

CARMINAWOOD DESIGN

ENGINEER'S REPORT

for

Proposed Warehouse
4560 Clinton Street
Town of West Seneca, Erie County, New York

Prepared for

Craig Tschetter

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March 2023



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Section 1 - Location & Description

This project is the construction of a 9,000 sf metal panel warehouse building on the current developed 3.8 acre site located on the north side of Clinton Street in the Town of West Seneca. Construction will consist of the 9,000 sf warehouse building and include associated utility, lighting and landscaping improvements. Currently the site is developed with existing warehouse buildings and pavement. The proposed site development area to be disturbed for this project is approximately 0.9 acres when construction is completed.

Section 2 - Water Service

An existing water service currently serves the existing two warehouse buildings on site. A new water service will be installed and connected to the existing 12" ECWA water main on the north side of Clinton Street. The service will be a 6" Class 52 DI combined water service, then split into a 6" Class 52 DI fire service and a 2" type 'k' copper domestic service at the ROW line. Both DI services will continue into the proposed insulated enclosure. Inside the enclosure the 2" domestic service will have a meter and RPZ and the 6" fire service will have a RPDA. Heat will be provided in the enclosure to prevent freezing. Drainage due to testing or failure of the RPZ will be via gravity to the nearest drainage inlet. The owner will be responsible for keeping the drainage ports clear of snow and debris. Water inside the buildings will be used for typical domestic uses. The proposed 2" domestic service will continue from the hot box enclosure to the existing front building, where this service will connect to the existing inside the building

The buildings are not to be sprinklered. One private hydrant will be installed on site to ensure fire hose coverage not exceeding 400'.

Domestic Summary:

Peak Operating Demand:	24.20 gpm
Water Main:	12" on Clinton Street
Static Pressure:	62 psi (ECWA)
Friction Loss:	0.0 psi
Loss through meter/RPZ:	13.4 psi
Elevation Loss:	0.0 psi
Pressure after RPZ:	49.0 psi

Repairs to all devices will be made during off hours, dual backflow preventers are not required. The site is not located in a 100-year flood plain. Disinfection of the water service following installation will be continuous feed, according to AWWA C-651, latest revision.

Section 3 - Sanitary Sewer Service

The proposed warehouse building will have a 6" SDR-35 PVC sanitary lateral at 1.0% minimum slope. This lateral will connect to an existing private sanitary sewer on site. This private sewer line connects into the existing Town of West Seneca sanitary sewer located on the north side of Clinton Street.

Design Parameters

Warehouse: 15 gal/day/employee x 8 emp = 120 gpd

120 gpd * 4.47 = 536 gpd *use peaking factor of 4.47

The hydraulic loading rate is per "Design Standards for Intermediate Sized Wastewater Treatment Systems" 2014, NYSDEC.

Section 4 - Storm Sewer Service

The existing site currently sheet drains to catch basins within the existing drive lane or sheet drains to an existing stormwater management pond, which connects to the drive lane drains. These ultimately discharge to an existing stormwater management area along the frontage of the property which outlets to the existing public storm sewer system along the north side of Clinton Street.

Stormwater runoff collected onsite as a result of the proposed warehouse building will be routed through the relocated dry stormwater pond connected by a series of catch basins and smooth interior HDPE stormwater pipe. This pond drains to the existing on site storm sewer via an existing 10" outlet pipe.

Detention Pond Summary:

Top of basin elevation = 667.00

Bottom of basin elevation = 665.00

100-year storm storage volume = 18,896 cf @ 587.99

Runoff Summary:

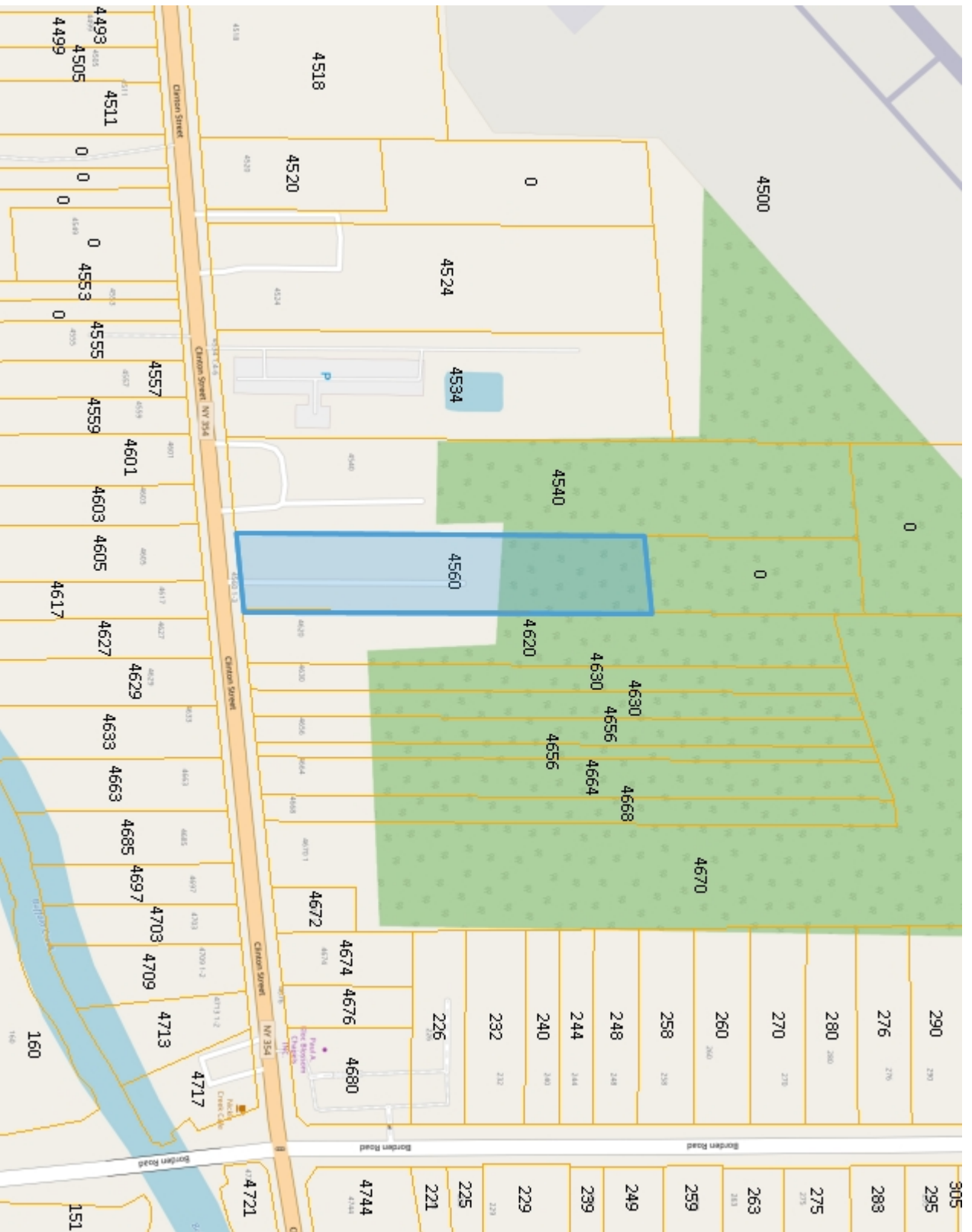
Event	Ex. Runoff (cfs)*	Pro. Runoff (cfs)*	Result (cfs)
1-year	0.66	0.60	-0.06
10-year	1.16	1.16	0.00
100-year	1.75	1.72	-0.03

* Existing and proposed runoff flowrate is the rate controlled by the existing 10" outlet pipe from the dry detention pond which discharges to the existing storm sewer system on site.

Appendix A
Location Map



Erie County On-Line Mapping Application



Legend
 □ Parcels

0 0.07 0.1 Miles
 WGS_1984_Web_Mercator_Auxiliary_Sphere
 THIS MAP IS NOT TO BE USED FOR NAVIGATION

ERIE COUNTY
DEPARTMENT OF ENVIRONMENT & PLANNING
OFFICE OF GIS

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

1 : 4,514

Appendix B

Sanitary Sewer and Water Demand Calculations

Sanitary Sewage Demand Calculations:

Proposed Warehouse

$$15 \text{ gal/d/emp} \times 8 \text{ emp} = 120 \text{ gpd} \quad \text{*use 15 gallons per employee per day}$$

Total Site Sanitary Demand: = 120 gpd

Find Peak Sanitary Demand:

Peaking Factor based on Population:

$$\text{Total demand: } 120 \text{ gpd} / 100 \text{ gpcd} = 1 \text{ per capita}$$

$$\text{Population (P)} = 1 \text{ people}$$

Peaking Factor : $(18 + \sqrt{P}) / (4 + \sqrt{P})$ where P is in thousands

$$\text{Peaking Factor} = 4.47$$

$$\begin{aligned} \text{Peak Sanitary Demand} &= 120 \times 4.47 = 536 \text{ gpd} \\ &= 0.001 \text{ MGD} \\ &= 0.001 \text{ cfs} \end{aligned}$$

