



ADDITIONAL CHANGES

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We trust this addresses your concerns. Should you require additional information, please call me at 860-760-1908.

Sincerely,

A handwritten signature in black ink, appearing to read 'Timothy A. Houle'.

Timothy A. Houle, P.E.
Senior Engineer

RECEIVED

SEP 07 2022

LAND USE DEPARTMENT

August 19, 2022

Ms. Juliet Hodge, Planning Director
Planning & Development Department
Town of Ledyard
741 Colonel Ledyard Highway
Ledyard, CT 06339-1511

Re: PZC #22-12SITE and #22-14CAM
Garrett Homes, LLC Site Plan Application
1682 & 1686 CT Route 12, Ledyard, CT

Dear Ms. Hodge:

We are in receipt of staff comments via an email dated 8/11/2022, and Town Engineer's comments dated 8/8/2022, regarding the project noted above. Our responses are shown in ***bold italic*** text. One copy of the following items have been included for your review in conjunction with this letter:

- Full-size copy of the revised Land Development Plan Set
- Revised stormwater hydraulic profiles and table
- Revised Proposed Conditions Hydrologic calculations including a tabular view of the stormwater pond hydrograph
- FEMA Flood Insurance Rate Map

1. Per 6.6B(1)(l): Please provide CAM Demarcation line on the Site Plan (boundary Survey or SP1)

Response: The CAM Demarcation line has been added to plan sheets OP-1 and SP-1.

2. Per 6.6B(1)(m) Please provide a signature block on all sheets (or at least those to be filed with the Clerk (Boundary Survey, GN1, SP1, OP1, GD1, SU1))

Response: A signature block has been added to plan sheets GN-1, SP-1, OP-1, GD-1, and SU-1 as well as the boundary survey.

3. Per 6.6B(8)(i): Please provide a signature block for the SE&SC Plan sheet and provide the name of the individual responsible for installing and maintaining the E&SC Measures (6.6B(8)(h)).

Response: A signature block has been added to plan sheet EC-1, Sediment and Erosion Control Plan.

Sediment and Erosion Control note #2 on plan sheet EC-2 states that the Contractor is responsible for installation and maintenance of all erosion and sedimentation control measures. At this time, a contractor has not been selected. When a contractor is chosen, their project supervisor name and contact information will be provided to Town staff.

4. Per 6.7A(1)(c): Please provide information regarding expected traffic generation.

Response: Accounting for the 20% pass-by trips allowed by CT DOT, it is projected that the proposed development will generate approximately 25 net new trips in the AM peak hour (14 enter, 11 exit), 57 net new trips in the PM peak hour (30 enter, 27 exit), and 88 net new trips (46 enter, 42 exit) in the Saturday mid-day peak hour.

5. Please provide a Lighting Plan and identify location and type of all proposed lighting for building and parking areas.

Response: A Site Lighting Plan has been added to the plan set included with this letter.

6. The plans were also reviewed by Steve Masalin, Town Engineer. Comments were provided and all issues identified must be addressed prior to approval.

Response: Acknowledged. Steve Masalin's comments have been added to this letter for convenience.

FURTHER PERMITS/APPROVALS REQUIRED

1. LLHD Approval is required

Response: An application with LLHD for review and approval of the septic system is being submitted concurrently with this response to comments.

2. Please provide application for encroachment permit

Response: Plans were submitted to CTDOT for the proposed development on July 27, 2022 and are currently under review.

3. Applicant must submit an application to merge 1682 & 1686 Rte. 12 prior to filing the mylars.

Response: Acknowledged.

4. Demolition permit required prior to issuance of a Building Permit for construction.

Response: Acknowledged.

STEVE MASALIN, TOWN ENGINEER, AUGUST 8, 2022

1. The Town's Drainage Ordinance (#300-017) is not included as a governing regulation in the application. The requirements of this ordinance must be met. More specific direction to this end follows:

- a. Part 3, Section 1, Standards for Hydrologic Models. The drainage area covered by this development is identified as 6.65 acres. The ordinance stipulates use of the rational/modified rational method as a general rule for activity of this size. The rational method has been used the drainage system hydraulics (Appendix D), but for overall site hydrology, the applicant cites the SCS method (TR-55 in the narrative, though TR-20 is identified in the individual calculation runs in Appendix B).

The Drainage Ordinance is flexible and allows departure from the general rules. Either the rules should be followed (i.e., use of the rational method) or the applicant should provide rational for departure from the rules and clear up any disparities that exist in the documentation, which may simply be editorial.

Response: For analysis of the site stormwater runoff, two different review methods were used. The Rational Method was utilized to analyze flow rate to the DOT drainage system for sizing the proposed culvert under the access drive. The SCS Method (TR-20) was utilized to compare pre- versus post-development runoff peak rates as well as design the proposed infiltration basin. We recognize the preference of utilizing the Rational Method for a project of this scale; however, we feel the SCS Method (TR-20) is more appropriate in this case. Since a hydrograph produced by the Rational Method does not reflect the total runoff or the intensity variations of a real storm, it is not recommended for the design and analysis of detention ponds.

- b. Part 3, Section 2, Para B, Detention Basin Structural Design. Subparagraph specifies preference for complete evacuation of a detention basin within 12 hours of the end of the rainfall event. The broader spirit of timely elimination of standing water is expressed. Though the hydrographs show a cessation of discharge flows just beyond 24 hours. This appears to coincide with a water elevation at the top of the weir in OCS-1 (i.e., 52.5 feet). Based on a basin floor elevation of no higher than 48-ft gradeline depicted, this appears to leave a considerable volume of standing water to infiltrate for some unspecified time after this. It is therefore unclear when complete evacuation is estimated to occur, but certainly it would be considerably beyond 24 hours, much less 12 hours.

By of associated concern, based on stormwater drainage system elevations, it appears that during and after larger storm events, water will back up and remain in the site

discharge/basin inlet piping all the way back to CB-1. Depending on the infiltration rate in the basin, this would seem to promote potential for progressive pipe siltation through inadequate self-flushing.

Response: We recognize the preference for drawdown of a detention basin within 12 hours after completion of a storm event; however, this is not a standard engineering design requirement. The 2004 Connecticut Stormwater Quality Manual recommends infiltration basins completely drain within 72 hours after the completion of a storm event. Additionally, it is recommended that a minimum draining time of 12 hours be provided to ensure adequate pollutant removal is achieved. Revised proposed conditions hydrologic calculations and a tabular report of the stormwater pond hydrograph are included with this letter which have an expanded time span for calculations to demonstrate when the stormwater basin is completely drained. This occurs 68 hours after the end of the storm event, which is compliant with the Stormwater Quality Manual.

During larger storm events, stormwater does back up into drainage piping and CB-1. This does not present a significant concern for siltation due to several factors. First, stormwater will not be backed up in the drainage system during the first flush, which is when most of the sediment will enter the drainage system. Second, pretreatment of stormwater runoff in the form of deep sump catch basins and a sweeping program will help capture sediment. Third, the anticipated flow velocity within all drainage piping exceeds the self-cleansing velocity of 2 feet per second.

- c. Note: We grant that the Town's drainage ordinance is outdated in certain ways, and thus we are open to design features that reflect newer and prevailing guidelines. One example is baseline rainfall intensity data. The applicant has used the up-to-date information, which overrides the ordinance guidelines.

Also, though the Town requires us of stormwater piping no smaller in diameter than 15", minimum full-flowing velocity of 2.5 fps, and minimum pipe slope of 0.5%, these does not apply to infrastructure that will remain under private ownership.

Response: Acknowledged.

This development will remain under private ownership; therefore, the Town's drainage ordinance does not apply. Most stormwater piping is 15" diameter or larger. The only pipe that is smaller is the roof leader pipe, which is 12" diameter. All stormwater piping exceeds the Town ordinance minimum full-flowing velocity of 2.5 fps as shown in the Hydraulic Grade Line Computations included in Appendix D of the Stormwater Management Report. Although several stormwater pipes do have slopes lower than 0.5%, minimum pipe slope values from TR-16 were followed.

2. Plans and Stormwater Management Report.
a. Appendix A: Figure 3 (FEMA Flood Insurance Rate Map) is illegible.

Response: *A new FEMA Flood Insurance Rate Map is attached to this letter for reference.*

- b. Appendix D: The calculated storm flows exceed the 10-year storm full flow capacities cited for Pipes 1 and 2.

Response: *The hydraulic grade line for Pipes 1 and 2 are below the elevations of either CB-1 or CB-2; therefore, stormwater up to the 10-year storm will be completely contained within the underground pipes and structures.*

- c. Disparities Between Drainage Plans and Stormwater Management Report Appendix D. There are a number of miscellaneous minor editorial inconsistencies in values (particularly pipe length) that are relatively insignificant, but the following are notable and should be reconciled.

	Plans	Report Profiles/Table
12" Downspout Collection Pipe (10)	155 feet	130.3 feet
CO-1 Invert	52.57	52.44
CO-1 TF Elevation	55.97	53.19
CO-3 TF Elevation	55.63	53.08

Response: *The report profiles and table have been revised to match the elevations and pipe lengths on plan sheet GD-1. Revised table and profiles are attached for review.*

- d. According to internal records, a separate water service lateral was installed for 1686 Route 12. The applicant may want to investigate further to confirm this, as it may offer a better alternative to water supply service than reuse/extension of the existing service at 1682.

Response: *The applicant will take this under advisement. The proposed plans show reuse of the existing service line to 1682 in order to avoid work within the roadway. If a service lateral for 1686 has been extended out of the roadway, the applicant may elect to utilize that lateral.*

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Sincerely,

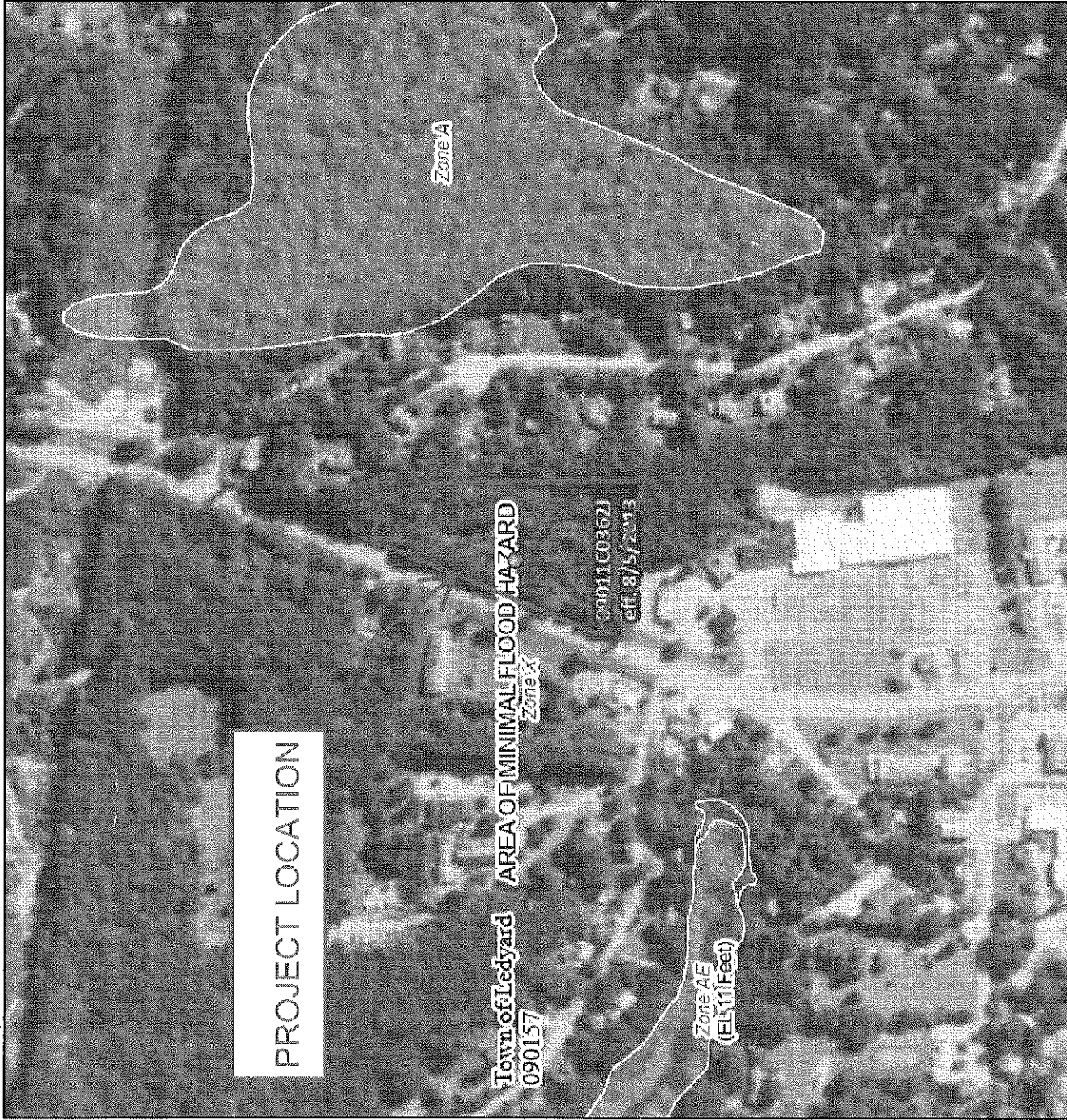


Timothy A. Houle, P.E.
Senior Engineer

National Flood Hazard Layer FIRMette



72°51'0"W 41°26'6"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AP Regulatory Floodway

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X

Future Conditions 1% Annual Chance Flood Hazard Zone X

Area with Reduced Flood Risk due to Levee. See Notes. Zone X

Area with Flood Risk due to Levee Zone D

NO SCREEN

Area of Minimal Flood Hazard Zone X

Effective LOMRs

Area of Undetermined Flood Hazard Zone D

Channel, Culvert, or Storm Sewer

Levee, Dike, or Floodwall

Cross Sections with 1% Annual Chance Water Surface Elevation

Coastal Transect

Base Flood Elevation Line (BFE)

