

PRELIMINARY STORM WATER MANAGEMENT REPORT

PROJECT:

Lighthouse of Waukesha Senior Living Development
STH 164 and E. Broadway
Waukesha, WI

PREPARED FOR:

New Perspective Senior Living
c/o The Boldt Company
1110 N. Old World Third Street
Milwaukee, WI

PREPARED BY:

The Sigma Group, Inc.
1300 West Canal Street
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August 24, 2018

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- A. Soils Map
- B. Storm Water Quantity (HydroCAD) Modeling
- C. Storm Water Quality (WinSLAMM) Modeling

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- SWM 1.0 Storm Water Management Plan - Pre-Development Conditions Plan**
- SWM 2.0 Storm Water Management Plan - Post-Development Conditions Plan**

Preliminary Site Civil Plan (separate cover)

1. INTRODUCTION

This report presents the proposed preliminary storm water management plan, including supporting modeling, analyses and plans/figures, for the proposed Lighthouse of Waukesha Senior Living Development. The project site is located at the southeast quadrant of State Highway 164 and E. Broadway in the City of Waukesha. An approximate 23.18 acre parcel will be split by Certified Survey Map from the existing Salem United Methodist Church parcel to create the parcel for the senior living development.

This project involves the construction of a multi-level senior living facility building with a footprint of approximately 68,900 square feet along with associated drives, surface parking, utilities and storm water management facility.

2. EXISTING CONDITIONS SUMMARY

The project site is bound by State Highway 164 to the west, East Broadway to the north, the Salem United Methodist Church to the north and residential development to the east. The project site is currently vacant. Approximately the western 2/3's of the site is surfaced with grasses; the eastern 1/3 is covered with dense stands of trees and brush. The site generally slopes/drains to the north/northeast. The western 2/3's of the site is relatively flat; the eastern 1/3 of the site slopes sharply to the northeast with about a total of approximately 31 feet of drop from the southwest corner of the site to the northeast corner of the site. An existing conditions survey is included in the preliminary civil plans attached to this report.

The existing soils and hydraulic group on the site, according to NRCS soil mapping, include the following: approximately 1.0% Hochheim laom HmB2, 58.2% Hochheim laom HmC2, 3.4% Hochheim loam HmD2, 11.5% Hochheim soils HoD3, 23.6% Lamartine silt loam LmB, and 2.4% Pella silt loam Ph. For the modeling purposes the hydraulic group C was used. Refer to NRCS soil mapping in Appendix A.

3. PROPOSED CONDITIONS SUMMARY

The project will result in the addition of approximately 3.09 acres of impervious surface including building and pavements. Storm water will be collected in storm inlets and piped to the proposed storm water management basin located at the northeast corner of the site. Refer to the attached preliminary site civil plans.

4. STORM WATER MANAGEMENT REQUIREMENTS

As a new development project that will disturb more than one acre of land, the project will be subject to the following storm water management requirements under WDNR NR 151 and City of Waukesha storm water management regulations.

QUALITY

WDNR NR 151 / City of Waukesha Chapter 32.10(d)(2)(i)

Reduce to the maximum extent practicable, the total suspended solids load by 80%, based on an average annual rainfall, as compared to no runoff management controls.

QUANTITY/PEAK FLOW

City of Waukesha Chapter 32.10(d)(1)(A)

The calculated post-development peak storm water discharge rate shall not exceed the calculated pre-development discharge rates for the 2-year, 10-year, and 100-year, 24-hour design storms.

WDNR NR 151.123(1)

Maintain or reduce the 1-year, 24-hour and the 2-year, 24-hour post construction discharge rates to the 1-year, 24-hour and the 2-year, 24-hour predevelopment peak discharge rates.

INFILTRATION

City of Waukesha Chapter 32.10(d)(3)(A)

Infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 90% of the pre-development infiltration volume, based on average annual rainfall; or, infiltrate 25% of the post-development runoff volume from the 2-year, 24-hour design storm with a type II distribution. In either case, when designing appropriate infiltration systems to meet this requirement, no more than 1% of the project site is required as an effective infiltration area.

5. PRELIMINARY PROPOSED STORM WATER MANAGEMENT FACILITIES

Currently a wet detention basin is proposed in the northeast corner of the site to provide the required storm water management and meet applicable discharge requirements. It should be noted that we understand that storm water infiltration will need to be evaluated for the site. We are currently waiting for additional soils information for this evaluation. Upon receipt of that information, Sigma will evaluate storm water infiltration. If the storm water infiltration is found to be suitable for the site, the basin will be modified to accommodate storm water infiltration and this storm water report will be updated accordingly.

As currently shown on our plans, the wet detention basin will have a normal water level of 882.00 and a high water elevation of 884.96. The area of the basin at the normal water elevation is 9,354 square feet. The basin will discharge to the existing drainage ditch along the south side of East Broadway. Discharge from the basin will be through an outlet control structure. The outlet control structure will be fitted with a 3.0" orifice

set at an elevation of 882.00 and a 36" orifice set at an elevation of 883.75. The outlet control structure will also include an overflow weir set at an elevation of 885.00.

6. MODELING & CALCULATIONS

The hydraulic calculations and analysis presented in this report were performed using HydroCad Watershed Modeling software which utilizes the methodologies of TR-55 for a hydrograph based analysis of watershed conditions. Hydrographs were developed using a standard Type II hydrograph for the various 24-hr storm events. Rainfall depths used in this model area as follows: 2 year = 2.70 in., 10 year = 4.00 in., 100 year = 5.60 in.

WinSLAMM modeling was used to model TSS removal for the storm water management measures.

Based on the NRCS soils data for the site, the majority of the native soils are silty loams a type C soil (CN = 79).

Time of concentration values were calculated based on the standard TR-55 method.

Refer to Figures SW 1.0 and SW 2.0 for data (surface areas, curve numbers, times of concentration, etc.) used to model pre-development and post development conditions.

HydroCad and WinSLAMM modeling backup are presented in Appendices D and E, respectively.

7. SUMMARY OF MODELING/CALCULATIONS

A summary of results for can be viewed in the tables below:

Storm Frequency (yr)	Pre-development Site Conditions	Post-Development Site Conditions
	Peak Runoff Discharge Rate (cfs)	Peak Runoff Discharge Rate (cfs)
2	12.08	3.42
10	24.18	21.13
100	40.44	32.64

Water Quality (TSS Reduction) Summary Table:

Drainage Area (AC)	Pounds of TSS Loading Generated (lbs)	Pounds of TSS Remaining After Post Control Treatment (lbs)	Removal Rate
7.18	1870	350.5	81.26

As shown, the proposed basin meets both the peak discharge requirements as well as total suspended solids treatment requirements.

8. MAINTENANCE PLAN

The Owner will be responsible for the regular inspection and maintenance of the storm water management facilities to ensure that they are functioning properly. We understand a maintenance agreement is required and will be prepared and submitted upon approval of our storm water approach and finalization of our storm water plans. Proposed inspection and maintenance activities and frequencies are included in Appendix D to this report.

9. CONCLUSION

Based on Sigma's evaluation, the proposed storm water management approach as summarized in this report and presented on the attached plans and attachments, meets City and WDNR storm water management requirements for both flow control and TSS removal.

Soil Map—Milwaukee and Waukesha Counties, Wisconsin



Map Scale: 1:1,210 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

8/27/2018
Page 1 of 3


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 1:15,800.

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: Milwaukee and Waukesha Counties, Wisconsin
 Survey Area Data: Version 13, Oct 6, 2017

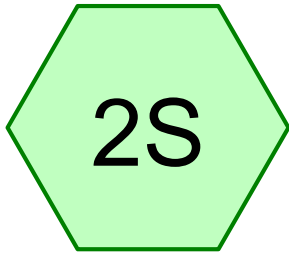
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 7, 2014—Sep 22, 2014

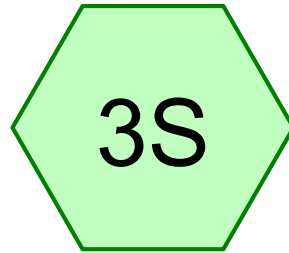
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

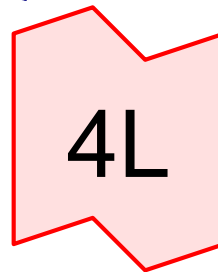
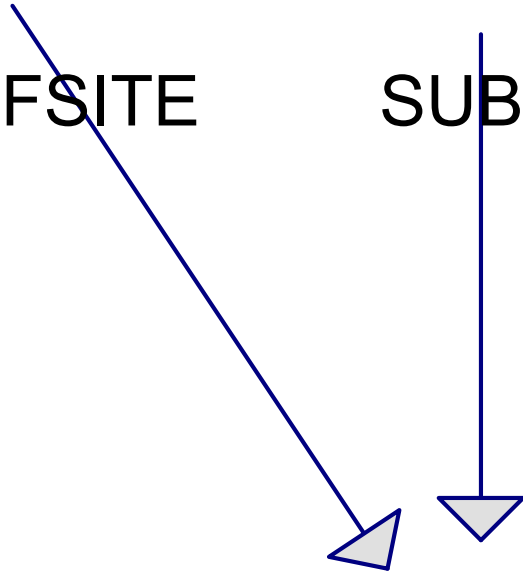
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HmB2	Hochheim loam, 2 to 6 percent slopes, eroded	0.1	1.0%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	3.8	58.2%
HmD2	Hochheim loam, 12 to 20 percent slopes, eroded	0.2	3.4%
HoD3	Hochheim soils, 12 to 20 percent slopes, severely eroded	0.7	11.5%
LmB	Lamartine silt loam, 0 to 3 percent slopes	1.5	23.6%
Ph	Pella silt loam, 0 to 2 percent slopes	0.2	2.4%
Totals for Area of Interest		6.5	100.0%



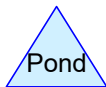
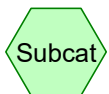
SUB 2 - OFFSITE



SUB 1



(new Link)



17884 - Existing HydroCAD

Type II 24-hr 2YR Rainfall=2.70"

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Printed 8/27/2018

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Page 2

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: SUB 2 - OFFSITE

Runoff Area=61,537 sf 0.00% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=79 Runoff=2.39 cfs 0.115 af

Subcatchment3S: SUB 1

Runoff Area=249,871 sf 0.00% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=79 Runoff=9.70 cfs 0.466 af

Link 4L: (new Link)

Inflow=12.08 cfs 0.580 af
Primary=12.08 cfs 0.580 af

Total Runoff Area = 7.149 ac Runoff Volume = 0.580 af Average Runoff Depth = 0.97"
100.00% Pervious = 7.149 ac 0.00% Impervious = 0.000 ac

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Type II 24-hr 2YR Rainfall=2.70"

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Summary for Subcatchment 2S: SUB 2 - OFFSITE

Runoff = 2.39 cfs @ 11.98 hrs, Volume= 0.115 af, Depth= 0.97"

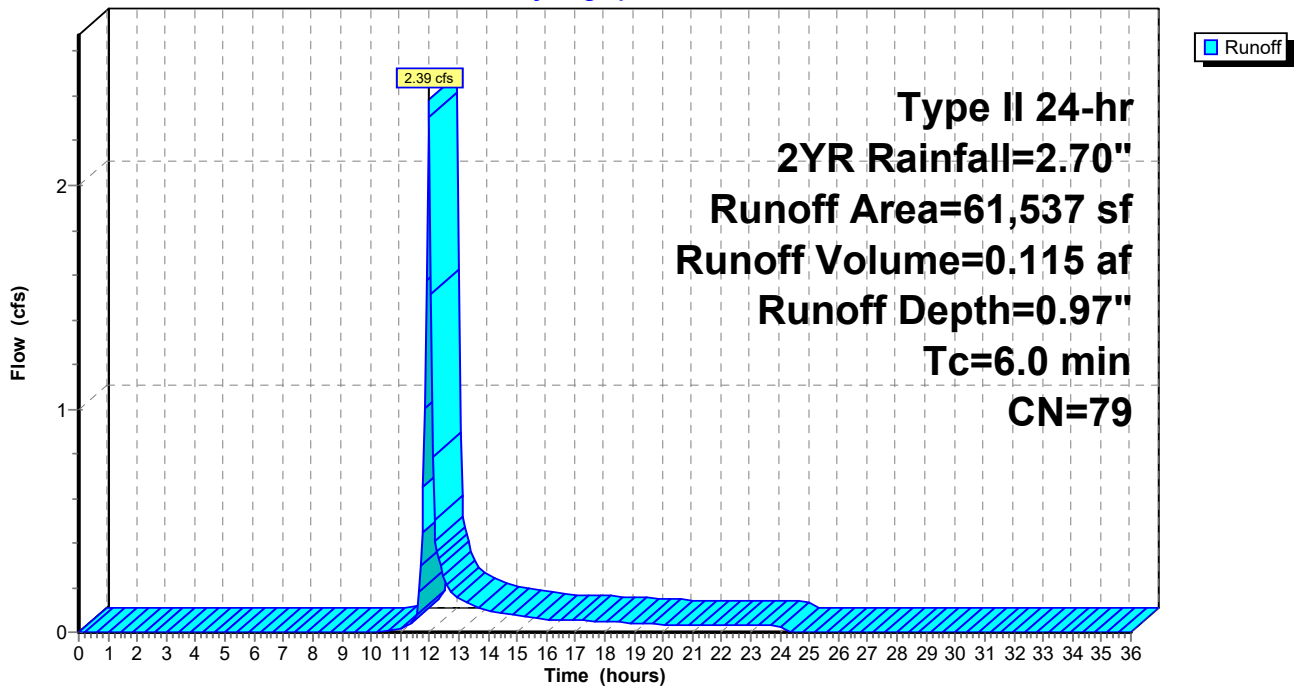
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR Rainfall=2.70"

Area (sf)	CN	Description
* 61,537	79	>75% Grass cover, Good, HSG C
61,537		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 2S: SUB 2 - OFFSITE

Hydrograph



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Type II 24-hr 2YR Rainfall=2.70"

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Summary for Subcatchment 3S: SUB 1

