Preliminary Stormwater Analysis

FOR

Golf Club Road Development
9164, 9384, & 9474 Golf Club Road SE
Aumsville, OR 97325

Prepared for:
Brownstone Development, Inc.
P.O. Box 2201
Lake Oswego, Oregon 97035

August 25th, 2025

Renew date: 6.30.2027

Prepared by:

MULTI/TECH
ENGINEERING SERVICES, INC.

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DESIGN ENGINEER'S CERTIFICATION

I hereby certify that this Drainage Report for Golf Club Road Development has been prepared by me or under my direct supervision and complies with the City of Stayton's Public Works Standards and standard engineering practice.

Renew date: 6.30.2021

TABLE OF CONTENTS

INTRODUCTION

The Golf Club Road Development is a 54.33 acre single-family subdivision located at 9164, 9384, & 9474 Golf Club Road SE. The Marion County Tax Assessor currently lists the property in Aumsville, Oregon, as the land has not be annexed into the City of Stayton. The proposal is for the development of 124 single-family dwelling units, as well as 15.76 acres of undisturbed open space. The approximate project area can be seen in Figure X outlined in ORANGE.

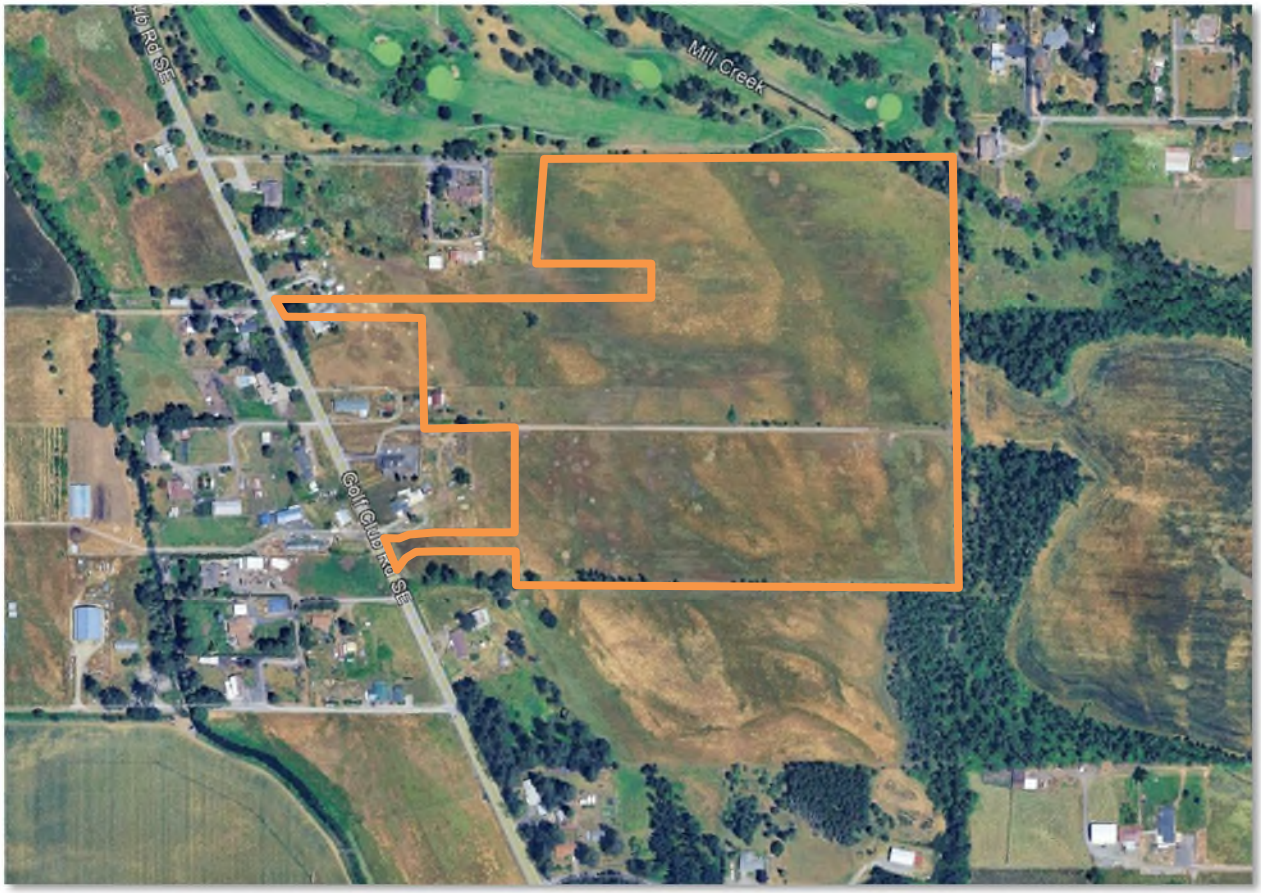


Figure 1: Aerial picture with approximate project boundary

The development will be required to construct stormwater improvements to provide stormwater quality as well as flow control such that the stormwater leaving the property matches the predeveloped flowrates for the 2, 5, 10, 25, 50, and 100 year storm events. The City of Stayton also requires that the 25 year post-developed flowrate not exceed the 10 year pre-developed flowrate. The design shall meet all stormwater requirements set for in the City of Stayton Stormwater Design Standards.

EXISTING CONDITIONS

The existing properties are currently located outside the City of Stayton city limits but within the Urban Growth Boundary (UGB), in Marion County. As a part of the development, the property will be annexed into City of Stayton city limits. The land surrounding the subject property is within Marion County and consists of single-family acreage lots with some accessory structures on the west and wooded wetlands to the east.

The subject property is not currently developed. There are no improved roadways or existing structures. The ground surface is grass, with some trees. There is a small ditch running in the east/west direction, with a high point east of the center of the creek. There are some wetlands located within the creek as well as along the east portion of the property. These areas are proposed to be avoided and left as undeveloped tracts.

Offsite Drainage

There is offsite drainage planned for through the subject property. A detention pond from the Phillips and Quail Run developments is planned to drain through a conveyance channel to the existing channel that runs east/west before it turns and travels north to Mill Creek. The east/west channel flows in both directions. The intersection of the conveyance channel from the Phillips/Quail Run detention pond flows to the east. The offsite drainage from the Phillips/Quail Run detention pond will not be collected or routed through the proposed development and therefore was not considered as part of the design. No other offsite drainage flows to the subject property.

Topography and Flowpath

The topography of the subject property is relatively flat, with an average slope of approximately 0.5%, with the highest point of the property in the southeast corner at an elevation of 425 and the lowest point of the property in the northwest corner at an elevation of 415. The portion of the property south of the east/west drainage way drains to the drainage way and has a different flowpath than the property located north of the east/west drainage way. The longest hydraulic flowpath for the project can be seen in Appendix A. It extends from the east/west drainage way to the northwest corner of the property for a total length of approximately 1,528 lineal feet. This flowpath is used for the calculation of the predeveloped time of concentration.

Soils and Hydrologic Soil Group

Preliminary soils information was obtained from the National Resource Conservation Services Web Soil Survey. The approximate site boundaries were used for the development of the soils map. From this map, four soil types were identified as Courtney gravelly silty clay, Clackamas gravelly loam, Salem gravelly loam, and Sifton gravelly loam. These soil types have hydrologic soil groups listed as D, C/D, B and B respectively. Hydrologic soil group determines the curve numbers selected for the hydrologic analysis.

For this analysis, the site was split according to the percentage of the area of interest indicated on the Web Soil Survey output. This can be seen in Table 1. This breakdown of areas of HSG will be used to determine the predeveloped runoff rate.

Table 1: NRCS Web Soil Survey Summary

Map Unit Symbol	Map Unit Name	HSG	% of Area of Interest	Acres
2224A	Courtney Gravelly Silty Clay	D	17.6	9.56208
Ck	Clackamas Gravelly Loam	C/D	35.9	19.50447
Sa	Salem Gravelly Silt Loam	B	1	0.5433
St	Sifton Gravelly Loam	B	45.5	24.72015

The ground cover type used for calculating the predeveloped condition was determined to be "Meadow-continuous grass, protected from grazing and generally mowed for hay". The corresponding curve number values came from the City of Stayton Design Standards. For the portion of the site with a HSG C/D, the curve number corresponding to HSG C will be used for the preliminary analysis, as this gives a more conservative predeveloped runoff rate than using HSG D, which would allow for more runoff to leave the site.

Groundwater

The proximity of the project site to Mill Creek, as well as the presence of HSG D soils indicates that the groundwater in this area is shallow. For this reason, infiltration facilities are deemed inappropriate for this site.

Table 2: Predeveloped Basin Summary Table

Basin	Area (ac)			Composite CN	T_c (min)
	Meadow, HSG B CN = 58	Meadow, HSG C CN = 71	Meadow, HSG D CN = 78		
Predeveloped	25.27	19.5	9.56	66.19	60.7

Point of Discharge

Given the topography of the site, the existing point of discharge for the site is along Golf Club Road. This water travels to the north along Golf Club Road before it outlets into Mill Creek. This is in keeping with the City of Stayton Stormwater Master Plan. A portion of the Stormwater Master Plan pertaining to the subject property can be seen in Figure CC.

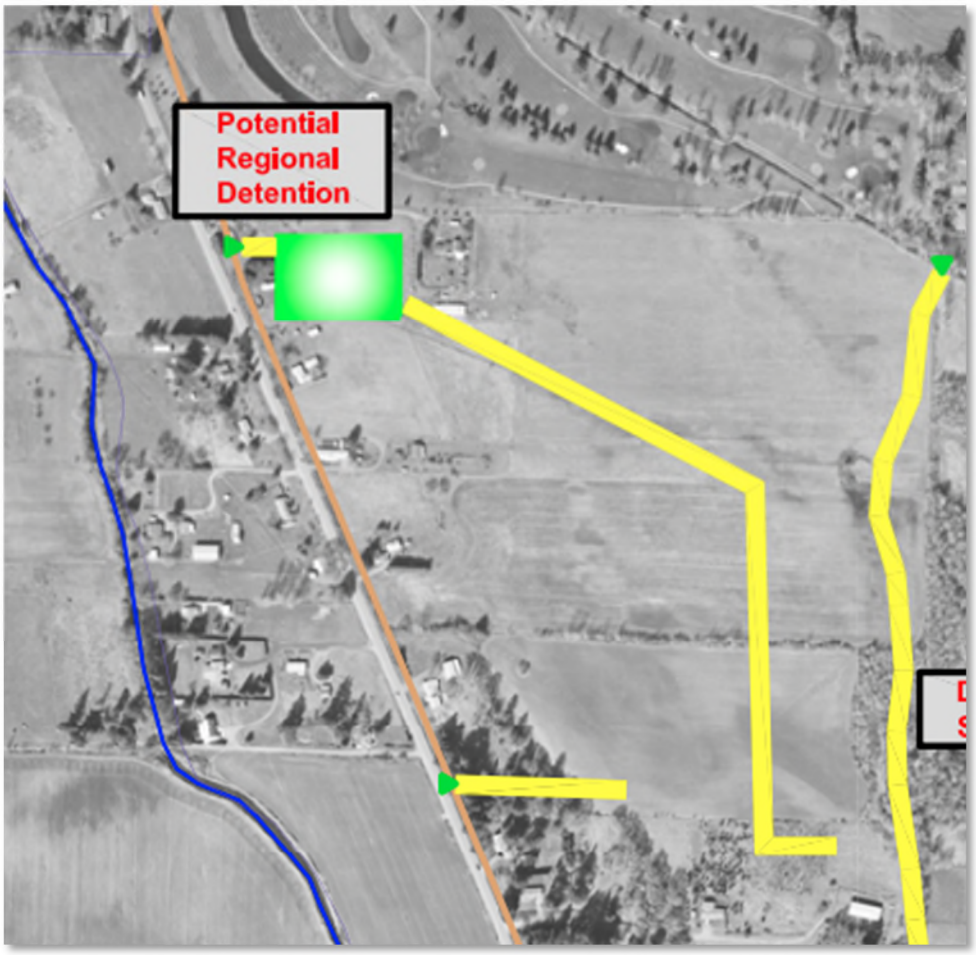


Figure 2: Recommended Improvements per the City of Stayton Stormwater Master Plan

DRAINAGE SUBBASINS

The proposed development consists of 124 single-family lots and the associated roads, sidewalks, utilities, and undisturbed wetland areas. A collector street is required out to Golf Club Road that bisects the project into a north subbasin and a south subbasin.

The portion of the property that is left undisturbed is also a separate subbasin. The topography of the undisturbed area directs water to the northeast towards Mill Creek, in the opposite direction of the developed project area point of discharge. For this reason, the flow from the undisturbed area is calculated and subtracted from the total predeveloped flowrate in order to determine the allowable release flowrate for the project.

Table 3: Developed Subbasin Summary Table

Basin	Area (ft^2)			Composite CN	T_c (min)
	Impervious, HSG B CN = 98	Lawn, HSG B = 61	Meadow, HSG C CN = 71		
North	349704	290760		81.0	5
South	577668	424327		82.0	5
Undisturbed			686419	71.0	60.7

Stormwater generated from each subbasin will be directed to a detention pond located in each subbasin. The north subbasin drains to a detention pond located in the northwest corner of the property, which provides treatment and flow control. Flow from this basin will outlet into the drainage ditch located along Golf Club Road. The south subbasin drains to a detention pond located adjacent to the collector road, which provides treatment and flow control. Flow from this basin will outlet to the Golf Club Road.

A Post-developed Basin Map can be found in Appendix A.

HYDROLOGIC ANALYSIS

Stormwater analysis was done using HydroCAD 10.20-7a, using the Santa Barbara Unit Hydrograph method. A Type 1A 24-hour storm distribution was used with the 24-hour rainfall depths obtained from the City of Stayton Public Works Design Standards, shown in Table 4.

Table 4: 24-hour Rainfall Depths from City of Stayton Stormwater Design Standards

Storm Event	24-hour Rainfall Depths (in)
2 year	2.50
5 year	3.00
10 year	3.50
25 year	4.00
50 year	4.50
100 year	4.60
Water Quality	1.61

This design was completed to match the City of Stayton design standards published in 2021. Because of this, the analysis needed to be done for the water quality event, the 2-, 5-, 10-, 25-, 50-, and 100-year events, matching the postdeveloped flowrate to the predeveloped allowed flowrate. In addition, the City of Stayton requires that the 25 year postdeveloped flowrate not exceed the 10-year predeveloped flowrate.

The predeveloped allowable flowrate is determined by taking the total site predeveloped rate and subtracting the flowrate generated by the undisturbed subbasin. Table 5 below shows the analysis and the ultimate allowable flowrate used for the purposes of sizing the detention facilities. Please note that the allowable flowrate for the 25-year event is the 10-year allowable flowrate. This is in accordance with the City of Stayton requirement that the 25-year post developed flowrate not exceed the 10-year predeveloped flowrate.

Table 5: Allowable Flowrate (cfs) by storm event

Storm Event	Predeveloped Runoff Rate (cfs)	Undisturbed Area Runoff (cfs)	Allowable Runoff (cfs)
2 year	1.24	0.49	0.75
5 year	1.91	0.88	1.03
10 year	2.95	1.41	1.54
25 year	4.58	2.03	1.54
50 year	6.5	2.73	3.77
100 year	6.91	2.88	4.03

City of Stayton Public Works Design Standards require a summary table comparing the pre and post development runoff values without the use of detention and flow control. Table CC gives the allowable predeveloped flowrate. The post-developed flowrates are also shown. The flowrates from the undisturbed areas are not included, as that subbasin has been taken into account with the allowable flowrate analysis (see Table 5). These values come from the basin node, without any routing to the proposed facilities. The proposed facilities are discussed in the following section.

Table 6: Pre to Post summary table without flow control

Storm Event	Allowable Runoff (cfs)	North Area Undetained Flowrate (cfs)	South Area Undetained Flowrate (cfs)	TOTAL Undetained Flowrate (cfs)
2 year	0.75	4.72	7.8	12.52
5 year	1.03	5.72	9.45	15.17
10 year	1.03	6.82	11.24	18.06
25 year	2.55	8.15	13.38	21.53
50 year	3.77	9.55	15.61	25.16
100 year	4.03	9.83	16.06	25.89

FACILITY DESIGN

The following section discusses the detention ponds and flow control used to meet the performance standard requirements of post-developed flowrate to the pre-developed flowrate match for the 2, 5, 10,

25, 50, and 100 year storm events as well as match the 25 year postdeveloped flowrate to the 10 year predeveloped flowrate. Table CC provides a summary of the flow out of the proposed facilities for all the design events, as well as the detention provided and the allowable outflow.

Ponds

The ponds were modeled within HydroCAD as irregular shaped ponds. This involved including the pond surface area at the bottom elevation of the pond and the top elevation of the pond. For both facilities, the maximum water depth is 4 feet, with 1 foot of freeboard required above the 100 year water surface elevation. Side slopes were set at 3 feet horizontal for every 1 foot of vertical change. The south pond does have one retaining wall proposed along the west side of the facility. A design exception will be submitted for this exception to the Public Works Design Standards.

Table 7: Facility Summary Table

Facility	Growing Media Elevation	Bottom of Pond		Top of Pond		Source	Ownership	Facility Type
		Surface Area (ft^2)	Elevation	Surface Area (ft^2)	Elevation			
North Pond	415.00	23461	415	39852	420	Roadway, Sidewalk, Roof, Lawn	Public	Combination Facility
South Pond	414.00	37000	414	53474	419	Roadway, Sidewalk, Roof, Lawn	Public	Combination Facility

Control Structure

Each pond facility will have a control structure. The final design of the control structure will be completed during the design phase of the project. The north pond facility has two orifices (primary outlet, secondary outlet) as well as a V-notch Weir (tertiary outlet). The south pond facility is modeled with three orifices (primary, secondar, and tertiary outlets). Both ponds would also be provided with an emergency overflow structure with a RIM set at the 100 year water surface elevation. This emergency overflow would bypass the control structure and would be analyzed to ensure it could pass the 100 year undetained storm. This analysis is not completed as part of the preliminary stormwater analysis.

Table 8: Control Structure Summary

	Growing Media Elevation	Orifice #1		Orifice #2		Orifice #3		V-notch Weir	
		Diameter (in)	INV Elevation	Diameter (in)	INV Elevation	Diameter (in)	INV Elevation	Notch Angle	INV Elevation
North Pond	415	1.5	415	2	417.75			45	418.2
South Pond	414	4	414	3.3	417	10	417.75		

Hydrograph Results

Below are the results of the hydrograph analysis for both pond facilities.

Table 9: Pre to Post Flowrate Summary with Detention/flow control

Storm Event	*North Pond*		*South Pond*		TOTAL Design Runoff (cfs)	Allowable Runoff (cfs)	Design < Allowable?
	Release Rate (cfsf)	Water Surface Elevation	Release Rate (cfs)	Water Surface Elevation			
2 year	0.22	417.32	0.47	416.17	0.70	0.75	YES
5 year	0.31	417.77	0.66	416.72	0.96	1.03	YES
10 year	0.37	418.23	0.82	417.21	1.53	1.54	YES
25 year	0.58	418.67	0.95	417.72	1.54	1.54	YES
50 year	0.96	418.95	1.85	417.96	2.77	3.77	YES
100 year	1.03	418.98	1.99	417.99	2.97	4.03	YES

Water Quality Analysis

The water quality event was analyzed to determine that both facilities will provide treatment. HydroCAD is used to perform the analysis, with a 24-hour rainfall depth of 1.61 inches. A filtration rate of 6.0 inches per hour is used for the growing media, per the City of Portland Bureau of Environmental Services Standards.

Table CC lists the water surface elevation within each facility. The beehive structures for each pond will be set above the stated water surface elevation to ensure that all of the water is able to flow through the growing media prior to be routing to the control structure orifices. For both facilities, the water depth in the facilities is 0.04 feet. The beehives will be set more than 0.25 feet above the growing media.

Table 10: Water quality hydrograph summary

Facility	Water Surface Elevation
North	415.04
South	414.04

CONVEYANCE CALCULATIONS

Conveyance calculations will be required as part of the construction permit approval. For the purposes of preliminary design, they are not provided. They will be provided during the construction permit approval process.

Downstream Capacity Analysis

The proposed analysis provides detention and flow control to the predeveloped rate for every storm event. In addition, the City of Stayton requires that the 25-year storm event cannot exceed the 10-year predeveloped flowrate. The 25-year post to 10-year pre requirement is the limiting factor for sizing detention facilities. It increases the size of the proposed facilities. For storm events larger than the 25-year storm event, the design flowrate becomes much lower than the allowable. In the purposes of this design, the design flowrate for the 50-year storm event is 1.0 cfs lower than the allowable and 1.04 cfs lower for the 100-year storm event. This is a reduction of over 25% of the allowable flowrate.

These detention requirements mean that the flow entering the system for the developed condition will be lower than the existing flow. Because of this, no downstream capacity analysis is necessary.

Operations and Maintenance

The two stormwater facilities will receive public water and will therefore be the responsibility of the City of Stayton.

Conclusions

The provided analysis demonstrates the stormwater facilities are able to meet the performance standards set forth in the City of Stayton Design Standards for both water quality and quantity. The flowrate leaving the project is less than the allowable for all storm events. For the 50 year and 100-year storm events, the flowrate leaving the project is 25% less than the allowable.

The two facilities are able to meet the requirements of the City of Stayton with one exception: the west side of the south pond is proposed with a retaining wall. A design exception request will be submitted for this deviation from the standards. This deviation is done to keep the facilities as close to the Design Standards as possible.

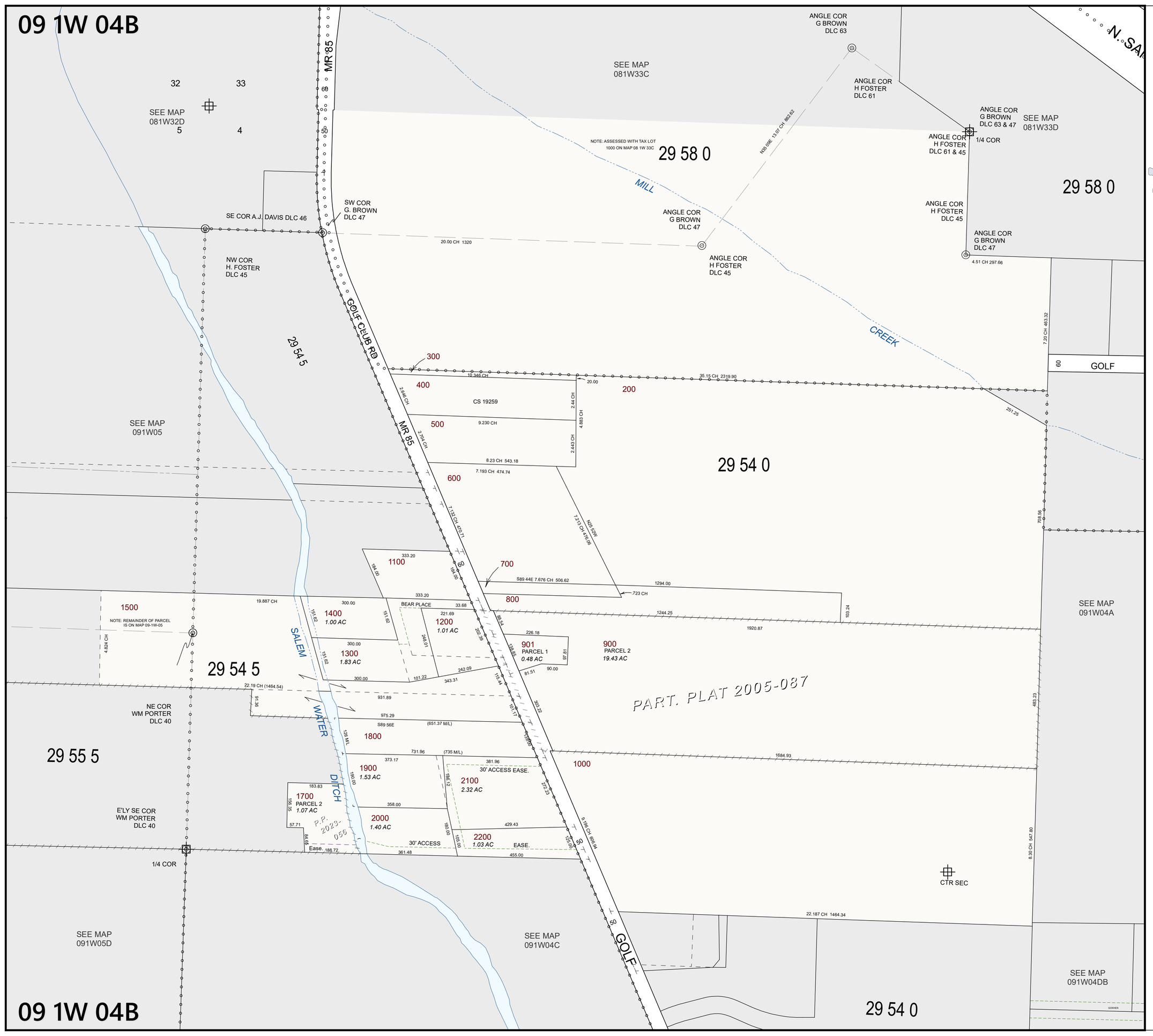
The provided analysis is for preliminary purposes. Additional analysis for conveyance as well as more detailed design drawings will be needed for the final design phase.

Contact

If there are any questions or concerns, please contact Natalie Janney with Multi/Tech Engineering by phone at (503) 363-9227 or via email at NJanney@mtengineering.net.

APPENDIX A: MAPS

09 1W 04B



09 1W 04B

MARION COUNTY, OREGON

NW1/4 SEC4 T9S R1W W.M.

