DRAINAGE ANALYSIS
&
EROSION AND SEDIMENT
CONTROL PLAN

Old Turnpike Road, Nottingham
Tax Map 6, Lot 22

Prepared for:

Domus Developers, Inc.
11 Whitehorse Road
RYE, NH 03870

Land of

Domus Developers, Inc.
11 Whitehorse Road
RYE, NH 03870

Prepared by:

Berry Surveying & Engineering
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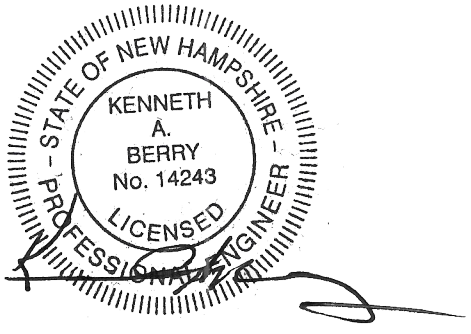

Project Number:
DB 2018-030

June 3, 2019

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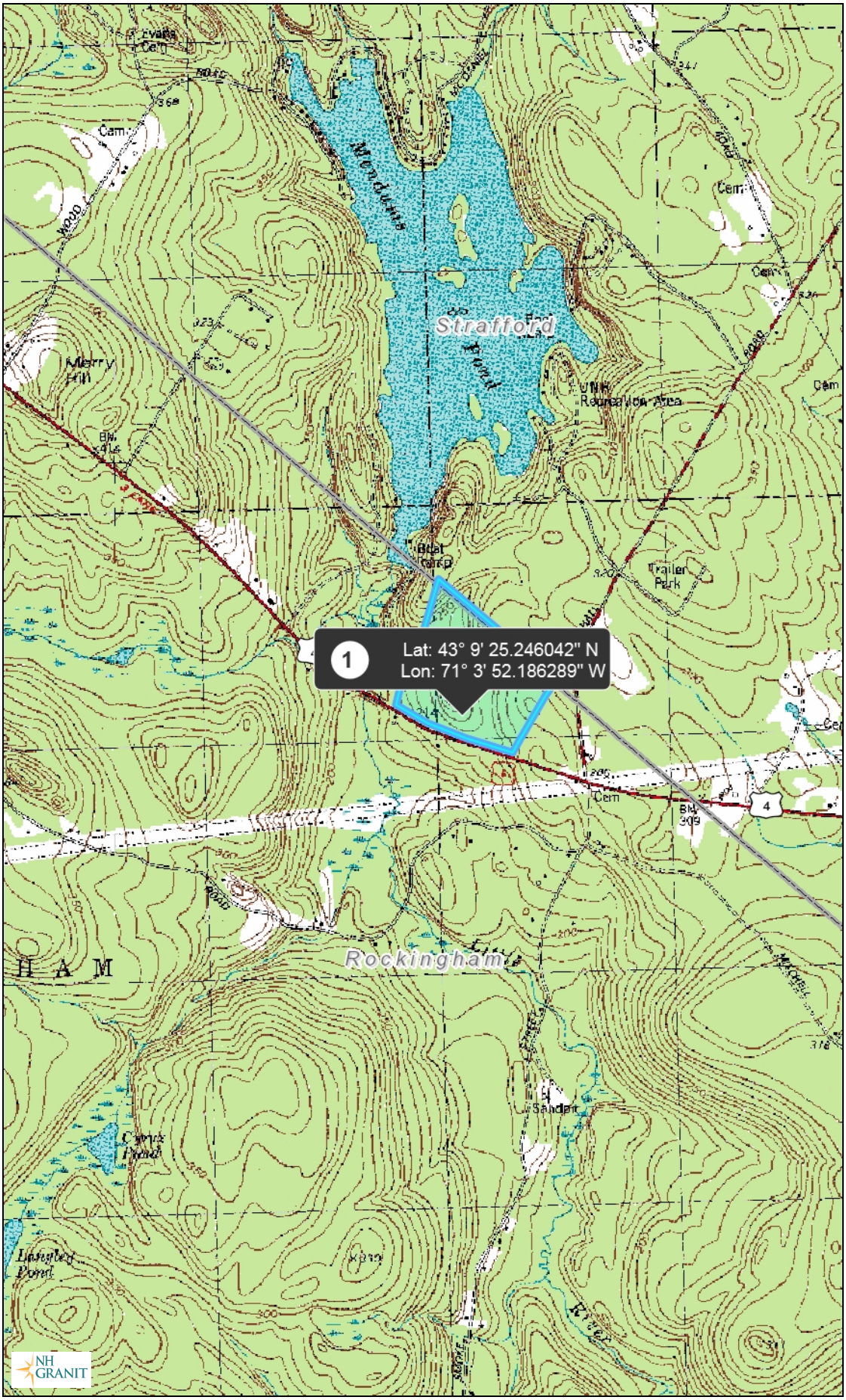
Map by NH GRANIT



Legend

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- City/Town

Map Scale

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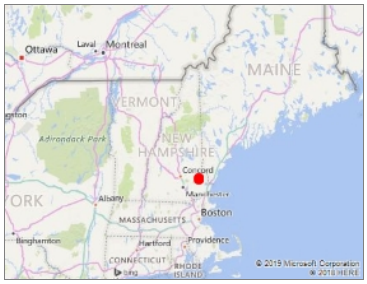
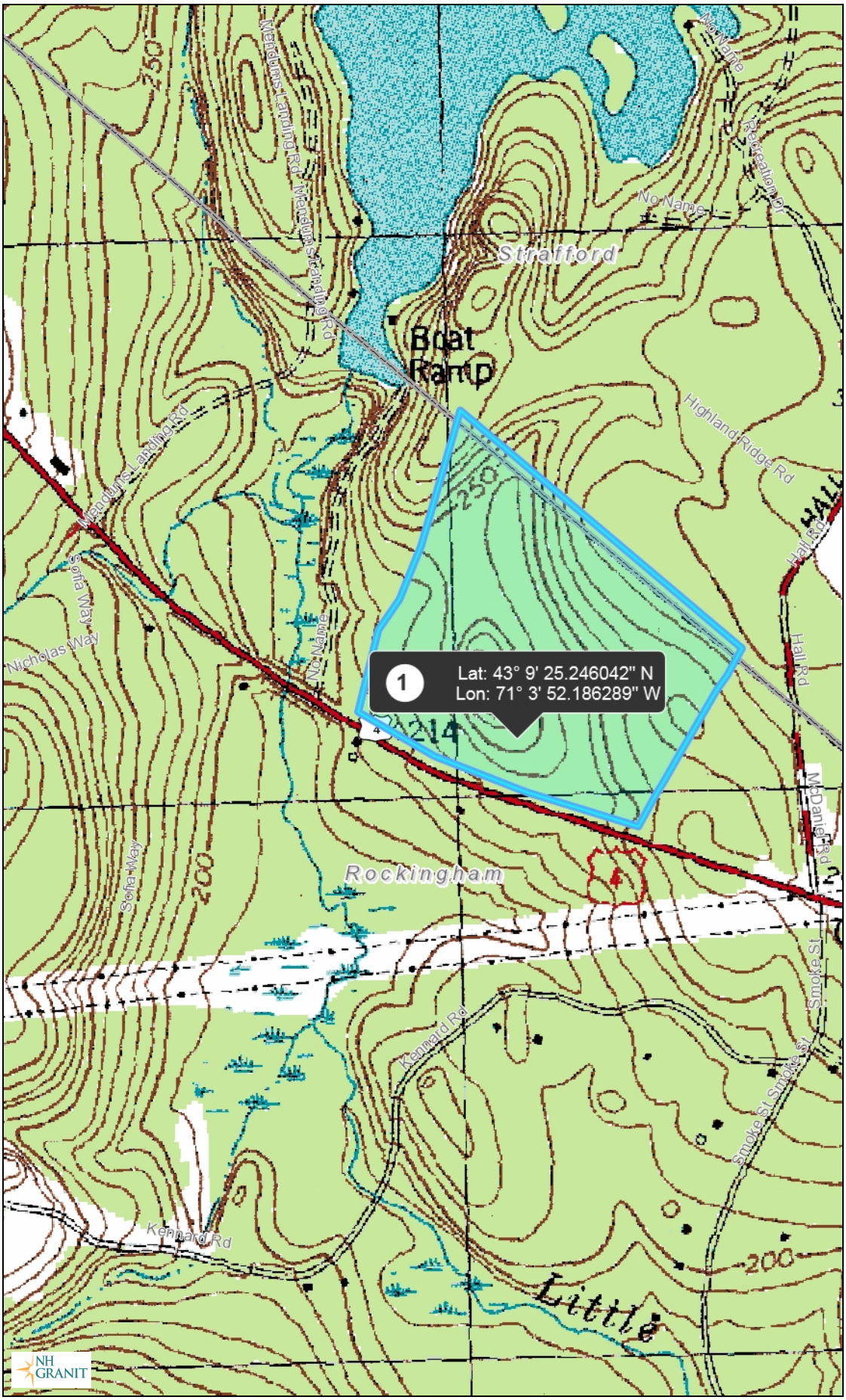


Map by NH GRANIT



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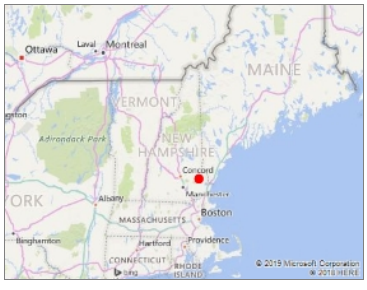


DESIGN METHOD OBJECTIVES

The owner, Domus Developers, is proposing to subdivide and develop Tax Map 6, Lot 22, Nottingham, by subdividing four lots and designing two multi-family site plans on two of the lots. The drainage infrastructure consists of cross culverts, open swales, dry swales, detention ponds and rain garden bio-filtration ponds.

Existing Topography was conducted on site during the boundary survey. Off-site topography was derived from USGS maps and Google tin. On-site soil types, in the area of the proposed development, were established by Site Specific Soil Survey mapping by Certified Soil Scientist as reflected on that plan. Off-site soils and isolated areas of the locus parcel were determined by USDA / NRCS Websoil for both Rockingham and Strafford County. The area of the parcel is 59.7 acres and the area of the differential analysis is 128.6 acres.

An Existing and Proposed Conditions analysis was conducted for the purpose of estimating the peak rate of stormwater run-off and to subsequently design adequate mitigation of drainage. There are three existing drainage discharge points which were identified in the existing analysis and duplicated in the proposed conditions analysis. Designing two watershed models we have compared the differences in these rates of peak run-off and surface water volume. Sheet W-1 outlines the characteristics of the site in its existing or pre-construction conditions. The second analysis displays the proposed (post-construction) conditions (See Sheet W-2). The analysis was conducted using data for; 2 Yr – 24 Hr (3.03”), 10 Yr – 24 Hr (4.56”), 25 Yr -24 Hr (5.77”), 50 Yr – 24 Hr (6.89”), and 100 Yr-24 Hr (8.24”) storm events. Storm event analysis was accomplished using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment and rainfall quantities are based on the Extreme Precipitation Table for this location from the Northeast Regional Climate Center / Cornell University (http://precip.eas.cornell.edu), in accordance with Alteration of Terrain Administrative Code, ENV-Wq (Attached in Appendix 3).

1.0 Existing Analysis:

Reference: W-1 Sheets - Existing Conditions Watershed Plan (Enclosed)
Sheet 3 Existing Conditions Plan
Sheet 4 – 8 Site Specific Soil Survey Map

The existing property consists of vacant land and comprised of 59.7 acres on the north side of US Route 4 in Nottingham, NH. The watershed area consists of land in Barrington, Strafford County and Nottingham, including a residential neighborhood north of the locus parcel. The residential neighborhood has several cross culvert onto that development and several cross culverts leaving the roadway network. The watershed area being analyzed consists of 128.6 acres and is being analyzed at four Final Reach Points, two being culverts from the north side of Old Turnpike Road to the south side. The remaining two Final Reach Points remain on the north side of the road and discharge into Little River.

The soils on the parcel are predominantly Hydrologic Soil Group C with areas of HSG B closer to Old Turnpike Road. The Hydric A soil component of the open water wetland is rated as HSG D. For the most part the soils on site are either a Chatfield Canton Complex or Montauk. The USDA / NRCS soils are mapped as primarily Canton and Charlton, all of which is rated as HSG B.

Final Reach #100:

Subcatchment #1 & 2 on site and Subcatchment #10 & 11 off site, consist of land area north of an existing highway culvert, including the above mentioned open water wetland. Subcatchments #2, 10 and 11 are routed through Subcatchment #1 and modeled as a pond at the roadway culvert. (Pond #1) the runoff that passes though the culvert being evaluated at the south side of the road. (Final Reach #100).

Final Reach #300:

Subcatchment #3 consists of a small portion of the land that contributes directly to a second highway culvert where it is modeled as a pond (Pond #3) and evaluated at the south side of the road. (Final Reach #300)

During the 100 year – 24 hour storm events, the 18-inch culvert at Pond #1 is not sufficient to handle the flow and therefore is bypassed to the 24-inch culvert at Pond #3.

Final Reach #500:

Subcatchment #4 and #5 are minor areas that are defined by a driveway culvert which is modeled as a pond (Pond #5) and Final Reach #500.

Final Reach #600:

Subcatchment #6 is a minor area that passes across the property line and is evaluated as a separate entity. **Final Reach #600**.

2.0 Proposed Analysis:

Reference: W-2 Sheets - Proposed Conditions Watershed Plan (Enclosed)
Plan & Profile Sheets
Rain Garden Plans

There are two proposed roads that would support access to two multi-family residential areas

Final Reach #100

Sera Drive, the four rain gardens, catchment pond and cross culverts discharge through rip rap outlet protection into the wetland that directly discharges runoff to the existing NHDOT Cross Culvert, Pond #1.

Subcatchment #10 and #11 remain unchanged. Subcatchment #1 and #2 are the remnants of those original areas.

Final Reach #300

Subcatchment #3 is relatively small in the existing conditions analysis and due to the placement of Ada Drive is further reduced. The proposed development involved with Ada Drive diverts part of Subcatchment #1, #3, #4, #5 and #6.

Runoff from Ada Drive & the residential driveway and developed land mass is treated in a rain garden and dry swale before discharge overland to an existing NHDOT Cross Culvert, Pond 3.

Final Reach #500

A the majority of Ada Drive development is within subcatchment #4 and the originally analyzed subcatchment #5. These two subcatchments are evaluated at the driveway crossing as Final Reach #500.

Final Reach #600

Subcatchment #6 is relatively small and remains relatively the same in the post condition, with the exception of part of a septic system design and placement.

Final Reach #500 and #600 in reality are evaluating runoff over a common property line which has been reflected in the addition of Final Reach #700 which is the sum of these two systems.

3.0a Stormwater Treatment:

The Water Quality Volume (WQV) is being treated in one of five bio-filtration Rain Gardens or one of two bio-filtration Dry Swales. There is a NHDES AoT Filtration Spreadsheet provided where the HydroCad Pond number corresponds to the spreadsheet and to the plan set.

3.1 FULL COMPARATIVE ANALYSIS:

ANALYSIS	COMPONENT	PEAK RATE DISCHARGE (Cubic Feet / Second)			
		2 Yr.	10 Yr.	25 Yr.	50 Yr.
Final Reach #100	Existing	6.50	14.26	16.25	17.57
	Proposed	6.35	14.09	16.22	17.56
Final Reach #300	Existing	1.29	3.52	5.57	7.59
	Proposed	0.85	2.14	4.79	7.40
Final Reach #500	Existing	1.74	6.47	11.28	16.02
	Proposed	1.74	5.18	8.76	12.44
Final Reach #600	Existing	0.17	0.82	1.54	2.30
	Proposed	0.16	0.78	1.54	2.17
Final Reach #700	Existing	1.90			
Sum of 500 + 600	Proposed	1.89			

ANALYSIS	COMPONENT	VOLUME (Acre Feet)			
		2 Yr.	10 Yr.	25 Yr.	50 Yr.
Final Reach #100	Existing	2.074	7.448	13.297	16.881
	Proposed	2.161	7.636	13.509	16.897
Final Reach #300	Existing	0.137	0.328	0.505	0.683
	Proposed	0.162	0.334	0.553	0.736
Final Reach #500	Existing	0.309	0.878	1.442	2.024
	Proposed	0.395	1.018	1.612	2.214
Final Reach #600	Existing	0.035	0.112	0.192	0.276
	Proposed	0.035	0.112	0.192	0.255

4.0 EROSION & SEDIMENT CONTROL PLANS BEST MANAGEMENT PRACTICES (BMP's):

Reference: Proposed Site Plan and Grading Plan
Erosion & Sediment Control Plan
Erosion & Sediment Control Details, E-101 & E-102

The proposed site development is protected from erosion and the abutting properties are protected from sediment by the use of Best Management Practices as outlined in the New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection & Design (December 2008, NHDES & US EPA). Any area disturbed by construction will be re-stabilized within 30 days and abutting properties will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them. Reference is also made to the Stormwater System Operation and Maintenance Plan / Inspection & Maintenance Manual which has been written specifically for this project and available to the owner.

Silt Fence / Perimeter Control:

The plan set demonstrates the location of silt fence for sediment control. The Erosion and Sediment Control Details, Sheet E-101, has the specifications for installation and maintenance of the silt fence. Silt fence is rated to be effective for 100 linear feet of fence to capture runoff from one-quarter acre or basically 100 feet of land sloping toward the fence. Filtrexx silt soxx have a variable area and depth, see Filtrexx supporting documents. The NHDES Stormwater Manual requires that the maximum spacing for support stakes is six-feet.

Filtrexx Silt Soxx, or approve equal, has been specified in numerous locations within the plan set and silt fence is not a substitution for silt soxx. Multiple sizes of this product have been specified for use.

EPA CGP 2017: "You must install sediment control along those perimeter areas of your site that will receive stormwater from earth disturbing activity."

In accordance with EPA CGP 2.1.2.1, Provide Natural Buffers or Equivalent Sediment Controls, and CGP Appendix G, Table G-3, and Table G-7, slopes between 3% and 6% with soils that are Fine Sandy Loams, there is a High Risk Factor and it is required to Double Perimeter Control and 7-Day Site Stabilization.

Erosion Control Mix Berm:

As an alternative to the Silt Fence, an Erosion Control Mix Berm can be utilized as a perimeter control. The specifications can be found on Sheet E-101, Detail E6.

Bioretention System (Rain Garden):

Description: Rain Gardens, or bioretention areas are located close to the source of runoff. They are intended to integrate with the site landscaping and become an aesthetically attractive opportunity to provide highly effective stormwater treatment. The rain gardens associated with this proposed development contribute toward recharge of surface water run-off into the ground. It is important that sediment be removed from run-off prior to discharge into the bioretention area to preserve the mulch and soil mix ratio. During construction it is important that the ground surface not be exposed to traffic or construction equipment to preserve the infiltration capabilities of the existing soil. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-3 Treatment Practices, 4c Bio-retention System.

Construction Considerations:

After the stone and bio-media has been installed, Filtrexx Silt Soxx or approved equal, will be installed at the toe of slope intersection between the berm and bio-media and will remain until the slopes of the berm are stable.

Maintenance Considerations:

Rain Gardens should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

On an annual basis the infiltration capabilities need to be confirmed by evaluation of the drawdown time. If the bioretention system does not drain within 72-hours following a rainfall event, a qualified professional will assess the condition of the rain garden to determine measures required to restore the infiltration function. This is normally the direct result of sediment accumulation which will be removed to restore the filter media ratio.

Also on an annual basis the vegetation should be inspected to ensure healthy condition. Invasive species need to be removed along with dead or diseased vegetation.

Rolled Erosion Control Blanket:

Description: Rolled Erosion Control Blankets, such as North American Green Bionet S150, SC150, SC125 (or equal) or turf reinforcement such as North American Green V-Max C-350 (or equal) consist of interlocking fiber mesh, bio-degradable or permanent, used to stabilize sloping earth while vegetation is being established. The product comes in rolls that are laid out over the earth, normally over-lapped, and secured to the soil by the use of anchors or staples. The RECB may be anchored in the earth at the

top of the slope to prevent wash-out. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 3, 4-1 Erosion Control Practices, Temporary Erosion Control Blanket

Construction Considerations: It is recommended that the blanket be installed in the same direction as the water flow or perpendicular to the slope. The manufacturer will recommend the amount of over-lap from one row to the next and on longer slopes between sections. Care must be taken that the RECB is laid directly on the earth / topsoil and that any existing vegetation not cause tenting as this will cause an issue with the blanket not staying in place. The staples or stakes are to be placed according to the manufacturer based on the slope of the receiving soil and forces that may be encountered. Care must be taken to utilize the correct product as specified. The choice of product are all different and in most cases are not interchangeable. NHDES or NH F&G may specify that some RECBs not be used in some applications.

Maintenance Considerations: RECBs will be inspected during the regular inspection schedule and any construction corrections made if the blanket is compromised.

Vegetated Stabilization:

All areas that are disturbed during construction will be stabilized with vegetated material within 30 days of breaking ground. Construction will be managed in such a manner that erosion is prevented and that no abutter's property will be subjected to any siltation, unless otherwise permitted. All areas to be planted with grass for long-term cover will follow the specification and on Sheet E-102 using seeding mixture C, as follows:

Mixture	Pounds per Acre	Pounds per 1,000 Sq. Ft.
Tall Fescue	24	0.55
Creeping Red Fescue	24	0.55
Total	48	1.10

Conservation Mix

Mixture	Pounds per Acre	Pounds per 1,000 Sq. Ft.
Tall Fescue	15	0.35
Creeping Red Fescue	15	0.35
Annual Ryegrass	5	0.12
Perennial Ryegrass	5	0.12
Kentucky Bluegrass	15	0.35
White Clover	7	0.16
Total	**62**	**1.45**

Conservation Mix will used to stabilize all 2:1 slopes and all land area disturbed within the 50-foot wetland buffer.

Stabilized Construction Entrance:

A temporary gravel construction entrance provides an area where mud can be dislodged from tires before the vehicle leaves the construction site to reduce the amount of mud and sediment transported onto paved municipal and state roads. The stone size for the pad should be 3-inch coarse aggregate, and the pad itself constructed to a minimum length of 75' for the full width of the access road. The aggregate should be placed at least six inches thick. A plan view and profile are shown on Sheet E-102- Erosion and Sediment Control Detail Plan. Alternatives to the length and berm are demonstrated on the detail.

Environmental Dust Control:

Dust will be controlled on the site by the use of multiple Best Management Practices. Mulching and temporary seeding will be the first line of protection to be utilized where problems occur. If dust problems are not solved by these applications, the use of water and calcium chloride can be applied. Calcium chloride will be applied at a rate that will keep the surface moist but not cause pollution.

Drainage Swales / Stormwater Conveyance Channels:

Drainage swales will be stabilized with vegetation for long term cover as outlined below, and on Sheet E-102 using seed mixture C. As a general rule, velocities in the swale should not exceed 3.0 feet per second for a vegetated swale although velocities as high as 4.5 FPS are allowed under certain soil conditions.

Outlet Structures

Description: Outlet Structures of 48-inch and 60-inch round concrete manhole structures are used in the Detention Pond and five rain gardens. All will be equipped with a cone grate trash rack.

Maintenance Considerations: Sediment must be removed from top of the stone filled sumps on a regular basis, at least twice a year and more often if the inverts become blocked. Because of limited runoff in the infiltration ponds or underdrain discharge in the under-drained ponds, sediment is not anticipated to be an issue. Inspections should be conducted periodically. At a minimum they should be cleaned after snow-melt and after leaf-drop. Damaged trash racks must be replaced.

Outlet Protection:

Outlet Protection consists of a riprap apron or preformed scour hole that is designed to provide velocity reduction of the surface water run-off that is leaving a culvert. The design is dependent on the culvert size, soil conditions, velocity, and quantity of the run-off. There are to be no bend or curves at the intersection of the conduit and apron. See sheet E-102 for details. North American Green turf reinforcement is proposed on the outlet berms of the rain garden. To be maintained two to three times annually without the use of a mower.

Rip Rap Level Spreader / Stone Berm Level Spreader:

The purpose of the level spreader is to convert concentrated flow into sheet flow, for example from a rip rap outlet protection at the end of a culvert discharge pipe prior to discharge overland through a filter strip or buffer. Each level spreader is specifically designed based on the amount of flow and specified on the grading plan. Details for the level spreader can be found on Sheet E-102, detail E12 and page 162 in the referenced NH Stormwater Manual, Volume 2. The level spreader should be inspected after it is installed and stabilized for the deposit of sediment. Any sediment build-up will be removed and transported to a suitable location. North American Green turf reinforcement is proposed on the outlet berms of the rain garden. To be maintained two to three times annually without the use of a mower.

Stockpiled Sediment or Soil:

Stockpiled materials including topsoil, excavated materials, borrow materials imported onto the site, construction aggregates, and sediment removed from temporary sediment traps will be located in designated areas at least 50 feet away form concentrated flows. All stockpiles will have erosion protection in the form of silt fence and diversion swales will be applied to protect the material and surrounding areas. Inactive stockpiles will be seeded for temporary stabilization. Erosion control measures will be inspected in accordance with the schedule for all other activities on site.

At a minimum, you must comply with following (EPA 2012 CGP Part 2.1.2.4d) "Do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similar effective control,) storm drain inlet, or surface water."

Dewatering Practices:

If during construction dewatering becomes required, an addendum will be published specific for the requirements. As a general rule, ground water that needs to be removed from an excavation will be pumped to a sediment basin or a storm drain inlet prior to discharge from the site.

At a minimum, you must comply with following (EPA 2012 CGP Part 2.1.3.4) "With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications."

Regarding dewatering practices in the State of New Hampshire, specifically see Construction General Permit Section 9.1.1 NHR12000 State of New Hampshire and "Clarification of Section 9.1.1 … and other New Hampshire specific information for the U.S. EPA 2012 NPDES Construction General Permit (CGP), January 20, 2017"

Construction Sequence:

1. Cut and remove trees in construction areas as directed or required.

2. Install Silt Fence and construct and/or install temporary and permanent sediment erosion and detention control facilities (Vegetated swales, level spreaders, and constructed filter strips), as required. Erosion, sediment and facilities shall be installed and stabilized prior to any earth moving operation, and prior to directing run-off to them.

3. Clear, grub, and dispose of debris in approved facilities.

4. Excavate and stockpile topsoil / loam. All disturbed areas shall be stabilized immediately after grading.

5. Construct the roadway and its associated drainage structures.

6. Begin permanent and temporary seeding and mulching. All cut and fill slopes and disturbed areas shall be seeded and mulched as required, or directed.

7. Daily, or as required, construct temporary berms, drainage ditches, sediment traps, etc. to prevent erosion on the site and prevent any siltation of abutting waters or property.

8. Inspect and maintain all erosion and sediment control measures during construction.

9. Complete permanent seeding and landscaping.

10. Remove temporary erosion control measures after seeding areas have established themselves and site improvements are complete. Smooth and re-vegetate all disturbed areas.

11. All swales and drainage structures will be constructed and stabilized prior to having run-off being directed to them.

12. Finish paving all roadways/parking.

Temporary Erosion Control Measures:

1. The smallest practical area of land shall be exposed at any one time.

2. Erosion, sediment control measures shall be installed as shown on the plans and at locations as required, or directed by the engineer.

3. All disturbed areas shall be returned to original grades and elevations. Disturbed areas shall be loamed with a minimum of 4" of loam and seeded with not less than 1.10 pound of seed per 1,000 square feet (48 pounds per acre) of area.

4. Silt fences and other barriers shall be inspected periodically and after every rainstorm during the life of the project. All damaged areas shall be repaired, sediment deposits shall periodically be removed and properly disposed of.

5. After all disturbed areas have been stabilized, the temporary erosion control measures are to be removed and the area disturbed by the removal smoothed and re-vegetated.
6. Areas must be seeded and mulched within 5 days of final grading, permanently stabilized within 15 days of final grading, or temporarily stabilized within 30 days of initial disturbance of soil.

Inspection and Maintenance Schedule:

Perimeter fencing will be inspected during and after storm events to ensure that the fence still has integrity and is not allowing sediment to pass. Depending on SWPPP / SWMP criteria, all controls will be inspected once every 7 days and after storm events of 0.25 inches. Inspection reports must be submitted to Town of Nottingham Building Department and DPW. Sediment build-up in swales and level spreaders will be removed if it is deeper than six inches. See also Inspection and Maintenance Manual: Stormwater System Management, published separately also by Berry Surveying & Engineering.

Corrective Action measures will be made in accordance with SWPPP requirements and records maintained on site by the Contractor.

5.0 CONCLUSION:

The peak rate of runoff has been reduced all of the Analysis Points for all of the evaluated storm events. The volumetric increases are minimized to 0.1 AF or less at the 2 Year/24Hr. storm event at all analyzed points.

A Rain Gardens are proposed to treat the surface water runoff from the entire site.

A Site Specific, Terrain Alteration Permit (RSA 485: A-17) is required for this site plan due to the area of disturbance being greater than 100,000 SF. The impact for this site will require an EPA Notice of Intent as the impact is less than one acre.

Respectfully Submitted,
BERRY SURVEYING & ENGINEERING

Christopher R. Berry, SIT 567
Principal, President

Kenneth A. Berry PE, LLS,
CPSWQ, CPESC, CESSWI
Principal, VP - Technical Operations

NOTES:

1.) OWNER: DOMUS DEVELOPERS, INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

1B.) APPLICANT: DOMUS DEVELOPERS, INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

2.) TAX MAP 6, LOT 22.

3.) LOT AREA: 2,600,133 Sq. Ft. 59.7 Ac.

4.) R.C.R.D. BOOK 5622, PAGE 472

5.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, PART OF THIS PARCEL DOES FALL WITHIN THE FLOOD PLAIN FLOOD HAZARD REF.: FEMA COMMUNITY# – 330150, MAP# – 33015C0115E, DATED: MAY 17, 2005

6.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING TOPCON HIPER SR SURVEY GRADE GPS RECEIVERS.

7.) THE BOUNDARY LINES SHOWN ON THIS PLAN ARE THE RESULT OF A CLOSED TRAVERSE PERFORMED BY THIS OFFICE IN AUGUST OF 2018, WITH AN ERROR OF CLOSURE OF 1 PART IN 11,922

8.) THE INTENT OF THIS PLAN IS TO REPRESENT THE EXISTING WATERSHED ON TAX MAP 6, LOT 22, AND ABUTTING LAND, AS OF THE DATE OF THIS PLAN. SEE SHEETS 2 THROUGH 7 FOR ADDITIONAL DETAIL.

OFF-SITE SOIL TYPE :

43B ~ CANTON FINE SANDY LOAM, 0–8% SLOPES, VERY STONY
43C ~ CANTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY
63C ~ CHARLTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY
CsB ~ CHARLTON FINE SANDY LOAM, 3–8% SLOPES, VERY STONY
CsC ~ CHARLTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY

ROCKINGHAM COUNTY

STRAFFORD COUNTY

SEE WEBSOIL USDA/NRCS

SOILS LEGEND		
SYMBOL	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
256B	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256C	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256D	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256E	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256F	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
44A	MONTAUK FINE SANDY LOAM	C/3
44B	MONTAUK FINE SANDY LOAM	C/3
44C	MONTAUK FINE SANDY LOAM	C/3
44D	MONTAUK FINE SANDY LOAM	C/3
44E	MONTAUK FINE SANDY LOAM	C/3
448A	SCITUATE FINE SANDY LOAM	C/3
448B	SCITUATE FINE SANDY LOAM	C/3
448C	SCITUATE FINE SANDY LOAM	C/3
448D	SCITUATE FINE SANDY LOAM	C/3
448E	SCITUATE FINE SANDY LOAM	C/3
514A	LEICESTER FINE SANDY LOAM	C/5
514B	LEICESTER FINE SANDY LOAM	C/5
514C	LEICESTER FINE SANDY LOAM	C/5
115A	SCARBORO FINE SANDY LOAM	D/6
SLOPES:	0–3% A 3–8% B 8–15% C 15–25% D 25%–50% E 50% + F	

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CWS #61

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CSS #84

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL

FLOW REACH SYMBOL

POND DEVICE SYMBOL

TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

REVISION	DATE	DESCRIPTION

W–1 EXISTING WATERSHED PLAN – OVERVIEW
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 150 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY No. 19243 LICENSED PROFESSIONAL ENGINEER

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL

FLOW REACH SYMBOL

POND DEVICE SYMBOL

TIME OF CONCENTRATION SEGMENT

OFF-SITE SOIL TYPE :

43B ~ CANTON FINE SANDY LOAM, 0-8% SLOPES, VERY STONY
43C ~ CANTON FINE SANDY LOAM, 8-15% SLOPES, VERY STONY
63C ~ CHARLTON FINE SANDY LOAM, 8-15% SLOPES, VERY STONY
CsB ~ CHARLTON FINE SANDY LOAM, 3-8% SLOPES, VERY STONY
CsC ~ CHARLTON FINE SANDY LOAM, 8-15% SLOPES, VERY STONY

ROCKINGHAM COUNTY

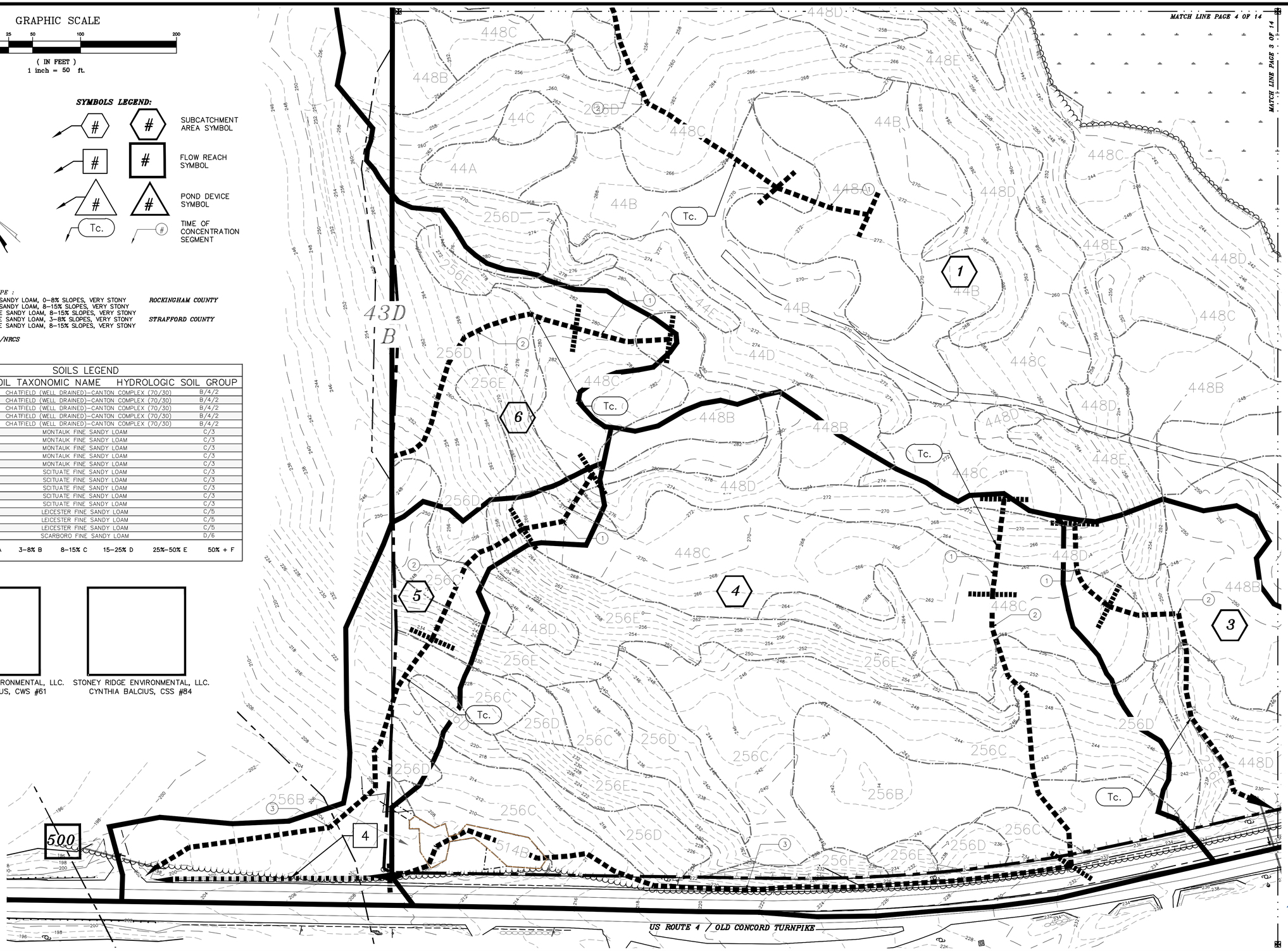
STRAFFORD COUNTY

SEE WEBSOIL USDA/NRCS

SOILS LEGEND		
SYMBOL	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
256B	CHATFIELD (WELL DRAINED)-CANTON COMPLEX (70/30)	B/4/2
256C	CHATFIELD (WELL DRAINED)-CANTON COMPLEX (70/30)	B/4/2
256D	CHATFIELD (WELL DRAINED)-CANTON COMPLEX (70/30)	B/4/2
256E	CHATFIELD (WELL DRAINED)-CANTON COMPLEX (70/30)	B/4/2
256F	CHATFIELD (WELL DRAINED)-CANTON COMPLEX (70/30)	B/4/2
44A	MONTAUK FINE SANDY LOAM	C/3
44B	MONTAUK FINE SANDY LOAM	C/3
44C	MONTAUK FINE SANDY LOAM	C/3
44D	MONTAUK FINE SANDY LOAM	C/3
44E	MONTAUK FINE SANDY LOAM	C/3
448A	SCITUATE FINE SANDY LOAM	C/3
448B	SCITUATE FINE SANDY LOAM	C/3
448C	SCITUATE FINE SANDY LOAM	C/3
448D	SCITUATE FINE SANDY LOAM	C/3
448E	SCITUATE FINE SANDY LOAM	C/3
514A	LEICESTER FINE SANDY LOAM	C/5
514B	LEICESTER FINE SANDY LOAM	C/5
514C	LEICESTER FINE SANDY LOAM	C/5
115A	SCARBORO FINE SANDY LOAM	D/6
SLOPES:	0-3% A 3-8% B 8-15% C 15-25% D 25%-50% E	50% + F

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CWS #61

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CSS #84



REVISION	DATE	DESCRIPTION

W-1 EXISTING WATERSHED PLAN - SOUTHWEST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 - 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14141
LICENSED PROFESSIONAL ENGINEER

MATCH LINE PAGE 5 OF 14

MATCH LINE PAGE 2 OF 14

US ROUTE 4 / OLD CONCORD TURNPIKE

Tc.

1P

100

300

SYMBOLS LEGEND:

- SUBCATCHMENT AREA SYMBOL
- FLOW REACH SYMBOL
- POND DEVICE SYMBOL
- TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

REVISION	DATE	DESCRIPTION

W-1 EXISTING WATERSHED PLAN – SOUTHEAST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 7473
LICENSED PROFESSIONAL ENGINEER

MATCH LINE PAGE 6 OF 14

MATCH LINE PAGE 5 OF 14

MATCH LINE PAGE 2 OF 14

11f

11g

8

7

Tc.

10

1

2

3

4

Tc.

Tc.

63C
B

448B

514B

448C

514C

514A

115A

495
B/D

448D

43C
B

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL

FLOW REACH SYMBOL

POND DEVICE SYMBOL

TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

REVISION	DATE	DESCRIPTION

W-1 EXISTING WATERSHED PLAN – WEST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14241
LICENSED PROFESSIONAL ENGINEER

MATCH LINE PAGE 7 OF 14

MATCH LINE PAGE 4 OF 14

MATCH LINE PAGE 3 OF 14

Tc.

Wα
C/D

CsB
B

43B
B

514B
514A
514C
448A
448B
448C
448D
44A
44B
44C
44D
547B
A/D

1
2
3
4
10
11

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL

FLOW REACH SYMBOL

POND DEVICE SYMBOL

TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

REVISION	DATE	DESCRIPTION

W-1 EXISTING WATERSHED PLAN – EAST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 7424
LICENSED
PROFESSIONAL ENGINEER

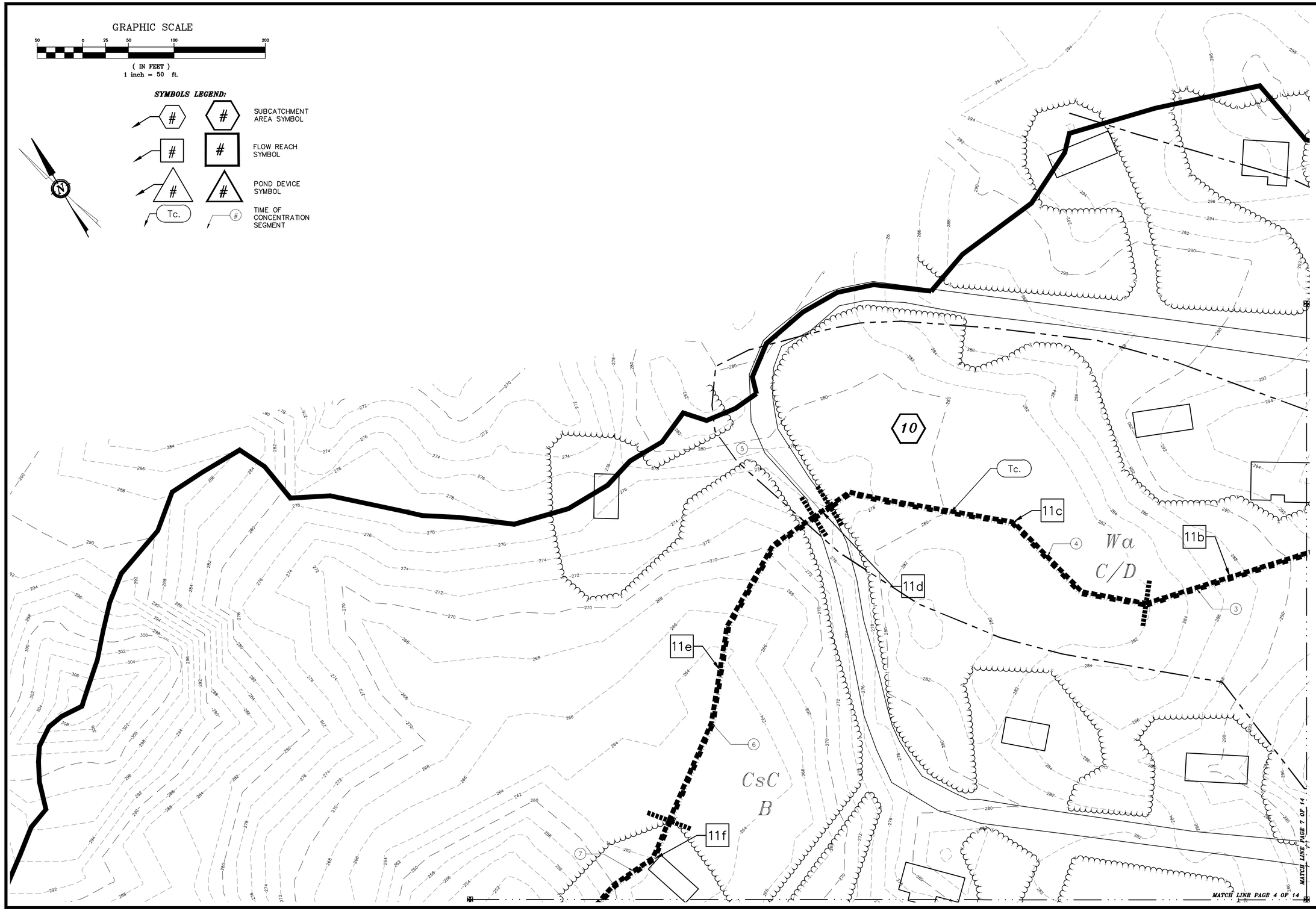
GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

SYMBOLS LEGEND:

- # — SUBCATCHMENT AREA SYMBOL
- # — FLOW REACH SYMBOL
- # — POND DEVICE SYMBOL
- Tc. — TIME OF CONCENTRATION SEGMENT
- # — TIME OF CONCENTRATION SEGMENT



REVISION	DATE	DESCRIPTION

W-1 EXISTING WATERSHED PLAN – NORTHWEST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 13243
LICENSED PROFESSIONAL ENGINEER

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

SYMBOLS LEGEND:

- # — SUBCATCHMENT AREA SYMBOL
- # — FLOW REACH SYMBOL
- # — POND DEVICE SYMBOL
- Tc. — TIME OF CONCENTRATION SEGMENT
- (#) — TIME OF CONCENTRATION SEGMENT

GsC
A

CsC
B

SnB
B/D

10

11

11a

11b

1

2

3

MATCH LINE PAGE 6 OF 14

MATCH LINE PAGE 6 OF 14

REVISION	DATE	DESCRIPTION

W-1 EXISTING WATERSHED PLAN – NORTHEAST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 7473
LICENSED PROFESSIONAL ENGINEER

NOTES:

1.) OWNER: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

1A.) APPLICANT: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

2.) TAX MAP 6, LOT 22

3.) LOT AREA: 2,599,972 Sq. Ft. 59.69 Ac.

4.) R.C.R.D. BOOK 5977, PAGE 2799

5.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, PART OF THIS PARCEL DOES FALL WITHIN THE FLOOD PLAIN FLOOD HAZARD REF.: FEMA COMMUNITY# – 330150, MAP# – 33015C0115E, DATED: MAY 17, 2005

6.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING TOPCON HIPER SR SURVEY GRADE GPS RECEIVERS.

7.) THE BOUNDARY LINES SHOWN ON THIS PLAN ARE THE RESULT OF A CLOSED TRAVERSE PERFORMED BY THIS OFFICE IN AUGUST OF 2018, WITH AN ERROR OF CLOSURE OF 1 PART IN 11,922

8.) THE INTENT OF THIS PLAN IS TO REPRESENT THE PROPOSED WATERSHED ON TAX MAP 6, LOT 22, AND ABUTTING PARCELS, AS OF THE DATE OF THIS PLAN. FOR ADDITIONAL DETAIL, SEE SHEETS 9 THROUGH 14.

43B ~ CANTON FINE SANDY LOAM, 0–8% SLOPES, VERY STONY — *ROCKINGHAM COUNTY*
43C ~ CANTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY
63C ~ CHARLTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY
CsB ~ CHARLTON FINE SANDY LOAM, 3–8% SLOPES, VERY STONY — *STRAFFORD COUNTY*
CsC ~ CHARLTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY

SEE WEBSOIL USDA/NRCS

SOILS LEGEND

SYMBOL	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
256B	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256C	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256D	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256E	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256F	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
44A	MONTAUK FINE SANDY LOAM	C/3
44B	MONTAUK FINE SANDY LOAM	C/3
44C	MONTAUK FINE SANDY LOAM	C/3
44D	MONTAUK FINE SANDY LOAM	C/3
44E	MONTAUK FINE SANDY LOAM	C/3
448A	SCITUATE FINE SANDY LOAM	C/3
448B	SCITUATE FINE SANDY LOAM	C/3
448C	SCITUATE FINE SANDY LOAM	C/3
448D	SCITUATE FINE SANDY LOAM	C/3
448E	SCITUATE FINE SANDY LOAM	C/3
514A	LEICESTER FINE SANDY LOAM	C/5
514B	LEICESTER FINE SANDY LOAM	C/5
514C	LEICESTER FINE SANDY LOAM	C/5
115A	SCARBORO FINE SANDY LOAM	D/6
SLOPES:	0–3% A 3–8% B 8–15% C 15–25% D 25%–50% E 50% + F	

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CWS #61

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CSS #84

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL
FLOW REACH SYMBOL
POND DEVICE SYMBOL
TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE
150 0 75 150 300 600
(IN FEET)
1 inch = 150 ft.

REVISION	DATE	DESCRIPTION

W–2 PROPOSED WATERSHED PLAN – OVERVIEW
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 150 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14241
LICENSED PROFESSIONAL ENGINEER

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

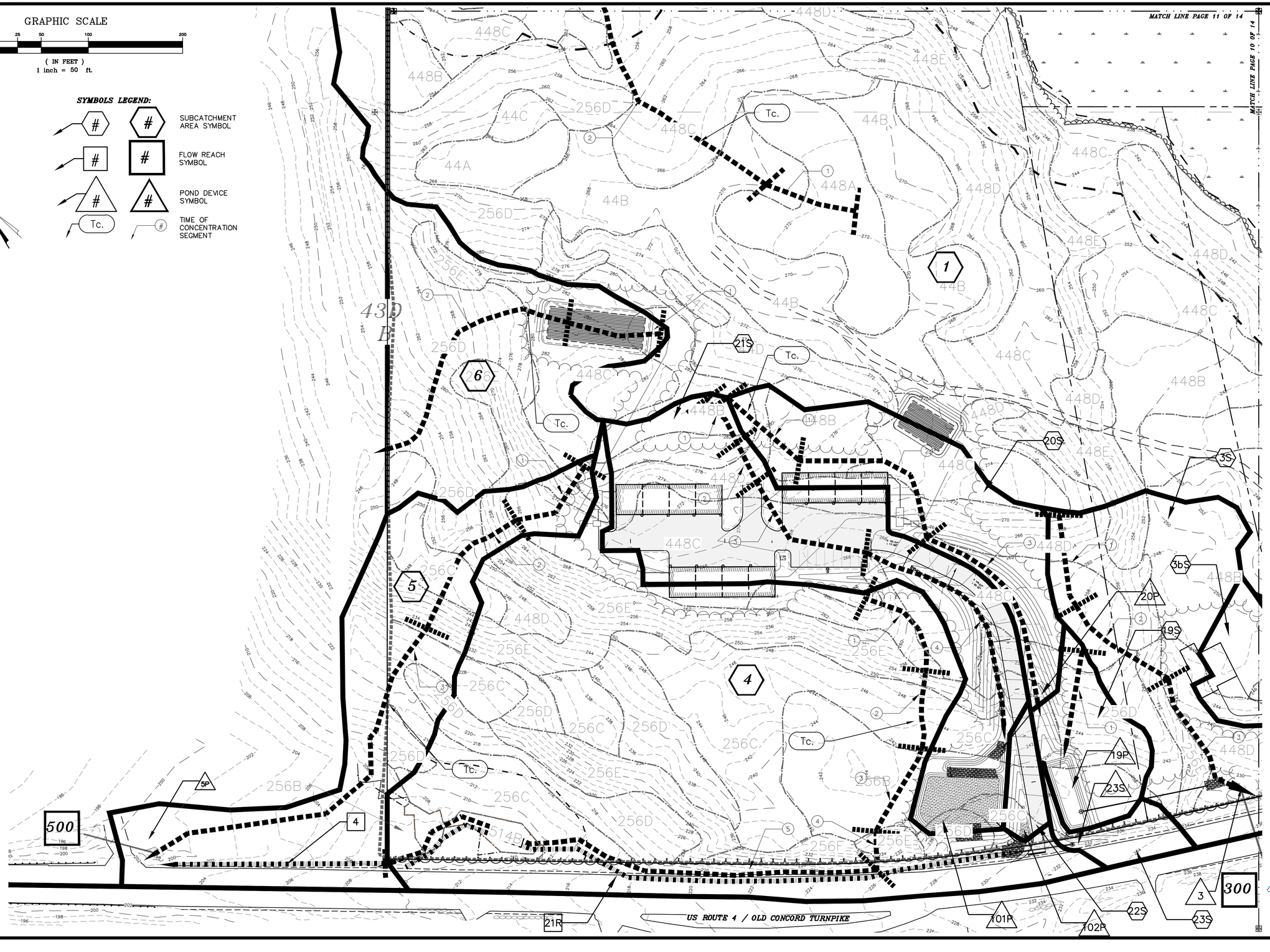
SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL

FLOW REACH SYMBOL

POND DEVICE SYMBOL

TIME OF CONCENTRATION SEGMENT



REVISION	DATE	DESCRIPTION

W-2 PROPOSED WATERSHED PLAN – SOUTHWEST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 7245
LICENSED PROFESSIONAL ENGINEER

MATCH LINE PAGE 12 OF 14

MATCH LINE PAGE 9 OF 14

US ROUTE 4 / OLD CONCORD TURNPIKE

18s
15s
16s
17s
14s
Tc.
1
2
3
4
2a
2b
3As
3aP
3Bs
3bP
14
100
104p
105p
106p
107p
300
43B
B
448A
448B
448C
448D
448E
514A
514B
256C
115A

SYMBOLS LEGEND:

- SUBCATCHMENT AREA SYMBOL
- FLOW REACH SYMBOL
- POND DEVICE SYMBOL
- TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

REVISION	DATE	DESCRIPTION

W-2 PROPOSED WATERSHED PLAN – SOUTHEAST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 7248
LICENSED PROFESSIONAL ENGINEER

MATCH LINE PAGE 13 OF 14

MATCH LINE PAGE 12 OF 14

MATCH LINE PAGE 9 OF 14

Tc.

11f

11g

10

1

2

3

4

7

8

448B

514B

448C

514C

63C
B

115A

495
B/D

43C
B

514A

448D

SYMBOLS LEGEND:

- # — SUBCATCHMENT AREA SYMBOL
- # — FLOW REACH SYMBOL
- # — POND DEVICE SYMBOL
- Tc. — TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

REVISION	DATE	DESCRIPTION

W-2 PROPOSED WATERSHED PLAN – WEST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

MATCH LINE PAGE 14 OF 14

MATCH LINE PAGE 11 OF 14

MATCH LINE PAGE 10 OF 14

10

CsB
B

448A

11

Tc.

514B

448B

448D

448C

43B
B

514A

514C

1

2

44C

44A

44D

44B

547B
A/D

3

4

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL

FLOW REACH SYMBOL

POND DEVICE SYMBOL

TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

REVISION	DATE	DESCRIPTION

W-2 PROPOSED WATERSHED PLAN – EAST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY & SURVEYING ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14143
LICENSED PROFESSIONAL ENGINEER

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

SYMBOLS LEGEND:

- # — SUBCATCHMENT AREA SYMBOL
- # — FLOW REACH SYMBOL
- # — POND DEVICE SYMBOL
- Tc. — TIME OF CONCENTRATION SEGMENT
- # — TIME OF CONCENTRATION SEGMENT

N

10

Tc.

11c

11b

11d

11e

11f

Wa
C/D

CsC
B

MATCH LINE PAGE 11 OF 14

MATCH LINE PAGE 14 OF 14

REVISION	DATE	DESCRIPTION

W-2 PROPOSED WATERSHED PLAN – NORTHWEST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH BERRY No. 11243 LICENSED PROFESSIONAL ENGINEER

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

SYMBOLS LEGEND:

- SUBCATCHMENT AREA SYMBOL
- FLOW REACH SYMBOL
- POND DEVICE SYMBOL
- TIME OF CONCENTRATION SEGMENT

GsC
A

CsC
B

SnB
B/D

10

11

11a

11b

1

2

3

Tc.

MATCH LINE PAGE 12 OF 14

MATCH LINE PAGE 13 OF 14

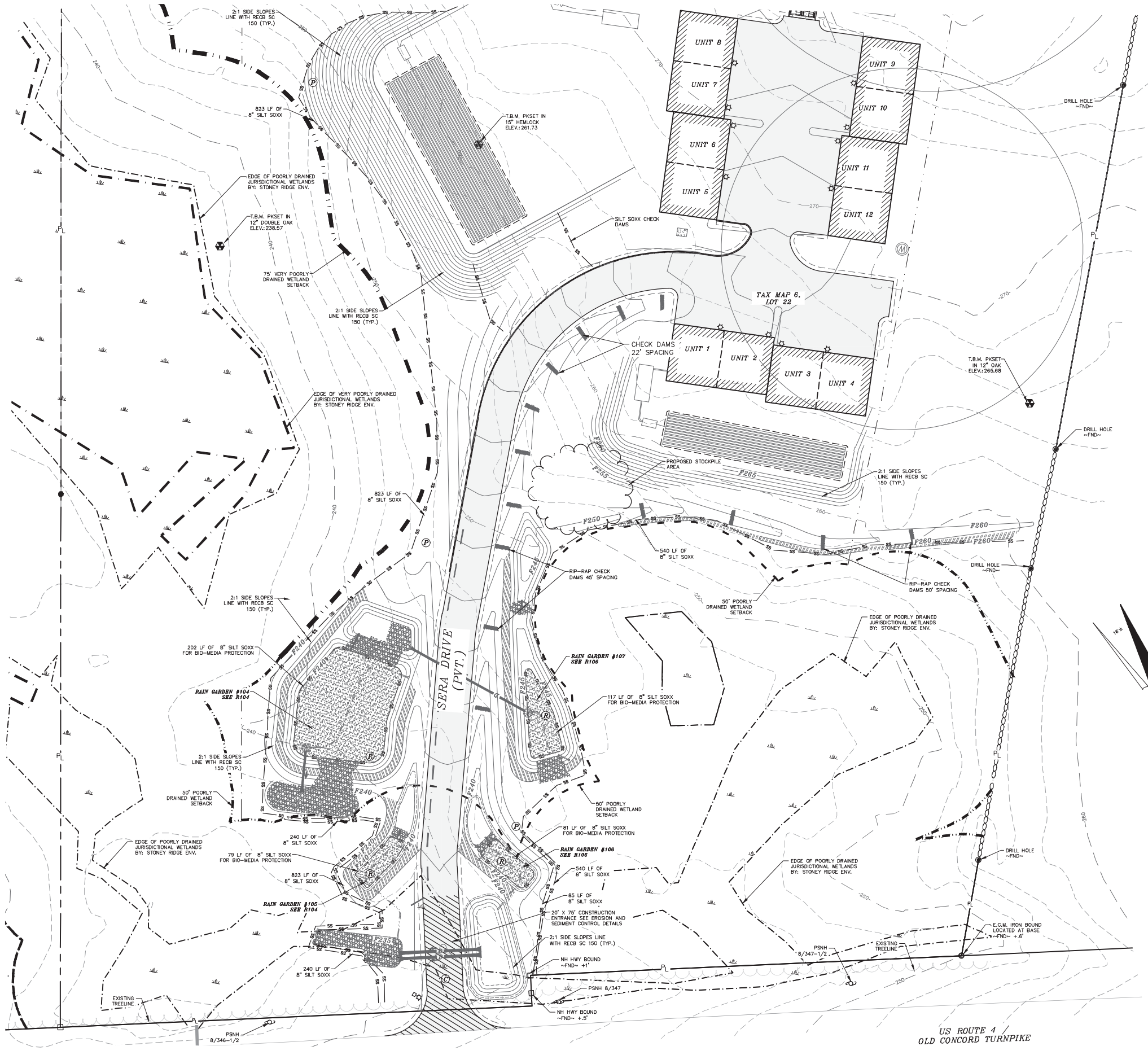
REVISION	DATE	DESCRIPTION

W-2 PROPOSED WATERSHED PLAN – NORTHEAST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY & SURVEYING ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 15243
LICENSED PROFESSIONAL ENGINEER



NOTES:

1. THE INTENT OF THIS PLAN SET IS TO DEMONSTRATE THE OVERVIEW EROSION AND SEDIMENT CONTROL PLAN FOR SERA DRIVE.

   OWNER: DOMUS DEVELOPERS INC.
   11 WHITEHORSE DRIVE
   RYE, NH 03870

   APPLICANT: DOMUS DEVELOPERS INC.
   11 WHITEHORSE DRIVE
   RYE, NH 03870

2. TAX MAP 6, LOT 22
3. LOT AREA: 1,164,698 Sq. Ft., 26.74 Ac
4. UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVE AND BELOW GROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ANY UTILITY CONFLICTS SHOULD BE REPORTED IMMEDIATELY TO THE DESIGN ENGINEER.
5. THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIGSAFE 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.
6. ALL ELEVATIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE DESIGN ENGINEER IS TO BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY. TEMPORARY BENCHMARKS (T.B.M.) ARE TO BE PROVIDED BY THE DESIGN ENGINEER.
7. UPON FINAL COMPLETION AND 85% STABILIZATION, THE DRAINAGE SYSTEM IS TO BE CLEANED OF ALL DEBRIS. SEDIMENT CONTROL PRACTICES REMOVED AND DISPOSED OF PROPERLY, AND ANNUAL MAINTENANCE PREFORMED ON ALL DRAINAGE PRACTICES.
8. EROSION AND SEDIMENT CONTROL INSPECTIONS TO BE CONDUCTED ONCE PER EVERY SEVEN DAYS AND AT AN INCREASED FREQUENCY INCLUDING WITHIN 24-HOURS OF A 0.25 INCH RAIN EVENT. INSPECTIONS TO BE CONDUCTED BY A "QUALIFIED PERSON" AS DEFINED BY EPA CGP 4.1.1 AND INSPECTION REPORTS SUBMITTED TO THE TOWN OF NOTTINGHAM,. NH, ENGINEERING DEPARTMENT WITHIN 24 HOURS IN ACCORDANCE WITH CGP 4.1.7 AND MAINTAINED BY THE OWNER FOR A PERIOD OF THREE YEARS AFTER THE NOTICE OF TERMINATION (NOT) IS SUBMITTED.
9. SILT FENCE MAY BE SUBSTITUTED WITH FILTREXX SILT SOXX OR EROSION CONTROL MIX BERM. SILT FENCE IS NOT A SUBSTITUTE FOR FILTREXX SILT SOXX OR APPROVED EQUAL. HOWEVER, CONTRACTOR MAY SUBSTITUTE ORANGE SAFETY SILT FENCE FOR THE PERIMETER PROTECTION.
10. PER EPA CGP Z.1.2.2 (INSTALL PERIMETER CONTROL), "YOU MUST INSTALL SEDIMENT CONTROLS ALONG THOSE PERIMETER AREAS OF YOUR SITE THAT WILL RECEIVE STORMWATER FROM EARTH DISTURBING ACTIVITIES." AS A RESULT OF SWPPP INSPECTIONS, THE CONTRACTOR MAY HAVE TO EXPAND PERIMETER CONTROLS TO MEET THIS REQUIREMENT. THE E&SC PLAN IS INITIAL GUIDANCE AS TO THE ANTICIPATED REQUIREMENTS AND IT THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT STORMWATER VIOLATION DO NOT OCCUR.
11. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONSTRUCTION ENTRANCE. ONCE THE ROADWAY IS PAVED THE CONTRATOR IS RESPONSIBLE FOR SWEEPING THE ROADWAY.

SOILS & DEWATERING:

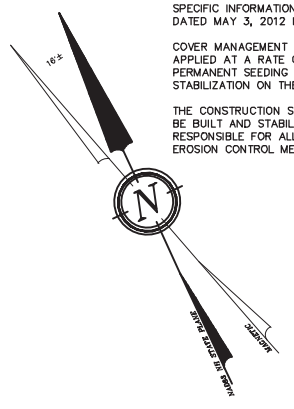
256B	*CHATFIELD*	*CANTON COMPLEX*	*K= 0.20*
256C	*CHATFIELD*	*CANTON COMPLEX*	*K= 0.20*
256D	*CHATFIELD*	*CANTON COMPLEX*	*K= 0.20*
256E	*CHATFIELD*	*CANTON COMPLEX*	*K= 0.20*
256F	*CHATFIELD*	*CANTON COMPLEX*	*K= 0.20*
44A	*MONTAUK*	*FINE SANDY LOAM*	*K= 0.24*
44B	*MONTAUK*	*FINE SANDY LOAM*	*K= 0.24*
44C	*MONTAUK*	*FINE SANDY LOAM*	*K= 0.20*
44D	*MONTAUK*	*FINE SANDY LOAM*	*K= 0.20*
44E	*MONTAUK*	*FINE SANDY LOAM*	*K= 0.20*
448A	*SCITUATE*	*FINE SANDY LOAM*	*K= 0.24*
448B	*SCITUATE*	*FINE SANDY LOAM*	*K= 0.24*
448C	*SCITUATE*	*FINE SANDY LOAM*	*K= 0.24*
448D	*SCITUATE*	*FINE SANDY LOAM*	*K= 0.24*
448E	*SCITUATE*	*FINE SANDY LOAM*	*K= 0.24*
514A	*LEICESTER*	*FINE SANDY LOAM*	*K= 0.17*
514B	*LEICESTER*	*FINE SANDY LOAM*	*K= 0.43*
514C	*LEICESTER*	*FINE SANDY LOAM*	*K= 0.43*
115A	*SCARBORO*	*FINE SANDY LOAM*	*K= 0.17*

SEE SITE SPECIFIC SOILS MAP (SSSM)
SEE WEBSOIL USDA-NRCS
ERODIBILITY FACTOR - K, CPESC MANUAL, ENVIROCERT INTERNATIONAL INC. & ROCKINGHAM COUNTTY SOIL SURVEY, ROCKWEB SOIL ATTRIBUTES

CONTRACTOR TO BE AWARE OF THE SOIL PROFILES AND ENSURE THAT PROPER EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE TAKEN AT ALL TIMES. ANY DEWATERING REQUIREMENTS IN NEW HAMPSHIRE REQUIRE SPECIAL PROVISIONS IN ACCORDANCE WITH THE "CLARIFICATION OF SECTION 9.1.2 (STATE OF NEW HAMPSHIRE CONDITIONS) AND OTHER NH SPECIFIC INFORMATION FOR THE U.S. EPA 2012 NPDES CONSTRUCTION GENERAL PERMIT (CGP)" DATED MAY 3, 2012 INCLUDED IN THE SWPPP.

COVER MANAGEMENT DURING CONSTRUCTION FOR EXPOSED SOIL WILL INCLUDE HAY / STRAW APPLIED AT A RATE OF 2.0 TONS PER ACRE, TEMPORARY SEEDING OF ANNUAL RYE GRASS, AND PERMANENT SEEDING AT THE EARLIEST OPPORTUNITY. SEE ADDITIONAL REQUIREMENT FOR STABILIZATION ON THE EROSION AND SEDIMENT CONTROL DETAIL SHEETS, E-101 AND E-102.

THE CONSTRUCTION SCHEDULE WILL BE MANAGED SO THAT ALL STORMWATER STRUCTURES WILL BE BUILT AND STABILIZED PRIOR TO RECEIVING SURFACE WATER RUNOFF. CONTRACTOR TO BE RESPONSIBLE FOR ALL DIVERSIONS DURING CONSTRUCTION AND FOR INTERIM SEDIMENT AND EROSION CONTROL MEASURES.



LEGEND:

- (R) RAIN GARDEN BIO-MEDIA PROTECTION
- (P) PERIMETER CONTROL
- (C) RESIDENTIAL/ROADWAY CONSTRUCTION
- IRON BOUND (FND)
- DRILL HOLE (FND)
- GRANITE BOUND (TBS)
- UTILITY POLE
- GUY WIRE
- BENCHMARK
- POORLY DRAINED WETLAND LINE
- VERY POORLY DRAINED WETLAND LINE
- WETLAND SETBACK 50' TO POORLY DRAINED
- WETLAND SETBACK 75' TO VERY POORLY DRAINED
- ORANGE CONSTRUCTION FENCE
- SILT FENCE
- FILTREXX SILTSOXX
- TREE LINE

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

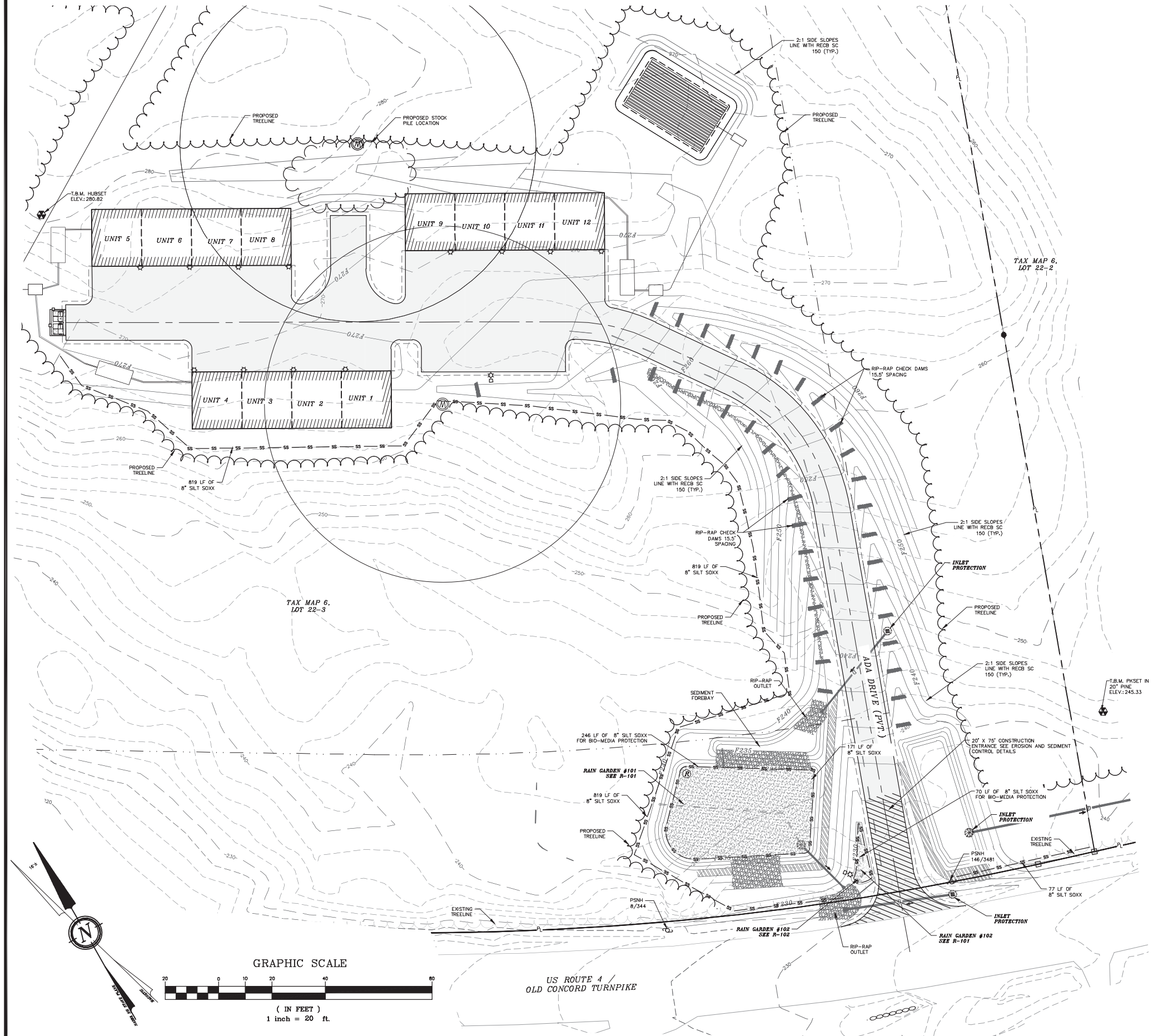
REVISION	DATE	DESCRIPTION

EROSION AND SEDIMENT CONTROL PLAN SERA DRIVE
LAND OF
DOMUS DEVELOPERS INC.
ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 - 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER



NOTES:

1. THE INTENT OF THIS PLAN SET IS TO DEMONSTRATE THE OVERVIEW EROSION AND SEDIMENT CONTROL PLAN FOR ADA DRIVE.

   OWNER: DOMUS DEVELOPERS INC.
   11 WHITEHORSE DRIVE
   RYE, NH 03870

   APPLICANT: DOMUS DEVELOPERS INC.
   11 WHITEHORSE DRIVE
   RYE, NH 03870

2. TAX MAP 6, LOT 22-3
3. LOT AREA: 1,111,859 Sq. Ft., 25.52 Ac
4. UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVE AND BELOW GROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ANY UTILITY CONFLICTS SHOULD BE REPORTED IMMEDIATELY TO THE DESIGN ENGINEER.
5. THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIGSAFE 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.
6. ALL ELEVATIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE DESIGN ENGINEER IS TO BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY. TEMPORARY BENCHMARKS (T.B.M.) ARE TO BE PROVIDED BY THE DESIGN ENGINEER.
7. UPON FINAL COMPLETION AND 85% STABILIZATION, THE DRAINAGE SYSTEM IS TO BE CLEANED OF ALL DEBRIS, SEDIMENT CONTROL PRACTICES REMOVED AND DISPOSED OF PROPERLY, AND ANNUAL MAINTENANCE PREFORMED ON ALL DRAINAGE PRACTICES.
8. EROSION AND SEDIMENT CONTROL INSPECTIONS TO BE CONDUCTED ONCE PER EVERY SEVEN DAYS AND AT AN INCREASED FREQUENCY INCLUDING WITHIN 24-HOURS OF A 0.25 INCH RAIN EVENT. INSPECTIONS TO BE CONDUCTED BY A "QUALIFIED PERSON" AS DEFINED BY EPA CGP 4.1.1 AND INSPECTION REPORTS SUBMITTED TO THE TOWN OF NOTTINGHAM,, NH, ENGINEERING DEPARTMENT WITHIN 24 HOURS IN ACCORDANCE WITH CGP 4.1.7 AND MAINTAINED BY THE OWNER FOR A PERIOD OF THREE YEARS AFTER THE NOTICE OF TERMINATION (NOT) IS SUBMITTED.
9. SILT FENCE MAY BE SUBSTITUTED WITH FILTREXX SILT SOXX OR EROSION CONTROL MIX BERM. SIILT FENCE IS NOT A SUBSTITUTE FOR FILTREXX SILT SOXX OR APPROVED EQUAL. HOWEVER, CONTRACTOR MAY SUBSTITUTE ORANGE SAFETY SILT FENCE FOR THE PERIMETER PROTECTION.
10. PER EPA CGP Z.1.2.2 (INSTALL PERIMETER CONTROL), "YOU MUST INSTALL SEDIMENT CONTROLS ALONG THOSE PERIMETER AREAS OF YOUR SITE THAT WILL RECEIVE STORMWATER FROM EARTH DISTURBING ACTIVITIES." AS A RESULT OF SWPPP INSPECTIONS, THE CONTRACTOR MAY HAVE TO EXPAND PERIMETER CONTROLS TO MEET THIS REQUIREMENT. THE E&SC PLAN IS INITIAL GUIDANCE AS TO THE ANTICIPATED REQUIREMENTS AND IT THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT STORMWATER VIOLATION DO NOT OCCUR.
11. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONSTRUCTION ENTRANCE. ONCE THE ROADWAY IS PAVED THE CONTRATOR IS RESPONSIBLE FOR SWEEPING THE ROADWAY.