Runoff = 9.70 cfs @ 11.98 hrs, Volume= 0.466 af, Depth= 0.97"

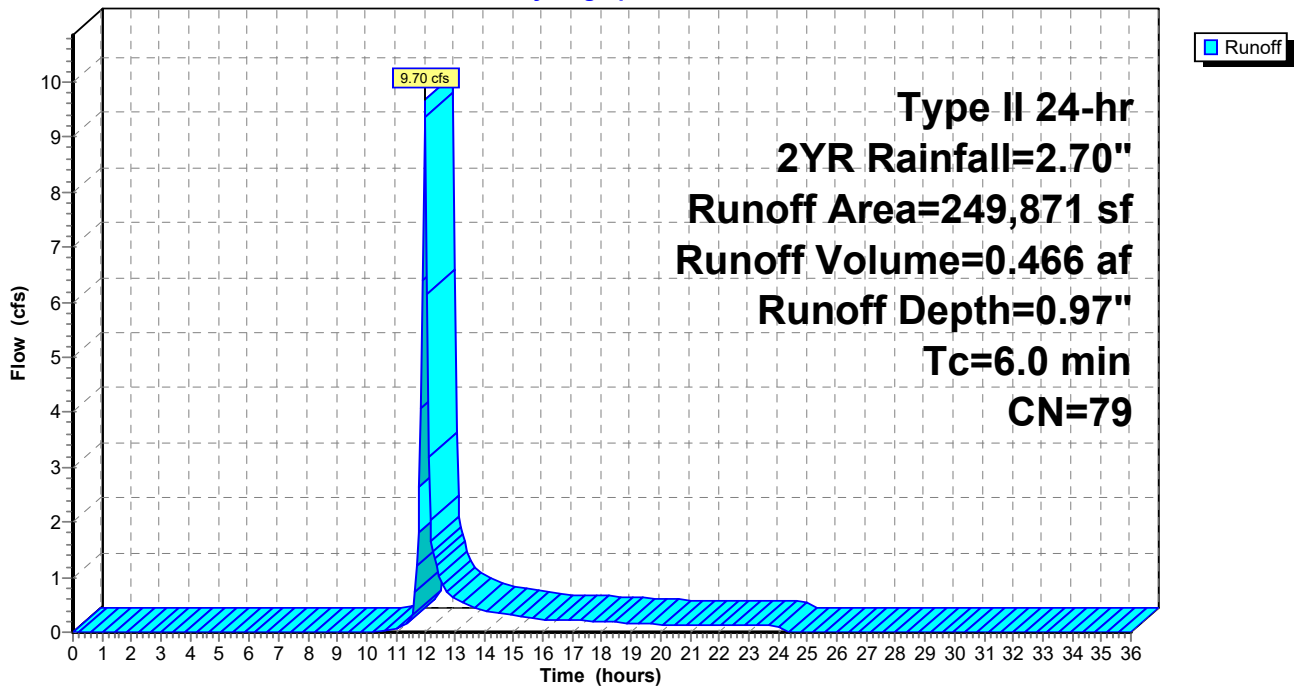
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR Rainfall=2.70"

Area (sf)	CN	Description
* 249,871	79	>75% Grass cover, Good, HSG C
249,871		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Minimum

Subcatchment 3S: SUB 1

Hydrograph



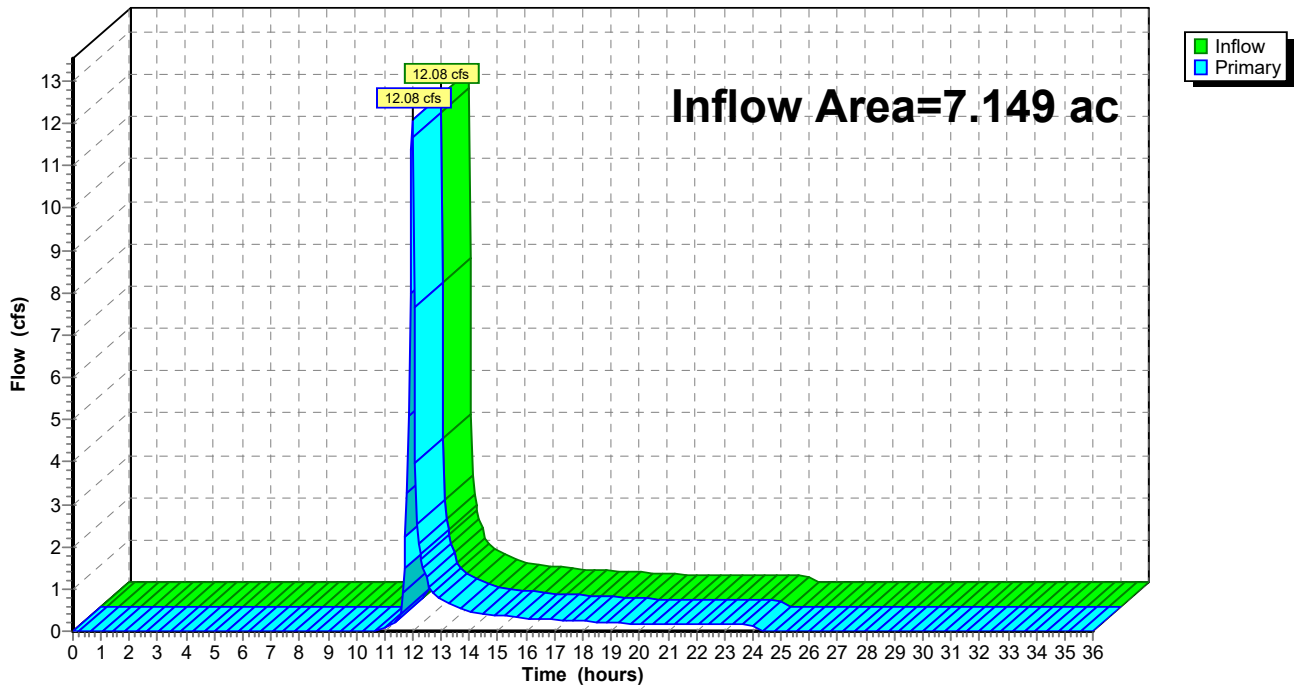
Summary for Link 4L: (new Link)

Inflow Area = 7.149 ac, 0.00% Impervious, Inflow Depth = 0.97" for 2YR event
Inflow = 12.08 cfs @ 11.98 hrs, Volume= 0.580 af
Primary = 12.08 cfs @ 11.98 hrs, Volume= 0.580 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 4L: (new Link)

Hydrograph



17884 - Existing HydroCAD

Type II 24-hr 10YR Rainfall=4.00"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: SUB 2 - OFFSITE

Runoff Area=61,537 sf 0.00% Impervious Runoff Depth=1.96"
Tc=6.0 min CN=79 Runoff=4.78 cfs 0.231 af

Subcatchment3S: SUB 1

Runoff Area=249,871 sf 0.00% Impervious Runoff Depth=1.96"
Tc=6.0 min CN=79 Runoff=19.40 cfs 0.939 af

Link 4L: (new Link)

Inflow=24.18 cfs 1.170 af
Primary=24.18 cfs 1.170 af

Total Runoff Area = 7.149 ac Runoff Volume = 1.170 af Average Runoff Depth = 1.96"
100.00% Pervious = 7.149 ac 0.00% Impervious = 0.000 ac

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Type II 24-hr 10YR Rainfall=4.00"

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Summary for Subcatchment 2S: SUB 2 - OFFSITE

Runoff = 4.78 cfs @ 11.97 hrs, Volume= 0.231 af, Depth= 1.96"

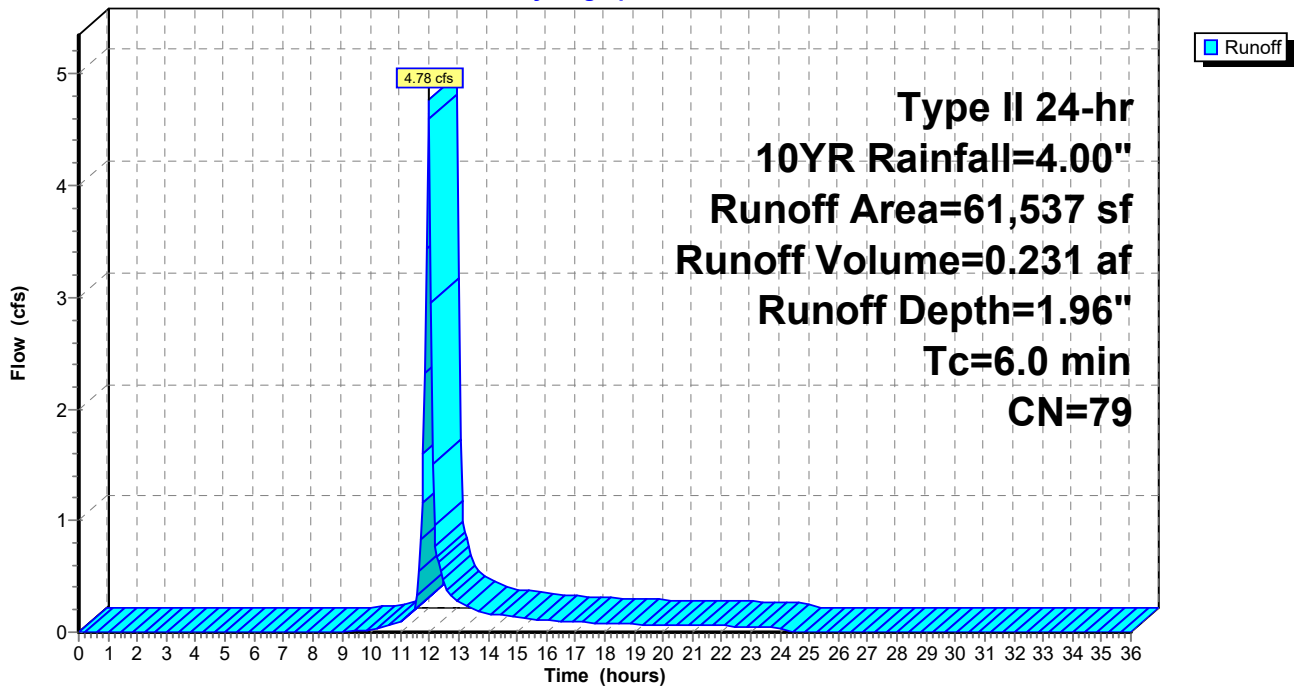
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Type II 24-hr 10YR Rainfall=4.00"

Area (sf)	CN	Description
* 61,537	79	>75% Grass cover, Good, HSG C
61,537		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 2S: SUB 2 - OFFSITE

Hydrograph



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Type II 24-hr 10YR Rainfall=4.00"

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Summary for Subcatchment 3S: SUB 1

Runoff = 19.40 cfs @ 11.97 hrs, Volume= 0.939 af, Depth= 1.96"

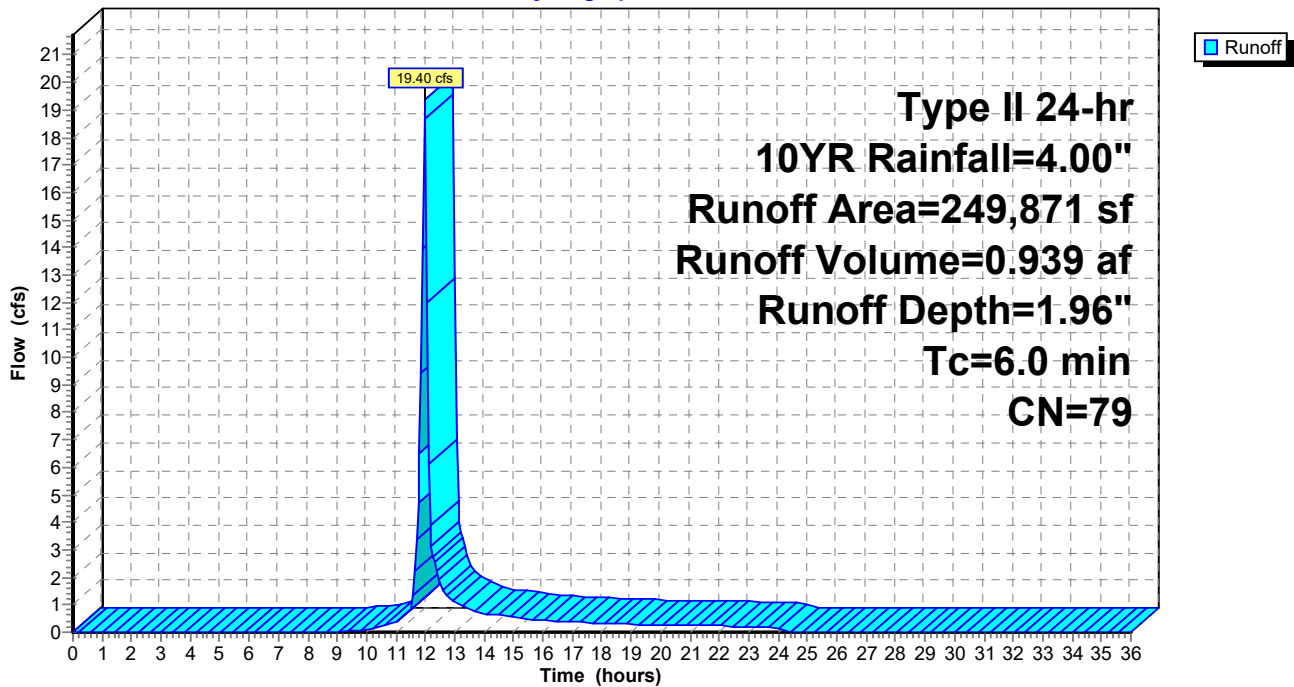
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR Rainfall=4.00"

Area (sf)	CN	Description
* 249,871	79	>75% Grass cover, Good, HSG C
249,871		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Minimum

Subcatchment 3S: SUB 1

Hydrograph



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Type II 24-hr 10YR Rainfall=4.00"