SCALE 1" = 200'

LEGEND

LINE TYPES

- Taxlot Boundary
- Historical Boundary
- Road Right-of-Way
- Easement
- Railroad Right-of-Way
- Railroad Centerline
- Private Road ROW
- Taxcode Line
- Subdivision/Plat Bndry
- Map Boundary
- Waterline - Taxlot Bndry
- Waterline - Non Bndry

CORNER TYPES

- 1/16TH Section Cor.
- 1/4 Section Cor.
- DLC Corner
- Section Corner (16 15 / 21 22)

NUMBERS

Tax Code Number

00 00 0

Acreage *0.25 AC*

All acres listed are Net Acres, excluding any portions of the taxlot within public ROWs

NOTES

Tick Marks: A tick mark in the road indicates that the labeled dimension extends into the public ROW

200.00
175.00

CANCELLED NUMBERS

1600

DISCLAIMER: THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY

Marion County OREGON — Assessors Office Cartography Dept

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT www.co.marion.or.us

PLOT DATE: 3/4/2024

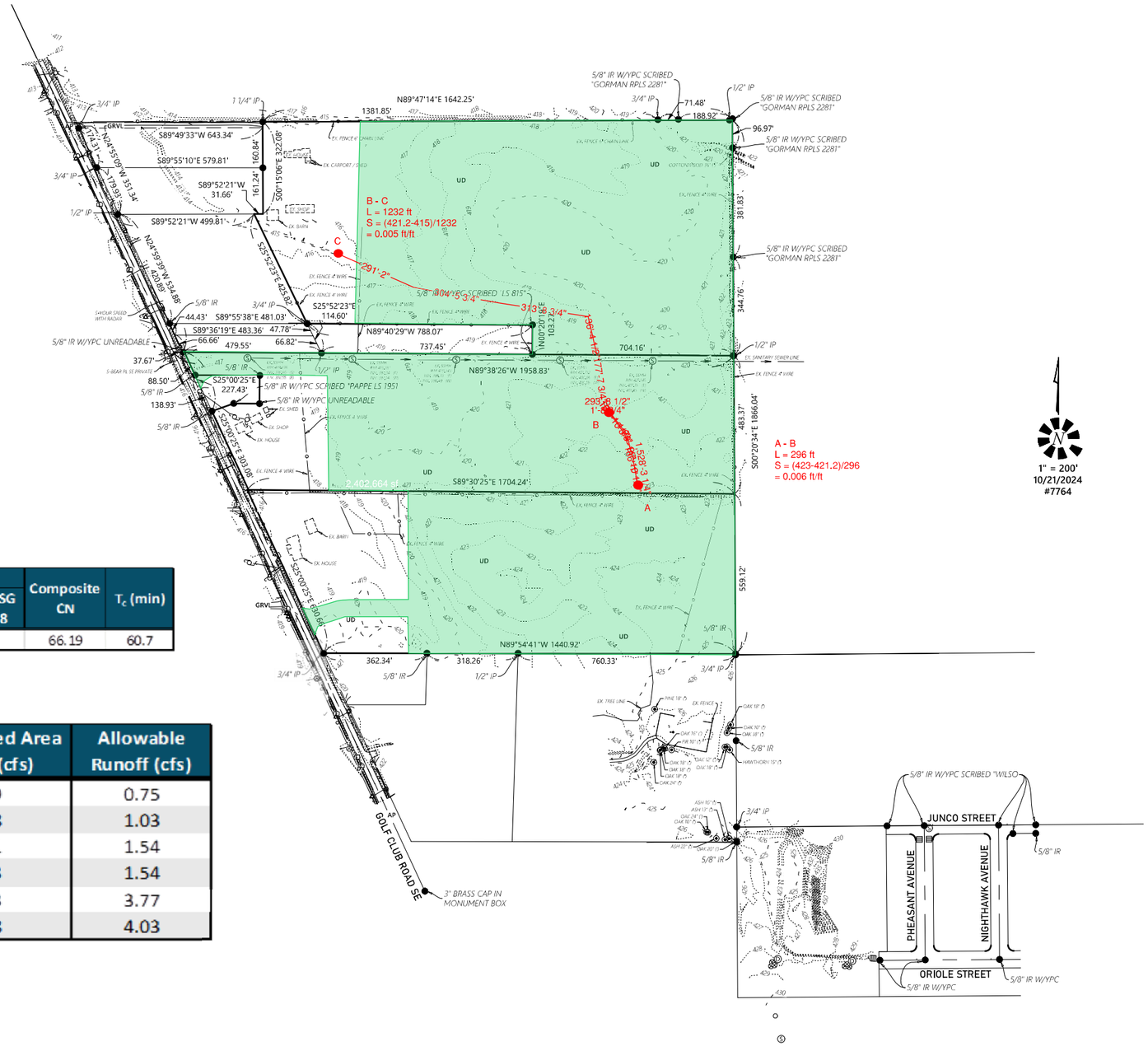
09 1W 04B

Pre-developed Basin Map

TOPOGRAPHIC MAP

NE 1/4 & NW 1/4, SEC. 4, T. 9 S., R. 1 W., W.M., City of Stayton, Marion County, Oregon
Tax Parcel No. 91W04B200, 91W04B900, 91W04B1000

BY:
MULTI/TECH ENGINEERING SERVICES, INC.
1155 13th STREET S.E.
SALEM, OREGON 97302
(503) 363-9227



LEGEND:

- CABLE / TV PEDESTAL
- SANITARY SEWER MANHOLE
- POWER BOX / POWER METER
- LIGHT POLE
- CABLE BOX
- CLEANOUT
- WATER VALVE
- S- SIGN
- CATCH BASIN
- STORM SEWER MANHOLE
- GUY WIRE
- POWER POLE
- CULVERT
- MAILBOX
- ELECTRIC PEDESTAL
- RISER
- AP ASPHALT/PAVEMENT
- SC GRAVEL
- UD UNDEVELOPED

Basin	Area (ac)			Composite CN	T_c (min)
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Post-developed Basin Map

Basin	Area (ft²) Impervious, HSG B CN = 98	Lawn, HSG B CN = 61	Meadow, HSG C CN = 71	Composite CN	T_c (min)
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Storm Event	*North Pond* Release Rate (cfsf)	*North Pond* Water Surface Elevation	*South Pond* Release Rate (cfs)	*South Pond* Water Surface Elevation	TOTAL Design Runoff (cfs)	Allowable Runoff (cfs)	Design < Allowable?
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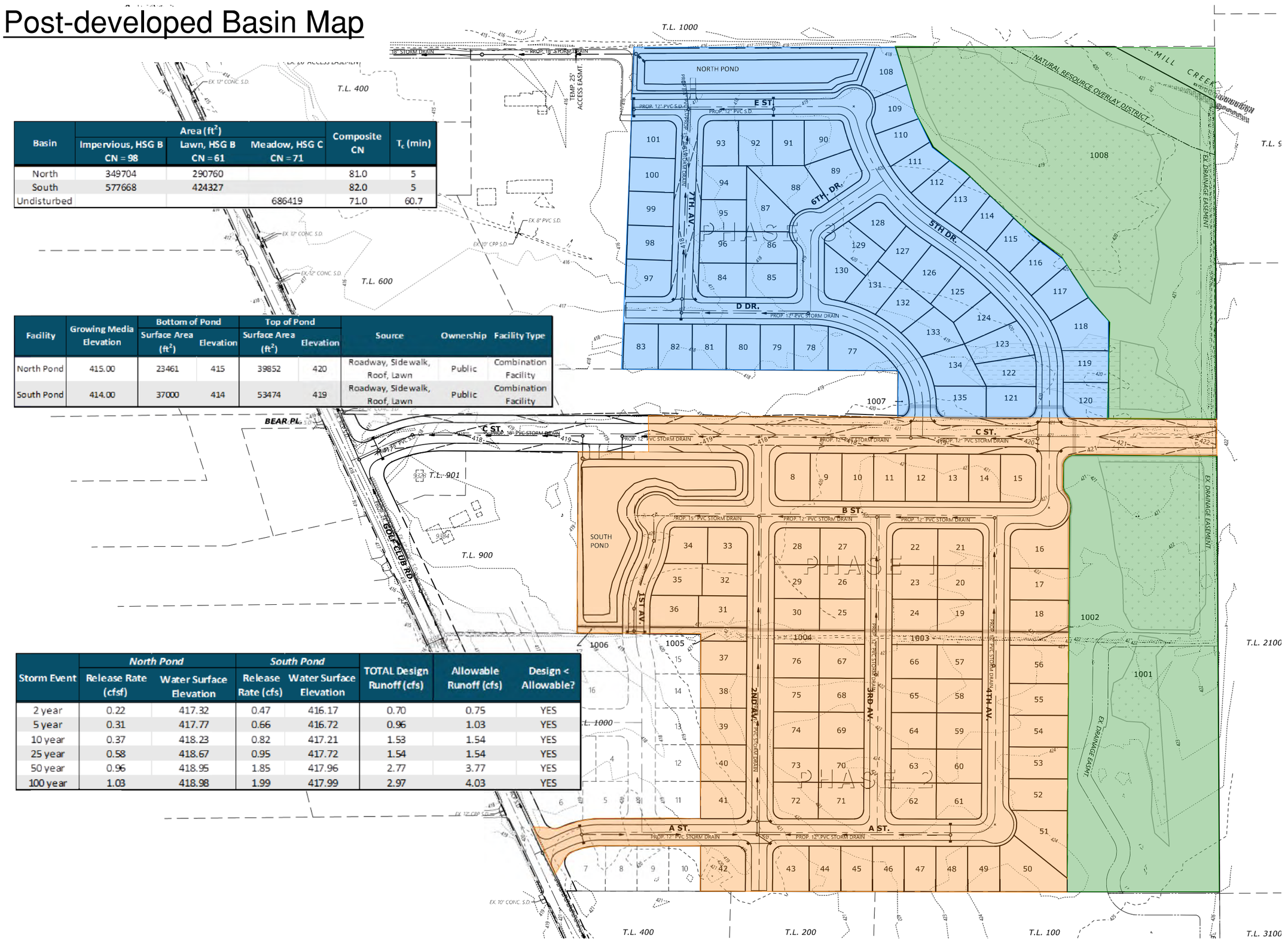
25 year	0.58	418.67	0.95	417.72	1.54	1.54	YES
50 year	0.96	418.95	1.85	417.96	2.77	3.77	YES
100 year	1.03	418.98	1.99	417.99	2.97	4.03	YES



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www.mtengineering.net office@mtengineering.net

LOT GRADING PLAN

GOLF CLUB ROAD DEVELOPMENT

NO CHANGES, MODIFICATIONS OR REPRODUCTIONS TO BE MADE TO THESE DRAWINGS WITHOUT WRITTEN AUTHORIZATION FROM THE DESIGN ENGINEER.

DIMENSIONS & NOTES TAKE PRECEDENCE OVER SCALED GRAPHICAL REPRESENTATION.

Design: M.D.G.
Drawn: D.G.G.
Checked: M.D.G.
Issue Date: 8/11/25
Scale: AS SHOWN
As-Built: ---

REGISTERED PROFESSIONAL ENGINEER
9654
OREGON
JULY 14, 1978
MARK D. GRENZ
EXPIRES: 06-30-2027

JOB # 7764

4xx

APPENDIX B: TIME OF CONCENTRATION

Worksheet 3: Time of Concentration (T_c) or travel time (T_t)

Project	By	Date
Golf Club Road Development	N. Janney, P.E.	8/2025
Location	**Checked**	**Date**
Stayton, Oregon		

Check one: ☐ Present ☐ Developed

Check one: ☐ T_c ☐ T_t through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID	A - B	
1. Surface description (table 3-1)	Meadow/Pasture	
2. Manning's roughness coefficient, n (table 3-1)	0.15	
3. Flow length, L (total L † 300 ft) ft	296	
4. Two-year 24-hour rainfall, P_2 in	2.5	
5. Land slope, s ft/ft	0.006	
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t hr	0.7125	+ =

Shallow concentrated flow

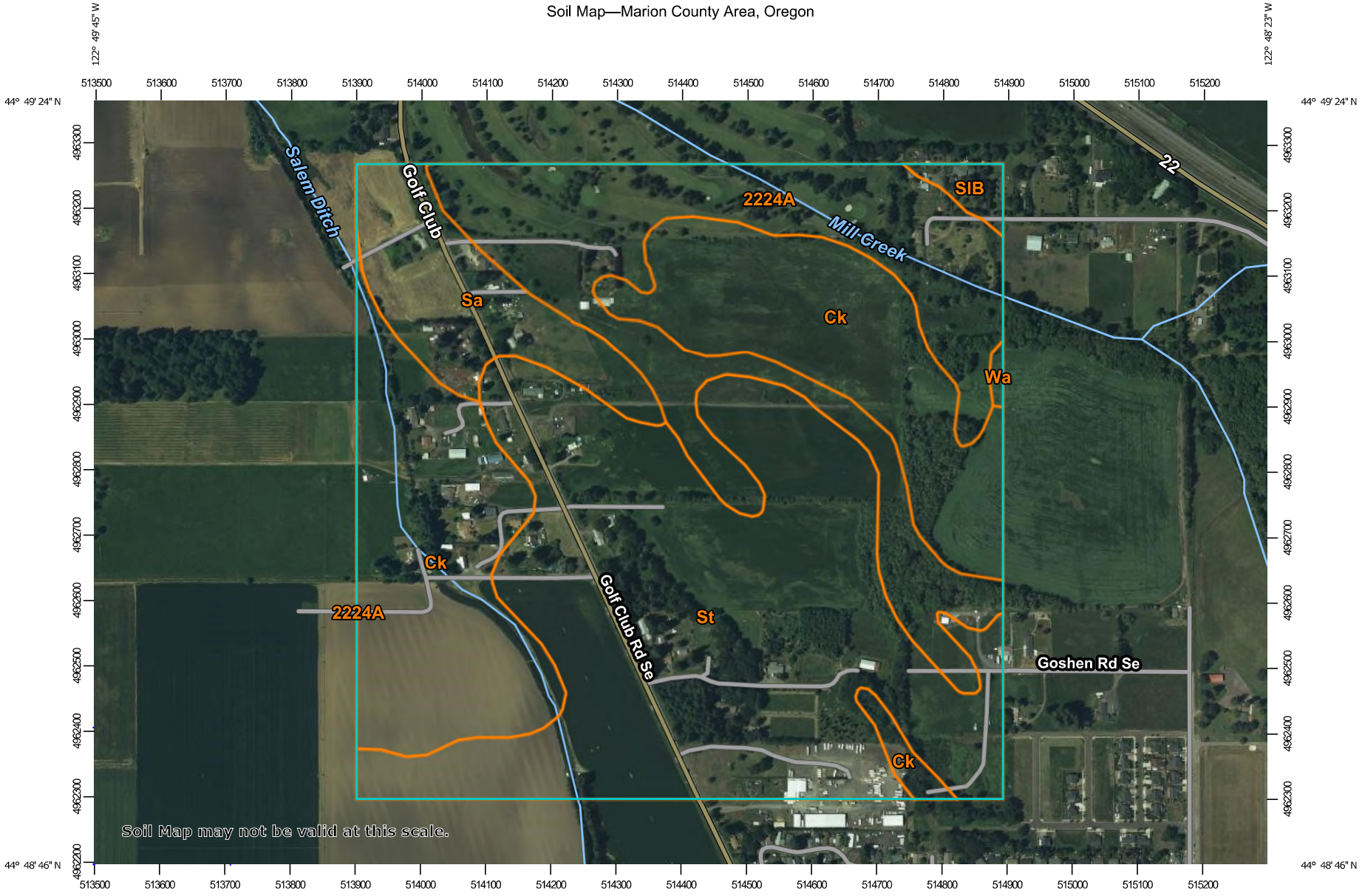
Segment ID	B - C	
7. Surface description (paved or unpaved)	Unpaved	
8. Flow length, L ft	1232	
9. Watercourse slope, s ft/ft	0.005	
10. Average velocity, V (figure 3-1) ft/s	1.1409	
11. $T_t = \frac{L}{3600\ V}$ Compute T_t hr	0.2999	+ =

Channel flow

Segment ID		
12. Cross sectional flow area, a ft^2		
13. Wetted perimeter, p_w ft		
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft		
15 Channel slope, s ft/ft		
16. Manning's roughness coefficient, n		
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V ft/s		
18. ~~Flow~~ length, L ft		
19. $T_t = \frac{L}{3600\ V}$ Compute T_t hr	+ =	
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) Hr		

Total Tc = 0.7125 + 0.2999 = 1.012 hours = 60.7 minutes

APPENDIX C: SOILS INFORMATION AND WELL LOGS



Map Scale: 1:8,220 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 22, Aug 30, 2024

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

Date(s) aerial images were photographed: May 28, 2020—May 29, 2020

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
2224A	Courtney gravelly silty clay loam, 0 to 3 percent slopes	51.2	21.5%
Ck	Clackamas gravelly loam	70.4	29.5%
Sa	Salem gravelly silt loam	18.7	7.8%
SlB	Salkum silty clay loam, basin, 0 to 6 percent slopes	2.1	0.9%
St	Sifton gravelly loam	96.0	40.2%
Wa	Waldo silty clay loam	0.4	0.2%
Totals for Area of Interest		**238.8**	**100.0%**

Marion County Area, Oregon

Ck—Clackamas gravelly loam

Map Unit Setting

National map unit symbol: 24nz
Elevation: 170 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Clackamas and similar soils: 85 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clackamas

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly mixed alluvium

Typical profile

H1 - 0 to 15 inches: gravelly loam
H2 - 15 to 24 inches: gravelly clay loam
H3 - 24 to 60 inches: extremely gravelly clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: R002XC005OR - High Flood Plain Group
Forage suitability group: Somewhat Poorly Drained (G002XY005OR)
Other vegetative classification: Somewhat Poorly Drained (G002XY005OR)

Hydric soil rating: No

Minor Components

Courtney

Percent of map unit: 8 percent
Landform: Terraces
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 22, Aug 30, 2024

Marion County Area, Oregon

2224A—Courtney gravelly silty clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2xpsh
Elevation: 160 to 800 feet
Mean annual precipitation: 39 to 59 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Courtney and similar soils: 85 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Courtney

Setting

Landform: Drainageways on stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

A1 - 0 to 8 inches: gravelly silty clay loam
A2 - 8 to 17 inches: gravelly silty clay loam
2Btg1 - 17 to 24 inches: gravelly clay
2Btg2 - 24 to 33 inches: gravelly clay
3Cg - 33 to 48 inches: very gravelly clay loam
4C - 48 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 10 to 19 inches to abrupt textural change
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D

Ecological site: R002XC005OR - High Flood Plain Group
Forage suitability group: Poorly Drained (G002XY006OR)
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Minor Components

Awbrig
Percent of map unit: 6 percent
Landform: Drainageways on stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Bashaw
Percent of map unit: 4 percent
Landform: Depressions on stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Conser
Percent of map unit: 2 percent
Landform: Depressions on stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Poorly Drained (G002XY006OR)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 22, Aug 30, 2024

Marion County Area, Oregon

Sa—Salem gravelly silt loam

Map Unit Setting

National map unit symbol: 24r5
Elevation: 100 to 600 feet
Mean annual precipitation: 40 to 45 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Salem and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salem

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly mixed alluvium

Typical profile

H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 30 inches: gravelly clay loam
H3 - 30 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: R002XC006OR - Stream Terrace Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 22, Aug 30, 2024

Marion County Area, Oregon

St—Sifton gravelly loam

Map Unit Setting

National map unit symbol: 24rg
Elevation: 100 to 600 feet
Mean annual precipitation: 40 to 45 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sifton and similar soils: 92 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sifton

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium over gravelly sand

Typical profile

H1 - 0 to 17 inches: gravelly loam
H2 - 17 to 24 inches: gravelly loam
H3 - 24 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Ecological site: R002XC006OR - Stream Terrace Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 22, Aug 30, 2024

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

MAR 14 2003 WATER RESOURCES DEPT SALEM, OREGON

MARI 57135 57135

(WELL I.D.)# L 61129

(START CARD) # 153169

RECEIVED MAR 31 2003 WATER RESOURCES DEPT. SALEM, OREGON WM

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number 3789

Name Gary Nokelby -- Dorothy Albrecht

Address 9574 Golf Club Rd. SE

City Aumsville State Oregon Zip 97325

(2) TYPE OF WORK

☐ New Well ☑ Deepening ☑ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:

☑ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger

☐ Other

(4) PROPOSED USE:

☑ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☑ No Depth of Completed Well 248' ft.

Explosives used ☐ Yes ☑ No Type Amount

HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or pounds
10"	0	23'	Cement	0'	23'	10 sacks
6"	122'	248'	Cement	40'	95'	45 sacks

How was seal placed: Method ☐ A ☑ B ☑ C ☐ D ☐ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	Existing				☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☑ Perforations Method Holte perforator

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
95'	102'	1/4	30		6"	☑	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☑ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
8 gpm	80'	100'	1 hr.

Temperature of water 56 Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Marion Latitude Longitude

Township 9 S Range 1 W WM

Section 4 NE 1/4 SW 1/4

Tax Lot 200 Lot Block Subdivision

Street Address of Well (or nearest address) 9584 Golf Club Rd. SE

Aumsville, OR 97325

(10) STATIC WATER LEVEL:

16 ft. below land surface. Date 3/07/03

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 95'

From	To	Estimated Flow Rate	SWL
95'	165'	8-1/2 gpm	16

(12) WELL LOG:

Ground Elevation

Material	From	To	SWL
Over shot & resealed well.			
Pressure grouted perforations & reperforate			
lower. Deepened.			
Cement	0	13	
Gravel	13	14	
Cement	14	19	
Cement & gravel	19	23	
Brown clay	122	130	
Sandy grey clay	130	165	
Brown clay	165	173	
grey clay w/some grit	173	194	
Grey clay hard	194	210	
Grey clay w/grit	210	245	
Basalt	245	248	
JONES DRILLING CO., INC.			
29400 SANTIAM HWY.			
LEBANON, OR 97355			
1-800-915-8388			

Date started 2/28/03 Completed 3/07/03

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1684

Signed Date 3-10-03

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

MIRI.... 17447

9s/1w/4ca

(START CARD) # W-17602

(1) OWNER:

Well Number: Sta

Name Bernice Roberts

Address 777 Shaff Rd.

City Stayton State OR Zip 97383

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☒ Cable

☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval Yes ☐ No ☒ Depth of Completed Well 122 ft.

Explosives used Yes ☐ No ☒ Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10"	0	20	Cement	0	20	30 + 5% bentonite
6"	20	122				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ____ ft. to ____ ft. Material ____

Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+2	122	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) ____

(7) PERFORATIONS/SCREENS:

☒ Perforations Method Mills Knife

☐ Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
72	82	3/8x3/4	105			☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☒ Pump ☒ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
42	9		1 hr.
28	5		1 hr
16	4	Pump	2½ hr.

Temperature of water 53° Depth Artesian Flow Found ____

Was a water analysis done? ☐ Yes By whom ____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other ____

Depth of strata: ____

(9) LOCATION OF WELL by legal description:

County Marion Latitude ____ ' ____ " Longitude ____ ' ____ "

Township 9-S N or S, Range 1-W E or W, WM.

Section 4 NE ¼ SW ¼

Tax Lot ____ Lot ____ Block ____ Subdivision ____

Street Address of Well (or nearest address) 9584 Golf Club Rd. SE Aumsville OR

(10) STATIC WATER LEVEL:

6 ft. below land surface. Date 3-2-90

Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:

Depth at which water was first found 5ft

From	To	Estimated Flow Rate	SWL
5	6	Cased to FF	1.5
20	32	10+	5.5
34	38	20 gpm	6
70	82	50 gpm	6

(12) WELL LOG:

Ground elevation ____

Material	From	To	SWL
Soil with small gravels	0	2	
Brown clay & gravel	2	5	
loose gravel	5	6	1.5
Brown silty clay & gravel	6	14	
Slightly cemented gravel	14	20	
Gravel & brown clay	20	24	5
Brown clay & gravel tight	24	27	
Clay & gravel loose	27	32	5.5
Tight brown clay & gravel	32	34	
loose gravel & clay	34	38	6
Tight clay & gravel	38	51	
Cemented Sand & gravel	51	70	
Clay & gravel loose	70	73	6
gravel with clay layers	73	76	6
Sand & gravel with clay layer	76	82	6
Cemented gravel & clay	82	84	
Cemented Sand & gravel	84	87	
Cemented Sand & gravel & clay	87	99	
loose Sand & gravel dirty	99	101	6
Cemented gravel & Clay	101	105	
Coarse Sand & gravel	105	107	6
Clay & gravel	109	109	
Dark brown clay	109	116	
Gray Clay	116	122	

Date started 1-26-90 Completed 3-2-90

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number ____

Signed ____ Date ____

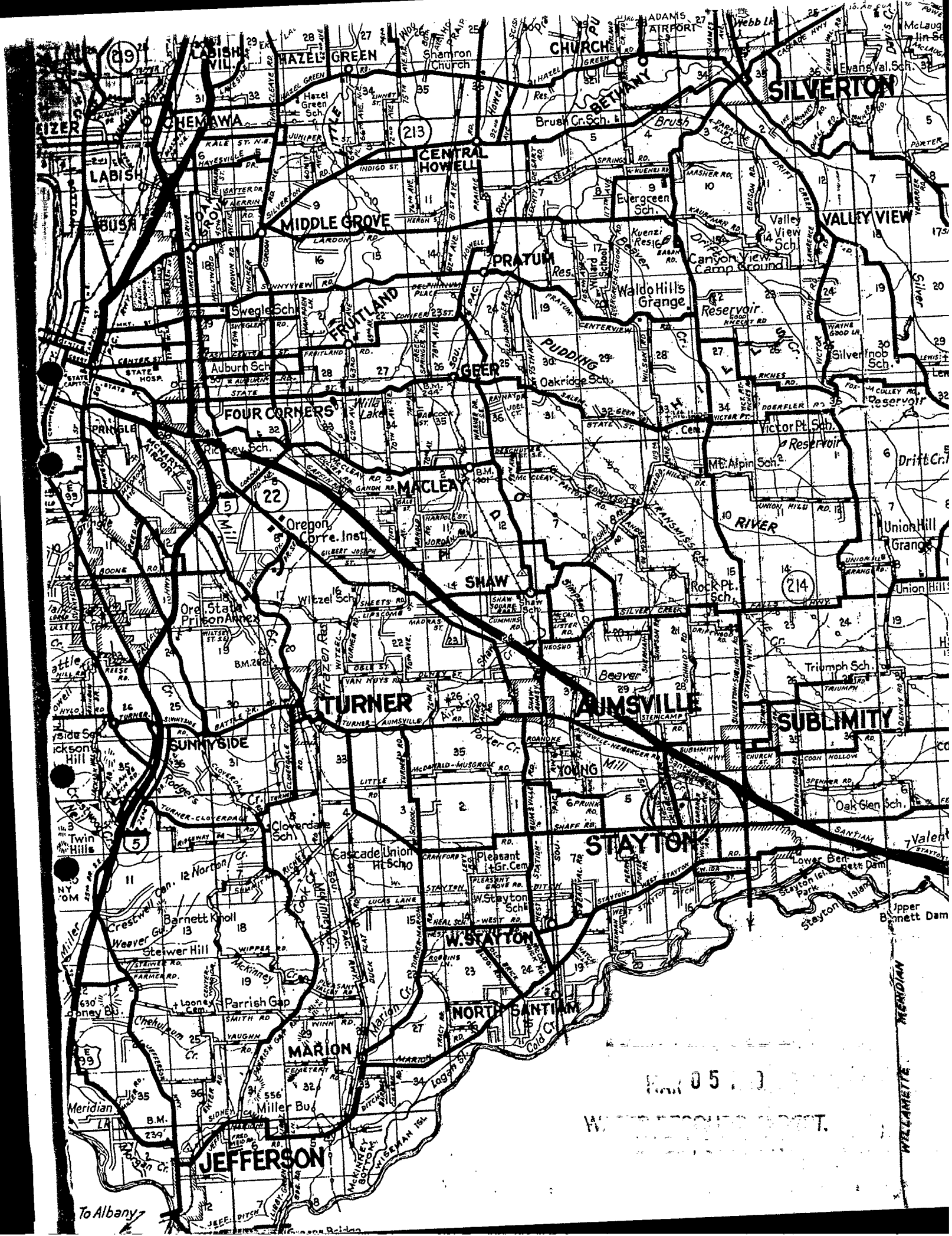
(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1273

Signed Floyd Seppe Date ____

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 3/88


99
LABISH VIL.
HAZEL GREEN
Shamrock Church
CHURCH
ADAMS AIRPORT
Webb Lk
McLaughlin Sch
SILVERTON
Evans Val. Sch.
BETHANY
Hazel Green Sch.
CHEMAWA
213
Brush Cr. Sch.
Brush
CENTRAL HOWELL
LABISH
MIDDLE GROVE
Evergreen Sch.
VALLEY VIEW
Valley View Sch.
Canyon View Camp Ground
PRATUM
Waldo Hills Grange
Reservoir
Swegle Sch.
FRUITLAND
Silverfnob Sch.
Auburn Sch.
GEER
Oakridge Sch.
PUDDING
FOUR CORNERS
Willa Lake
Victor Pt. Sch.
Reservoir
Rickey Sch.
Mt. Alpin Sch.
MACLEAY
22
Oregon Corre. Inst.
Union Hill Grange
RIVER
SHAW
Witzel Sch.
Rock Pt. Sch.
214
Ore. State Prison Annex
Triumph Sch.
TURNER
AUMSVILLE
SUBLIMITY
SUNNYSIDE
YOUNG
Oak Glen Sch.
Cloverdale Sch.
STAYTON
Cascade Union Hi Sch.
Pleasant Gr. Cem.
W. Stayton Sch.
W. STAYTON
Barnett Knoll
Steiwer Hill
Parrish Gap
NORTH SANTIAM
MARION
Miller Bu.
JEFFERSON
To Albany
WILLAMETTE MERIDIAN

RECEIVED
NOV 8 1984
WATER RESOURCES DEPT.
SALEM, OREGON

MAR..... 9S/1W-4
17149
(for official use only)

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

PLEASE TYPE or PRINT IN INK

(1) OWNER:
Name Ned Uffelman
Address 9499 Golf Club Rd.
City Stayton State Oregon

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☐ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☑ Bored ☐

(4) PROPOSED USE (check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Thermal: Withdrawal ☐ Reinjection ☐
Other: Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:
Steel Threaded ☐ Plastic Welded ☑
6 " Diam. from +.5 ft. to 40 ft. Gauge .250
" Diam. from ft. to ft. Gauge

LINER INSTALLED:
Steel Threaded ☐ Plastic Welded ☐
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☑ Yes ☐ No If yes, by whom? Driller
Yield: 20 gal./min. with 23 ft. drawdown after 2 hrs.
" " " "
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☑
Well seal—Material used Portland cement
Well sealed from land surface to 18 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Amount of sealing material 16 sacks ☐ pounds ☐
How was cement grout placed? an air grout pump was placed the grout at surface casing pulled. One side of casing has bentonite as pitless was putin
Was pump installed? yes Type Sub HP 3/4 Depth 35 ft.
Was a drive shoe used? ☑ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☑ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:
County Marion ¼ ¼ of Section 4 of
Township 9S (Township is North or South), Range 1W (Range is East or West), WM.
Tax Lot Lot Block Subdivision
MAILING ADDRESS OF WELL (or nearest address) 9499 Golf Club Rd.

(11) WATER LEVEL of COMPLETED WELL:
Depth at which water was first found 11 ft.
Static level 7 ft. below land surface. Date 10/12/84
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing
Depth drilled ft. Depth of completed well ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Small - large gravel w/ Brown clay and sand	0'	11'	
Brown clay, sand and gravel (some tight, cemented areas)	11'	29'	
Small - medium sand + gravel w/ reddish, brown clay (water)	29'	40'	7'

Date work started Oct. 9, '84 /completed Oct. 21, '84
Date well drilling machine moved off of well Oct. 26 1984

(unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Date , 19

(bonded) Water Well Constructor Certification:
Bond 84-97-460 (number) Issued by: Maryland Fidelity + Deposit (Surety Company Name)
On behalf of Mike Waldroop (type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
(Signed) Michael Waldroop (Water Well Constructor)
(Dated) October 26, 1984

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*46866-690

MARI 57062

RECEIVED

MARI 57062

Pg 1 of 2

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

FEB 10 2003

WATER RESOURCES DEPT
SALEM, OREGON

WELL I.D.# L 62630
START CARD # 101185

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number
Name Charles + Glenda Hawkins
Address 9534 Golf Club Rd SE.
City Aumsville State OR Zip 97325

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☒ Yes ☐ No Depth of Completed Well 324 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	Material	SEAL From	To	Sacks or pounds
11	0	59	Cement	0	59	29+ bent
7.5	59	278		150	278	28+ bent
5.5	278	324				

How was seal placed: Method ☐ A ☐ B ☒ C ☒ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6 in	+1'	278	.25	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4 in	+1	278	.237	☒	☐	☒	☐
					☐	☐	☐	☐

Drive Shoe used ☒ Inside ☐ Outside ☐ None
Final location of shoe(s) 278

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
20+		322	1 hr.

Temperature of water 54 ± Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Marion Latitude Longitude
Township 9-S N or S Range 1-W E or W. WM.
Section 4 NE 1/4 SW 1/4
Tax Lot 00409 Lot Block Subdivision
Street Address of Well (or nearest address) Same as #1

(10) STATIC WATER LEVEL:
20 ft. below land surface. Date 1-31-03
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 9 ft.

From	To	Estimated Flow Rate	SWL
9	85	50	3
280	322	20+	20

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Top Soil with large gravel	0	4	
Brown Clay + gravel	4	9	
Loose gravel brown	9	12	
Large tight gray gravel	12	18	
Boulders gray	18	21	
Brown Clay + gravel	21	35	
Loose gravel gray	35	39	
Brown clay + gravel with brown Sand	39	75	
Semi-loose Sand and gravel dark gray	75	85	
Brown Clay + gravel	85	111	
Sticky brown clay	111	118	
Sticky gray + blue clay	118	150	
Soft dark gray clay with Sand layers	150	170	
Cont Pg 2			

Date started 1-20-03 Completed 1-31-03

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number 1629
Signed Date 2-3-03

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1273
Signed Floyd Sippe Date 2-3-03

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

MARI 57062

RECEIVED MARI 57062

FEB 10 2003

WATER RESOURCES DEPT.
SALEM, OREGON

Pg 2 of 2

WELL I.D. # L 62630

START CARD # 101185

STATE OF OREGON

WATER SUPPLY WELL REPORT

(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number ____

Name Charles + Glenda Hawkins

Address 9534 Golf Club Rd SE.