SOILS & DEWATERING:

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44C	*MONTAUK*	*FINE SANDY LOAM*	*K= 0.20*
44D	*MONTAUK*	*FINE SANDY LOAM*	*K= 0.20*
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SEE SITE SPECIFIC SOILS MAP (SSSM)
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- POORLY DRAINED WETLAND LINE
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- WETLAND SETBACK 75' TO VERY POORLY DRAINED
- C C C ORANGE CONSTRUCTION FENCE
- SF SILT FENCE
- SS SS SS FILTREXX SILTSOXX
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REVISION	DATE	DESCRIPTION

EROSION AND SEDIMENT CONTROL PLAN ADA DRIVE
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22-3

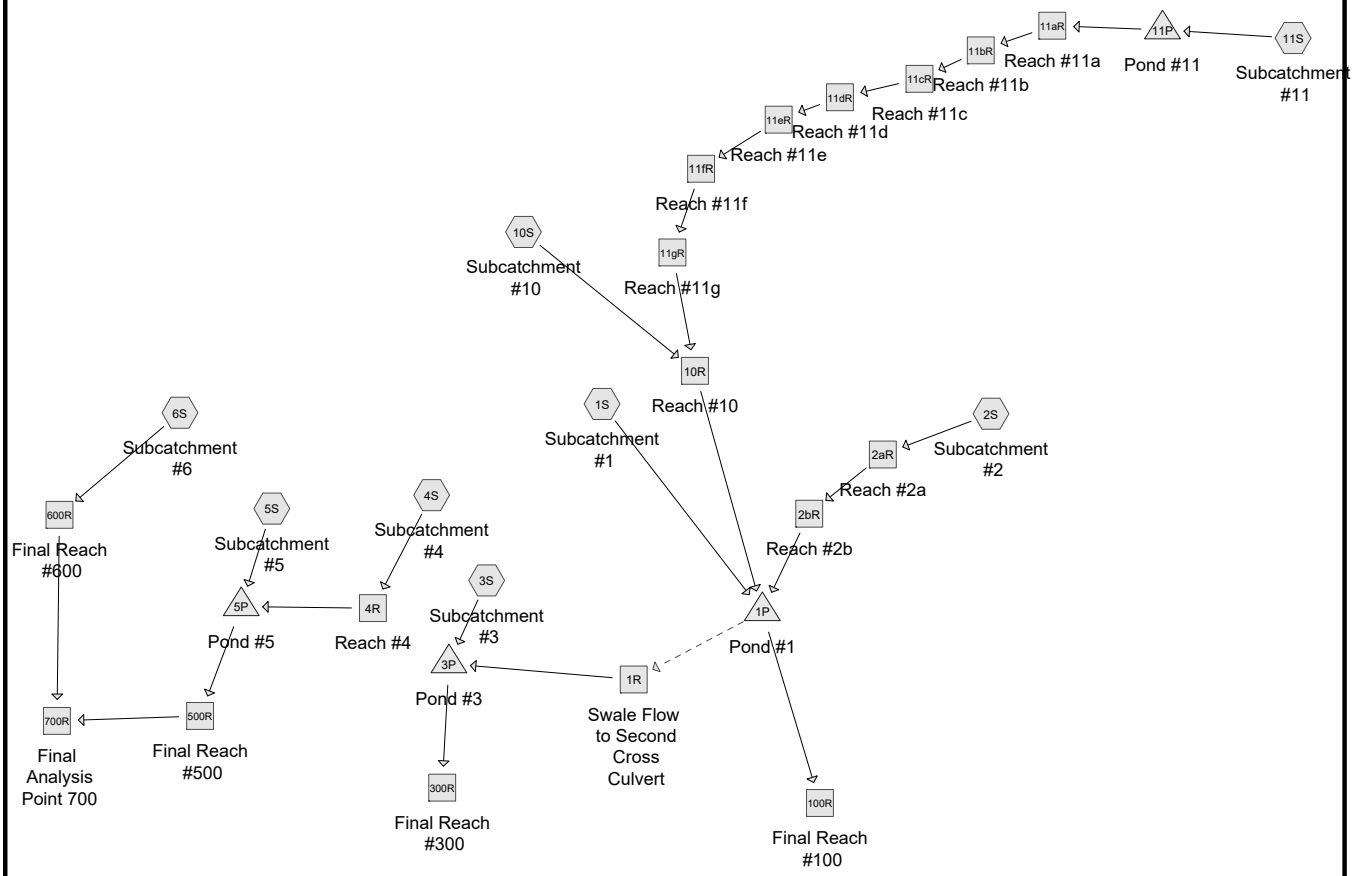
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 - 030

STATE OF NEW HAMPSHIRE - KENNETH A. BERRY No. 14243 LICENSED PROFESSIONAL ENGINEER

Appendix I - Existing Conditions Analysis

25 Yr - 24 Hr. Full Summary
2 Yr - 24 Hr. Node Listing
10 Yr -24 Hr. Node Listing
25 Yr - 24 Hr. Node Listing
50 Yr - 24 Hr. Node Listing



Subcat Reach Pond Link

Routing Diagram for 18-030 Existing Conditions
Prepared by Berry Surveying & Engineering, Printed 6/2/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.150	39	>75% Grass cover, Good, HSG A (1S)
2.301	61	>75% Grass cover, Good, HSG B (1S, 5S, 11S)
0.673	74	>75% Grass cover, Good, HSG C (1S, 5S, 11S)
0.019	85	Gravel roads, HSG B (1S)
0.193	89	Gravel roads, HSG C (1S, 3S)
0.174	98	Paved parking, HSG A (1S)
0.784	98	Paved parking, HSG B (1S, 3S, 4S, 5S)
0.126	98	Paved parking, HSG C (5S)
0.490	98	Unconnected pavement, HSG A (10S)
1.614	98	Unconnected pavement, HSG B (2S, 10S, 11S)
0.243	98	Unconnected pavement, HSG C (10S, 11S)
0.050	98	Unconnected roofs, HSG A (10S)
0.605	98	Unconnected roofs, HSG B (10S)
0.104	98	Unconnected roofs, HSG C (10S)
3.340	30	Woods, Good, HSG A (2S, 10S)
46.382	45	Woods, Good, HSG B (1S, 2S, 10S, 11S)
6.981	55	Woods, Good, HSG B (3S, 4S, 5S, 6S)
39.746	62	Woods, Good, HSG C (1S, 2S, 10S, 11S)
4.811	70	Woods, Good, HSG C (3S, 4S, 5S, 6S)
7.366	77	Woods, Good, HSG D (1S)
1.204	32	Woods/grass comb., Good, HSG A (10S)
9.649	58	Woods/grass comb., Good, HSG B (2S, 10S)
1.573	72	Woods/grass comb., Good, HSG C (10S)
128.578	**57**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.408	HSG A	1S, 2S, 10S
68.336	HSG B	1S, 2S, 3S, 4S, 5S, 6S, 10S, 11S
47.468	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 10S, 11S
7.366	HSG D	1S
0.000	Other	
128.578		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.150	2.301	0.673	0.000	0.000	3.124	>75% Grass cover, Good	1S, 5S, 11S
0.000	0.019	0.193	0.000	0.000	0.212	Gravel roads	1S, 3S
0.174	0.784	0.126	0.000	0.000	1.084	Paved parking	1S, 3S, 4S, 5S
0.490	1.614	0.243	0.000	0.000	2.347	Unconnected pavement	2S, 10S, 11S
0.050	0.605	0.104	0.000	0.000	0.759	Unconnected roofs	10S
3.340	53.364	44.557	7.366	0.000	108.627	Woods, Good	1S, 2S, 3S, 4S, 5S, 6S, 10S, 11S
1.204	9.649	1.573	0.000	0.000	12.426	Woods/grass comb., Good	2S, 10S
5.408	**68.336**	**47.468**	**7.366**	**0.000**	**128.578**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	233.20	232.97	68.8	0.0033	0.012	18.0	0.0	0.0
2	3P	227.24	223.84	105.2	0.0323	0.012	24.0	0.0	0.0
3	5P	195.65	193.92	77.5	0.0223	0.012	18.0	0.0	0.0
4	11P	304.00	303.87	25.6	0.0051	0.012	18.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=2,024,339 sf 0.64% Impervious Runoff Depth>1.84"
Flow Length=655' Tc=32.3 min CN=61 Runoff=52.06 cfs 7.113 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>0.88"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=5.02 cfs 1.024 af

Subcatchment 3S: Subcatchment #3 Runoff Area=104,612 sf 7.71% Impervious Runoff Depth>2.53"
Flow Length=404' Tc=13.3 min CN=69 Runoff=5.58 cfs 0.506 af

Subcatchment 4S: Subcatchment #4 Runoff Area=318,856 sf 6.17% Impervious Runoff Depth>1.92"
Flow Length=1,147' Tc=27.5 min CN=62 Runoff=9.27 cfs 1.171 af

Subcatchment 5S: Subcatchment #5 Runoff Area=67,744 sf 9.50% Impervious Runoff Depth>2.09"
Flow Length=679' Tc=15.7 min CN=64 Runoff=2.74 cfs 0.271 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>1.68"
Flow Length=377' Tc=24.8 min CN=59 Runoff=1.54 cfs 0.192 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>1.07"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=17.91 cfs 4.463 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>1.67"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=4.77 cfs 0.779 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=315.0' S=0.0222 '/' Capacity=83.53 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.21' Max Vel=2.62 fps Inflow=5.02 cfs 1.024 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=5.02 cfs 1.023 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.24' Max Vel=2.47 fps Inflow=5.02 cfs 1.023 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=5.00 cfs 1.021 af

Reach 4R: Reach #4 Avg. Flow Depth=0.56' Max Vel=6.66 fps Inflow=9.27 cfs 1.171 af
n=0.022 L=230.7' S=0.0390 '/' Capacity=31.88 cfs Outflow=9.27 cfs 1.171 af

Reach 10R: Reach #10 Avg. Flow Depth=0.49' Max Vel=3.19 fps Inflow=17.96 cfs 5.177 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=17.95 cfs 5.173 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.36' Max Vel=0.51 fps Inflow=2.69 cfs 0.774 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=2.60 cfs 0.763 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.29' Max Vel=0.88 fps Inflow=2.60 cfs 0.763 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=2.57 cfs 0.757 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.56' Max Vel=0.12 fps Inflow=2.57 cfs 0.757 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=2.03 cfs 0.724 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.09' Max Vel=3.87 fps Inflow=2.03 cfs 0.724 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=2.03 cfs 0.723 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.26' Max Vel=0.82 fps Inflow=2.03 cfs 0.723 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=2.02 cfs 0.719 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.16' Max Vel=1.60 fps Inflow=2.02 cfs 0.719 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=2.02 cfs 0.717 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.28' Max Vel=0.70 fps Inflow=2.02 cfs 0.717 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=2.02 cfs 0.715 af

Reach 100R: Final Reach #100 Inflow=16.25 cfs 13.297 af
Outflow=16.25 cfs 13.297 af

Reach 300R: Final Reach #300 Inflow=5.57 cfs 0.505 af
Outflow=5.57 cfs 0.505 af

Reach 500R: Final Reach #500 Inflow=11.28 cfs 1.442 af
Outflow=11.28 cfs 1.442 af

Reach 600R: Final Reach #600 Inflow=1.54 cfs 0.192 af
Outflow=1.54 cfs 0.192 af

Reach 700R: Final Analysis Point 700 Inflow=12.82 cfs 1.634 af
Outflow=12.82 cfs 1.634 af

Pond 1P: Pond #1 Peak Elev=237.85' Storage=186,808 cf Inflow=61.71 cfs 13.307 af
Primary=16.25 cfs 13.297 af Secondary=0.00 cfs 0.000 af Outflow=16.25 cfs 13.297 af

Pond 3P: Pond #3 Peak Elev=228.26' Storage=112 cf Inflow=5.58 cfs 0.506 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=5.57 cfs 0.505 af

Pond 5P: Pond #5 Peak Elev=198.16' Storage=107 cf Inflow=11.29 cfs 1.442 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=11.28 cfs 1.442 af

Pond 11P: Pond #11 Peak Elev=304.91' Storage=6,795 cf Inflow=4.77 cfs 0.779 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=2.69 cfs 0.774 af

Total Runoff Area = 128.578 ac Runoff Volume = 15.519 af Average Runoff Depth = 1.45"
96.74% Pervious = 124.388 ac 3.26% Impervious = 4.190 ac

Summary for Subcatchment 1S: Subcatchment #1

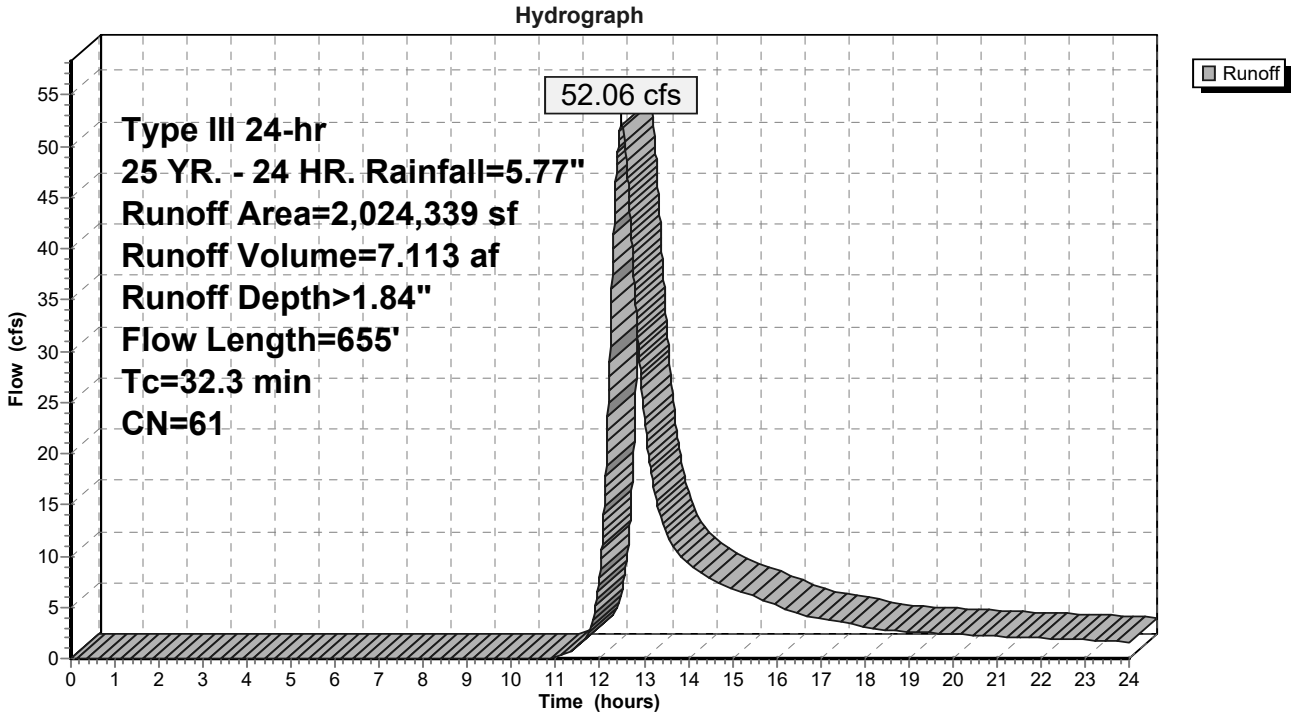
Runoff = 52.06 cfs @ 12.49 hrs, Volume= 7.113 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

	Area (sf)	CN	Description
	6,520	39	>75% Grass cover, Good, HSG A
	14,583	61	>75% Grass cover, Good, HSG B
	25,568	74	>75% Grass cover, Good, HSG C
	297,452	77	Woods, Good, HSG D
	7,573	98	Paved parking, HSG A
	5,473	98	Paved parking, HSG B
*	442,598	45	Woods, Good, HSG B
*	1,192,005	62	Woods, Good, HSG C
	23,412	77	Woods, Good, HSG D
	837	85	Gravel roads, HSG B
	8,318	89	Gravel roads, HSG C
	2,024,339	61	Weighted Average
	2,011,293		99.36% Pervious Area
	13,046		0.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0300	0.09		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 3.03"
3.3	285	0.0842	1.45		**Shallow Concentrated Flow, 2** Woodland Kv= 5.0 fps
9.4	200	0.0050	0.35		**Shallow Concentrated Flow, 3** Woodland Kv= 5.0 fps
0.8	70	0.0857	1.46		**Shallow Concentrated Flow, 4** Woodland Kv= 5.0 fps
32.3	655	Total			

Subcatchment 1S: Subcatchment #1



Summary for Subcatchment 2S: Subcatchment #2

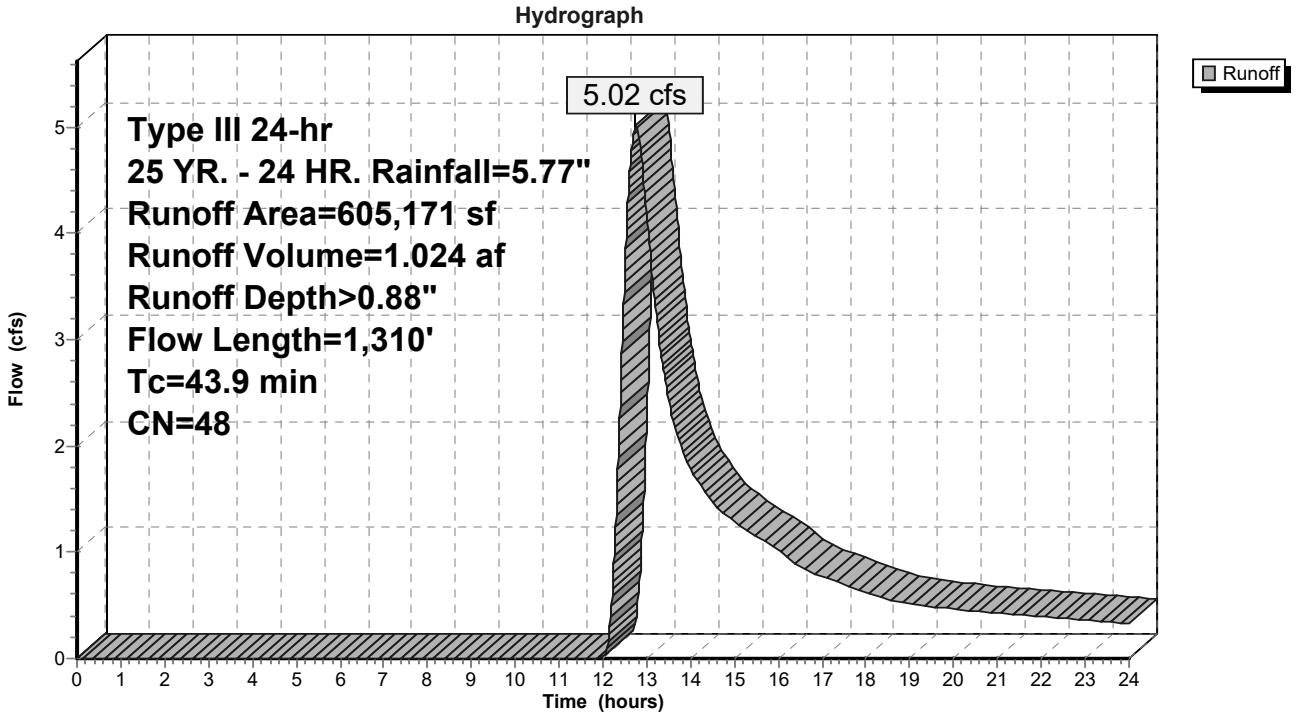
Runoff = 5.02 cfs @ 12.73 hrs, Volume= 1.024 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

	Area (sf)	CN	Description
	35,000	58	Woods/grass comb., Good, HSG B
	7,889	98	Unconnected pavement, HSG B
	83,599	30	Woods, Good, HSG A
*	348,434	45	Woods, Good, HSG B
*	130,249	62	Woods, Good, HSG C
	605,171	48	Weighted Average
	597,282		98.70% Pervious Area
	7,889		1.30% Impervious Area
	7,889		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.1	100	0.0200	0.08		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
3.8	195	0.0300	0.87		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
2.4	175	0.0600	1.22		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
15.6	840	0.0321	0.90		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
43.9	1,310	Total			

Subcatchment 2S: Subcatchment #2



Summary for Subcatchment 3S: Subcatchment #3

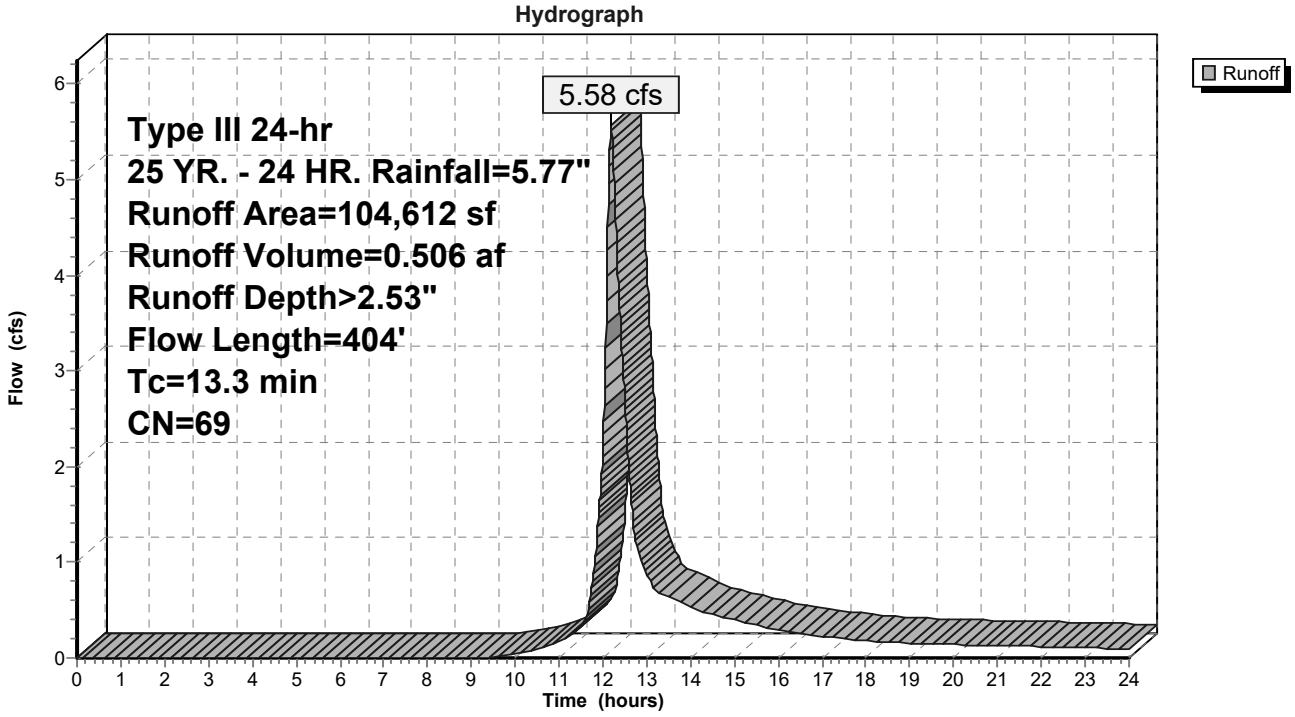
Runoff = 5.58 cfs @ 12.19 hrs, Volume= 0.506 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
21,968	55	Woods, Good, HSG B
74,508	70	Woods, Good, HSG C
8,062	98	Paved parking, HSG B
74	89	Gravel roads, HSG C
104,612	69	Weighted Average
96,550		92.29% Pervious Area
8,062		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1400	0.16		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
3.2	304	0.0988	1.57		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
13.3	404	Total			

Subcatchment 3S: Subcatchment #3



Summary for Subcatchment 4S: Subcatchment #4

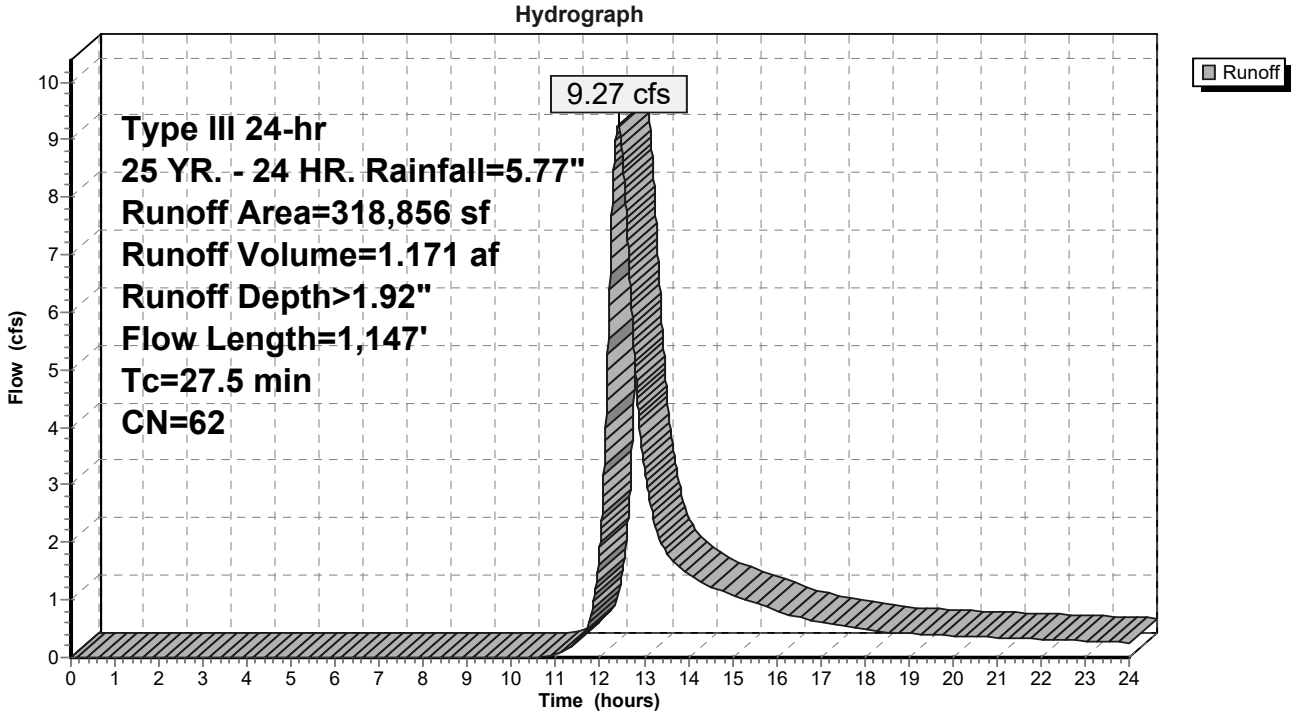
Runoff = 9.27 cfs @ 12.41 hrs, Volume= 1.171 af, Depth> 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
19,681	98	Paved parking, HSG B
198,494	55	Woods, Good, HSG B
100,681	70	Woods, Good, HSG C
318,856	62	Weighted Average
299,175		93.83% Pervious Area
19,681		6.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	100	0.1500	0.17		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
3.3	307	0.0946	1.54		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
14.3	740	0.0297	0.86		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
27.5	1,147	Total			

Subcatchment 4S: Subcatchment #4



Summary for Subcatchment 5S: Subcatchment #5

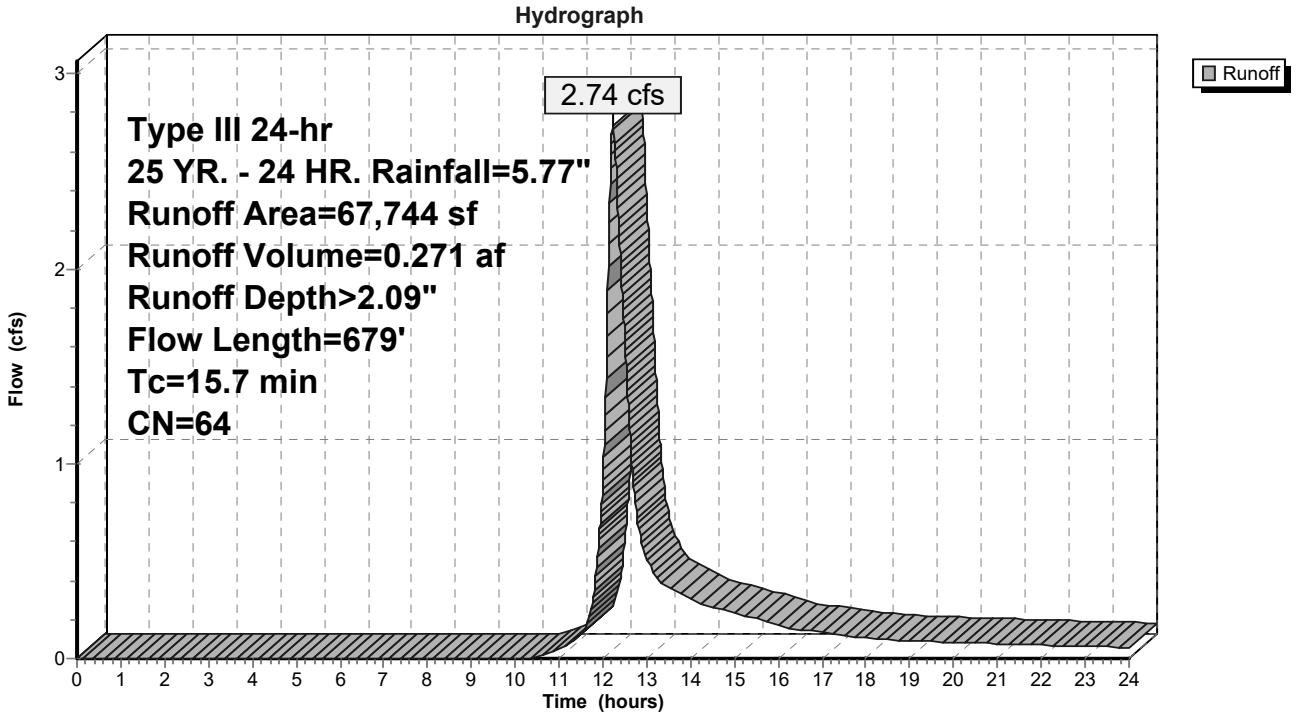
Runoff = 2.74 cfs @ 12.23 hrs, Volume= 0.271 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
286	61	>75% Grass cover, Good, HSG B
2,656	74	>75% Grass cover, Good, HSG C
925	98	Paved parking, HSG B
5,509	98	Paved parking, HSG C
40,991	55	Woods, Good, HSG B
17,377	70	Woods, Good, HSG C
67,744	64	Weighted Average
61,310		90.50% Pervious Area
6,434		9.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1600	0.17		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
1.1	156	0.2114	2.30		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
5.0	423	0.0804	1.42		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
15.7	679	Total			

Subcatchment 5S: Subcatchment #5



Summary for Subcatchment 6S: Subcatchment #6

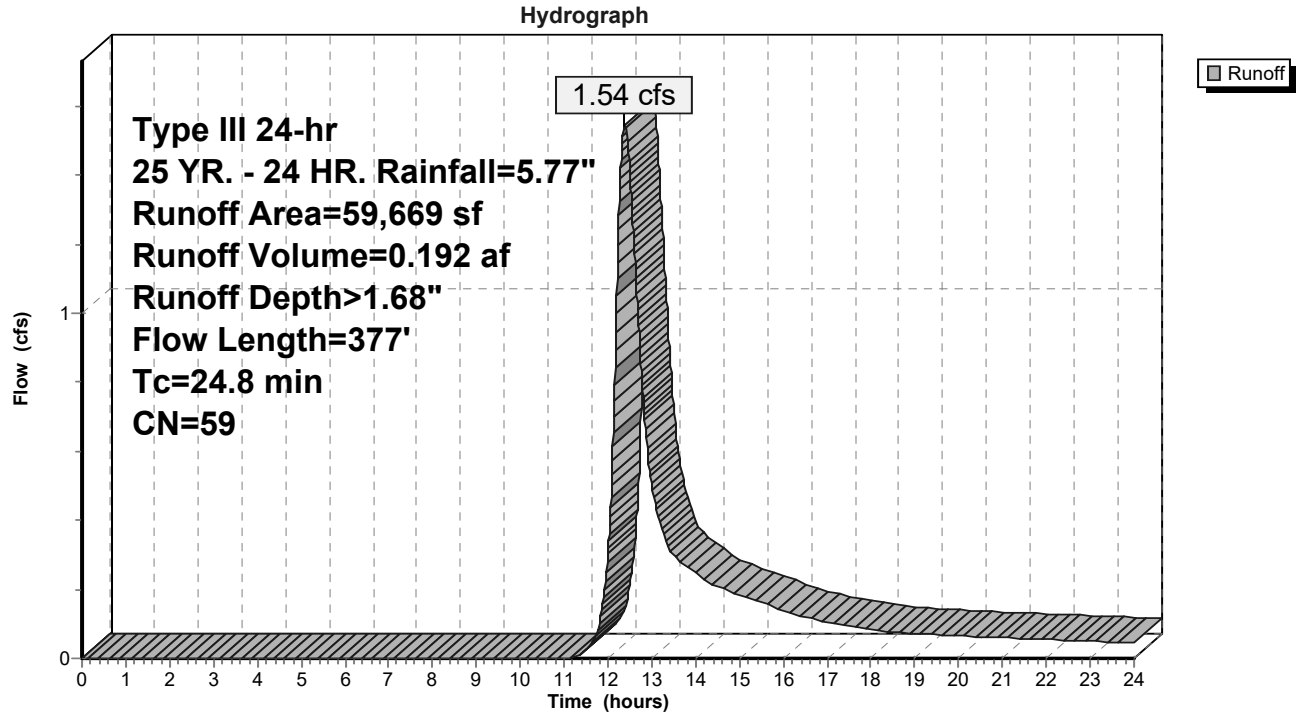
Runoff = 1.54 cfs @ 12.38 hrs, Volume= 0.192 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
42,654	55	Woods, Good, HSG B
17,015	70	Woods, Good, HSG C
59,669	59	Weighted Average
59,669		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.1	100	0.0200	0.08		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
2.7	277	0.1190	1.72		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
24.8	377	Total			

Subcatchment 6S: Subcatchment #6



Summary for Subcatchment 10S: Subcatchment #10

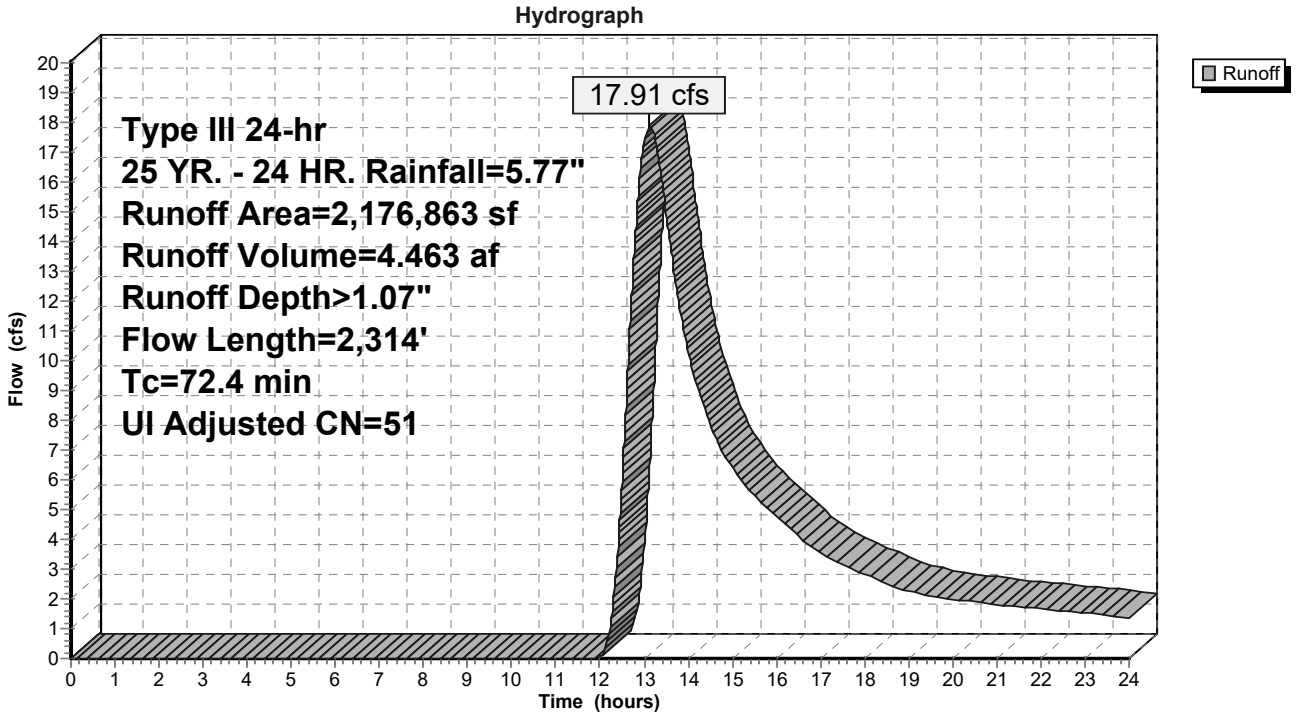
Runoff = 17.91 cfs @ 13.12 hrs, Volume= 4.463 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

	Area (sf)	CN	Adj	Description
	2,181	98		Unconnected roofs, HSG A
	26,354	98		Unconnected roofs, HSG B
	4,525	98		Unconnected roofs, HSG C
	52,459	32		Woods/grass comb., Good, HSG A
	385,291	58		Woods/grass comb., Good, HSG B
	68,512	72		Woods/grass comb., Good, HSG C
	21,330	98		Unconnected pavement, HSG A
	56,088	98		Unconnected pavement, HSG B
	7,831	98		Unconnected pavement, HSG C
	61,898	30		Woods, Good, HSG A
*	1,179,260	45		Woods, Good, HSG B
*	311,134	62		Woods, Good, HSG C
	2,176,863	53	51	Weighted Average, UI Adjusted
	2,058,554			94.57% Pervious Area
	118,309			5.43% Impervious Area
	118,309			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0600	0.12		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
15.1	497	0.0121	0.55		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
10.6	568	0.0317	0.89		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
18.3	388	0.0050	0.35		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
0.1	21	0.0477	4.43		**Shallow Concentrated Flow, Segment #5** Paved Kv= 20.3 fps
7.2	381	0.0315	0.89		**Shallow Concentrated Flow, Segment #6** Woodland Kv= 5.0 fps
2.3	162	0.0557	1.18		**Shallow Concentrated Flow, Segment #7** Woodland Kv= 5.0 fps
4.6	197	0.0204	0.71		**Shallow Concentrated Flow, Segment #8** Woodland Kv= 5.0 fps
72.4	2,314	Total			

Subcatchment 10S: Subcatchment #10



Summary for Subcatchment 11S: Subcatchment #11

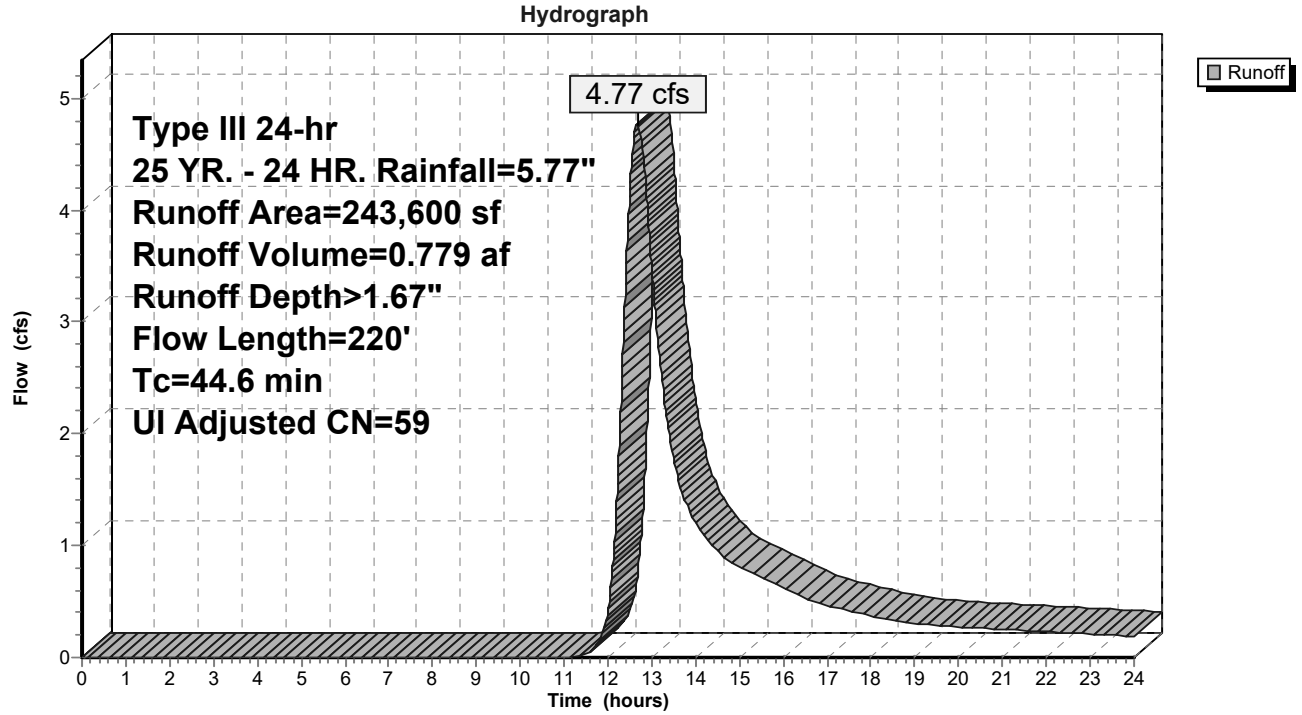
Runoff = 4.77 cfs @ 12.68 hrs, Volume= 0.779 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

	Area (sf)	CN	Adj	Description
	85,372	61		>75% Grass cover, Good, HSG B
	1,084	74		>75% Grass cover, Good, HSG C
	6,338	98		Unconnected pavement, HSG B
	2,739	98		Unconnected pavement, HSG C
*	50,126	45		Woods, Good, HSG B
*	97,941	62		Woods, Good, HSG C
	243,600	60	59	Weighted Average, UI Adjusted
	234,523			96.27% Pervious Area
	9,077			3.73% Impervious Area
	9,077			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.4	100	0.0050	0.04		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
6.2	120	0.0042	0.32		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
44.6	220	Total			

Subcatchment 11S: Subcatchment #11



Summary for Reach 1R: Swale Flow to Second Cross Culvert

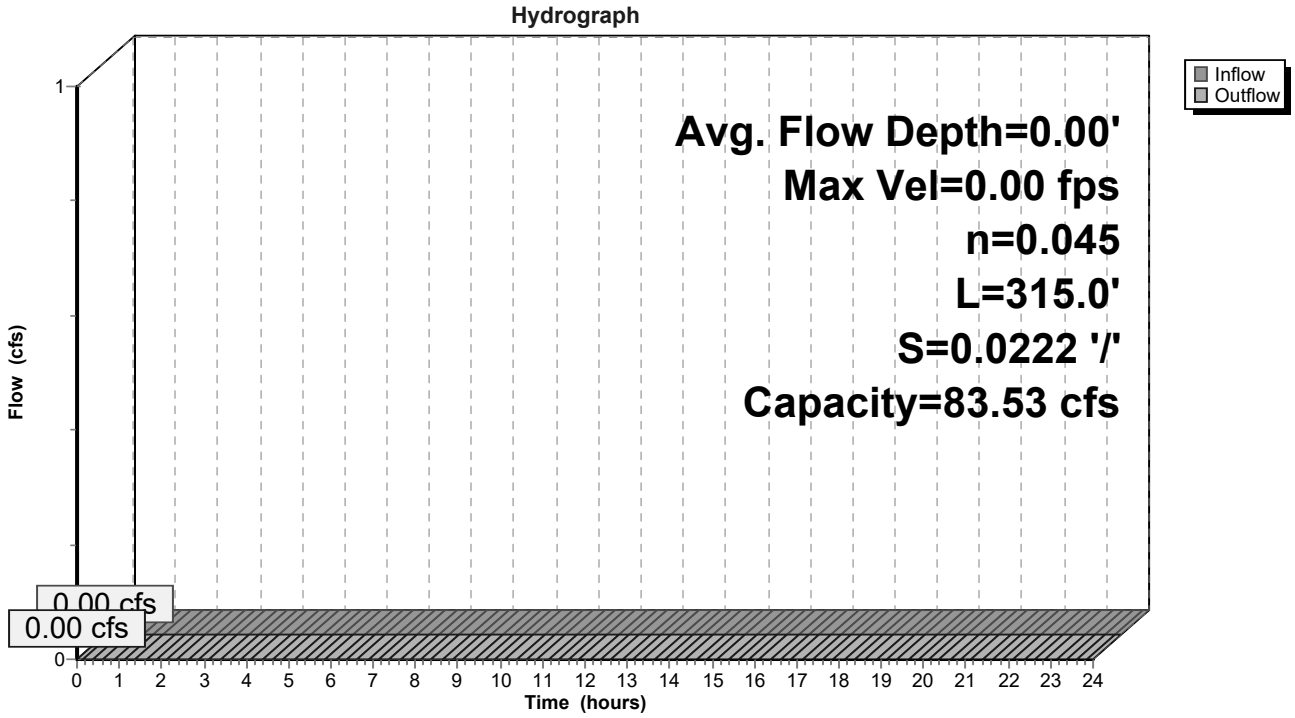
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 83.53 cfs

2.00' x 2.00' deep channel, n= 0.045
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 315.0' Slope= 0.0222 '/'
Inlet Invert= 237.00', Outlet Invert= 230.00'

Reach 1R: Swale Flow to Second Cross Culvert



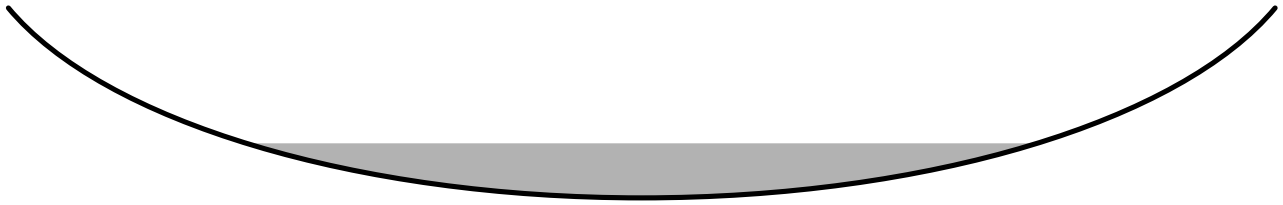
Summary for Reach 2aR: Reach #2a

Inflow Area = 13.893 ac, 1.30% Impervious, Inflow Depth > 0.88" for 25 YR. - 24 HR. event
Inflow = 5.02 cfs @ 12.73 hrs, Volume= 1.024 af
Outflow = 5.02 cfs @ 12.74 hrs, Volume= 1.023 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 2.62 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 0.7 min

Peak Storage= 120 cf @ 12.74 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.75' Flow Area= 12.5 sf, Capacity= 75.29 cfs

25.00' x 0.75' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 62.6' Slope= 0.1038 '/'
Inlet Invert= 256.50', Outlet Invert= 250.00'



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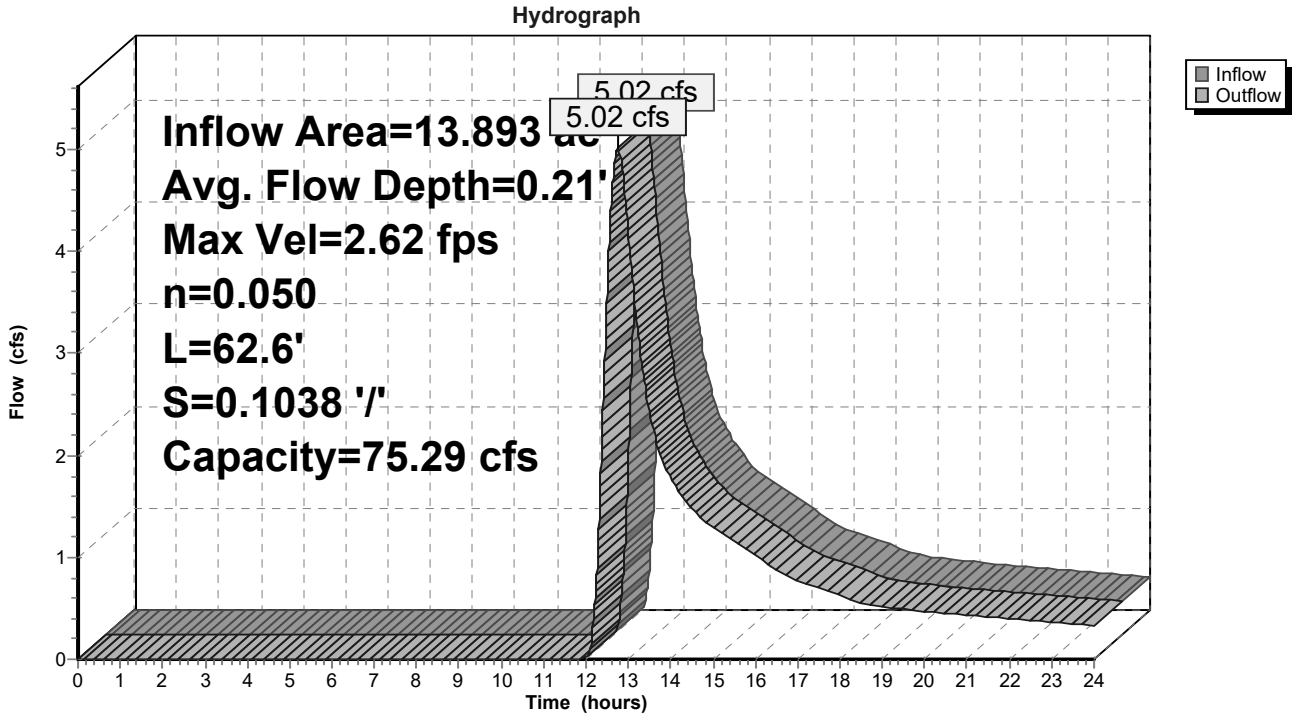


Summary for Reach 2bR: Reach #2b

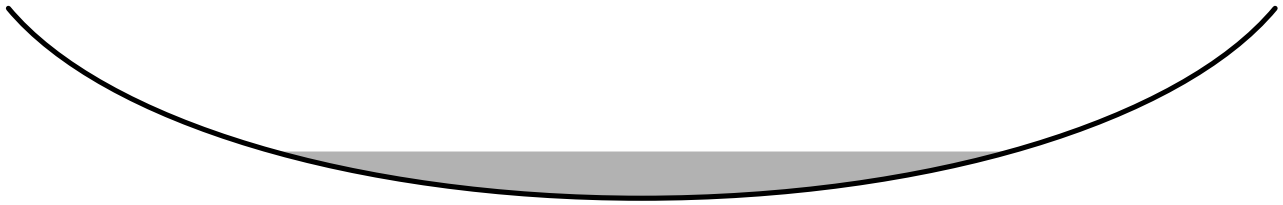
[62] Hint: Exceeded Reach 2aR OUTLET depth by 0.03' @ 12.90 hrs

Inflow Area = 13.893 ac, 1.30% Impervious, Inflow Depth > 0.88" for 25 YR. - 24 HR. event
Inflow = 5.02 cfs @ 12.74 hrs, Volume= 1.023 af
Outflow = 5.00 cfs @ 12.78 hrs, Volume= 1.021 af, Atten= 0%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 2.47 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.41 fps, Avg. Travel Time= 4.2 min

Peak Storage= 723 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 16.7 sf, Capacity= 105.00 cfs

25.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 358.0' Slope= 0.0279 '/'
Inlet Invert= 250.00', Outlet Invert= 240.00'



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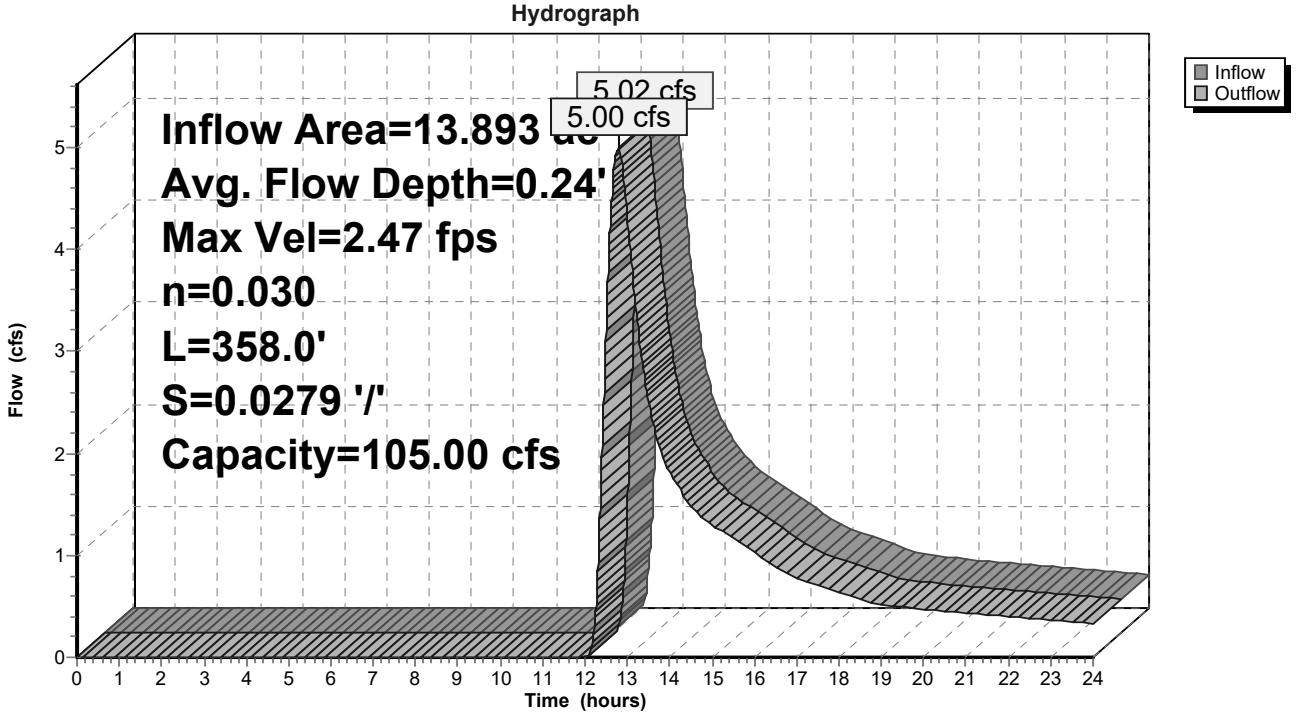
Reach 2bR: Reach #2b



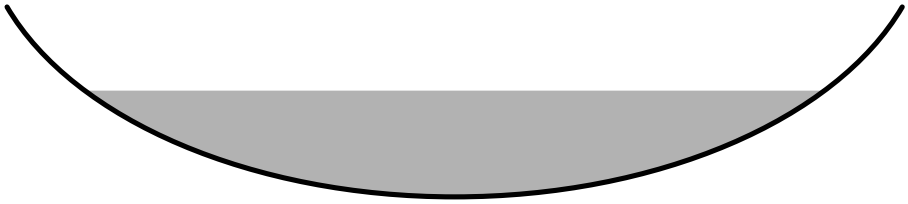
Summary for Reach 4R: Reach #4

Inflow Area = 7.320 ac, 6.17% Impervious, Inflow Depth > 1.92" for 25 YR. - 24 HR. event
Inflow = 9.27 cfs @ 12.41 hrs, Volume= 1.171 af
Outflow = 9.27 cfs @ 12.42 hrs, Volume= 1.171 af, Atten= 0%, Lag= 0.6 min

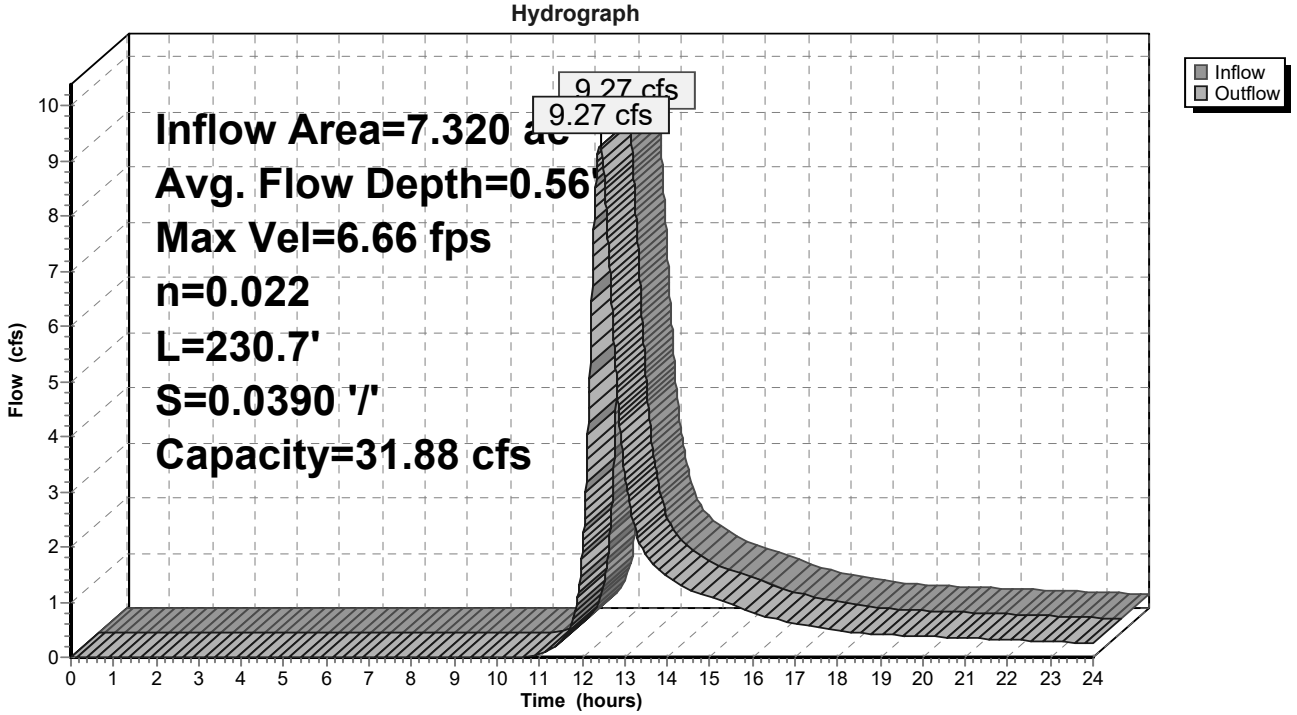
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 6.66 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 3.02 fps, Avg. Travel Time= 1.3 min

Peak Storage= 321 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.00' Flow Area= 3.3 sf, Capacity= 31.88 cfs

5.00' x 1.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 230.7' Slope= 0.0390 '/'
Inlet Invert= 209.00', Outlet Invert= 200.00'



Reach 4R: Reach #4



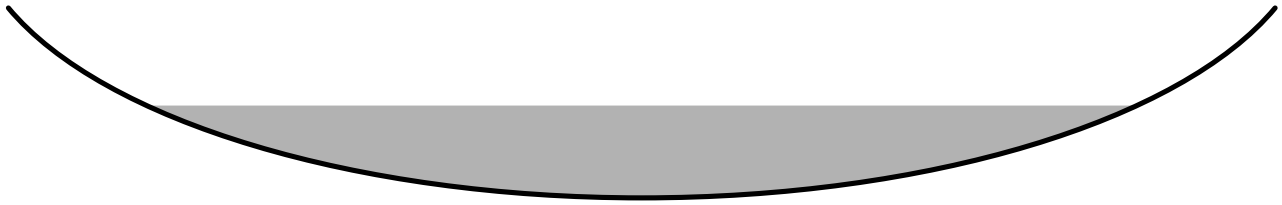
Summary for Reach 10R: Reach #10

Inflow Area = 55.566 ac, 5.26% Impervious, Inflow Depth > 1.12" for 25 YR. - 24 HR. event
Inflow = 17.96 cfs @ 13.12 hrs, Volume= 5.177 af
Outflow = 17.95 cfs @ 13.13 hrs, Volume= 5.173 af, Atten= 0%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 3.19 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.00 fps, Avg. Travel Time= 1.4 min

Peak Storage= 977 cf @ 13.13 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.00' Flow Area= 16.7 sf, Capacity= 85.88 cfs

25.00' x 1.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 173.4' Slope= 0.0519 '/'
Inlet Invert= 249.00', Outlet Invert= 240.00'



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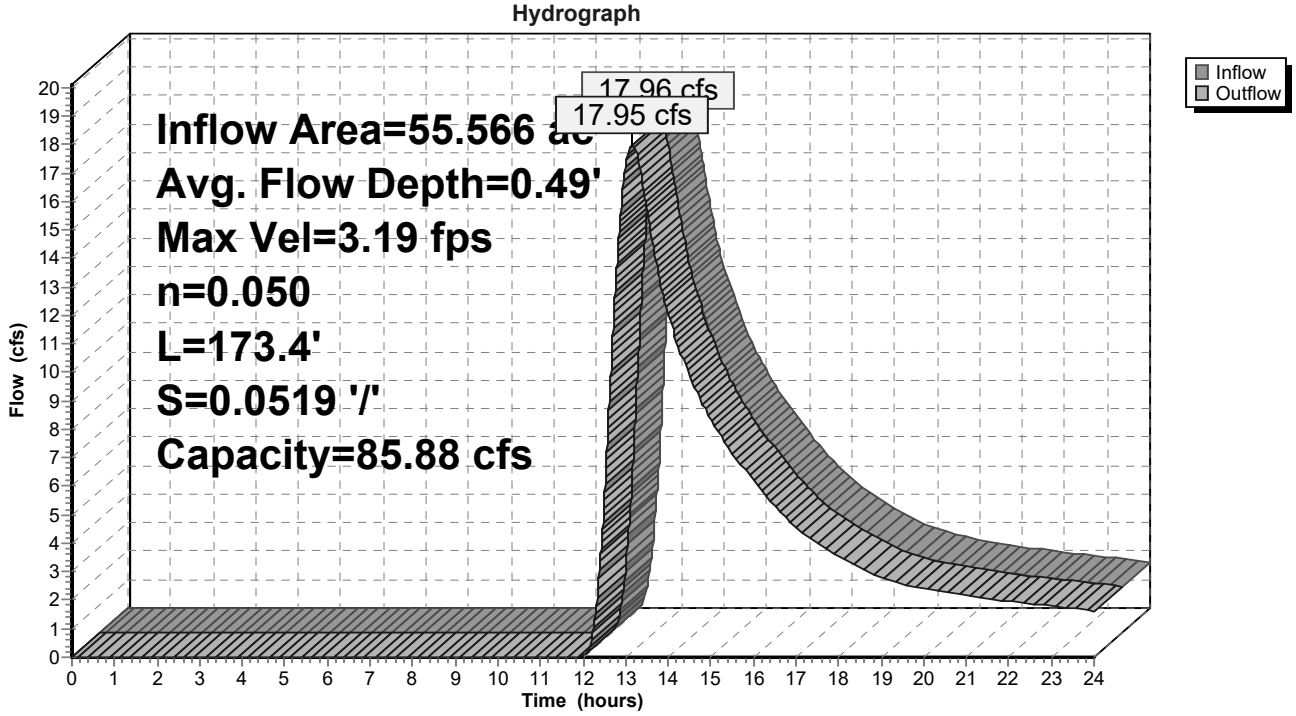
Reach 10R: Reach #10



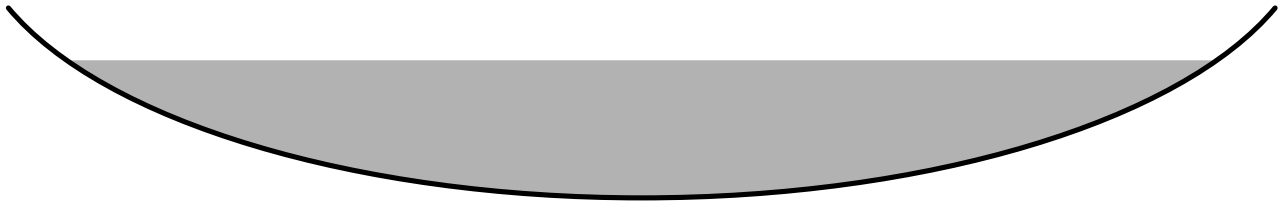
Summary for Reach 11aR: Reach #11a

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.66" for 25 YR. - 24 HR. event
Inflow = 2.69 cfs @ 13.17 hrs, Volume= 0.774 af
Outflow = 2.60 cfs @ 13.44 hrs, Volume= 0.763 af, Atten= 4%, Lag= 15.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.51 fps, Min. Travel Time= 17.1 min
Avg. Velocity = 0.31 fps, Avg. Travel Time= 28.2 min

Peak Storage= 2,658 cf @ 13.44 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 0.50' Flow Area= 8.3 sf, Capacity= 5.23 cfs

25.00' x 0.50' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 517.8' Slope= 0.0077 '/'
Inlet Invert= 304.00', Outlet Invert= 300.00'



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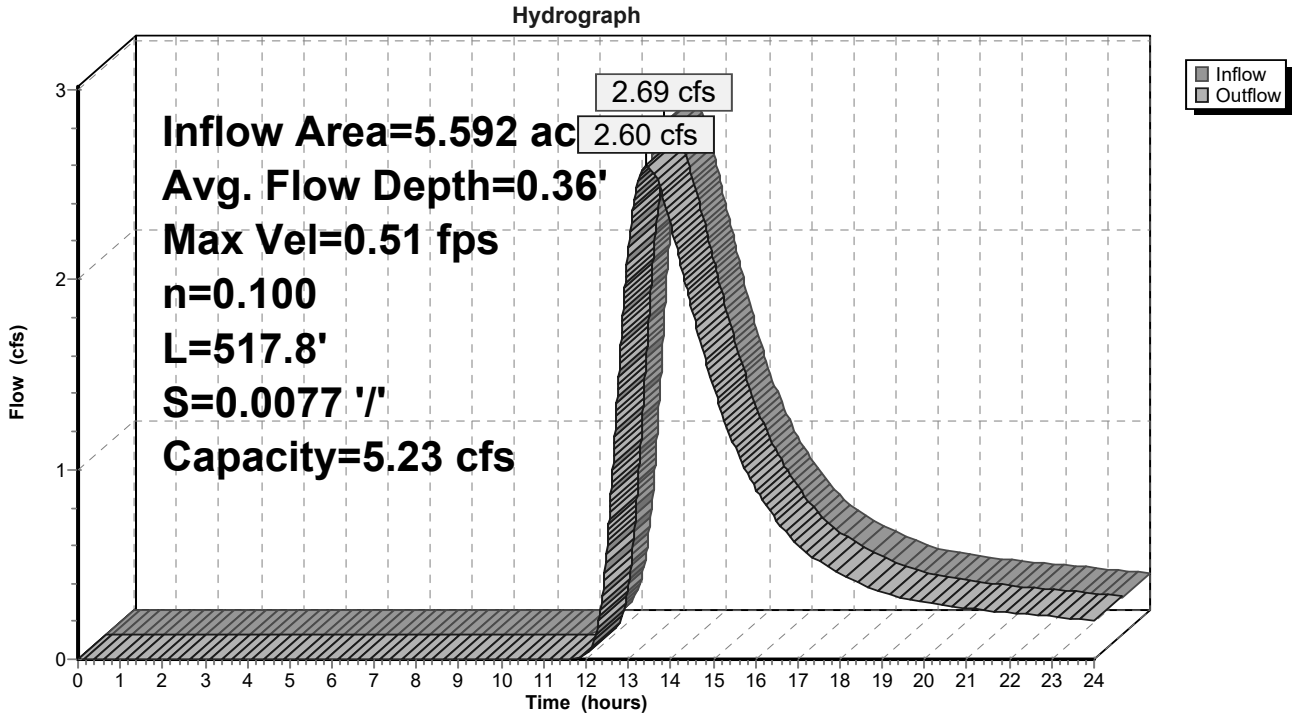
Reach 11aR: Reach #11a



Summary for Reach 11bR: Reach #11b

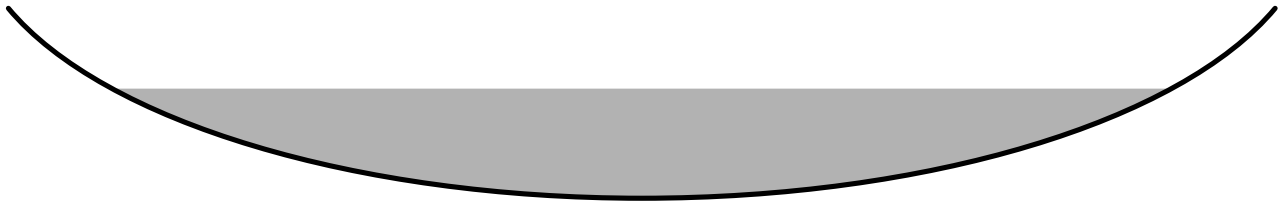
[61] Hint: Exceeded Reach 11aR outlet invert by 0.29' @ 13.59 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.64" for 25 YR. - 24 HR. event
Inflow = 2.60 cfs @ 13.44 hrs, Volume= 0.763 af
Outflow = 2.57 cfs @ 13.59 hrs, Volume= 0.757 af, Atten= 1%, Lag= 9.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.88 fps, Min. Travel Time= 10.7 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 17.6 min

Peak Storage= 1,654 cf @ 13.59 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 8.47 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 567.6' Slope= 0.0317 '/'
Inlet Invert= 300.00', Outlet Invert= 282.00'



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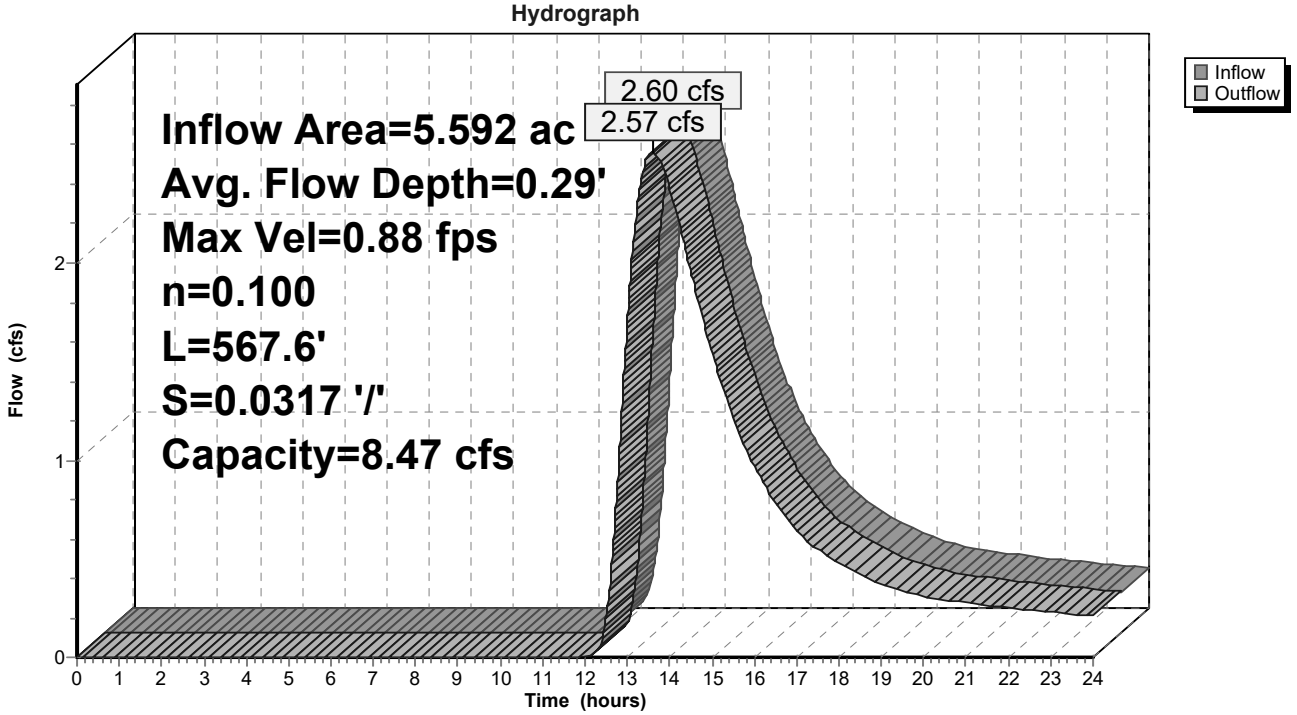
Reach 11bR: Reach #11b



Summary for Reach 11cR: Reach #11c

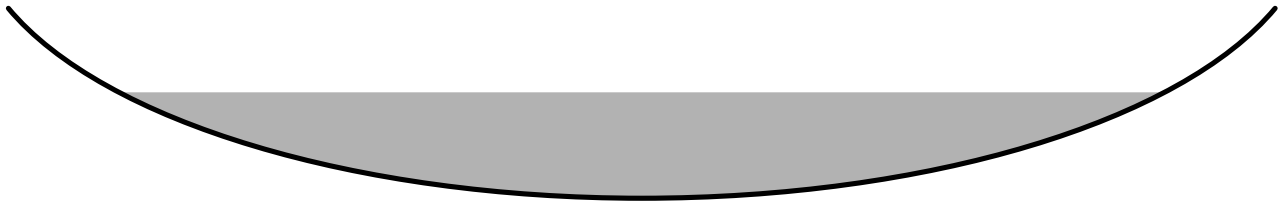
[62] Hint: Exceeded Reach 11bR OUTLET depth by 0.31' @ 14.83 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.62" for 25 YR. - 24 HR. event
Inflow = 2.57 cfs @ 13.59 hrs, Volume= 0.757 af
Outflow = 2.03 cfs @ 14.42 hrs, Volume= 0.724 af, Atten= 21%, Lag= 50.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.12 fps, Min. Travel Time= 52.8 min
Avg. Velocity = 0.08 fps, Avg. Travel Time= 80.3 min

Peak Storage= 6,417 cf @ 14.42 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 7.20 cfs

60.00' x 1.00' deep Parabolic Channel, n= 0.200 Dense willows
Length= 386.1' Slope= 0.0010 '/'
Inlet Invert= 282.00', Outlet Invert= 281.61'



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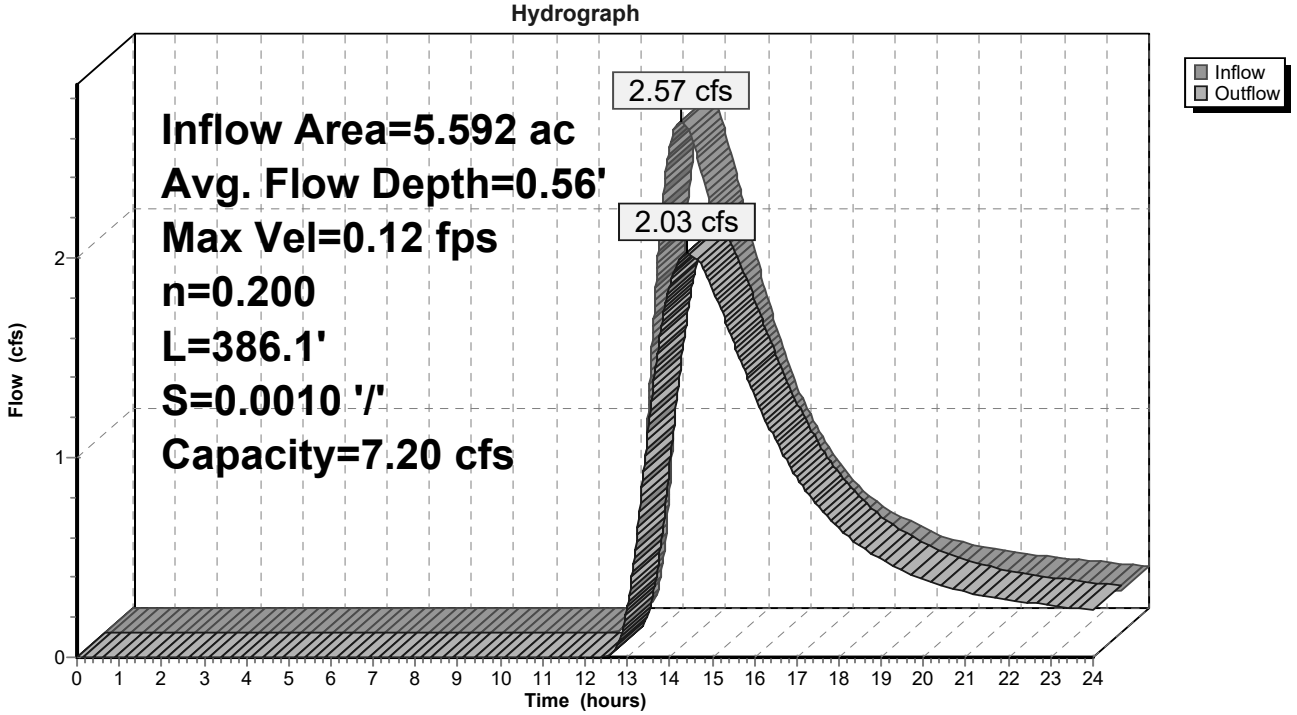
Reach 11cR: Reach #11c



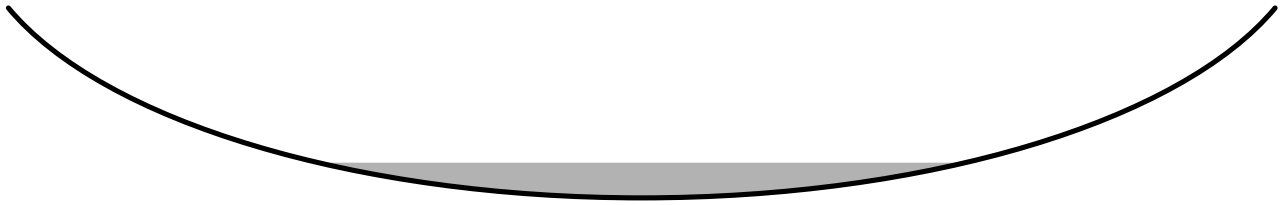
Summary for Reach 11dR: Reach #11d

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.55" for 25 YR. - 24 HR. event
Inflow = 2.03 cfs @ 14.42 hrs, Volume= 0.724 af
Outflow = 2.03 cfs @ 14.43 hrs, Volume= 0.723 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 3.87 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 0.1 min

Peak Storage= 11 cf @ 14.43 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 79.86 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 21.0' Slope= 0.0476 '/'
Inlet Invert= 276.00', Outlet Invert= 275.00'



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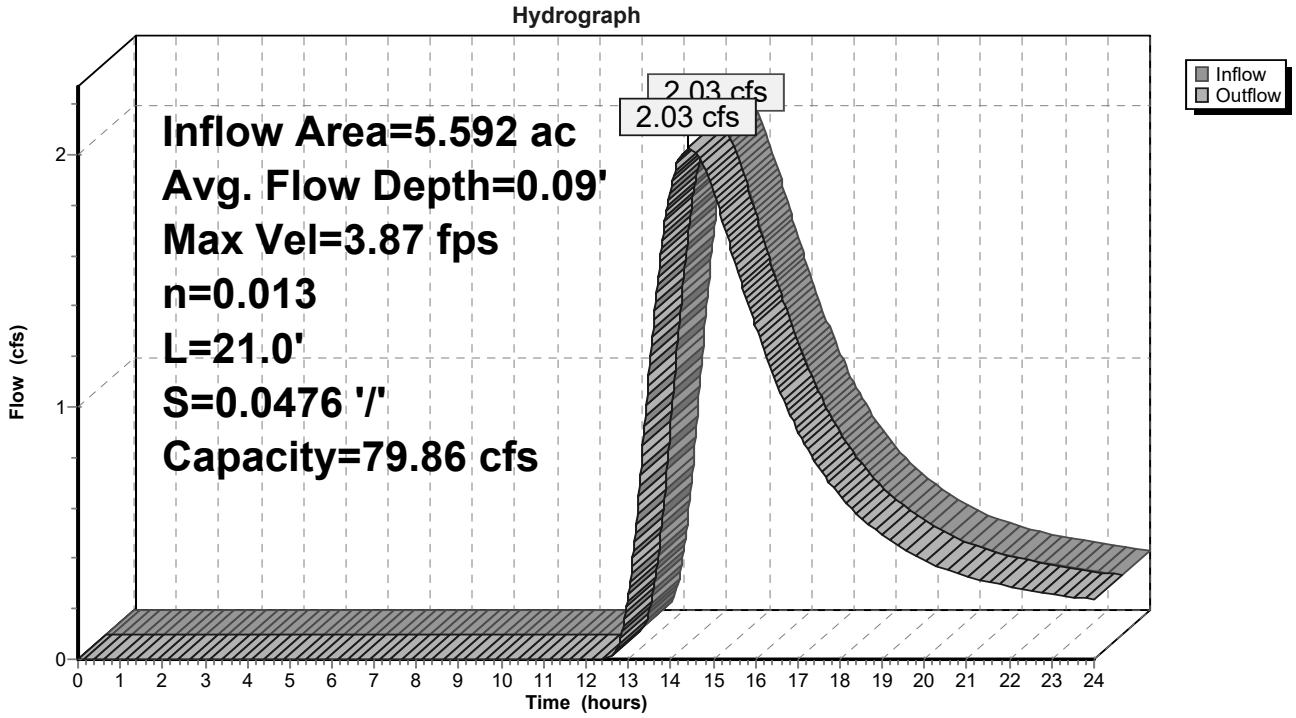
Reach 11dR: Reach #11d



Summary for Reach 11eR: Reach #11e

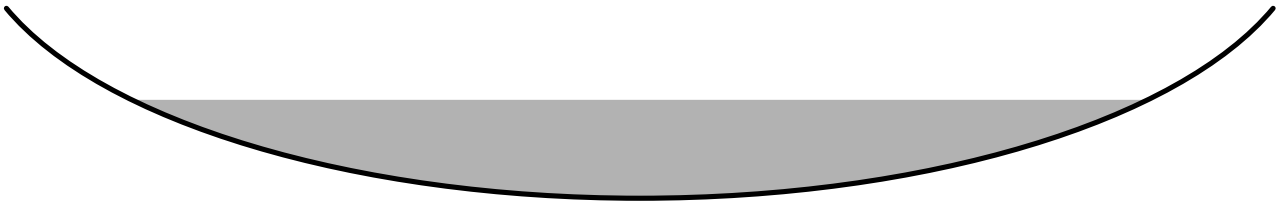
[62] Hint: Exceeded Reach 11dR OUTLET depth by 0.17' @ 14.57 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.55" for 25 YR. - 24 HR. event
Inflow = 2.03 cfs @ 14.43 hrs, Volume= 0.723 af
Outflow = 2.02 cfs @ 14.52 hrs, Volume= 0.719 af, Atten= 0%, Lag= 5.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.82 fps, Min. Travel Time= 7.8 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 11.6 min

Peak Storage= 942 cf @ 14.52 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 8.45 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 380.7' Slope= 0.0315 '/'
Inlet Invert= 275.00', Outlet Invert= 263.00'



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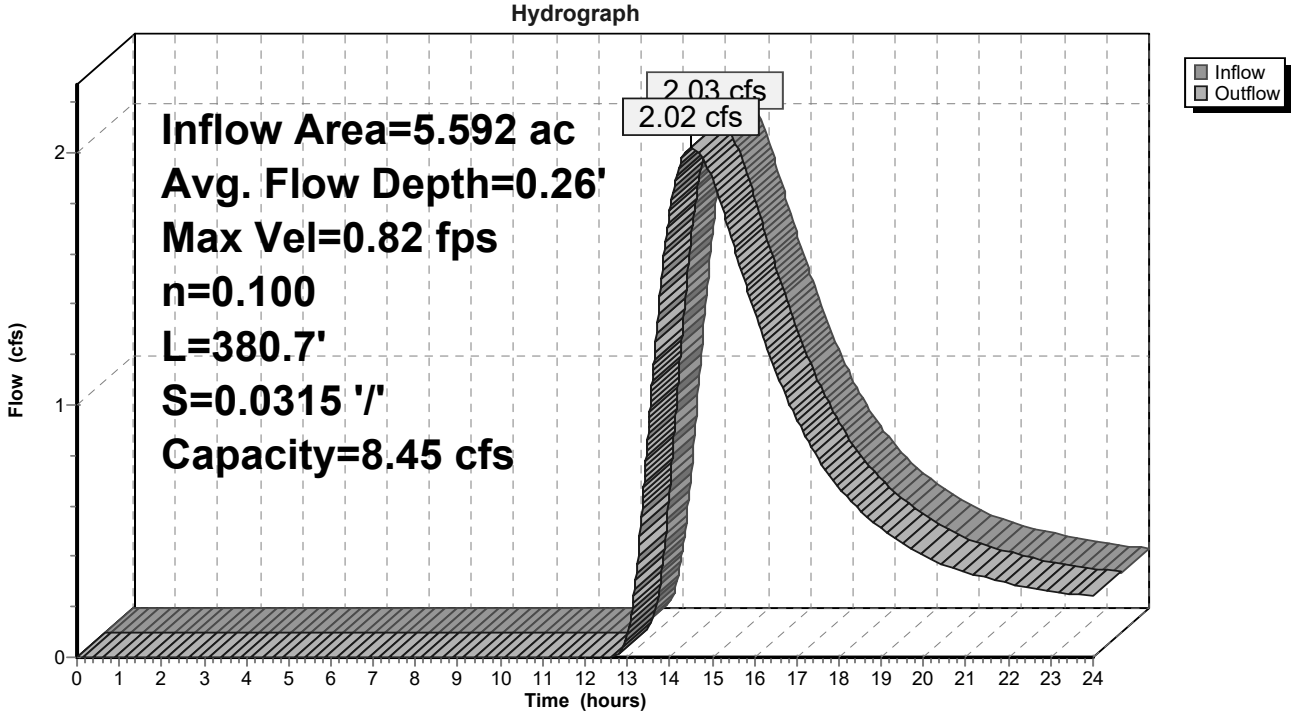
Reach 11eR: Reach #11e



Summary for Reach 11fR: Reach #11f

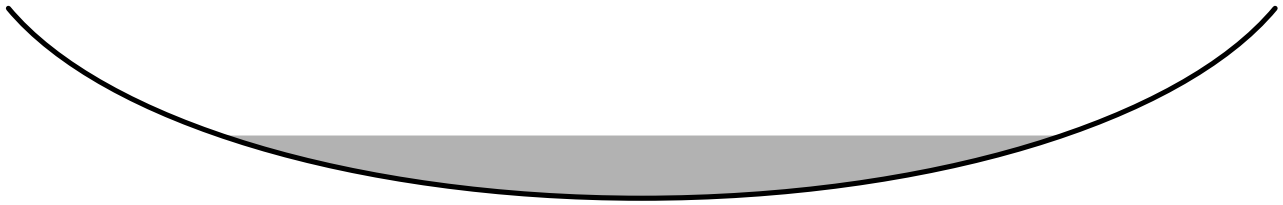
[61] Hint: Exceeded Reach 11eR outlet invert by 0.16' @ 14.54 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.54" for 25 YR. - 24 HR. event
Inflow = 2.02 cfs @ 14.52 hrs, Volume= 0.719 af
Outflow = 2.02 cfs @ 14.54 hrs, Volume= 0.717 af, Atten= 0%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 1.60 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 2.5 min

Peak Storage= 204 cf @ 14.54 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 22.41 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 162.3' Slope= 0.0555 '/'
Inlet Invert= 263.00', Outlet Invert= 254.00'



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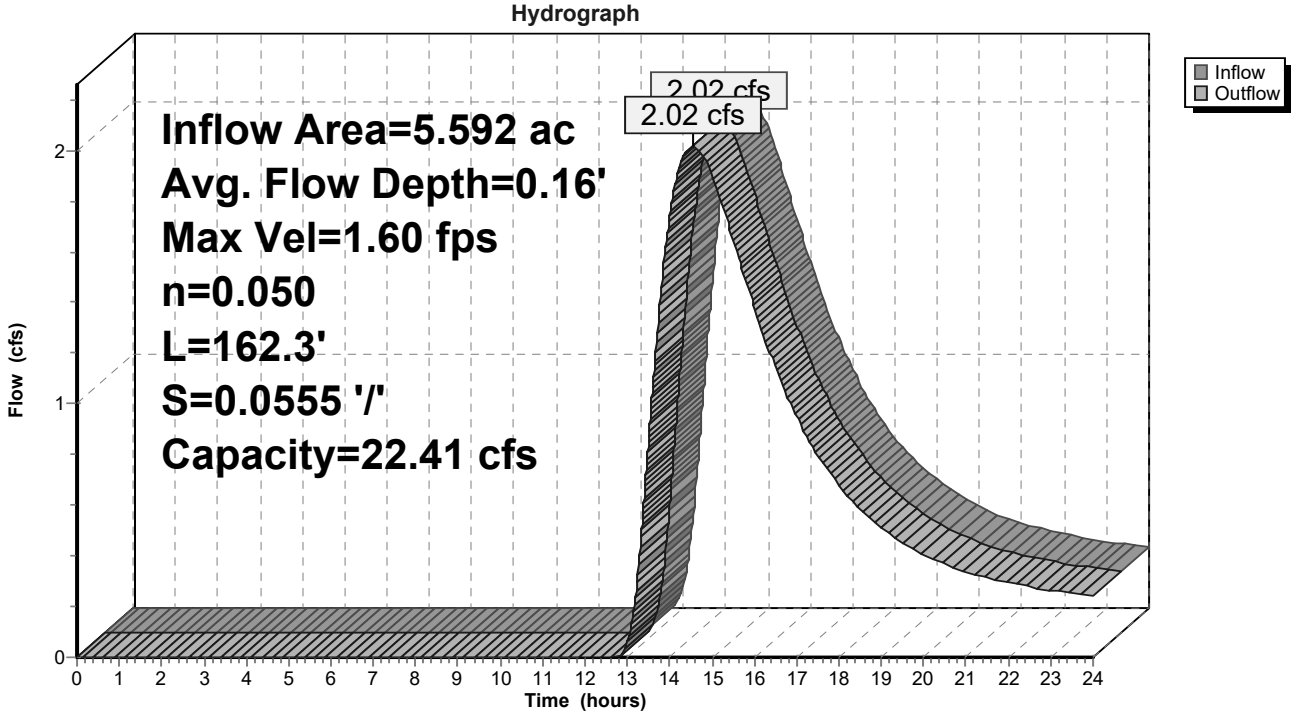
Reach 11fR: Reach #11f



Summary for Reach 11gR: Reach #11g

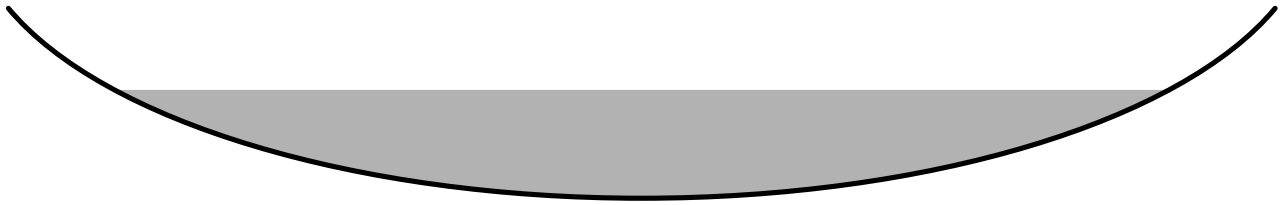
[62] Hint: Exceeded Reach 11fR OUTLET depth by 0.12' @ 14.67 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.54" for 25 YR. - 24 HR. event
Inflow = 2.02 cfs @ 14.54 hrs, Volume= 0.717 af
Outflow = 2.02 cfs @ 14.60 hrs, Volume= 0.715 af, Atten= 0%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.70 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 6.7 min

Peak Storage= 555 cf @ 14.60 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 6.84 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 193.7' Slope= 0.0207 '/'
Inlet Invert= 254.00', Outlet Invert= 250.00'



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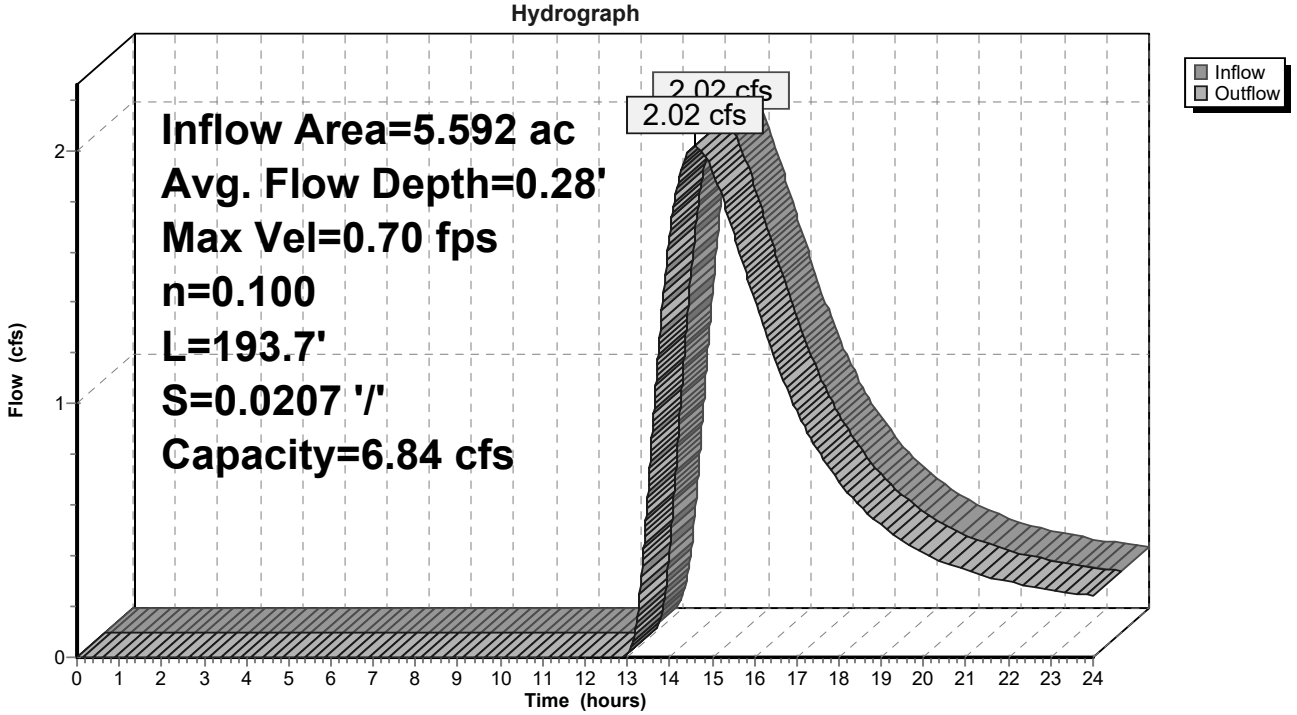
Reach 11gR: Reach #11g



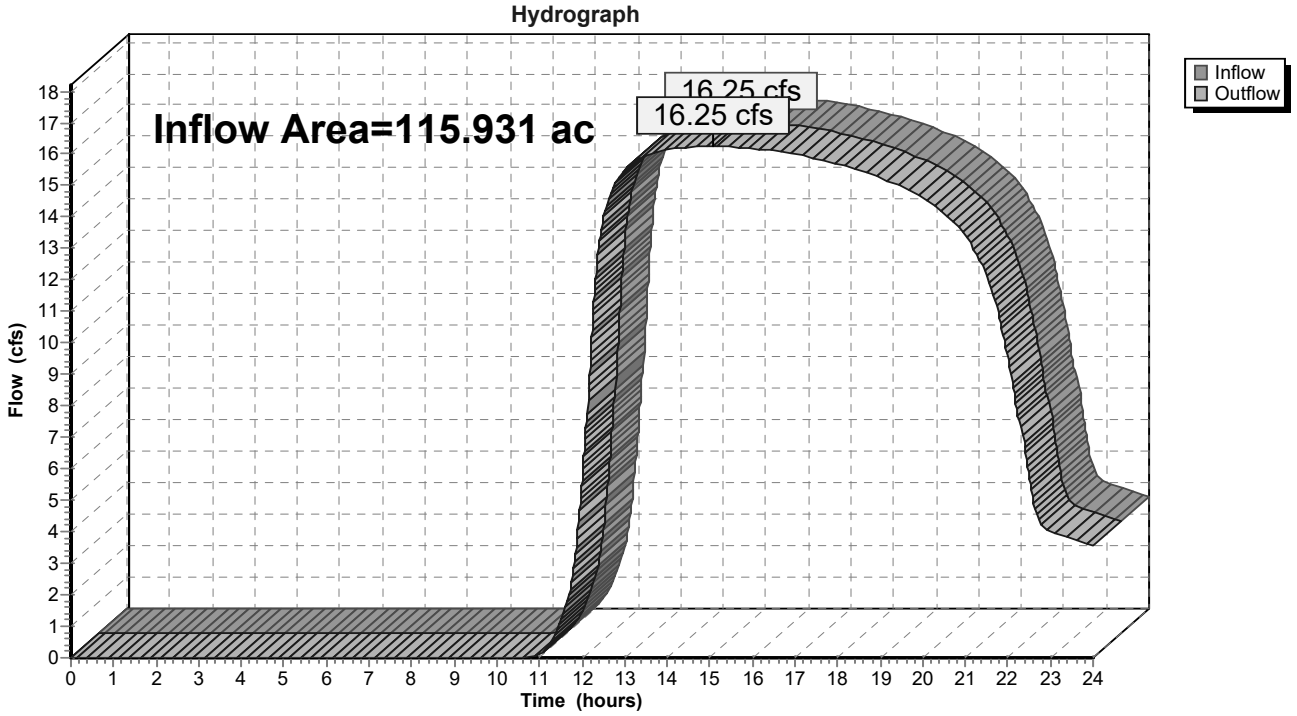
Summary for Reach 100R: Final Reach #100

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

Inflow Area = 115.931 ac, 2.94% Impervious, Inflow Depth > 1.38" for 25 YR. - 24 HR. event
Inflow = 16.25 cfs @ 15.06 hrs, Volume= 13.297 af
Outflow = 16.25 cfs @ 15.06 hrs, Volume= 13.297 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 100R: Final Reach #100