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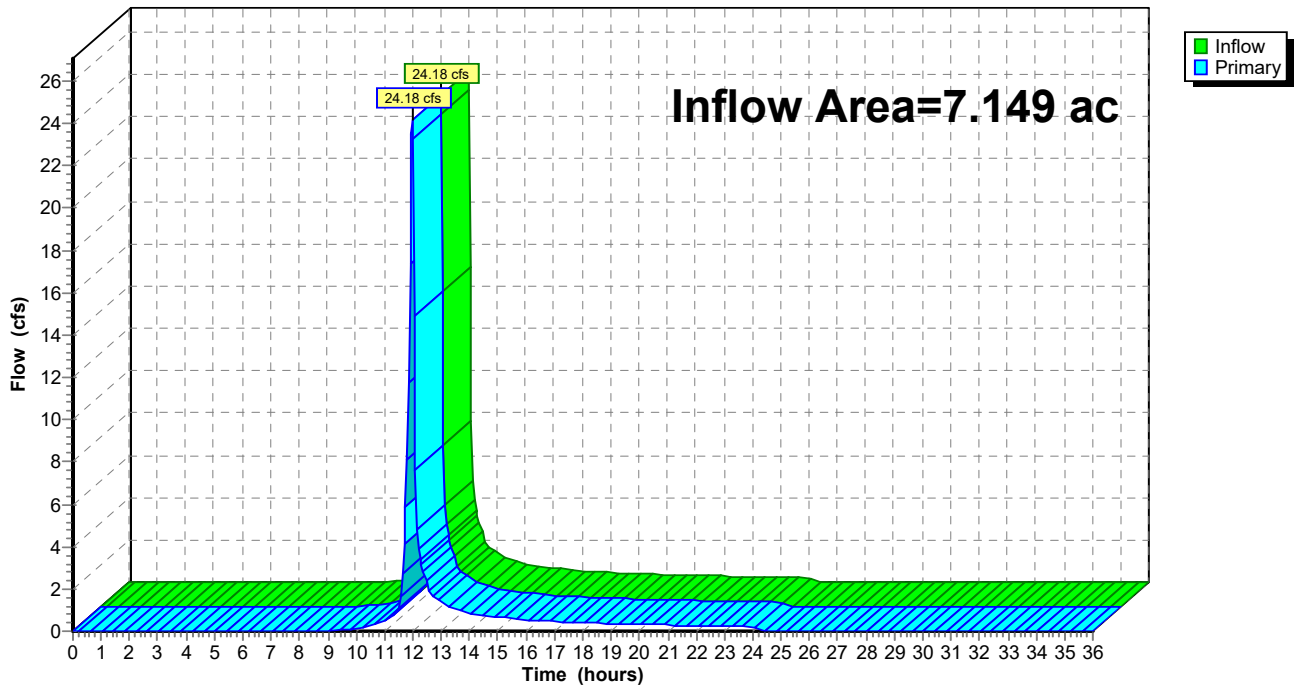
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Inflow = 24.18 cfs @ 11.97 hrs, Volume= 1.170 af
Primary = 24.18 cfs @ 11.97 hrs, Volume= 1.170 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 4L: (new Link)

Hydrograph



17884 - Existing HydroCAD

Type II 24-hr 100YR Rainfall=5.60"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: SUB 2 - OFFSITE

Runoff Area=61,537 sf 0.00% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=79 Runoff=7.99 cfs 0.391 af

Subcatchment3S: SUB 1

Runoff Area=249,871 sf 0.00% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=79 Runoff=32.45 cfs 1.589 af

Link 4L: (new Link)

Inflow=40.44 cfs 1.981 af
Primary=40.44 cfs 1.981 af

Total Runoff Area = 7.149 ac Runoff Volume = 1.981 af Average Runoff Depth = 3.32"
100.00% Pervious = 7.149 ac 0.00% Impervious = 0.000 ac

17884 - Existing HydroCAD

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Type II 24-hr 100YR Rainfall=5.60"

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Summary for Subcatchment 2S: SUB 2 - OFFSITE

Runoff = 7.99 cfs @ 11.97 hrs, Volume= 0.391 af, Depth= 3.32"

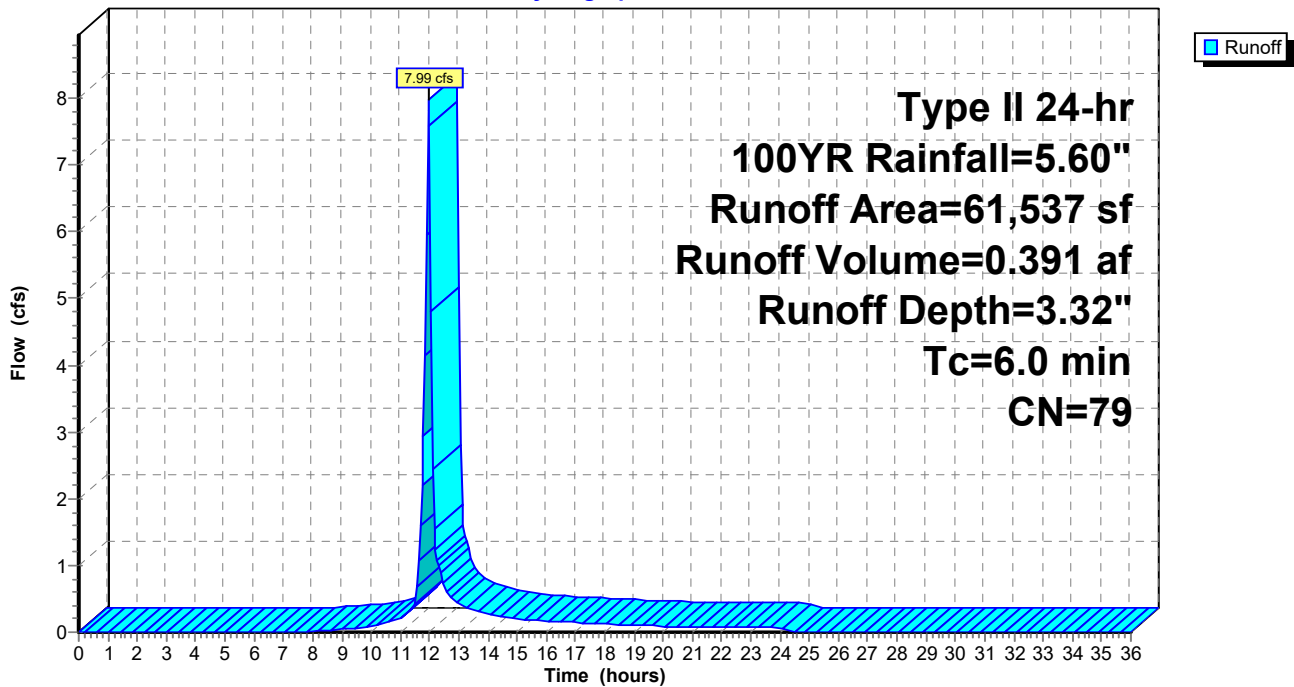
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR Rainfall=5.60"

Area (sf)	CN	Description
* 61,537	79	>75% Grass cover, Good, HSG C
61,537		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 2S: SUB 2 - OFFSITE

Hydrograph



17884 - Existing HydroCAD

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Type II 24-hr 100YR Rainfall=5.60"

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Summary for Subcatchment 3S: SUB 1

Runoff = 32.45 cfs @ 11.97 hrs, Volume= 1.589 af, Depth= 3.32"

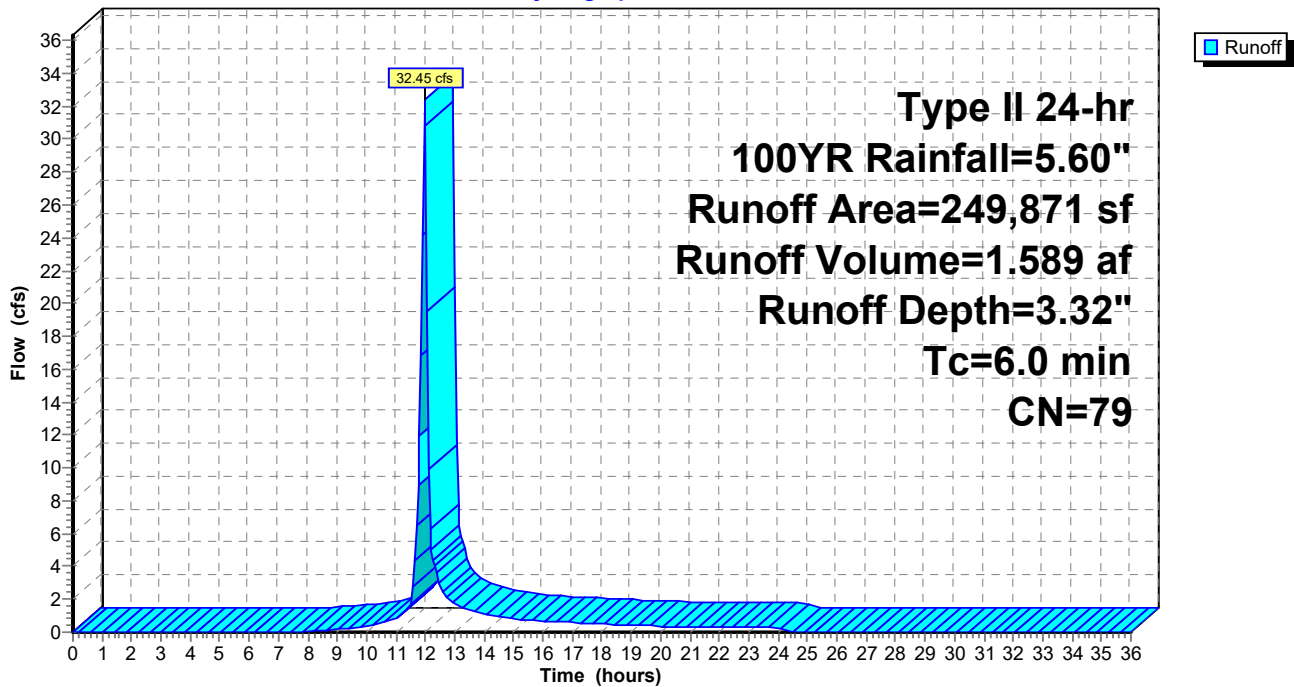
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR Rainfall=5.60"

Area (sf)	CN	Description
* 249,871	79	>75% Grass cover, Good, HSG C
249,871		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Minimum

Subcatchment 3S: SUB 1

Hydrograph



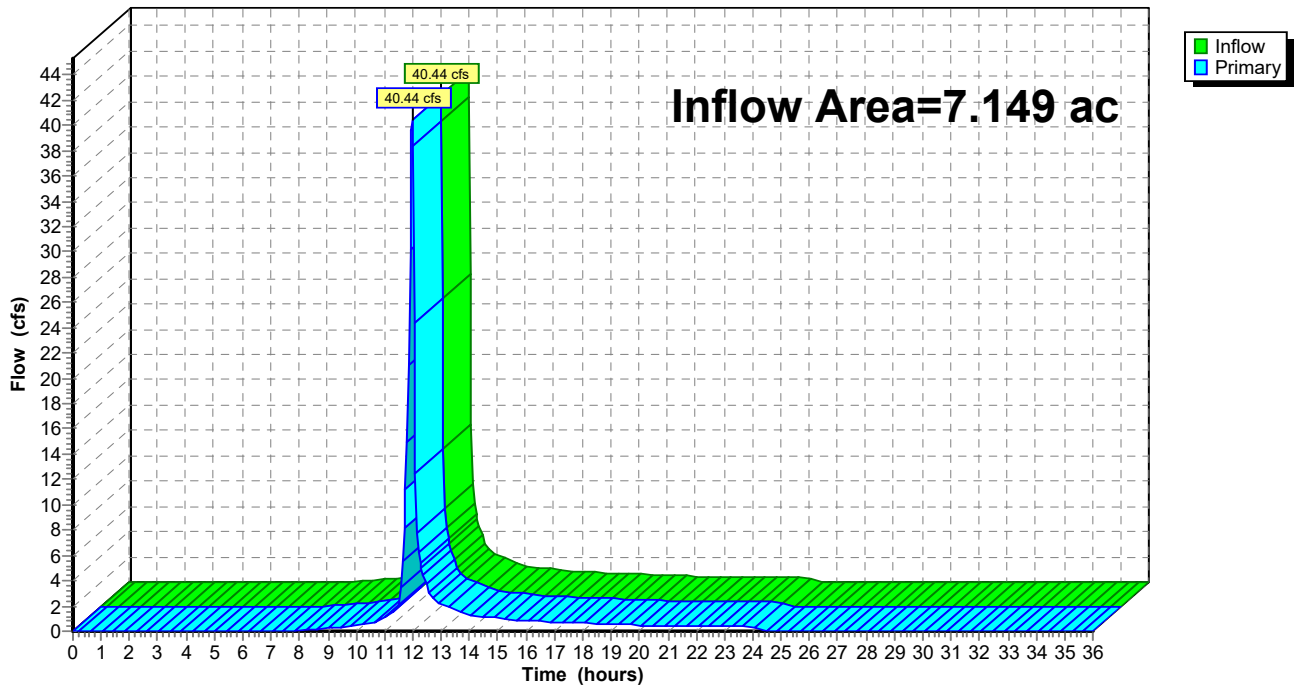
Summary for Link 4L: (new Link)

