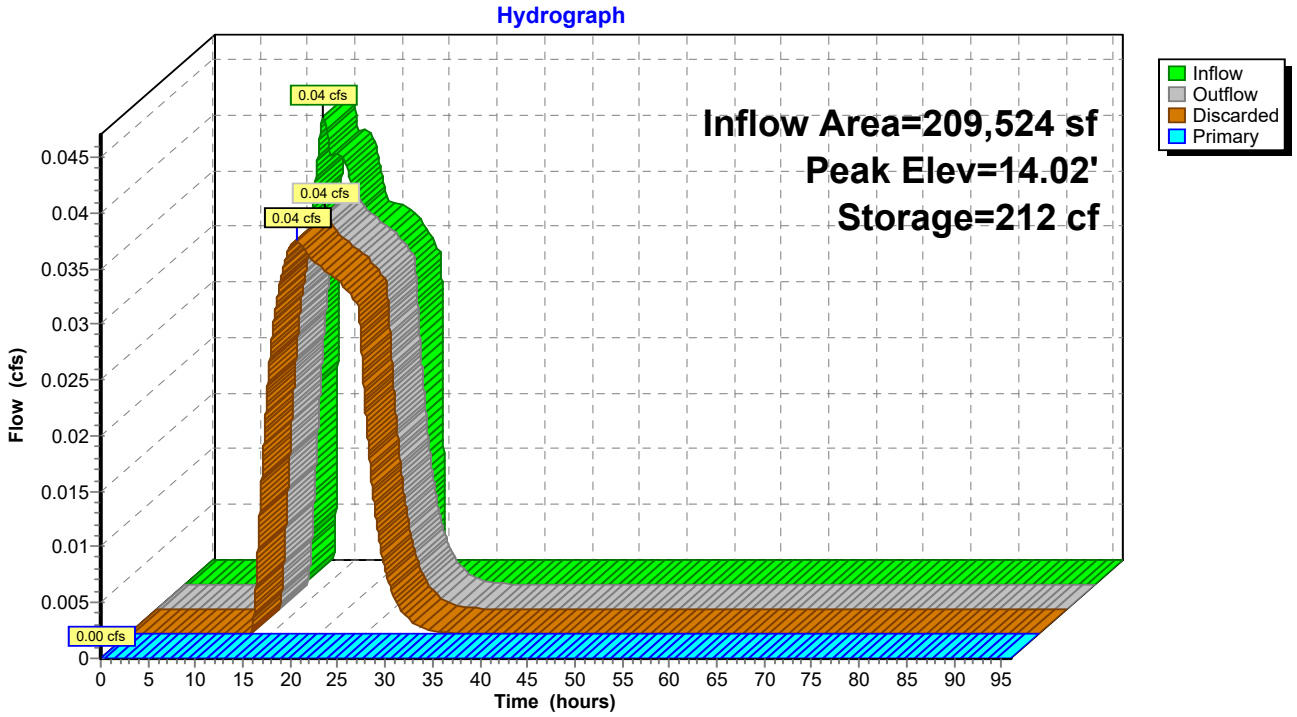
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.11 cfs @ 17.68 hrs HW=14.02' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=14.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 0.05" for 2-yr event
Inflow = 0.01 cfs @ 16.96 hrs, Volume= 423 cf
Outflow = 0.01 cfs @ 22.07 hrs, Volume= 423 cf, Atten= 6%, Lag= 306.4 min
Discarded = 0.01 cfs @ 22.07 hrs, Volume= 423 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 20.04' @ 22.07 hrs Surf.Area= 1,745 sf Storage= 69 cf

Plug-Flow detention time= 99.7 min calculated for 423 cf (100% of inflow)
Center-of-Mass det. time= 99.6 min (1,251.0 - 1,151.5)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

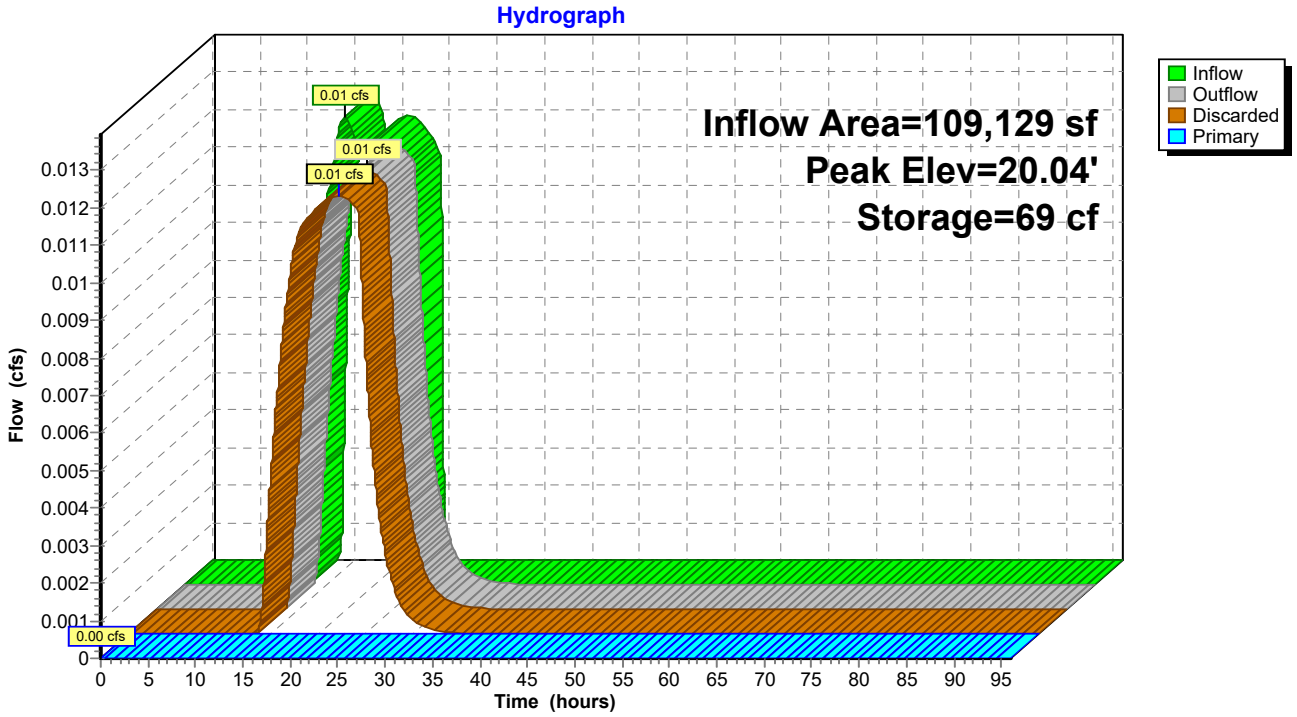
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 22.07 hrs HW=20.04' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=20.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 1.40" for 2-yr event
Inflow = 8.06 cfs @ 12.42 hrs, Volume= 47,326 cf
Outflow = 0.62 cfs @ 16.23 hrs, Volume= 47,326 cf, Atten= 92%, Lag= 228.6 min
Discarded = 0.30 cfs @ 16.23 hrs, Volume= 26,031 cf
Primary = 0.32 cfs @ 16.23 hrs, Volume= 21,295 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 19.19' @ 16.23 hrs Surf.Area= 11,007 sf Storage= 27,462 cf

Plug-Flow detention time= 628.4 min calculated for 47,326 cf (100% of inflow)
Center-of-Mass det. time= 628.3 min (1,509.4 - 881.2)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

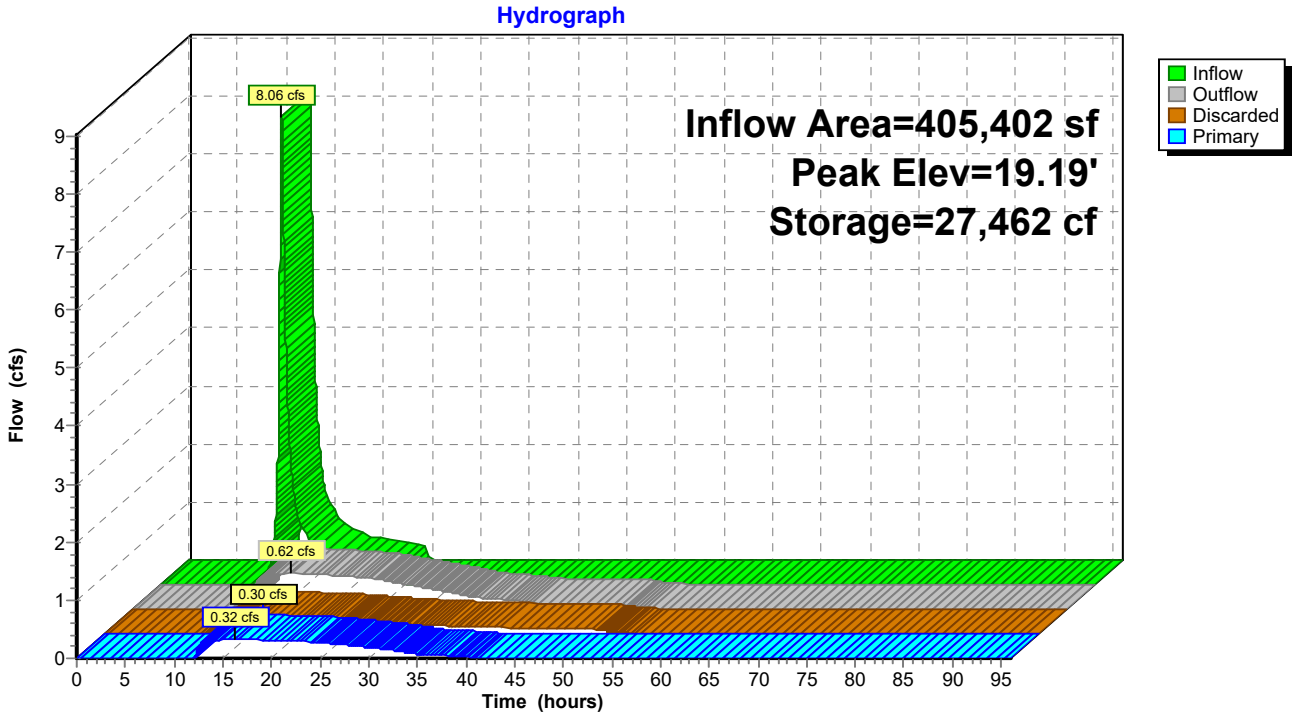
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 16.23 hrs HW=19.19' (Free Discharge)
└**3=Exfiltration** (Controls 0.30 cfs)

Primary OutFlow Max=0.32 cfs @ 16.23 hrs HW=19.19' (Free Discharge)
└**1=Culvert** (Passes 0.32 cfs of 32.92 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.77 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.99 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 0.14" for 2-yr event
Inflow = 0.24 cfs @ 13.73 hrs, Volume= 6,240 cf
Outflow = 0.12 cfs @ 18.89 hrs, Volume= 6,240 cf, Atten= 49%, Lag= 309.7 min
Discarded = 0.12 cfs @ 18.89 hrs, Volume= 6,240 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.14' @ 18.89 hrs Surf.Area= 10,769 sf Storage= 1,502 cf

Plug-Flow detention time= 166.3 min calculated for 6,240 cf (100% of inflow)
Center-of-Mass det. time= 166.2 min (1,237.5 - 1,071.3)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

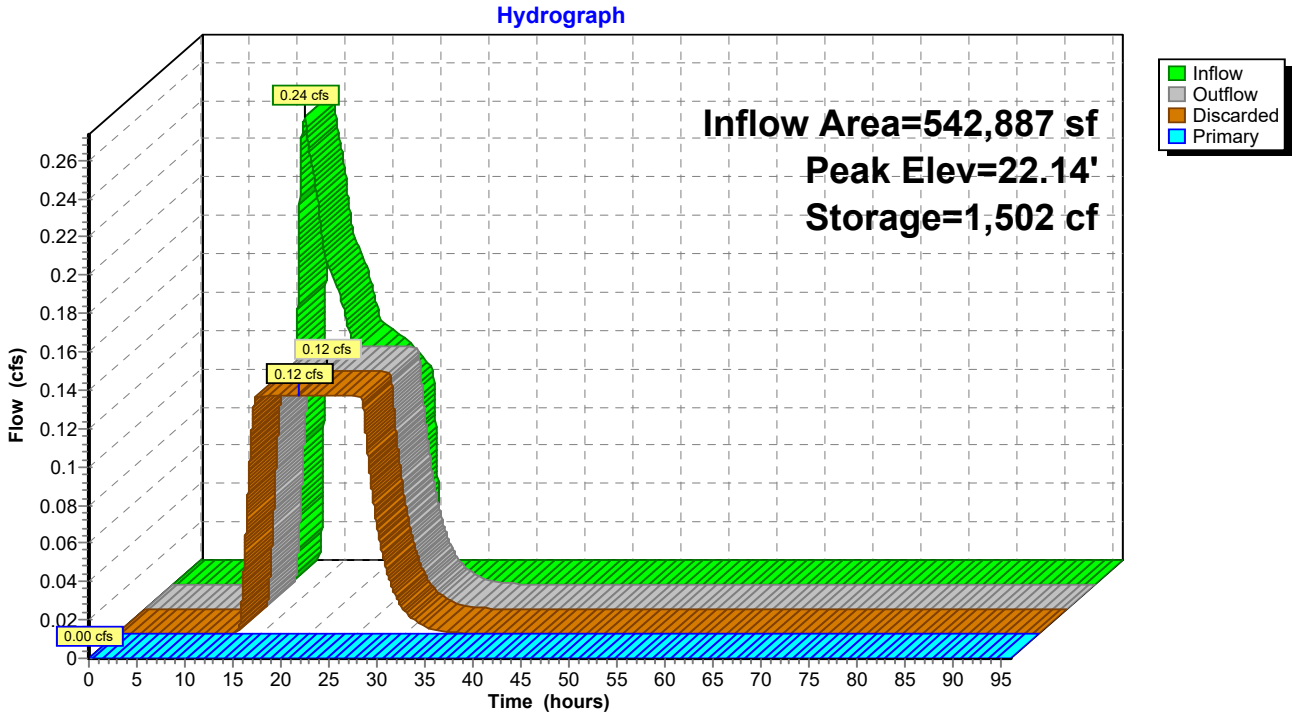
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 18.89 hrs HW=22.14' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=22.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 0.55" for 2-yr event
Inflow = 1.11 cfs @ 12.31 hrs, Volume= 6,954 cf
Outflow = 0.10 cfs @ 17.51 hrs, Volume= 6,954 cf, Atten= 91%, Lag= 311.8 min
Discarded = 0.06 cfs @ 17.51 hrs, Volume= 5,821 cf
Primary = 0.04 cfs @ 17.51 hrs, Volume= 1,133 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 35.48' @ 17.51 hrs Surf.Area= 3,080 sf Storage= 3,700 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 641.2 min calculated for 6,954 cf (100% of inflow)
Center-of-Mass det. time= 641.1 min (1,574.1 - 933.0)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

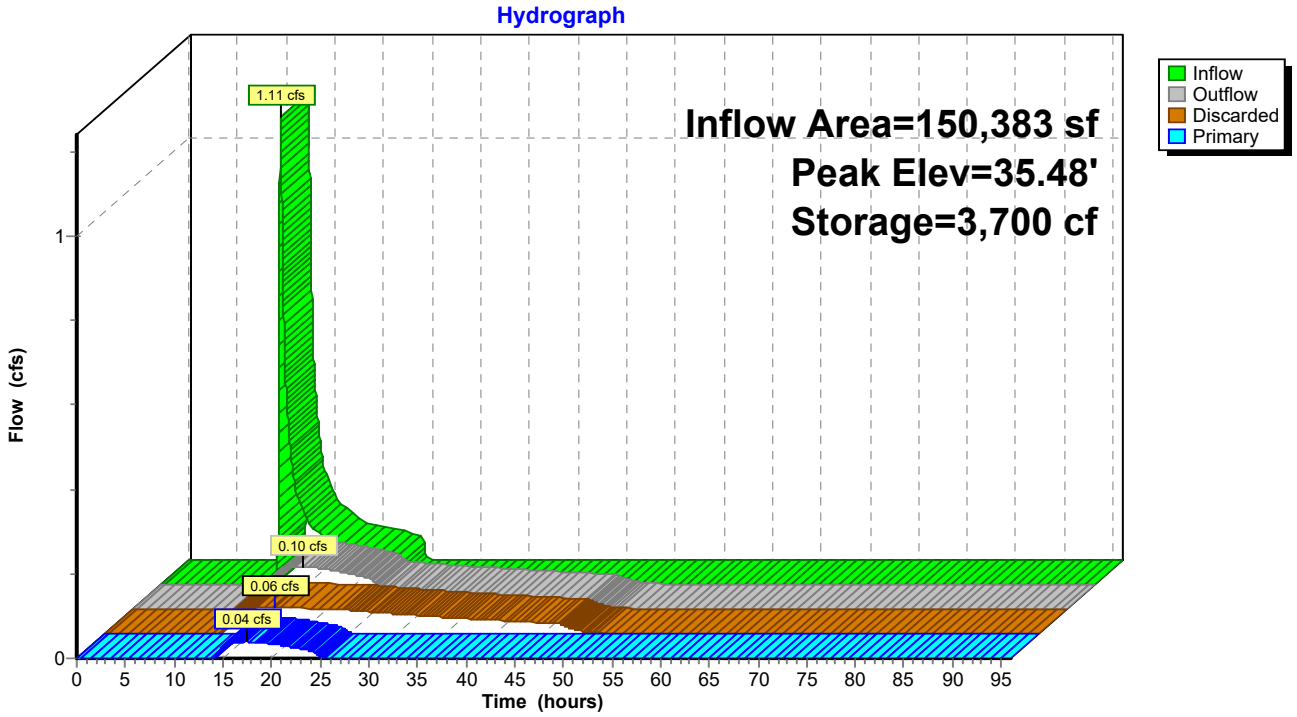
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 17.51 hrs HW=35.48' (Free Discharge)
└**3=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.04 cfs @ 17.51 hrs HW=35.48' (Free Discharge)
└**1=Culvert** (Passes 0.04 cfs of 10.29 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.82 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 22P: Water Quality Basin #3.2

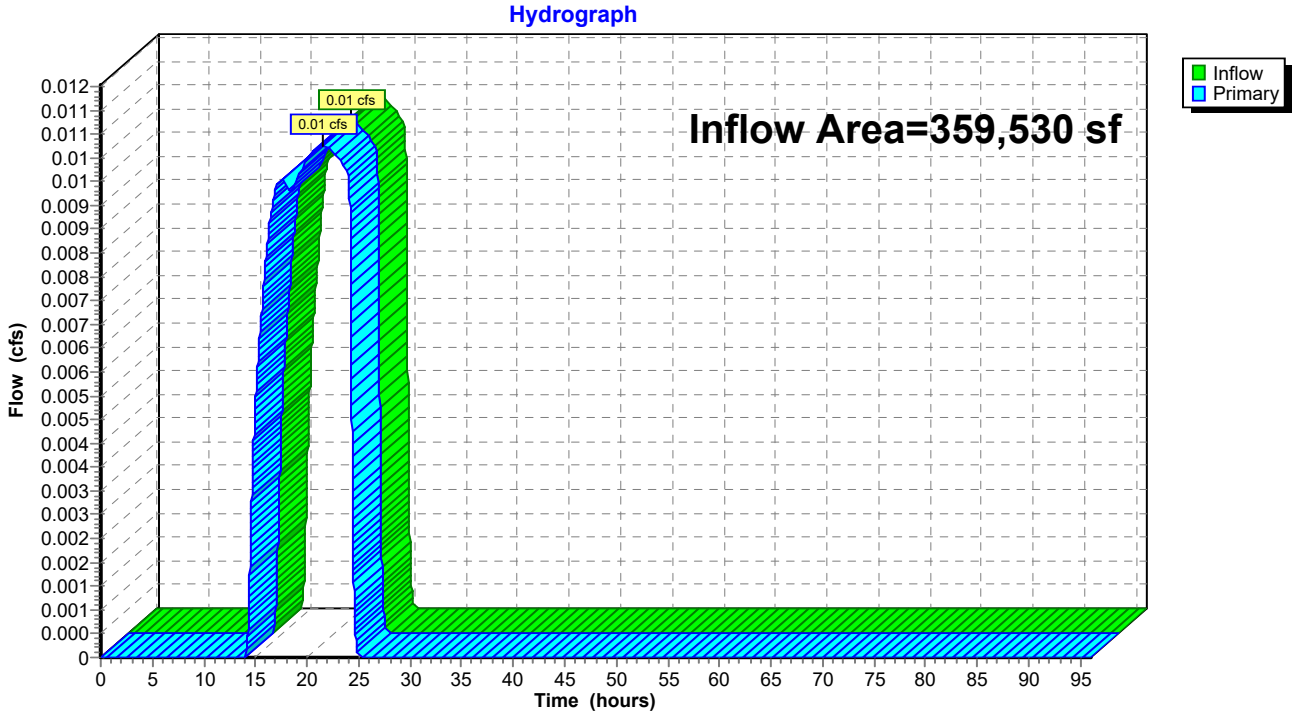


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.01" for 2-yr event
Inflow = 0.01 cfs @ 21.62 hrs, Volume= 341 cf
Primary = 0.01 cfs @ 21.62 hrs, Volume= 341 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

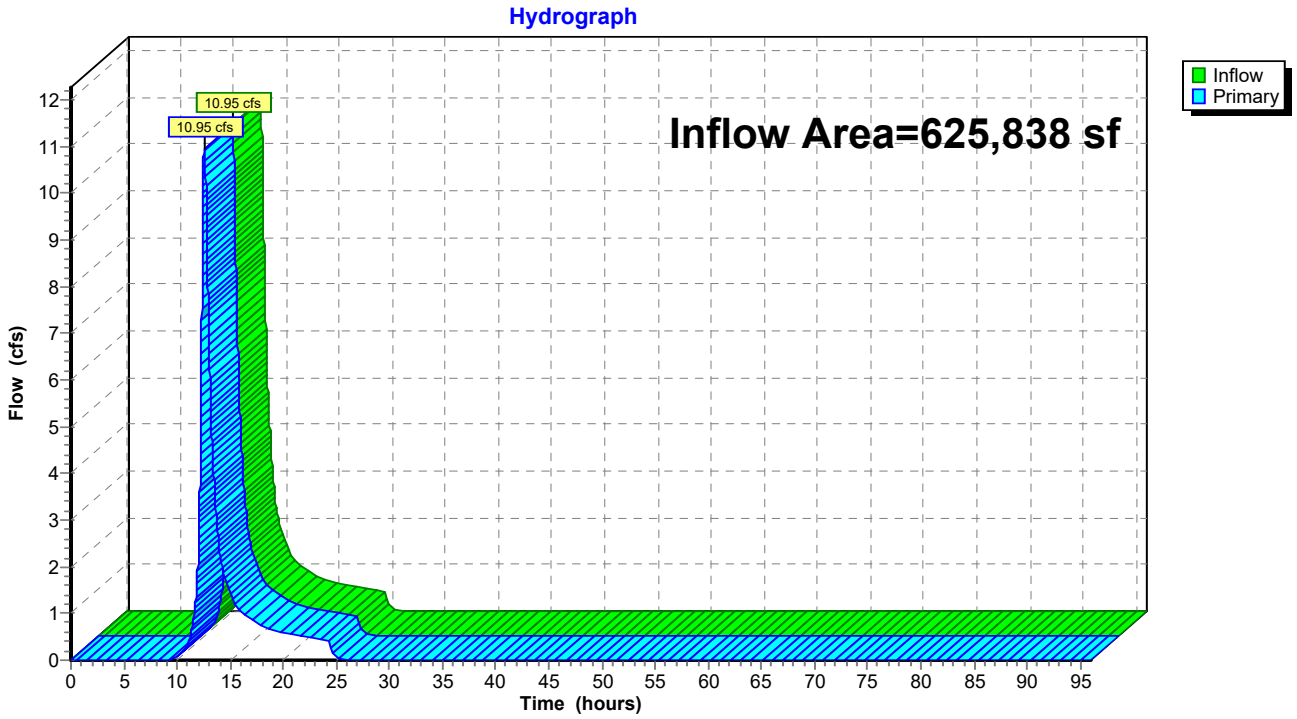


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 1.47" for 2-yr event
Inflow = 10.95 cfs @ 12.57 hrs, Volume= 76,511 cf
Primary = 10.95 cfs @ 12.57 hrs, Volume= 76,511 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

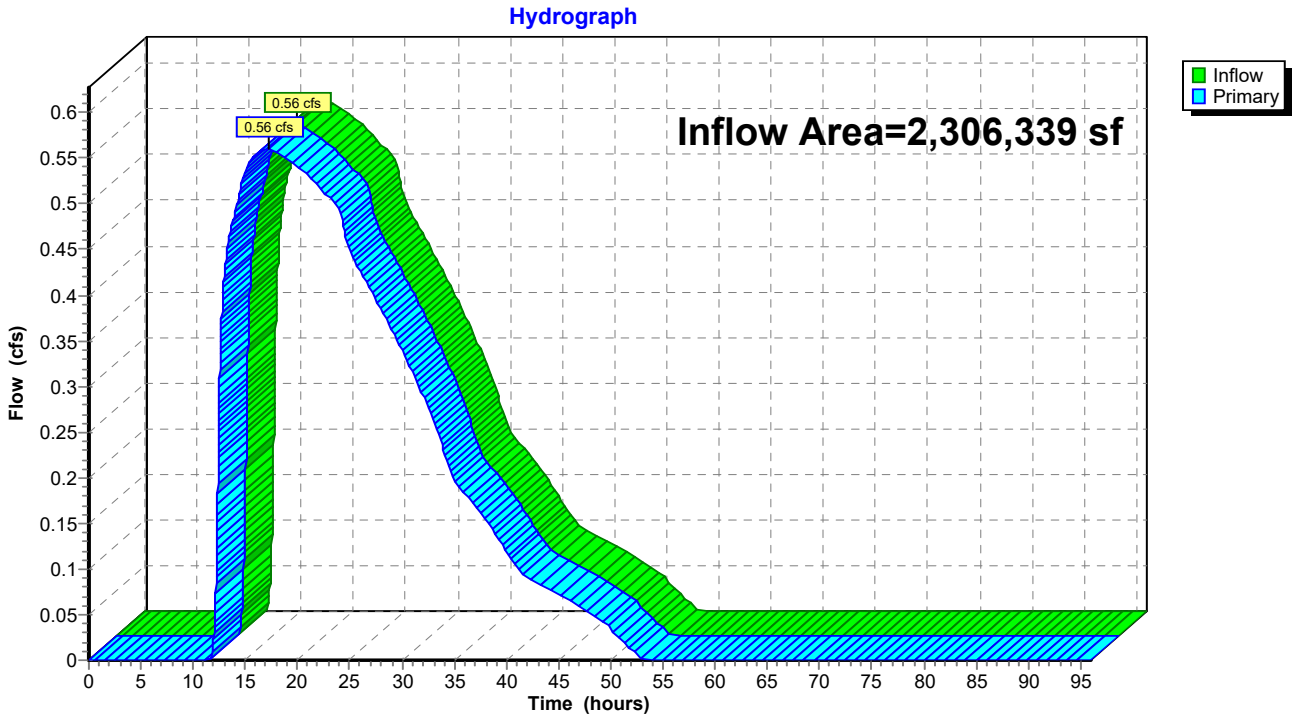


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 0.21" for 2-yr event
Inflow = 0.56 cfs @ 17.16 hrs, Volume= 41,313 cf
Primary = 0.56 cfs @ 17.16 hrs, Volume= 41,313 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

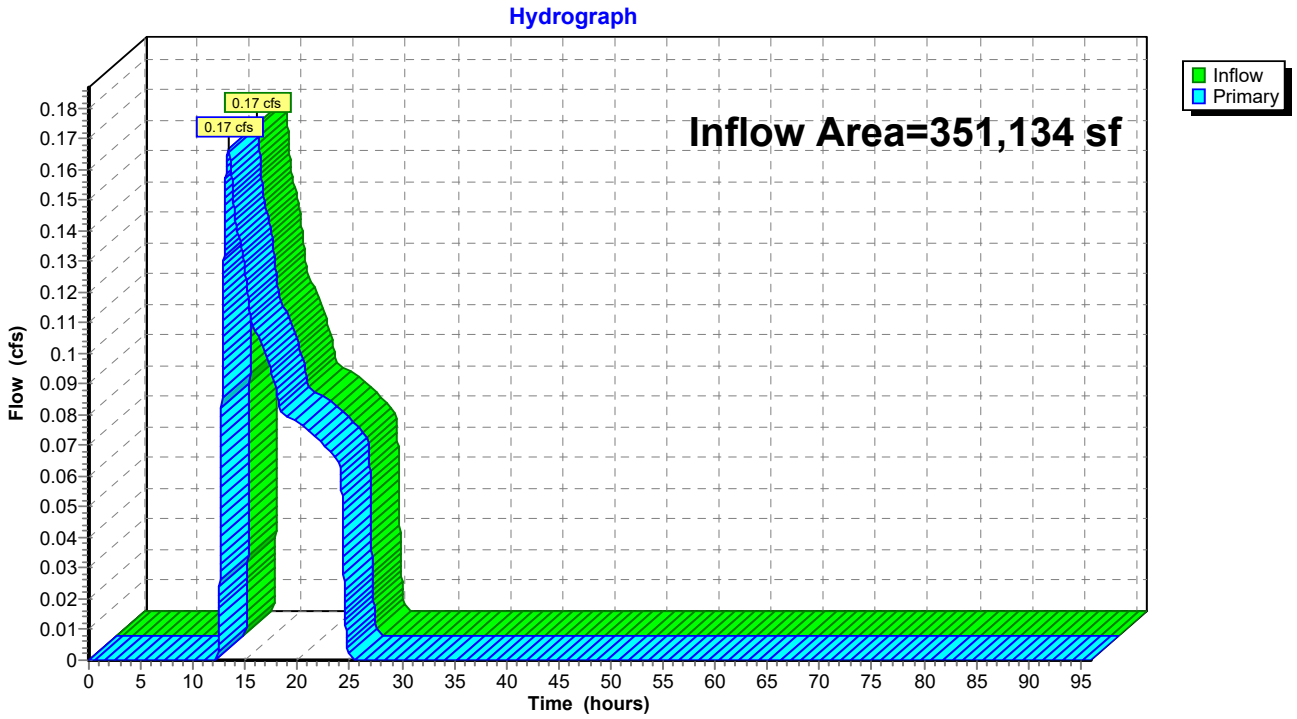


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 0.14" for 2-yr event
Inflow = 0.17 cfs @ 13.35 hrs, Volume= 4,036 cf
Primary = 0.17 cfs @ 13.35 hrs, Volume= 4,036 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=0.34"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=0.22 cfs 3,489 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=1.44"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=3.69 cfs 18,068 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=0.63"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=2.43 cfs 28,622 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=3.19"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=19.76 cfs 127,713 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=2.81"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=21.38 cfs 146,752 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=2.72"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=15.99 cfs 92,016 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=0.63"
Flow Length=815' Tc=28.4 min CN=48 Runoff=1.92 cfs 18,512 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=0.39"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=0.25 cfs 3,525 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=0.48"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=0.73 cfs 8,390 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=0.43"
Flow Length=335' Tc=16.8 min CN=44 Runoff=0.15 cfs 1,753 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.01 cfs 171 cf

Pond 12P: Water Quality Basin #4 Peak Elev=26.19' Storage=77,285 cf Inflow=19.76 cfs 127,713 cf
Discarded=0.67 cfs 70,180 cf Primary=1.28 cfs 57,533 cf Outflow=1.95 cfs 127,713 cf

Pond 13P: Water Quality Basin #1 Peak Elev=14.39' Storage=3,714 cf Inflow=0.73 cfs 8,390 cf
Discarded=0.11 cfs 8,390 cf Primary=0.00 cfs 0 cf Outflow=0.11 cfs 8,390 cf

Pond 18P: Water Quality Basin #5 Peak Elev=20.56' Storage=1,061 cf Inflow=0.25 cfs 3,525 cf
Discarded=0.02 cfs 1,877 cf Primary=0.07 cfs 1,649 cf Outflow=0.10 cfs 3,525 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=21.59' Storage=58,623 cf Inflow=15.99 cfs 92,016 cf
Discarded=0.51 cfs 49,763 cf Primary=0.46 cfs 42,253 cf Outflow=0.97 cfs 92,016 cf

Pond 21P: Water Quality Basin #2 Peak Elev=22.94' Storage=10,669 cf Inflow=2.43 cfs 28,622 cf
Discarded=0.14 cfs 12,579 cf Primary=0.51 cfs 16,042 cf Outflow=0.65 cfs 28,622 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=36.51' Storage=7,315 cf Inflow=3.69 cfs 18,068 cf
Discarded=0.09 cfs 8,018 cf Primary=0.59 cfs 10,050 cf Outflow=0.69 cfs 18,068 cf

Link 2L: Northeast Wetland Inflow=0.22 cfs 3,660 cf
Primary=0.22 cfs 3,660 cf

Link 3L: South Off-Site (POC 3) Inflow=21.38 cfs 146,752 cf
Primary=21.38 cfs 146,752 cf

Link 4L: West Wetlands (POC 1) Inflow=2.88 cfs 132,939 cf
Primary=2.88 cfs 132,939 cf

Link 5L: West Off-Site (POC 2) Inflow=1.92 cfs 18,512 cf
Primary=1.92 cfs 18,512 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 449,010 cf Average Runoff Depth = 1.64"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

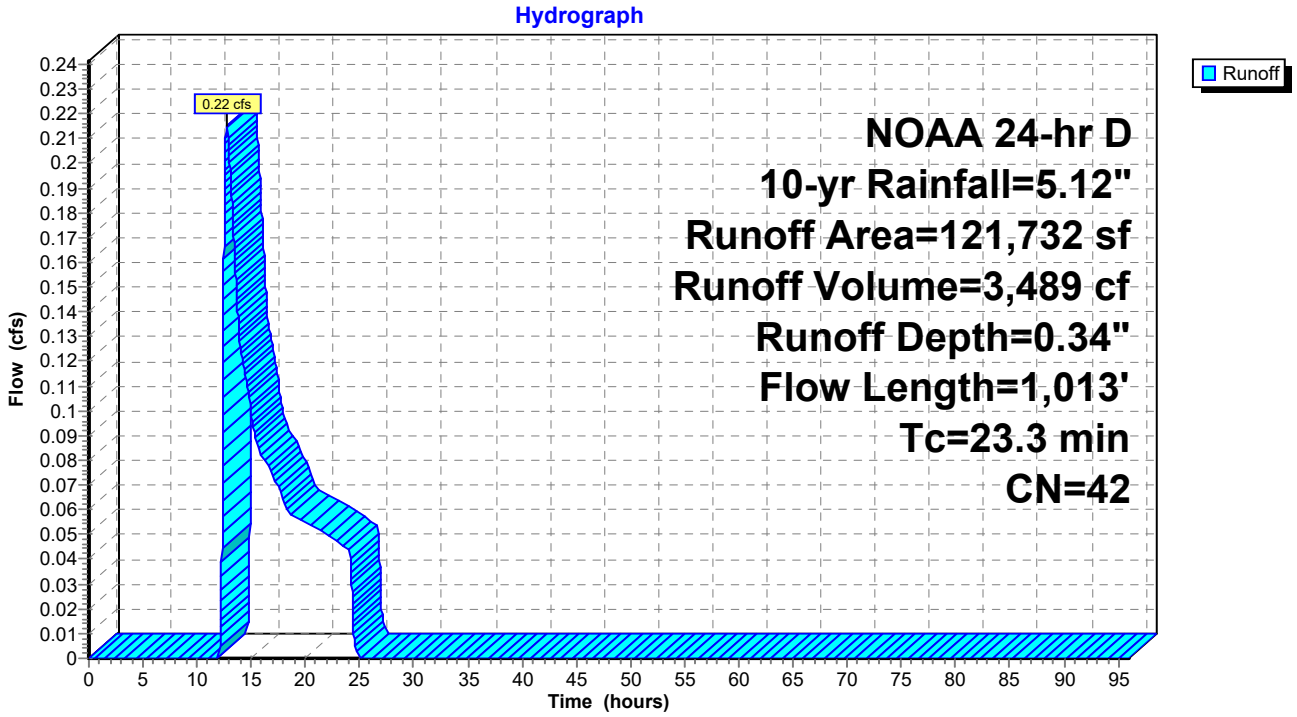
Runoff = 0.22 cfs @ 12.71 hrs, Volume= 3,489 cf, Depth= 0.34"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

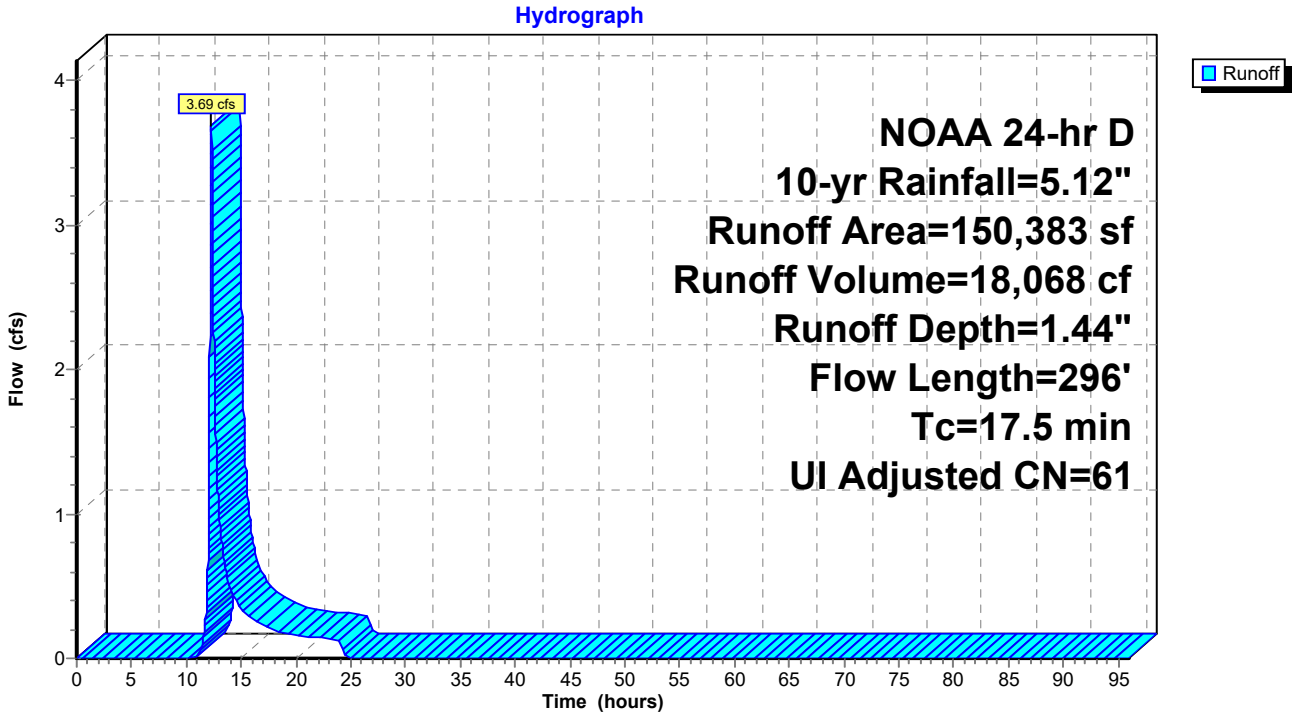
Runoff = 3.69 cfs @ 12.27 hrs, Volume= 18,068 cf, Depth= 1.44"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

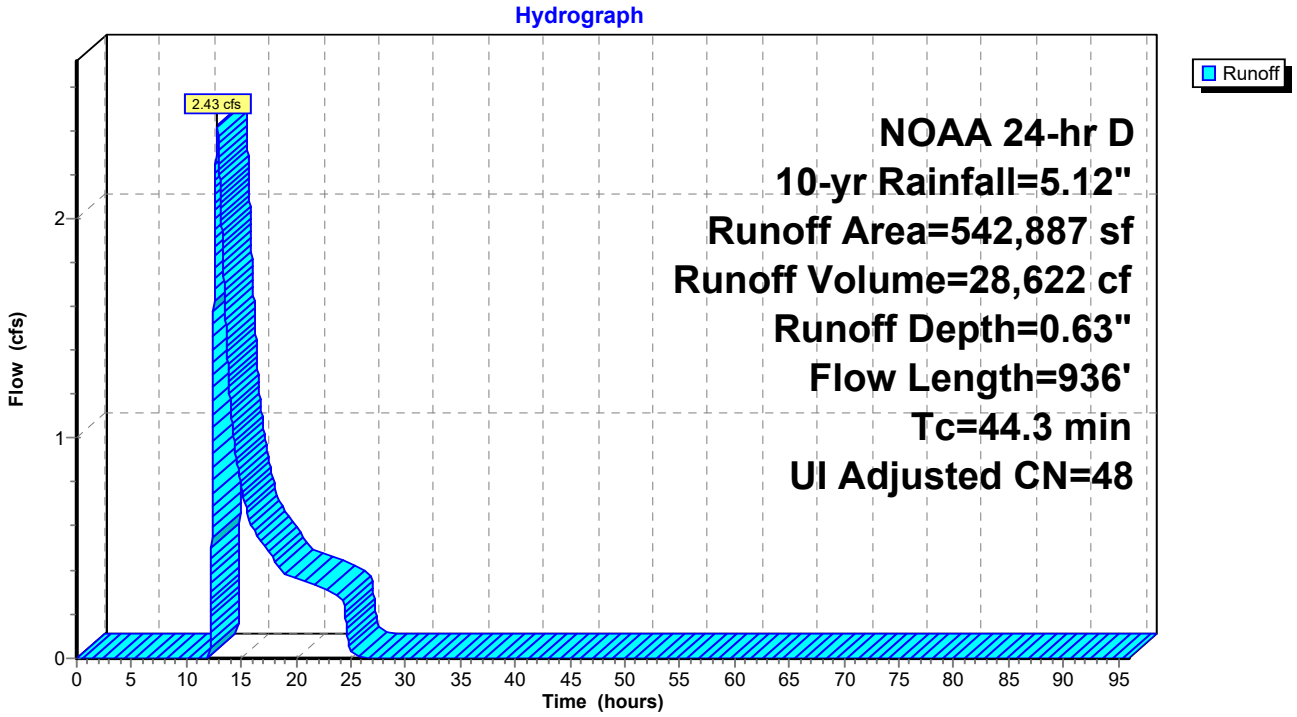
Runoff = 2.43 cfs @ 12.80 hrs, Volume= 28,622 cf, Depth= 0.63"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

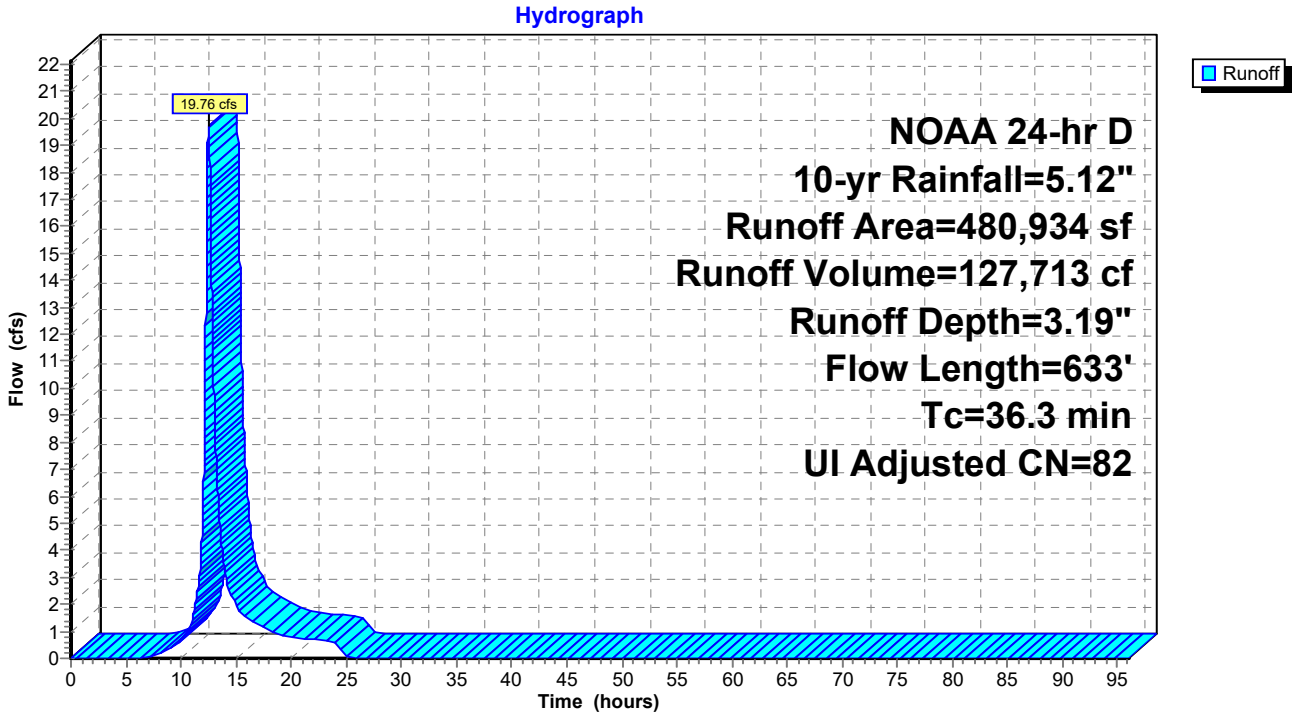
Runoff = 19.76 cfs @ 12.50 hrs, Volume= 127,713 cf, Depth= 3.19"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