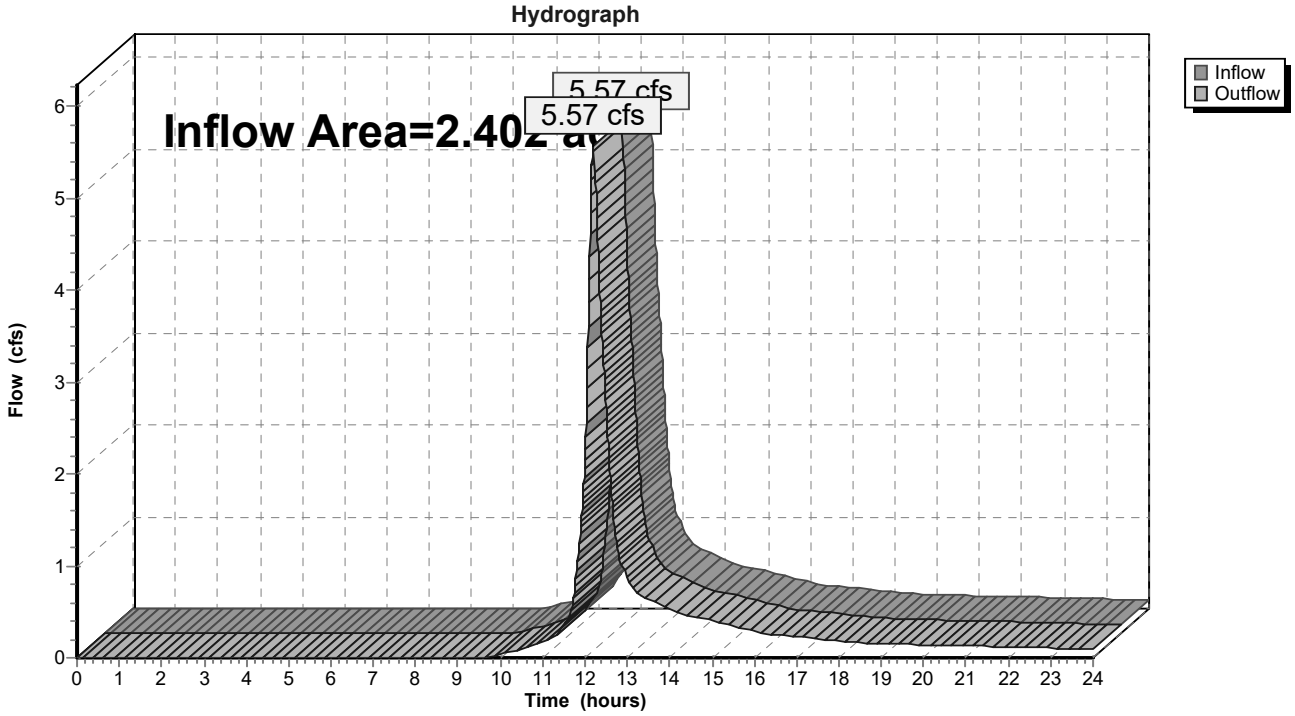
Summary for Reach 300R: Final Reach #300

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

Inflow Area = 2.402 ac, 7.71% Impervious, Inflow Depth > 2.53" for 25 YR. - 24 HR. event
Inflow = 5.57 cfs @ 12.20 hrs, Volume= 0.505 af
Outflow = 5.57 cfs @ 12.20 hrs, Volume= 0.505 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 300R: Final Reach #300



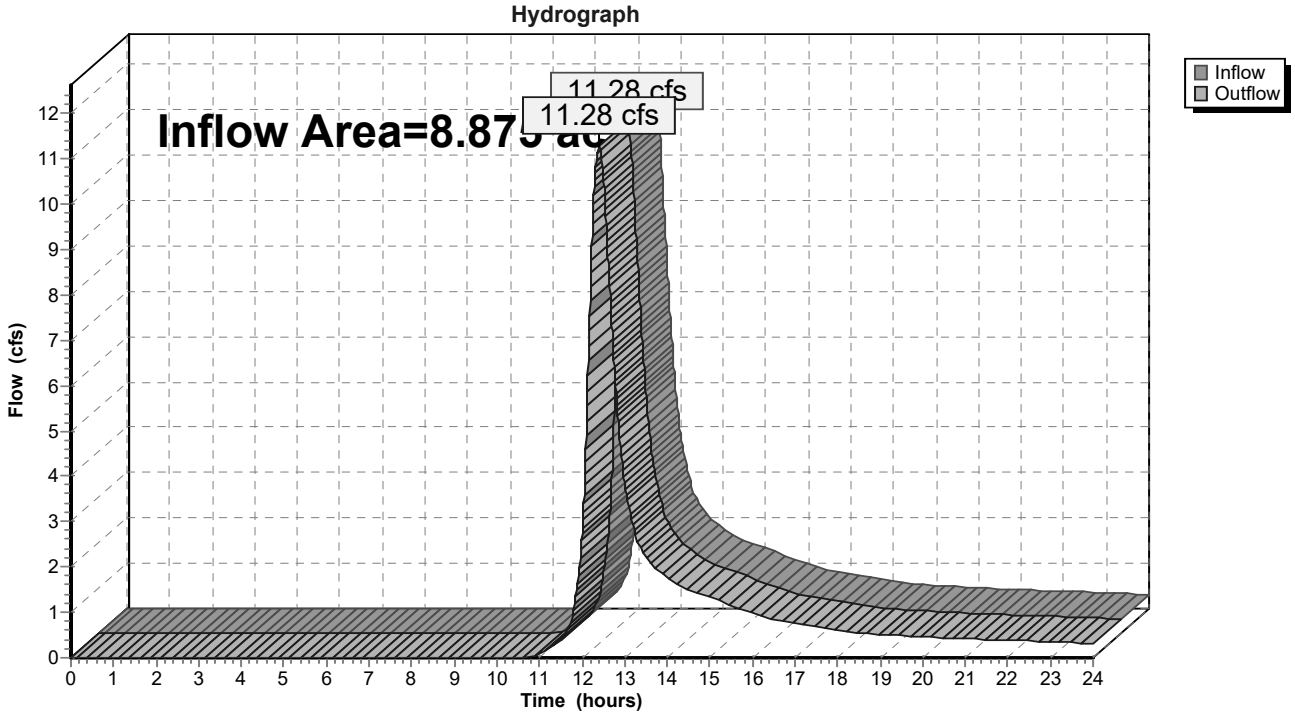
Summary for Reach 500R: Final Reach #500

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

Inflow Area = 8.875 ac, 6.76% Impervious, Inflow Depth > 1.95" for 25 YR. - 24 HR. event
Inflow = 11.28 cfs @ 12.40 hrs, Volume= 1.442 af
Outflow = 11.28 cfs @ 12.40 hrs, Volume= 1.442 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 500R: Final Reach #500



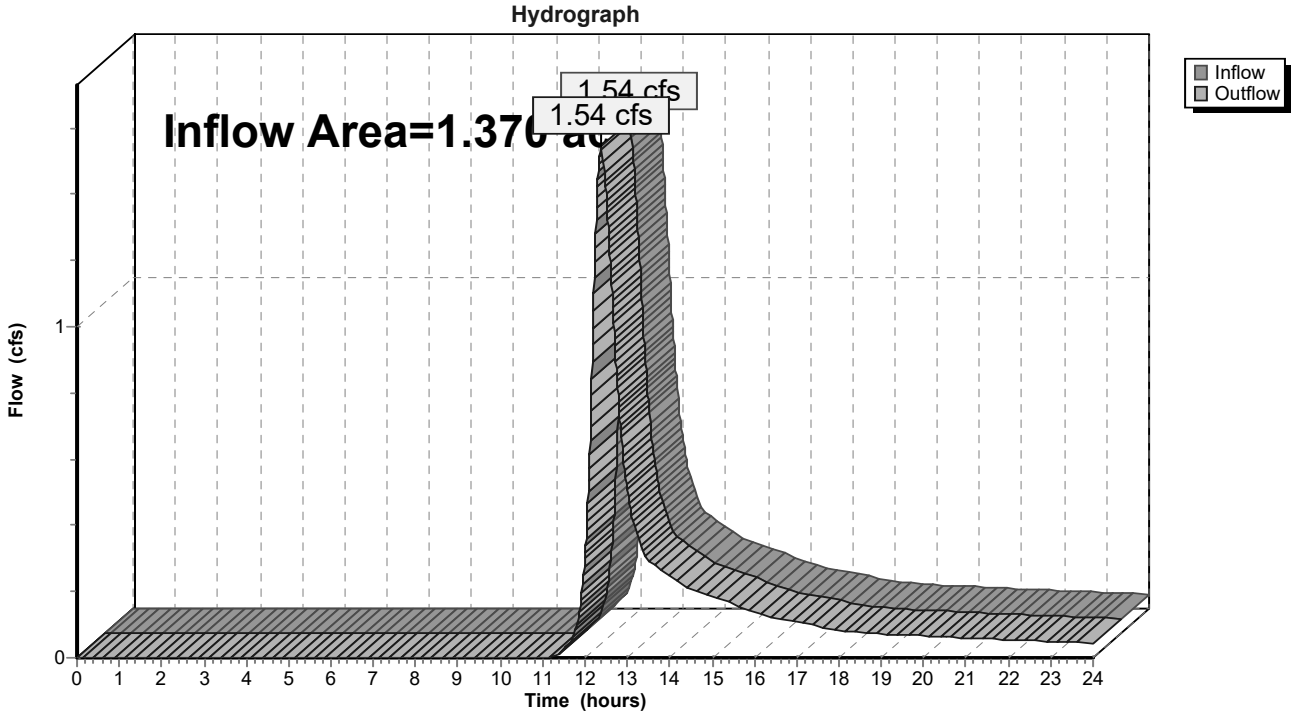
Summary for Reach 600R: Final Reach #600

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

Inflow Area = 1.370 ac, 0.00% Impervious, Inflow Depth > 1.68" for 25 YR. - 24 HR. event
Inflow = 1.54 cfs @ 12.38 hrs, Volume= 0.192 af
Outflow = 1.54 cfs @ 12.38 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 600R: Final Reach #600



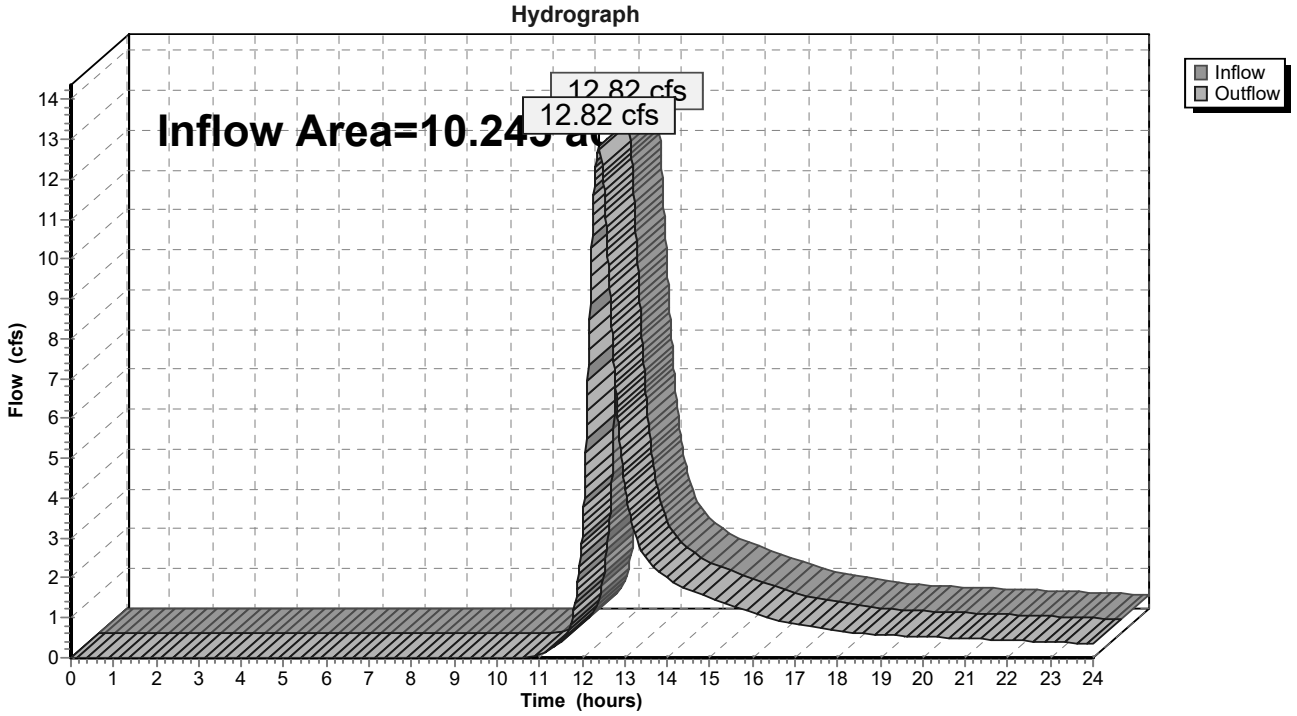
Summary for Reach 700R: Final Analysis Point 700

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

Inflow Area = 10.245 ac, 5.85% Impervious, Inflow Depth > 1.91" for 25 YR. - 24 HR. event
Inflow = 12.82 cfs @ 12.40 hrs, Volume= 1.634 af
Outflow = 12.82 cfs @ 12.40 hrs, Volume= 1.634 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 700R: Final Analysis Point 700



Summary for Pond 1P: Pond #1

Inflow Area = 115.931 ac, 2.94% Impervious, Inflow Depth > 1.38" for 25 YR. - 24 HR. event
Inflow = 61.71 cfs @ 12.56 hrs, Volume= 13.307 af
Outflow = 16.25 cfs @ 15.06 hrs, Volume= 13.297 af, Atten= 74%, Lag= 149.8 min
Primary = 16.25 cfs @ 15.06 hrs, Volume= 13.297 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 237.85' @ 15.06 hrs Surf.Area= 267,750 sf Storage= 186,808 cf
Flood Elev= 239.50' Surf.Area= 369,141 sf Storage= 756,164 cf

Plug-Flow detention time= 120.7 min calculated for 13.291 af (100% of inflow)
Center-of-Mass det. time= 120.2 min (1,033.3 - 913.1)

Volume	Invert	Avail.Storage	Storage Description
#1	233.19'	940,735 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

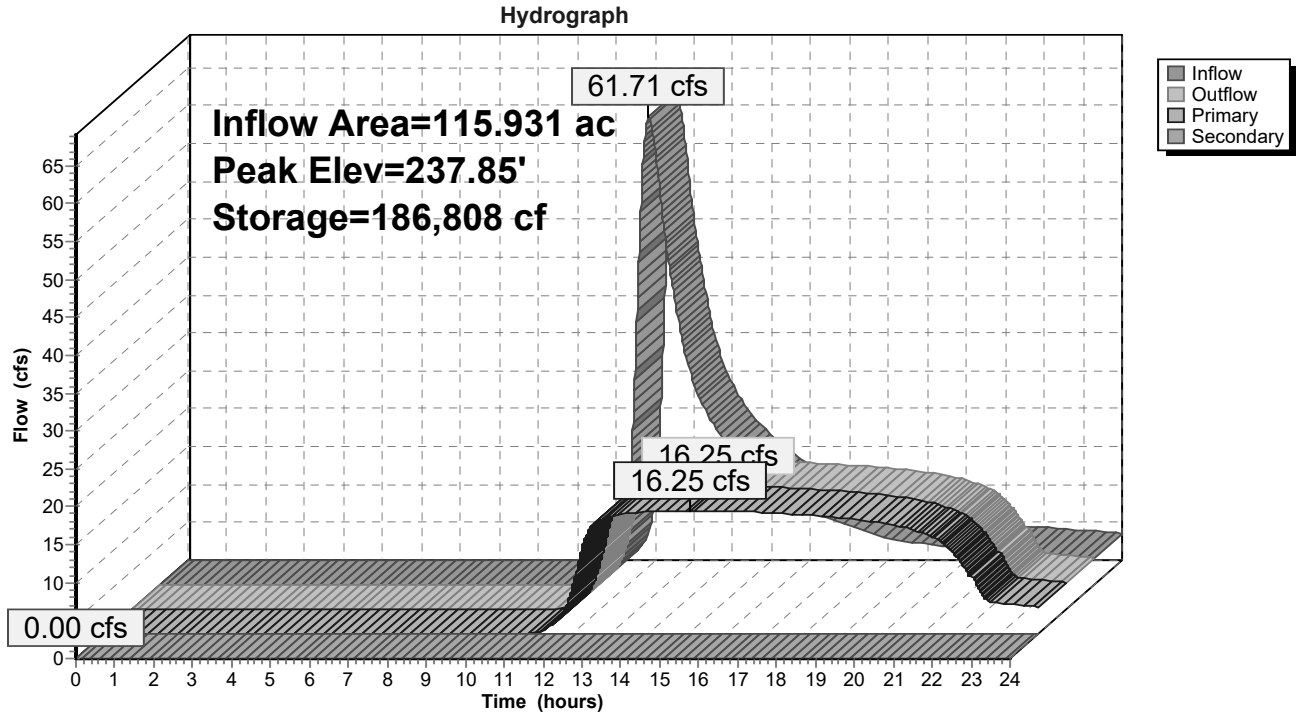
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.19	10	14.0	0	0	10
234.00	518	99.7	162	162	787
235.00	5,281	312.0	2,484	2,646	7,745
236.00	14,800	800.0	9,641	12,287	50,932
236.50	30,632	2,000.0	11,121	23,408	318,313
237.00	72,841	2,758.0	25,118	48,526	605,317
237.50	180,044	3,271.0	61,234	109,760	851,445
238.00	312,208	4,624.0	121,557	231,317	1,701,489
239.00	369,141	4,349.8	340,277	571,594	1,897,350
240.00	369,141	4,349.8	369,141	940,735	1,901,699

Device	Routing	Invert	Outlet Devices
#1	Primary	233.20'	**18.0" Round 18" RCP** L= 68.8' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 233.20' / 232.97' S= 0.0033 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf
#2	Secondary	238.50'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=16.25 cfs @ 15.06 hrs HW=237.85' TW=0.00' (Dynamic Tailwater)
↑—**1=18" RCP** (Barrel Controls 16.25 cfs @ 9.19 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=233.19' TW=237.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Pond #1



Summary for Pond 3P: Pond #3

Inflow Area = 2.402 ac, 7.71% Impervious, Inflow Depth > 2.53" for 25 YR. - 24 HR. event
Inflow = 5.58 cfs @ 12.19 hrs, Volume= 0.506 af
Outflow = 5.57 cfs @ 12.20 hrs, Volume= 0.505 af, Atten= 0%, Lag= 0.4 min
Primary = 5.57 cfs @ 12.20 hrs, Volume= 0.505 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 228.26' @ 12.20 hrs Surf.Area= 224 sf Storage= 112 cf

Plug-Flow detention time= 0.6 min calculated for 0.505 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (847.9 - 847.5)

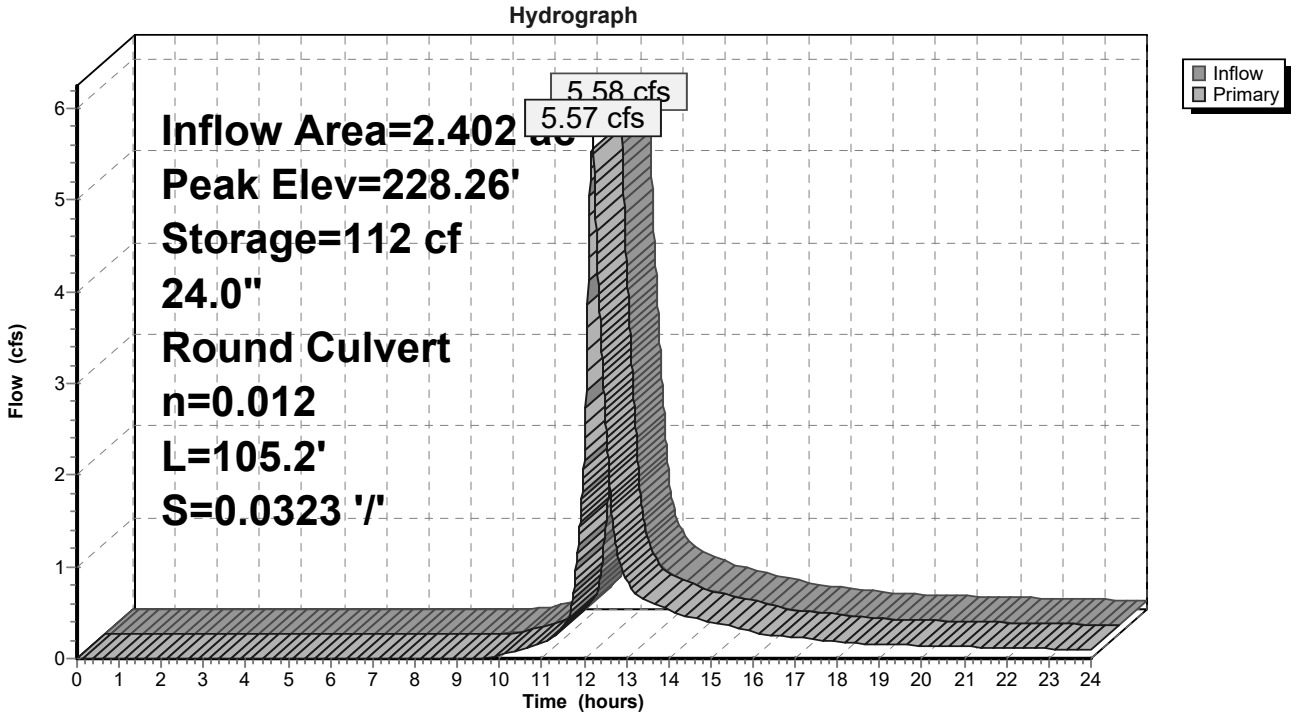
Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	13,902 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	10	14.0	0	0	10
228.00	144	73.3	64	64	424
230.00	1,202	146.0	1,175	1,239	1,712
232.00	2,869	237.3	3,952	5,191	4,523
234.00	6,036	457.1	8,711	13,902	16,689

Device	Routing	Invert	Outlet Devices
#1	Primary	227.24'	**24.0" Round 24" RCP** L= 105.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 227.24' / 223.84' S= 0.0323 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=5.56 cfs @ 12.20 hrs HW=228.26' TW=0.00' (Dynamic Tailwater)
↑**1=24" RCP** (Inlet Controls 5.56 cfs @ 3.44 fps)

Pond 3P: Pond #3



Summary for Pond 5P: Pond #5

Inflow Area = 8.875 ac, 6.76% Impervious, Inflow Depth > 1.95" for 25 YR. - 24 HR. event
Inflow = 11.29 cfs @ 12.39 hrs, Volume= 1.442 af
Outflow = 11.28 cfs @ 12.40 hrs, Volume= 1.442 af, Atten= 0%, Lag= 0.8 min
Primary = 11.28 cfs @ 12.40 hrs, Volume= 1.442 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 198.16' @ 12.40 hrs Surf.Area= 128 sf Storage= 107 cf

Plug-Flow detention time= 0.1 min calculated for 1.442 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (873.6 - 873.6)

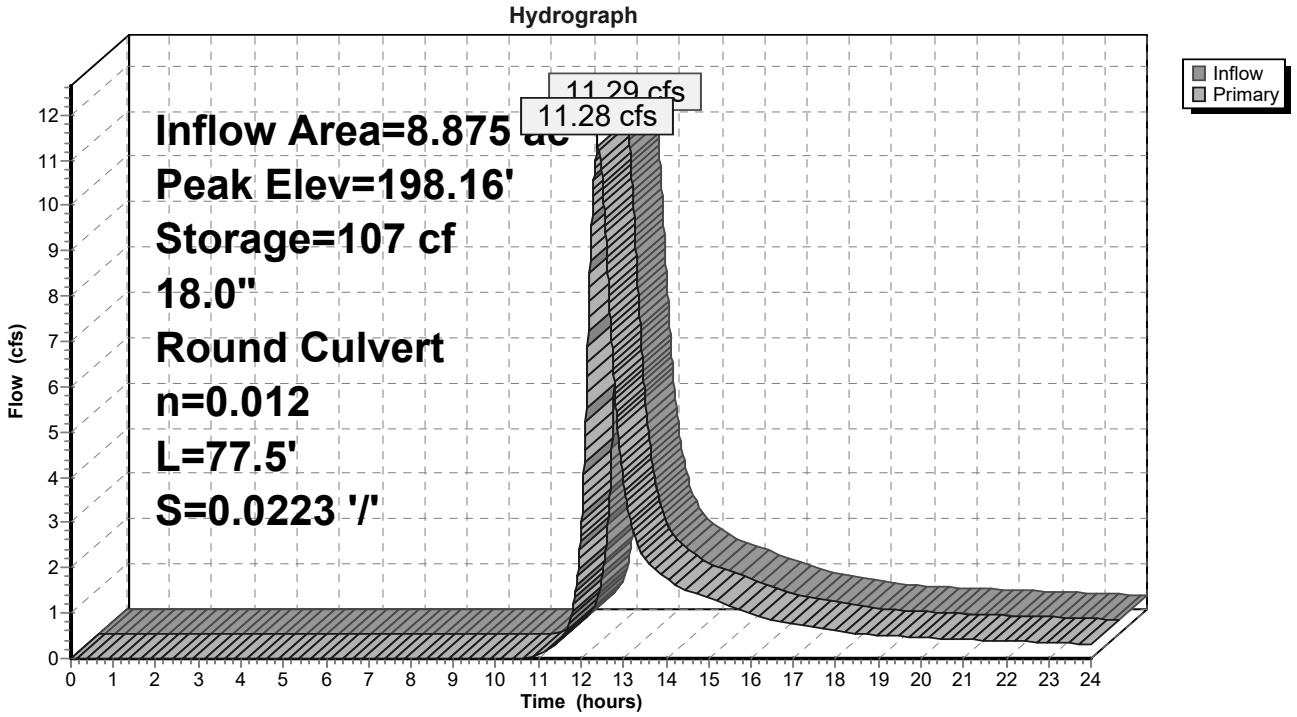
Volume	Invert	Avail.Storage	Storage Description
#1	195.65'	7,065 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
195.65	3	7.1	0	0	3
196.00	3	7.1	1	1	5
198.00	109	46.2	87	88	180
200.00	471	131.7	538	625	1,403
202.00	7,330	396.0	6,439	7,065	12,514

Device	Routing	Invert	Outlet Devices
#1	Primary	195.65'	**18.0" Round Culvert** L= 77.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.65' / 193.92' S= 0.0223 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=11.28 cfs @ 12.40 hrs HW=198.16' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 11.28 cfs @ 6.38 fps)

Pond 5P: Pond #5



Summary for Pond 11P: Pond #11

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.67" for 25 YR. - 24 HR. event
Inflow = 4.77 cfs @ 12.68 hrs, Volume= 0.779 af
Outflow = 2.69 cfs @ 13.17 hrs, Volume= 0.774 af, Atten= 44%, Lag= 29.9 min
Primary = 2.69 cfs @ 13.17 hrs, Volume= 0.774 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 304.91' @ 13.17 hrs Surf.Area= 20,895 sf Storage= 6,795 cf

Plug-Flow detention time= 30.3 min calculated for 0.774 af (99% of inflow)
Center-of-Mass det. time= 26.9 min (923.4 - 896.5)

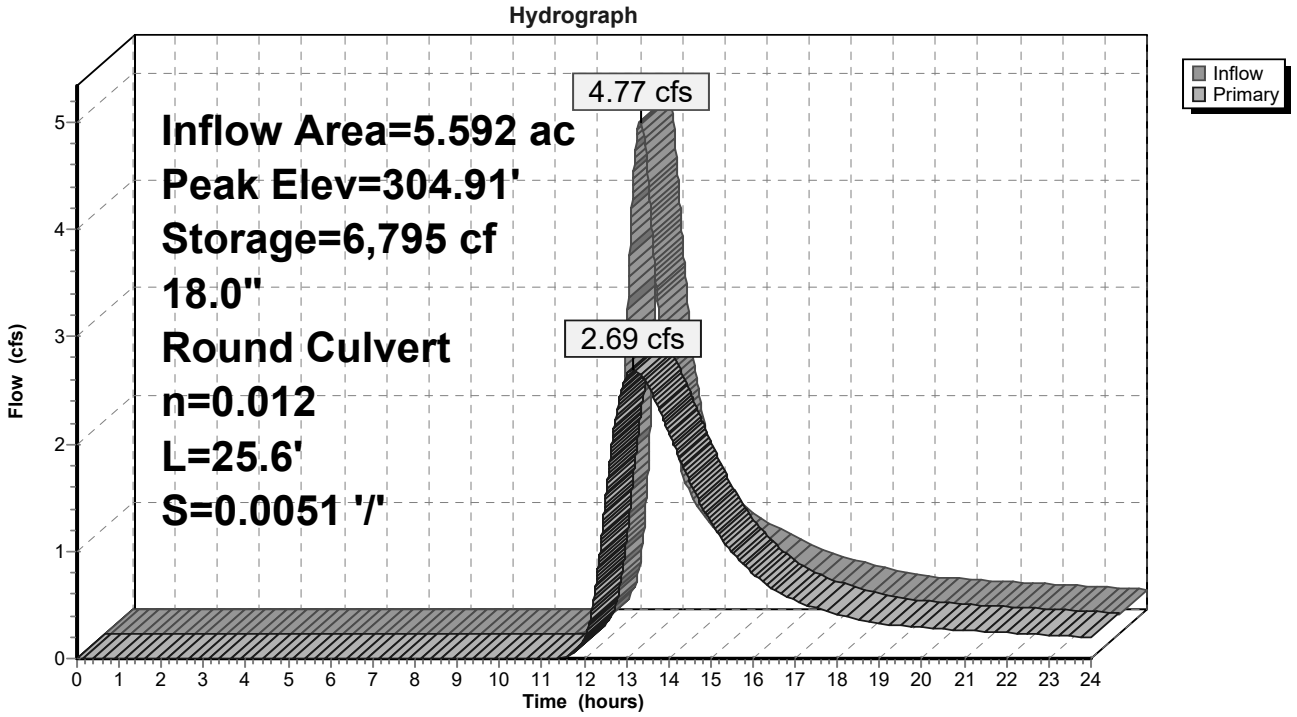
Volume	Invert	Avail.Storage	Storage Description
#1	304.00'	45,725 cf	**Open Water Storage (Irregular)** Listed below (Recalc)

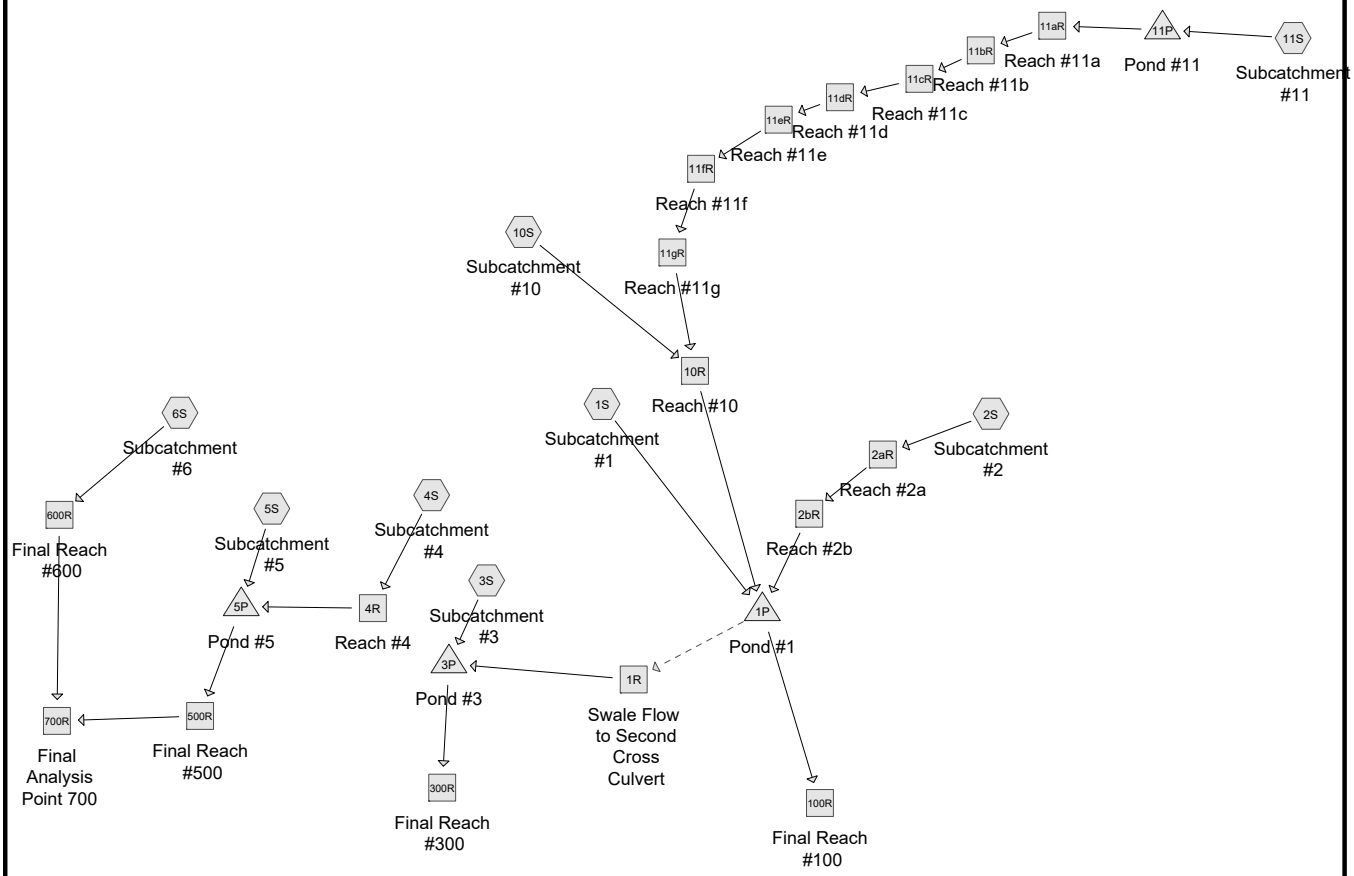
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
304.00	100	50.0	0	0	100
305.00	25,000	435.0	8,894	8,894	14,961
306.00	50,102	873.5	36,831	45,725	60,626

Device	Routing	Invert	Outlet Devices
#1	Primary	304.00'	**18.0" Round Culvert** L= 25.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 304.00' / 303.87' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=2.69 cfs @ 13.17 hrs HW=304.91' TW=304.35' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.69 cfs @ 3.45 fps)

Pond 11P: Pond #11





Subcat Reach Pond Link

Routing Diagram for 18-030 Existing Conditions
Prepared by Berry Surveying & Engineering, Printed 6/2/2019

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=2,024,339 sf 0.64% Impervious Runoff Depth>0.37"
Flow Length=655' Tc=32.3 min CN=61 Runoff=7.17 cfs 1.439 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>0.06"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=0.12 cfs 0.071 af

Subcatchment 3S: Subcatchment #3 Runoff Area=104,612 sf 7.71% Impervious Runoff Depth>0.68"
Flow Length=404' Tc=13.3 min CN=69 Runoff=1.29 cfs 0.137 af

Subcatchment 4S: Subcatchment #4 Runoff Area=318,856 sf 6.17% Impervious Runoff Depth>0.41"
Flow Length=1,147' Tc=27.5 min CN=62 Runoff=1.38 cfs 0.248 af

Subcatchment 5S: Subcatchment #5 Runoff Area=67,744 sf 9.50% Impervious Runoff Depth>0.48"
Flow Length=679' Tc=15.7 min CN=64 Runoff=0.46 cfs 0.062 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>0.31"
Flow Length=377' Tc=24.8 min CN=59 Runoff=0.17 cfs 0.035 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>0.11"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=0.78 cfs 0.452 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>0.31"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=0.55 cfs 0.143 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=315.0' S=0.0222 '/' Capacity=83.53 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.04' Max Vel=0.82 fps Inflow=0.12 cfs 0.071 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=0.12 cfs 0.071 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.04' Max Vel=0.78 fps Inflow=0.12 cfs 0.071 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=0.12 cfs 0.070 af

Reach 4R: Reach #4 Avg. Flow Depth=0.23' Max Vel=3.76 fps Inflow=1.38 cfs 0.248 af
n=0.022 L=230.7' S=0.0390 '/' Capacity=31.88 cfs Outflow=1.38 cfs 0.247 af

Reach 10R: Reach #10 Avg. Flow Depth=0.13' Max Vel=1.30 fps Inflow=0.96 cfs 0.568 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=0.96 cfs 0.566 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.14' Max Vel=0.27 fps Inflow=0.43 cfs 0.141 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=0.36 cfs 0.137 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.11' Max Vel=0.47 fps Inflow=0.36 cfs 0.137 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=0.34 cfs 0.134 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.20' Max Vel=0.06 fps Inflow=0.34 cfs 0.134 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=0.22 cfs 0.119 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.03' Max Vel=1.96 fps Inflow=0.22 cfs 0.119 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=0.22 cfs 0.119 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.09' Max Vel=0.41 fps Inflow=0.22 cfs 0.119 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=0.22 cfs 0.117 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.06' Max Vel=0.81 fps Inflow=0.22 cfs 0.117 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=0.22 cfs 0.117 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.10' Max Vel=0.36 fps Inflow=0.22 cfs 0.117 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=0.22 cfs 0.115 af

Reach 100R: Final Reach #100 Inflow=6.50 cfs 2.074 af
Outflow=6.50 cfs 2.074 af

Reach 300R: Final Reach #300 Inflow=1.29 cfs 0.137 af
Outflow=1.29 cfs 0.137 af

Reach 500R: Final Reach #500 Inflow=1.74 cfs 0.309 af
Outflow=1.74 cfs 0.309 af

Reach 600R: Final Reach #600 Inflow=0.17 cfs 0.035 af
Outflow=0.17 cfs 0.035 af

Reach 700R: Final Analysis Point 700 Inflow=1.90 cfs 0.345 af
Outflow=1.90 cfs 0.345 af

Pond 1P: Pond #1 Peak Elev=234.83' Storage=1,862 cf Inflow=7.18 cfs 2.075 af
Primary=6.50 cfs 2.074 af Secondary=0.00 cfs 0.000 af Outflow=6.50 cfs 2.074 af

Pond 3P: Pond #3 Peak Elev=227.70' Storage=30 cf Inflow=1.29 cfs 0.137 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=1.29 cfs 0.137 af

Pond 5P: Pond #5 Peak Elev=196.25' Storage=2 cf Inflow=1.74 cfs 0.309 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=1.74 cfs 0.309 af

Pond 11P: Pond #11 Peak Elev=304.34' Storage=479 cf Inflow=0.55 cfs 0.143 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=0.43 cfs 0.141 af

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=2,024,339 sf 0.64% Impervious Runoff Depth>1.10"
Flow Length=655' Tc=32.3 min CN=61 Runoff=29.19 cfs 4.267 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>0.42"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=1.78 cfs 0.491 af

Subcatchment 3S: Subcatchment #3 Runoff Area=104,612 sf 7.71% Impervious Runoff Depth>1.64"
Flow Length=404' Tc=13.3 min CN=69 Runoff=3.52 cfs 0.328 af

Subcatchment 4S: Subcatchment #4 Runoff Area=318,856 sf 6.17% Impervious Runoff Depth>1.16"
Flow Length=1,147' Tc=27.5 min CN=62 Runoff=5.30 cfs 0.711 af

Subcatchment 5S: Subcatchment #5 Runoff Area=67,744 sf 9.50% Impervious Runoff Depth>1.30"
Flow Length=679' Tc=15.7 min CN=64 Runoff=1.61 cfs 0.168 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>0.99"
Flow Length=377' Tc=24.8 min CN=59 Runoff=0.82 cfs 0.112 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>0.55"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=7.55 cfs 2.292 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>0.98"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=2.56 cfs 0.456 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=315.0' S=0.0222 '/' Capacity=83.53 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.13' Max Vel=1.90 fps Inflow=1.78 cfs 0.491 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=1.78 cfs 0.491 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.15' Max Vel=1.79 fps Inflow=1.78 cfs 0.491 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=1.76 cfs 0.489 af

Reach 4R: Reach #4 Avg. Flow Depth=0.43' Max Vel=5.63 fps Inflow=5.30 cfs 0.711 af
n=0.022 L=230.7' S=0.0390 '/' Capacity=31.88 cfs Outflow=5.29 cfs 0.710 af

Reach 10R: Reach #10 Avg. Flow Depth=0.33' Max Vel=2.44 fps Inflow=7.57 cfs 2.700 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=7.56 cfs 2.697 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.28' Max Vel=0.43 fps Inflow=1.63 cfs 0.453 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=1.53 cfs 0.445 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.22' Max Vel=0.75 fps Inflow=1.53 cfs 0.445 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=1.50 cfs 0.440 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.42' Max Vel=0.10 fps Inflow=1.50 cfs 0.440 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=1.07 cfs 0.414 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.07' Max Vel=3.18 fps Inflow=1.07 cfs 0.414 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=1.07 cfs 0.414 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.19' Max Vel=0.67 fps Inflow=1.07 cfs 0.414 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=1.07 cfs 0.410 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.12' Max Vel=1.32 fps Inflow=1.07 cfs 0.410 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=1.07 cfs 0.409 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.21' Max Vel=0.58 fps Inflow=1.07 cfs 0.409 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=1.07 cfs 0.407 af

Reach 100R: Final Reach #100 Inflow=14.26 cfs 7.448 af
Outflow=14.26 cfs 7.448 af

Reach 300R: Final Reach #300 Inflow=3.52 cfs 0.328 af
Outflow=3.52 cfs 0.328 af

Reach 500R: Final Reach #500 Inflow=6.47 cfs 0.878 af
Outflow=6.47 cfs 0.878 af

Reach 600R: Final Reach #600 Inflow=0.82 cfs 0.112 af
Outflow=0.82 cfs 0.112 af

Reach 700R: Final Analysis Point 700 Inflow=7.30 cfs 0.991 af
Outflow=7.30 cfs 0.991 af

Pond 1P: Pond #1 Peak Elev=237.07' Storage=54,250 cf Inflow=31.86 cfs 7.452 af
Primary=14.26 cfs 7.448 af Secondary=0.00 cfs 0.000 af Outflow=14.26 cfs 7.448 af

Pond 3P: Pond #3 Peak Elev=228.03' Storage=69 cf Inflow=3.52 cfs 0.328 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=3.52 cfs 0.328 af

Pond 5P: Pond #5 Peak Elev=196.98' Storage=17 cf Inflow=6.47 cfs 0.878 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=6.47 cfs 0.878 af

Pond 11P: Pond #11 Peak Elev=304.68' Storage=3,101 cf Inflow=2.56 cfs 0.456 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=1.63 cfs 0.453 af

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=2,024,339 sf 0.64% Impervious Runoff Depth>1.84"
Flow Length=655' Tc=32.3 min CN=61 Runoff=52.06 cfs 7.113 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>0.88"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=5.02 cfs 1.024 af

Subcatchment 3S: Subcatchment #3 Runoff Area=104,612 sf 7.71% Impervious Runoff Depth>2.53"
Flow Length=404' Tc=13.3 min CN=69 Runoff=5.58 cfs 0.506 af

Subcatchment 4S: Subcatchment #4 Runoff Area=318,856 sf 6.17% Impervious Runoff Depth>1.92"
Flow Length=1,147' Tc=27.5 min CN=62 Runoff=9.27 cfs 1.171 af

Subcatchment 5S: Subcatchment #5 Runoff Area=67,744 sf 9.50% Impervious Runoff Depth>2.09"
Flow Length=679' Tc=15.7 min CN=64 Runoff=2.74 cfs 0.271 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>1.68"
Flow Length=377' Tc=24.8 min CN=59 Runoff=1.54 cfs 0.192 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>1.07"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=17.91 cfs 4.463 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>1.67"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=4.77 cfs 0.779 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=315.0' S=0.0222 '/' Capacity=83.53 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.21' Max Vel=2.62 fps Inflow=5.02 cfs 1.024 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=5.02 cfs 1.023 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.24' Max Vel=2.47 fps Inflow=5.02 cfs 1.023 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=5.00 cfs 1.021 af

Reach 4R: Reach #4 Avg. Flow Depth=0.56' Max Vel=6.66 fps Inflow=9.27 cfs 1.171 af
n=0.022 L=230.7' S=0.0390 '/' Capacity=31.88 cfs Outflow=9.27 cfs 1.171 af

Reach 10R: Reach #10 Avg. Flow Depth=0.49' Max Vel=3.19 fps Inflow=17.96 cfs 5.177 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=17.95 cfs 5.173 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.36' Max Vel=0.51 fps Inflow=2.69 cfs 0.774 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=2.60 cfs 0.763 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.29' Max Vel=0.88 fps Inflow=2.60 cfs 0.763 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=2.57 cfs 0.757 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.56' Max Vel=0.12 fps Inflow=2.57 cfs 0.757 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=2.03 cfs 0.724 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.09' Max Vel=3.87 fps Inflow=2.03 cfs 0.724 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=2.03 cfs 0.723 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.26' Max Vel=0.82 fps Inflow=2.03 cfs 0.723 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=2.02 cfs 0.719 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.16' Max Vel=1.60 fps Inflow=2.02 cfs 0.719 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=2.02 cfs 0.717 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.28' Max Vel=0.70 fps Inflow=2.02 cfs 0.717 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=2.02 cfs 0.715 af

Reach 100R: Final Reach #100 Inflow=16.25 cfs 13.297 af
Outflow=16.25 cfs 13.297 af

Reach 300R: Final Reach #300 Inflow=5.57 cfs 0.505 af
Outflow=5.57 cfs 0.505 af

Reach 500R: Final Reach #500 Inflow=11.28 cfs 1.442 af
Outflow=11.28 cfs 1.442 af

Reach 600R: Final Reach #600 Inflow=1.54 cfs 0.192 af
Outflow=1.54 cfs 0.192 af

Reach 700R: Final Analysis Point 700 Inflow=12.82 cfs 1.634 af
Outflow=12.82 cfs 1.634 af

Pond 1P: Pond #1 Peak Elev=237.85' Storage=186,808 cf Inflow=61.71 cfs 13.307 af
Primary=16.25 cfs 13.297 af Secondary=0.00 cfs 0.000 af Outflow=16.25 cfs 13.297 af

Pond 3P: Pond #3 Peak Elev=228.26' Storage=112 cf Inflow=5.58 cfs 0.506 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=5.57 cfs 0.505 af

Pond 5P: Pond #5 Peak Elev=198.16' Storage=107 cf Inflow=11.29 cfs 1.442 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=11.28 cfs 1.442 af

Pond 11P: Pond #11 Peak Elev=304.91' Storage=6,795 cf Inflow=4.77 cfs 0.779 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=2.69 cfs 0.774 af

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=2,024,339 sf 0.64% Impervious Runoff Depth>2.60"
Flow Length=655' Tc=32.3 min CN=61 Runoff=75.80 cfs 10.074 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>1.41"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=9.10 cfs 1.636 af

Subcatchment 3S: Subcatchment #3 Runoff Area=104,612 sf 7.71% Impervious Runoff Depth>3.41"
Flow Length=404' Tc=13.3 min CN=69 Runoff=7.61 cfs 0.683 af

Subcatchment 4S: Subcatchment #4 Runoff Area=318,856 sf 6.17% Impervious Runoff Depth>2.70"
Flow Length=1,147' Tc=27.5 min CN=62 Runoff=13.38 cfs 1.648 af

Subcatchment 5S: Subcatchment #5 Runoff Area=67,744 sf 9.50% Impervious Runoff Depth>2.91"
Flow Length=679' Tc=15.7 min CN=64 Runoff=3.89 cfs 0.377 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>2.41"
Flow Length=377' Tc=24.8 min CN=59 Runoff=2.30 cfs 0.276 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>1.65"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=30.20 cfs 6.886 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>2.40"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=7.12 cfs 1.119 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=315.0' S=0.0222 '/' Capacity=83.53 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.28' Max Vel=3.15 fps Inflow=9.10 cfs 1.636 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=9.10 cfs 1.635 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.32' Max Vel=2.97 fps Inflow=9.10 cfs 1.635 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=9.08 cfs 1.632 af

Reach 4R: Reach #4 Avg. Flow Depth=0.66' Max Vel=7.42 fps Inflow=13.38 cfs 1.648 af
n=0.022 L=230.7' S=0.0390 '/' Capacity=31.88 cfs Outflow=13.38 cfs 1.647 af

Reach 10R: Reach #10 Avg. Flow Depth=0.62' Max Vel=3.75 fps Inflow=30.49 cfs 7.927 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=30.47 cfs 7.921 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.42' Max Vel=0.56 fps Inflow=3.67 cfs 1.112 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=3.58 cfs 1.099 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.33' Max Vel=0.97 fps Inflow=3.58 cfs 1.099 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=3.55 cfs 1.091 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.66' Max Vel=0.14 fps Inflow=3.55 cfs 1.091 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=2.97 cfs 1.051 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.11' Max Vel=4.35 fps Inflow=2.97 cfs 1.051 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=2.97 cfs 1.051 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.31' Max Vel=0.92 fps Inflow=2.97 cfs 1.051 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=2.96 cfs 1.045 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.20' Max Vel=1.80 fps Inflow=2.96 cfs 1.045 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=2.96 cfs 1.044 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.34' Max Vel=0.79 fps Inflow=2.96 cfs 1.044 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=2.96 cfs 1.041 af

Reach 100R: Final Reach #100 Inflow=17.57 cfs 16.881 af
Outflow=17.57 cfs 16.881 af

Reach 300R: Final Reach #300 Inflow=7.59 cfs 0.683 af
Outflow=7.59 cfs 0.683 af

Reach 500R: Final Reach #500 Inflow=16.02 cfs 2.024 af
Outflow=16.02 cfs 2.024 af

Reach 600R: Final Reach #600 Inflow=2.30 cfs 0.276 af
Outflow=2.30 cfs 0.276 af

Reach 700R: Final Analysis Point 700 Inflow=18.27 cfs 2.300 af
Outflow=18.27 cfs 2.300 af

Pond 1P: Pond #1 Peak Elev=238.42' Storage=366,598 cf Inflow=95.35 cfs 19.627 af
Primary=17.57 cfs 16.881 af Secondary=0.00 cfs 0.000 af Outflow=17.57 cfs 16.881 af

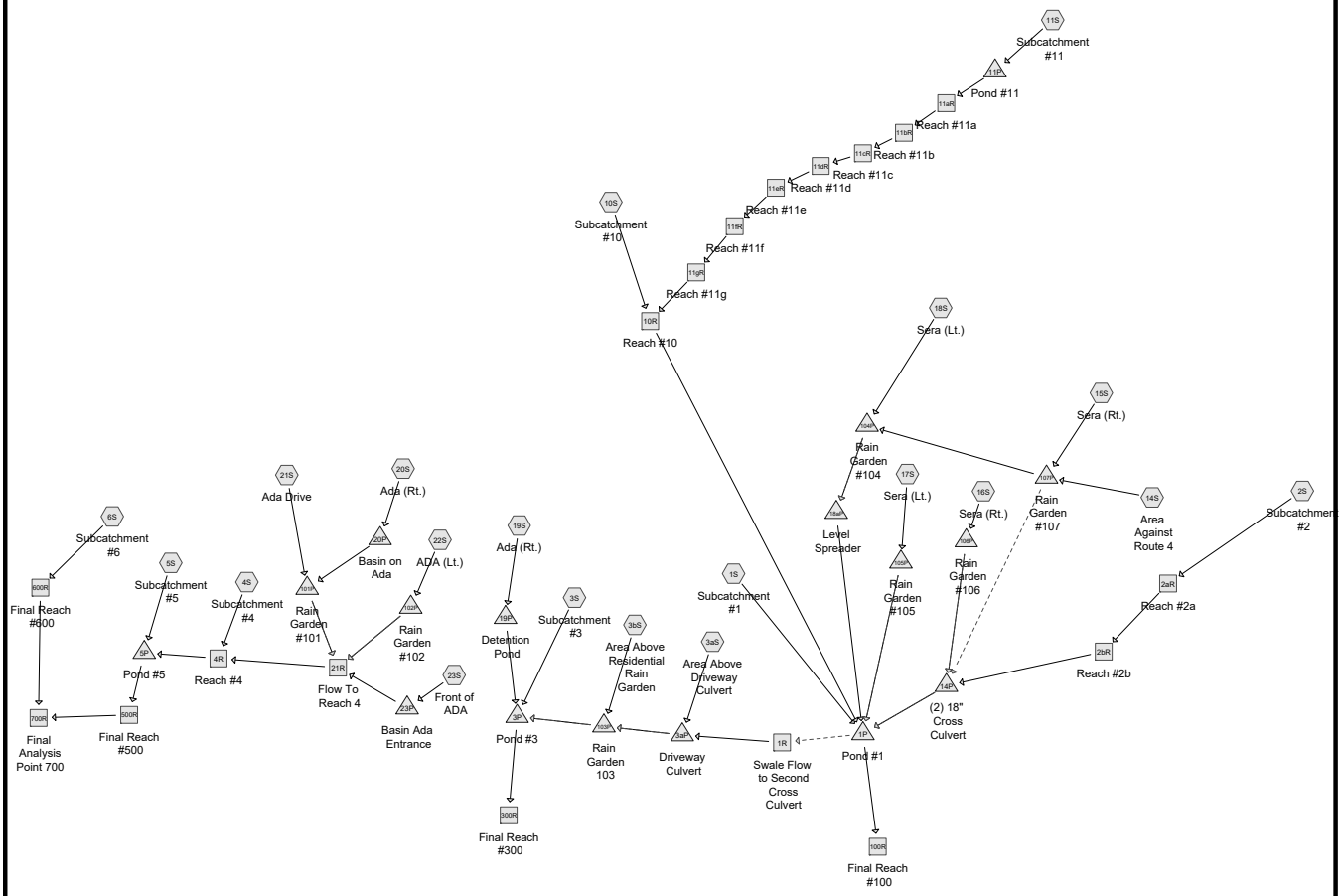
Pond 3P: Pond #3 Peak Elev=228.46' Storage=164 cf Inflow=7.61 cfs 0.683 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=7.59 cfs 0.683 af

Pond 5P: Pond #5 Peak Elev=199.94' Storage=599 cf Inflow=16.25 cfs 2.024 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=16.02 cfs 2.024 af

Pond 11P: Pond #11 Peak Elev=305.09' Storage=11,238 cf Inflow=7.12 cfs 1.119 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=3.67 cfs 1.112 af

Appendix II - Proposed Conditions Analysis

25 Yr - 24 Hr. Full Summary
2 Yr - 24 Hr. Node Listing
10 Yr - 24 Hr. Node Listing
25 Yr – 24 Hr. Node Listing
50 Yr - 24 Hr. Node Listing



Subcat Reach Pond Link

Routing Diagram for 18-030 Proposed Conditions
Prepared by Berry Surveying & Engineering, Printed 6/2/2019
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.144	39	>75% Grass cover, Good, HSG A (1S, 14S)
3.230	61	>75% Grass cover, Good, HSG B (1S, 3aS, 3S, 4S, 5S, 11S, 14S, 19S, 20S, 21S, 22S, 23S)
4.931	74	>75% Grass cover, Good, HSG C (1S, 2S, 3aS, 3bS, 3S, 4S, 5S, 6S, 11S, 14S, 15S, 16S, 17S, 18S, 20S, 21S)
0.095	98	Paved parking, HSG A (1S)
0.115	98	Paved parking, HSG B (3S, 5S)
0.483	98	Paved parking, HSG C (5S, 14S, 18S)
0.575	98	Unconnected pavement, HSG A (10S, 14S)
2.399	98	Unconnected pavement, HSG B (1S, 2S, 3aS, 4S, 10S, 11S, 14S, 21S, 22S, 23S)
1.081	98	Unconnected pavement, HSG C (3aS, 3S, 4S, 10S, 11S, 16S, 17S, 20S, 21S)
0.088	98	Unconnected roofs & pavement, HSG C (1S)
0.050	98	Unconnected roofs, HSG A (10S)
0.605	98	Unconnected roofs, HSG B (10S)
0.454	98	Unconnected roofs, HSG C (3bS, 10S, 15S)
3.340	30	Woods, Good, HSG A (2S, 10S)
46.610	45	Woods, Good, HSG B (1S, 2S, 10S, 11S)
5.728	55	Woods, Good, HSG B (3aS, 3S, 4S, 5S, 6S, 19S, 21S)
33.813	62	Woods, Good, HSG C (1S, 2S, 10S, 11S)
5.046	70	Woods, Good, HSG C (3aS, 3bS, 3S, 4S, 5S, 6S, 14S, 15S, 18S, 19S, 20S, 21S)
7.366	77	Woods, Good, HSG D (1S)
1.204	32	Woods/grass comb., Good, HSG A (10S)
9.649	58	Woods/grass comb., Good, HSG B (2S, 10S)
1.573	72	Woods/grass comb., Good, HSG C (10S)
128.578	**57**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.408	HSG A	1S, 2S, 10S, 14S
68.335	HSG B	1S, 2S, 3aS, 3S, 4S, 5S, 6S, 10S, 11S, 14S, 19S, 20S, 21S, 22S, 23S
47.468	HSG C	1S, 2S, 3aS, 3bS, 3S, 4S, 5S, 6S, 10S, 11S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S
7.366	HSG D	1S
0.000	Other	
128.578		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.144	3.230	4.931	0.000	0.000	8.304	>75% Grass cover, Good	1S, 2S, 3aS, 3bS, 3S, 4S, 5S, 6S, 11S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S
0.095	0.115	0.483	0.000	0.000	0.693	Paved parking	1S, 3S, 5S, 14S, 18S
0.575	2.399	1.081	0.000	0.000	4.054	Unconnected pavement	1S, 2S, 3aS, 3S, 4S, 10S, 11S

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.050	0.605	0.454	0.000	0.000	1.109	Unconnected roofs	3bS, 10S, 15S
0.000	0.000	0.088	0.000	0.000	0.088	Unconnected roofs & pavement	1S
3.340	52.338	38.859	7.366	0.000	101.904	Woods, Good	1S, 2S, 3aS, 3bS, 3S, 4S, 5S, 6S, 10S, 11S, 14S, 15S, 18S, 19S, 20S, 21S
1.204	9.649	1.573	0.000	0.000	12.426	Woods/grass comb., Good	2S, 10S
5.408	**68.335**	**47.468**	**7.366**	**0.000**	**128.578**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	233.20	232.97	68.8	0.0033	0.012	18.0	0.0	0.0
2	3aP	235.00	233.00	30.0	0.0667	0.012	18.0	0.0	0.0
3	3P	227.24	223.84	105.2	0.0323	0.012	24.0	0.0	0.0
4	5P	195.65	193.92	77.5	0.0223	0.012	18.0	0.0	0.0
5	11P	304.00	303.87	25.6	0.0051	0.012	18.0	0.0	0.0
6	14P	236.40	236.00	40.0	0.0100	0.012	18.0	0.0	0.0
7	19P	231.00	230.00	140.0	0.0071	0.012	12.0	0.0	0.0
8	20P	235.28	235.00	55.0	0.0051	0.012	12.0	0.0	0.0
9	23P	227.80	227.50	57.1	0.0053	0.012	12.0	0.0	0.0
10	101P	232.00	231.00	30.0	0.0333	0.012	12.0	0.0	0.0
11	102P	227.50	227.50	10.0	0.0000	0.012	6.0	0.0	0.0
12	103P	230.00	230.00	20.0	0.0000	0.012	6.0	0.0	0.0
13	104P	237.00	237.00	20.0	0.0000	0.012	12.0	0.0	0.0
14	105P	236.00	236.00	50.0	0.0000	0.012	6.0	0.0	0.0
15	106P	236.75	236.40	50.0	0.0070	0.012	6.0	0.0	0.0
16	107P	241.00	240.65	70.0	0.0050	0.012	12.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=1,797,161 sf 0.56% Impervious Runoff Depth>1.84"
Flow Length=655' Tc=32.3 min CN=61 Runoff=46.22 cfs 6.315 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>0.88"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=5.02 cfs 1.024 af

Subcatchment 3aS: Area Above Driveway Runoff Area=33,449 sf 20.54% Impervious Runoff Depth>2.53"
Flow Length=100' Slope=0.0500 '/' Tc=15.3 min UI Adjusted CN=69 Runoff=1.69 cfs 0.162 af

Subcatchment 3bS: Area Above Runoff Area=16,619 sf 27.23% Impervious Runoff Depth>3.28"
Tc=0.0 min UI Adjusted CN=77 Runoff=1.80 cfs 0.104 af

Subcatchment 3S: Subcatchment #3 Runoff Area=56,977 sf 8.23% Impervious Runoff Depth>2.62"
Flow Length=404' Tc=13.3 min CN=70 Runoff=3.16 cfs 0.285 af

Subcatchment 4S: Subcatchment #4 Runoff Area=195,772 sf 10.11% Impervious Runoff Depth>1.68"
Flow Length=887' Tc=24.0 min UI Adjusted CN=59 Runoff=5.13 cfs 0.630 af

Subcatchment 5S: Subcatchment #5 Runoff Area=69,744 sf 9.23% Impervious Runoff Depth>2.09"
Flow Length=679' Tc=15.7 min CN=64 Runoff=2.82 cfs 0.279 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>1.68"
Flow Length=377' Tc=28.2 min CN=59 Runoff=1.46 cfs 0.192 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>1.07"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=17.91 cfs 4.463 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>1.67"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=4.77 cfs 0.779 af

Subcatchment 14S: Area Against Route 4 Runoff Area=76,802 sf 9.88% Impervious Runoff Depth>2.61"
Flow Length=389' Tc=16.8 min UI Adjusted CN=70 Runoff=3.89 cfs 0.384 af

Subcatchment 15S: Sera (Rt.) Runoff Area=96,848 sf 11.06% Impervious Runoff Depth>2.89"
Flow Length=730' Tc=13.8 min UI Adjusted CN=73 Runoff=5.89 cfs 0.536 af

Subcatchment 16S: Sera (Rt.) Runoff Area=7,152 sf 24.58% Impervious Runoff Depth>3.28"
Tc=6.0 min UI Adjusted CN=77 Runoff=0.63 cfs 0.045 af

Subcatchment 17S: Sera (Lt.) Runoff Area=3,416 sf 29.77% Impervious Runoff Depth>3.37"
Tc=6.0 min UI Adjusted CN=78 Runoff=0.31 cfs 0.022 af

Subcatchment 18S: Sera (Lt.) Runoff Area=30,552 sf 49.26% Impervious Runoff Depth>4.18"
Flow Length=605' Tc=11.8 min CN=86 Runoff=2.80 cfs 0.244 af

Subcatchment 19S: Ada (Rt.) Runoff Area=15,825 sf 0.00% Impervious Runoff Depth>1.69"
Flow Length=100' Slope=0.1400 '/' Tc=10.1 min CN=59 Runoff=0.58 cfs 0.051 af

Subcatchment 20S: Ada (Rt.) Runoff Area=37,491 sf 4.78% Impervious Runoff Depth>2.89"
Flow Length=516' Tc=16.7 min CN=73 Runoff=2.12 cfs 0.207 af

Subcatchment 21S: Ada Drive Runoff Area=66,926 sf 42.72% Impervious Runoff Depth>3.67"
Flow Length=505' Tc=11.3 min CN=81 Runoff=5.53 cfs 0.470 af

Subcatchment 22S: ADA (Lt.) Runoff Area=4,518 sf 54.54% Impervious Runoff Depth>3.67"
Tc=6.0 min CN=81 Runoff=0.44 cfs 0.032 af

Subcatchment 23S: Front of ADA Runoff Area=6,292 sf 37.76% Impervious Runoff Depth>3.08"
Tc=6.0 min CN=75 Runoff=0.52 cfs 0.037 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=302.0' S=0.0033 '/' Capacity=32.24 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.21' Max Vel=2.62 fps Inflow=5.02 cfs 1.024 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=5.02 cfs 1.023 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.24' Max Vel=2.47 fps Inflow=5.02 cfs 1.023 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=5.00 cfs 1.021 af

Reach 4R: Reach #4 Avg. Flow Depth=0.47' Max Vel=6.03 fps Inflow=6.40 cfs 1.333 af
n=0.022 L=223.0' S=0.0404 '/' Capacity=32.43 cfs Outflow=6.39 cfs 1.333 af

Reach 10R: Reach #10 Avg. Flow Depth=0.49' Max Vel=3.19 fps Inflow=17.96 cfs 5.177 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=17.95 cfs 5.173 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.36' Max Vel=0.51 fps Inflow=2.69 cfs 0.774 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=2.60 cfs 0.763 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.29' Max Vel=0.88 fps Inflow=2.60 cfs 0.763 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=2.57 cfs 0.757 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.56' Max Vel=0.12 fps Inflow=2.57 cfs 0.757 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=2.03 cfs 0.724 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.09' Max Vel=3.87 fps Inflow=2.03 cfs 0.724 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=2.03 cfs 0.723 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.26' Max Vel=0.82 fps Inflow=2.03 cfs 0.723 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=2.02 cfs 0.719 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.16' Max Vel=1.60 fps Inflow=2.02 cfs 0.719 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=2.02 cfs 0.717 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.28' Max Vel=0.70 fps Inflow=2.02 cfs 0.717 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=2.02 cfs 0.715 af

Reach 21R: Flow To Reach 4 Avg. Flow Depth=0.25' Max Vel=3.58 fps Inflow=1.70 cfs 0.704 af
n=0.022 L=603.0' S=0.0322 '/' Capacity=142.77 cfs Outflow=1.65 cfs 0.703 af

Reach 100R: Final Reach #100 Inflow=16.22 cfs 13.509 af
Outflow=16.22 cfs 13.509 af

Reach 300R: Final Reach #300 Inflow=4.79 cfs 0.533 af
Outflow=4.79 cfs 0.533 af

Reach 500R: Final Reach #500 Inflow=8.76 cfs 1.612 af
Outflow=8.76 cfs 1.612 af

Reach 600R: Final Reach #600 Inflow=1.46 cfs 0.192 af
Outflow=1.46 cfs 0.192 af

Reach 700R: Final Analysis Point 700 Inflow=10.10 cfs 1.804 af
Outflow=10.10 cfs 1.804 af

Pond 1P: Pond #1 Peak Elev=237.84' Storage=183,850 cf Inflow=60.95 cfs 13.522 af
Primary=16.22 cfs 13.509 af Secondary=0.00 cfs 0.000 af Outflow=16.22 cfs 13.509 af

Pond 3aP: Driveway Culvert Peak Elev=235.80' Storage=132 cf Inflow=1.69 cfs 0.162 af
Primary=1.59 cfs 0.161 af Secondary=0.00 cfs 0.000 af Outflow=1.59 cfs 0.161 af

Pond 3P: Pond #3 Peak Elev=228.18' Storage=95 cf Inflow=4.80 cfs 0.534 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=4.79 cfs 0.533 af

Pond 5P: Pond #5 Peak Elev=197.46' Storage=41 cf Inflow=8.76 cfs 1.612 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=8.76 cfs 1.612 af

Pond 11P: Pond #11 Peak Elev=304.91' Storage=6,795 cf Inflow=4.77 cfs 0.779 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=2.69 cfs 0.774 af

Pond 14P: (2) 18" Cross Culvert Peak Elev=237.84' Storage=1,189 cf Inflow=5.08 cfs 1.079 af
Primary=4.90 cfs 1.077 af Secondary=0.00 cfs 0.000 af Outflow=4.90 cfs 1.077 af

Pond 18aP: Level Spreader Peak Elev=238.63' Storage=636 cf Inflow=5.23 cfs 0.952 af
Outflow=5.23 cfs 0.938 af

Pond 19P: Detention Pond Peak Elev=231.55' Storage=680 cf Inflow=0.58 cfs 0.051 af
Outflow=0.15 cfs 0.049 af

Pond 20P: Basin on Ada Peak Elev=237.02' Storage=0.001 af Inflow=2.12 cfs 0.207 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0051 '/' Outflow=2.11 cfs 0.207 af

Pond 23P: Basin Ada Entrance Peak Elev=230.26' Storage=0.001 af Inflow=0.52 cfs 0.037 af
12.0" Round Culvert n=0.012 L=57.1' S=0.0053 '/' Outflow=0.52 cfs 0.036 af

Pond 101P: Rain Garden #101 Peak Elev=237.01' Storage=13,309 cf Inflow=7.41 cfs 0.677 af
Primary=0.90 cfs 0.641 af Secondary=0.00 cfs 0.000 af Outflow=0.90 cfs 0.641 af

Pond 102P: Rain Garden #102 Peak Elev=230.25' Storage=255 cf Inflow=0.44 cfs 0.032 af
Primary=0.04 cfs 0.003 af Secondary=0.39 cfs 0.024 af Outflow=0.43 cfs 0.027 af

Pond 103P: Rain Garden 103 Peak Elev=235.62' Storage=3,364 cf Inflow=2.41 cfs 0.265 af
Primary=0.08 cfs 0.091 af Secondary=1.97 cfs 0.108 af Outflow=2.05 cfs 0.199 af

Pond 104P: Rain Garden #104 Peak Elev=242.65' Storage=14,989 cf Inflow=11.13 cfs 1.034 af
Primary=3.06 cfs 0.904 af Secondary=2.17 cfs 0.048 af Outflow=5.23 cfs 0.952 af

Pond 105P: Rain Garden #105 Peak Elev=239.17' Storage=338 cf Inflow=0.31 cfs 0.022 af
Primary=0.07 cfs 0.019 af Secondary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.019 af

Pond 106P: Rain Garden #106 Peak Elev=239.81' Storage=767 cf Inflow=0.63 cfs 0.045 af
Primary=0.08 cfs 0.041 af Secondary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.041 af

Pond 107P: Rain Garden #107 Peak Elev=247.61' Storage=5,720 cf Inflow=9.65 cfs 0.920 af
Primary=8.38 cfs 0.789 af Secondary=1.09 cfs 0.017 af Outflow=9.47 cfs 0.806 af

Total Runoff Area = 128.578 ac Runoff Volume = 16.260 af Average Runoff Depth = 1.52"
95.38% Pervious = 122.634 ac 4.62% Impervious = 5.944 ac

Summary for Subcatchment 1S: Subcatchment #1

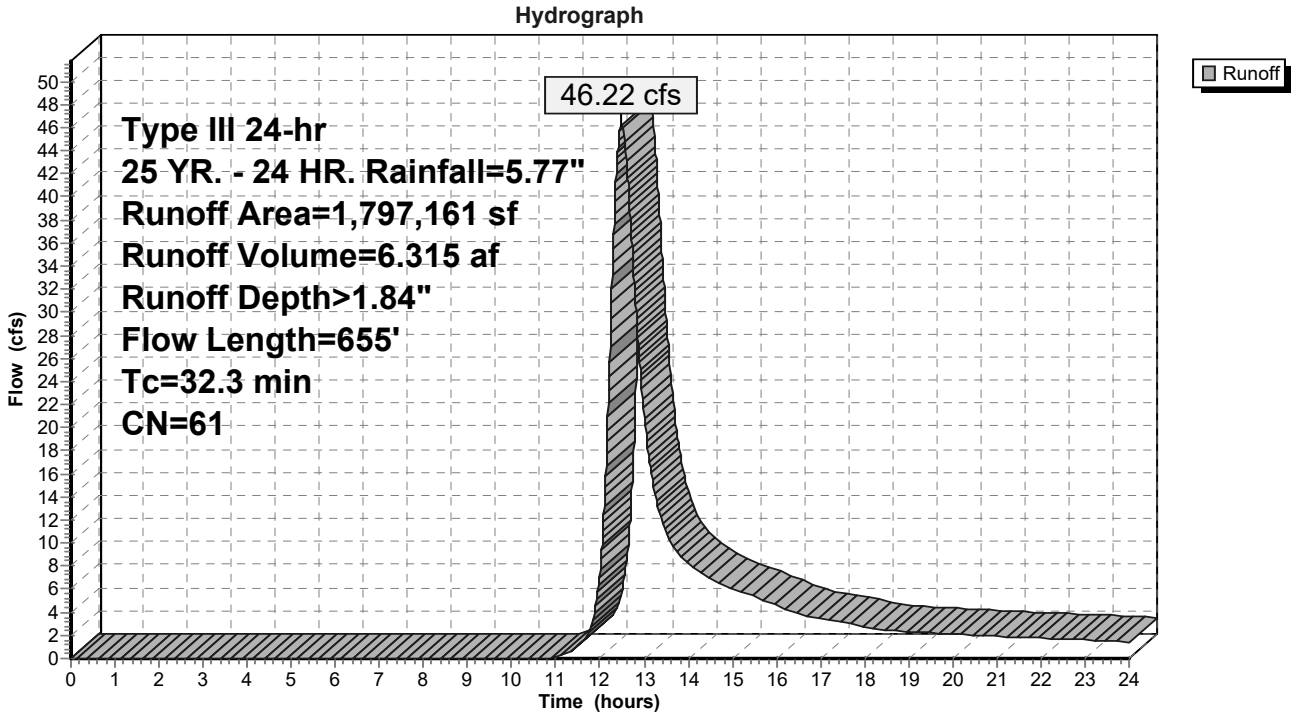
Runoff = 46.22 cfs @ 12.49 hrs, Volume= 6.315 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

	Area (sf)	CN	Description
	1,832	39	>75% Grass cover, Good, HSG A
	2,500	61	>75% Grass cover, Good, HSG B
	71,585	74	>75% Grass cover, Good, HSG C
	297,452	77	Woods, Good, HSG D
	4,117	98	Paved parking, HSG A
	2,049	98	Unconnected pavement, HSG B
*	3,825	98	Unconnected roofs & pavement, HSG C
*	452,529	45	Woods, Good, HSG B
*	937,847	62	Woods, Good, HSG C
	23,425	77	Woods, Good, HSG D
	1,797,161	61	Weighted Average
	1,787,170		99.44% Pervious Area
	9,991		0.56% Impervious Area
	5,874		58.79% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0300	0.09		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
3.3	285	0.0842	1.45		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
9.4	200	0.0050	0.35		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
0.8	70	0.0857	1.46		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
32.3	655	Total			

Subcatchment 1S: Subcatchment #1



Summary for Subcatchment 2S: Subcatchment #2

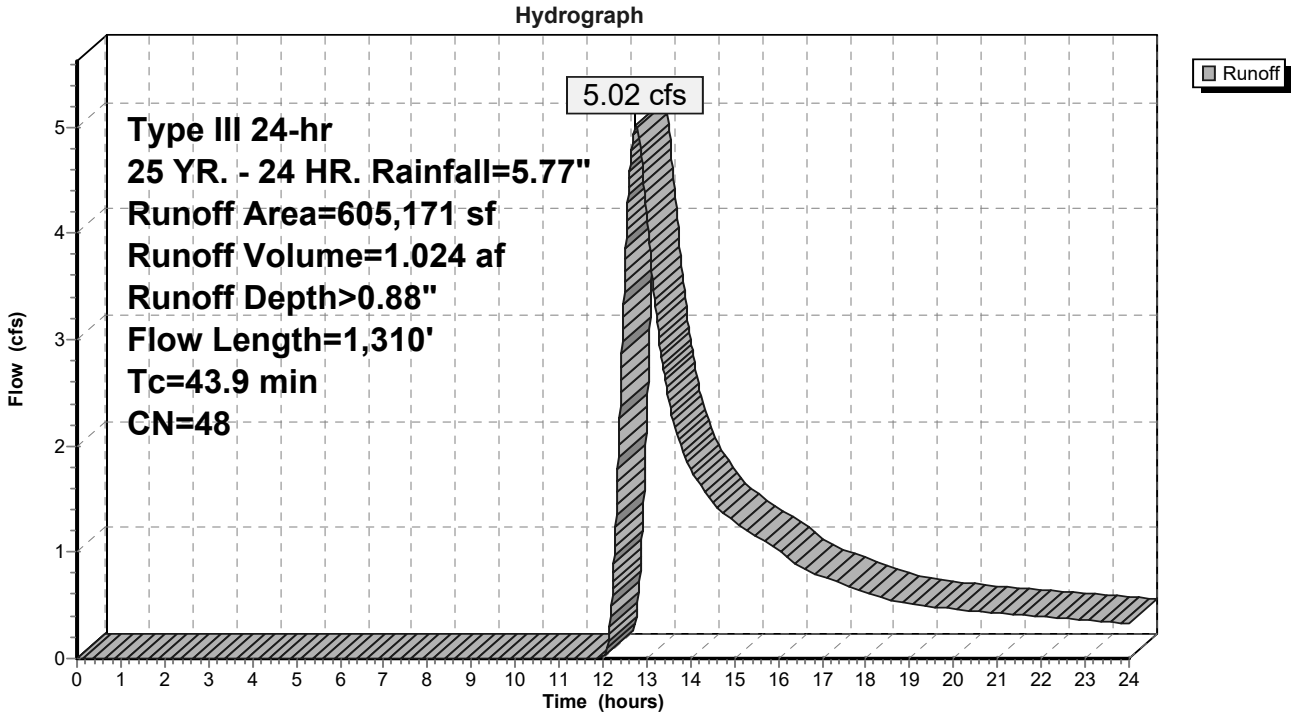
Runoff = 5.02 cfs @ 12.73 hrs, Volume= 1.024 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

	Area (sf)	CN	Description
	4,285	74	>75% Grass cover, Good, HSG C
	35,000	58	Woods/grass comb., Good, HSG B
	7,889	98	Unconnected pavement, HSG B
	83,599	30	Woods, Good, HSG A
*	348,434	45	Woods, Good, HSG B
*	125,964	62	Woods, Good, HSG C
	605,171	48	Weighted Average
	597,282		98.70% Pervious Area
	7,889		1.30% Impervious Area
	7,889		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.1	100	0.0200	0.08		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
3.8	195	0.0300	0.87		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
2.4	175	0.0600	1.22		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
15.6	840	0.0321	0.90		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
43.9	1,310	Total			

Subcatchment 2S: Subcatchment #2



Summary for Subcatchment 3aS: Area Above Driveway Culvert

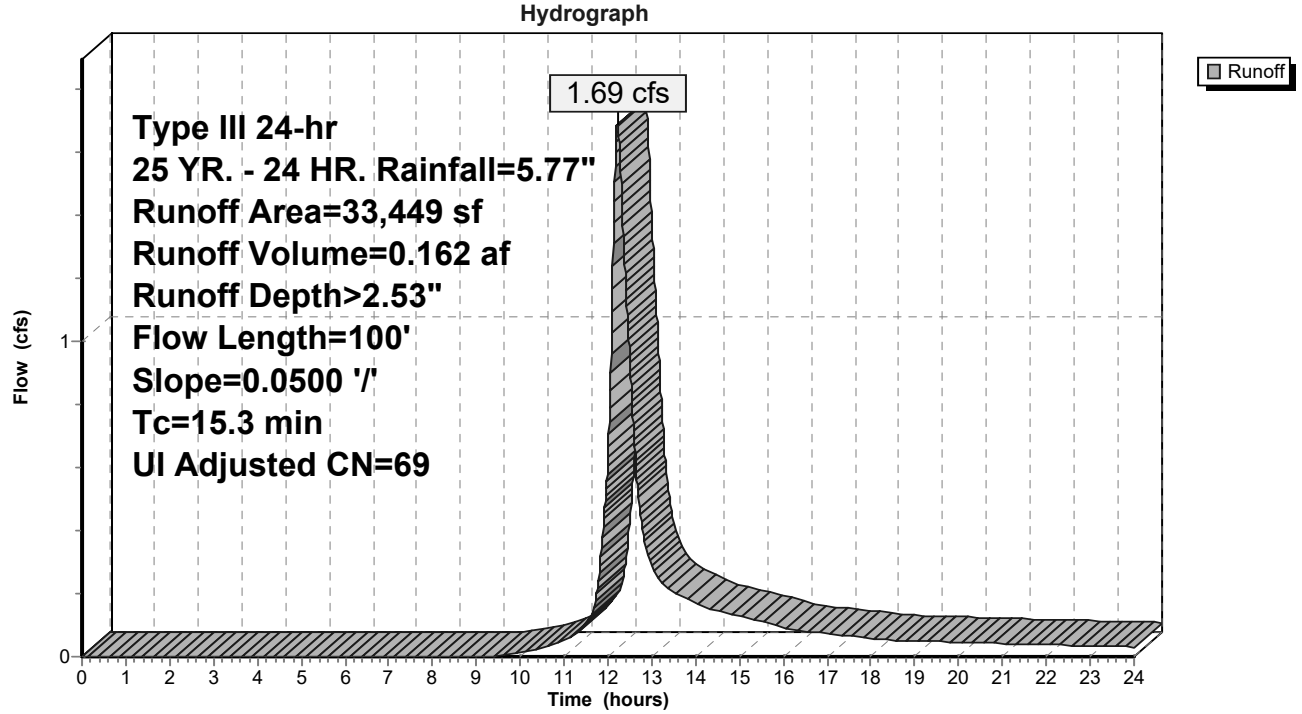
Runoff = 1.69 cfs @ 12.22 hrs, Volume= 0.162 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Adj	Description
2,900	98		Unconnected pavement, HSG C
9,062	70		Woods, Good, HSG C
6,588	74		>75% Grass cover, Good, HSG C
5,787	55		Woods, Good, HSG B
3,970	98		Unconnected pavement, HSG B
5,142	61		>75% Grass cover, Good, HSG B
33,449	73	69	Weighted Average, UI Adjusted
26,579			79.46% Pervious Area
6,870			20.54% Impervious Area
6,870			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	100	0.0500	0.11		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 3.03"

Subcatchment 3aS: Area Above Driveway Culvert



Summary for Subcatchment 3bS: Area Above Residential Rain Garden

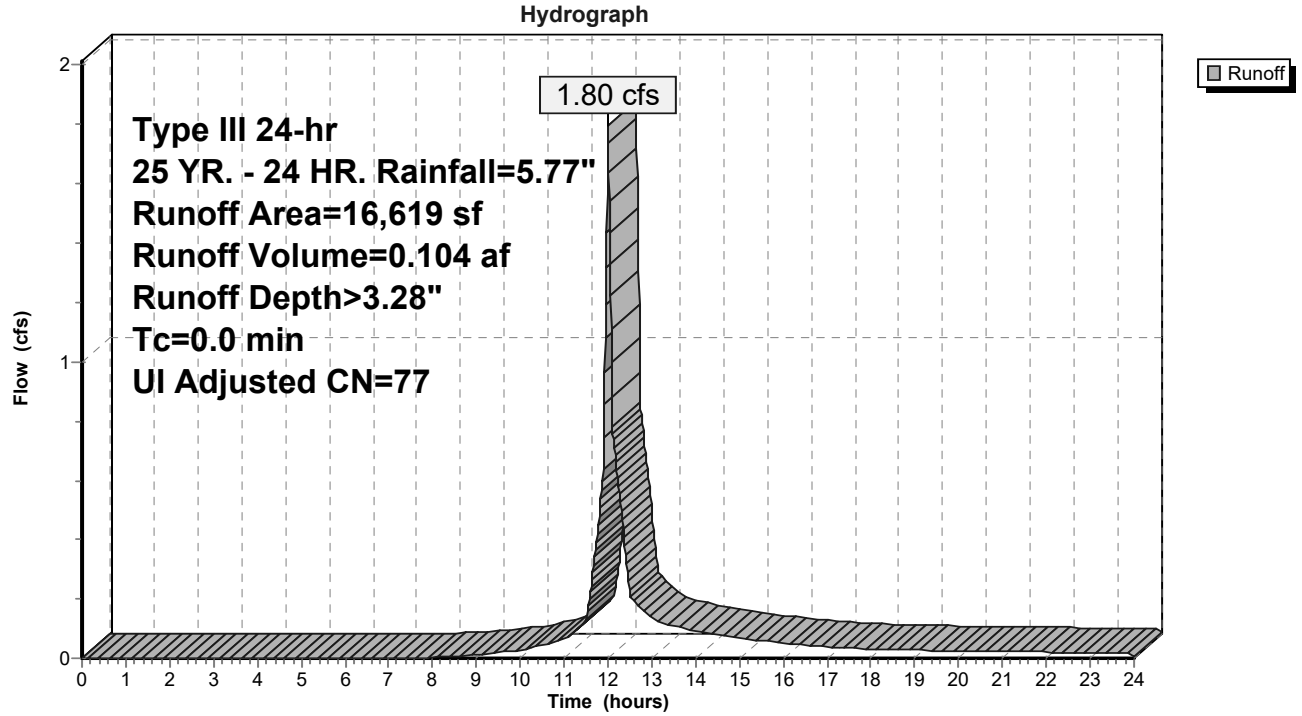
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.80 cfs @ 12.00 hrs, Volume= 0.104 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Adj	Description
4,526	98		Unconnected roofs, HSG C
10,015	74		>75% Grass cover, Good, HSG C
2,078	70		Woods, Good, HSG C
16,619	80	77	Weighted Average, UI Adjusted
12,093			72.77% Pervious Area
4,526			27.23% Impervious Area
4,526			100.00% Unconnected