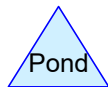
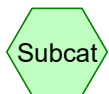
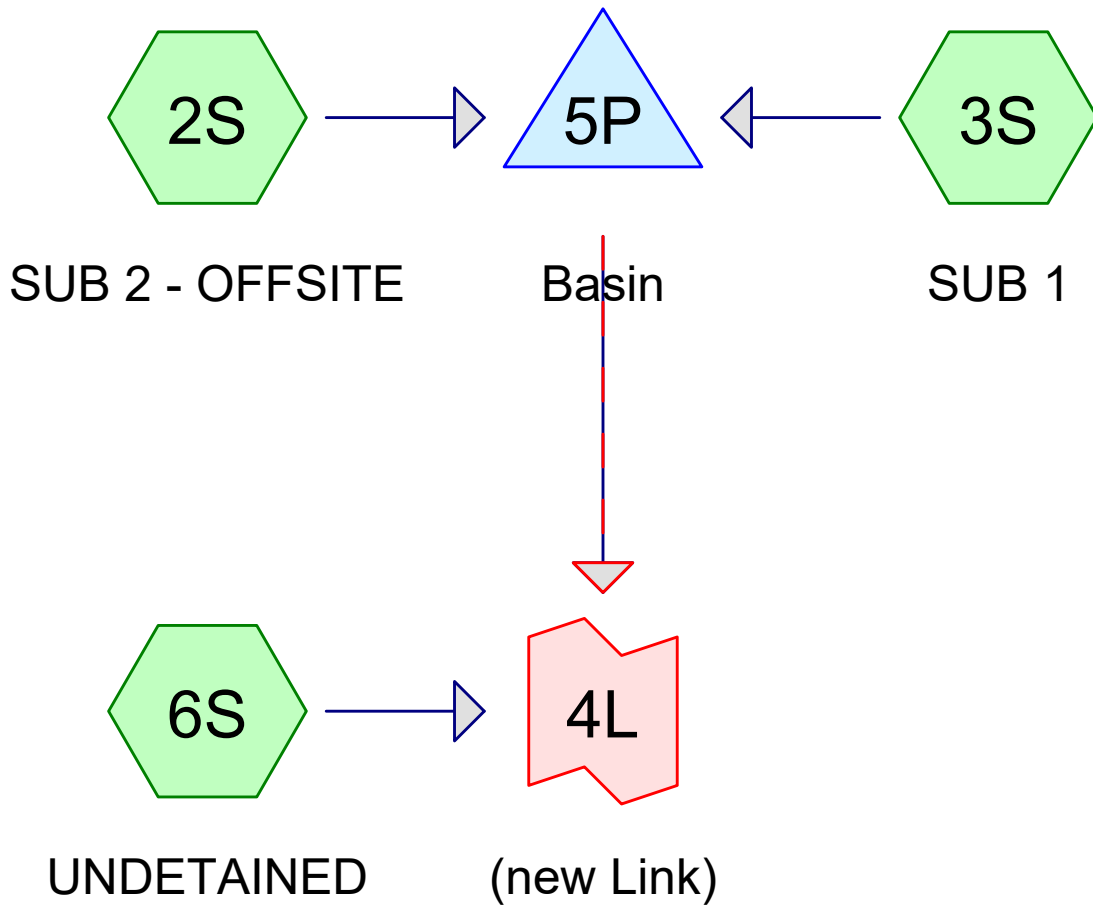
Inflow Area = 7.149 ac, 0.00% Impervious, Inflow Depth = 3.32" for 100YR event
Inflow = 40.44 cfs @ 11.97 hrs, Volume= 1.981 af
Primary = 40.44 cfs @ 11.97 hrs, Volume= 1.981 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 4L: (new Link)

Hydrograph





17884 - Proposed HydroCAD

Type II 24-hr 2YR Rainfall=2.70"

Prepared by The Sigma Group, Inc.

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Page 2

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: SUB 2 - OFFSITE Runoff Area=61,538 sf 2.93% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=80 Runoff=2.53 cfs 0.121 af

Subcatchment3S: SUB 1 Runoff Area=227,328 sf 74.32% Impervious Runoff Depth=1.97"
Tc=6.0 min CN=93 Runoff=16.88 cfs 0.856 af

Subcatchment6S: UNDETAINED Runoff Area=22,543 sf 0.00% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=79 Runoff=0.87 cfs 0.042 af

Pond 5P: Basin Peak Elev=883.96' Storage=22,001 cf Inflow=19.36 cfs 0.977 af
Primary=3.22 cfs 0.808 af Secondary=0.00 cfs 0.000 af Outflow=3.22 cfs 0.808 af

Link 4L: (new Link) Inflow=3.42 cfs 0.850 af
Primary=3.42 cfs 0.850 af

Total Runoff Area = 7.149 ac Runoff Volume = 1.019 af Average Runoff Depth = 1.71"
45.17% Pervious = 3.229 ac 54.83% Impervious = 3.920 ac

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Type II 24-hr 2YR Rainfall=2.70"

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Summary for Subcatchment 2S: SUB 2 - OFFSITE

Runoff = 2.53 cfs @ 11.98 hrs, Volume= 0.121 af, Depth= 1.03"

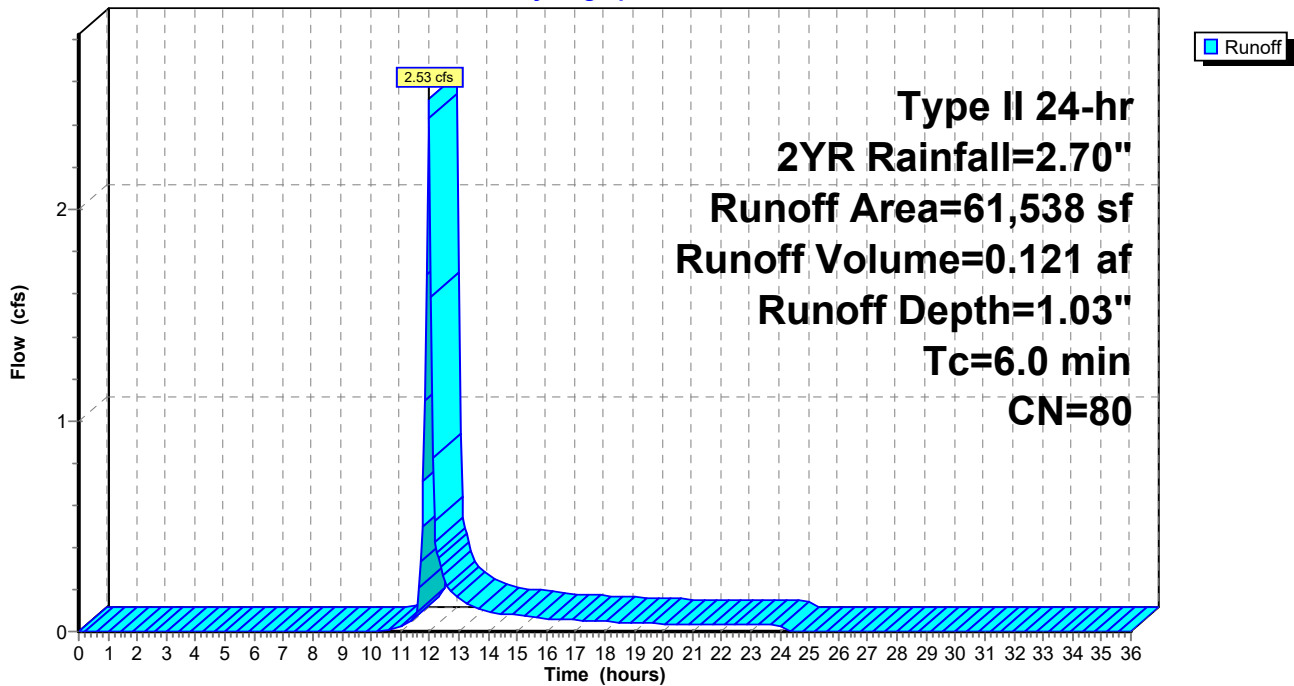
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (sf)	CN	Description
*	59,738	79	>75% Grass cover, Good, HSG C
	1,800	98	Paved parking, HSG B
	61,538	80	Weighted Average
	59,738		97.07% Pervious Area
	1,800		2.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 2S: SUB 2 - OFFSITE

Hydrograph



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Type II 24-hr 2YR Rainfall=2.70"

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Summary for Subcatchment 3S: SUB 1

Runoff = 16.88 cfs @ 11.97 hrs, Volume= 0.856 af, Depth= 1.97"

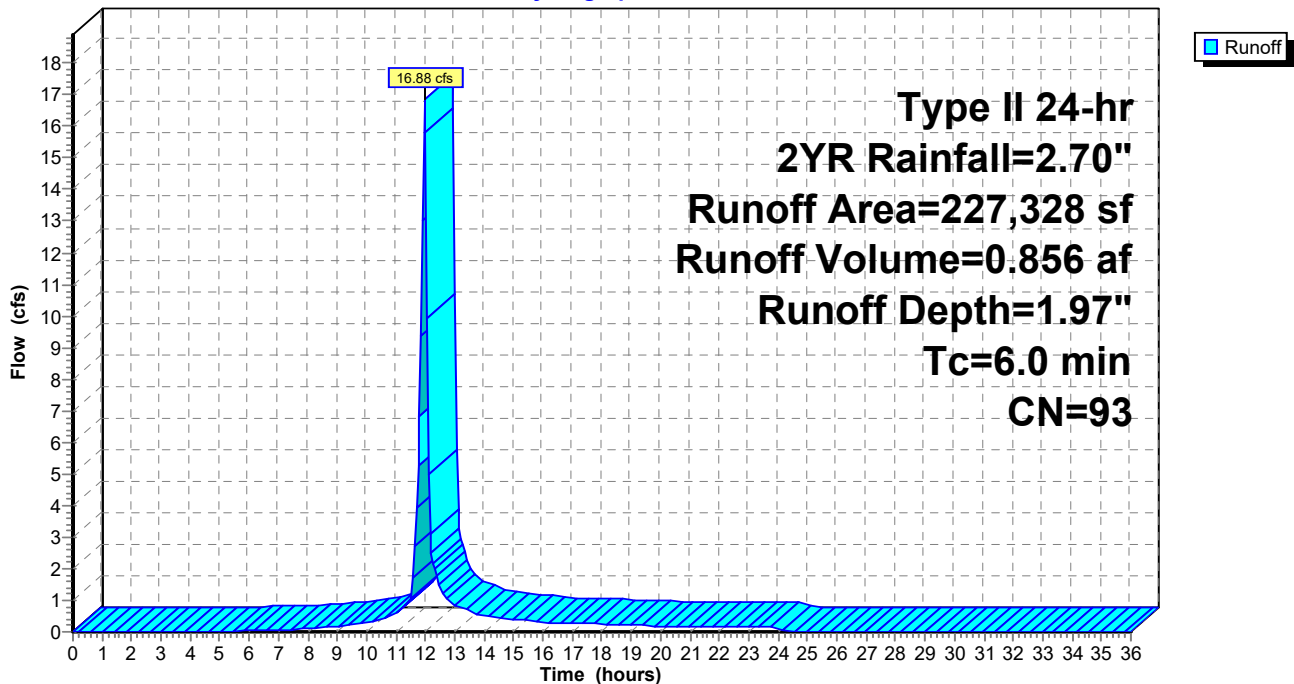
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR Rainfall=2.70"

	Area (sf)	CN	Description
*	58,374	79	>75% Grass cover, Good, HSG C
	74,304	98	Roofs, HSG C
	60,296	98	Paved parking, HSG C
	9,354	98	Water Surface, HSG C
*	25,000	98	Additional Future Parking
	227,328	93	Weighted Average
	58,374		25.68% Pervious Area
	168,954		74.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Minimum

Subcatchment 3S: SUB 1

Hydrograph



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Type II 24-hr 2YR Rainfall=2.70"

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Summary for Subcatchment 6S: UNDETAINED

Runoff = 0.87 cfs @ 11.98 hrs, Volume= 0.042 af, Depth= 0.97"

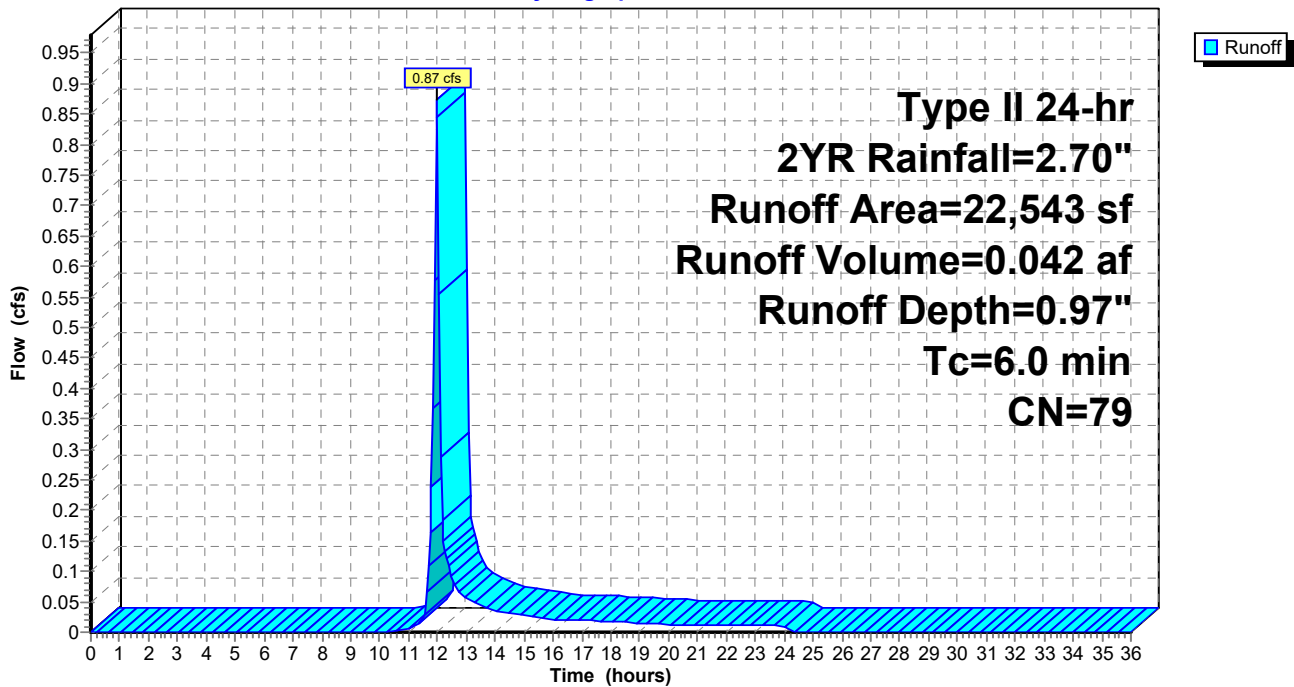
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 2YR Rainfall=2.70"