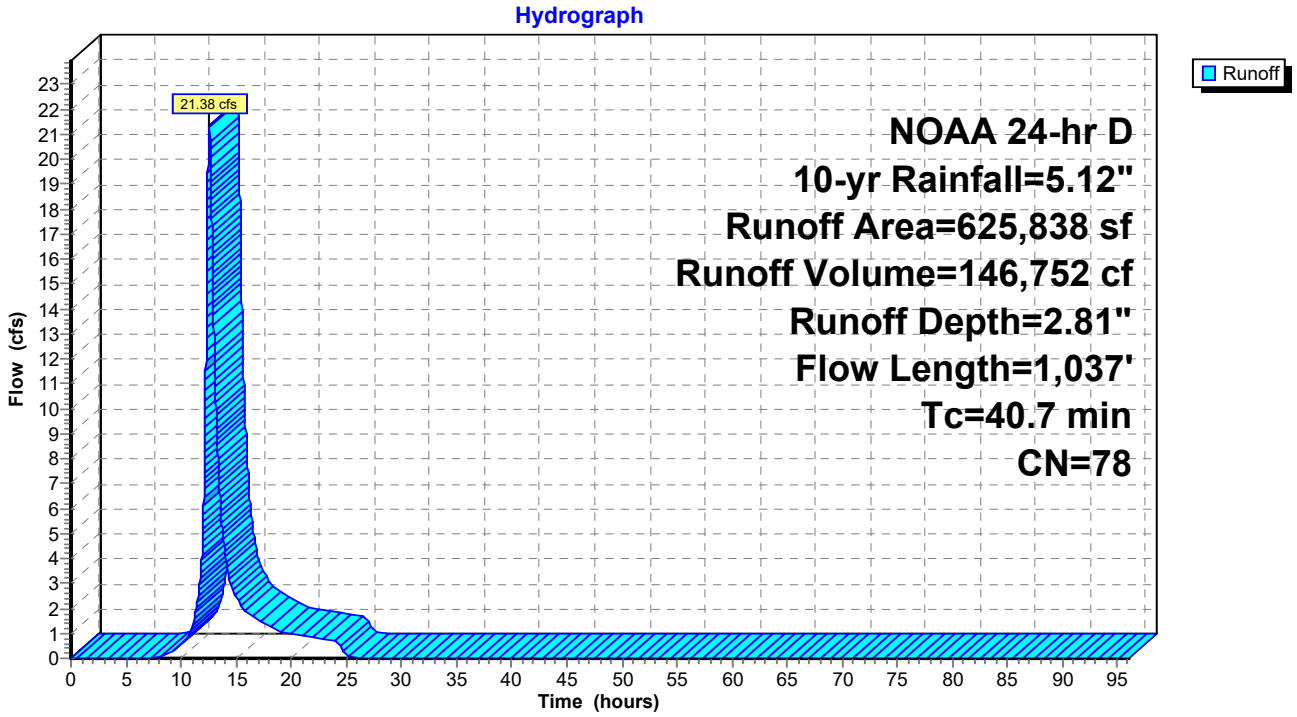
Runoff = 21.38 cfs @ 12.57 hrs, Volume= 146,752 cf, Depth= 2.81"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

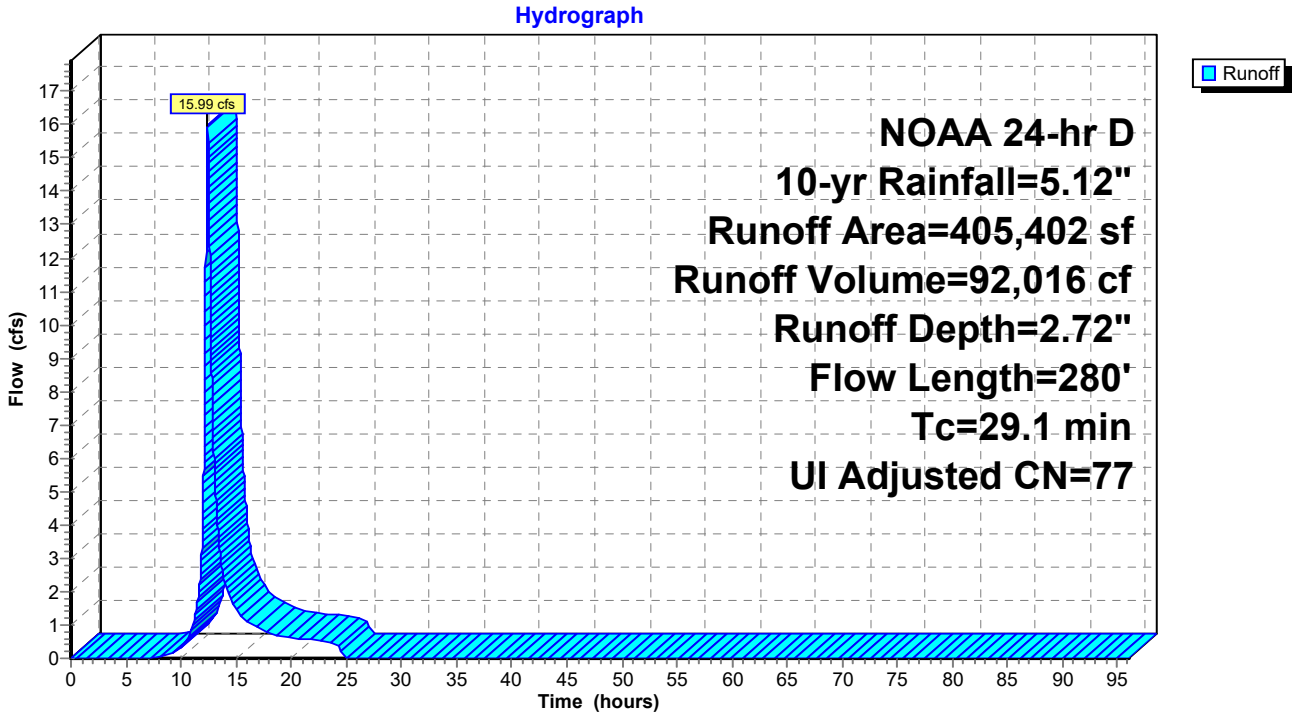
Runoff = 15.99 cfs @ 12.41 hrs, Volume= 92,016 cf, Depth= 2.72"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

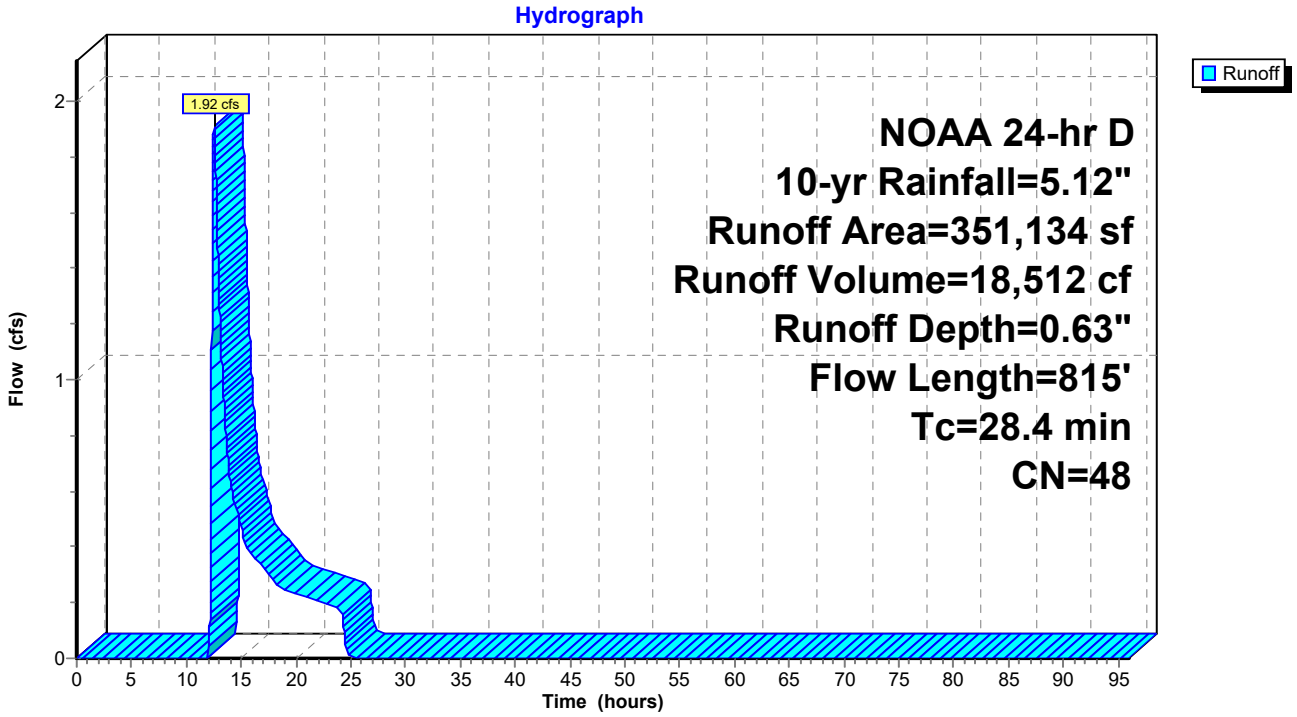
Runoff = 1.92 cfs @ 12.53 hrs, Volume= 18,512 cf, Depth= 0.63"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

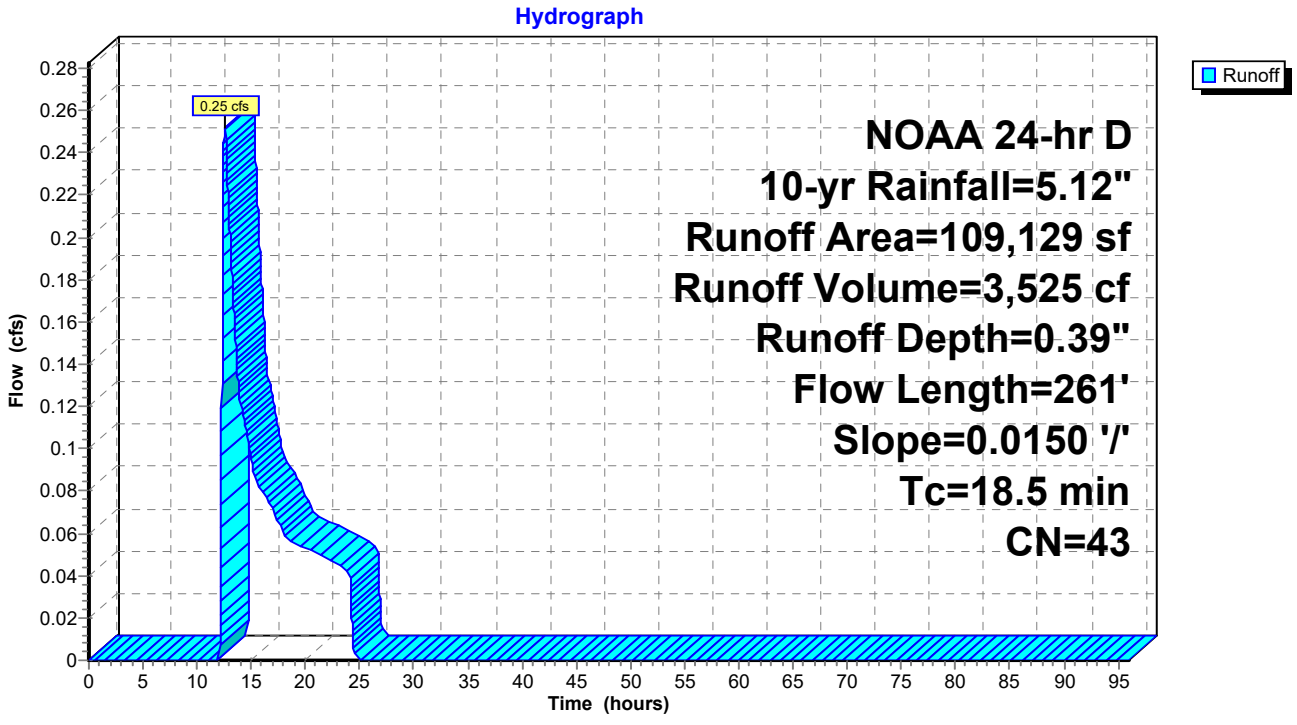
Runoff = 0.25 cfs @ 12.56 hrs, Volume= 3,525 cf, Depth= 0.39"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

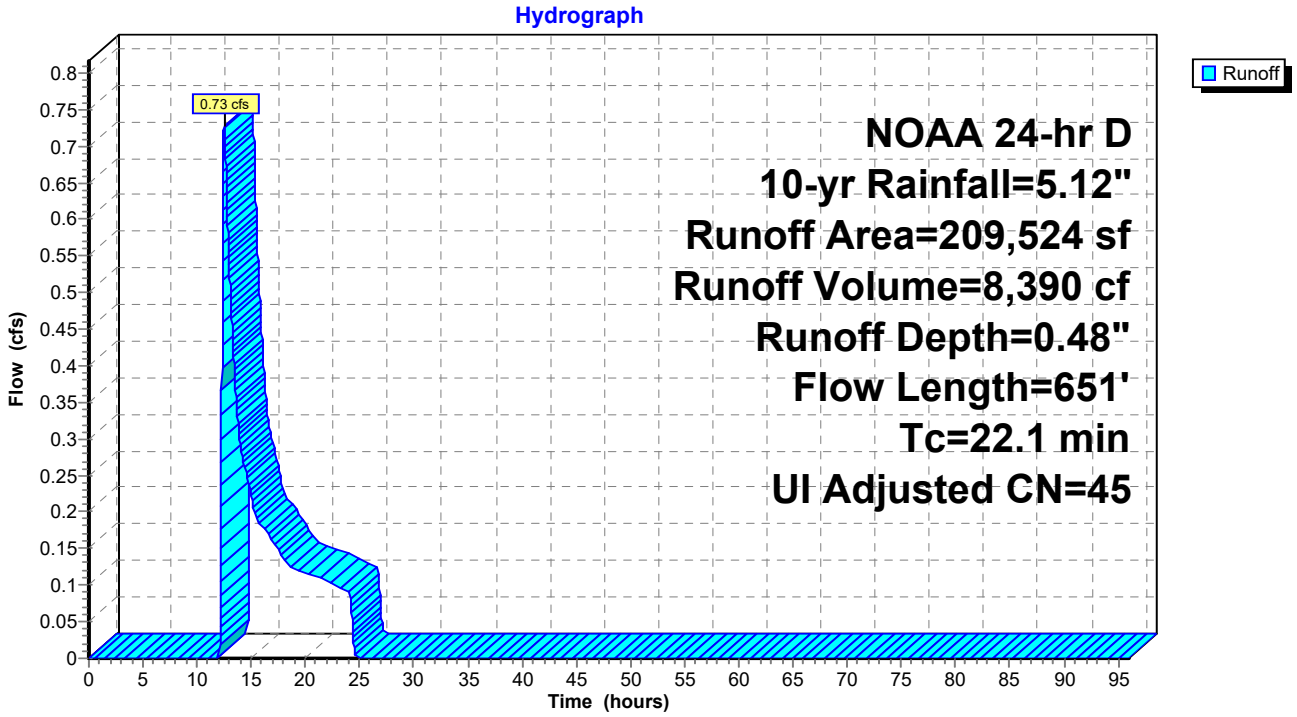
Runoff = 0.73 cfs @ 12.49 hrs, Volume= 8,390 cf, Depth= 0.48"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

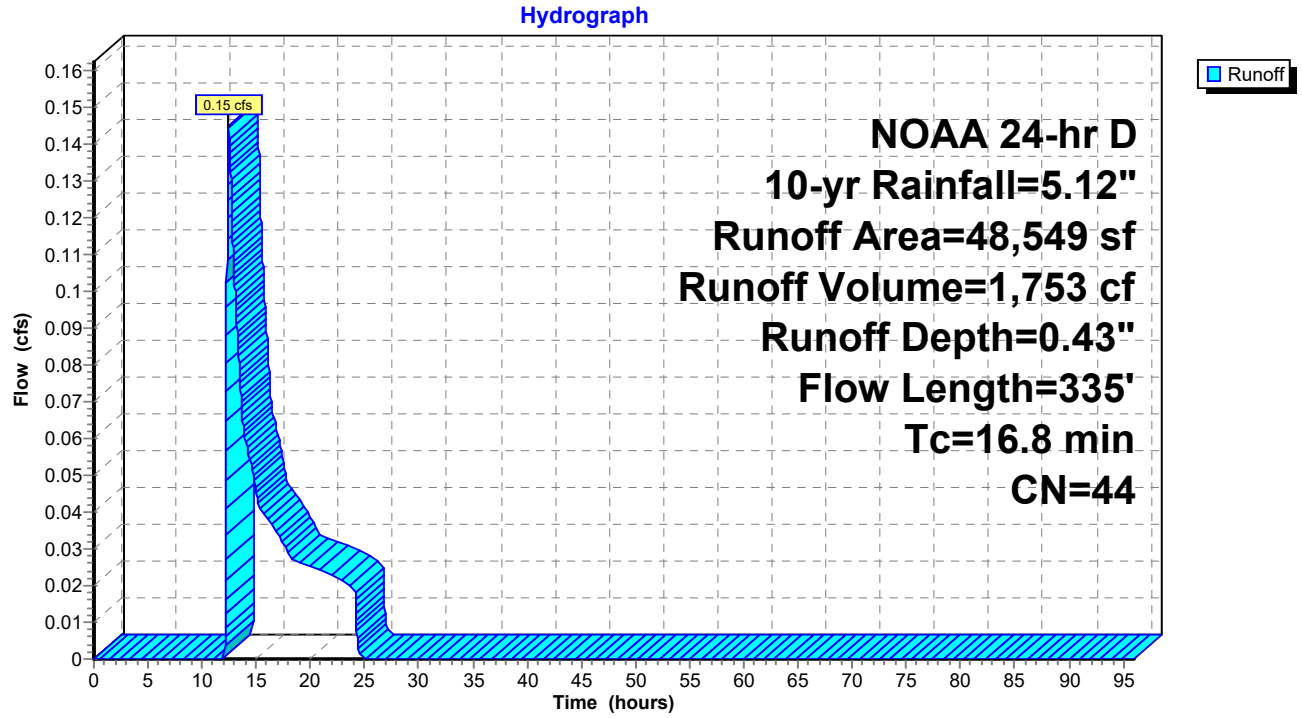
Runoff = 0.15 cfs @ 12.42 hrs, Volume= 1,753 cf, Depth= 0.43"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

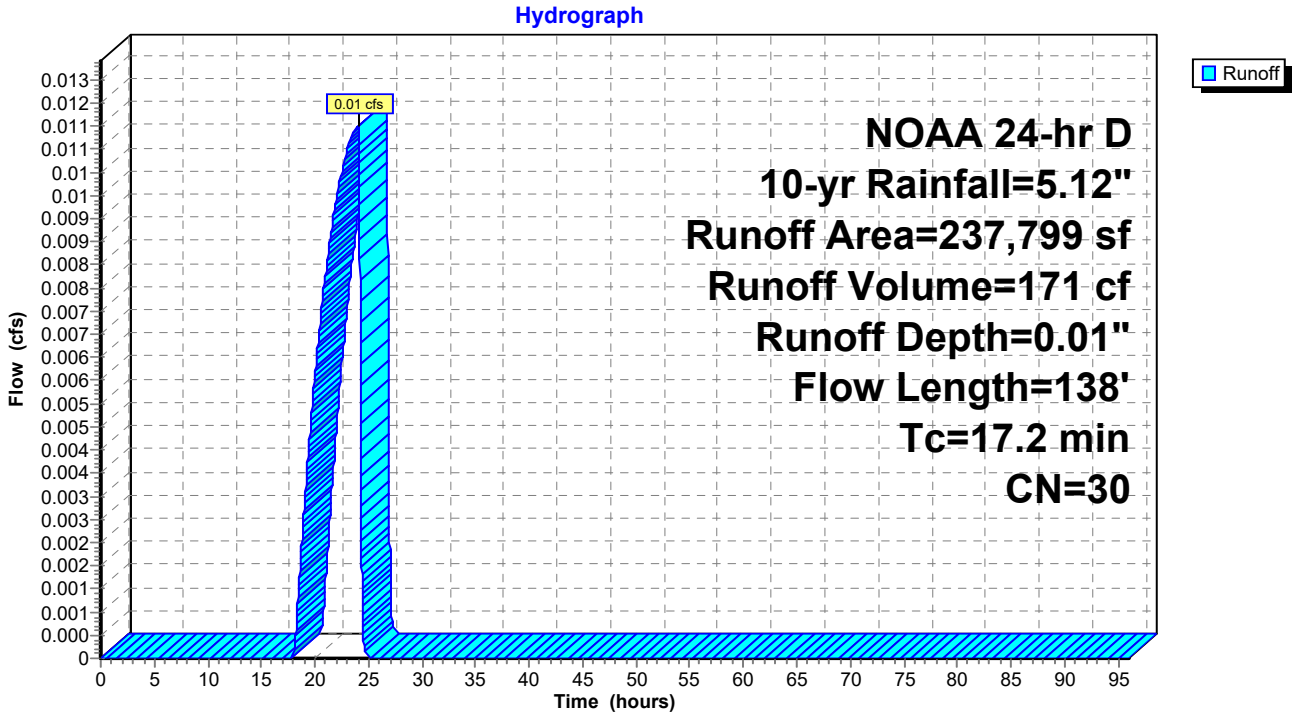
Runoff = 0.01 cfs @ 24.02 hrs, Volume= 171 cf, Depth= 0.01"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 3.19" for 10-yr event
Inflow = 19.76 cfs @ 12.50 hrs, Volume= 127,713 cf
Outflow = 1.95 cfs @ 15.06 hrs, Volume= 127,713 cf, Atten= 90%, Lag= 153.9 min
Discarded = 0.67 cfs @ 15.06 hrs, Volume= 70,180 cf
Primary = 1.28 cfs @ 15.06 hrs, Volume= 57,533 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 26.19' @ 15.06 hrs Surf.Area= 19,346 sf Storage= 77,285 cf

Plug-Flow detention time= 781.9 min calculated for 127,713 cf (100% of inflow)
Center-of-Mass det. time= 781.9 min (1,633.6 - 851.7)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

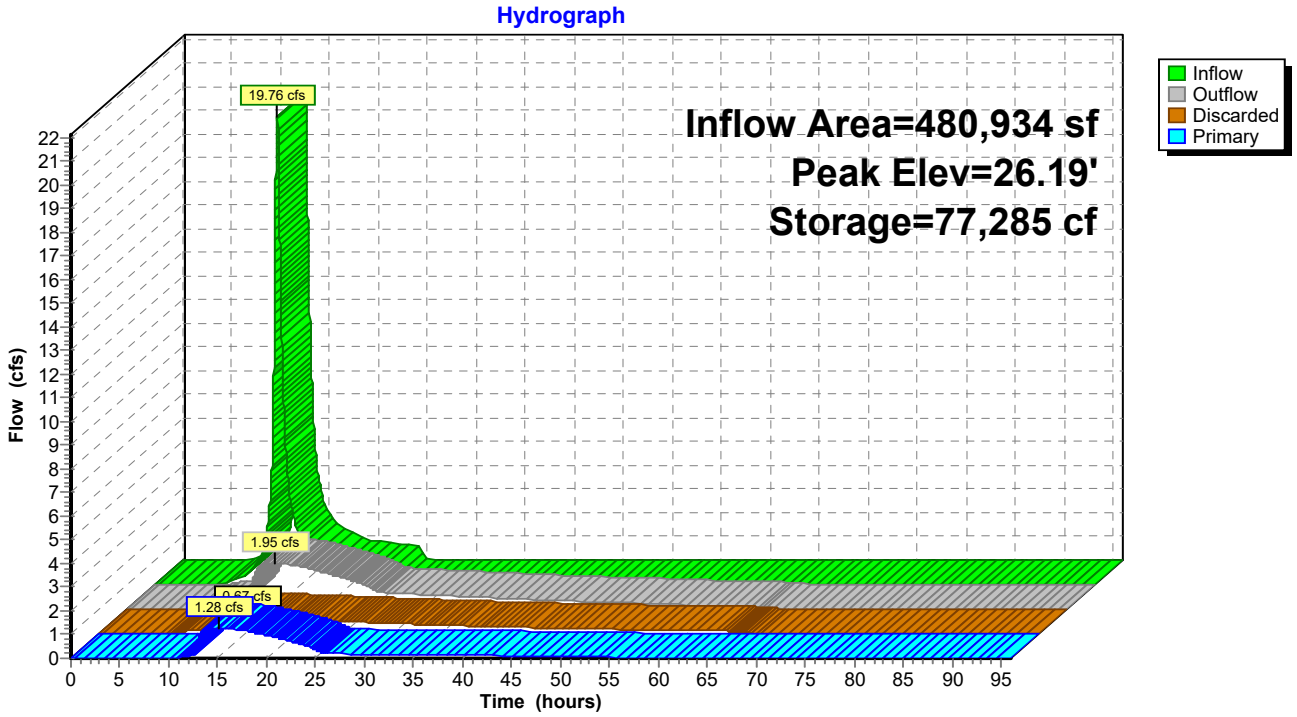
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.67 cfs @ 15.06 hrs HW=26.19' (Free Discharge)
└**3=Exfiltration** (Controls 0.67 cfs)

Primary OutFlow Max=1.28 cfs @ 15.06 hrs HW=26.19' (Free Discharge)
└**1=Culvert** (Passes 1.28 cfs of 46.89 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.23 cfs @ 10.55 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.05 cfs @ 5.35 fps)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 0.48" for 10-yr event
Inflow = 0.73 cfs @ 12.49 hrs, Volume= 8,390 cf
Outflow = 0.11 cfs @ 20.71 hrs, Volume= 8,390 cf, Atten= 84%, Lag= 493.3 min
Discarded = 0.11 cfs @ 20.71 hrs, Volume= 8,390 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 14.39' @ 20.71 hrs Surf.Area= 9,766 sf Storage= 3,714 cf

Plug-Flow detention time= 396.0 min calculated for 8,389 cf (100% of inflow)
Center-of-Mass det. time= 396.1 min (1,373.0 - 976.9)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

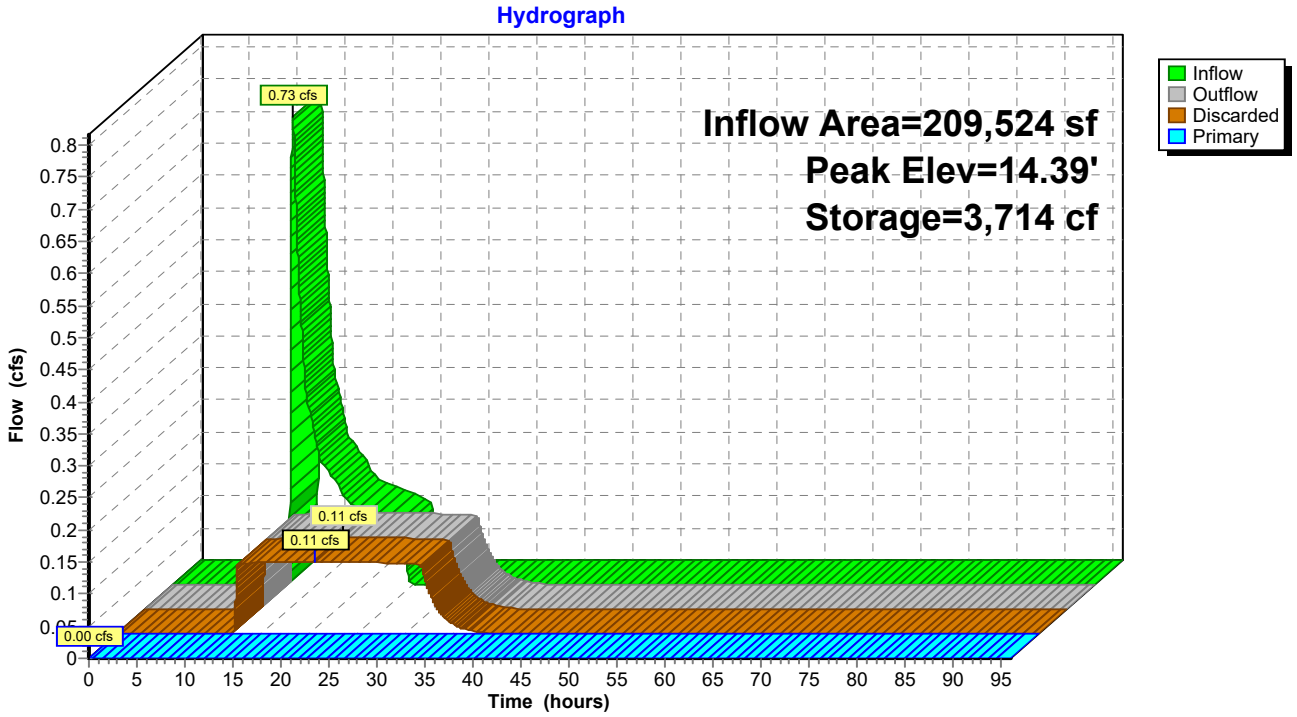
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.11 cfs @ 20.71 hrs HW=14.39' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=14.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 0.39" for 10-yr event
Inflow = 0.25 cfs @ 12.56 hrs, Volume= 3,525 cf
Outflow = 0.10 cfs @ 14.95 hrs, Volume= 3,525 cf, Atten= 61%, Lag= 143.6 min
Discarded = 0.02 cfs @ 14.95 hrs, Volume= 1,877 cf
Primary = 0.07 cfs @ 14.95 hrs, Volume= 1,649 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 20.56' @ 14.95 hrs Surf.Area= 2,082 sf Storage= 1,061 cf

Plug-Flow detention time= 268.4 min calculated for 3,525 cf (100% of inflow)
Center-of-Mass det. time= 268.4 min (1,259.4 - 990.9)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

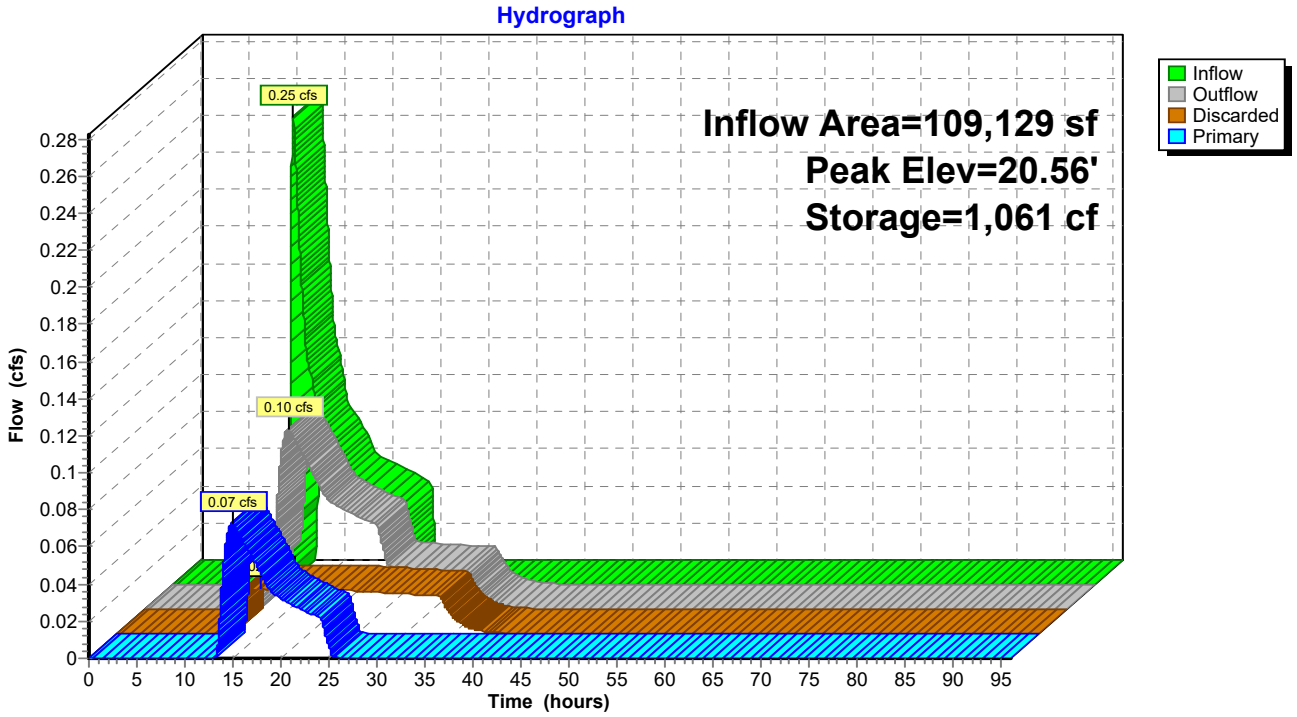
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 14.95 hrs HW=20.56' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.07 cfs @ 14.95 hrs HW=20.56' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 1.53 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.36 fps)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 2.72" for 10-yr event
Inflow = 15.99 cfs @ 12.41 hrs, Volume= 92,016 cf
Outflow = 0.97 cfs @ 16.87 hrs, Volume= 92,016 cf, Atten= 94%, Lag= 267.5 min
Discarded = 0.51 cfs @ 16.87 hrs, Volume= 49,763 cf
Primary = 0.46 cfs @ 16.87 hrs, Volume= 42,253 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 21.59' @ 16.87 hrs Surf.Area= 15,008 sf Storage= 58,623 cf

Plug-Flow detention time= 816.7 min calculated for 92,016 cf (100% of inflow)
Center-of-Mass det. time= 816.6 min (1,676.4 - 859.8)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

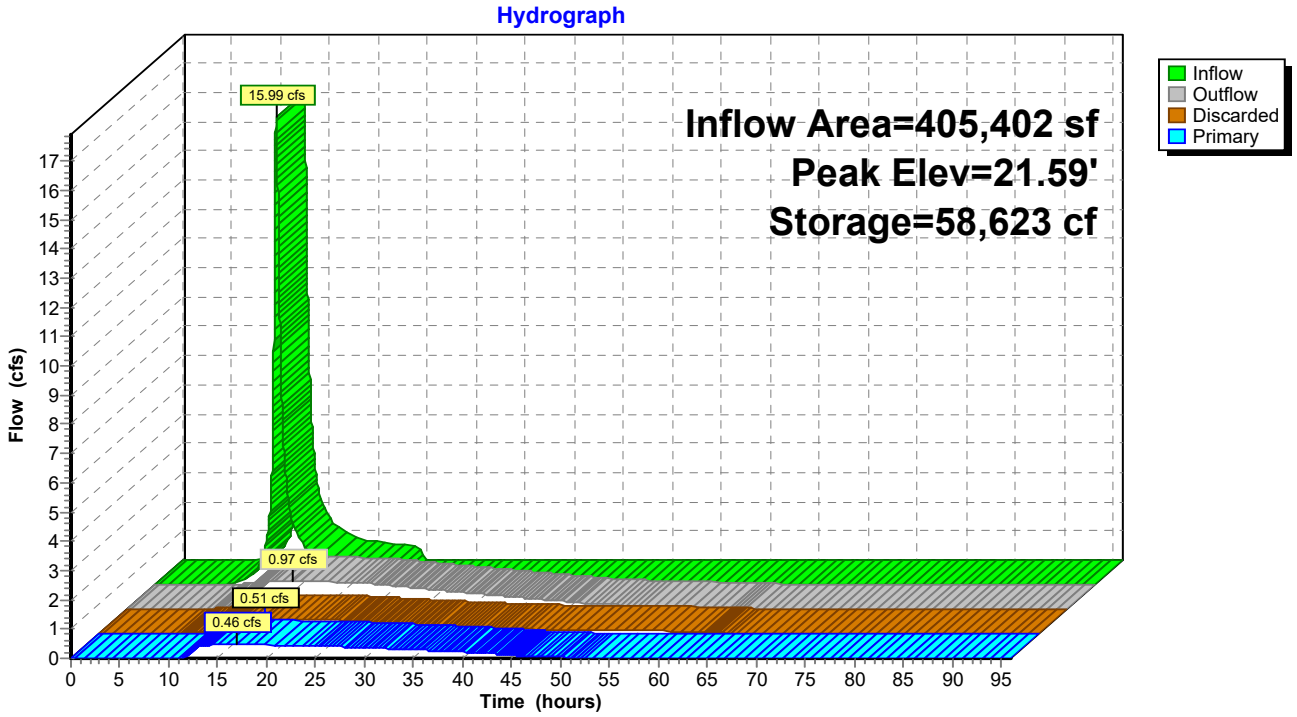
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.51 cfs @ 16.87 hrs HW=21.59' (Free Discharge)
└**3=Exfiltration** (Controls 0.51 cfs)

Primary OutFlow Max=0.46 cfs @ 16.87 hrs HW=21.59' (Free Discharge)
└**1=Culvert** (Passes 0.46 cfs of 49.25 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 10.78 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.22 cfs @ 10.22 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 0.63" for 10-yr event
Inflow = 2.43 cfs @ 12.80 hrs, Volume= 28,622 cf
Outflow = 0.65 cfs @ 15.59 hrs, Volume= 28,622 cf, Atten= 73%, Lag= 167.2 min
Discarded = 0.14 cfs @ 15.59 hrs, Volume= 12,579 cf
Primary = 0.51 cfs @ 15.59 hrs, Volume= 16,042 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.94' @ 15.59 hrs Surf.Area= 12,060 sf Storage= 10,669 cf

Plug-Flow detention time= 323.3 min calculated for 28,619 cf (100% of inflow)
Center-of-Mass det. time= 323.5 min (1,299.9 - 976.5)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

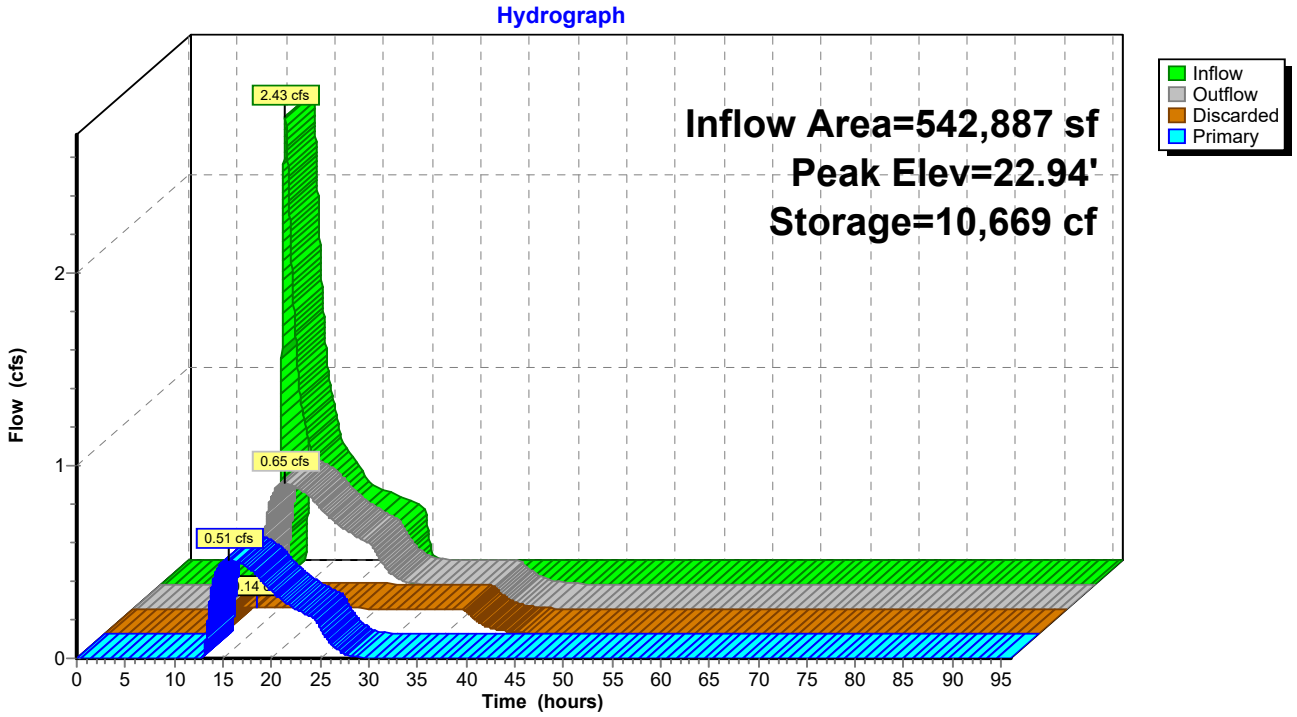
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 15.59 hrs HW=22.94' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.51 cfs @ 15.59 hrs HW=22.94' (Free Discharge)
└**1=Culvert** (Passes 0.51 cfs of 4.83 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.51 cfs @ 2.61 fps)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 1.44" for 10-yr event
Inflow = 3.69 cfs @ 12.27 hrs, Volume= 18,068 cf
Outflow = 0.69 cfs @ 13.42 hrs, Volume= 18,068 cf, Atten= 81%, Lag= 68.8 min
Discarded = 0.09 cfs @ 13.42 hrs, Volume= 8,018 cf
Primary = 0.59 cfs @ 13.42 hrs, Volume= 10,050 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 36.51' @ 13.42 hrs Surf.Area= 3,957 sf Storage= 7,315 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 415.2 min calculated for 18,066 cf (100% of inflow)
Center-of-Mass det. time= 415.4 min (1,310.6 - 895.2)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

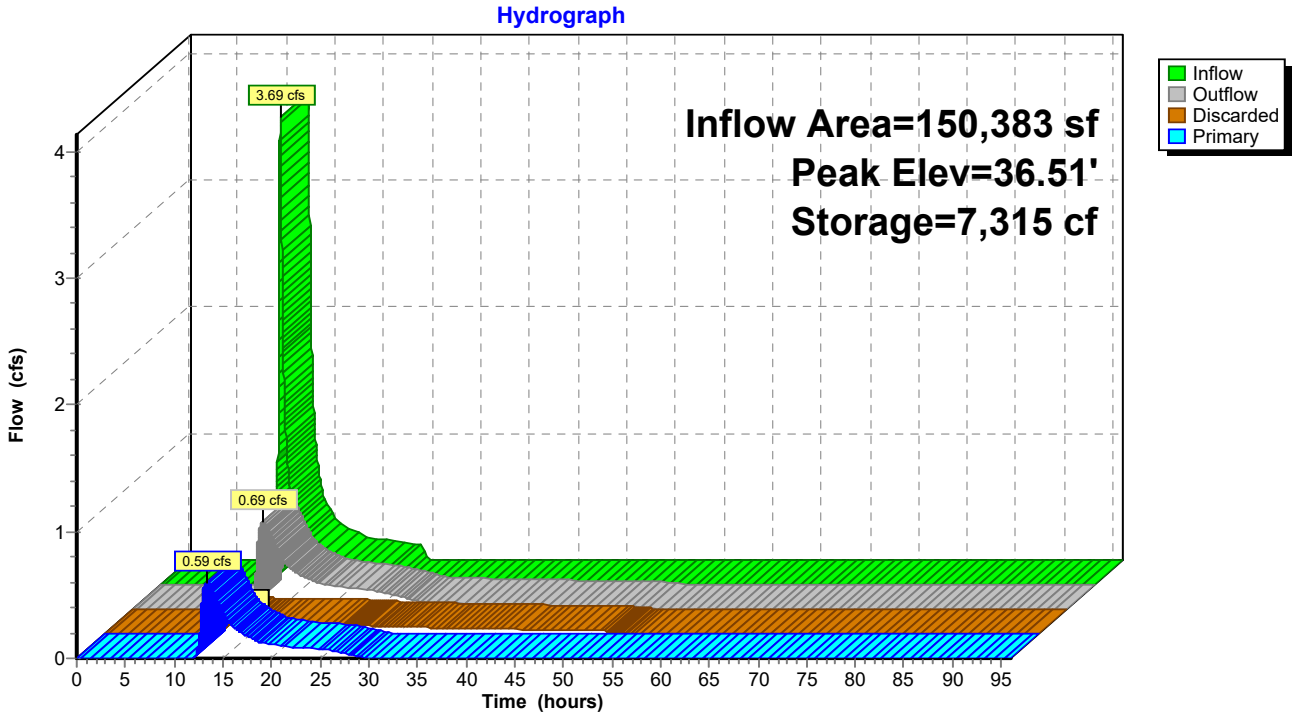
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.09 cfs @ 13.42 hrs HW=36.51' (Free Discharge)
└**3=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.59 cfs @ 13.42 hrs HW=36.51' (Free Discharge)
└**1=Culvert** (Passes 0.59 cfs of 18.56 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.21 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.48 cfs @ 2.44 fps)

Pond 22P: Water Quality Basin #3.2

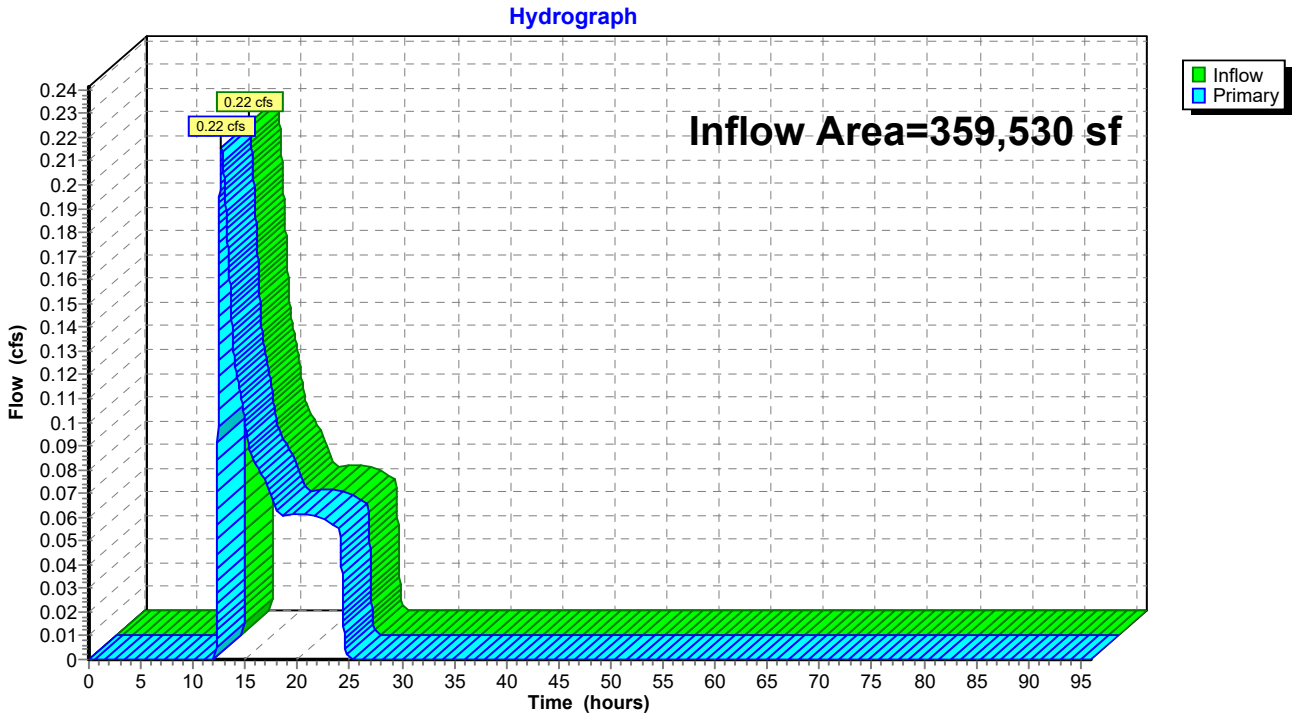


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.12" for 10-yr event
Inflow = 0.22 cfs @ 12.71 hrs, Volume= 3,660 cf
Primary = 0.22 cfs @ 12.71 hrs, Volume= 3,660 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