City Aumsville State OR Zip 97325

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger

☐ Other ____

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Livestock ☐ Other ____

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☒ Yes ☐ No Depth of Completed Well 324 ft.

Explosives used ☐ Yes ☒ No Type ____ Amount ____

HOLE Diameter	From	To	Material	SEAL From	To	Sacks or pounds
11	0	59	Cement	0	59	29+bent
7.5	59	278		150	278	28+bent
5.5	278	324				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other ____

Backfill placed from ____ ft. to ____ ft. Material ____

Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☒ Inside ☐ Outside ☐ None

Final location of shoe(s) 278

(7) PERFORATIONS/SCREENS:

☐ Perforations Method ____

☐ Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.

Temperature of water ____ Depth Artesian Flow Found ____

Was a water analysis done? ☐ Yes By whom ____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other ____

Depth of strata: ____

(9) LOCATION OF WELL by legal description:

County Marion Latitude ____ Longitude ____

Township 9-S N or S Range 1-W E or W. WM.

Section 4 NE 1/4 SW 1/4

Tax Lot 00400 Lot ____ Block ____ Subdivision ____

Street Address of Well (or nearest address) Same as #1

(10) STATIC WATER LEVEL:

20 ft. below land surface. Date 1-31-03

Artesian pressure ____ lb. per square inch Date ____

(11) WATER BEARING ZONES:

Depth at which water was first found ____

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:

Ground Elevation ____

Material	From	To	SWL
Gray Clay	170	202	
Brown Siltstone	202	212	
Sticky gray clay	212	216	
Soft gray clay with some wood	216	238	
Clay gray hard	238	249	
Basalt gray	249	258	
Brown Clay	258	262	
Gray basalt	262	280	
Soft black basalt (Ash)	280	322	
Gray blue Claystone	322	324	
Note: Cement placed between 4inch + 6inch casing's Steel ring on Tub-x shoe and 2 4x6 packers with approx 10 ft of Cement.			

Date started 1-20-03 Completed 1-31-03

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number 1629

Signed ____ Date 2-3-03

(bonded) Water Well Constructor Certification:

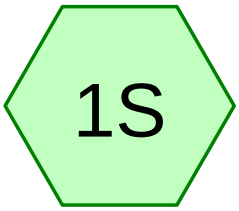
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1273

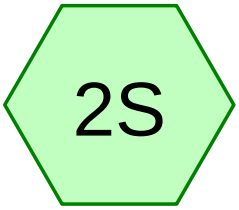
Signed Floyd Sippe Date 2-3-03

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

APPENDIX D: PREDEVELOPED HYDROGRAPHS



Predeveloped



Undisturbed

Subcat Reach Pond Link

Routing Diagram for Golf Club Prelim Hydrographs
Prepared by Multi/Tech Engineering Service, Printed 8/22/2025

Summary for Subcatchment 1S: Predeveloped

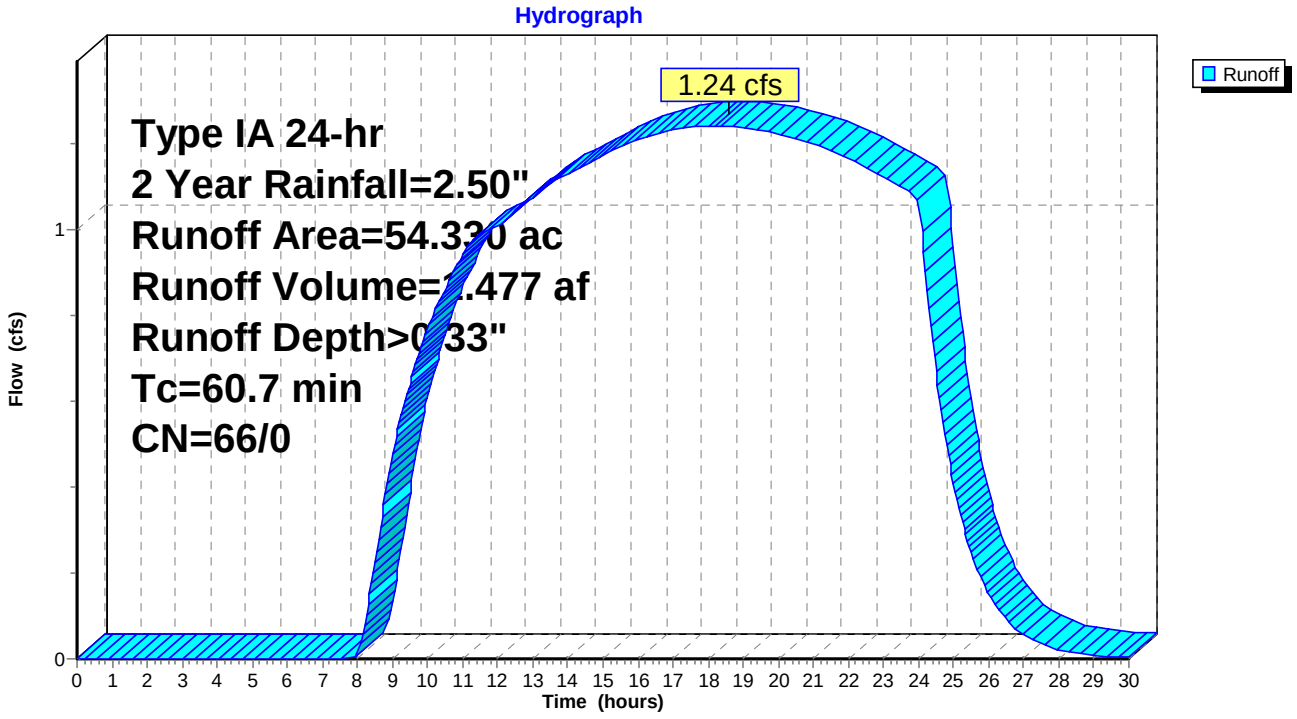
Runoff = 1.24 cfs @ 18.21 hrs, Volume= 1.477 af, Depth> 0.33"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.50"

Area (ac)	CN	Description
25.270	58	Meadow, non-grazed, HSG B
19.500	71	Meadow, non-grazed, HSG C
9.560	78	Meadow, non-grazed, HSG D
54.330	66	Weighted Average
54.330		100.00% Pervious Area

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

Subcatchment 1S: Predeveloped



Summary for Subcatchment 2S: Undisturbed

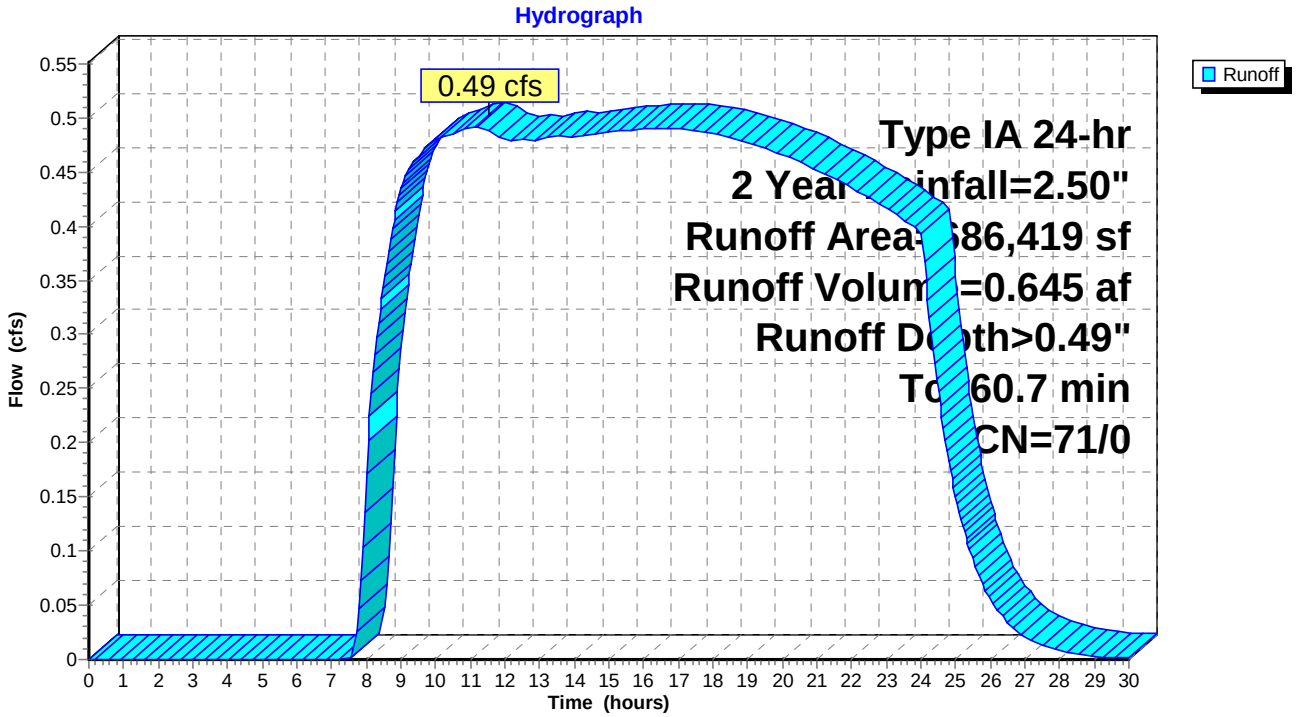
Runoff = 0.49 cfs @ 11.15 hrs, Volume= 0.645 af, Depth> 0.49"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.50"

Area (sf)	CN	Description
686,419	71	Meadow, non-grazed, HSG C
686,419		100.00% Pervious Area

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

Subcatchment 2S: Undisturbed



Summary for Subcatchment 1S: Predeveloped

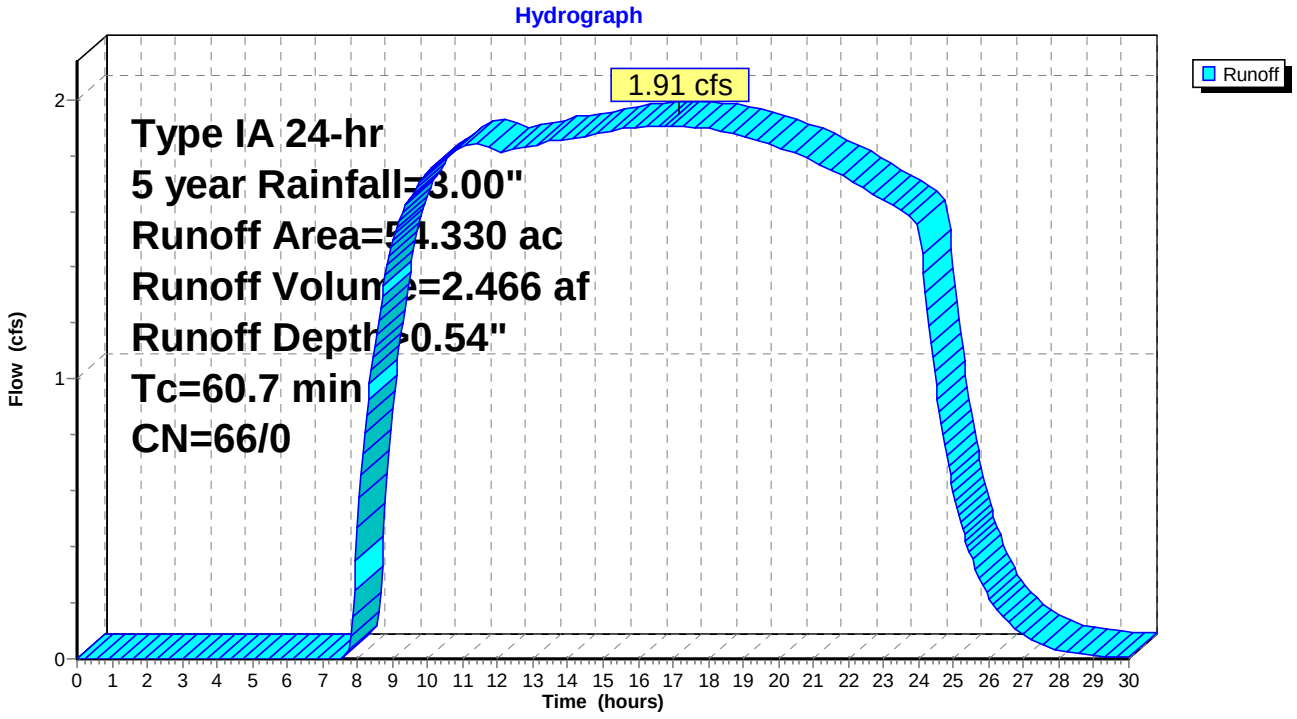
Runoff = 1.91 cfs @ 16.78 hrs, Volume= 2.466 af, Depth> 0.54"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 year Rainfall=3.00"

Area (ac)	CN	Description
25.270	58	Meadow, non-grazed, HSG B
19.500	71	Meadow, non-grazed, HSG C
9.560	78	Meadow, non-grazed, HSG D
54.330	66	Weighted Average
54.330		100.00% Pervious Area

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

Subcatchment 1S: Predeveloped



Summary for Subcatchment 2S: Undisturbed

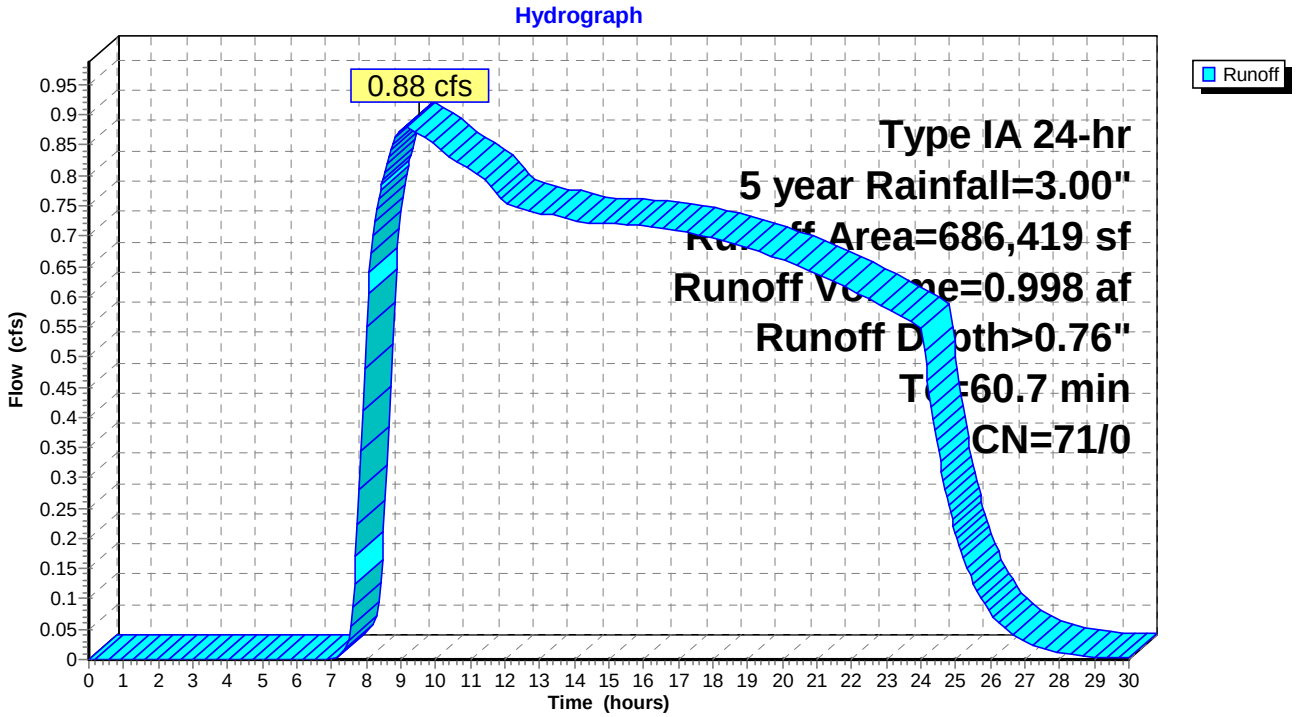
Runoff = 0.88 cfs @ 9.13 hrs, Volume= 0.998 af, Depth> 0.76"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 year Rainfall=3.00"

Area (sf)	CN	Description
686,419	71	Meadow, non-grazed, HSG C
686,419		100.00% Pervious Area

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

Subcatchment 2S: Undisturbed



Summary for Subcatchment 1S: Predeveloped

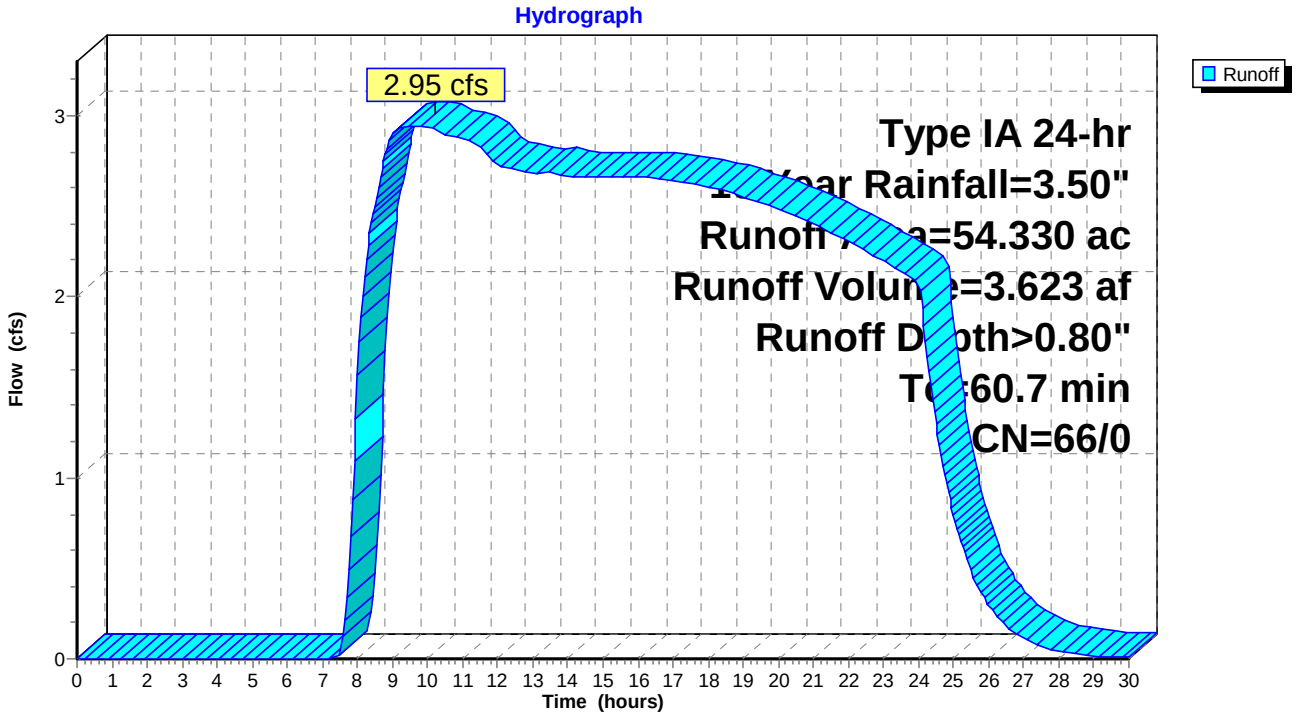
Runoff = 2.95 cfs @ 9.82 hrs, Volume= 3.623 af, Depth> 0.80"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.50"

Area (ac)	CN	Description
25.270	58	Meadow, non-grazed, HSG B
19.500	71	Meadow, non-grazed, HSG C
9.560	78	Meadow, non-grazed, HSG D
54.330	66	Weighted Average
54.330		100.00% Pervious Area

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

Subcatchment 1S: Predeveloped



Summary for Subcatchment 2S: Undisturbed

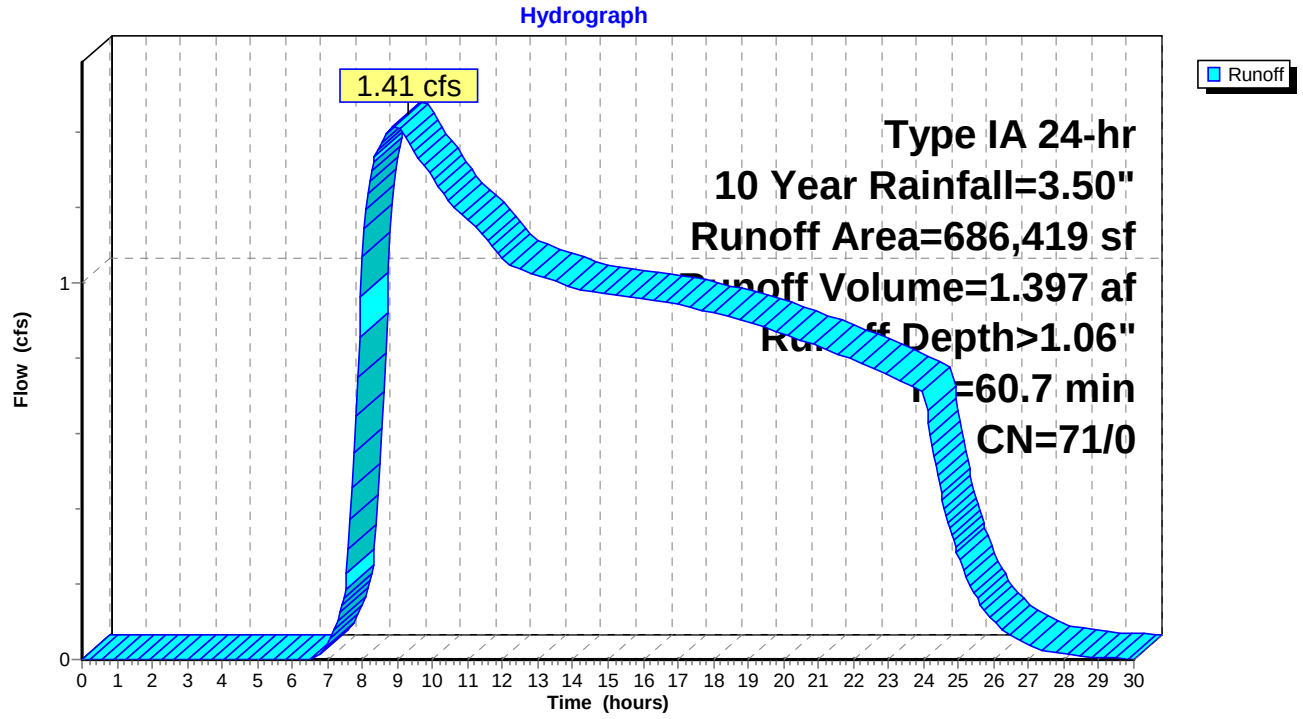
Runoff = 1.41 cfs @ 8.92 hrs, Volume= 1.397 af, Depth> 1.06"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.50"

Area (sf)	CN	Description
686,419	71	Meadow, non-grazed, HSG C
686,419		100.00% Pervious Area

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

Subcatchment 2S: Undisturbed



Summary for Subcatchment 1S: Predeveloped

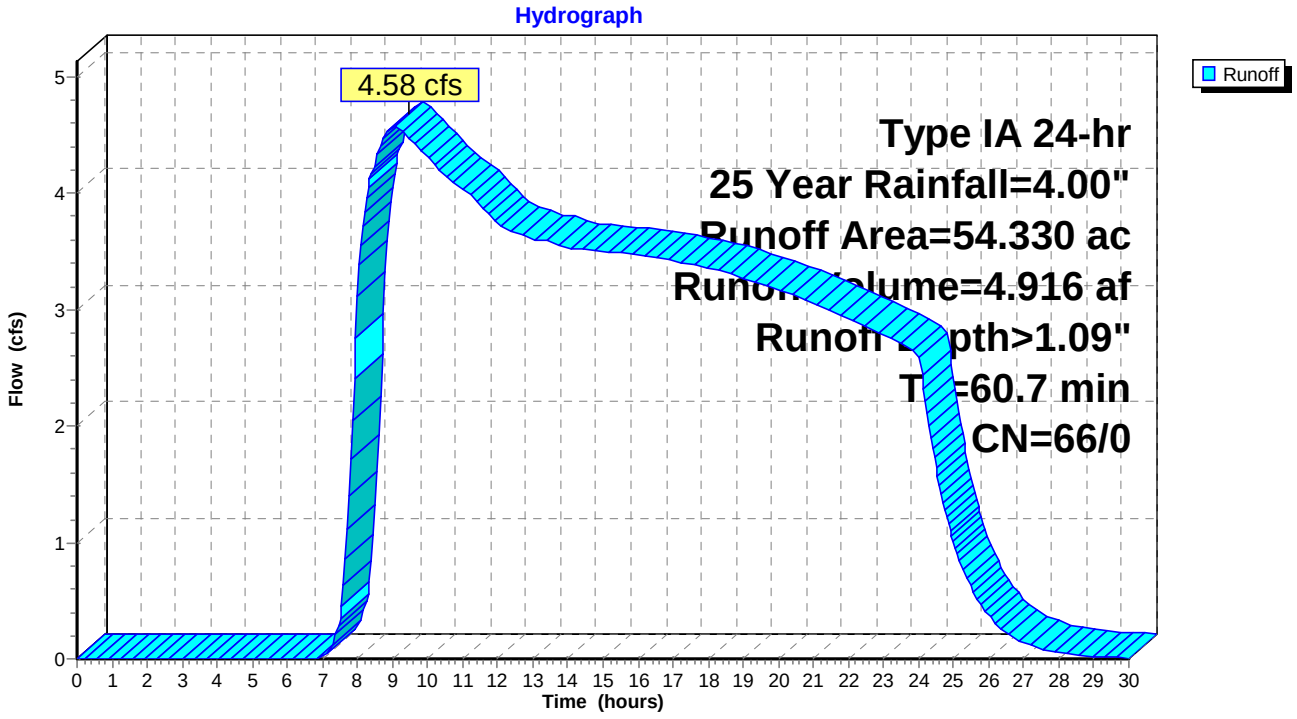
Runoff = 4.58 cfs @ 9.04 hrs, Volume= 4.916 af, Depth> 1.09"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=4.00"

Area (ac)	CN	Description
25.270	58	Meadow, non-grazed, HSG B
19.500	71	Meadow, non-grazed, HSG C
9.560	78	Meadow, non-grazed, HSG D
54.330	66	Weighted Average
54.330		100.00% Pervious Area

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

Subcatchment 1S: Predeveloped



Summary for Subcatchment 2S: Undisturbed

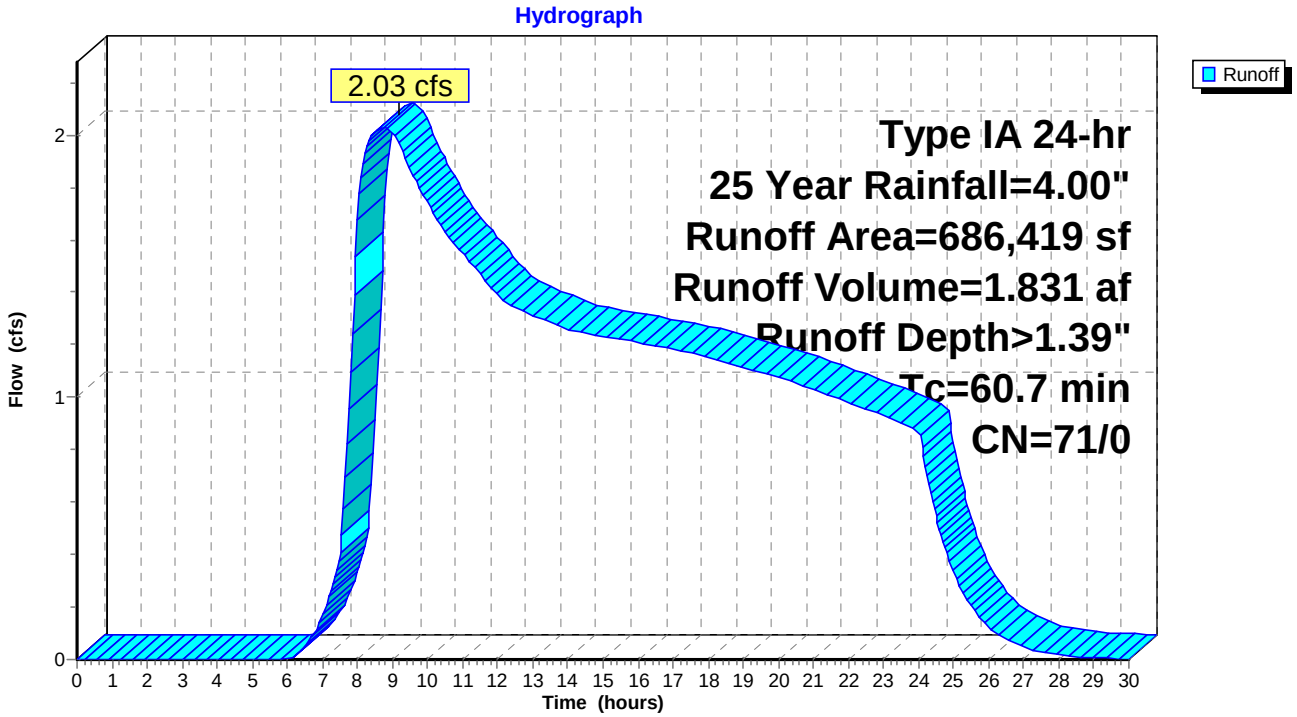
Runoff = 2.03 cfs @ 8.76 hrs, Volume= 1.831 af, Depth> 1.39"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=4.00"