Water Demand Calculations (domestic):

Proposed Warehouse

$$120 \text{ gpd} \times 1.1 = 132 \text{ gpd} \quad \text{*use 110\% of sewage demand}$$

*use 1.8 peaking factor and assume a 12 hour day

$$132 \text{ gpm} \times 1 \text{ day}/12 \text{ hr} \times 1 \text{ hr}/60 \text{ min} = 0.18 \text{ gpm}$$

$$0.18 \text{ gpm} \times 1.8 = 0.33 \text{ gpm} \quad Q_{\text{peak}}$$

Headlosses:

$$Q_{\text{peak}} = 0.33 \text{ gpm}$$

$$\text{Pipe} = 2 \text{ inch Type 'K' Copper} \quad C = 140$$

$$\text{Length} = 25 \text{ LF (approx. distance from tap to RPZ in hot box)}$$

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(25)(0.33)^{1.85}}{(140)^{1.85} (2)^{4.866}} = 0.00 \text{ ft} = 0.00 \text{ psi}$$

$$\Delta \text{ elev} = 0 \text{ ft} = 0.00 \text{ psi}$$

$$\text{Loss through meter} = 1 \text{ psi}$$

$$\text{Loss through RPZ} = 12 \text{ psi}$$

$$\text{Total Losses} = 13.0 \text{ psi}$$

$$\text{Static Pressure} = 62 \text{ psi (per ECWA)}$$

$$\text{Residual Pressure Following RPZ} = 62 - 13.0 = 49.0 \text{ psi (available after rpz \& meter)}$$

Water Demand Calculations (fire):

Proposed Townhouses

$$Q = 1,000 \text{ gpm}$$

Headlosses:

$$Q_{\text{peak}} = 1000 \text{ gpm}$$

$$\text{Pipe} = 6 \text{ inch Ductile Iron} \quad C = 140$$

$$\text{Length} = 25 \text{ LF (approx. distance from tap to RPDA in hot box)}$$

$$H_L = \frac{10.44 L Q^{1.85}}{C^{1.85} D^{4.866}} = \frac{10.44(25)(1000)^{1.85}}{(140)^{1.85} (6)^{4.866}} = 1.62 \text{ ft} = 0.70 \text{ psi}$$

$$\Delta \text{ elev} = 0 \text{ ft} = 0.00 \text{ psi}$$

$$\text{Loss Through RPZ} = 12.0 \text{ psi}$$

$$\text{Total Losses} = 12.7 \text{ psi}$$

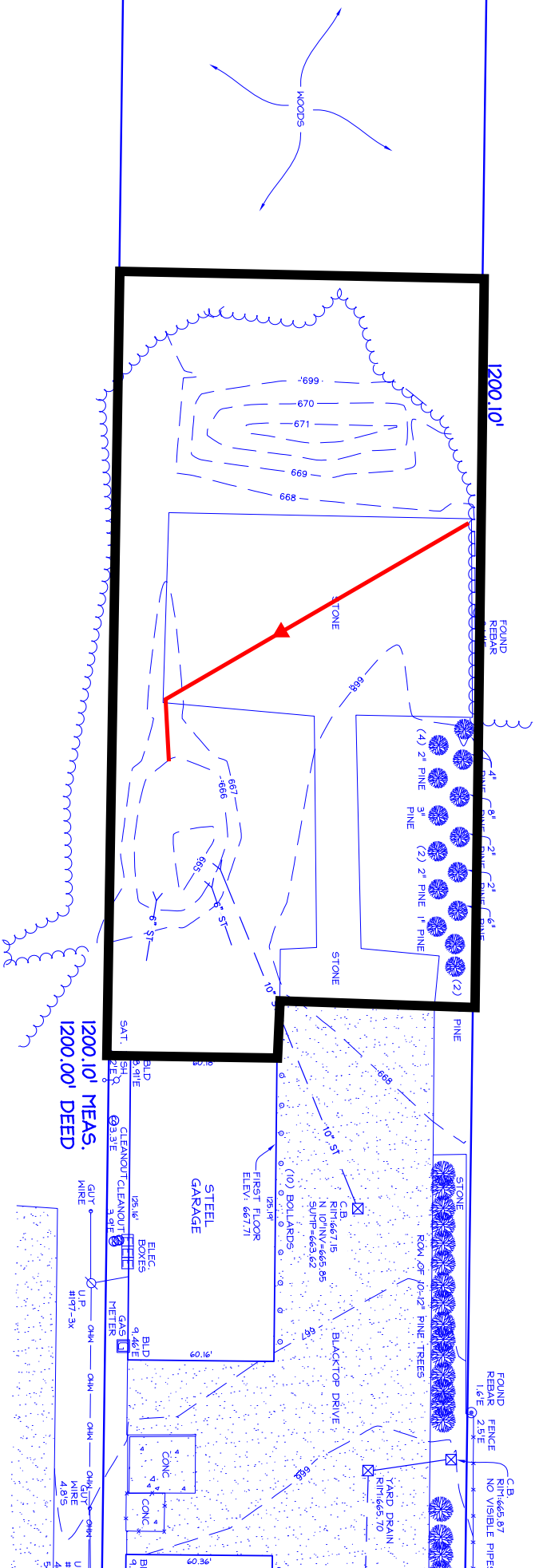
$$\text{Static Pressure} = 62.0 \text{ psi (per ECWA)}$$

$$\text{Residual Pressure after RPDA} = 62 - 12.7 = 49.3 \text{ psi}$$

Appendix C

Storm Sewer System Drainage Calculations

EXISTING RUNOFF



- NOTES**
- ELEVATIONS ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
 - THE LOCATION OF ANY UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRIOR TO ANY CONSTRUCTION ACTIVITIES, ALL UTILITY COMPANIES SHOULD BE NOTIFIED IN ORDER TO VERIFY OR AMEND THEIR LOCATIONS AND/OR EXISTENCE FOR ASSISTANCE

- LEGEND**
- ELECTRIC BOX
 - CLEANOUT
 - FIRE HYDRANT
 - WATER VALVE
 - SANITARY MANHOLE
 - BOLLARD

Existing Runoff

22.346 existing

Prepared by Carmina Wood Morris, PC

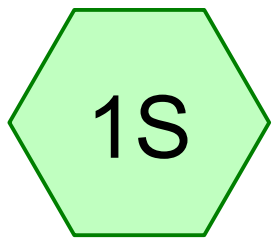
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Type II 24-hr 100-Year Rainfall=5.23"

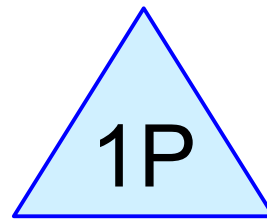
Printed 3/21/2023

Events for Pond 1P: Ex. Pond

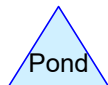
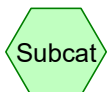
Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-Year	1.36	0.66	665.71	611
2-Year	1.80	0.86	665.84	822
5-Year	2.50	1.07	666.04	1,180
10-Year	3.15	1.16	666.21	1,575
25-Year	4.18	1.41	666.46	2,221
50-Year	5.13	1.58	666.66	2,855
100-Year	6.25	1.75	666.88	3,639



Existing



Ex. Pond



22.346 existing

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	1.87	2
2	10-Year	Type II 24-hr		Default	24.00	1	3.14	2
3	100-Year	Type II 24-hr		Default	24.00	1	5.23	2

22.346 existing

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
23,958	79	50-75% Grass cover, Fair, HSG C (1S)
15,246	96	Gravel surface, HSG C (1S)
39,204	86	TOTAL AREA

22.346 existing

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
39,204	HSG C	1S
0	HSG D	
0	Other	
39,204		TOTAL AREA

22.346 existing

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	23,958	0	0	23,958	50-75% Grass cover, Fair
0	0	15,246	0	0	15,246	Gravel surface
0	0	39,204	0	0	39,204	TOTAL AREA

22.346 existing

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1P	665.00	664.85	150.0	0.0010	0.013	0.0	10.0	0.0

22.346 existing

Type II 24-hr 1-Year Rainfall=1.87"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing

Runoff Area=0.900 ac 0.00% Impervious Runoff Depth=0.75"
Flow Length=155' Slope=0.0100 '/' Tc=3.1 min CN=86 Runoff=1.36 cfs 2,456 cf

Pond 1P: Ex. Pond

Peak Elev=665.71' Storage=611 cf Inflow=1.36 cfs 2,456 cf
10.0" Round Culvert n=0.013 L=150.0' S=0.0010 '/' Outflow=0.66 cfs 2,456 cf

Total Runoff Area = 39,204 sf Runoff Volume = 2,456 cf Average Runoff Depth = 0.75"
100.00% Pervious = 39,204 sf 0.00% Impervious = 0 sf

22.346 existing

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Type II 24-hr 1-Year Rainfall=1.87"

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Summary for Subcatchment 1S: Existing

Runoff = 1.36 cfs @ 11.94 hrs, Volume= 2,456 cf, Depth= 0.75"
 Routed to Pond 1P : Ex. Pond