Limit of Study

Jurisdiction Boundary

Coastal Transect Baseline

Profile Baseline

Hydrographic Feature

Digital Data Available

No Digital Data Available

Unmapped

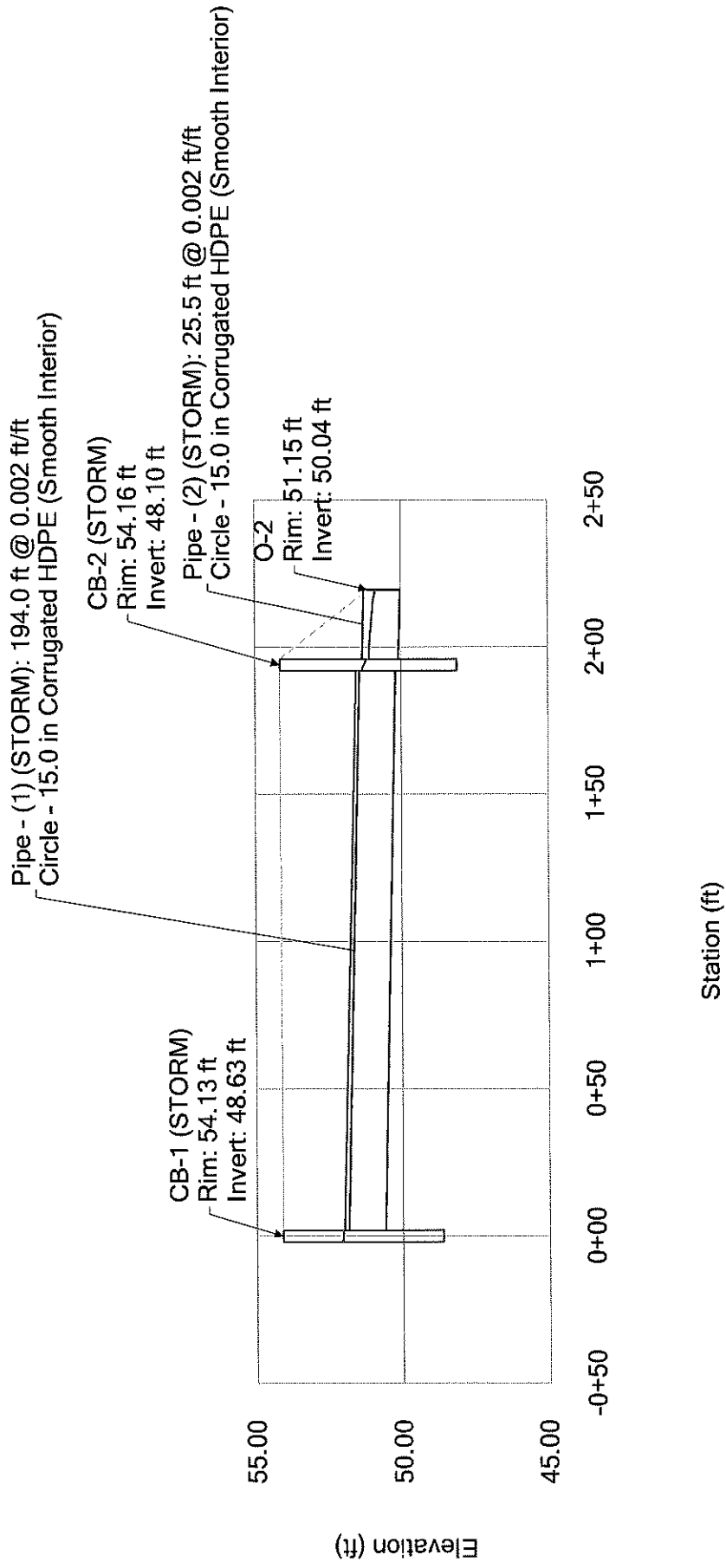
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

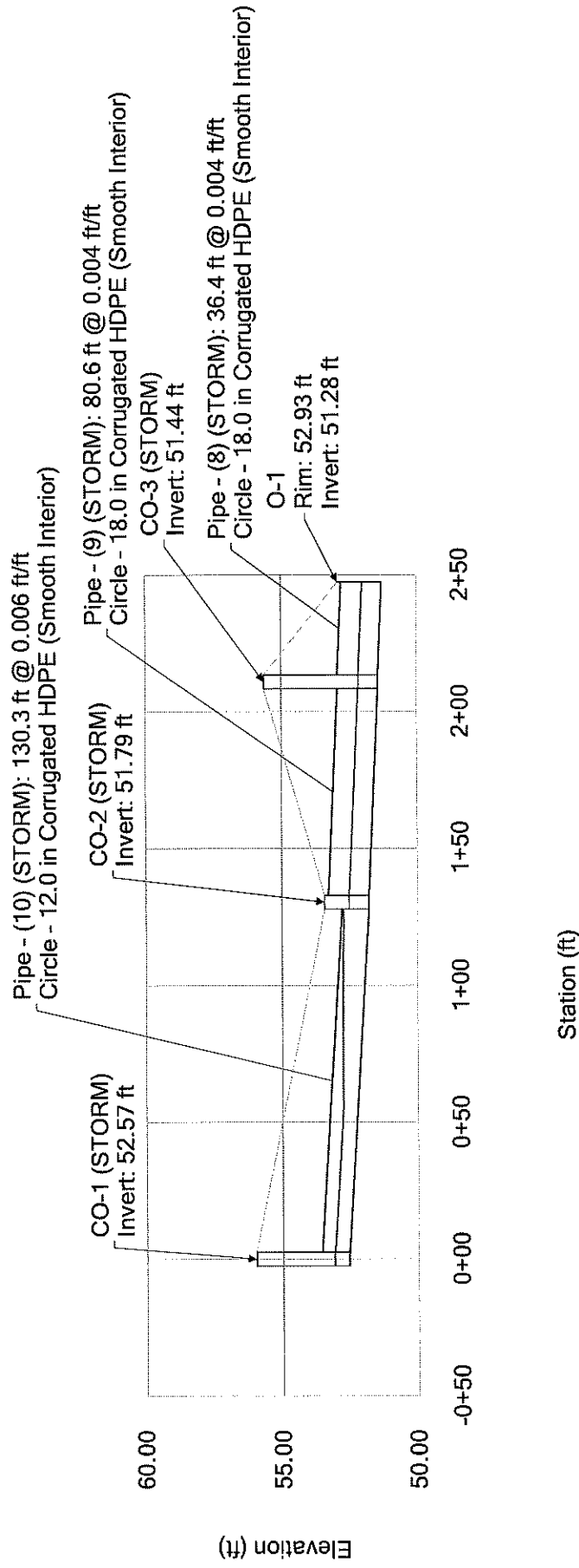
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/20/2022 at 12:32 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

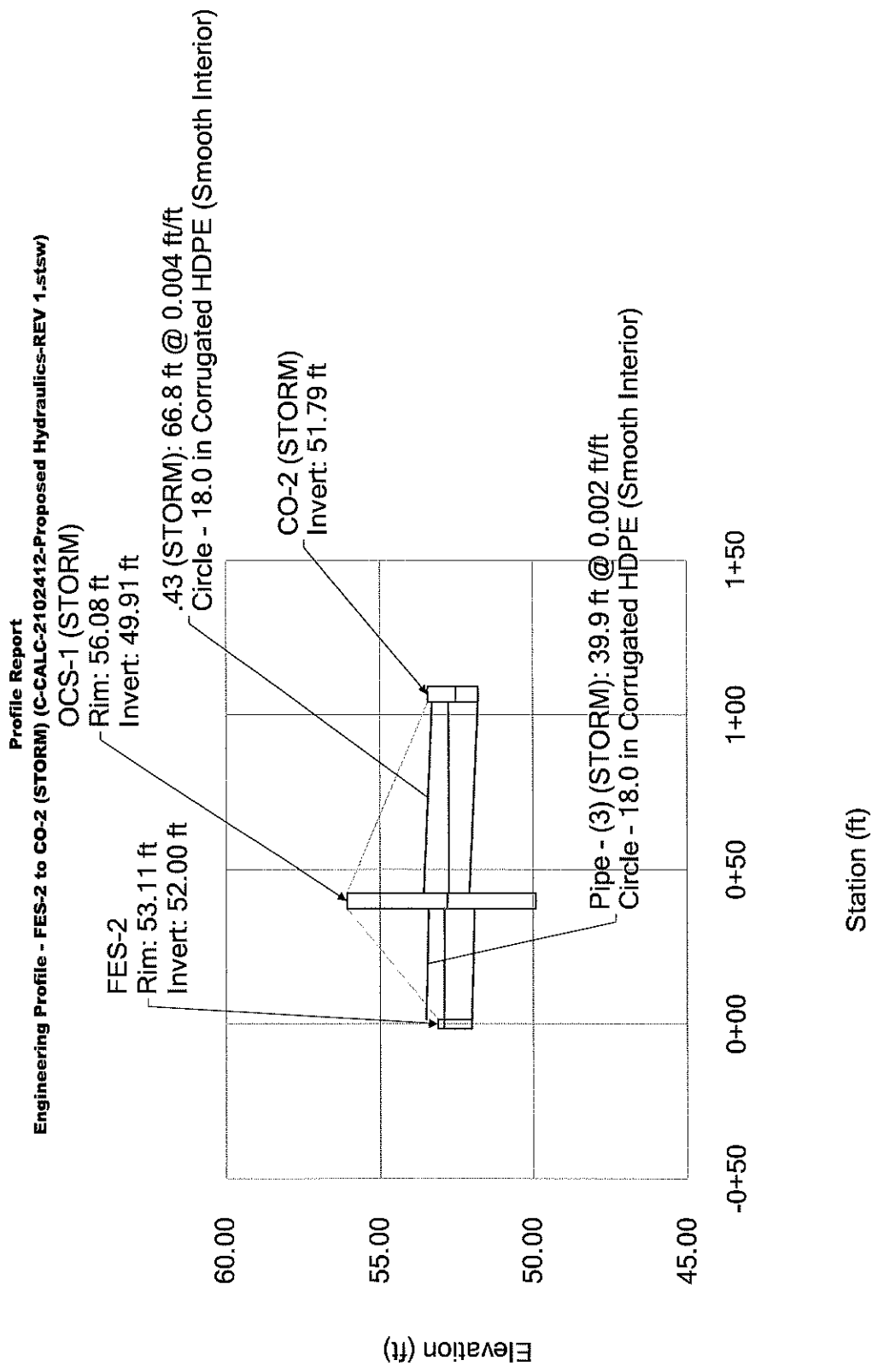
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Profile Report
Engineering Profile - CB-1 (STORM) to O-2 (C-CALC-2102412-Proposed Hydraulics-REV 1.stsw)



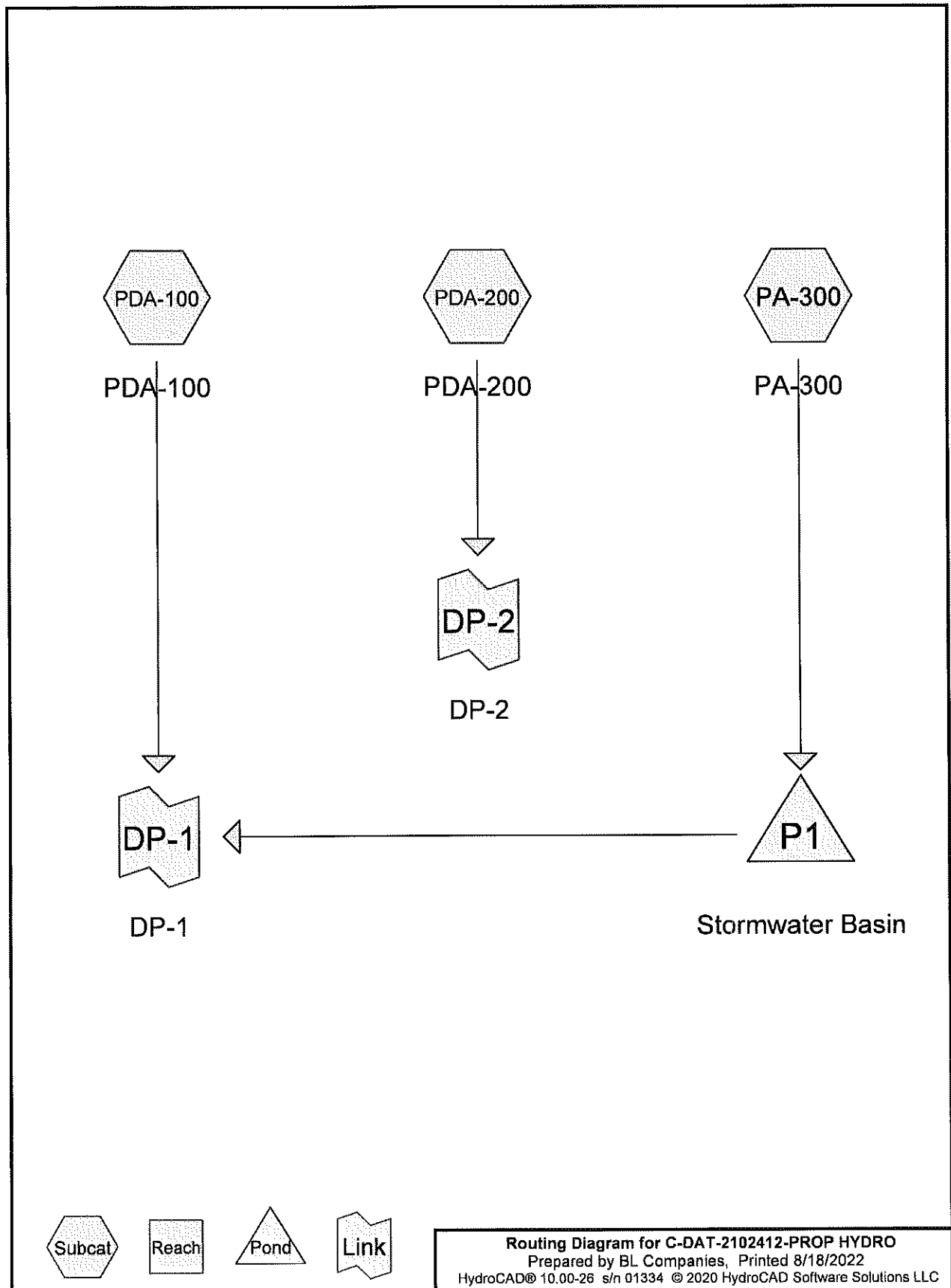
Profile Report
Engineering Profile - CO-1 (STORM) to O-1 (C-CALC-2102412-Proposed Hydraulics-REV 1.stsw)





Conduit FlexTable: Hydraulic Grade Line Computations

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	System Rational Flow (cfs)	Total System Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Slope (Calculated) (ft/ft)	Invert (Start) (ft)	Invert (Stop) (ft)	EGL (In) (ft)	EGL (Out) (ft)	HGL (In) (ft)	HGL (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
.43 (STORM)	OCS-1 (STORM)	CO-2 (STORM)	18.0	66.8	0.00	2.06	7.46	3.61	0.004	52.08	51.79	52.87	52.80	52.76	52.75	56.08	53.44
Pipe - (1) (STORM)	CS-1 (STORM)	CS-2 (STORM)	15.0	194.0	3.48	3.48	3.28	2.84	0.002	50.63	50.20	52.16	51.68	52.04	51.56	54.13	54.16
Pipe - (2) (STORM)	CS-2 (STORM)	O-2 (STORM)	15.0	25.6	4.39	4.39	3.38	3.58	0.002	50.10	50.04	51.38	51.27	51.13	50.89	54.16	51.15
Pipe - (3) (STORM)	FES-2 (STORM)	OCS-1 (STORM)	18.0	39.9	0.00	2.06	5.41	2.85	0.002	52.00	51.91	52.96	52.94	52.91	52.90	53.11	56.08
Pipe - (6) (STORM)	CO-3 (STORM)	O-1 (STORM)	18.0	36.4	1.53	3.59	7.46	4.18	0.004	51.44	51.28	52.45	52.29	52.17	52.01	55.63	52.93
Pipe - (9) (STORM)	CO-2 (STORM)	CO-3 (STORM)	18.0	80.6	1.56	3.62	7.46	4.19	0.004	51.79	51.44	52.80	52.45	52.53	52.17	53.44	55.63
Pipe - (10) (STORM)	CO-1 (STORM)	CO-2 (STORM)	12.0	130.3	1.61	1.61	2.99	3.88	0.006	52.57	51.79	53.33	52.80	53.11	52.73	55.97	53.44