Area (sf)	CN	Description
* 22,543	79	>75% Grass cover, Good, HSG C
22,543		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 6S: UNDETAINED

Hydrograph



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Type II 24-hr 2YR Rainfall=2.70"

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Summary for Pond 5P: Basin

Inflow Area = 6.631 ac, 59.11% Impervious, Inflow Depth = 1.77" for 2YR event
 Inflow = 19.36 cfs @ 11.97 hrs, Volume= 0.977 af
 Outflow = 3.22 cfs @ 12.18 hrs, Volume= 0.808 af, Atten= 83%, Lag= 12.9 min
 Primary = 3.22 cfs @ 12.18 hrs, Volume= 0.808 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 883.96' @ 12.18 hrs Surf.Area= 13,138 sf Storage= 22,001 cf

Plug-Flow detention time= 451.5 min calculated for 0.807 af (83% of inflow)
 Center-of-Mass det. time= 377.5 min (1,179.6 - 802.1)

Volume	Invert	Avail.Storage	Storage Description
#1	882.00'	44,825 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	9,354	0	0
883.00	11,282	10,318	10,318
884.00	13,222	12,252	22,570
885.00	15,358	14,290	36,860
885.50	16,500	7,965	44,825

Device	Routing	Invert	Outlet Devices
#1	Primary	880.00'	24.0" Round Culvert L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 880.00' / 879.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	882.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	883.75'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	885.00'	20.0' 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=3.20 cfs @ 12.18 hrs HW=883.96' (Free Discharge)

- ↑ **1=Culvert** (Passes 3.20 cfs of 26.01 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.52 fps)
- ↑ **3=Orifice/Grate** (Weir Controls 2.88 cfs @ 1.48 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=882.00' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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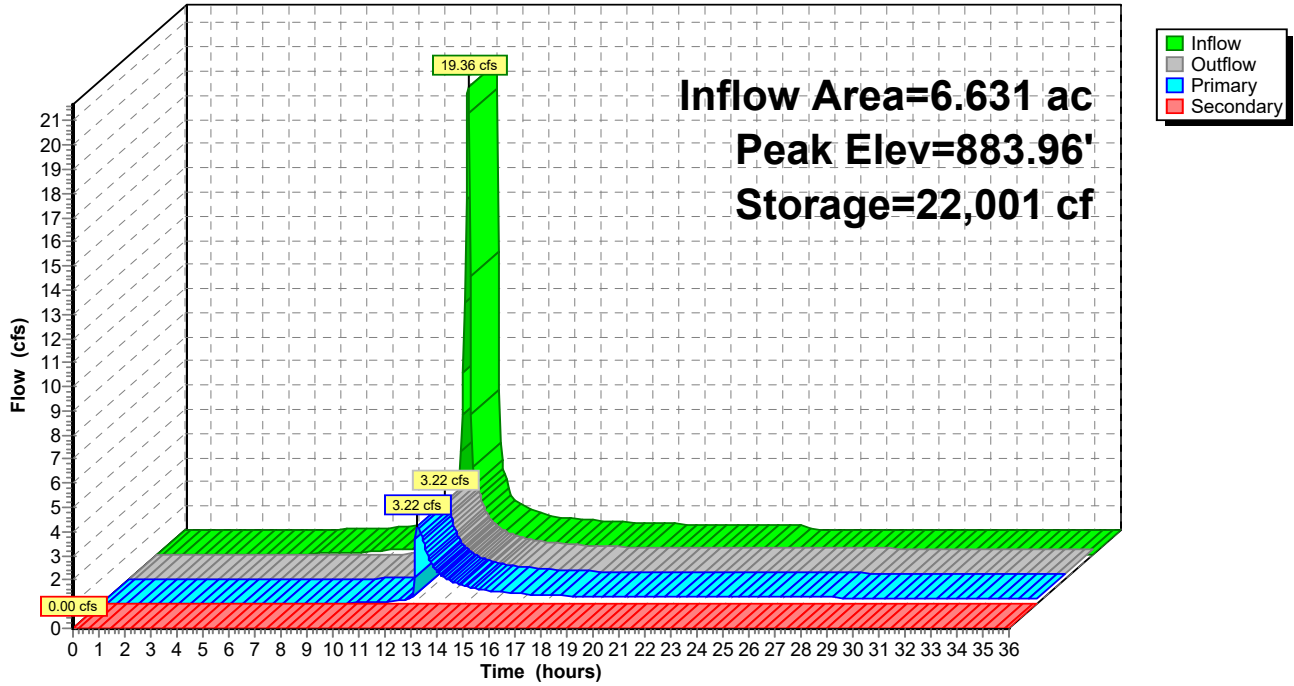
Type II 24-hr 2YR Rainfall=2.70"

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Pond 5P: Basin

Hydrograph



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Type II 24-hr 2YR Rainfall=2.70"

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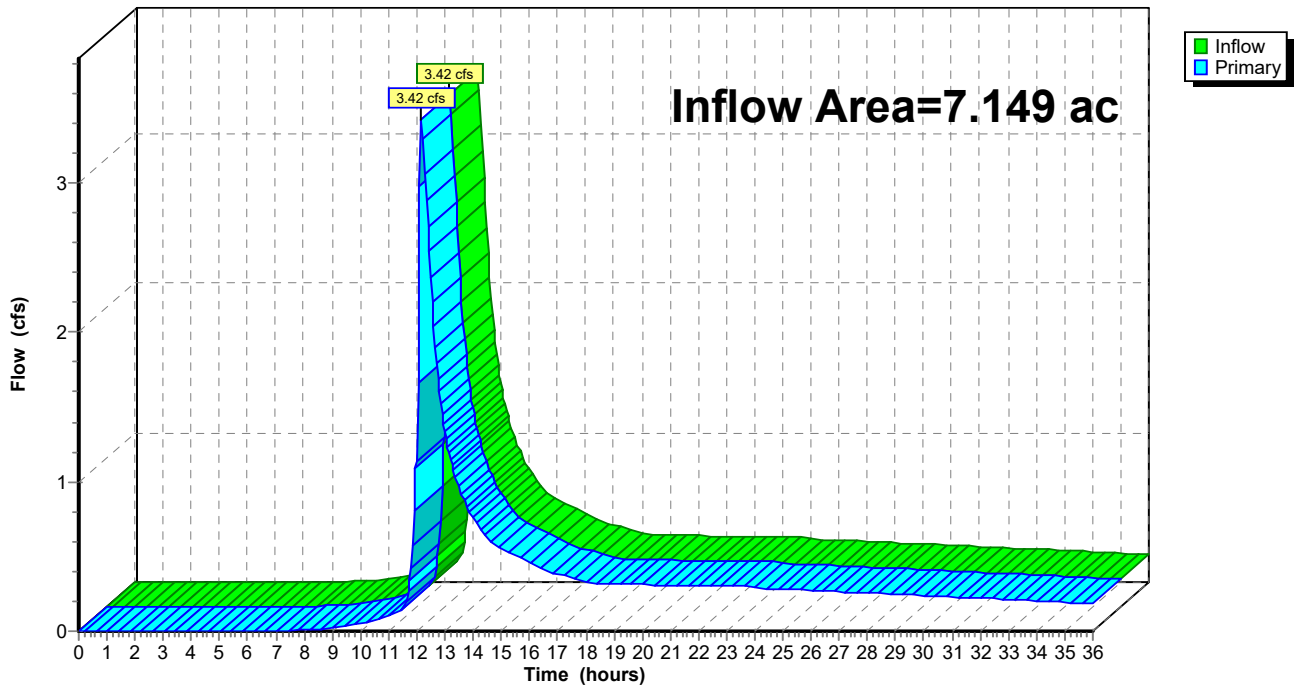
Summary for Link 4L: (new Link)

Inflow Area = 7.149 ac, 54.83% Impervious, Inflow Depth > 1.43" for 2YR event
Inflow = 3.42 cfs @ 12.17 hrs, Volume= 0.850 af
Primary = 3.42 cfs @ 12.17 hrs, Volume= 0.850 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 4L: (new Link)

Hydrograph



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Type II 24-hr 10YR Rainfall=4.00"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: SUB 2 - OFFSITE Runoff Area=61,538 sf 2.93% Impervious Runoff Depth=2.04"
Tc=6.0 min CN=80 Runoff=4.96 cfs 0.240 af

Subcatchment3S: SUB 1 Runoff Area=227,328 sf 74.32% Impervious Runoff Depth=3.22"
Tc=6.0 min CN=93 Runoff=26.78 cfs 1.400 af

Subcatchment6S: UNDETAINED Runoff Area=22,543 sf 0.00% Impervious Runoff Depth=1.96"
Tc=6.0 min CN=79 Runoff=1.75 cfs 0.085 af

Pond 5P: Basin Peak Elev=884.49' Storage=29,324 cf Inflow=31.73 cfs 1.641 af
Primary=20.04 cfs 1.446 af Secondary=0.00 cfs 0.000 af Outflow=20.04 cfs 1.446 af

Link 4L: (new Link) Inflow=21.13 cfs 1.531 af
Primary=21.13 cfs 1.531 af

Total Runoff Area = 7.149 ac Runoff Volume = 1.725 af Average Runoff Depth = 2.90"
45.17% Pervious = 3.229 ac 54.83% Impervious = 3.920 ac

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Type II 24-hr 10YR Rainfall=4.00"

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Summary for Subcatchment 2S: SUB 2 - OFFSITE

Runoff = 4.96 cfs @ 11.97 hrs, Volume= 0.240 af, Depth= 2.04"

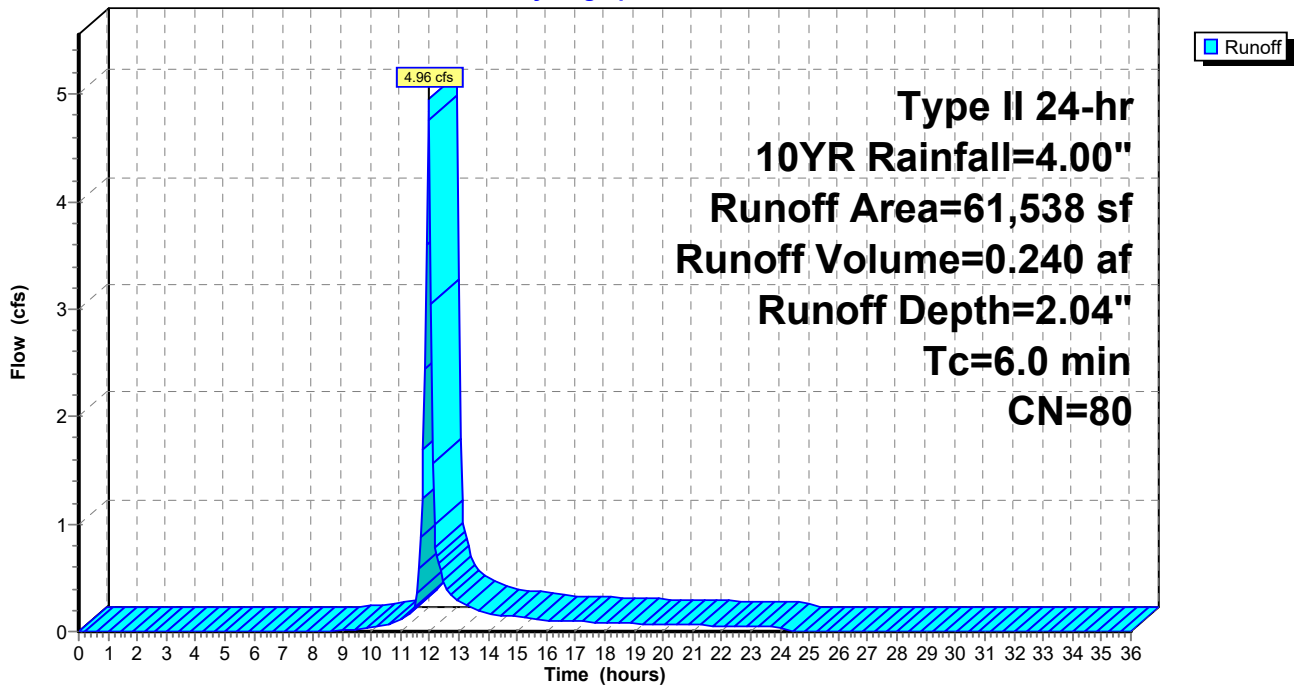
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (sf)	CN	Description
*	59,738	79	>75% Grass cover, Good, HSG C
	1,800	98	Paved parking, HSG B
	61,538	80	Weighted Average
	59,738		97.07% Pervious Area
	1,800		2.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 2S: SUB 2 - OFFSITE

Hydrograph



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Type II 24-hr 10YR Rainfall=4.00"

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Summary for Subcatchment 3S: SUB 1

Runoff = 26.78 cfs @ 11.96 hrs, Volume= 1.400 af, Depth= 3.22"