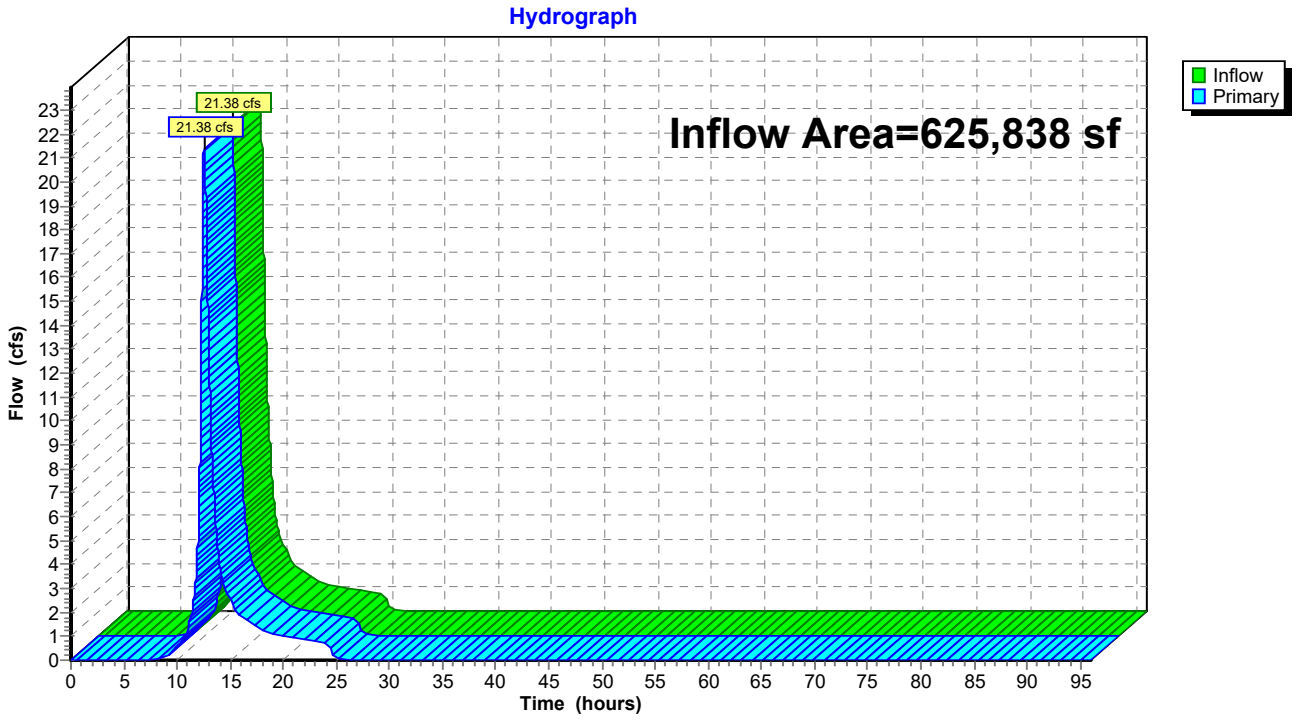


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 21.38 cfs @ 12.57 hrs, Volume= 146,752 cf
Primary = 21.38 cfs @ 12.57 hrs, Volume= 146,752 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

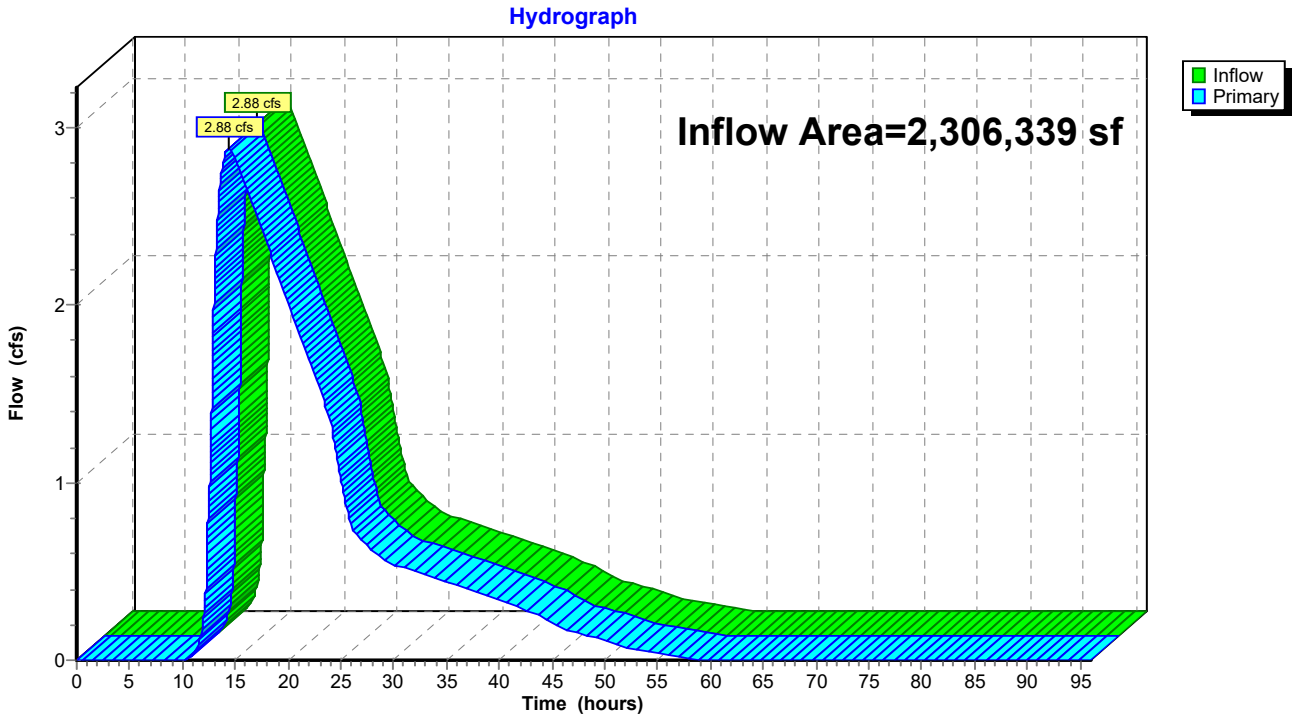


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 0.69" for 10-yr event
Inflow = 2.88 cfs @ 14.37 hrs, Volume= 132,939 cf
Primary = 2.88 cfs @ 14.37 hrs, Volume= 132,939 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

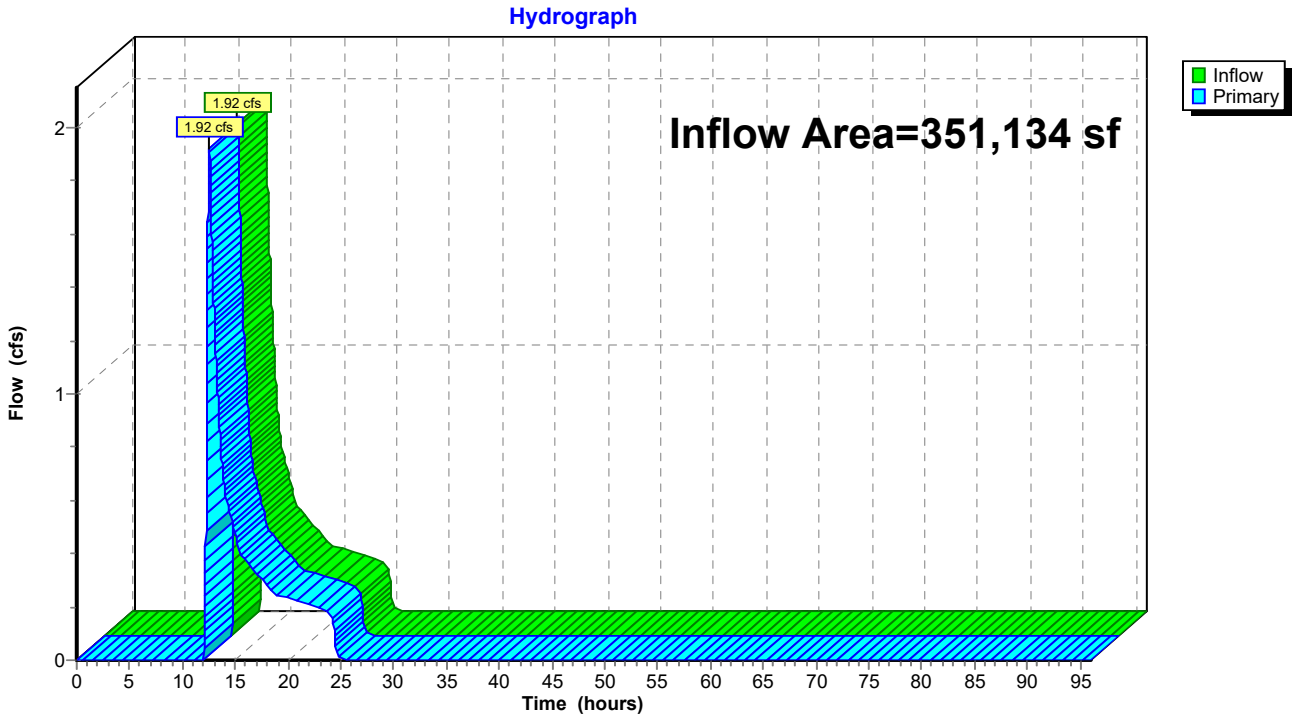


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 0.63" for 10-yr event
Inflow = 1.92 cfs @ 12.53 hrs, Volume= 18,512 cf
Primary = 1.92 cfs @ 12.53 hrs, Volume= 18,512 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=0.67"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=0.68 cfs 6,771 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=2.11"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=5.63 cfs 26,399 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=1.07"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=5.07 cfs 48,447 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=4.13"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=25.45 cfs 165,334 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=3.71"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=28.19 cfs 193,578 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=3.61"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=21.21 cfs 121,972 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=815' Tc=28.4 min CN=48 Runoff=4.14 cfs 31,335 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=0.73"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=0.80 cfs 6,645 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=0.86"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=1.94 cfs 15,052 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=0.80"
Flow Length=335' Tc=16.8 min CN=44 Runoff=0.44 cfs 3,219 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.09"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.05 cfs 1,757 cf

Pond 12P: Water Quality Basin #4 Peak Elev=26.79' Storage=89,391 cf Inflow=25.45 cfs 165,334 cf
Discarded=0.75 cfs 75,822 cf Primary=5.63 cfs 89,512 cf Outflow=6.37 cfs 165,334 cf

Pond 13P: Water Quality Basin #1 Peak Elev=14.66' Storage=6,416 cf Inflow=1.94 cfs 15,052 cf
Discarded=0.12 cfs 10,024 cf Primary=0.18 cfs 5,028 cf Outflow=0.30 cfs 15,052 cf

Pond 18P: Water Quality Basin #5 Peak Elev=20.75' Storage=1,478 cf Inflow=0.80 cfs 6,645 cf
Discarded=0.03 cfs 1,953 cf Primary=0.30 cfs 4,692 cf Outflow=0.33 cfs 6,645 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=22.22' Storage=68,378 cf Inflow=21.21 cfs 121,972 cf
Discarded=0.57 cfs 57,208 cf Primary=3.14 cfs 64,764 cf Outflow=3.71 cfs 121,972 cf

Pond 21P: Water Quality Basin #2 Peak Elev=23.62' Storage=19,229 cf Inflow=5.07 cfs 48,447 cf
Discarded=0.15 cfs 13,807 cf Primary=0.93 cfs 34,641 cf Outflow=1.08 cfs 48,447 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=37.17' Storage=10,158 cf Inflow=5.63 cfs 26,399 cf
Discarded=0.12 cfs 8,595 cf Primary=1.05 cfs 17,804 cf Outflow=1.17 cfs 26,399 cf

Link 2L: Northeast Wetland Inflow=0.68 cfs 8,528 cf
Primary=0.68 cfs 8,528 cf

Link 3L: South Off-Site (POC 3) Inflow=28.19 cfs 193,578 cf
Primary=28.19 cfs 193,578 cf

Link 4L: West Wetlands (POC 1) Inflow=11.26 cfs 228,187 cf
Primary=11.26 cfs 228,187 cf

Link 5L: West Off-Site (POC 2) Inflow=4.14 cfs 31,335 cf
Primary=4.14 cfs 31,335 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 620,510 cf Average Runoff Depth = 2.27"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

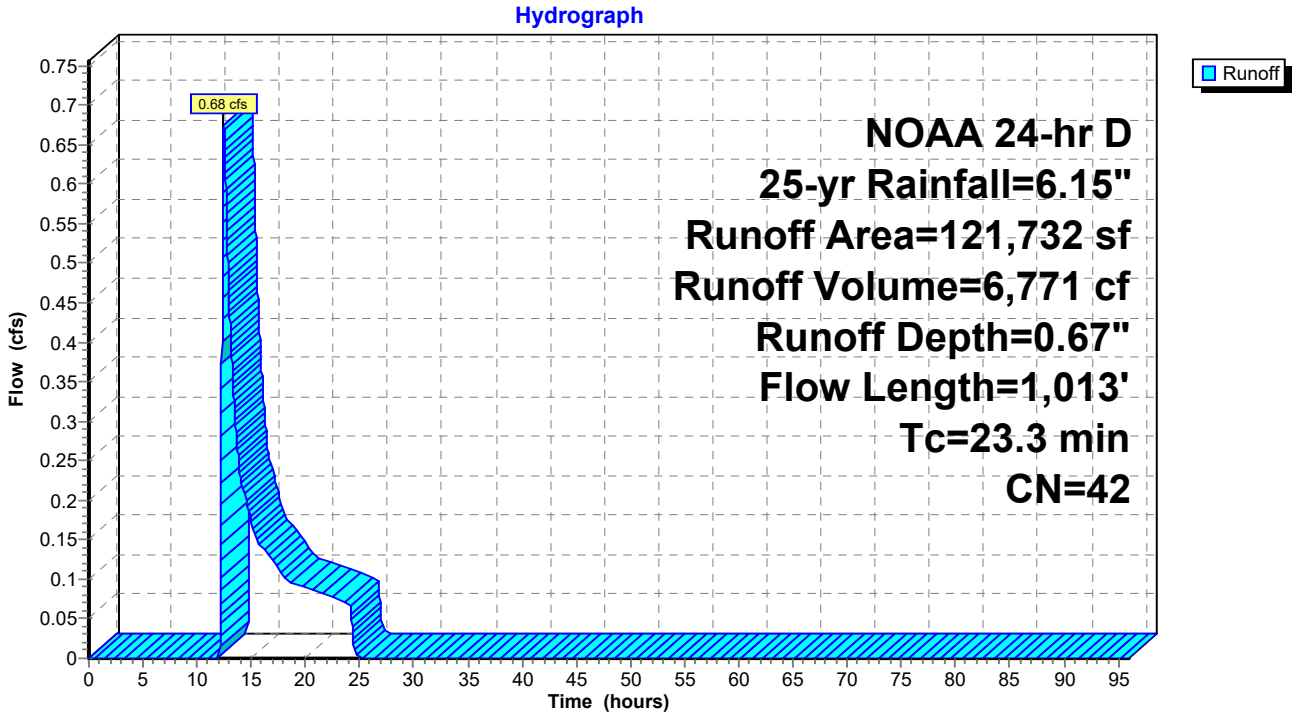
Runoff = 0.68 cfs @ 12.46 hrs, Volume= 6,771 cf, Depth= 0.67"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

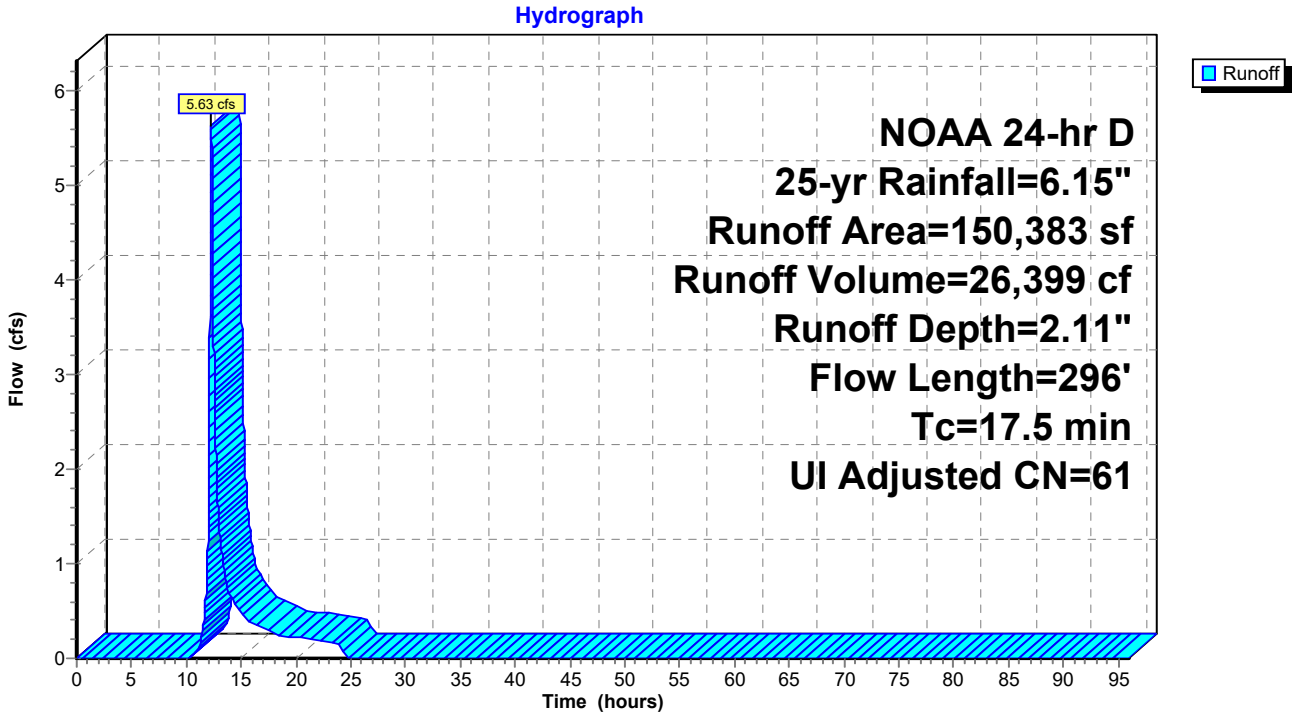
Runoff = 5.63 cfs @ 12.27 hrs, Volume= 26,399 cf, Depth= 2.11"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

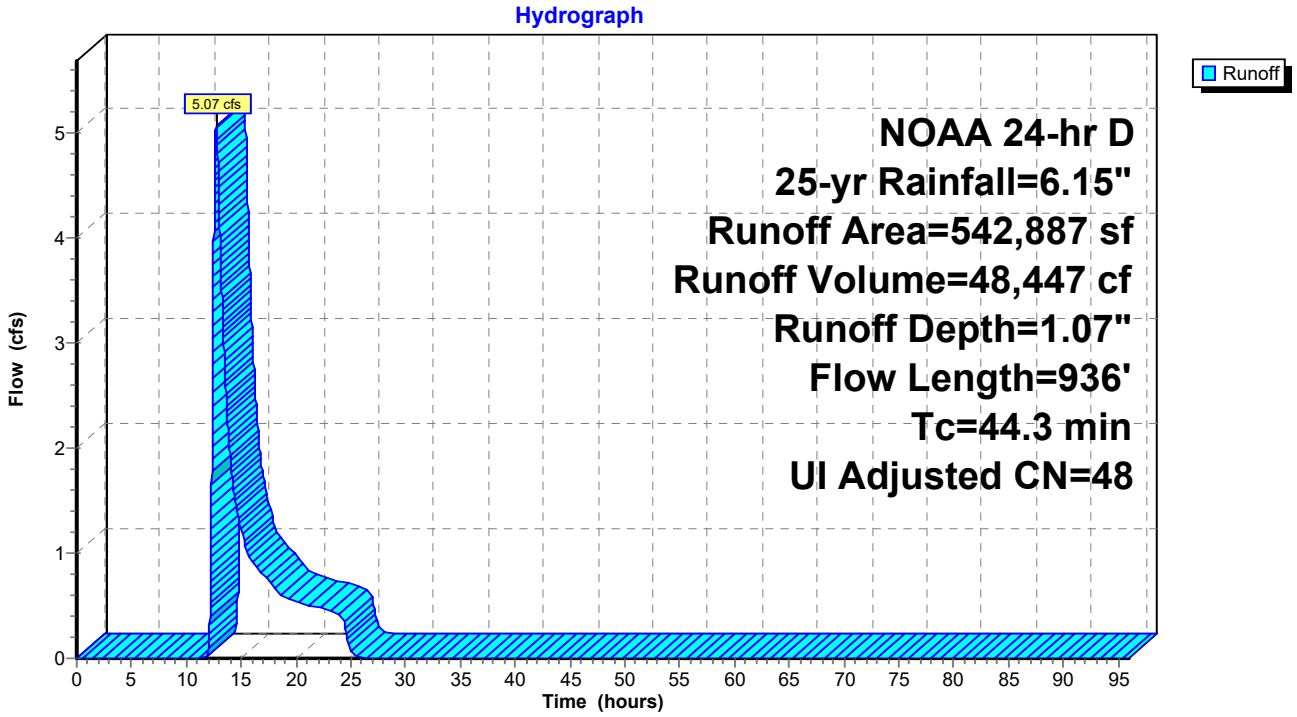
Runoff = 5.07 cfs @ 12.75 hrs, Volume= 48,447 cf, Depth= 1.07"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

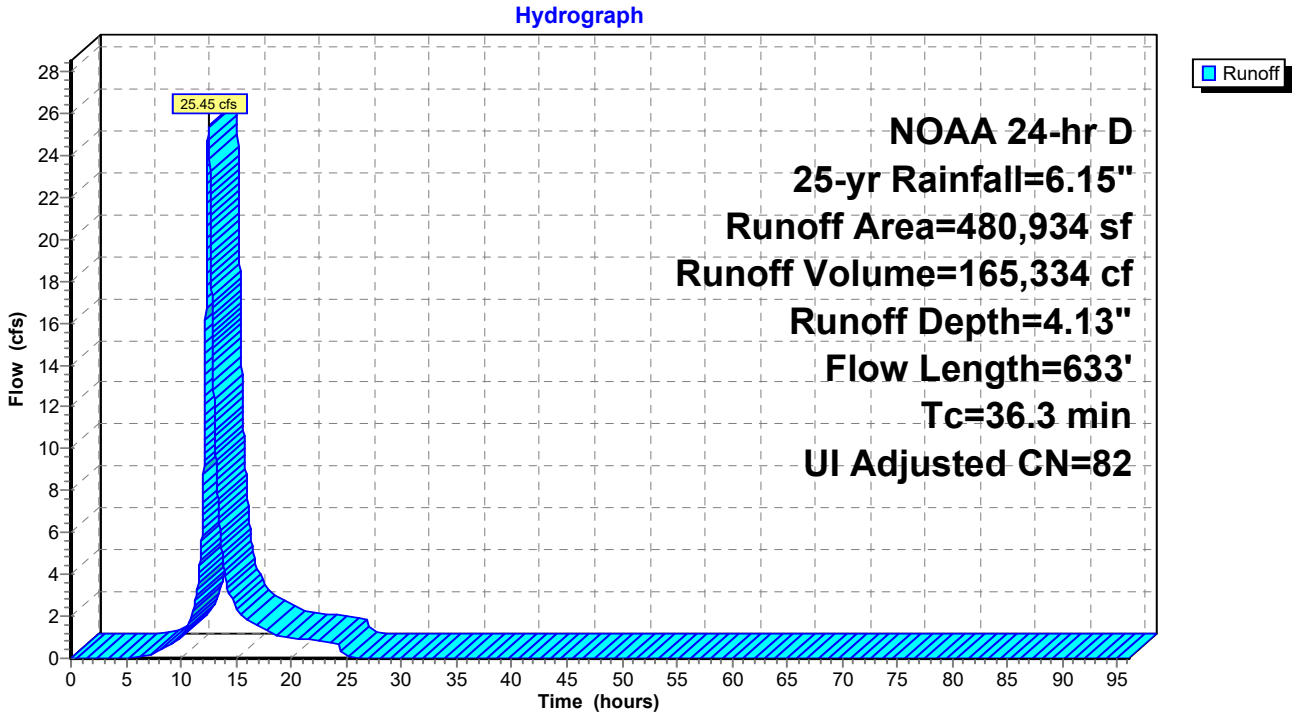
Runoff = 25.45 cfs @ 12.47 hrs, Volume= 165,334 cf, Depth= 4.13"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

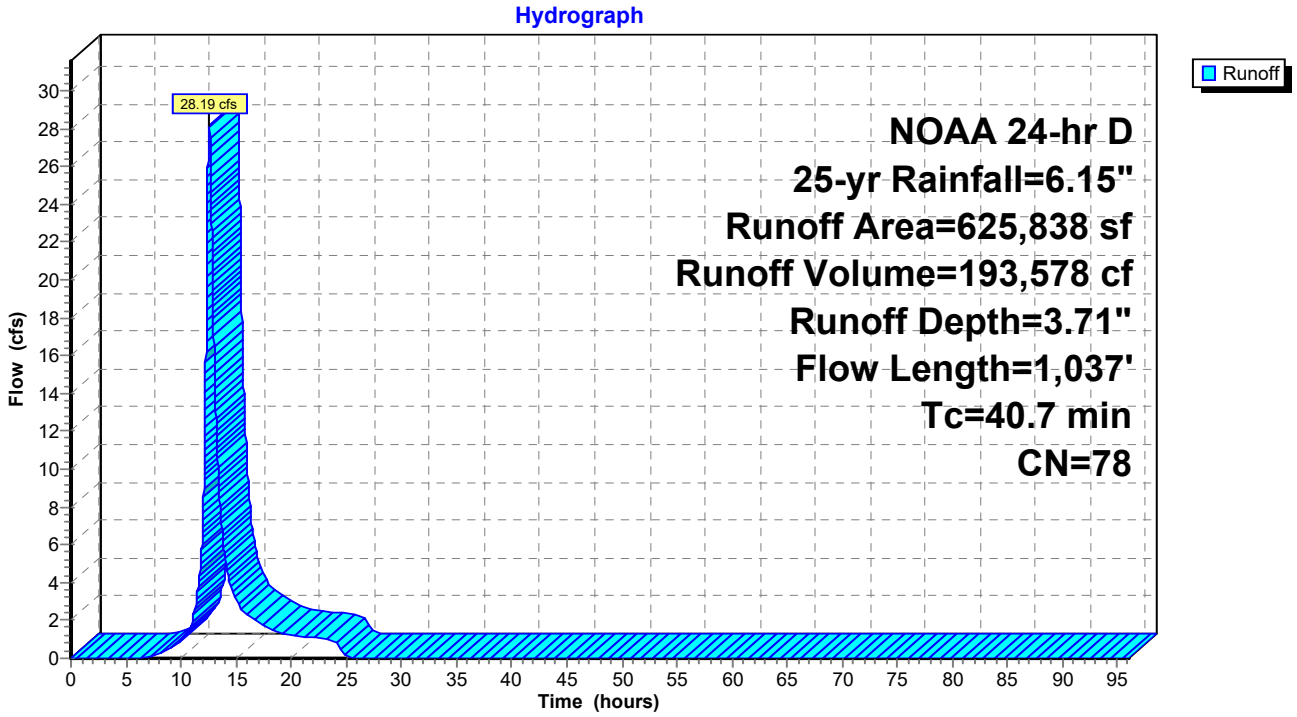
Runoff = 28.19 cfs @ 12.54 hrs, Volume= 193,578 cf, Depth= 3.71"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

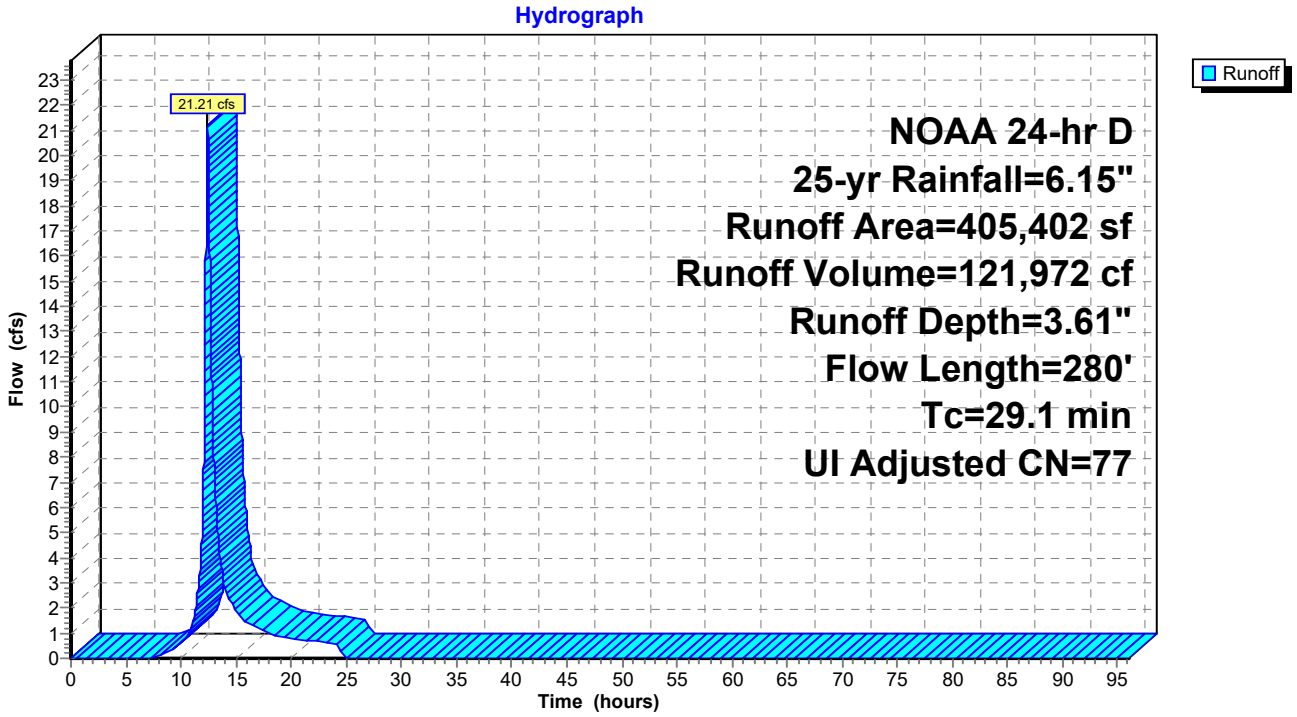
Runoff = 21.21 cfs @ 12.41 hrs, Volume= 121,972 cf, Depth= 3.61"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

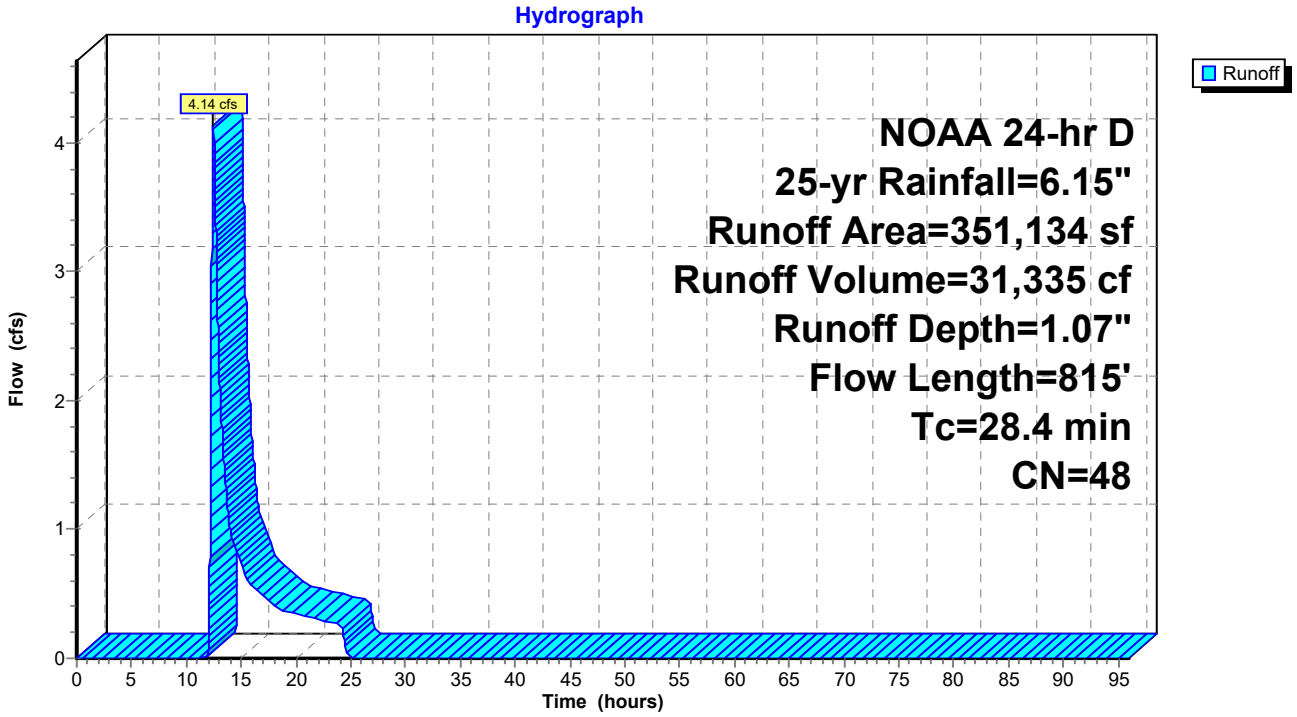
Runoff = 4.14 cfs @ 12.47 hrs, Volume= 31,335 cf, Depth= 1.07"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

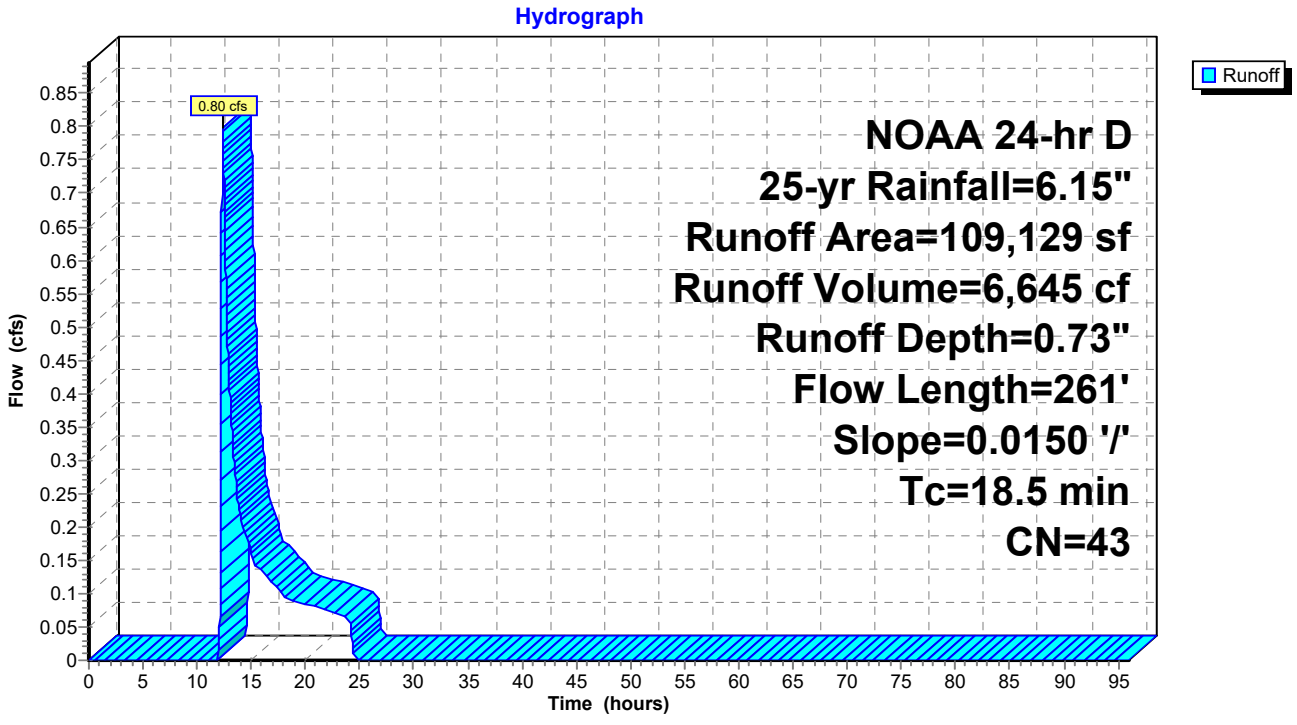
Runoff = 0.80 cfs @ 12.36 hrs, Volume= 6,645 cf, Depth= 0.73"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

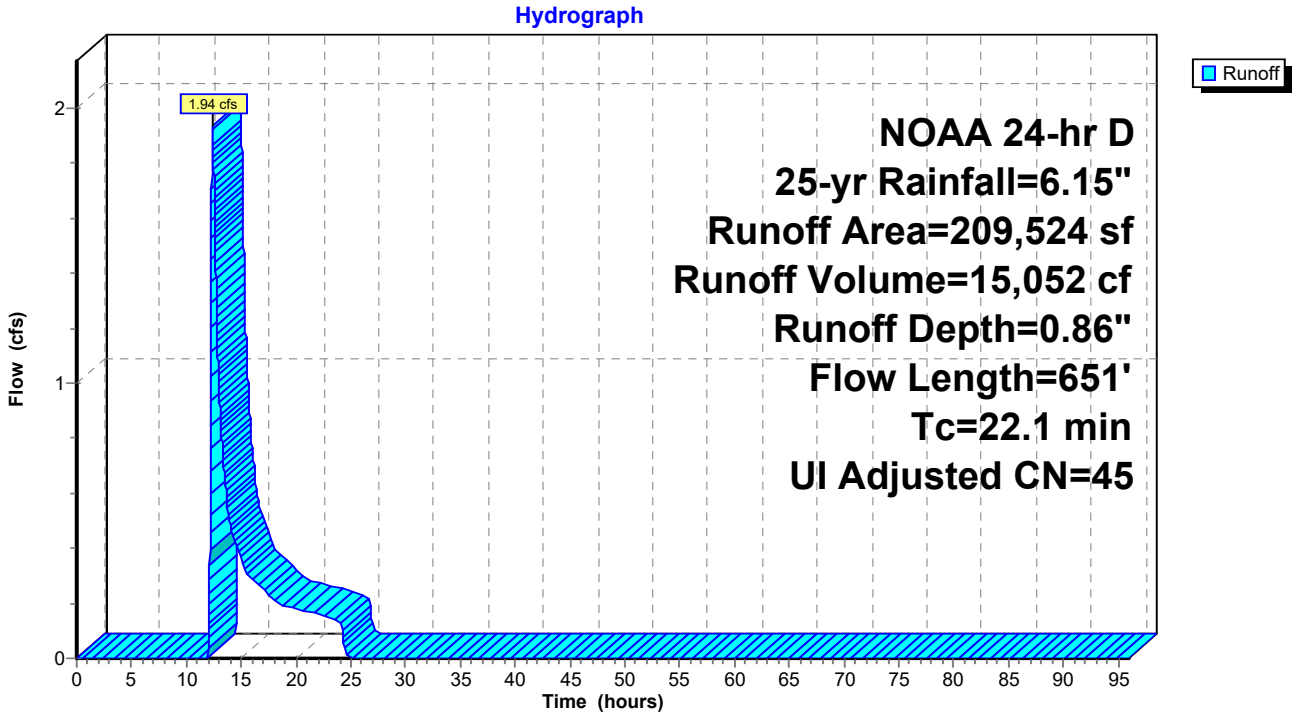
Runoff = 1.94 cfs @ 12.40 hrs, Volume= 15,052 cf, Depth= 0.86"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

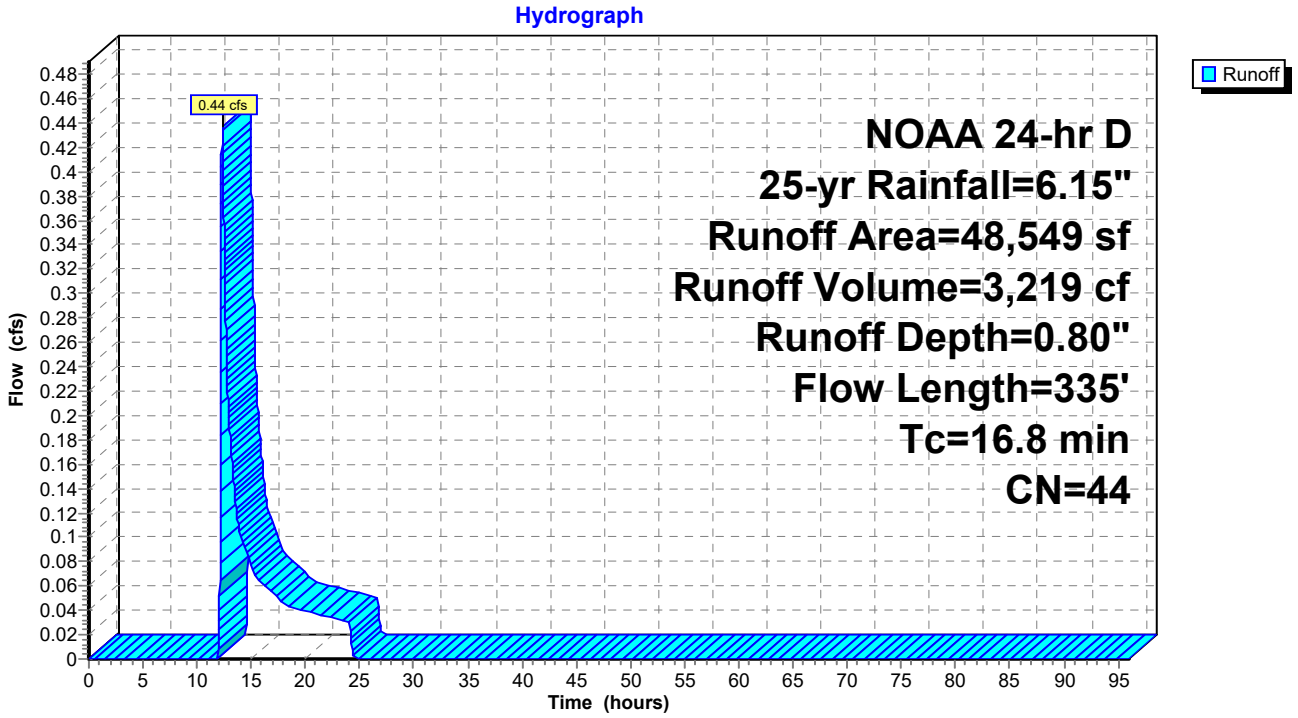
Runoff = 0.44 cfs @ 12.32 hrs, Volume= 3,219 cf, Depth= 0.80"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