C-DAT-2102412-PROP HYDRO*CT-GALES-FERRY_NOAA14 24-hr S1 2-yr Rainfall=3.46"*

Prepared by BL Companies

Printed 8/18/2022

HydroCAD® 10.00-26 s/n 01334 © 2020 HydroCAD Software Solutions LLC

Page 2

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

SubcatchmentPA-300: PA-300

Runoff Area=139,303 sf 24.31% Impervious Runoff Depth=1.75"
Flow Length=423' Tc=12.8 min CN=82 Runoff=5.31 cfs 20,311 cf

SubcatchmentPDA-100: PDA-100

Runoff Area=124,577 sf 21.80% Impervious Runoff Depth=1.60"
Flow Length=673' Tc=19.1 min CN=80 Runoff=3.53 cfs 16,659 cf

SubcatchmentPDA-200: PDA-200

Runoff Area=25,738 sf 25.99% Impervious Runoff Depth=1.04"
Flow Length=183' Tc=8.7 min CN=71 Runoff=0.63 cfs 2,227 cf

Pond P1: Stormwater Basin

Peak Elev=52.39' Storage=14,769 cf Inflow=5.31 cfs 20,311 cf
Discarded=0.12 cfs 20,311 cf Primary=0.00 cfs 0 cf Outflow=0.12 cfs 20,311 cf

Link DP-1: DP-1

Inflow=3.53 cfs 16,659 cf
Primary=3.53 cfs 16,659 cf

Link DP-2: DP-2

Inflow=0.63 cfs 2,227 cf
Primary=0.63 cfs 2,227 cf

Total Runoff Area = 289,618 sf Runoff Volume = 39,197 cf Average Runoff Depth = 1.62"
76.62% Pervious = 221,908 sf 23.38% Impervious = 67,710 sf

Summary for Subcatchment PA-300: PA-300

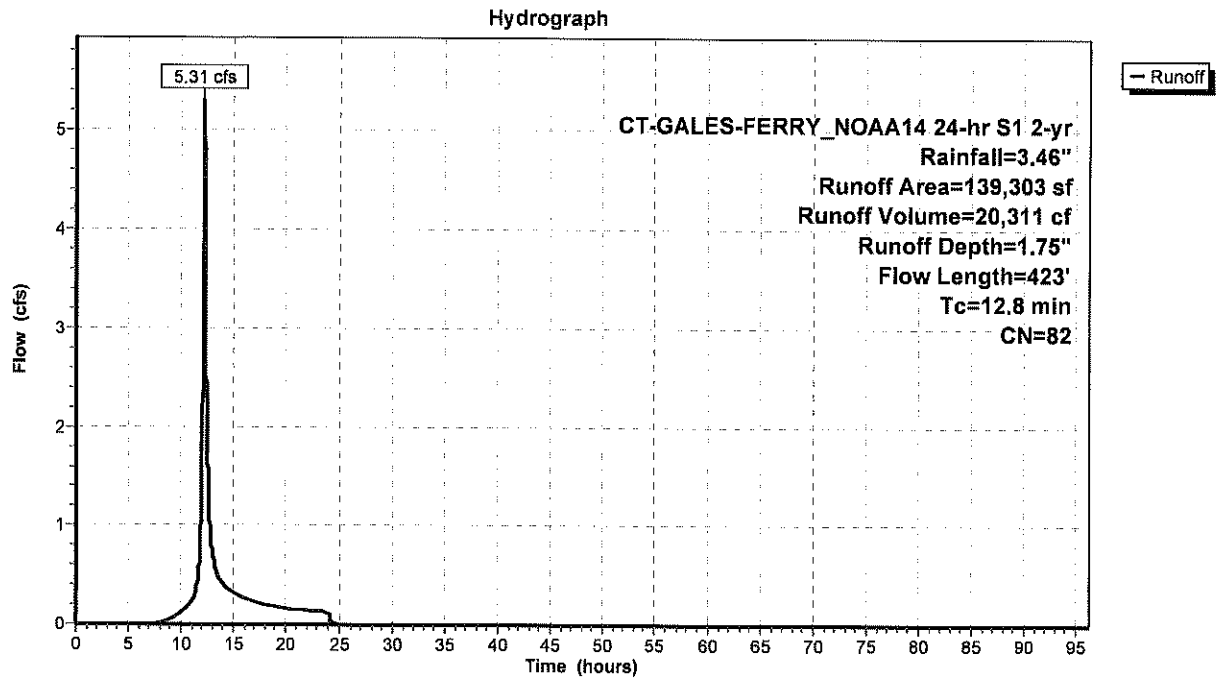
Runoff = 5.31 cfs @ 12.13 hrs, Volume= 20,311 cf, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
CT-GALES-FERRY_NOAA14 24-hr S1 2-yr Rainfall=3.46"

Area (sf)	CN	Description
627	60	Woods, Fair, HSG B
60,165	79	Woods, Fair, HSG D
15,389	61	>75% Grass cover, Good, HSG B
29,260	80	>75% Grass cover, Good, HSG D
21,042	98	Paved parking, HSG B
3,051	98	Paved parking, HSG D
2,319	98	Roofs, HSG B
7,450	98	Water Surface, HSG D
139,303	82	Weighted Average
105,441		75.69% Pervious Area
33,862		24.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	31	0.0922	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
3.6	48	0.3621	0.22		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
1.3	21	0.9076	0.27		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	24	0.4338	3.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	18	1.0000	5.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	48	0.1877	2.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.0	98	0.0131	0.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	13	0.3945	4.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	43	0.0169	2.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.6	79	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
12.8	423	Total			

Subcatchment PA-300: PA-300



Summary for Subcatchment PDA-100: PDA-100

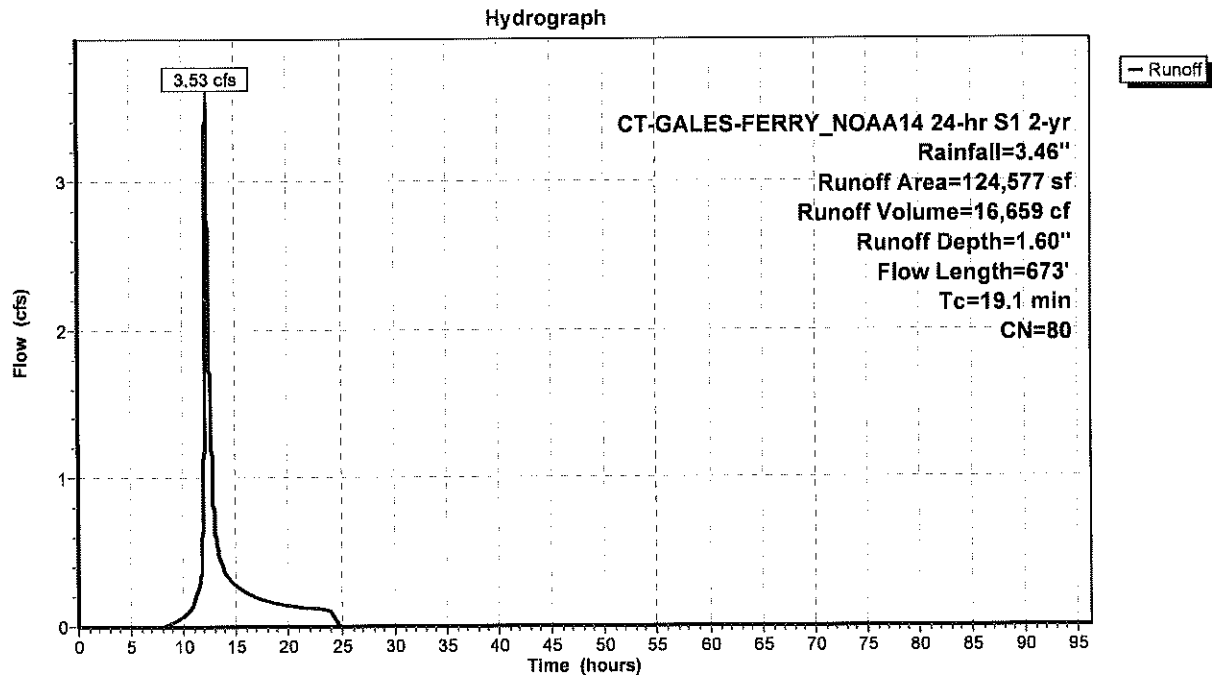
Runoff = 3.53 cfs @ 12.22 hrs, Volume= 16,659 cf, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
CT-GALES-FERRY_NOAA14 24-hr S1 2-yr Rainfall=3.46"

Area (sf)	CN	Description
5,812	60	Woods, Fair, HSG B
60,628	79	Woods, Fair, HSG D
21,174	61	>75% Grass cover, Good, HSG B
6,833	80	>75% Grass cover, Good, HSG D
9,925	98	Paved parking, HSG B
6,539	98	Paved parking, HSG D
150	96	Gravel surface, HSG B
2,821	96	Gravel surface, HSG D
10,695	98	Roofs, HSG B
124,577	80	Weighted Average
97,418		78.20% Pervious Area
27,159		21.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	70	0.0528	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
2.8	30	0.2648	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
0.4	68	0.3617	3.01		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	36	1.0000	5.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.7	331	0.0544	1.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	25	0.1400	1.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	66	0.0666	5.24		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	47	0.0426	4.19		Shallow Concentrated Flow, Paved Kv= 20.3 fps
19.1	673	Total			

Subcatchment PDA-100: PDA-100



Summary for Subcatchment PDA-200: PDA-200

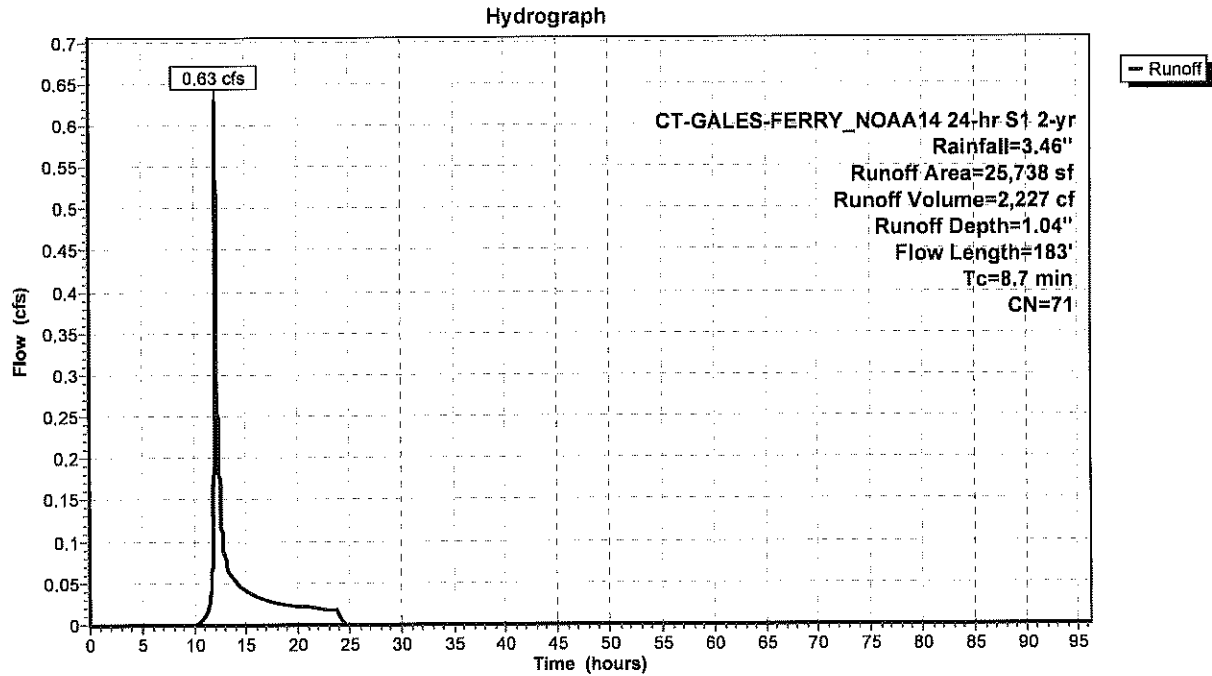
Runoff = 0.63 cfs @ 12.08 hrs, Volume= 2,227 cf, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
CT-GALES-FERRY_NOAA14 24-hr S1 2-yr Rainfall=3.46"

Area (sf)	CN	Description
2,265	60	Woods, Fair, HSG B
598	79	Woods, Fair, HSG D
16,063	61	>75% Grass cover, Good, HSG B
123	80	>75% Grass cover, Good, HSG D
6,689	98	Paved parking, HSG B
25,738	71	Weighted Average
19,049		74.01% Pervious Area
6,689		25.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	10	0.0953	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
0.8	19	0.3100	0.38		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
1.0	13	0.0821	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
4.9	58	0.0341	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
0.3	25	0.0341	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	58	0.0261	1.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.7	183	Total			

Subcatchment PDA-200: PDA-200



Summary for Pond P1: Stormwater Basin

Inflow Area = 139,303 sf, 24.31% Impervious, Inflow Depth = 1.75" for 2-yr event
 Inflow = 5.31 cfs @ 12.13 hrs, Volume= 20,311 cf
 Outflow = 0.12 cfs @ 23.95 hrs, Volume= 20,311 cf, Atten= 98%, Lag= 709.5 min
 Discarded = 0.12 cfs @ 23.95 hrs, Volume= 20,311 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 52.39' @ 23.95 hrs Surf.Area= 5,299 sf Storage= 14,769 cf

Plug-Flow detention time= 1,479.1 min calculated for 20,309 cf (100% of inflow)
 Center-of-Mass det. time= 1,479.3 min (2,338.9 - 859.6)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	32,030 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,605	0	0
49.00	2,349	1,977	1,977
50.00	3,150	2,750	4,727
51.00	4,006	3,578	8,305
52.00	4,919	4,463	12,767
53.00	5,889	5,404	18,171
54.00	6,915	6,402	24,573
55.00	7,998	7,457	32,030