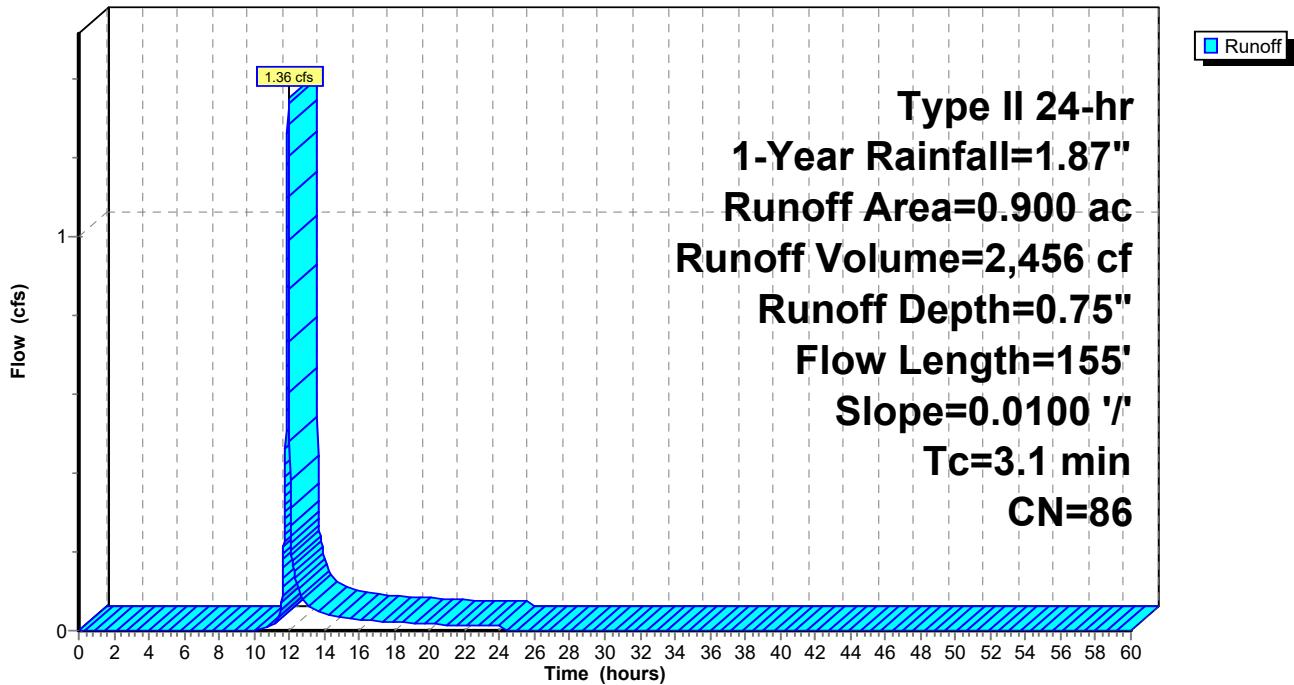
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-Year Rainfall=1.87"

Area (ac)	CN	Description
0.350	96	Gravel surface, HSG C
0.550	79	50-75% Grass cover, Fair, HSG C
0.900	86	Weighted Average
0.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.92		Sheet Flow, gravel Smooth surfaces n= 0.011 P2= 2.50"
1.3	55	0.0100	0.70		Shallow Concentrated Flow, grass Short Grass Pasture Kv= 7.0 fps
3.1	155	Total			

Subcatchment 1S: Existing

Hydrograph



22.346 existing

Type II 24-hr 1-Year Rainfall=1.87"

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Summary for Pond 1P: Ex. Pond

Inflow Area = 39,204 sf, 0.00% Impervious, Inflow Depth = 0.75" for 1-Year event
 Inflow = 1.36 cfs @ 11.94 hrs, Volume= 2,456 cf
 Outflow = 0.66 cfs @ 12.02 hrs, Volume= 2,456 cf, Atten= 52%, Lag= 4.5 min
 Primary = 0.66 cfs @ 12.02 hrs, Volume= 2,456 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 665.71' @ 12.02 hrs Surf.Area= 1,455 sf Storage= 611 cf

Plug-Flow detention time= 26.4 min calculated for 2,456 cf (100% of inflow)
 Center-of-Mass det. time= 26.6 min (869.1 - 842.5)

Volume	Invert	Avail.Storage	Storage Description
#1	665.00'	4,100 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
665.00	275	0	0
666.00	1,945	1,110	1,110
667.00	4,035	2,990	4,100

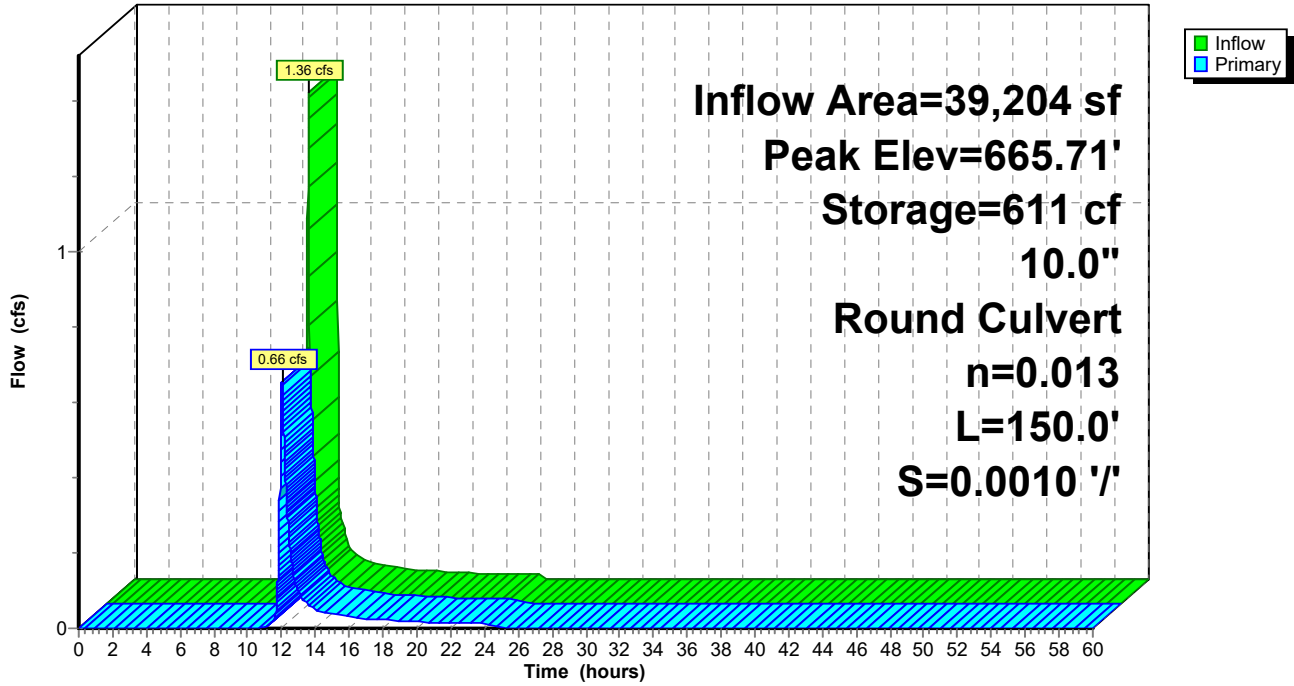
Device	Routing	Invert	Outlet Devices
#1	Primary	665.00'	10.0" Round Culvert L= 150.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 665.00' / 664.85' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.66 cfs @ 12.02 hrs HW=665.71' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.66 cfs @ 1.79 fps)

Pond 1P: Ex. Pond

Hydrograph



22.346 existing

Type II 24-hr 10-Year Rainfall=3.14"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing

Runoff Area=0.900 ac 0.00% Impervious Runoff Depth=1.78"
Flow Length=155' Slope=0.0100 '/' Tc=3.1 min CN=86 Runoff=3.15 cfs 5,825 cf

Pond 1P: Ex. Pond

Peak Elev=666.21' Storage=1,575 cf Inflow=3.15 cfs 5,825 cf
10.0" Round Culvert n=0.013 L=150.0' S=0.0010 '/' Outflow=1.16 cfs 5,825 cf

Total Runoff Area = 39,204 sf Runoff Volume = 5,825 cf Average Runoff Depth = 1.78"
100.00% Pervious = 39,204 sf 0.00% Impervious = 0 sf

22.346 existing

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Type II 24-hr 10-Year Rainfall=3.14"

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Summary for Subcatchment 1S: Existing

Runoff = 3.15 cfs @ 11.94 hrs, Volume= 5,825 cf, Depth= 1.78"
Routed to Pond 1P : Ex. Pond