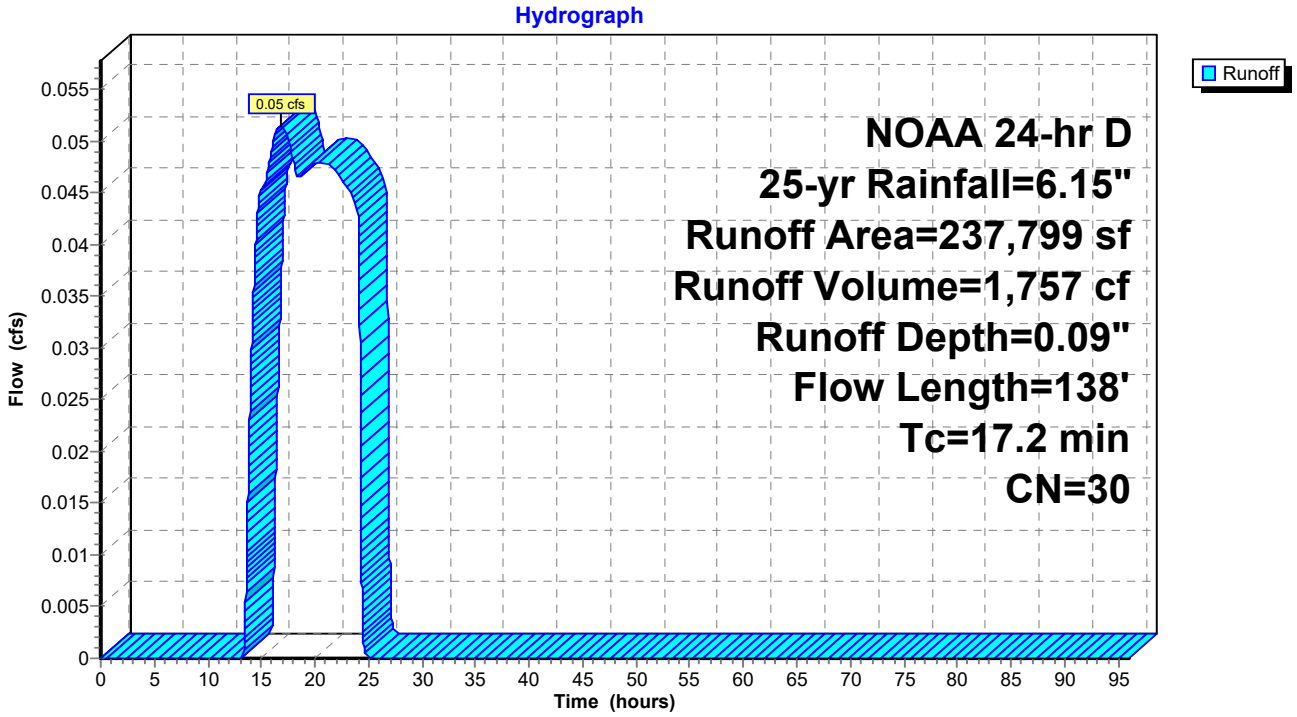
Runoff = 0.05 cfs @ 16.84 hrs, Volume= 1,757 cf, Depth= 0.09"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 4.13" for 25-yr event
Inflow = 25.45 cfs @ 12.47 hrs, Volume= 165,334 cf
Outflow = 6.37 cfs @ 13.49 hrs, Volume= 165,334 cf, Atten= 75%, Lag= 61.2 min
Discarded = 0.75 cfs @ 13.49 hrs, Volume= 75,822 cf
Primary = 5.63 cfs @ 13.49 hrs, Volume= 89,512 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 26.79' @ 13.49 hrs Surf.Area= 20,477 sf Storage= 89,391 cf

Plug-Flow detention time= 673.6 min calculated for 165,334 cf (100% of inflow)
Center-of-Mass det. time= 673.5 min (1,517.1 - 843.5)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

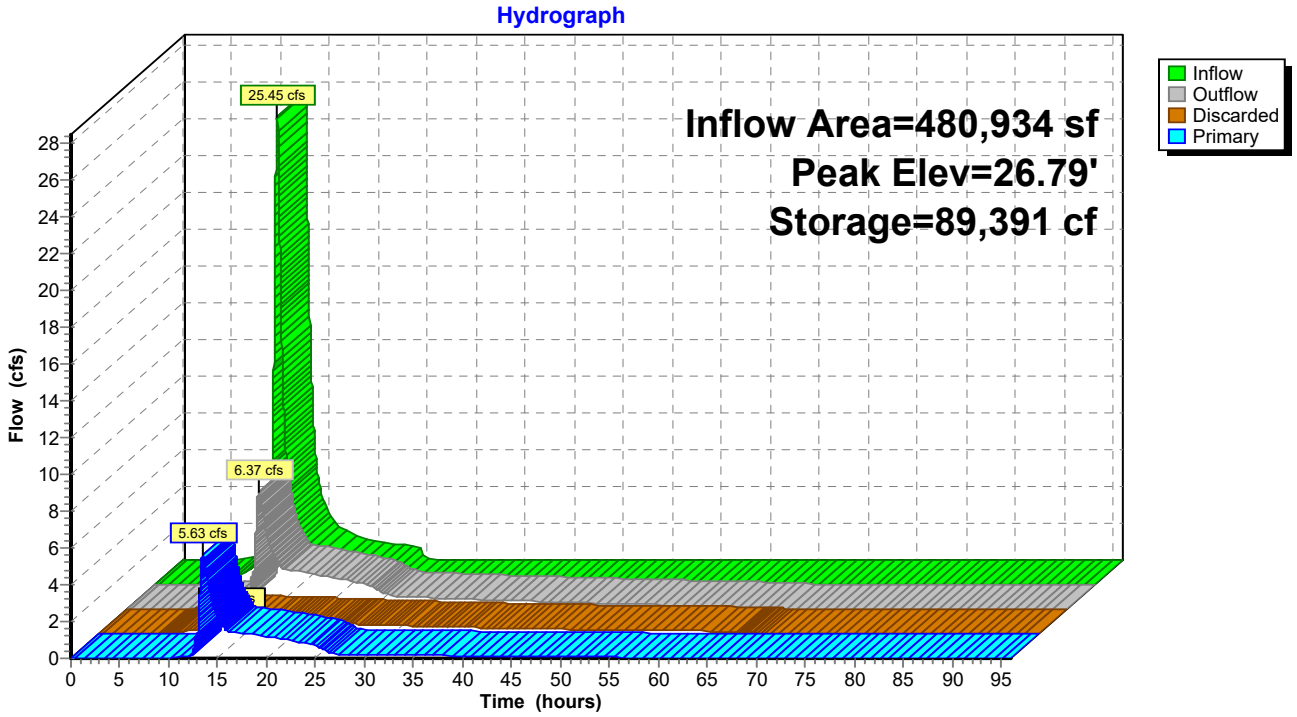
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.75 cfs @ 13.49 hrs HW=26.79' (Free Discharge)
└**3=Exfiltration** (Controls 0.75 cfs)

Primary OutFlow Max=5.61 cfs @ 13.49 hrs HW=26.79' (Free Discharge)
└**1=Culvert** (Passes 5.61 cfs of 50.38 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 4.08 cfs @ 1.74 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 11.20 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.28 cfs @ 6.54 fps)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 0.86" for 25-yr event
Inflow = 1.94 cfs @ 12.40 hrs, Volume= 15,052 cf
Outflow = 0.30 cfs @ 15.60 hrs, Volume= 15,052 cf, Atten= 84%, Lag= 191.8 min
Discarded = 0.12 cfs @ 15.60 hrs, Volume= 10,024 cf
Primary = 0.18 cfs @ 15.60 hrs, Volume= 5,028 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 14.66' @ 15.60 hrs Surf.Area= 10,181 sf Storage= 6,416 cf

Plug-Flow detention time= 392.5 min calculated for 15,051 cf (100% of inflow)
Center-of-Mass det. time= 392.6 min (1,339.4 - 946.8)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

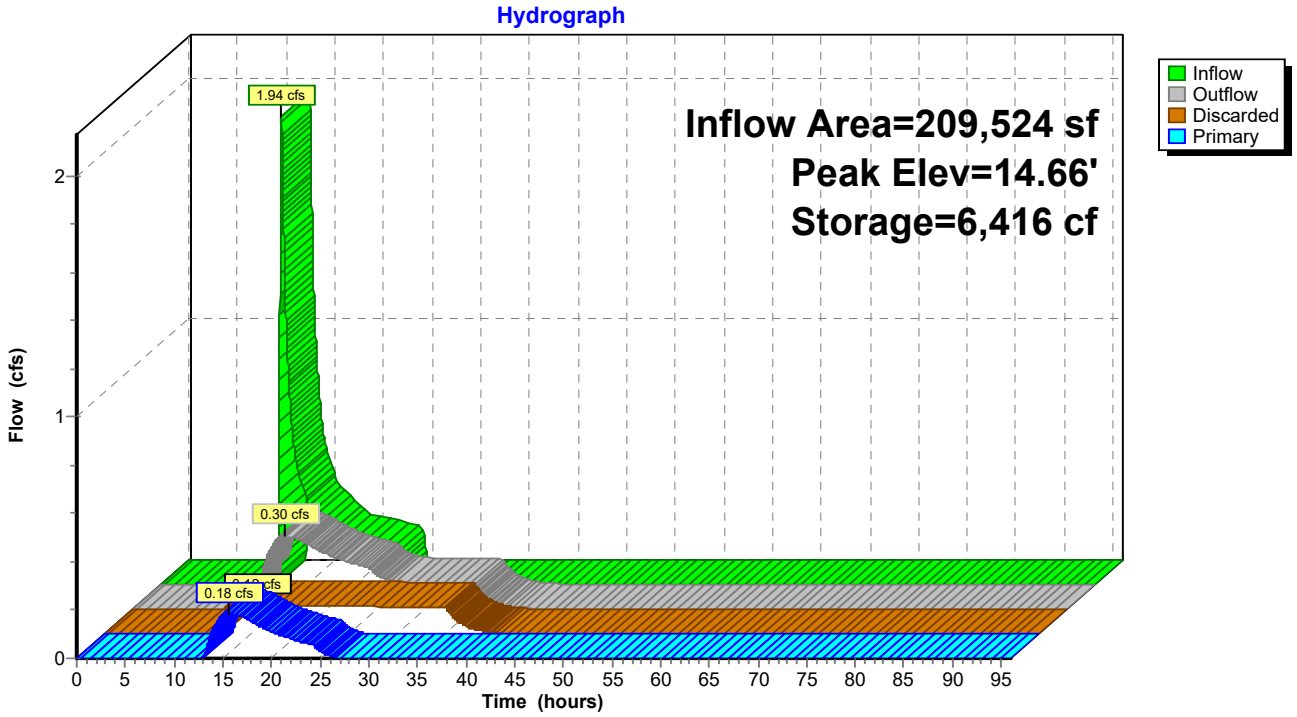
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 15.60 hrs HW=14.66' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.18 cfs @ 15.60 hrs HW=14.66' (Free Discharge)
└**1=Culvert** (Passes 0.18 cfs of 2.89 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.18 cfs @ 1.75 fps)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 0.73" for 25-yr event
Inflow = 0.80 cfs @ 12.36 hrs, Volume= 6,645 cf
Outflow = 0.33 cfs @ 13.28 hrs, Volume= 6,645 cf, Atten= 59%, Lag= 55.5 min
Discarded = 0.03 cfs @ 13.28 hrs, Volume= 1,953 cf
Primary = 0.30 cfs @ 13.28 hrs, Volume= 4,692 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 20.75' @ 13.28 hrs Surf.Area= 2,216 sf Storage= 1,478 cf

Plug-Flow detention time= 166.9 min calculated for 6,644 cf (100% of inflow)
Center-of-Mass det. time= 167.0 min (1,122.6 - 955.5)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

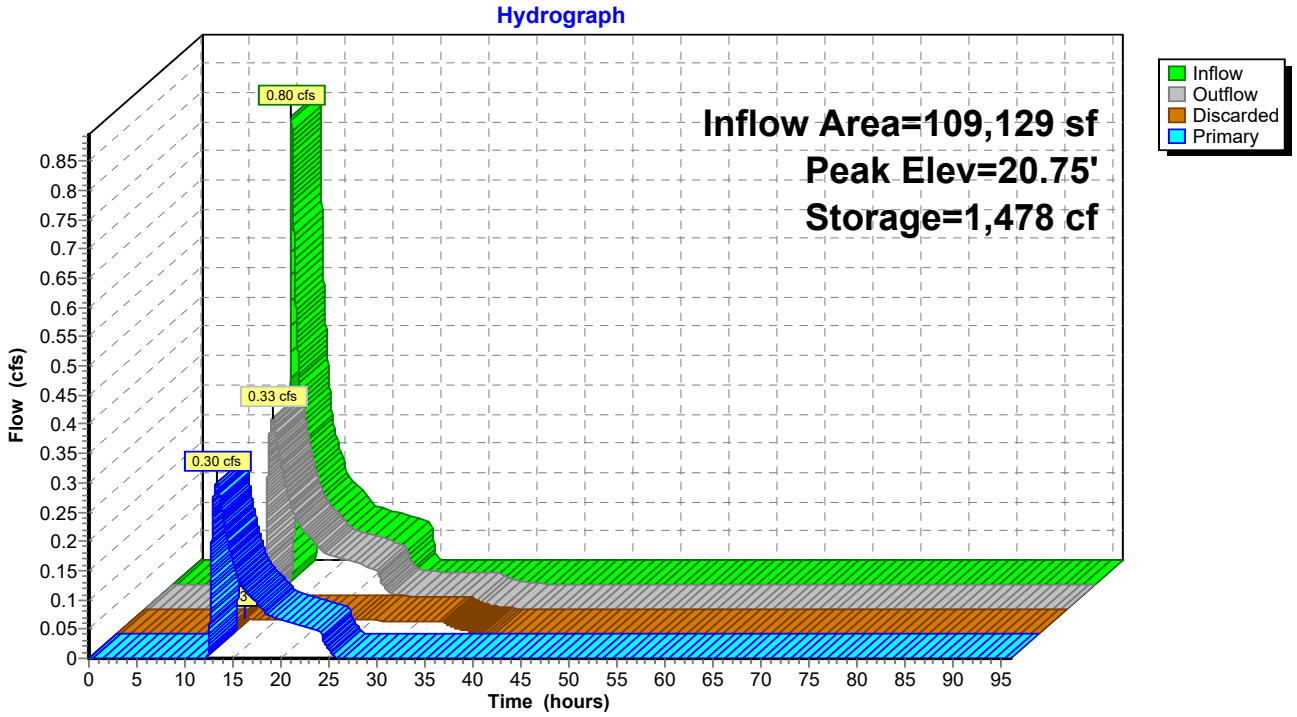
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 13.28 hrs HW=20.75' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.30 cfs @ 13.28 hrs HW=20.75' (Free Discharge)
└**1=Culvert** (Passes 0.30 cfs of 2.63 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.30 cfs @ 2.02 fps)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 3.61" for 25-yr event
Inflow = 21.21 cfs @ 12.41 hrs, Volume= 121,972 cf
Outflow = 3.71 cfs @ 13.63 hrs, Volume= 121,972 cf, Atten= 83%, Lag= 73.6 min
Discarded = 0.57 cfs @ 13.63 hrs, Volume= 57,208 cf
Primary = 3.14 cfs @ 13.63 hrs, Volume= 64,764 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.22' @ 13.63 hrs Surf.Area= 16,122 sf Storage= 68,378 cf

Plug-Flow detention time= 743.3 min calculated for 121,972 cf (100% of inflow)
Center-of-Mass det. time= 743.3 min (1,594.1 - 850.9)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

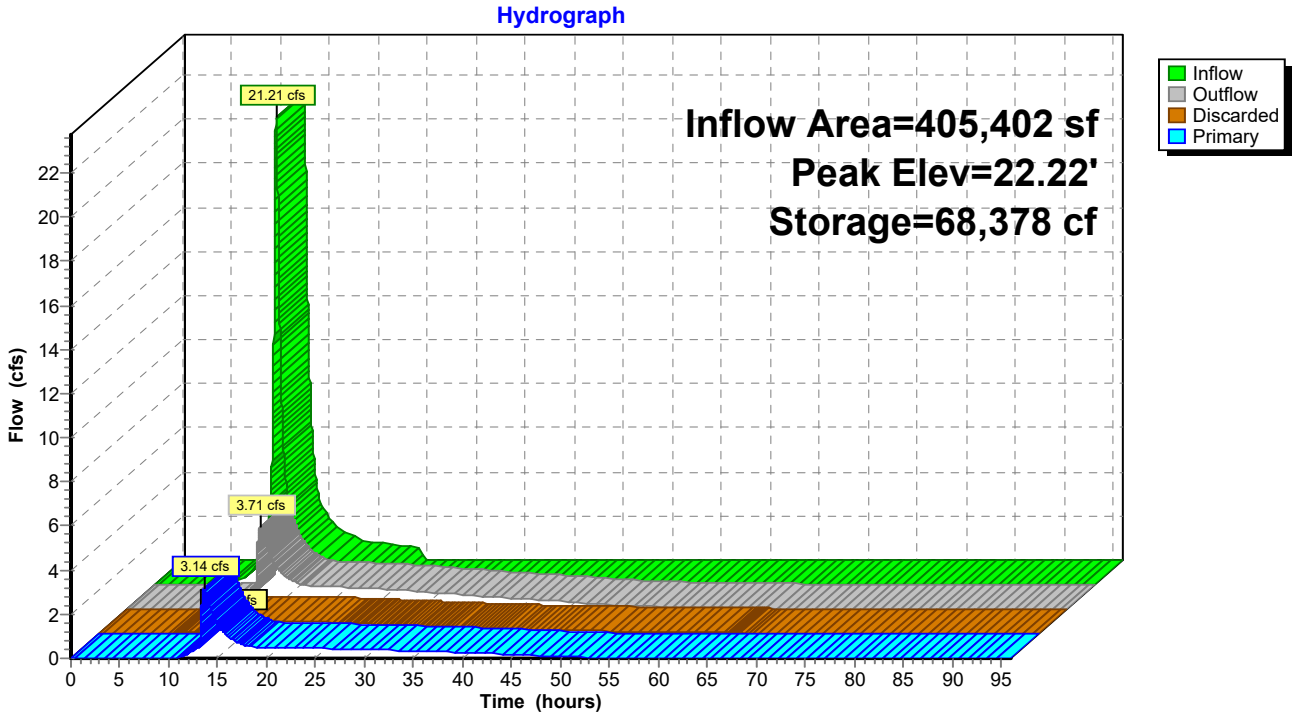
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.57 cfs @ 13.63 hrs HW=22.22' (Free Discharge)
└**3=Exfiltration** (Controls 0.57 cfs)

Primary OutFlow Max=3.12 cfs @ 13.63 hrs HW=22.22' (Free Discharge)
└**1=Culvert** (Passes 3.12 cfs of 52.21 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.64 cfs @ 1.50 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.43 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.24 cfs @ 10.91 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 1.07" for 25-yr event
Inflow = 5.07 cfs @ 12.75 hrs, Volume= 48,447 cf
Outflow = 1.08 cfs @ 15.36 hrs, Volume= 48,447 cf, Atten= 79%, Lag= 156.7 min
Discarded = 0.15 cfs @ 15.36 hrs, Volume= 13,807 cf
Primary = 0.93 cfs @ 15.36 hrs, Volume= 34,641 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 23.62' @ 15.36 hrs Surf.Area= 13,182 sf Storage= 19,229 cf

Plug-Flow detention time= 299.8 min calculated for 48,447 cf (100% of inflow)
Center-of-Mass det. time= 299.6 min (1,251.7 - 952.1)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

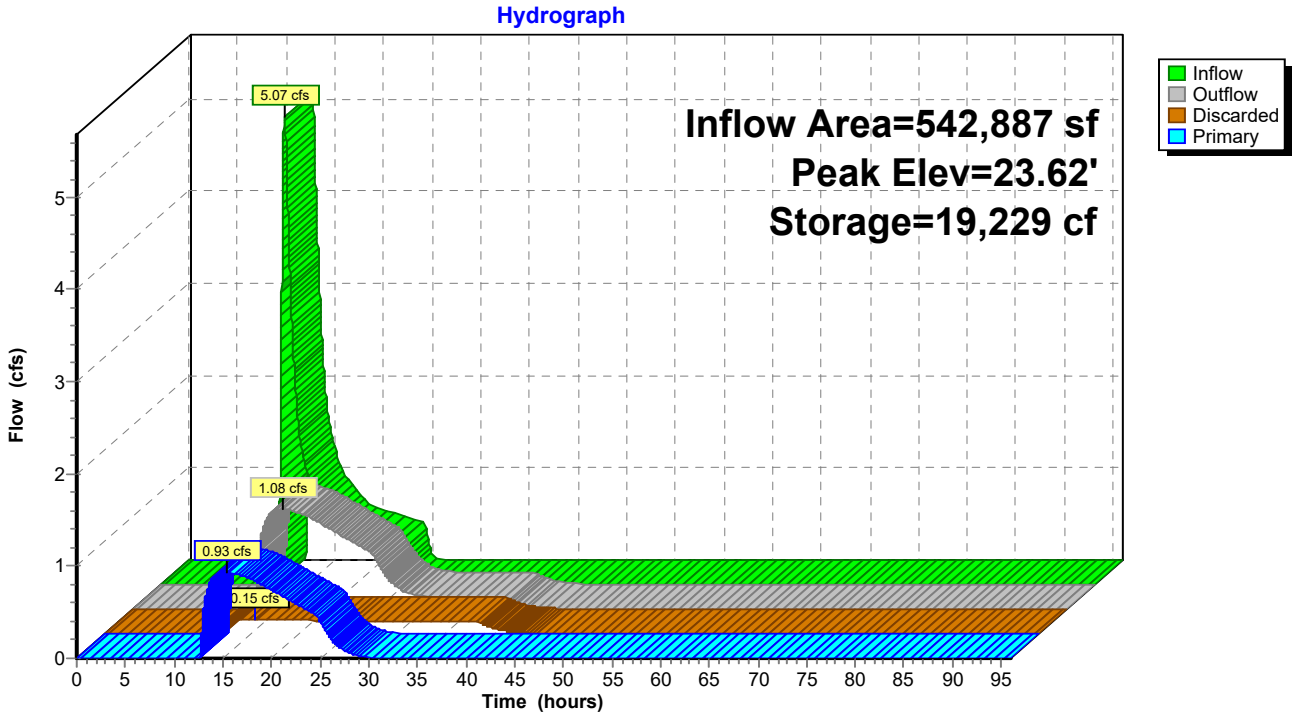
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.15 cfs @ 15.36 hrs HW=23.62' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.93 cfs @ 15.36 hrs HW=23.62' (Free Discharge)
└**1=Culvert** (Passes 0.93 cfs of 11.84 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.93 cfs @ 4.75 fps)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 2.11" for 25-yr event
Inflow = 5.63 cfs @ 12.27 hrs, Volume= 26,399 cf
Outflow = 1.17 cfs @ 13.18 hrs, Volume= 26,399 cf, Atten= 79%, Lag= 54.6 min
Discarded = 0.12 cfs @ 13.18 hrs, Volume= 8,595 cf
Primary = 1.05 cfs @ 13.18 hrs, Volume= 17,804 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 37.17' @ 13.18 hrs Surf.Area= 4,568 sf Storage= 10,158 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 317.6 min calculated for 26,399 cf (100% of inflow)
Center-of-Mass det. time= 317.5 min (1,199.5 - 882.1)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

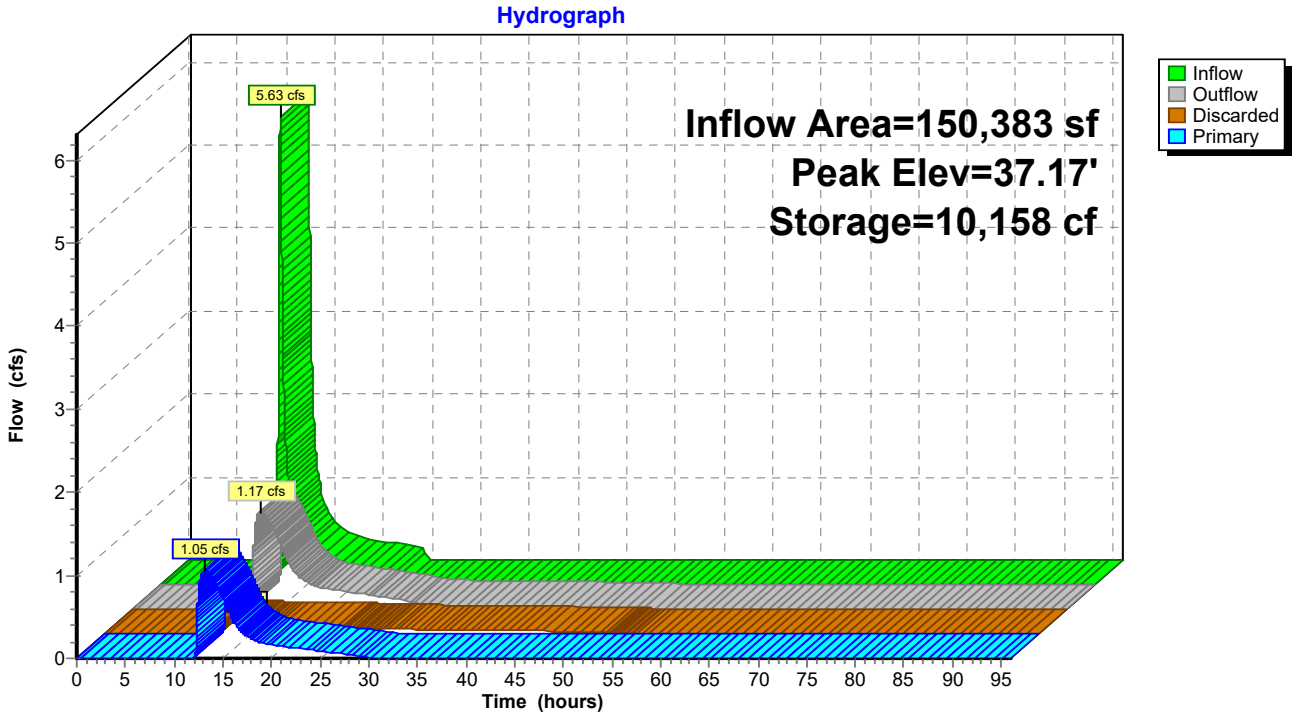
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 13.18 hrs HW=37.17' (Free Discharge)
└**3=Exfiltration** (Controls 0.12 cfs)

Primary OutFlow Max=1.05 cfs @ 13.18 hrs HW=37.17' (Free Discharge)
└**1=Culvert** (Passes 1.05 cfs of 22.30 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.53 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.91 cfs @ 4.63 fps)

Pond 22P: Water Quality Basin #3.2

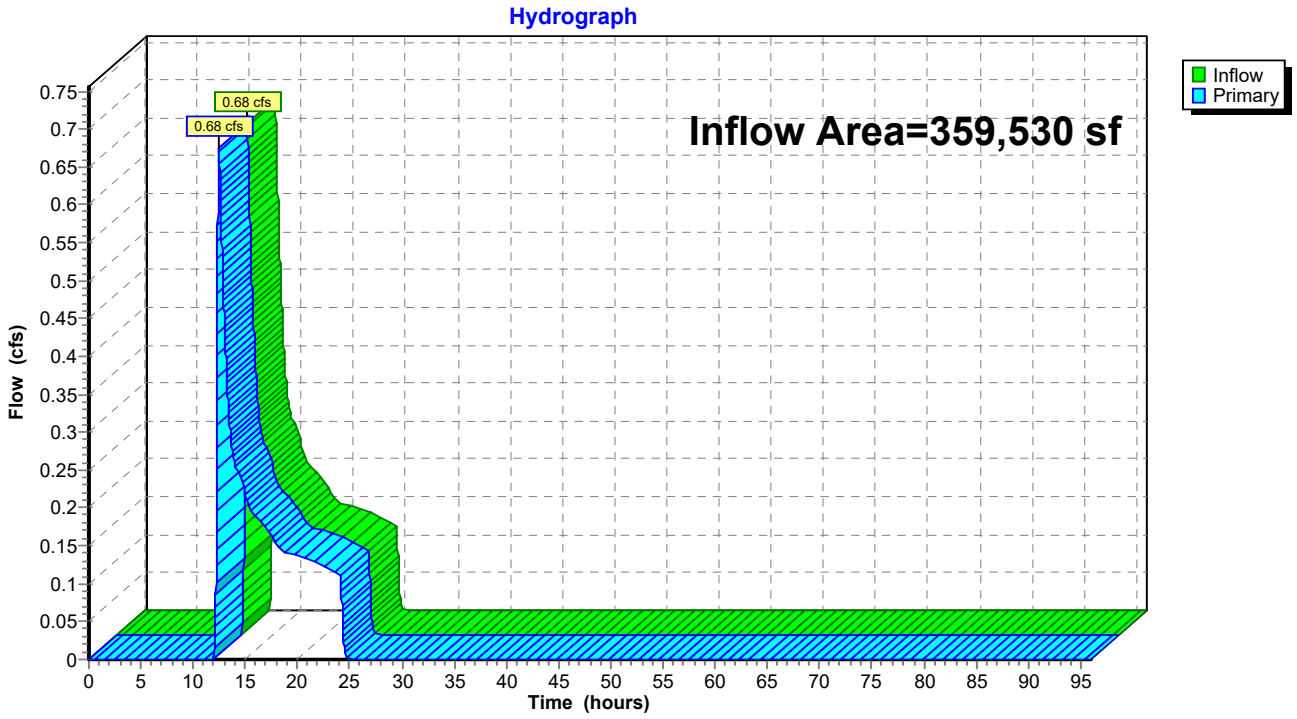


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.28" for 25-yr event
Inflow = 0.68 cfs @ 12.46 hrs, Volume= 8,528 cf
Primary = 0.68 cfs @ 12.46 hrs, Volume= 8,528 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

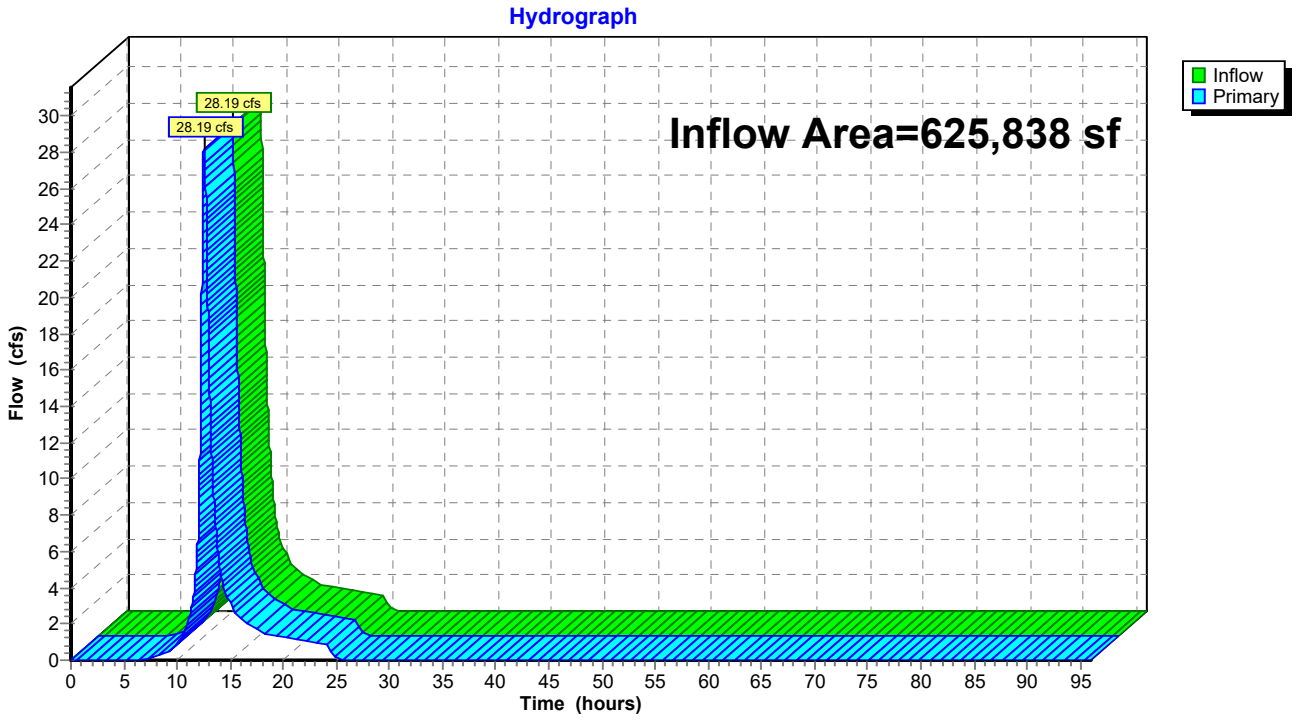


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 3.71" for 25-yr event
Inflow = 28.19 cfs @ 12.54 hrs, Volume= 193,578 cf
Primary = 28.19 cfs @ 12.54 hrs, Volume= 193,578 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

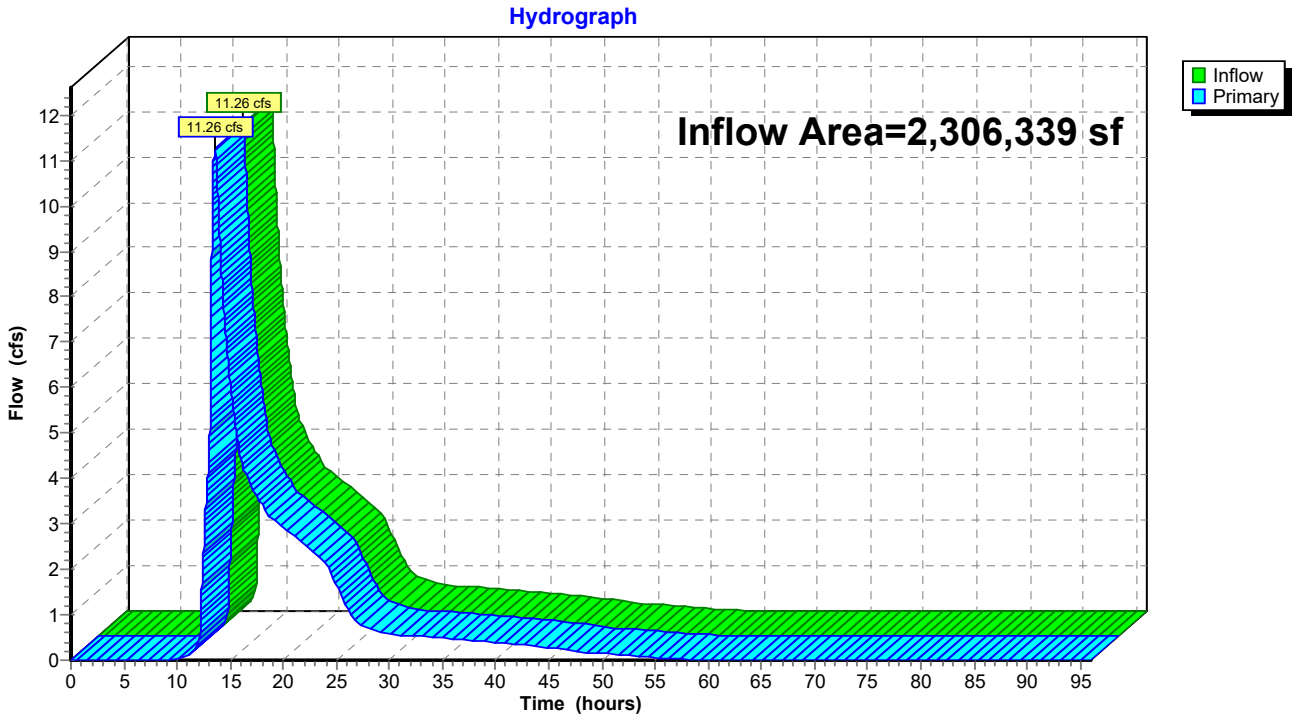


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 1.19" for 25-yr event
Inflow = 11.26 cfs @ 13.55 hrs, Volume= 228,187 cf
Primary = 11.26 cfs @ 13.55 hrs, Volume= 228,187 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

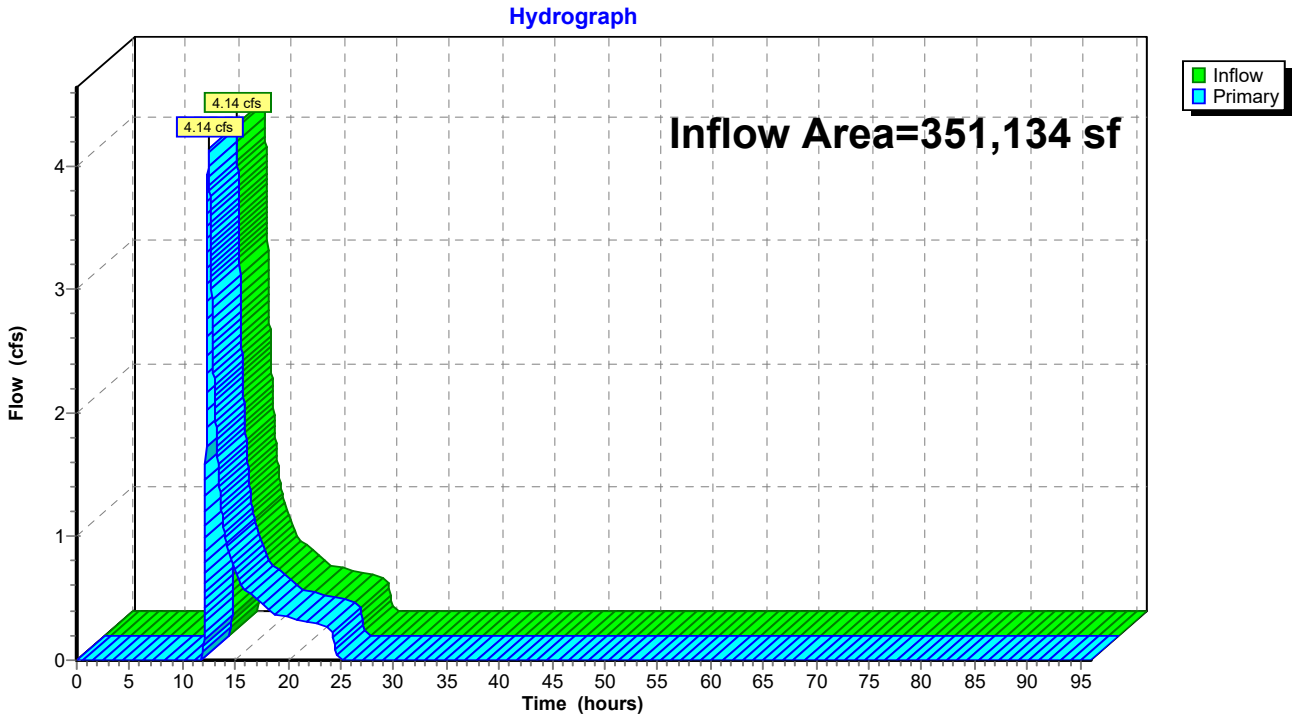


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 1.07" for 25-yr event
Inflow = 4.14 cfs @ 12.47 hrs, Volume= 31,335 cf
Primary = 4.14 cfs @ 12.47 hrs, Volume= 31,335 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=1.22 cfs 9,762 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=2.64"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=7.19 cfs 33,139 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=1.45"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=7.49 cfs 65,580 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=4.84"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=29.75 cfs 194,026 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=4.40"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=33.40 cfs 229,595 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=4.29"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=25.18 cfs 145,066 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=1.45"
Flow Length=815' Tc=28.4 min CN=48 Runoff=6.16 cfs 42,417 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=1.04"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=1.40 cfs 9,456 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=1.20"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=3.12 cfs 20,945 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=1.12"
Flow Length=335' Tc=16.8 min CN=44 Runoff=0.74 cfs 4,527 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.20"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.13 cfs 3,932 cf

Pond 12P: Water Quality Basin #4 Peak Elev=27.01' Storage=93,953 cf Inflow=29.75 cfs 194,026 cf
Discarded=0.77 cfs 78,208 cf Primary=11.07 cfs 115,818 cf Outflow=11.85 cfs 194,026 cf

Pond 13P: Water Quality Basin #1 Peak Elev=14.84' Storage=8,249 cf Inflow=3.12 cfs 20,945 cf
Discarded=0.12 cfs 10,434 cf Primary=0.41 cfs 10,512 cf Outflow=0.54 cfs 20,945 cf

Pond 18P: Water Quality Basin #5 Peak Elev=20.97' Storage=1,967 cf Inflow=1.40 cfs 9,456 cf
Discarded=0.03 cfs 1,998 cf Primary=0.53 cfs 7,459 cf Outflow=0.56 cfs 9,456 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=22.41' Storage=71,537 cf Inflow=25.18 cfs 145,066 cf
Discarded=0.59 cfs 59,197 cf Primary=7.34 cfs 85,869 cf Outflow=7.93 cfs 145,066 cf

Pond 21P: Water Quality Basin #2 Peak Elev=24.27' Storage=28,052 cf Inflow=7.49 cfs 65,580 cf
Discarded=0.17 cfs 15,166 cf Primary=1.20 cfs 50,414 cf Outflow=1.37 cfs 65,580 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=37.76' Storage=12,992 cf Inflow=7.19 cfs 33,139 cf
Discarded=0.14 cfs 9,050 cf Primary=1.32 cfs 24,089 cf Outflow=1.47 cfs 33,139 cf

Link 2L: Northeast Wetland Inflow=1.22 cfs 13,694 cf
Primary=1.22 cfs 13,694 cf

Link 3L: South Off-Site (POC 3) Inflow=33.40 cfs 229,595 cf
Primary=33.40 cfs 229,595 cf

Link 4L: West Wetlands (POC 1) Inflow=22.29 cfs 312,381 cf
Primary=22.29 cfs 312,381 cf

Link 5L: West Off-Site (POC 2) Inflow=6.16 cfs 42,417 cf
Primary=6.16 cfs 42,417 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 758,445 cf Average Runoff Depth = 2.77"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

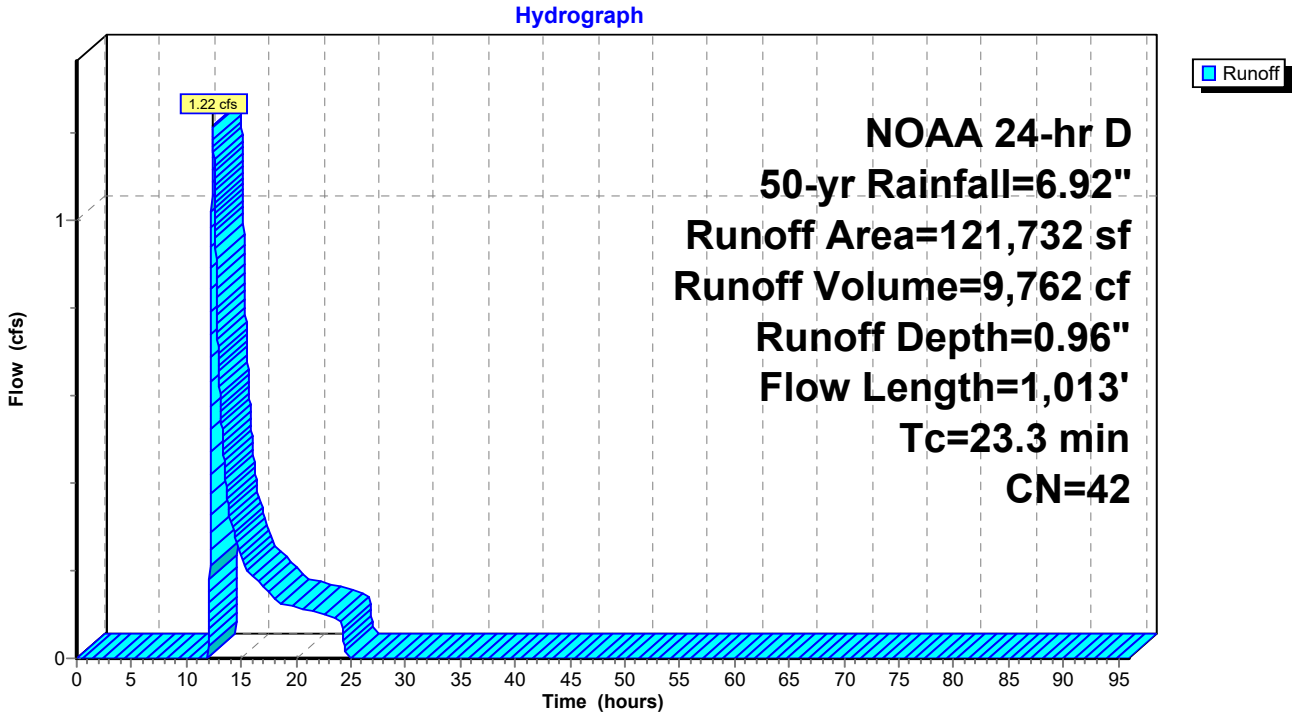
Runoff = 1.22 cfs @ 12.42 hrs, Volume= 9,762 cf, Depth= 0.96"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

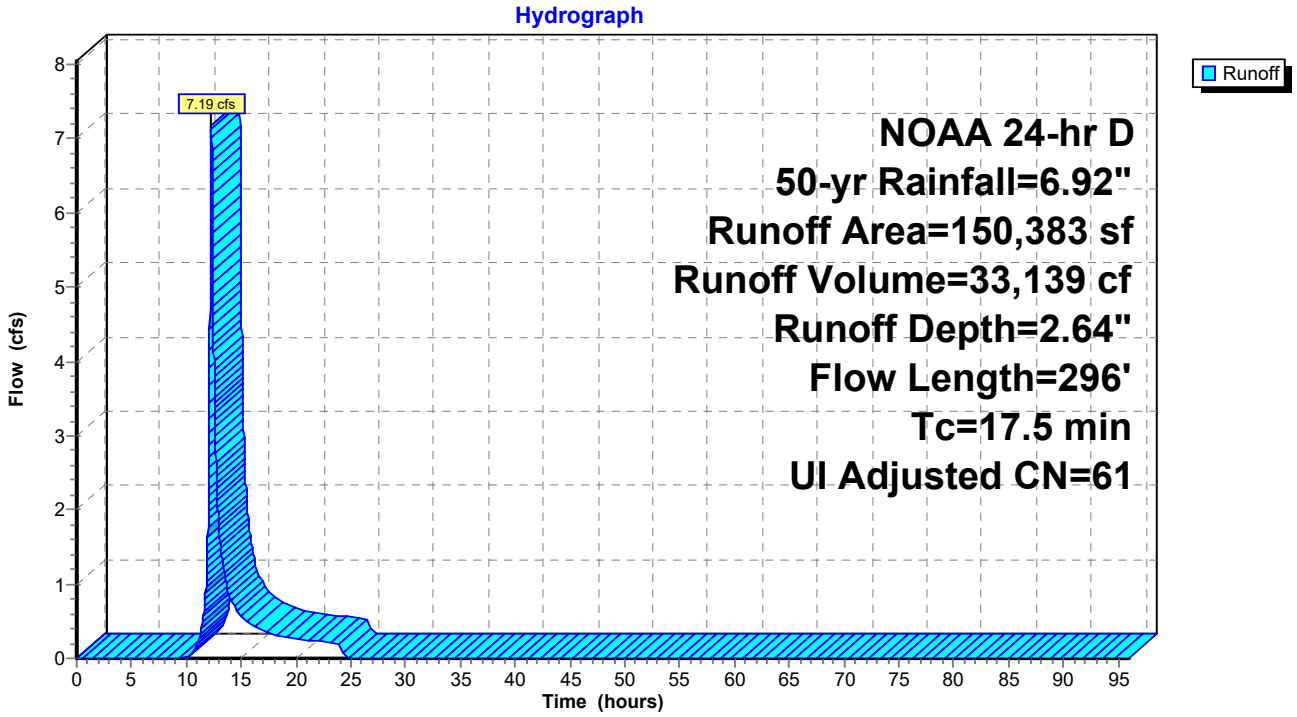
Runoff = 7.19 cfs @ 12.27 hrs, Volume= 33,139 cf, Depth= 2.64"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