Area (sf)	CN	Description
686,419	71	Meadow, non-grazed, HSG C
686,419		100.00% Pervious Area

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

Subcatchment 2S: Undisturbed



Summary for Subcatchment 1S: Predeveloped

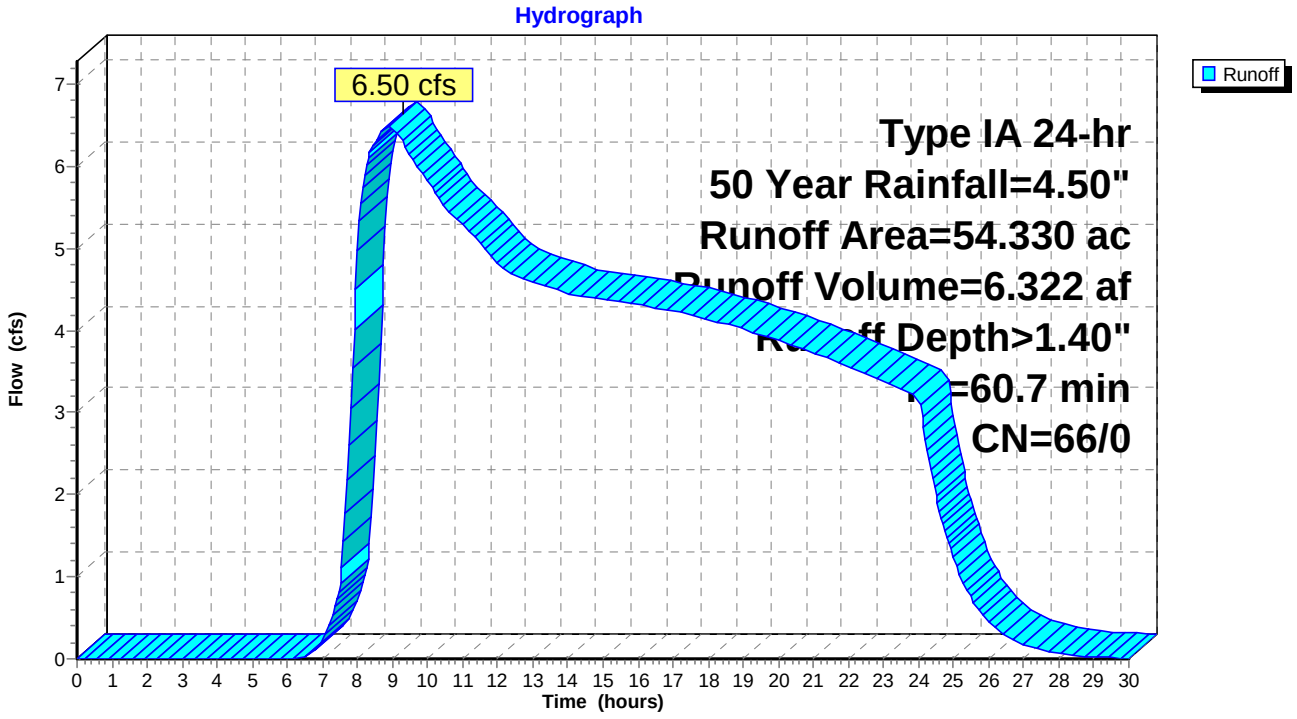
Runoff = 6.50 cfs @ 8.89 hrs, Volume= 6.322 af, Depth> 1.40"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 50 Year Rainfall=4.50"

Area (ac)	CN	Description
25.270	58	Meadow, non-grazed, HSG B
19.500	71	Meadow, non-grazed, HSG C
9.560	78	Meadow, non-grazed, HSG D
54.330	66	Weighted Average
54.330		100.00% Pervious Area

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

Subcatchment 1S: Predeveloped



Summary for Subcatchment 2S: Undisturbed

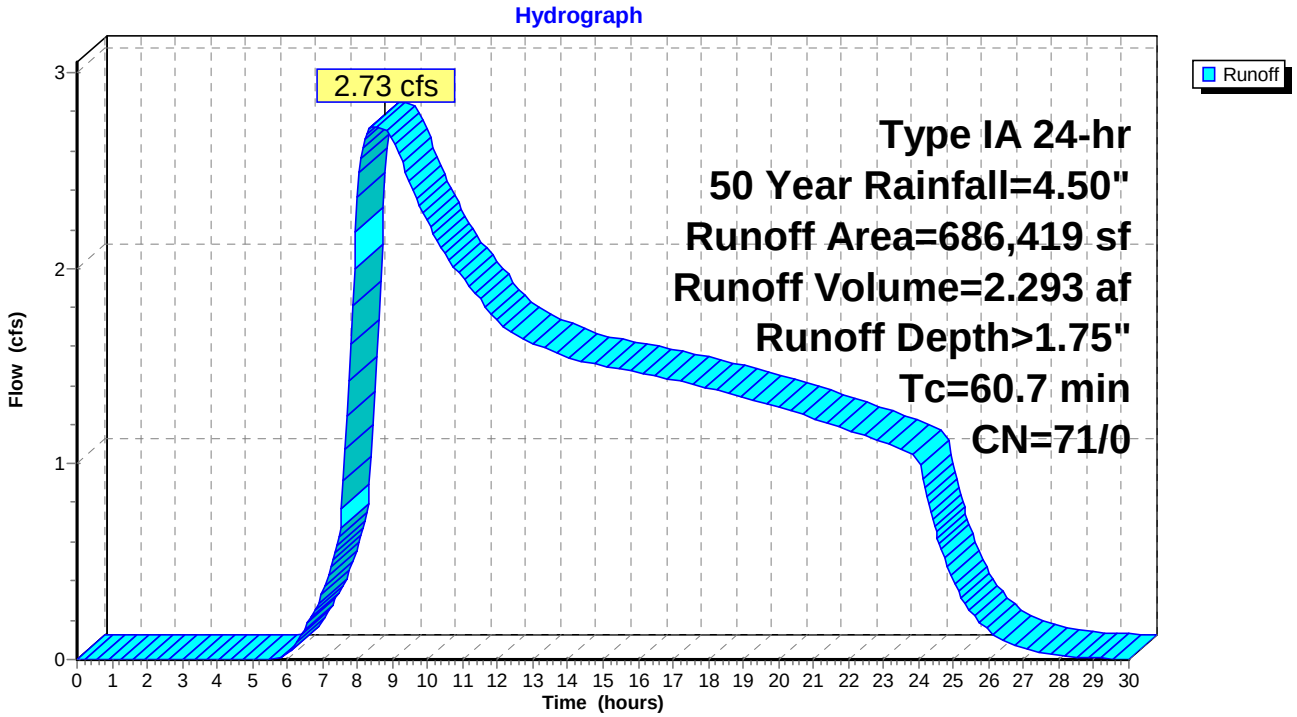
Runoff = 2.73 cfs @ 8.41 hrs, Volume= 2.293 af, Depth> 1.75"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 50 Year Rainfall=4.50"

Area (sf)	CN	Description
686,419	71	Meadow, non-grazed, HSG C
686,419		100.00% Pervious Area

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

Subcatchment 2S: Undisturbed



Summary for Subcatchment 1S: Predeveloped

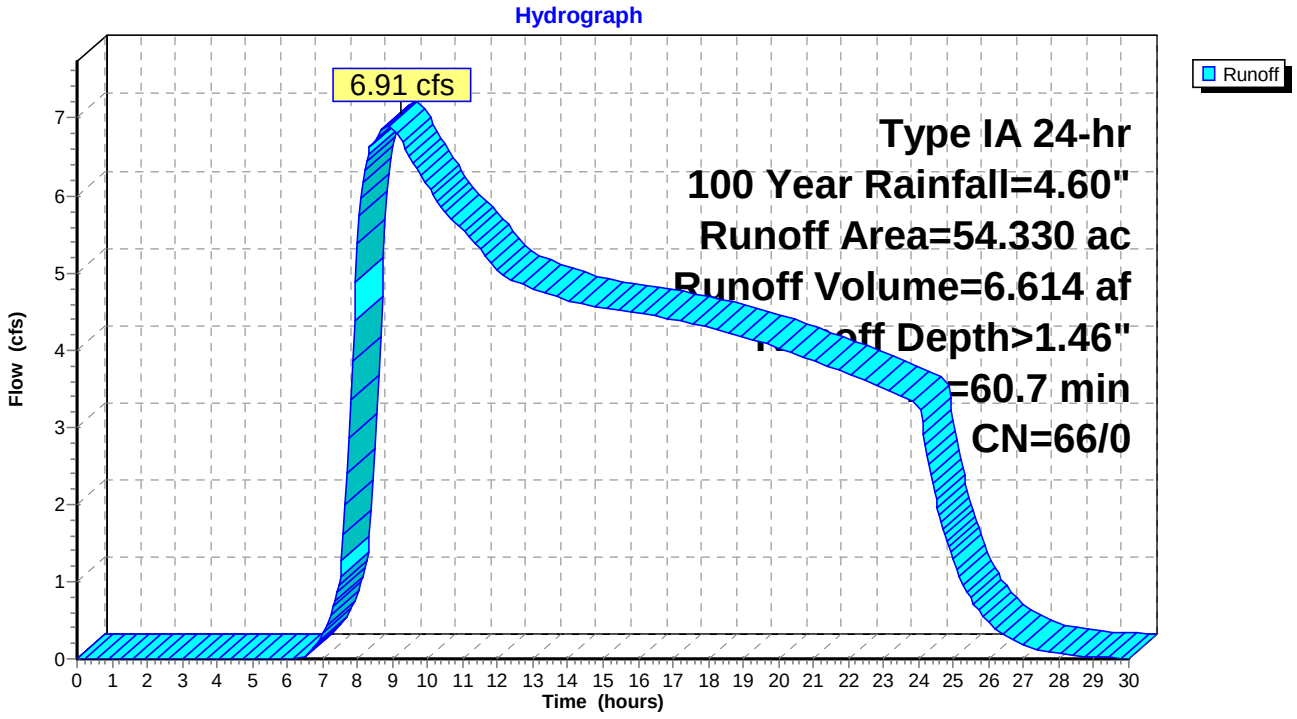
Runoff = 6.91 cfs @ 8.86 hrs, Volume= 6.614 af, Depth> 1.46"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.60"

Area (ac)	CN	Description
25.270	58	Meadow, non-grazed, HSG B
19.500	71	Meadow, non-grazed, HSG C
9.560	78	Meadow, non-grazed, HSG D
54.330	66	Weighted Average
54.330		100.00% Pervious Area

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

Subcatchment 1S: Predeveloped



Summary for Subcatchment 2S: Undisturbed

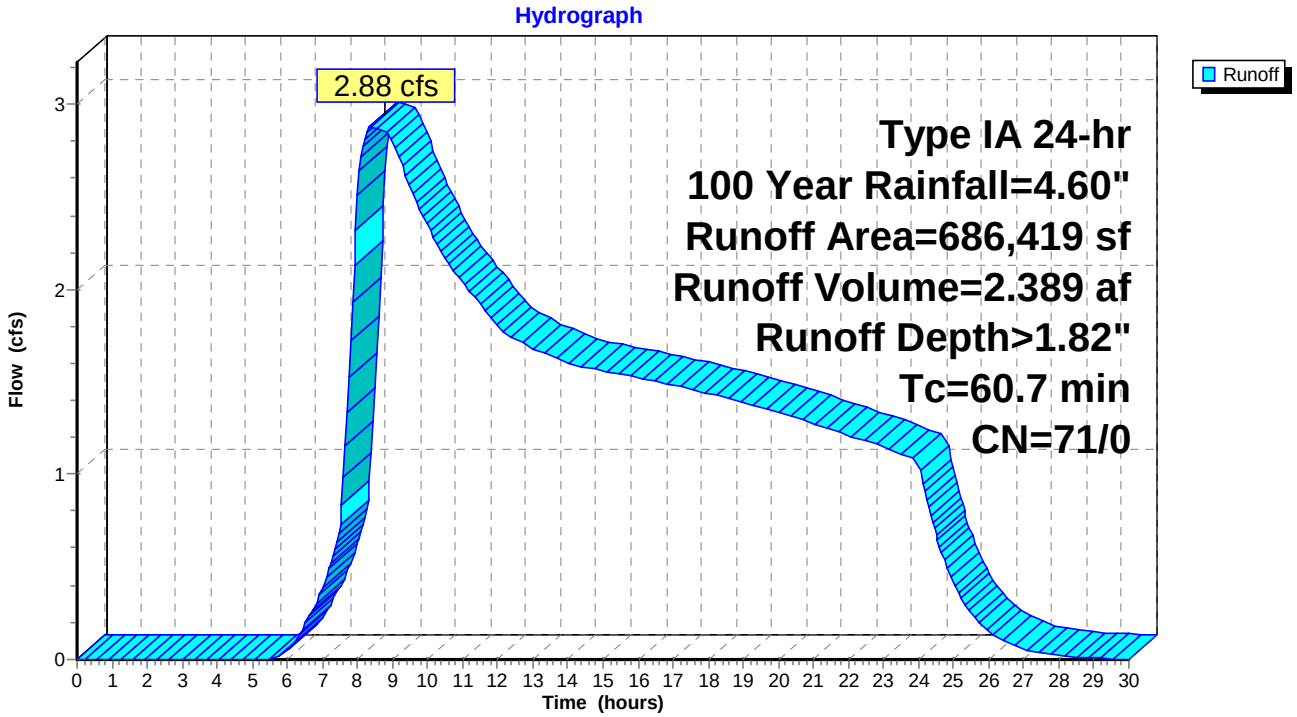
Runoff = 2.88 cfs @ 8.40 hrs, Volume= 2.389 af, Depth> 1.82"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.60"

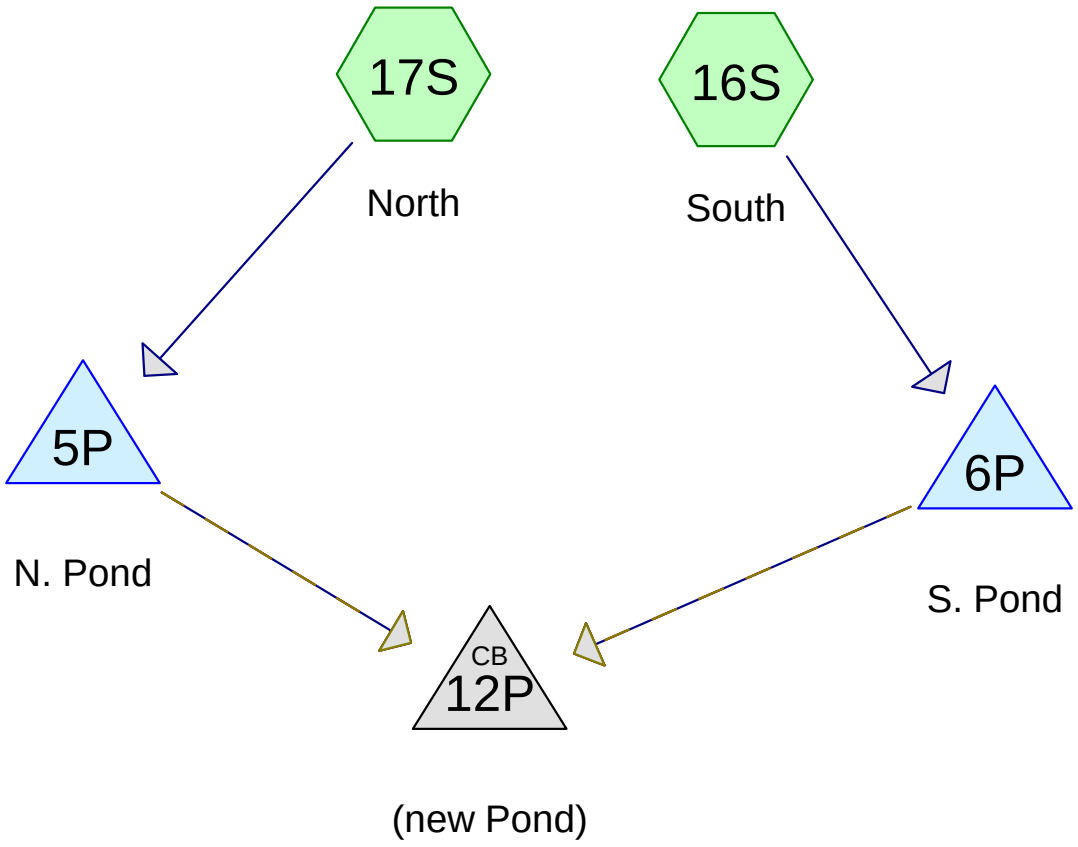
Area (sf)	CN	Description
686,419	71	Meadow, non-grazed, HSG C
686,419		100.00% Pervious Area

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

Subcatchment 2S: Undisturbed



APPENDIX E: DEVELOPED HYDROGRAPHS



Subcat Reach Pond Link

Routing Diagram for Golf Club Prelim Hydrographs
Prepared by Multi/Tech Engineering Service, Printed 8/22/2025

Summary for Subcatchment 16S: South

[49] Hint: Tc<2dt may require smaller dt

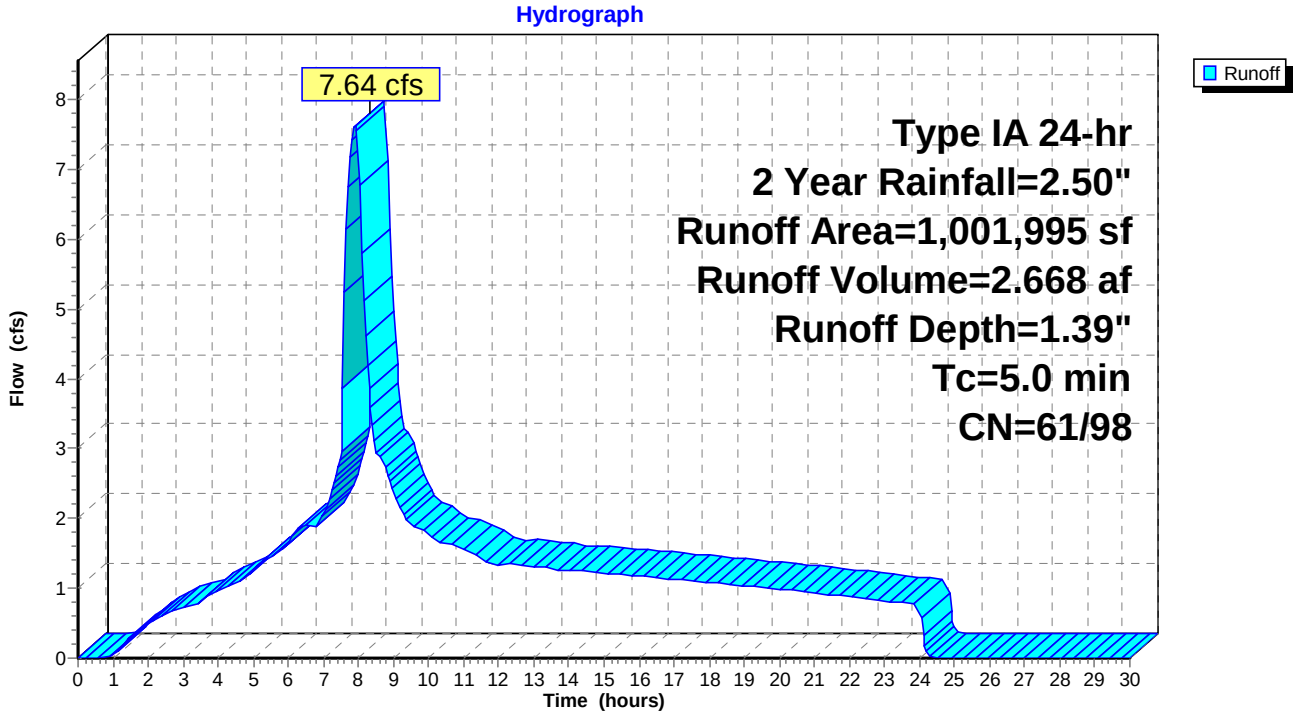
Runoff = 7.64 cfs @ 7.90 hrs, Volume= 2.668 af, Depth= 1.39"
Routed to Pond 6P : S. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.50"

Area (sf)	CN	Description
577,668	98	Paved roads w/curbs & sewers, HSG C
424,327	61	>75% Grass cover, Good, HSG B
1,001,995	82	Weighted Average
424,327		42.35% Pervious Area
577,668		57.65% Impervious Area

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

Subcatchment 16S: South



Summary for Subcatchment 17S: North

[49] Hint: Tc<2dt may require smaller dt

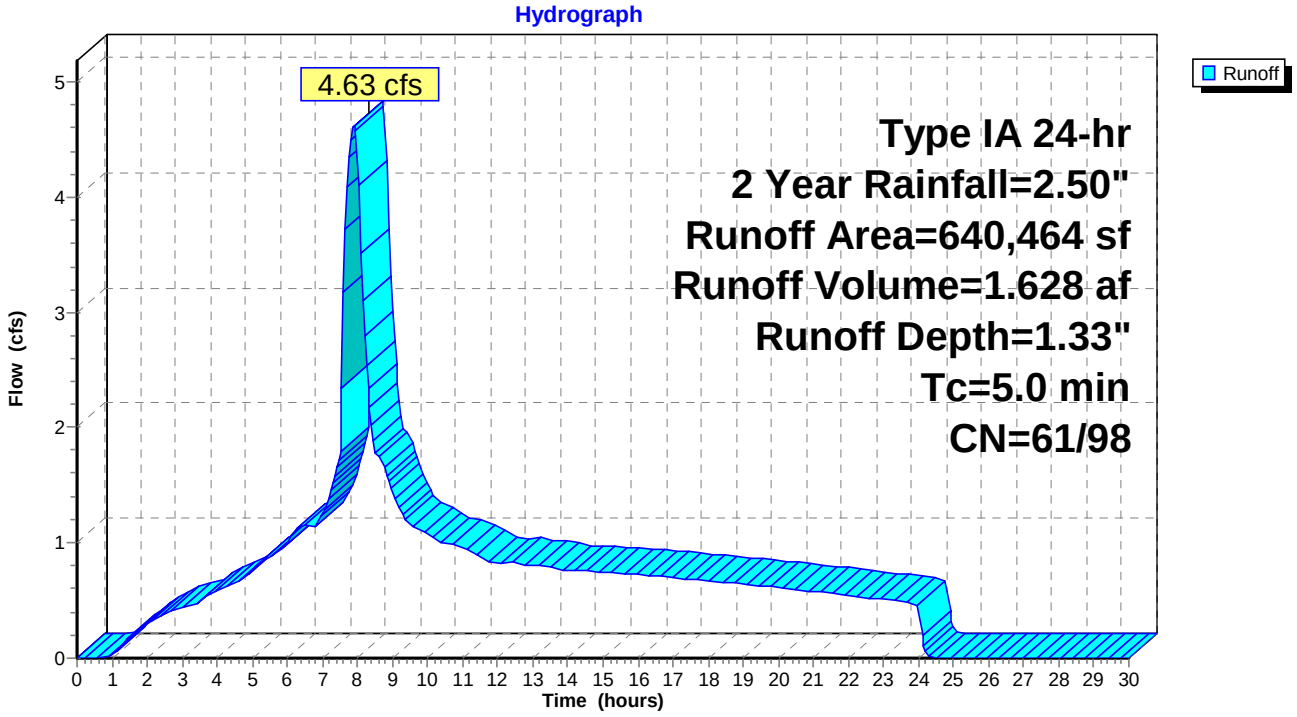
Runoff = 4.63 cfs @ 7.90 hrs, Volume= 1.628 af, Depth= 1.33"
Routed to Pond 5P : N. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 Year Rainfall=2.50"

Area (sf)	CN	Description
290,760	61	>75% Grass cover, Good, HSG B
349,704	98	Paved roads w/curbs & sewers, HSG C
640,464	81	Weighted Average
290,760		45.40% Pervious Area
349,704		54.60% Impervious Area

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

Subcatchment 17S: North



Summary for Pond 5P: N. Pond

Inflow Area = 14.703 ac, 54.60% Impervious, Inflow Depth = 1.33" for 2 Year event
Inflow = 4.63 cfs @ 7.90 hrs, Volume= 1.628 af
Outflow = 0.22 cfs @ 24.10 hrs, Volume= 0.274 af, Atten= 95%, Lag= 971.8 min
Primary = 0.09 cfs @ 24.10 hrs, Volume= 0.164 af
Routed to Pond 12P : (new Pond)
Secondary = 0.13 cfs @ 24.10 hrs, Volume= 0.110 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 417.32' @ 24.10 hrs Surf.Area= 31,073 sf Storage= 63,310 cf

Plug-Flow detention time= 962.7 min calculated for 0.274 af (17% of inflow)
Center-of-Mass det. time= 544.0 min (1,243.0 - 699.0)

Volume	Invert	Avail.Storage	Storage Description
#1	415.00'	158,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
415.00	23,461	0	0
420.00	39,852	158,283	158,283

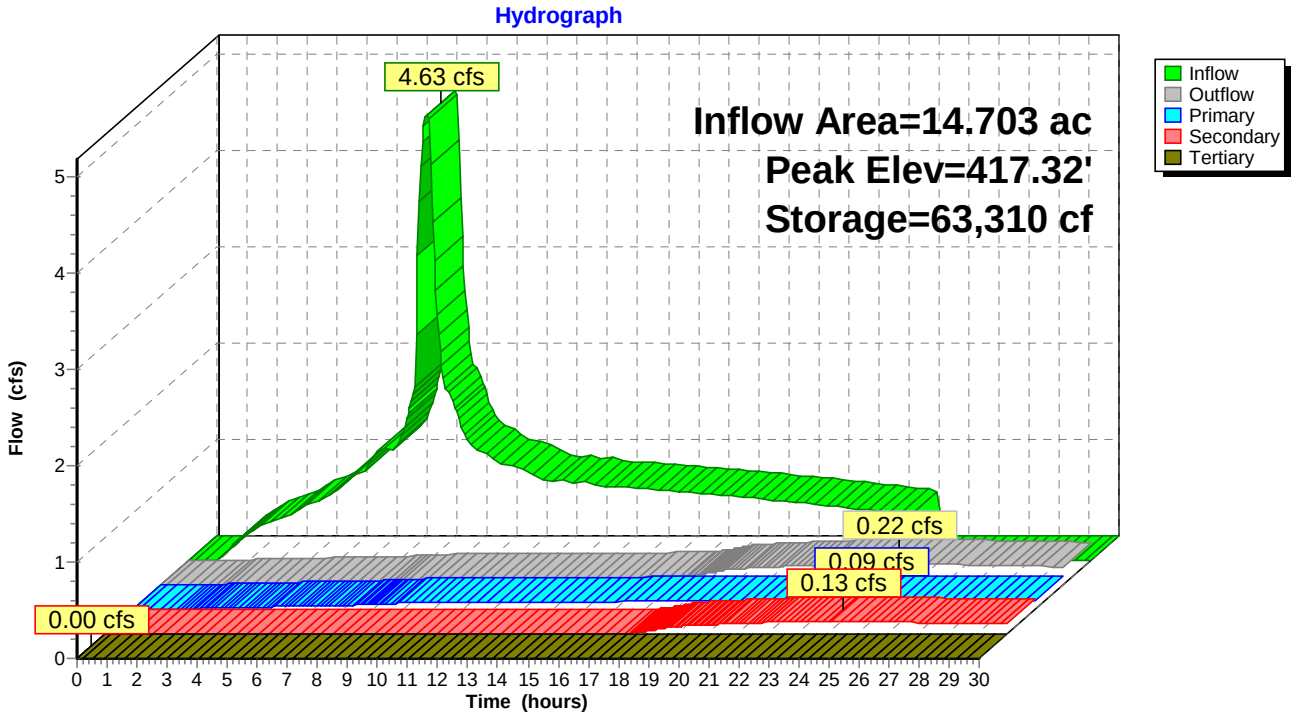
Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**1.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	417.00'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	418.20'	**45.0 deg x 0.80' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Primary OutFlow Max=0.09 cfs @ 24.10 hrs HW=417.32' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.09 cfs @ 7.34 fps)

Secondary OutFlow Max=0.13 cfs @ 24.10 hrs HW=417.32' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 2.73 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=415.00' (Free Discharge)
└**3=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 5P: N. Pond



Summary for Pond 6P: S. Pond

Inflow Area = 23.003 ac, 57.65% Impervious, Inflow Depth = 1.39" for 2 Year event
Inflow = 7.64 cfs @ 7.90 hrs, Volume= 2.668 af
Outflow = 0.47 cfs @ 24.07 hrs, Volume= 0.870 af, Atten= 94%, Lag= 970.2 min
Primary = 0.47 cfs @ 24.07 hrs, Volume= 0.870 af
Routed to Pond 12P : (new Pond)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 416.17' @ 24.07 hrs Surf.Area= 44,155 sf Storage= 88,114 cf

Plug-Flow detention time= 732.3 min calculated for 0.868 af (33% of inflow)
Center-of-Mass det. time= 399.5 min (1,095.7 - 696.2)

Volume	Invert	Avail.Storage	Storage Description
#1	414.00'	226,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
414.00	37,000	0	0
419.00	53,474	226,185	226,185