Subcatchment 3bS: Area Above Residential Rain Garden



Summary for Subcatchment 3S: Subcatchment #3

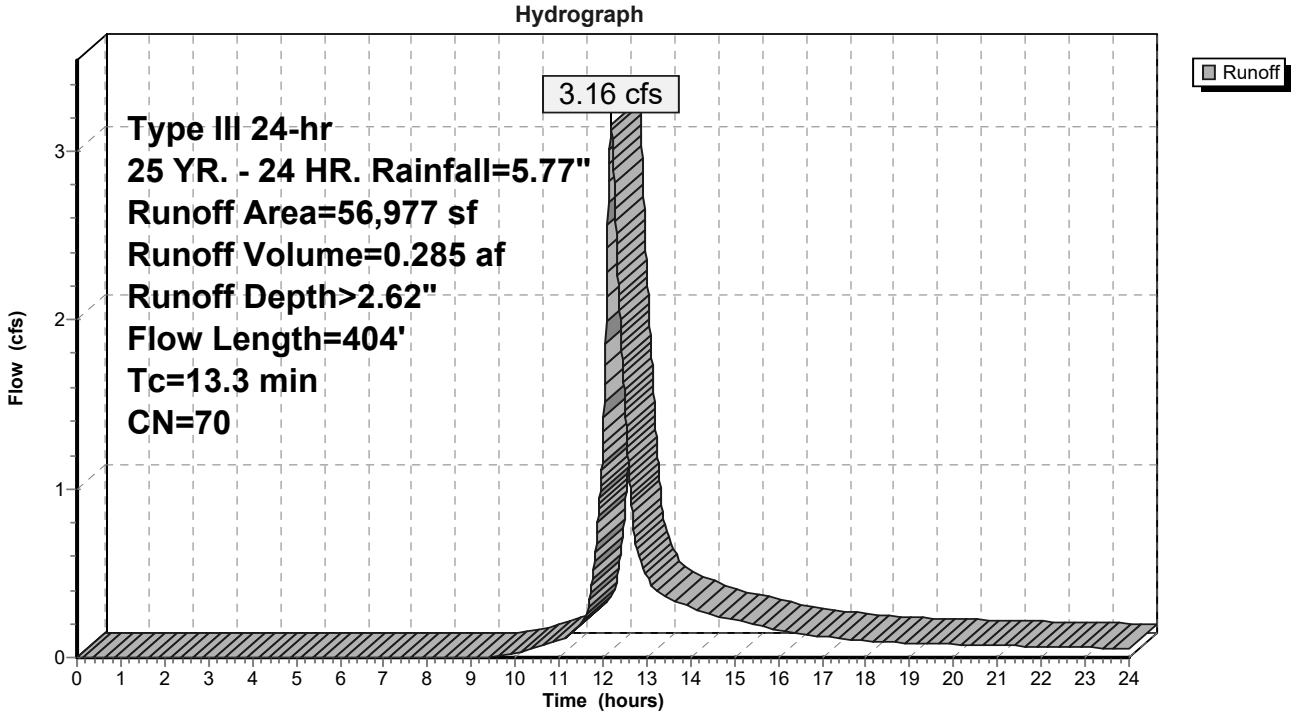
Runoff = 3.16 cfs @ 12.19 hrs, Volume= 0.285 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
600	98	Unconnected pavement, HSG C
4,092	98	Paved parking, HSG B
1,241	61	>75% Grass cover, Good, HSG B
5,397	74	>75% Grass cover, Good, HSG C
9,798	55	Woods, Good, HSG B
35,849	70	Woods, Good, HSG C
56,977	70	Weighted Average
52,285		91.77% Pervious Area
4,692		8.23% Impervious Area
600		12.79% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1400	0.16		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
3.2	304	0.0988	1.57		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
13.3	404	Total			

Subcatchment 3S: Subcatchment #3



Summary for Subcatchment 4S: Subcatchment #4

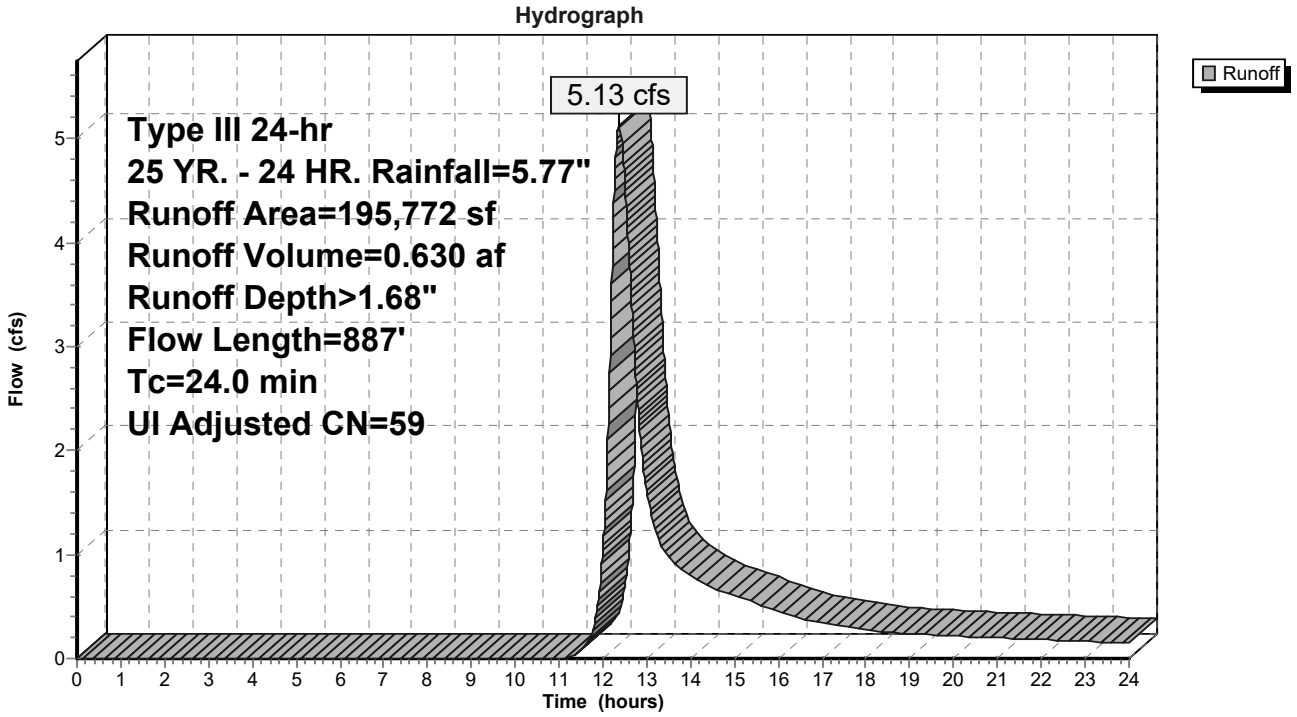
Runoff = 5.13 cfs @ 12.37 hrs, Volume= 0.630 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Adj	Description
18,181	98		Unconnected pavement, HSG B
1,602	98		Unconnected pavement, HSG C
14,254	61		>75% Grass cover, Good, HSG B
7,350	74		>75% Grass cover, Good, HSG C
141,883	55		Woods, Good, HSG B
12,502	70		Woods, Good, HSG C
195,772	61	59	Weighted Average, UI Adjusted
175,989			89.89% Pervious Area
19,783			10.11% Impervious Area
19,783			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1600	0.17		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
0.7	82	0.1341	1.83		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
2.9	116	0.0172	0.66		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
0.2	40	0.3500	2.96		**Shallow Concentrated Flow, 4** Woodland Kv= 5.0 fps
10.6	549	0.0297	0.86		**Shallow Concentrated Flow, 5** Woodland Kv= 5.0 fps
24.0	887	Total			

Subcatchment 4S: Subcatchment #4



Summary for Subcatchment 5S: Subcatchment #5

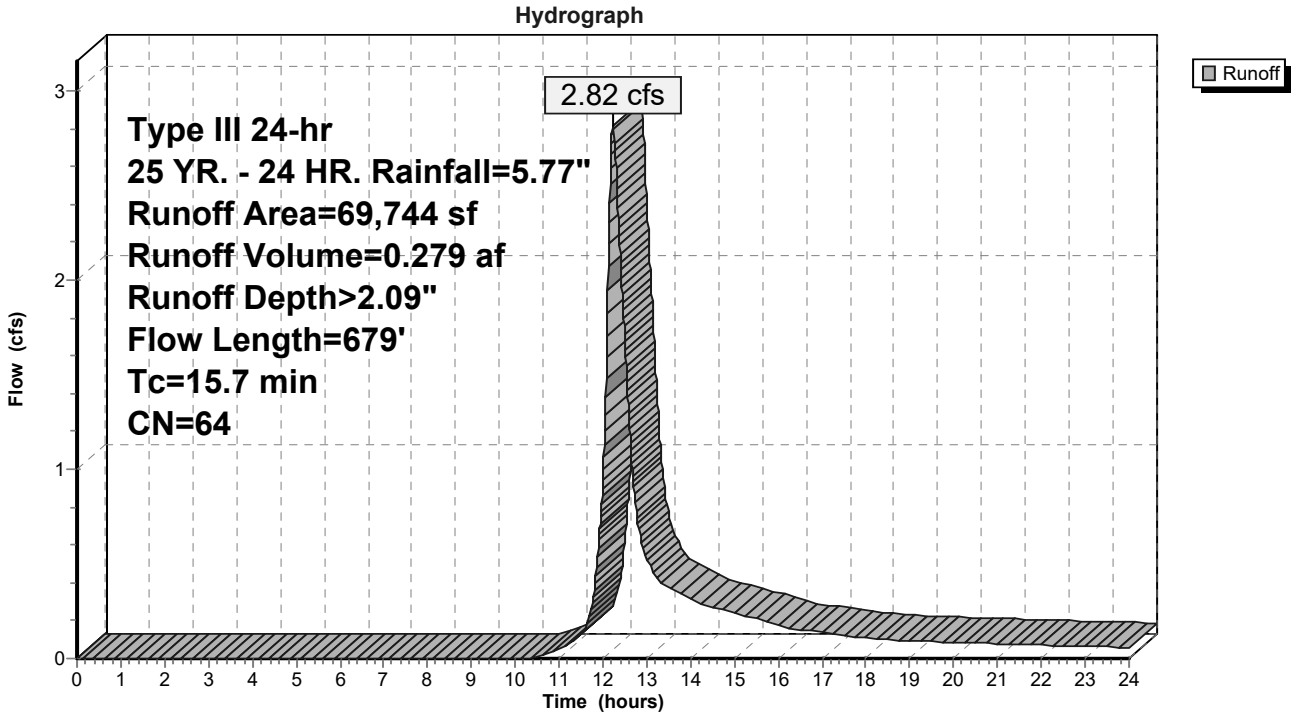
Runoff = 2.82 cfs @ 12.23 hrs, Volume= 0.279 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
286	61	>75% Grass cover, Good, HSG B
2,656	74	>75% Grass cover, Good, HSG C
925	98	Paved parking, HSG B
5,509	98	Paved parking, HSG C
40,991	55	Woods, Good, HSG B
18,377	70	Woods, Good, HSG C
1,000	74	>75% Grass cover, Good, HSG C
69,744	64	Weighted Average
63,310		90.77% Pervious Area
6,434		9.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1600	0.17		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
1.1	156	0.2114	2.30		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
5.0	423	0.0804	1.42		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
15.7	679	Total			

Subcatchment 5S: Subcatchment #5



Summary for Subcatchment 6S: Subcatchment #6

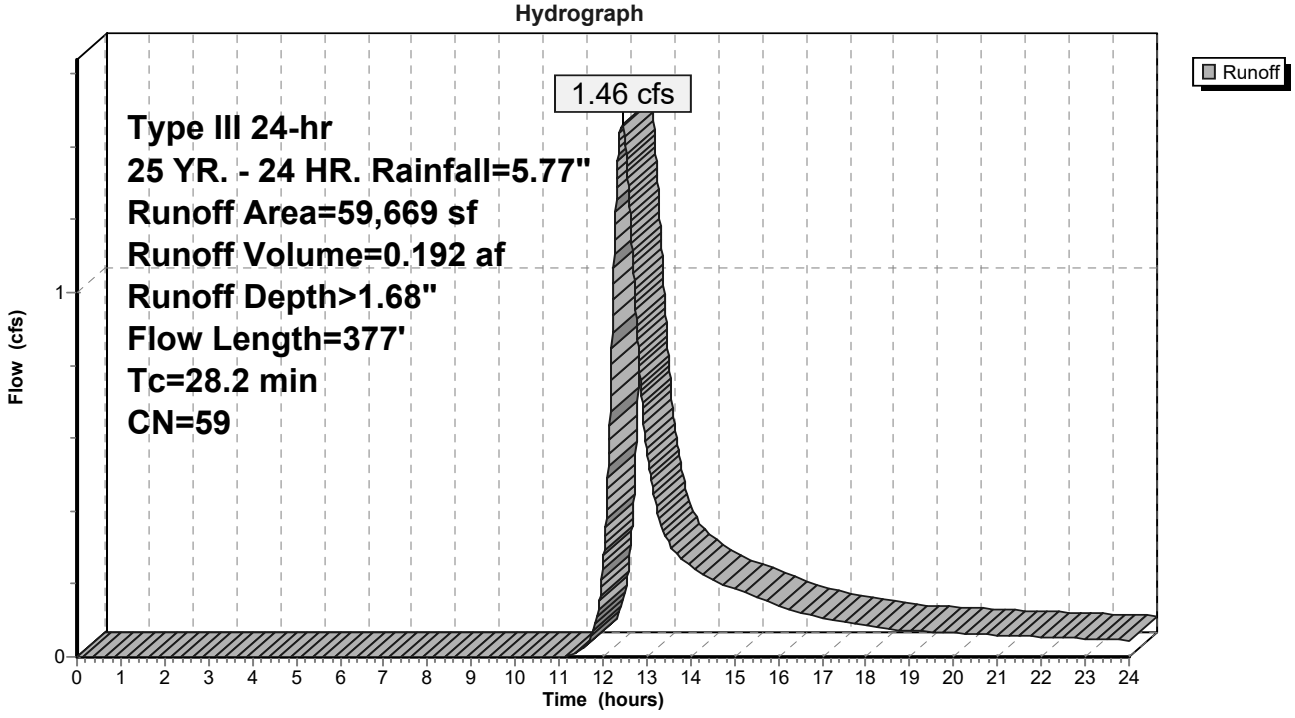
Runoff = 1.46 cfs @ 12.44 hrs, Volume= 0.192 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
42,654	55	Woods, Good, HSG B
15,944	70	Woods, Good, HSG C
1,071	74	>75% Grass cover, Good, HSG C
59,669	59	Weighted Average
59,669		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	100	0.0050	0.07		**Sheet Flow, Segment #1** Grass: Dense n= 0.240 P2= 3.03"
2.7	277	0.1190	1.72		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
28.2	377	Total			

Subcatchment 6S: Subcatchment #6



Summary for Subcatchment 10S: Subcatchment #10

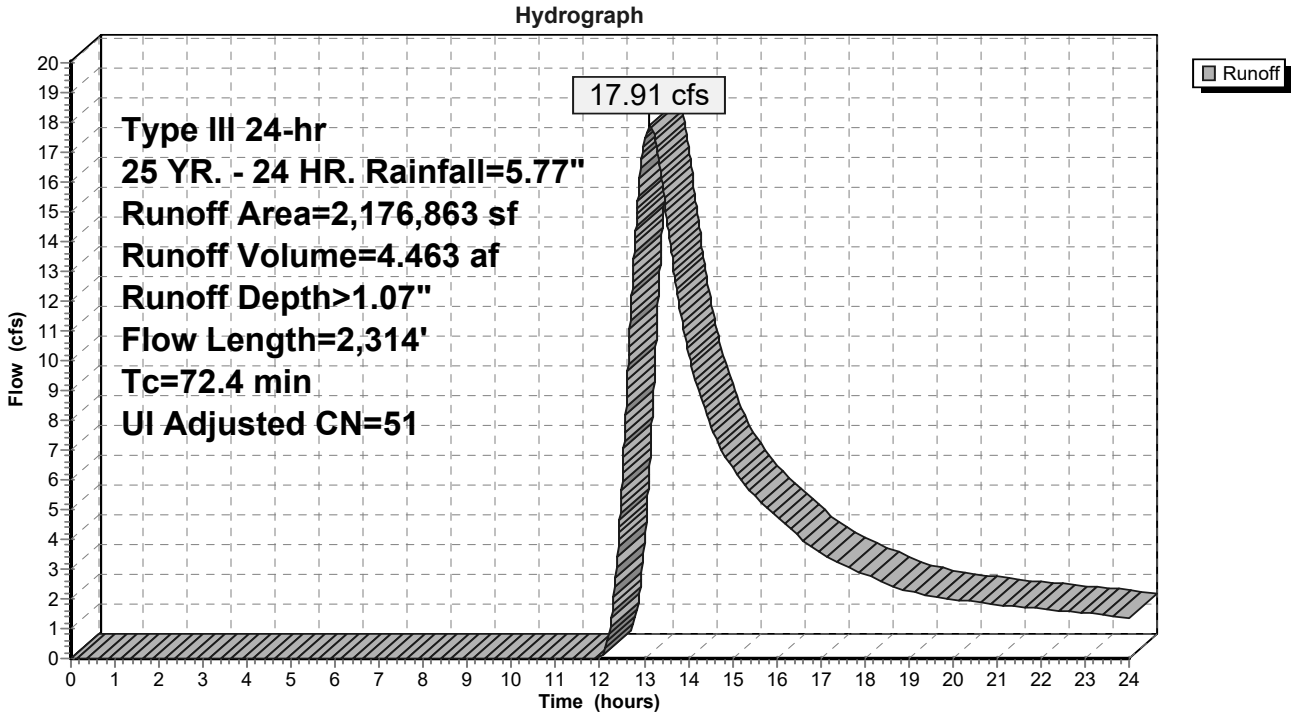
Runoff = 17.91 cfs @ 13.12 hrs, Volume= 4.463 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

	Area (sf)	CN	Adj	Description
	2,181	98		Unconnected roofs, HSG A
	26,354	98		Unconnected roofs, HSG B
	4,525	98		Unconnected roofs, HSG C
	52,459	32		Woods/grass comb., Good, HSG A
	385,291	58		Woods/grass comb., Good, HSG B
	68,512	72		Woods/grass comb., Good, HSG C
	21,330	98		Unconnected pavement, HSG A
	56,088	98		Unconnected pavement, HSG B
	7,831	98		Unconnected pavement, HSG C
	61,898	30		Woods, Good, HSG A
*	1,179,260	45		Woods, Good, HSG B
*	311,134	62		Woods, Good, HSG C
	2,176,863	53	51	Weighted Average, UI Adjusted
	2,058,554			94.57% Pervious Area
	118,309			5.43% Impervious Area
	118,309			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0600	0.12		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
15.1	497	0.0121	0.55		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
10.6	568	0.0317	0.89		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
18.3	388	0.0050	0.35		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
0.1	21	0.0477	4.43		**Shallow Concentrated Flow, Segment #5** Paved Kv= 20.3 fps
7.2	381	0.0315	0.89		**Shallow Concentrated Flow, Segment #6** Woodland Kv= 5.0 fps
2.3	162	0.0557	1.18		**Shallow Concentrated Flow, Segment #7** Woodland Kv= 5.0 fps
4.6	197	0.0204	0.71		**Shallow Concentrated Flow, Segment #8** Woodland Kv= 5.0 fps
72.4	2,314	Total			

Subcatchment 10S: Subcatchment #10



Summary for Subcatchment 11S: Subcatchment #11

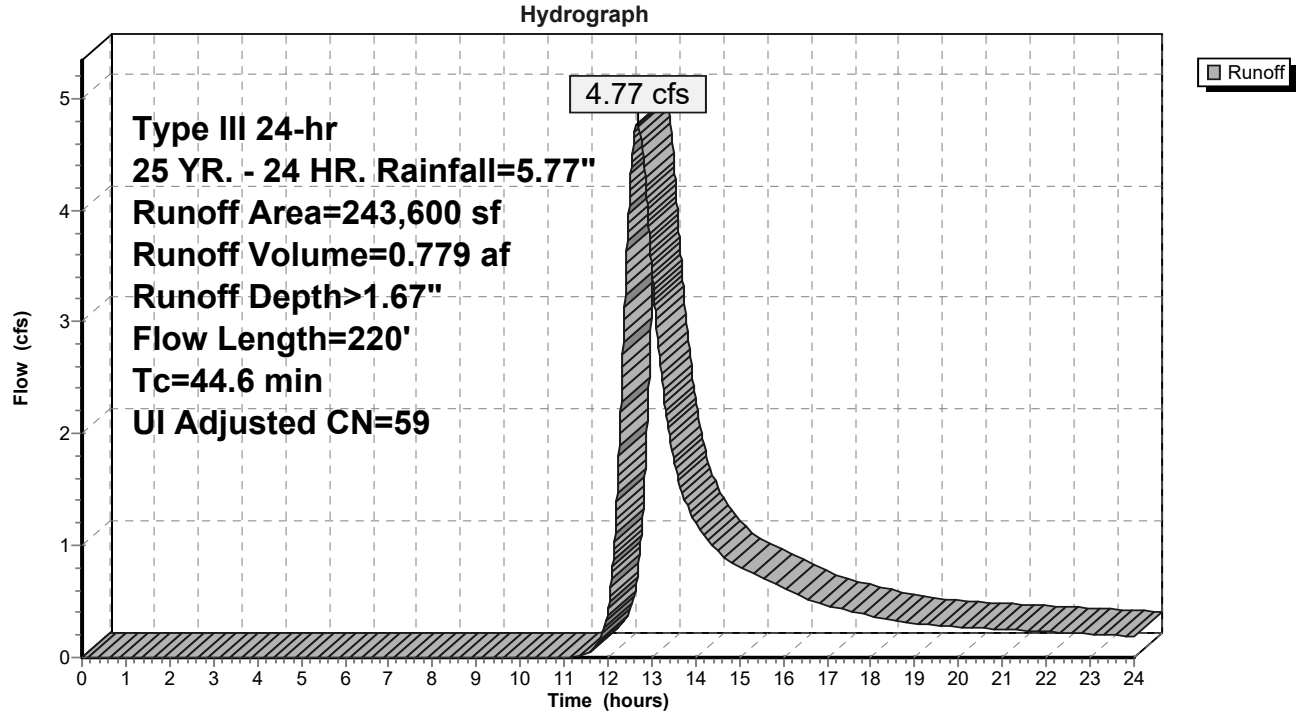
Runoff = 4.77 cfs @ 12.68 hrs, Volume= 0.779 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

	Area (sf)	CN	Adj	Description
	85,372	61		>75% Grass cover, Good, HSG B
	1,084	74		>75% Grass cover, Good, HSG C
	6,338	98		Unconnected pavement, HSG B
	2,739	98		Unconnected pavement, HSG C
*	50,126	45		Woods, Good, HSG B
*	97,941	62		Woods, Good, HSG C
	243,600	60	59	Weighted Average, UI Adjusted
	234,523			96.27% Pervious Area
	9,077			3.73% Impervious Area
	9,077			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.4	100	0.0050	0.04		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.03"
6.2	120	0.0042	0.32		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
44.6	220	Total			

Subcatchment 11S: Subcatchment #11



Summary for Subcatchment 14S: Area Against Route 4

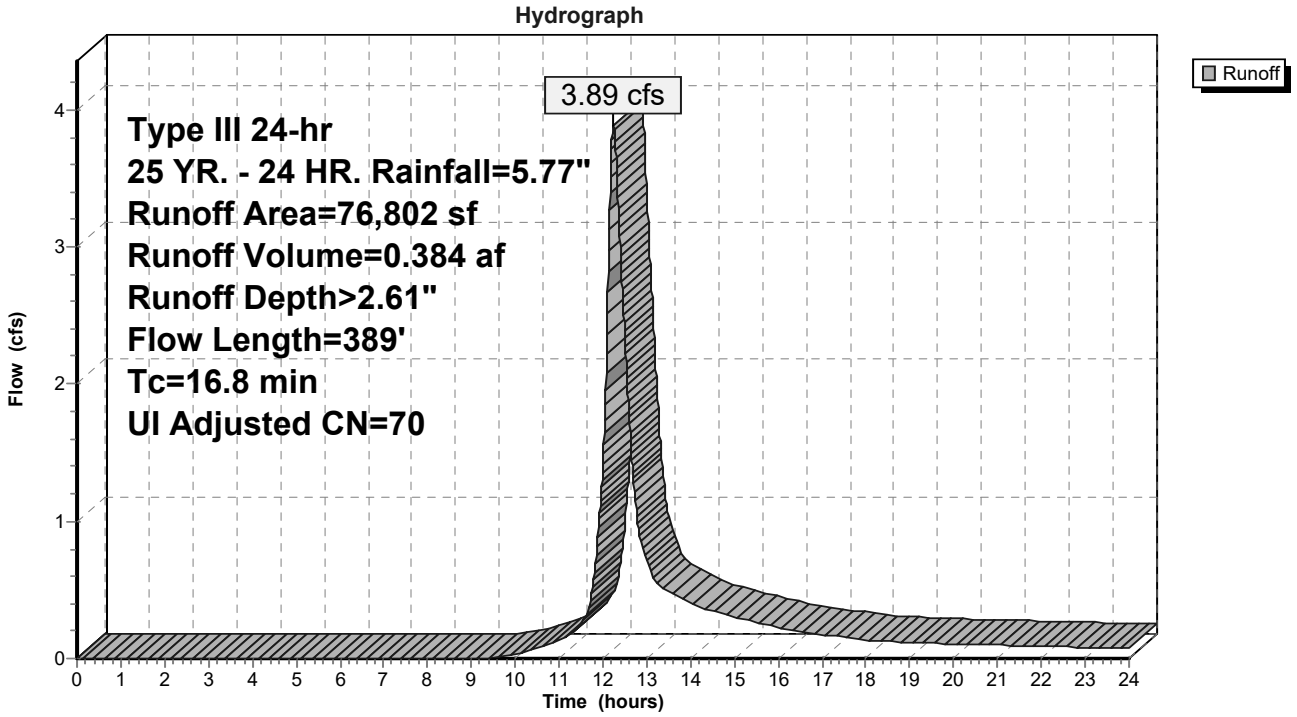
Runoff = 3.89 cfs @ 12.23 hrs, Volume= 0.384 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Adj	Description
3,709	98		Unconnected pavement, HSG A
3,376	98		Unconnected pavement, HSG B
500	98		Paved parking, HSG C
7,038	74		>75% Grass cover, Good, HSG C
4,433	39		>75% Grass cover, Good, HSG A
3,044	61		>75% Grass cover, Good, HSG B
54,702	70		Woods, Good, HSG C
76,802	71	70	Weighted Average, UI Adjusted
69,217			90.12% Pervious Area
7,585			9.88% Impervious Area
7,085			93.41% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.1000	0.14		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 3.03"
5.2	289	0.0346	0.93		**Shallow Concentrated Flow, 2** Woodland Kv= 5.0 fps
16.8	389	Total			

Subcatchment 14S: Area Against Route 4



Summary for Subcatchment 15S: Sera (Rt.)

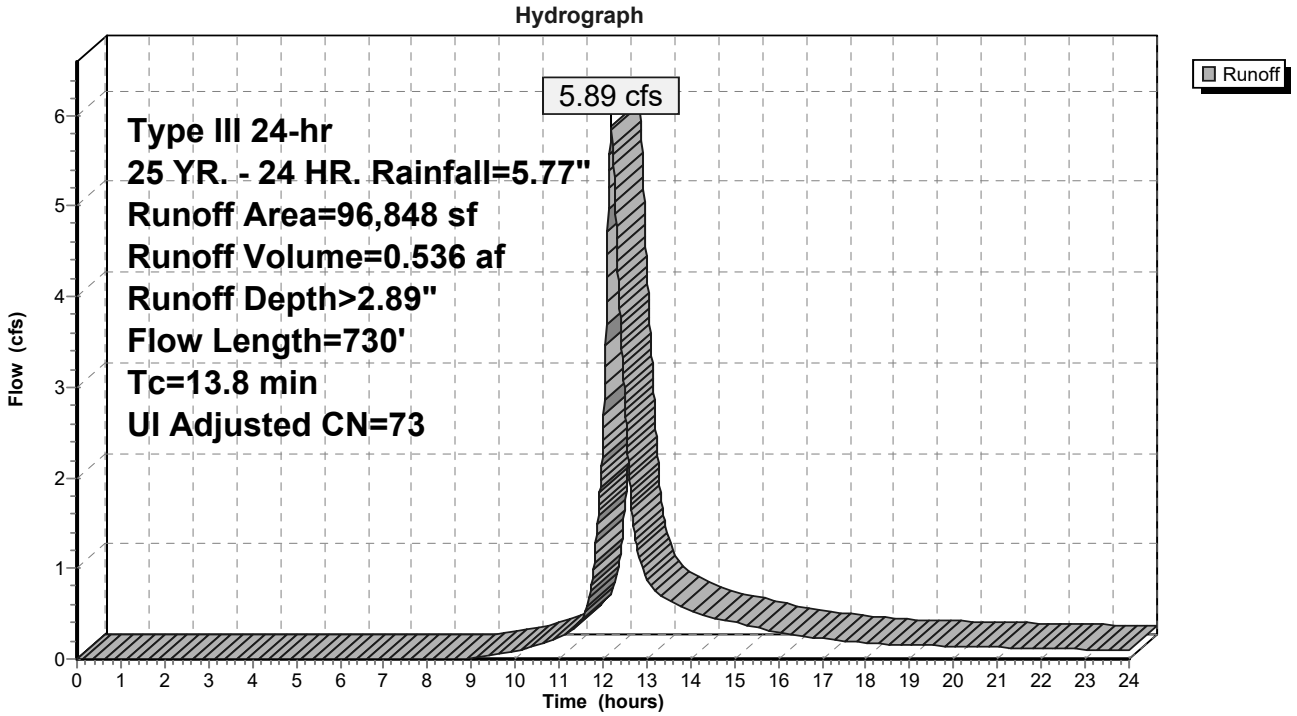
Runoff = 5.89 cfs @ 12.19 hrs, Volume= 0.536 af, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Adj	Description
10,713	98		Unconnected roofs, HSG C
33,702	74		>75% Grass cover, Good, HSG C
52,433	70		Woods, Good, HSG C
96,848	74	73	Weighted Average, UI Adjusted
86,135			88.94% Pervious Area
10,713			11.06% Impervious Area
10,713			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	83	0.1807	0.26		**Sheet Flow, 1** Grass: Dense n= 0.240 P2= 3.03"
5.2	375	0.0587	1.21		**Shallow Concentrated Flow, 2** Woodland Kv= 5.0 fps
3.4	272	0.0368	1.34		**Shallow Concentrated Flow, 3** Short Grass Pasture Kv= 7.0 fps
13.8	730	Total			

Subcatchment 15S: Sera (Rt.)



Summary for Subcatchment 16S: Sera (Rt.)

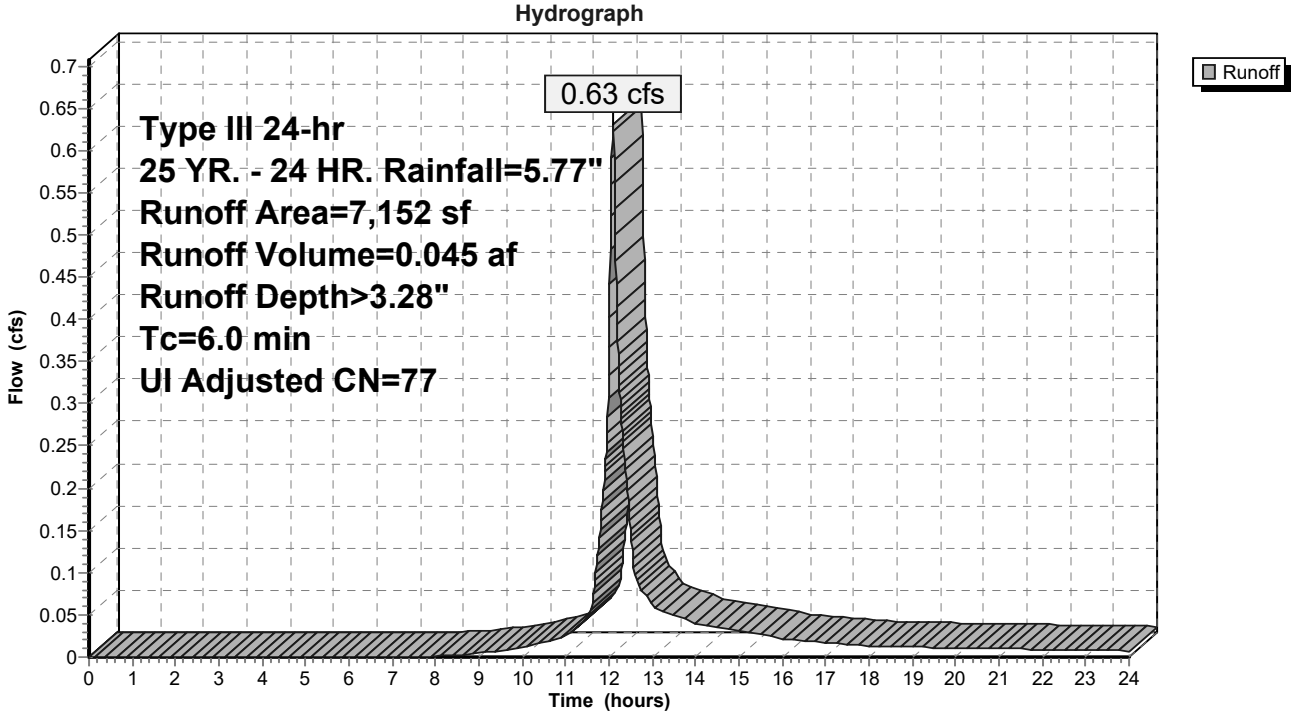
Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.045 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Adj	Description
1,758	98		Unconnected pavement, HSG C
5,394	74		>75% Grass cover, Good, HSG C
7,152	80	77	Weighted Average, UI Adjusted
5,394			75.42% Pervious Area
1,758			24.58% Impervious Area
1,758			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 1**

Subcatchment 16S: Sera (Rt.)



Summary for Subcatchment 17S: Sera (Lt.)

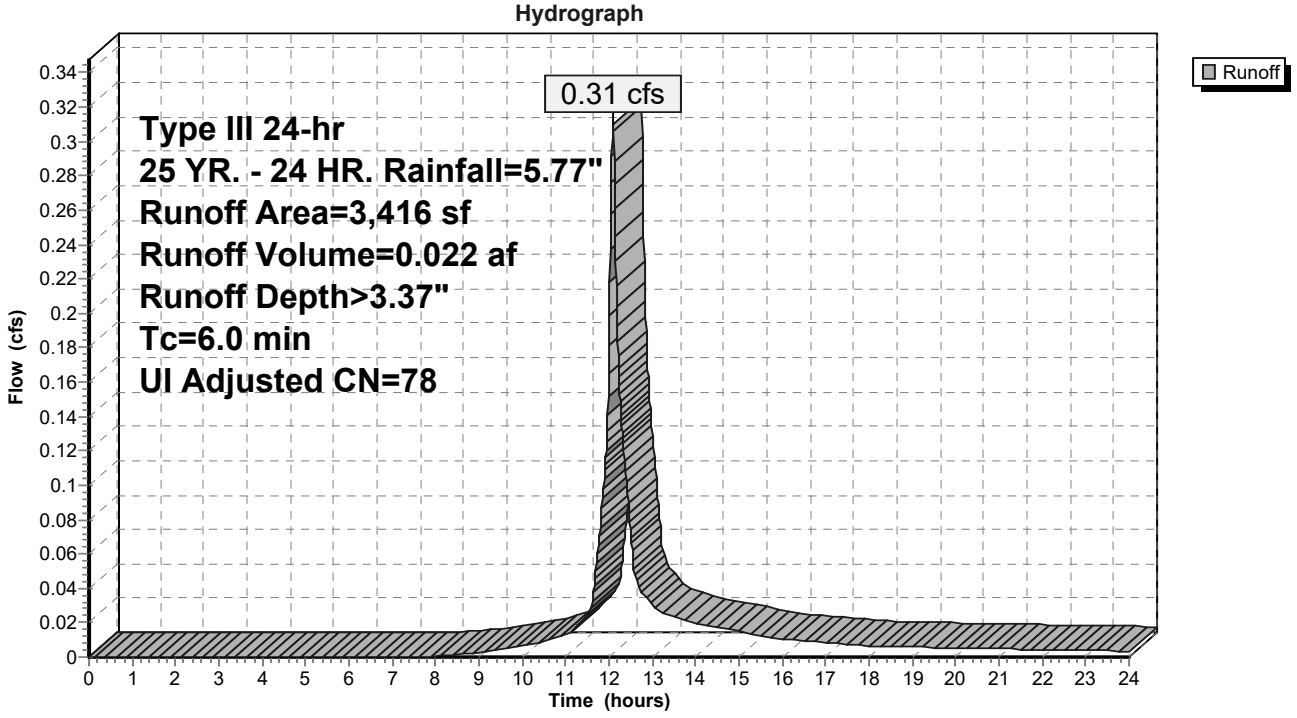
Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Adj	Description
1,017	98		Unconnected pavement, HSG C
2,399	74		>75% Grass cover, Good, HSG C
3,416	81	78	Weighted Average, UI Adjusted
2,399			70.23% Pervious Area
1,017			29.77% Impervious Area
1,017			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 1**

Subcatchment 17S: Sera (Lt.)



Summary for Subcatchment 18S: Sera (Lt.)

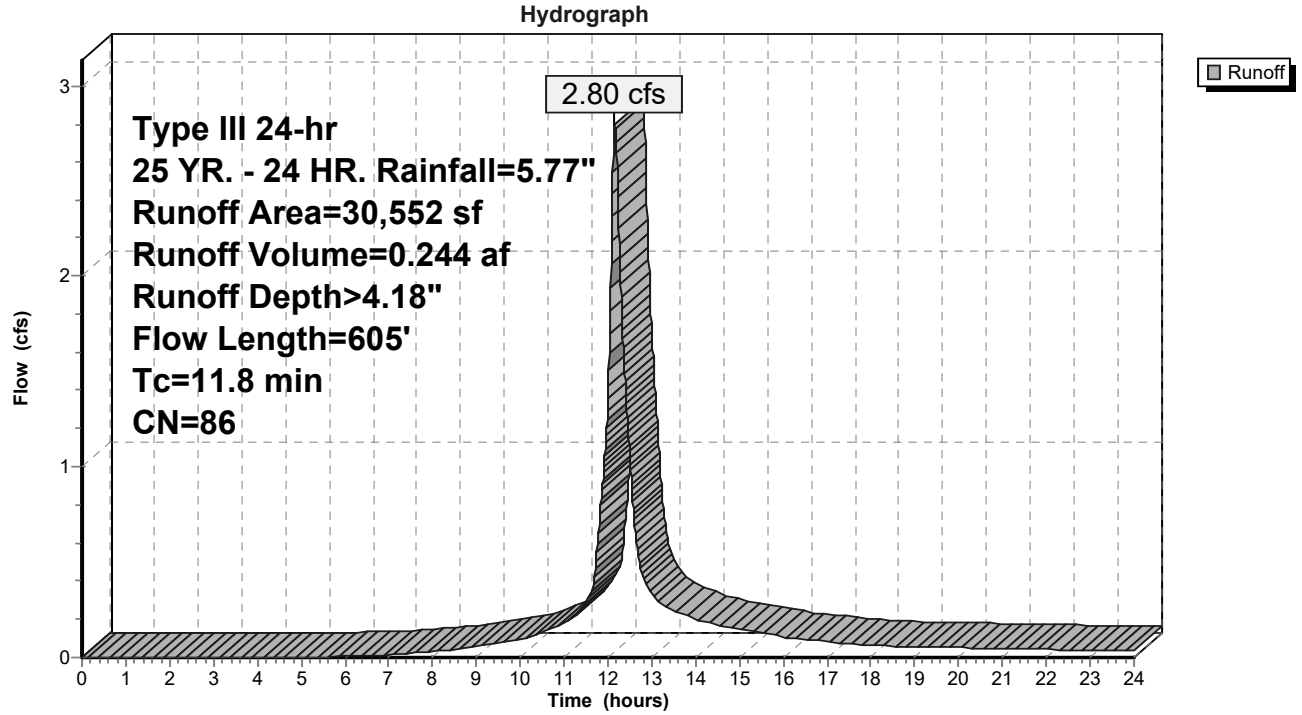
Runoff = 2.80 cfs @ 12.16 hrs, Volume= 0.244 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
15,050	98	Paved parking, HSG C
13,086	74	>75% Grass cover, Good, HSG C
2,416	70	Woods, Good, HSG C
30,552	86	Weighted Average
15,502		50.74% Pervious Area
15,050		49.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	75	0.0933	0.13		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 3.03"
0.4	50	0.0930	2.13		**Shallow Concentrated Flow, 2** Short Grass Pasture Kv= 7.0 fps
1.4	415	0.0578	4.88		**Shallow Concentrated Flow, 3** Paved Kv= 20.3 fps
0.5	65	0.0923	2.13		**Shallow Concentrated Flow, 4** Short Grass Pasture Kv= 7.0 fps
11.8	605	Total			

Subcatchment 18S: Sera (Lt.)



Summary for Subcatchment 19S: Ada (Rt.)

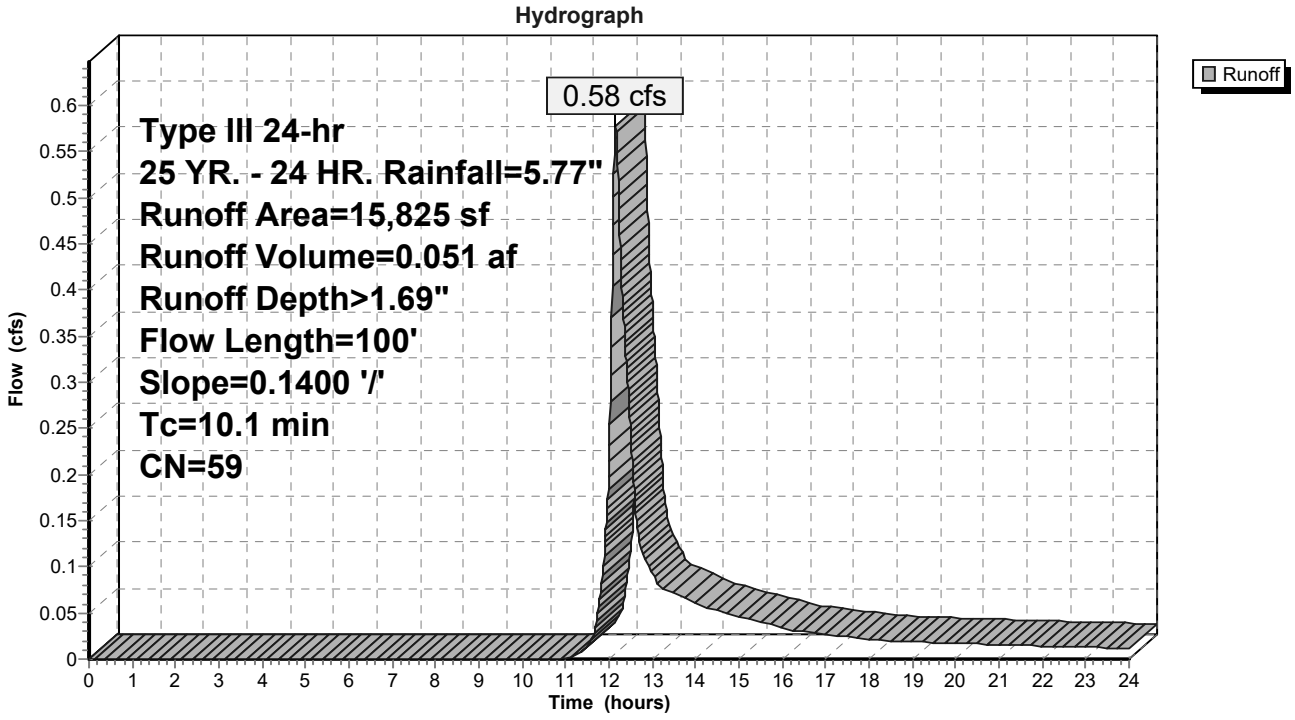
Runoff = 0.58 cfs @ 12.15 hrs, Volume= 0.051 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
912	70	Woods, Good, HSG C
7,625	55	Woods, Good, HSG B
7,288	61	>75% Grass cover, Good, HSG B
15,825	59	Weighted Average
15,825		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1400	0.16		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 3.03"

Subcatchment 19S: Ada (Rt.)



Summary for Subcatchment 20S: Ada (Rt.)

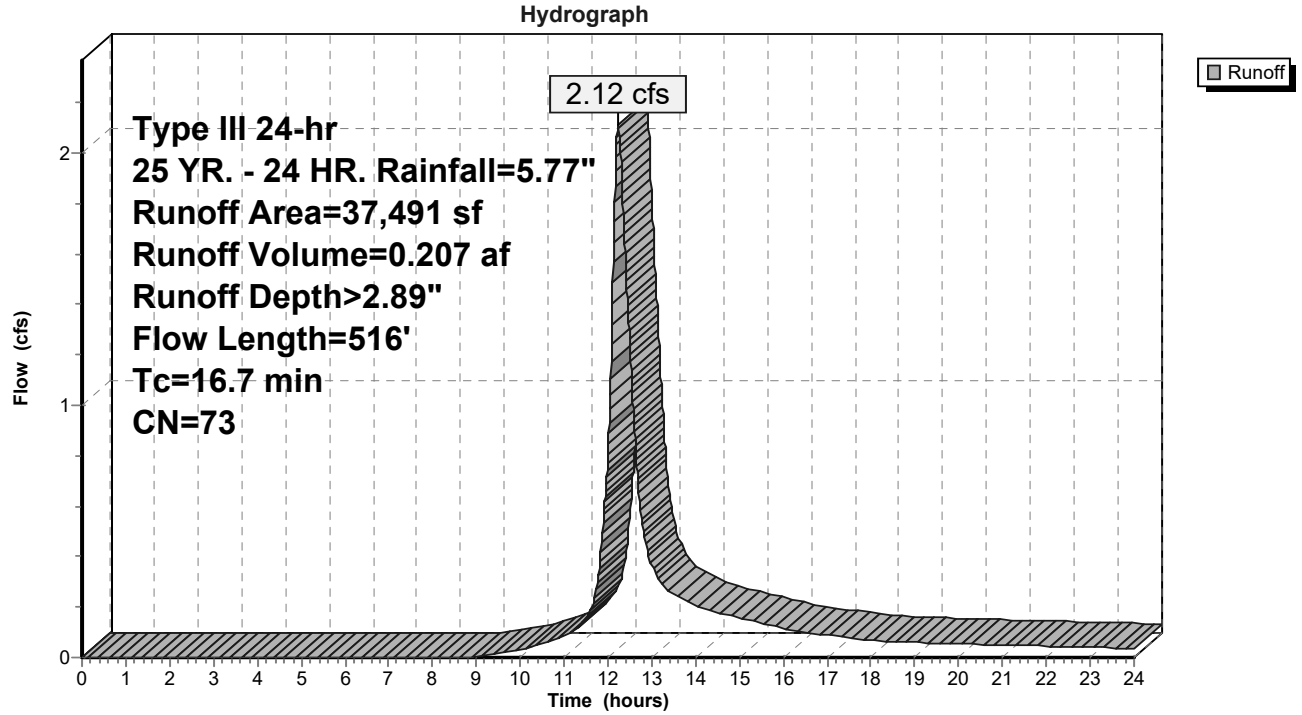
Runoff = 2.12 cfs @ 12.23 hrs, Volume= 0.207 af, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
1,792	98	Unconnected pavement, HSG C
22,231	74	>75% Grass cover, Good, HSG C
11,196	70	Woods, Good, HSG C
2,272	61	>75% Grass cover, Good, HSG B
37,491	73	Weighted Average
35,699		95.22% Pervious Area
1,792		4.78% Impervious Area
1,792		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0700	0.12		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 3.03"
1.5	188	0.0850	2.04		**Shallow Concentrated Flow, 2** Short Grass Pasture Kv= 7.0 fps
1.8	228	0.0878	2.07		**Shallow Concentrated Flow, 3** Short Grass Pasture Kv= 7.0 fps
16.7	516	Total			

Subcatchment 20S: Ada (Rt.)



Summary for Subcatchment 21S: Ada Drive

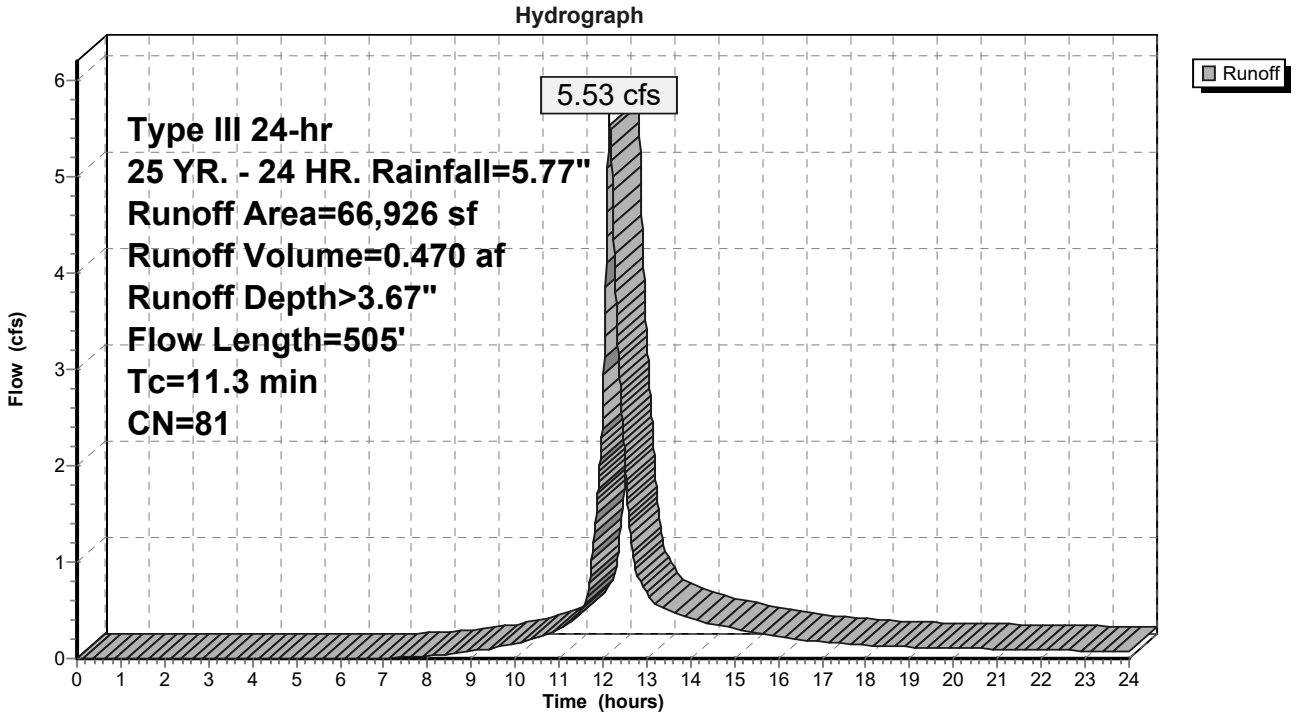
Runoff = 5.53 cfs @ 12.16 hrs, Volume= 0.470 af, Depth> 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
26,842	98	Unconnected pavement, HSG C
1,752	98	Unconnected pavement, HSG B
13,315	61	>75% Grass cover, Good, HSG B
775	55	Woods, Good, HSG B
4,345	70	Woods, Good, HSG C
19,897	74	>75% Grass cover, Good, HSG C
66,926	81	Weighted Average
38,332		57.28% Pervious Area
28,594		42.72% Impervious Area
28,594		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	57	0.0700	0.11		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 3.03"
0.3	50	0.2000	3.13		**Shallow Concentrated Flow, 2** Short Grass Pasture Kv= 7.0 fps
0.6	148	0.0400	4.06		**Shallow Concentrated Flow, 3** Paved Kv= 20.3 fps
1.9	250	0.0960	2.17		**Shallow Concentrated Flow, 4** Short Grass Pasture Kv= 7.0 fps
11.3	505	Total			

Subcatchment 21S: Ada Drive



Summary for Subcatchment 22S: ADA (Lt.)

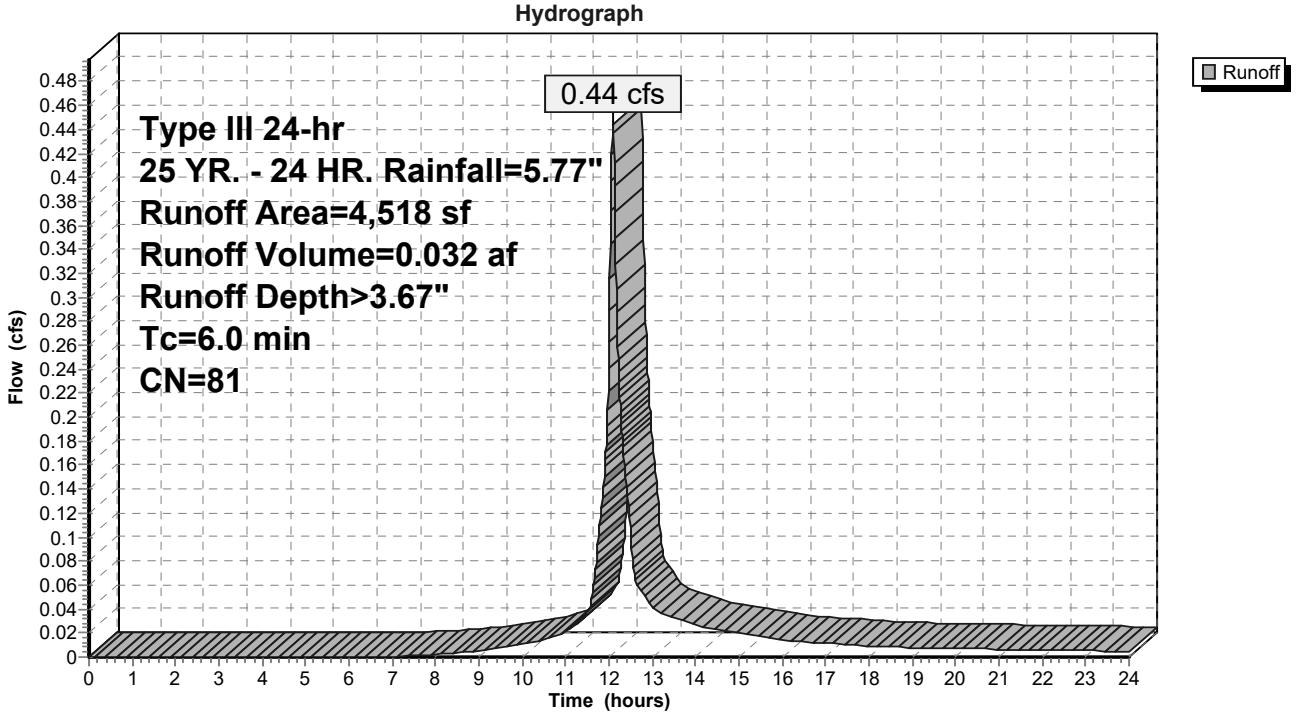
Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.032 af, Depth> 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
2,464	98	Unconnected pavement, HSG B
2,054	61	>75% Grass cover, Good, HSG B
4,518	81	Weighted Average
2,054		45.46% Pervious Area
2,464		54.54% Impervious Area
2,464		100.00% Unconnected

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

Subcatchment 22S: ADA (Lt.)



Summary for Subcatchment 23S: Front of ADA

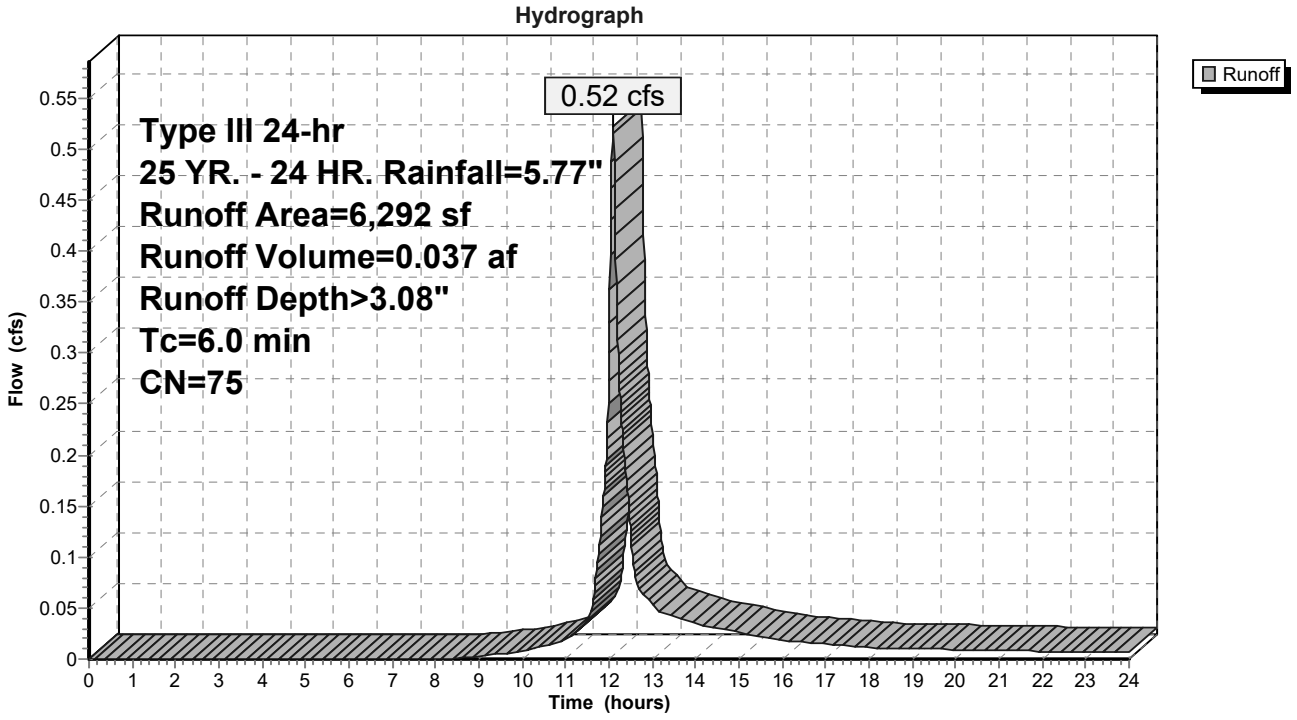
Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.037 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR. - 24 HR. Rainfall=5.77"

Area (sf)	CN	Description
2,376	98	Unconnected pavement, HSG B
3,916	61	>75% Grass cover, Good, HSG B
6,292	75	Weighted Average
3,916		62.24% Pervious Area
2,376		37.76% Impervious Area
2,376		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 1**

Subcatchment 23S: Front of ADA



Summary for Reach 1R: Swale Flow to Second Cross Culvert

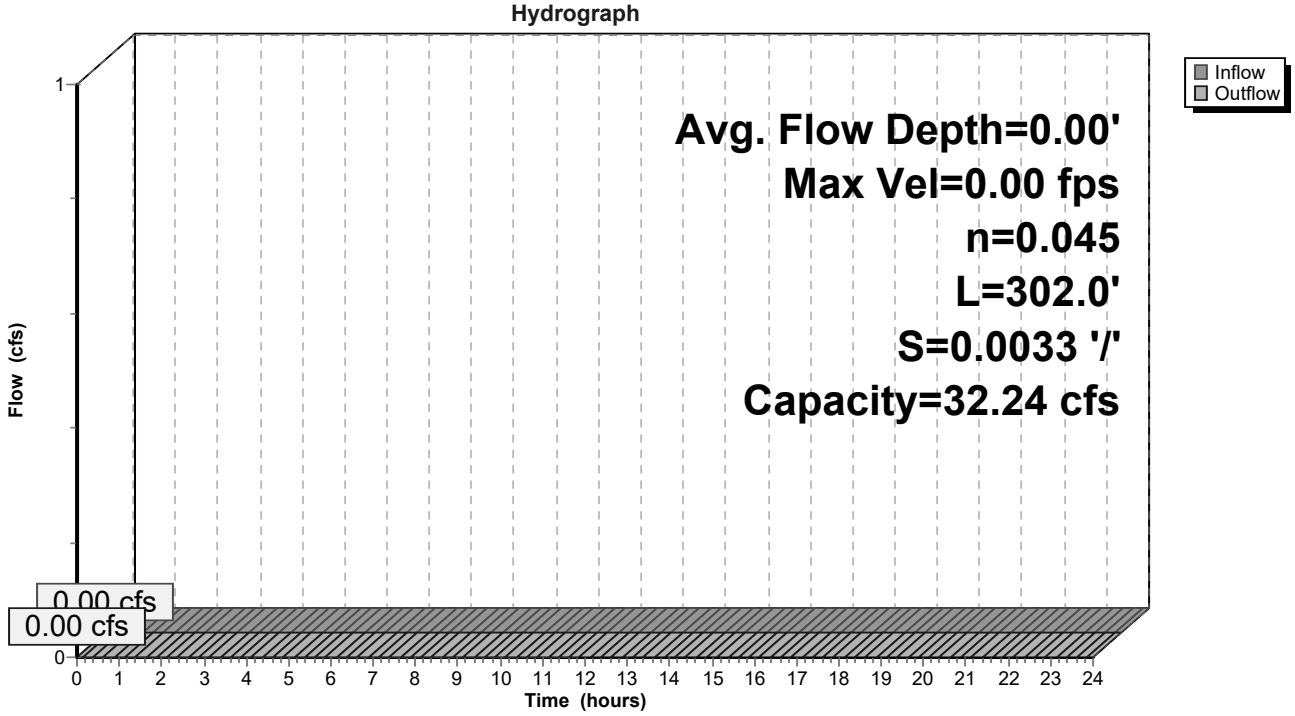
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 32.24 cfs

2.00' x 2.00' deep channel, n= 0.045
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 302.0' Slope= 0.0033 '/'
Inlet Invert= 237.00', Outlet Invert= 236.00'

Reach 1R: Swale Flow to Second Cross Culvert



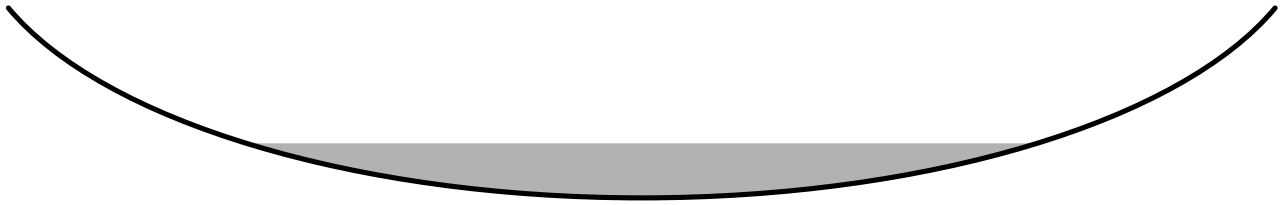
Summary for Reach 2aR: Reach #2a

Inflow Area = 13.893 ac, 1.30% Impervious, Inflow Depth > 0.88" for 25 YR. - 24 HR. event
Inflow = 5.02 cfs @ 12.73 hrs, Volume= 1.024 af
Outflow = 5.02 cfs @ 12.74 hrs, Volume= 1.023 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 2.62 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 0.7 min

Peak Storage= 120 cf @ 12.74 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.75' Flow Area= 12.5 sf, Capacity= 75.29 cfs

25.00' x 0.75' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 62.6' Slope= 0.1038 '/'
Inlet Invert= 256.50', Outlet Invert= 250.00'



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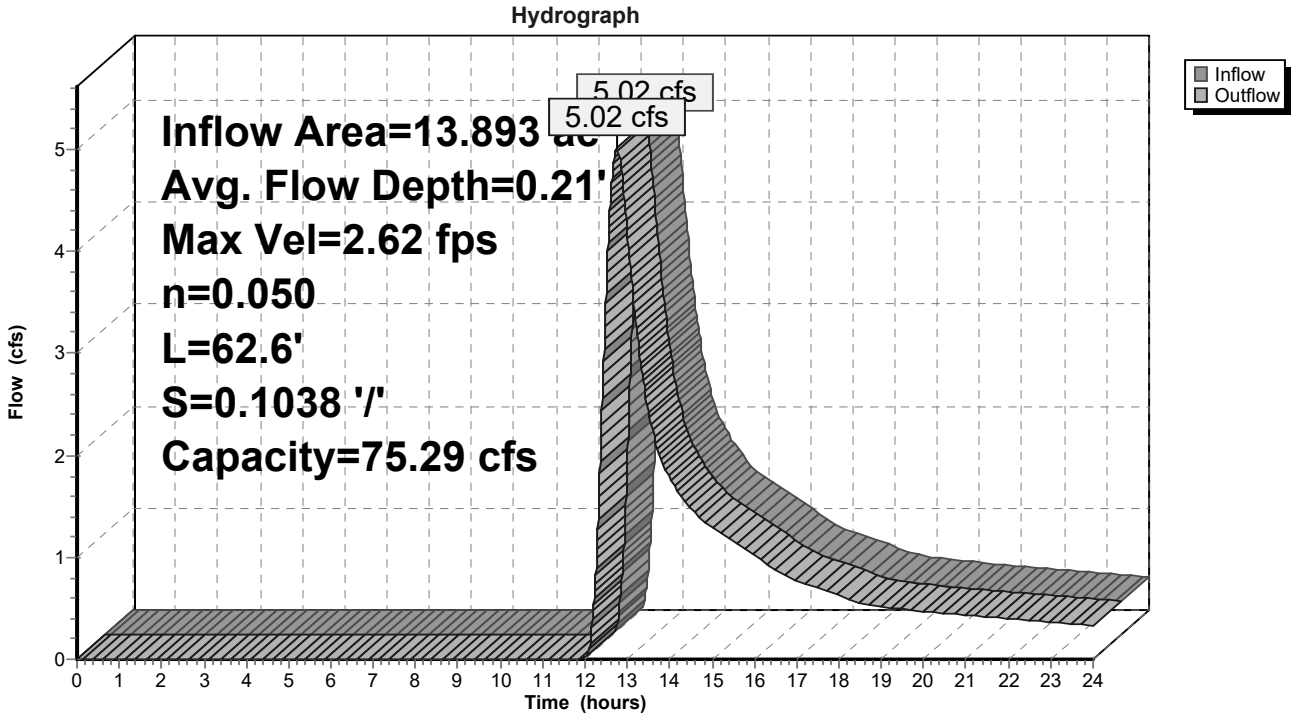
Reach 2aR: Reach #2a



Summary for Reach 2bR: Reach #2b

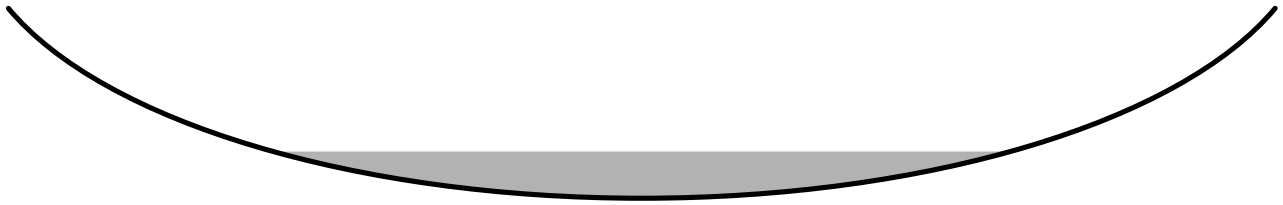
[62] Hint: Exceeded Reach 2aR OUTLET depth by 0.03' @ 12.90 hrs

Inflow Area = 13.893 ac, 1.30% Impervious, Inflow Depth > 0.88" for 25 YR. - 24 HR. event
Inflow = 5.02 cfs @ 12.74 hrs, Volume= 1.023 af
Outflow = 5.00 cfs @ 12.78 hrs, Volume= 1.021 af, Atten= 0%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 2.47 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.41 fps, Avg. Travel Time= 4.2 min

Peak Storage= 723 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 16.7 sf, Capacity= 105.00 cfs

25.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 358.0' Slope= 0.0279 '/'
Inlet Invert= 250.00', Outlet Invert= 240.00'



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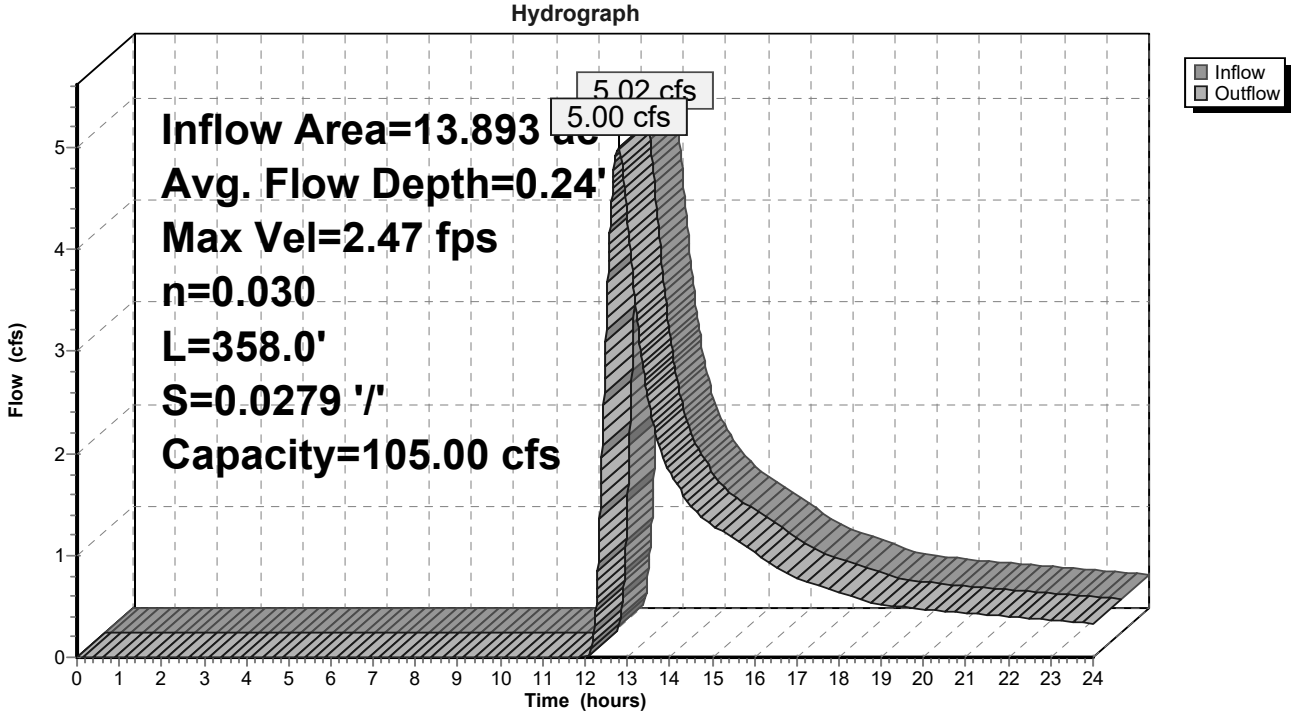
Reach 2bR: Reach #2b



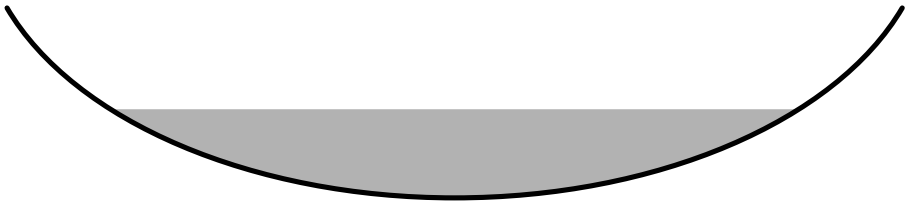
Summary for Reach 4R: Reach #4

Inflow Area = 7.140 ac, 17.69% Impervious, Inflow Depth > 2.24" for 25 YR. - 24 HR. event
Inflow = 6.40 cfs @ 12.35 hrs, Volume= 1.333 af
Outflow = 6.39 cfs @ 12.36 hrs, Volume= 1.333 af, Atten= 0%, Lag= 0.6 min

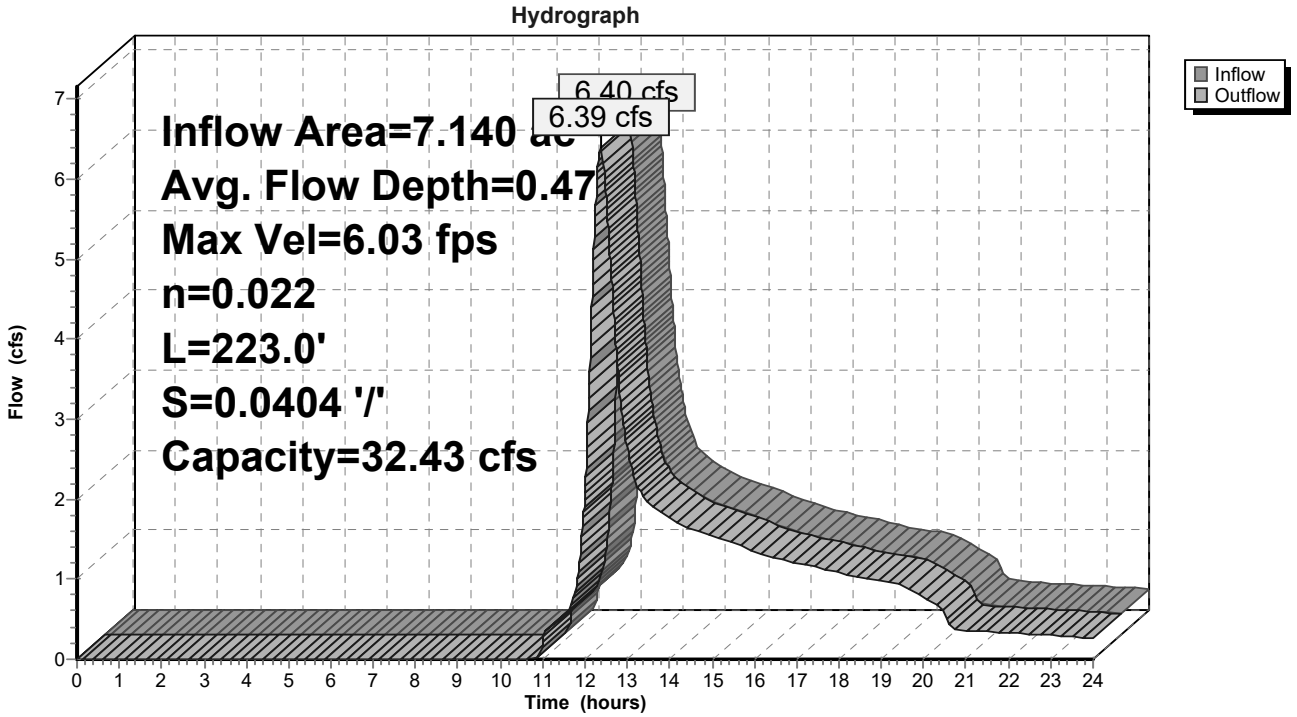
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 6.03 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 3.29 fps, Avg. Travel Time= 1.1 min

Peak Storage= 236 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.00' Flow Area= 3.3 sf, Capacity= 32.43 cfs

5.00' x 1.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 223.0' Slope= 0.0404 '/'
Inlet Invert= 209.00', Outlet Invert= 200.00'



Reach 4R: Reach #4



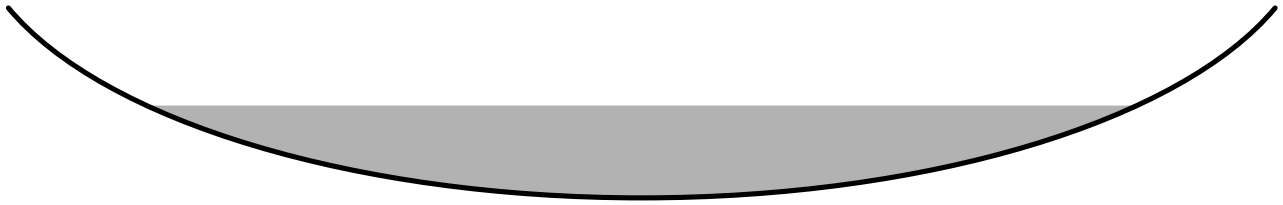
Summary for Reach 10R: Reach #10

Inflow Area = 55.566 ac, 5.26% Impervious, Inflow Depth > 1.12" for 25 YR. - 24 HR. event
Inflow = 17.96 cfs @ 13.12 hrs, Volume= 5.177 af
Outflow = 17.95 cfs @ 13.13 hrs, Volume= 5.173 af, Atten= 0%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 3.19 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.00 fps, Avg. Travel Time= 1.4 min

Peak Storage= 977 cf @ 13.13 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.00' Flow Area= 16.7 sf, Capacity= 85.88 cfs

25.00' x 1.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 173.4' Slope= 0.0519 '/'
Inlet Invert= 249.00', Outlet Invert= 240.00'



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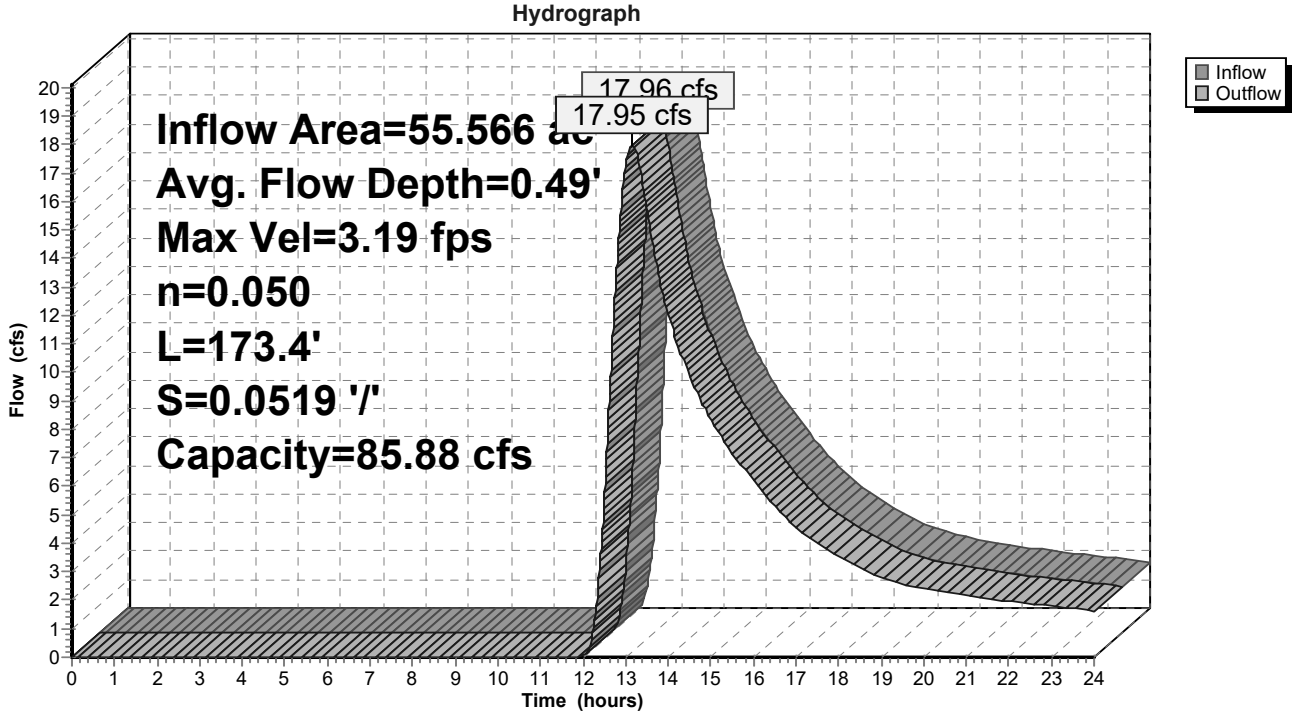
Reach 10R: Reach #10



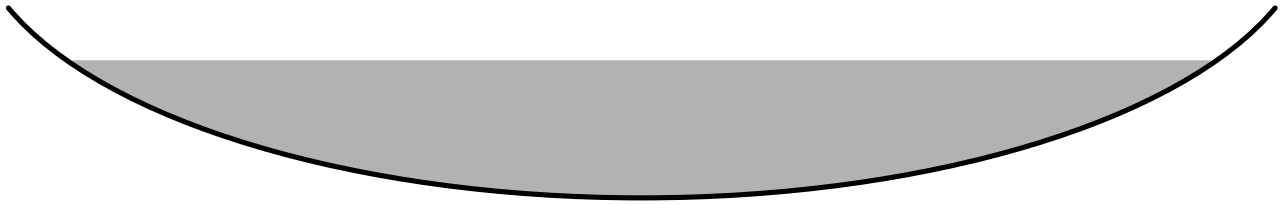
Summary for Reach 11aR: Reach #11a

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.66" for 25 YR. - 24 HR. event
Inflow = 2.69 cfs @ 13.17 hrs, Volume= 0.774 af
Outflow = 2.60 cfs @ 13.44 hrs, Volume= 0.763 af, Atten= 4%, Lag= 15.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.51 fps, Min. Travel Time= 17.1 min
Avg. Velocity = 0.31 fps, Avg. Travel Time= 28.2 min

Peak Storage= 2,658 cf @ 13.44 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 0.50' Flow Area= 8.3 sf, Capacity= 5.23 cfs

25.00' x 0.50' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 517.8' Slope= 0.0077 '/'
Inlet Invert= 304.00', Outlet Invert= 300.00'



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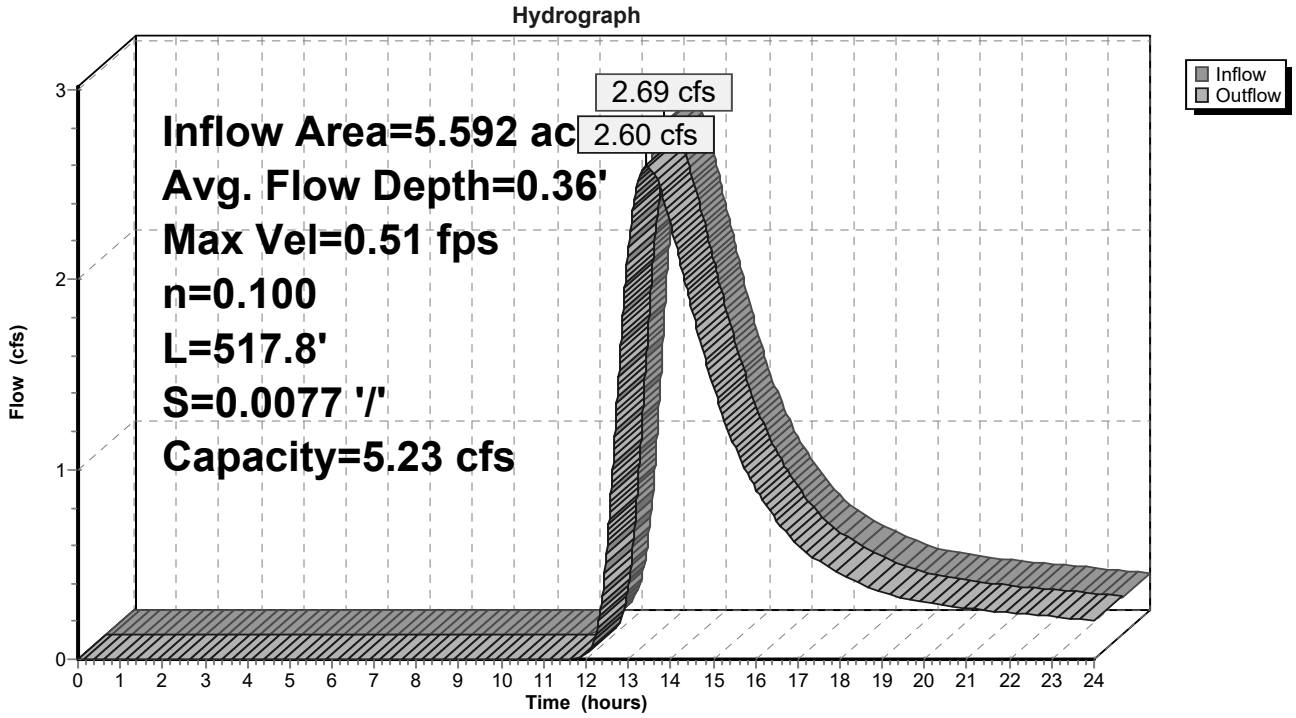
Reach 11aR: Reach #11a



Summary for Reach 11bR: Reach #11b

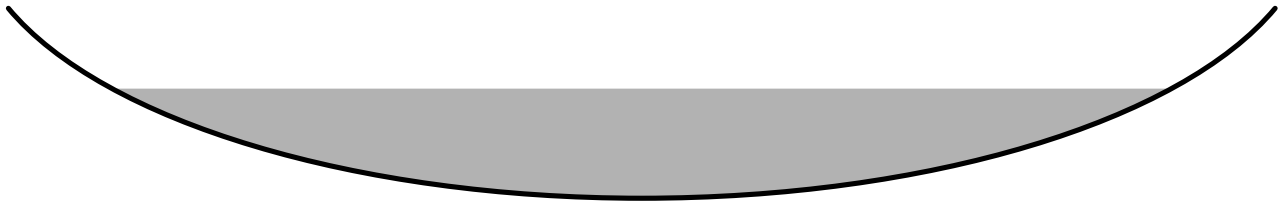
[61] Hint: Exceeded Reach 11aR outlet invert by 0.29' @ 13.59 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.64" for 25 YR. - 24 HR. event
Inflow = 2.60 cfs @ 13.44 hrs, Volume= 0.763 af
Outflow = 2.57 cfs @ 13.59 hrs, Volume= 0.757 af, Atten= 1%, Lag= 9.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.88 fps, Min. Travel Time= 10.7 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 17.6 min

Peak Storage= 1,654 cf @ 13.59 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 8.47 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 567.6' Slope= 0.0317 '/'
Inlet Invert= 300.00', Outlet Invert= 282.00'



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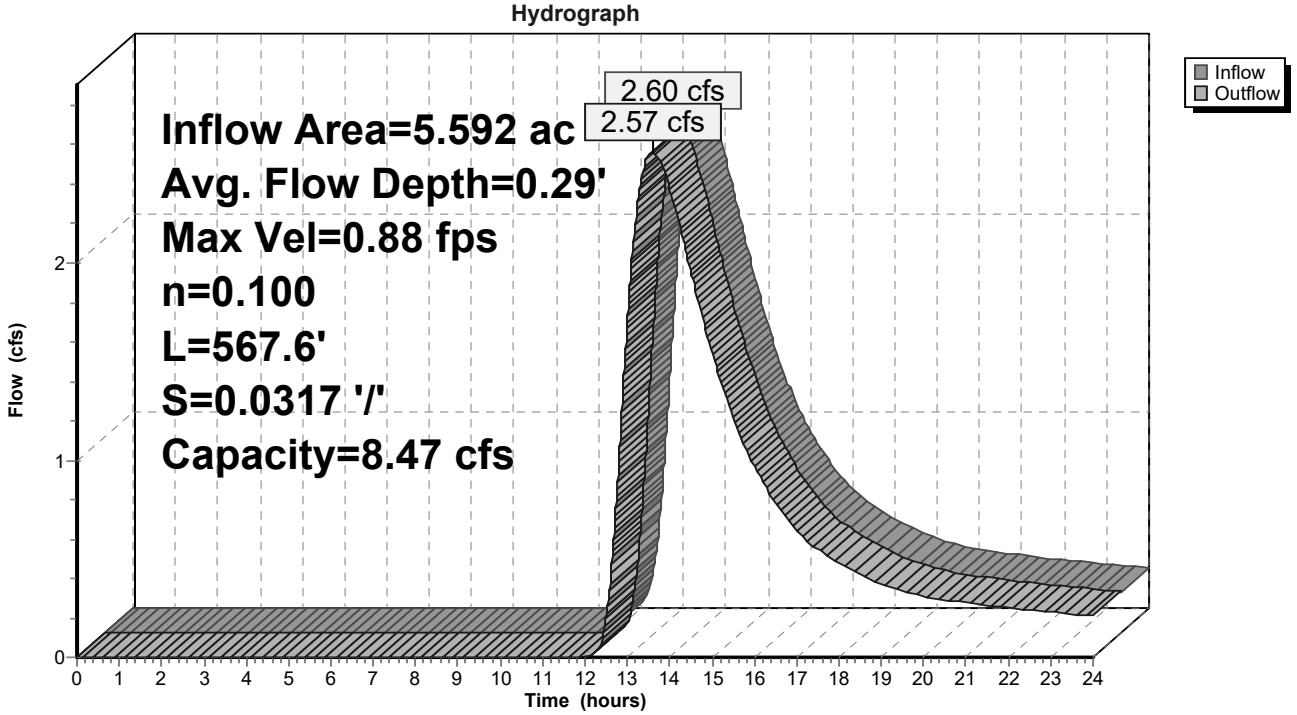
Reach 11bR: Reach #11b