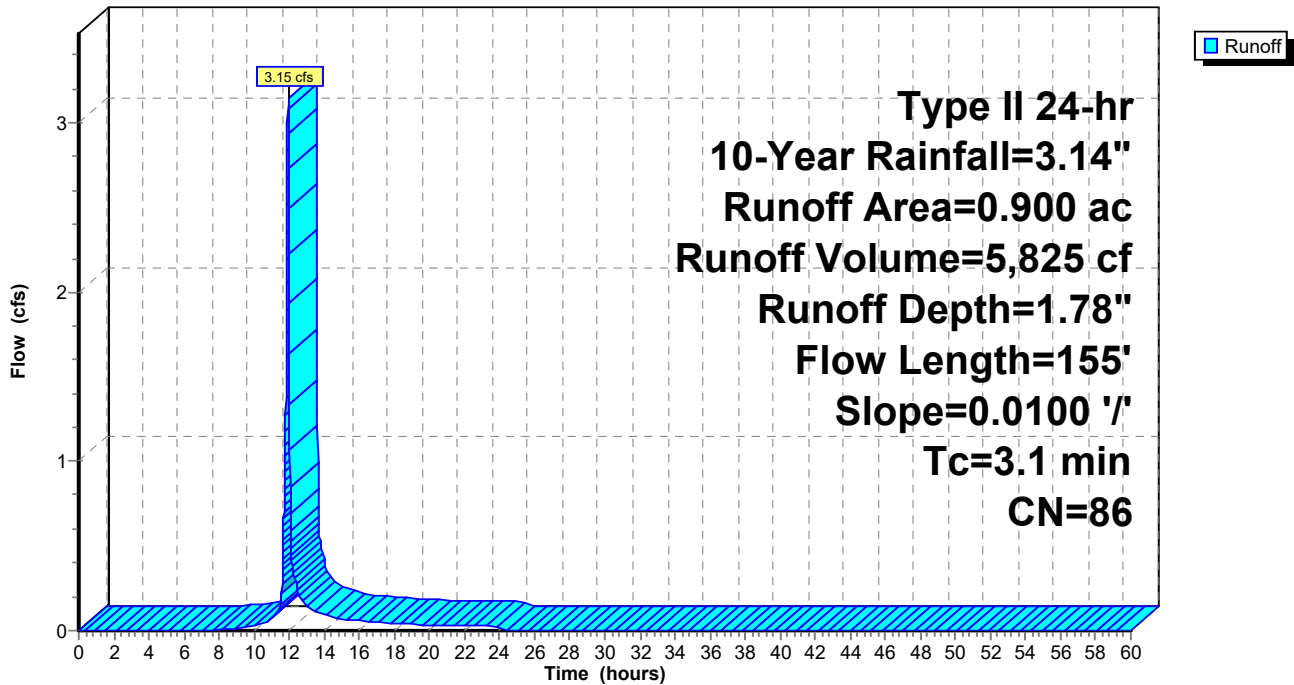
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.350	96	Gravel surface, HSG C
0.550	79	50-75% Grass cover, Fair, HSG C
0.900	86	Weighted Average
0.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.92		Sheet Flow, gravel Smooth surfaces n= 0.011 P2= 2.50"
1.3	55	0.0100	0.70		Shallow Concentrated Flow, grass Short Grass Pasture Kv= 7.0 fps
3.1	155	Total			

Subcatchment 1S: Existing

Hydrograph



22.346 existing

Type II 24-hr 10-Year Rainfall=3.14"

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Summary for Pond 1P: Ex. Pond

Inflow Area = 39,204 sf, 0.00% Impervious, Inflow Depth = 1.78" for 10-Year event
 Inflow = 3.15 cfs @ 11.94 hrs, Volume= 5,825 cf
 Outflow = 1.16 cfs @ 12.03 hrs, Volume= 5,825 cf, Atten= 63%, Lag= 5.3 min
 Primary = 1.16 cfs @ 12.03 hrs, Volume= 5,825 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 666.21' @ 12.03 hrs Surf.Area= 2,393 sf Storage= 1,575 cf

Plug-Flow detention time= 22.7 min calculated for 5,825 cf (100% of inflow)
 Center-of-Mass det. time= 22.7 min (840.2 - 817.6)

Volume	Invert	Avail.Storage	Storage Description
#1	665.00'	4,100 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
665.00	275	0	0
666.00	1,945	1,110	1,110
667.00	4,035	2,990	4,100

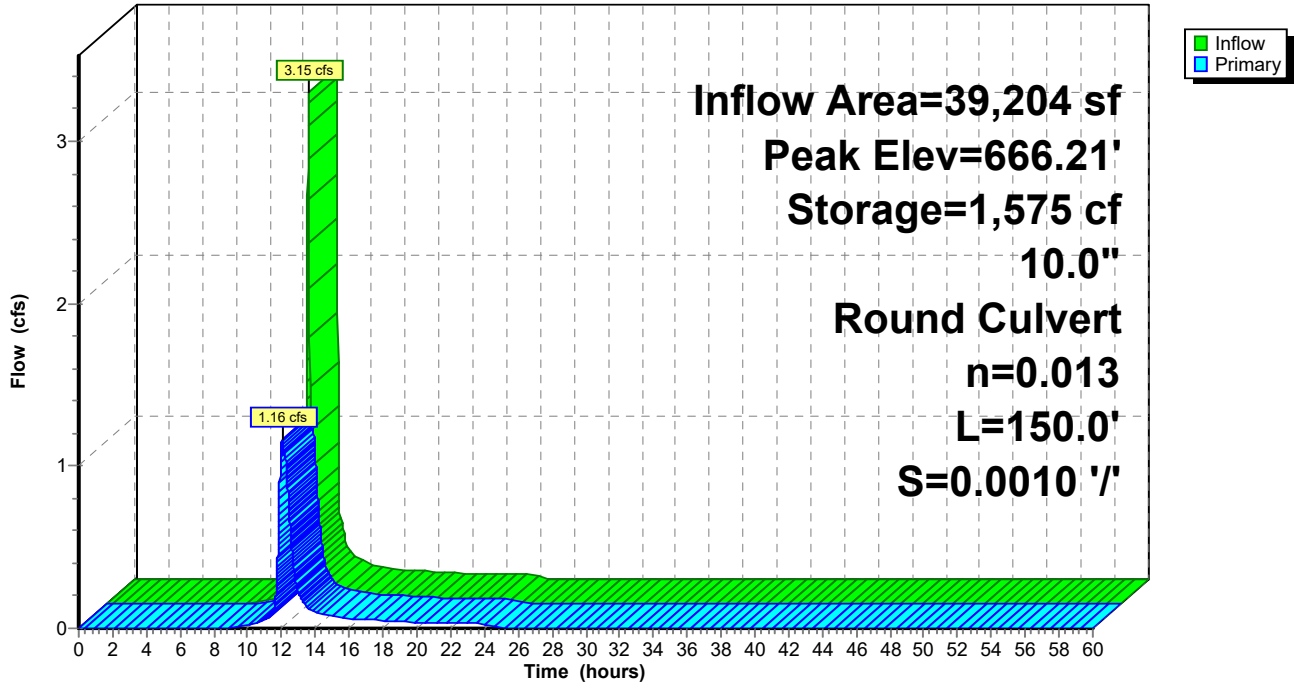
Device	Routing	Invert	Outlet Devices
#1	Primary	665.00'	10.0" Round Culvert L= 150.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 665.00' / 664.85' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.16 cfs @ 12.03 hrs HW=666.21' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.16 cfs @ 2.13 fps)

Pond 1P: Ex. Pond

Hydrograph



22.346 existing

Type II 24-hr 100-Year Rainfall=5.23"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing

Runoff Area=0.900 ac 0.00% Impervious Runoff Depth=3.68"
Flow Length=155' Slope=0.0100 '/' Tc=3.1 min CN=86 Runoff=6.25 cfs 12,030 cf

Pond 1P: Ex. Pond

Peak Elev=666.88' Storage=3,639 cf Inflow=6.25 cfs 12,030 cf
10.0" Round Culvert n=0.013 L=150.0' S=0.0010 '/' Outflow=1.75 cfs 12,030 cf

Total Runoff Area = 39,204 sf Runoff Volume = 12,030 cf Average Runoff Depth = 3.68"
100.00% Pervious = 39,204 sf 0.00% Impervious = 0 sf

22.346 existing

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Type II 24-hr 100-Year Rainfall=5.23"

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Summary for Subcatchment 1S: Existing

Runoff = 6.25 cfs @ 11.94 hrs, Volume= 12,030 cf, Depth= 3.68"
Routed to Pond 1P : Ex. Pond