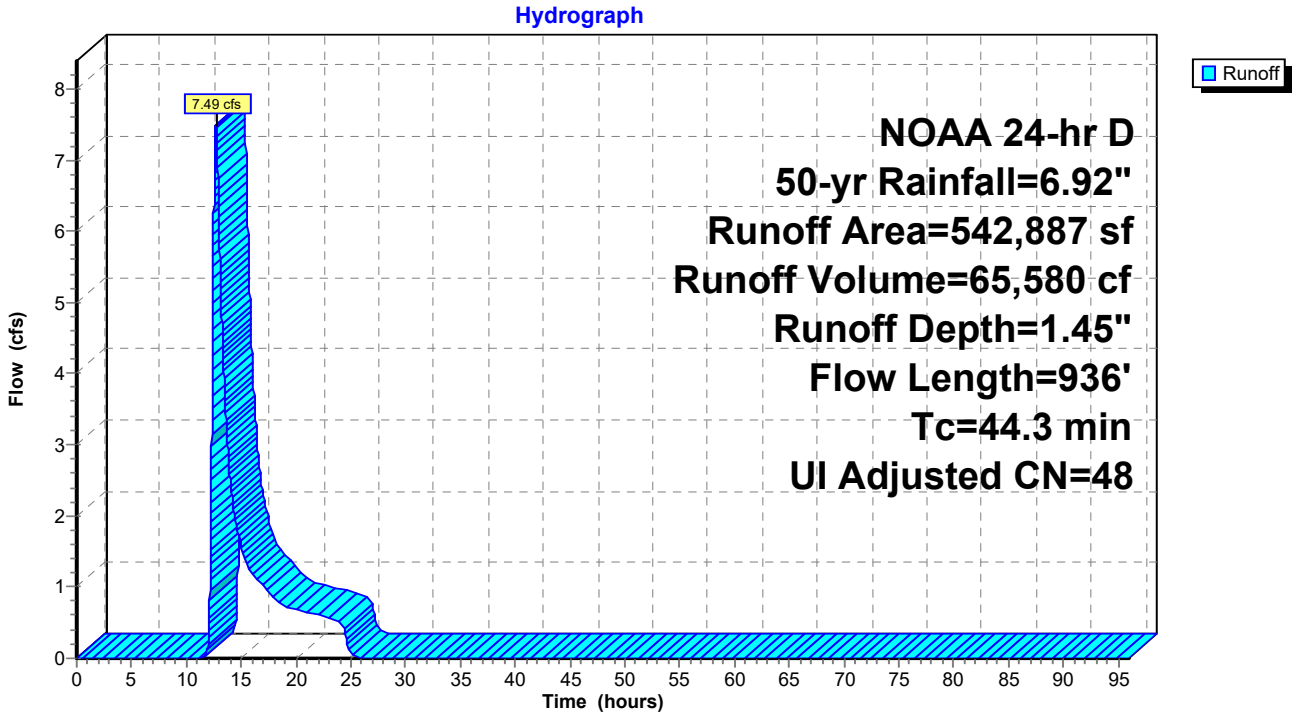
Runoff = 7.49 cfs @ 12.70 hrs, Volume= 65,580 cf, Depth= 1.45"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

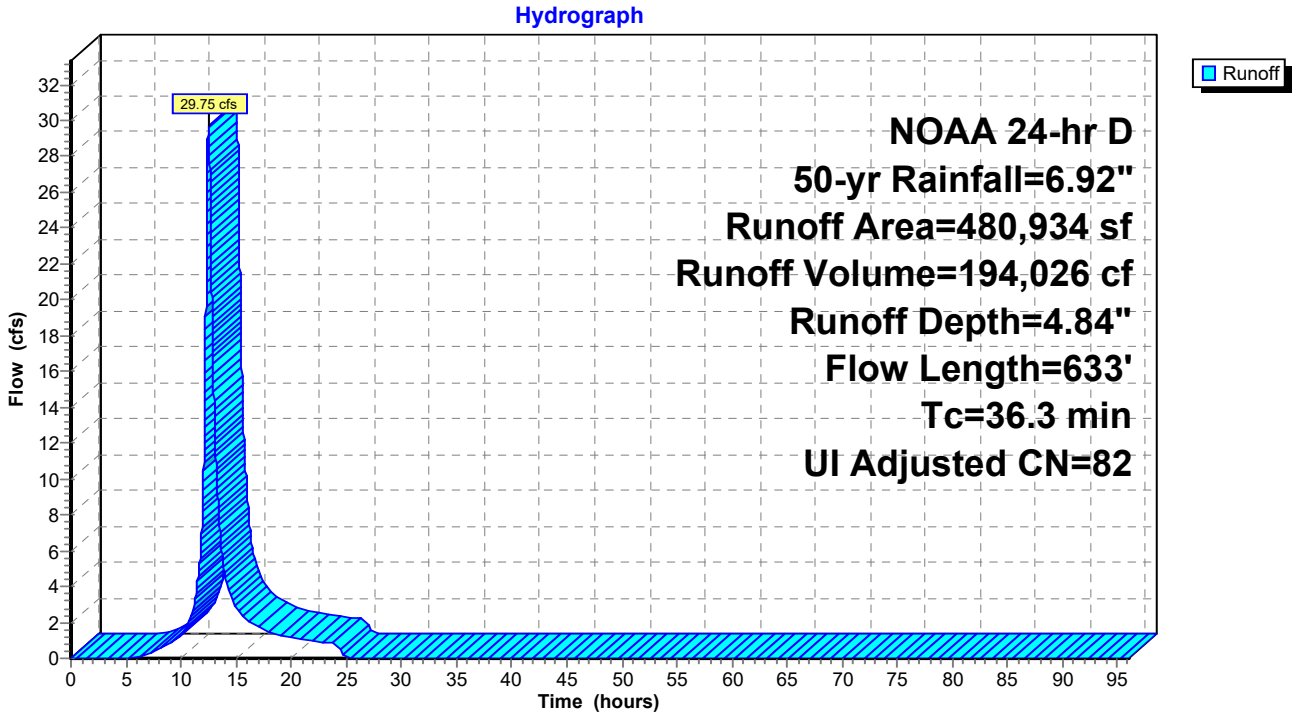
Runoff = 29.75 cfs @ 12.47 hrs, Volume= 194,026 cf, Depth= 4.84"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

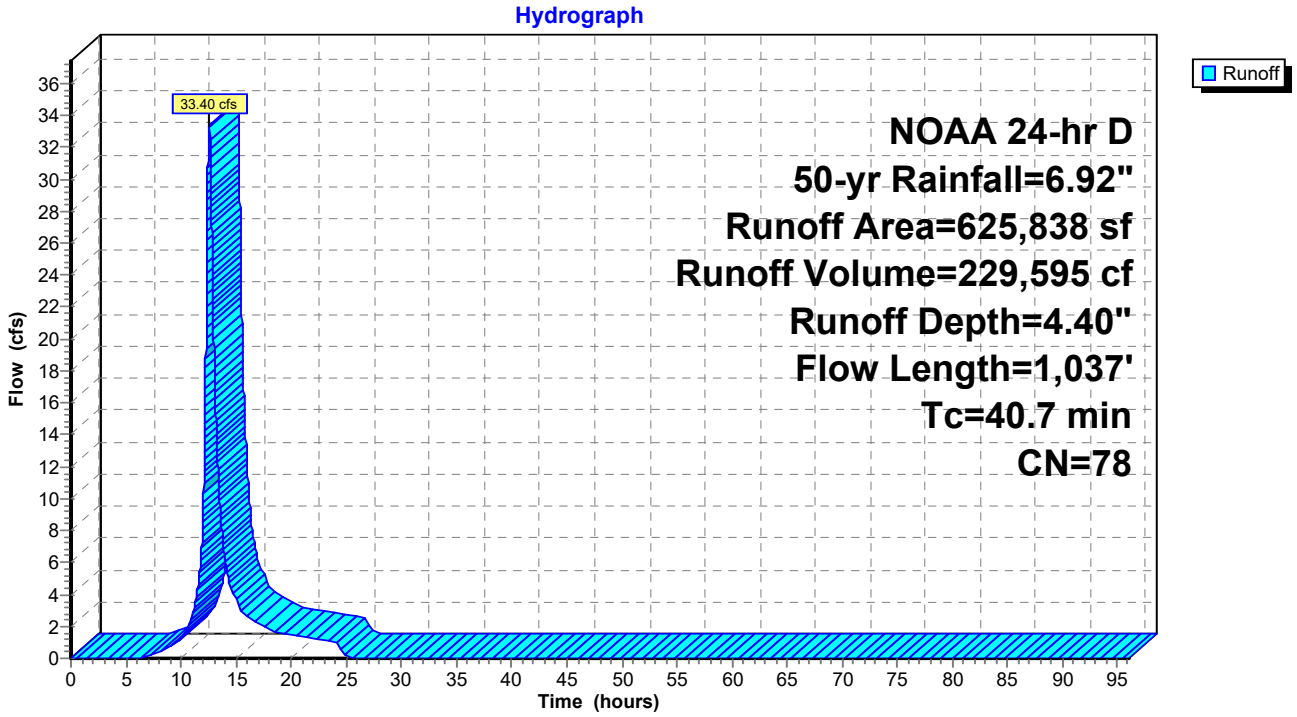
Runoff = 33.40 cfs @ 12.53 hrs, Volume= 229,595 cf, Depth= 4.40"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

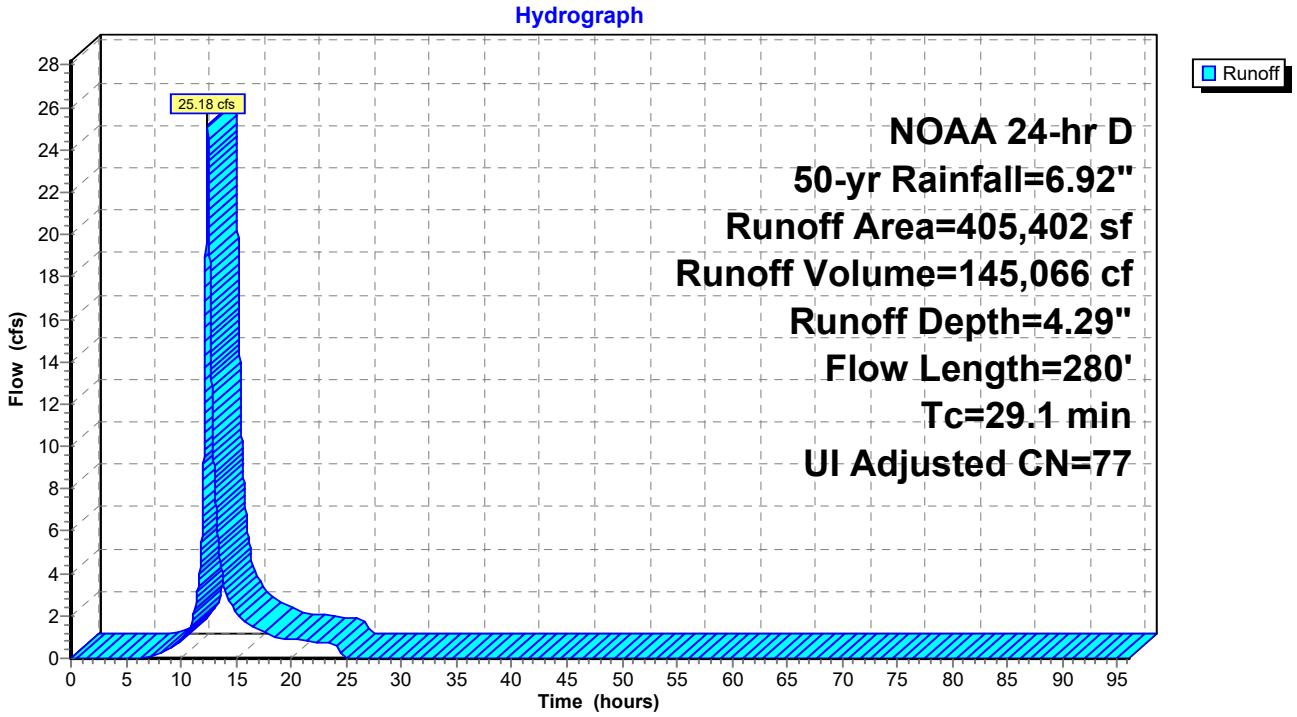
Runoff = 25.18 cfs @ 12.39 hrs, Volume= 145,066 cf, Depth= 4.29"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

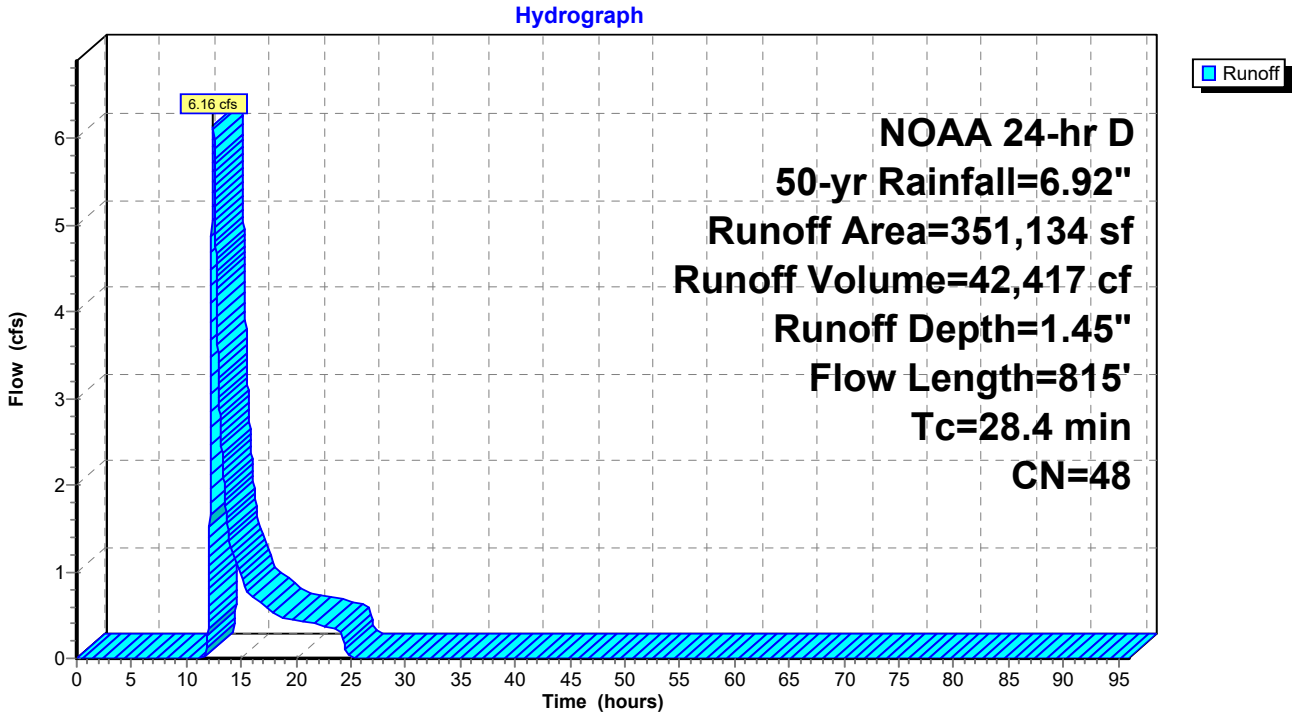
Runoff = 6.16 cfs @ 12.46 hrs, Volume= 42,417 cf, Depth= 1.45"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

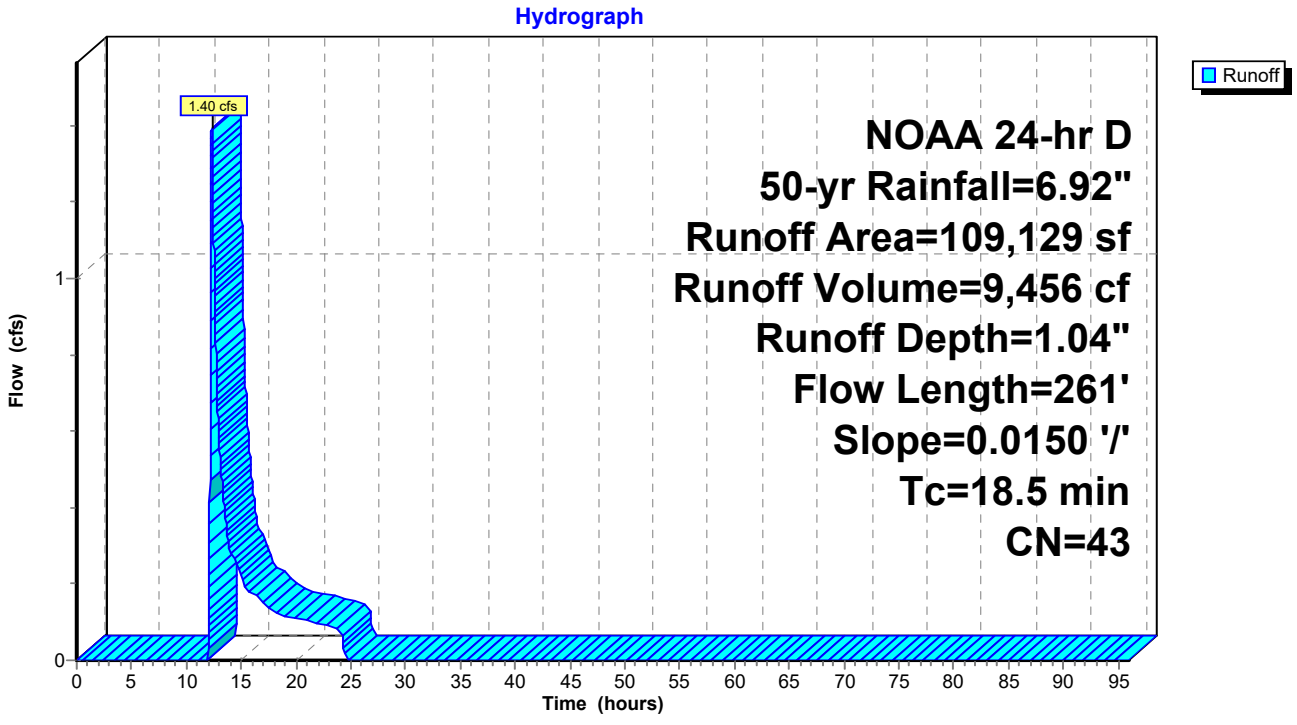
Runoff = 1.40 cfs @ 12.33 hrs, Volume= 9,456 cf, Depth= 1.04"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

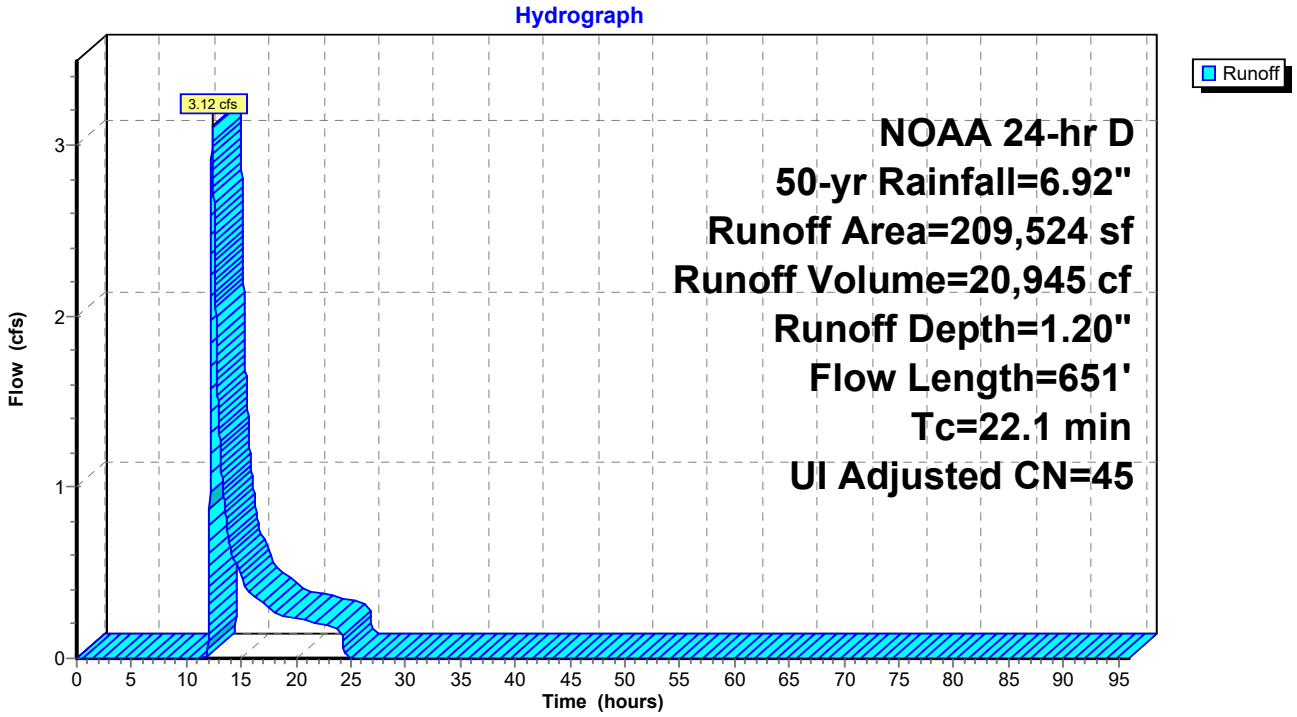
Runoff = 3.12 cfs @ 12.38 hrs, Volume= 20,945 cf, Depth= 1.20"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

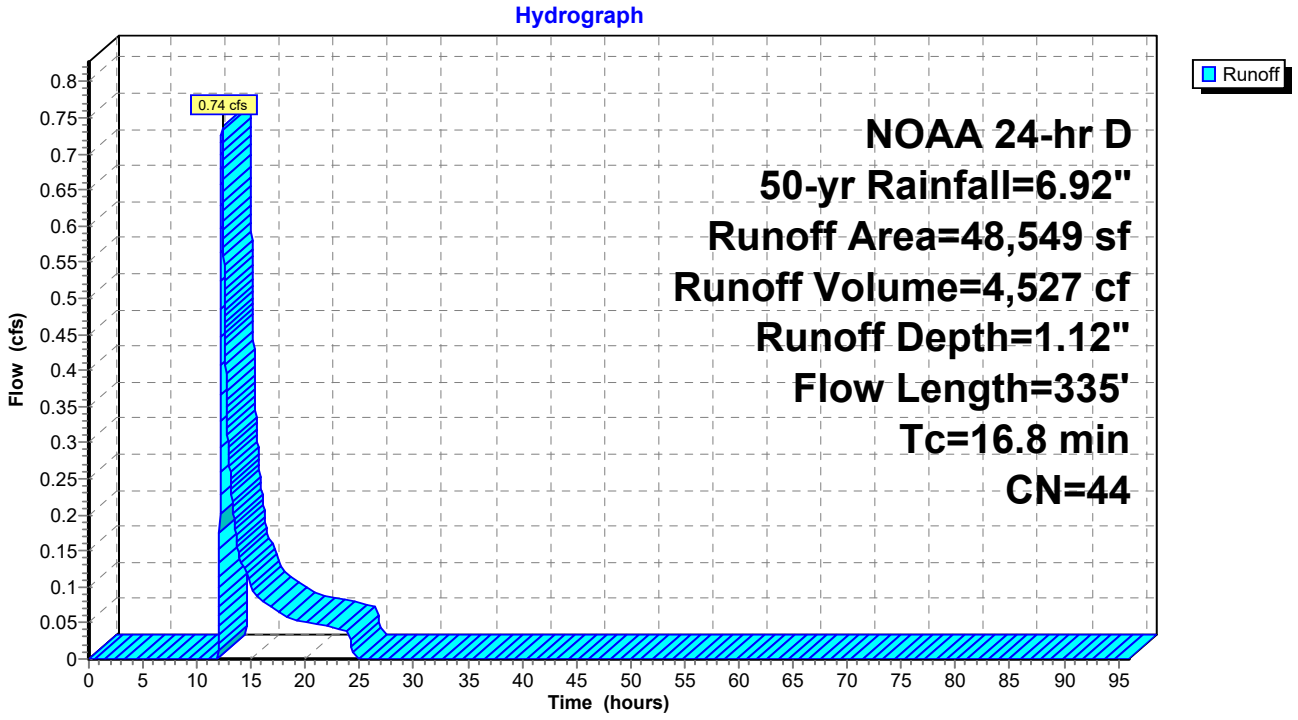
Runoff = 0.74 cfs @ 12.30 hrs, Volume= 4,527 cf, Depth= 1.12"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

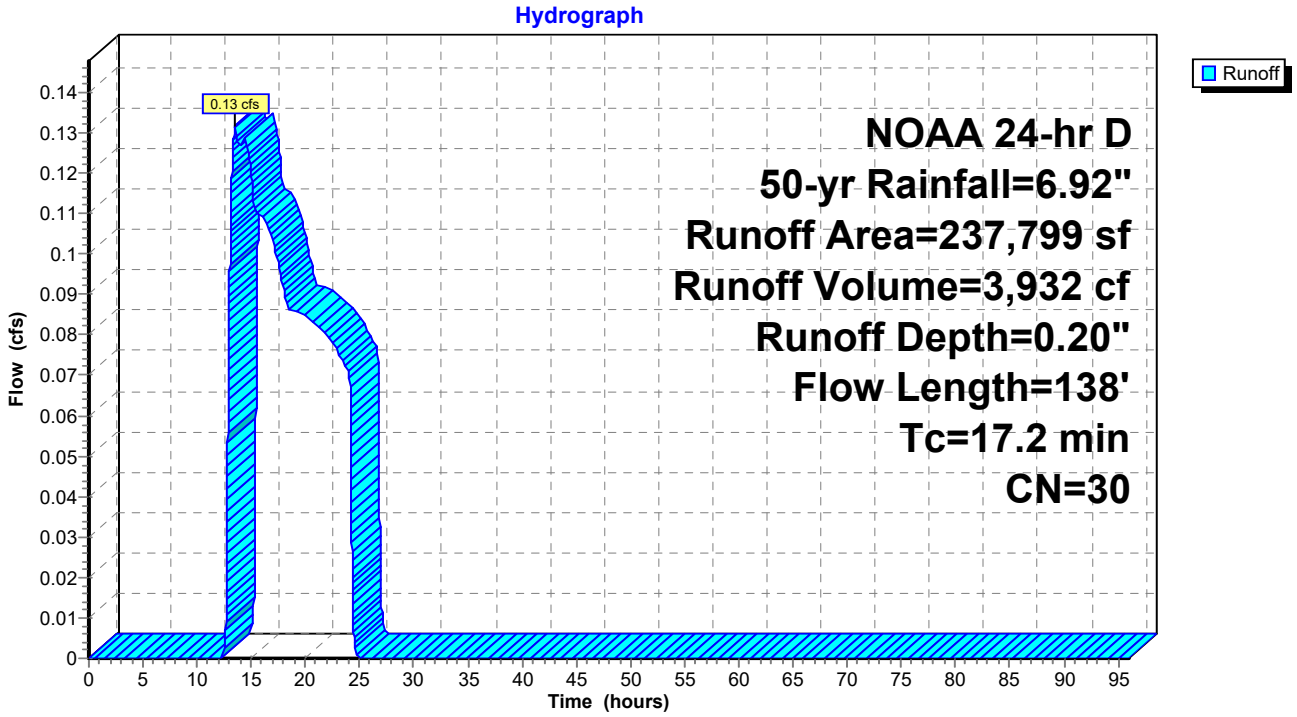
Runoff = 0.13 cfs @ 13.51 hrs, Volume= 3,932 cf, Depth= 0.20"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 4.84" for 50-yr event
Inflow = 29.75 cfs @ 12.47 hrs, Volume= 194,026 cf
Outflow = 11.85 cfs @ 13.12 hrs, Volume= 194,026 cf, Atten= 60%, Lag= 38.6 min
Discarded = 0.77 cfs @ 13.12 hrs, Volume= 78,208 cf
Primary = 11.07 cfs @ 13.12 hrs, Volume= 115,818 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 27.01' @ 13.12 hrs Surf.Area= 20,894 sf Storage= 93,953 cf

Plug-Flow detention time= 597.2 min calculated for 194,006 cf (100% of inflow)
Center-of-Mass det. time= 597.5 min (1,436.0 - 838.5)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

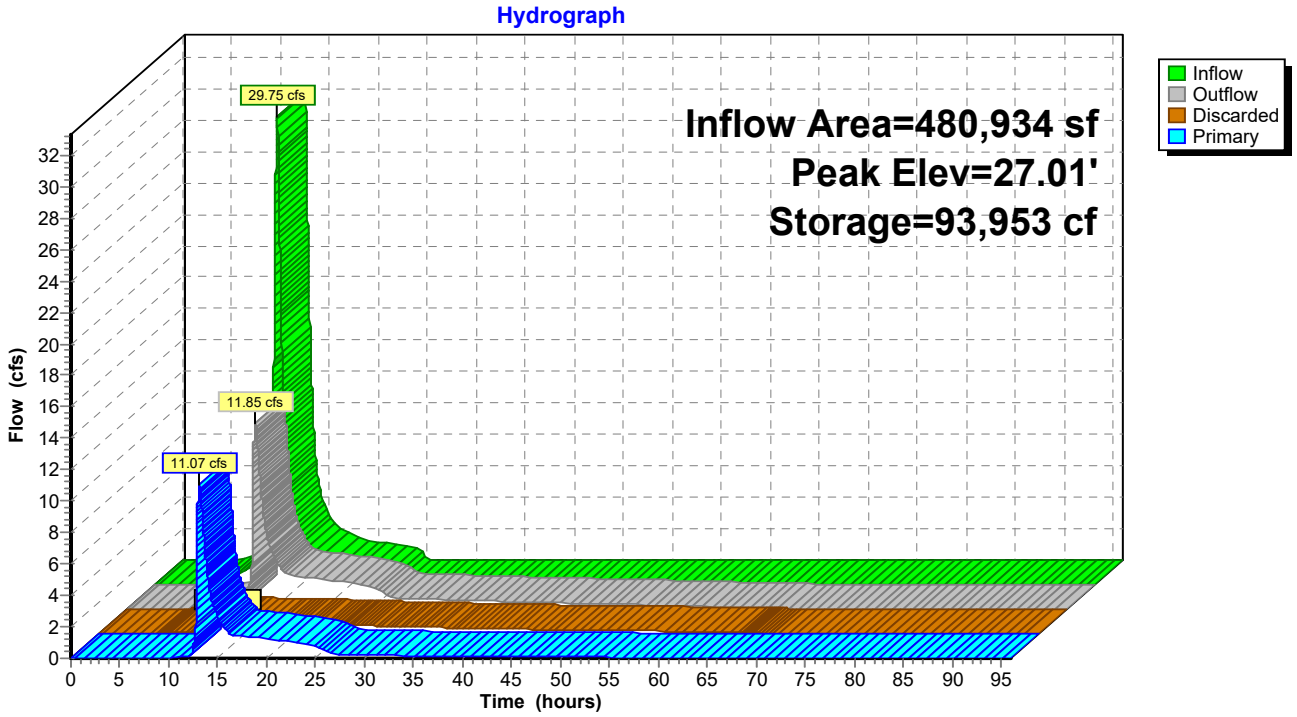
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.77 cfs @ 13.12 hrs HW=27.01' (Free Discharge)
└**3=Exfiltration** (Controls 0.77 cfs)

Primary OutFlow Max=11.07 cfs @ 13.12 hrs HW=27.01' (Free Discharge)
└**1=Culvert** (Passes 11.07 cfs of 51.59 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 9.46 cfs @ 2.30 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.43 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.36 cfs @ 6.92 fps)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 1.20" for 50-yr event
Inflow = 3.12 cfs @ 12.38 hrs, Volume= 20,945 cf
Outflow = 0.54 cfs @ 14.63 hrs, Volume= 20,945 cf, Atten= 83%, Lag= 135.0 min
Discarded = 0.12 cfs @ 14.63 hrs, Volume= 10,434 cf
Primary = 0.41 cfs @ 14.63 hrs, Volume= 10,512 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 14.84' @ 14.63 hrs Surf.Area= 10,458 sf Storage= 8,249 cf

Plug-Flow detention time= 332.1 min calculated for 20,943 cf (100% of inflow)
Center-of-Mass det. time= 332.2 min (1,264.1 - 931.9)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

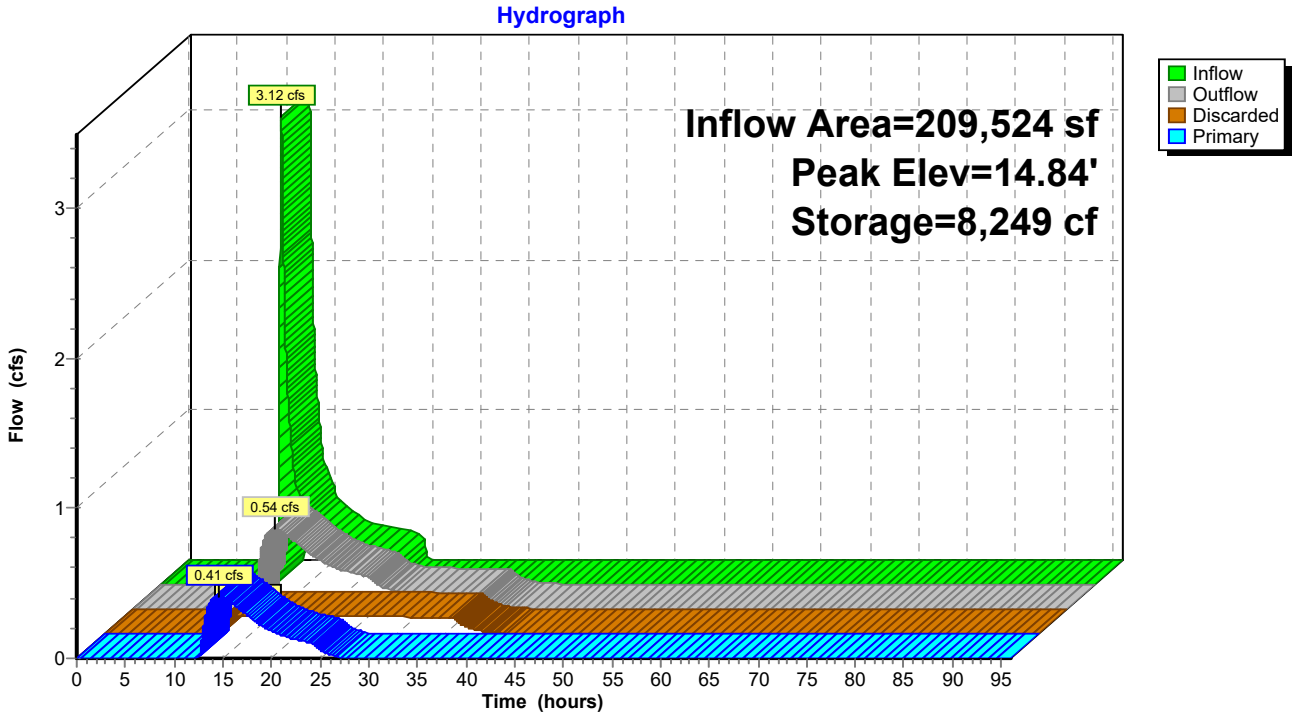
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 14.63 hrs HW=14.84' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.41 cfs @ 14.63 hrs HW=14.84' (Free Discharge)
└**1=Culvert** (Passes 0.41 cfs of 4.53 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.41 cfs @ 2.26 fps)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 1.04" for 50-yr event
Inflow = 1.40 cfs @ 12.33 hrs, Volume= 9,456 cf
Outflow = 0.56 cfs @ 13.02 hrs, Volume= 9,456 cf, Atten= 60%, Lag= 41.5 min
Discarded = 0.03 cfs @ 13.02 hrs, Volume= 1,998 cf
Primary = 0.53 cfs @ 13.02 hrs, Volume= 7,459 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 20.97' @ 13.02 hrs Surf.Area= 2,368 sf Storage= 1,967 cf

Plug-Flow detention time= 129.0 min calculated for 9,455 cf (100% of inflow)
Center-of-Mass det. time= 129.1 min (1,067.6 - 938.5)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

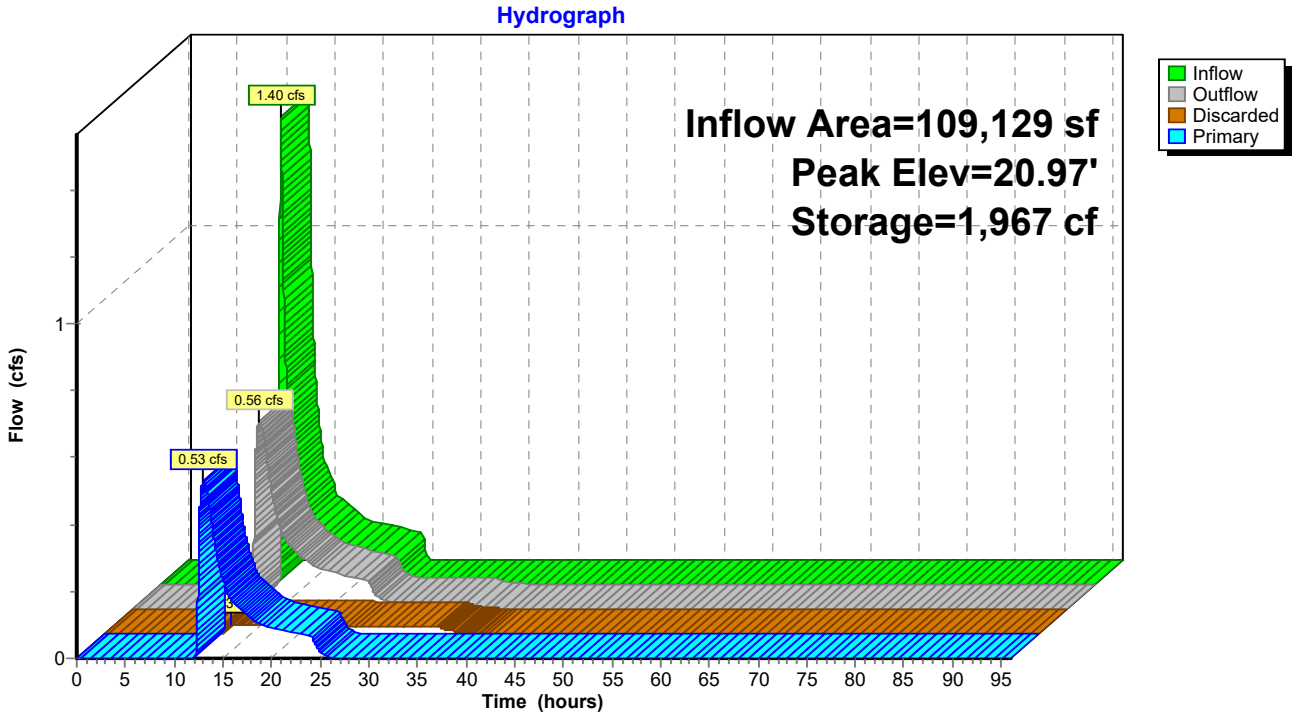
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 13.02 hrs HW=20.97' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.53 cfs @ 13.02 hrs HW=20.97' (Free Discharge)
└**1=Culvert** (Passes 0.53 cfs of 4.03 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.71 fps)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 4.29" for 50-yr event
Inflow = 25.18 cfs @ 12.39 hrs, Volume= 145,066 cf
Outflow = 7.93 cfs @ 13.09 hrs, Volume= 145,066 cf, Atten= 69%, Lag= 41.8 min
Discarded = 0.59 cfs @ 13.09 hrs, Volume= 59,197 cf
Primary = 7.34 cfs @ 13.09 hrs, Volume= 85,869 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.41' @ 13.09 hrs Surf.Area= 16,471 sf Storage= 71,537 cf

Plug-Flow detention time= 651.8 min calculated for 145,066 cf (100% of inflow)
Center-of-Mass det. time= 651.8 min (1,497.1 - 845.4)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

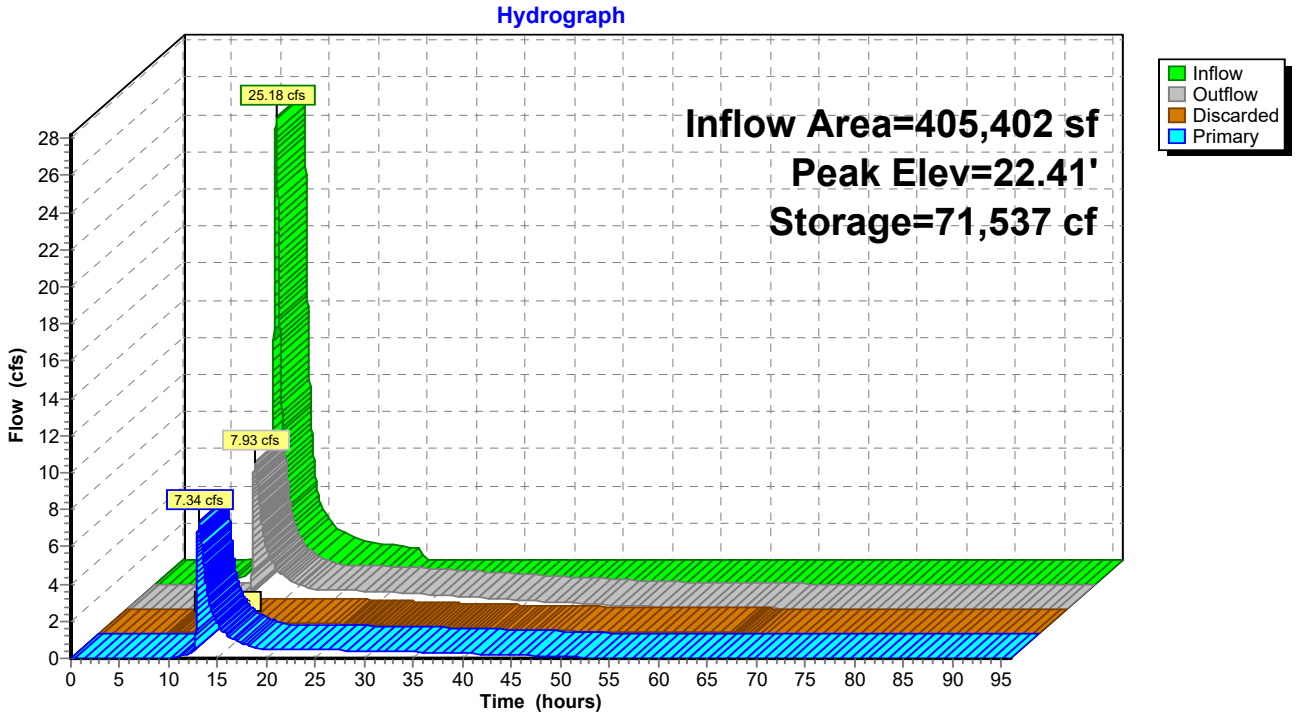
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.59 cfs @ 13.09 hrs HW=22.41' (Free Discharge)
└**3=Exfiltration** (Controls 0.59 cfs)

Primary OutFlow Max=7.31 cfs @ 13.09 hrs HW=22.41' (Free Discharge)
└**1=Culvert** (Passes 7.31 cfs of 53.06 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 6.82 cfs @ 2.06 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.63 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.24 cfs @ 11.12 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 1.45" for 50-yr event
Inflow = 7.49 cfs @ 12.70 hrs, Volume= 65,580 cf
Outflow = 1.37 cfs @ 15.41 hrs, Volume= 65,580 cf, Atten= 82%, Lag= 162.9 min
Discarded = 0.17 cfs @ 15.41 hrs, Volume= 15,166 cf
Primary = 1.20 cfs @ 15.41 hrs, Volume= 50,414 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 24.27' @ 15.41 hrs Surf.Area= 14,279 sf Storage= 28,052 cf

Plug-Flow detention time= 319.5 min calculated for 65,573 cf (100% of inflow)
Center-of-Mass det. time= 319.6 min (1,259.2 - 939.6)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