Summary for Reach 11cR: Reach #11c

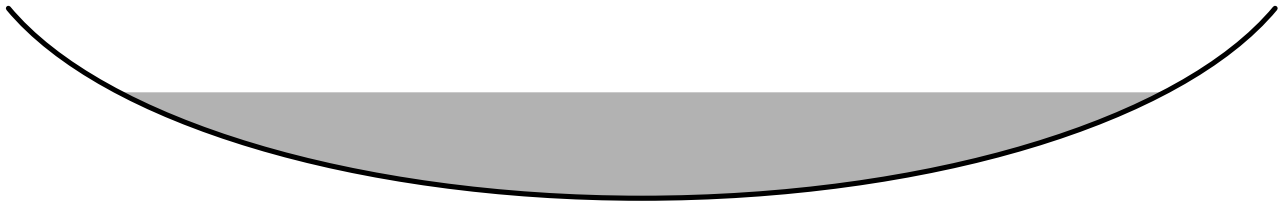
[62] Hint: Exceeded Reach 11bR OUTLET depth by 0.31' @ 14.83 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.62" for 25 YR. - 24 HR. event
Inflow = 2.57 cfs @ 13.59 hrs, Volume= 0.757 af
Outflow = 2.03 cfs @ 14.42 hrs, Volume= 0.724 af, Atten= 21%, Lag= 50.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.12 fps, Min. Travel Time= 52.8 min
Avg. Velocity = 0.08 fps, Avg. Travel Time= 80.3 min

Peak Storage= 6,417 cf @ 14.42 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 7.20 cfs

60.00' x 1.00' deep Parabolic Channel, n= 0.200 Dense willows
Length= 386.1' Slope= 0.0010 '/'
Inlet Invert= 282.00', Outlet Invert= 281.61'



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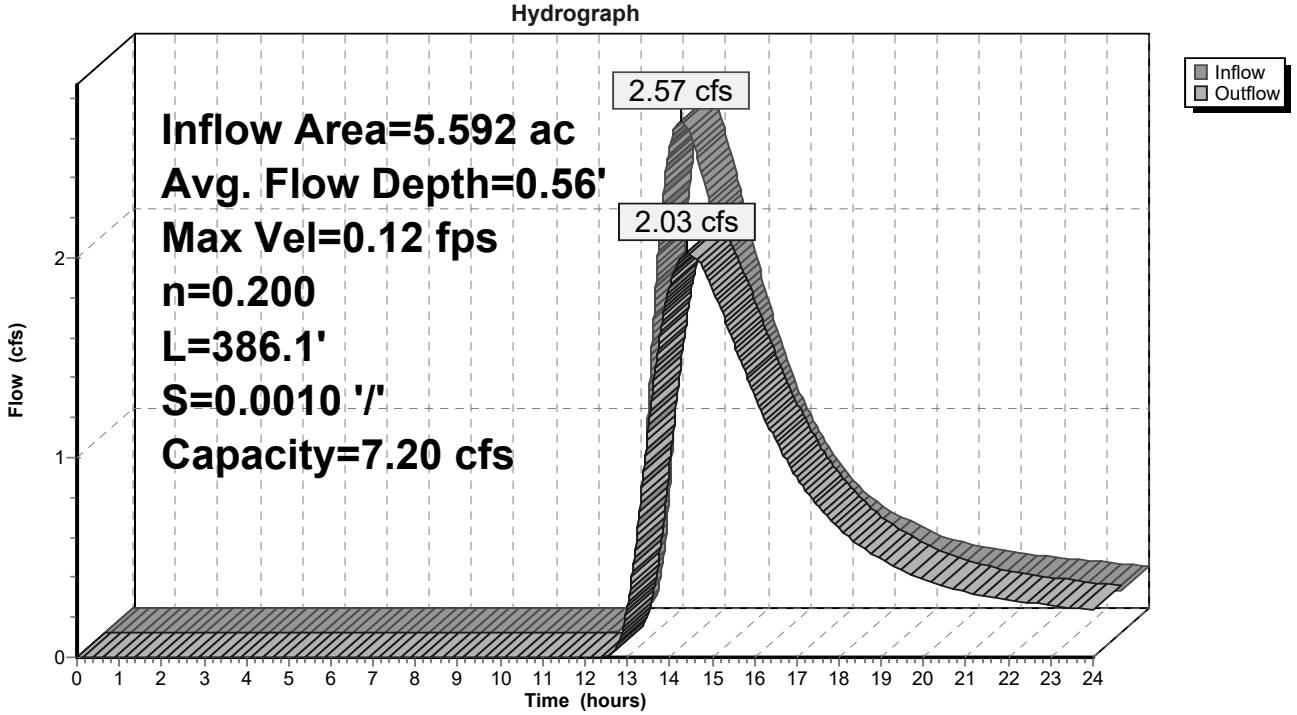
Reach 11cR: Reach #11c



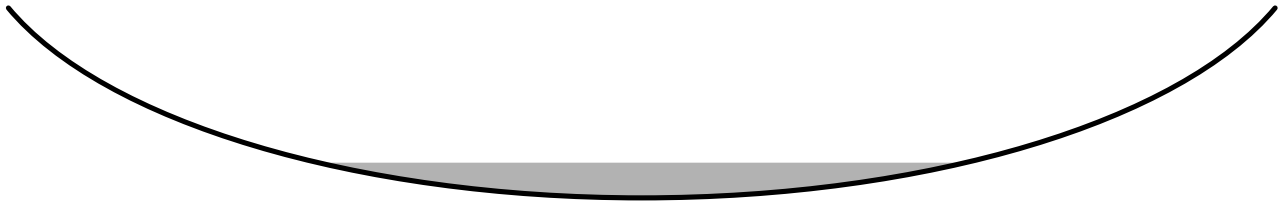
Summary for Reach 11dR: Reach #11d

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.55" for 25 YR. - 24 HR. event
Inflow = 2.03 cfs @ 14.42 hrs, Volume= 0.724 af
Outflow = 2.03 cfs @ 14.43 hrs, Volume= 0.723 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 3.87 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 0.1 min

Peak Storage= 11 cf @ 14.43 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 79.86 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 21.0' Slope= 0.0476 '/'
Inlet Invert= 276.00', Outlet Invert= 275.00'



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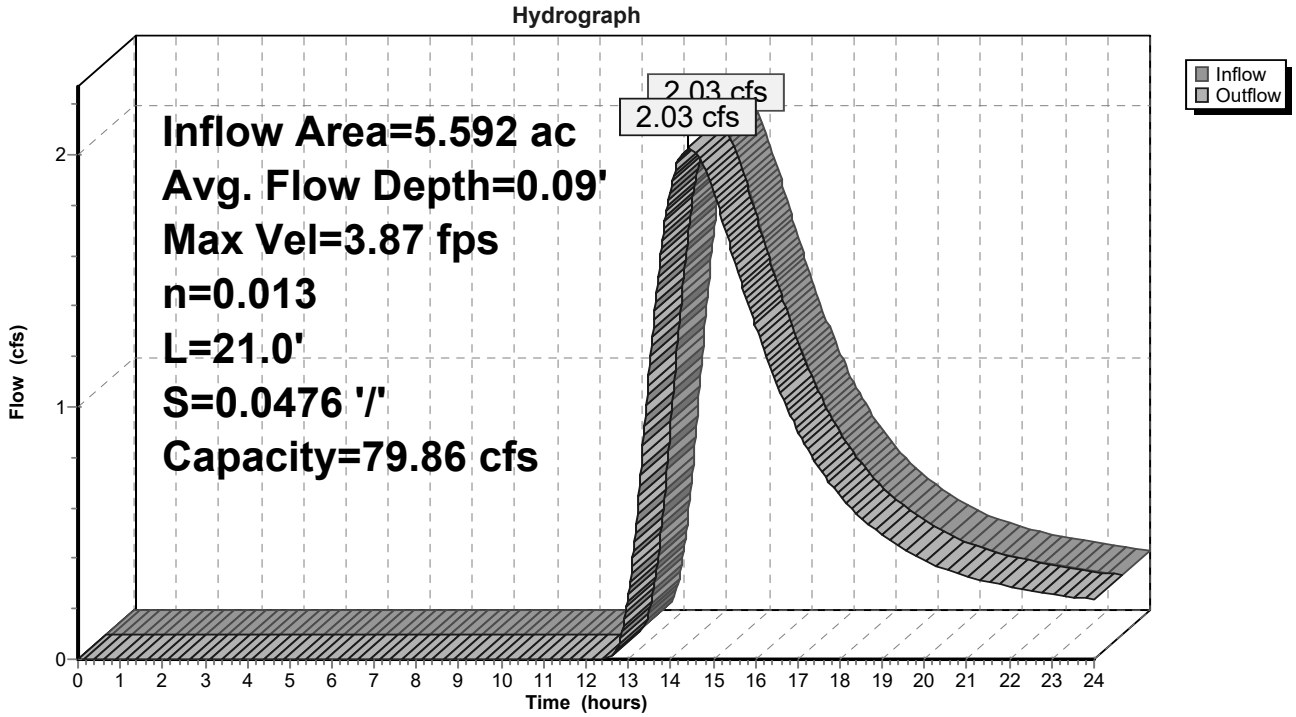
Reach 11dR: Reach #11d



Summary for Reach 11eR: Reach #11e

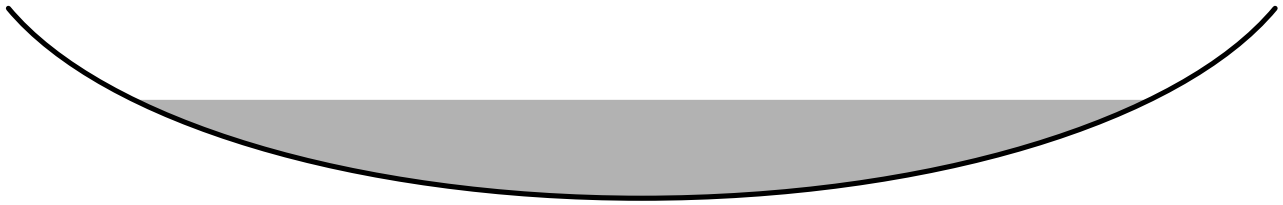
[62] Hint: Exceeded Reach 11dR OUTLET depth by 0.17' @ 14.57 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.55" for 25 YR. - 24 HR. event
Inflow = 2.03 cfs @ 14.43 hrs, Volume= 0.723 af
Outflow = 2.02 cfs @ 14.52 hrs, Volume= 0.719 af, Atten= 0%, Lag= 5.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.82 fps, Min. Travel Time= 7.8 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 11.6 min

Peak Storage= 942 cf @ 14.52 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 8.45 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 380.7' Slope= 0.0315 '/'
Inlet Invert= 275.00', Outlet Invert= 263.00'



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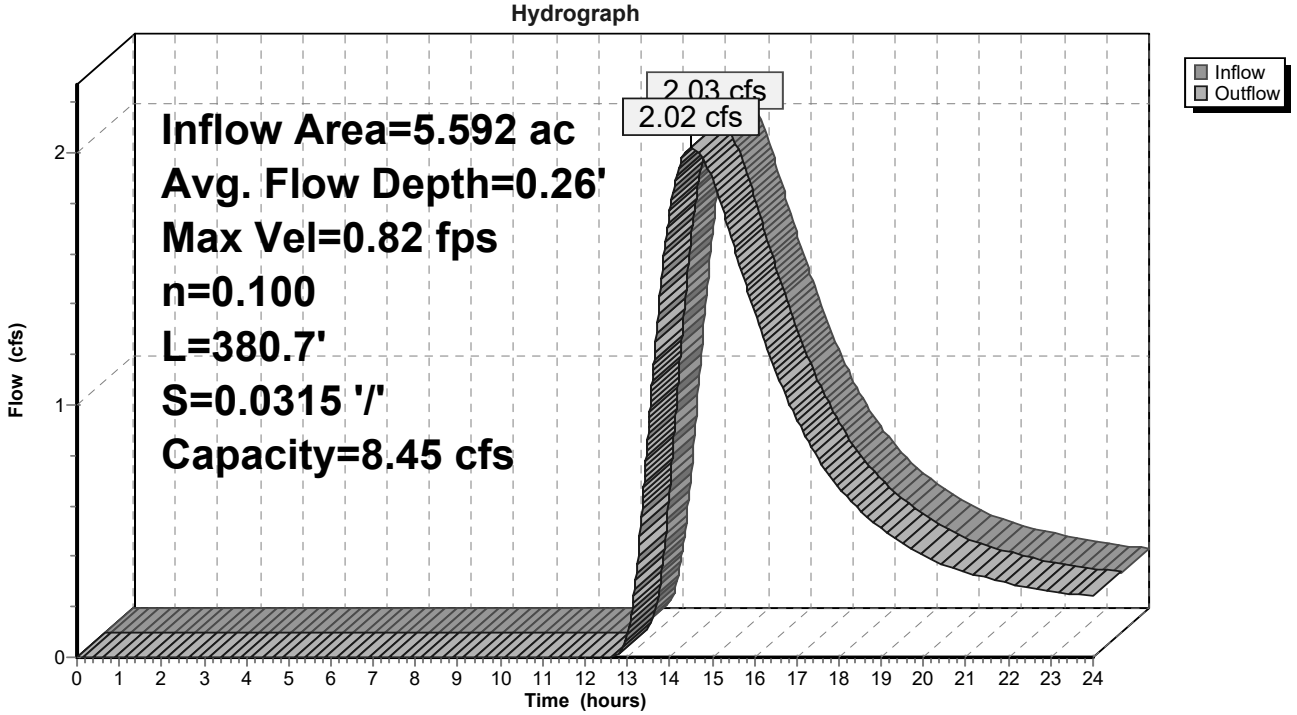
Reach 11eR: Reach #11e



Summary for Reach 11fR: Reach #11f

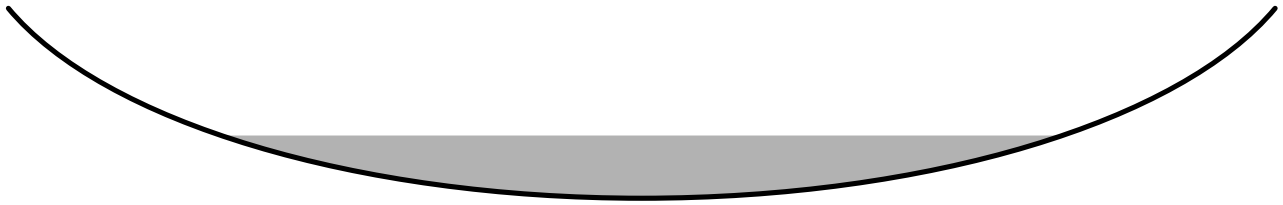
[61] Hint: Exceeded Reach 11eR outlet invert by 0.16' @ 14.54 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.54" for 25 YR. - 24 HR. event
Inflow = 2.02 cfs @ 14.52 hrs, Volume= 0.719 af
Outflow = 2.02 cfs @ 14.54 hrs, Volume= 0.717 af, Atten= 0%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 1.60 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 2.5 min

Peak Storage= 204 cf @ 14.54 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 22.41 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 162.3' Slope= 0.0555 '/'
Inlet Invert= 263.00', Outlet Invert= 254.00'



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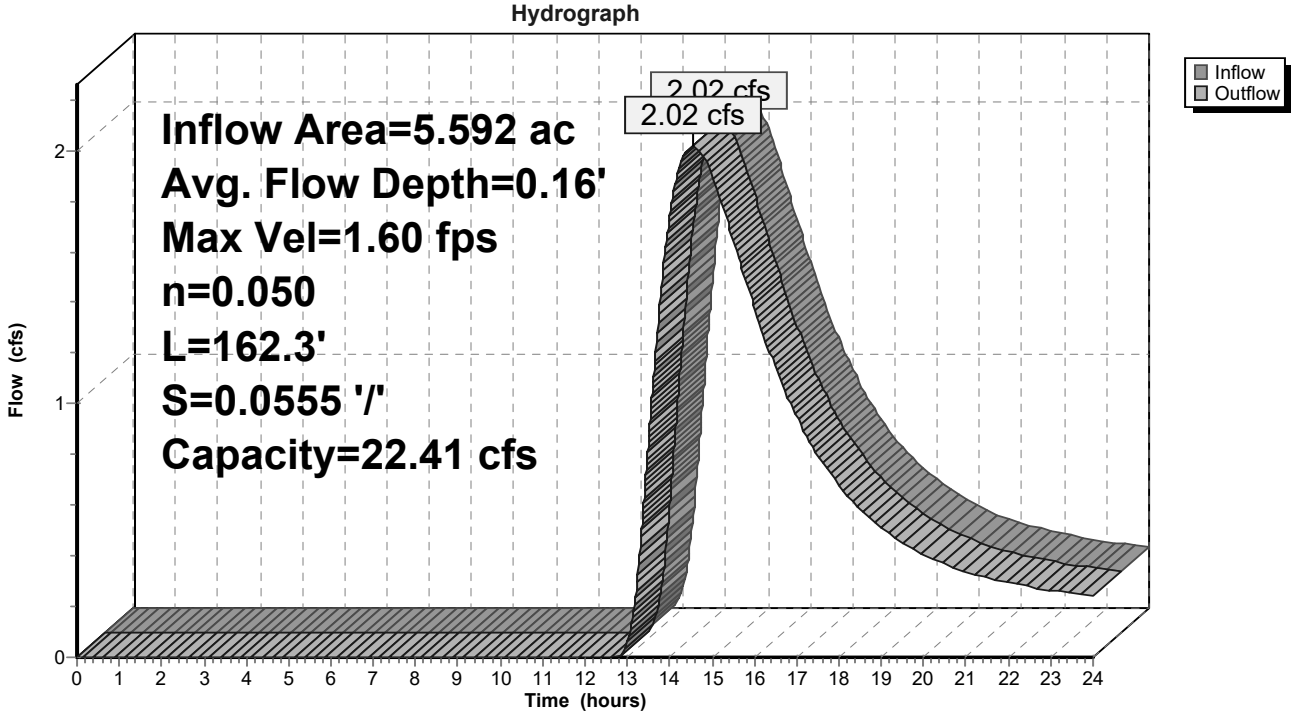
Reach 11fR: Reach #11f



Summary for Reach 11gR: Reach #11g

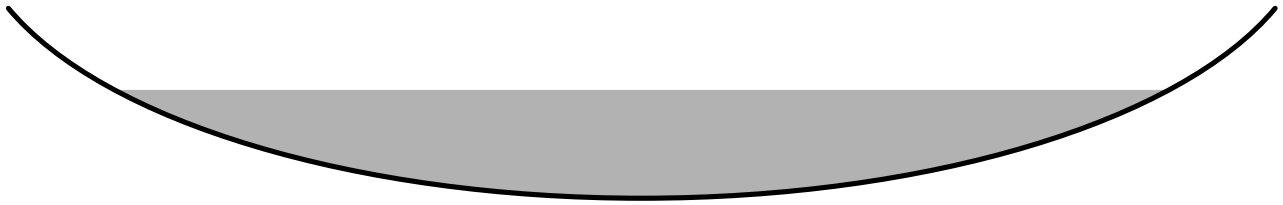
[62] Hint: Exceeded Reach 11fR OUTLET depth by 0.12' @ 14.67 hrs

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.54" for 25 YR. - 24 HR. event
Inflow = 2.02 cfs @ 14.54 hrs, Volume= 0.717 af
Outflow = 2.02 cfs @ 14.60 hrs, Volume= 0.715 af, Atten= 0%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 0.70 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 6.7 min

Peak Storage= 555 cf @ 14.60 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 6.84 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.100 Heavy timber, flow below branches
Length= 193.7' Slope= 0.0207 '/'
Inlet Invert= 254.00', Outlet Invert= 250.00'



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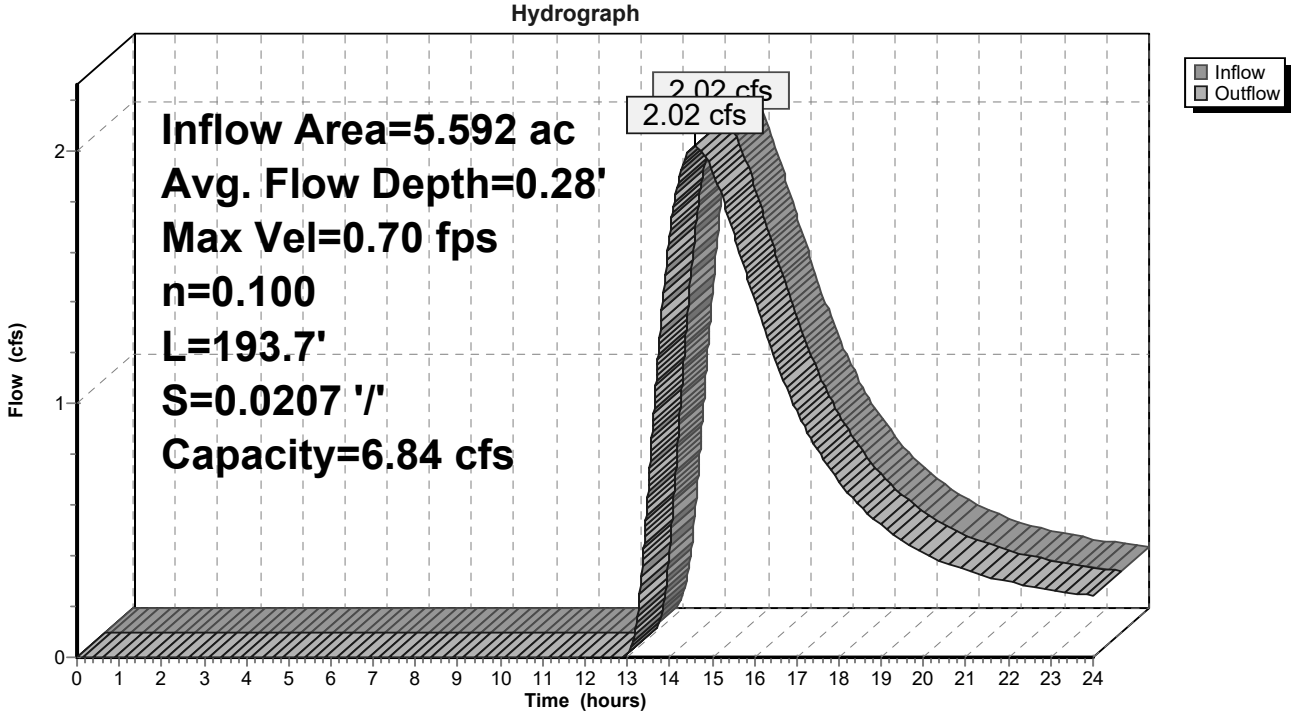
Reach 11gR: Reach #11g



Summary for Reach 21R: Flow To Reach 4

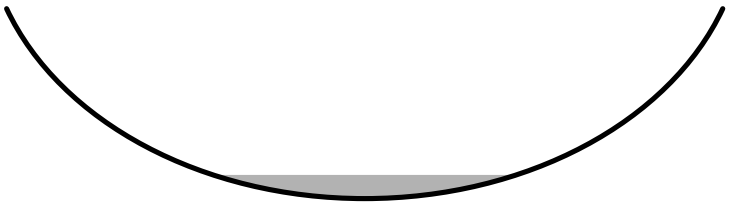
[80] Warning: Exceeded Pond 23P by 2.20' @ 0.00 hrs (4.44 cfs 3.663 af)
[80] Warning: Exceeded Pond 102P by 2.50' @ 0.00 hrs (0.04 cfs 0.039 af)
[80] Warning: Exceeded Pond 102P by 1.49' @ 10.17 hrs (0.00 cfs 0.046 af)

Inflow Area = 2.645 ac, 30.57% Impervious, Inflow Depth > 3.20" for 25 YR. - 24 HR. event
Inflow = 1.70 cfs @ 12.10 hrs, Volume= 0.704 af
Outflow = 1.65 cfs @ 12.13 hrs, Volume= 0.703 af, Atten= 3%, Lag= 1.9 min

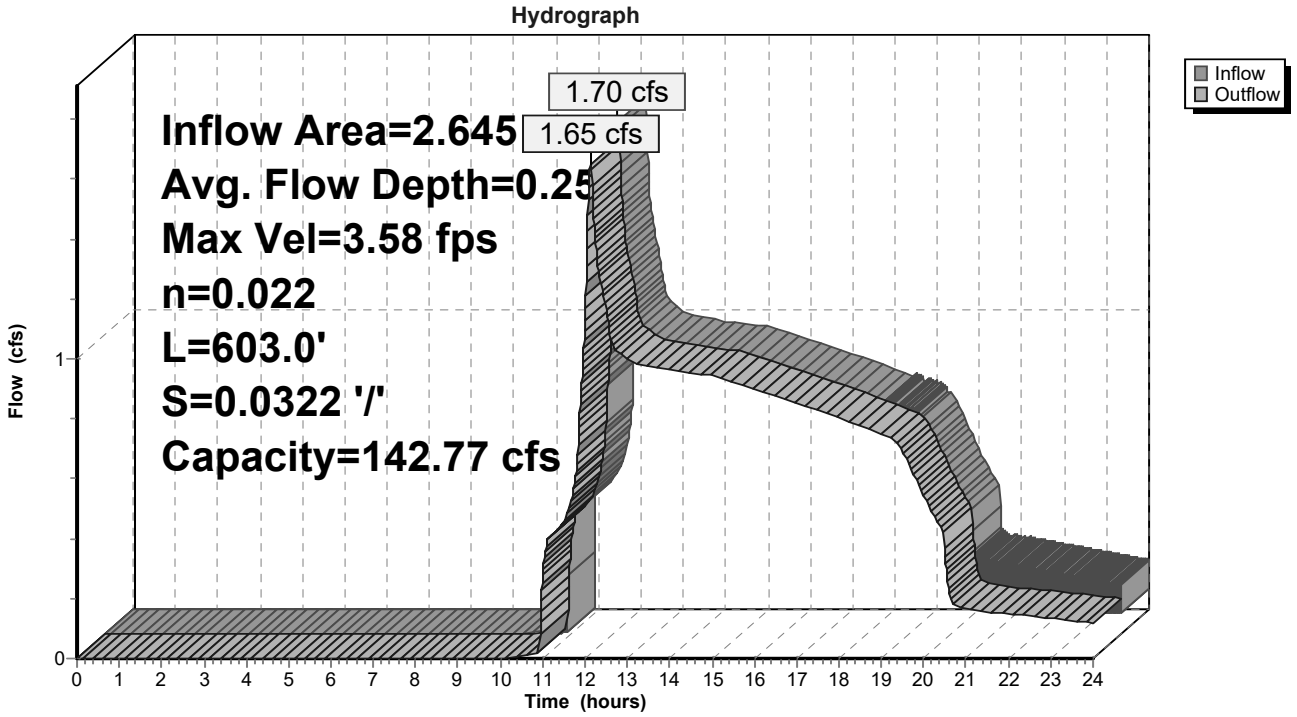
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Max. Velocity= 3.58 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 2.48 fps, Avg. Travel Time= 4.1 min

Peak Storage= 277 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 10.7 sf, Capacity= 142.77 cfs

8.00' x 2.00' deep Parabolic Channel, n= 0.022
Length= 603.0' Slope= 0.0322 '/'
Inlet Invert= 230.00', Outlet Invert= 210.61'



Reach 21R: Flow To Reach 4



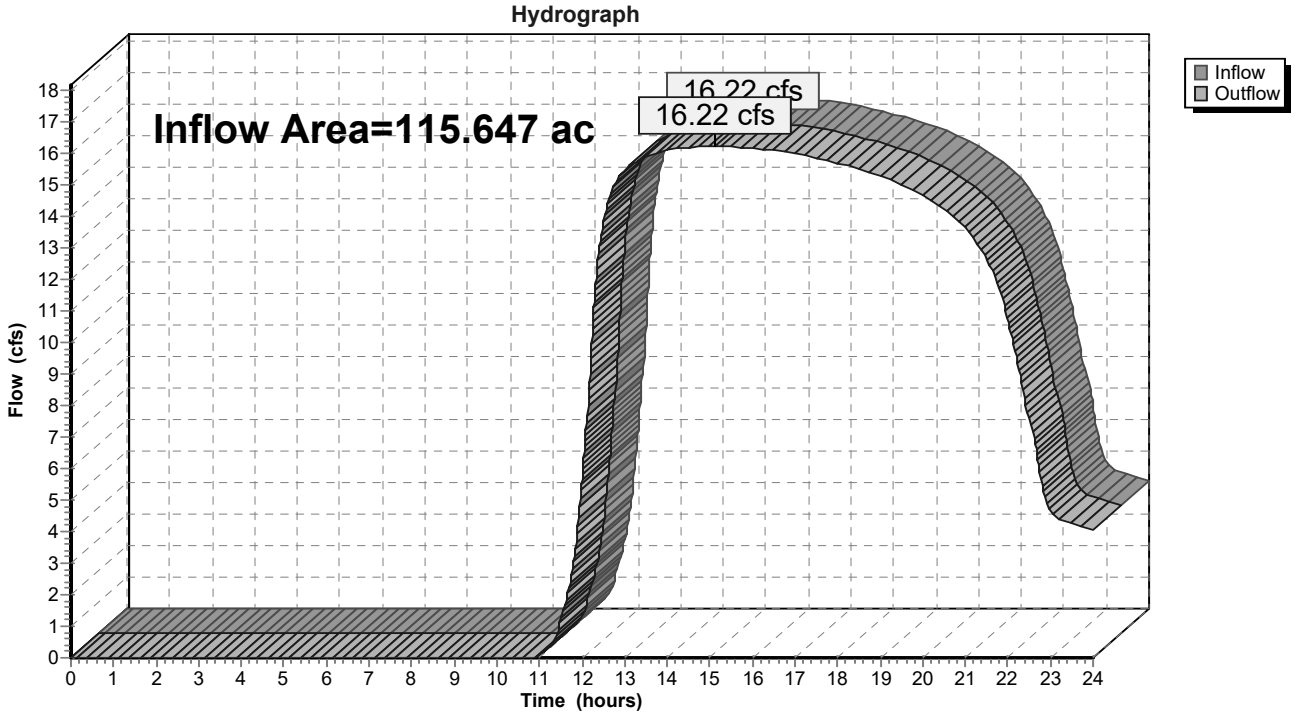
Summary for Reach 100R: Final Reach #100

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

Inflow Area = 115.647 ac, 3.60% Impervious, Inflow Depth > 1.40" for 25 YR. - 24 HR. event
Inflow = 16.22 cfs @ 15.12 hrs, Volume= 13.509 af
Outflow = 16.22 cfs @ 15.12 hrs, Volume= 13.509 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 100R: Final Reach #100



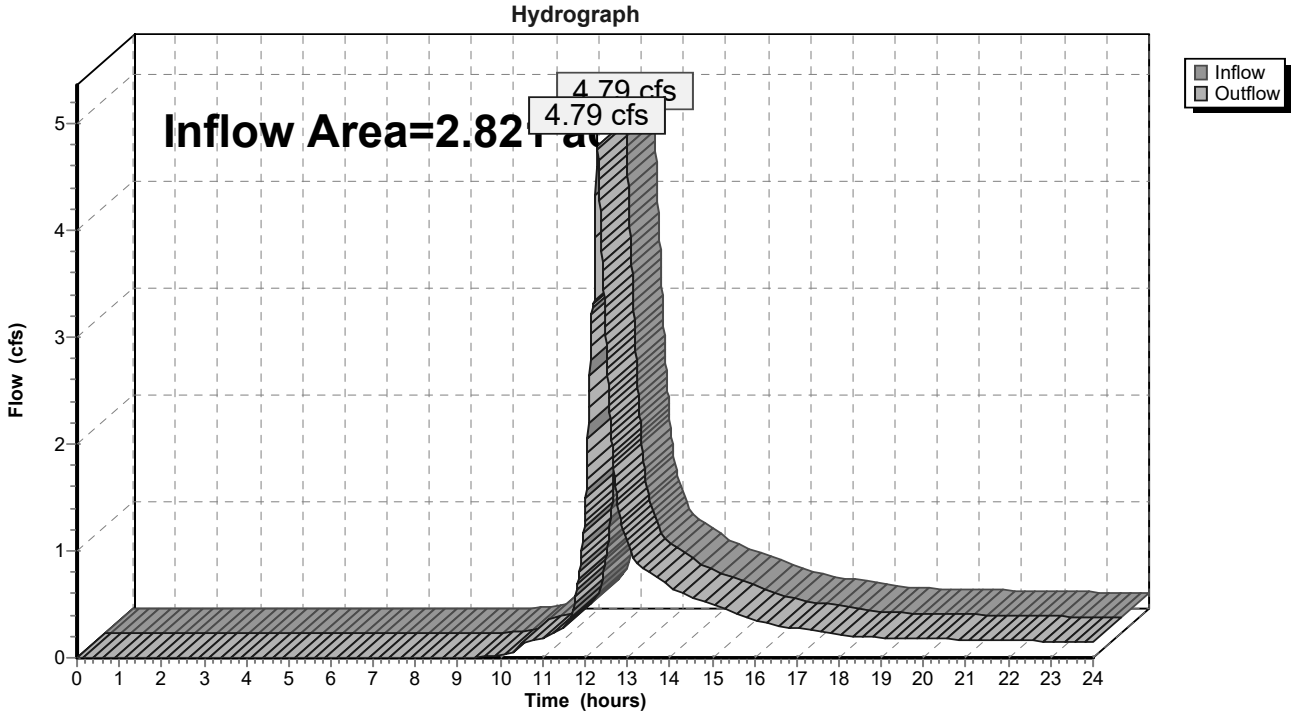
Summary for Reach 300R: Final Reach #300

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

Inflow Area = 2.821 ac, 13.09% Impervious, Inflow Depth > 2.27" for 25 YR. - 24 HR. event
Inflow = 4.79 cfs @ 12.28 hrs, Volume= 0.533 af
Outflow = 4.79 cfs @ 12.28 hrs, Volume= 0.533 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 300R: Final Reach #300



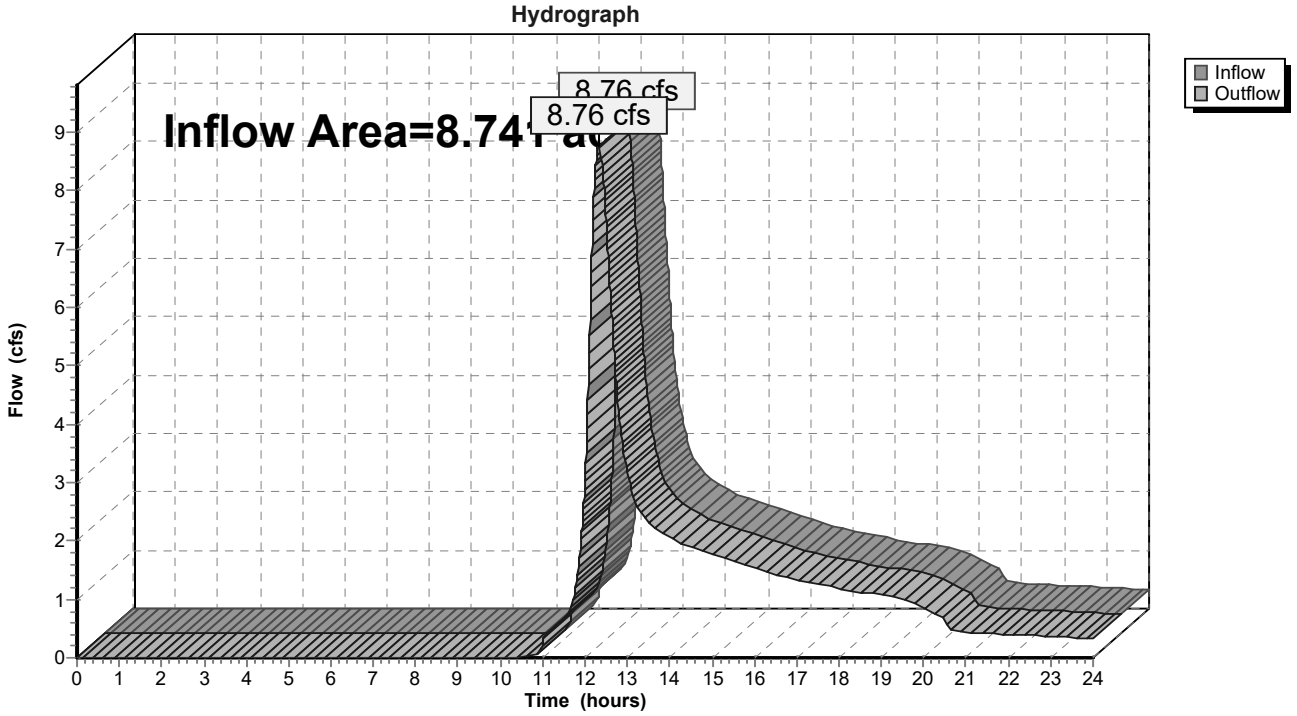
Summary for Reach 500R: Final Reach #500

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

Inflow Area = 8.741 ac, 16.14% Impervious, Inflow Depth > 2.21" for 25 YR. - 24 HR. event
Inflow = 8.76 cfs @ 12.32 hrs, Volume= 1.612 af
Outflow = 8.76 cfs @ 12.32 hrs, Volume= 1.612 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 500R: Final Reach #500



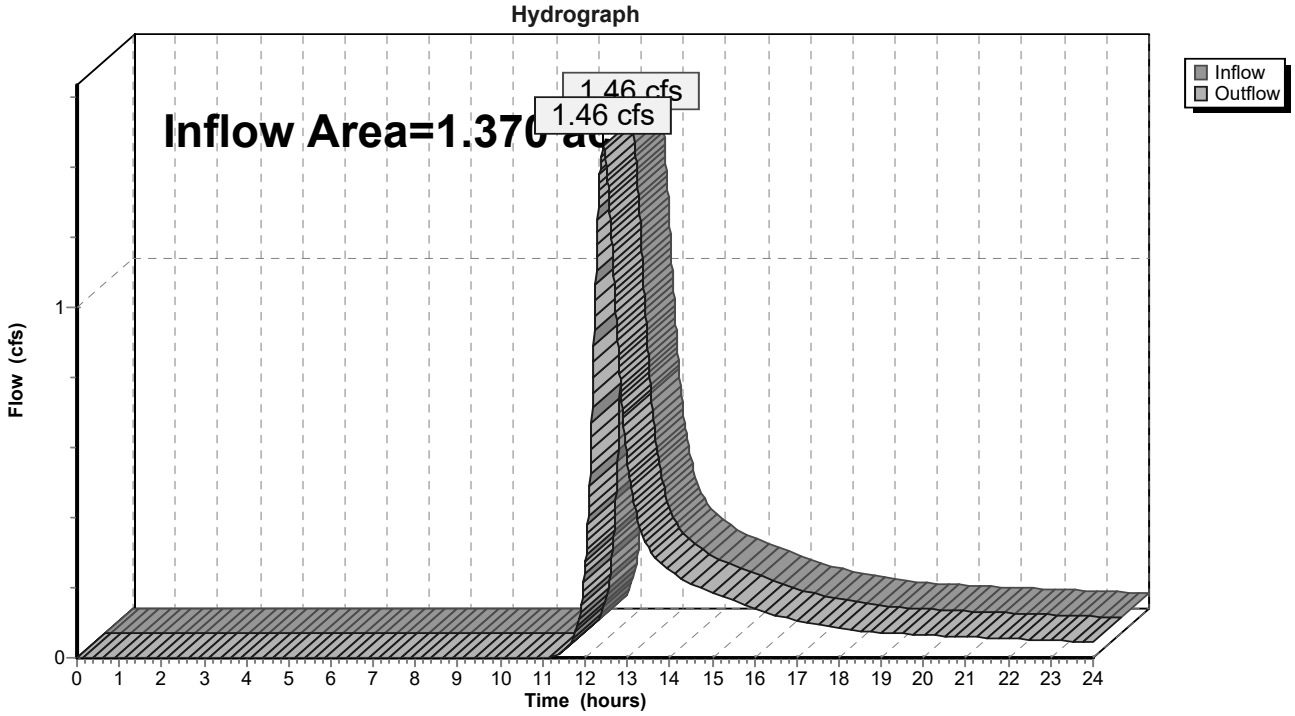
Summary for Reach 600R: Final Reach #600

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

Inflow Area = 1.370 ac, 0.00% Impervious, Inflow Depth > 1.68" for 25 YR. - 24 HR. event
Inflow = 1.46 cfs @ 12.44 hrs, Volume= 0.192 af
Outflow = 1.46 cfs @ 12.44 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 600R: Final Reach #600



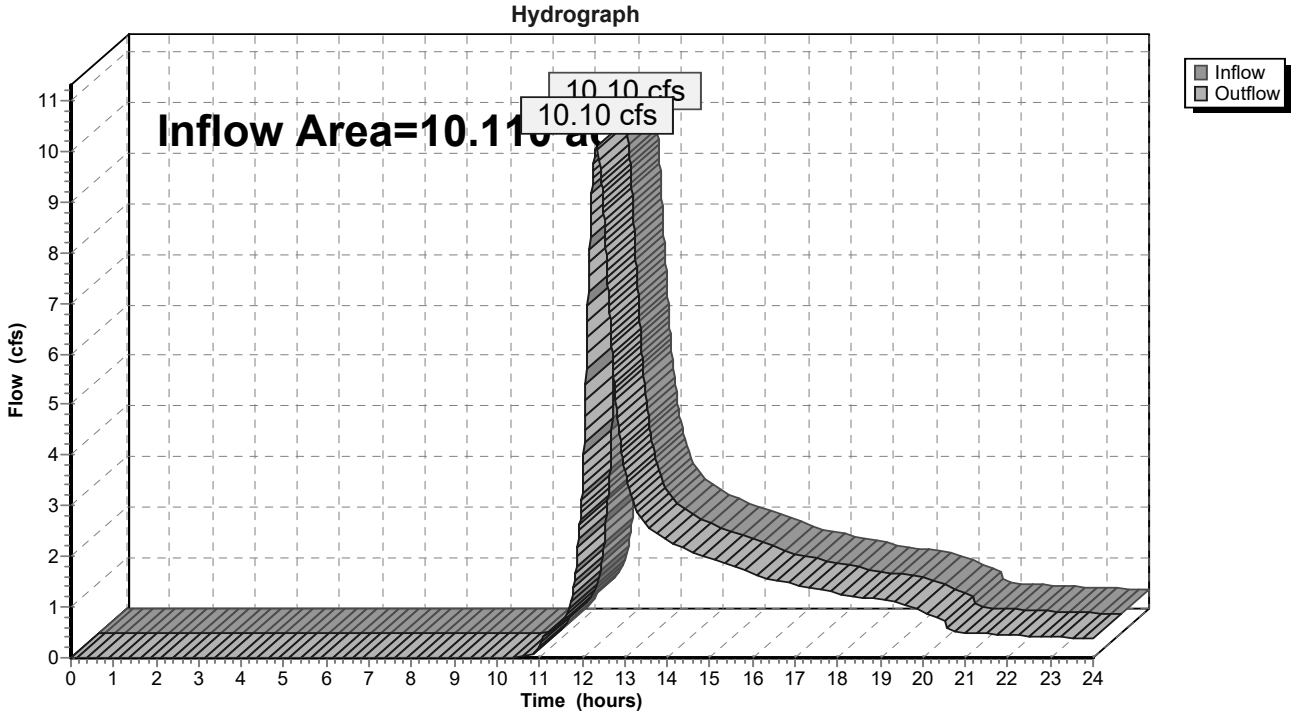
Summary for Reach 700R: Final Analysis Point 700

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

Inflow Area = 10.110 ac, 13.95% Impervious, Inflow Depth > 2.14" for 25 YR. - 24 HR. event
Inflow = 10.10 cfs @ 12.34 hrs, Volume= 1.804 af
Outflow = 10.10 cfs @ 12.34 hrs, Volume= 1.804 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5

Reach 700R: Final Analysis Point 700



Summary for Pond 1P: Pond #1

Inflow Area = 115.647 ac, 3.60% Impervious, Inflow Depth > 1.40" for 25 YR. - 24 HR. event
Inflow = 60.95 cfs @ 12.58 hrs, Volume= 13.522 af
Outflow = 16.22 cfs @ 15.12 hrs, Volume= 13.509 af, Atten= 73%, Lag= 152.7 min
Primary = 16.22 cfs @ 15.12 hrs, Volume= 13.509 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 237.84' @ 15.12 hrs Surf.Area= 264,666 sf Storage= 183,850 cf
Flood Elev= 239.50' Surf.Area= 369,141 sf Storage= 756,164 cf

Plug-Flow detention time= 118.4 min calculated for 13.509 af (100% of inflow)
Center-of-Mass det. time= 117.9 min (1,038.7 - 920.8)

Volume	Invert	Avail.Storage	Storage Description
#1	233.19'	940,735 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

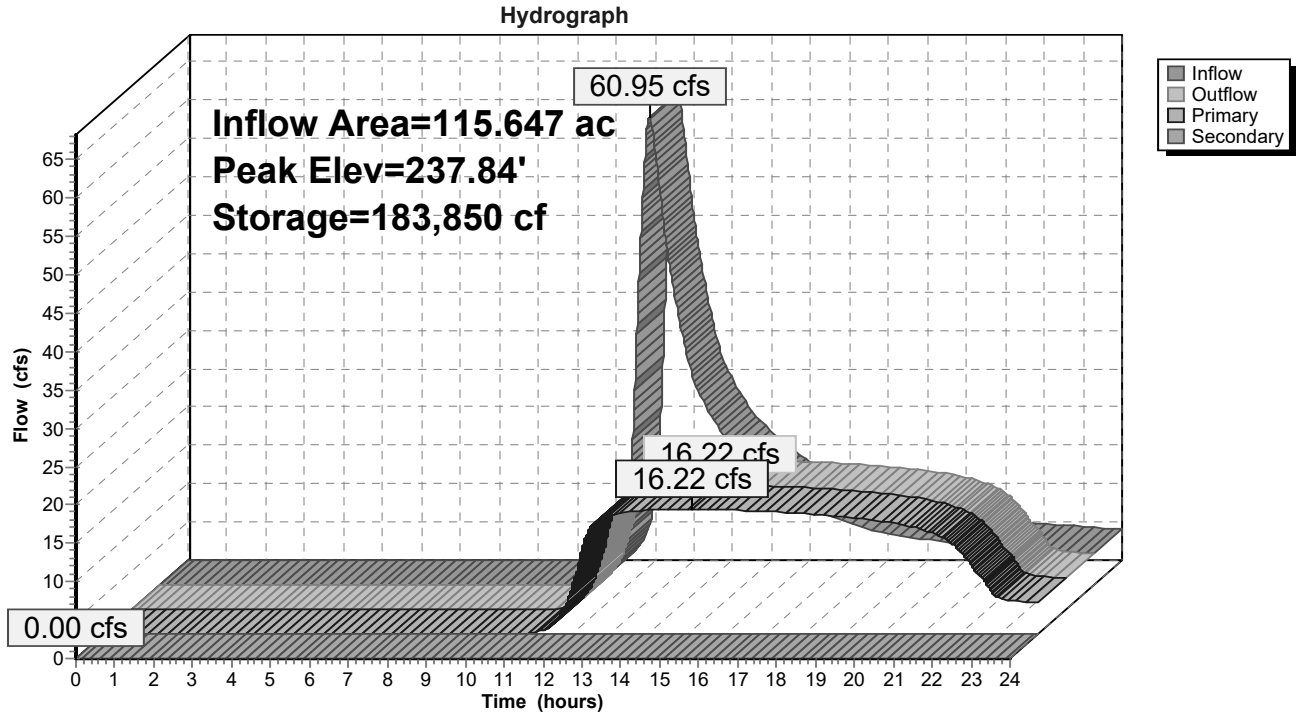
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.19	10	14.0	0	0	10
234.00	518	99.7	162	162	787
235.00	5,281	312.0	2,484	2,646	7,745
236.00	14,800	800.0	9,641	12,287	50,932
236.50	30,632	2,000.0	11,121	23,408	318,313
237.00	72,841	2,758.0	25,118	48,526	605,317
237.50	180,044	3,271.0	61,234	109,760	851,445
238.00	312,208	4,624.0	121,557	231,317	1,701,489
239.00	369,141	4,349.8	340,277	571,594	1,897,350
240.00	369,141	4,349.8	369,141	940,735	1,901,699

Device	Routing	Invert	Outlet Devices
#1	Primary	233.20'	**18.0" Round 18" RCP** L= 68.8' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 233.20' / 232.97' S= 0.0033 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf
#2	Secondary	238.50'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=16.22 cfs @ 15.12 hrs HW=237.84' TW=0.00' (Dynamic Tailwater)
↑—**1=18" RCP** (Barrel Controls 16.22 cfs @ 9.18 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=233.19' TW=237.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Pond #1



Summary for Pond 3aP: Driveway Culvert

Inflow Area = 0.768 ac, 20.54% Impervious, Inflow Depth > 2.53" for 25 YR. - 24 HR. event
Inflow = 1.69 cfs @ 12.22 hrs, Volume= 0.162 af
Outflow = 1.59 cfs @ 12.26 hrs, Volume= 0.161 af, Atten= 6%, Lag= 2.8 min
Primary = 1.59 cfs @ 12.26 hrs, Volume= 0.161 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 235.80' @ 12.28 hrs Surf.Area= 254 sf Storage= 132 cf

Plug-Flow detention time= 7.8 min calculated for 0.161 af (99% of inflow)
Center-of-Mass det. time= 4.2 min (853.3 - 849.1)

Volume	Invert	Avail.Storage	Storage Description
#1	233.50'	532 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

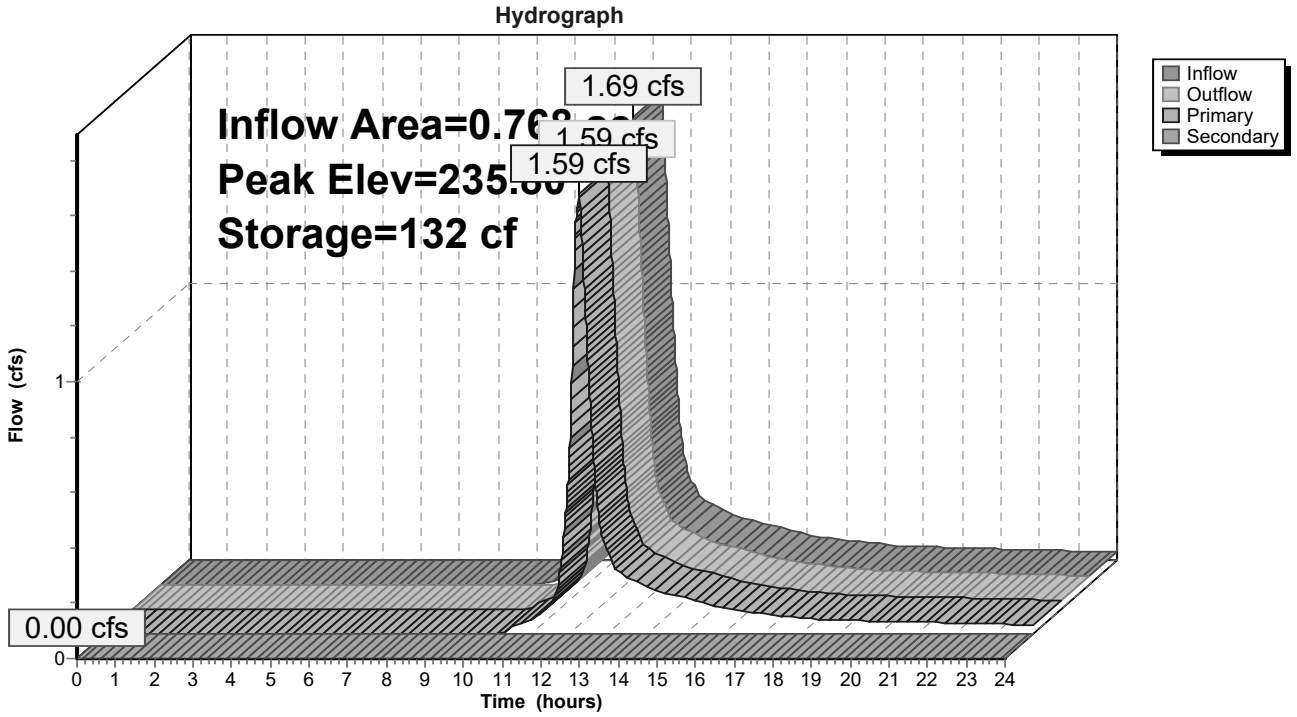
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.50	10	10.0	0	0	10
234.00	15	15.0	6	6	22
235.00	34	34.0	24	30	100
236.00	341	120.0	161	191	1,157
237.00	341	120.0	341	532	1,277

Device	Routing	Invert	Outlet Devices
#1	Primary	235.00'	**18.0" Round 18" HDPE N-12** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 235.00' / 233.00' S= 0.0667 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	236.50'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.59 cfs @ 12.26 hrs HW=235.80' TW=235.61' (Dynamic Tailwater)
1=18" HDPE N-12 (Outlet Controls 1.59 cfs @ 2.41 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=233.50' TW=229.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3aP: Driveway Culvert



Summary for Pond 3P: Pond #3

Inflow Area = 2.821 ac, 13.09% Impervious, Inflow Depth > 2.27" for 25 YR. - 24 HR. event
Inflow = 4.80 cfs @ 12.28 hrs, Volume= 0.534 af
Outflow = 4.79 cfs @ 12.28 hrs, Volume= 0.533 af, Atten= 0%, Lag= 0.4 min
Primary = 4.79 cfs @ 12.28 hrs, Volume= 0.533 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 228.18' @ 12.28 hrs Surf.Area= 197 sf Storage= 95 cf

Plug-Flow detention time= 0.6 min calculated for 0.533 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (875.3 - 875.0)

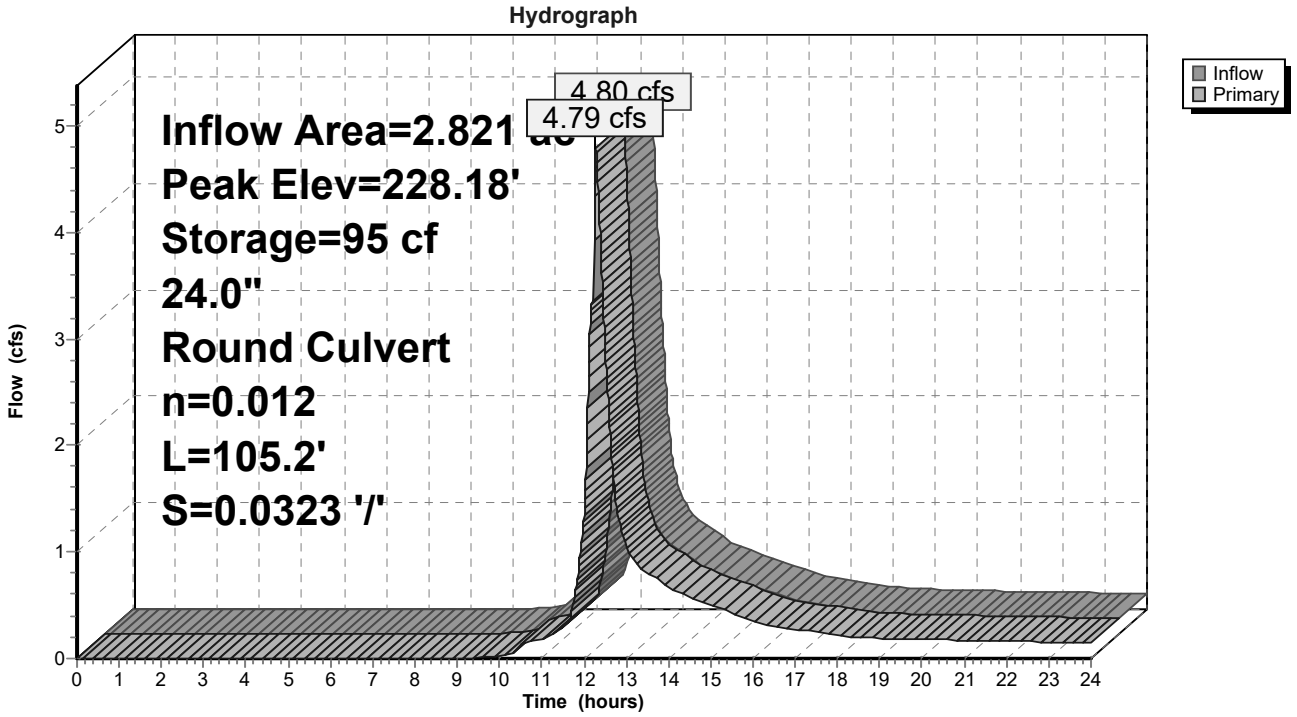
Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	13,902 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	10	14.0	0	0	10
228.00	144	73.3	64	64	424
230.00	1,202	146.0	1,175	1,239	1,712
232.00	2,869	237.3	3,952	5,191	4,523
234.00	6,036	457.1	8,711	13,902	16,689

Device	Routing	Invert	Outlet Devices
#1	Primary	227.24'	**24.0" Round 24" RCP** L= 105.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 227.24' / 223.84' S= 0.0323 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=4.79 cfs @ 12.28 hrs HW=228.18' TW=0.00' (Dynamic Tailwater)
↑—**1=24" RCP** (Inlet Controls 4.79 cfs @ 3.30 fps)

Pond 3P: Pond #3



Summary for Pond 5P: Pond #5

Inflow Area = 8.741 ac, 16.14% Impervious, Inflow Depth > 2.21" for 25 YR. - 24 HR. event
Inflow = 8.76 cfs @ 12.31 hrs, Volume= 1.612 af
Outflow = 8.76 cfs @ 12.32 hrs, Volume= 1.612 af, Atten= 0%, Lag= 0.3 min
Primary = 8.76 cfs @ 12.32 hrs, Volume= 1.612 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 197.46' @ 12.32 hrs Surf.Area= 65 sf Storage= 41 cf

Plug-Flow detention time= 0.0 min calculated for 1.612 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (909.9 - 909.9)

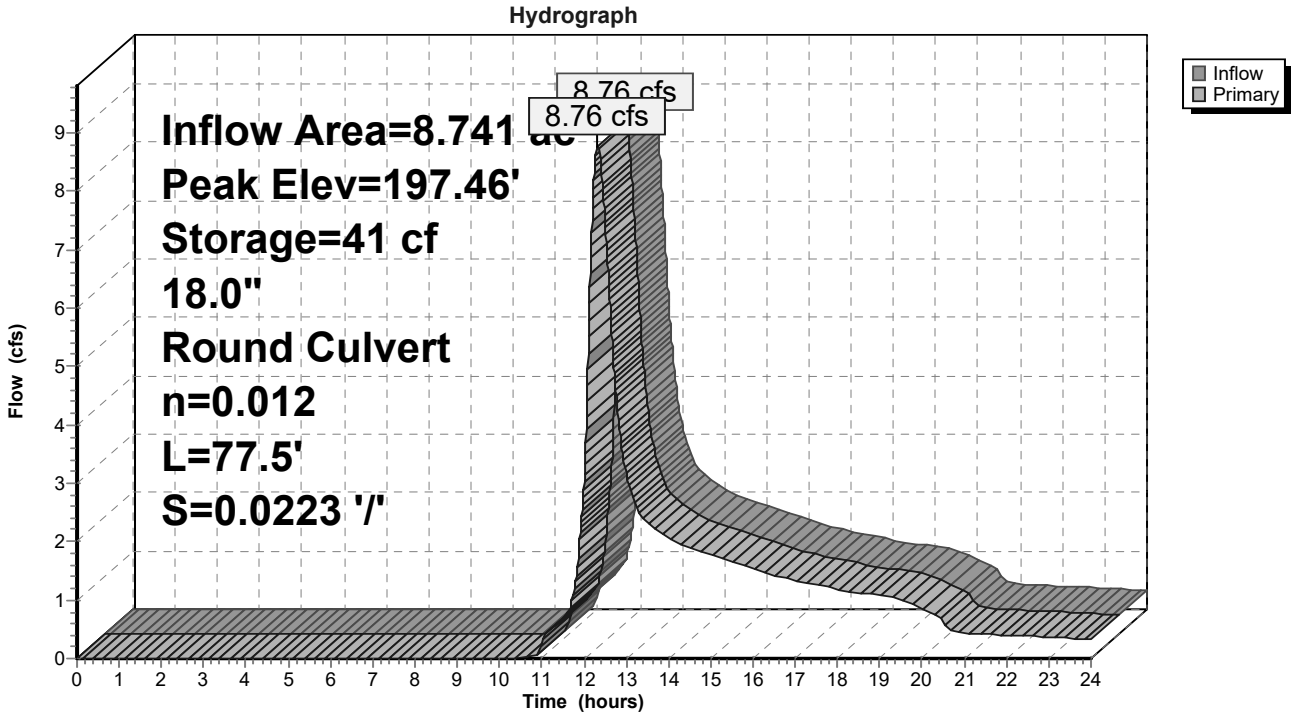
Volume	Invert	Avail.Storage	Storage Description
#1	195.65'	7,065 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
195.65	3	7.1	0	0	3
196.00	3	7.1	1	1	5
198.00	109	46.2	87	88	180
200.00	471	131.7	538	625	1,403
202.00	7,330	396.0	6,439	7,065	12,514

Device	Routing	Invert	Outlet Devices
#1	Primary	195.65'	**18.0" Round Culvert** L= 77.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.65' / 193.92' S= 0.0223 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=8.76 cfs @ 12.32 hrs HW=197.46' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 8.76 cfs @ 4.96 fps)

Pond 5P: Pond #5



Summary for Pond 11P: Pond #11

Inflow Area = 5.592 ac, 3.73% Impervious, Inflow Depth > 1.67" for 25 YR. - 24 HR. event
Inflow = 4.77 cfs @ 12.68 hrs, Volume= 0.779 af
Outflow = 2.69 cfs @ 13.17 hrs, Volume= 0.774 af, Atten= 44%, Lag= 29.9 min
Primary = 2.69 cfs @ 13.17 hrs, Volume= 0.774 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 304.91' @ 13.17 hrs Surf.Area= 20,895 sf Storage= 6,795 cf

Plug-Flow detention time= 30.3 min calculated for 0.774 af (99% of inflow)
Center-of-Mass det. time= 26.9 min (923.4 - 896.5)

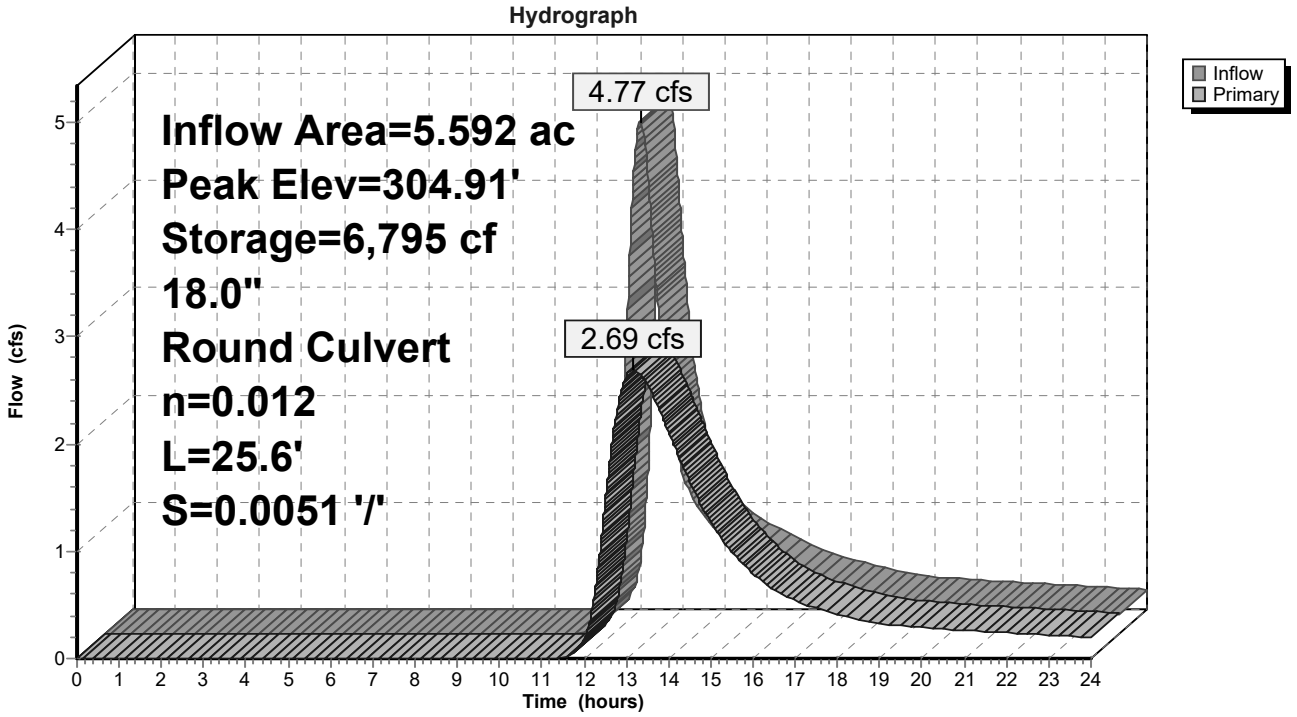
Volume	Invert	Avail.Storage	Storage Description
#1	304.00'	45,725 cf	**Open Water Storage (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
304.00	100	50.0	0	0	100
305.00	25,000	435.0	8,894	8,894	14,961
306.00	50,102	873.5	36,831	45,725	60,626

Device	Routing	Invert	Outlet Devices
#1	Primary	304.00'	**18.0" Round Culvert** L= 25.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 304.00' / 303.87' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=2.69 cfs @ 13.17 hrs HW=304.91' TW=304.35' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 2.69 cfs @ 3.45 fps)

Pond 11P: Pond #11



Summary for Pond 14P: (2) 18" Cross Culvert

Inflow Area = 14.057 ac, 1.58% Impervious, Inflow Depth > 0.92" for 25 YR. - 24 HR. event
Inflow = 5.08 cfs @ 12.78 hrs, Volume= 1.079 af
Outflow = 4.90 cfs @ 12.80 hrs, Volume= 1.077 af, Atten= 4%, Lag= 1.3 min
Primary = 4.90 cfs @ 12.80 hrs, Volume= 1.077 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 237.84' @ 15.08 hrs Surf.Area= 1,025 sf Storage= 1,189 cf
Flood Elev= 240.00' Surf.Area= 1,509 sf Storage= 4,024 cf

Plug-Flow detention time= 11.1 min calculated for 1.077 af (100% of inflow)
Center-of-Mass det. time= 9.9 min (941.3 - 931.4)

Volume	Invert	Avail.Storage	Storage Description
#1	236.40'	4,024 cf	**Open Storage (Irregular)** Listed below (Recalc)

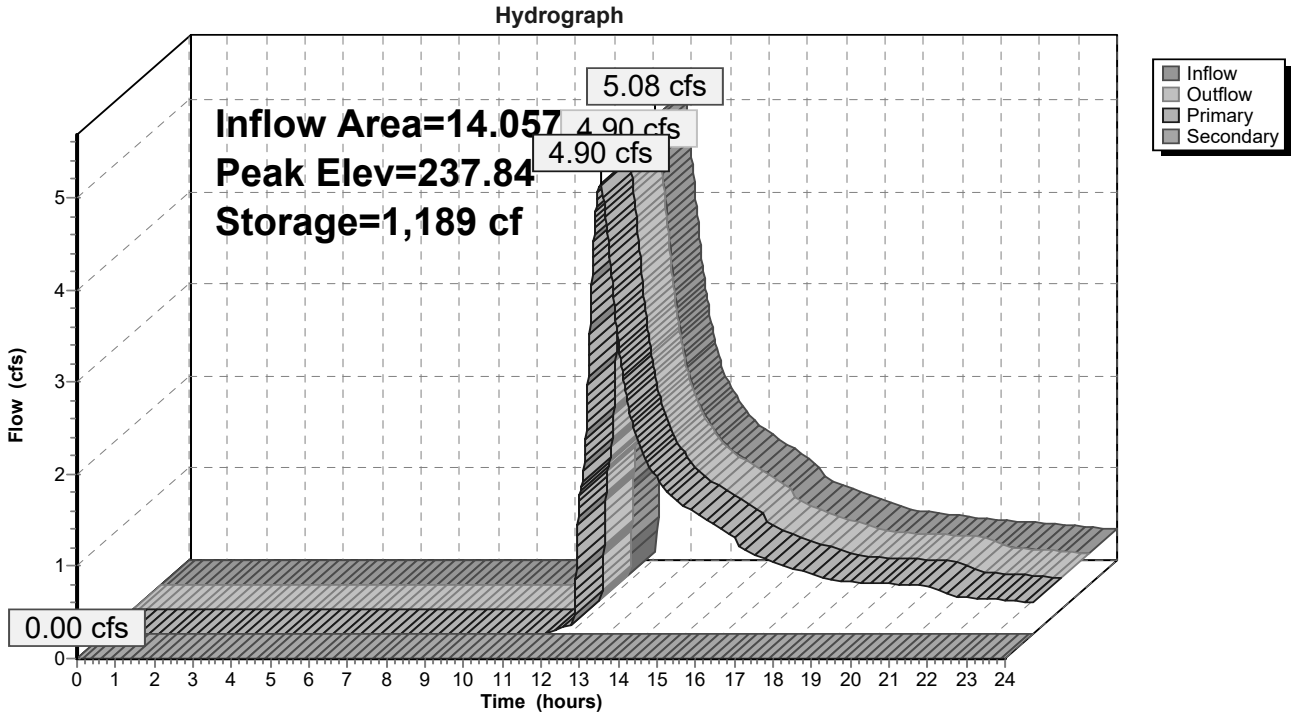
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
236.40	581	109.0	0	0	581
237.00	812	121.0	416	416	811
238.00	1,068	134.0	937	1,353	1,104
239.00	1,350	147.0	1,206	2,559	1,427
239.50	1,500	153.0	712	3,271	1,589
240.00	1,509	152.0	752	4,024	1,669

Device	Routing	Invert	Outlet Devices
#1	Primary	236.40'	**18.0" Round (2) 18" HDPE N-12 X 2.00** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 236.40' / 236.00' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	239.86'	**20.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=4.90 cfs @ 12.80 hrs HW=237.55' TW=237.38' (Dynamic Tailwater)
↑—**1=(2) 18" HDPE N-12** (Outlet Controls 4.90 cfs @ 2.33 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=236.40' TW=233.19' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 14P: (2) 18" Cross Culvert



Summary for Pond 18aP: Level Spreader

Inflow Area = 4.688 ac, 16.33% Impervious, Inflow Depth > 2.44" for 25 YR. - 24 HR. event
Inflow = 5.23 cfs @ 12.57 hrs, Volume= 0.952 af
Outflow = 5.23 cfs @ 12.58 hrs, Volume= 0.938 af, Atten= 0%, Lag= 0.2 min
Primary = 5.23 cfs @ 12.58 hrs, Volume= 0.938 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 238.63' @ 12.58 hrs Surf.Area= 533 sf Storage= 636 cf

Plug-Flow detention time= 11.1 min calculated for 0.938 af (99% of inflow)
Center-of-Mass det. time= 4.7 min (991.0 - 986.3)

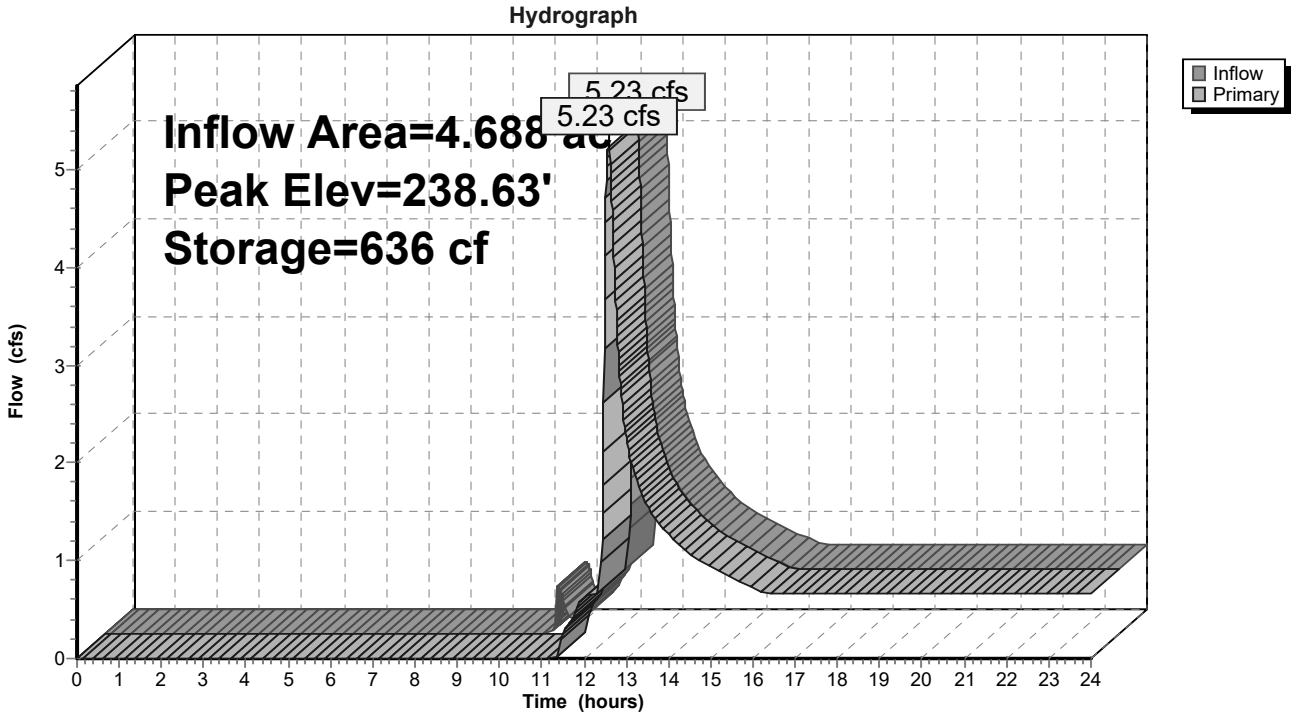
Volume	Invert	Avail.Storage	Storage Description
#1	237.00'	835 cf	**Open Storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
237.00	238	88.0	0	0	238
238.00	428	101.0	328	328	455
238.50	533	107.0	240	568	567
239.00	533	107.0	267	835	621

Device	Routing	Invert	Outlet Devices
#1	Primary	238.50'	**45.0' long x 2.0' breadth Level Lip** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=5.23 cfs @ 12.58 hrs HW=238.63' TW=237.07' (Dynamic Tailwater)
↑**1=Level Lip** (Weir Controls 5.23 cfs @ 0.91 fps)

Pond 18aP: Level Spreader



Summary for Pond 19P: Detention Pond

Inflow Area = 0.363 ac, 0.00% Impervious, Inflow Depth > 1.69" for 25 YR. - 24 HR. event
Inflow = 0.58 cfs @ 12.15 hrs, Volume= 0.051 af
Outflow = 0.15 cfs @ 12.63 hrs, Volume= 0.049 af, Atten= 73%, Lag= 28.6 min
Primary = 0.15 cfs @ 12.63 hrs, Volume= 0.049 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 231.55' @ 12.63 hrs Surf.Area= 1,340 sf Storage= 680 cf
Flood Elev= 234.00' Surf.Area= 2,301 sf Storage= 5,109 cf

Plug-Flow detention time= 71.9 min calculated for 0.049 af (96% of inflow)
Center-of-Mass det. time= 49.8 min (920.2 - 870.4)

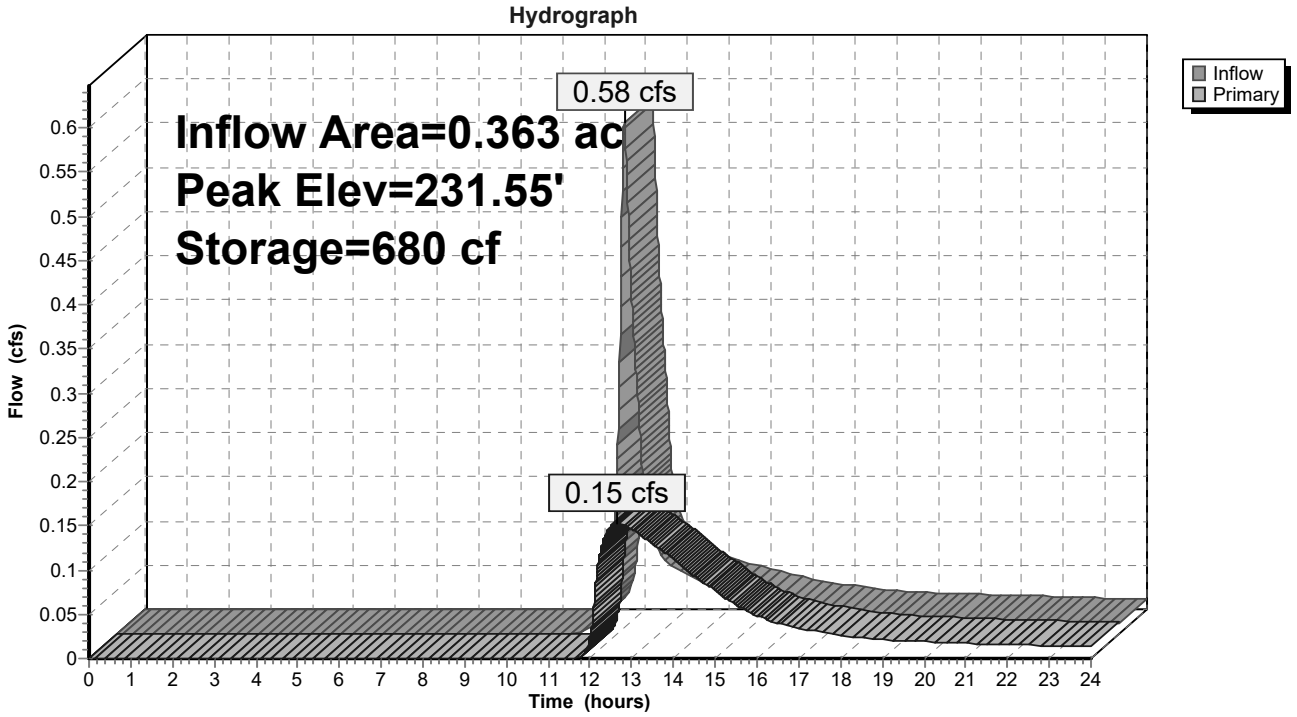
Volume	Invert	Avail.Storage	Storage Description
#1	231.00'	5,109 cf	**Open Storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
231.00	1,154	163.0	0	0	1,154
232.00	1,505	180.0	1,326	1,326	1,649
233.00	1,887	194.0	1,692	3,018	2,105
234.00	2,301	210.0	2,091	5,109	2,658

Device	Routing	Invert	Outlet Devices
#1	Primary	231.00'	**12.0" Round 12" HDPE N-12** L= 140.0' Ke= 0.500 Inlet / Outlet Invert= 231.00' / 230.00' S= 0.0071 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	231.00'	**3.0" Vert. 3" Orifice** C= 0.600
#3	Device 1	233.50'	**48.0" Horiz. Top of Structure** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 12.63 hrs HW=231.55' TW=227.83' (Dynamic Tailwater)
└─**1=12" HDPE N-12** (Passes 0.15 cfs of 1.06 cfs potential flow)
  ├─**2=3" Orifice** (Orifice Controls 0.15 cfs @ 3.12 fps)
  └─**3=Top of Structure** (Controls 0.00 cfs)

Pond 19P: Detention Pond



Summary for Pond 20P: Basin on Ada

Inflow Area = 0.861 ac, 4.78% Impervious, Inflow Depth > 2.89" for 25 YR. - 24 HR. event
Inflow = 2.12 cfs @ 12.23 hrs, Volume= 0.207 af
Outflow = 2.11 cfs @ 12.23 hrs, Volume= 0.207 af, Atten= 0%, Lag= 0.1 min
Primary = 2.11 cfs @ 12.23 hrs, Volume= 0.207 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 237.02' @ 13.12 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 239.50' Surf.Area= 0.000 ac Storage= 0.001 af

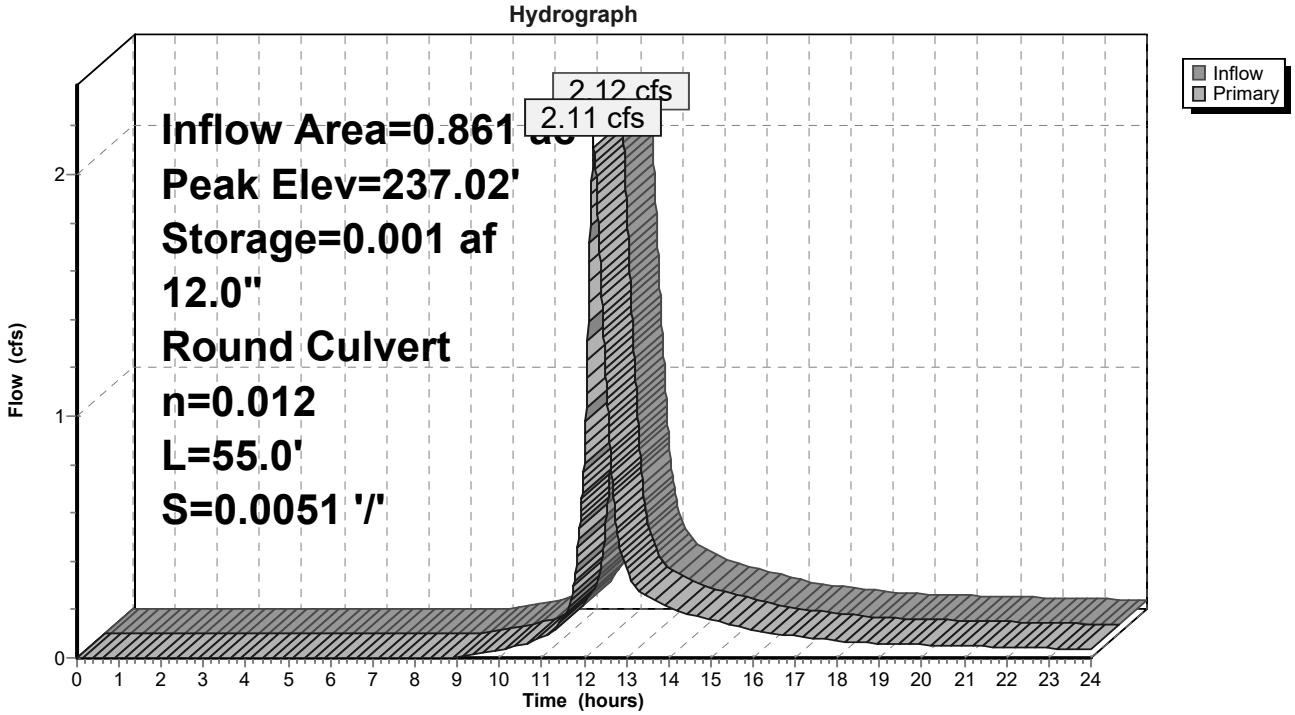
Plug-Flow detention time= 0.7 min calculated for 0.207 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (841.4 - 840.7)

Volume	Invert	Avail.Storage	Storage Description
#1	235.28'	0.001 af	**4.00'D x 4.22'H Basin**

Device	Routing	Invert	Outlet Devices
#1	Primary	235.28'	**12.0" Round 12" HDPE N-12** L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 235.28' / 235.00' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.11 cfs @ 12.23 hrs HW=236.40' TW=236.04' (Dynamic Tailwater)
↳**1=12" HDPE N-12** (Outlet Controls 2.11 cfs @ 2.99 fps)

Pond 20P: Basin on Ada



Summary for Pond 23P: Basin Ada Entrance

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=338)

Inflow Area = 0.144 ac, 37.76% Impervious, Inflow Depth > 3.08" for 25 YR. - 24 HR. event
Inflow = 0.52 cfs @ 12.09 hrs, Volume= 0.037 af
Outflow = 0.52 cfs @ 12.09 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.09 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 230.26' @ 12.11 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 232.00' Surf.Area= 0.000 ac Storage= 0.001 af