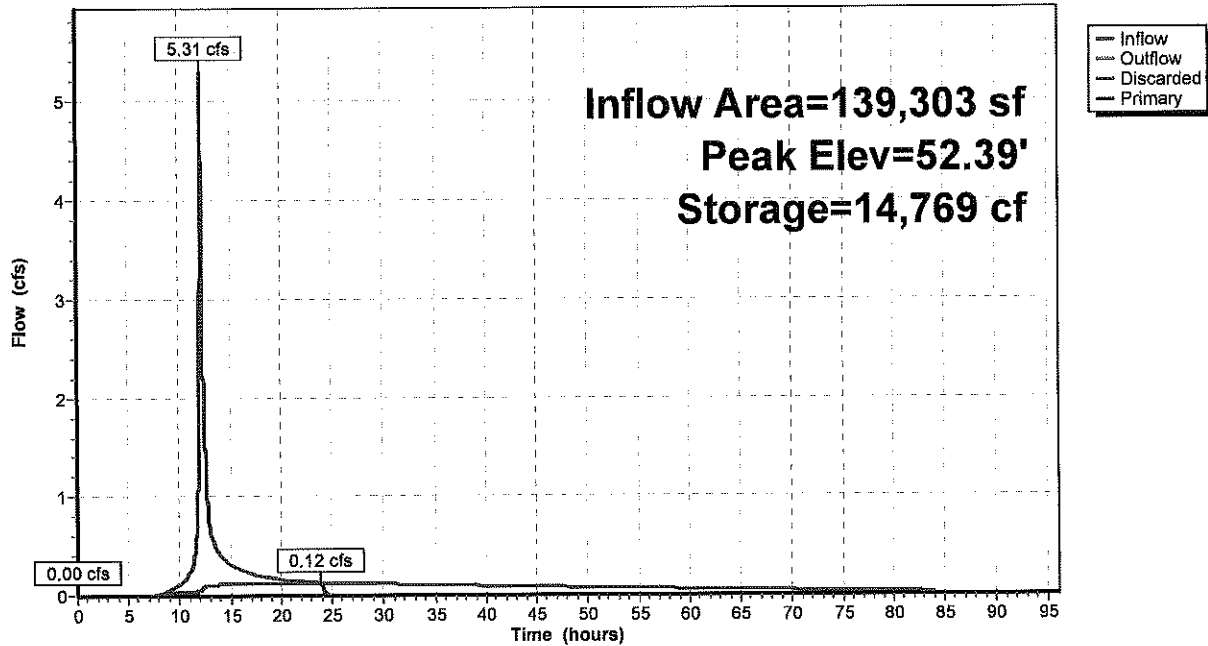
Device	Routing	Invert	Outlet Devices
#1	Discarded	48.00'	0.720 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 42.00'
#2	Primary	52.08'	18.0" Round Culvert L= 147.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 52.08' / 51.44' S= 0.0044 ' S= 0.0044 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	52.50'	4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.12 cfs @ 23.95 hrs HW=52.39' (Free Discharge)
 ↑1=Exfiltration (Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=48.00' (Free Discharge)
 ↑2=Culvert (Controls 0.00 cfs)
 ↑3=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond P1: Stormwater Basin

Hydrograph



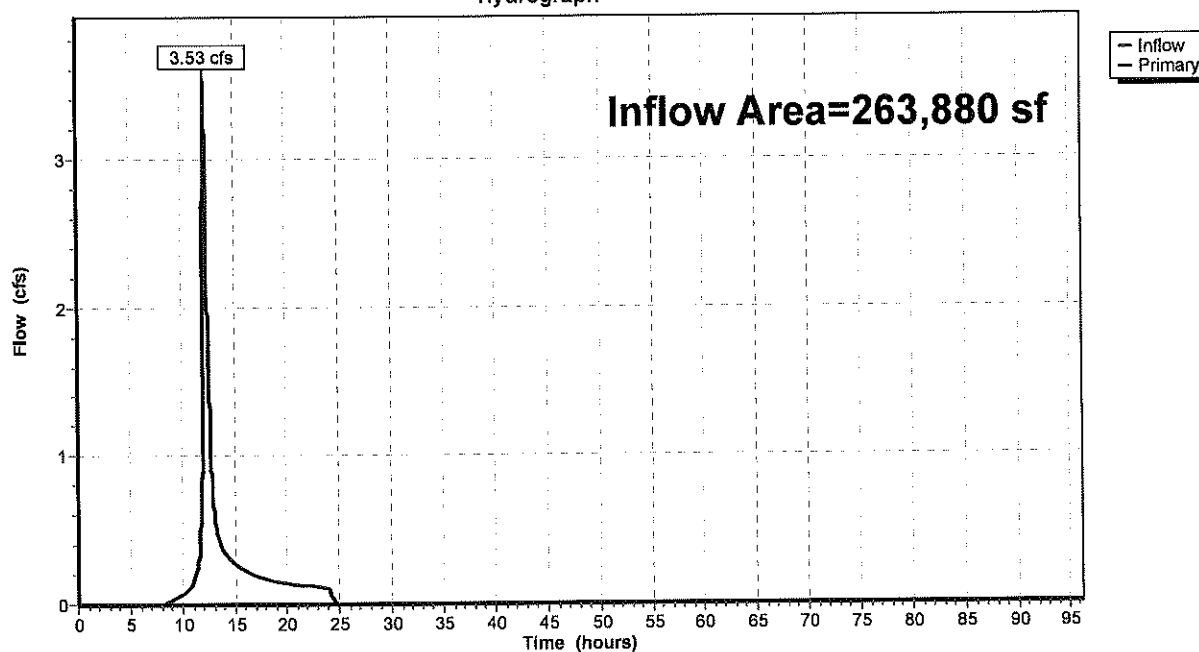
Summary for Link DP-1: DP-1

Inflow Area = 263,880 sf, 23.12% Impervious, Inflow Depth = 0.76" for 2-yr event
Inflow = 3.53 cfs @ 12.22 hrs, Volume= 16,659 cf
Primary = 3.53 cfs @ 12.22 hrs, Volume= 16,659 cf, Atten= 0%, Lag= 0.0 min

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

Link DP-1: DP-1

Hydrograph



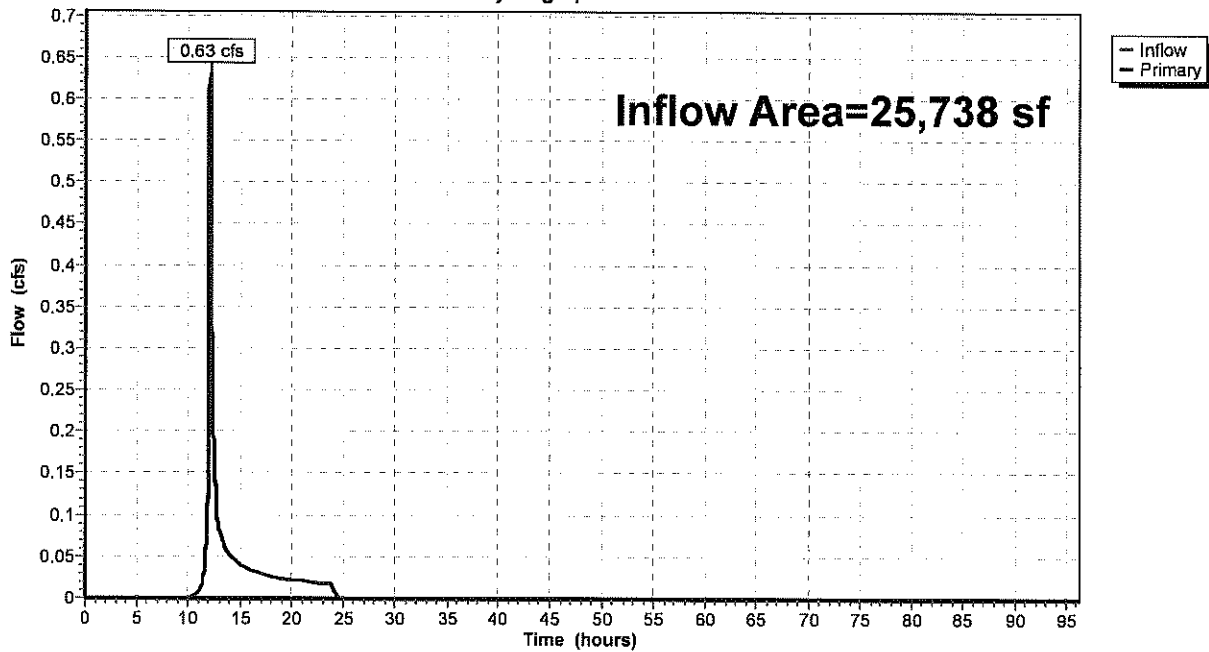
Summary for Link DP-2: DP-2

Inflow Area = 25,738 sf, 25.99% Impervious, Inflow Depth = 1.04" for 2-yr event
Inflow = 0.63 cfs @ 12.08 hrs, Volume= 2,227 cf
Primary = 0.63 cfs @ 12.08 hrs, Volume= 2,227 cf, Atten= 0%, Lag= 0.0 min

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

Link DP-2: DP-2

Hydrograph



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

SubcatchmentPA-300: PA-300 Runoff Area=139,303 sf 24.31% Impervious Runoff Depth=3.19"
Flow Length=423' Tc=12.8 min CN=82 Runoff=9.75 cfs 36,992 cf

SubcatchmentPDA-100: PDA-100 Runoff Area=124,577 sf 21.80% Impervious Runoff Depth=3.00"
Flow Length=673' Tc=19.1 min CN=80 Runoff=6.72 cfs 31,122 cf

SubcatchmentPDA-200: PDA-200 Runoff Area=25,738 sf 25.99% Impervious Runoff Depth=2.21"
Flow Length=183' Tc=8.7 min CN=71 Runoff=1.45 cfs 4,735 cf

Pond P1: Stormwater Basin Peak Elev=52.86' Storage=17,338 cf Inflow=9.75 cfs 36,992 cf
Discarded=0.14 cfs 21,950 cf Primary=2.06 cfs 15,042 cf Outflow=2.20 cfs 36,992 cf

Link DP-1: DP-1 Inflow=6.72 cfs 46,164 cf
Primary=6.72 cfs 46,164 cf

Link DP-2: DP-2 Inflow=1.45 cfs 4,735 cf
Primary=1.45 cfs 4,735 cf

Total Runoff Area = 289,618 sf Runoff Volume = 72,849 cf Average Runoff Depth = 3.02"
76.62% Pervious = 221,908 sf 23.38% Impervious = 67,710 sf

Summary for Subcatchment PA-300: PA-300

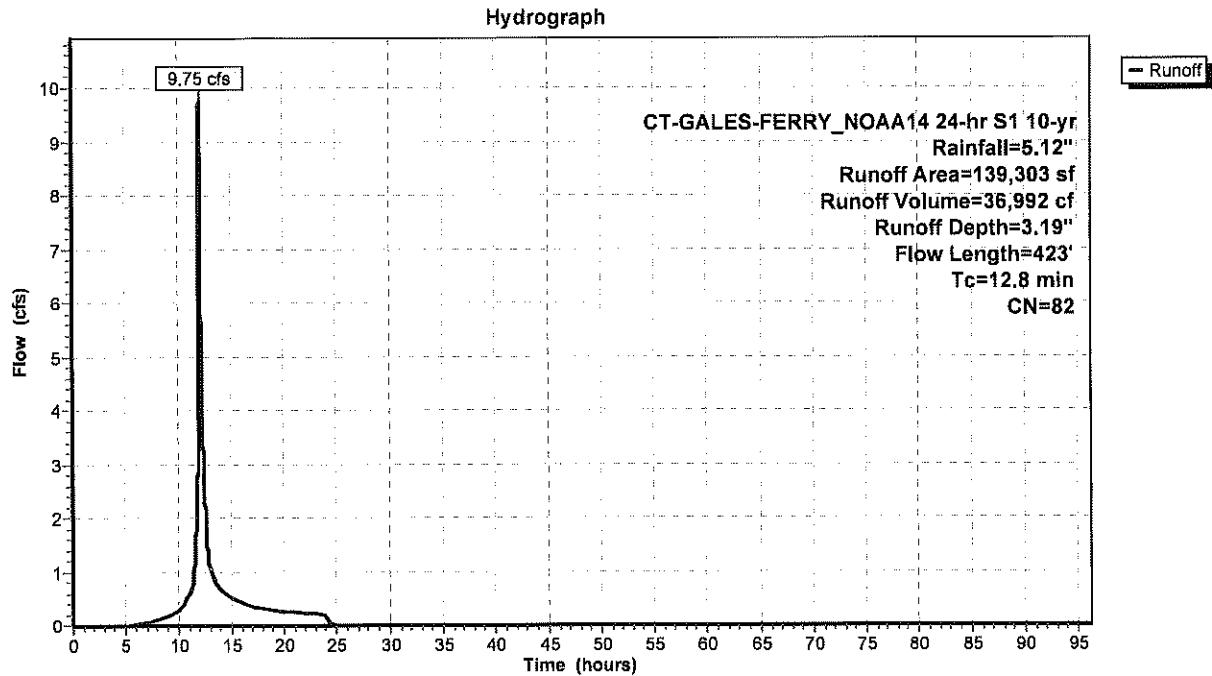
Runoff = 9.75 cfs @ 12.13 hrs, Volume= 36,992 cf, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 CT-GALES-FERRY_NOAA14 24-hr S1 10-yr Rainfall=5.12"

Area (sf)	CN	Description
627	60	Woods, Fair, HSG B
60,165	79	Woods, Fair, HSG D
15,389	61	>75% Grass cover, Good, HSG B
29,260	80	>75% Grass cover, Good, HSG D
21,042	98	Paved parking, HSG B
3,051	98	Paved parking, HSG D
2,319	98	Roofs, HSG B
7,450	98	Water Surface, HSG D
139,303	82	Weighted Average
105,441		75.69% Pervious Area
33,862		24.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	31	0.0922	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
3.6	48	0.3621	0.22		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
1.3	21	0.9076	0.27		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	24	0.4338	3.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	18	1.0000	5.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	48	0.1877	2.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.0	98	0.0131	0.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	13	0.3945	4.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	43	0.0169	2.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.6	79	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
12.8	423	Total			

Subcatchment PA-300: PA-300



Summary for Subcatchment PDA-100: PDA-100

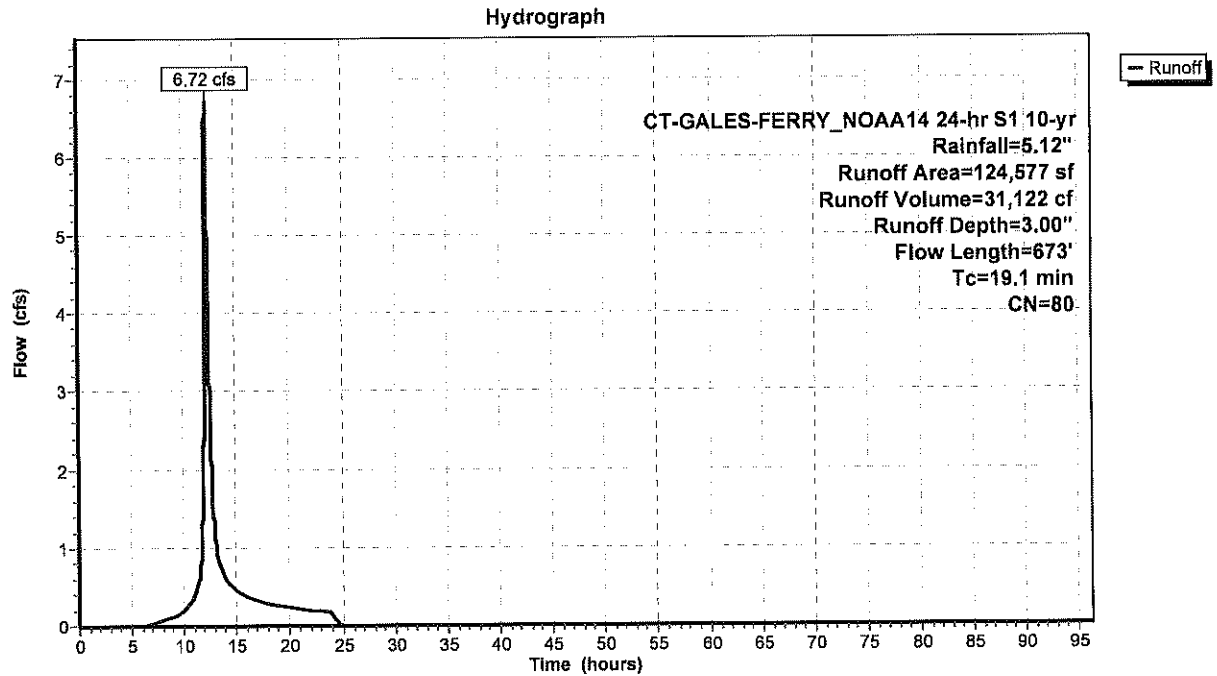
Runoff = 6.72 cfs @ 12.21 hrs, Volume= 31,122 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 CT-GALES-FERRY_NOAA14 24-hr S1 10-yr Rainfall=5.12"