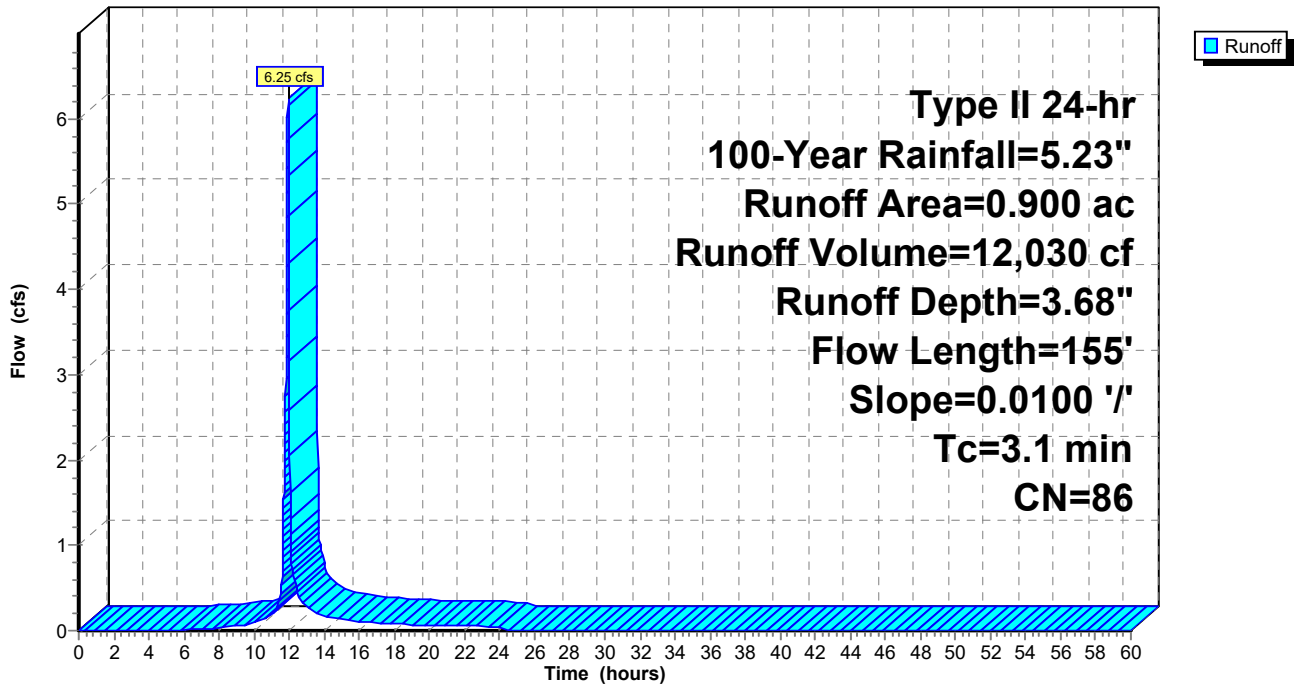
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.23"

Area (ac)	CN	Description
0.350	96	Gravel surface, HSG C
0.550	79	50-75% Grass cover, Fair, HSG C
0.900	86	Weighted Average
0.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.92		Sheet Flow, gravel Smooth surfaces n= 0.011 P2= 2.50"
1.3	55	0.0100	0.70		Shallow Concentrated Flow, grass Short Grass Pasture Kv= 7.0 fps
3.1	155	Total			

Subcatchment 1S: Existing

Hydrograph



22.346 existing

Type II 24-hr 100-Year Rainfall=5.23"

Prepared by Carmina Wood Morris, PC

Printed 3/21/2023

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Summary for Pond 1P: Ex. Pond

Inflow Area = 39,204 sf, 0.00% Impervious, Inflow Depth = 3.68" for 100-Year event
 Inflow = 6.25 cfs @ 11.94 hrs, Volume= 12,030 cf
 Outflow = 1.75 cfs @ 12.04 hrs, Volume= 12,030 cf, Atten= 72%, Lag= 6.0 min
 Primary = 1.75 cfs @ 12.04 hrs, Volume= 12,030 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 666.88' @ 12.04 hrs Surf.Area= 3,789 sf Storage= 3,639 cf

Plug-Flow detention time= 24.4 min calculated for 12,030 cf (100% of inflow)
 Center-of-Mass det. time= 24.3 min (821.3 - 796.9)

Volume	Invert	Avail.Storage	Storage Description
#1	665.00'	4,100 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
665.00	275	0	0
666.00	1,945	1,110	1,110
667.00	4,035	2,990	4,100

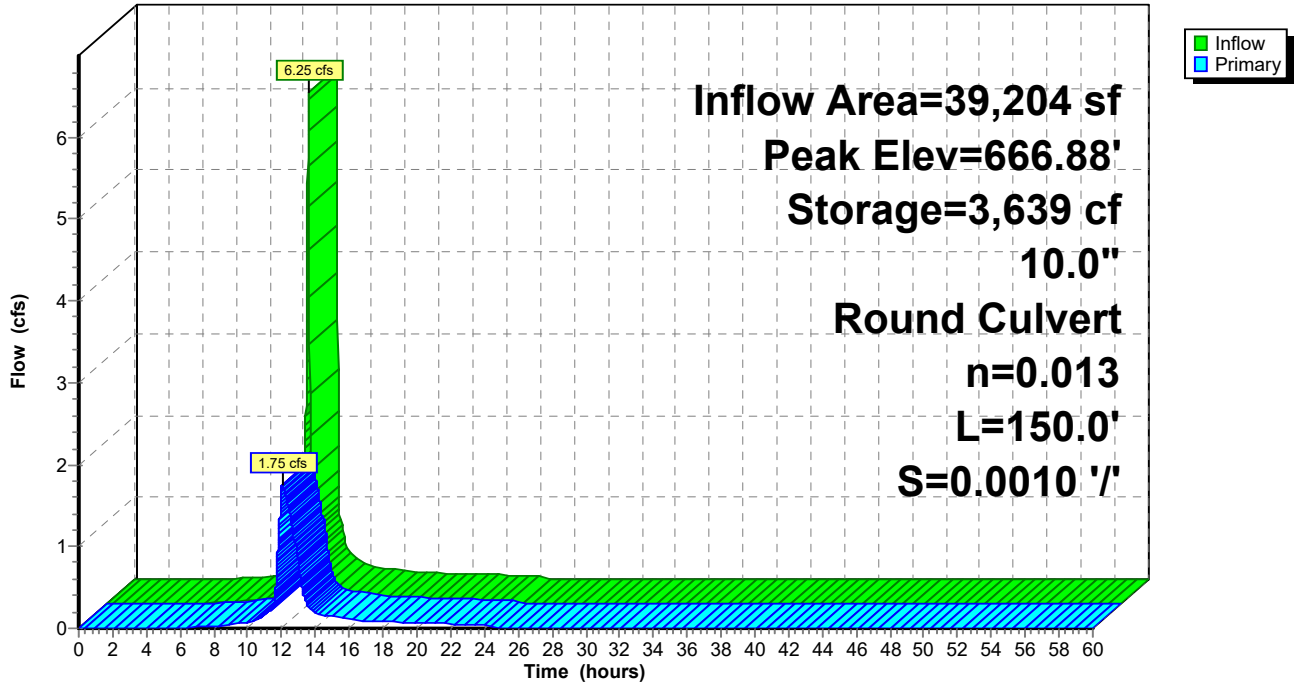
Device	Routing	Invert	Outlet Devices
#1	Primary	665.00'	10.0" Round Culvert L= 150.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 665.00' / 664.85' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.75 cfs @ 12.04 hrs HW=666.88' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.75 cfs @ 3.21 fps)

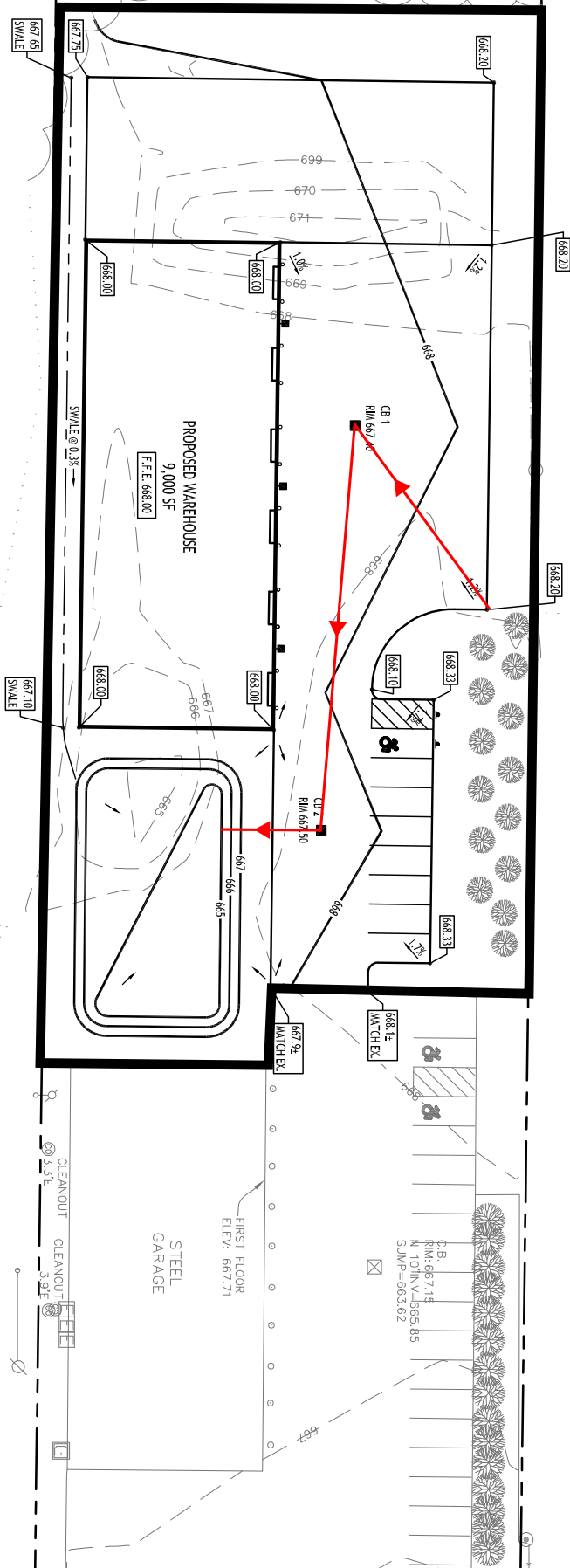
Pond 1P: Ex. Pond

Hydrograph



PROPOSED RUNOFF

4620 CLINTON ST
N/F MICHA MALEWSKI



N
Grading Plan
SCALE: 1"=30'