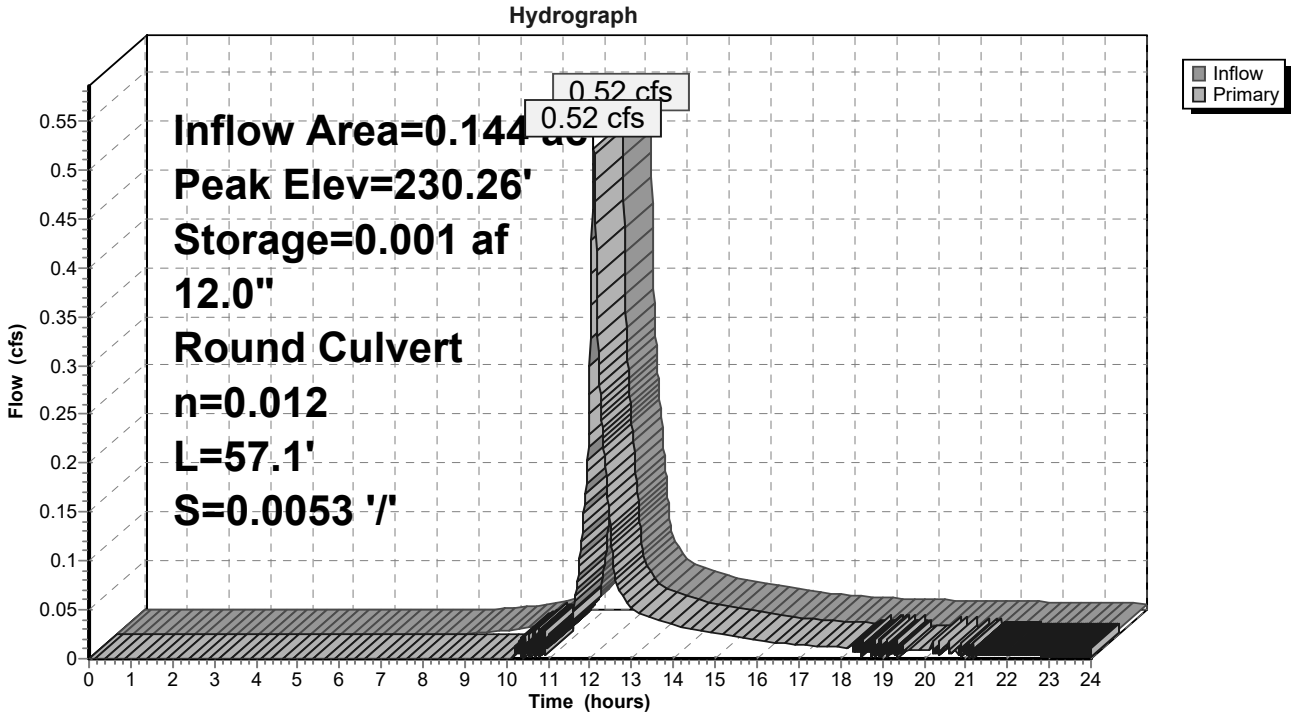
Plug-Flow detention time= 16.2 min calculated for 0.036 af (98% of inflow)
Center-of-Mass det. time= 4.8 min (832.2 - 827.5)

Volume	Invert	Avail.Storage	Storage Description
#1	227.80'	0.001 af	**4.00'D x 4.20'H Basin**

Device	Routing	Invert	Outlet Devices
#1	Primary	227.80'	**12.0" Round Culvert** L= 57.1' Ke= 0.500 Inlet / Outlet Invert= 227.80' / 227.50' S= 0.0053 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.09 hrs HW=230.26' TW=230.24' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.52 cfs @ 0.66 fps)

Pond 23P: Basin Ada Entrance



Summary for Pond 101P: Rain Garden #101

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=173)

Inflow Area = 2.397 ac, 29.10% Impervious, Inflow Depth > 3.39" for 25 YR. - 24 HR. event
Inflow = 7.41 cfs @ 12.17 hrs, Volume= 0.677 af
Outflow = 0.90 cfs @ 12.49 hrs, Volume= 0.641 af, Atten= 88%, Lag= 19.3 min
Primary = 0.90 cfs @ 12.49 hrs, Volume= 0.641 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 237.01' @ 13.15 hrs Surf.Area= 3,875 sf Storage= 13,309 cf
Flood Elev= 238.00' Surf.Area= 3,875 sf Storage= 19,247 cf

Plug-Flow detention time= 165.4 min calculated for 0.641 af (95% of inflow)
Center-of-Mass det. time= 137.1 min (961.4 - 824.3)

Volume	Invert	Avail.Storage	Storage Description
#1	232.00'	1,550 cf	**Stone Bed (Irregular)**Listed below (Recalc) -Impervious 3,875 cf Overall x 40.0% Voids
#2	233.00'	1,550 cf	**Bio-Media (Irregular)**Listed below (Recalc) 7,750 cf Overall x 20.0% Voids
#3	235.00'	14,742 cf	**Open Storage (Irregular)**Listed below (Recalc) -Impervious
#4	235.00'	1,404 cf	**Forebay (Irregular)**Listed below (Recalc) -Impervious
		19,247 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
232.00	3,875	245.0	0	0	3,875
233.00	3,875	245.0	3,875	3,875	4,120

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.00	3,875	245.0	0	0	3,875
235.00	3,875	245.0	7,750	7,750	4,365

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
235.00	3,875	245.0	0	0	3,875
236.00	4,379	258.0	4,124	4,124	4,453
237.00	4,909	271.0	4,641	8,766	5,061
238.00	7,112	376.0	5,977	14,742	10,477

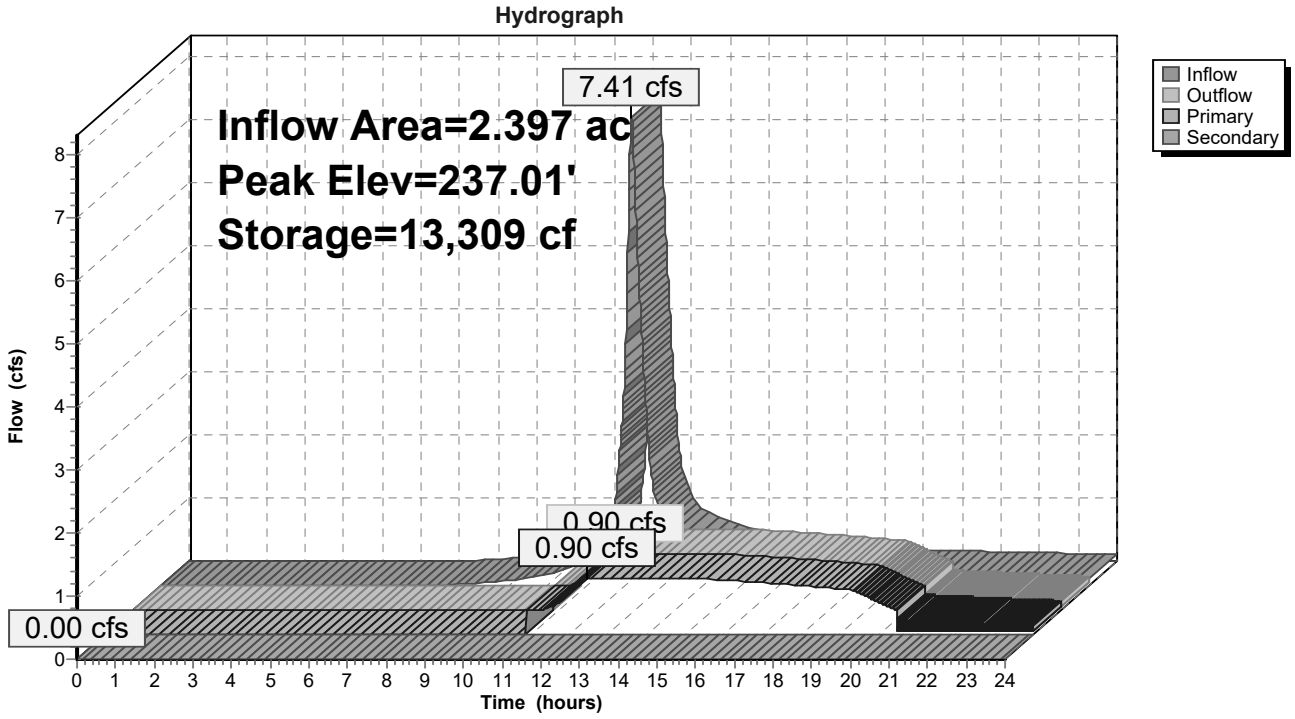
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
235.00	405	138.0	0	0	405
236.00	700	151.0	546	546	737
237.00	1,027	166.0	858	1,404	1,147

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	**12.0" Round 12" HDPE N-12** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0333 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	232.00'	**4.0" Vert. 4" Orifice** C= 0.600
#3	Device 1	237.25'	**12.0" Horiz. Top of Structure** C= 0.600 Limited to weir flow at low heads
#4	Device 2	233.00'	**10.000 in/hr Through Media over Surface area**
#5	Secondary	237.50'	**20.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.90 cfs @ 12.49 hrs HW=236.73' TW=230.21' (Dynamic Tailwater)
└─**1=12" HDPE N-12** (Passes 0.90 cfs of 7.78 cfs potential flow)
  └─**2=4" Orifice** (Passes 0.90 cfs of 0.90 cfs potential flow)
    └─**4=Through Media** (Exfiltration Controls 0.90 cfs)
  └─**3=Top of Structure** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=232.00' TW=230.00' (Dynamic Tailwater)
└─**5=E-Spillway** (Controls 0.00 cfs)

Pond 101P: Rain Garden #101



Summary for Pond 102P: Rain Garden #102

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=234)

Inflow Area = 0.104 ac, 54.54% Impervious, Inflow Depth > 3.67" for 25 YR. - 24 HR. event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.032 af
Outflow = 0.43 cfs @ 12.10 hrs, Volume= 0.027 af, Atten= 4%, Lag= 0.6 min
Primary = 0.04 cfs @ 12.05 hrs, Volume= 0.003 af
Secondary = 0.39 cfs @ 12.10 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 230.25' @ 12.12 hrs Surf.Area= 173 sf Storage= 255 cf
Flood Elev= 230.50' Surf.Area= 173 sf Storage= 318 cf

Plug-Flow detention time= 107.4 min calculated for 0.027 af (85% of inflow)
Center-of-Mass det. time= 43.1 min (855.5 - 812.5)

Volume	Invert	Avail.Storage	Storage Description
#1	227.50'	35 cf	**Stone Base (Irregular)**Listed below (Recalc) -Impervious 87 cf Overall x 40.0% Voids
#2	228.00'	52 cf	**Bio-Media (Irregular)**Listed below (Recalc) 260 cf Overall x 20.0% Voids
#3	229.50'	257 cf	**Open Storage (Irregular)**Listed below (Recalc) -Impervious
		343 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.50	173	75.0	0	0	173
228.00	173	75.0	87	87	211

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	173	75.0	0	0	173
229.50	173	75.0	260	260	286

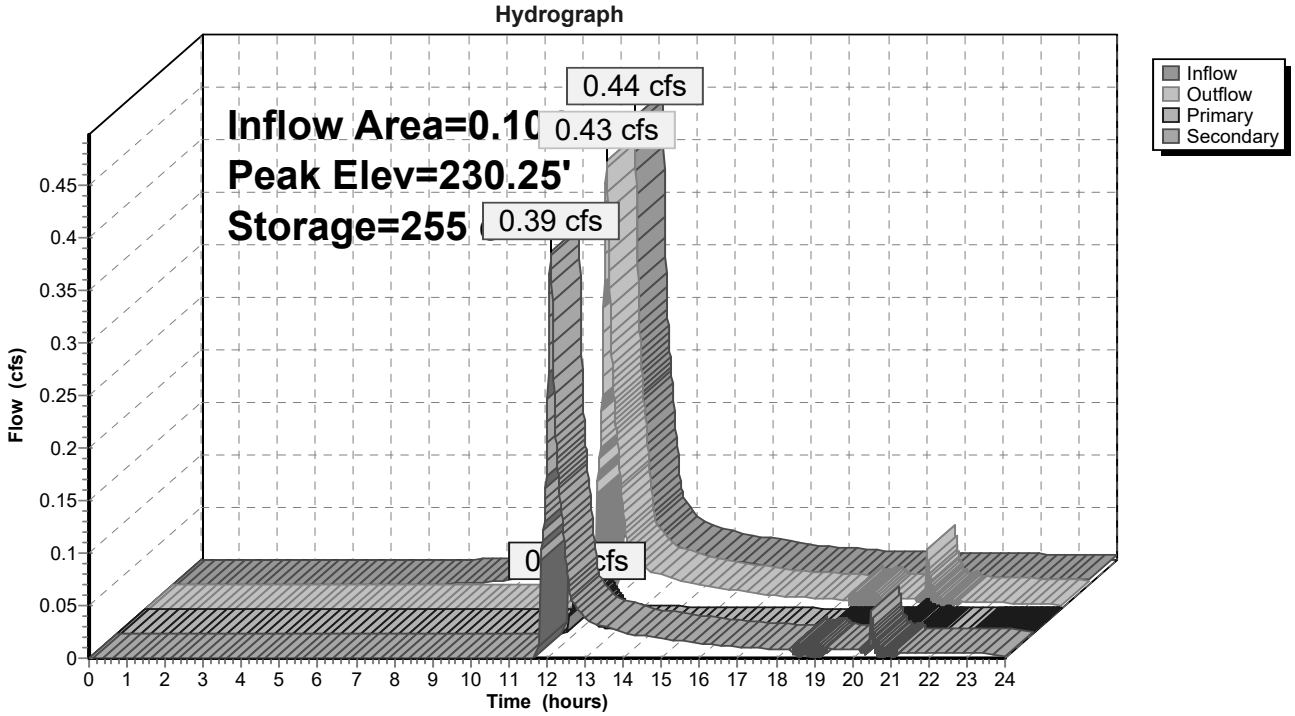
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
229.50	173	75.0	0	0	173
230.00	252	82.0	106	106	269
230.60	252	82.0	151	257	318

Device	Routing	Invert	Outlet Devices
#1	Primary	227.50'	**6.0" Round 6" UD** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 227.50' / 227.50' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	228.00'	**10.000 in/hr Exfiltration over Surface area**
#3	Secondary	230.00'	**5.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.04 cfs @ 12.05 hrs HW=230.23' TW=230.23' (Dynamic Tailwater)
└**1=6" UD** (Passes 0.04 cfs of 0.06 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=0.39 cfs @ 12.10 hrs HW=230.25' TW=230.24' (Dynamic Tailwater)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.39 cfs @ 0.31 fps)

Pond 102P: Rain Garden #102



Summary for Pond 103P: Rain Garden 103

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=7)

Inflow Area = 1.149 ac, 22.76% Impervious, Inflow Depth > 2.77" for 25 YR. - 24 HR. event
Inflow = 2.41 cfs @ 12.00 hrs, Volume= 0.265 af
Outflow = 2.05 cfs @ 12.30 hrs, Volume= 0.199 af, Atten= 15%, Lag= 17.6 min
Primary = 0.08 cfs @ 10.39 hrs, Volume= 0.091 af
Secondary = 1.97 cfs @ 12.30 hrs, Volume= 0.108 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 235.62' @ 12.30 hrs Surf.Area= 351 sf Storage= 3,364 cf
Flood Elev= 236.00' Surf.Area= 351 sf Storage= 4,077 cf

Plug-Flow detention time= 156.4 min calculated for 0.199 af (75% of inflow)
Center-of-Mass det. time= 67.3 min (906.6 - 839.3)

Volume	Invert	Avail.Storage	Storage Description
#1	229.50'	140 cf	**Stone Base (Irregular)**Listed below (Recalc) -Impervious 351 cf Overall x 40.0% Voids
#2	230.50'	140 cf	**Bio-Media (Irregular)**Listed below (Recalc) 702 cf Overall x 20.0% Voids
#3	232.50'	2,909 cf	**Open Storage (Irregular)**Listed below (Recalc) -Impervious
#4	233.00'	887 cf	**Forebay (Irregular)**Listed below (Recalc) -Impervious
		4,077 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
229.50	351	77.0	0	0	351
230.50	351	77.0	351	351	428

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.50	351	77.0	0	0	351
232.50	351	77.0	702	702	505

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
232.50	355	77.0	0	0	355
233.00	437	87.0	198	198	492
234.00	625	100.0	528	726	707
235.00	840	113.0	730	1,456	951
236.00	2,170	237.0	1,453	2,909	4,409

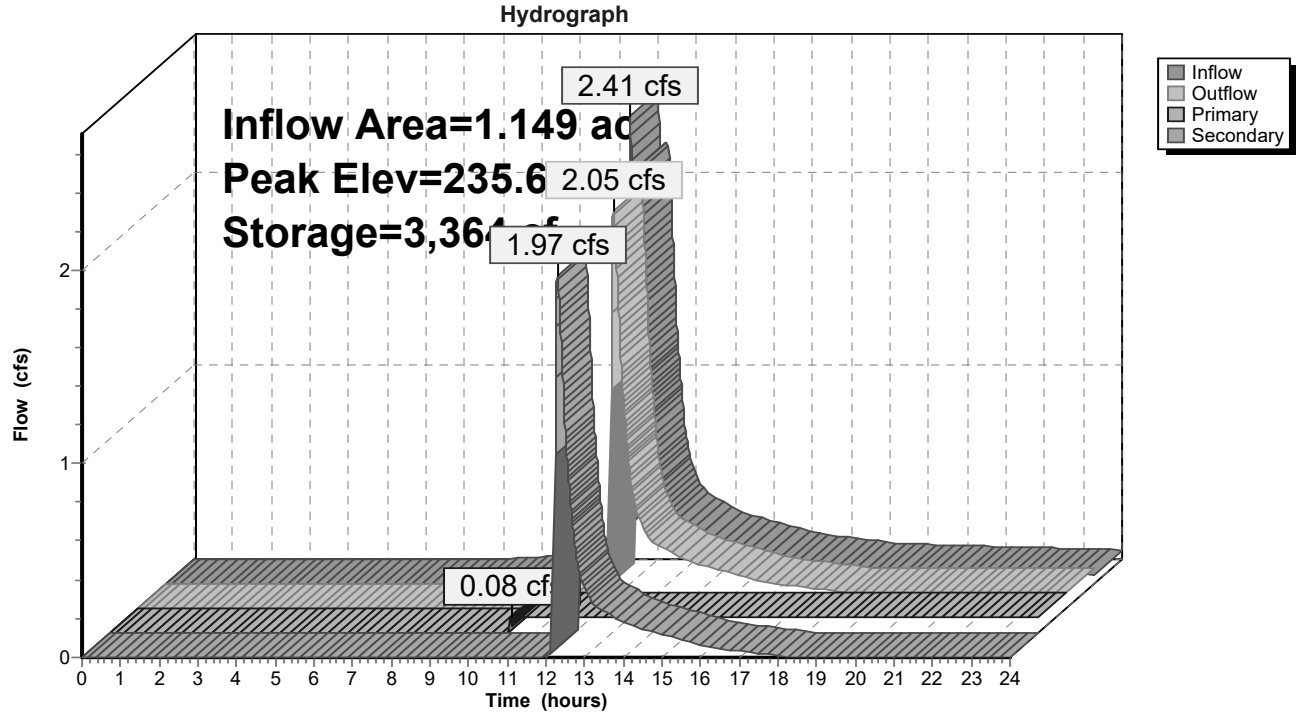
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.00	278	74.0	0	0	278
234.00	440	87.0	356	356	463
235.00	627	99.0	531	887	663

Device	Routing	Invert	Outlet Devices
#1	Primary	230.00'	**6.0" Round 6" UD** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 230.00' / 230.00' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	230.50'	**10.000 in/hr Through Media over Surface area**
#3	Secondary	235.50'	**20.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.08 cfs @ 10.39 hrs HW=230.50' TW=227.37' (Dynamic Tailwater)
└**1=6" UD** (Passes 0.08 cfs of 0.28 cfs potential flow)
└**2=Through Media** (Exfiltration Controls 0.08 cfs)

Secondary OutFlow Max=1.97 cfs @ 12.30 hrs HW=235.62' TW=228.18' (Dynamic Tailwater)
└**3=E-Spillway** (Weir Controls 1.97 cfs @ 0.82 fps)

Pond 103P: Rain Garden 103



Summary for Pond 104P: Rain Garden #104

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=9)

Inflow Area = 4.688 ac, 16.33% Impervious, Inflow Depth > 2.65" for 25 YR. - 24 HR. event
Inflow = 11.13 cfs @ 12.18 hrs, Volume= 1.034 af
Outflow = 5.23 cfs @ 12.57 hrs, Volume= 0.952 af, Atten= 53%, Lag= 23.5 min
Primary = 3.06 cfs @ 12.57 hrs, Volume= 0.904 af
Secondary = 2.17 cfs @ 12.57 hrs, Volume= 0.048 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 242.65' @ 12.57 hrs Surf.Area= 2,826 sf Storage= 14,989 cf
Flood Elev= 243.00' Surf.Area= 2,826 sf Storage= 17,104 cf

Plug-Flow detention time= 173.6 min calculated for 0.952 af (92% of inflow)
Center-of-Mass det. time= 134.1 min (986.3 - 852.2)

Volume	Invert	Avail.Storage	Storage Description
#1	237.00'	1,130 cf	**Stone Bed (Irregular)**Listed below (Recalc) -Impervious 2,826 cf Overall x 40.0% Voids
#2	238.00'	1,130 cf	**Bio-Media (Irregular)**Listed below (Recalc) 5,652 cf Overall x 20.0% Voids
#3	240.00'	13,653 cf	**Open Storage (Irregular)**Listed below (Recalc) x 1.25 -Impervious
#4	240.00'	1,190 cf	**Forebay (Irregular)**Listed below (Recalc) -Impervious
		17,104 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
237.00	2,826	201.0	0	0	2,826
238.00	2,826	201.0	2,826	2,826	3,027

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
238.00	2,826	201.0	0	0	2,826
240.00	2,826	201.0	5,652	5,652	3,228

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	2,826	201.0	0	0	2,826
241.00	3,250	215.0	3,036	3,036	3,334
242.00	3,700	229.0	3,473	6,508	3,876
243.00	5,170	278.0	4,415	10,923	5,869

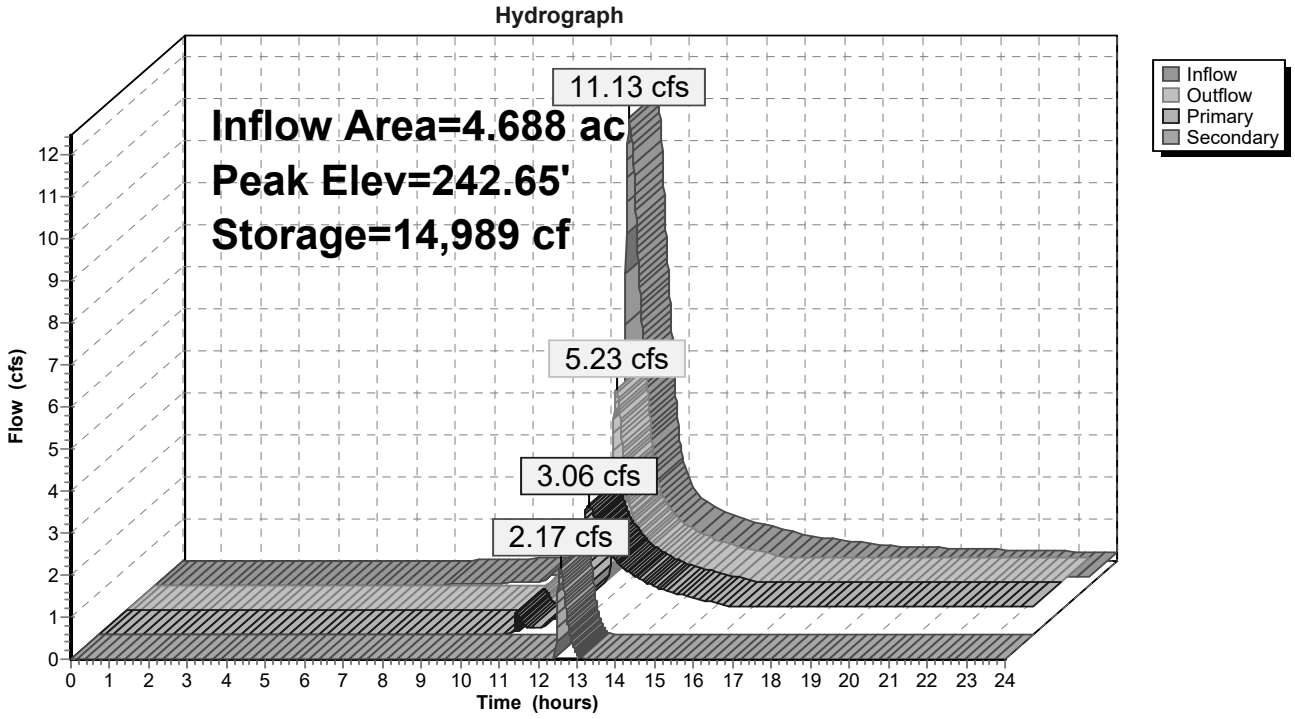
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	396	83.0	0	0	396
241.00	594	100.0	492	492	660
242.00	808	113.0	698	1,190	905

Device	Routing	Invert	Outlet Devices
#1	Primary	237.00'	**12.0" Round 12" HDPE N-12** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 237.00' / 237.00' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	237.00'	**5.0" Vert. 5" Orifice** C= 0.600
#3	Device 1	242.25'	**12.0" Horiz. Top of Structure** C= 0.600 Limited to weir flow at low heads
#4	Device 2	238.00'	**10.000 in/hr Through Media over Surface area**
#5	Secondary	242.50'	**15.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=3.06 cfs @ 12.57 hrs HW=242.65' TW=238.63' (Dynamic Tailwater)
- **1=12" HDPE N-12** (Passes 3.06 cfs of 7.59 cfs potential flow)
  - **2=5" Orifice** (Passes 0.65 cfs of 1.32 cfs potential flow)
    - **4=Through Media** (Exfiltration Controls 0.65 cfs)
  - **3=Top of Structure** (Orifice Controls 2.41 cfs @ 3.06 fps)

Secondary OutFlow Max=2.17 cfs @ 12.57 hrs HW=242.65' TW=238.63' (Dynamic Tailwater)
- **5=E-Spillway** (Weir Controls 2.17 cfs @ 0.94 fps)

Pond 104P: Rain Garden #104



Summary for Pond 105P: Rain Garden #105

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=6)

Inflow Area = 0.078 ac, 29.77% Impervious, Inflow Depth > 3.37" for 25 YR. - 24 HR. event
Inflow = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.07 cfs @ 12.13 hrs, Volume= 0.019 af, Atten= 77%, Lag= 2.5 min
Primary = 0.07 cfs @ 12.13 hrs, Volume= 0.019 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 239.17' @ 12.50 hrs Surf.Area= 310 sf Storage= 338 cf
Flood Elev= 240.00' Surf.Area= 310 sf Storage= 856 cf

Plug-Flow detention time= 120.3 min calculated for 0.019 af (87% of inflow)
Center-of-Mass det. time= 62.3 min (882.4 - 820.1)

Volume	Invert	Avail.Storage	Storage Description
#1	236.00'	124 cf	**Stone Bed (Irregular)**Listed below (Recalc) -Impervious 310 cf Overall x 40.0% Voids
#2	237.00'	124 cf	**Bio-Media (Irregular)**Listed below (Recalc) 620 cf Overall x 20.0% Voids
#3	239.00'	485 cf	**Open Storage (Irregular)**Listed below (Recalc) -Impervious
#4	239.00'	124 cf	**Forebay (Irregular)**Listed below (Recalc) -Impervious
		856 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
236.00	310	80.0	0	0	310
237.00	310	80.0	310	310	390

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
237.00	310	80.0	0	0	310
239.00	310	80.0	620	620	470

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	310	80.0	0	0	310
239.50	392	85.0	175	175	388
240.00	878	167.0	309	485	2,033

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	209	76.0	0	0	209
239.50	288	82.0	124	124	294

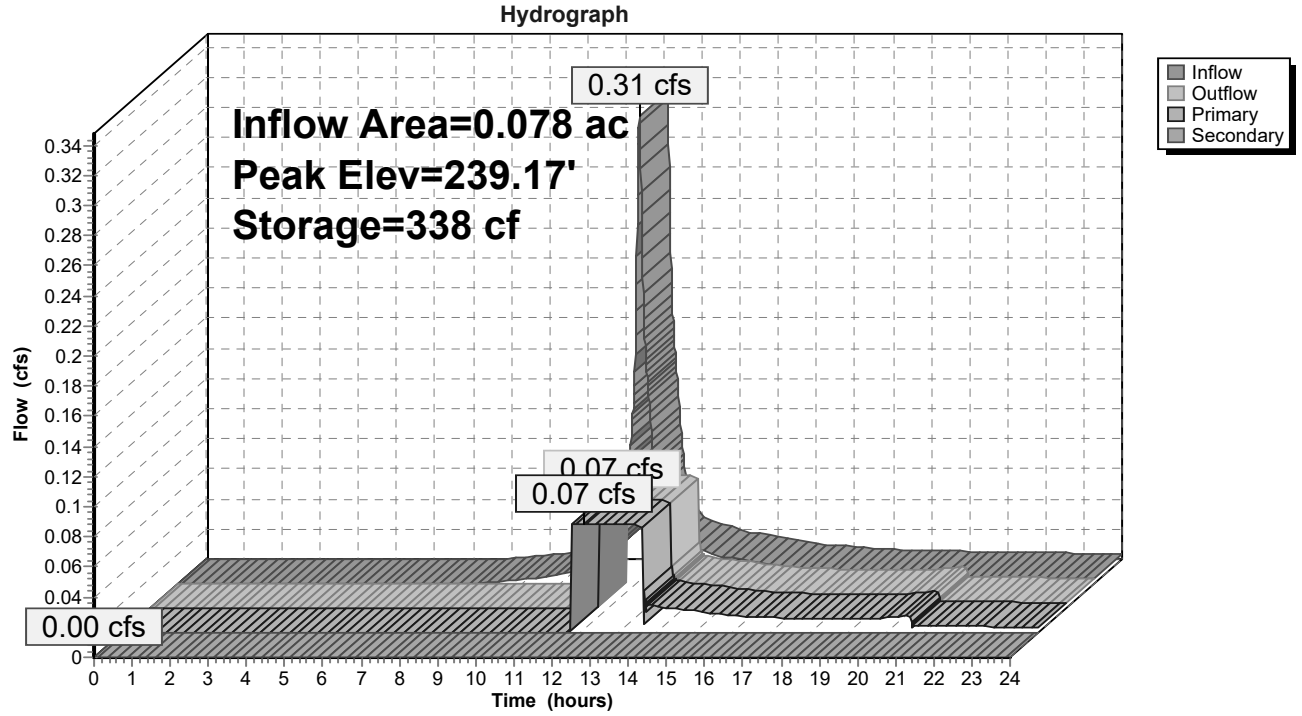
Device	Routing	Invert	Outlet Devices
#1	Primary	236.00'	**6.0" Round 6" UD** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 236.00' / 236.00' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

#2	Device 1	237.00'	**10.000 in/hr Through Media over Surface area**
#3	Secondary	240.00'	**50.0' long x 4.0' breadth E-Spillway**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.07 cfs @ 12.13 hrs HW=238.98' TW=235.18' (Dynamic Tailwater)
└─**1=6" UD** (Passes 0.07 cfs of 1.13 cfs potential flow)
└─**2=Through Media** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=236.00' TW=233.19' (Dynamic Tailwater)
└─**3=E-Spillway** (Controls 0.00 cfs)

Pond 105P: Rain Garden #105



Summary for Pond 106P: Rain Garden #106

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=15)

Inflow Area = 0.164 ac, 24.58% Impervious, Inflow Depth > 3.28" for 25 YR. - 24 HR. event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.045 af
Outflow = 0.08 cfs @ 11.60 hrs, Volume= 0.041 af, Atten= 87%, Lag= 0.0 min
Primary = 0.08 cfs @ 11.60 hrs, Volume= 0.041 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 239.81' @ 12.69 hrs Surf.Area= 362 sf Storage= 767 cf
Flood Elev= 241.00' Surf.Area= 362 sf Storage= 1,895 cf

Plug-Flow detention time= 112.6 min calculated for 0.041 af (93% of inflow)
Center-of-Mass det. time= 74.7 min (897.2 - 822.6)

Volume	Invert	Avail.Storage	Storage Description
#1	236.40'	145 cf	**Stone Bed (Irregular)**Listed below (Recalc) -Impervious 362 cf Overall x 40.0% Voids
#2	237.40'	116 cf	**Bio-Media (Irregular)**Listed below (Recalc) 579 cf Overall x 20.0% Voids
#3	239.00'	1,512 cf	**Open Storage (Irregular)**Listed below (Recalc) -Impervious
#4	239.00'	123 cf	**Forebay (Irregular)**Listed below (Recalc) -Impervious
		1,895 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
236.40	362	81.0	0	0	362
237.40	362	81.0	362	362	443

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
237.40	362	81.0	0	0	362
239.00	362	81.0	579	579	492

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	362	81.0	0	0	362
239.50	448	88.0	202	202	465
240.00	965	169.0	345	547	2,123
241.00	965	169.0	965	1,512	2,292

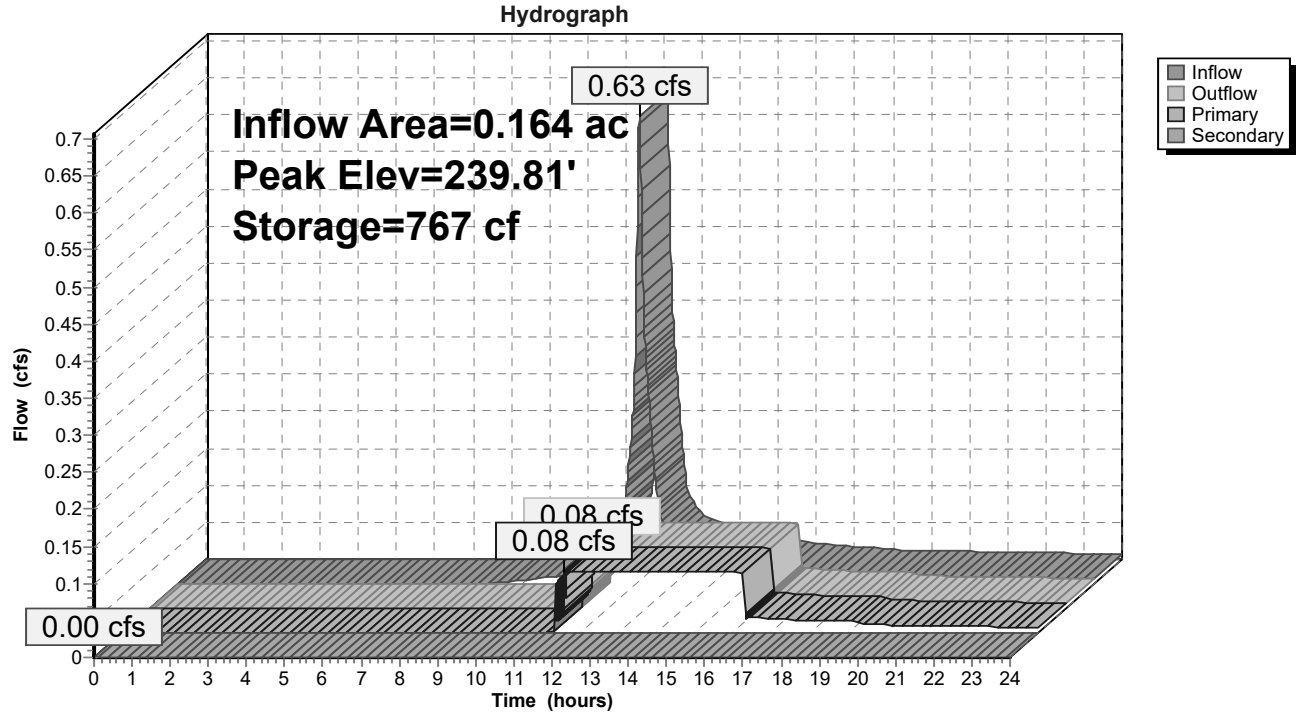
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	213	63.0	0	0	213
239.50	279	70.0	123	123	294

Device	Routing	Invert	Outlet Devices
#1	Primary	236.75'	**6.0" Round 6" UD** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 236.75' / 236.40' S= 0.0070 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	237.40'	**10.000 in/hr through Media over Surface area**
#3	Secondary	240.00'	**10.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.08 cfs @ 11.60 hrs HW=237.40' TW=236.45' (Dynamic Tailwater)
└─**1=6" UD** (Passes 0.08 cfs of 0.53 cfs potential flow)
└─**2=through Media** (Exfiltration Controls 0.08 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=236.40' TW=236.40' (Dynamic Tailwater)
└─**3=E-Spillway** (Controls 0.00 cfs)

Pond 106P: Rain Garden #106



Summary for Pond 107P: Rain Garden #107

Inflow Area = 3.986 ac, 10.54% Impervious, Inflow Depth > 2.77" for 25 YR. - 24 HR. event
Inflow = 9.65 cfs @ 12.21 hrs, Volume= 0.920 af
Outflow = 9.47 cfs @ 12.24 hrs, Volume= 0.806 af, Atten= 2%, Lag= 1.7 min
Primary = 8.38 cfs @ 12.24 hrs, Volume= 0.789 af
Secondary = 1.09 cfs @ 12.24 hrs, Volume= 0.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 247.61' @ 12.24 hrs Surf.Area= 599 sf Storage= 5,720 cf
Flood Elev= 248.00' Surf.Area= 599 sf Storage= 6,750 cf

Plug-Flow detention time= 78.2 min calculated for 0.806 af (88% of inflow)
Center-of-Mass det. time= 22.1 min (864.5 - 842.4)

Volume	Invert	Avail.Storage	Storage Description
#1	241.00'	240 cf	**Stone Bed (Irregular)**Listed below (Recalc) -Impervious 599 cf Overall x 40.0% Voids
#2	242.00'	240 cf	**Bio-Media (Irregular)**Listed below (Recalc) 1,198 cf Overall x 20.0% Voids
#3	244.00'	5,536 cf	**Open Storage (Irregular)**Listed below (Recalc) -Impervious
#4	245.00'	735 cf	**Forebay (Irregular)**Listed below (Recalc) -Impervious
		6,750 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
241.00	599	117.0	0	0	599
242.00	599	117.0	599	599	716

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
242.00	599	117.0	0	0	599
244.00	599	117.0	1,198	1,198	833

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
244.00	599	117.0	0	0	599
245.00	864	134.0	727	727	961
246.00	1,257	177.0	1,054	1,782	2,036
247.00	1,694	207.0	1,470	3,252	2,973
248.00	2,930	324.0	2,284	5,536	7,924

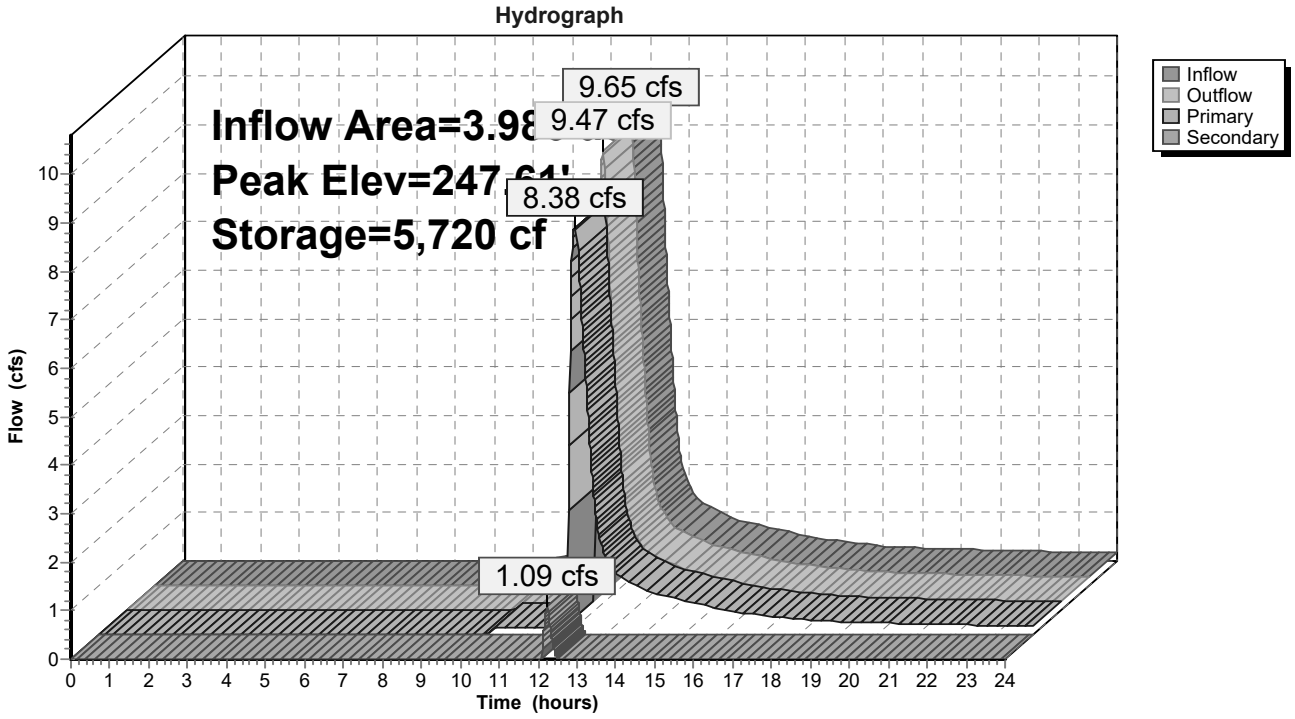
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
245.00	178	60.0	0	0	178
246.00	367	92.0	267	267	572
247.00	578	109.0	469	735	862

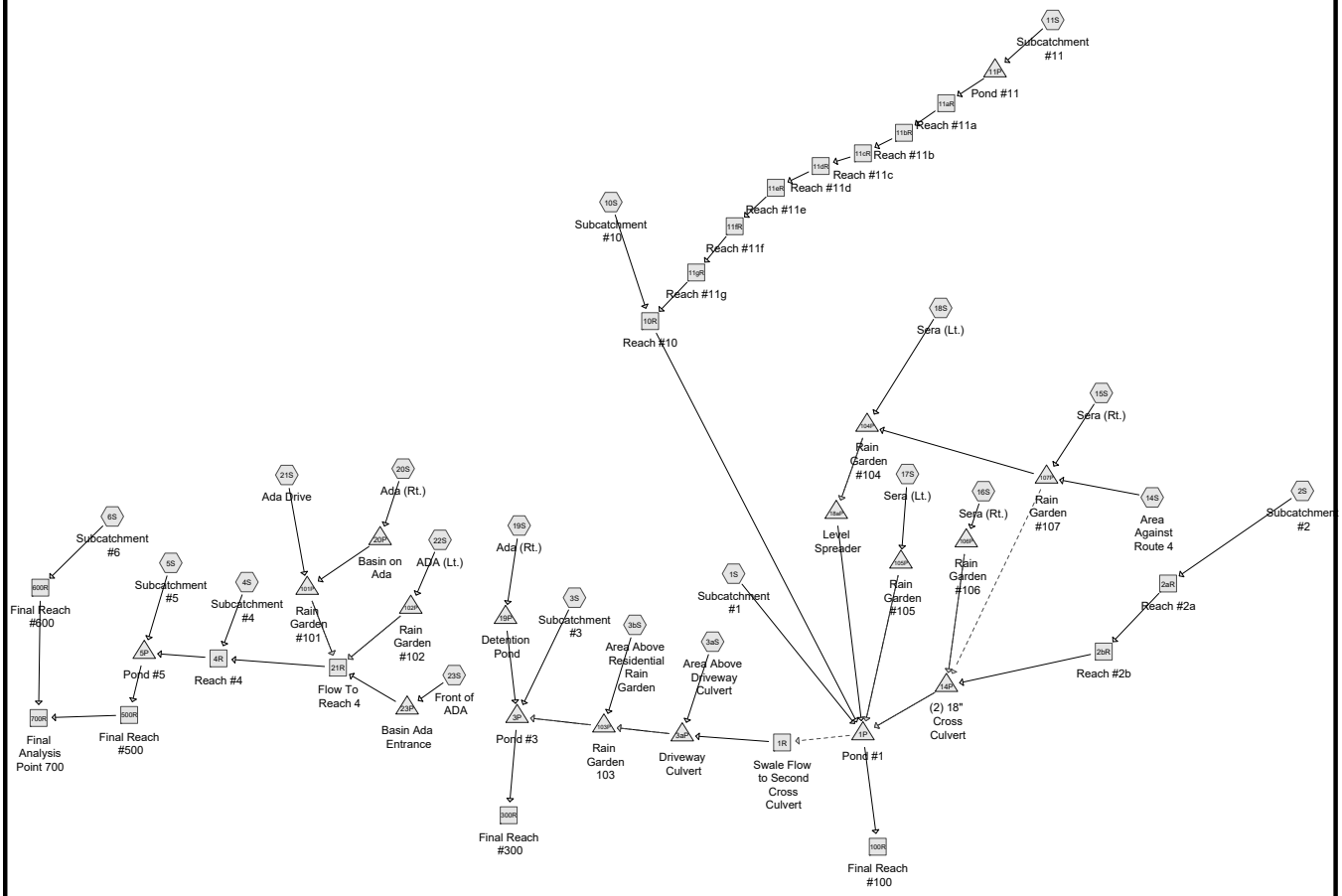
Device	Routing	Invert	Outlet Devices
#1	Primary	241.00'	**12.0" Round 12" HDPE N-12** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 241.00' / 240.65' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	241.00'	**6.0" Vert. 6" Orifice** C= 0.600
#3	Device 1	247.25'	**48.0" Horiz. Top Of Structure** C= 0.600 Limited to weir flow at low heads
#4	Device 2	242.00'	**10.000 in/hr Through Bio-Media over Surface area**
#5	Secondary	247.50'	**12.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=8.38 cfs @ 12.24 hrs HW=247.61' TW=241.25' (Dynamic Tailwater)
└─**1=12" HDPE N-12** (Barrel Controls 8.38 cfs @ 10.67 fps)
  └─**2=6" Orifice** (Passes < 2.38 cfs potential flow)
    └─**4=Through Bio-Media** (Passes < 0.14 cfs potential flow)
  └─**3=Top Of Structure** (Passes < 9.00 cfs potential flow)

Secondary OutFlow Max=1.09 cfs @ 12.24 hrs HW=247.61' TW=236.75' (Dynamic Tailwater)
└─**5=E-Spillway** (Weir Controls 1.09 cfs @ 0.80 fps)

Pond 107P: Rain Garden #107





Subcat Reach Pond Link

Routing Diagram for 18-030 Proposed Conditions
Prepared by Berry Surveying & Engineering, Printed 6/2/2019
HydroCAD® 10.00-22 s/n 07605 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=1,797,161 sf 0.56% Impervious Runoff Depth>0.37"
Flow Length=655' Tc=32.3 min CN=61 Runoff=6.37 cfs 1.277 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>0.06"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=0.12 cfs 0.071 af

Subcatchment 3aS: Area Above Driveway Runoff Area=33,449 sf 20.54% Impervious Runoff Depth>0.68"
Flow Length=100' Slope=0.0500 '/' Tc=15.3 min UI Adjusted CN=69 Runoff=0.39 cfs 0.044 af

Subcatchment 3bS: Area Above Runoff Area=16,619 sf 27.23% Impervious Runoff Depth>1.09"
Tc=0.0 min UI Adjusted CN=77 Runoff=0.58 cfs 0.035 af

Subcatchment 3S: Subcatchment #3 Runoff Area=56,977 sf 8.23% Impervious Runoff Depth>0.73"
Flow Length=404' Tc=13.3 min CN=70 Runoff=0.77 cfs 0.079 af

Subcatchment 4S: Subcatchment #4 Runoff Area=195,772 sf 10.11% Impervious Runoff Depth>0.31"
Flow Length=887' Tc=24.0 min UI Adjusted CN=59 Runoff=0.57 cfs 0.116 af

Subcatchment 5S: Subcatchment #5 Runoff Area=69,744 sf 9.23% Impervious Runoff Depth>0.48"
Flow Length=679' Tc=15.7 min CN=64 Runoff=0.47 cfs 0.064 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>0.31"
Flow Length=377' Tc=28.2 min CN=59 Runoff=0.16 cfs 0.035 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>0.11"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=0.78 cfs 0.452 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>0.31"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=0.55 cfs 0.143 af

Subcatchment 14S: Area Against Route 4 Runoff Area=76,802 sf 9.88% Impervious Runoff Depth>0.73"
Flow Length=389' Tc=16.8 min UI Adjusted CN=70 Runoff=0.95 cfs 0.107 af

Subcatchment 15S: Sera (Rt.) Runoff Area=96,848 sf 11.06% Impervious Runoff Depth>0.87"
Flow Length=730' Tc=13.8 min UI Adjusted CN=73 Runoff=1.63 cfs 0.162 af

Subcatchment 16S: Sera (Rt.) Runoff Area=7,152 sf 24.58% Impervious Runoff Depth>1.09"
Tc=6.0 min UI Adjusted CN=77 Runoff=0.20 cfs 0.015 af

Subcatchment 17S: Sera (Lt.) Runoff Area=3,416 sf 29.77% Impervious Runoff Depth>1.15"
Tc=6.0 min UI Adjusted CN=78 Runoff=0.10 cfs 0.008 af

Subcatchment 18S: Sera (Lt.) Runoff Area=30,552 sf 49.26% Impervious Runoff Depth>1.68"
Flow Length=605' Tc=11.8 min CN=86 Runoff=1.15 cfs 0.098 af

Subcatchment 19S: Ada (Rt.) Runoff Area=15,825 sf 0.00% Impervious Runoff Depth>0.31"
Flow Length=100' Slope=0.1400 '/' Tc=10.1 min CN=59 Runoff=0.05 cfs 0.009 af

Subcatchment 20S: Ada (Rt.) Runoff Area=37,491 sf 4.78% Impervious Runoff Depth>0.87"
Flow Length=516' Tc=16.7 min CN=73 Runoff=0.59 cfs 0.063 af

Subcatchment 21S: Ada Drive Runoff Area=66,926 sf 42.72% Impervious Runoff Depth>1.33"
Flow Length=505' Tc=11.3 min CN=81 Runoff=1.99 cfs 0.171 af

Subcatchment 22S: ADA (Lt.) Runoff Area=4,518 sf 54.54% Impervious Runoff Depth>1.33"
Tc=6.0 min CN=81 Runoff=0.16 cfs 0.012 af

Subcatchment 23S: Front of ADA Runoff Area=6,292 sf 37.76% Impervious Runoff Depth>0.98"
Tc=6.0 min CN=75 Runoff=0.16 cfs 0.012 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=302.0' S=0.0033 '/' Capacity=32.24 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.04' Max Vel=0.82 fps Inflow=0.12 cfs 0.071 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=0.12 cfs 0.071 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.04' Max Vel=0.78 fps Inflow=0.12 cfs 0.071 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=0.12 cfs 0.070 af

Reach 4R: Reach #4 Avg. Flow Depth=0.23' Max Vel=3.79 fps Inflow=1.37 cfs 0.331 af
n=0.022 L=223.0' S=0.0404 '/' Capacity=32.43 cfs Outflow=1.37 cfs 0.331 af

Reach 10R: Reach #10 Avg. Flow Depth=0.13' Max Vel=1.30 fps Inflow=0.96 cfs 0.568 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=0.96 cfs 0.566 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.14' Max Vel=0.27 fps Inflow=0.43 cfs 0.141 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=0.36 cfs 0.137 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.11' Max Vel=0.47 fps Inflow=0.36 cfs 0.137 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=0.34 cfs 0.134 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.20' Max Vel=0.06 fps Inflow=0.34 cfs 0.134 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=0.22 cfs 0.119 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.03' Max Vel=1.96 fps Inflow=0.22 cfs 0.119 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=0.22 cfs 0.119 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.09' Max Vel=0.41 fps Inflow=0.22 cfs 0.119 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=0.22 cfs 0.117 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.06' Max Vel=0.81 fps Inflow=0.22 cfs 0.117 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=0.22 cfs 0.117 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.10' Max Vel=0.36 fps Inflow=0.22 cfs 0.117 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=0.22 cfs 0.115 af

Reach 21R: Flow To Reach 4 Avg. Flow Depth=0.18' Max Vel=2.88 fps Inflow=0.84 cfs 0.216 af
n=0.022 L=603.0' S=0.0322 '/' Capacity=142.77 cfs Outflow=0.80 cfs 0.215 af

Reach 100R: Final Reach #100 Inflow=6.35 cfs 2.161 af
Outflow=6.35 cfs 2.161 af

Reach 300R: Final Reach #300 Inflow=0.85 cfs 0.162 af
Outflow=0.85 cfs 0.162 af

Reach 500R: Final Reach #500 Inflow=1.74 cfs 0.395 af
Outflow=1.74 cfs 0.395 af

Reach 600R: Final Reach #600 Inflow=0.16 cfs 0.035 af
Outflow=0.16 cfs 0.035 af

Reach 700R: Final Analysis Point 700 Inflow=1.89 cfs 0.430 af
Outflow=1.89 cfs 0.430 af

Pond 1P: Pond #1 Peak Elev=234.80' Storage=1,740 cf Inflow=6.98 cfs 2.162 af
Primary=6.35 cfs 2.161 af Secondary=0.00 cfs 0.000 af Outflow=6.35 cfs 2.161 af

Pond 3aP: Driveway Culvert Peak Elev=235.27' Storage=46 cf Inflow=0.39 cfs 0.044 af
Primary=0.39 cfs 0.043 af Secondary=0.00 cfs 0.000 af Outflow=0.39 cfs 0.043 af

Pond 3P: Pond #3 Peak Elev=227.61' Storage=23 cf Inflow=0.85 cfs 0.162 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=0.85 cfs 0.162 af

Pond 5P: Pond #5 Peak Elev=196.25' Storage=2 cf Inflow=1.74 cfs 0.395 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=1.74 cfs 0.395 af

Pond 11P: Pond #11 Peak Elev=304.34' Storage=479 cf Inflow=0.55 cfs 0.143 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=0.43 cfs 0.141 af

Pond 14P: (2) 18" Cross Culvert Peak Elev=236.51' Storage=66 cf Inflow=0.13 cfs 0.082 af
Primary=0.13 cfs 0.081 af Secondary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.081 af

Pond 18aP: Level Spreader Peak Elev=238.53' Storage=582 cf Inflow=0.63 cfs 0.247 af
Outflow=0.50 cfs 0.234 af

Pond 19P: Detention Pond Peak Elev=231.09' Storage=102 cf Inflow=0.05 cfs 0.009 af
Outflow=0.02 cfs 0.008 af

Pond 20P: Basin on Ada Peak Elev=235.72' Storage=0.000 af Inflow=0.59 cfs 0.063 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0051 '/' Outflow=0.59 cfs 0.063 af

Pond 23P: Basin Ada Entrance Peak Elev=230.18' Storage=0.001 af Inflow=0.16 cfs 0.012 af
12.0" Round Culvert n=0.012 L=57.1' S=0.0053 '/' Outflow=0.17 cfs 0.011 af

Pond 101P: Rain Garden #101 Peak Elev=235.11' Storage=3,564 cf Inflow=2.49 cfs 0.233 af
Primary=0.72 cfs 0.198 af Secondary=0.00 cfs 0.000 af Outflow=0.72 cfs 0.198 af

Pond 102P: Rain Garden #102 Peak Elev=230.18' Storage=236 cf Inflow=0.16 cfs 0.012 af
Primary=0.01 cfs 0.001 af Secondary=0.05 cfs 0.006 af Outflow=0.06 cfs 0.007 af

Pond 103P: Rain Garden 103 Peak Elev=234.04' Storage=1,408 cf Inflow=0.61 cfs 0.078 af
Primary=0.08 cfs 0.074 af Secondary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.074 af

Pond 104P: Rain Garden #104 Peak Elev=239.11' Storage=1,757 cf Inflow=1.29 cfs 0.280 af
Primary=0.63 cfs 0.247 af Secondary=0.00 cfs 0.000 af Outflow=0.63 cfs 0.247 af

Pond 105P: Rain Garden #105 Peak Elev=237.00' Storage=124 cf Inflow=0.10 cfs 0.008 af
Primary=0.06 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.005 af

Pond 106P: Rain Garden #106 Peak Elev=237.93' Storage=183 cf Inflow=0.20 cfs 0.015 af
Primary=0.08 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.012 af

Pond 107P: Rain Garden #107 Peak Elev=247.29' Storage=5,003 cf Inflow=2.54 cfs 0.269 af
Primary=0.46 cfs 0.182 af Secondary=0.00 cfs 0.000 af Outflow=0.46 cfs 0.182 af

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=1,797,161 sf 0.56% Impervious Runoff Depth>1.10"
Flow Length=655' Tc=32.3 min CN=61 Runoff=25.92 cfs 3.788 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>0.42"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=1.78 cfs 0.491 af

Subcatchment 3aS: Area Above Driveway Runoff Area=33,449 sf 20.54% Impervious Runoff Depth>1.64"
Flow Length=100' Slope=0.0500 '/' Tc=15.3 min UI Adjusted CN=69 Runoff=1.07 cfs 0.105 af

Subcatchment 3bS: Area Above Runoff Area=16,619 sf 27.23% Impervious Runoff Depth>2.26"
Tc=0.0 min UI Adjusted CN=77 Runoff=1.24 cfs 0.072 af

Subcatchment 3S: Subcatchment #3 Runoff Area=56,977 sf 8.23% Impervious Runoff Depth>1.71"
Flow Length=404' Tc=13.3 min CN=70 Runoff=2.02 cfs 0.186 af

Subcatchment 4S: Subcatchment #4 Runoff Area=195,772 sf 10.11% Impervious Runoff Depth>0.99"
Flow Length=887' Tc=24.0 min UI Adjusted CN=59 Runoff=2.75 cfs 0.369 af

Subcatchment 5S: Subcatchment #5 Runoff Area=69,744 sf 9.23% Impervious Runoff Depth>1.30"
Flow Length=679' Tc=15.7 min CN=64 Runoff=1.66 cfs 0.173 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>0.98"
Flow Length=377' Tc=28.2 min CN=59 Runoff=0.78 cfs 0.112 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>0.55"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=7.55 cfs 2.292 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>0.98"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=2.56 cfs 0.456 af

Subcatchment 14S: Area Against Route 4 Runoff Area=76,802 sf 9.88% Impervious Runoff Depth>1.71"
Flow Length=389' Tc=16.8 min UI Adjusted CN=70 Runoff=2.48 cfs 0.251 af

Subcatchment 15S: Sera (Rt.) Runoff Area=96,848 sf 11.06% Impervious Runoff Depth>1.93"
Flow Length=730' Tc=13.8 min UI Adjusted CN=73 Runoff=3.89 cfs 0.358 af

Subcatchment 16S: Sera (Rt.) Runoff Area=7,152 sf 24.58% Impervious Runoff Depth>2.26"
Tc=6.0 min UI Adjusted CN=77 Runoff=0.43 cfs 0.031 af

Subcatchment 17S: Sera (Lt.) Runoff Area=3,416 sf 29.77% Impervious Runoff Depth>2.34"
Tc=6.0 min UI Adjusted CN=78 Runoff=0.22 cfs 0.015 af

Subcatchment 18S: Sera (Lt.) Runoff Area=30,552 sf 49.26% Impervious Runoff Depth>3.05"
Flow Length=605' Tc=11.8 min CN=86 Runoff=2.06 cfs 0.178 af

Subcatchment 19S: Ada (Rt.) Runoff Area=15,825 sf 0.00% Impervious Runoff Depth>0.99"
Flow Length=100' Slope=0.1400 '/' Tc=10.1 min CN=59 Runoff=0.31 cfs 0.030 af

Subcatchment 20S: Ada (Rt.) Runoff Area=37,491 sf 4.78% Impervious Runoff Depth>1.93"
Flow Length=516' Tc=16.7 min CN=73 Runoff=1.40 cfs 0.139 af

Subcatchment 21S: Ada Drive Runoff Area=66,926 sf 42.72% Impervious Runoff Depth>2.59"
Flow Length=505' Tc=11.3 min CN=81 Runoff=3.93 cfs 0.332 af

Subcatchment 22S: ADA (Lt.) Runoff Area=4,518 sf 54.54% Impervious Runoff Depth>2.60"
Tc=6.0 min CN=81 Runoff=0.32 cfs 0.022 af

Subcatchment 23S: Front of ADA Runoff Area=6,292 sf 37.76% Impervious Runoff Depth>2.09"
Tc=6.0 min CN=75 Runoff=0.35 cfs 0.025 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=302.0' S=0.0033 '/' Capacity=32.24 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.13' Max Vel=1.90 fps Inflow=1.78 cfs 0.491 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=1.78 cfs 0.491 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.15' Max Vel=1.79 fps Inflow=1.78 cfs 0.491 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=1.76 cfs 0.489 af

Reach 4R: Reach #4 Avg. Flow Depth=0.37' Max Vel=5.17 fps Inflow=3.81 cfs 0.846 af
n=0.022 L=223.0' S=0.0404 '/' Capacity=32.43 cfs Outflow=3.81 cfs 0.845 af

Reach 10R: Reach #10 Avg. Flow Depth=0.33' Max Vel=2.44 fps Inflow=7.57 cfs 2.700 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=7.56 cfs 2.697 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.28' Max Vel=0.43 fps Inflow=1.63 cfs 0.453 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=1.53 cfs 0.445 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.22' Max Vel=0.75 fps Inflow=1.53 cfs 0.445 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=1.50 cfs 0.440 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.42' Max Vel=0.10 fps Inflow=1.50 cfs 0.440 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=1.07 cfs 0.414 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.07' Max Vel=3.18 fps Inflow=1.07 cfs 0.414 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=1.07 cfs 0.414 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.19' Max Vel=0.67 fps Inflow=1.07 cfs 0.414 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=1.07 cfs 0.410 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.12' Max Vel=1.32 fps Inflow=1.07 cfs 0.410 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=1.07 cfs 0.409 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.21' Max Vel=0.58 fps Inflow=1.07 cfs 0.409 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=1.07 cfs 0.407 af

Reach 21R: Flow To Reach 4 Avg. Flow Depth=0.22' Max Vel=3.33 fps Inflow=1.36 cfs 0.477 af
n=0.022 L=603.0' S=0.0322 '/' Capacity=142.77 cfs Outflow=1.30 cfs 0.477 af

Reach 100R: Final Reach #100 Inflow=14.09 cfs 7.636 af
Outflow=14.09 cfs 7.636 af

Reach 300R: Final Reach #300 Inflow=2.14 cfs 0.334 af
Outflow=2.14 cfs 0.334 af

Reach 500R: Final Reach #500 Inflow=5.18 cfs 1.018 af
Outflow=5.18 cfs 1.018 af

Reach 600R: Final Reach #600 Inflow=0.78 cfs 0.112 af
Outflow=0.78 cfs 0.112 af

Reach 700R: Final Analysis Point 700 Inflow=5.90 cfs 1.130 af
Outflow=5.90 cfs 1.130 af

Pond 1P: Pond #1 Peak Elev=237.01' Storage=49,212 cf Inflow=29.22 cfs 7.641 af
Primary=14.09 cfs 7.636 af Secondary=0.00 cfs 0.000 af Outflow=14.09 cfs 7.636 af

Pond 3aP: Driveway Culvert Peak Elev=235.57' Storage=83 cf Inflow=1.07 cfs 0.105 af
Primary=1.06 cfs 0.104 af Secondary=0.00 cfs 0.000 af Outflow=1.06 cfs 0.104 af

Pond 3P: Pond #3 Peak Elev=227.85' Storage=44 cf Inflow=2.14 cfs 0.335 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=2.14 cfs 0.334 af

Pond 5P: Pond #5 Peak Elev=196.78' Storage=11 cf Inflow=5.18 cfs 1.018 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=5.18 cfs 1.018 af

Pond 11P: Pond #11 Peak Elev=304.68' Storage=3,101 cf Inflow=2.56 cfs 0.456 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=1.63 cfs 0.453 af

Pond 14P: (2) 18" Cross Culvert Peak Elev=237.06' Storage=463 cf Inflow=1.85 cfs 0.517 af
Primary=1.77 cfs 0.515 af Secondary=0.00 cfs 0.000 af Outflow=1.77 cfs 0.515 af

Pond 18aP: Level Spreader Peak Elev=238.53' Storage=586 cf Inflow=0.68 cfs 0.642 af
Outflow=0.68 cfs 0.629 af

Pond 19P: Detention Pond Peak Elev=231.29' Storage=345 cf Inflow=0.31 cfs 0.030 af
Outflow=0.10 cfs 0.028 af

Pond 20P: Basin on Ada Peak Elev=236.19' Storage=0.000 af Inflow=1.40 cfs 0.139 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0051 '/' Outflow=1.40 cfs 0.139 af

Pond 23P: Basin Ada Entrance Peak Elev=230.23' Storage=0.001 af Inflow=0.35 cfs 0.025 af
12.0" Round Culvert n=0.012 L=57.1' S=0.0053 '/' Outflow=0.35 cfs 0.025 af

Pond 101P: Rain Garden #101 Peak Elev=236.18' Storage=8,690 cf Inflow=5.16 cfs 0.471 af
Primary=0.84 cfs 0.435 af Secondary=0.00 cfs 0.000 af Outflow=0.84 cfs 0.435 af

Pond 102P: Rain Garden #102 Peak Elev=230.22' Storage=248 cf Inflow=0.32 cfs 0.022 af
Primary=0.04 cfs 0.002 af Secondary=0.26 cfs 0.015 af Outflow=0.30 cfs 0.018 af

Pond 103P: Rain Garden 103 Peak Elev=235.54' Storage=3,244 cf Inflow=1.59 cfs 0.176 af
Primary=0.08 cfs 0.086 af Secondary=0.40 cfs 0.034 af Outflow=0.49 cfs 0.120 af

Pond 104P: Rain Garden #104 Peak Elev=242.27' Storage=12,889 cf Inflow=7.33 cfs 0.676 af
Primary=0.68 cfs 0.642 af Secondary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.642 af

Pond 105P: Rain Garden #105 Peak Elev=238.56' Storage=220 cf Inflow=0.22 cfs 0.015 af
Primary=0.07 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.012 af

Pond 106P: Rain Garden #106 Peak Elev=239.36' Storage=488 cf Inflow=0.43 cfs 0.031 af
Primary=0.08 cfs 0.028 af Secondary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.028 af

Pond 107P: Rain Garden #107 Peak Elev=247.52' Storage=5,491 cf Inflow=6.29 cfs 0.610 af
Primary=5.79 cfs 0.497 af Secondary=0.06 cfs 0.000 af Outflow=5.85 cfs 0.498 af

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=1,797,161 sf 0.56% Impervious Runoff Depth>1.84"
Flow Length=655' Tc=32.3 min CN=61 Runoff=46.22 cfs 6.315 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>0.88"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=5.02 cfs 1.024 af

Subcatchment 3aS: Area Above Driveway Runoff Area=33,449 sf 20.54% Impervious Runoff Depth>2.53"
Flow Length=100' Slope=0.0500 '/' Tc=15.3 min UI Adjusted CN=69 Runoff=1.69 cfs 0.162 af

Subcatchment 3bS: Area Above Runoff Area=16,619 sf 27.23% Impervious Runoff Depth>3.28"
Tc=0.0 min UI Adjusted CN=77 Runoff=1.80 cfs 0.104 af

Subcatchment 3S: Subcatchment #3 Runoff Area=56,977 sf 8.23% Impervious Runoff Depth>2.62"
Flow Length=404' Tc=13.3 min CN=70 Runoff=3.16 cfs 0.285 af

Subcatchment 4S: Subcatchment #4 Runoff Area=195,772 sf 10.11% Impervious Runoff Depth>1.68"
Flow Length=887' Tc=24.0 min UI Adjusted CN=59 Runoff=5.13 cfs 0.630 af

Subcatchment 5S: Subcatchment #5 Runoff Area=69,744 sf 9.23% Impervious Runoff Depth>2.09"
Flow Length=679' Tc=15.7 min CN=64 Runoff=2.82 cfs 0.279 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>1.68"
Flow Length=377' Tc=28.2 min CN=59 Runoff=1.46 cfs 0.192 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>1.07"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=17.91 cfs 4.463 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>1.67"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=4.77 cfs 0.779 af

Subcatchment 14S: Area Against Route 4 Runoff Area=76,802 sf 9.88% Impervious Runoff Depth>2.61"
Flow Length=389' Tc=16.8 min UI Adjusted CN=70 Runoff=3.89 cfs 0.384 af

Subcatchment 15S: Sera (Rt.) Runoff Area=96,848 sf 11.06% Impervious Runoff Depth>2.89"
Flow Length=730' Tc=13.8 min UI Adjusted CN=73 Runoff=5.89 cfs 0.536 af

Subcatchment 16S: Sera (Rt.) Runoff Area=7,152 sf 24.58% Impervious Runoff Depth>3.28"
Tc=6.0 min UI Adjusted CN=77 Runoff=0.63 cfs 0.045 af

Subcatchment 17S: Sera (Lt.) Runoff Area=3,416 sf 29.77% Impervious Runoff Depth>3.37"
Tc=6.0 min UI Adjusted CN=78 Runoff=0.31 cfs 0.022 af

Subcatchment 18S: Sera (Lt.) Runoff Area=30,552 sf 49.26% Impervious Runoff Depth>4.18"
Flow Length=605' Tc=11.8 min CN=86 Runoff=2.80 cfs 0.244 af

Subcatchment 19S: Ada (Rt.) Runoff Area=15,825 sf 0.00% Impervious Runoff Depth>1.69"
Flow Length=100' Slope=0.1400 '/' Tc=10.1 min CN=59 Runoff=0.58 cfs 0.051 af

Subcatchment 20S: Ada (Rt.) Runoff Area=37,491 sf 4.78% Impervious Runoff Depth>2.89"
Flow Length=516' Tc=16.7 min CN=73 Runoff=2.12 cfs 0.207 af

Subcatchment 21S: Ada Drive Runoff Area=66,926 sf 42.72% Impervious Runoff Depth>3.67"
Flow Length=505' Tc=11.3 min CN=81 Runoff=5.53 cfs 0.470 af

Subcatchment 22S: ADA (Lt.) Runoff Area=4,518 sf 54.54% Impervious Runoff Depth>3.67"
Tc=6.0 min CN=81 Runoff=0.44 cfs 0.032 af

Subcatchment 23S: Front of ADA Runoff Area=6,292 sf 37.76% Impervious Runoff Depth>3.08"
Tc=6.0 min CN=75 Runoff=0.52 cfs 0.037 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=302.0' S=0.0033 '/' Capacity=32.24 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.21' Max Vel=2.62 fps Inflow=5.02 cfs 1.024 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=5.02 cfs 1.023 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.24' Max Vel=2.47 fps Inflow=5.02 cfs 1.023 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=5.00 cfs 1.021 af

Reach 4R: Reach #4 Avg. Flow Depth=0.47' Max Vel=6.03 fps Inflow=6.40 cfs 1.333 af
n=0.022 L=223.0' S=0.0404 '/' Capacity=32.43 cfs Outflow=6.39 cfs 1.333 af

Reach 10R: Reach #10 Avg. Flow Depth=0.49' Max Vel=3.19 fps Inflow=17.96 cfs 5.177 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=17.95 cfs 5.173 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.36' Max Vel=0.51 fps Inflow=2.69 cfs 0.774 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=2.60 cfs 0.763 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.29' Max Vel=0.88 fps Inflow=2.60 cfs 0.763 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=2.57 cfs 0.757 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.56' Max Vel=0.12 fps Inflow=2.57 cfs 0.757 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=2.03 cfs 0.724 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.09' Max Vel=3.87 fps Inflow=2.03 cfs 0.724 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=2.03 cfs 0.723 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.26' Max Vel=0.82 fps Inflow=2.03 cfs 0.723 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=2.02 cfs 0.719 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.16' Max Vel=1.60 fps Inflow=2.02 cfs 0.719 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=2.02 cfs 0.717 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.28' Max Vel=0.70 fps Inflow=2.02 cfs 0.717 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=2.02 cfs 0.715 af

Reach 21R: Flow To Reach 4 Avg. Flow Depth=0.25' Max Vel=3.58 fps Inflow=1.70 cfs 0.704 af
n=0.022 L=603.0' S=0.0322 '/' Capacity=142.77 cfs Outflow=1.65 cfs 0.703 af

Reach 100R: Final Reach #100 Inflow=16.22 cfs 13.509 af
Outflow=16.22 cfs 13.509 af

Reach 300R: Final Reach #300 Inflow=4.79 cfs 0.533 af
Outflow=4.79 cfs 0.533 af

Reach 500R: Final Reach #500 Inflow=8.76 cfs 1.612 af
Outflow=8.76 cfs 1.612 af

Reach 600R: Final Reach #600 Inflow=1.46 cfs 0.192 af
Outflow=1.46 cfs 0.192 af

Reach 700R: Final Analysis Point 700 Inflow=10.10 cfs 1.804 af
Outflow=10.10 cfs 1.804 af

Pond 1P: Pond #1 Peak Elev=237.84' Storage=183,850 cf Inflow=60.95 cfs 13.522 af
Primary=16.22 cfs 13.509 af Secondary=0.00 cfs 0.000 af Outflow=16.22 cfs 13.509 af

Pond 3aP: Driveway Culvert Peak Elev=235.80' Storage=132 cf Inflow=1.69 cfs 0.162 af
Primary=1.59 cfs 0.161 af Secondary=0.00 cfs 0.000 af Outflow=1.59 cfs 0.161 af

Pond 3P: Pond #3 Peak Elev=228.18' Storage=95 cf Inflow=4.80 cfs 0.534 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=4.79 cfs 0.533 af

Pond 5P: Pond #5 Peak Elev=197.46' Storage=41 cf Inflow=8.76 cfs 1.612 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=8.76 cfs 1.612 af

Pond 11P: Pond #11 Peak Elev=304.91' Storage=6,795 cf Inflow=4.77 cfs 0.779 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=2.69 cfs 0.774 af

Pond 14P: (2) 18" Cross Culvert Peak Elev=237.84' Storage=1,189 cf Inflow=5.08 cfs 1.079 af
Primary=4.90 cfs 1.077 af Secondary=0.00 cfs 0.000 af Outflow=4.90 cfs 1.077 af

Pond 18aP: Level Spreader Peak Elev=238.63' Storage=636 cf Inflow=5.23 cfs 0.952 af
Outflow=5.23 cfs 0.938 af

Pond 19P: Detention Pond Peak Elev=231.55' Storage=680 cf Inflow=0.58 cfs 0.051 af
Outflow=0.15 cfs 0.049 af

Pond 20P: Basin on Ada Peak Elev=237.02' Storage=0.001 af Inflow=2.12 cfs 0.207 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0051 '/' Outflow=2.11 cfs 0.207 af

Pond 23P: Basin Ada Entrance Peak Elev=230.26' Storage=0.001 af Inflow=0.52 cfs 0.037 af
12.0" Round Culvert n=0.012 L=57.1' S=0.0053 '/' Outflow=0.52 cfs 0.036 af

Pond 101P: Rain Garden #101 Peak Elev=237.01' Storage=13,309 cf Inflow=7.41 cfs 0.677 af
Primary=0.90 cfs 0.641 af Secondary=0.00 cfs 0.000 af Outflow=0.90 cfs 0.641 af

Pond 102P: Rain Garden #102 Peak Elev=230.25' Storage=255 cf Inflow=0.44 cfs 0.032 af
Primary=0.04 cfs 0.003 af Secondary=0.39 cfs 0.024 af Outflow=0.43 cfs 0.027 af

Pond 103P: Rain Garden 103 Peak Elev=235.62' Storage=3,364 cf Inflow=2.41 cfs 0.265 af
Primary=0.08 cfs 0.091 af Secondary=1.97 cfs 0.108 af Outflow=2.05 cfs 0.199 af

Pond 104P: Rain Garden #104 Peak Elev=242.65' Storage=14,989 cf Inflow=11.13 cfs 1.034 af
Primary=3.06 cfs 0.904 af Secondary=2.17 cfs 0.048 af Outflow=5.23 cfs 0.952 af

Pond 105P: Rain Garden #105 Peak Elev=239.17' Storage=338 cf Inflow=0.31 cfs 0.022 af
Primary=0.07 cfs 0.019 af Secondary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.019 af

Pond 106P: Rain Garden #106 Peak Elev=239.81' Storage=767 cf Inflow=0.63 cfs 0.045 af
Primary=0.08 cfs 0.041 af Secondary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.041 af

Pond 107P: Rain Garden #107 Peak Elev=247.61' Storage=5,720 cf Inflow=9.65 cfs 0.920 af
Primary=8.38 cfs 0.789 af Secondary=1.09 cfs 0.017 af Outflow=9.47 cfs 0.806 af

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 5
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment #1 Runoff Area=1,797,161 sf 0.56% Impervious Runoff Depth>2.60"
Flow Length=655' Tc=32.3 min CN=61 Runoff=67.29 cfs 8.944 af

Subcatchment 2S: Subcatchment #2 Runoff Area=605,171 sf 1.30% Impervious Runoff Depth>1.41"
Flow Length=1,310' Tc=43.9 min CN=48 Runoff=9.10 cfs 1.636 af

Subcatchment 3aS: Area Above Driveway Runoff Area=33,449 sf 20.54% Impervious Runoff Depth>3.41"
Flow Length=100' Slope=0.0500 '/' Tc=15.3 min UI Adjusted CN=69 Runoff=2.31 cfs 0.218 af

Subcatchment 3bS: Area Above Runoff Area=16,619 sf 27.23% Impervious Runoff Depth>4.27"
Tc=0.0 min UI Adjusted CN=77 Runoff=2.33 cfs 0.136 af

Subcatchment 3S: Subcatchment #3 Runoff Area=56,977 sf 8.23% Impervious Runoff Depth>3.52"
Flow Length=404' Tc=13.3 min CN=70 Runoff=4.28 cfs 0.383 af

Subcatchment 4S: Subcatchment #4 Runoff Area=195,772 sf 10.11% Impervious Runoff Depth>2.41"
Flow Length=887' Tc=24.0 min UI Adjusted CN=59 Runoff=7.66 cfs 0.904 af

Subcatchment 5S: Subcatchment #5 Runoff Area=69,744 sf 9.23% Impervious Runoff Depth>2.91"
Flow Length=679' Tc=15.7 min CN=64 Runoff=4.00 cfs 0.388 af

Subcatchment 6S: Subcatchment #6 Runoff Area=59,669 sf 0.00% Impervious Runoff Depth>2.41"
Flow Length=377' Tc=28.2 min CN=59 Runoff=2.17 cfs 0.275 af

Subcatchment 10S: Subcatchment #10 Runoff Area=2,176,863 sf 5.43% Impervious Runoff Depth>1.65"
Flow Length=2,314' Tc=72.4 min UI Adjusted CN=51 Runoff=30.20 cfs 6.886 af

Subcatchment 11S: Subcatchment #11 Runoff Area=243,600 sf 3.73% Impervious Runoff Depth>2.40"
Flow Length=220' Tc=44.6 min UI Adjusted CN=59 Runoff=7.12 cfs 1.119 af

Subcatchment 14S: Area Against Route 4 Runoff Area=76,802 sf 9.88% Impervious Runoff Depth>3.51"
Flow Length=389' Tc=16.8 min UI Adjusted CN=70 Runoff=5.27 cfs 0.516 af

Subcatchment 15S: Sera (Rt.) Runoff Area=96,848 sf 11.06% Impervious Runoff Depth>3.83"
Flow Length=730' Tc=13.8 min UI Adjusted CN=73 Runoff=7.83 cfs 0.710 af

Subcatchment 16S: Sera (Rt.) Runoff Area=7,152 sf 24.58% Impervious Runoff Depth>4.26"
Tc=6.0 min UI Adjusted CN=77 Runoff=0.82 cfs 0.058 af

Subcatchment 17S: Sera (Lt.) Runoff Area=3,416 sf 29.77% Impervious Runoff Depth>4.37"
Tc=6.0 min UI Adjusted CN=78 Runoff=0.40 cfs 0.029 af

Subcatchment 18S: Sera (Lt.) Runoff Area=30,552 sf 49.26% Impervious Runoff Depth>5.25"
Flow Length=605' Tc=11.8 min CN=86 Runoff=3.48 cfs 0.307 af

Subcatchment 19S: Ada (Rt.) Runoff Area=15,825 sf 0.00% Impervious Runoff Depth>2.42"
Flow Length=100' Slope=0.1400 '/' Tc=10.1 min CN=59 Runoff=0.86 cfs 0.073 af

Subcatchment 20S: Ada (Rt.) Runoff Area=37,491 sf 4.78% Impervious Runoff Depth>3.83"
Flow Length=516' Tc=16.7 min CN=73 Runoff=2.82 cfs 0.275 af

Subcatchment 21S: Ada Drive Runoff Area=66,926 sf 42.72% Impervious Runoff Depth>4.69"
Flow Length=505' Tc=11.3 min CN=81 Runoff=7.04 cfs 0.601 af

Subcatchment 22S: ADA (Lt.) Runoff Area=4,518 sf 54.54% Impervious Runoff Depth>4.70"
Tc=6.0 min CN=81 Runoff=0.57 cfs 0.041 af

Subcatchment 23S: Front of ADA Runoff Area=6,292 sf 37.76% Impervious Runoff Depth>4.05"
Tc=6.0 min CN=75 Runoff=0.69 cfs 0.049 af

Reach 1R: Swale Flow to Second Cross Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.045 L=302.0' S=0.0033 '/' Capacity=32.24 cfs Outflow=0.00 cfs 0.000 af

Reach 2aR: Reach #2a Avg. Flow Depth=0.28' Max Vel=3.15 fps Inflow=9.10 cfs 1.636 af
n=0.050 L=62.6' S=0.1038 '/' Capacity=75.29 cfs Outflow=9.10 cfs 1.635 af

Reach 2bR: Reach #2b Avg. Flow Depth=0.32' Max Vel=2.97 fps Inflow=9.10 cfs 1.635 af
n=0.030 L=358.0' S=0.0279 '/' Capacity=105.00 cfs Outflow=9.08 cfs 1.632 af

Reach 4R: Reach #4 Avg. Flow Depth=0.55' Max Vel=6.69 fps Inflow=9.08 cfs 1.827 af
n=0.022 L=223.0' S=0.0404 '/' Capacity=32.43 cfs Outflow=9.07 cfs 1.826 af

Reach 10R: Reach #10 Avg. Flow Depth=0.62' Max Vel=3.75 fps Inflow=30.49 cfs 7.927 af
n=0.050 L=173.4' S=0.0519 '/' Capacity=85.88 cfs Outflow=30.47 cfs 7.921 af

Reach 11aR: Reach #11a Avg. Flow Depth=0.42' Max Vel=0.56 fps Inflow=3.67 cfs 1.112 af
n=0.100 L=517.8' S=0.0077 '/' Capacity=5.23 cfs Outflow=3.58 cfs 1.099 af

Reach 11bR: Reach #11b Avg. Flow Depth=0.33' Max Vel=0.97 fps Inflow=3.58 cfs 1.099 af
n=0.100 L=567.6' S=0.0317 '/' Capacity=8.47 cfs Outflow=3.55 cfs 1.091 af

Reach 11cR: Reach #11c Avg. Flow Depth=0.66' Max Vel=0.14 fps Inflow=3.55 cfs 1.091 af
n=0.200 L=386.1' S=0.0010 '/' Capacity=7.20 cfs Outflow=2.97 cfs 1.051 af

Reach 11dR: Reach #11d Avg. Flow Depth=0.11' Max Vel=4.35 fps Inflow=2.97 cfs 1.051 af
n=0.013 L=21.0' S=0.0476 '/' Capacity=79.86 cfs Outflow=2.97 cfs 1.051 af

Reach 11eR: Reach #11e Avg. Flow Depth=0.31' Max Vel=0.92 fps Inflow=2.97 cfs 1.051 af
n=0.100 L=380.7' S=0.0315 '/' Capacity=8.45 cfs Outflow=2.96 cfs 1.045 af

Reach 11fR: Reach #11f Avg. Flow Depth=0.20' Max Vel=1.80 fps Inflow=2.96 cfs 1.045 af
n=0.050 L=162.3' S=0.0555 '/' Capacity=22.41 cfs Outflow=2.96 cfs 1.044 af

Reach 11gR: Reach #11g Avg. Flow Depth=0.34' Max Vel=0.79 fps Inflow=2.96 cfs 1.044 af
n=0.100 L=193.7' S=0.0207 '/' Capacity=6.84 cfs Outflow=2.96 cfs 1.041 af

Reach 21R: Flow To Reach 4 Avg. Flow Depth=0.31' Max Vel=4.14 fps Inflow=2.70 cfs 0.924 af
n=0.022 L=603.0' S=0.0322 '/' Capacity=142.77 cfs Outflow=2.66 cfs 0.922 af

Reach 100R: Final Reach #100 Inflow=17.56 cfs 16.897 af
Outflow=17.56 cfs 16.897 af

Reach 300R: Final Reach #300 Inflow=7.40 cfs 0.736 af
Outflow=7.40 cfs 0.736 af

Reach 500R: Final Reach #500 Inflow=12.44 cfs 2.214 af
Outflow=12.44 cfs 2.214 af

Reach 600R: Final Reach #600 Inflow=2.17 cfs 0.275 af
Outflow=2.17 cfs 0.275 af

Reach 700R: Final Analysis Point 700 Inflow=14.48 cfs 2.489 af
Outflow=14.48 cfs 2.489 af

Pond 1P: Pond #1 Peak Elev=238.41' Storage=365,430 cf Inflow=95.04 cfs 19.827 af
Primary=17.56 cfs 16.897 af Secondary=0.00 cfs 0.000 af Outflow=17.56 cfs 16.897 af

Pond 3aP: Driveway Culvert Peak Elev=235.92' Storage=165 cf Inflow=2.31 cfs 0.218 af
Primary=2.30 cfs 0.217 af Secondary=0.00 cfs 0.000 af Outflow=2.30 cfs 0.217 af

Pond 3P: Pond #3 Peak Elev=228.45' Storage=159 cf Inflow=7.41 cfs 0.737 af
24.0" Round Culvert n=0.012 L=105.2' S=0.0323 '/' Outflow=7.40 cfs 0.736 af

Pond 5P: Pond #5 Peak Elev=198.54' Storage=165 cf Inflow=12.48 cfs 2.214 af
18.0" Round Culvert n=0.012 L=77.5' S=0.0223 '/' Outflow=12.44 cfs 2.214 af

Pond 11P: Pond #11 Peak Elev=305.09' Storage=11,238 cf Inflow=7.12 cfs 1.119 af
18.0" Round Culvert n=0.012 L=25.6' S=0.0051 '/' Outflow=3.67 cfs 1.112 af

Pond 14P: (2) 18" Cross Culvert Peak Elev=238.42' Storage=1,829 cf Inflow=9.19 cfs 1.773 af
Primary=8.94 cfs 1.751 af Secondary=0.00 cfs 0.000 af Outflow=8.94 cfs 1.751 af

Pond 18aP: Level Spreader Peak Elev=238.68' Storage=665 cf Inflow=8.80 cfs 1.200 af
Outflow=8.80 cfs 1.187 af

Pond 19P: Detention Pond Peak Elev=231.83' Storage=1,076 cf Inflow=0.86 cfs 0.073 af
Outflow=0.20 cfs 0.071 af

Pond 20P: Basin on Ada Peak Elev=237.63' Storage=0.001 af Inflow=2.82 cfs 0.275 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0051 '/' Outflow=2.80 cfs 0.274 af

Pond 23P: Basin Ada Entrance Peak Elev=230.31' Storage=0.001 af Inflow=0.69 cfs 0.049 af
12.0" Round Culvert n=0.012 L=57.1' S=0.0053 '/' Outflow=0.69 cfs 0.048 af

Pond 101P: Rain Garden #101 Peak Elev=237.52' Storage=16,124 cf Inflow=9.52 cfs 0.875 af
Primary=2.37 cfs 0.838 af Secondary=0.17 cfs 0.002 af Outflow=2.54 cfs 0.840 af

Pond 102P: Rain Garden #102 Peak Elev=230.31' Storage=270 cf Inflow=0.57 cfs 0.041 af
Primary=0.04 cfs 0.004 af Secondary=0.50 cfs 0.032 af Outflow=0.54 cfs 0.036 af

Pond 103P: Rain Garden 103 Peak Elev=235.66' Storage=3,426 cf Inflow=3.22 cfs 0.353 af
Primary=0.08 cfs 0.096 af Secondary=2.98 cfs 0.186 af Outflow=3.06 cfs 0.282 af

Pond 104P: Rain Garden #104 Peak Elev=242.78' Storage=15,724 cf Inflow=11.91 cfs 1.333 af
Primary=3.40 cfs 1.042 af Secondary=5.40 cfs 0.158 af Outflow=8.80 cfs 1.200 af

Pond 105P: Rain Garden #105 Peak Elev=239.36' Storage=458 cf Inflow=0.40 cfs 0.029 af
Primary=0.07 cfs 0.025 af Secondary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.025 af

Pond 106P: Rain Garden #106 Peak Elev=240.03' Storage=962 cf Inflow=0.82 cfs 0.058 af
Primary=0.08 cfs 0.052 af Secondary=0.14 cfs 0.003 af Outflow=0.23 cfs 0.055 af

Pond 107P: Rain Garden #107 Peak Elev=247.78' Storage=6,138 cf Inflow=12.94 cfs 1.226 af
Primary=8.46 cfs 1.026 af Secondary=4.33 cfs 0.086 af Outflow=12.54 cfs 1.112 af

Appendix III - Calculations, Charts, & Graphs

Extreme Precipitation Tables
Rip Rap Calculations
NHDES AoT Spreadsheets
USDA / NRCS Websoil
Site Specific Soil Survey Report
Stormwater System Operation & Maintenance Plan
& Inspection and Maintenance Manual
Watershed Report Card, 303 (d) List, ORW List

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.097 degrees West
Latitude	43.174 degrees North
Elevation	0 feet
Date/Time	Mon, 21 Jan 2019 09:03:22 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.19	1.52	1.96	2.53	2.77
2yr	0.32	0.49	0.61	0.80	1.01	1.28	**2yr**	0.87	1.16	1.48	1.88	2.38	3.03	3.37
5yr	0.37	0.57	0.72	0.96	1.23	1.58	**5yr**	1.06	1.44	1.85	2.35	3.00	3.82	4.31
10yr	0.41	0.64	0.81	1.10	1.43	1.86	**10yr**	1.24	1.70	2.18	2.80	3.57	4.56	5.19
25yr	0.47	0.75	0.96	1.32	1.76	2.30	**25yr**	1.52	2.10	2.72	3.51	4.51	5.77	6.64
50yr	0.53	0.85	1.09	1.52	2.05	2.71	**50yr**	1.77	2.48	3.22	4.17	5.38	6.89	8.00
100yr	0.60	0.97	1.25	1.76	2.40	3.20	**100yr**	2.07	2.92	3.81	4.96	6.41	8.24	9.65
200yr	0.67	1.09	1.41	2.03	2.80	3.78	**200yr**	2.42	3.45	4.52	5.91	7.65	9.85	11.64
500yr	0.79	1.30	1.70	2.47	3.45	4.69	**500yr**	2.98	4.30	5.64	7.42	9.66	12.48	14.93

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr	
1yr	0.23	0.36	0.44	0.59	0.72	0.90	**1yr**	0.62	0.88	0.95	1.27	1.54	2.00	2.48	
2yr	0.31	0.48	0.59	0.81	0.99	1.17	**2yr**	0.86	1.15	1.35	1.80	2.31	2.92	3.23	
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.60	2.11	2.73	3.44	3.84	
10yr	0.39	0.59	0.73	1.03	1.33	1.59	**10yr**	1.14	1.56	1.81	2.40	3.08	3.87	4.35	
25yr	0.44	0.67	0.84	1.20	1.58	1.90	**25yr**	1.36	1.86	2.11	2.80	3.61	4.50	5.12	
50yr	0.49	0.75	0.93	1.34	1.80	2.17	**50yr**	1.55	2.12	2.37	3.15	4.06	5.02	5.75	
100yr	0.55	0.83	1.04	1.50	2.06	2.49	**100yr**	1.78	2.43	2.67	3.53	4.56	5.59	6.46	1
200yr	0.61	0.92	1.17	1.69	2.36	2.84	**200yr**	2.04	2.78	3.00	3.97	5.12	6.18	8.80	2
500yr	0.72	1.07	1.38	2.00	2.85	3.42	**500yr**	2.46	3.34	3.52	4.62	6.00	7.02	10.68	5

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr
1yr	0.28	0.44	0.53	0.72	0.88	1.07	**1yr**	0.76	1.05	1.23	1.70	2.14	2.78	3.16
2yr	0.33	0.50	0.62	0.84	1.04	1.24	**2yr**	0.90	1.22	1.45	1.92	2.46	3.21	3.56
5yr	0.40	0.61	0.76	1.04	1.32	1.57	**5yr**	1.14	1.54	1.83	2.43	3.11	4.22	4.81
10yr	0.46	0.71	0.88	1.23	1.59	1.91	**10yr**	1.38	1.87	2.20	2.94	3.74	5.26	6.07
25yr	0.57	0.87	1.08	1.54	2.03	2.47	**25yr**	1.75	2.41	2.84	3.79	4.76	7.04	8.30
50yr	0.66	1.01	1.26	1.81	2.43	2.99	**50yr**	2.10	2.92	3.43	4.60	5.75	8.78	10.55
100yr	0.78	1.18	1.48	2.13	2.92	3.61	**100yr**	2.52	3.53	4.16	5.58	6.94	10.98	13.40
200yr	0.91	1.37	1.74	2.51	3.51	4.39	**200yr**	3.03	4.29	5.05	6.78	8.37	13.78	14.75
500yr	1.13	1.68	2.16	3.13	4.46	5.66	**500yr**	3.85	5.53	6.50	8.79	10.75	18.61	19.75

RIP RAP CALCULATIONS

18-030 Sera
Ada & Sera Drive
Nottingham, NH

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH
3-Jun-19

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.* Rip Rap was sized for the 25 year storm event. (Some d50 sizes and T values have been modified)

TAILWATER < HALF THE Do

La = (1.8 x Q) / Do 3/2 + (7 x Do) Q = Peak Flow & Do is Pipe Diameter

W = La + 3*Do or defined channel width

d50 = (0.02 x Q4/3) / (Tw x Do) Tw = Tailwater Depth

T = Largest Stone Size x 1.5

Culvert or Catch Basin	Tailwater (Feet) Tw	Discharge (C.F.S.) Q	Diameter of Pipe Do	Length of Rip Rap La (feet)	Width of Rip Rap W (feet)	d50-Stone Rip Rap d50(ft.)	Actual Size	Thickness
12" HDPE (Pond #101P)	0.20	0.90	1.00	8.62	11.62	0.09	0.5	1.2
12" HDPE (Pond #23P)	0.20	0.52	1.00	7.94	10.94	0.04	0.5	1.2
12" HDPE (Pond #19P)	0.20	0.15	1.00	7.27	10.27	0.01	0.5	1.2
12" HDPE (Pond #104P)	0.20	3.06	1.00	12.51	15.51	0.44	0.5	1.2
12" HDPE (Pond #107P)	2.00	8.38	1.00	22.08	25.08	0.17	0.5	1.2
(2) 18" HDPE (Pond #12aP)	0.30	2.45	1.50	12.90	17.40	0.15	0.5	1.2
18" HDPE (Pond #3aP)	0.30	1.59	1.25	10.80	14.55	0.10	0.5	1.2

Please note that the designer chose to use the 25 Year Event for the dimensional calculations.