Area (sf)	CN	Description
5,812	60	Woods, Fair, HSG B
60,628	79	Woods, Fair, HSG D
21,174	61	>75% Grass cover, Good, HSG B
6,833	80	>75% Grass cover, Good, HSG D
9,925	98	Paved parking, HSG B
6,539	98	Paved parking, HSG D
150	96	Gravel surface, HSG B
2,821	96	Gravel surface, HSG D
10,695	98	Roofs, HSG B
124,577	80	Weighted Average
97,418		78.20% Pervious Area
27,159		21.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	70	0.0528	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
2.8	30	0.2648	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
0.4	68	0.3617	3.01		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	36	1.0000	5.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.7	331	0.0544	1.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	25	0.1400	1.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	66	0.0666	5.24		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	47	0.0426	4.19		Shallow Concentrated Flow, Paved Kv= 20.3 fps
19.1	673	Total			

Subcatchment PDA-100: PDA-100



Summary for Subcatchment PDA-200: PDA-200

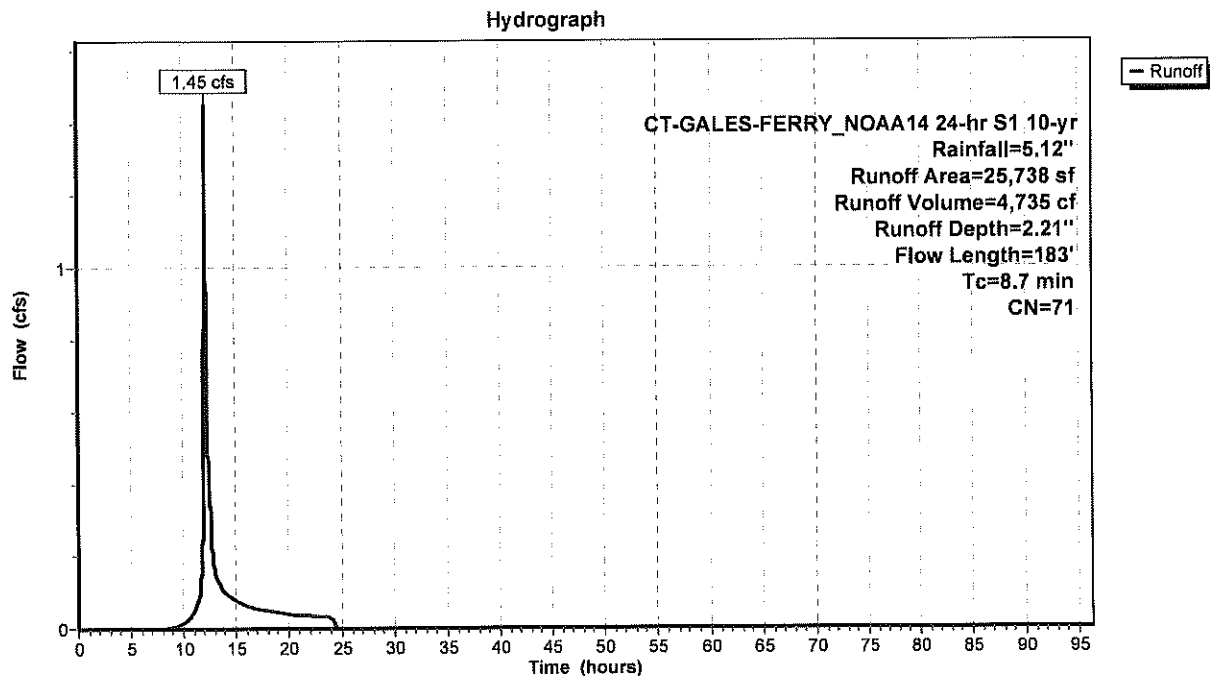
Runoff = 1.45 cfs @ 12.07 hrs, Volume= 4,735 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 CT-GALES-FERRY_NOAA14 24-hr S1 10-yr Rainfall=5.12"

Area (sf)	CN	Description
2,265	60	Woods, Fair, HSG B
598	79	Woods, Fair, HSG D
16,063	61	>75% Grass cover, Good, HSG B
123	80	>75% Grass cover, Good, HSG D
6,689	98	Paved parking, HSG B
25,738	71	Weighted Average
19,049		74.01% Pervious Area
6,689		25.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	10	0.0953	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
0.8	19	0.3100	0.38		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
1.0	13	0.0821	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
4.9	58	0.0341	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
0.3	25	0.0341	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	58	0.0261	1.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.7	183	Total			

Subcatchment PDA-200: PDA-200



Summary for Pond P1: Stormwater Basin

Inflow Area = 139,303 sf, 24.31% Impervious, Inflow Depth = 3.19" for 10-yr event
 Inflow = 9.75 cfs @ 12.13 hrs, Volume= 36,992 cf
 Outflow = 2.20 cfs @ 12.64 hrs, Volume= 36,992 cf, Atten= 77%, Lag= 30.6 min
 Discarded = 0.14 cfs @ 12.64 hrs, Volume= 21,950 cf
 Primary = 2.06 cfs @ 12.64 hrs, Volume= 15,042 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 52.86' @ 12.64 hrs Surf.Area= 5,750 sf Storage= 17,338 cf

Plug-Flow detention time= 906.1 min calculated for 36,988 cf (100% of inflow)
 Center-of-Mass det. time= 906.4 min (1,744.2 - 837.8)

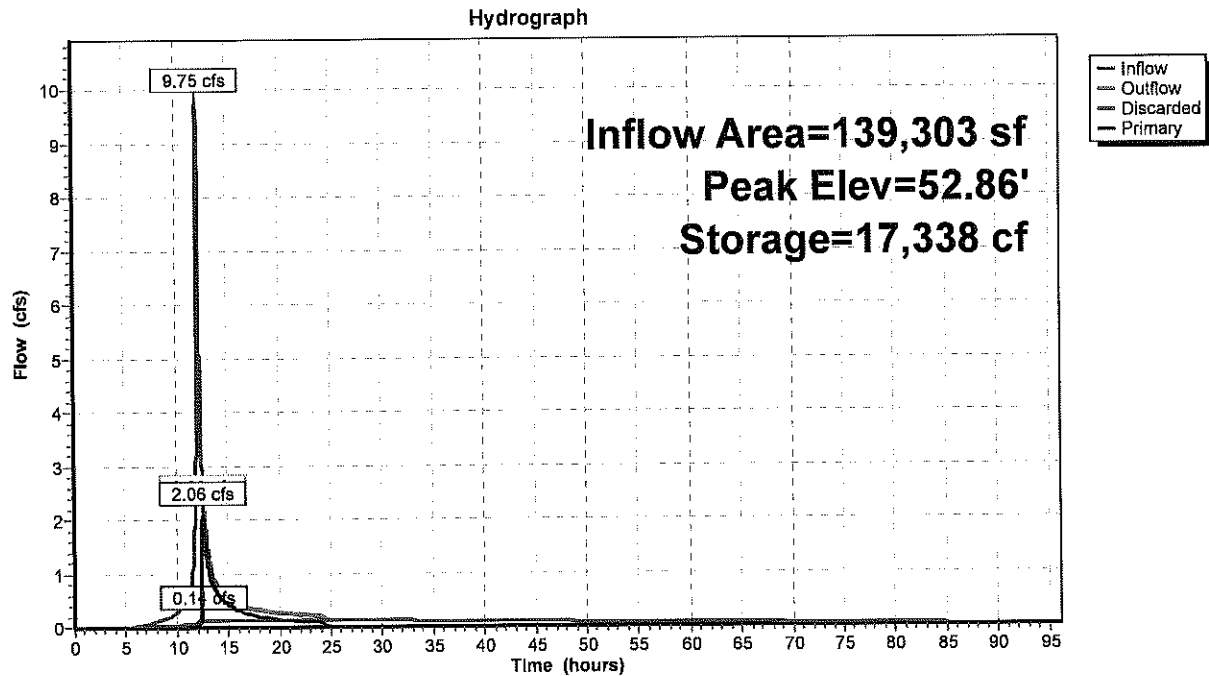
Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	32,030 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,605	0	0
49.00	2,349	1,977	1,977
50.00	3,150	2,750	4,727
51.00	4,006	3,578	8,305
52.00	4,919	4,463	12,767
53.00	5,889	5,404	18,171
54.00	6,915	6,402	24,573
55.00	7,998	7,457	32,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	48.00'	0.720 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 42.00'
#2	Primary	52.08'	18.0" Round Culvert L= 147.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 52.08' / 51.44' S= 0.0044 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	52.50'	4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.14 cfs @ 12.64 hrs HW=52.86' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=2.06 cfs @ 12.64 hrs HW=52.86' (Free Discharge)
 ↑ **2=Culvert** (Barrel Controls 2.06 cfs @ 3.25 fps)
 ↑ **3=Broad-Crested Rectangular Weir** (Passes 2.06 cfs of 2.31 cfs potential flow)

Pond P1: Stormwater Basin



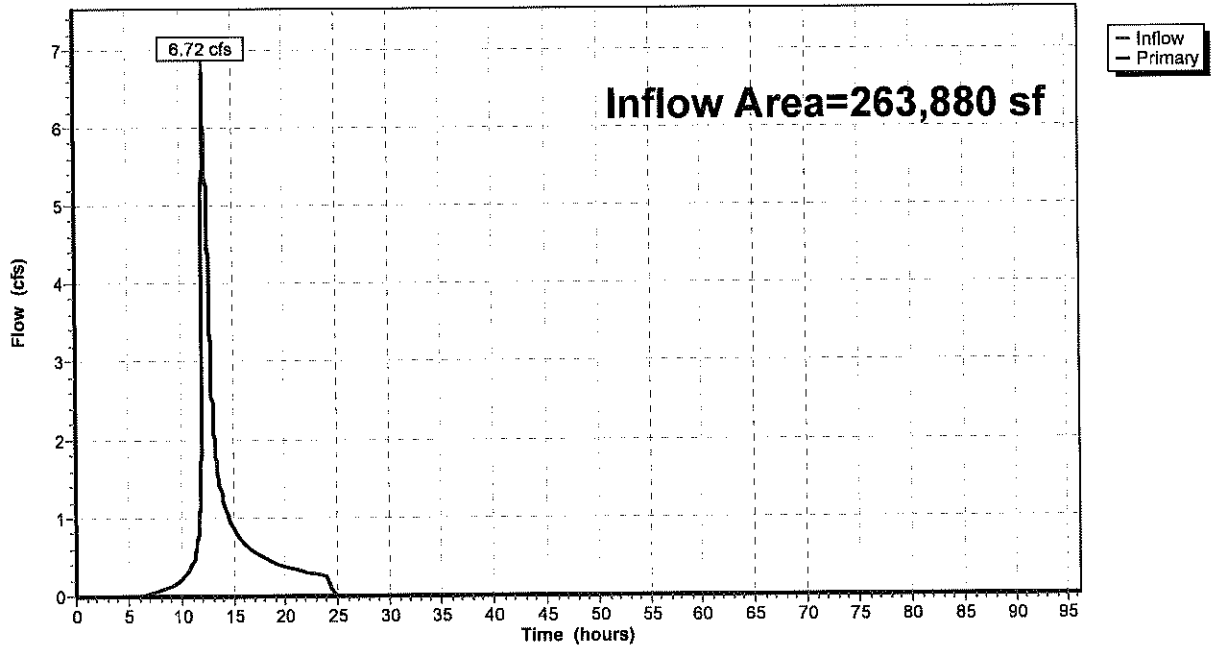
Summary for Link DP-1: DP-1

Inflow Area = 263,880 sf, 23.12% Impervious, Inflow Depth = 2.10" for 10-yr event
Inflow = 6.72 cfs @ 12.21 hrs, Volume= 46,164 cf
Primary = 6.72 cfs @ 12.21 hrs, Volume= 46,164 cf, Atten= 0%, Lag= 0.0 min

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

Link DP-1: DP-1

Hydrograph



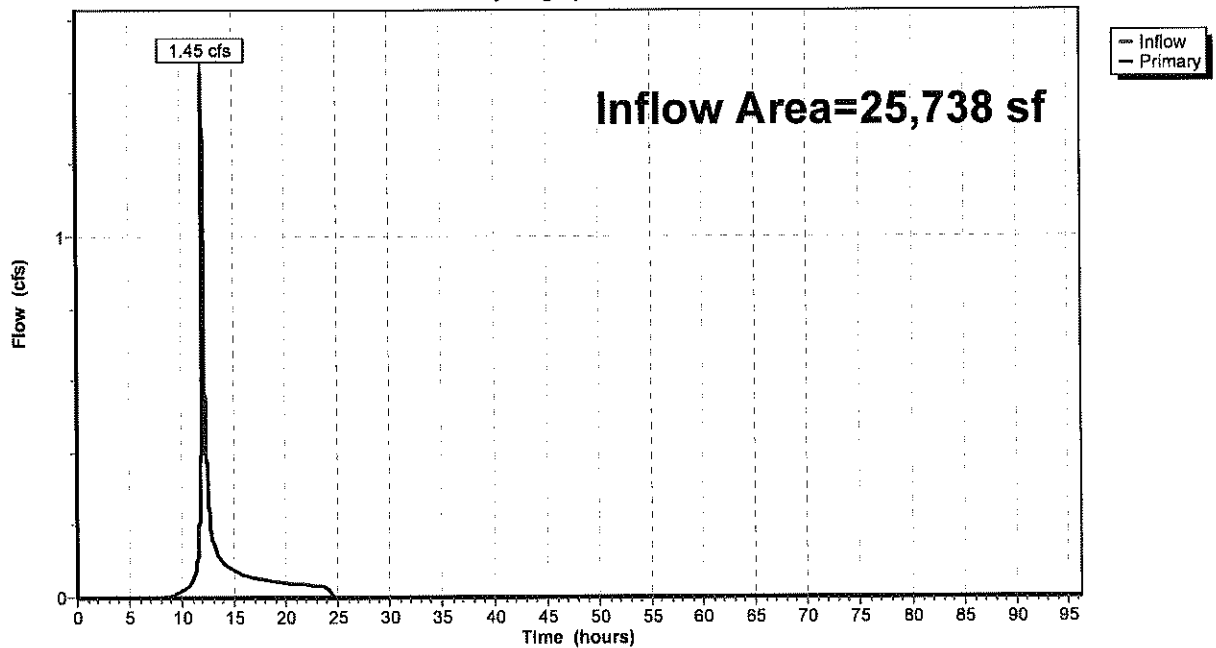
Summary for Link DP-2: DP-2

Inflow Area = 25,738 sf, 25.99% Impervious, Inflow Depth = 2.21" for 10-yr event
Inflow = 1.45 cfs @ 12.07 hrs, Volume= 4,735 cf
Primary = 1.45 cfs @ 12.07 hrs, Volume= 4,735 cf, Atten= 0%, Lag= 0.0 min