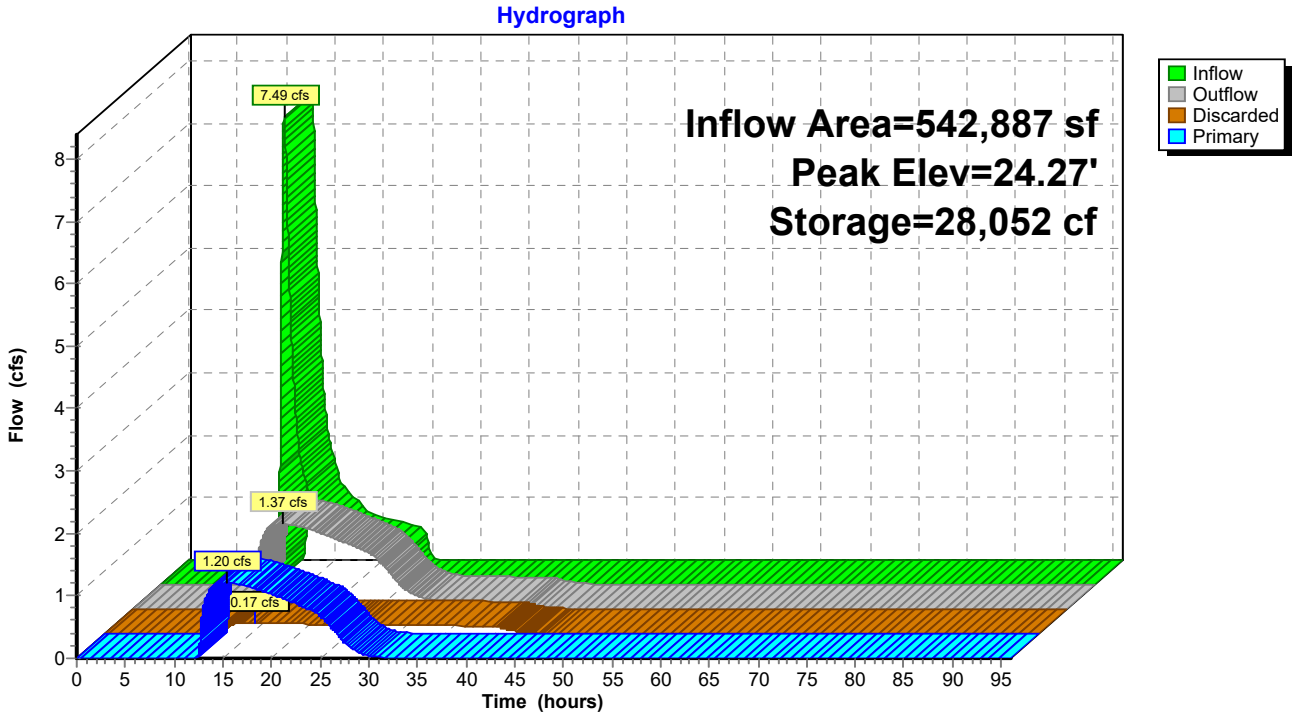
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.17 cfs @ 15.41 hrs HW=24.27' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=1.20 cfs @ 15.41 hrs HW=24.27' (Free Discharge)
└**1=Culvert** (Passes 1.20 cfs of 17.02 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 1.20 cfs @ 6.12 fps)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 2.64" for 50-yr event
Inflow = 7.19 cfs @ 12.27 hrs, Volume= 33,139 cf
Outflow = 1.47 cfs @ 13.16 hrs, Volume= 33,139 cf, Atten= 80%, Lag= 53.2 min
Discarded = 0.14 cfs @ 13.16 hrs, Volume= 9,050 cf
Primary = 1.32 cfs @ 13.16 hrs, Volume= 24,089 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 37.76' @ 13.16 hrs Surf.Area= 5,127 sf Storage= 12,992 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 276.2 min calculated for 33,139 cf (100% of inflow)
Center-of-Mass det. time= 276.1 min (1,150.7 - 874.5)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

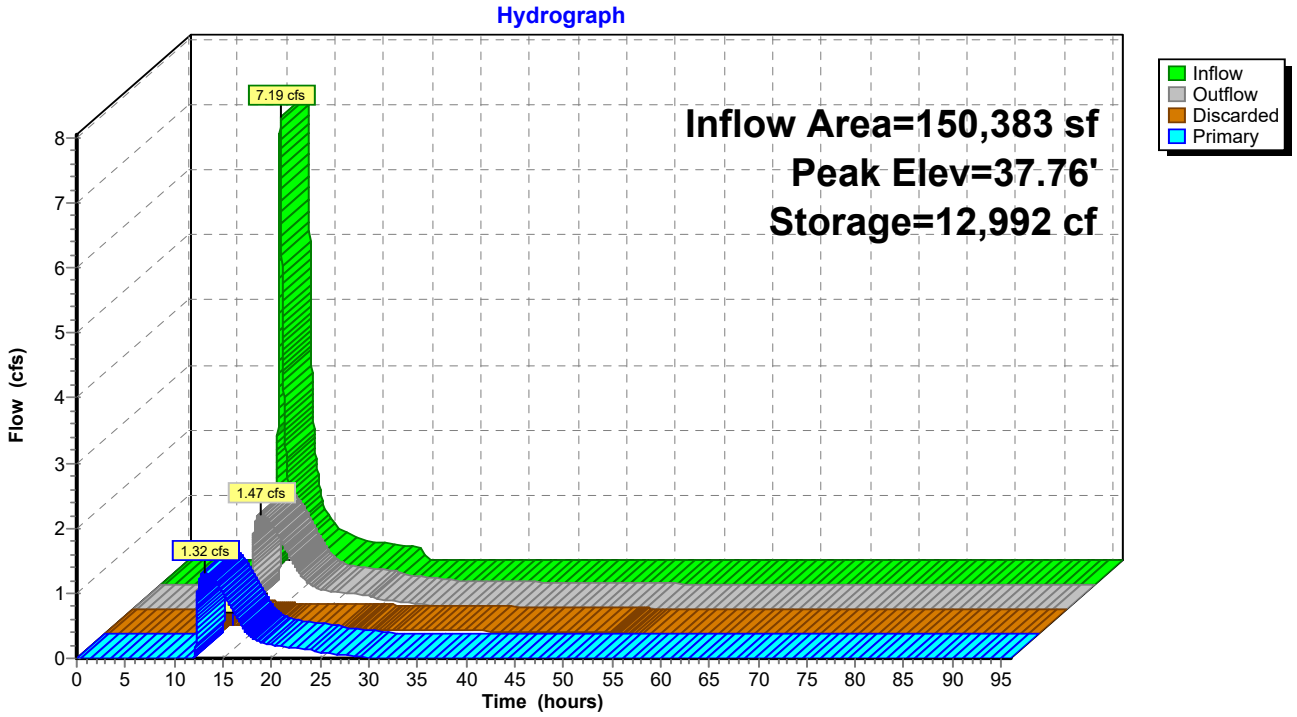
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 13.16 hrs HW=37.76' (Free Discharge)
└**3=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=1.32 cfs @ 13.16 hrs HW=37.76' (Free Discharge)
└**1=Culvert** (Passes 1.32 cfs of 25.12 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.50 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.16 cfs @ 5.91 fps)

Pond 22P: Water Quality Basin #3.2

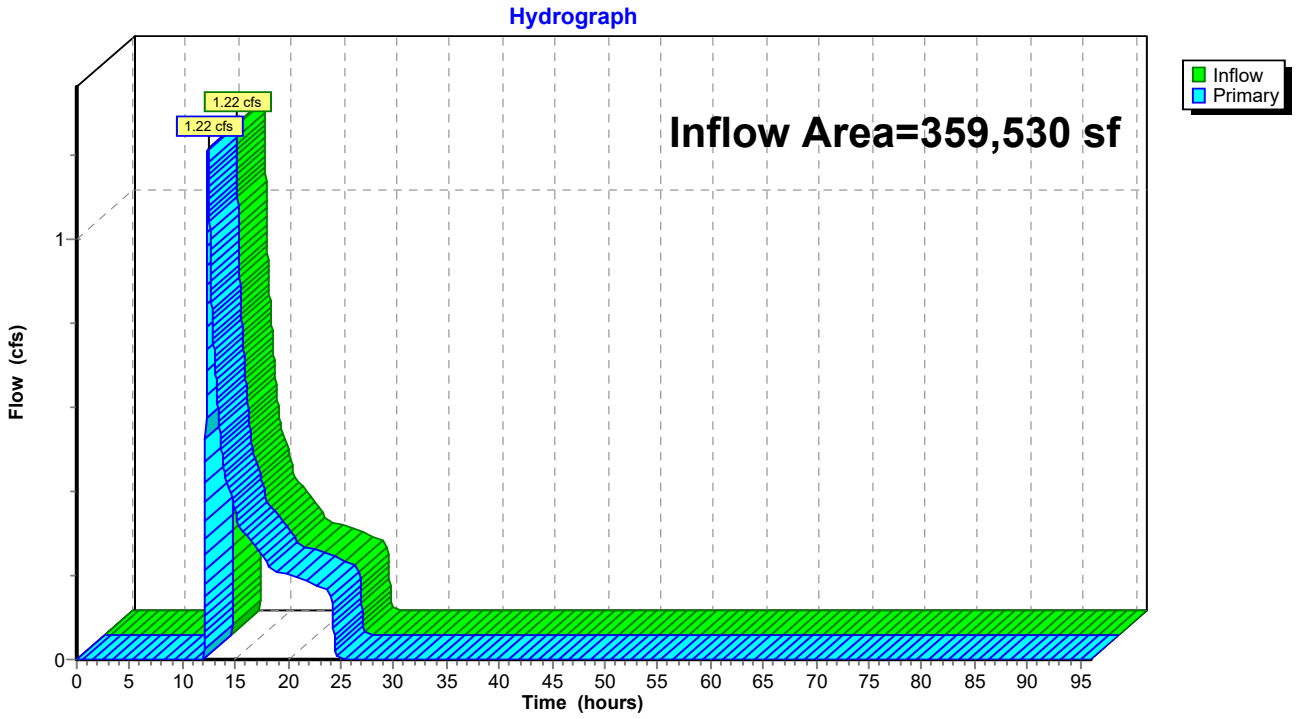


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.46" for 50-yr event
Inflow = 1.22 cfs @ 12.42 hrs, Volume= 13,694 cf
Primary = 1.22 cfs @ 12.42 hrs, Volume= 13,694 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

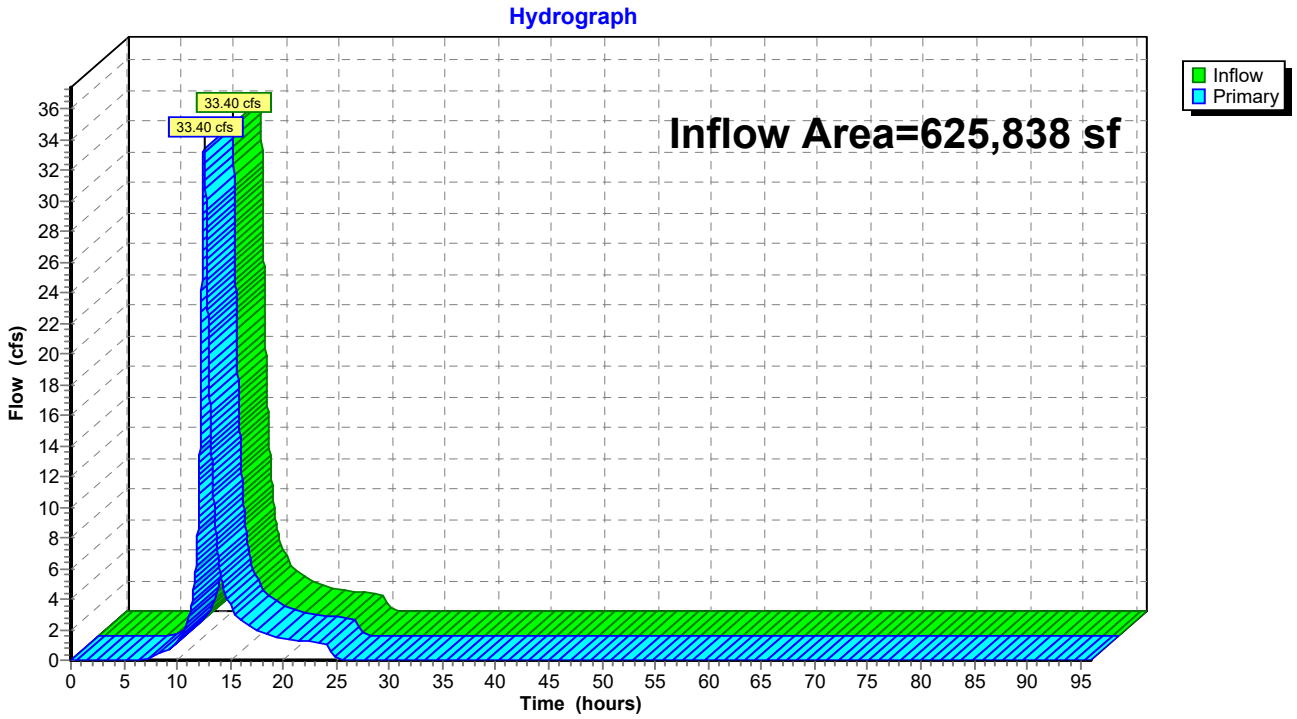


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 4.40" for 50-yr event
Inflow = 33.40 cfs @ 12.53 hrs, Volume= 229,595 cf
Primary = 33.40 cfs @ 12.53 hrs, Volume= 229,595 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

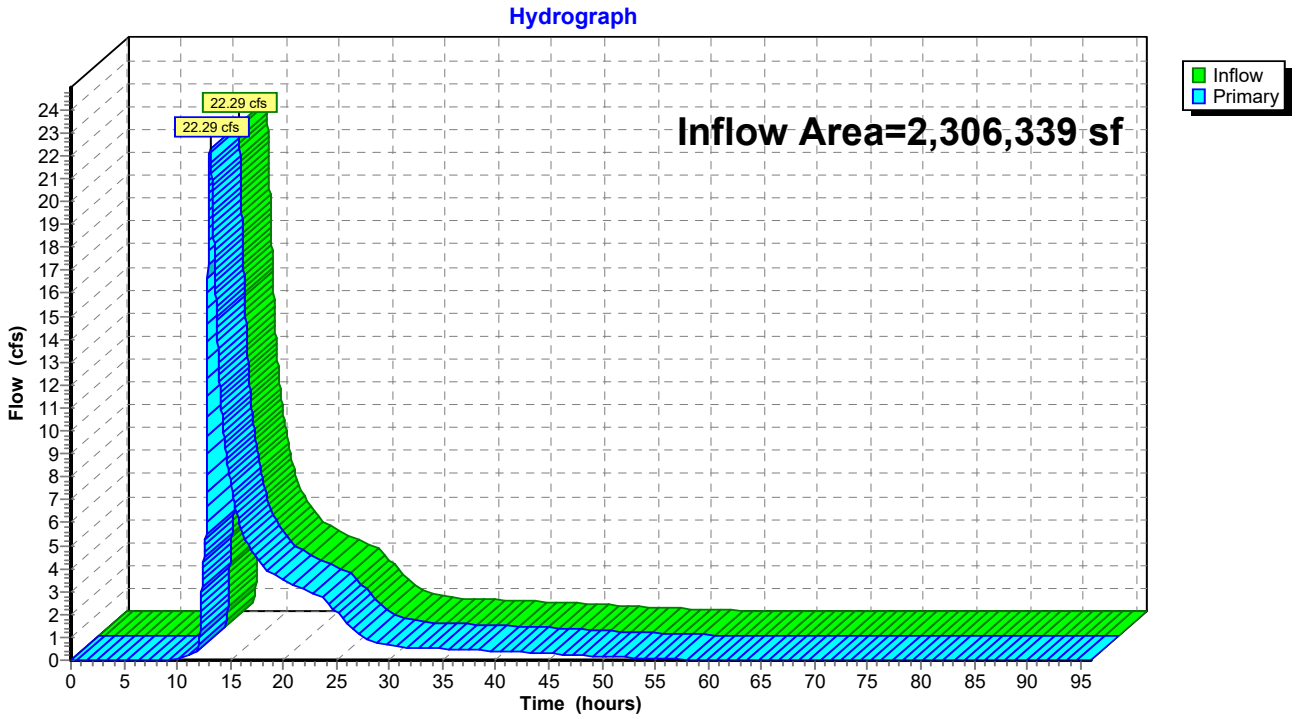


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 1.63" for 50-yr event
Inflow = 22.29 cfs @ 13.11 hrs, Volume= 312,381 cf
Primary = 22.29 cfs @ 13.11 hrs, Volume= 312,381 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

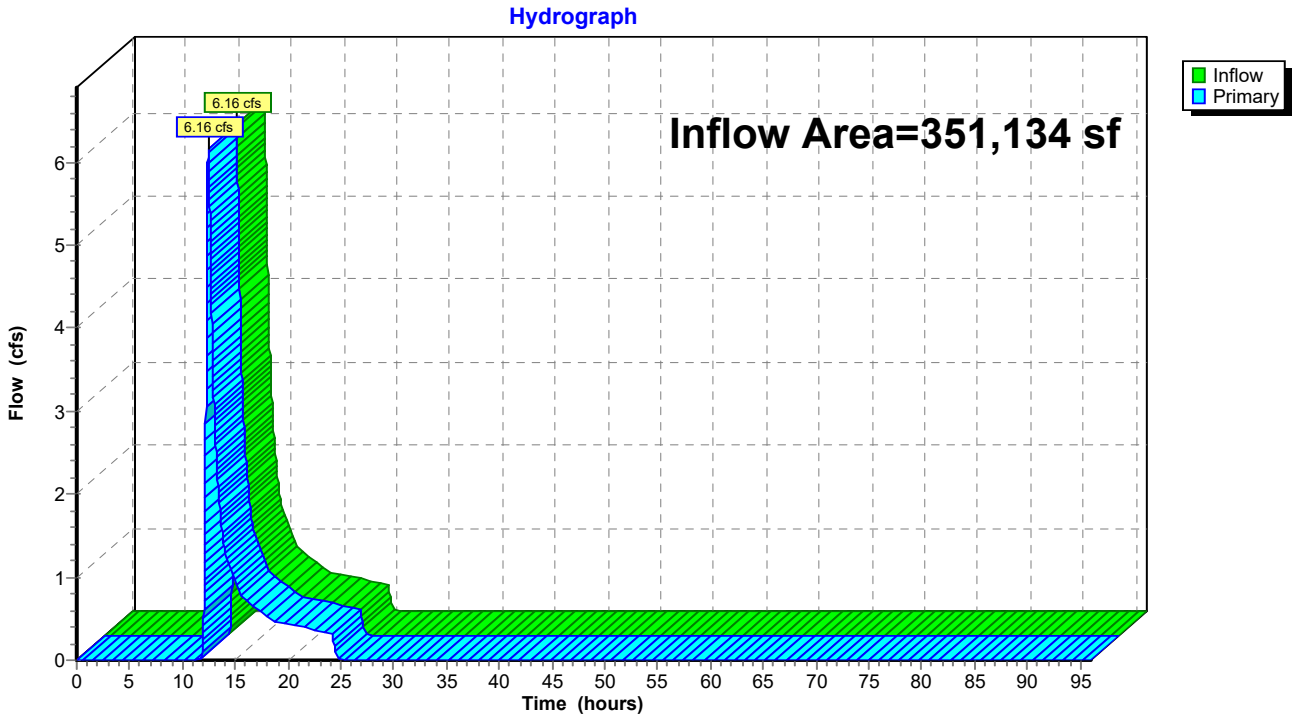


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 1.45" for 50-yr event
Inflow = 6.16 cfs @ 12.46 hrs, Volume= 42,417 cf
Primary = 6.16 cfs @ 12.46 hrs, Volume= 42,417 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=1.32"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=1.93 cfs 13,381 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=3.25"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=8.92 cfs 40,700 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=1.89"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=10.40 cfs 85,652 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=5.61"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=34.34 cfs 224,968 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=5.15"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=38.98 cfs 268,652 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=5.04"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=29.46 cfs 170,147 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=1.89"
Flow Length=815' Tc=28.4 min CN=48 Runoff=8.53 cfs 55,399 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=1.41"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=2.16 cfs 12,838 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=1.60"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=4.57 cfs 27,951 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=1.51"
Flow Length=335' Tc=16.8 min CN=44 Runoff=1.11 cfs 6,091 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.36"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.34 cfs 7,088 cf

Pond 12P: Water Quality Basin #4 Peak Elev=27.23' Storage=98,492 cf Inflow=34.34 cfs 224,968 cf
Discarded=0.80 cfs 80,493 cf Primary=17.68 cfs 144,475 cf Outflow=18.48 cfs 224,968 cf

Pond 13P: Water Quality Basin #1 Peak Elev=15.09' Storage=10,927 cf Inflow=4.57 cfs 27,951 cf
Discarded=0.13 cfs 10,822 cf Primary=0.63 cfs 17,129 cf Outflow=0.75 cfs 27,951 cf

Pond 18P: Water Quality Basin #5 Peak Elev=21.30' Storage=2,809 cf Inflow=2.16 cfs 12,838 cf
Discarded=0.03 cfs 2,047 cf Primary=0.76 cfs 10,791 cf Outflow=0.80 cfs 12,838 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=22.62' Storage=74,968 cf Inflow=29.46 cfs 170,147 cf
Discarded=0.61 cfs 60,891 cf Primary=13.04 cfs 109,256 cf Outflow=13.65 cfs 170,147 cf

Pond 21P: Water Quality Basin #2 Peak Elev=25.02' Storage=39,346 cf Inflow=10.40 cfs 85,652 cf
Discarded=0.18 cfs 16,928 cf Primary=1.46 cfs 68,724 cf Outflow=1.64 cfs 85,652 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=38.40' Storage=16,468 cf Inflow=8.92 cfs 40,700 cf
Discarded=0.17 cfs 9,604 cf Primary=1.57 cfs 31,096 cf Outflow=1.74 cfs 40,700 cf

Link 2L: Northeast Wetland Inflow=2.02 cfs 20,469 cf
Primary=2.02 cfs 20,469 cf

Link 3L: South Off-Site (POC 3) Inflow=38.98 cfs 268,652 cf
Primary=38.98 cfs 268,652 cf

Link 4L: West Wetlands (POC 1) Inflow=35.89 cfs 408,031 cf
Primary=35.89 cfs 408,031 cf

Link 5L: West Off-Site (POC 2) Inflow=8.53 cfs 55,399 cf
Primary=8.53 cfs 55,399 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 912,866 cf Average Runoff Depth = 3.34"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

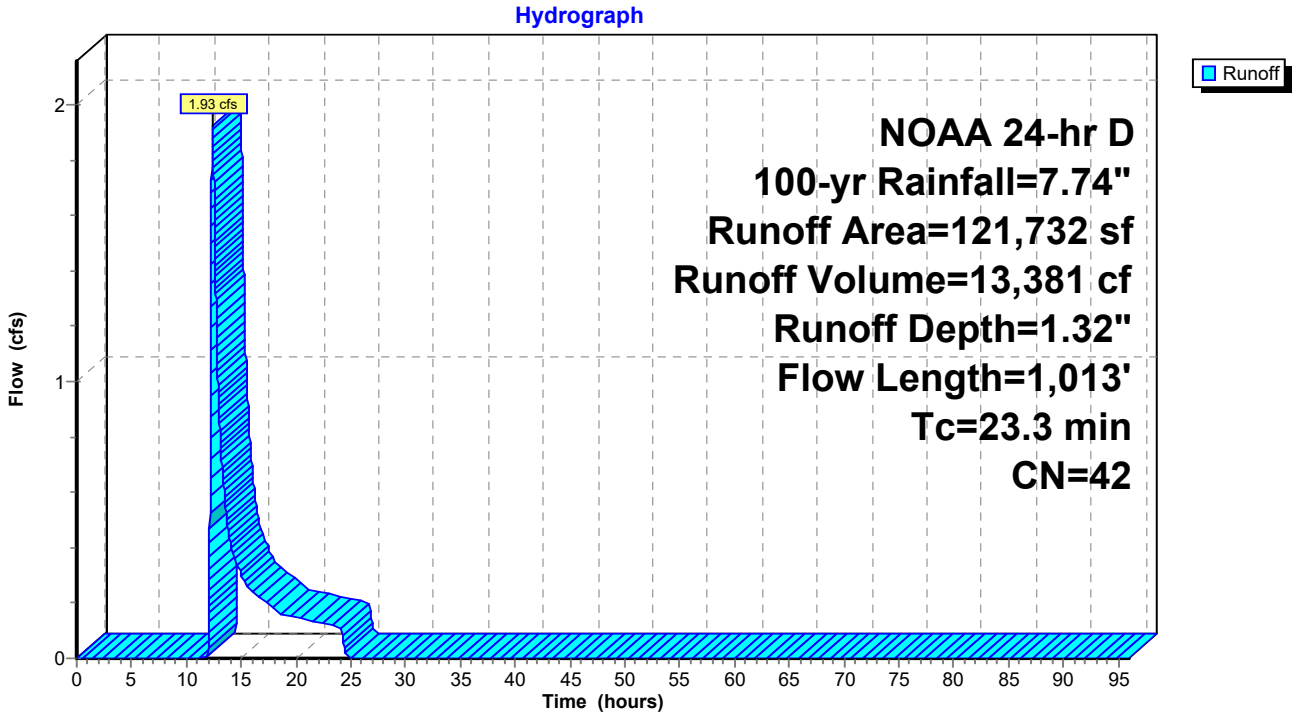
Runoff = 1.93 cfs @ 12.40 hrs, Volume= 13,381 cf, Depth= 1.32"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

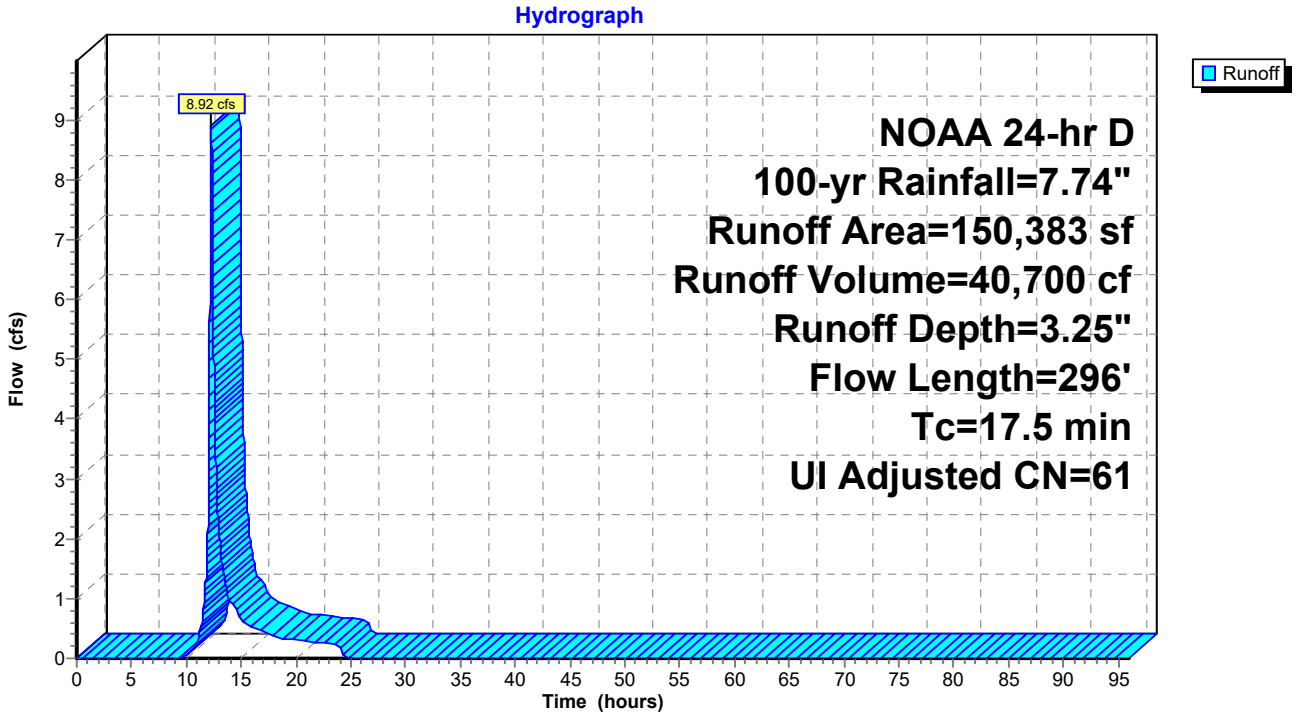
Runoff = 8.92 cfs @ 12.27 hrs, Volume= 40,700 cf, Depth= 3.25"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

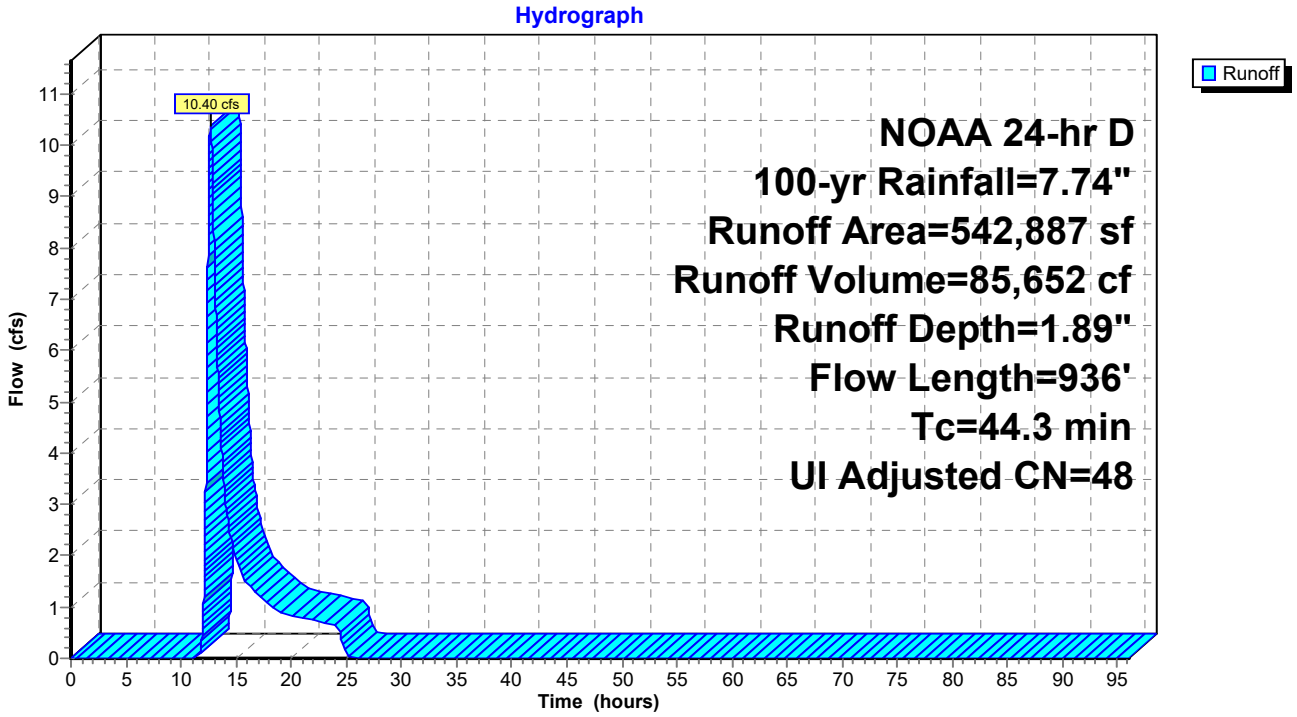
Runoff = 10.40 cfs @ 12.66 hrs, Volume= 85,652 cf, Depth= 1.89"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

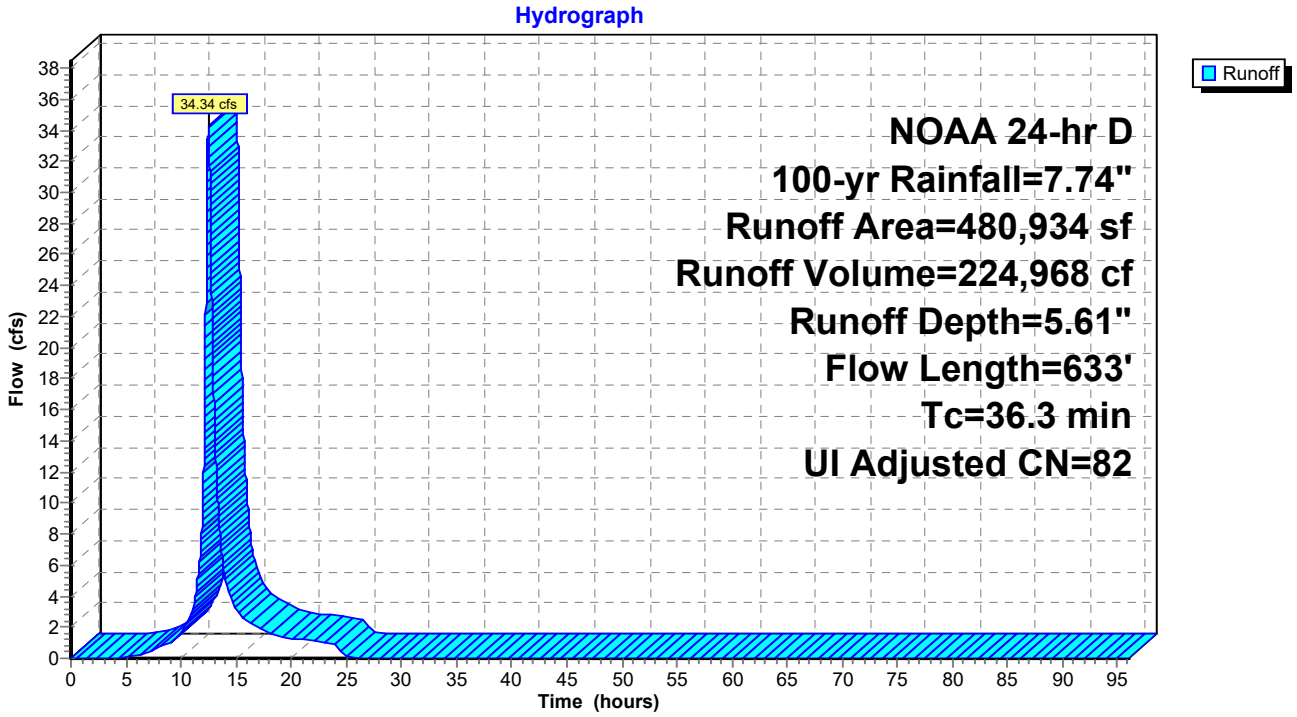
Runoff = 34.34 cfs @ 12.47 hrs, Volume= 224,968 cf, Depth= 5.61"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

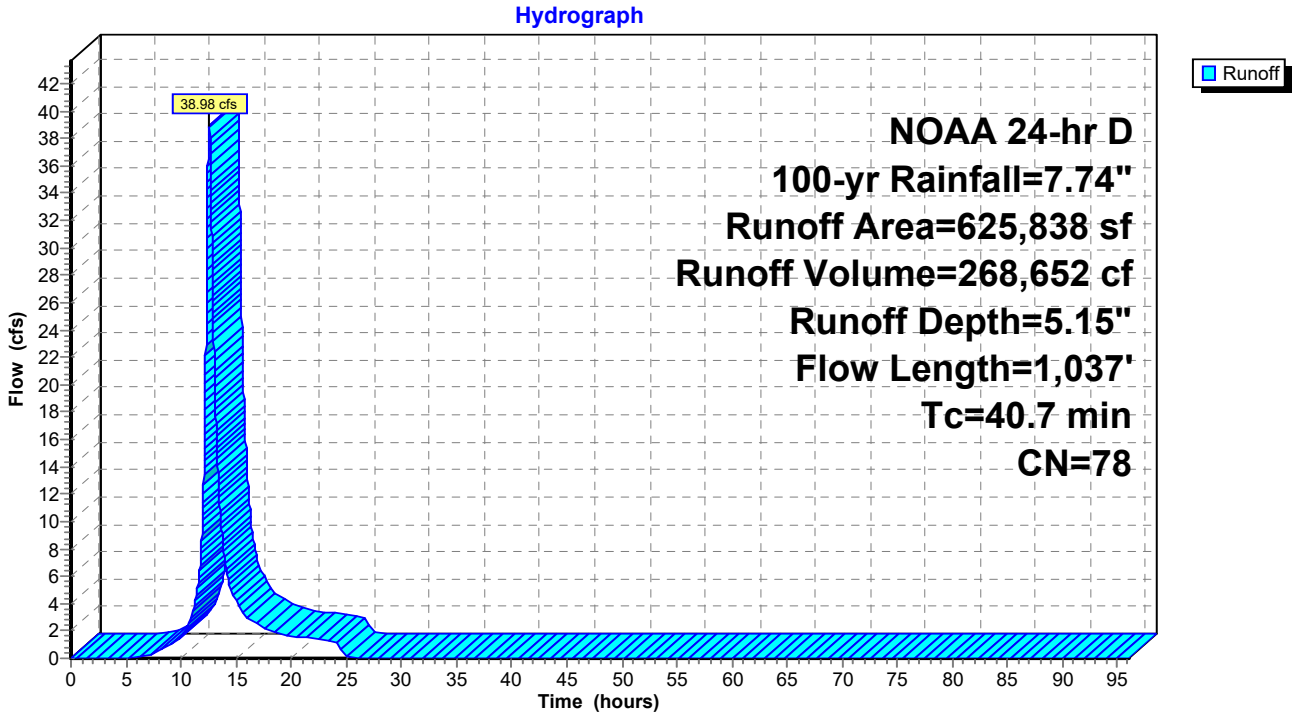
Runoff = 38.98 cfs @ 12.53 hrs, Volume= 268,652 cf, Depth= 5.15"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

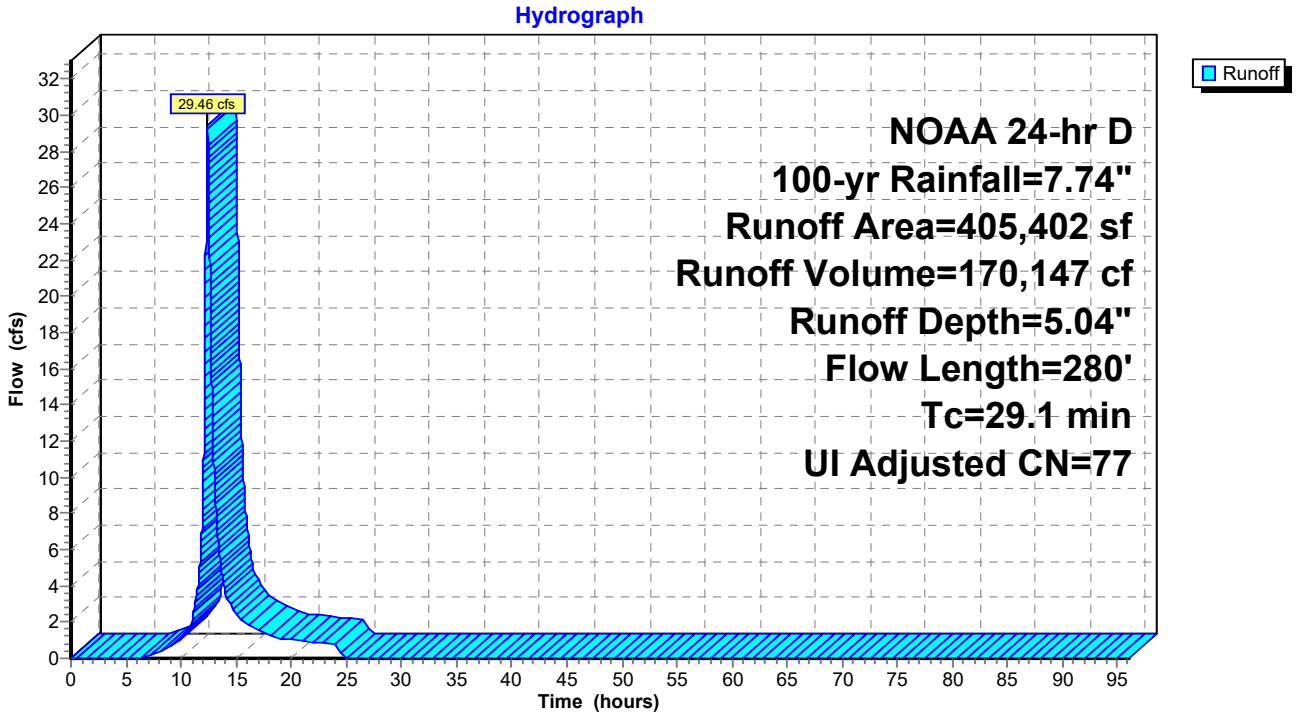
Runoff = 29.46 cfs @ 12.39 hrs, Volume= 170,147 cf, Depth= 5.04"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

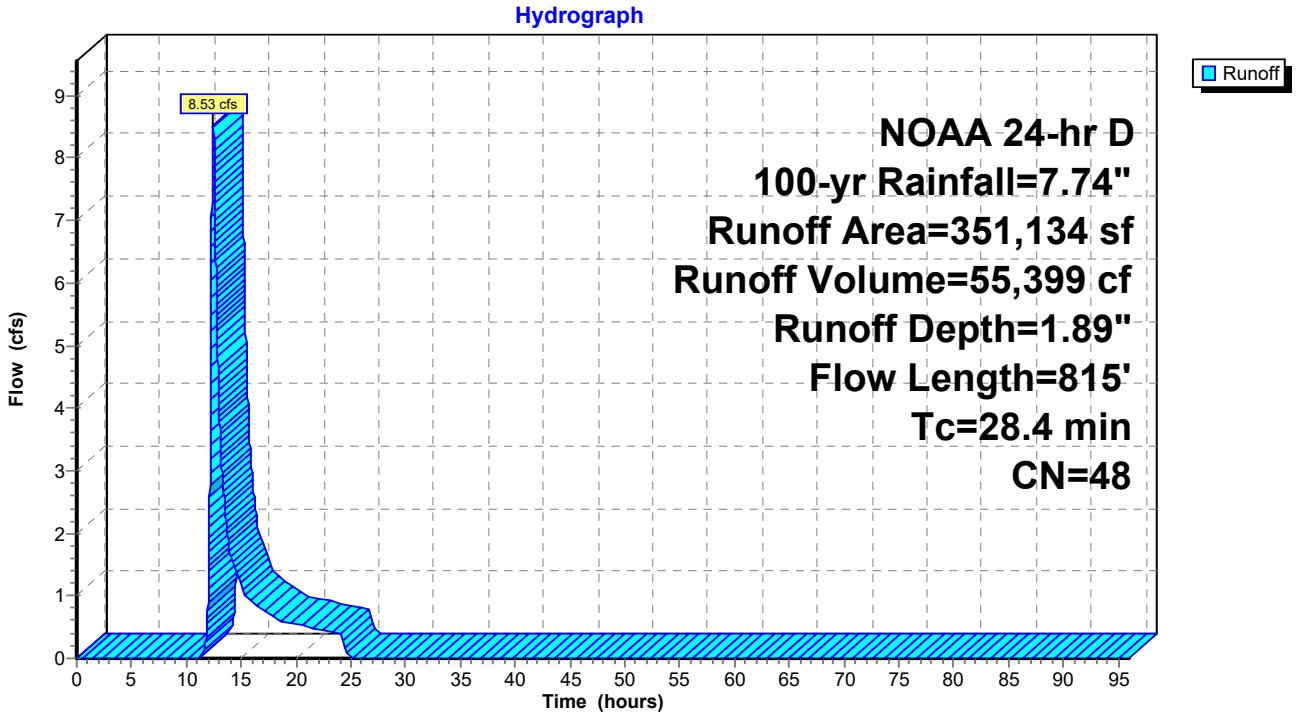
Runoff = 8.53 cfs @ 12.44 hrs, Volume= 55,399 cf, Depth= 1.89"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

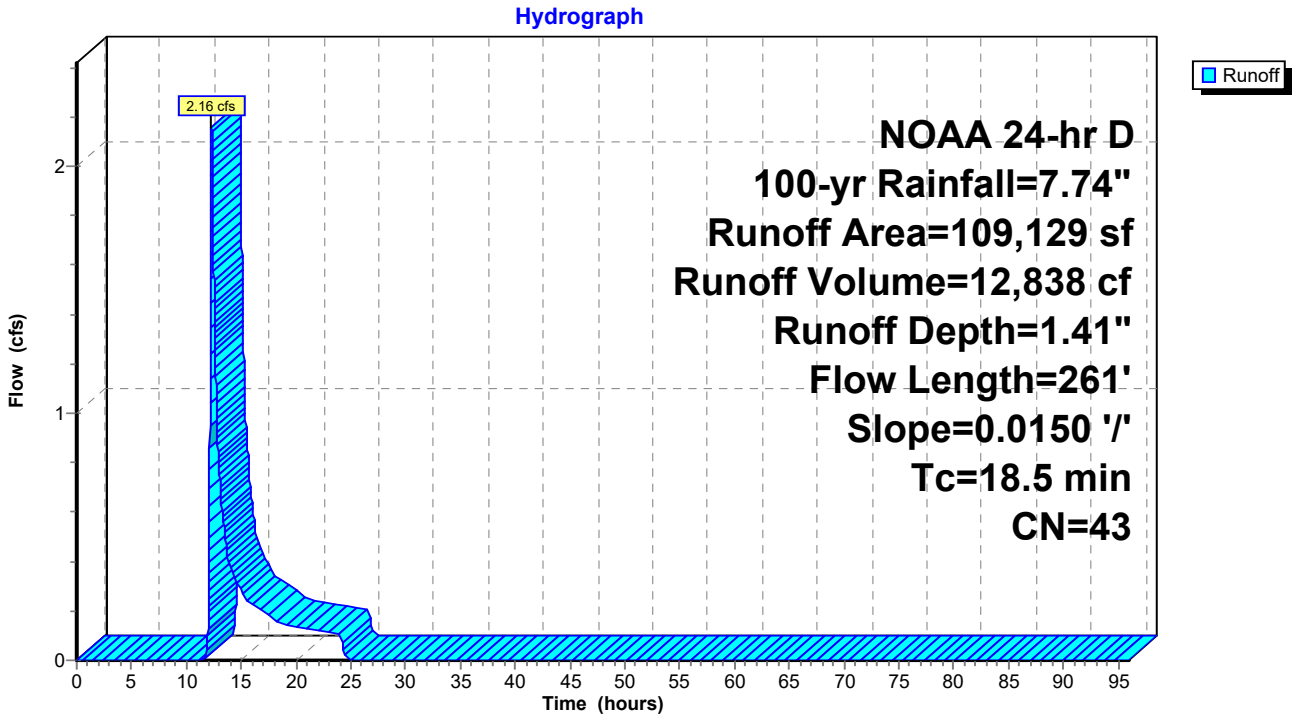
Runoff = 2.16 cfs @ 12.31 hrs, Volume= 12,838 cf, Depth= 1.41"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