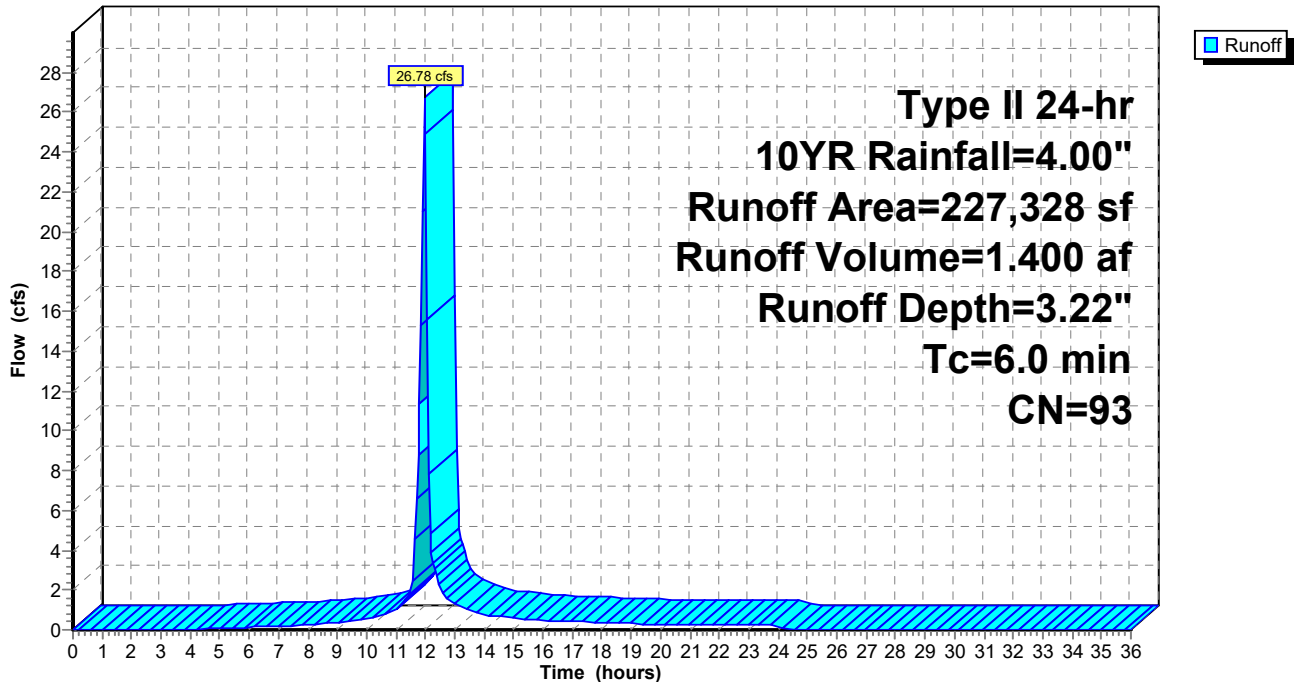
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR Rainfall=4.00"

	Area (sf)	CN	Description
*	58,374	79	>75% Grass cover, Good, HSG C
	74,304	98	Roofs, HSG C
	60,296	98	Paved parking, HSG C
	9,354	98	Water Surface, HSG C
*	25,000	98	Additional Future Parking
	227,328	93	Weighted Average
	58,374		25.68% Pervious Area
	168,954		74.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Minimum

Subcatchment 3S: SUB 1

Hydrograph



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Type II 24-hr 10YR Rainfall=4.00"

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Summary for Subcatchment 6S: UNDETAINED

Runoff = 1.75 cfs @ 11.97 hrs, Volume= 0.085 af, Depth= 1.96"

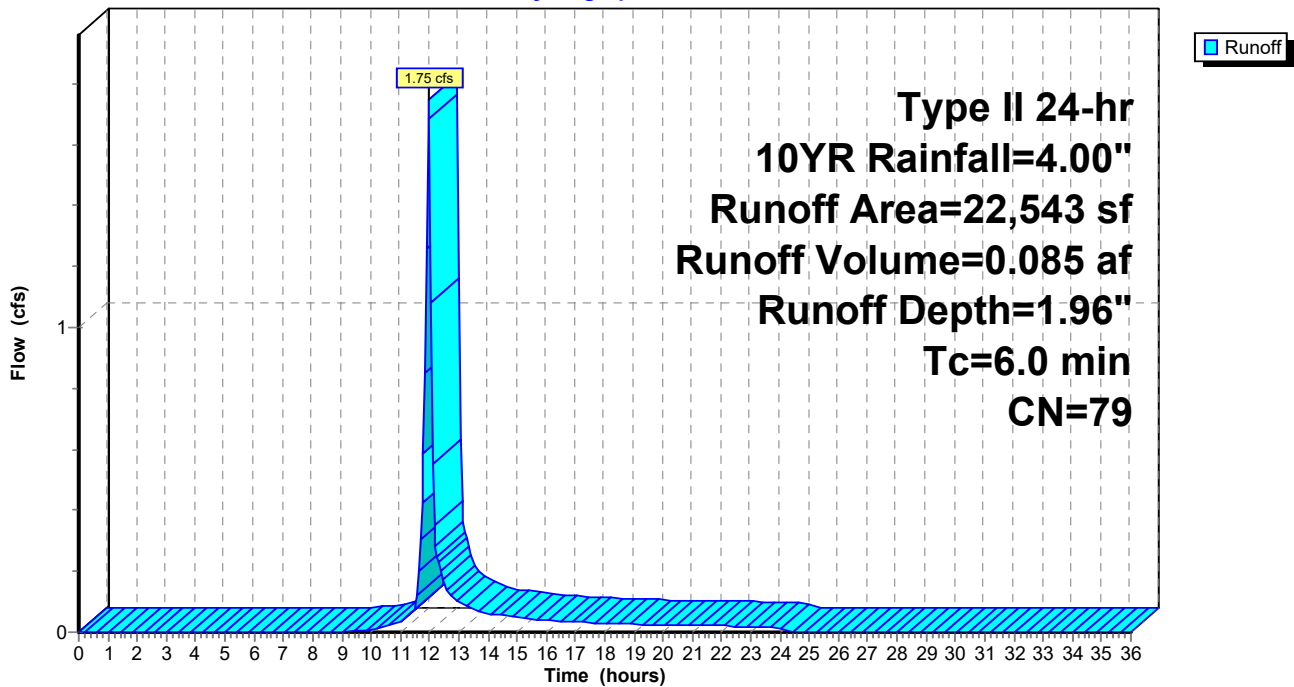
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 10YR Rainfall=4.00"

Area (sf)	CN	Description
* 22,543	79	>75% Grass cover, Good, HSG C
22,543		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 6S: UNDETAINED

Hydrograph



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Type II 24-hr 10YR Rainfall=4.00"

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Summary for Pond 5P: Basin

Inflow Area = 6.631 ac, 59.11% Impervious, Inflow Depth = 2.97" for 10YR event
 Inflow = 31.73 cfs @ 11.97 hrs, Volume= 1.641 af
 Outflow = 20.04 cfs @ 12.05 hrs, Volume= 1.446 af, Atten= 37%, Lag= 5.2 min
 Primary = 20.04 cfs @ 12.05 hrs, Volume= 1.446 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 884.49' @ 12.05 hrs Surf.Area= 14,271 sf Storage= 29,324 cf

Plug-Flow detention time= 280.7 min calculated for 1.446 af (88% of inflow)
 Center-of-Mass det. time= 222.6 min (1,011.4 - 788.8)

Volume	Invert	Avail.Storage	Storage Description
#1	882.00'	44,825 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	9,354	0	0
883.00	11,282	10,318	10,318
884.00	13,222	12,252	22,570
885.00	15,358	14,290	36,860
885.50	16,500	7,965	44,825

Device	Routing	Invert	Outlet Devices
#1	Primary	880.00'	24.0" Round Culvert L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 880.00' / 879.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	882.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	883.75'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	885.00'	20.0' 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=19.96 cfs @ 12.05 hrs HW=884.49' (Free Discharge)

- ↑1=Culvert (Passes 19.96 cfs of 28.26 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.36 cfs @ 7.40 fps)
- ↑3=Orifice/Grate (Weir Controls 19.60 cfs @ 2.81 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=882.00' (Free Discharge)

- ↑4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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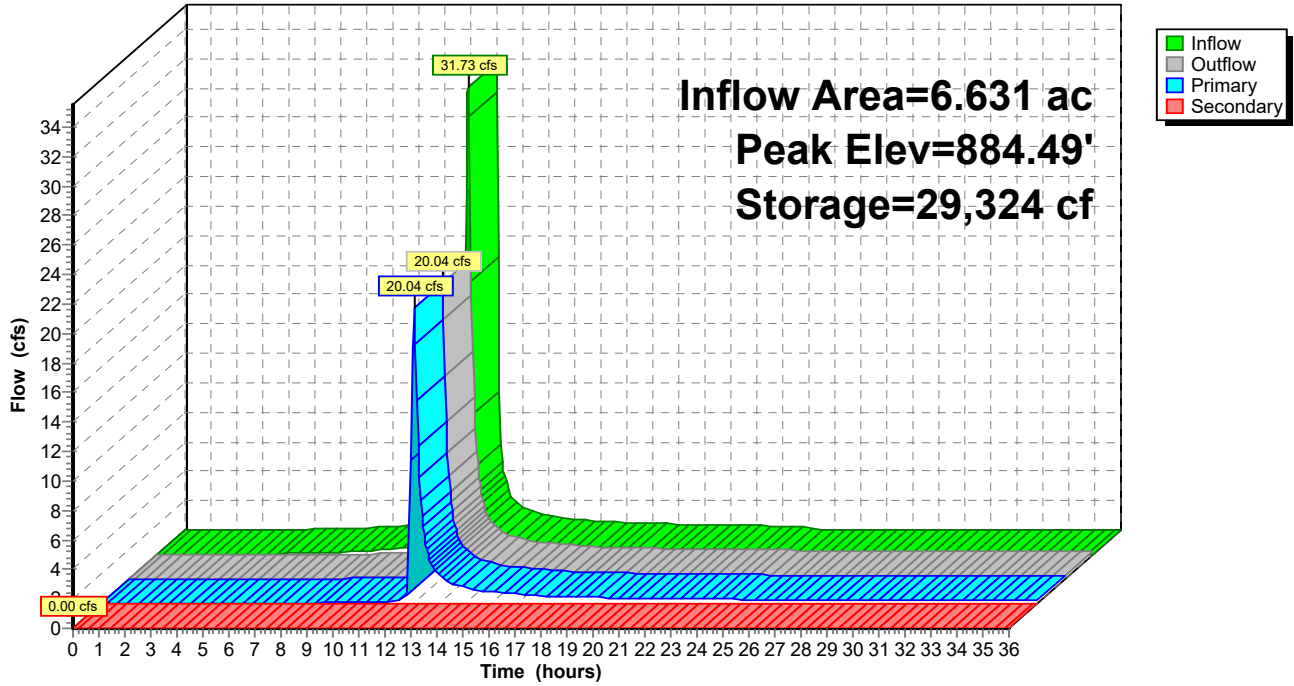
Type II 24-hr 10YR Rainfall=4.00"

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Pond 5P: Basin

Hydrograph



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Type II 24-hr 10YR Rainfall=4.00"

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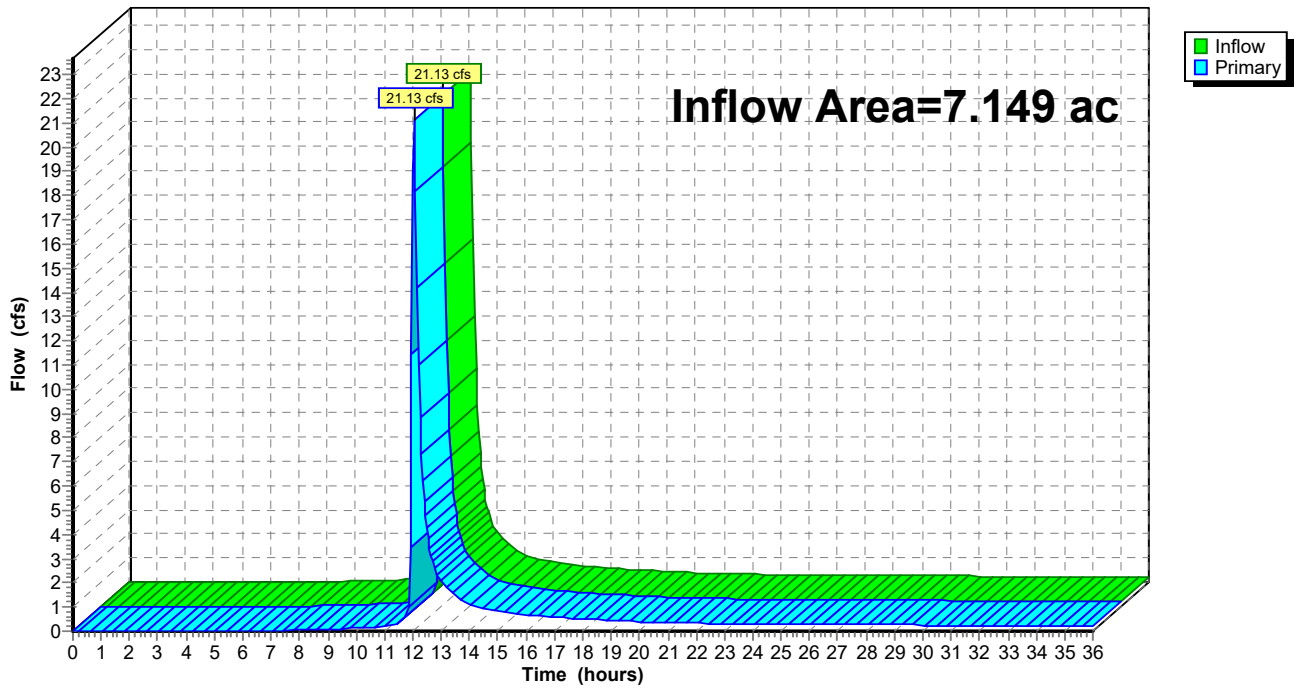
Summary for Link 4L: (new Link)

Inflow Area = 7.149 ac, 54.83% Impervious, Inflow Depth > 2.57" for 10YR event
Inflow = 21.13 cfs @ 12.05 hrs, Volume= 1.531 af
Primary = 21.13 cfs @ 12.05 hrs, Volume= 1.531 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 4L: (new Link)

Hydrograph



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Type II 24-hr 100YR Rainfall=5.60"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: SUB 2 - OFFSITE Runoff Area=61,538 sf 2.93% Impervious Runoff Depth=3.42"
Tc=6.0 min CN=80 Runoff=8.20 cfs 0.403 af

Subcatchment3S: SUB 1 Runoff Area=227,328 sf 74.32% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=93 Runoff=38.82 cfs 2.082 af

Subcatchment6S: UNDETAINED Runoff Area=22,543 sf 0.00% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=79 Runoff=2.93 cfs 0.143 af

Pond 5P: Basin Peak Elev=884.96' Storage=36,282 cf Inflow=47.00 cfs 2.485 af
Primary=30.11 cfs 2.287 af Secondary=0.00 cfs 0.000 af Outflow=30.11 cfs 2.287 af