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

Link DP-2: DP-2

Hydrograph



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

SubcatchmentPA-300: PA-300 Runoff Area=139,303 sf 24.31% Impervious Runoff Depth=4.13"
Flow Length=423' Tc=12.8 min CN=82 Runoff=12.59 cfs 47,889 cf

SubcatchmentPDA-100: PDA-100 Runoff Area=124,577 sf 21.80% Impervious Runoff Depth=3.92"
Flow Length=673' Tc=19.1 min CN=80 Runoff=8.78 cfs 40,663 cf

SubcatchmentPDA-200: PDA-200 Runoff Area=25,738 sf 25.99% Impervious Runoff Depth=3.02"
Flow Length=183' Tc=8.7 min CN=71 Runoff=2.02 cfs 6,478 cf

Pond P1: StormwaterBasin Peak Elev=53.27' Storage=19,809 cf Inflow=12.59 cfs 47,889 cf
Discarded=0.15 cfs 22,304 cf Primary=4.24 cfs 25,585 cf Outflow=4.39 cfs 47,889 cf

Link DP-1: DP-1 Inflow=11.62 cfs 66,248 cf
Primary=11.62 cfs 66,248 cf

Link DP-2: DP-2 Inflow=2.02 cfs 6,478 cf
Primary=2.02 cfs 6,478 cf

Total Runoff Area = 289,618 sf Runoff Volume = 95,029 cf Average Runoff Depth = 3.94"
76.62% Pervious = 221,908 sf 23.38% Impervious = 67,710 sf

Summary for Subcatchment PA-300: PA-300

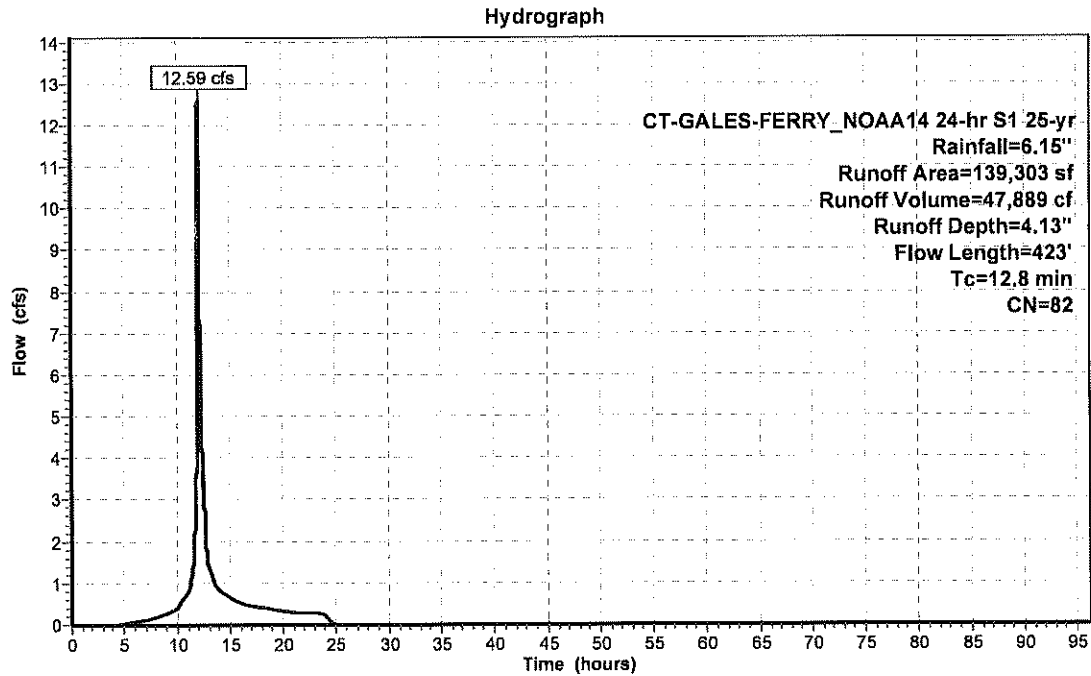
Runoff = 12.59 cfs @ 12.13 hrs, Volume= 47,889 cf, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 CT-GALES-FERRY_NOAA14 24-hr S1 25-yr Rainfall=6.15"

Area (sf)	CN	Description
627	60	Woods, Fair, HSG B
60,165	79	Woods, Fair, HSG D
15,389	61	>75% Grass cover, Good, HSG B
29,260	80	>75% Grass cover, Good, HSG D
21,042	98	Paved parking, HSG B
3,051	98	Paved parking, HSG D
2,319	98	Roofs, HSG B
7,450	98	Water Surface, HSG D
139,303	82	Weighted Average
105,441		75.69% Pervious Area
33,862		24.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	31	0.0922	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
3.6	48	0.3621	0.22		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
1.3	21	0.9076	0.27		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	24	0.4338	3.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	18	1.0000	5.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	48	0.1877	2.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.0	98	0.0131	0.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	13	0.3945	4.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	43	0.0169	2.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.6	79	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
12.8	423	Total			

Subcatchment PA-300: PA-300



C-DAT-2102412-PROP HYDRO

CT-GALES-FERRY_NOAA14 24-hr S1 25-yr Rainfall=6.15"

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Page 27

Summary for Subcatchment PDA-100: PDA-100

Runoff = 8.78 cfs @ 12.21 hrs, Volume= 40,663 cf, Depth= 3.92"

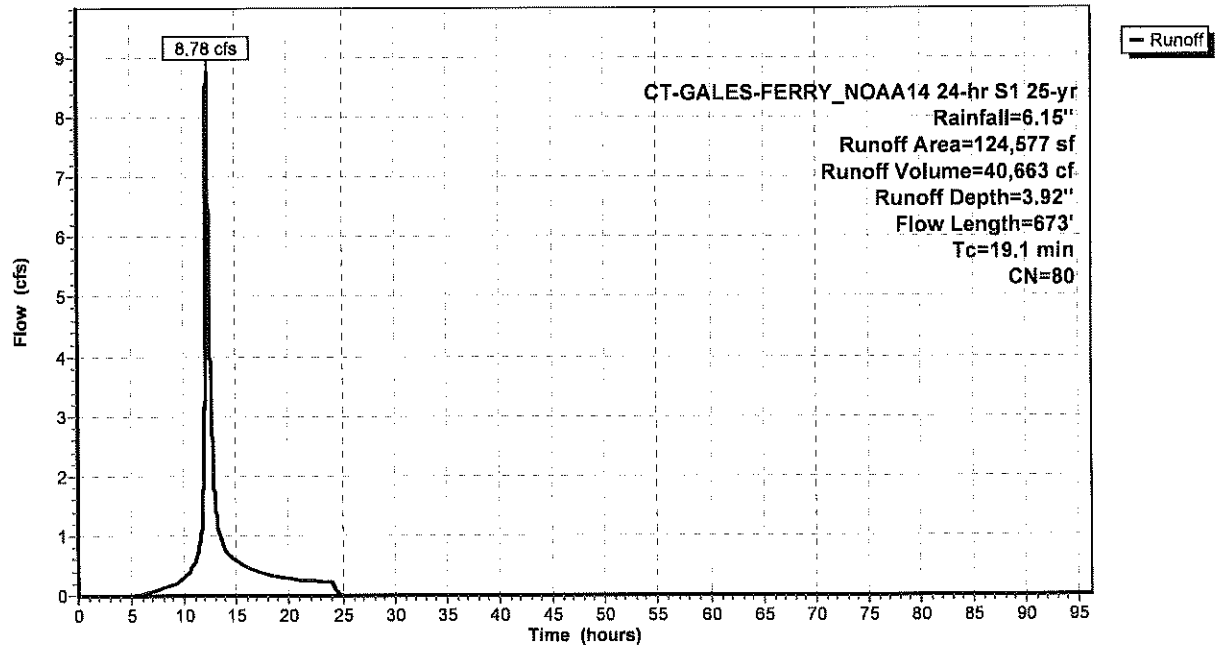
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
CT-GALES-FERRY_NOAA14 24-hr S1 25-yr Rainfall=6.15"

Area (sf)	CN	Description
5,812	60	Woods, Fair, HSG B
60,628	79	Woods, Fair, HSG D
21,174	61	>75% Grass cover, Good, HSG B
6,833	80	>75% Grass cover, Good, HSG D
9,925	98	Paved parking, HSG B
6,539	98	Paved parking, HSG D
150	96	Gravel surface, HSG B
2,821	96	Gravel surface, HSG D
10,695	98	Roofs, HSG B
124,577	80	Weighted Average
97,418		78.20% Pervious Area
27,159		21.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	70	0.0528	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
2.8	30	0.2648	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
0.4	68	0.3617	3.01		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	36	1.0000	5.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.7	331	0.0544	1.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	25	0.1400	1.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	66	0.0666	5.24		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	47	0.0426	4.19		Shallow Concentrated Flow, Paved Kv= 20.3 fps
19.1	673	Total			

Subcatchment PDA-100: PDA-100

Hydrograph



Summary for Subcatchment PDA-200: PDA-200

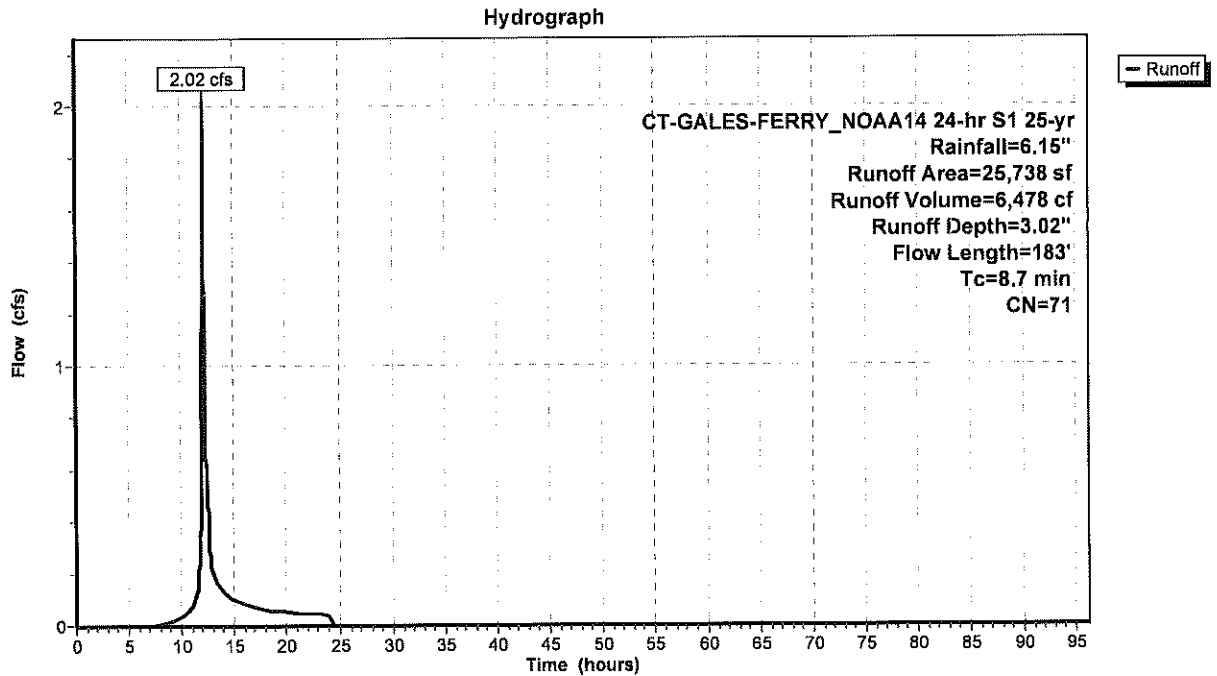
Runoff = 2.02 cfs @ 12.07 hrs, Volume= 6,478 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 CT-GALES-FERRY_NOAA14 24-hr S1 25-yr Rainfall=6.15"

Area (sf)	CN	Description
2,265	60	Woods, Fair, HSG B
598	79	Woods, Fair, HSG D
16,063	61	>75% Grass cover, Good, HSG B
123	80	>75% Grass cover, Good, HSG D
6,689	98	Paved parking, HSG B
25,738	71	Weighted Average
19,049		74.01% Pervious Area
6,689		25.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	10	0.0953	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
0.8	19	0.3100	0.38		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
1.0	13	0.0821	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
4.9	58	0.0341	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.46"
0.3	25	0.0341	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	58	0.0261	1.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.7	183	Total			

Subcatchment PDA-200: PDA-200



Summary for Pond P1: Stormwater Basin

Inflow Area = 139,303 sf, 24.31% Impervious, Inflow Depth = 4.13" for 25-yr event
 Inflow = 12.59 cfs @ 12.13 hrs, Volume= 47,889 cf
 Outflow = 4.39 cfs @ 12.43 hrs, Volume= 47,889 cf, Atten= 65%, Lag= 18.4 min
 Discarded = 0.15 cfs @ 12.43 hrs, Volume= 22,304 cf
 Primary = 4.24 cfs @ 12.43 hrs, Volume= 25,585 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 53.27' @ 12.43 hrs Surf.Area= 6,168 sf Storage= 19,809 cf

Plug-Flow detention time= 713.7 min calculated for 47,889 cf (100% of inflow)
 Center-of-Mass det. time= 713.7 min (1,542.3 - 828.6)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	32,030 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,605	0	0
49.00	2,349	1,977	1,977
50.00	3,150	2,750	4,727
51.00	4,006	3,578	8,305
52.00	4,919	4,463	12,767
53.00	5,889	5,404	18,171
54.00	6,915	6,402	24,573
55.00	7,998	7,457	32,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	48.00'	0.720 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 42.00'
#2	Primary	52.08'	18.0" Round Culvert L= 147.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 52.08' / 51.44' S= 0.0044 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	52.50'	4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.15 cfs @ 12.43 hrs HW=53.27' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.15 cfs)