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d50 Size =	1	Feet	12	Inches
% of Weight Smaller Than the Given d50 Size	Size of Stone (Inches) From		To	
100%	18		24	
85%	16		22	
50%	12		18	

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d50 Size =	0.5	Feet	6	Inches
% of Weight Smaller Than the Given d50 Size	Size of Stone (Inches) From		To	
100%	9		12	
85%	8		11	
50%	6		9	

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d50 Size =	0.75	Feet	9	Inches
% of Weight Smaller	Size of Stone (Inches)			
Than the Given d50 Size	From		To	
100%	14		18	
85%	12		16	
50%	9		14	
15%	3		5	

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Rain Garden #101 - Pond 101- June 2, 2019**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
2.40	ac	A = Area draining to the practice	
0.70	ac	A_I = Impervious area draining to the practice	
0.29	decimal	I = percent impervious area draining to the practice, in decimal form	
0.31	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.75	ac-in	WQV= 1" x Rv x A	
2,715	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
679	cf	25% x WQV (check calc for sediment forebay volume)	
2,037	cf	75% x WQV (check calc for surface sand filter volume)	
Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
1,404	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
3,875	sf	A_{SA} = surface area of the practice	
10.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]	
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
0.8	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
233.00	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
232.00	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
237.75	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
235.83	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← ≥ 1'
(2.83)	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← ≥ 1'
(4.75)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← ≥ 1'
237.52	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
238.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ 75%WQV
	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← **yes**
13,169	cf	V = volume of storage[3] (attach a stage-storage table)	← **≥ WQV**
24.0	inches	D_{FC} = filter course thickness	← **18", or 24" if within GPA**
Sheet	R-101	Note what sheet in the plan set contains the filter course specification	
2.0	:1	Pond side slopes	← **≥3:1**
Sheet	R-101	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← **5:1**
	inches	D_{FC} = filter course thickness	← **12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	← **304.1 sand**

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Summary for Pond 101P: Rain Garden #101

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=111)

Inflow Area = 2.397 ac, 29.10% Impervious, Inflow Depth > 4.38" for 50 YR. - 24 HR. event
Inflow = 9.52 cfs @ 12.17 hrs, Volume= 0.875 af
Outflow = 2.54 cfs @ 12.64 hrs, Volume= 0.840 af, Atten= 73%, Lag= 28.6 min
Primary = 2.37 cfs @ 12.64 hrs, Volume= 0.838 af
Secondary = 0.17 cfs @ 12.64 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 237.52' @ 12.64 hrs Surf.Area= 3,875 sf Storage= 16,124 cf
Flood Elev= 238.00' Surf.Area= 3,875 sf Storage= 19,247 cf

Plug-Flow detention time= 165.9 min calculated for 0.840 af (96% of inflow)
Center-of-Mass det. time= 143.3 min (960.5 - 817.2)

Volume	Invert	Avail.Storage	Storage Description
#1	232.00'	1,550 cf	**Stone Bed (Irregular)** Listed below (Recalc) -Impervious 3,875 cf Overall x 40.0% Voids
#2	233.00'	1,550 cf	**Bio-Media (Irregular)** Listed below (Recalc) 7,750 cf Overall x 20.0% Voids
#3	235.00'	14,742 cf	**Open Storage (Irregular)** Listed below (Recalc) -Impervious
#4	235.00'	1,404 cf	**Forebay (Irregular)** Listed below (Recalc) -Impervious
		19,247 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
232.00	3,875	245.0	0	0	3,875
233.00	3,875	245.0	3,875	3,875	4,120

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.00	3,875	245.0	0	0	3,875
235.00	3,875	245.0	7,750	7,750	4,365

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
235.00	3,875	245.0	0	0	3,875
236.00	4,379	258.0	4,124	4,124	4,453
237.00	4,909	271.0	4,641	8,766	5,061
238.00	7,112	376.0	5,977	14,742	10,477

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
235.00	405	138.0	0	0	405
236.00	700	151.0	546	546	737
237.00	1,027	166.0	858	1,404	1,147

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	**12.0" Round 12" HDPE N-12** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0333 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	232.00'	**4.0" Vert. 4" Orifice** C= 0.600
#3	Device 1	237.25'	**12.0" Horiz. Top of Structure** C= 0.600 Limited to weir flow at low heads
#4	Device 2	233.00'	**10.000 in/hr Through Media over Surface area**
#5	Secondary	237.50'	**20.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=2.37 cfs @ 12.64 hrs HW=237.52' TW=230.30' (Dynamic Tailwater)
└─**1=12" HDPE N-12** (Passes 2.37 cfs of 8.48 cfs potential flow)
  ├─**2=4" Orifice** (Passes 0.90 cfs of 0.97 cfs potential flow)
  │ └─**4=Through Media** (Exfiltration Controls 0.90 cfs)
  └─**3=Top of Structure** (Weir Controls 1.47 cfs @ 1.71 fps)

Secondary OutFlow Max=0.17 cfs @ 12.64 hrs HW=237.52' TW=230.30' (Dynamic Tailwater)
└─**5=E-Spillway** (Weir Controls 0.17 cfs @ 0.36 fps)

Stage-Area-Storage for Pond 101P: Rain Garden #101

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
232.00	0	0
232.10	0	155
232.20	0	310
232.30	0	465
232.40	0	620
232.50	0	775
232.60	0	930
232.70	0	1,085
232.80	0	1,240
232.90	0	1,395
233.00	3,875	1,550
233.10	3,875	1,627
233.20	3,875	1,705
233.30	3,875	1,783
233.40	3,875	1,860
233.50	3,875	1,938
233.60	3,875	2,015
233.70	3,875	2,092
233.80	3,875	2,170
233.90	3,875	2,248
234.00	3,875	2,325
234.10	3,875	2,402
234.20	3,875	2,480
234.30	3,875	2,558
234.40	3,875	2,635
234.50	3,875	2,713
234.60	3,875	2,790
234.70	3,875	2,867
234.80	3,875	2,945
234.90	3,875	3,023
235.00	**3,875**	3,100
235.10	3,875	3,532
235.20	3,875	3,971
235.30	3,875	4,418
235.40	3,875	4,873
235.50	3,875	5,335
235.60	3,875	5,806
235.70	3,875	6,285
235.80	3,875	6,771
235.90	3,875	7,267
236.00	3,875	7,770
236.10	3,875	8,282
236.20	3,875	8,802
236.30	3,875	9,331
236.40	3,875	9,868
236.50	3,875	10,413
236.60	3,875	10,967
236.70	3,875	11,529
236.80	3,875	12,101
236.90	3,875	12,681
237.00	3,875	13,270
237.10	3,875	13,771

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
237.20	3,875	14,292
237.30	3,875	14,835
237.40	3,875	15,398
237.50	3,875	15,983
237.60	3,875	16,590
237.70	3,875	17,219
237.80	3,875	17,872
237.90	3,875	18,547
238.00	3,875	**19,247**

237.25
14,563

14,563 − 1,395 =
13,169

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden #102 - Pond 102 - June 2, 2019**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
0.10	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
0.55	decimal	I = percent impervious area draining to the practice, in decimal form	
0.54	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.06	ac-in	WQV= 1" x Rv x A	
205	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
51	cf	25% x WQV (check calc for sediment forebay volume)	
154	cf	75% x WQV (check calc for surface sand filter volume)	
Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
-	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
173	sf	A_{SA} = surface area of the practice	
10.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]	
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
1.4	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
228.00	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
227.50	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
234.75	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
232.83	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
0.50	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← ≥ 1'
(4.83)	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← ≥ 1'
(6.75)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← ≥ 1'
230.31	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
230.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ 75%WQV
	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← yes
161	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ WQV
24.0	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet	R-102	Note what sheet in the plan set contains the filter course specification	
2.0	:1	Pond side slopes	← ≥3:1
Sheet	R-102	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← 5:1
	inches	D_{FC} = filter course thickness	← 12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	← 304.1 sand

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Summary for Pond 102P: Rain Garden #102

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=77)

Inflow Area = 0.104 ac, 54.54% Impervious, Inflow Depth > 4.70" for 50 YR. - 24 HR. event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.54 cfs @ 12.10 hrs, Volume= 0.036 af, Atten= 4%, Lag= 0.6 min
Primary = 0.04 cfs @ 12.01 hrs, Volume= 0.004 af
Secondary = 0.50 cfs @ 12.10 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 230.31' @ 12.68 hrs Surf.Area= 173 sf Storage= 270 cf
Flood Elev= 230.50' Surf.Area= 173 sf Storage= 318 cf

Plug-Flow detention time= 93.1 min calculated for 0.036 af (88% of inflow)
Center-of-Mass det. time= 38.2 min (843.7 - 805.5)

Volume	Invert	Avail.Storage	Storage Description
#1	227.50'	35 cf	**Stone Base (Irregular)** Listed below (Recalc) -Impervious 87 cf Overall x 40.0% Voids
#2	228.00'	52 cf	**Bio-Media (Irregular)** Listed below (Recalc) 260 cf Overall x 20.0% Voids
#3	229.50'	257 cf	**Open Storage (Irregular)** Listed below (Recalc) -Impervious
		343 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.50	173	75.0	0	0	173
228.00	173	75.0	87	87	211

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	173	75.0	0	0	173
229.50	173	75.0	260	260	286

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
229.50	173	75.0	0	0	173
230.00	252	82.0	106	106	269
230.60	252	82.0	151	257	318

Device	Routing	Invert	Outlet Devices
#1	Primary	227.50'	**6.0" Round 6" UD** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 227.50' / 227.50' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	228.00'	**10.000 in/hr Exfiltration over Surface area**
#3	Secondary	230.00'	**5.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.04 cfs @ 12.01 hrs HW=230.23' TW=230.23' (Dynamic Tailwater)
└─**1=6" UD** (Passes 0.04 cfs of 0.05 cfs potential flow)
└─**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=0.50 cfs @ 12.10 hrs HW=230.27' TW=230.26' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.50 cfs @ 0.37 fps)

Stage-Area-Storage for Pond 102P: Rain Garden #102

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
227.50	0	0
227.55	0	3
227.60	0	7
227.65	0	10
227.70	0	14
227.75	0	17
227.80	0	21
227.85	0	24
227.90	0	28
227.95	0	31
228.00	**173**	35
228.05	173	36
228.10	173	38
228.15	173	40
228.20	173	42
228.25	173	43
228.30	173	45
228.35	173	47
228.40	173	48
228.45	173	50
228.50	173	52
228.55	173	54
228.60	173	55
228.65	173	57
228.70	173	59
228.75	173	61
228.80	173	62
228.85	173	64
228.90	173	66
228.95	173	67
229.00	173	69
229.05	173	71
229.10	173	73
229.15	173	74
229.20	173	76
229.25	173	78
229.30	173	80
229.35	173	81
229.40	173	83
229.45	173	85
229.50	173	87
229.55	173	95
229.60	173	105
229.65	173	114
229.70	173	124
229.75	173	134
229.80	173	145
229.85	173	156
229.90	173	168
229.95	173	180
230.00	173	192
230.05	173	205

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
230.10	173	217
230.15	173	230
230.20	173	243
230.25	173	255
230.30	173	268
230.35	173	280
230.40	173	293
230.45	173	306
230.50	173	318
230.55	173	331
230.60	173	**343**

192 - 31 = 161

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden #103 - Pond 103 - June 2, 2019**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?
1.15	ac	A = Area draining to the practice
0.26	ac	A_I = Impervious area draining to the practice
0.23	decimal	I = percent impervious area draining to the practice, in decimal form
0.25	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.29	ac-in	WQV= 1" x Rv x A
1,058	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")
264	cf	25% x WQV (check calc for sediment forebay volume)
793	cf	75% x WQV (check calc for surface sand filter volume)
Forebay		Method of Pretreatment? (not required for clean or roof runoff)
887	cf	V_{SED} = sediment forebay volume, if used for pretreatment ← ≥ 25%WQV
351	sf	A_{SA} = surface area of the practice
10.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?
3.6	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN}) ← ≤ 72-hrs
230.50	feet	E_{FC} = elevation of the bottom of the filter course material[2]
230.00	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable
234.83	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)
233.83	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)
0.50	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course ← ≥ 1'
(3.33)	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course ← ≥ 1'
(4.33)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course ← ≥ 1'
235.66	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)
236.00	ft	Elevation of the top of the practice
YES		50 peak elevation ≤ Elevation of the top of the practice ← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check. ← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table) ← ≥ 75%WQV
	inches	D_{FC} = filter course thickness ← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification
	Yes/No	Access grate provided? ← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← **yes**
3,058	cf	V = volume of storage[3] (attach a stage-storage table)	← **≥ WQV**
24.0	inches	D_{FC} = filter course thickness	← **18", or 24" if within GPA**
Sheet	R-103	Note what sheet in the plan set contains the filter course specification	
2.0	:1	Pond side slopes	← **≥3:1**
Sheet	R-103	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← **5:1**
	inches	D_{FC} = filter course thickness	← **12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	← **304.1 sand**

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Summary for Pond 103P: Rain Garden 103

Inflow Area = 1.149 ac, 22.76% Impervious, Inflow Depth > 3.68" for 50 YR. - 24 HR. event
Inflow = 3.22 cfs @ 12.00 hrs, Volume= 0.353 af
Outflow = 3.06 cfs @ 12.23 hrs, Volume= 0.282 af, Atten= 5%, Lag= 13.5 min
Primary = 0.08 cfs @ 9.96 hrs, Volume= 0.096 af
Secondary = 2.98 cfs @ 12.23 hrs, Volume= 0.186 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 235.66' @ 12.23 hrs Surf.Area= 351 sf Storage= 3,426 cf
Flood Elev= 236.00' Surf.Area= 351 sf Storage= 4,077 cf

Plug-Flow detention time= 118.0 min calculated for 0.282 af (80% of inflow)
Center-of-Mass det. time= 40.7 min (871.1 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	229.50'	140 cf	**Stone Base (Irregular)** Listed below (Recalc) -Impervious 351 cf Overall x 40.0% Voids
#2	230.50'	140 cf	**Bio-Media (Irregular)** Listed below (Recalc) 702 cf Overall x 20.0% Voids
#3	232.50'	2,909 cf	**Open Storage (Irregular)** Listed below (Recalc) -Impervious
#4	233.00'	887 cf	**Forebay (Irregular)** Listed below (Recalc) -Impervious
		4,077 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
229.50	351	77.0	0	0	351
230.50	351	77.0	351	351	428

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.50	351	77.0	0	0	351
232.50	351	77.0	702	702	505

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
232.50	355	77.0	0	0	355
233.00	437	87.0	198	198	492
234.00	625	100.0	528	726	707
235.00	840	113.0	730	1,456	951
236.00	2,170	237.0	1,453	2,909	4,409

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.00	278	74.0	0	0	278
234.00	440	87.0	356	356	463
235.00	627	99.0	531	887	663

Device	Routing	Invert	Outlet Devices
#1	Primary	230.00'	**6.0" Round 6" UD** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 230.00' / 230.00' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	230.50'	**10.000 in/hr Through Media over Surface area**
#3	Secondary	235.50'	**20.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.08 cfs @ 9.96 hrs HW=230.50' TW=227.39' (Dynamic Tailwater)
└─**1=6" UD** (Passes 0.08 cfs of 0.28 cfs potential flow)
└─**2=Through Media** (Exfiltration Controls 0.08 cfs)

Secondary OutFlow Max=2.98 cfs @ 12.23 hrs HW=235.66' TW=228.44' (Dynamic Tailwater)
└─**3=E-Spillway** (Weir Controls 2.98 cfs @ 0.95 fps)

Stage-Area-Storage for Pond 103P: Rain Garden 103

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
229.50	0	0
229.60	0	14
229.70	0	28
229.80	0	42
229.90	0	56
230.00	0	70
230.10	0	84
230.20	0	98
230.30	0	112
230.40	0	126
230.50	**351**	140
230.60	351	147
230.70	351	154
230.80	351	161
230.90	351	168
231.00	351	176
231.10	351	183
231.20	351	190
231.30	351	197
231.40	351	204
231.50	351	211
231.60	351	218
231.70	351	225
231.80	351	232
231.90	351	239
232.00	351	246
232.10	351	253
232.20	351	260
232.30	351	267
232.40	351	274
232.50	351	281
232.60	351	317
232.70	351	355
232.80	351	394
232.90	351	436
233.00	351	478
233.10	351	552
233.20	351	628
233.30	351	707
233.40	351	790
233.50	351	877
233.60	351	967
233.70	351	1,060
233.80	351	1,157
233.90	351	1,258
234.00	351	1,363
234.10	351	1,471
234.20	351	1,583
234.30	351	1,699
234.40	351	1,819
234.50	351	1,943
234.60	351	2,070
234.70	351	2,202
234.80	351	2,338
234.90	351	2,479
235.00	351	2,623
235.10	351	2,712
235.20	351	2,812
235.30	351	2,924
235.40	351	3,047
235.50	351	3,184
235.60	351	3,333
235.70	351	3,497
235.80	351	3,675
235.90	351	3,868
236.00	351	**4,077**

3,184 - 126 = 3,058

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Rain Garden #104 - Pond 104 - June 2, 2019**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
4.69	ac	A = Area draining to the practice	
0.77	ac	A_I = Impervious area draining to the practice	
0.16	decimal	I = percent impervious area draining to the practice, in decimal form	
0.20	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.92	ac-in	WQV= 1" x Rv x A	
3,352	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
838	cf	25% x WQV (check calc for sediment forebay volume)	
2,514	cf	75% x WQV (check calc for surface sand filter volume)	
Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
1,190	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
2,826	sf	A_{SA} = surface area of the practice	
10.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]	
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
1.4	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
238.00	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
237.00	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
238.85	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
236.35	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← ≥ 1'
1.65	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← ≥ 1'
(0.85)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← ≥ 1'
242.78	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
243.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ 75%WQV
	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← yes
12,985	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ WQV
24.0	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet	R-104	Note what sheet in the plan set contains the filter course specification	
2.0	:1	Pond side slopes	← ≥3:1
Sheet	R-104	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← 5:1
	inches	D_{FC} = filter course thickness	← 12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	← 304.1 sand

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Summary for Pond 104P: Rain Garden #104

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=10)

Inflow Area = 4.688 ac, 16.33% Impervious, Inflow Depth > 3.41" for 50 YR. - 24 HR. event
Inflow = 11.91 cfs @ 12.16 hrs, Volume= 1.333 af
Outflow = 8.80 cfs @ 12.48 hrs, Volume= 1.200 af, Atten= 26%, Lag= 18.9 min
Primary = 3.40 cfs @ 12.48 hrs, Volume= 1.042 af
Secondary = 5.40 cfs @ 12.48 hrs, Volume= 0.158 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 242.78' @ 12.48 hrs Surf.Area= 2,826 sf Storage= 15,724 cf
Flood Elev= 243.00' Surf.Area= 2,826 sf Storage= 17,104 cf

Plug-Flow detention time= 144.4 min calculated for 1.200 af (90% of inflow)
Center-of-Mass det. time= 96.6 min (943.4 - 846.8)

Volume	Invert	Avail.Storage	Storage Description
#1	237.00'	1,130 cf	**Stone Bed (Irregular)** Listed below (Recalc) -Impervious 2,826 cf Overall x 40.0% Voids
#2	238.00'	1,130 cf	**Bio-Media (Irregular)** Listed below (Recalc) 5,652 cf Overall x 20.0% Voids
#3	240.00'	13,653 cf	**Open Storage (Irregular)** Listed below (Recalc) x 1.25 -Impervious
#4	240.00'	1,190 cf	**Forebay (Irregular)** Listed below (Recalc) -Impervious
		17,104 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
237.00	2,826	201.0	0	0	2,826
238.00	2,826	201.0	2,826	2,826	3,027

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
238.00	2,826	201.0	0	0	2,826
240.00	2,826	201.0	5,652	5,652	3,228

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	2,826	201.0	0	0	2,826
241.00	3,250	215.0	3,036	3,036	3,334
242.00	3,700	229.0	3,473	6,508	3,876
243.00	5,170	278.0	4,415	10,923	5,869

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	396	83.0	0	0	396
241.00	594	100.0	492	492	660
242.00	808	113.0	698	1,190	905

Device	Routing	Invert	Outlet Devices
#1	Primary	237.00'	**12.0" Round 12" HDPE N-12** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 237.00' / 237.00' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	237.00'	**5.0" Vert. 5" Orifice** C= 0.600
#3	Device 1	242.25'	**12.0" Horiz. Top of Structure** C= 0.600 Limited to weir flow at low heads
#4	Device 2	238.00'	**10.000 in/hr Through Media over Surface area**
#5	Secondary	242.50'	**15.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=3.40 cfs @ 12.48 hrs HW=242.78' TW=238.68' (Dynamic Tailwater)
└─**1=12" HDPE N-12** (Passes 3.40 cfs of 7.66 cfs potential flow)
  ├─**2=5" Orifice** (Passes 0.65 cfs of 1.33 cfs potential flow)
  │ └─**4=Through Media** (Exfiltration Controls 0.65 cfs)
  └─**3=Top of Structure** (Orifice Controls 2.75 cfs @ 3.50 fps)

Secondary OutFlow Max=5.40 cfs @ 12.48 hrs HW=242.78' TW=238.68' (Dynamic Tailwater)
└─**5=E-Spillway** (Weir Controls 5.40 cfs @ 1.29 fps)

Stage-Area-Storage for Pond 104P: Rain Garden #104

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
237.00	0	0
237.10	0	113
237.20	0	226
237.30	0	339
237.40	0	452
237.50	0	565
237.60	0	678
237.70	0	791
237.80	0	904
237.90	0	1,017
238.00	**2,826**	1,130
238.10	2,826	1,187
238.20	2,826	1,243
238.30	2,826	1,300
238.40	2,826	1,356
238.50	2,826	1,413
238.60	2,826	1,470
238.70	2,826	1,526
238.80	2,826	1,583
238.90	2,826	1,639
239.00	2,826	1,696
239.10	2,826	1,752
239.20	2,826	1,809
239.30	2,826	1,865
239.40	2,826	1,922
239.50	2,826	1,978
239.60	2,826	2,035
239.70	2,826	2,091
239.80	2,826	2,148
239.90	2,826	2,204
240.00	2,826	2,261
240.10	2,826	2,657
240.20	2,826	3,060
240.30	2,826	3,471
240.40	2,826	3,888
240.50	2,826	4,313
240.60	2,826	4,745
240.70	2,826	5,184
240.80	2,826	5,631
240.90	2,826	6,085
241.00	2,826	6,547
241.10	2,826	7,016
241.20	2,826	7,493
241.30	2,826	7,978
241.40	2,826	8,470
241.50	2,826	8,969
241.60	2,826	9,477
241.70	2,826	9,992
241.80	2,826	10,515
241.90	2,826	11,047
242.00	2,826	11,586
242.10	2,826	12,057
242.20	2,826	12,545
242.30	2,826	13,051
242.40	2,826	13,574
242.50	2,826	14,115
242.60	2,826	14,675
242.70	2,826	15,254
242.80	2,826	15,851
242.90	2,826	16,468
243.00	2,826	**17,104**

14,115 − 1017 =
12,985

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden #105 (Dry Swale) - Pond 105 - June 2, 2019**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?
0.08	ac	A = Area draining to the practice
0.02	ac	A_I = Impervious area draining to the practice
0.29	decimal	I = percent impervious area draining to the practice, in decimal form
0.32	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.02	ac-in	WQV= 1" x Rv x A
89	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")
22	cf	25% x WQV (check calc for sediment forebay volume)
67	cf	75% x WQV (check calc for surface sand filter volume)
Forebay		Method of Pretreatment? (not required for clean or roof runoff)
124	cf	V_{SED} = sediment forebay volume, if used for pretreatment ← ≥ 25%WQV
310	sf	A_{SA} = surface area of the practice
10.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?
0.3	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN}) ← ≤ 72-hrs
237.00	feet	E_{FC} = elevation of the bottom of the filter course material[2]
236.00	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable
237.13	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)
235.50	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course ← ≥ 1'
1.50	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course ← ≥ 1'
(0.13)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course ← ≥ 1'
239.36	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)
240.00	ft	Elevation of the top of the practice
YES		50 peak elevation ≤ Elevation of the top of the practice ← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check. ← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table) ← ≥ 75%WQV
	inches	D_{FC} = filter course thickness ← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification
	Yes/No	Access grate provided? ← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← yes
738	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ WQV
24.0	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet	C-102	Note what sheet in the plan set contains the filter course specification	
2.0	:1	Pond side slopes	← ≥3:1
Sheet	C-102	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← 5:1
	inches	D_{FC} = filter course thickness	← 12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	← 304.1 sand

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Summary for Pond 105P: Rain Garden #105

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=17)

Inflow Area = 0.078 ac, 29.77% Impervious, Inflow Depth > 4.37" for 50 YR. - 24 HR. event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.07 cfs @ 12.08 hrs, Volume= 0.025 af, Atten= 82%, Lag= 0.0 min
Primary = 0.07 cfs @ 12.08 hrs, Volume= 0.025 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 239.36' @ 12.55 hrs Surf.Area= 310 sf Storage= 458 cf
Flood Elev= 240.00' Surf.Area= 310 sf Storage= 856 cf

Plug-Flow detention time= 127.7 min calculated for 0.025 af (87% of inflow)
Center-of-Mass det. time= 69.8 min (882.5 - 812.7)

Volume	Invert	Avail.Storage	Storage Description
#1	236.00'	124 cf	**Stone Bed (Irregular)** Listed below (Recalc) -Impervious 310 cf Overall x 40.0% Voids
#2	237.00'	124 cf	**Bio-Media (Irregular)** Listed below (Recalc) 620 cf Overall x 20.0% Voids
#3	239.00'	485 cf	**Open Storage (Irregular)** Listed below (Recalc) -Impervious
#4	239.00'	124 cf	**Forebay (Irregular)** Listed below (Recalc) -Impervious
		856 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
236.00	310	80.0	0	0	310
237.00	310	80.0	310	310	390

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
237.00	310	80.0	0	0	310
239.00	310	80.0	620	620	470

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	310	80.0	0	0	310
239.50	392	85.0	175	175	388
240.00	878	167.0	309	485	2,033

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	209	76.0	0	0	209
239.50	288	82.0	124	124	294

Device	Routing	Invert	Outlet Devices
#1	Primary	236.00'	**6.0" Round 6" UD** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 236.00' / 236.00' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

#2	Device 1	237.00'	**10.000 in/hr Through Media over Surface area**
#3	Secondary	240.00'	**50.0' long x 4.0' breadth E-Spillway**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.07 cfs @ 12.08 hrs HW=239.02' TW=235.51' (Dynamic Tailwater)
└─**1=6" UD** (Passes 0.07 cfs of 1.13 cfs potential flow)
└─**2=Through Media** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=236.00' TW=233.19' (Dynamic Tailwater)
└─**3=E-Spillway** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 105P: Rain Garden #105

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
236.00	0	0
236.05	0	6
236.10	0	12
236.15	0	19
236.20	0	25
236.25	0	31
236.30	0	37
236.35	0	43
236.40	0	50
236.45	0	56
236.50	0	62
236.55	0	68
236.60	0	74
236.65	0	81
236.70	0	87
236.75	0	93
236.80	0	99
236.85	0	105
236.90	0	112
236.95	0	118
237.00	310	124
237.05	310	127
237.10	310	130
237.15	310	133
237.20	310	136
237.25	310	140
237.30	310	143
237.35	310	146
237.40	310	149
237.45	310	152
237.50	310	155
237.55	310	158
237.60	310	161
237.65	310	164
237.70	310	167
237.75	310	171
237.80	310	174
237.85	310	177
237.90	310	180
237.95	310	183
238.00	310	186
238.05	310	189
238.10	310	192
238.15	310	195
238.20	310	198
238.25	310	202
238.30	310	205
238.35	310	208
238.40	310	211
238.45	310	214
238.50	310	217
238.55	310	220

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.60	310	223
238.65	310	226
238.70	310	229
238.75	310	233
238.80	310	236
238.85	310	239
238.90	310	242
238.95	310	245
239.00	**310**	248
239.05	310	274
239.10	310	301
239.15	310	329
239.20	310	358
239.25	310	387
239.30	310	418
239.35	310	449
239.40	310	481
239.45	310	513
239.50	310	547
239.55	310	567
239.60	310	590
239.65	310	615
239.70	310	642
239.75	310	671
239.80	310	703
239.85	310	737
239.90	310	774
239.95	310	814
240.00	310	**856**

856 - 118 =
738

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Rain Garden #106 (Dry Swale) Pond 106 - June 2, 2019**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?
0.16	ac	A = Area draining to the practice
0.04	ac	A_I = Impervious area draining to the practice
0.25	decimal	I = percent impervious area draining to the practice, in decimal form
0.27	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.04	ac-in	WQV= 1" x Rv x A
161	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")
40	cf	25% x WQV (check calc for sediment forebay volume)
121	cf	75% x WQV (check calc for surface sand filter volume)
Forebay		Method of Pretreatment? (not required for clean or roof runoff)
123	cf	V_{SED} = sediment forebay volume, if used for pretreatment ← ≥ 25%WQV
362	sf	A_{SA} = surface area of the practice
10.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?
0.5	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN}) ← ≤ 72-hrs
237.40	feet	E_{FC} = elevation of the bottom of the filter course material[2]
236.40	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable
241.64	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)
239.59	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course ← ≥ 1'
(2.19)	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course ← ≥ 1'
(4.24)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course ← ≥ 1'
240.03	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)
241.00	ft	Elevation of the top of the practice
YES		50 peak elevation ≤ Elevation of the top of the practice ← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check. ← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table) ← ≥ 75%WQV
	inches	D_{FC} = filter course thickness ← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification
	Yes/No	Access grate provided? ← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← yes
785	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ WQV
24.0	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet	R-106	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	← ≥3:1
Sheet	R-106	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← 5:1
	inches	D_{FC} = filter course thickness	← 12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	← 304.1 sand

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Summary for Pond 106P: Rain Garden #106

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=40)

Inflow Area = 0.164 ac, 24.58% Impervious, Inflow Depth > 4.26" for 50 YR. - 24 HR. event
Inflow = 0.82 cfs @ 12.09 hrs, Volume= 0.058 af
Outflow = 0.23 cfs @ 12.45 hrs, Volume= 0.055 af, Atten= 73%, Lag= 22.0 min
Primary = 0.08 cfs @ 11.54 hrs, Volume= 0.052 af
Secondary = 0.14 cfs @ 12.45 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 240.03' @ 12.45 hrs Surf.Area= 362 sf Storage= 962 cf
Flood Elev= 241.00' Surf.Area= 362 sf Storage= 1,895 cf

Plug-Flow detention time= 124.7 min calculated for 0.055 af (94% of inflow)
Center-of-Mass det. time= 91.5 min (906.6 - 815.1)

Volume	Invert	Avail.Storage	Storage Description
#1	236.40'	145 cf	**Stone Bed (Irregular)** Listed below (Recalc) -Impervious 362 cf Overall x 40.0% Voids
#2	237.40'	116 cf	**Bio-Media (Irregular)** Listed below (Recalc) 579 cf Overall x 20.0% Voids
#3	239.00'	1,512 cf	**Open Storage (Irregular)** Listed below (Recalc) -Impervious
#4	239.00'	123 cf	**Forebay (Irregular)** Listed below (Recalc) -Impervious
		1,895 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
236.40	362	81.0	0	0	362
237.40	362	81.0	362	362	443

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
237.40	362	81.0	0	0	362
239.00	362	81.0	579	579	492

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	362	81.0	0	0	362
239.50	448	88.0	202	202	465
240.00	965	169.0	345	547	2,123
241.00	965	169.0	965	1,512	2,292

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	213	63.0	0	0	213
239.50	279	70.0	123	123	294

Device	Routing	Invert	Outlet Devices
#1	Primary	236.75'	**6.0" Round 6" UD** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 236.75' / 236.40' S= 0.0070 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	237.40'	**10.000 in/hr through Media over Surface area**
#3	Secondary	240.00'	**10.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.08 cfs @ 11.54 hrs HW=237.40' TW=236.48' (Dynamic Tailwater)
↑—**1=6" UD** (Passes 0.08 cfs of 0.53 cfs potential flow)
↑—**2=through Media** (Exfiltration Controls 0.08 cfs)

Secondary OutFlow Max=0.14 cfs @ 12.45 hrs HW=240.03' TW=237.54' (Dynamic Tailwater)
↑—**3=E-Spillway** (Weir Controls 0.14 cfs @ 0.43 fps)

Stage-Area-Storage for Pond 106P: Rain Garden #106

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
236.40	0	0
236.45	0	7
236.50	0	14
236.55	0	22
236.60	0	29
236.65	0	36
236.70	0	43
236.75	0	51
236.80	0	58
236.85	0	65
236.90	0	72
236.95	0	80
237.00	0	87
237.05	0	94
237.10	0	101
237.15	0	109
237.20	0	116
237.25	0	123
237.30	0	130
237.35	0	138
237.40	**362**	145
237.45	362	148
237.50	362	152
237.55	362	156
237.60	362	159
237.65	362	163
237.70	362	167
237.75	362	170
237.80	362	174
237.85	362	177
237.90	362	181
237.95	362	185
238.00	362	188
238.05	362	192
238.10	362	195
238.15	362	199
238.20	362	203
238.25	362	206
238.30	362	210
238.35	362	214
238.40	362	217
238.45	362	221
238.50	362	224
238.55	362	228
238.60	362	232
238.65	362	235
238.70	362	239
238.75	362	243
238.80	362	246
238.85	362	250
238.90	362	253
238.95	362	257

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
239.00	362	261
239.05	362	290
239.10	362	320
239.15	362	350
239.20	362	381
239.25	362	414
239.30	362	446
239.35	362	480
239.40	362	514
239.45	362	549
239.50	362	585
239.55	362	609
239.60	362	635
239.65	362	662
239.70	362	693
239.75	362	726
239.80	362	761
239.85	362	799
239.90	362	840
239.95	362	884
240.00	362	930
240.05	362	979
240.10	362	1,027
240.15	362	1,075
240.20	362	1,123
240.25	362	1,172
240.30	362	1,220
240.35	362	1,268
240.40	362	1,316
240.45	362	1,365
240.50	362	1,413
240.55	362	1,461
240.60	362	1,509
240.65	362	1,558
240.70	362	1,606
240.75	362	1,654
240.80	362	1,702
240.85	362	1,751
240.90	362	1,799
240.95	362	1,847
241.00	362	**1,895**

930 - 145 =
785

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Rain Garden #107 - Pond 107 - June 2, 2019**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
3.99	ac	A = Area draining to the practice	
0.42	ac	A_I = Impervious area draining to the practice	
0.11	decimal	I = percent impervious area draining to the practice, in decimal form	
0.14	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.58	ac-in	WQV= 1" x Rv x A	
2,096	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
524	cf	25% x WQV (check calc for sediment forebay volume)	
1,572	cf	75% x WQV (check calc for surface sand filter volume)	
Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
735	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
599	sf	A_{SA} = surface area of the practice	
10.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]	
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
4.2	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
242.00	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
241.00	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
246.25	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
241.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← ≥ 1'
1.00	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← ≥ 1'
(4.25)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← ≥ 1'
247.78	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
248.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ 75%WQV
	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← yes
5,238	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ WQV
24.0	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet	R-107	Note what sheet in the plan set contains the filter course specification	
2.0	:1	Pond side slopes	← ≥3:1
Sheet	R-107	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← 5:1
	inches	D_{FC} = filter course thickness	← 12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	← 304.1 sand

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Summary for Pond 107P: Rain Garden #107

Inflow Area = 3.986 ac, 10.54% Impervious, Inflow Depth > 3.69" for 50 YR. - 24 HR. event
Inflow = 12.94 cfs @ 12.21 hrs, Volume= 1.226 af
Outflow = 12.54 cfs @ 12.24 hrs, Volume= 1.112 af, Atten= 3%, Lag= 1.8 min
Primary = 8.46 cfs @ 12.18 hrs, Volume= 1.026 af
Secondary = 4.33 cfs @ 12.25 hrs, Volume= 0.086 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 5
Peak Elev= 247.78' @ 12.25 hrs Surf.Area= 599 sf Storage= 6,138 cf
Flood Elev= 248.00' Surf.Area= 599 sf Storage= 6,750 cf

Plug-Flow detention time= 62.8 min calculated for 1.112 af (91% of inflow)
Center-of-Mass det. time= 17.8 min (852.1 - 834.2)

Volume	Invert	Avail.Storage	Storage Description
#1	241.00'	240 cf	**Stone Bed (Irregular)** Listed below (Recalc) -Impervious 599 cf Overall x 40.0% Voids
#2	242.00'	240 cf	**Bio-Media (Irregular)** Listed below (Recalc) 1,198 cf Overall x 20.0% Voids
#3	244.00'	5,536 cf	**Open Storage (Irregular)** Listed below (Recalc) -Impervious
#4	245.00'	735 cf	**Forebay (Irregular)** Listed below (Recalc) -Impervious
		6,750 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
241.00	599	117.0	0	0	599
242.00	599	117.0	599	599	716

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
242.00	599	117.0	0	0	599
244.00	599	117.0	1,198	1,198	833

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
244.00	599	117.0	0	0	599
245.00	864	134.0	727	727	961
246.00	1,257	177.0	1,054	1,782	2,036
247.00	1,694	207.0	1,470	3,252	2,973
248.00	2,930	324.0	2,284	5,536	7,924

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
245.00	178	60.0	0	0	178
246.00	367	92.0	267	267	572
247.00	578	109.0	469	735	862

Device	Routing	Invert	Outlet Devices
#1	Primary	241.00'	**12.0" Round 12" HDPE N-12** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 241.00' / 240.65' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	241.00'	**6.0" Vert. 6" Orifice** C= 0.600
#3	Device 1	247.25'	**48.0" Horiz. Top Of Structure** C= 0.600 Limited to weir flow at low heads
#4	Device 2	242.00'	**10.000 in/hr Through Bio-Media over Surface area**
#5	Secondary	247.50'	**12.0' long x 4.0' breadth E-Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=8.46 cfs @ 12.18 hrs HW=247.73' TW=241.60' (Dynamic Tailwater)
- **1=12" HDPE N-12** (Barrel Controls 8.46 cfs @ 10.77 fps)
  - **2=6" Orifice** (Passes < 2.34 cfs potential flow)
    - **4=Through Bio-Media** (Passes < 0.14 cfs potential flow)
  - **3=Top Of Structure** (Passes < 13.56 cfs potential flow)

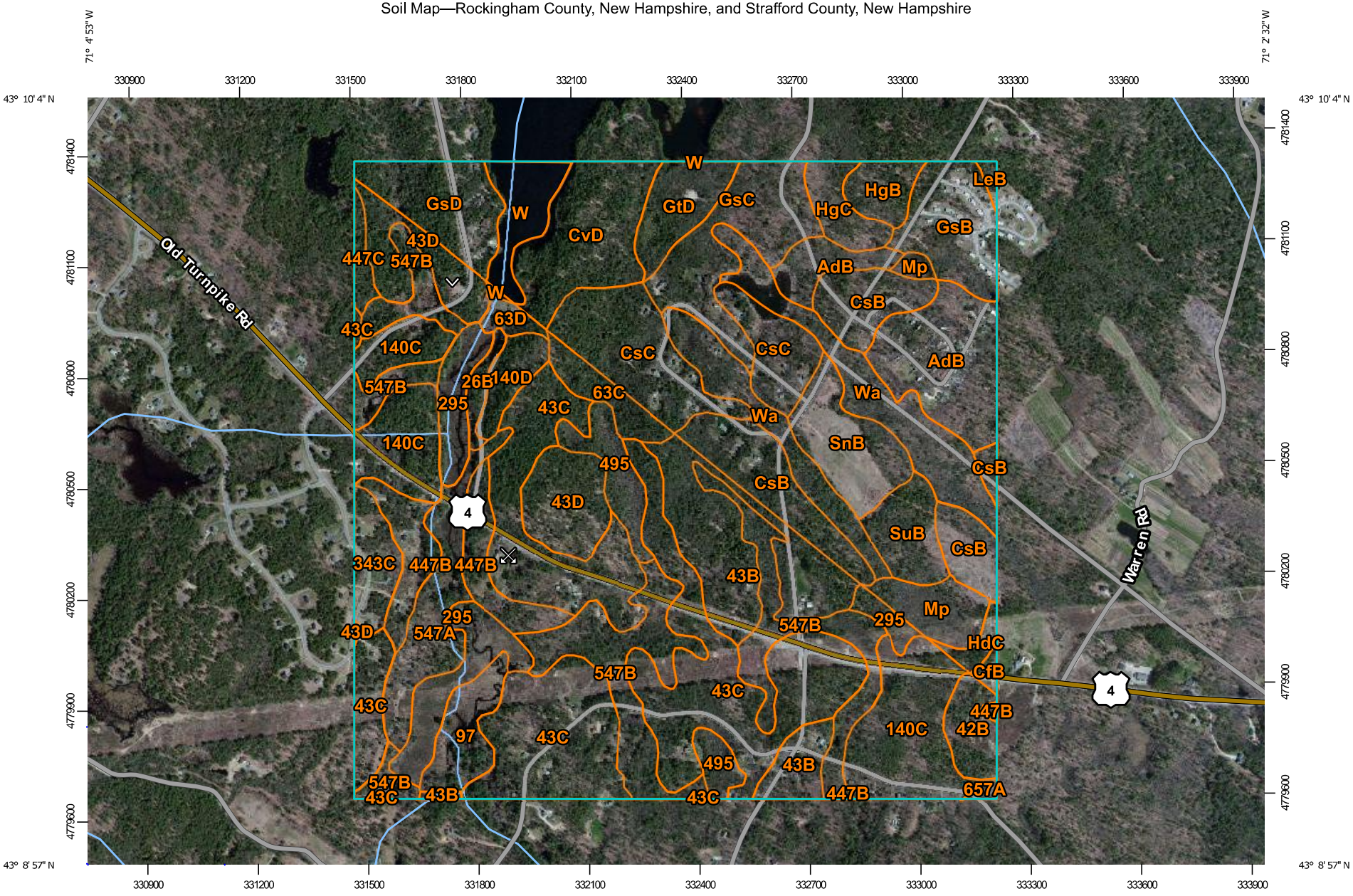
Secondary OutFlow Max=4.33 cfs @ 12.25 hrs HW=247.78' TW=237.21' (Dynamic Tailwater)
- **5=E-Spillway** (Weir Controls 4.33 cfs @ 1.29 fps)

Stage-Area-Storage for Pond 107P: Rain Garden #107

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
241.00	0	0
241.10	0	24
241.20	0	48
241.30	0	72
241.40	0	96
241.50	0	120
241.60	0	144
241.70	0	168
241.80	0	192
241.90	0	216
242.00	**599**	240
242.10	599	252
242.20	599	264
242.30	599	276
242.40	599	288
242.50	599	300
242.60	599	311
242.70	599	323
242.80	599	335
242.90	599	347
243.00	599	359
243.10	599	371
243.20	599	383
243.30	599	395
243.40	599	407
243.50	599	419
243.60	599	431
243.70	599	443
243.80	599	455
243.90	599	467
244.00	599	479
244.10	599	540
244.20	599	604
244.30	599	670
244.40	599	739
244.50	599	810
244.60	599	884
244.70	599	960
244.80	599	1,040
244.90	599	1,122
245.00	599	1,207
245.10	599	1,313
245.20	599	1,425
245.30	599	1,543
245.40	599	1,666
245.50	599	1,795
245.60	599	1,929
245.70	599	2,069
245.80	599	2,216
245.90	599	2,369
246.00	599	2,528
246.10	599	2,693

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
246.20	599	2,865
246.30	599	3,042
246.40	599	3,226
246.50	599	3,416
246.60	599	3,613
246.70	599	3,816
246.80	599	4,026
246.90	599	4,243
247.00	599	4,467
247.10	599	4,641
247.20	599	4,827
247.30	599	5,024
247.40	599	5,233
247.50	599	5,454
247.60	599	5,687
247.70	599	5,933
247.80	599	6,192
247.90	599	6,464
248.00	599	**6,750**

5454 − 216 = 5238



Map Scale: 1:14,600 if printed on A landscape (11" x 8.5") sheet.

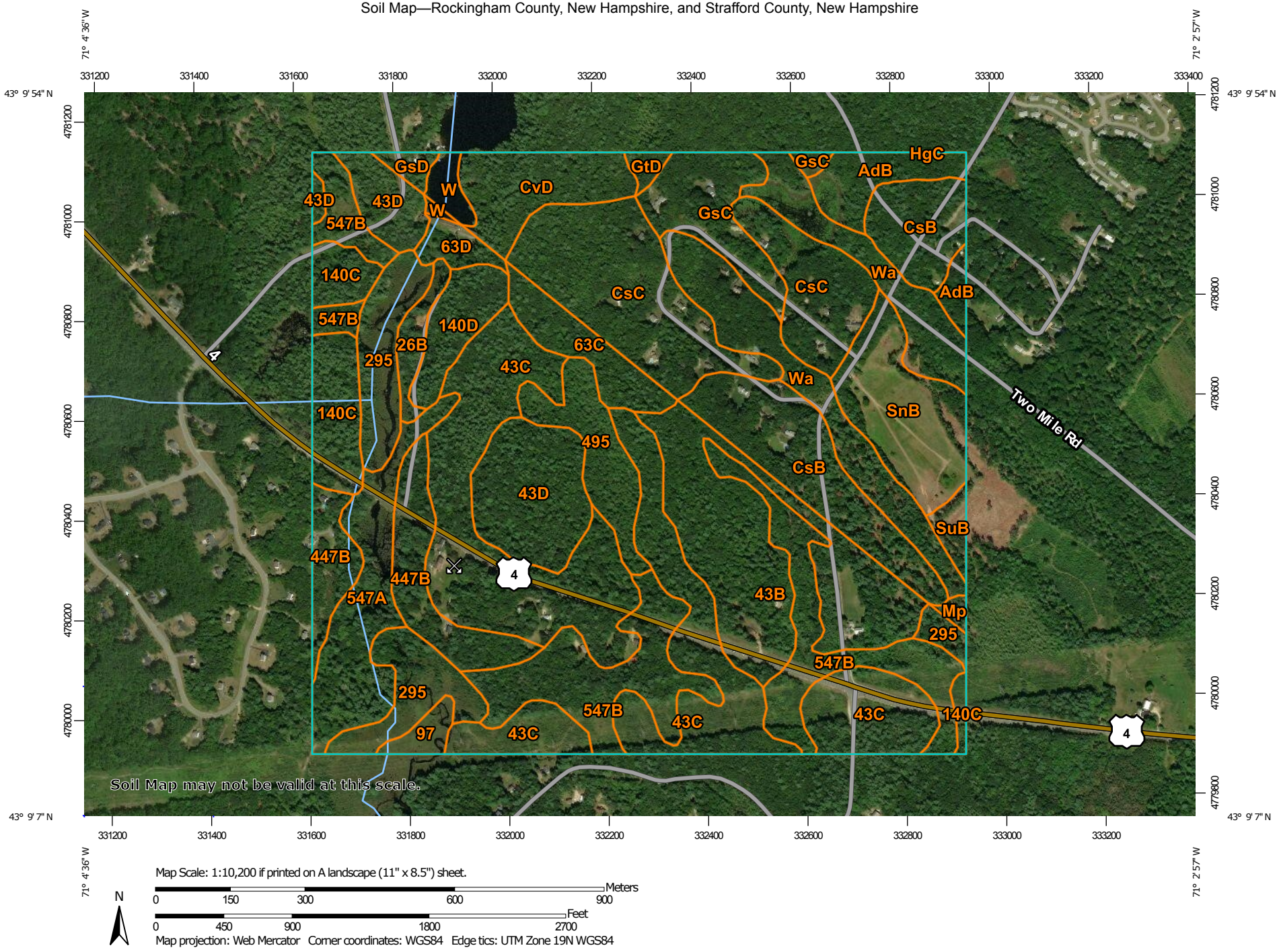
Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
26B	Windsor loamy sand, 3 to 8 percent slopes	3.2	0.4%
42B	Canton fine sandy loam, 3 to 8 percent slopes	7.8	1.0%
43B	Canton fine sandy loam, 0 to 8 percent slopes, very stony	39.4	5.3%
43C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	121.5	16.3%
43D	Canton fine sandy loam, 15 to 25 percent slopes, very stony	27.2	3.6%
63C	Charlton fine sandy loam, 8 to 15 percent slopes, very stony	7.5	1.0%
63D	Charlton fine sandy loam, 15 to 25 percent slopes, very stony	2.9	0.4%
97	Freetown and Natchaug mucky peats, ponded, 0 to 2 percent slopes	11.2	1.5%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	48.3	6.5%
140D	Chatfield-Hollis-Canton complex, 15 to 35 percent slopes, rocky	6.7	0.9%
295	Freetown mucky peat, 0 to 2 percent slopes	25.3	3.4%
343C	Canton gravelly fine sandy loam, 8 to 15 percent slopes, extremely bouldery	9.2	1.2%
447B	Scituate-Newfields complex, 3 to 8 percent slopes, very stony	20.4	2.7%
447C	Scituate-Newfields complex, 8 to 15 percent slopes, very stony	3.0	0.4%
495	Natchaug mucky peat, 0 to 2 percent slopes	13.5	1.8%
547A	Walpole very fine sandy loam, 0 to 3 percent slopes, very stony	19.8	2.7%
547B	Walpole very fine sandy loam, 3 to 8 percent slopes, very stony	58.7	7.9%



Map Scale: 1:10,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 450 900 1800 2700

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 20, Sep 7, 2018

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 18, Sep 5, 2018

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Aug 28, 2015—May 15, 2017

MAP LEGEND

MAP INFORMATION

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
26B	Windsor loamy sand, 3 to 8 percent slopes	3.2	0.8%
43B	Canton fine sandy loam, 0 to 8 percent slopes, very stony	31.6	8.0%
43C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	67.0	17.0%
43D	Canton fine sandy loam, 15 to 25 percent slopes, very stony	20.2	5.1%
63C	Charlton fine sandy loam, 8 to 15 percent slopes, very stony	7.5	1.9%
63D	Charlton fine sandy loam, 15 to 25 percent slopes, very stony	2.9	0.7%
97	Freetown and Natchaug mucky peats, ponded, 0 to 2 percent slopes	2.2	0.6%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	11.9	3.0%
140D	Chatfield-Hollis-Canton complex, 15 to 35 percent slopes, rocky	6.7	1.7%
295	Freetown mucky peat, 0 to 2 percent slopes	18.7	4.7%
447B	Scituate-Newfields complex, 3 to 8 percent slopes, very stony	15.6	3.9%
495	Natchaug mucky peat, 0 to 2 percent slopes	9.4	2.4%
547A	Walpole very fine sandy loam, 0 to 3 percent slopes, very stony	16.1	4.1%
547B	Walpole very fine sandy loam, 3 to 8 percent slopes, very stony	37.4	9.5%
W	Water	0.3	0.1%
Subtotals for Soil Survey Area		**250.7**	**63.6%**
Totals for Area of Interest		**393.9**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdB	Acton very stony fine sandy loam, 0 to 8 percent slopes	8.0	2.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CsB	Charlton fine sandy loam, 3 to 8 percent slopes, very stony	26.2	6.7%
CsC	Charlton fine sandy loam, 8 to 15 percent slopes, very stony	36.3	9.2%
CvD	Charlton extremely stony fine sandy loam, 8 to 25 percent slopes	11.0	2.8%
GsC	Gloucester very stony fine sandy loam, 8 to 15 percent slopes	11.6	2.9%
GsD	Gloucester very stony fine sandy loam, 15 to 25 percent slopes	1.4	0.4%
GtD	Gloucester extremely stony fine sandy loam, 8 to 25 percent slopes	1.1	0.3%
HgC	Hollis-Gloucester very rocky fine sandy loams, 8 to 15 percent slopes	0.1	0.0%
Mp	Freetown and Swansea mucky peats, 0 to 2 percent slopes	0.7	0.2%
SnB	Sutton fine sandy loam, 3 to 8 percent slopes	15.9	4.0%
SuB	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	2.0	0.5%
W	Water	2.1	0.5%
Wa	Whitman very stony fine sandy loam	26.8	6.8%
Subtotals for Soil Survey Area		**143.2**	**36.4%**
Totals for Area of Interest		**393.9**	**100.0%**

Stoney Ridge
ENVIRONMENTAL LLC

January 21, 2019

Mr. Chris Berry
Berry Surveying & Engineering
335 2nd Crown Point Rd
Barrington, NH 03825

RE: Tax Map 6, Lot 22
Nottingham, New Hampshire

SUBJECT: Site-Specific Soil Map Report

Dear Mr. Berry,

The purpose of this soil report and accompanying map is to document the soil characteristics for the project location referenced above.

This soil map was prepared utilizing the Site-Specific Soil Mapping Standards for New Hampshire and Vermont (SSSMS), SSSNNE Special Publication No. 3, Version 5, December 2017. The soil map units were identified using the New Hampshire State-Wide Numerical Soils Legend, Issue #10, January 2011. The Site-Specific Standards apply the latest up to date knowledge of soils and provide the public with the most advanced soil resource information available today. The Site-Specific Standards are based on a universally recognized taxonomic system of soil classification and are supported by national soil mapping standards established by the USDA National Cooperative Soil Survey. They allow for the development of multi-purpose soil map products, which are carefully controlled and monitored through a state, regional, and national quality assessment program. The Site-Specific Standards are backed by the most advanced soil research program in the world. The Site-Specific Standards have been developed by the Society of Soil Scientists of Northern New England in cooperation with the USDA Natural Resources Conservation Service in response to the need to provide regulatory agencies, local officials, and land use planners with consistent high quality large scale soil resource information.

The accompanying soil map was developed on a base map of 1" = 60', with contour intervals of 2'. The base existing conditions plan was supplied by Berry Surveying & Engineering. The soils fieldwork for the Site-Specific Soils Map was performed in May of 2018 and in January of 2019, and included conducting test pits on two different occasions. The final drafting of the soil map took place on January 15, 2019. All field work and soil mapping was completed by Cynthia M. Balcius CSS, CWS & CPESC and Kyle Macdonald of SRE.

229 Prospect Mountain Road • Alton, NH 03809 • (p) 603-776-5825 • (f) 603-776-5826 • stoneyridgeenv.com

Location Description

The site is located off of Route 4 in Nottingham, New Hampshire and can be found on Nottingham Tax Map 6, labeled as Lot 22. The site is approximately 68 acres. The site features forested land with an access road running through a portion of the lot, as well as evidence of a selective cut in the recent past.

The site features many steep slopes throughout. The center of the site is transected by a large wetland system with very poorly drained soils formed in glacial outwash. The soils formed upslope from this wetland were formed in glacial till. This large wetland system is fed by multiple wetland drainage ways with soils formed in glacial till. There is one other large wetland system in the northwest corner of the lot, as well as a few other small wetland pockets throughout. Large stones and boulders were observed throughout the site during the completion of the soils fieldwork, with the highest concentration of boulders being in the southwestern portion of the lot at the bottom of a steep slope.

View of the high concentration of boulders observed on site.

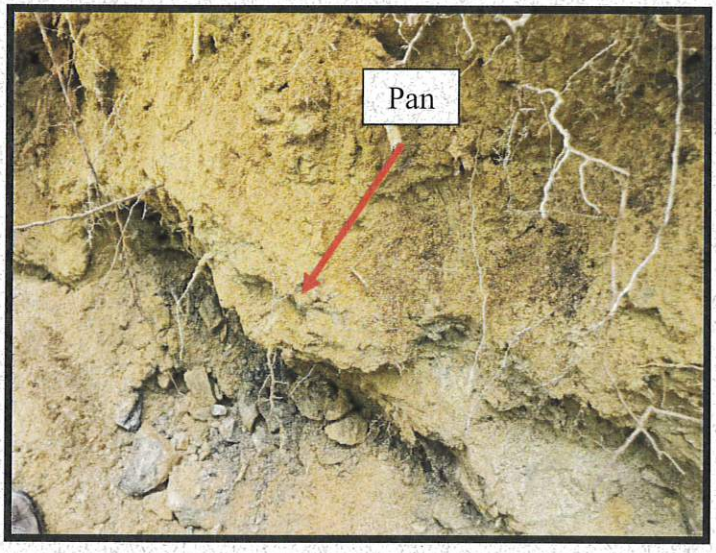
In the northeastern portion of the site, Scituate and Montauk soils were mapped due to the observation of a pan between 20-40 inches from the soil surface. However, it should be noted that ledge was observed at 50 inches or greater in this area. In the southwestern portion of the site, deep loamy soils were observed in spots, but this area was dominated by Chatfield soils with ledge observed between 30 and 40 inches.

Site Soil Descriptions

Chatfield (Well Drained) – Canton Complex (256 B,C,D,E,F) – This map unit is a complex that includes both the well drained Chatfield and the well drained Canton soils. The area mapped as this complex is approximately 70% Chatfield, and 30% Canton. Chatfield soils are loamy glacial till soils that are moderately deep to bedrock (20-40 inches). K_{sat} rates for Chatfield range from 0.6-6 inches per hour in both the upper and lower horizons. Canton soils were formed in glacial till, and are deep to bedrock (greater than 60 inches). K_{sat} rates for Canton range from 2-6 inches per hour in the upper horizon and 6-20 inches per hour in the lower horizon. A significant amount of surface boulders were observed within this map unit.

Scituate fine sandy loam (448 A,B,C,D,E) – Scituate soils are the dominant soil series on site and were formed in glacial till. These soils were found on top of a steep slope adjacent to the Chatfield-Canton Complex, and extended to the northern limit of the soil survey, excluding some areas of the associated, well drained Montauk soil. Scituate soils are relatively deep to bedrock, and moderately deep to a densic contact, as they have a pan between 18 and 34 inches from the soil surface. These soils are moderately well drained, and have a K_{sat} value that ranges from 0.6-2 inches per hour in the upper horizon, and 0.06 to 0.2 inches per hour in the lower horizon.

Montauk fine sandy loam (44 A,B,C,D,E) – Montauk soils were observed in some areas adjacent to areas mapped as Scituate. Montauk soils are in a drainage sequence with Scituate, and are classified as well drained, while Scituate is classified as moderately well drained. Montauk soils were formed in glacial till, and are relatively deep to bedrock, and moderately deep to a densic contact (pan between 20 and 40 inches). K_{sat} rates for this soil series range from 0.6-6 inches per hour in the upper horizon, and 0.06-0.6 inches per hour in the lower horizon.



View of a Scituate soil profile observed on site showing a distinctive pan.

Leicester fine sandy loam (414 A,B,C) – This soil series was observed within many of the wetlands on site. They are poorly drained sandy/loamy soils developed in glacial till. K_{sat} rates are 0.6 to 6 inches per hour in the upper horizon, and 0.6-20 inches per hour in the lower horizon, however, these rates are controlled by the high water table.

Scarboro fine sandy loam (115A) – This soil series was observed in the larger, flatter wetland areas. Scarboro soils are very deep, very poorly drained sandy soils formed in glacial outwash, with a thick organic surface horizon. K_{sat} rates are 6 to 20 inches per hour in both the upper and lower horizons, but like the Leicester soil series, these rates are controlled by the high water table.

This is a view of a steep slope leading to a wetland with Scarboro very poorly drained soil.

A Site-Specific Soil Map Unit legend for the site-specific soil map symbols used in the preparation of this map is attached to this report.

This completes the narrative report that accompanies the site-specific soil map prepared for the site located in Nottingham, New Hampshire, Tax Map 6, Lot 22. If there are any questions regarding the soil map or the report, please feel free to contact us at 776-5825.

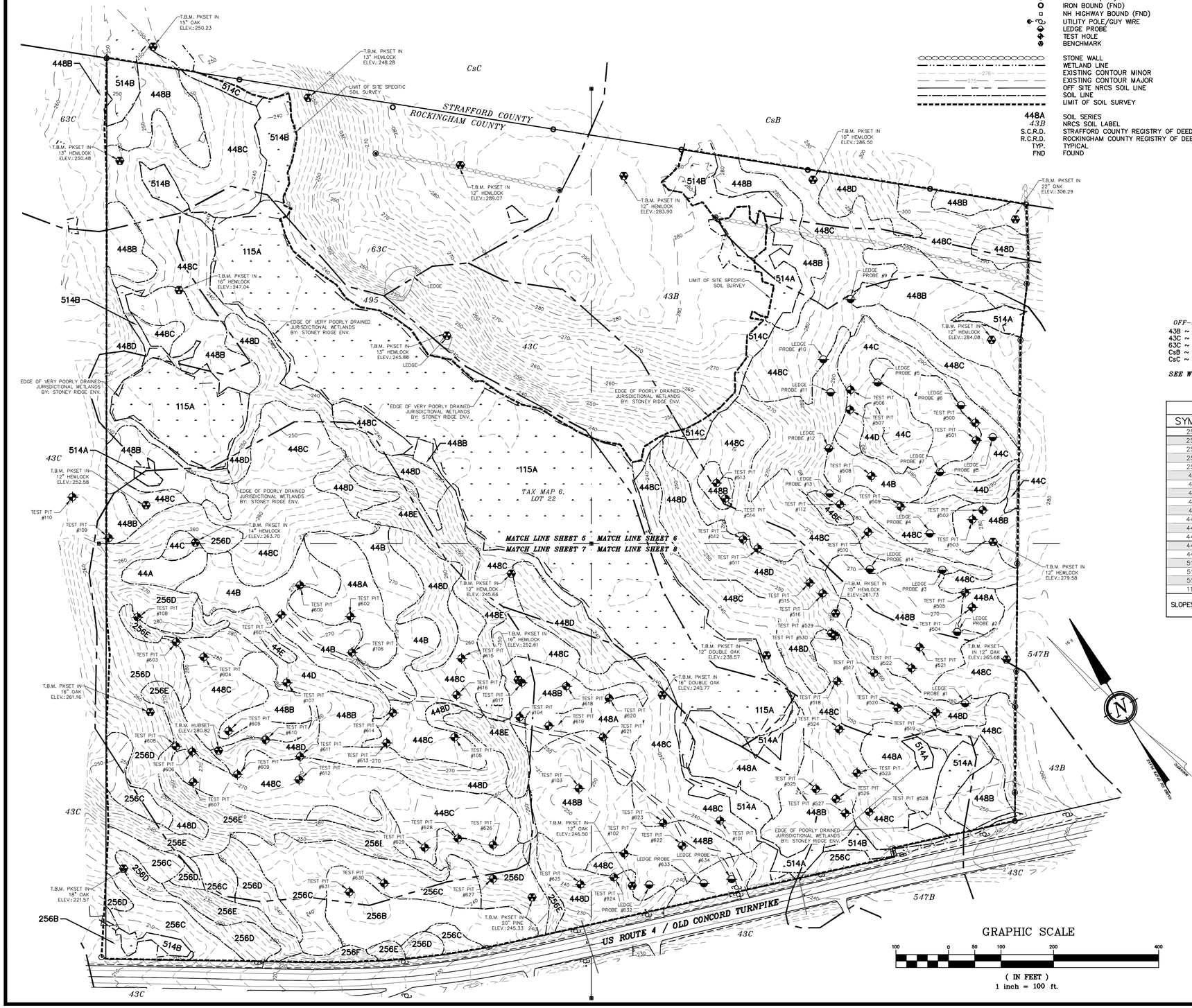
Sincerely,

Stoney Ridge Environmental, LLC

Cynthia M. Balcius, CSS, CWS, CPESC
Senior Soil & Wetland Scientist

Kyle Macdonald
Assistant Project Manager

Attachments: Site-Specific Soil Map, Site-Specific Key



LEGEND:

- DRILL HOLE (FND)
- IRON PIPE (FND)
- IRON BOUND (FND)
- NH HIGHWAY BOUND (FND)
- UTILITY POLE/GUY WIRE
- LEDGE PROBE
- TEST HOLE
- BENCHMARK

- STONE WALL
- WETLAND LINE
- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- OFF SITE NRCS SOIL LINE
- SOIL LINE
- LIMIT OF SOIL SURVEY

448A — SOIL SERIES
43B — NRCS SOIL LABEL
S.C.R.D. — STRAFFORD COUNTY REGISTRY OF DEEDS
R.C.R.D. — ROCKINGHAM COUNTY REGISTRY OF DEEDS
TYP. — TYPICAL
FND — FOUND

NOTES:

1.) OWNER: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

1A.) APPLICANT: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

2.) TAX MAP 6, LOT 22

3.) LOT AREA: 2,599,972 Sq. Ft., 59.69 ACRES

4.) R.C.R.D. BOOK 5977, PAGE 2799

5.) ZONING: COMMERCIAL/INDUSTRIAL DISTRICT & RESIDENTIAL/AGRICULTURAL DISTRICT
FRONTAGE ~ 200.0'
MINIMUM LOT SIZE ~ 87,120 SQ. FT.
FRONT SETBACK ~ 50.0'
REAR SETBACK ~ 50.0'
SIDE SETBACK ~ 50.0'
WETLANDS SETBACK ~ 50.0'

6.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, PART OF THIS PARCEL DOES FALL WITHIN THE FLOOD PLAIN FLOOD HAZARD REF.: FEMA COMMUNITY# – 330137, MAP# – 33015C0115E & MAP# – 33015C0120E, DATED: MAY 17, 2005

7.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING TOPCON HIPER SR SURVEY GRADE GPS RECEIVERS.

8.) THE BOUNDARY LINES SHOWN ON THIS PLAN ARE THE RESULT OF A CLOSED TRAVERSE PERFORMED BY THIS OFFICE IN AUGUST OF 2018, WITH AN ERROR OF CLOSURE OF 1 PART IN 11,922.

9.) TOPOGRAPHIC SURVEY PREFORMED BY THIS OFFICE IN SUMMER OF 2018. EXISTING CONTOURS ARE PROVIDED AT 2' INTERVALS.

10.) THE INTENT OF THIS PLAN IS TO REPRESENT THE SITE SPECIFIC SOILS ON TAX MAP 6, LOT 22 AS OF THE DATE OF THIS PLAN.

OFF-SITE SOIL TYPE :

43B ~ CANTON FINE SANDY LOAM, 0–8% SLOPES, VERY STONY — *ROCKINGHAM COUNTY*
43C ~ CANTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY
63C ~ CHARLTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY
CsB ~ CHARLTON FINE SANDY LOAM, 3–8% SLOPES, VERY STONY — *STRAFFORD COUNTY*
CsC ~ CHARLTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY

SEE WEBSOIL USDA/NRCS

SOILS LEGEND

SYMBOL	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
256B	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256C	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256D	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256E	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
256F	CHATFIELD (WELL DRAINED)–CANTON COMPLEX (70/30)	B/4/2
44A	MONTAUK FINE SANDY LOAM	C/3
44B	MONTAUK FINE SANDY LOAM	C/3
44C	MONTAUK FINE SANDY LOAM	C/3
44D	MONTAUK FINE SANDY LOAM	C/3
44E	MONTAUK FINE SANDY LOAM	C/3
448A	SCITUATE FINE SANDY LOAM	C/3
448B	SCITUATE FINE SANDY LOAM	C/3
448C	SCITUATE FINE SANDY LOAM	C/3
448D	SCITUATE FINE SANDY LOAM	C/3
448E	SCITUATE FINE SANDY LOAM	C/3
514A	LEICESTER FINE SANDY LOAM	C/5
514B	LEICESTER FINE SANDY LOAM	C/5
514C	LEICESTER FINE SANDY LOAM	C/5
115A	SCARBORO FINE SANDY LOAM	D/6
SLOPES:	0–3% A 3–8% B 8–15% C 15–25% D 25%–50% E 50% + F	

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CWS #61

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CSS #84

JURISDICTIONAL WETLANDS WERE DELINEATED BY CYNTHIA BALCIUS OF STONEY RIDGE ENVIRONMENTAL LLC IN SEPTEMBER OF 2018 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
2) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 3. APRIL 2004. NEIWPCC WETLANDS WORKGROUP. WILMINGTON, MA 01887.
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.1.0 (HTTP://WETLAND_PLANTS.USACE.ARMY.MIL). U.S. ARMY CORPS OF ENGINEERS, ENGINEER RESEARCH AND DEVELOPMENT CENTER, COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NH, AND BONAP, CHAPEN HILL.
4) STATE OF NEW HAMPSHIRE 2014 WETLAND PLANT LIST. LICHVAR, R.W., M. BUTTERWICH, N.C. MELVIN, AND W.N. KIRCHNER. 2014. THE NATIONAL WETLAND PLANT LIST: 2014 UPDATE OF WETLAND RATINGS. PHYTONEURON 2014–41:1–42.
5) CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. JANUARY 1987. WETLANDS RESEARCH PROGRAM TECHNICAL REPORT Y–87–1.
6) REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. JANUARY 2012, VERSION 2. U.S. ARMY CORPS OF ENGINEERS. ENVIRONMENTAL LABORATORY ERDC/EL TR–12–1.
7) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. DECEMBER 1979. L. COWARDIN, V. CARTER, F. GOLET, AND E. LAROE. US DEPARTMENT OF THE INTERIOR. FISH AND WILDLIFE SERVICE. FWS/OBS–79/31.