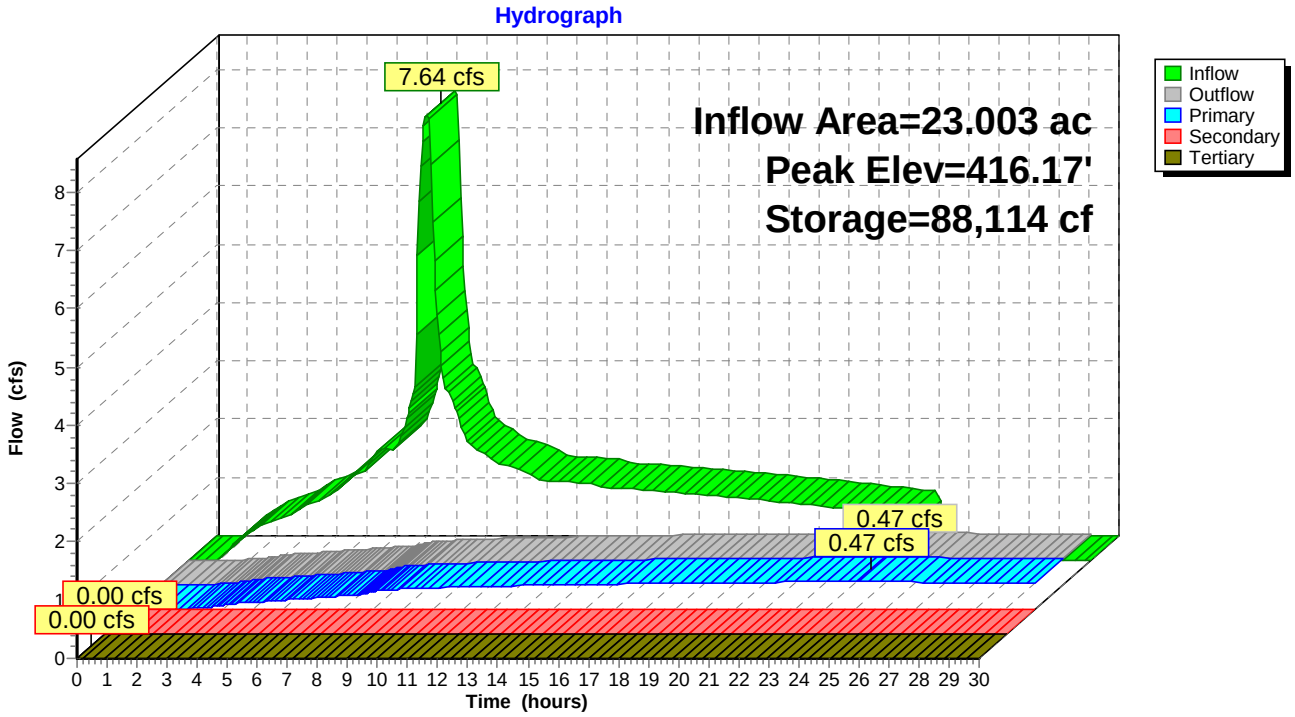
Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**3.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	416.40'	**3.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	417.75'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.47 cfs @ 24.07 hrs HW=416.17' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.47 cfs @ 7.10 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=414.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=414.00' (Free Discharge)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 6P: S. Pond



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 414.37' (Flood elevation advised)
[81] Warning: Exceeded Pond 6P by 0.05' @ 2.85 hrs

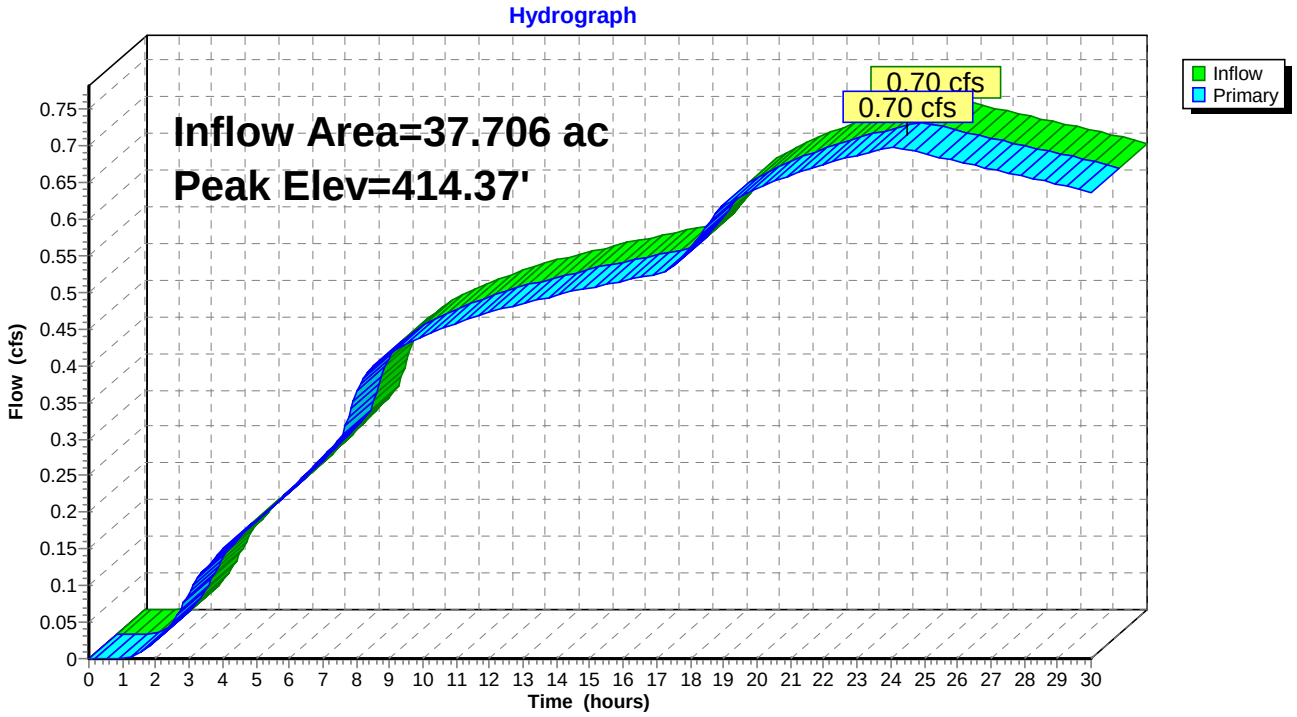
Inflow Area = 37.706 ac, 56.46% Impervious, Inflow Depth > 0.36" for 2 Year event
Inflow = 0.70 cfs @ 24.09 hrs, Volume= 1.144 af
Outflow = 0.70 cfs @ 24.09 hrs, Volume= 1.144 af, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 24.09 hrs, Volume= 1.144 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 414.37' @ 24.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**18.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.70 cfs @ 24.09 hrs HW=414.37' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.70 cfs @ 2.07 fps)

Pond 12P: (new Pond)



Summary for Subcatchment 16S: South

[49] Hint: Tc<2dt may require smaller dt

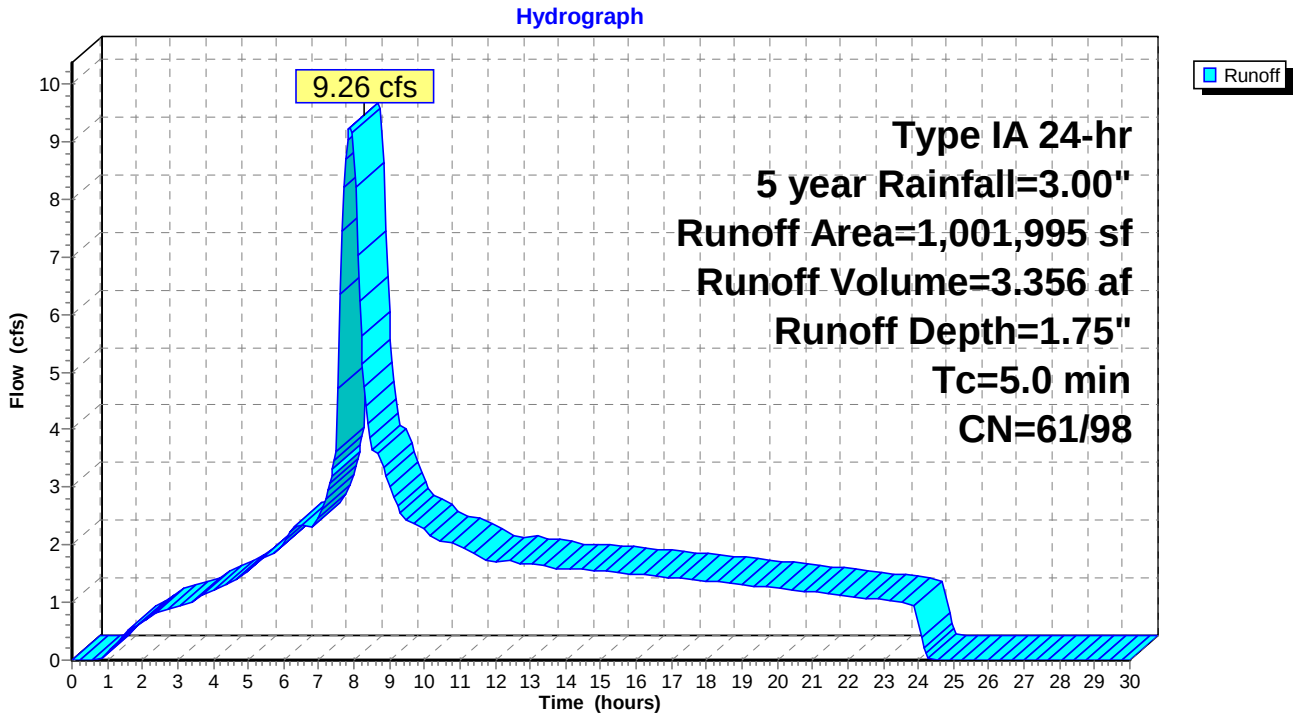
Runoff = 9.26 cfs @ 7.90 hrs, Volume= 3.356 af, Depth= 1.75"
Routed to Pond 6P : S. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 year Rainfall=3.00"

Area (sf)	CN	Description
577,668	98	Paved roads w/curbs & sewers, HSG C
424,327	61	>75% Grass cover, Good, HSG B
1,001,995	82	Weighted Average
424,327		42.35% Pervious Area
577,668		57.65% Impervious Area

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

Subcatchment 16S: South



Summary for Subcatchment 17S: North

[49] Hint: Tc<2dt may require smaller dt

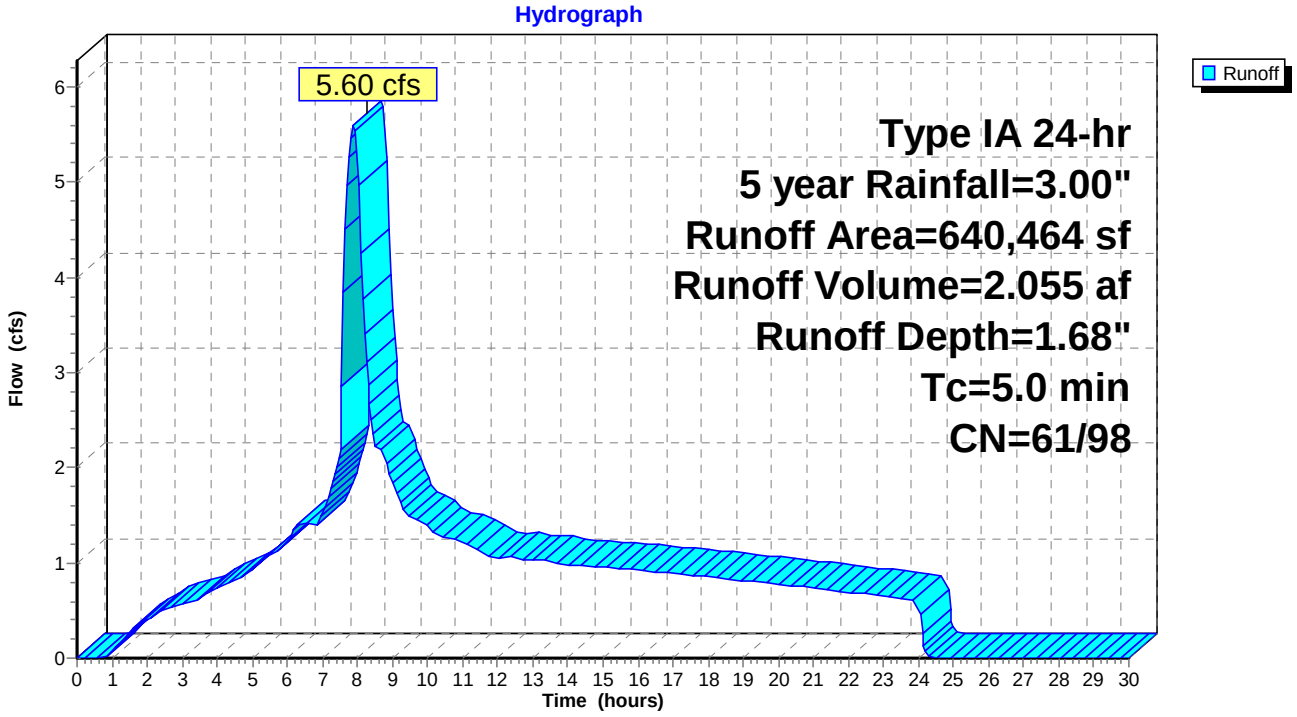
Runoff = 5.60 cfs @ 7.90 hrs, Volume= 2.055 af, Depth= 1.68"
Routed to Pond 5P : N. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 year Rainfall=3.00"

Area (sf)	CN	Description
290,760	61	>75% Grass cover, Good, HSG B
349,704	98	Paved roads w/curbs & sewers, HSG C
640,464	81	Weighted Average
290,760		45.40% Pervious Area
349,704		54.60% Impervious Area

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

Subcatchment 17S: North



Summary for Pond 5P: N. Pond

Inflow Area = 14.703 ac, 54.60% Impervious, Inflow Depth = 1.68" for 5 year event
Inflow = 5.60 cfs @ 7.90 hrs, Volume= 2.055 af
Outflow = 0.31 cfs @ 24.09 hrs, Volume= 0.418 af, Atten= 95%, Lag= 971.5 min
Primary = 0.10 cfs @ 24.09 hrs, Volume= 0.181 af
Routed to Pond 12P : (new Pond)
Secondary = 0.21 cfs @ 24.09 hrs, Volume= 0.237 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 417.77' @ 24.09 hrs Surf.Area= 32,527 sf Storage= 77,418 cf

Plug-Flow detention time= 936.8 min calculated for 0.417 af (20% of inflow)
Center-of-Mass det. time= 536.0 min (1,236.4 - 700.4)

Volume	Invert	Avail.Storage	Storage Description
#1	415.00'	158,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
415.00	23,461	0	0
420.00	39,852	158,283	158,283

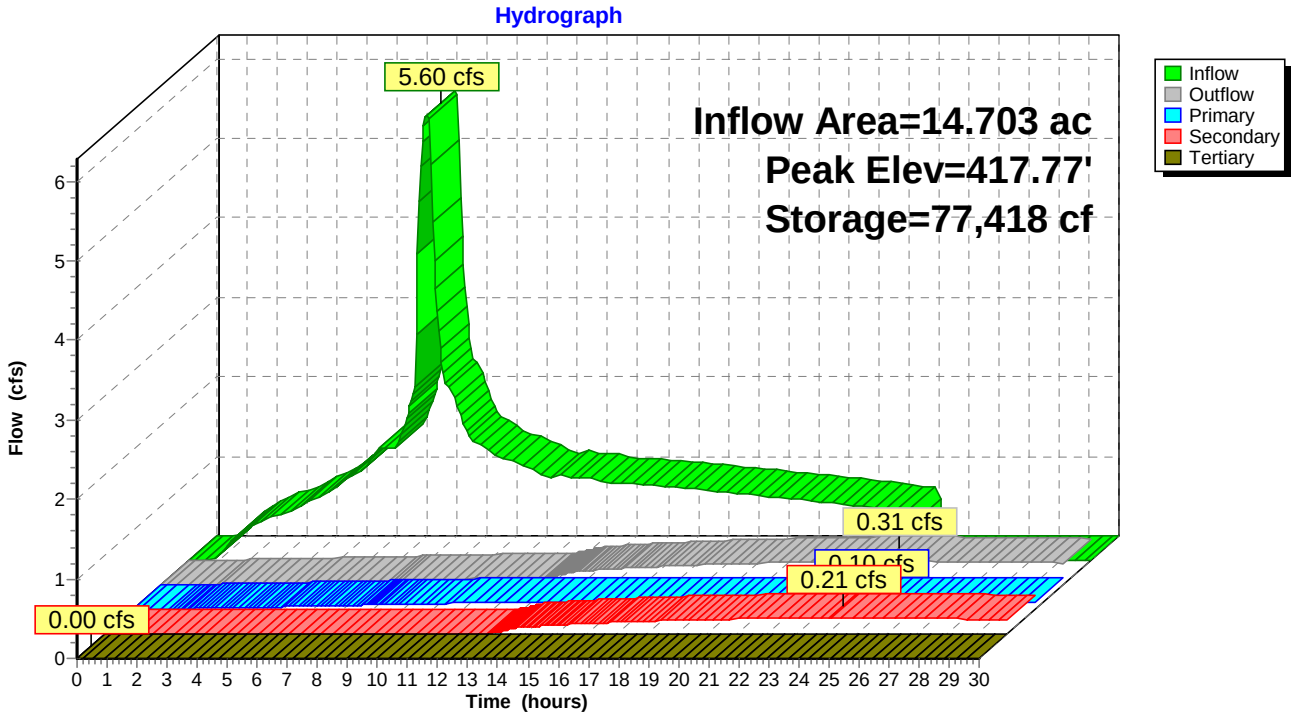
Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**1.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	417.00'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	418.20'	**45.0 deg x 0.80' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Primary OutFlow Max=0.10 cfs @ 24.09 hrs HW=417.77' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.10 cfs @ 8.01 fps)

Secondary OutFlow Max=0.21 cfs @ 24.09 hrs HW=417.77' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.21 cfs @ 4.21 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=415.00' (Free Discharge)
└**3=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 5P: N. Pond



Summary for Pond 6P: S. Pond

Inflow Area = 23.003 ac, 57.65% Impervious, Inflow Depth = 1.75" for 5 year event
Inflow = 9.26 cfs @ 7.90 hrs, Volume= 3.356 af
Outflow = 0.66 cfs @ 24.06 hrs, Volume= 1.047 af, Atten= 93%, Lag= 969.7 min
Primary = 0.53 cfs @ 24.06 hrs, Volume= 0.978 af
Routed to Pond 12P : (new Pond)
Secondary = 0.13 cfs @ 24.06 hrs, Volume= 0.069 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 416.72' @ 24.06 hrs Surf.Area= 45,963 sf Storage= 112,848 cf

Plug-Flow detention time= 760.8 min calculated for 1.047 af (31% of inflow)
Center-of-Mass det. time= 417.6 min (1,114.5 - 697.0)

Volume	Invert	Avail.Storage	Storage Description
#1	414.00'	226,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
414.00	37,000	0	0
419.00	53,474	226,185	226,185

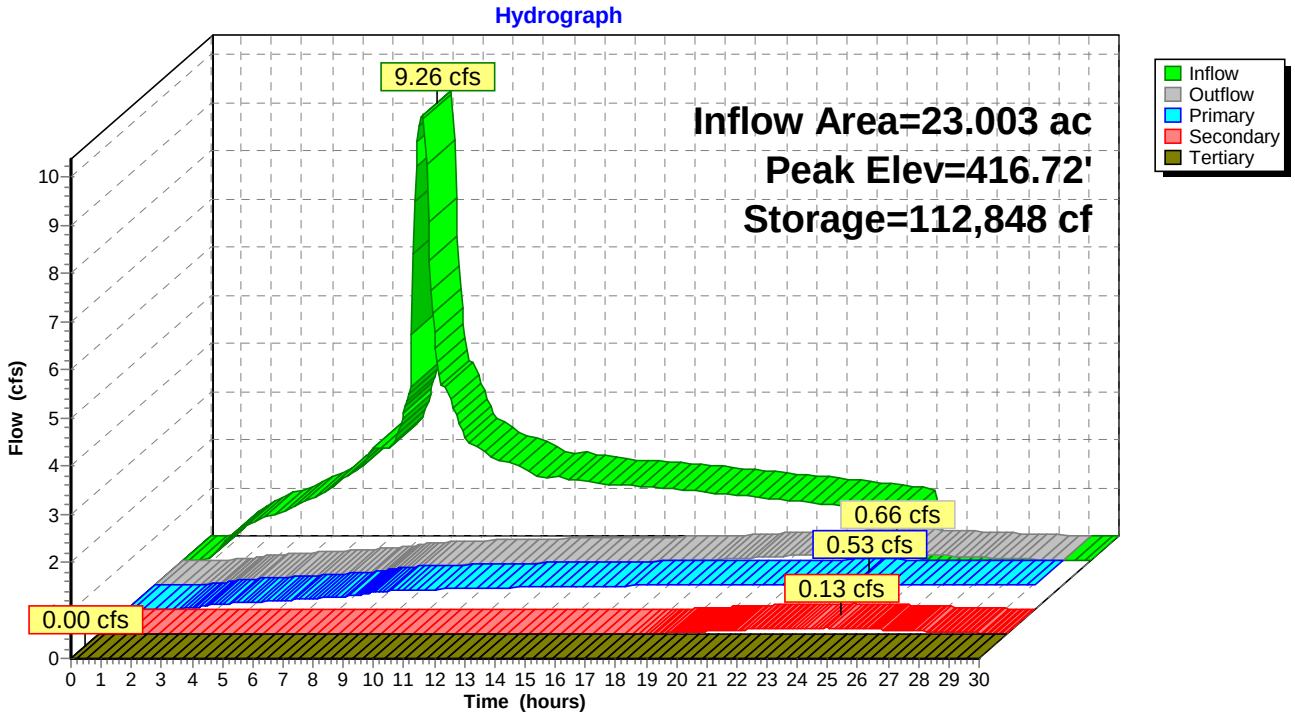
Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**3.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	416.40'	**3.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	417.75'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.53 cfs @ 24.06 hrs HW=416.72' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.53 cfs @ 7.94 fps)

Secondary OutFlow Max=0.13 cfs @ 24.06 hrs HW=416.72' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 2.04 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=414.00' (Free Discharge)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 6P: S. Pond



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 414.44' (Flood elevation advised)
[81] Warning: Exceeded Pond 6P by 0.05' @ 2.50 hrs

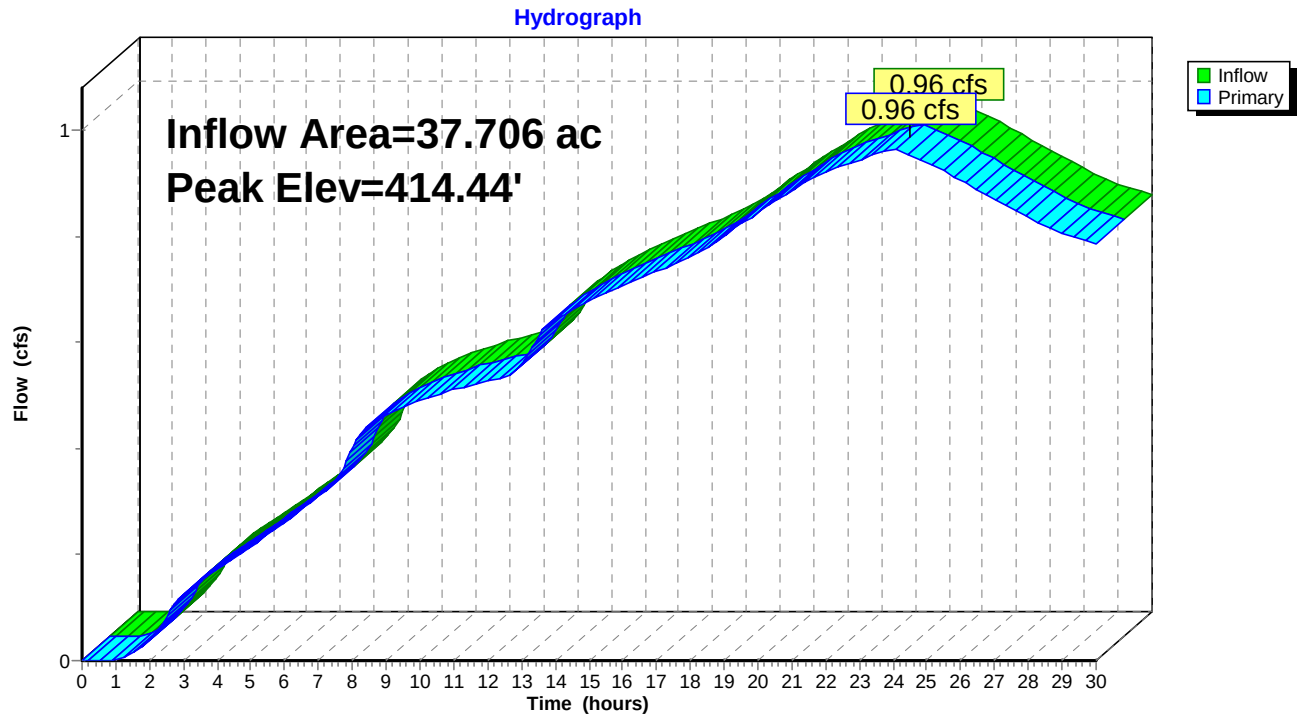
Inflow Area = 37.706 ac, 56.46% Impervious, Inflow Depth > 0.47" for 5 year event
Inflow = 0.96 cfs @ 24.07 hrs, Volume= 1.465 af
Outflow = 0.96 cfs @ 24.07 hrs, Volume= 1.465 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 24.07 hrs, Volume= 1.465 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 414.44' @ 24.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**18.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.96 cfs @ 24.07 hrs HW=414.44' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.96 cfs @ 2.25 fps)

Pond 12P: (new Pond)



Summary for Subcatchment 16S: South

[49] Hint: Tc<2dt may require smaller dt

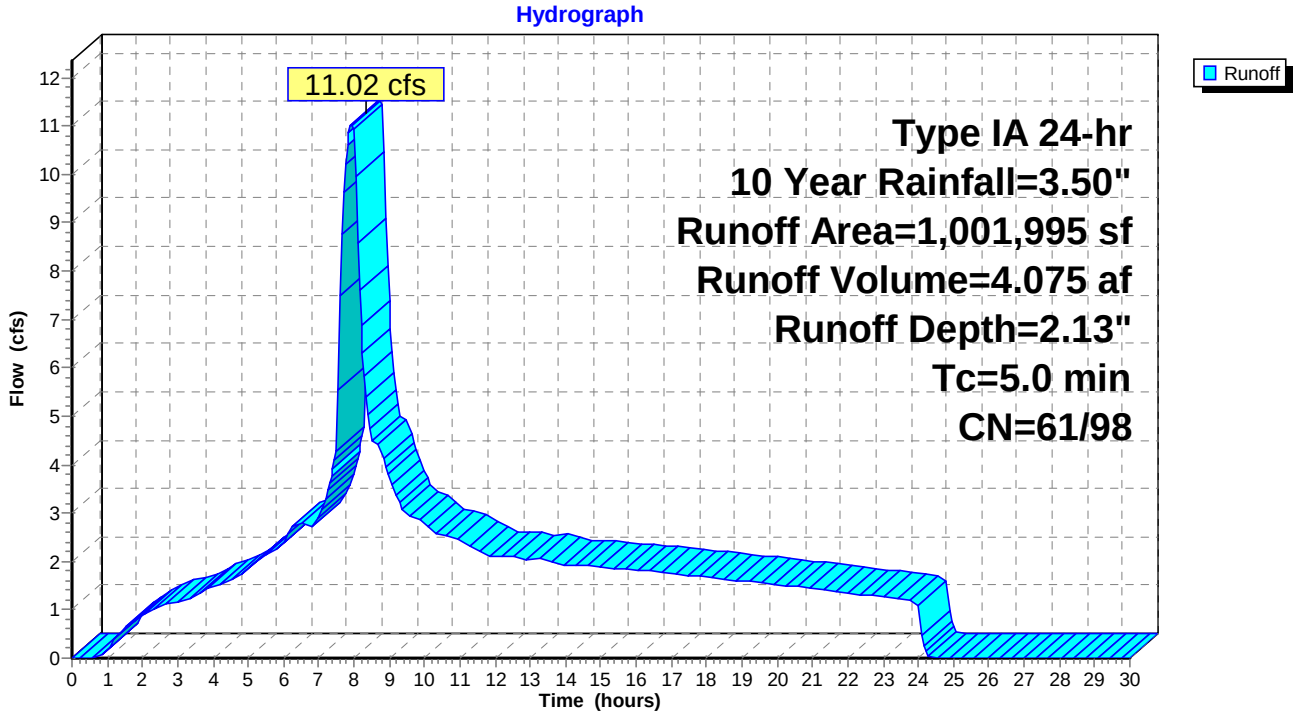
Runoff = 11.02 cfs @ 7.93 hrs, Volume= 4.075 af, Depth= 2.13"
Routed to Pond 6P : S. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.50"

Area (sf)	CN	Description
577,668	98	Paved roads w/curbs & sewers, HSG C
424,327	61	>75% Grass cover, Good, HSG B
1,001,995	82	Weighted Average
424,327		42.35% Pervious Area
577,668		57.65% Impervious Area