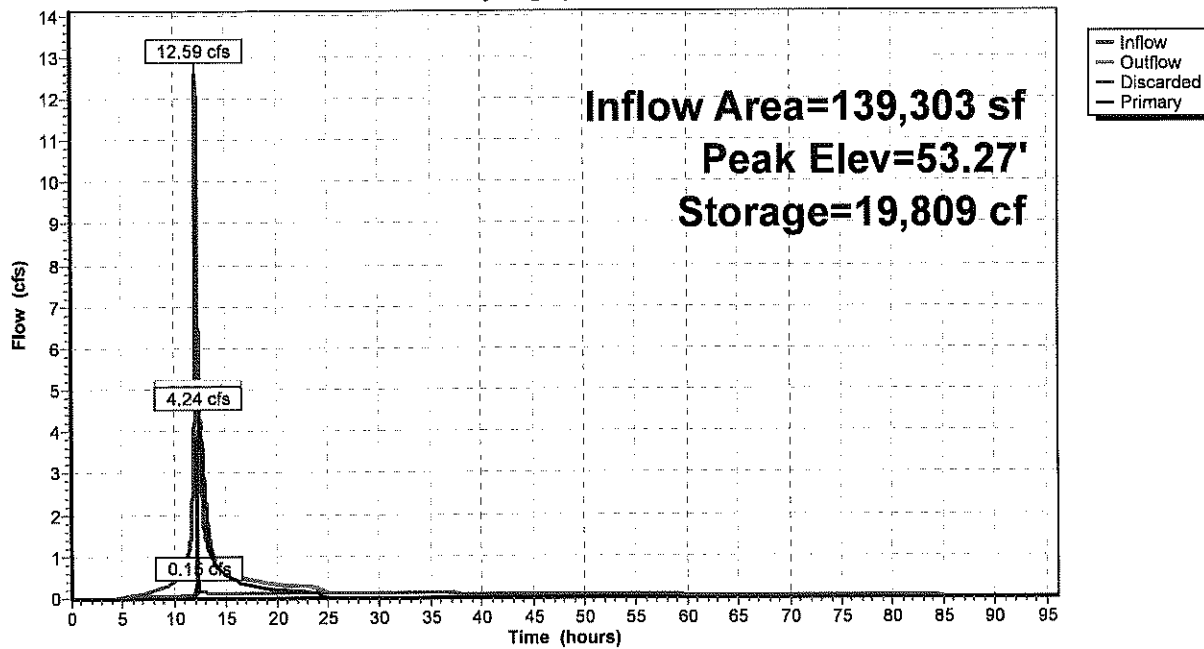
Primary OutFlow Max=4.24 cfs @ 12.43 hrs HW=53.27' (Free Discharge)

↑ **2=Culvert** (Barrel Controls 4.24 cfs @ 3.86 fps)

↑ **3=Broad-Crested Rectangular Weir** (Passes 4.24 cfs of 7.69 cfs potential flow)

Pond P1: Stormwater Basin

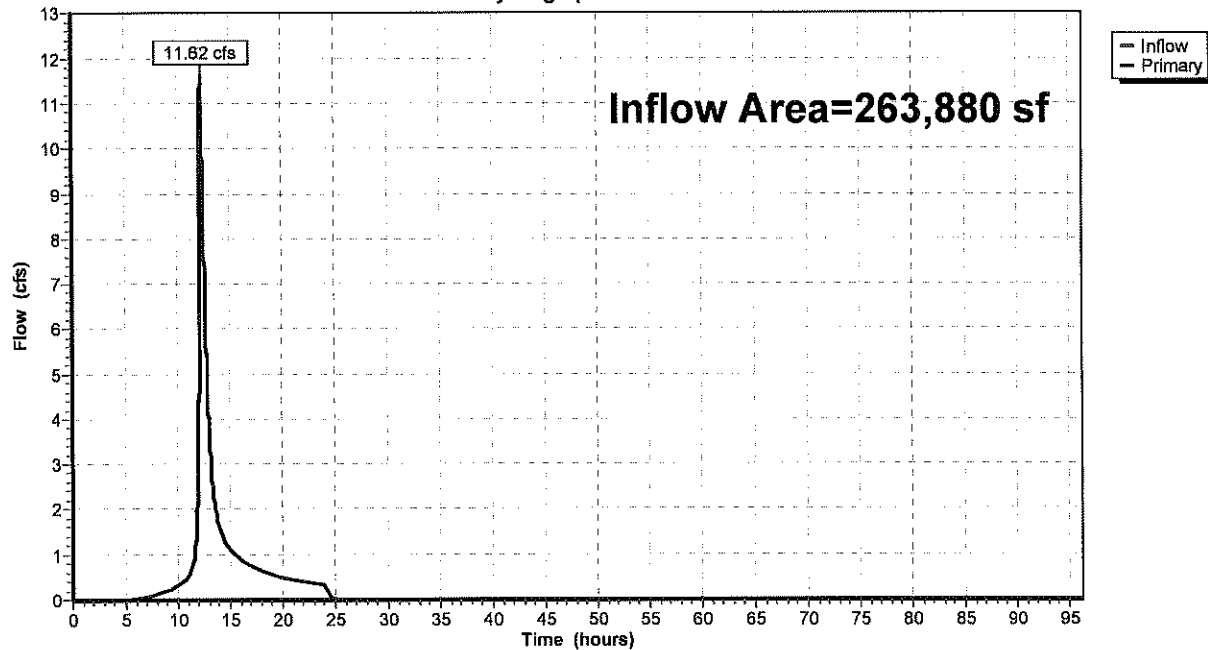
Hydrograph



Summary for Link DP-1: DP-1

Inflow Area = 263,880 sf, 23.12% Impervious, Inflow Depth = 3.01" for 25-yr event
Inflow = 11.62 cfs @ 12.26 hrs, Volume= 66,248 cf
Primary = 11.62 cfs @ 12.26 hrs, Volume= 66,248 cf, Atten= 0%, Lag= 0.0 min

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

Link DP-1: DP-1**Hydrograph**

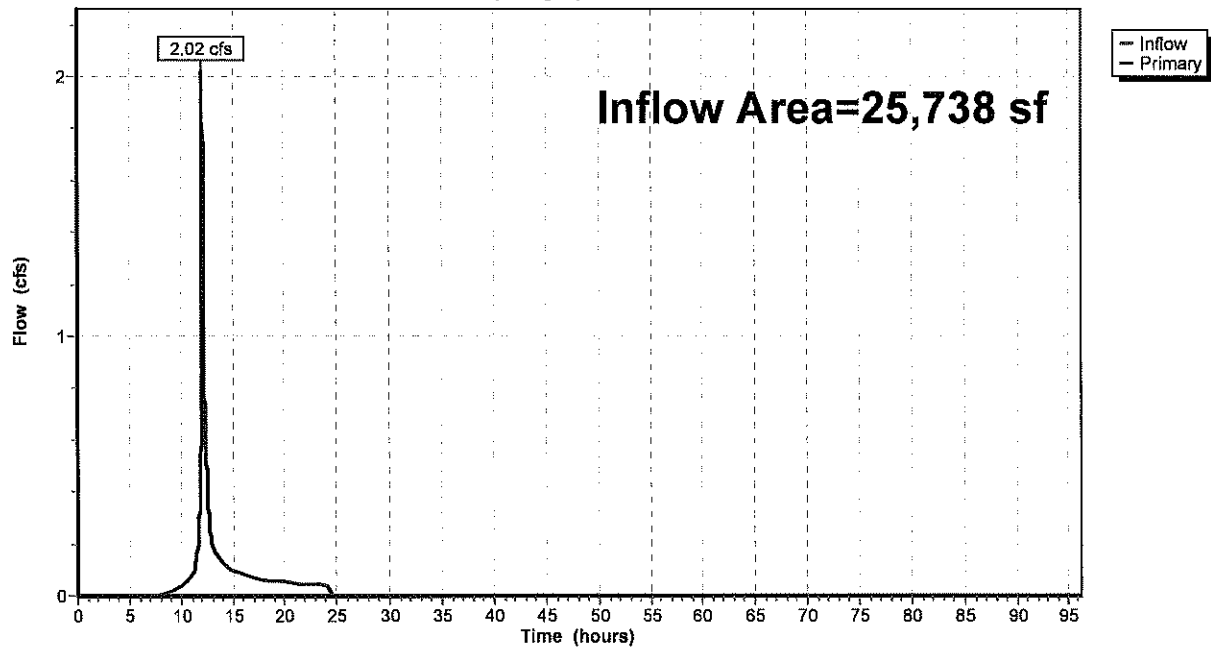
Summary for Link DP-2: DP-2

Inflow Area = 25,738 sf, 25.99% Impervious, Inflow Depth = 3.02" for 25-yr event
Inflow = 2.02 cfs @ 12.07 hrs, Volume= 6,478 cf
Primary = 2.02 cfs @ 12.07 hrs, Volume= 6,478 cf, Atten= 0%, Lag= 0.0 min

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

Link DP-2: DP-2

Hydrograph



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

SubcatchmentPA-300: PA-300 Runoff Area=139,303 sf 24.31% Impervious Runoff Depth=5.62"
Flow Length=423' Tc=12.8 min CN=82 Runoff=17.03 cfs 65,272 cf

SubcatchmentPDA-100: PDA-100 Runoff Area=124,577 sf 21.80% Impervious Runoff Depth=5.39"
Flow Length=673' Tc=19.1 min CN=80 Runoff=12.02 cfs 55,966 cf

SubcatchmentPDA-200: PDA-200 Runoff Area=25,738 sf 25.99% Impervious Runoff Depth=4.36"
Flow Length=183' Tc=8.7 min CN=71 Runoff=2.95 cfs 9,358 cf

Pond P1: Stormwater Basin Peak Elev=53.99' Storage=24,486 cf Inflow=17.03 cfs 65,272 cf
Discarded=0.17 cfs 22,797 cf Primary=7.40 cfs 42,475 cf Outflow=7.58 cfs 65,272 cf

Link DP-1: DP-1 Inflow=18.99 cfs 98,442 cf
Primary=18.99 cfs 98,442 cf

Link DP-2: DP-2 Inflow=2.95 cfs 9,358 cf
Primary=2.95 cfs 9,358 cf

Total Runoff Area = 289,618 sf Runoff Volume = 130,596 cf Average Runoff Depth = 5.41"
76.62% Pervious = 221,908 sf 23.38% Impervious = 67,710 sf

Summary for Subcatchment PA-300: PA-300

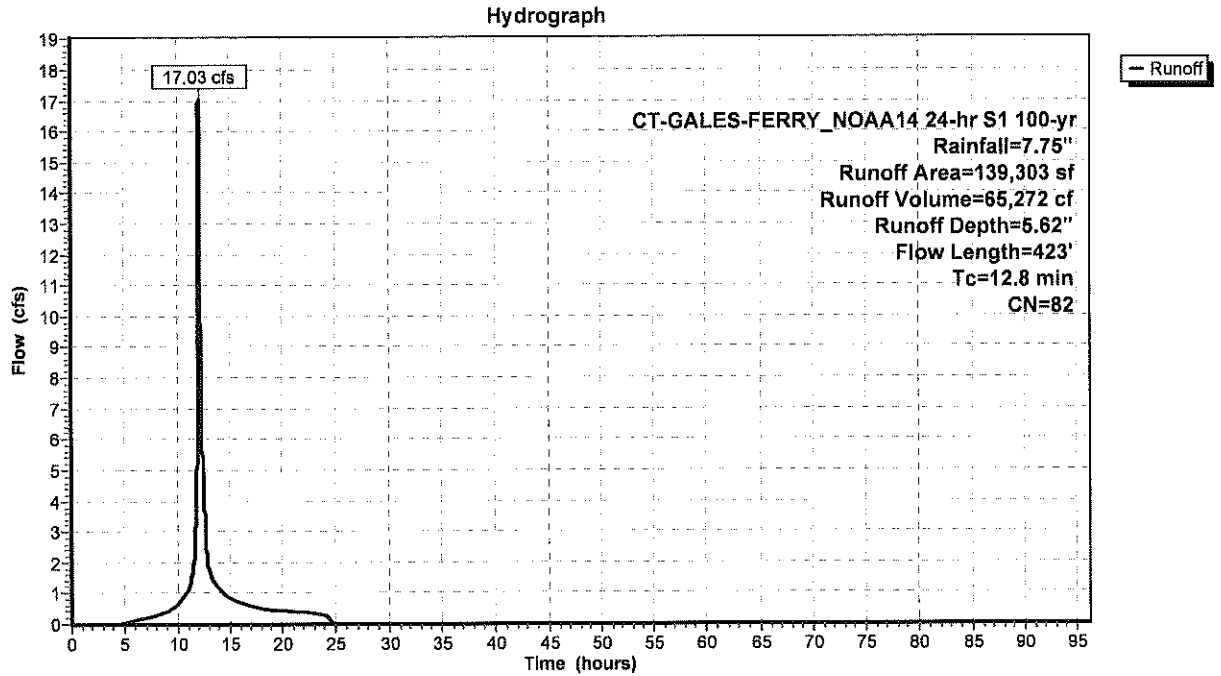
Runoff = 17.03 cfs @ 12.12 hrs, Volume= 65,272 cf, Depth= 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 CT-GALES-FERRY_NOAA14 24-hr S1 100-yr Rainfall=7.75"

Area (sf)	CN	Description
627	60	Woods, Fair, HSG B
60,165	79	Woods, Fair, HSG D
15,389	61	>75% Grass cover, Good, HSG B
29,260	80	>75% Grass cover, Good, HSG D
21,042	98	Paved parking, HSG B
3,051	98	Paved parking, HSG D
2,319	98	Roofs, HSG B
7,450	98	Water Surface, HSG D
139,303	82	Weighted Average
105,441		75.69% Pervious Area
33,862		24.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	31	0.0922	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
3.6	48	0.3621	0.22		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
1.3	21	0.9076	0.27		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
0.1	24	0.4338	3.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	18	1.0000	5.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	48	0.1877	2.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.0	98	0.0131	0.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	13	0.3945	4.40		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	43	0.0169	2.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.6	79	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
12.8	423	Total			

Subcatchment PA-300: PA-300



Summary for Subcatchment PDA-100: PDA-100

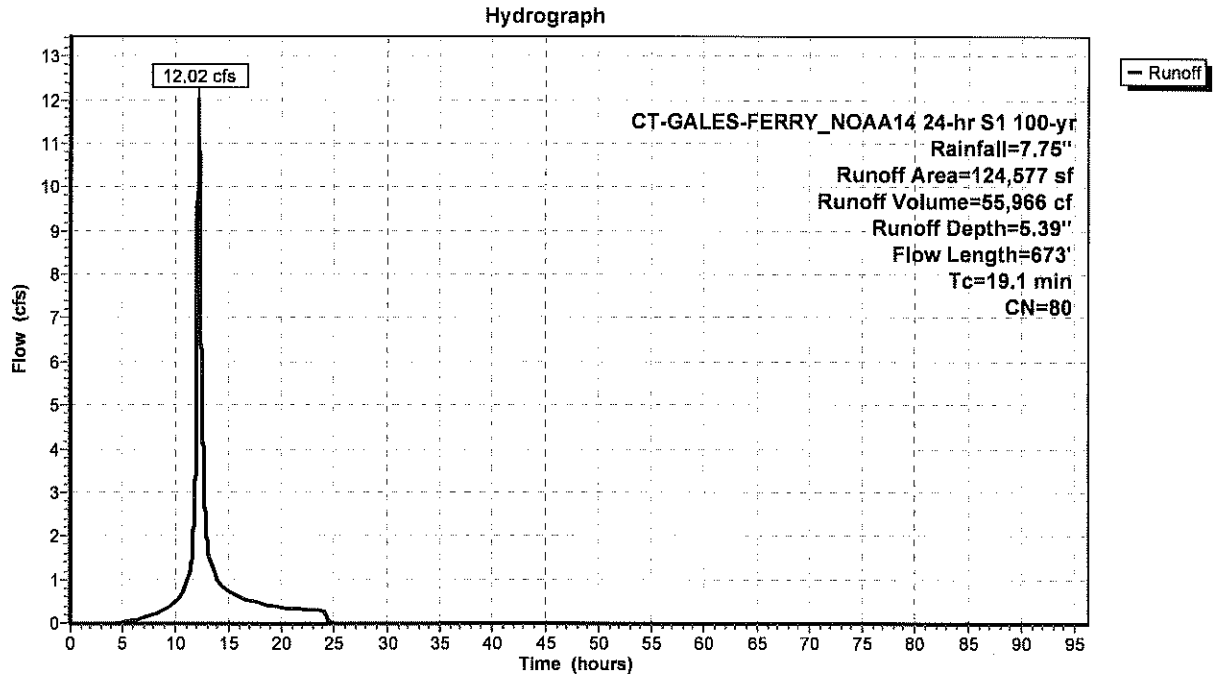
Runoff = 12.02 cfs @ 12.21 hrs, Volume= 55,966 cf, Depth= 5.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 CT-GALES-FERRY_NOAA14 24-hr S1 100-yr Rainfall=7.75"