Link 4L: (new Link) Inflow=32.64 cfs 2.430 af
Primary=32.64 cfs 2.430 af

Total Runoff Area = 7.149 ac Runoff Volume = 2.629 af Average Runoff Depth = 4.41"
45.17% Pervious = 3.229 ac 54.83% Impervious = 3.920 ac

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Type II 24-hr 100YR Rainfall=5.60"

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Summary for Subcatchment 2S: SUB 2 - OFFSITE

Runoff = 8.20 cfs @ 11.97 hrs, Volume= 0.403 af, Depth= 3.42"

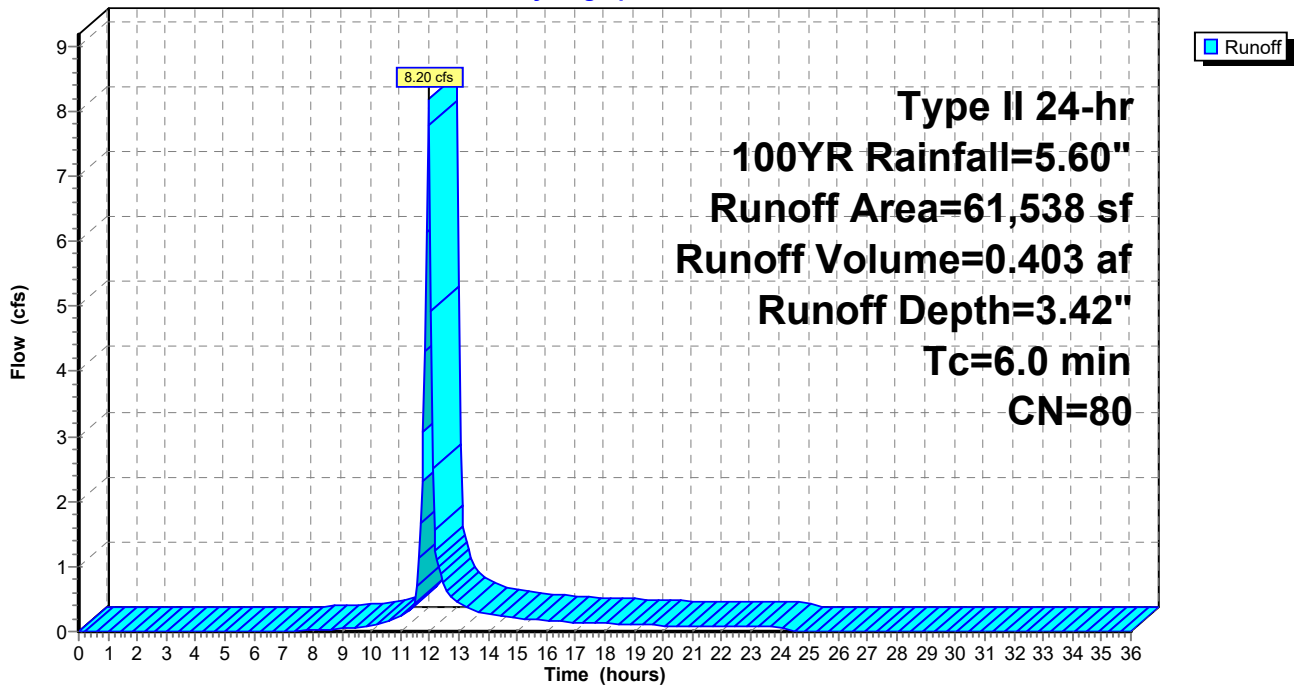
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR Rainfall=5.60"

	Area (sf)	CN	Description
*	59,738	79	>75% Grass cover, Good, HSG C
	1,800	98	Paved parking, HSG B
	61,538	80	Weighted Average
	59,738		97.07% Pervious Area
	1,800		2.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 2S: SUB 2 - OFFSITE

Hydrograph



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Type II 24-hr 100YR Rainfall=5.60"

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Summary for Subcatchment 3S: SUB 1

Runoff = 38.82 cfs @ 11.96 hrs, Volume= 2.082 af, Depth= 4.79"

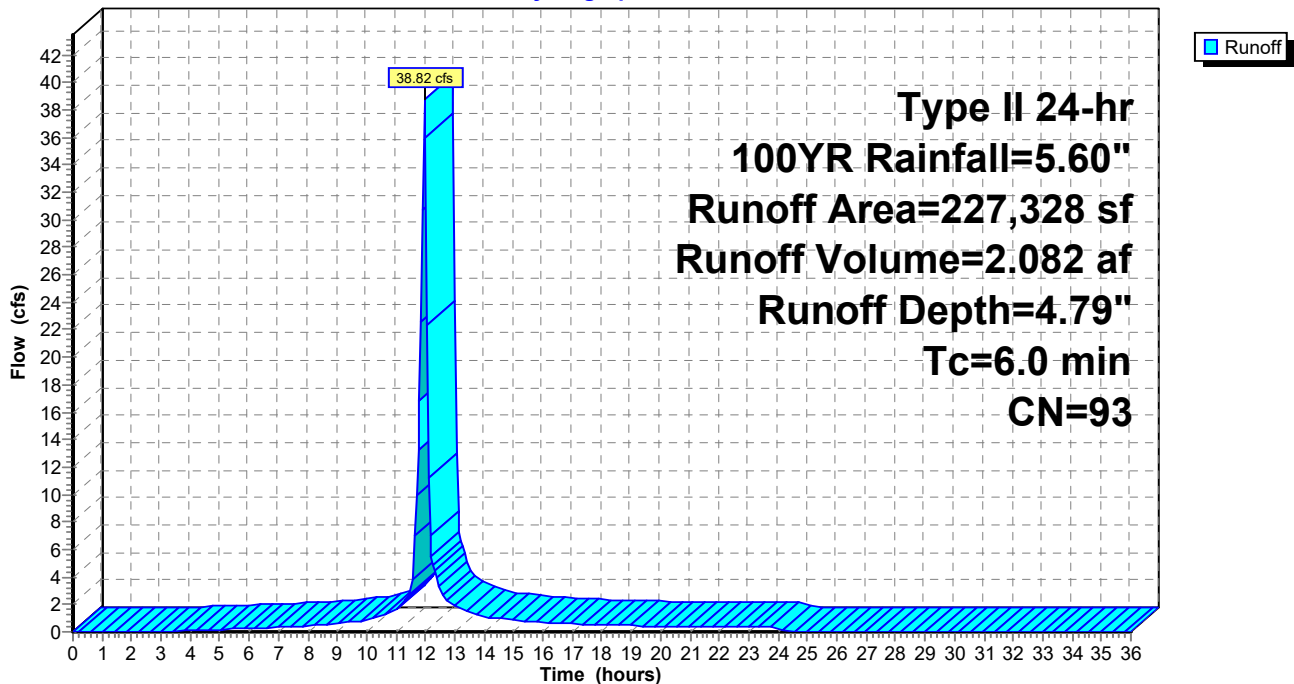
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100YR Rainfall=5.60"

	Area (sf)	CN	Description
*	58,374	79	>75% Grass cover, Good, HSG C
	74,304	98	Roofs, HSG C
	60,296	98	Paved parking, HSG C
	9,354	98	Water Surface, HSG C
*	25,000	98	Additional Future Parking
	227,328	93	Weighted Average
	58,374		25.68% Pervious Area
	168,954		74.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Minimum

Subcatchment 3S: SUB 1

Hydrograph



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Type II 24-hr 100YR Rainfall=5.60"

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Summary for Subcatchment 6S: UNDETAINED

Runoff = 2.93 cfs @ 11.97 hrs, Volume= 0.143 af, Depth= 3.32"

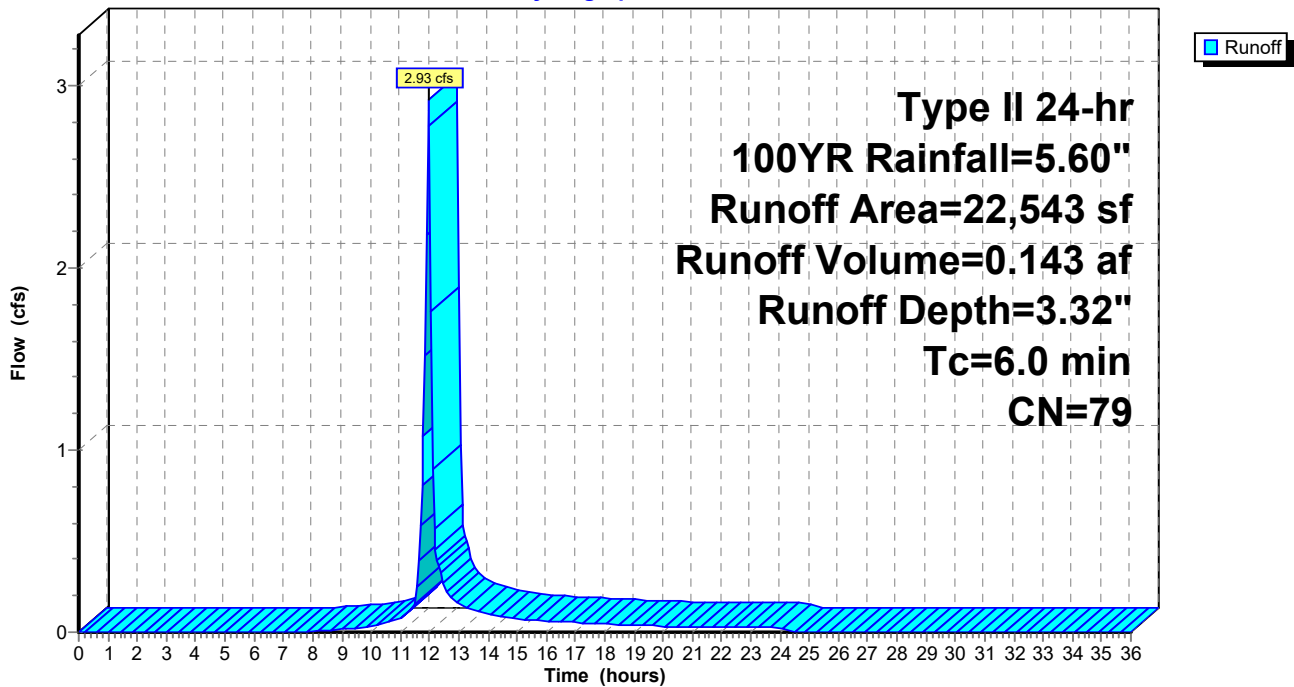
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type II 24-hr 100YR Rainfall=5.60"

Area (sf)	CN	Description
* 22,543	79	>75% Grass cover, Good, HSG C
22,543		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 Minute Min

Subcatchment 6S: UNDETAINED

Hydrograph



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Type II 24-hr 100YR Rainfall=5.60"

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Summary for Pond 5P: Basin

Inflow Area = 6.631 ac, 59.11% Impervious, Inflow Depth = 4.50" for 100YR event
 Inflow = 47.00 cfs @ 11.96 hrs, Volume= 2.485 af
 Outflow = 30.11 cfs @ 12.04 hrs, Volume= 2.287 af, Atten= 36%, Lag= 4.8 min
 Primary = 30.11 cfs @ 12.04 hrs, Volume= 2.287 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 884.96' @ 12.04 hrs Surf.Area= 15,277 sf Storage= 36,282 cf

Plug-Flow detention time= 197.4 min calculated for 2.287 af (92% of inflow)
 Center-of-Mass det. time= 154.0 min (932.4 - 778.3)

Volume	Invert	Avail.Storage	Storage Description
#1	882.00'	44,825 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.00	9,354	0	0
883.00	11,282	10,318	10,318
884.00	13,222	12,252	22,570
885.00	15,358	14,290	36,860
885.50	16,500	7,965	44,825

Device	Routing	Invert	Outlet Devices
#1	Primary	880.00'	24.0" Round Culvert L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 880.00' / 879.00' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	882.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	883.75'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	885.00'	20.0' 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=30.07 cfs @ 12.04 hrs HW=884.95' (Free Discharge)

- ↑ **1=Culvert** (Inlet Controls 30.07 cfs @ 9.57 fps)
- ↑ **2=Orifice/Grate** (Passes < 0.40 cfs potential flow)
- ↑ **3=Orifice/Grate** (Passes < 37.32 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=882.00' (Free Discharge)

- ↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

17884 - Proposed HydroCAD

Prepared by The Sigma Group, Inc.