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

Subcatchment 16S: South



Summary for Subcatchment 17S: North

[49] Hint: Tc<2dt may require smaller dt

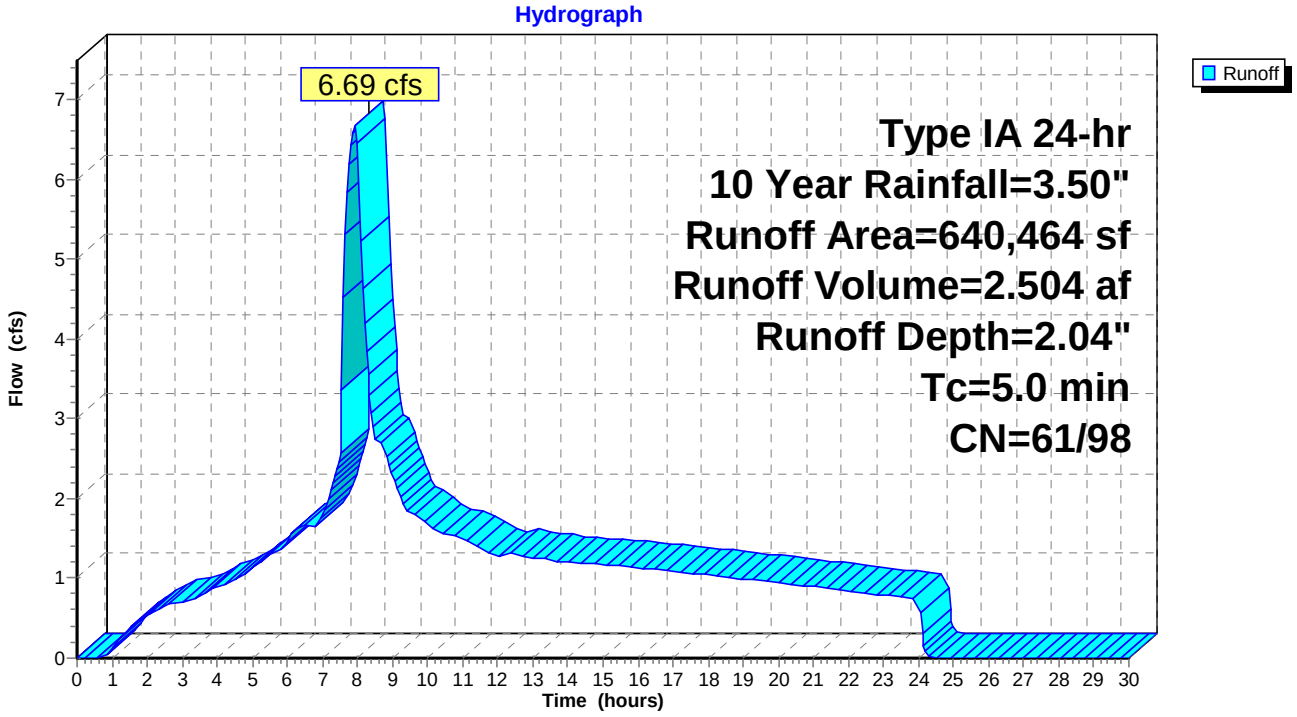
Runoff = 6.69 cfs @ 7.93 hrs, Volume= 2.504 af, Depth= 2.04"
Routed to Pond 5P : N. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 Year Rainfall=3.50"

Area (sf)	CN	Description
290,760	61	>75% Grass cover, Good, HSG B
349,704	98	Paved roads w/curbs & sewers, HSG C
640,464	81	Weighted Average
290,760		45.40% Pervious Area
349,704		54.60% Impervious Area

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

Subcatchment 17S: North



Summary for Pond 5P: N. Pond

Inflow Area = 14.703 ac, 54.60% Impervious, Inflow Depth = 2.04" for 10 Year event
Inflow = 6.69 cfs @ 7.93 hrs, Volume= 2.504 af
Outflow = 0.37 cfs @ 24.09 hrs, Volume= 0.543 af, Atten= 94%, Lag= 969.6 min
Primary = 0.11 cfs @ 24.09 hrs, Volume= 0.197 af
Routed to Pond 12P : (new Pond)
Secondary = 0.26 cfs @ 24.09 hrs, Volume= 0.346 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.00 cfs @ 24.09 hrs, Volume= 0.000 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 418.23' @ 24.09 hrs Surf.Area= 34,048 sf Storage= 92,867 cf

Plug-Flow detention time= 906.6 min calculated for 0.542 af (22% of inflow)
Center-of-Mass det. time= 511.3 min (1,212.3 - 701.0)

Volume	Invert	Avail.Storage	Storage Description
#1	415.00'	158,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
415.00	23,461	0	0
420.00	39,852	158,283	158,283

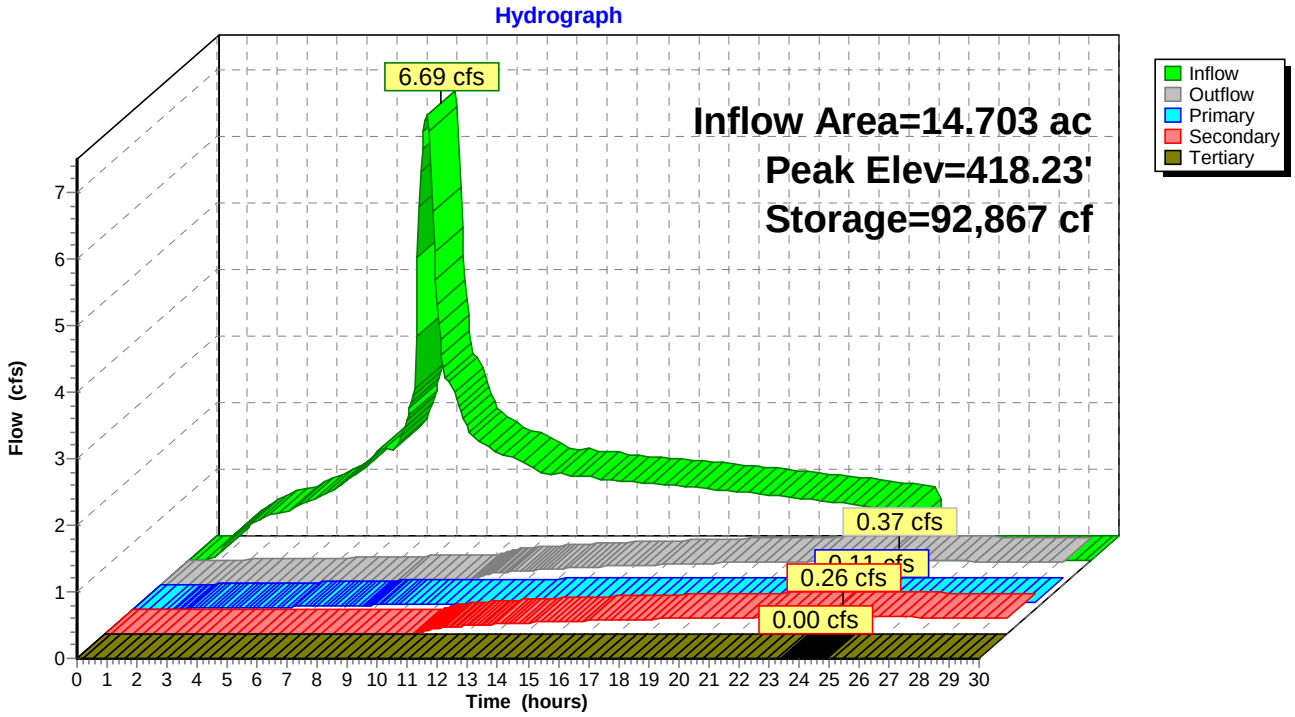
Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**1.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	417.00'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	418.20'	**45.0 deg x 0.80' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Primary OutFlow Max=0.11 cfs @ 24.09 hrs HW=418.23' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 8.65 fps)

Secondary OutFlow Max=0.26 cfs @ 24.09 hrs HW=418.23' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.34 fps)

Tertiary OutFlow Max=0.00 cfs @ 24.09 hrs HW=418.23' (Free Discharge)
└**3=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.00 cfs @ 0.44 fps)

Pond 5P: N. Pond



Summary for Pond 6P: S. Pond

Inflow Area = 23.003 ac, 57.65% Impervious, Inflow Depth = 2.13" for 10 Year event
Inflow = 11.02 cfs @ 7.93 hrs, Volume= 4.075 af
Outflow = 0.82 cfs @ 24.06 hrs, Volume= 1.332 af, Atten= 93%, Lag= 967.7 min
Primary = 0.58 cfs @ 24.06 hrs, Volume= 1.070 af
Routed to Pond 12P : (new Pond)
Secondary = 0.25 cfs @ 24.06 hrs, Volume= 0.262 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 417.21' @ 24.06 hrs Surf.Area= 47,582 sf Storage= 135,822 cf

Plug-Flow detention time= 781.9 min calculated for 1.330 af (33% of inflow)
Center-of-Mass det. time= 443.2 min (1,140.4 - 697.2)

Volume	Invert	Avail.Storage	Storage Description
#1	414.00'	226,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
414.00	37,000	0	0
419.00	53,474	226,185	226,185

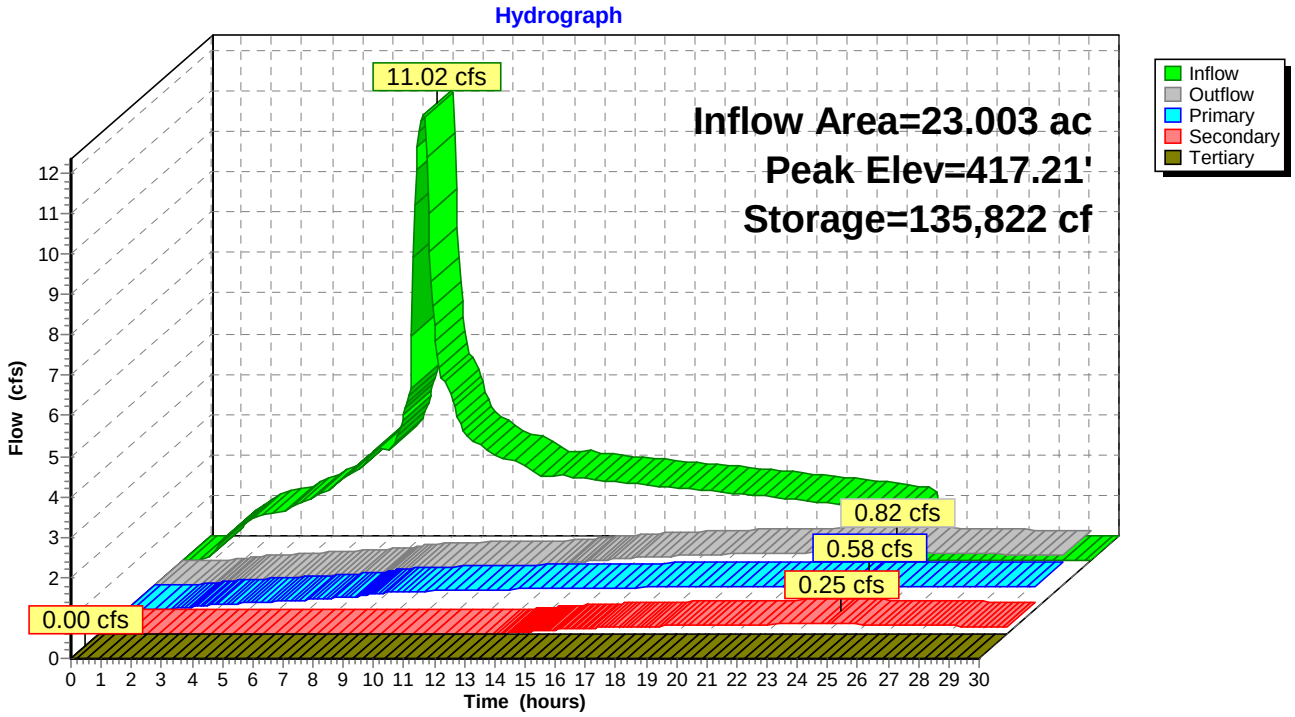
Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**3.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	416.40'	**3.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	417.75'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.58 cfs @ 24.06 hrs HW=417.21' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.58 cfs @ 8.63 fps)

Secondary OutFlow Max=0.25 cfs @ 24.06 hrs HW=417.21' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 3.94 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=414.00' (Free Discharge)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 6P: S. Pond



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 414.49' (Flood elevation advised)
[81] Warning: Exceeded Pond 6P by 0.05' @ 2.20 hrs

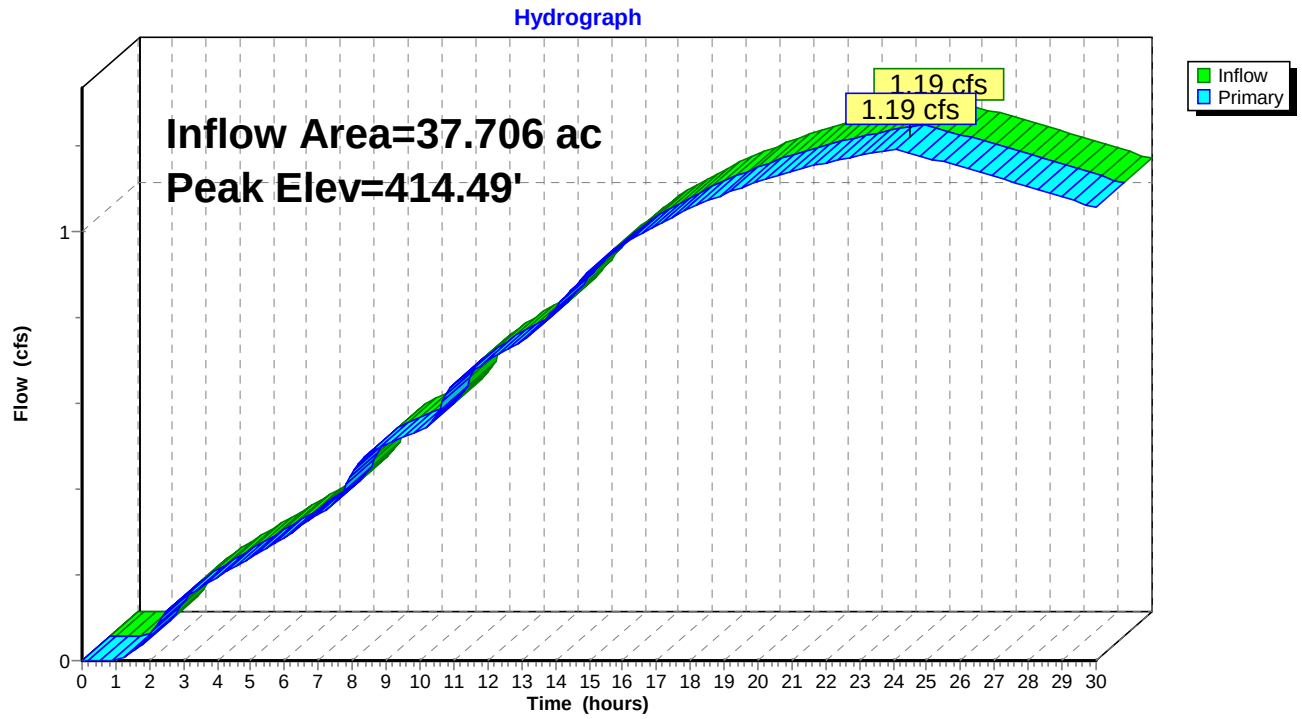
Inflow Area = 37.706 ac, 56.46% Impervious, Inflow Depth > 0.60" for 10 Year event
Inflow = 1.19 cfs @ 24.07 hrs, Volume= 1.876 af
Outflow = 1.19 cfs @ 24.07 hrs, Volume= 1.876 af, Atten= 0%, Lag= 0.0 min
Primary = 1.19 cfs @ 24.07 hrs, Volume= 1.876 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 414.49' @ 24.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**18.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 24.07 hrs HW=414.49' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 1.19 cfs @ 2.38 fps)

Pond 12P: (new Pond)



Summary for Subcatchment 16S: South

[49] Hint: Tc<2dt may require smaller dt

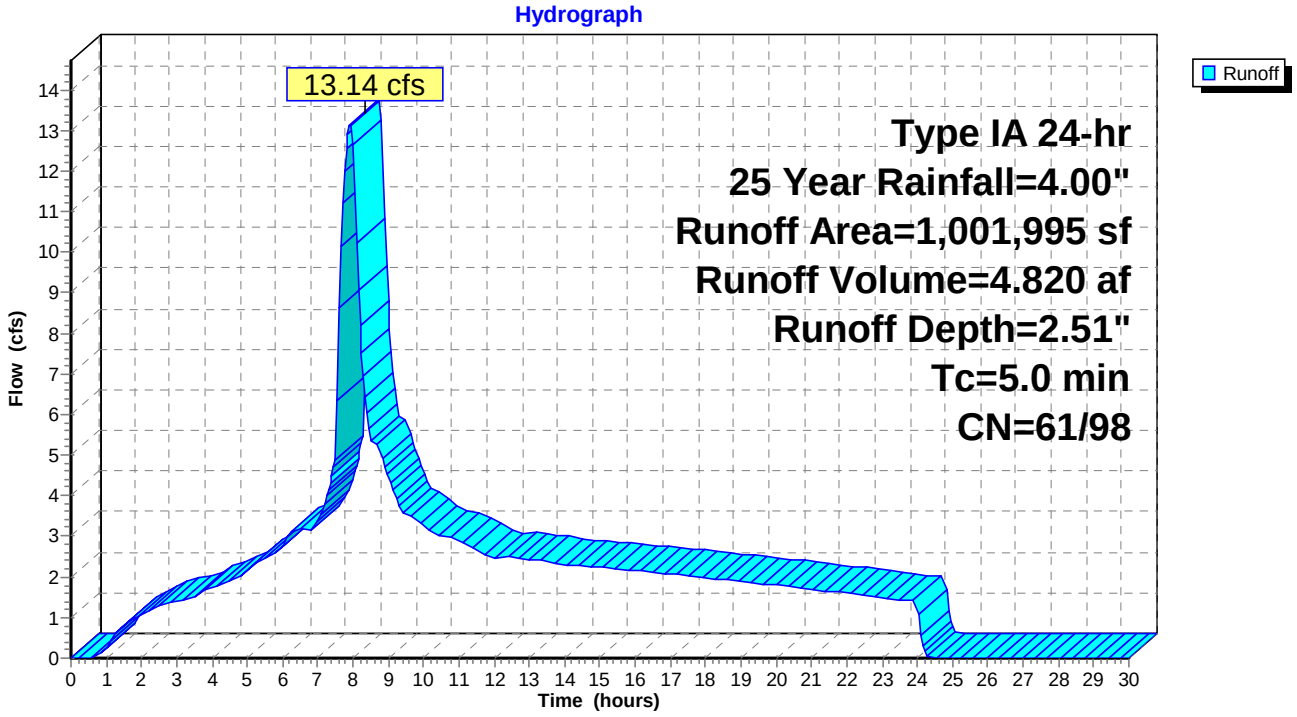
Runoff = 13.14 cfs @ 7.93 hrs, Volume= 4.820 af, Depth= 2.51"
Routed to Pond 6P : S. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=4.00"

Area (sf)	CN	Description
577,668	98	Paved roads w/curbs & sewers, HSG C
424,327	61	>75% Grass cover, Good, HSG B
1,001,995	82	Weighted Average
424,327		42.35% Pervious Area
577,668		57.65% Impervious Area

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

Subcatchment 16S: South



Summary for Subcatchment 17S: North

[49] Hint: Tc<2dt may require smaller dt

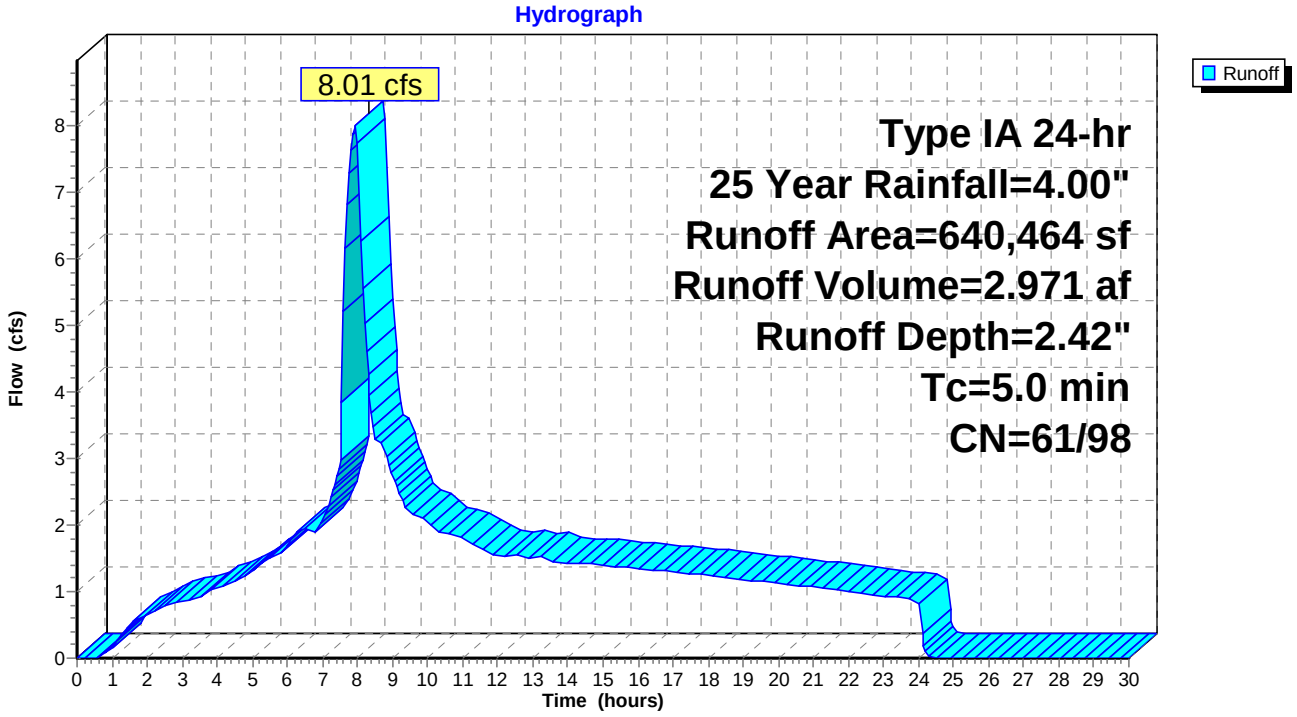
Runoff = 8.01 cfs @ 7.94 hrs, Volume= 2.971 af, Depth= 2.42"
Routed to Pond 5P : N. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=4.00"

Area (sf)	CN	Description
290,760	61	>75% Grass cover, Good, HSG B
349,704	98	Paved roads w/curbs & sewers, HSG C
640,464	81	Weighted Average
290,760		45.40% Pervious Area
349,704		54.60% Impervious Area

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

Subcatchment 17S: North



Summary for Pond 5P: N. Pond

Inflow Area = 14.703 ac, 54.60% Impervious, Inflow Depth = 2.42" for 25 Year event
Inflow = 8.01 cfs @ 7.94 hrs, Volume= 2.971 af
Outflow = 0.58 cfs @ 24.06 hrs, Volume= 0.719 af, Atten= 93%, Lag= 967.7 min
Primary = 0.11 cfs @ 24.06 hrs, Volume= 0.211 af
Routed to Pond 12P : (new Pond)
Secondary = 0.31 cfs @ 24.06 hrs, Volume= 0.437 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.16 cfs @ 24.06 hrs, Volume= 0.070 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 418.67' @ 24.06 hrs Surf.Area= 35,479 sf Storage= 108,042 cf

Plug-Flow detention time= 895.6 min calculated for 0.717 af (24% of inflow)
Center-of-Mass det. time= 514.1 min (1,215.2 - 701.1)

Volume	Invert	Avail.Storage	Storage Description
#1	415.00'	158,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
415.00	23,461	0	0
420.00	39,852	158,283	158,283

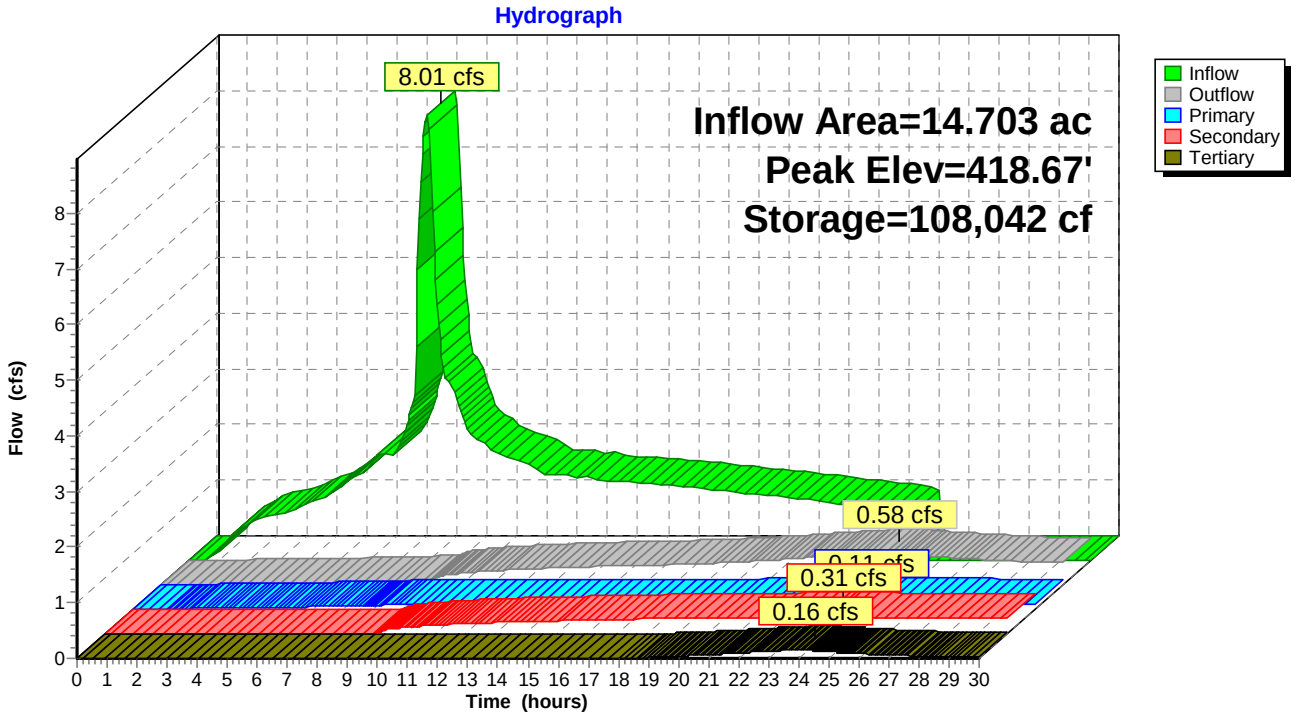
Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**1.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	417.00'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	418.20'	**45.0 deg x 0.80' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Primary OutFlow Max=0.11 cfs @ 24.06 hrs HW=418.67' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 9.22 fps)

Secondary OutFlow Max=0.31 cfs @ 24.06 hrs HW=418.67' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.21 fps)

Tertiary OutFlow Max=0.16 cfs @ 24.06 hrs HW=418.67' (Free Discharge)
└**3=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.16 cfs @ 1.75 fps)

Pond 5P: N. Pond



Summary for Pond 6P: S. Pond

Inflow Area = 23.003 ac, 57.65% Impervious, Inflow Depth = 2.51" for 25 Year event
Inflow = 13.14 cfs @ 7.93 hrs, Volume= 4.820 af
Outflow = 0.95 cfs @ 24.06 hrs, Volume= 1.574 af, Atten= 93%, Lag= 967.7 min
Primary = 0.62 cfs @ 24.06 hrs, Volume= 1.156 af
Routed to Pond 12P : (new Pond)
Secondary = 0.33 cfs @ 24.06 hrs, Volume= 0.418 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 417.72' @ 24.06 hrs Surf.Area= 49,263 sf Storage= 160,530 cf

Plug-Flow detention time= 782.4 min calculated for 1.572 af (33% of inflow)
Center-of-Mass det. time= 442.5 min (1,139.6 - 697.1)

Volume	Invert	Avail.Storage	Storage Description
#1	414.00'	226,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
414.00	37,000	0	0
419.00	53,474	226,185	226,185

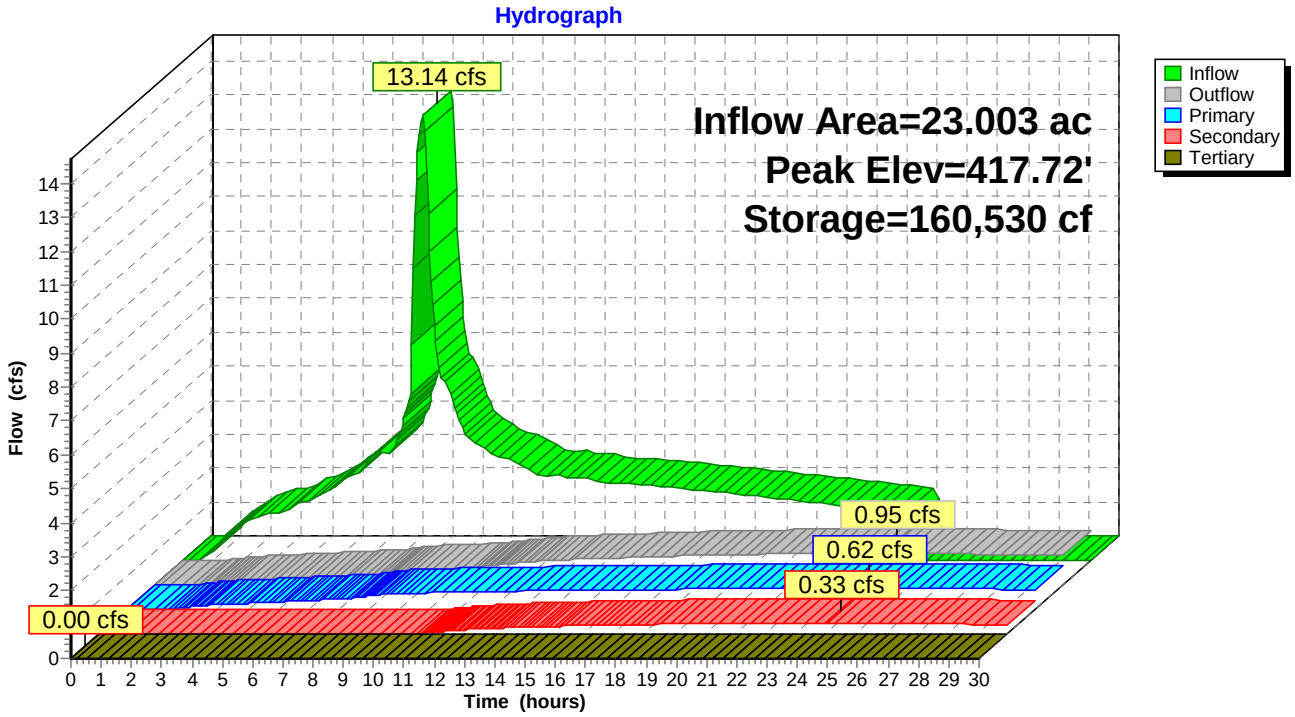
Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**3.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	416.40'	**3.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	417.75'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.62 cfs @ 24.06 hrs HW=417.72' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.62 cfs @ 9.29 fps)