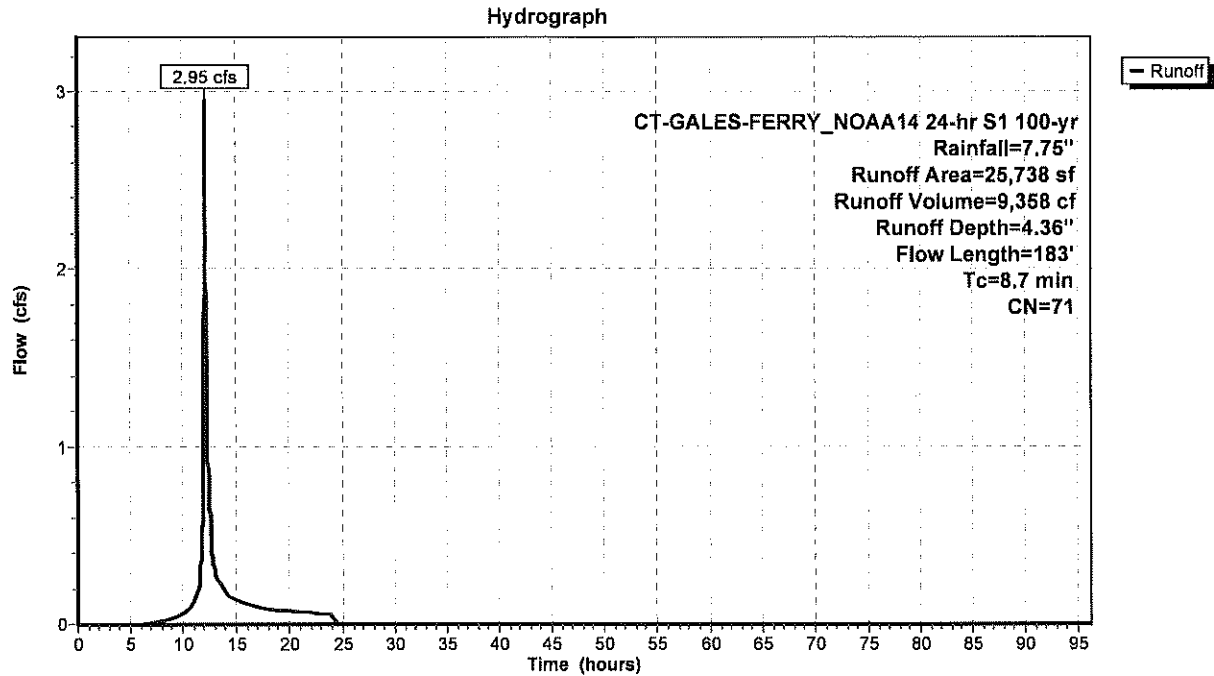
Area (sf)	CN	Description
5,812	60	Woods, Fair, HSG B
60,628	79	Woods, Fair, HSG D
21,174	61	>75% Grass cover, Good, HSG B
6,833	80	>75% Grass cover, Good, HSG D
9,925	98	Paved parking, HSG B
6,539	98	Paved parking, HSG D
150	96	Gravel surface, HSG B
2,821	96	Gravel surface, HSG D
10,695	98	Roofs, HSG B
124,577	80	Weighted Average
97,418		78.20% Pervious Area
27,159		21.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	70	0.0528	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
2.8	30	0.2648	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.46"
0.4	68	0.3617	3.01		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	36	1.0000	5.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.7	331	0.0544	1.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	25	0.1400	1.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	66	0.0666	5.24		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	47	0.0426	4.19		Shallow Concentrated Flow, Paved Kv= 20.3 fps
19.1	673	Total			

Subcatchment PDA-100: PDA-100



Subcatchment PDA-200: PDA-200



Summary for Pond P1: Stormwater Basin

Inflow Area = 139,303 sf, 24.31% Impervious, Inflow Depth = 5.62" for 100-yr event
 Inflow = 17.03 cfs @ 12.12 hrs, Volume= 65,272 cf
 Outflow = 7.58 cfs @ 12.35 hrs, Volume= 65,272 cf, Atten= 56%, Lag= 13.5 min
 Discarded = 0.17 cfs @ 12.35 hrs, Volume= 22,797 cf
 Primary = 7.40 cfs @ 12.35 hrs, Volume= 42,475 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 53.99' @ 12.35 hrs Surf.Area= 6,902 sf Storage= 24,486 cf

Plug-Flow detention time= 538.8 min calculated for 65,265 cf (100% of inflow)
 Center-of-Mass det. time= 539.1 min (1,356.6 - 817.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	32,030 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

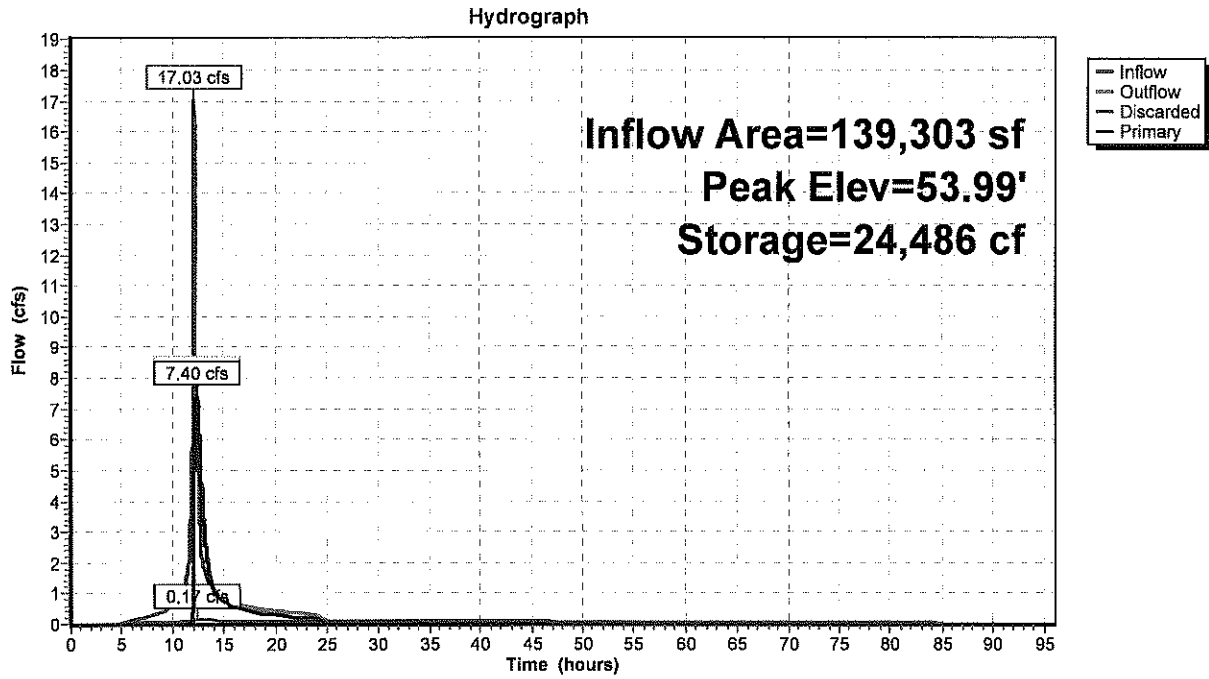
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.00	1,605	0	0
49.00	2,349	1,977	1,977
50.00	3,150	2,750	4,727
51.00	4,006	3,578	8,305
52.00	4,919	4,463	12,767
53.00	5,889	5,404	18,171
54.00	6,915	6,402	24,573
55.00	7,998	7,457	32,030

Device	Routing	Invert	Outlet Devices
#1	Discarded	48.00'	0.720 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 42.00'
#2	Primary	52.08'	18.0" Round Culvert L= 147.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 52.08' / 51.44' S= 0.0044 ' S= 0.0044 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	52.50'	4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.17 cfs @ 12.35 hrs HW=53.99' (Free Discharge)
 1=Exfiltration (Controls 0.17 cfs)

Primary OutFlow Max=7.41 cfs @ 12.35 hrs HW=53.99' (Free Discharge)
 2=Culvert (Barrel Controls 7.41 cfs @ 4.26 fps)
 3=Broad-Crested Rectangular Weir(Passes 7.41 cfs of 23.47 cfs potential flow)

Pond P1: Stormwater Basin



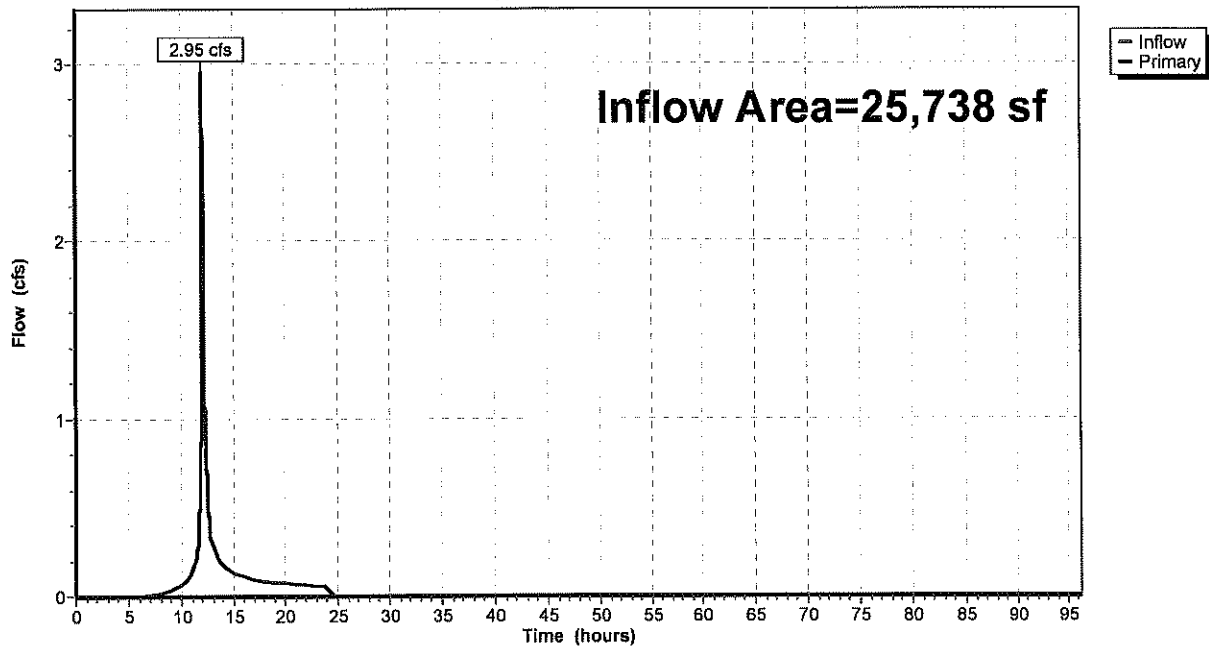
Summary for Link DP-2: DP-2

Inflow Area = 25,738 sf, 25.99% Impervious, Inflow Depth = 4.36" for 100-yr event
Inflow = 2.95 cfs @ 12.07 hrs, Volume= 9,358 cf
Primary = 2.95 cfs @ 12.07 hrs, Volume= 9,358 cf, Atten= 0%, Lag= 0.0 min

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

Link DP-2: DP-2

Hydrograph



Hydrograph for Pond P1: Stormwater Basin

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	48.00	0.00	0.00	0.00
2.00	0.00	0	48.00	0.00	0.00	0.00
4.00	0.00	1	48.00	0.00	0.00	0.00
6.00	0.12	302	48.18	0.03	0.03	0.00
8.00	0.28	1,465	48.77	0.04	0.04	0.00
10.00	0.62	4,170	49.82	0.06	0.06	0.00
12.00	8.14	15,130	52.46	0.13	0.13	0.00
14.00	1.11	16,554	52.72	1.25	0.13	1.11
16.00	0.68	16,116	52.64	0.71	0.13	0.58
18.00	0.51	15,949	52.61	0.53	0.13	0.40
20.00	0.42	15,833	52.59	0.43	0.13	0.30
22.00	0.36	15,760	52.58	0.37	0.13	0.24
24.00	0.32	15,708	52.57	0.33	0.13	0.20
26.00	0.00	14,760	52.39	0.12	0.12	0.00
28.00	0.00	13,877	52.22	0.12	0.12	0.00
30.00	0.00	13,029	52.05	0.12	0.12	0.00
32.00	0.00	12,214	51.89	0.11	0.11	0.00
34.00	0.00	11,430	51.72	0.11	0.11	0.00
36.00	0.00	10,677	51.56	0.10	0.10	0.00
38.00	0.00	9,955	51.39	0.10	0.10	0.00
40.00	0.00	9,262	51.23	0.09	0.09	0.00
42.00	0.00	8,599	51.07	0.09	0.09	0.00
44.00	0.00	7,965	50.91	0.09	0.09	0.00
46.00	0.00	7,357	50.76	0.08	0.08	0.00
48.00	0.00	6,777	50.60	0.08	0.08	0.00
50.00	0.00	6,222	50.45	0.08	0.08	0.00
52.00	0.00	5,693	50.29	0.07	0.07	0.00
54.00	0.00	5,189	50.14	0.07	0.07	0.00
56.00	0.00	4,709	49.99	0.06	0.06	0.00
58.00	0.00	4,253	49.85	0.06	0.06	0.00
60.00	0.00	3,819	49.70	0.06	0.06	0.00
62.00	0.00	3,407	49.56	0.06	0.06	0.00
64.00	0.00	3,017	49.41	0.05	0.05	0.00
66.00	0.00	2,647	49.27	0.05	0.05	0.00
68.00	0.00	2,297	49.13	0.05	0.05	0.00
70.00	0.00	1,968	49.00	0.04	0.04	0.00
72.00	0.00	1,657	48.86	0.04	0.04	0.00
74.00	0.00	1,364	48.73	0.04	0.04	0.00
76.00	0.00	1,088	48.60	0.04	0.04	0.00
78.00	0.00	829	48.47	0.03	0.03	0.00
80.00	0.00	587	48.34	0.03	0.03	0.00
82.00	0.00	360	48.21	0.03	0.03	0.00
84.00	0.00	149	48.09	0.03	0.03	0.00
86.00	0.00	27	48.02	0.01	0.01	0.00
88.00	0.00	5	48.00	0.00	0.00	0.00
90.00	0.00	1	48.00	0.00	0.00	0.00
92.00	0.00	0	48.00	0.00	0.00	0.00
94.00	0.00	0	48.00	0.00	0.00	0.00
96.00	0.00	0	48.00	0.00	0.00	0.00