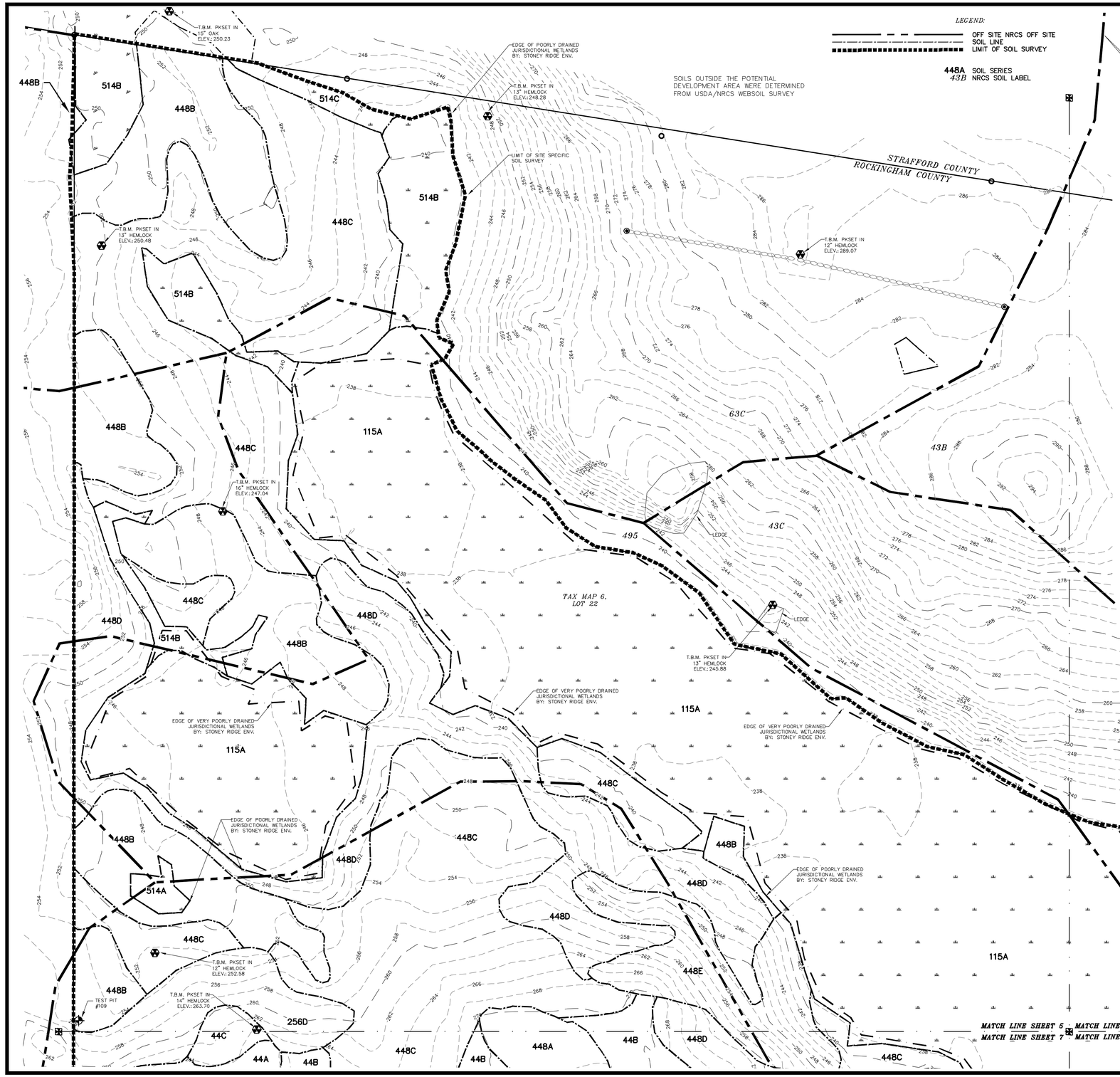
REVISION	DATE	DESCRIPTION

SITE SPECIFIC SOILS MAP OVERVIEW
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 100 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 1243
LICENSED PROFESSIONAL ENGINEER



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SEE WEBSOIL USDA/NRCS

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448D	SCITUATE FINE SANDY LOAM	C/3
448E	SCITUATE FINE SANDY LOAM	C/3
514A	LEICESTER FINE SANDY LOAM	C/5
514B	LEICESTER FINE SANDY LOAM	C/5
514C	LEICESTER FINE SANDY LOAM	C/5
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SLOPES:	0–3% A 3–8% B 8–15% C 15–25% D 25%–50% E 50% + F	

STONEY RIDGE ENVIRONMENTAL, LLC.
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GRAPHIC SCALE

50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

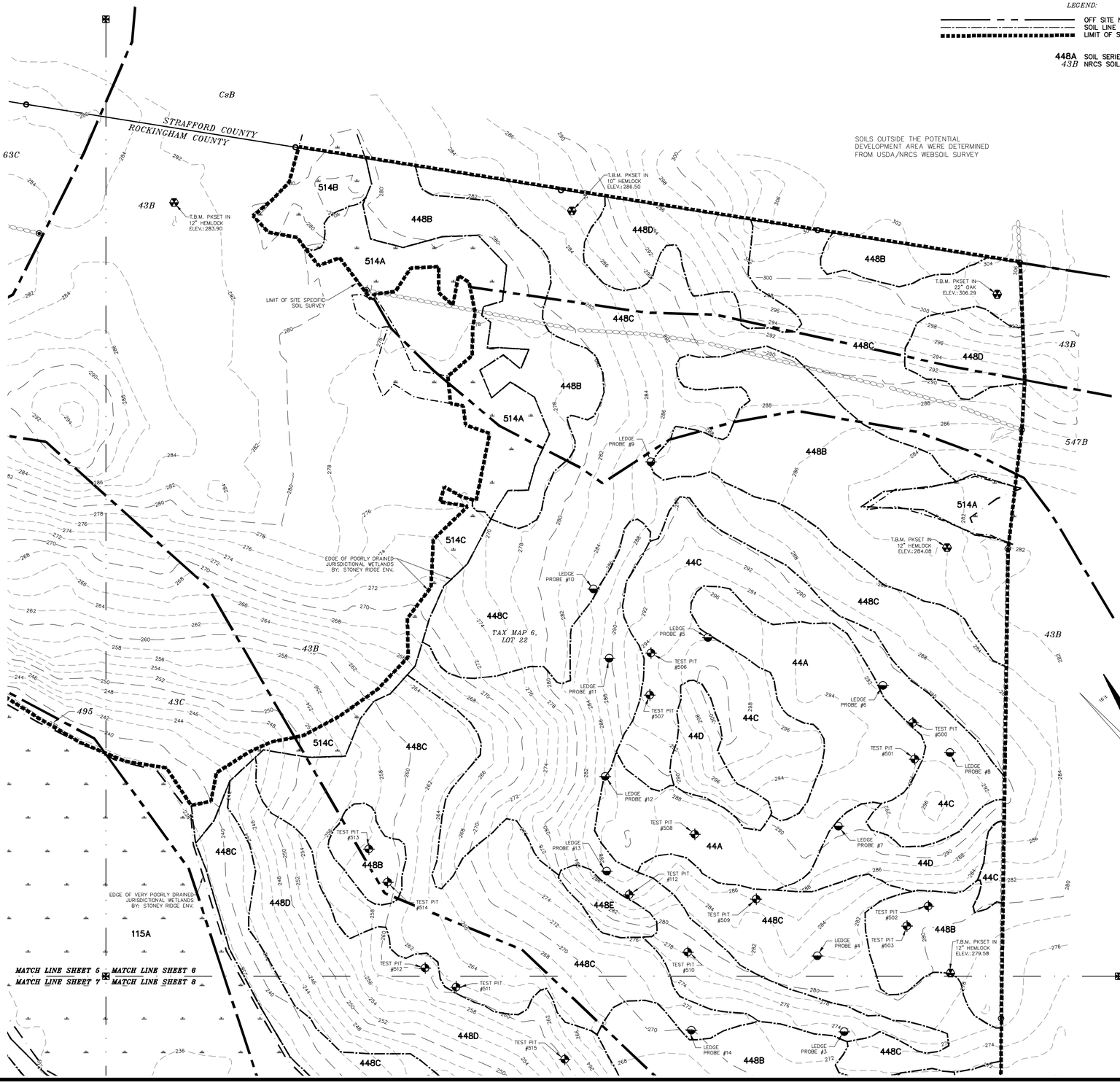
REVISION	DATE	DESCRIPTION

SITE SPECIFIC SOILS MAP – NORTHWEST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY & SURVEYING ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 11243
LICENSED PROFESSIONAL ENGINEER



NOTES:

1.) OWNER: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

1A.) APPLICANT: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

2.) TAX MAP 6, LOT 22

3.) LOT AREA: 2,599,972 Sq. Ft., 59.69 ACRES

4.) R.C.R.D. BOOK 5977, PAGE 2799

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FRONTAGE ~ 200.0'
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WETLANDS SETBACK ~ 50.0'

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OFF-SITE SOIL TYPE :

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43C ~ CANTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY
63C ~ CHARLTON FINE SANDY LOAM, 8–15% SLOPES, VERY STONY
CsB ~ CHARLTON FINE SANDY LOAM, 3–8% SLOPES, VERY STONY — ***STRAFFORD COUNTY***
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SEE WEBSOIL USDA/NRCS

SOILS LEGEND		
SYMBOL	SOIL TAXONOMIC NAME	HYDROLOGIC SOIL GROUP
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448D	SCITUATE FINE SANDY LOAM	C/3
448E	SCITUATE FINE SANDY LOAM	C/3
514A	LEICESTER FINE SANDY LOAM	C/5
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STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CWS #61

STONEY RIDGE ENVIRONMENTAL, LLC.
CYNTHIA BALCIUS, CSS #84

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GRAPHIC SCALE

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REVISION	DATE	DESCRIPTION

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DOMUS DEVELOPERS INC.
OFF
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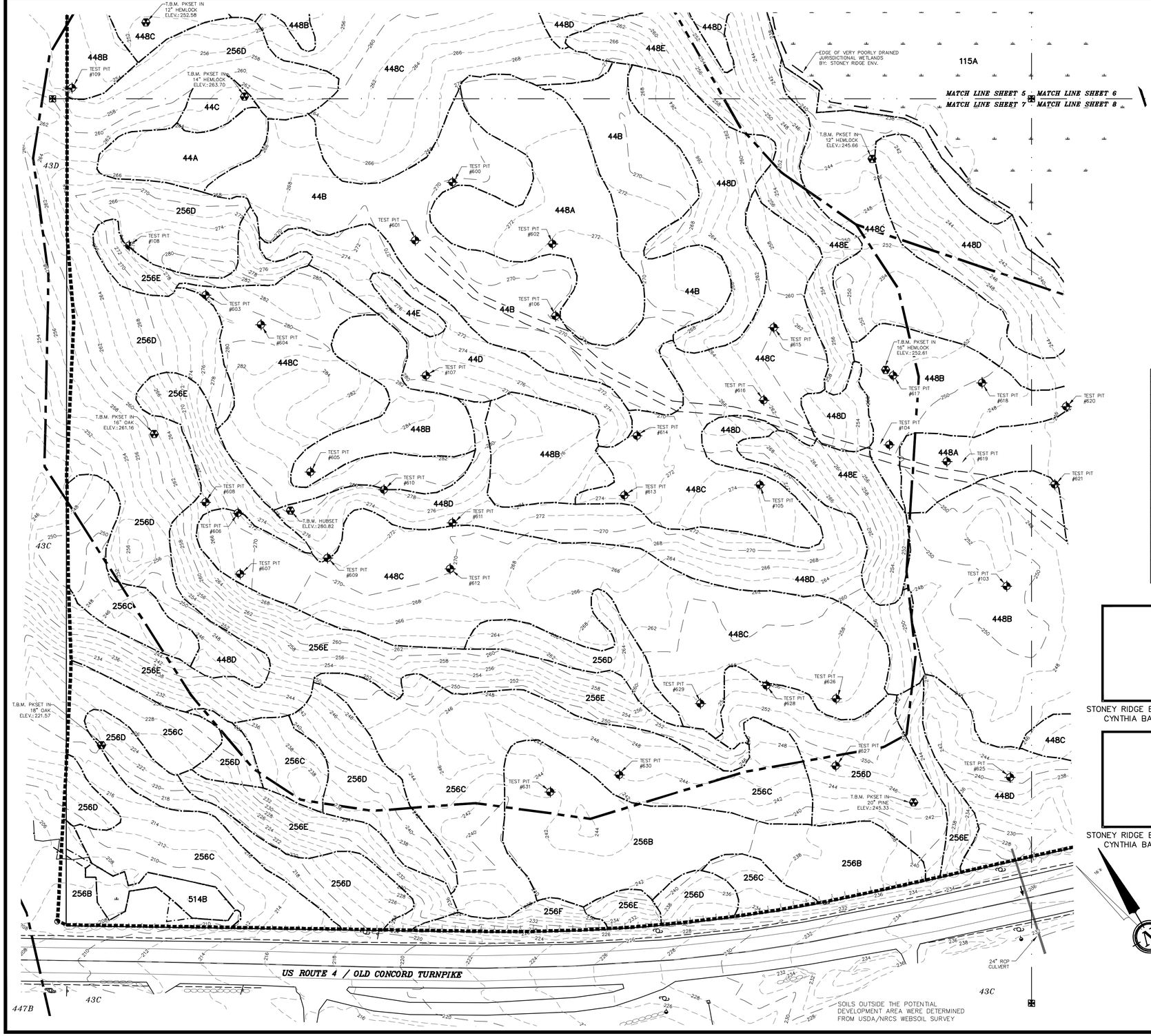
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER



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SEE WEBSOIL USDA/NRCS

SOILS LEGEND

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LEGEND:

- QFF SITE NRCS OFF SITE SOIL LINE
- LIMIT OF SOIL SURVEY

448A SOIL SERIES
43B NRCS SOIL LABEL

GRAPHIC SCALE

50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

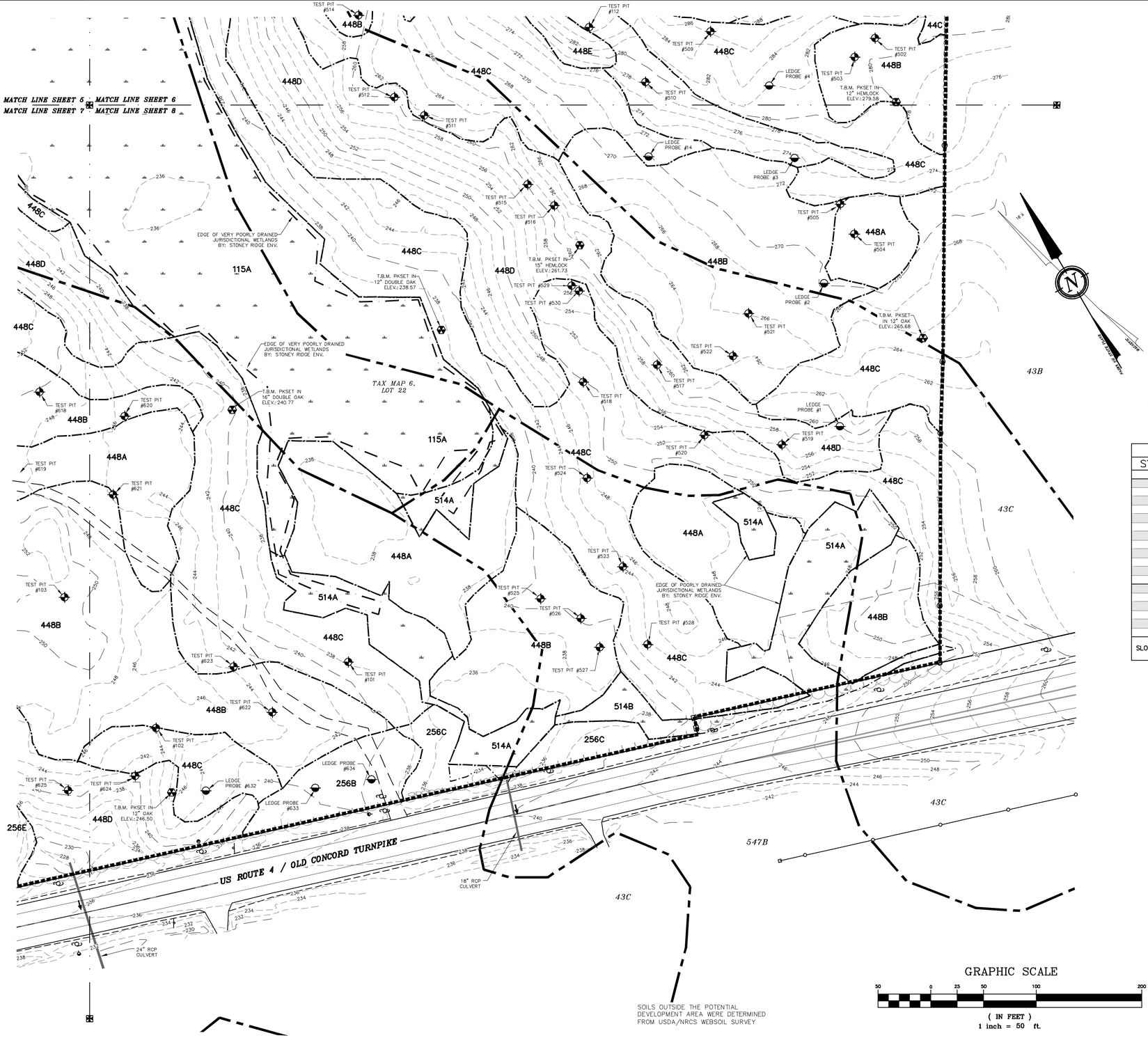
REVISION	DATE	DESCRIPTION

SITE SPECIFIC SOILS MAP – SOUTHWEST
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY & SURVEYING ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 – 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER



SOILS OUTSIDE THE POTENTIAL DEVELOPMENT AREA WERE DETERMINED FROM USDA/NRCS WEBSOIL SURVEY

NOTES:

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11 WHITEHORSE DRIVE
RYE, NH 03870

1A.) APPLICANT: DOMUS DEVELOPERS INC.
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ROCKINGHAM COUNTY

STRAFFORD COUNTY

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US ROUTE 4 / OLD TURNPIKE ROAD
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TAX MAP 6, LOT 22

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SCALE : 1 IN. EQUALS 50 FT.
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KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

BERRY SURVEYING & ENGINEERING
335 Second Crown Point Road
Barrington, NH 03825
Phone: (603) 332-2863
Fax: (603) 335-4623
www.BerrySurveying.Com

Inspection and Maintenance Manual

Stormwater System Management

Old Turnpike Road, Nottingham
Tax Map 6, Lot 22

Land of and Prepared for:

Domus Developers, Inc.
11 Whitehorse Road
RYE, NH 03870

Prepared By

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825
603-332-2863

File Number
DB2018-030

June 3, 2019

Inspection and Maintenance Manual

Stormwater System Management

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Deicing Log Sheet.....Page 14

Owner Certification .....Page 15

Operation & Maintenance Plans Attached – 3 Page

Control of Invasive Plants, NH Department of Agriculture Attached – 4 Pages

NHDES Green SnoPro Utilization Chart Attached – 1 Page

Introduction

The Best Management Practices (BMP) described in this manual are specified in more detail within the plan set giving design details and specifications. The New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection & Design (December 2008, NHDES & US EPA) is included by reference to this manual. Additional details, construction specifications, and example drawings are provided within this reference. (http://des.nh.gov/organization/divisions/water/stormwater/)

The BMP's are covered below in the general order in which the storm water flows. Each BMP has a description and maintenance consideration listed. A Check List table is proved after the narrative to summarize the maintenance responsibilities and schedule. A Log Form is also provided for the owners use.

For details regarding the design of the Storm Water System see also Drainage Analysis & Sediment and Erosion Control Plan also published by Berry Surveying & Engineering originally dated March 4, 2019, as revised. See also plan set completed for Domus Developers, Inc., originally dated March 4, 2019, as revised.

Domus Developers, Inc., Lu Sera, President & Owner, is responsible for the Stormwater System Operation and Maintenance until such time as the proposed streets are accepted as Town streets and if the drainage infrastructure is likewise the responsibility of the municipality. A significant step in this responsibility is the Inspection and Maintenance of each component of the system. Ongoing, semi-annual, and annual inspection and maintenance requirement are documented below and must be taken seriously. Failure of any component of the system can result in surface water run-off ponding and/or freezing in the roadway and parking lots, leaving the developed site untreated, and/or causing violations to issued permits. The owner must maintain, and have available, plans of the Stormwater System in order properly inspect and maintain the system. (Reduced copies attached.) Domus Developers, Inc. conduct the inspections, will maintain the Inspection & Maintenance Check Lists and Logs, and will provide copies with the Annual Report to the Town of Nottingham, Building Department and DPW and provided a copy to NHDES AoT by December 15th of each year. The Stormwater Operations & Maintenance Plan and Inspection and Maintenance Manual will be made available to municipality at the time the roads are accepted.

The owner of Tax Map 6, Lot 22, Domus Developers, Inc, is proposing continue to develop the existing parcel into a proposed residential subdivision and two site plans. The proposal consists of two roads that are 1286 linear feet and 1059 lf respectively.

Surface water is controlled by detention ponds or rain gardens, roadside swales, culverts, and collected in conveyance swales and treated in rain gardens or dry-swales prior to discharge.

The following drainage features will all require periodic inspections and maintenance based on this manual and drainage layout:

Phase 1 – Ada Drive

Rain Garden #101 w/ Sediment forebay, underdrains, Outlet Structure, Culvert, & Outlet Protection

Roadside Swales, Cross Culvert and Outlet Protection

Rain Garden #102 w/ Sediment Forebay, Infiltration, Outlet Structure, Culvert, Emergency Spillway & Outlet Protection

Rain Garden #103 w/ Sediment Forebay, Underdrains, Outlet Structure, Culvert, and Outlet Protection

Outlet / Inlet Protection – NHDOT Cross Culvert

Phase 2 – Sera Drive

Detention Pond #19 w/ Outlet Structure, Culvert, and Outlet Protection

Roadside Swales

Rain Garden #104 w/ Sediment Forebay, Infiltration, Outlet Structure, Culvert, Emergency Spillway

Rain Garden #105 w/ Sediment Forebay, Underdrains, Outlet Structure, Culvert, Level Spreader, and Emergency Spillway

Rain Garden #106 w/ Sediment Forebay, Infiltration, Outlet Structure, Culvert, Emergency Spillway

Rain Garden #107 w/ Sediment Forebay, Infiltration, Outlet Structure, Culvert, Emergency Spillway

Outlet Structures

Description: Outlet Structures of 48-inch and 60-inch round concrete manhole structures are used in the Detention Pond and five rain gardens. All will be equipped with a cone grate trash rack.

Rain Garden #101 Outlet Structure is a 48-inch structure with the sump filled with washed crushed stone to the level of the culvert outlet pipe. As an infiltration pond this outlet structure will receive very little runoff over the concrete rim that is protected by a trash rack. There is no open water storage in the sump of these structures for wildlife protection considerations.

Rain Garden #102 Outlet Structure is a 60-inch structure with an underdrain inlet, 15-inch vertical stack, with a four-inch orifice, that is attached to the discharge culvert. Again, the sump of the structure is filled with washed crushed stone to the invert elevations.

Rain Garden #107 Outlet Structure, inside the Ada Drive cul-de-sac, is a 48-inch structure with the sump filled with washed crushed stone to the level of the culvert outlet pipe. As an infiltration pond this outlet structure will receive very little runoff over the concrete rim that is protected by a trash rack.

Rain Garden #103 Outlet Structure is a 60-inch structure with an underdrain inlet, 15-inch vertical stack, with a three-inch orifice, that is attached to the discharge culvert. Again, the sump of the structure is filled with washed crushed stone to the invert elevations.

Rain Garden #104 Outlet Structure is a 48-inch structure with the sump filled with washed crushed stone to the level of the culvert outlet pipe. As an infiltration pond this outlet structure will receive very little runoff over the concrete rim that is protected by a trash rack.

Maintenance Considerations: Sediment must be removed from top of the stone filled sumps on a regular basis, at least twice a year and more often if the inverts become blocked. Because of limited runoff in the infiltration ponds or underdrain discharge in the under-drained ponds, sediment is not anticipated to be an issue. Inspections should be conducted periodically. At a minimum they should be cleaned after snow-melt and after leaf-drop. Damaged trash racks must be replaced.

See Rain Gardens and Dry-Swales below.

Conveyance & Treatment Swales

Description: "Swales are stabilized channels designed to convey runoff at non-erosive velocities." (NHDES SWM) A conveyance swale is intended to move surface water runoff from one point to another where as a treatment swale will slow the velocity to a point where sediment will settle out of the stormwater flow. A treatment swale will be constructed to a width of between four and eight feet and have a minimum length of 100 feet. The flow characteristics will also meet design criteria. A conveyance swale will be designed so that there is the capacity to convey the 10 year 24 hour storm event.

Project Intent: The swales are individually designed in the drainage analysis and specified on the design plans.

Maintenance Considerations: Grassed swales will be inspected twice annually, removing accumulated sediment and gross solids. Grass will be mowed periodically but to a depth of not less than 4 inches. Any damage to the vegetation will be repaired and woody vegetation and invasive vegetation will be removed.

Cross Culverts

Description: Cross culverts are placed to capture and divert surface water runoff from roadside swales on one side of the roadway to the other side and to capture and discharge the runoff in such a manner that erosion or roadway undermining does not take place.

Maintenance Considerations: The entrance and exit of the culvert pipe should be cleaned of any trash and sediment build-up. The culvert should be clear to let runoff pass through the culvert unobstructed.

Sediment Forebay

Description: A sediment forebay is designed to reduce the velocity of incoming surface water runoff allowing sediment to fall out of suspension initially pre-treating the runoff before it is sent to a treatment structure. This earthen basin will have vegetated side-slopes and will a check dam to further reduce and pretreat the runoff. At the point of incoming runoff, the basin will be protected by rip rap outlet protection construction

and the outgoing edge will be protected with rip rap. The check dam will be constructed from one side of the basin to the other and cause runoff to either go through or over. The volume of the forebay is generally one-tenth the volume of the Water Quality Volume (WQV). Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-4 Pretreatment Practices 1, Sediment Forebays.

Maintenance Considerations: The basin and slopes will be periodically mowed, at least twice per year ensuring that woody material does not get an opportunity to grow. Sediment accumulated in the basin will be removed and properly disposed of when it reaches half the height of the check dam. Erosion or other damage to the basin will be repaired and revegetated. (See Outlet Protection below.)

Infiltration Basins & Detention Ponds

Description: Infiltration Basins are constructed ponds that are intended to detain surface water runoff and during the detention to infiltrate runoff into the ground. Detention Ponds are also constructed ponds with the purpose of detaining runoff but not necessarily for infiltration purposes. During construction it is important that the ground surface not be exposed to traffic or construction equipment to preserve the infiltration capabilities of the existing soil. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-3 Treatment Practices, 3B, In-ground Infiltration Basin and 1A Micro-pool Extended Detention Pond.

Maintenance Considerations:
Infiltration Basins and Detention Ponds should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

On an annual basis the infiltration capabilities need to be confirmed by evaluation the drawdown time. If the infiltration system does not drain within 72-hours following a rainfall event, a qualified professional will assess the condition of the basin to determine measures required to restore the infiltration function. This is normally the direct result of sediment accumulation which will be removed to restore the filter media ratio.

Also on an annual basis the vegetation should be inspected to ensure healthy condition. Invasive species need to be removed along with dead or diseased vegetation.

Bio-Filtration System (Rain Gardens & Bio-Swales)

Description: Rain Gardens, or bio-filtration areas are located close to the source of runoff. They are intended to integrate with the site landscaping an become an aesthetically attractive opportunity to provide highly effective stormwater treatment. The rain gardens associated with this proposed development contribute toward recharge of surface water run-off into the ground. It is important that sediment be removed from run-off prior to discharge into the bio-filtration area to preserve the mulch and soil mix ratio. During construction it is important that the ground surface not be exposed to traffic or construction equipment to preserve the infiltration capabilities of the existing soil. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-3 Treatment Practices, 4c Bioretention System. (Bio-media and bio-filtration mean bioretention filter media.)

Maintenance Considerations:
Rain Gardens should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

On an annual basis the infiltration capabilities need to be confirmed by evaluation the drawdown time. If the bio-filtration system does not drain within 72-hours following a rainfall event, a qualified professional will assess the condition of the rain garden to determine measures required to restore the infiltration function. This is normally the direct result of sediment accumulation which will be removed to restore the filter media ratio.

Also on an annual basis the vegetation should be inspected to ensure healthy condition. Invasive species need to be removed along with dead or diseased vegetation.

Outlet Protection & Level Spreaders

Description: Outlet Protection consists of a riprap apron or preformed scour hole that is designed to provide velocity reduction of the surface water run-off that is leaving a culvert. The design is dependent on the culvert size, soil conditions, velocity, and quantity of the run-off. There are to be no bend or curves at the intersection of the

conduit and apron. Level spreaders are intended to provide a level lip where surface water runoff is allowed to continue downhill closer to sheet flow. The level lip is to be constructed as level as possible for the entire length.

Maintenance Considerations: The riprap outlet protection will be inspected annually for damage, which must be corrected immediately. Any sediment buildup will be removed and disposed of correctly. Sediment and subsequent vegetation will build up in the Level Spreader. This material will be cleaned out along with any gross solids and disposed of properly. (See invasive species below) Any rip rap that has been displaced from the original construction will be repaired, especially recreating the level lip.

CONTROL OF INVASIVE PLANTS

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

Annual Report

Description: The owner is responsible to keep an **I & M Activity Log** that documents inspection, maintenance and repairs to the storm water management system, and a **Deicing Log** to track the amount and type of deicing material applied to the site. The original owner is responsible to ensure that any subsequent owner (s) have copies of the Inspection & Maintenance Manual, Stormwater System Management, copies of past logs and check lists. This includes any owner association that might become involved with the property. The Annual Report will be prepared and submitted to the Town of Nottingham Building Department and DPW with copies of both logs and check lists no later than December 15th of each year and made available to NHDES on that same date. Upon an ownership change, the Annual Report will include the Transfer of Ownership Responsibility Forms duplicated from the form found below.

The plans that accompanies this manual includes a three sheets, "Drainage Operation & Maintenance Plan". The owner / homeowners association will also maintain a complete set of the approved original design plans.

Respectfully
BERRY SURVEYING & ENGINEERING

Kenneth A. Berry, PE, LLS
CPSWQ, CPESC, CESSWI
Principal, VP – Technical Operations

STORMWATER SYSTEM OPERATION AND MAINTENANCE PLAN

Inspection & Maintenance Manual Checklist

Old Turnpike Road, Nottingham, Tax Map 6, Lot 22
Domus Developers, Inc.
11 Whitehorse Road
RYE, NH 03870

☑	Date	BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Pavement Sweeping	Three Times Per Year	N/A	N/A
		Litter/Trash Removal	Routinely	Inspect dumpsters, outdoor waste receptacles area, and yard areas.	Parcel will be free of litter/trash.
		Deicing Agents	N/A	N/A	Use salt as the primary agent for roadway safety during winter.
		Invasive Species	Two times per year.	Inspect for Invasive Species	Remove and dispose invasive species.
		Closed Drainage System:			
		Drainage Pipes	1 time per 2 years	Check for sediment accumulation & clogging.	Less than 2" sediment depth
		Deep Sump Catch Basins	2 times per year	Check for sediment accumulation & clogging.	Sediment accumulated to a depth of 2 feet.

☑	Date	BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Rain Gardens, Detention Ponds & Infiltration Ponds	2 times per year	Check for sediment and debris accumulation buildup.	Remove sediment & debris when required. Remove Invasive Species
		Rain Garden & Infiltration Ponds	Annually	72-Hour drawdown time evaluation and vegetation evaluation. Underdrain flushing.	Remove dead & diseased vegetation along with all debris, take corrective measures of filtration media if required. Flush underdrain clean-outs with a hose.
		Riprap Outlet Protection	Annually	Check for sediment buildup and structure damage.	Remove excess sediment and repair damage.
		Winter Maintenance	Ongoing	Remove snow as directed.	Ongoing
		Post Winter Maintenance	Annually	Remove excess sand, gross solids, and repair vegetation and plantings	Parcel will be free of excess sand, litter/trash. Vegetation per approved plans.
		Annual Report	1 time per year	Submit Annual Report to Nottingham Building Dept. / DPW and kept on file by the owner.	Report to be submitted on or before December 15th each year. Copies submitted to NHDES by that date.

Inspection Check List: Page 3

The following drainage features will all require periodic inspections and maintenance based on this manual and drainage layout:

Phase 1 – Ada Drive

Rain Garden #101 w/ Sediment forebay, underdrains, Outlet Structure, Culvert, & Outlet Protection

Roadside Swales, Cross Culvert and Outlet Protection

Rain Garden #102 w/ Sediment Forebay, Infiltration, Outlet Structure, Culvert, Emergency Spillway & Outlet Protection

Rain Garden #103 w/ Sediment Forebay, Underdrains, Outlet Structure, Culvert, and Outlet Protection

Outlet / Inlet Protection – NHDOT Cross Culvert

Phase 2 – Sera Drive

Detention Pond #19 w/ Outlet Structure, Culvert, and Outlet Protection

Roadside Swales

Rain Garden #104 w/ Sediment Forebay, Infiltration, Outlet Structure, Culvert, Emergency Spillway

Rain Garden #105 w/ Sediment Forebay, Underdrains, Outlet Structure, Culvert, Level Spreader, and Emergency Spillway

Rain Garden #106 w/ Sediment Forebay, Infiltration, Outlet Structure, Culvert, Emergency Spillway

Rain Garden #107 w/ Sediment Forebay, Infiltration, Outlet Structure, Culvert, Emergency Spillway

STORMWATER SYSTEM OPERATION AND MAINTENANCE PLAN

Inspection & Maintenance Manual Log Form

Old Turnpike Road, Nottingham, Tax Map 6, Lot 22
Domus Developers, Inc.
11 Whitehorse Road
RYE, NH 03870

BMP / System	Date Inspected	Inspector	Cleaning/Repair (List Items & Comments)	Repair Date	Performed By:

STORMWATER SYSTEM OPERATION AND MAINTENANCE PLAN

Deicing Log Form

Old Turnpike Road, Nottingham, Tax Map 6, Lot 22
Domus Developers, Inc.
11 Whitehorse Road
RYE, NH 03870

Date	Amount Applied	Performed By:	Date	Amount Applied	Performed By:

STORMWATER SYSTEM OPERATION & MAINTENANCE PLAN CERTIFICATION

Owner	Responsibility
Name: Domus Developers, Inc. Lu Sera, President & Owner Address: 11 Whitehorse Road Rye, NH 03870 Telephone: (603) 490-7635	The owner is responsible for the conduct of all construction activities, and ultimate compliance with all the provisions of the Stormwater System Operation & Maintenance Plan and the implementation of the Inspection and Maintenance Manual.

OWNER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____ Date: _____

Printed Name:

Representing:

Pavement Temp. (°F) and Trend (↑ ↓)	Weather Condition	Maintenance Actions	Application Rate (lbs/per 1000 sq.ft.)			
			Salt Prewetted/Pretreated with salt brine	Salt Prewetted/Pretreated with other blends	Dry salt	Winter sand
>30 ↑	Snow	Plow, treat intersections only				Not recommended
	Frz. Rain	Apply chemical				Not recommended
30 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				Not recommended
25 - 30 ↑	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				Not recommended
25 - 30 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
20 - 25 ↑	Snow or frz. Rain	Plow and Apply chemical				3.25 for frz. Rain
20 - 25 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
15 - 20 ↑	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
15 - 20 ↓	Snow or Frz. Rain	Plow and apply chemical				3.25 for frz. Rain
0 to 15 ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended		Not recommended	5.0 and spot-treat as needed
< 0	Snow	Plow, treat with blends, sand hazardous areas	Not recommended		Not recommended	5.0 and spot-treat as needed

Table 19. Application Rates for Deicing

These rates & table format are based on road application guidelines (Mn Snow & Ice Control Field Handbook, Manual 2005-1). Develop your own application rates by adjusting your current rates incrementally downward toward these guidelines. Where temperature categories overlap, select the rate most applicable to your situation.

Control of Invasive Plants

New Hampshire
Department of Agriculture,
Markets & Food
Douglas Cygan
603-271-3488
doug.cygan@agr.nh.gov

This guide lists garden plants and weeds which are already causing significant changes to natural areas in the Mid-Atlantic. **Measures for controlling each species are indicated by number, e.g., (3), in the text with a full explanation at the end of this article.** Click on the word Control: to jump to that section. Then click your "back" button to return to the text. Following each section suggested alternative plants are given. These alternatives are native plants, well adapted and needing little care, attractive to birds and butterflies, and an important part of the food web for our indigenous species.

INVASIVE TREES

NORWAY MAPLE (*Acer platanoides*) has large leaves similar to sugar maple. To easily confirm that the plant is Norway maple, break off a leaf and if it's truly Norway maple it will exude milky white sap. Fall foliage is yellow. (Exception: cultivars such as 'Crimson King,' which have red leaves in spring or summer, may have red autumn leaves.) The leaves turn color late, usually in late October after native trees have dropped their foliage. This tree suppresses growth of grass, garden plants, and forest understory beneath it, at least as far as the drip-line. Its wind-borne seeds can germinate and grow in deep shade. The presence of young Norway maples in our woodlands is increasing.

Control: (1); (7), (8), (9), or (10); (11) in mid-October to early November, before the leaves turn color.

TREE OF HEAVEN (*Ailanthus altissima*), is incredibly tough and can grow in the poorest conditions. It produces huge quantities of wind-borne seeds, grows rapidly, and secretes a toxin that kills other plants. Its long compound leaves, with 11-25 lance-shaped leaflets, smell like peanut butter or burnt coffee when crushed. Once established, this tree cannot be removed by mechanical means alone.

Control: (1) - seedlings only. Herbicide - use Garlon 3a (9) with no more than a 1" gap between cuts, or (10); plus (11) on re-growth. Or paint bottom 12" of bark with Garlon 4 Ultra (in February or March to protect surrounding plants). USE MAXIMUM STRENGTH SPECIFIED ON LABEL for all herbicide applications on Ailanthus. Glyphosate is not effective against Ailanthus.

INVASIVE SHRUBS

AUTUMN OLIVE (*Eleagnus umbellata*): Formerly recommended for erosion control and wildlife value, these have proved highly invasive and diminish the overall quality of wildlife habitat.

Control: (1) - up to 4" diameter trunks; (7) or (10) or bury stump. Do not mow.

MULTIFLORA ROSE (*Rosa multiflora*), formerly recommended for erosion control, hedges, and wildlife habitat, becomes a huge shrub that chokes out all other vegetation and is too dense for many species of birds to nest in, though a few favor it. In shade, it grows up trees like a vine. It is covered with white flowers in June. (Our native roses have fewer flowers, mostly pink.) Distinguish multiflora by its size, and by the presence of very hard, curved thorns, and a fringed edge to the leaf stalk.

Control: (1) - pull seedlings, dig out larger plants at least 6" from the crown and 6" down; (4) on extensive infestations; (10) or (11). It may remain green in winter, so herbicide may *applied when other plants are dormant. For foliar application, mix Rodeo with extra sticker-spreader, or use Roundup Sure Shot Foam on small plants.*

BUSH HONEYSUCKLES (*Lonicera spp.*), including Belle, Amur, Morrow's, and Tatarian honeysuckle. (In our region, assume that any honeysuckle is exotic unless it is a scarlet-flowered vine). Bush honeysuckles create denser shade than native shrubs, reducing plant diversity and eliminating nest sites for many forest interior species.
Control: (2) on ornamentals; (1); on shady sites only, brush cut in early spring and again in early fall (3); (4) during the growing season; (7); or (10) late in the growing season.

BLUNT-LEAVED PRIVET (*Ligustrum* obtusifolium). *Control:* (1); (7) or (10); or trim off all flowers. Do not cut back or mow.

BURNING BUSH, WINGED EUONYMUS (*Euonymus alatus*), identified by wide, corky wings on the branches.
Control: (1); (7) or (10); or trim off all flowers.

JAPANESE BARBERRY (*Berberis thunbergii*), and all cultivars and varieties.
Control: (1); (7) or (10); or trim off all flowers.

INVASIVE WOODY VINES

All of these vines shade out the shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle. DO NOT PLANT NEXT TO OPEN SPACE.

JAPANESE HONEYSUCKLE (*Lonicera japonica*), including Hall's honeysuckle, has gold-and-white flowers with a heavenly scent and sweet nectar in June. This is probably the familiar honeysuckle of your childhood. It is a rampant grower that spirals around trees, often strangling them.
Control: (1); (3); (10); (11) in fall or early spring when native vegetation is dormant. Plan to re-treat repeatedly.

ORIENTAL BITTERSWEET (*Celastrus orbiculatus*) has almost completely displaced American bittersweet (*C. scandens*). The Asian plant has its flowers and bright orange seed capsules in clusters all along the stem, while the native species bears them only at the branch tips.
Control: (1); keep ornamental plants cut back, remove all fruits as soon as they open, and bag or burn fruits; to eradicate use Garlon 3a (10).

JAPANESE KNOTWEED, MEXICAN BAMBOO (*Polygonum cuspidatum*) can grow in shade. The stems have knotty joints, reminiscent of bamboo. It grows 6-10' tall and has large pointed oval or triangular leaves.
Control: Cut at least 3 times each growing season and/or treat with Rodeo (10) or (11). In gardens, heavy mulch or dense shade may kill it.

INVASIVE HERBACEOUS PLANTS

GARLIC MUSTARD (*Alliaria petiolata*, *A. officinalis*), a white-flowered biennial with rough, scalloped leaves (kidney-, heart- or arrow-shaped), recognizable by the smell of garlic and taste of mustard when its leaves are crushed. (The odor fades by fall.)
Control: Pull before it flowers in spring (1), removing crown and roots. Tamp down soil afterwards. Once it has flowered, cut (2), being careful not to scatter seed, then bag and burn or send to the landfill. (11) may be appropriate in some settings.

JAPANESE STILT GRASS (*Microstegium vimineum*) can be identified by its lime-green color and a line of silvery hairs down the middle of the 2-3" long blade. It tolerates sun or dense shade and quickly invades areas left bare or disturbed by tilling or flooding. An annual grass, it builds up a large seed bank in the soil.

Control: Easily pulled in early to mid-summer (1) - be sure to pull before it goes to seed. If seeds have formed, bag and burn or send to landfill. Mowing weekly or when it has just begun to flower may prevent it from setting seed (3). Use glyphosate (11) or herbicidal soap (less effective) on large infestations. Follow up with (5) in spring.

MILE-A-MINUTE VINE, DEVIL'S TAIL TEARTHUMB (*Polygonum perfoliatum*), a rapidly growing annual vine with triangular leaves, barbed stems, and turquoise berries in August which are spread by birds. It quickly covers and shades out herbaceous plants.
Control: same as for stilt grass.

SPOTTED KNAPWEED (*Centaurea maculosa*), a biennial with thistle-like flowers.
Control: Do NOT pull (1) unless the plant is young and the ground is very soft - the tap root will break off and produce several new plants. Wear sturdy gloves. (2); (6); (10) or (11).

CONTROL MEASURES

(1) PULL seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs.
(2) DEADHEAD to prevent spread of seeds of invasive plants. Cut off seeds or fruits before they ripen. Bag, and burn or send to a landfill.
(3) MOW or CUTTING at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year.
(4) CONTROLLED BURNING during the spring, repeated over several years, allows native vegetation to compete more effectively with the invasive species. This requires a permit. Spot treatment with glyphosate in late fall can be used to make this method more effective.
(5) Use a CORN-BASED PRE-EMERGENCE HERBICIDE on annual weeds. This product is also an organic fertilizer, i.e., it can stimulate growth of existing plants, including weeds, so it is appropriate for lawns and gardens but may not be appropriate in woodlands.
(6) In lawns, SPOT TREAT with BROAD-LEAF WEEDKILLER. Good lawn-care practices (test soil; use lime and fertilizer only when soil test shows a need; mow high and frequently; leave clippings on lawn) reduce weed infestations.
(7) CUT DOWN the tree. Grind out the stump, or clip off re-growth.
(8) GIRDLE tree: cut through the bark and growing layer (cambium) all around the trunk, about 6" above the ground. Girdling is most effective in spring when the sap is rising, and from middle to late summer when the tree is sending down food to the roots. Clip off sucker sprouts.
(9) FRILL: Using a machete, hatchet or similar device, hack scars (several holes in larger trees) downward into the cambium layer, and squirt in glyphosate (or triclopyr if recommended in text above). Follow label directions for Injection and Frill Applications. This is most effective from middle to late summer. Clip off any sucker sprouts or treat with glyphosate.
(10) CUT STEM / CUT STUMP WITH GLYPHOSATE (or triclopyr if specified above). Follow label directions for Cut Stump Application. Clip off sucker sprouts or paint with glyphosate. See Note on Herbicides.
(11) FOLIAR SPRAY WITH GLYPHOSATE herbicide (see Note on Herbicides). Use a backpack or garden sprayer or mist blower, following label directions. Avoid overspray and/or dripping onto non-target plants, because glyphosate kills most plants except moss. If it rolls off waxy or grass-like foliage, use additional sticker-spreader. Deciduous trees, shrubs, and perennials move nutrients down to the roots in late summer. Glyphosate is particularly effective at this time and when plants have just gone out of flowering. Several invasive species retain their foliage after native plants have lost theirs, and resume growth earlier in spring than most natives. This allows you to treat them without harming the natives. However, the plant must be actively growing for the herbicide to work. Retreatments may be necessary the following year if suckering occurs or the plant hasn't been entirely killed.

NOTE ON HERBICIDES: It is highly recommended that small populations try to be controlled using non-chemical methods wherever feasible. However, for large infestations, and for a few plants specified above, herbicide use is essential. Apply herbicides carefully to avoid non-target plants, glyphosate is the least environmentally damaging herbicide in most cases. Add food coloring for visibility, and a soap-based sticker such as Cide-Kick. Glyphosate is ineffective on some

plants; for these, triclopyr (Garlon) may be indicated. When using herbicides, read the entire label and observe all precautions listed, including proper disposal. If in doubt, call your local Cooperative Extension Service.

STANDARD CONSTRUCTION NOTES:

1.) OWNER: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

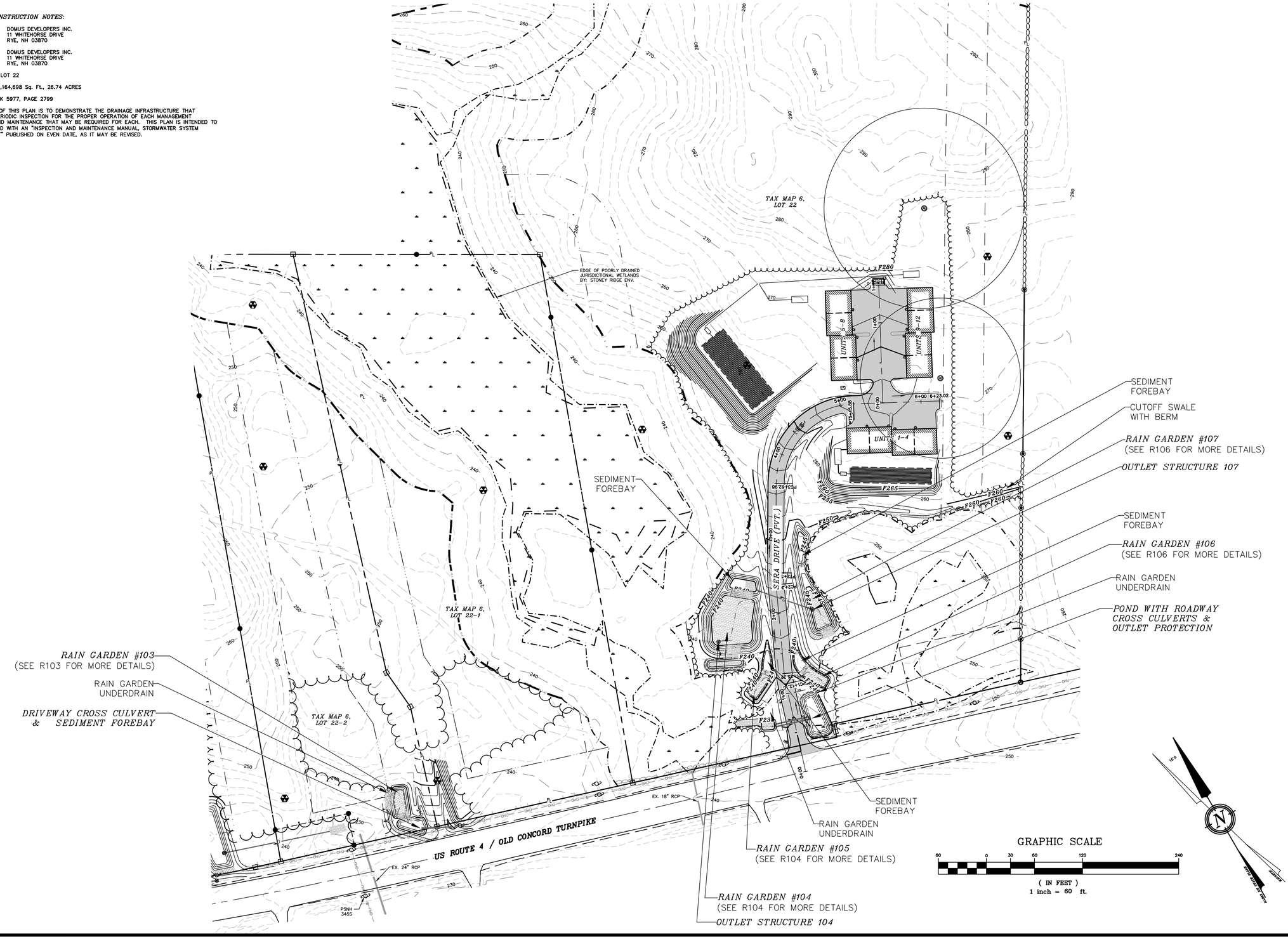
1A.) APPLICANT: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

2.) TAX MAP 6, LOT 22

3.) LOT AREA: 1,164,698 Sq. Ft., 26.74 ACRES

4.) R.C.R.D. BOOK 5977, PAGE 2799

5.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE DRAINAGE INFRASTRUCTURE THAT REQUIRES PERIODIC INSPECTION FOR THE PROPER OPERATION OF EACH MANAGEMENT PRACTICE AND MAINTENANCE THAT MAY BE REQUIRED FOR EACH. THIS PLAN IS INTENDED TO BE PUBLISHED WITH AN "INSPECTION AND MAINTENANCE MANUAL, STORMWATER SYSTEM MANAGEMENT" PUBLISHED ON EVEN DATE, AS IT MAY BE REVISED.



REVISION	DATE	DESCRIPTION

INSPECTION, OPERATION & MAINTENANCE PLAN
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 60 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 - 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

STANDARD CONSTRUCTION NOTES:

1.) OWNER: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

1A.) APPLICANT: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

2.) TAX MAP 6, LOT 22

3.) LOT AREA: 1,164,698 Sq. Ft., 26.74 ACRES

4.) R.C.R.D. BOOK 5977, PAGE 2799

5.) THE INTENT OF THIS PLAN IS TO PROVIDE GRADING AND ENGINEERING DETAIL OF SERA DRIVE.

6.) EXISTING CONDITIONS INFORMATION IS BASED ON A SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING AND IS ENCLOSED IN THIS PACKAGE.

7.) ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO TOWN OF NOTTINGHAM SUBDIVISION REGULATIONS AND THE LATEST EDITION OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION.

8.) AS-BUILT PLANS OF THE SITE SHALL BE SUBMITTED ON A REPRODUCIBLE MYLAR MEDIUM AND IN A DIGITAL DXF FORMAT ON DISK TO THE TOWN OF NOTTINGHAM UPON COMPLETION OF PROJECT. AS-BUILT PLANS SHALL BE PREPARED AND CERTIFIED CORRECT BY A L.L.S. OR P.E.

9.) TOPOGRAPHIC SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING IN THE SUMMER OF 2018.

10.) DATUM: PROJECT DATUM IS BASED ON GPS COORDINATES ESTABLISHED WITH A TOPCON HIPER SR RECEIVER IN THE SUMMER OF 2018 AND REPRESENTED IN NEW HAMPSHIRE STATE PLANE COORDINATES NAD 1983 AND VERTICALLY BY NAVD 1988.

11.) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVE AND BELOW GROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ANY UTILITY CONFLICTS SHOULD BE REPORTED IMMEDIATELY TO THE DESIGN ENGINEER.

12.) THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIGSAFE 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

13.) SEE DETAILS CONCERNING SITE LAYOUT, DRAINAGE, UTILITY AND SEDIMENT AND EROSION CONTROLS.

14.) SEE SEDIMENT & EROSION CONTROL PLAN FOR INLET PROTECTION AND CONTROLS FOR THE ENTIRE SITE.

15.) REQUIRED EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY DISTURBANCE OF THE SITE'S SURFACE AREA AND SHALL BE MAINTAINED THROUGH THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED TO STOP AND EROSION ON THE CONSTRUCTION SITE DUE TO ACTUAL SITE CONDITIONS, THE OWNER SHALL BE REQUIRED TO INSTALL THE NECESSARY EROSION PROTECTION AT NO EXPENSE TO THE TOWN.

16.) THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.

17.) AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.

18.) CONTRACTOR SHALL TAKE SPECIAL CARE IN NOT DISTURBING EXISTING MONUMENTS BOUNDS, AND OR BENCHMARKS WITHOUT FIRST MAKING PROVISIONS FOR RELOCATION.

19.) WHERE AN EXISTING UNDERGROUND UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.

20.) FINAL UTILITY LOCATIONS TO BE COORDINATED BETWEEN THE CONTRACTOR, ALL APPROPRIATE UTILITY COMPANIES AND THE TOWN OF NOTTINGHAM.

21.) CONTRACTOR SHALL COORDINATE ALL ELECTRICAL INSTALLATIONS WITH EVERSOURCE AT (603)-436-7708. ALL ELECTRIC CONDUIT INSTALLATION SHALL BE INSPECTED BY EVERSOURCE PRIOR TO BACKFILL. A 48-HOUR MINIMUM NOTICE IS REQUIRED.

22.) CONTRACTOR SHALL COORDINATE ALL CABLE AND TELECOMMUNICATIONS INSTALLATIONS WITH COMCAST.

23.) ALL NEW ON-SITE UTILITIES SHALL BE INSTALLED UNDERGROUND.

24.) THE SUBDIVISION WILL BE SERVED BY ONSITE WELL AND SEPTIC SYSTEMS.

25.) THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS, OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE & RESET" (R & R).

26.) ALL SYMBOLS, WORDS, TRANSVERSE MARKINGS (STOP BARS, CROSSWALK LINES, AND RAILROAD SYMBOLS), LANE LINES, AND ALL OTHER MARKINGS NOTED WITH [T] SHALL BE THERMOPLASTIC.

27.) ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL HAVE LOAM PLACED AND SEEDED. THE LOAM SHALL HAVE A MINIMUM DEPTH OF 4 INCHES AND SHALL BE PLACED FLUSH WITH THE TOP OF THE ADJACENT CURB, EDGING, BERM OR PAVEMENT SURFACE.

28.) PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DE-WATERED SUBGRADES, TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL MEETING THE ENGINEERS SPECIFIC RECOMMENDED CRITERIA.

29.) IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER (NOT ALLOWED IN TOWN R.O.W.), EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATION. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.

30.) PLACEMENT OF BORROW MATERIALS SHALL BE PERFORMED IN A MANNER THAT PREVENTS LONG TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION. VOIDS BETWEEN STONES AND CLUMPS OF MATERIAL SHALL BE FILLED WITH FINE MATERIALS.

31.) BERMS ARE TO BE CONSTRUCTED WITH HIGH QUALITY CLAY OR LOAMY MATERIAL AND COMPACTED APPROPRIATELY. NO FROZEN MATERIALS ARE TO BE USED IN THE CONSTRUCTION OF ANY BERM ON SITE. TO BE REVIEWED AND APPROVED BY THE TOWN OF NOTTINGHAM OR THEIR AGENTS.

32.) ALL ELEVATIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE DESIGN ENGINEER IS TO BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY. TEMPORARY BENCHMARKS (T.B.M.) ARE TO BE PROVIDED BY THE DESIGN ENGINEER.

33.) ALL DRAINAGE PIPE IS TO BE HDPE N-12 ASTM F2648. (GREEN PIPE) INDIVIDUAL PIPE SIZES ARE SPECIFIED.

34.) UPON FINAL COMPLETION AND 85% STABILIZATION THE DRAINAGE SYSTEM IS TO BE CLEANED OF ALL DEBRIS TO INCLUDE THE PUMPING OF THE BASIN SUMPS.

35.) ALL BASINS AND DRAINS ARE TO HAVE BOOTS INSTALLED ON ALL INLETS AND OUTLETS.

36.) ALL PROPOSED CLEAN OUTS ARE TO BE VERTICAL 12" N-12 PIPE WITH CAST IRON COVERS SCREWED WITH STAINLESS SCREWS. THE COVER IS TO BE DEMARCATED WITH A "D".

37.) ALL TREATMENT SWALE TO BE CONSTRUCTED SHALL HAVE SOD BOTTOMS UNLESS OTHERWISE INSTRUCTED BY THE DESIGN ENGINEER DURING CONSTRUCTION.

38.) A LETTER OF CREDIT FOR THE COST OF RE-VEGETATING ALL DISTURBED AREAS ON THE SITE SHALL BE SUBMITTED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS, AS MAY BE APPLICABLE.

39.) A PRE-CONSTRUCTION CONFERENCE WITH THE DEVELOPER, THE DESIGN ENGINEER, THE EARTHWORK CONTRACTOR AND NOTTINGHAM TOWN STAFF SHALL OCCUR PRIOR TO ANY EARTH DISTURBING ACTIVITY.

STANDARD CONSTRUCTION NOTES CONT.:

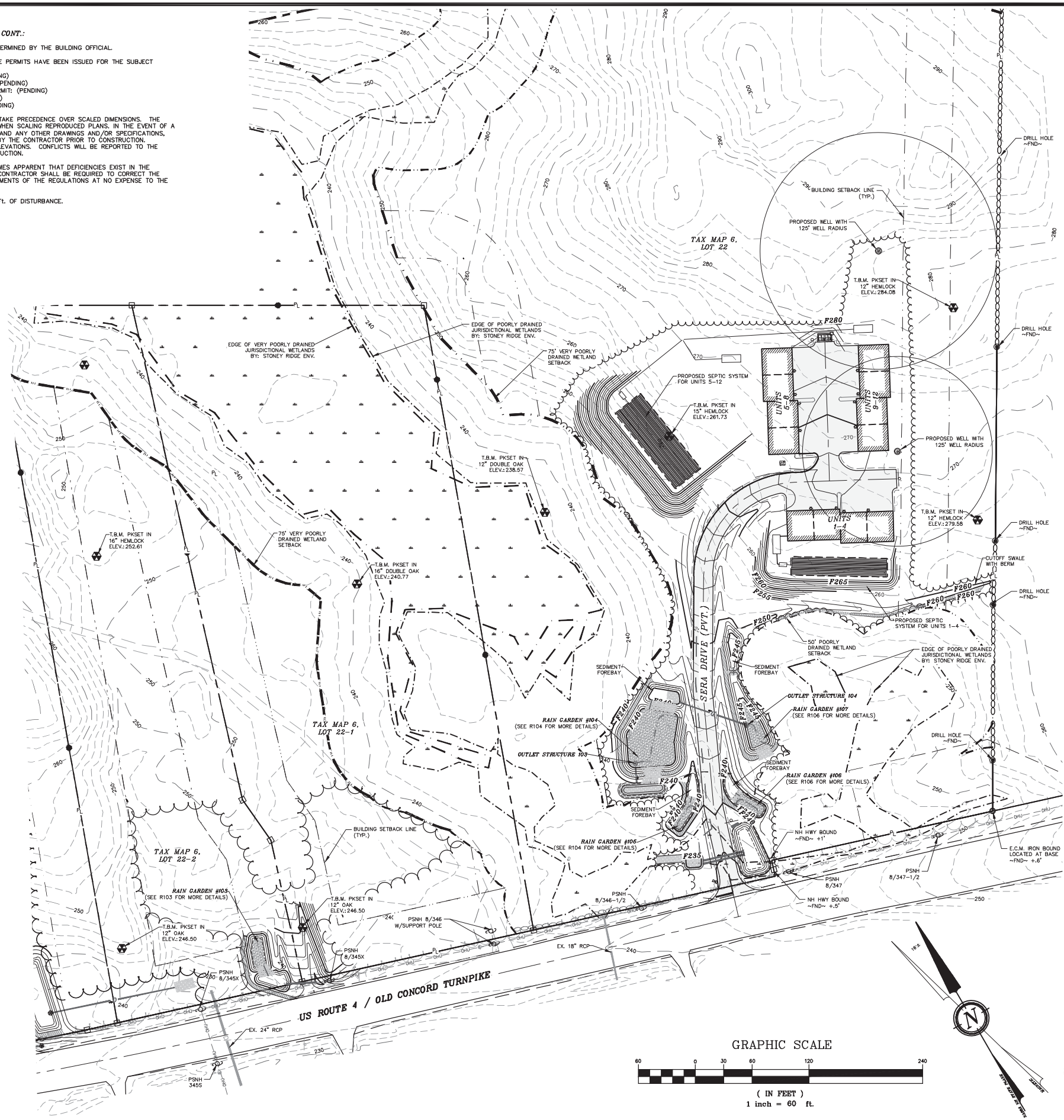
40.) BUILDING ADDRESSES SHALL BE DETERMINED BY THE BUILDING OFFICIAL.

41.) THE FOLLOWING FEDERAL AND STATE PERMITS HAVE BEEN ISSUED FOR THE SUBJECT PROPERTY:
NHDES SUBDIVISION PERMIT: (PENDING)
NHDES WETLANDS IMPACT PERMIT: (PENDING)
NHDES ALTERATION OF TERRAIN PERMIT: (PENDING)
CONDITIONAL USE PERMIT: (PENDING)
EPA NOTICE OF INTENT (NOI): (PENDING)

42.) WRITTEN DIMENSION ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR IS TO CONFIRM ALL ELEVATIONS. CONFLICTS WILL BE REPORTED TO THE DESIGN ENGINEER PRIOR TO CONSTRUCTION.

43.) IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT DEFICIENCIES EXIST IN THE APPROVED DESIGN DRAWINGS, THE CONTRACTOR SHALL BE REQUIRED TO CORRECT THE DEFICIENCIES TO MEET THE REQUIREMENTS OF THE REGULATIONS AT NO EXPENSE TO THE TOWN.

44.) THIS PLAN PROPOSED 113,000 Sq. Ft. OF DISTURBANCE.



REVISION	DATE	DESCRIPTION

OVERVIEW GRADING PLAN
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 60 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 - 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

SHEET 11 OF 26

STANDARD CONSTRUCTION NOTES:

1.) OWNER: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

1A.) APPLICANT: DOMUS DEVELOPERS INC.
11 WHITEHORSE DRIVE
RYE, NH 03870

2.) TAX MAP 6, LOT 22-3

3.) LOT AREA: 1,111,859 Sq. Ft., 25.52 ACRES

4.) R.C.R.D. BOOK 5977, PAGE 2799

5.) THE INTENT OF THIS PLAN IS TO PROVIDE GRADING AND ENGINEERING DETAIL OF ADA DRIVE.

6.) EXISTING CONDITIONS INFORMATION IS BASED ON A SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING AND IS ENCLOSED IN THIS PACKAGE.

7.) ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO TOWN OF NOTTINGHAM SUBDIVISION REGULATIONS AND THE LATEST EDITION OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION.

8.) AS-BUILT PLANS OF THE SITE SHALL BE SUBMITTED ON A REPRODUCIBLE MYLAR MEDIUM AND IN A DIGITAL DXF FORMAT ON DISK TO THE TOWN OF NOTTINGHAM UPON COMPLETION OF PROJECT. AS-BUILT PLANS SHALL BE PREPARED AND CERTIFIED CORRECT BY A L.L.S. OR P.E.

9.) TOPOGRAPHIC SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING IN THE SUMMER OF 2018.

10.) DATUM: PROJECT DATUM IS BASED ON GPS COORDINATES ESTABLISHED WITH A TOPCON HIPER SR RECEIVER IN THE SUMMER OF 2018 AND REPRESENTED IN NEW HAMPSHIRE STATE PLANE COORDINATES NAD 1983 AND VERTICALLY BY NAVD 1988.

11.) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVE AND BELOW GROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ANY UTILITY CONFLICTS SHOULD BE REPORTED IMMEDIATELY TO THE DESIGN ENGINEER.

12.) THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIGSAFE 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

13.) SEE DETAILS CONCERNING SITE LAYOUT, DRAINAGE, UTILITY AND SEDIMENT AND EROSION CONTROLS.

14.) SEE SEDIMENT & EROSION CONTROL PLAN FOR INLET PROTECTION AND CONTROLS FOR THE ENTIRE SITE.

15.) REQUIRED EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY DISTURBANCE OF THE SITE'S SURFACE AREA AND SHALL BE MAINTAINED THROUGH THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED TO STOP AND EROSION ON THE CONSTRUCTION SITE DUE TO ACTUAL SITE CONDITIONS, THE OWNER SHALL BE REQUIRED TO INSTALL THE NECESSARY EROSION PROTECTION AT NO EXPENSE TO THE TOWN.

16.) THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.

17.) AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.

18.) CONTRACTOR SHALL TAKE SPECIAL CARE IN NOT DISTURBING EXISTING MONUMENTS BOUNDS, AND OR BENCHMARKS WITHOUT FIRST MAKING PROVISIONS FOR RELOCATION.

19.) WHERE AN EXISTING UNDERGROUND UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.

20.) FINAL UTILITY LOCATIONS TO BE COORDINATED BETWEEN THE CONTRACTOR, ALL APPROPRIATE UTILITY COMPANIES AND THE TOWN OF NOTTINGHAM.

21.) CONTRACTOR SHALL COORDINATE ALL ELECTRICAL INSTALLATIONS WITH EVERSOURCE AT (603)-436-7708. ALL ELECTRIC CONDUIT INSTALLATION SHALL BE INSPECTED BY EVERSOURCE PRIOR TO BACKFILL. A 48-HOUR MINIMUM NOTICE IS REQUIRED.

STANDARD CONSTRUCTION NOTES CONT.:

22.) CONTRACTOR SHALL COORDINATE ALL CABLE AND TELECOMMUNICATIONS INSTALLATIONS WITH COMCAST.

23.) ALL NEW ON-SITE UTILITIES SHALL BE INSTALLED UNDERGROUNDWITH THE EXCEPTION OF ONE DROP POLE.

24.) THE SUBDIVISION WILL BE SERVED BY ONSITE WELL AND SEPTIC SYSTEMS.

25.) THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS, OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE & RESET" (R & R).

26.) ALL SYMBOLS, WORDS, TRANSVERSE MARKINGS (STOP BARS, CROSSWALK LINES, AND RAILROAD SYMBOLS), LANE LINES, AND ALL OTHER MARKINGS NOTED WITH (T) SHALL BE THERMOPLASTIC

27.) ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL HAVE LOAM PLACED AND SEEDED. THE LOAM SHALL HAVE A MINIMUM DEPTH OF 4 INCHES AND SHALL BE PLACED FLUSH WITH THE TOP OF THE ADJACENT CURB, EDGING, BERM OR PAVEMENT SURFACE.

28.) PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DE-WATERED SUBGRADES, TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL MEETING THE ENGINEERS SPECIFIC RECOMMENDED CRITERIA.

29.) IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER (NOT ALLOWED IN TOWN OR STATE R.O.W.), EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATION. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.

30.) PLACEMENT OF BORROW MATERIALS SHALL BE PERFORMED IN A MANNER THAT PREVENTS LONG TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION. VOIDS BETWEEN STONES AND CLUMPS OF MATERIAL SHALL BE FILLED WITH FINE MATERIALS.

31.) BERMS ARE TO BE CONSTRUCTED WITH HIGH QUALITY CLAY OR LOAMY MATERIAL AND COMPACTED APPROPRIATELY. NO FROZEN MATERIALS ARE TO BE USED IN THE CONSTRUCTION OF ANY BERM ON SITE. TO BE REVIEWED AND APPROVED BY THE TOWN OF NOTTINGHAM OR THEIR AGENTS.

32.) ALL ELEVATIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE DESIGN ENGINEER IS TO BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY. TEMPORARY BENCHMARKS (T.B.M.) ARE TO BE PROVIDED BY THE DESIGN ENGINEER.

33.) ALL DRAINAGE PIPE IS TO BE HDPE N-12 ASTM F2648. (GREEN PIPE) INDIVIDUAL PIPE SIZES ARE SPECIFIED.

34.) UPON FINAL COMPLETION AND 85% STABILIZATION THE DRAINAGE SYSTEM IS TO BE CLEANED OF ALL DEBRIS TO INCLUDE THE PUMPING OF THE BASIN SUMPS.

35.) ALL BASINS AND DRAINS ARE TO HAVE BOOTS INSTALLED ON ALL INLETS AND OUTLETS.

36.) ALL PROPOSED CLEAN OUTS ARE TO BE VERTICAL 12" N-12 PIPE WITH CAST IRON COVERS SCREWED WITH STAINLESS SCREWS. THE COVER IS TO BE DEMARCATED WITH A "D".

37.) ALL TREATMENT SWALE TO BE CONSTRUCTED SHALL HAVE SOD BOTTOMS UNLESS OTHERWISE INSTRUCTED BY THE DESIGN ENGINEER DURING CONSTRUCTION.

38.) A LETTER OF CREDIT FOR THE COST OF RE-VEGETATING ALL DISTURBED AREAS ON THE SITE SHALL BE SUBMITTED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS, AS MAY BE APPLICABLE.

39.) A PRE-CONSTRUCTION CONFERENCE WITH THE DEVELOPER, THE DESIGN ENGINEER, THE EARTHWORK CONTRACTOR AND NOTTINGHAM TOWN STAFF SHALL OCCUR PRIOR TO ANY EARTH DISTURBING ACTIVITY.

STANDARD CONSTRUCTION NOTES CONT.:

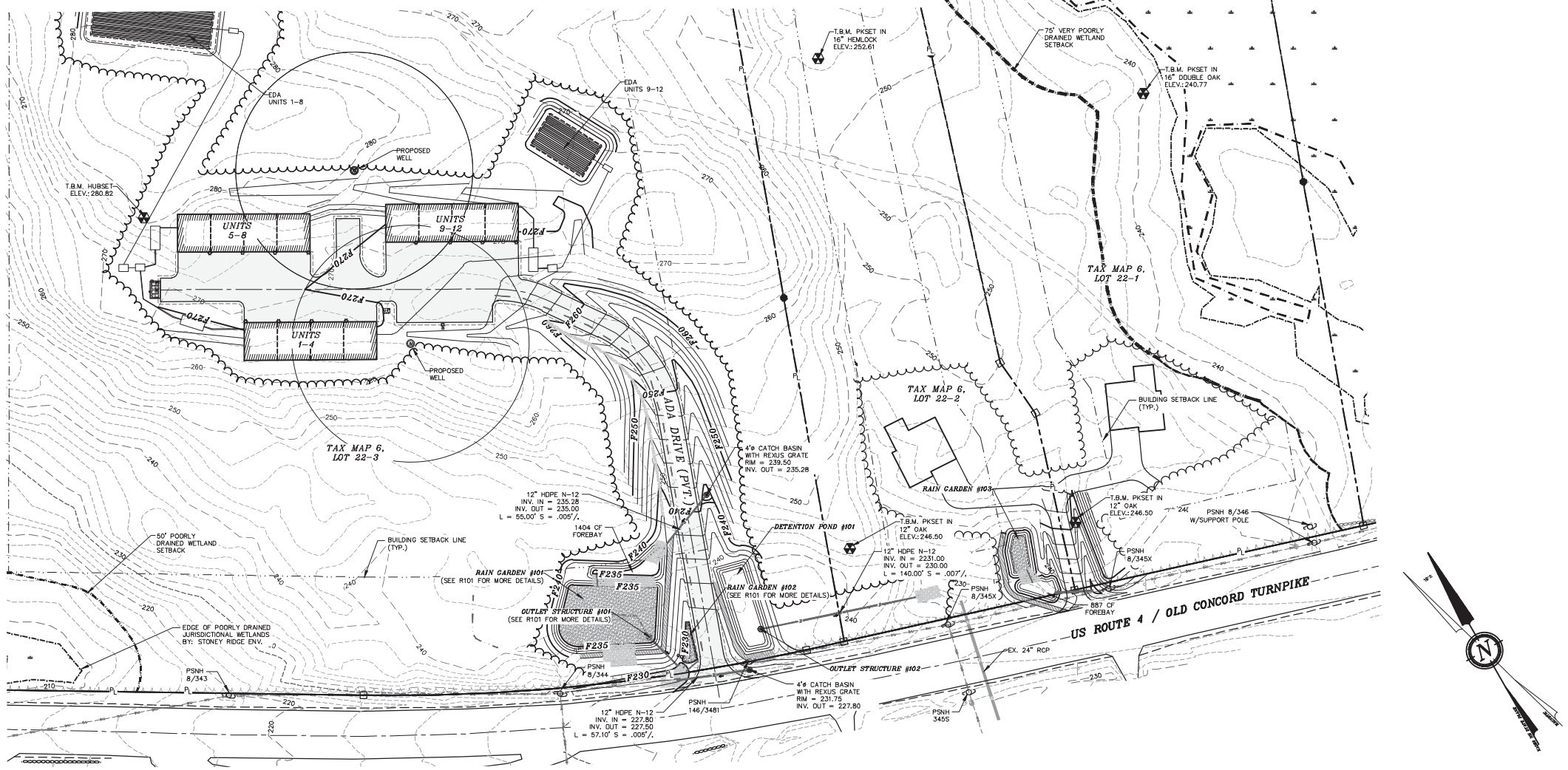
40.) BUILDING ADDRESSES SHALL BE DETERMINED BY THE BUILDING OFFICIAL.

41.) THE FOLLOWING FEDERAL AND STATE PERMITS HAVE BEEN ISSUED FOR THE SUBJECT PROPERTY:
NHDES SUBDIVISION PERMIT: (PENDING)
NHDES ALTERATION OF TERRAIN PERMIT: (PENDING)
EPA NOTICE OF INTENT (NOI): (PENDING)

42.) WRITTEN DIMENSION ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR IS TO CONFIRM ALL ELEVATIONS. CONFLICTS WILL BE REPORTED TO THE DESIGN ENGINEER PRIOR TO CONSTRUCTION.

43.) IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT DEFICIENCIES EXIST IN THE APPROVED DESIGN DRAWINGS, THE CONTRACTOR SHALL BE REQUIRED TO CORRECT THE DEFICIENCIES TO MEET THE REQUIREMENTS OF THE REGULATIONS AT NO EXPENSE TO THE TOWN.

44.) THIS PLAN PROPOSED 102,000 Sq. Ft. OF DISTURBANCE.



GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 80 ft.

REVISION	DATE	DESCRIPTION

OVERVIEW GRADING PLAN ADA DRIVE
LAND OF
DOMUS DEVELOPERS INC.
US ROUTE 4 / OLD TURNPIKE ROAD
NOTTINGHAM, N.H.
TAX MAP 6, LOT 22-3

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 60 FT.
DATE : JUNE 3, 2019
FILE NO. : DB 2018 - 030

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY No. 10043 LICENSED PROFESSIONAL ENGINEER

SHEET 11 OF 26

Welcome to New Hampshire's Watershed Report Cards built from the 2016, 305(b)/303(d)

Each Watershed Report Card covers a single 12 digit Hydrologic Unit Code (HUC12), on average a 34 square mile area. Each Watershed Report Card has three components;

1. REPORT CARD - A one page card that summarizes the overall use support for Aquatic Life, Primary Contact (i.e. Swimming), and Secondary Contact (i.e. Boating) Designated Uses on every Assessment Unit ID (AUID) within the HUC12.
2. HUC 12 MAP - A map of the watershed with abbreviated labels for each AUID within the HUC12.
3. ASSESSMENT DETAILS - Anywhere from one to forty pages with the detailed assessment information for each and every AUID in the Report Card and Map.

How are the Surface Water Quality Assessment determinations made?

All readily available data with reliable Quality Assurance/Quality Control is used in the biennial surface water quality assessments. For a full understanding of how the Surface Water Quality Standards (Env-Wq 1700) are translated into surface water quality assessments we urge the reader to review the 2016 Consolidated Assessment and Listing Methodology (CALM) at https://www.des.nh.gov/organization/divisions/water/wmb/swqa/2016/documents/r-wd-17-08.pdf

Where can I find more advanced mapping resources?

GIS files are available by assessment cycle at ftp://pubftp.nh.gov/DES/wmb/WaterQuality/SWQA/

I'd like to see the more raw water quality data?

The web mapping tool allows you to download the data used in the assessment of the primary contact and aquatic life designated uses by clicking on the "**Data Access** Waterbody Data (Aquatic Life and Swimming Uses)" link for any assessment unit. (http://www2.des.state.nh.us/WaterShed_SWQA/SWQA_Map.aspx)

How are assessments coded in the report card?

Assessment outcomes are displayed on a color scale as well as an alpha numeric scale that provides additional distinctions for the designated use and parameter level assessments as outlined in the table below.

		Severe Not Supporting, Severe	**Poor** Not Supporting, Marginal	**Likely Bad** Insufficient Information – Potentially Not Supporting	**No Data** No Data	**Likely Good** Insufficient Information – Potentially Full Supporting	**Marginal** Full Support, Marginal	**Good** Full Support, Good
CATEGORY	**Description**							
*Category 2	Meets standards						2-M or 2-OBS	2-G
Category 3	Insufficient Information			3-PNS	3-ND	3-PAS		
Category 4	Does not Meet Standards;							
4A	TMDL^ Completed	4A-P	4A-M or 4A-T					
4B	Other enforceable measure will correct the issue.	4B-P	4B-M or 4B-T					
4C	Non-pollutant (i.e. exotic weeds)	4C-P	4C-M					
Category 5	TMDL^ Needed	5-P	5-M or 5-T					

* "Category 1" only exists at the Assessment Unit Level.

^ TMDL stands for Total Maximum Daily Load studies (http://des.nh.gov/organization/divisions/water/wmb/tmdl/index.htm)

November 30, 2017

WATERSHED 305(b) ASSESSMENT SUMMARY REPORT:

HUC 12 010600030707

HUC 12 NAME LITTLE RIVER

(Locator map on next page only applies to this HUC12)

Assessment Cycle 2016

Good	Full Support Good
Marginal	Full Support Marginal
Likely Good	Insufficient Information – Potentially Full Support
No Data	No Data
Likely Bad	Insufficient Information – Potentially Not Support
Poor	Not Support Marginal
Severe	Not Support Severe

ASSESSMENT UNIT ID	MAP LABEL	ASSESSMENT UNIT NAME	AQUATIC LIFE	SWIMMING	BOATING	FISH CONSUMP.
NHIMP600030707-01		TRIB TO MENDUMS POND	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-01		MENDUMS POND	5-P	2-G	2-G	4A-M
NHLAK600030707-01-02		MENDUMS POND - UNH REC AREA	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-02		NOTTINGHAM LAKE	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-03		ROUND POND	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-04		UNNAMED POND	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-05		CEDAR WATERS	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-06		LANGLEY POND	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-07		CYRUS POND	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-08		ROUND PONDS	3-ND	3-ND	3-ND	4A-M
NHLAK600030707-09		UNNAMED POND	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-01		PERKINS BROOK - THRU ROUND POND TO MENDUMS POND	5-P	3-ND	3-ND	4A-M
NHRIV600030707-02		HOWE BROOK	5-P	3-ND	3-ND	4A-M
NHRIV600030707-03		LITTLE RIVER	5-P	3-ND	3-ND	4A-M
NHRIV600030707-04		UNNAMED BROOK - THRU CYRUS & LANGLEY PONDS TO CEDAR WATERS	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-05		PEA PORRIDGE BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-07		LITTLE RIVER	3-M	4A-M	3-ND	4A-M
NHRIV600030707-08		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-09		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-10		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-11		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-12		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-13		MCDANIAL BROOK - TO MENDUMS POND	5-P	3-ND	3-ND	4A-M
NHRIV600030707-14		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-15		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-16		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-17		UNNAMED BROOK	3-ND	3-ND	3-ND	4A-M
NHRIV600030707-18		WOOD ROAD BROOK	3-ND	3-ND	3-ND	4A-M

WATERSHED 305(b) ASSESSMENT SUMMARY REPORT:

HUC 12 010600030707

HUC 12 NAME LITTLE RIVER

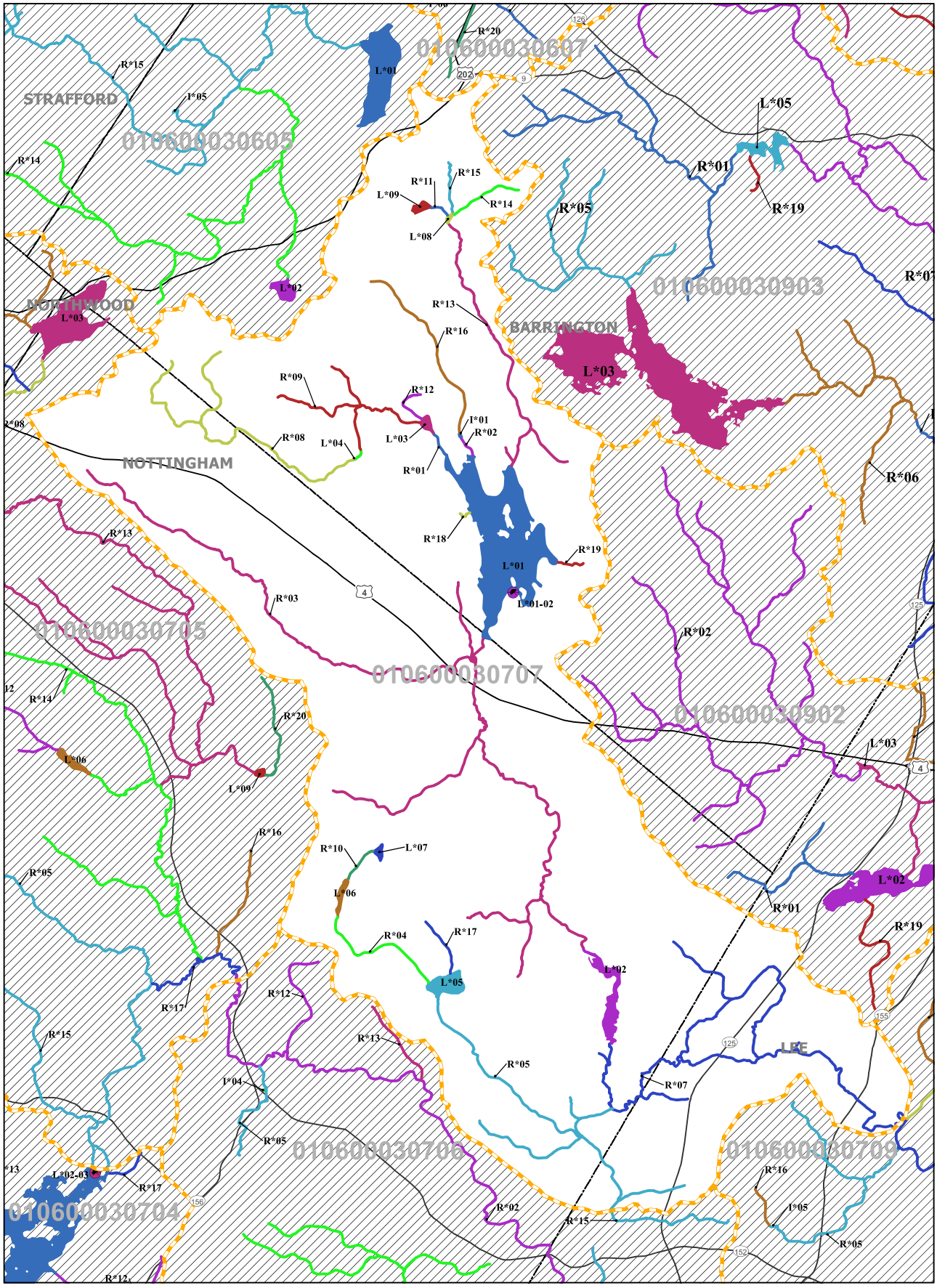
(Locator map on next page only applies to this HUC12)

Assessment Cycle 2016

Good		Full Support Good
Marginal		Full Support Marginal
Likely Good		Insufficient Information – Potentially Full Support
No Data		No Data
Likely Bad		Insufficient Information – Potentially Not Support
Poor		Not Support Marginal
Severe		Not Support Severe

ASSESSMENT UNIT ID	MAP LABEL	ASSESSMENT UNIT NAME	AQUATIC LIFE	SWIMMING	BOATING	FISH CONSUMP.
NHRIV600030707-19		POWERLINE BROOK	3-ND	3-ND	3-ND	4A-M

AUIDs For HUC12: 010600030707 - Little River



HUC12 Boundaries
Town Boundaries
Major Roads
Interstate Highway
US Highway
State Highway

Assessment Unit Coloring
AUs Ending with:
0 = 1 = 2 = 3 = 4 = 5 = 6 = 7 = 8 = 9 =

N W E S

Abbrv. Label	HUC 12
L* 03	010 700060201

AUID = NH LAK700060201-03

Assessment Unit IDs are derived from the HUC12 they reside within. The labels have been shortened on this map for presentation purposes.
Example: the Label "L*03" in HUC12 = 010700060201 represents AUID = "NHLAK700060201-03"
In rare cases where an AUID extends beyond the boundary of a single HUC12, additional portions of the end of the HUC 12 number have also been replaced.

0 0.4 0.8 1.2 1.6 Miles

Scale:1:42,900

S:\WD-Watershed\WQ_Planning\305b_303d\2016\AUIDs\HUC12Maps

Assessment Unit ID NHRIV600030707-03 Size 10.3150 MILES

Assessment Unit Name LITTLE RIVER Beach N

Primary Town NOTTINGHAM Assessment Unit Category*~ 5-P

2016, 305(b)/303(d) - All Reviewed Parameters by Assessment Unit

Designated Use Description	*Desig. Use Category	Desig. Use Threat	Parameter Name	Parameter Threatened (Y/N)	Last Sample	Last Exceed	Parameter Category*	TMDL Priority	Source Name (Impairments only)
Aquatic Life	5-P		Benthic-Macroinvertebrate Bioassessments (Streams)	N			3-ND		
			CHLORIDE	N	2016	N/A	3-PAS		
			DISSOLVED OXYGEN SATURATION	N	2016	N/A	2-G		
			Fishes Bioassessments (Streams)	N			3-ND		
			OXYGEN, DISSOLVED	N	2016	2016	3-PNS		
			PHOSPHORUS (TOTAL)		2007	NLV	3-ND		
			TURBIDITY	N	2016	N/A	3-PAS		
			pH	N	2016	2016	5-P	TOW	Source Unknown
Drinking Water After Adequate Treatment	2-G								
Fish Consumption	4A-M		Mercury	N			4A-M		Atmospheric Deposition - Toxics
Primary Contact Recreation	3-ND		Escherichia coli	N			3-ND		
Secondary Contact Recreation	3-ND		Escherichia coli	N			3-ND		
Wildlife	3-ND								

Severe	Poor	Likely Bad	No Data	Likely Good	Marginal	Good
Not Supporting, Severe	Not Supporting, Marginal	Insufficient Information – Potentially Full Supporting	No Data	Insufficient Information – Potentially Full Supporting	Full Support, Marginal	Full Support, Good

*DES Categories; 2-G = Supports Parameter well above criteria, 2-M = Supports Parameter marginally above criteria, 2-OBS = Exceeds WQ criteria but natural therefore not a WQ exceedence, 3-ND = Insufficient Information/No data, 3-PAS= Insufficient Information/Potentially Attaining Standard, 3-PNS= Insufficient Information/Potentially Not Attaining Standard, (4A=Impaired/TMDL Completed, 4B=Impaired/Other Measure will rectify Impairment, 4C=Impaired/Non-Pollutant, 5=Impaired/TMDL needed) M=Marginal Impairment, P=Severe Impairment, T=Threatened (http://des.nh.gov/organization/divisions/water/wmb/swqa/index.htm)

List of ORW and Impaired (4A and 5) Waters for CGP NOIs 5/10/12							
(Outstanding Resource Waters and Impairments on the 2010 305(b)/303(d) that need, or have a completed, TMDL. File last update May 10, 2012.)							
Assessment Unit ID	**Assessment Unit Name**	**Impairment Name**	**Pollutant allocated in TMDL (if different than "Impairment Name")**	**CGP eNOI Equivalent (to Impairment Name)**	**TMDl Approval Date**	**TMDL Name**	**Outstanding Resource Water (ORW) (AUIDs not shown are non ORWs) {See http://www2.des.state.nh.us/gis/onestop/ if your AUID says "Review OneStop GIS ORW Layer"}**
NHRIV600030704-07	MOUNTAIN BROOK - UNNAMED BROOKS	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030704-10	MOUNTAIN BROOK - BETWEEN MOUNTAIN POND AND PAWTACKAWAY LAKE	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030704-12	UNNAMED BROOK - TO PAWTUCKAWAY POND EAST SIDE	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030704-14	WHITE GROVE BROOK - TO PAWTUCKAWAY POND	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030705-13	NORTH RIVER	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030706-02	NORTH RIVER	Escherichia coli		PATHOGENS	21-Sep-10	NEW HAMPSHIRE STATEWIDE BACTERIA	Non-ORW
NHRIV600030706-02	NORTH RIVER	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030707-01	PERKINS BROOK - THRU ROUND POND TO MENDUMS POND	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030707-02	HOWE BROOK	Dissolved oxygen saturation		ORGANIC ENRICHMENT/OXYGEN DEPLETION			Non-ORW
NHRIV600030707-02	HOWE BROOK	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030707-03	LITTLE RIVER	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030707-07	LITTLE RIVER	Aluminum		METALS (OTHER THAN MERCURY)			Non-ORW
NHRIV600030707-07	LITTLE RIVER	Escherichia coli		PATHOGENS	21-Sep-10	NEW HAMPSHIRE STATEWIDE BACTERIA	Non-ORW
NHRIV600030707-07	LITTLE RIVER	Lead		METALS (OTHER THAN MERCURY)			Non-ORW
NHRIV600030707-07	LITTLE RIVER	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW
NHRIV600030707-13	MCDANIAL BROOK - TO MENDUMS POND	pH		PH/ACIDITY/CAUSTIC CONDITIONS			Non-ORW

DRAFT 2016 LIST OF THREATENED OR IMPAIRED WATERS THAT REQUIRE A TMDL

(i.e., Category 5 Impairments - this represents the Section 303(d) List)

(Excluding Fish/Shellfish Consumption Advisories due to Mercury - see Note 3)

Notes:
1. See the Consolidated Assessment and Listing Methodology (CALM) for definitions and details regarding how this list was developed.
2. This list is sorted by Waterbody Type and then Assessment Unit ID.
3. By this note, all marine surface waters in New Hampshire are also included on this list due to statewide fish/shellfish consumption advisories issued because of mercury levels in fish/shellfish tissue. To keep the size of this list manageable, mercury impairment for fish/shellfish consumption are not shown below.
4. TMDL stands for Total Maximum Daily Load study. TMDL schedules are subject to change as funding and resources become available.
5. Waters presented on this list may also be threatened or impaired by other pollutants or nonpollutants that do not require a TMDL.

Assessment Unit ID	Water Name	Primary Town	Water Size	Size Unit	Use Desc	Impairment Name	DES Category	Threatened	TMDL Priority	Source Name
NHRIV600030704-10	Mountain Brook -Between Mountain Pond And Pawtackaway Lake	Nottingham	0.179	Miles	Aquatic Life	pH	5-M	N	Low	Source Unknown
NHRIV600030704-12	Unnamed Brook - To Pawtuckaway Pond	Nottingham	1.227	Miles	Aquatic Life	pH	5-M	N	Low	Source Unknown
NHRIV600030704-13	Unnamed Brook	Nottingham	0.422	Miles	Aquatic Life	pH	5-P		Low	Source Unknown
NHRIV600030704-14	Unnamed Brook	Nottingham	0.179	Miles	Aquatic Life	pH	5-M	N	Low	Source Unknown
NHRIV600030705-13	North River	Nottingham	8.109	Miles	Aquatic Life	pH	5-M	N	Low	Source Unknown
NHRIV600030706-02	North River	Nottingham	8.000	Miles	Aquatic Life	pH	5-P	N	Low	Source Unknown
NHRIV600030707-01	Unnamed Brooks - Thru Round Pond To Mendums Pond	Barrington	0.158	Miles	Aquatic Life	pH	5-P	N	Low	Source Unknown
NHRIV600030707-02	Howe Brook	Barrington	0.153	Miles	Aquatic Life	Dissolved oxygen saturation	5-M	N	Low	Source Unknown
						Oxygen, Dissolved	5-M	N	Low	Source Unknown
						pH	5-P	N	Low	Source Unknown
NHRIV600030707-03	Little River	Nottingham	10.315	Miles	Aquatic Life	pH	5-P	N	Low	Source Unknown
NHRIV600030707-07	Little River	Lee	7.225	Miles	Aquatic Life	Aluminum	5-M	N	Low	Source Unknown
						Lead	5-M	N	Low	Source Unknown
						pH	5-M	N	Low	Source Unknown
NHRIV600030707-13	Unnamed Brook	Barrington	2.606	Miles	Aquatic Life	pH	5-P	N	Low	Source Unknown
NHRIV600030708-02	Fresh River, Pws, Cls-A	Epping	10.024	Miles	Aquatic Life	Dissolved oxygen saturation	5-P	N	Low	Source Unknown
						Oxygen, Dissolved	5-P	N	Low	Source Unknown
						pH	5-M	N	Low	Source Unknown
NHRIV600030708-07	Piscassic River, Pws, Cls-A	Newmarket	7.385	Miles	Aquatic Life	Dissolved oxygen saturation	5-M	N	Low	Source Unknown
						Oxygen, Dissolved	5-P	N	Low	Source Unknown
						pH	5-P	N	Low	Source Unknown
NHRIV600030708-14	Unnamed Brook	Fremont	9.088	Miles	Aquatic Life	DISSOLVED OXYGEN SATURATION	5-P	N	Low	Source Unknown
						OXYGEN, DISSOLVED	5-P	N	Low	Source Unknown
						pH	5-M	N	Low	Source Unknown
NHRIV600030709-07	Lamprey River	Lee	6.354	Miles	Aquatic Life	pH	5-P	N	Low	Source Unknown
NHRIV600030709-08	Lamprey River	Lee	1.674	Miles	Aquatic Life	pH	5-M	N	Low	Source Unknown
NHRIV600030709-09	Lamprey River	Durham	1.164	Miles	Aquatic Life	pH	5-P	N	Low	Source Unknown
NHRIV600030709-13	Moonlight Brook, Newmarket	Newmarket	0.778	Miles	Aquatic Life	pH	5-M	N	Low	Source Unknown
NHRIV600030801-01	Fordway Brook	Raymond	3.401	Miles	Aquatic Life	PH	5-P	N	Low	Source Unknown
NHRIV600030801-05	Fordway Brook	Raymond	14.294	Miles	Aquatic Life	Benthic-Macroinvertebrate Bioassessments (Streams)	5-P		Low	Source Unknown