Secondary OutFlow Max=0.33 cfs @ 24.06 hrs HW=417.72' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.33 cfs @ 5.23 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=414.00' (Free Discharge)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 6P: S. Pond



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 414.56' (Flood elevation advised)
[81] Warning: Exceeded Pond 6P by 0.05' @ 2.00 hrs

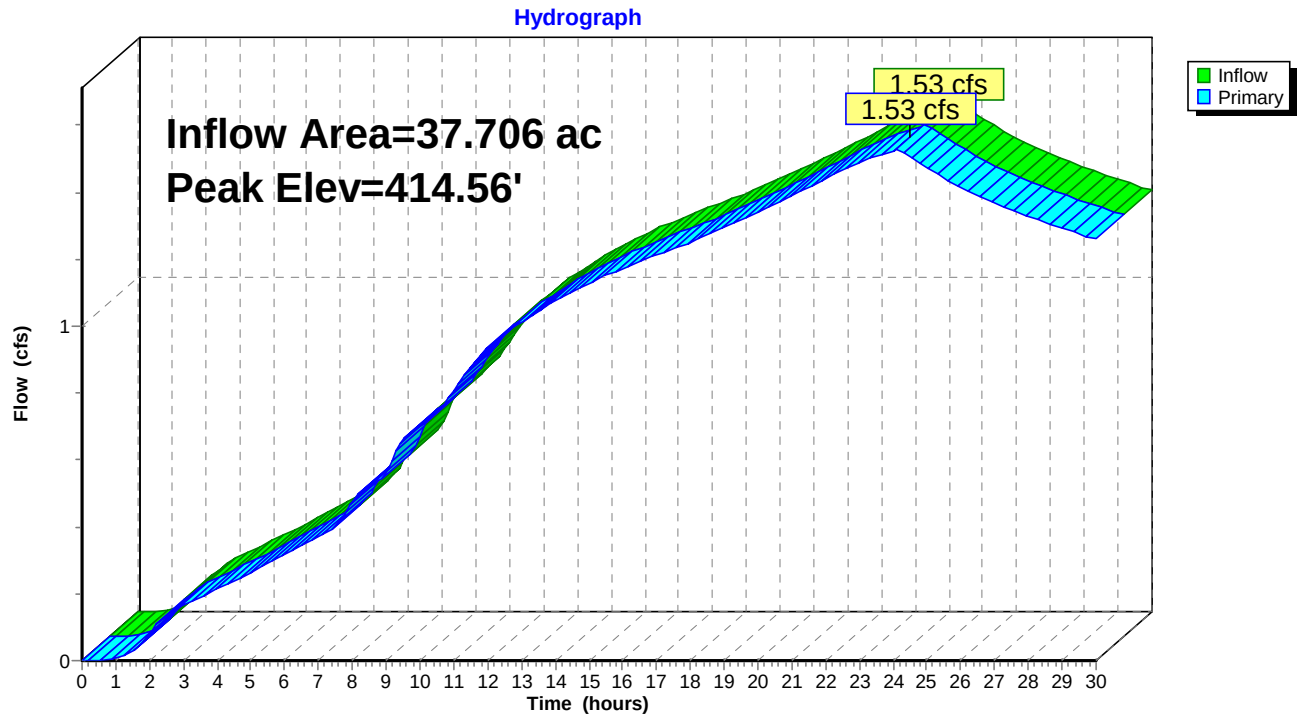
Inflow Area = 37.706 ac, 56.46% Impervious, Inflow Depth > 0.73" for 25 Year event
Inflow = 1.53 cfs @ 24.06 hrs, Volume= 2.293 af
Outflow = 1.53 cfs @ 24.06 hrs, Volume= 2.293 af, Atten= 0%, Lag= 0.0 min
Primary = 1.53 cfs @ 24.06 hrs, Volume= 2.293 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 414.56' @ 24.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**18.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.53 cfs @ 24.06 hrs HW=414.56' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 1.53 cfs @ 2.54 fps)

Pond 12P: (new Pond)



Summary for Subcatchment 16S: South

[49] Hint: Tc<2dt may require smaller dt

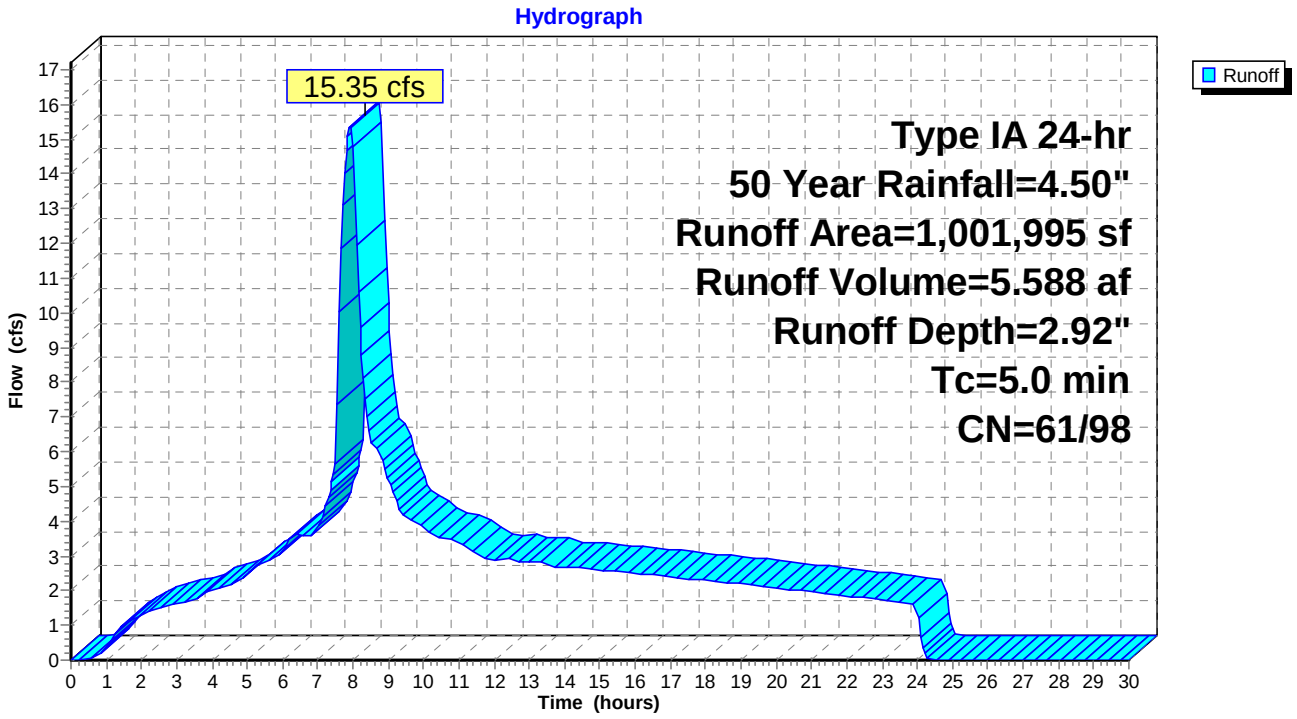
Runoff = 15.35 cfs @ 7.93 hrs, Volume= 5.588 af, Depth= 2.92"
Routed to Pond 6P : S. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 50 Year Rainfall=4.50"

Area (sf)	CN	Description
577,668	98	Paved roads w/curbs & sewers, HSG C
424,327	61	>75% Grass cover, Good, HSG B
1,001,995	82	Weighted Average
424,327		42.35% Pervious Area
577,668		57.65% Impervious Area

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

Subcatchment 16S: South



Summary for Subcatchment 17S: North

[49] Hint: Tc<2dt may require smaller dt

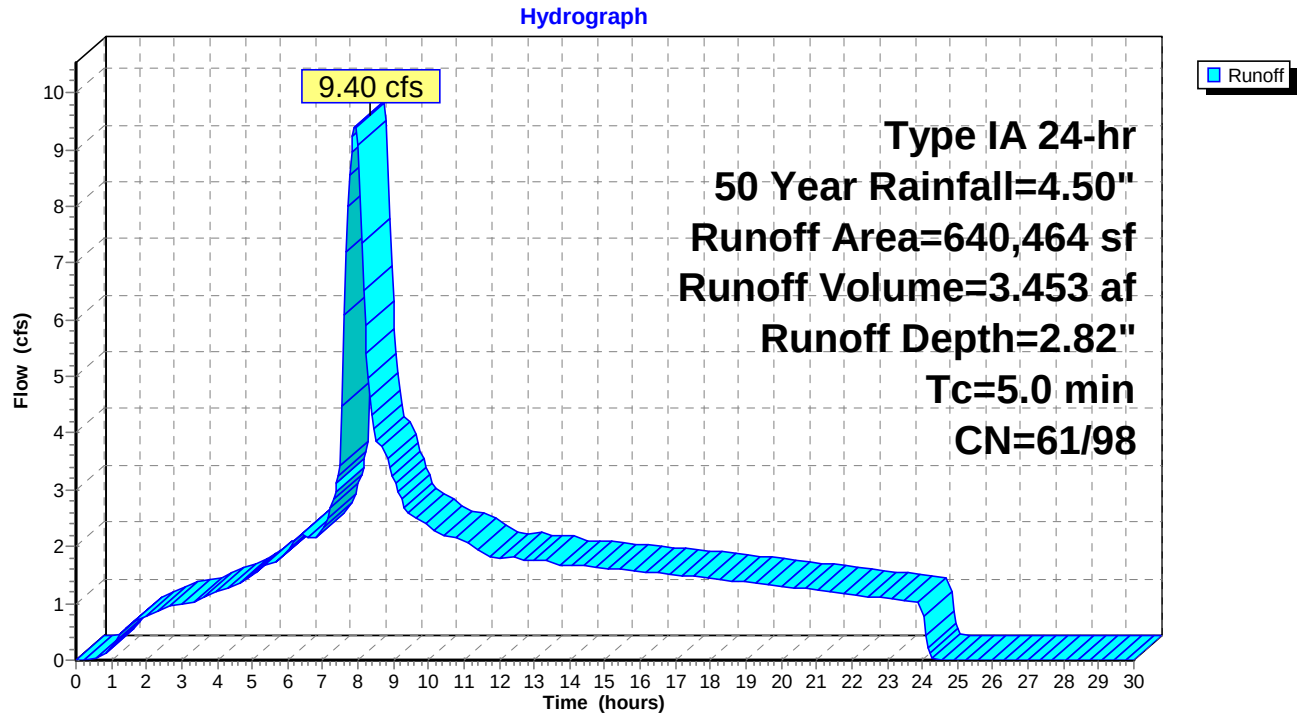
Runoff = 9.40 cfs @ 7.93 hrs, Volume= 3.453 af, Depth= 2.82"
Routed to Pond 5P : N. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 50 Year Rainfall=4.50"

Area (sf)	CN	Description
290,760	61	>75% Grass cover, Good, HSG B
349,704	98	Paved roads w/curbs & sewers, HSG C
640,464	81	Weighted Average
290,760		45.40% Pervious Area
349,704		54.60% Impervious Area

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

Subcatchment 17S: North



Summary for Pond 5P: N. Pond

Inflow Area = 14.703 ac, 54.60% Impervious, Inflow Depth = 2.82" for 50 Year event
Inflow = 9.40 cfs @ 7.93 hrs, Volume= 3.453 af
Outflow = 0.96 cfs @ 24.00 hrs, Volume= 1.064 af, Atten= 90%, Lag= 963.8 min
Primary = 0.12 cfs @ 24.00 hrs, Volume= 0.222 af
Routed to Pond 12P : (new Pond)
Secondary = 0.33 cfs @ 24.00 hrs, Volume= 0.504 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.51 cfs @ 24.00 hrs, Volume= 0.338 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 418.95' @ 24.00 hrs Surf.Area= 36,398 sf Storage= 118,110 cf

Plug-Flow detention time= 880.1 min calculated for 1.062 af (31% of inflow)
Center-of-Mass det. time= 530.8 min (1,231.7 - 700.9)

Volume	Invert	Avail.Storage	Storage Description
#1	415.00'	158,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
415.00	23,461	0	0
420.00	39,852	158,283	158,283

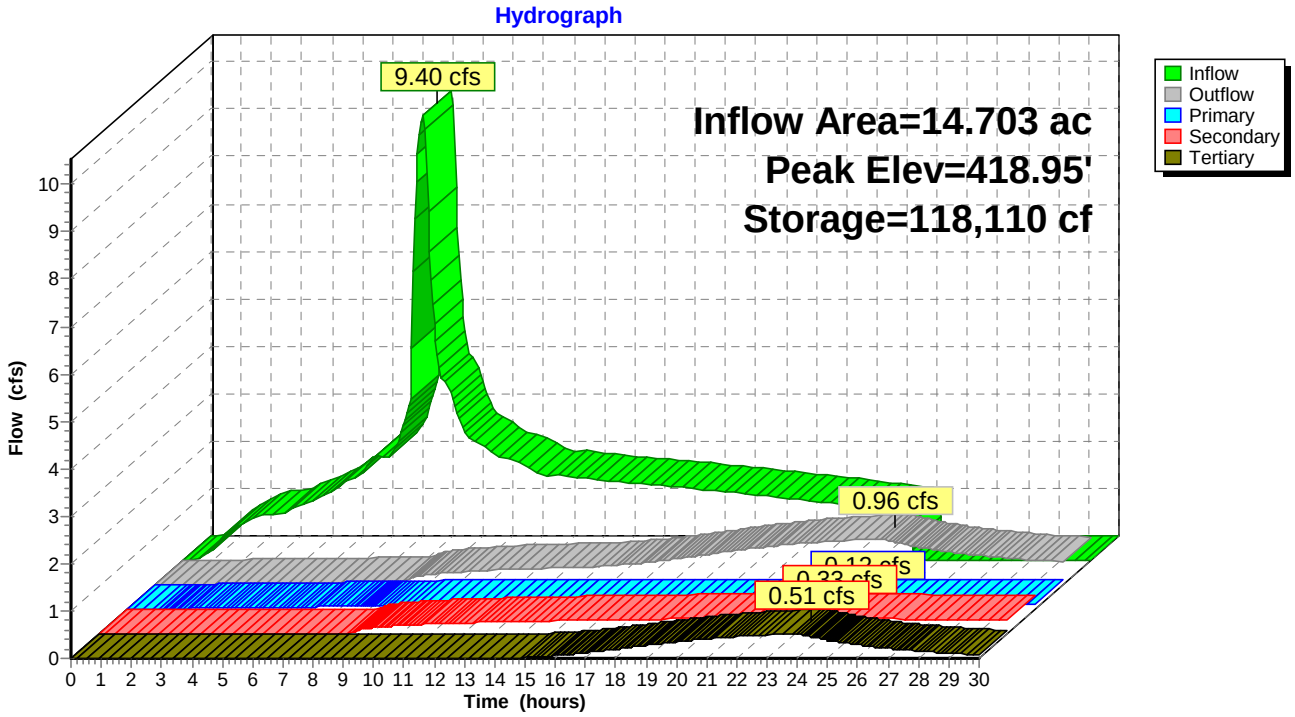
Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**1.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	417.00'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	418.20'	**45.0 deg x 0.80' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Primary OutFlow Max=0.12 cfs @ 24.00 hrs HW=418.95' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 9.57 fps)

Secondary OutFlow Max=0.33 cfs @ 24.00 hrs HW=418.95' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.33 cfs @ 6.72 fps)

Tertiary OutFlow Max=0.51 cfs @ 24.00 hrs HW=418.95' (Free Discharge)
└**3=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.51 cfs @ 2.21 fps)

Pond 5P: N. Pond



Summary for Pond 6P: S. Pond

Inflow Area = 23.003 ac, 57.65% Impervious, Inflow Depth = 2.92" for 50 Year event
Inflow = 15.35 cfs @ 7.93 hrs, Volume= 5.588 af
Outflow = 1.85 cfs @ 21.98 hrs, Volume= 2.156 af, Atten= 88%, Lag= 843.1 min
Primary = 0.64 cfs @ 21.98 hrs, Volume= 1.220 af
Routed to Pond 12P : (new Pond)
Secondary = 0.36 cfs @ 21.98 hrs, Volume= 0.521 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.85 cfs @ 21.98 hrs, Volume= 0.415 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 417.96' @ 21.98 hrs Surf.Area= 50,058 sf Storage= 172,511 cf

Plug-Flow detention time= 780.3 min calculated for 2.152 af (39% of inflow)
Center-of-Mass det. time= 461.3 min (1,158.1 - 696.7)

Volume	Invert	Avail.Storage	Storage Description
#1	414.00'	226,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
414.00	37,000	0	0
419.00	53,474	226,185	226,185

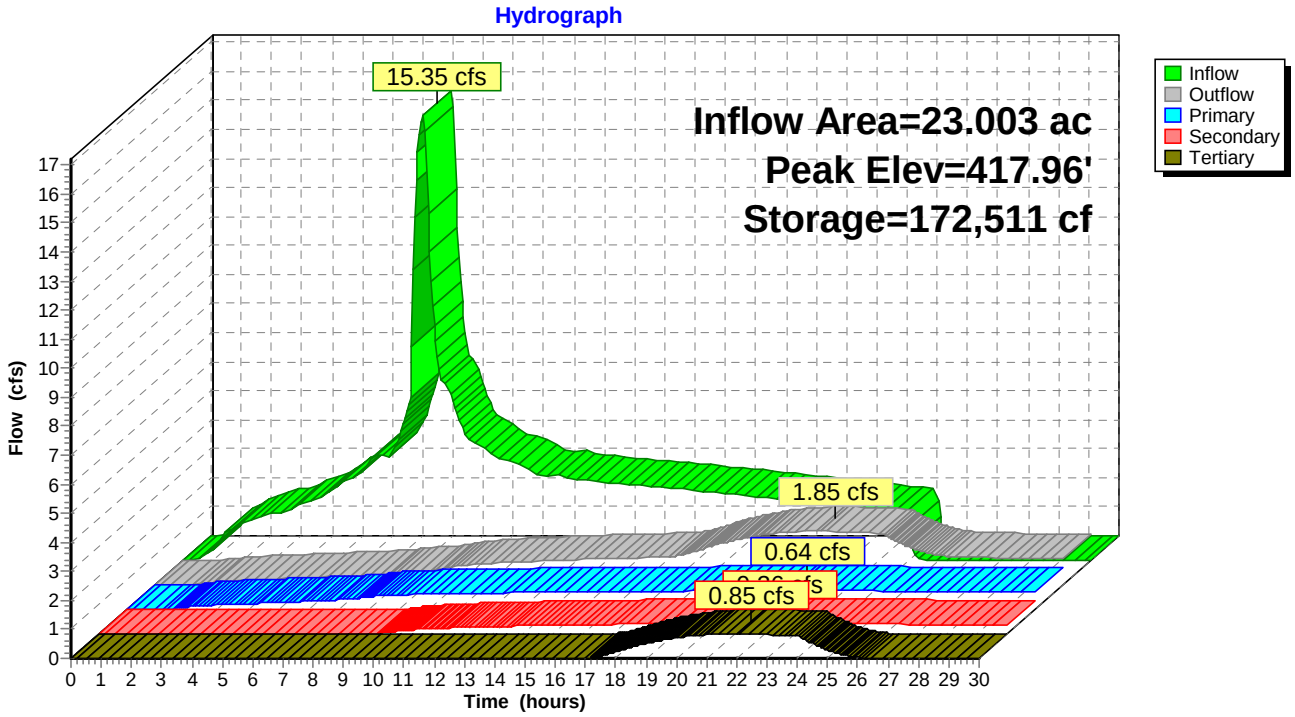
Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**3.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	416.40'	**3.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	417.75'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.64 cfs @ 21.98 hrs HW=417.96' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.64 cfs @ 9.59 fps)

Secondary OutFlow Max=0.36 cfs @ 21.98 hrs HW=417.96' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 5.74 fps)

Tertiary OutFlow Max=0.84 cfs @ 21.98 hrs HW=417.96' (Free Discharge)
└**3=Orifice/Grate** (Weir Controls 0.84 cfs @ 1.51 fps)

Pond 6P: S. Pond



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 414.78' (Flood elevation advised)
[81] Warning: Exceeded Pond 6P by 0.05' @ 1.80 hrs

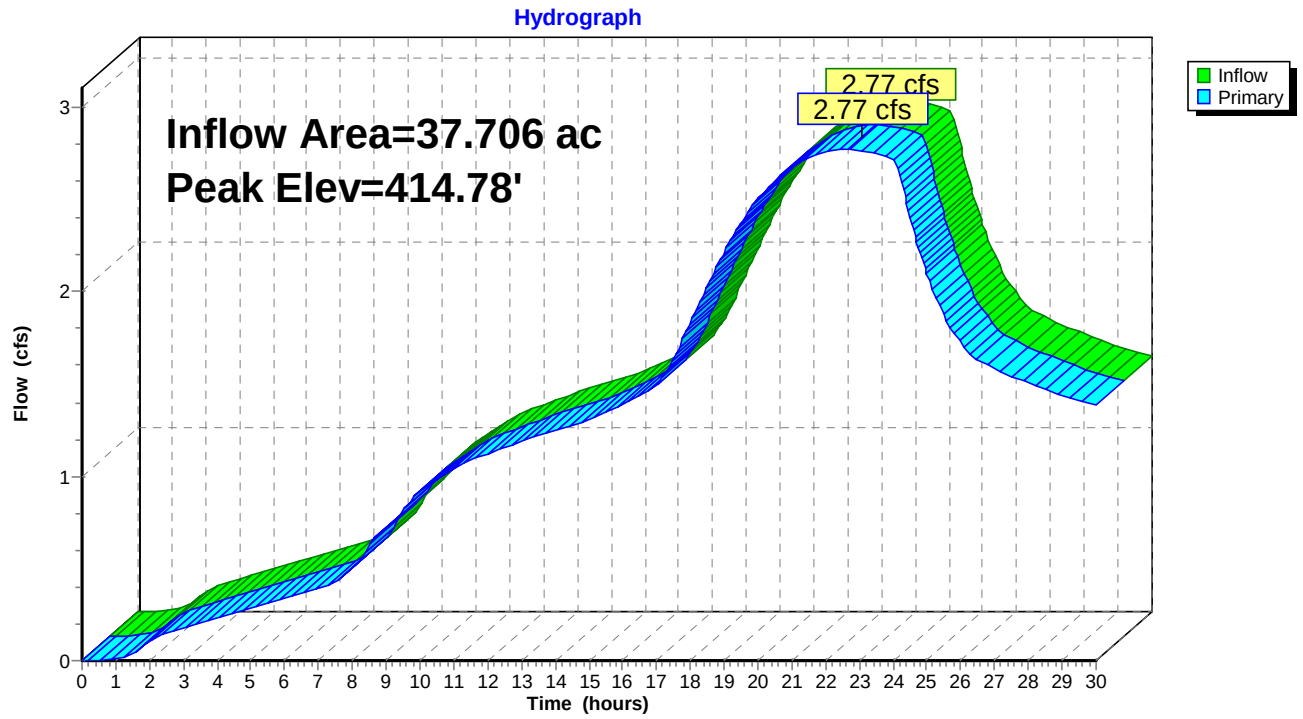
Inflow Area = 37.706 ac, 56.46% Impervious, Inflow Depth > 1.02" for 50 Year event
Inflow = 2.77 cfs @ 22.65 hrs, Volume= 3.220 af
Outflow = 2.77 cfs @ 22.65 hrs, Volume= 3.220 af, Atten= 0%, Lag= 0.0 min
Primary = 2.77 cfs @ 22.65 hrs, Volume= 3.220 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 414.78' @ 22.65 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**18.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.77 cfs @ 22.65 hrs HW=414.78' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 2.77 cfs @ 3.00 fps)

Pond 12P: (new Pond)



Summary for Subcatchment 16S: South

[49] Hint: Tc<2dt may require smaller dt

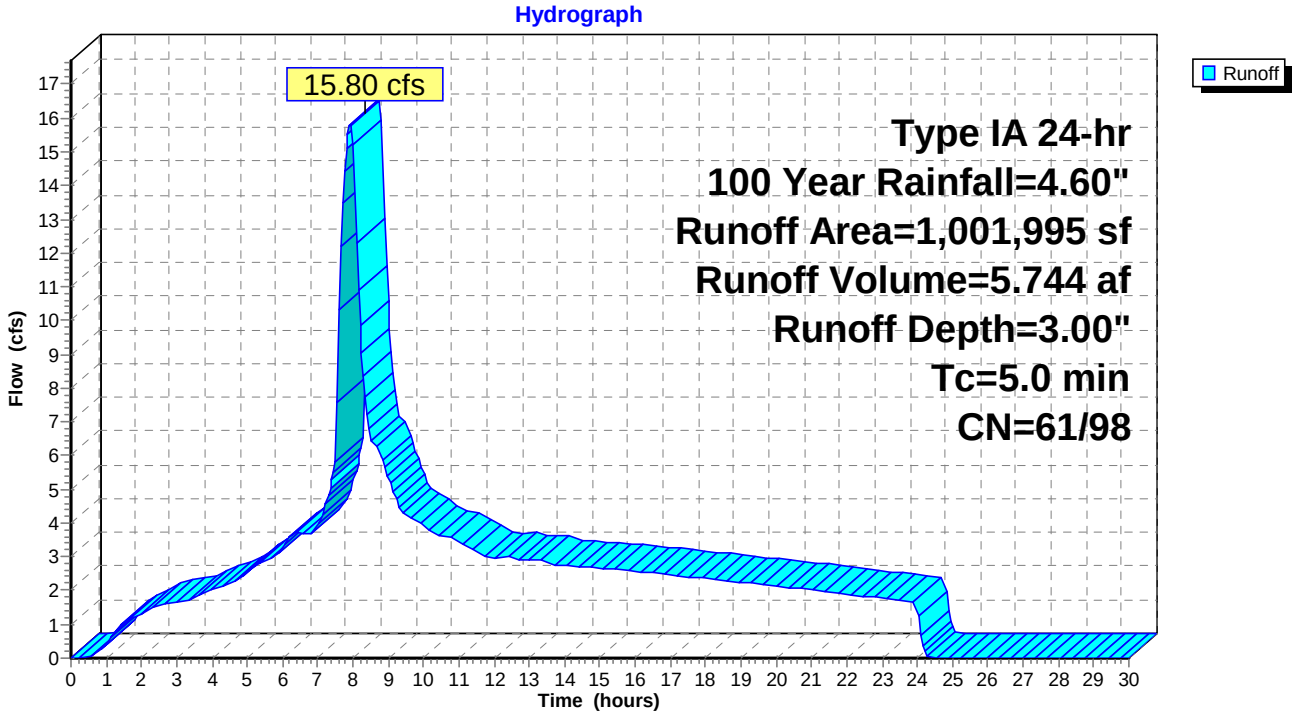
Runoff = 15.80 cfs @ 7.93 hrs, Volume= 5.744 af, Depth= 3.00"
Routed to Pond 6P : S. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.60"

Area (sf)	CN	Description
577,668	98	Paved roads w/curbs & sewers, HSG C
424,327	61	>75% Grass cover, Good, HSG B
1,001,995	82	Weighted Average
424,327		42.35% Pervious Area
577,668		57.65% Impervious Area

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

Subcatchment 16S: South



Summary for Subcatchment 17S: North

[49] Hint: Tc<2dt may require smaller dt

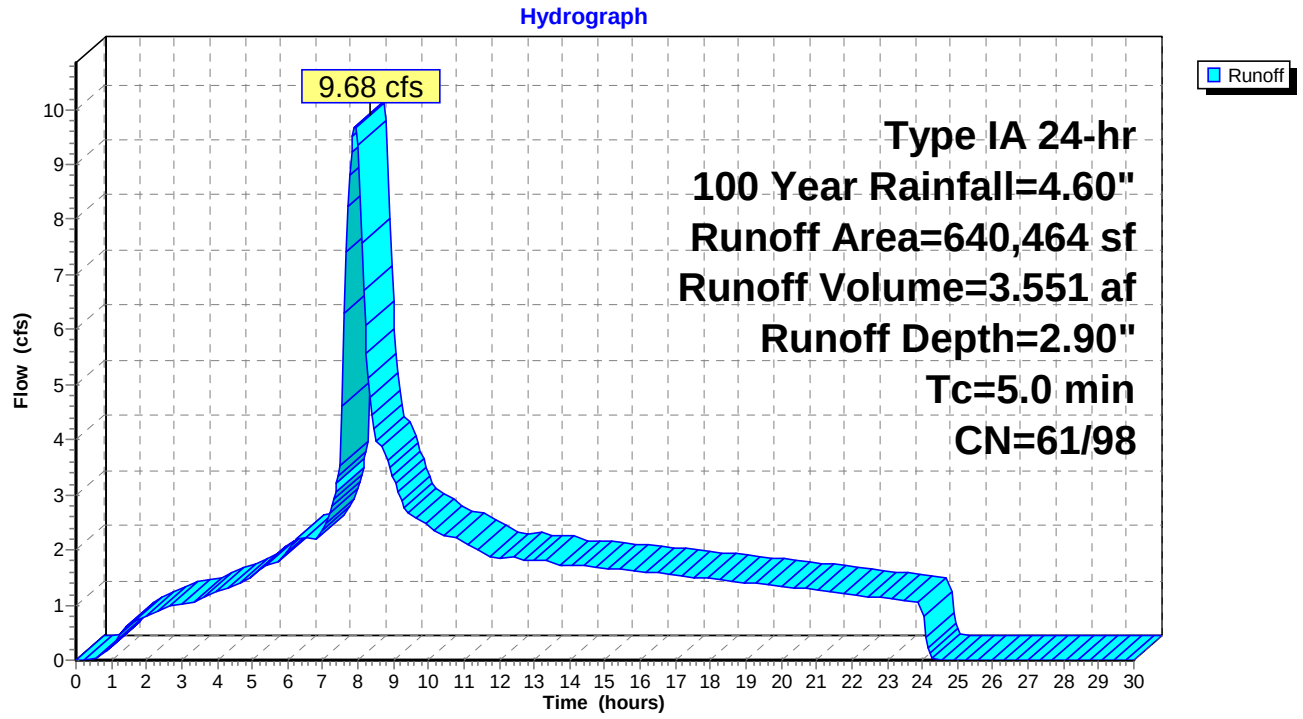
Runoff = 9.68 cfs @ 7.93 hrs, Volume= 3.551 af, Depth= 2.90"
Routed to Pond 5P : N. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100 Year Rainfall=4.60"