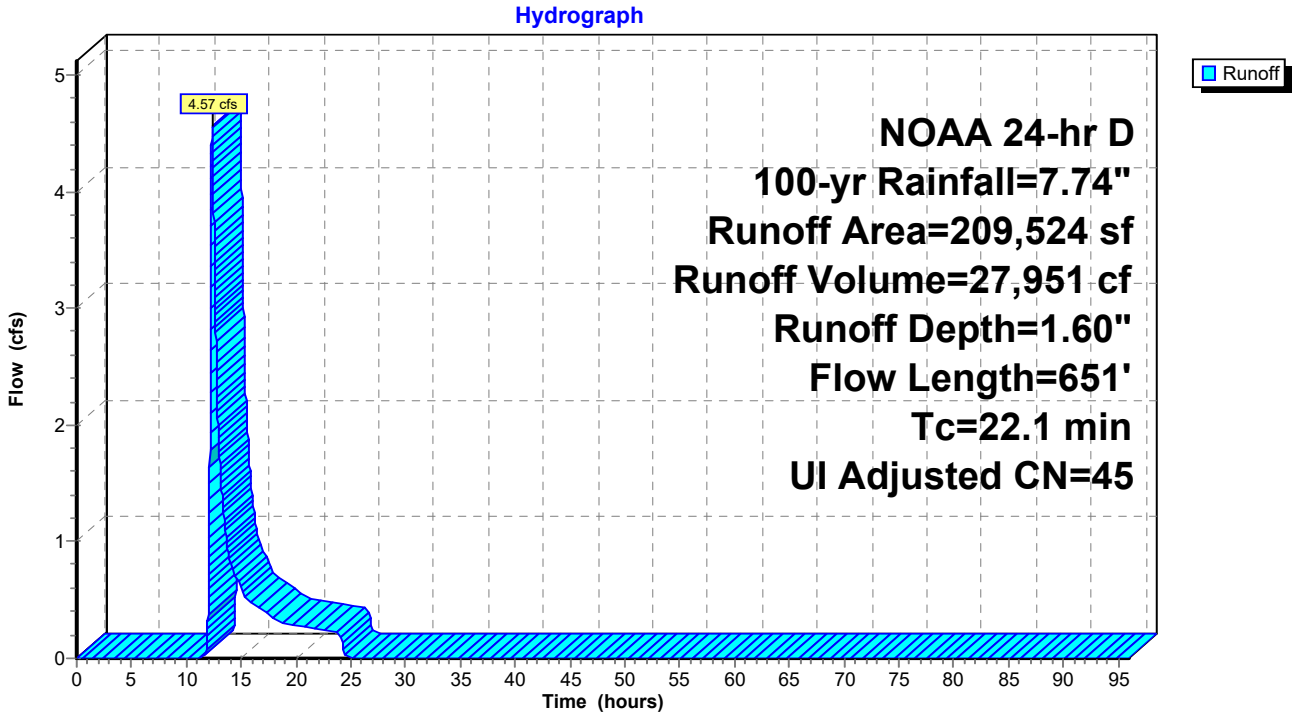
Runoff = 4.57 cfs @ 12.36 hrs, Volume= 27,951 cf, Depth= 1.60"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

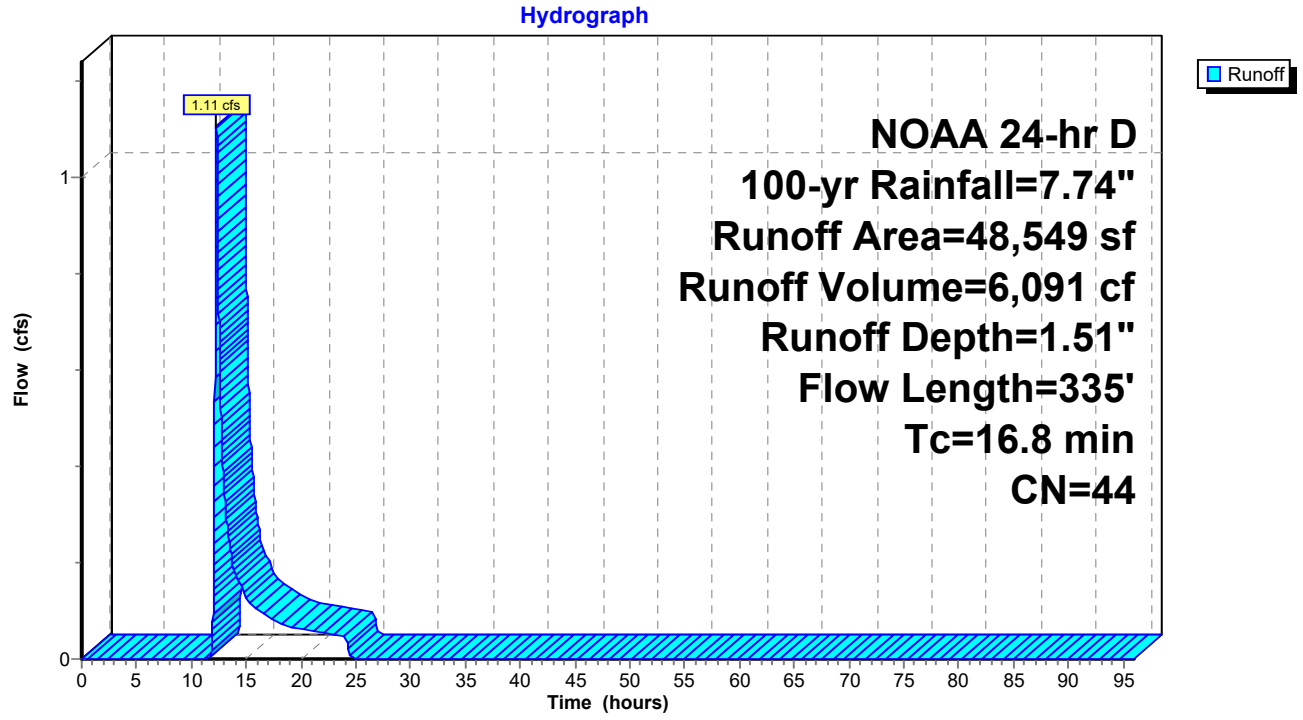
Runoff = 1.11 cfs @ 12.29 hrs, Volume= 6,091 cf, Depth= 1.51"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

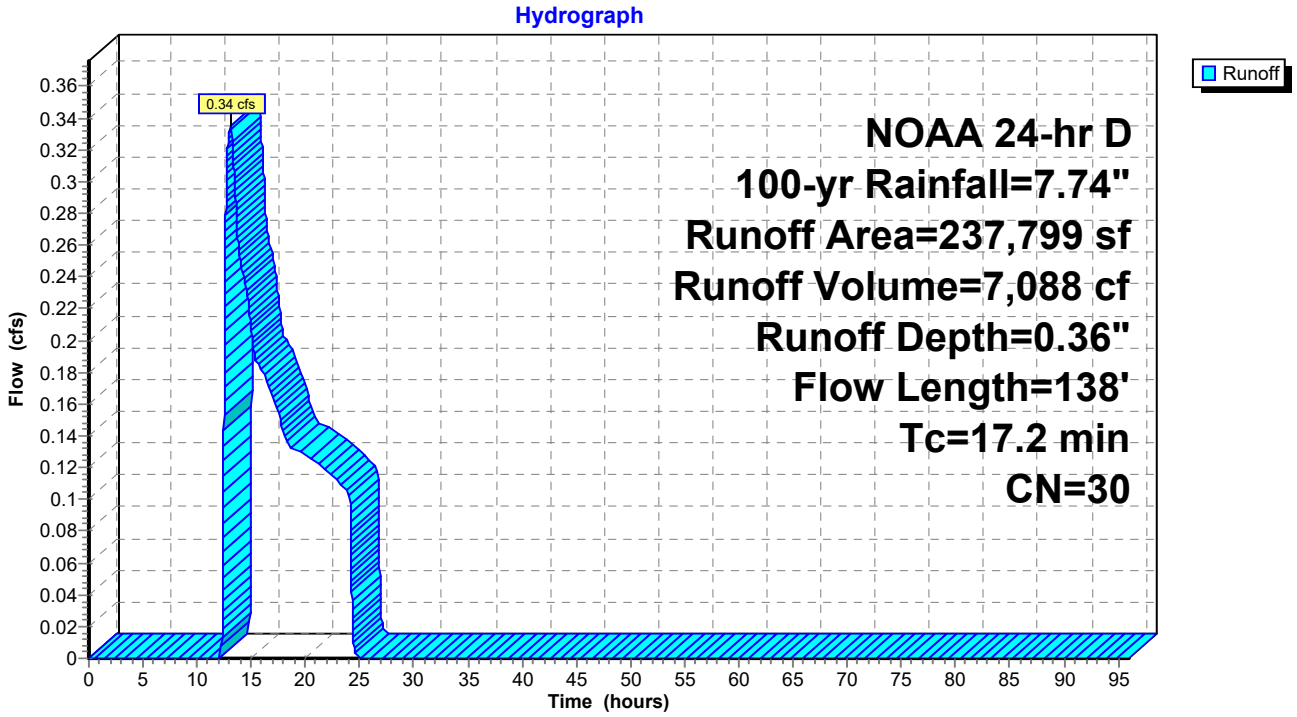
Runoff = 0.34 cfs @ 13.05 hrs, Volume= 7,088 cf, Depth= 0.36"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 5.61" for 100-yr event
Inflow = 34.34 cfs @ 12.47 hrs, Volume= 224,968 cf
Outflow = 18.48 cfs @ 12.92 hrs, Volume= 224,968 cf, Atten= 46%, Lag= 27.1 min
Discarded = 0.80 cfs @ 12.92 hrs, Volume= 80,493 cf
Primary = 17.68 cfs @ 12.92 hrs, Volume= 144,475 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 27.23' @ 12.92 hrs Surf.Area= 21,303 sf Storage= 98,492 cf

Plug-Flow detention time= 534.6 min calculated for 224,945 cf (100% of inflow)
Center-of-Mass det. time= 534.8 min (1,368.7 - 833.9)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

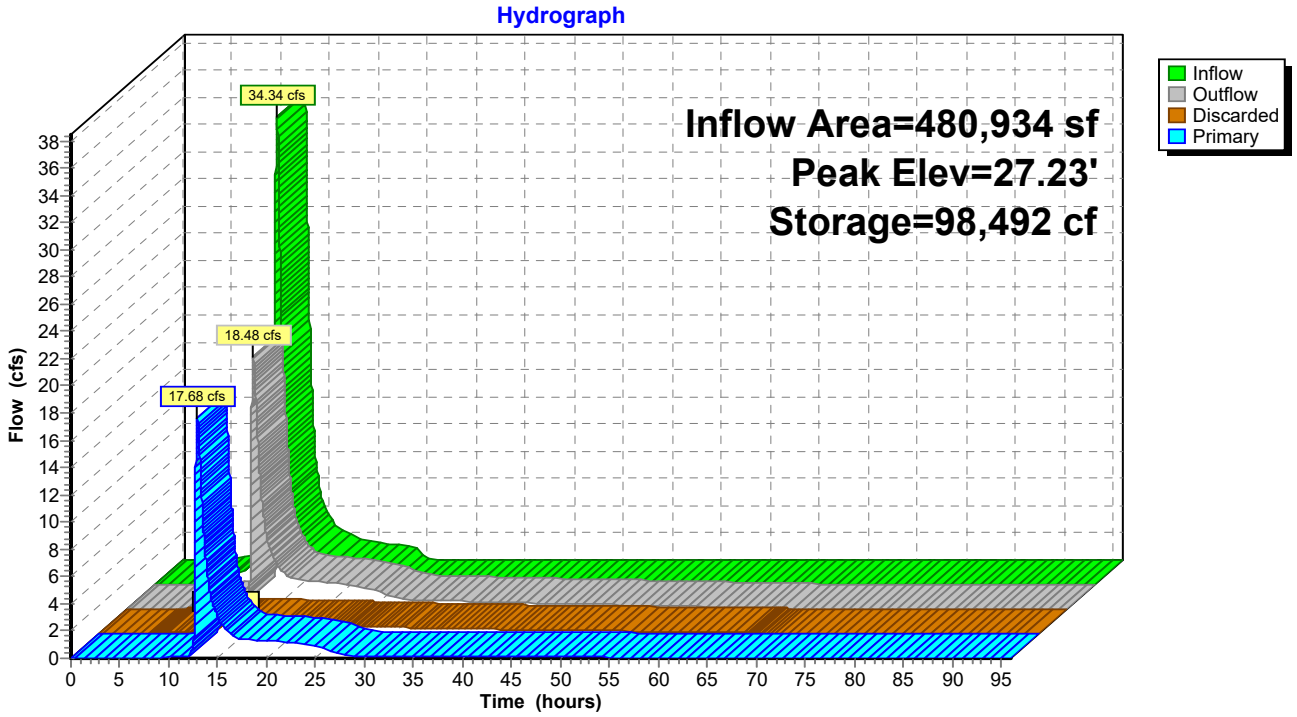
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.80 cfs @ 12.92 hrs HW=27.23' (Free Discharge)
└**3=Exfiltration** (Controls 0.80 cfs)

Primary OutFlow Max=17.66 cfs @ 12.92 hrs HW=27.23' (Free Discharge)
└**1=Culvert** (Passes 17.66 cfs of 52.74 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 15.98 cfs @ 2.74 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.64 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.43 cfs @ 7.27 fps)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 1.60" for 100-yr event
Inflow = 4.57 cfs @ 12.36 hrs, Volume= 27,951 cf
Outflow = 0.75 cfs @ 14.28 hrs, Volume= 27,951 cf, Atten= 84%, Lag= 115.5 min
Discarded = 0.13 cfs @ 14.28 hrs, Volume= 10,822 cf
Primary = 0.63 cfs @ 14.28 hrs, Volume= 17,129 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 15.09' @ 14.28 hrs Surf.Area= 10,853 sf Storage= 10,927 cf

Plug-Flow detention time= 294.6 min calculated for 27,951 cf (100% of inflow)
Center-of-Mass det. time= 294.5 min (1,214.4 - 919.9)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

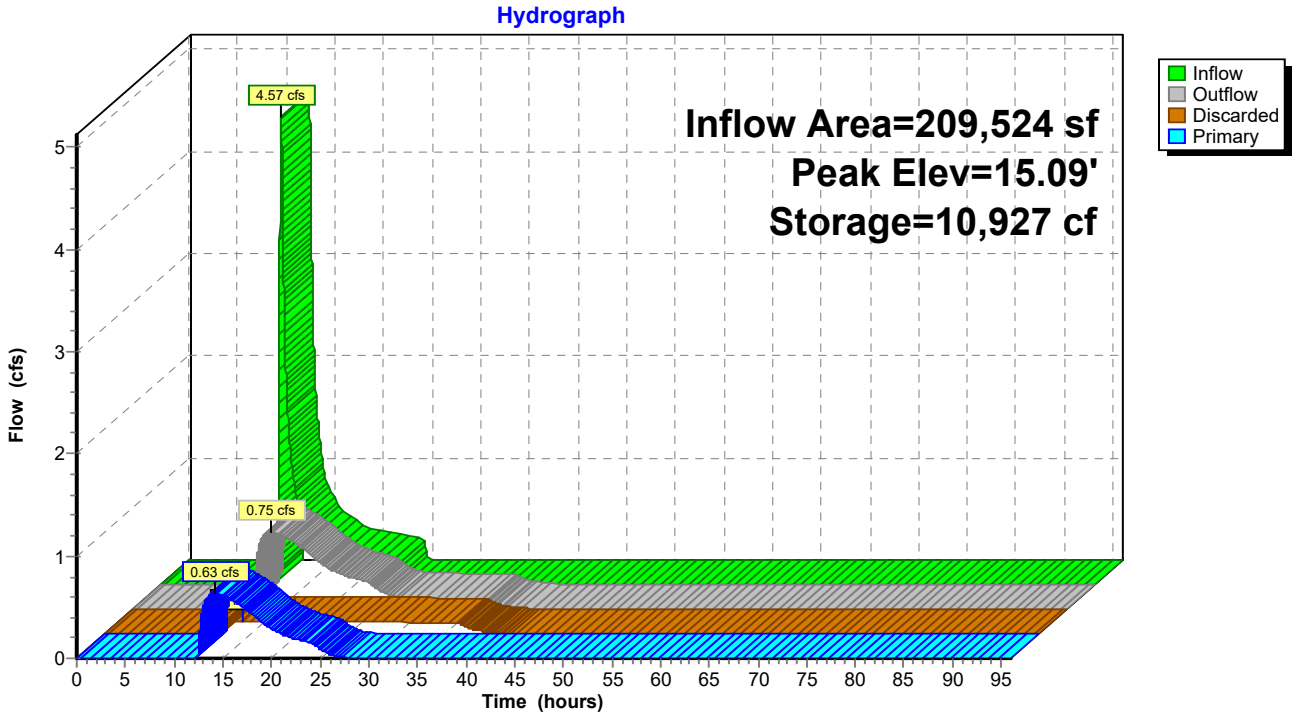
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.13 cfs @ 14.28 hrs HW=15.09' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.63 cfs @ 14.28 hrs HW=15.09' (Free Discharge)
└**1=Culvert** (Passes 0.63 cfs of 7.33 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.63 cfs @ 3.20 fps)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 1.41" for 100-yr event
Inflow = 2.16 cfs @ 12.31 hrs, Volume= 12,838 cf
Outflow = 0.80 cfs @ 12.95 hrs, Volume= 12,838 cf, Atten= 63%, Lag= 38.3 min
Discarded = 0.03 cfs @ 12.95 hrs, Volume= 2,047 cf
Primary = 0.76 cfs @ 12.95 hrs, Volume= 10,791 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 21.30' @ 12.95 hrs Surf.Area= 2,608 sf Storage= 2,809 cf

Plug-Flow detention time= 106.5 min calculated for 12,836 cf (100% of inflow)
Center-of-Mass det. time= 106.6 min (1,031.6 - 925.0)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

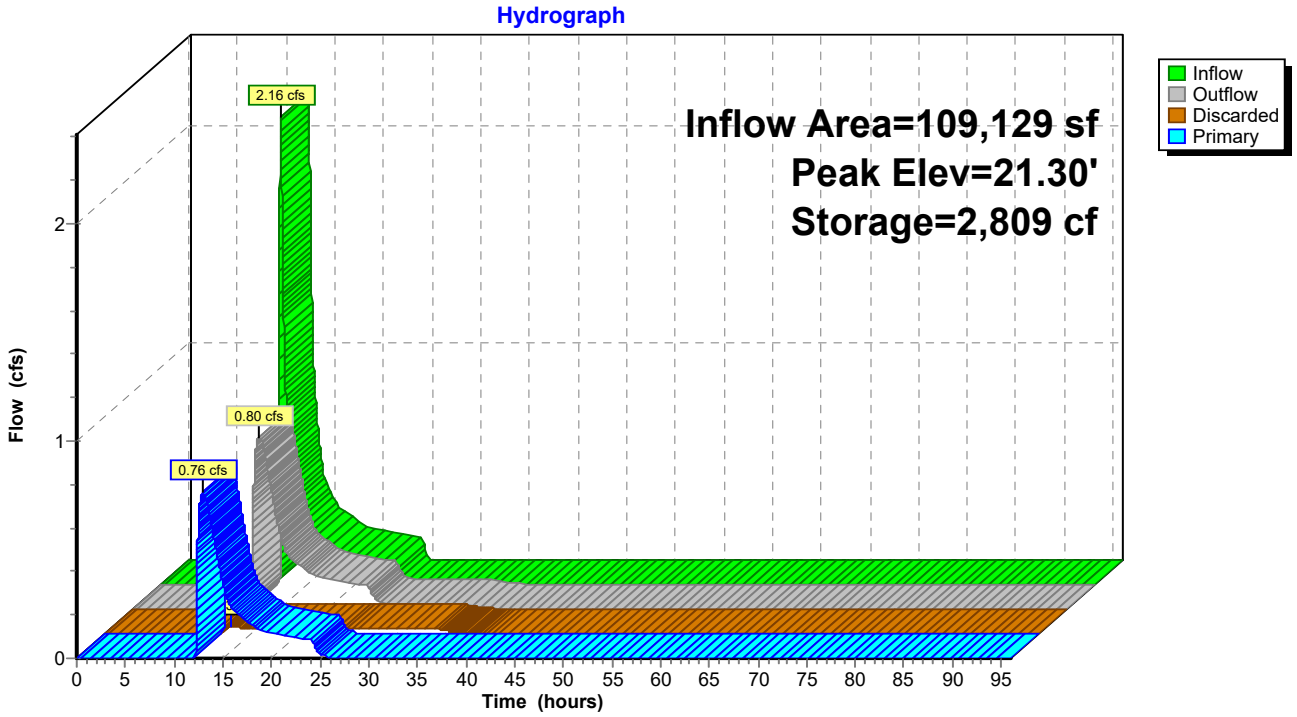
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.95 hrs HW=21.30' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.77 cfs @ 12.95 hrs HW=21.30' (Free Discharge)
└**1=Culvert** (Passes 0.77 cfs of 6.35 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.77 cfs @ 3.90 fps)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 5.04" for 100-yr event
Inflow = 29.46 cfs @ 12.39 hrs, Volume= 170,147 cf
Outflow = 13.65 cfs @ 12.85 hrs, Volume= 170,147 cf, Atten= 54%, Lag= 27.1 min
Discarded = 0.61 cfs @ 12.85 hrs, Volume= 60,891 cf
Primary = 13.04 cfs @ 12.85 hrs, Volume= 109,256 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.62' @ 12.85 hrs Surf.Area= 16,846 sf Storage= 74,968 cf

Plug-Flow detention time= 574.7 min calculated for 170,129 cf (100% of inflow)
Center-of-Mass det. time= 575.0 min (1,415.3 - 840.3)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

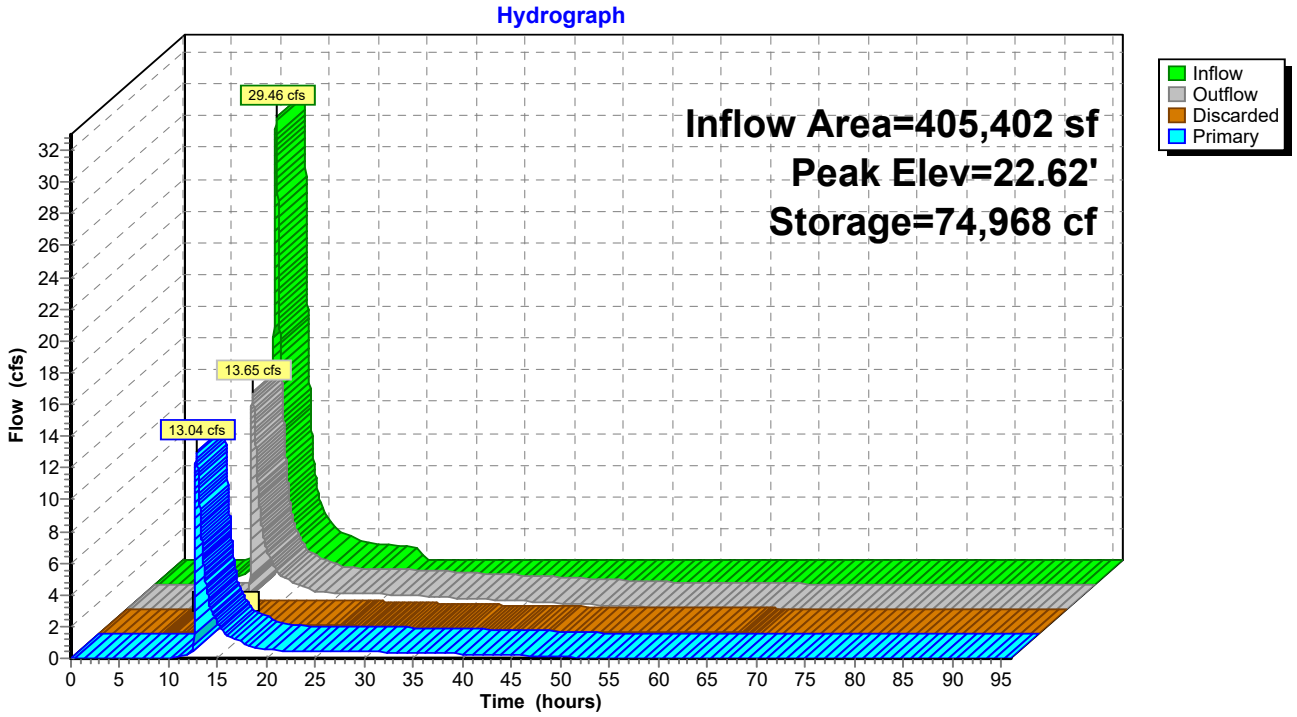
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.61 cfs @ 12.85 hrs HW=22.62' (Free Discharge)
└**3=Exfiltration** (Controls 0.61 cfs)

Primary OutFlow Max=13.01 cfs @ 12.85 hrs HW=22.62' (Free Discharge)
└**1=Culvert** (Passes 13.01 cfs of 53.94 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 12.51 cfs @ 2.53 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.26 cfs @ 11.83 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.33 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 1.89" for 100-yr event
Inflow = 10.40 cfs @ 12.66 hrs, Volume= 85,652 cf
Outflow = 1.64 cfs @ 15.53 hrs, Volume= 85,652 cf, Atten= 84%, Lag= 172.2 min
Discarded = 0.18 cfs @ 15.53 hrs, Volume= 16,928 cf
Primary = 1.46 cfs @ 15.53 hrs, Volume= 68,724 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 25.02' @ 15.53 hrs Surf.Area= 15,621 sf Storage= 39,346 cf

Plug-Flow detention time= 354.2 min calculated for 85,652 cf (100% of inflow)
Center-of-Mass det. time= 354.1 min (1,283.4 - 929.3)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

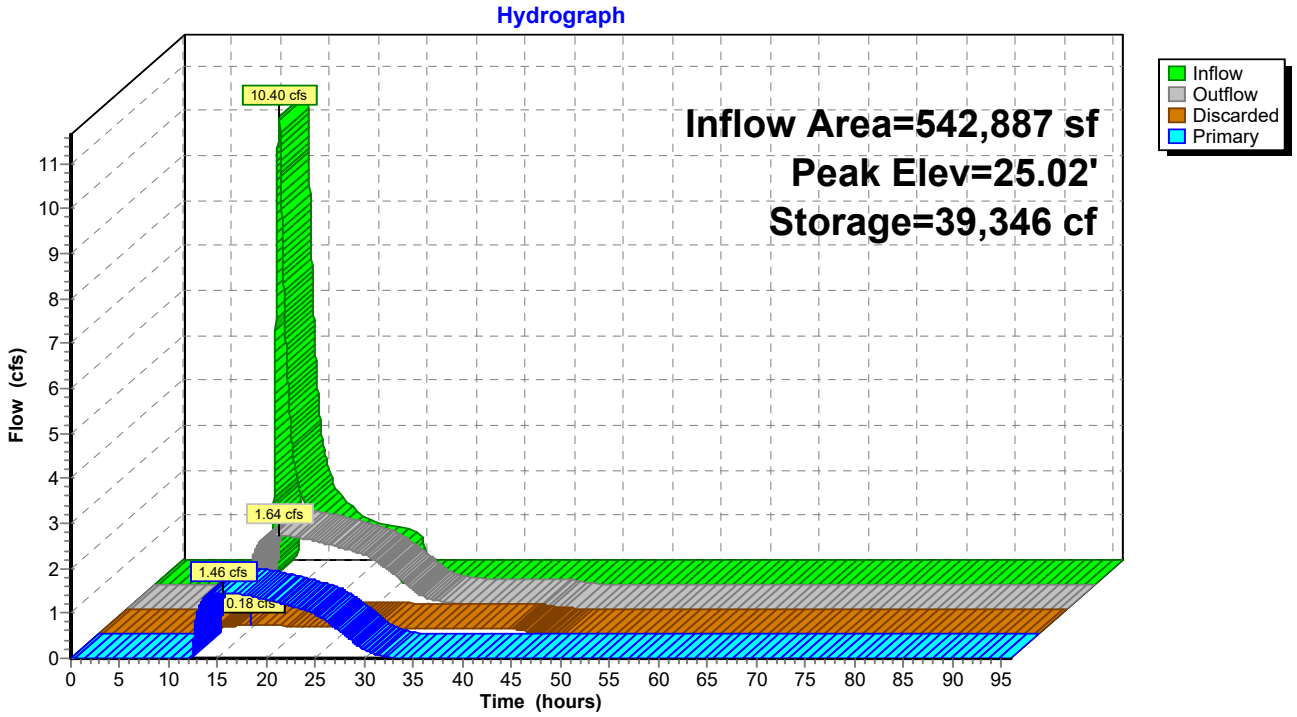
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.18 cfs @ 15.53 hrs HW=25.02' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=1.46 cfs @ 15.53 hrs HW=25.02' (Free Discharge)
└**1=Culvert** (Passes 1.46 cfs of 21.51 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 1.46 cfs @ 7.41 fps)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 3.25" for 100-yr event
Inflow = 8.92 cfs @ 12.27 hrs, Volume= 40,700 cf
Outflow = 1.74 cfs @ 13.17 hrs, Volume= 40,700 cf, Atten= 81%, Lag= 54.0 min
Discarded = 0.17 cfs @ 13.17 hrs, Volume= 9,604 cf
Primary = 1.57 cfs @ 13.17 hrs, Volume= 31,096 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 38.40' @ 13.17 hrs Surf.Area= 5,766 sf Storage= 16,468 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 249.4 min calculated for 40,696 cf (100% of inflow)
Center-of-Mass det. time= 249.6 min (1,117.5 - 867.8)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

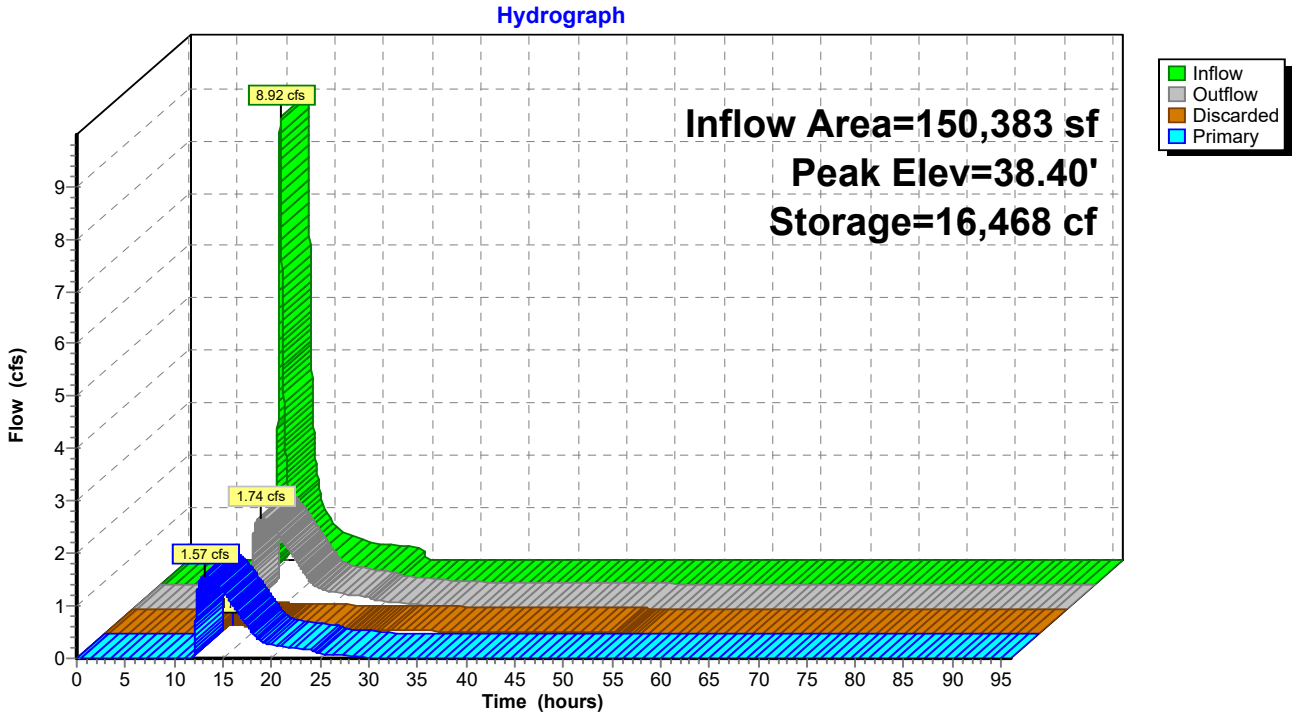
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.17 cfs @ 13.17 hrs HW=38.40' (Free Discharge)
└**3=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=1.57 cfs @ 13.17 hrs HW=38.40' (Free Discharge)
└**1=Culvert** (Passes 1.57 cfs of 27.68 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.43 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.39 cfs @ 7.05 fps)

Pond 22P: Water Quality Basin #3.2

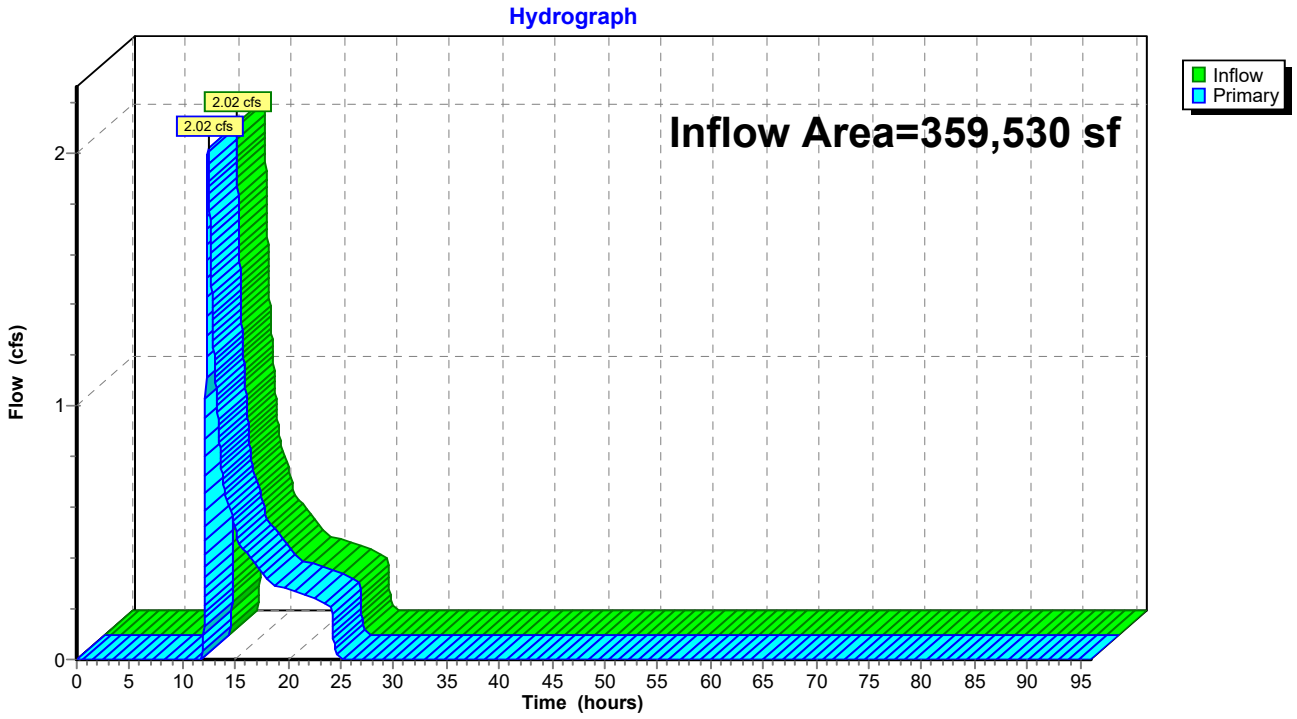


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.68" for 100-yr event
Inflow = 2.02 cfs @ 12.42 hrs, Volume= 20,469 cf
Primary = 2.02 cfs @ 12.42 hrs, Volume= 20,469 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

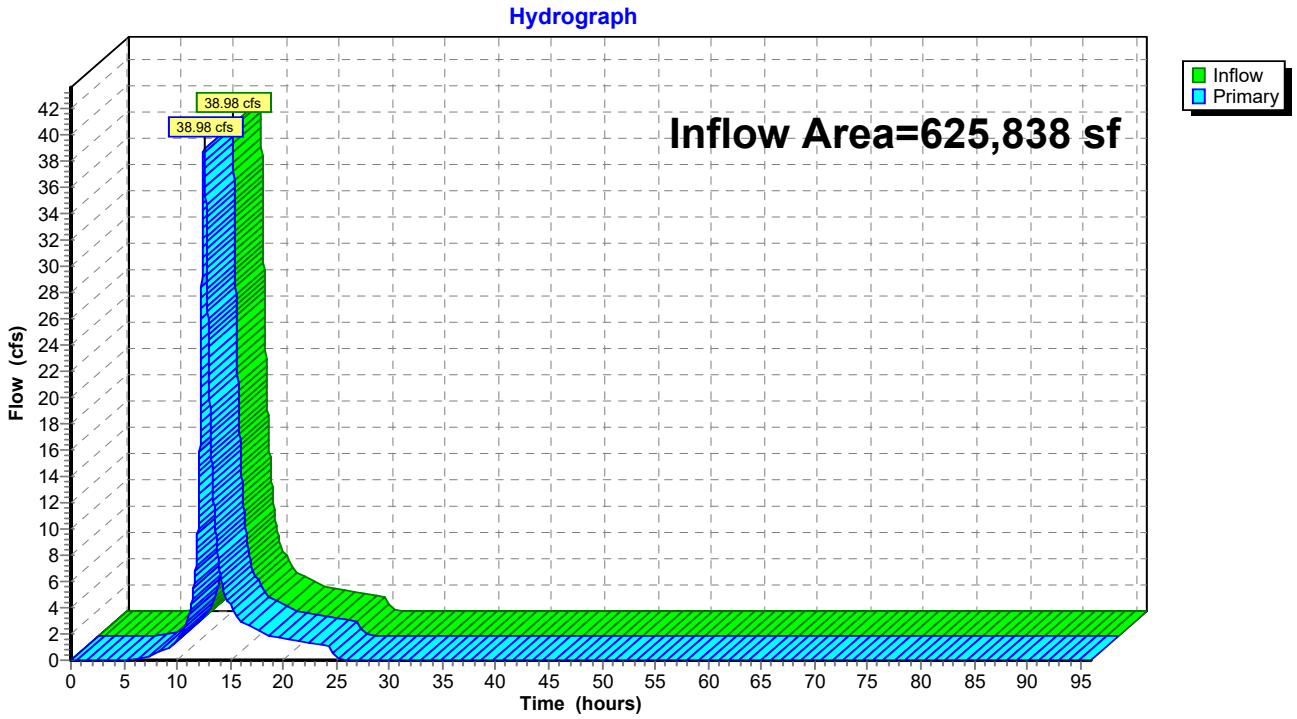


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 5.15" for 100-yr event
Inflow = 38.98 cfs @ 12.53 hrs, Volume= 268,652 cf
Primary = 38.98 cfs @ 12.53 hrs, Volume= 268,652 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

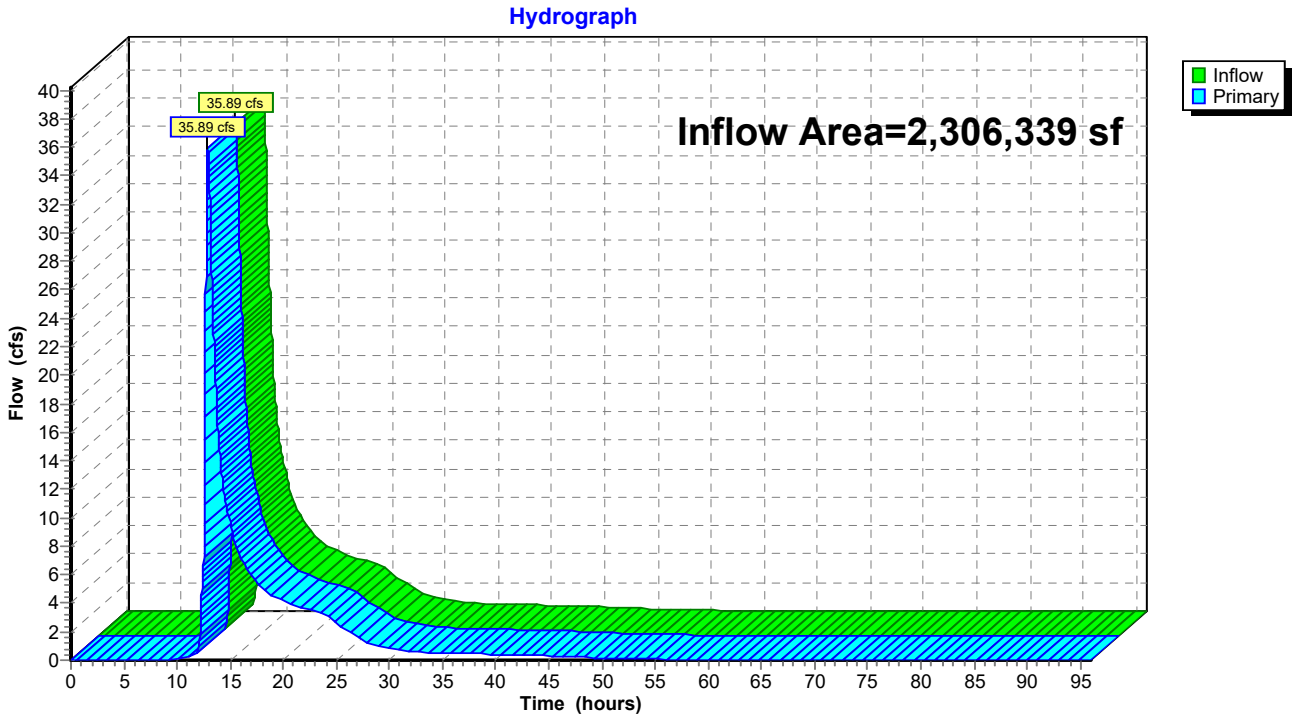


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 2.12" for 100-yr event
Inflow = 35.89 cfs @ 12.89 hrs, Volume= 408,031 cf
Primary = 35.89 cfs @ 12.89 hrs, Volume= 408,031 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

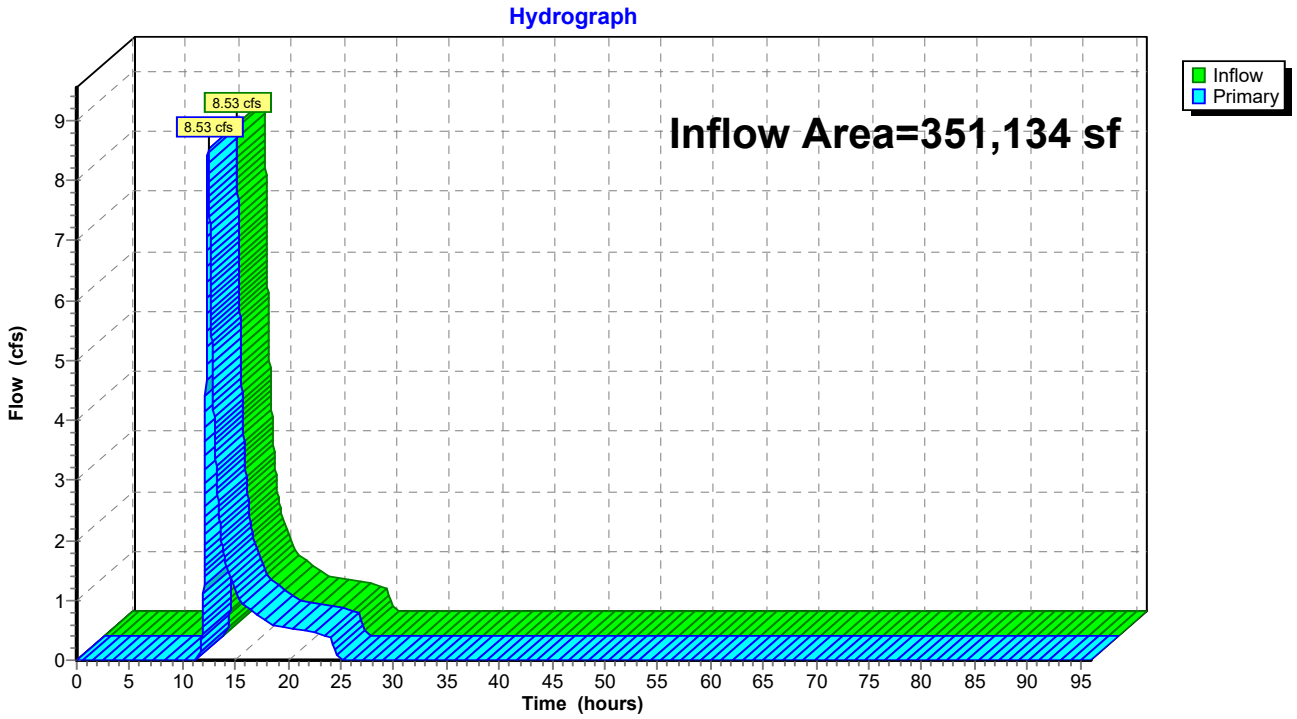


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 1.89" for 100-yr event
Inflow = 8.53 cfs @ 12.44 hrs, Volume= 55,399 cf
Primary = 8.53 cfs @ 12.44 hrs, Volume= 55,399 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Cashman Industrial Site Preparation Plan

"Newly Graded Area" cover type used
TC=5.0 min

Phase 1:
Peak flow 25 year storm = 1.94 cfs
Total 10 hour volume = 5,359 cf
Peak flow 10 year storm = 0.73 cfs

Phase 2:
Peak flow 25 year storm = 5.07 cfs
Total 10 hour volume = 18,666 cf
Peak flow 10 year storm = 2.43 cfs

Phase 3.1 (Western):
Peak flow 25 year storm = 21.21 cfs
Total 10 hour volume = 75,432 cf
Peak flow 10 year storm = 15.99 cfs

Phase 3.2 (Q25
Peak flow 25 year storm = 5.63 cfs
Total 10 hour volume = 13,873cf
Peak flow 10 year storm = 3.69 cfs