4540 CLINTON ST
N/F JAMN LLC

Proposed Runoff

22.346 proposed

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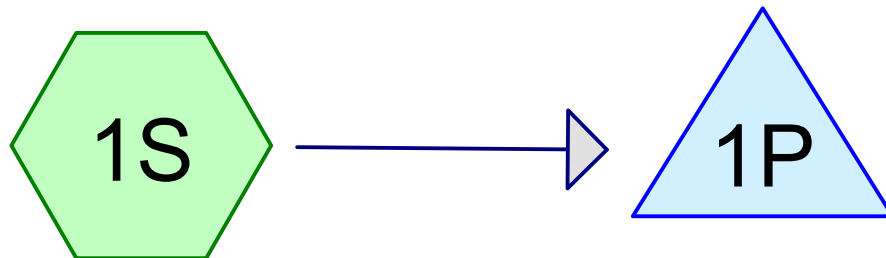
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Type II 24-hr 100-Year Rainfall=5.23"

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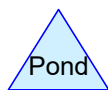
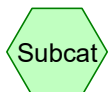
Events for Pond 1P: Pond

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-Year	1.99	0.60	665.65	1,435
2-Year	2.49	0.79	665.76	1,776
5-Year	3.23	1.03	665.92	2,284
10-Year	3.90	1.16	666.06	2,767
25-Year	4.95	1.32	666.28	3,560
50-Year	5.91	1.52	666.47	4,278
100-Year	7.02	1.72	666.69	5,130



Proposed

Pond



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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	1.87	2
2	10-Year	Type II 24-hr		Default	24.00	1	3.14	2
3	100-Year	Type II 24-hr		Default	24.00	1	5.23	2

22.346 proposed

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
11,761	79	50-75% Grass cover, Fair, HSG C (1S)
6,098	96	Gravel surface, HSG C (1S)
12,632	98	Paved parking, HSG C (1S)
8,712	98	Roofs, HSG C (1S)
39,204	92	TOTAL AREA

22.346 proposed

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
39,204	HSG C	1S
0	HSG D	
0	Other	
39,204		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	11,761	0	0	11,761	50-75% Grass cover, Fair
0	0	6,098	0	0	6,098	Gravel surface
0	0	12,632	0	0	12,632	Paved parking
0	0	8,712	0	0	8,712	Roofs
0	0	39,204	0	0	39,204	TOTAL AREA

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1S	0.00	0.00	155.0	0.0030	0.013	0.0	8.0	0.0
2	1P	665.00	664.85	125.0	0.0012	0.013	0.0	10.0	0.0

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Type II 24-hr 1-Year Rainfall=1.87"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Proposed

Runoff Area=0.900 ac 54.44% Impervious Runoff Depth=1.12"
Flow Length=225' Tc=2.7 min CN=92 Runoff=1.99 cfs 3,663 cf

Pond 1P: Pond

Peak Elev=665.65' Storage=1,435 cf Inflow=1.99 cfs 3,663 cf
10.0" Round Culvert n=0.013 L=125.0' S=0.0012 ' Outflow=0.60 cfs 3,650 cf

Total Runoff Area = 39,204 sf Runoff Volume = 3,663 cf Average Runoff Depth = 1.12"
45.56% Pervious = 17,860 sf 54.44% Impervious = 21,344 sf

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Type II 24-hr 1-Year Rainfall=1.87"

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Summary for Subcatchment 1S: Proposed

[47] Hint: Peak is 301% of capacity of segment #2

Runoff = 1.99 cfs @ 11.93 hrs, Volume= 3,663 cf, Depth= 1.12"
 Routed to Pond 1P : Pond

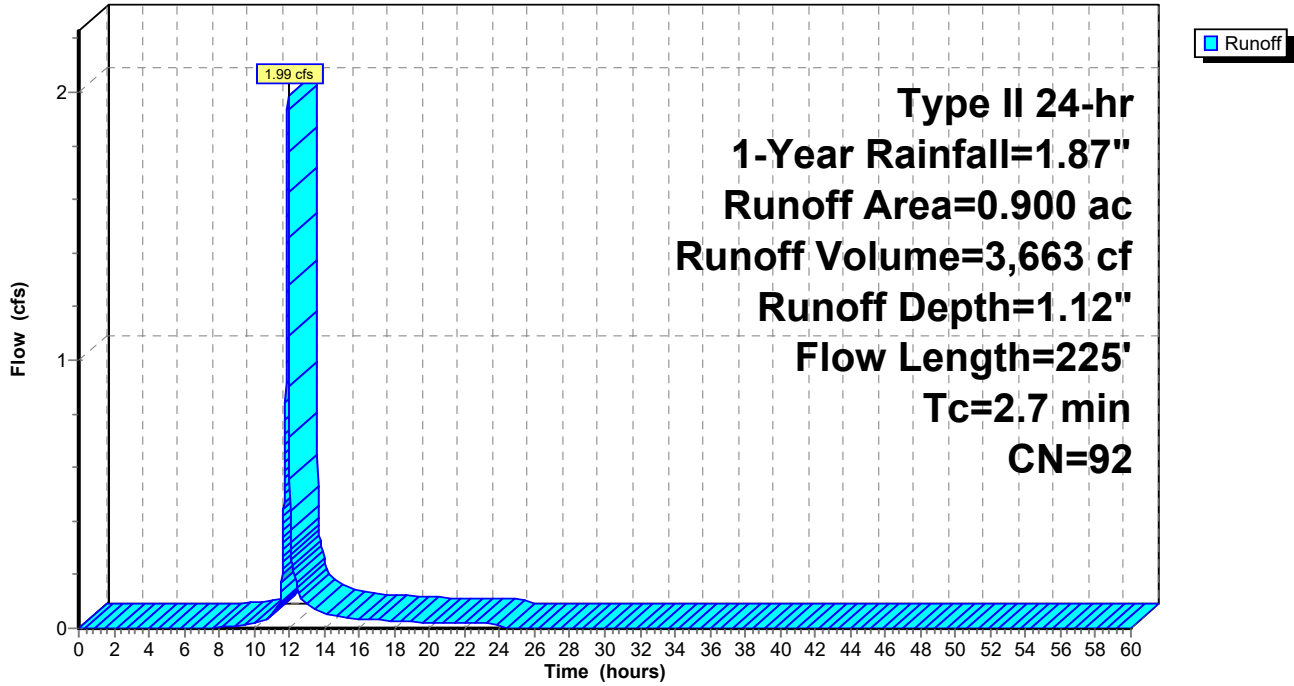
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-Year Rainfall=1.87"

Area (ac)	CN	Description
0.200	98	Roofs, HSG C
0.290	98	Paved parking, HSG C
0.140	96	Gravel surface, HSG C
0.270	79	50-75% Grass cover, Fair, HSG C
0.900	92	Weighted Average
0.410		45.56% Pervious Area
0.490		54.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	70	0.0120	0.92		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	155	0.0030	1.90	0.66	Pipe Channel, 8" Pipe 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
2.7	225	Total			

Subcatchment 1S: Proposed

Hydrograph



22.346 proposed

Type II 24-hr 1-Year Rainfall=1.87"

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Summary for Pond 1P: Pond

Inflow Area = 39,204 sf, 54.44% Impervious, Inflow Depth = 1.12" for 1-Year event
 Inflow = 1.99 cfs @ 11.93 hrs, Volume= 3,663 cf
 Outflow = 0.60 cfs @ 12.03 hrs, Volume= 3,650 cf, Atten= 70%, Lag= 5.6 min
 Primary = 0.60 cfs @ 12.03 hrs, Volume= 3,650 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 665.65' @ 12.03 hrs Surf.Area= 2,831 sf Storage= 1,435 cf

Plug-Flow detention time= 97.3 min calculated for 3,650 cf (100% of inflow)
 Center-of-Mass det. time= 95.1 min (907.6 - 812.6)