Area (sf)	CN	Description
290,760	61	>75% Grass cover, Good, HSG B
349,704	98	Paved roads w/curbs & sewers, HSG C
640,464	81	Weighted Average
290,760		45.40% Pervious Area
349,704		54.60% Impervious Area

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

Subcatchment 17S: North



Summary for Pond 5P: N. Pond

Inflow Area = 14.703 ac, 54.60% Impervious, Inflow Depth = 2.90" for 100 Year event
Inflow = 9.68 cfs @ 7.93 hrs, Volume= 3.551 af
Outflow = 1.03 cfs @ 24.00 hrs, Volume= 1.146 af, Atten= 89%, Lag= 963.9 min
Primary = 0.12 cfs @ 24.00 hrs, Volume= 0.224 af
Routed to Pond 12P : (new Pond)
Secondary = 0.33 cfs @ 24.00 hrs, Volume= 0.514 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.58 cfs @ 24.00 hrs, Volume= 0.407 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 418.98' @ 24.00 hrs Surf.Area= 36,523 sf Storage= 119,507 cf

Plug-Flow detention time= 874.1 min calculated for 1.146 af (32% of inflow)
Center-of-Mass det. time= 530.0 min (1,230.8 - 700.9)

Volume	Invert	Avail.Storage	Storage Description
#1	415.00'	158,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
415.00	23,461	0	0
420.00	39,852	158,283	158,283

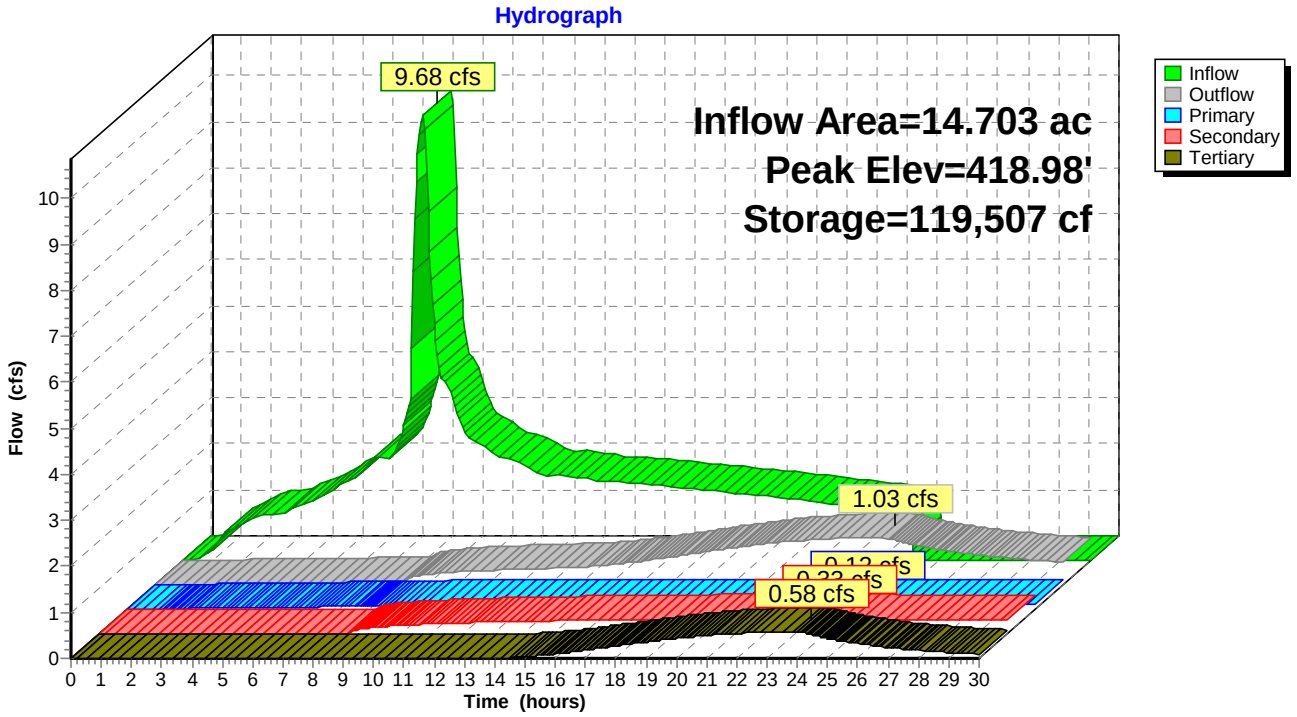
Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**1.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	417.00'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	418.20'	**45.0 deg x 0.80' rise Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Primary OutFlow Max=0.12 cfs @ 24.00 hrs HW=418.98' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 9.61 fps)

Secondary OutFlow Max=0.33 cfs @ 24.00 hrs HW=418.98' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.33 cfs @ 6.78 fps)

Tertiary OutFlow Max=0.58 cfs @ 24.00 hrs HW=418.98' (Free Discharge)
└**3=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.58 cfs @ 2.27 fps)

Pond 5P: N. Pond



Summary for Pond 6P: S. Pond

Inflow Area = 23.003 ac, 57.65% Impervious, Inflow Depth = 3.00" for 100 Year event
Inflow = 15.80 cfs @ 7.93 hrs, Volume= 5.744 af
Outflow = 1.99 cfs @ 21.24 hrs, Volume= 2.305 af, Atten= 87%, Lag= 798.4 min
Primary = 0.64 cfs @ 21.24 hrs, Volume= 1.229 af
Routed to Pond 12P : (new Pond)
Secondary = 0.36 cfs @ 21.24 hrs, Volume= 0.535 af
Routed to Pond 12P : (new Pond)
Tertiary = 0.98 cfs @ 21.24 hrs, Volume= 0.541 af
Routed to Pond 12P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 417.99' @ 21.24 hrs Surf.Area= 50,131 sf Storage= 173,626 cf

Plug-Flow detention time= 774.2 min calculated for 2.305 af (40% of inflow)
Center-of-Mass det. time= 459.7 min (1,156.3 - 696.6)

Volume	Invert	Avail.Storage	Storage Description
#1	414.00'	226,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
414.00	37,000	0	0
419.00	53,474	226,185	226,185

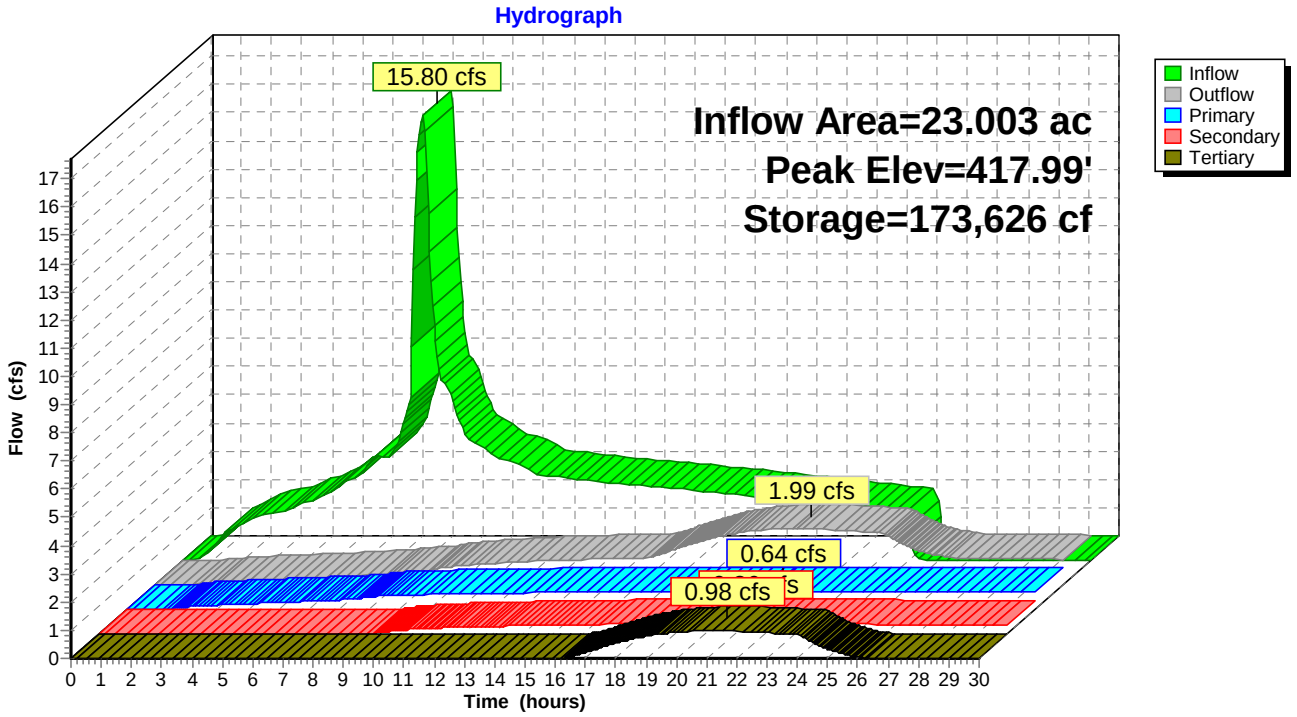
Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**3.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	416.40'	**3.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Tertiary	417.75'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.64 cfs @ 21.24 hrs HW=417.99' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.64 cfs @ 9.61 fps)

Secondary OutFlow Max=0.36 cfs @ 21.24 hrs HW=417.99' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 5.79 fps)

Tertiary OutFlow Max=0.98 cfs @ 21.24 hrs HW=417.99' (Free Discharge)
└**3=Orifice/Grate** (Weir Controls 0.98 cfs @ 1.59 fps)

Pond 6P: S. Pond



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 414.81' (Flood elevation advised)
[81] Warning: Exceeded Pond 6P by 0.05' @ 1.80 hrs

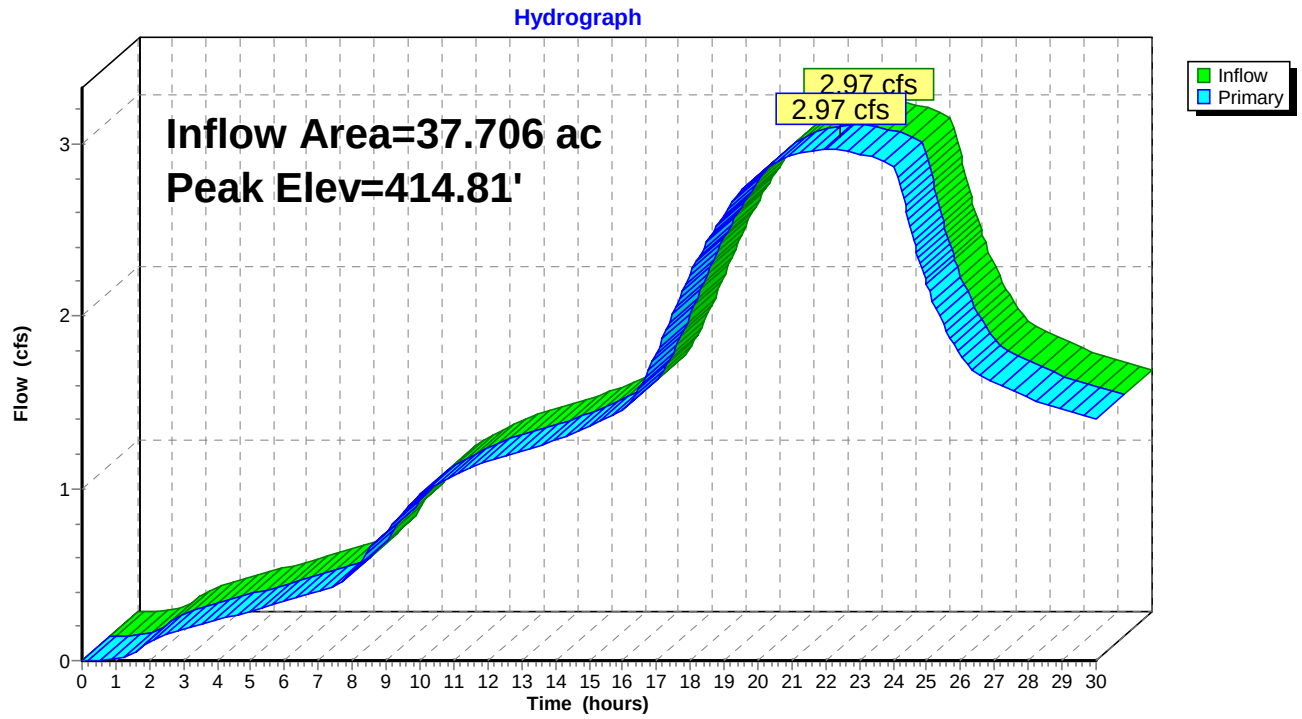
Inflow Area = 37.706 ac, 56.46% Impervious, Inflow Depth > 1.10" for 100 Year event
Inflow = 2.97 cfs @ 22.04 hrs, Volume= 3.451 af
Outflow = 2.97 cfs @ 22.04 hrs, Volume= 3.451 af, Atten= 0%, Lag= 0.0 min
Primary = 2.97 cfs @ 22.04 hrs, Volume= 3.451 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 414.81' @ 22.04 hrs

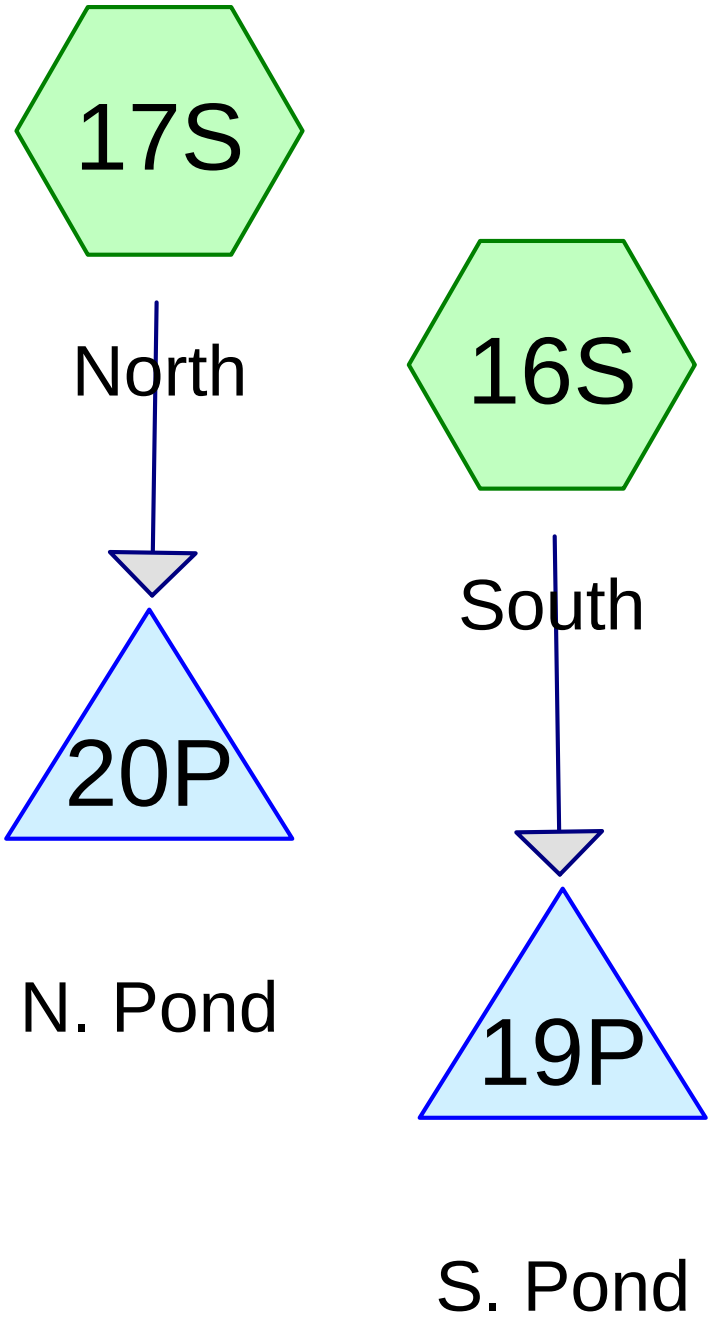
Device	Routing	Invert	Outlet Devices
#1	Primary	414.00'	**18.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.97 cfs @ 22.04 hrs HW=414.81' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 2.97 cfs @ 3.06 fps)

Pond 12P: (new Pond)



APPENDIX F: WATER QUALITY HYDROGRAPHS



Subcat Reach Pond Link

Routing Diagram for Golf Club Prelim Hydrographs
Prepared by Multi/Tech Engineering Service, Printed 8/22/2025

Summary for Subcatchment 16S: South

[49] Hint: Tc<2dt may require smaller dt

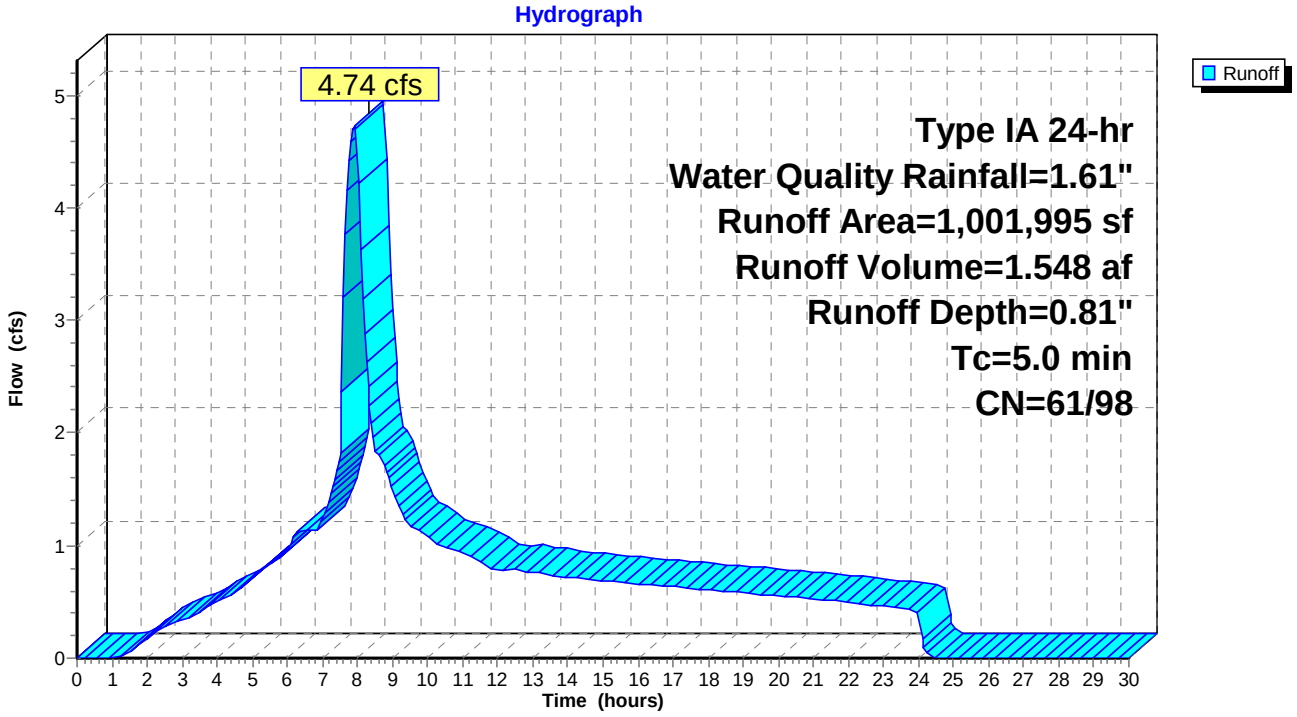
Runoff = 4.74 cfs @ 7.91 hrs, Volume= 1.548 af, Depth= 0.81"
Routed to Pond 19P : S. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr Water Quality Rainfall=1.61"

Area (sf)	CN	Description
577,668	98	Paved roads w/curbs & sewers, HSG C
424,327	61	>75% Grass cover, Good, HSG B
1,001,995	82	Weighted Average
424,327		42.35% Pervious Area
577,668		57.65% Impervious Area

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

Subcatchment 16S: South



Summary for Subcatchment 17S: North

[49] Hint: Tc<2dt may require smaller dt

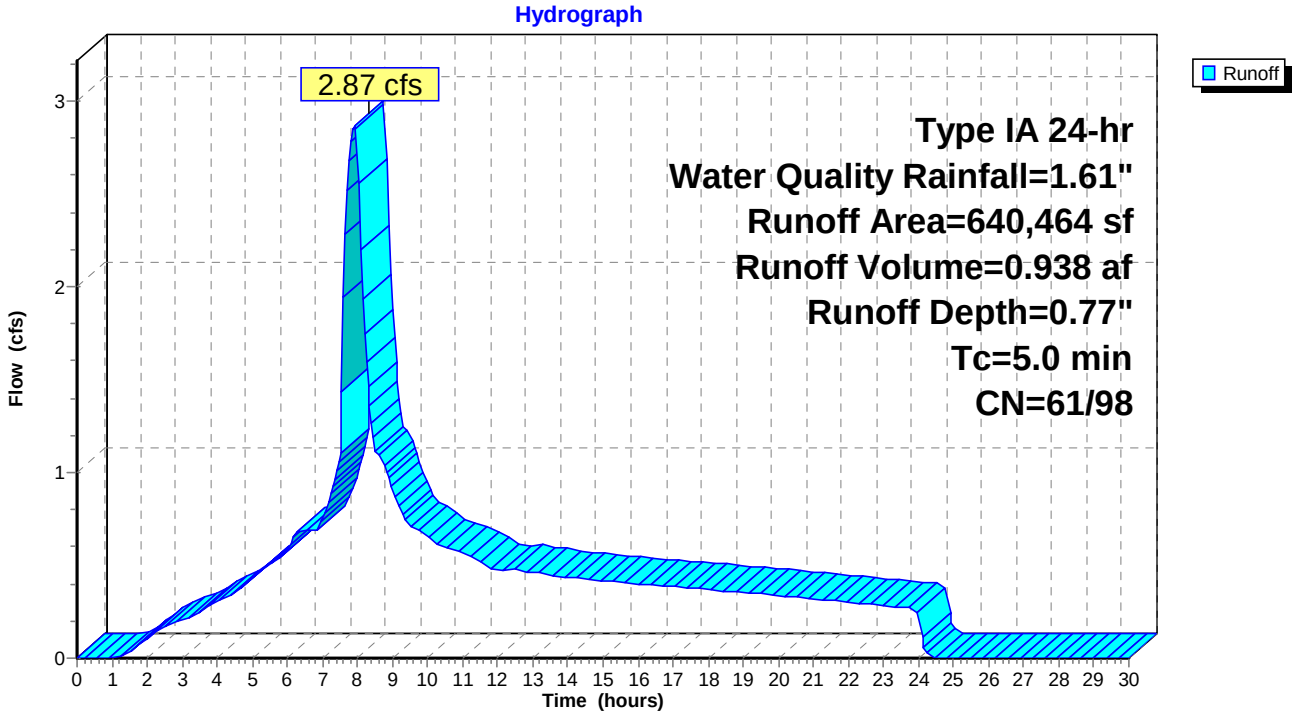
Runoff = 2.87 cfs @ 7.91 hrs, Volume= 0.938 af, Depth= 0.77"
Routed to Pond 20P : N. Pond

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type IA 24-hr Water Quality Rainfall=1.61"

Area (sf)	CN	Description
290,760	61	>75% Grass cover, Good, HSG B
349,704	98	Paved roads w/curbs & sewers, HSG C
640,464	81	Weighted Average
290,760		45.40% Pervious Area
349,704		54.60% Impervious Area

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

Subcatchment 17S: North



Summary for Pond 19P: S. Pond

Inflow Area = 23.003 ac, 57.65% Impervious, Inflow Depth = 0.81" for Water Quality event
Inflow = 4.74 cfs @ 7.91 hrs, Volume= 1.548 af
Outflow = 4.60 cfs @ 7.99 hrs, Volume= 1.548 af, Atten= 3%, Lag= 5.3 min
Discarded = 4.60 cfs @ 7.99 hrs, Volume= 1.548 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 414.04' @ 7.99 hrs Surf.Area= 37,147 sf Storage= 1,652 cf

Plug-Flow detention time= 6.0 min calculated for 1.545 af (100% of inflow)
Center-of-Mass det. time= 6.0 min (701.2 - 695.2)

Volume	Invert	Avail.Storage	Storage Description
#1	414.00'	226,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

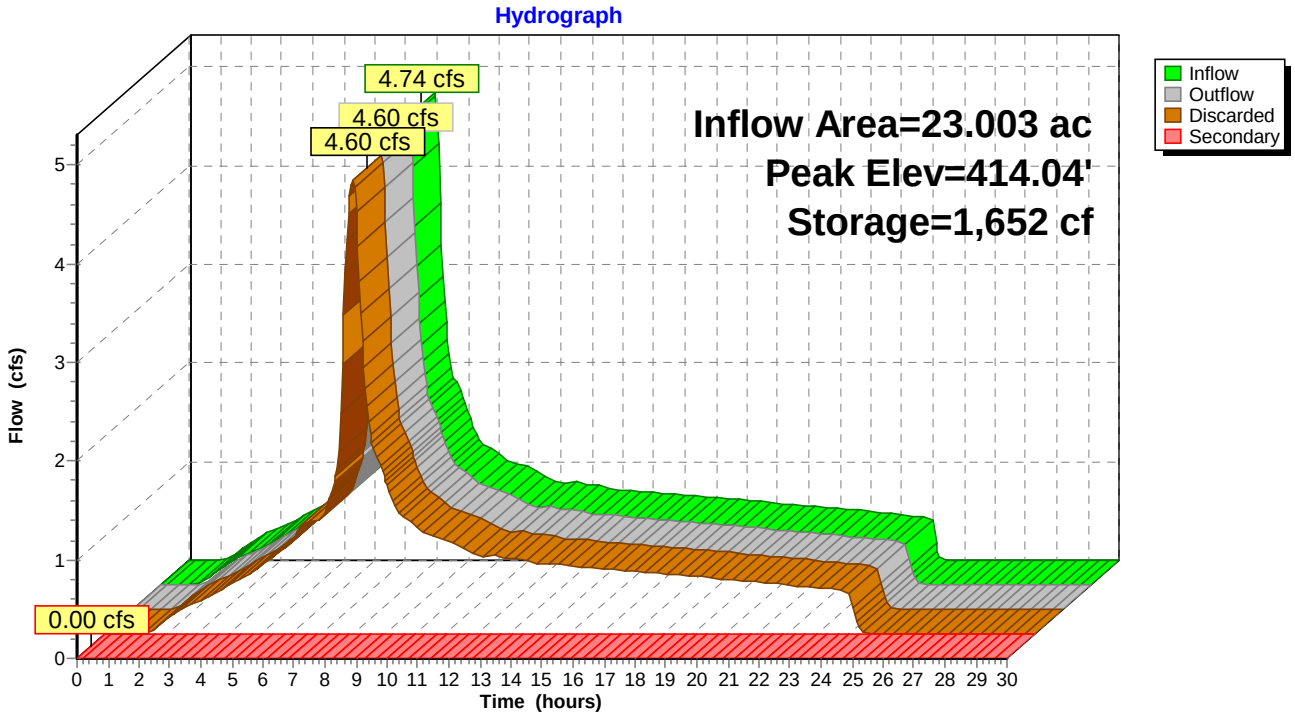
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
414.00	37,000	0	0
419.00	53,474	226,185	226,185

Device	Routing	Invert	Outlet Devices
#1	Discarded	414.00'	**6.000 in/hr Exfiltration over Surface area**
#2	Secondary	416.40'	**3.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=5.16 cfs @ 7.99 hrs HW=414.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 5.16 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=414.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 19P: S. Pond



Summary for Pond 20P: N. Pond

Inflow Area = 14.703 ac, 54.60% Impervious, Inflow Depth = 0.77" for Water Quality event
Inflow = 2.87 cfs @ 7.91 hrs, Volume= 0.938 af
Outflow = 2.79 cfs @ 8.00 hrs, Volume= 0.938 af, Atten= 3%, Lag= 5.3 min
Discarded = 2.79 cfs @ 8.00 hrs, Volume= 0.938 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 415.04' @ 8.00 hrs Surf.Area= 23,600 sf Storage= 999 cf

Plug-Flow detention time= 6.0 min calculated for 0.936 af (100% of inflow)
Center-of-Mass det. time= 6.0 min (701.8 - 695.8)

Volume	Invert	Avail.Storage	Storage Description
#1	415.00'	158,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
415.00	23,461	0	0
420.00	39,852	158,283	158,283

Device	Routing	Invert	Outlet Devices
#1	Discarded	415.00'	**6.000 in/hr Exfiltration over Surface area**
#2	Secondary	417.00'	**3.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=3.28 cfs @ 8.00 hrs HW=415.04' (Free Discharge)
1=Exfiltration (Exfiltration Controls 3.28 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=415.00' (Free Discharge)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 20P: N. Pond