Phase 4:
Peak flow 25 year storm = 25.45cfs
Total 10 hour volume = 106,069 cf
Peak flow 10 year storm = 19.76 cfs

Phase 5:
Peak flow 25 year storm = 0.80 cfs
Total 10 hour volume = 2,159 cf
Peak flow 10 year storm = 0.25 cfs

Phase I

Universal Soil Loss

Drainage area (ac)	DA	9.2
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.079512

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 5,359 input from hydrograph

Wet Storage (CF)= 8822.529

Basin Width

Q5 (CFS) Q25 1.94

Width (ft)= 13.92839

Basin Length

Length (ft)= 27.85678 minimum

234' x 75' x 5'

Outlet

Q25 (CFS)	Q25	1.94
Outlet Area (SF)	A	0.97

Adjusted A (SF)= 0.983773 4' x 5'

Barrel Size

Q25 (CFS)	Q25	1.94
Pipe D (FT fromGohi Culvert Seelye		30"

Spillway

Q25 (CFS)	Q25	1.94	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required (FT)= 0.570588

Phase II

Universal Soil Loss

Drainage area (ac)	DA	10
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.086426

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 18,666 input from hydrograph

Wet Storage (CF)= 22430.71

Basin Width

Q5 (CFS) Q25 5.07

Width (ft)= 22.51666

Basin Length

Length (ft)= 45.03332 minimum

241' x 80' x 5'

Outlet

Q25 (CFS)	Q25	5.07
Outlet Area (SF	A	2.535

Adjusted A (SF)= 2.570994 3.5' x 4'

Barrel Size

Q25 (CFS)	Q25	5.07
Pipe D (FT fromGohi Culvert Seelye		30"

Spillway

Q25 (CFS)	Q25	5.07 Assume 50% plugged w/trash
Cw coeff	C	1.7
H (FT)	H	1

L of spillway required= 1.491176

Phase III (1)

Universal Soil Loss

Drainage area (ac)	DA	6.2
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.053584

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 75,432 input from hydrograph

Wet Storage (CF)= 77766.12

Basin Width

Q5 (CFS) Q25 21.21

Width (ft)= 46.05432 minimum

Basin Length

Length (ft)= 92.10863 minimum

234' x 75' x 5'

Outlet

Q25 (CFS)	Q25	21.21
Outlet Area (SF	A	10.605

Adjusted A (SF)= 10.75558 4' x 3'

Barrel Size

Q25 (CFS)	Q25	21.21
Pipe D (FT fromGohi Culvert Seelye		30"

Spillway

Q25 (CFS)	Q25	21.21	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required= 6.238235

Phase III (2)

Universal Soil Loss

Drainage area (ac)	DA	3.5
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.030249

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 13,873 input from hydrograph

Wet Storage (CF)= 15190.65

Basin Width

Q5 (CFS) Q25 5.63

Width (ft)= 23.72762

Basin Length

Length (ft)= 47.45524 minimum

128' x 50' x 5'

Outlet

Q25 (CFS)	Q25	5.63
Outlet Area (SF	A	2.815

Adjusted A (SF)= 2.85497 3' x 2'

Barrel Size

Q25 (CFS)	Q25	5.63
Pipe D (FT fromGohi Culvert Seelye		24"

Spillway

Q25 (CFS)	Q25	5.63	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required= 1.655882

Phase IV

Universal Soil Loss

Drainage area (ac)	DA	9.8
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.084697

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 106,069 input from hydrograph

Wet Storage (CF)= 109758.4

Basin Width

Q5 (CFS) Q25 25.45

Width (ft)= 50.44799

Basin Length

Length (ft)= 100.896 minimum

228' x 100' x 6'

Outlet

Q25 (CFS)	Q25	25.45
Outlet Area (SF	A	12.725

Adjusted A (SF)= 12.90568 5' x 5'

Barrel Size

Q25 (CFS)	Q25	25.45
Pipe D (FT fromGohi Culvert Seelye		36"

Spillway

Q25 (CFS)	Q25	25.45	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required= 7.485294

Phase V

Universal Soil Loss

Drainage area (ac)	DA	3
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.025928

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 2,159 input from hydrograph

Wet Storage (CF)= 3288.412

Basin Width

Q5 (CFS) Q25 0.8

Width (ft)= 8.944272

Basin Length

Length (ft)= 17.88854 minimum

116' x 50' x 5'

Outlet

Q25 (CFS)	Q25	0.8
Outlet Area (SF	A	0.4

Adjusted A (SF)= 0.40568 30" diameter CMP

Barrel Size

Q25 (CFS)	Q25	0.8
Pipe D (FT fromGohi Culvert Seelye		18"

Spillway

Q25 (CFS)	Q25	0.8	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required= 0.235294

Sediment Basin Outlet Design

Phase I

Outlet Structure Size (FT)	5'x4'x5'	LxWxH
Outlet Pipe Diameter (FT)	30"	
Spillway Width (FT)	10'	

Phase II

Outlet Structure Size (FT)	4'x3.5'x5'	LxWxH
Outlet Pipe Diameter (FT)	30"	
Spillway Width (FT)	8.5'	

Phase III (1)

Outlet Structure Size (FT)	4'x3'x5'	LxWxH
Outlet Pipe Diameter (FT)	30"	
Spillway Width (FT)	7.5'	
	Q25	

Phase III (2)

Outlet Structure Size (FT)	3'x2'x5'	LxWxH
Outlet Pipe Diameter (FT)	24"	
Spillway Width (FT)	3'	

Phase IV

Outlet Structure Size (FT)	5'x5'x6'	LxWxH
Outlet Pipe Diameter (FT)	36"	
Spillway Width (FT)	12'	

Phase V

Outlet Structure Size (FT)	30"	Diameter
Outlet Pipe Diameter (FT)	18"	
Spillway Width (FT)	2.5'	

Estimated Net Annual Solids Load Reduction
Based on the Rational Rainfall Method

CONTECH ENGINEERED SOLUTIONS

CASCADE separator™

CASHMAN INDUSTRIAL SITE

GALES FERRY, CT

HDS

AREA	44.69	acres	**CASCADE MODEL**	CS-4	
WEIGHTED C	0.05		**PARTICLE SIZE**	110	microns
TC	10.00	minutes	**RAINFALL STATION**	34	

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Hydraulic Loading Rate (gpm/ft2)	Removal Efficiency (%)	Incremental Removal (%)
0.02	9.7%	1.60	100.0	9.7
0.04	9.7%	3.19	100.0	9.7
0.06	9.8%	4.79	100.0	9.8
0.08	7.7%	6.38	100.0	7.7
0.10	8.0%	7.98	100.0	8.0
0.12	5.4%	9.58	100.0	5.4
0.14	4.7%	11.17	100.0	4.7
0.16	5.5%	12.77	99.9	5.5
0.18	3.5%	14.37	98.4	3.4
0.20	4.1%	15.96	96.9	4.0
0.25	6.5%	19.95	93.1	6.1
0.30	5.5%	23.94	89.4	4.9
0.35	4.0%	27.93	85.6	3.4
0.40	2.0%	31.92	81.9	1.6
0.45	2.1%	35.91	78.1	1.7
0.50	2.0%	39.90	74.4	1.5
0.75	5.1%	59.86	55.6	2.8
1.00	2.5%	76.08	38.5	1.0
1.50	1.8%	76.08	25.7	0.5
2.00	0.5%	76.08	19.2	0.1
				91.4
			Removal Efficiency Adjustment[2] =	6.5%
			Predicted % Annual Rainfall Treated =	92.5%
			Predicted Net Annual Load Removal Efficiency =	**84.9%**

1 - Based on 10 years of hourly precipitation data from NCDC station 806, Bridgeport WSO ARPT, Fairfield County, CT

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Hydraulically Applied Slope Stabilization & Re-Vegetation

1. Temporary Stabilization

If temporary cessation of earth disturbance activities occurs in an area or on stockpiles where the cessation will exceed 4 days, the site shall be immediately stabilized utilizing EarthGuard Fiber Matrix to prevent accelerated erosion. Seed is not required as the treatment is designed to prevent erosion on its own. See application rates below. For local distributor information, please contact.

2. Final Stabilization & Re-Vegetation

Apply soil stabilization hydraulic product to any disturbed areas where final grade has been established within 4 days of restoration to initiate final restoration.

A. Spring, summer, fall application: use the chart below to determine proper application rates. If only temporary stabilization is required, do not add seed and seeds amendments.
B. Late fall seeding (Oct 15th – Nov 20th): seeding should not occur from October 15 through November 20th unless weather is warmer than normal. During this time, seeds are likely to germinate but not grow sufficient root mass to survive during the winter. To achieve proper re-vegetation, EarthGuard Fiber Matrix shall be applied at two different time intervals unless project requirements demand otherwise. From the period Oct 15th – Nov 20th, apply EarthGuard Fiber Matrix without seed. After November 20th, and if weather permits (due to the possibility of freezing water and its application through a hydroseeder), apply a second application of EarthGuard Fiber Matrix along with seed, lime and amendments.
C. Site winterization/dormant seeding: to winterize a site that is in interim construction throughout the winter or for dormant seeding after Nov 20th refer to the chart below for appropriate application rate. Seed not required for winterization. For dormant seeding, increase seed quantity by 50%.

3. Materials

A. EarthGuard Fiber Matrix: the sprayed-on hydraulic product shall be EarthGuard Fiber Matrix manufactured by LSC Environmental Products, LLC. (800) 800-7671 or sales@LSCenv.com or approved equivalent. If alternate product is proposed it must at a minimum demonstrate a cover factor of ≤ 0.001 when tested utilizing ASTM 6459 modified large-scale erosion control testing, be applied at the manufacturer's recommended rate as outlined in product literature and be demonstrated to show effective performance on past projects in area. Alternate product proposal shall be made to the on-site engineer for approval.

i. EarthGuard Liquid Soil Stabilizer: the soil stabilizing emulsion blend to be applied shall be "EarthGuard Liquid" as manufactured by LSC Environmental Products, LLC. (800) 800-7671 and shall applied at the rates found in the table below.
ii. Wood Fiber: The Fiber to be used shall be Mesic Wood Fiber as manufactured by LSC Environmental Products, LLC.

B. HydroLime: HydroLime as manufactured by LSC Environmental Products, LLC. and shall be applied to acidic soils as recommended by soils tests (laboratory or portable field test) and can be applied in combination with hydroseed slurry.

Ph	APPLICATION RATE (lb/ac)
≤ 4.9	250
5.4 – 5.0	150
5.9 - 5.5	100
6.5 - 6.0	50
≥ 6.6	35

4. Seedbed Preparation

Compacted soils should be broken up to allow for maximum water infiltration unless located in a slip-prone area. Track-walk all areas, if possible, perpendicular to the flow of water. If track-walking is not possible use some other type of implement to roughen the areas to be treated. Utilize slope interruption devices, water bars or other water diversion techniques when possible and when slope lengths are greater than 100 feet in length.

5. Installation

Strictly comply with manufacturer's application rates and installation instructions. Apply in a manner to achieve optimum soil surface coverage. Roughened surfaces (track-walked, rocky terrain, etc.) May require higher application rates to achieve optimal coverage of soil. Hydraulic applications are not recommended for channel or concentrated flow areas. Areas with sandy-sandy loam soils, very little organic matter in the soil, poorly compacted slopes, very intense rain storms (3-4 inches at a time), high wind exposure, etc. May require increasing the EarthGuard and/or fiber rates.

For proper installation, determine appropriate application rate (par) per chart below. Next determine how many pounds of fiber can be loaded into the hydroseeder tank load (ht). Perform calculation below to determine area that will be covered by the load.

Area to be covered in feet = (ht/par) * 43,560 sq ft/acre

Stake out the appropriate surface area that the tank load should cover and apply the entire tank within the boundary.

6. Application rates

Application rates are for standard conditions. Contractor may need to increase application rates to account for roughened surfaces.

Normal Conditions. Use Chart 1A & 1B when the project requires a service life of EarthGuard Fiber Matrix to withstand up to 20" of rain over a period of time.

Chart 1A: EarthGuard (Liquid) Fiber Matrix+

Maximum Rainfall of ≤ 20"							
SLOPE	6:1	5:1	4:1	3:1	2:1	1½: to 1	1:1
EARTHGUARD (gals/acre)	4	5	6	7	8	9	10
EARTHGUARD (liters/hectare)	37.4	46.8	56.1	65.5	74.8	84.2	93.5
Fiber (lb/acre)	1500	1500	1500	1800	2000	2500	3000
Fiber (kg/hectare)	1680	1680	1680	2020	2245	2810	3355

Chart 1B: EarthGuard (Pre-Packaged) Fiber Matrix+

Maximum Rainfall of ≤ 20"					
SLOPE	≤ 4:1	3:1	2:1	1½: to 1	1 to 1
Pre-Packaged (lb/acre)	1500	1800	2000	2500	3000
Pre-Packaged (kg/hectare)	1680	2020	2245	2810	3355

3.2. Severe Conditions. Use Chart 2A & 2B when the project requires a service life of EarthGuard Fiber Matrix to withstand over 20" of rain over a period of time.

Chart 2A: EarthGuard (Liquid) Fiber Matrix+

Maximum Rainfall of > 20"			
SLOPE	≤ 5:1	4:1	≥ 3:1
EARTHGUARD (gals/acre)	6	8	10
EARTHGUARD (liters/hectare)	56.1	74.8	93.5
FIBER (lb/acre)	2000	2500	3000
Fiber (kg/hectare)	2245	2810	3335

Chart 2B: EarthGuard (Pre-Packaged) Fiber Matrix+

Maximum Rainfall of > 20"				
SLOPE	≤ 5:1	4:1	≥ 3:1	
Pre-Packaged (lb/acre)	2,000	2,500	3,000	
Pre-Packaged (kg/hectare)	2245	2810	3335	

+ SOME SITUATIONS WITH: SANDY-SANDY LOAM SOILS, VERY LITTLE ORGANIC MATTER IN THE SOIL, POORLY COMPACTED SLOPES, HEAVY RAINFALL LOCATIONS (OVER 19 INCHES PER YEAR), VERY INTENSE RAIN STORMS (2-3 INCHES AT A TIME), HIGH WIND EXPOSURE, ETC. MAY REQUIRE INCREASING THE EARTHGUARD AND/OR FIBER RATES.

7. Repair

Damaged hydroseeded areas shall be repaired within 4 days.

EARTHGUARD®

Fiber Matrix™

Top Performance & Cost Savings

Why not go with the best?

Use EarthGuard® Fiber Matrix™ and get the highest returns on your investment. This hydraulically applied, patented technology offers highly rated erosion control along with excellent turbidity reduction and promotes quick growth establishment — all with fast, easy applications and a great price.

Latest independent performance study

NTPEP ASTM 6459 Soil Loss Testing — Impartial 3rd party testing shows EarthGuard outperforms:

- Curlex®
- Single and Double Net Straw™ Blankets
- Single and Double Net Coconut™ Blankets
- Double Net Straw / Coconut™ Blankets
- ProMatrix™
- Flexterra®
- And Other Commonly Used Hydraulic or Rolled Erosion Control Products

Formulated for your success — EarthGuard.

- **Lower your material costs.**
- **Lower your labor costs.**
- **Boost your results.**

LSC Environmental Products, LLC
www.LSCenv.com • sales@LSCenv.com • 800-800-7671

LSC™

EARTHGUARD® Fiber Matrix™

Highly Effective. Cost Efficient.

Two ways to apply.
Same great performance.

EarthGuard Fiber Matrix Bale

EarthGuard soil stabilizer and 100% wood fiber mulch combined in one easy to use 50 lb. bale.

— OR —

EarthGuard Liquid 5 Gallon Container

EarthGuard soil stabilizing concentrate — ready to mix on site with the mulch of your choice.

MADE IN THE USA

EGFM1016

Application Rates:

Normal Conditions: Maximum Rainfall of < 20" (480 mm) before adequate vegetative establishment

EARTHGUARD	≤ 4 to 1 Slope		3 to 1 Slope		2 to 1 Slope		≥ 1 to 1 Slope	
	Per Acre	Per Ha	Per Acre	Per Ha	Per Acre	Per Ha	Per Acre	Per Ha
EarthGuard Fiber Matrix	1500 LB	1680 KG	1800 LB	2020 KG	2000 LB	2245 KG	3000 LB	3355 KG
OR								
EarthGuard Liquid	4-6 GALS	37-56 LITERS	7 GALS	66 LITERS	8 GALS	75 LITERS	10 GALS	94 LITERS
Mulch	1500 LB	1680 KG	1800 LB	2020 KG	2000 LB	2245 KG	3000 LB	3355 KG

Severe Conditions: Maximum Rainfall of > 20" (480 mm) before adequate vegetative establishment

EARTHGUARD	≤ 5 to 1 Slope		4 to 1 Slope		≥ 3 to 1 Slope	
	Per Acre	Per Ha	Per Acre	Per Ha	Per Acre	Per Ha
EarthGuard Fiber Matrix	2000 LB	2245 KG	2500 LB	2800 KG	3000 LB	3355 KG
OR						
EarthGuard Liquid	6 GALS	56 LITERS	8 GALS	75 LITERS	10 GALS	94 LITERS
Mulch	2000 LB	2245 KG	2500 LB	2800 KG	3000 LB	3355 KG

EarthGuard Liquid can be used for dust control at 10 gallons per acre.

For technical services or to locate your nearest EarthGuard dealer:

LSC ENVIRONMENTAL PRODUCTS, LLC ™

Call: **1-800-800-7671** • Email: **Sales@LSCenv.com**
Visit LSC online at: **www.LSCenv.com**
LSC Environmental Products, LLC
2183 Pennsylvania Ave., Apalachin, NY 13732

EARTHGUARD®

REAP
Rain Event Action Plan

Water from untreated soil on the left, water from soil treated with EarthGuard® shown on the right.

EarthGuard® Meets CASQA specifications for:

- Soil Binder EC-5
- Stockpile Management WM-3
- Wind Erosion Control WE-1

Simple, Effective & Affordable

EarthGuard® can help satisfy new construction permit requirements by keeping stormwater clean.

EarthGuard® is your solution to your Rain Event Action Plan (REAP) BMP and site winterization. Simply apply EarthGuard® mixed with water to exposed soils or ash to control erosion, dust and turbidity. **It's active immediately, even during a rain event.**

Controls Turbidity, Heavy Metals, and Other Harmful Constituents. Active Immediately.

The EarthGuard® Advantage:

- No specialized equipment needed – apply with a water truck, hydroseeder or any spray rig.
- Use to treat active construction areas.
- Does not require an active treatment plan or monitoring.
- Safe for equipment – easy clean out.
- Actively controls turbidity, heavy metals, and other harmful constituents.
- Inexpensive application.
- Environmentally friendly.
- Can be applied over existing vegetation.
- Low application rates: 3-10 gal per acre.
- Packaged in 5 gallon pails for easy handling and storage.

LSC Environmental Products, LLC
www.LSCenv.com • sales@LSCenv.com • 800-800-7671

LSC™

EARTHGUARD®

REAP
Rain Event Action Plan

SWPPP Insert for:

Temporary Soil Stabilization
A Rain Event Action Plan (REAP) BMP
or Pad & Flat Area Winterization BMP

Definition: EarthGuard® is a temporary erosion control system that stabilizes soil by maintaining existing soil structure and by settling out any fine sediment or ash that may get dislodged by stormwater or wind.

The use of stabilizers for soil stabilization/erosion control does not require an Active Treatment Plan (ATS) according to the California Regional Water Quality Control Board.

Temporary Soil Stabilization A Rain Event Action Plan (REAP) BMP:

Function: EarthGuard® is used to immediately stabilize active and inactive construction sites, pads, roads, slopes and stockpiles for impending rain events.

Slope	EarthGuard®	Water (gal/ac)*
≤ 4:1	**3** gal/ac	As required to properly cover 1 acre of area: • Spray Rig ≥ 1500 gal/ac • Water Truck ≥ 2000 gal/ac
3:1	**4** gal/ac	
2:1	**5** gal/ac	
1.5:1	**6** gal/ac	
1:1	**8** gal/ac	
Stockpiles	**10** gal/ac	

Pad & Flat Area Winterization BMP:

Function: EarthGuard® is used to provide extended erosion control protection on inactive pads, flat areas and roadway cuts.

Time	EarthGuard®	Water (gal/ac)*
1-2 months	**3-5** gal/ac	As required to properly cover 1 acre of area: • Spray Rig ≥ 1500 gal/ac • Water Truck ≥ 2000 gal/ac
2-3 months	**5-8** gal/ac	
3-6 months	**8-10** gal/ac	
6-12 months	**10-15** gal/ac	

*Minimum dilution 1/800. Application Rates dependent on anticipated precipitation throughout duration of required protection.

Installation Instructions:

Soil preparation is not required and EarthGuard® can be applied over existing vegetation. Simply add EarthGuard® to a water truck, hydroseeder or spray rig and apply to disturbed soil for immediate erosion protection. Make multiple applications if necessary to avoid over saturation and the creation of run-off. EarthGuard® is active immediately and will not harm equipment.

EarthGuard® is specifically designed to work with all soil types to reduce soil movement and turbidity, helping maintain compliance with environmental regulations.

For Hydraulic Mulch – EC 3 and Hydroseeding – EC 4 use EarthGuard® Fiber Matrix™

For technical services or to locate your nearest EarthGuard® dealer:

LSC ENVIRONMENTAL PRODUCTS, LLC ™

Call: **1-800-800-7671** • Email: **Sales@LSCenv.com**
Visit LSC online at: **www.LSCenv.com**
LSC Environmental Products, LLC
2183 Pennsylvania Ave., Apalachin, NY 13732

MADE IN THE USA

REAP0817

Posi-Lock™
CONTAINMENT SYSTEM

Durable – Versatile – Proven

Spray-applied membrane designed to protect air, soil, and waterways from the toxic impacts of contaminated sites.

Applications

Posi-Lock™ formulations are used on Superfund and Remediation sites all over the world to:

- Contain odors and VOCs during active excavation
- Prevent migration of toxic dust and ash
- Encapsulate contaminated soils and stockpiles
- Eliminate toxic infiltration into groundwater
- Contain coal ash and asbestos
- Establish debris containment following fires

Formulations

Posi-Lock™ is a unique mineral-based mortar membrane offered in various formulations to meet specific project requirements:

- Formulations to balance durability with cost
- Available in brown, grey, and green

Attributes

- **Easy to Apply** – Install multiple acres per day; Use LSC Applicators or standard hydroseeders to apply; Minimum surface prep; Apply remotely where safety or access is a concern.
- **Durable** – Formulations for durability measured in days, months or years.
- **Versatile** – Easily accessed and patched if ongoing excavation required; Withstands even the most intense rainstorms; Can be applied year-round in all conditions; Scalable for small or large projects; No product shelf life.
- **Eco-Friendly** – Used on some of the world's most environmentally sensitive sites; Mineral-based membrane; Insignificant removal or disposal costs; Minimal fuel and equipment required.

LSC Environmental Products, LLC
www.LSCenv.com • sales@LSCenv.com • 800-800-7671

LSC™

Trusted by Leading Remediation Companies

Posi-Lock™ is used during active excavation, over-night cover, or for extended long-term cover.

Posi-Lock™ Case Study on Coal Ash

Coal Ash Containment: 3:1 Slopes covered with Posi-Lock™ after 1 year and 90" of rain!

Notable Projects:

- Toxic Dust Control — Hanford Nuclear Site
- Asbestos Containment — 911 World Trade Center Cleanup
- Odor and Infiltration Control — Contaminated Pond Dredging at Ethanol Production Facility
- VOC Containment — Superfund Site in Populated Metropolitan Area
- Debris Containment — California Wildfires

For technical services or to locate your nearest Posi-Lock™ dealer:

LSC ENVIRONMENTAL PRODUCTS, LLC ™

Call: **1-800-800-7671** • Email: **Sales@LSCenv.com**

Visit LSC online at: **www.LSCenv.com**

LSC Environmental Products, LLC

2183 Pennsylvania Ave., Apalachin, NY 13732

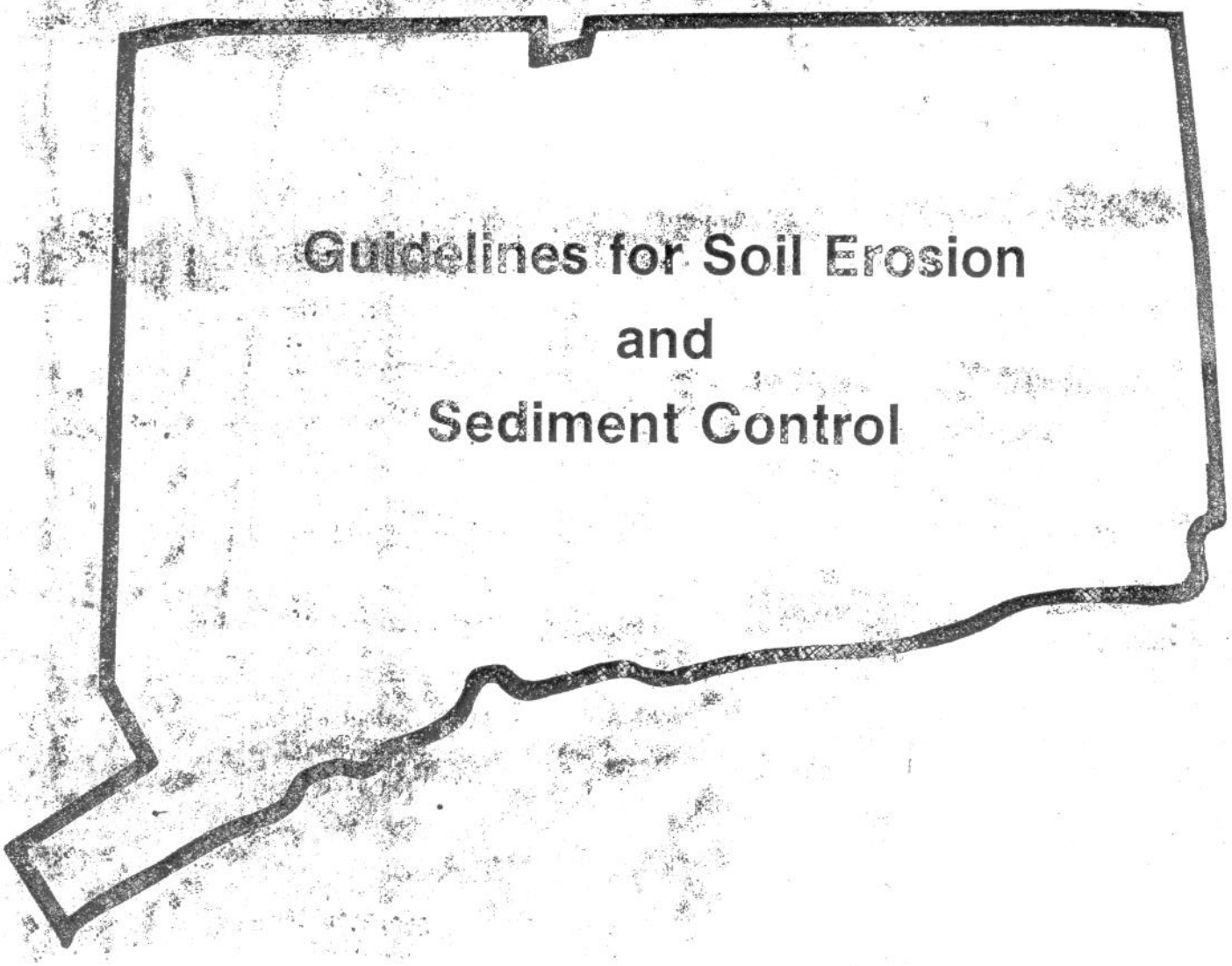
MADE IN THE USA

PL 0323

APPENDIX D

Connecticut Guidelines for Soil Erosion and Sediment Control Drainage References

ANDREWS



Guidelines for Soil Erosion and Sediment Control

Connecticut

Figure 9-2 - Values of Runoff Coefficient (C) for Rational Formula

Land use	C
Business:	
Downtown areas	0.70-0.95
Neighborhood areas	0.50-0.70
Residential:	
Single-family areas	0.30-0.50
Multi units, detached	0.40-0.60
Multi units, attached	0.60-0.75
Suburban	0.25-0.40
Industrial:	
Light areas	0.50-0.80
Heavy areas	0.60-0.90
Parks, cemeteries	0.10-0.25
Playgrounds	0.20-0.35
Railroad yard areas	0.20-0.40
Unimproved areas	0.10-0.30
Streets:	
Asphaltic	0.70-0.95
Concrete	0.80-0.95
Brick	0.70-0.85
Drives and walks	0.75-0.85
Roofs	0.75-0.95

Land use	C
Lawns:	
Sandy soil, flat, 2%	0.05-0.10
Sandy soil, average, 2-7%	0.10-0.15
Sandy soil, steep, 7%	0.15-0.20
Heavy soil, flat, 2%	0.13-0.17
Heavy soil, average, 2-7%	0.18-0.22
Heavy soil, steep, 7 %	0.25-0.35
Agricultural land:	
Bare packed soil	
Smooth	0.30-0.60
Rough	0.20-0.50
Cultivated rows	
Heavy soil no crop	0.30-0.60
Heavy soil with crop	0.20-0.50
Sandy soil no crop	0.20-0.40
Sandy soil with crop	0.10-0.25
Pasture	
Heavy soil	0.15-0.45
Sandy soil	0.05-0.25
Woodlands	0.05-0.25

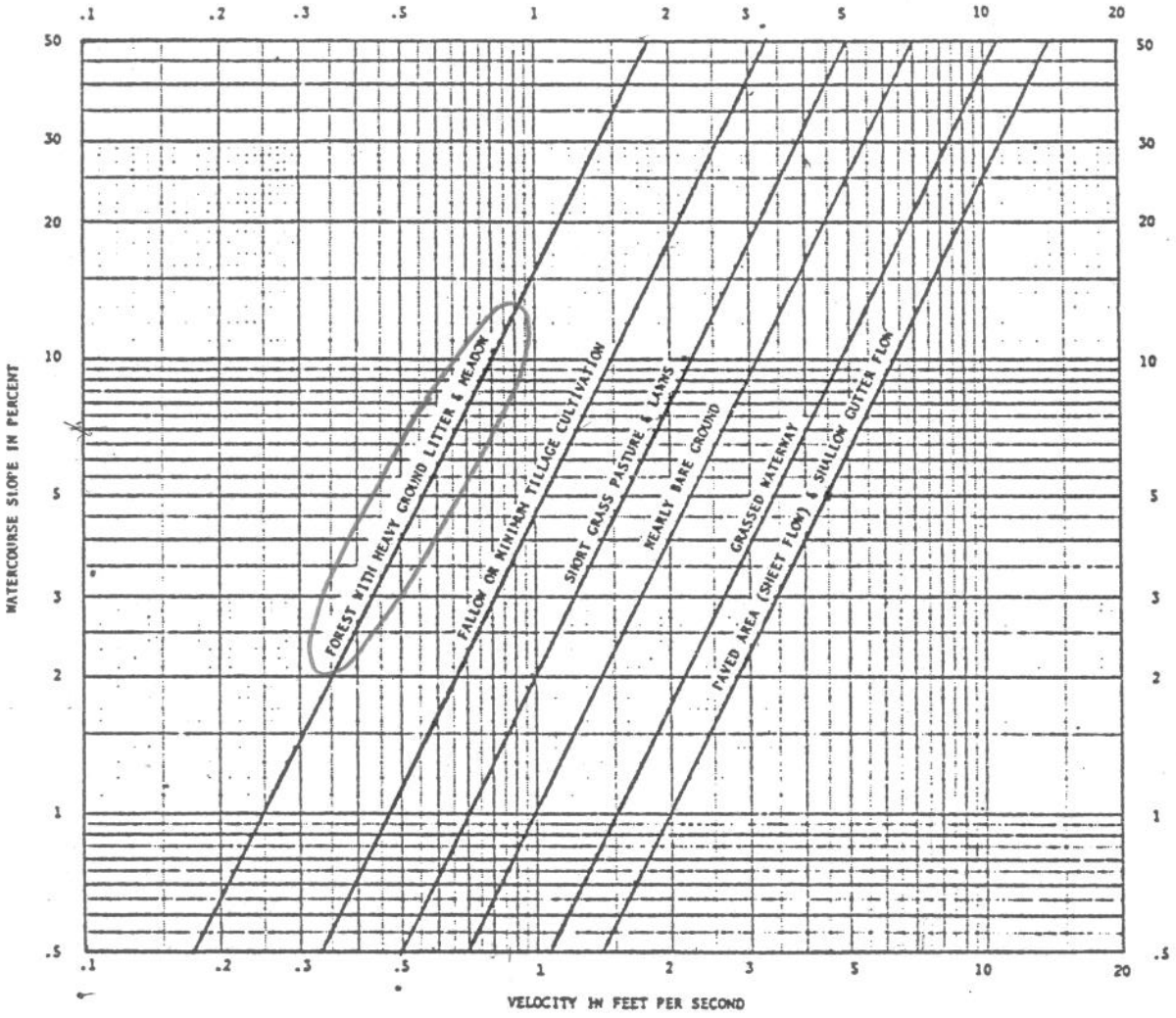
=0.15 (WELL MAINTAINED)

=0.15 (AVERAGE)

Note: The designer must use judgement to select the appropriate C value within the range. Generally, larger areas with permeable soils, flat slopes and dense vegetation should have lowest (C) values. Smaller areas with dense soils, moderate to steep slopes, and sparce vegetation should be assigned highest (C) values.

Source: Virginia Erosion and Sediment Control Handbook, 1980. Virginia Soil and Water Conservation Commission.

Figure 9-3 - Velocities for Upland Method of Estimating Tc



Source: U.S. Department of Agriculture, SCS, Urban Hydrology for Small Watersheds, Technical Release Number 55, Washington, DC.

APPENDIX E

Inspection Report Forms

Gales Ferry Intermodal
1737 & 1761 Route 12, Gales Ferry, CT
STORM WATER POLLUTION CONTROL PLAN
POST RAINFALL INSPECTION LOG

Date:_____ Time:_____
Conducted By:_____ Weather:_____
Accompanied By:_____ Rainfall Gauge Level: _____

In completing this inspection form the areas should be graded as satisfactory, unsatisfactory, or not applicable at the time of the inspection. Any area graded as unsatisfactory must be explained on the inspection summary report. The remedial action sheet and completed inspection form shall serve as the "Inspection Summary Report": Completed inspection documents shall be retained for at least 3 years as part of the Plan.

No	DESCRIPTION	RESULTS		
		SAT	UNSAT	NA
1	Walk entire Site to determine if there are any disturbed areas not protected by soil erosion or sediment control measures.			
2	Check entire Site for wastes resulting from equipment maintenance, personnel, and construction activities - these wastes will not be discarded on the Site.			
3	Soil erosion and sediment controls located throughout the Site, including diversion ditches, swales, hay bales, mulch socks/berms and silt fencing.			
4	Accumulated silt and sediment will be removed from silt fences and hay bales when silt exceeds 1/3 the height of the control			
5	Stockpiles- erosion controls, dust controls, odor controls, covers; check perimeter silt fences or hay bales; check anchoring and stake integrity.			
6	All disturbed soil areas - check for erosion rills; check all protective dams and silt barriers.			
7	All restored landscaped areas, mulch, mats, checks and siltation barriers - check all measures necessary to enhance growth of stabilizing vegetation; check mulch; check barriers.			
8	Check at entrance/exit point for signs of excessive off-site sediment and/or soil tracking.			
9	The contractor parking and staging areas shall be maintained on bituminous pavement or crushed stone in all phases; washout areas are structurally intact, self-contained and producing no discharge.			
10	Anti-tracking pads and gravel check dams shall be replaced when void spaces are full or structures are breeched, as applicable.			
11	The contractor is providing sweeping and dust control measures on the entrance road, during all phases of construction.			
12	Supplies - Check if silt fence is available at the site for emergency use.			
13	Check water quality of stormwater discharge for turbidity; check for evidence of, or potential for, pollutants entering the drainage system and impacts to the receiving waters.			

Additional Comments:

_____
_____
_____
_____
_____
_____
_____

_____ _____
Inspector's Signature **Permittee's Signature**

APPENDIX F

Executed Certifications

STORMWATER POLLUTION CONTROL PLAN

Gales Ferry Intermodal LLC
1761 Route 12, Gales Ferry, Connecticut
Certification of Documents

Unless otherwise specified in this general permit, any document, including but not limited to any notice, information or report, which is submitted to the commissioner under this general permit shall be signed by the permittee, or a duly authorized representative of the permittee, and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with section 22a-6 of the Connecticut General Statutes, pursuant to section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute.

_____
Name of Firm

_____
Address 1

_____
Address 2

_____
City, State, Zip

_____
Phone Number – including area code

_____ _____
Authorized Signature Date

_____
Printed Name

_____
Title

STORMWATER POLLUTION CONTROL PLAN

Gales Ferry Intermodal LLC
1761 Route 12, Gales Ferry, Connecticut
Registrant Certification

The Plan shall include the following certification signed by each the permittee, or a duly authorized representative of the permittee, and by the individual or individuals responsible for actually preparing such document.

I hereby certify that I am making this certification in connection with a registration under such general permit, submitted to the commissioner by Gales Ferry Intermodal LLC for an activity located at 1761 Route 12, Gales Ferry, Connecticut and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the Site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(b)(8)(B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law.

_____
Name of Firm

_____
Address 1

_____
Address 2

_____
City, State, Zip

_____
Phone Number – including area code

_____ _____
Authorized Signature Date

_____
Printed Name

_____
Title

STORMWATER POLLUTION CONTROL PLAN

Gales Ferry Intermodal LLC
1761 Route 12, Gales Ferry, Connecticut
Professional Engineer Certification

The Plan shall include the following certification signed by the professional engineer responsible for the preparation, planning and design of the SWPCP and stormwater management systems:

I hereby certify that I am a professional engineer licensed in the State of Connecticut. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by Gales Ferry Intermodal LLC for an activity located at 1761 Route 12, Gales Ferry, Connecticut. I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the project or activity covered by this certification. I further certify, based on such review and on the standard of care for such projects, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, the Stormwater Quality Manual, as amended, and the conditions of the general permit, and that the controls required for such Plan are appropriate for the Site. I further certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement in this certification may subject me to sanction by the Department and/or be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law.

_____
Name of Firm

_____
Address 1

_____
Address 2

_____
City, State, Zip

_____
Phone Number – including area code

_____ _____
Authorized Signature Date

_____
Printed Name

_____
Title

STORMWATER POLLUTION CONTROL PLAN

Gales Ferry Intermodal LLC
1761 Route 12, Gales Ferry, Connecticut
Individual Employee and/or Contractor Certification

The Plan shall include the following certification signed by each contractor and subcontractor identified in the Plan as described above:

I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the Site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including, but not limited to, the requirements of the SWPCP prepared for the Site.

The certification shall include the name and title of the person providing the signature; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the Site; and the date the certification is made.

_____
Name of Firm

_____
Address 1

_____
Address 2

_____
City, State, Zip

_____
Phone Number – including area code

_____ _____
Authorized Signature Date

_____
Printed Name

_____
Title

APPENDIX G

Notice of Termination

Connecticut Department of
Energy & Environmental Protection
Bureau of Materials Management & Compliance Assurance
Water Permitting & Enforcement Division

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Notice of Termination Form: Non-Solar Projects

This Notice serves as a request to terminate the below listed permit as well as any applicable Letter(s) of Credit.

Part I: Permittee Information

The below information is required in accordance with Section 6(b) of the General Permit.

1. Permit Number: GSN _____
2. Registrant: _____
3. Site Address: _____

   City/Town: _____ State: _____ Zip Code: _____
4. Date of completion of construction: _____

   Date all storm drainage structures were cleared of construction sediment and debris: _____

   Beginning and Ending Dates of post-construction inspections: _____

   Date of final stabilization inspection(s)*: _____

   Qualified Inspector who conducted the Final Stabilization Inspection: (This person must sign Part III) _____
5. Check the post-construction activity(ies)** at the site (check all that apply):

   ☐ Industrial ☐ Residential ☐ Capped Landfill

   ☐ Commercial ☐ Solar Array ☐ Other: _____

* The Final Stabilization Inspection must occur at least one full growing season after final stabilization has been achieved. A full growing season is defined as the timeframe encompassed by two consecutive full seeding seasons: April 1 through June 15, and August 15 through October 1. If final stabilization is achieved during a seeding season, the following seeding season will be considered the first full seeding season after final stabilization has been achieved.

** If the post-construction activity involves solar arrays, the Department may require that the "Solar Projects: Notice of Termination Form" be used. Any questions regarding the necessity of such a form for the project can be sent via email to DEEP.StormwaterStaff@ct.gov.

Locally Approvable Projects Must Complete the following Part II - *(Attach additional sheets as needed)*

Part II: Locally Approvable Post-Construction Inspection Certification

The below information is required in accordance with Section 5(b)(4)(C)(i) of the General Permit.

Certification by a Qualified Professional Engineer / Qualified Soil Erosion and Sediment Control Professional / District Representative

"I hereby certify that I am a qualified professional engineer / a qualified soil erosion and sediment control professional / a representative of the District in which the site is located as defined in Section 2 of the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (general permit). I am familiar with the site described in this Notice of Termination and the requirements of the general permit. I certify, based on my personal inspection of the site pursuant to Section 6(a) of the general permit that all post-construction measures have been installed as specified in the permittee's Stormwater Pollution Control Plan and in accordance with Section 5(b)(2)(C) of the general permit and that all such measures have been cleaned of construction sediment and debris. I understand that this certification is part of a registration submitted in accordance with section 22a-430b of Connecticut General Statutes and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature of Qualified Professional Engineer / Qualified Soil Erosion and Sediment Control Professional / Representative of the District	Date
Printed Name of Qualified Professional Engineer / Qualified Soil Erosion and Sediment Control Professional / Representative of the District	Title

Check off the qualifications of the signatory of the above part:

☐ Qualified Professional Engineer ☐ Qualified Soil Erosion and Sediment Control Professional ☐ Representative of the District

Locally Exempt Projects Must Complete the following Part II - *(Attach additional sheets as needed)*

Part II: Locally Exempt Post-Construction Inspection Certification

The below information is required in accordance with Section 5(b)(4)(C)(ii) of the General Permit.

Certification by a Qualified Professional Engineer / Qualified Soil Erosion and Sediment Control Professional

"I hereby certify that I am a qualified professional engineer / a qualified soil erosion and sediment control professional as defined in Section 2 of the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (general permit). I am familiar with the site described in this Notice of Termination and the requirements of the general permit. I certify, based on my personal inspection of the site pursuant to Section 6(a) of the general permit that all post-construction measures have been installed as specified in the permittee's Stormwater Pollution Control Plan and in accordance with Section 5(b)(2)(C) of the general permit and that all such measures have been cleaned of construction sediment and debris. I understand that this certification is part of a registration submitted in accordance with section 22a-430b of Connecticut General Statutes and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature of Qualified Professional Engineer / Qualified Soil Erosion and Sediment Control Professional	Date
Printed Name of Qualified Professional Engineer / Qualified Soil Erosion and Sediment Control Professional	Title

Check off the qualifications of the signatory of the above part:

☐ Qualified Professional Engineer ☐ Qualified Soil Erosion and Sediment Control Professional

State Agency Projects Must Complete the following Part II - (Attach additional sheets as needed)

Part II: State Agency Post-Construction Inspection Certification

The below information is required in accordance with Section 5(b)(4)(C)(iii) of the General Permit.

Certification by a DOT District Engineer or his/her designee / a DOT District Environmental Coordinator / a designated employee of another state agency

"I hereby certify that I am a DOT District Engineer or his/her designee / a DOT District Environmental Coordinator / a designated employee of another state agency as defined in Section 2 of the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (general permit). I am familiar with the site described in this Notice of Termination and the requirements of the general permit. I certify, based on my personal inspection of the site pursuant to Section 6(a) of the general permit that all post-construction measures have been installed as specified in the permittee's Stormwater Pollution Control Plan and in accordance with Section 5(b)(2)(C) of the general permit and that all such measures have been cleaned of construction sediment and debris. I understand that this certification is part of a registration submitted in accordance with section 22a-430b of Connecticut General Statutes and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature	Date
Printed Name	Title

Check off the qualifications of the signatory of the above part:

☐ Qualified Professional Engineer ☐ Qualified Soil Erosion and Sediment Control Professional ☐ Representative of the District

All Projects Must Complete the following Part III - *(Attach additional sheets as needed)*

Part III: Final Stabilization Inspection Certification

The below information is required in accordance with Section 5(b)(4)(D) of the General Permit.

Certification by a Qualified Inspector

"I hereby certify that I am a qualified inspector as defined in Section 2 of the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (general permit). I am familiar with the site described in this Notice of Termination and the requirements of the general permit. I certify, based on my personal inspection of the site pursuant to Section 6(a) of the general permit that the site has been stabilized, as defined in Section 2 of the general permit, for a period of no less than one full growing season following the cessation of construction activities. I further certify that there is no active erosion or sedimentation present on site and no disturbed areas remain exposed. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature of Qualified Inspector	Date
Printed Name of Qualified Inspector	Title

All Projects Must Complete the following Part IV - *(Attach additional sheets as needed)*

Part IV: Permittee Certification

The below information is required in accordance with Section 5(b)(4)(D) of the General Permit.

Certification by the Permittee

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with section 22a-6 of the Connecticut General Statutes, pursuant to section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Signature of Permittee	Date
Printed Name of Permittee	Title

All Projects Must Complete the following Part V - *(Attach additional documentation as needed)*

Part V: Additional Submittals

The following attachments are required to be submitted along with the Notice of Termination Form:

☐ Post-Construction Inspection Report (must contain photos with time stamps)

☐ Final Stabilization Inspection Report (must contain photos with time stamps)

Complete and submit this form in accordance with the general permit (DEEP-WPED-GP-015) to ensure the proper handling of the termination. Print or type unless otherwise noted.

Submit this Notice of Termination Form to the address below, as well as via email to DEEP.StormwaterStaff@ct.gov:

WATER PERMITTING AND ENFORCEMENT DIVISION/STORMWATER GROUP
DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127