Volume	Invert	Avail.Storage	Storage Description
#1	665.00'	6,428 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
665.00	1,615	0	0
666.00	3,500	2,558	2,558
667.00	4,240	3,870	6,428

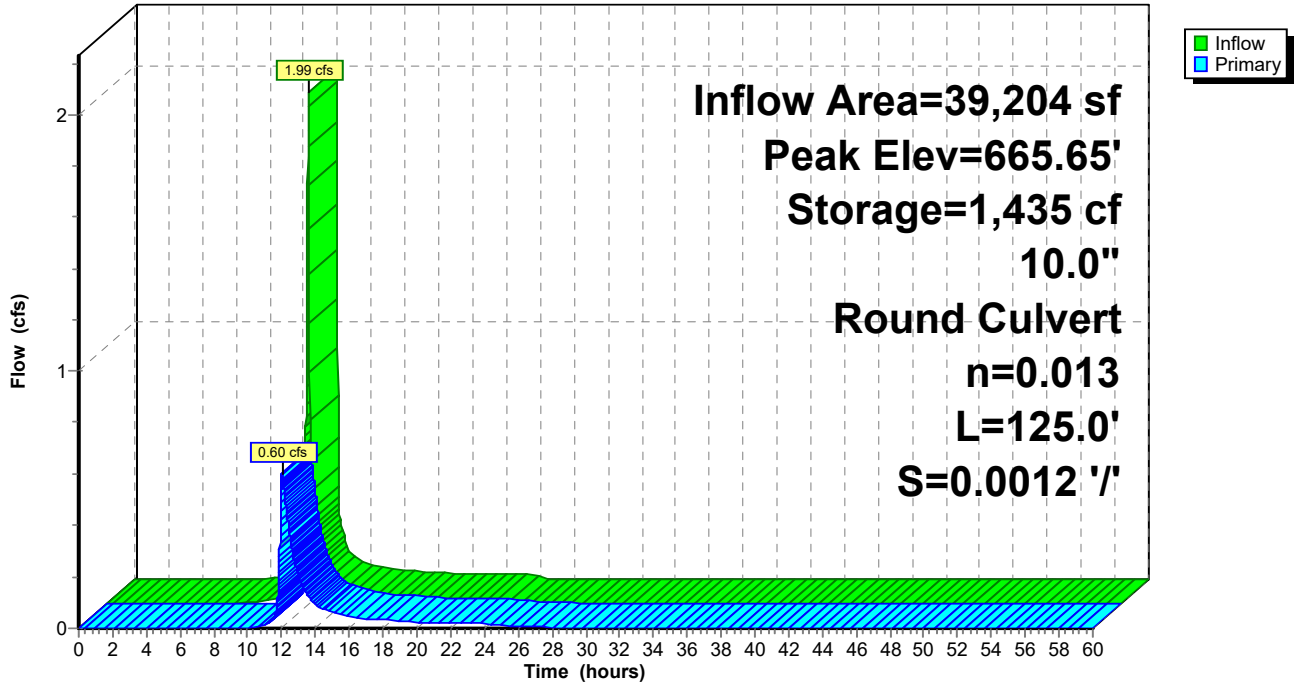
Device	Routing	Invert	Outlet Devices
#1	Primary	665.00'	10.0" Round Culvert L= 125.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 665.00' / 664.85' S= 0.0012 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.60 cfs @ 12.03 hrs HW=665.65' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.60 cfs @ 1.84 fps)

Pond 1P: Pond

Hydrograph



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Type II 24-hr 10-Year Rainfall=3.14"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Proposed

Runoff Area=0.900 ac 54.44% Impervious Runoff Depth=2.29"
Flow Length=225' Tc=2.7 min CN=92 Runoff=3.90 cfs 7,493 cf

Pond 1P: Pond

Peak Elev=666.06' Storage=2,767 cf Inflow=3.90 cfs 7,493 cf
10.0" Round Culvert n=0.013 L=125.0' S=0.0012 '/' Outflow=1.16 cfs 7,480 cf

Total Runoff Area = 39,204 sf Runoff Volume = 7,493 cf Average Runoff Depth = 2.29"
45.56% Pervious = 17,860 sf 54.44% Impervious = 21,344 sf

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Type II 24-hr 10-Year Rainfall=3.14"

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Summary for Subcatchment 1S: Proposed

[47] Hint: Peak is 590% of capacity of segment #2

Runoff = 3.90 cfs @ 11.93 hrs, Volume= 7,493 cf, Depth= 2.29"
 Routed to Pond 1P : Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.200	98	Roofs, HSG C
0.290	98	Paved parking, HSG C
0.140	96	Gravel surface, HSG C
0.270	79	50-75% Grass cover, Fair, HSG C
0.900	92	Weighted Average
0.410		45.56% Pervious Area
0.490		54.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	70	0.0120	0.92		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	155	0.0030	1.90	0.66	Pipe Channel, 8" Pipe 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
2.7	225	Total			

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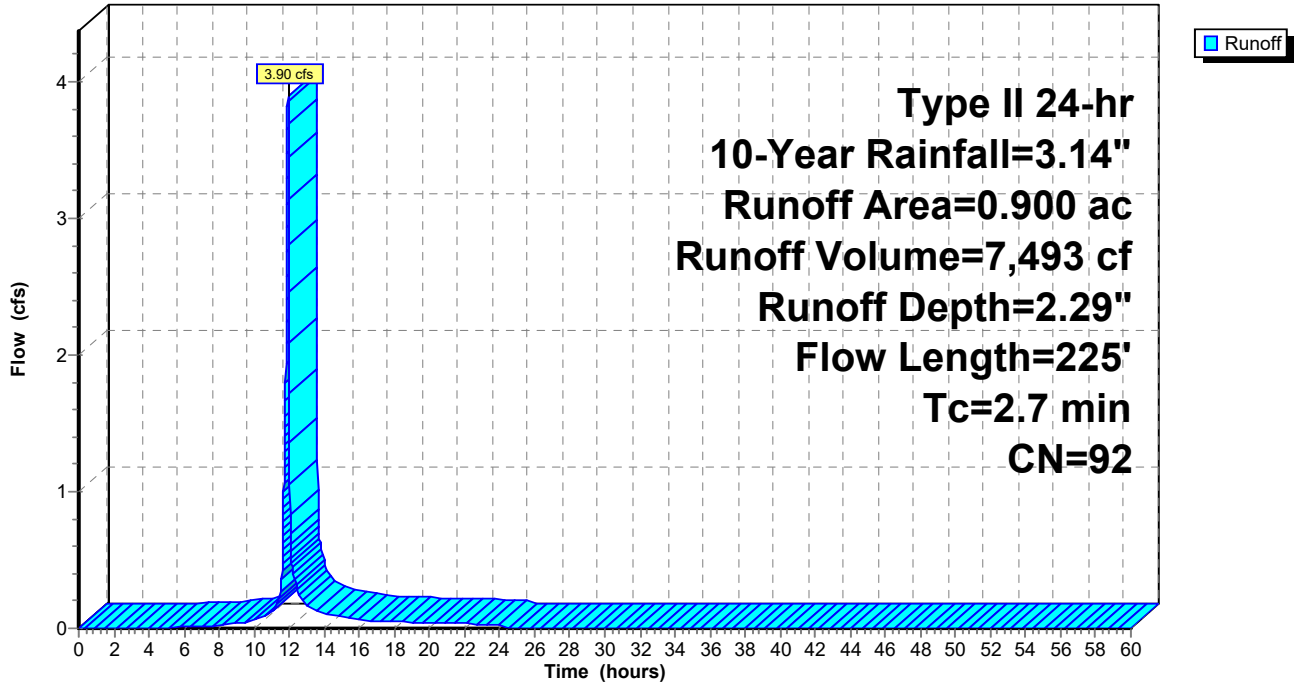
Type II 24-hr 10-Year Rainfall=3.14"

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Subcatchment 1S: Proposed

Hydrograph



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Type II 24-hr 10-Year Rainfall=3.14"

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Summary for Pond 1P: Pond

Inflow Area = 39,204 sf, 54.44% Impervious, Inflow Depth = 2.29" for 10-Year event
 Inflow = 3.90 cfs @ 11.93 hrs, Volume= 7,493 cf
 Outflow = 1.16 cfs @ 12.03 hrs, Volume= 7,480 cf, Atten= 70%, Lag= 5.7 min
 Primary = 1.16 cfs @ 12.03 hrs, Volume= 7,480 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 666.06' @ 12.03 hrs Surf.Area= 3,544 sf Storage= 2,767 cf

Plug-Flow detention time= 72.2 min calculated for 7,479 cf (100% of inflow)
 Center-of-Mass det. time= 71.3 min (863.6 - 792.2)

Volume	Invert	Avail.Storage	Storage Description
#1	665.00'	6,428 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
665.00	1,615	0	0
666.00	3,500	2,558	2,558
667.00	4,240	3,870	6,428

Device	Routing	Invert	Outlet Devices
#1	Primary	665.00'	10.0" Round Culvert L= 125.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 665.00' / 664.85' S= 0.0012 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.16 cfs @ 12.03 hrs HW=666.06' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.16 cfs @ 2.17 fps)