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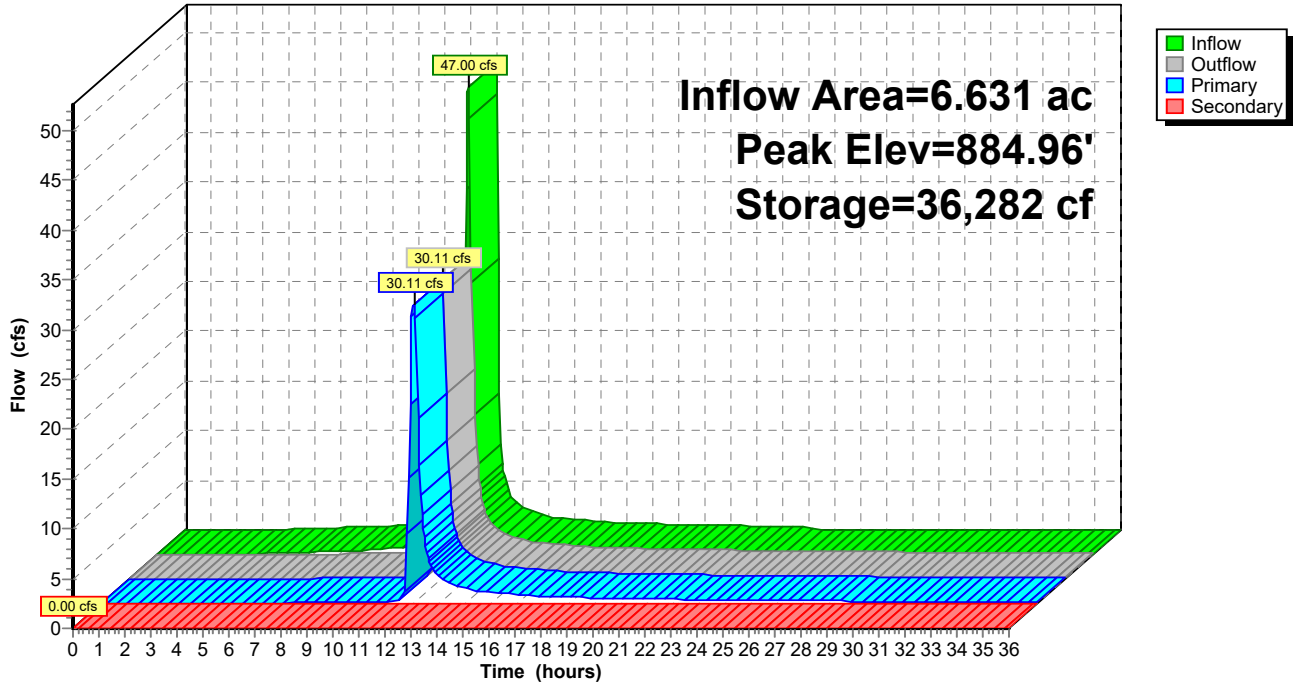
Type II 24-hr 100YR Rainfall=5.60"

Printed 8/27/2018

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Pond 5P: Basin

Hydrograph



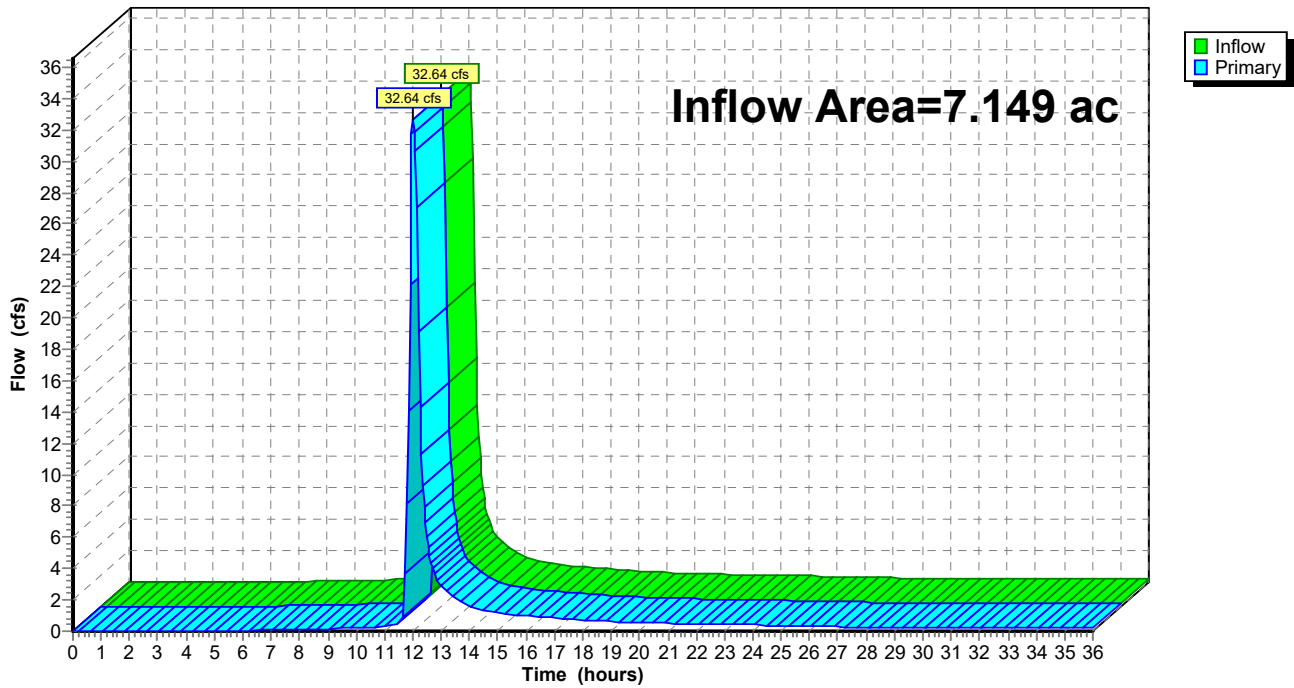
Summary for Link 4L: (new Link)

Inflow Area = 7.149 ac, 54.83% Impervious, Inflow Depth > 4.08" for 100YR event
Inflow = 32.64 cfs @ 12.00 hrs, Volume= 2.430 af
Primary = 32.64 cfs @ 12.00 hrs, Volume= 2.430 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 4L: (new Link)

Hydrograph



17884 Water Quality - InputData

Data file name: I:\Boldt Company\17884 Lighthouse of Waukesha\060 CAD\C - Civil\100 Modeling\Storm Sewer\040 WinSLAMM\17884 Water Quality.mdb

WinSLAMM Version 10.2.0

Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN

Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx

Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx

Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std

Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False

Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx

Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv

Cost Data file name:

Seed for random number generator: -42

Study period starting date: 01/05/69

Study period ending date: 12/31/69

Start of Winter Season: 12/06

End of Winter Season: 03/28

Date: 08-27-2018

Time: 11:45:58

Site information:

LU# 1 - Residential: Residential 6 Total area (ac): 6.661

1 - Roofs 1: 1.706 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

13 - Paved Parking 1: 1.384 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

14 - Paved Parking 2: 0.574 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

15 - Paved Parking 3: 0.041 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 1.370 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

46 - Large Landscaped Areas 2: 1.371 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

70 - Water Body Areas: 0.215 ac. Source Area PSD File:

LU# 2 - Residential: Residential 7 Total area (ac): 0.518

45 - Large Landscaped Areas 1: 0.518 ac. Normal Silty Source Area PSD File: C:\WinSLAMM

Control Practice 1: Wet Detention Pond CP# 1 (DS) - DS Wet Pond # 4

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

1. Orifice diameter (ft): 0.25
2. Number of orifices: 1
3. Invert elevation above datum (ft): 5

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 20
2. Weir crest width (ft): 20
3. Height from datum to bottom of weir opening: 8

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 3
2. Stand pipe height above datum (ft): 6.75

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.10	0.0240	0.00	0.00
2	1.00	0.0422	0.00	0.00
3	2.00	0.0640	0.00	0.00
4	3.00	0.0900	0.00	0.00
5	4.00	0.1250	0.00	0.00
6	5.00	0.2170	0.00	0.00
7	6.00	0.2590	0.00	0.00
8	7.00	0.3040	0.00	0.00
9	8.00	0.3530	0.00	0.00
10	8.50	0.3790	0.00	0.00

17884 Water Quality - Output Summary

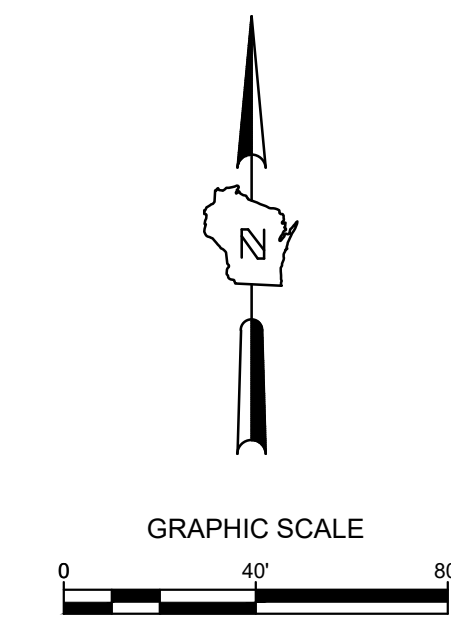
SLAMM for Windows Version 10.2.0
 (c) Copyright Robert Pitt and John Voorhees 2012
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Data file name: I:\Boldt Company\17884 Lighthouse of Waukesha\060 CAD\C - Civil\100 Modeling\Storm Sewer\040 WinSLAMM\17884 Water Quality.mdb

Data file description:

Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
 Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
 Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
 Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
 Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
 Start of Winter Season: 12/06 End of Winter Season: 03/28
 Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
 Date of run: 08-27-2018 Time of run: 11:46:18
 Total Area Modeled (acres): 7.179
 Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	358585	-	83.55	1870	-
Outfall Total with Controls:	357981	0.17%	15.68	350.5	81.26%
Annualized Total After Outfall Controls:	362953			355.3	



SUBCATCHMENT 1

SUBCATCHMENT 2



CALL DIGGERS HOTLINE
 1-800-242-8511
 TOLL FREE
 WI STATE 182.0175(1974)
 REQUIRES MIN. 3 WORK DAYS
 NOTICE BEFORE YOU EXCAVATE
 MILW. AREA 259-1181

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 COMPLETENESS CANNOT BE GUARANTEED.

NEW PERSPECTIVE
 WAUKESHA, WISCONSIN

NO. REVISION DATE BY

DRAWING NO. 17884-SW 1.0.dwg

DRAWN BY: ---

DATE: ---

PROJECT NO: 17884

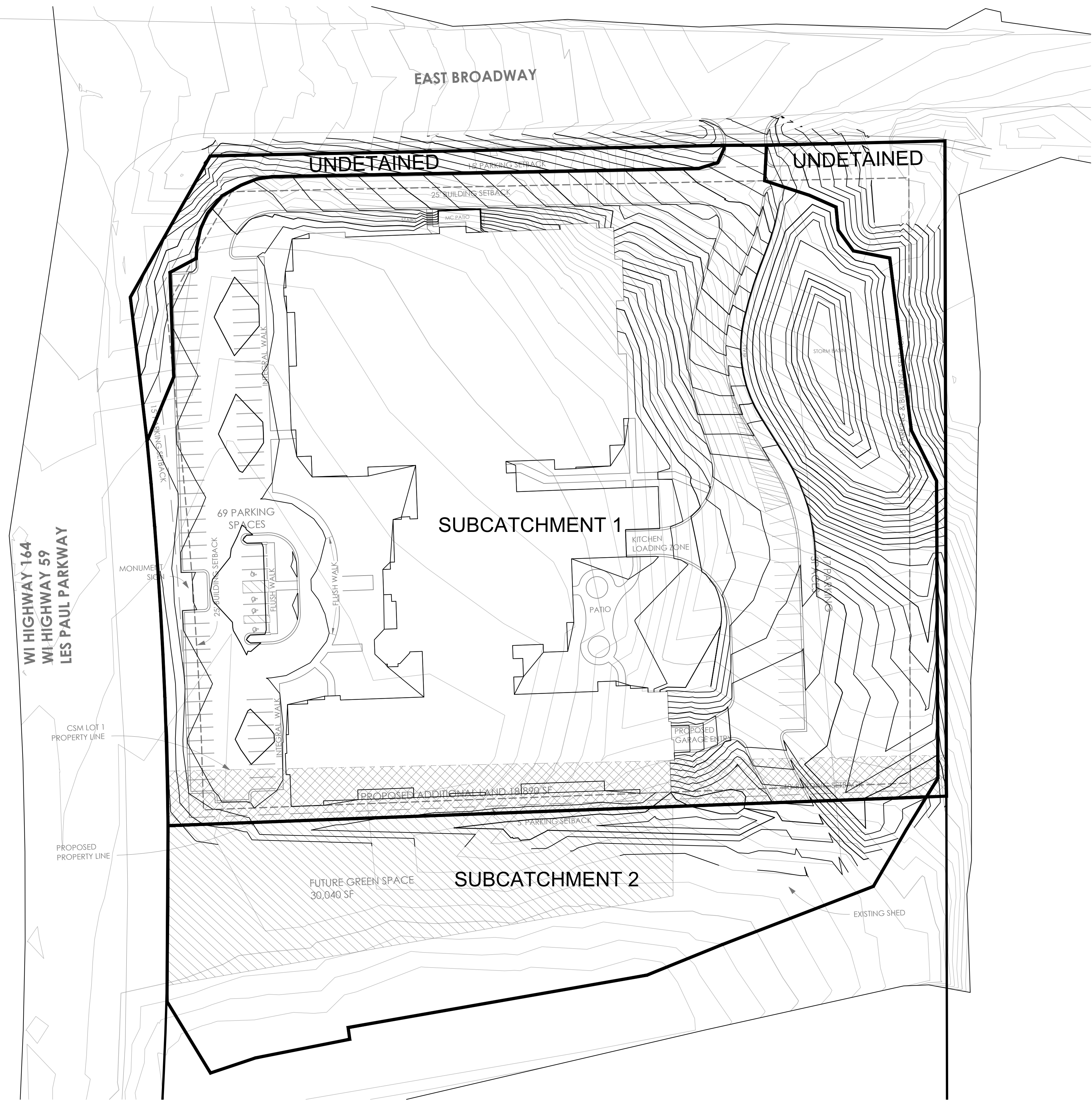
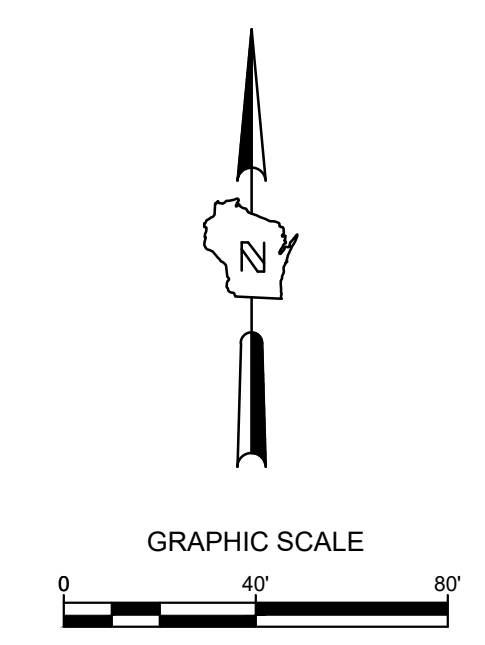
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SW 1.0



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NEW PERSPECTIVE
 WAUKESHA, WISCONSIN

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 DATE: ---
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SW 2.0