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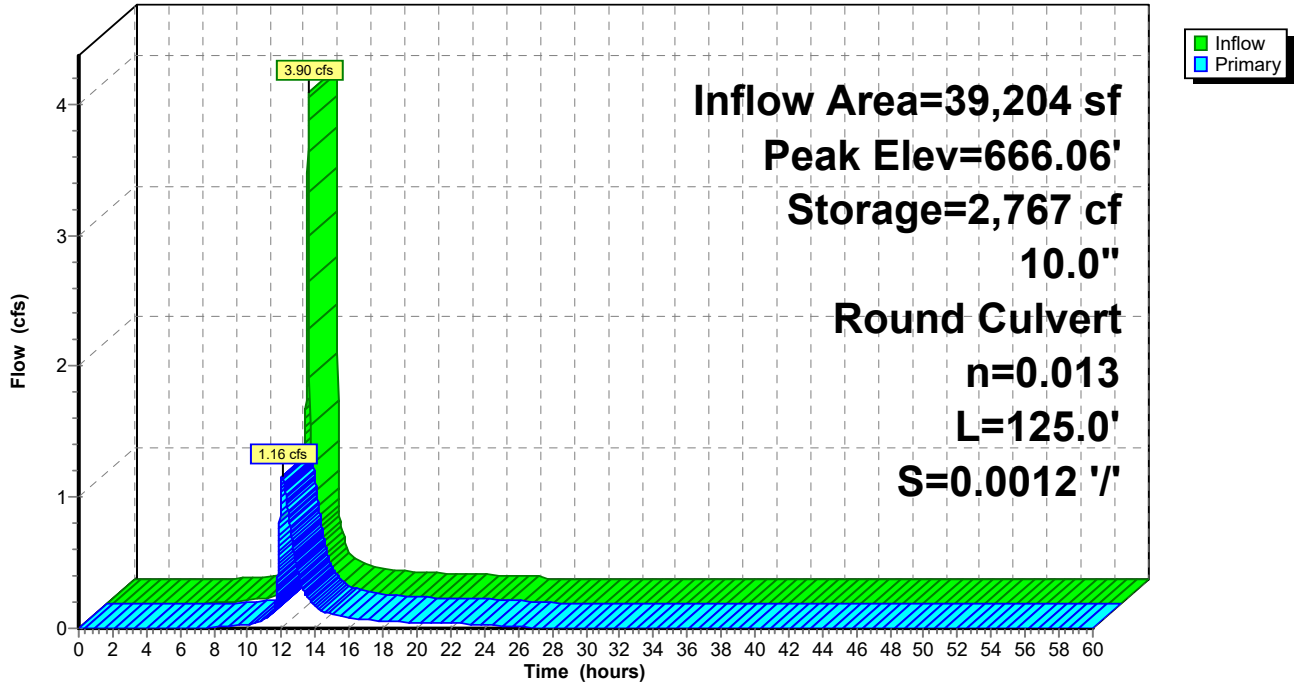
Type II 24-hr 10-Year Rainfall=3.14"

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Pond 1P: Pond

Hydrograph



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Type II 24-hr 100-Year Rainfall=5.23"

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Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Proposed

Runoff Area=0.900 ac 54.44% Impervious Runoff Depth=4.31"
Flow Length=225' Tc=2.7 min CN=92 Runoff=7.02 cfs 14,094 cf

Pond 1P: Pond

Peak Elev=666.69' Storage=5,130 cf Inflow=7.02 cfs 14,094 cf
10.0" Round Culvert n=0.013 L=125.0' S=0.0012 '/' Outflow=1.72 cfs 14,080 cf

Total Runoff Area = 39,204 sf Runoff Volume = 14,094 cf Average Runoff Depth = 4.31"
45.56% Pervious = 17,860 sf 54.44% Impervious = 21,344 sf

22.346 proposed

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Type II 24-hr 100-Year Rainfall=5.23"

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Summary for Subcatchment 1S: Proposed

[47] Hint: Peak is 1061% of capacity of segment #2

Runoff = 7.02 cfs @ 11.93 hrs, Volume= 14,094 cf, Depth= 4.31"
 Routed to Pond 1P : Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=5.23"

Area (ac)	CN	Description
0.200	98	Roofs, HSG C
0.290	98	Paved parking, HSG C
0.140	96	Gravel surface, HSG C
0.270	79	50-75% Grass cover, Fair, HSG C
0.900	92	Weighted Average
0.410		45.56% Pervious Area
0.490		54.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	70	0.0120	0.92		Sheet Flow, pavement Smooth surfaces n= 0.011 P2= 2.50"
1.4	155	0.0030	1.90	0.66	Pipe Channel, 8" Pipe 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
2.7	225	Total			

22.346 proposed

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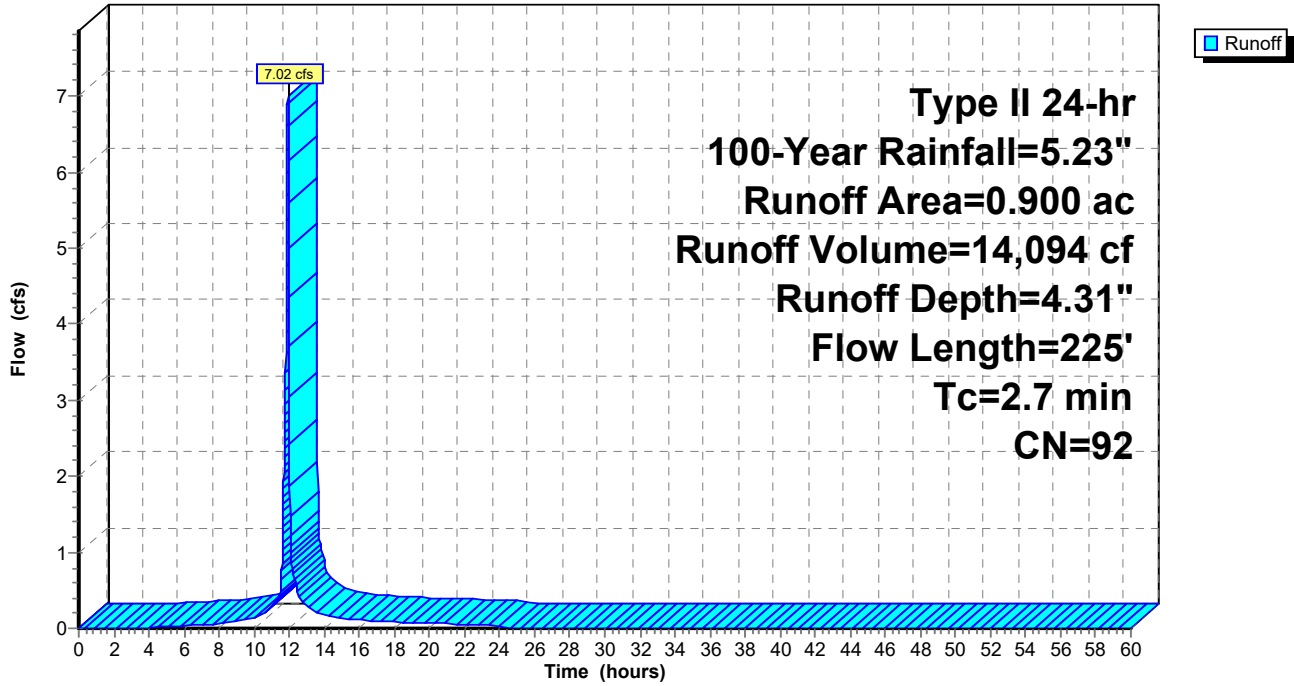
Type II 24-hr 100-Year Rainfall=5.23"

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Subcatchment 1S: Proposed

Hydrograph



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Type II 24-hr 100-Year Rainfall=5.23"

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Summary for Pond 1P: Pond

Inflow Area = 39,204 sf, 54.44% Impervious, Inflow Depth = 4.31" for 100-Year event
 Inflow = 7.02 cfs @ 11.93 hrs, Volume= 14,094 cf
 Outflow = 1.72 cfs @ 12.03 hrs, Volume= 14,080 cf, Atten= 76%, Lag= 6.2 min
 Primary = 1.72 cfs @ 12.03 hrs, Volume= 14,080 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
 Peak Elev= 666.69' @ 12.03 hrs Surf.Area= 4,007 sf Storage= 5,130 cf

Plug-Flow detention time= 61.7 min calculated for 14,078 cf (100% of inflow)
 Center-of-Mass det. time= 61.4 min (836.3 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	665.00'	6,428 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
665.00	1,615	0	0
666.00	3,500	2,558	2,558
667.00	4,240	3,870	6,428

Device	Routing	Invert	Outlet Devices
#1	Primary	665.00'	10.0" Round Culvert L= 125.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 665.00' / 664.85' S= 0.0012 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.72 cfs @ 12.03 hrs HW=666.68' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.72 cfs @ 3.15 fps)

Pond 1P: Pond

Hydrograph

