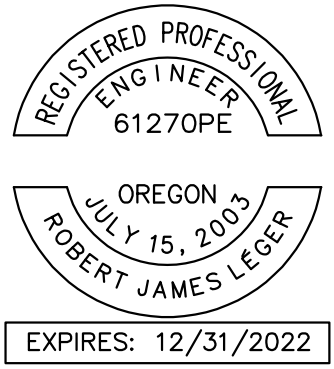
Stormwater Calculations

Family Pet Clinic

Newberg, OR



DCI Job Number 22032-0016

June 2022

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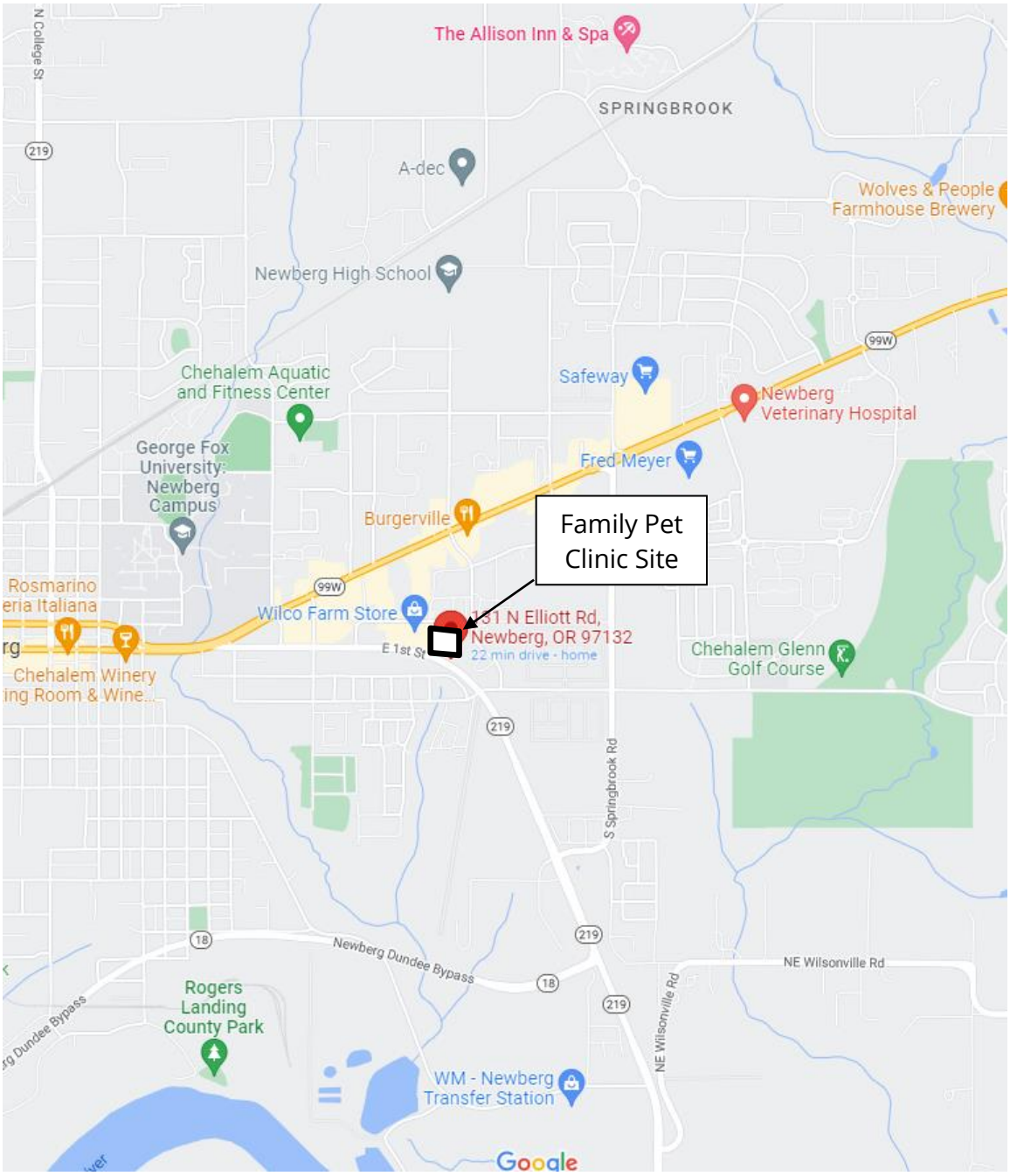
Section I: Site Background Information

Section I-1
Vicinity Map



Section I-2: Project Information

The family pet clinic site is located in Newberg, Oregon and borders S Elliott Road to the east, Hillsboro-Silverton Highway to the south, and private development to the north and west. This preliminary report contains information for the private onsite stormwater quality and quantity control systems.

The existing site conditions contain three buildings, parking areas, a stormwater swale, and scattered trees. Most of the improvements are remaining or being renovated, including items such as the parking areas and stormwater facilities. The internal building areas are being upgraded, and the building footprint will be expanded by approximately 1,680 sf. The existing stormwater discharge is to the ODOT ROW and will remain this way for the developed conditions. The impervious areas on site are remaining relatively close in quantity, due to the parking fields being reconfigured and being replaced in-kind.

It is assumed that the entire impervious area will be captured and discharged to the stormwater facilities in the southwest corner of the property. The existing swale is designed to remain for treatment and settling and a new extended dry detention basin will be added for storage and additional water quality treatment.

The stormwater facilities for the site is designed to meet Newberg stormwater requirements, as well as meeting the ODOT Hydraulics Manual due to discharge to ODOT ROW.

Section I-3: Stormwater Narrative

The proposed site is designed to provide a stormwater swale and stormwater extended dry detention basin for stormwater water quality and quantity. For detention, the full property pre- and post-development conditions have been used for the analysis. The developed site contains buildings, parking areas, sidewalks, landscaping, and stormwater facilities. Some water quality and pre-treatment is provided in the existing stormwater swale that will be remain. Further water quality and quantity is designed within the extended dry detention basin.

Site Area

Stormwater runoff from the proposed site is designed to be captured and discharged to the southwest corner for stormwater treatment and detention, prior to release into the ODOT right of way. Stormwater runoff from the building is designed to be captured by roof drains and parking areas are designed to capture stormwater runoff using catch basins or curb inlets. The stormwater facilities are designed to be unlined with drainage rock to allow infiltration into the native soils. The existing soil is rated as C/D by the USGS Soil Survey, so infiltration rates will likely be low.

The existing swale is to remain and serve as a pre-treatment facility, while also assisting with treating the runoff for water quality. The existing swale will be inspected for adequate vegetation coverage and neglected areas will be brought up to design standard quality. A new extended dry detention basin is proposed to be connected after the swale for detention and water quality treatment. The extended dry detention basin will be vegetated and provide an opportunity for infiltration to native soils through 18” of filtration soil media. In the preliminary design calculations, an approximate depth of three to four feet of depth will be proposed for the facility.

A control structure will be provided in the extended dry detention facility for releasing runoff at rates that match the existing rates, prior to redevelopment. The post-developed rates are designed to match the annual rates of the ½ of the 2-year, the 2-year, the 10-year, and the 25-year. In addition, due to the site discharging to ODOT right of way, the control manhole will release rates that match the 50-year existing flows as well. The control manhole is designed with a single weir wall inside. The weir wall is designed with several orifices for the annual storm event releases. The peak overflow at the wall is designed for the 50-year storm event.

Conveyance

The stormwater pipes onsite have been designed to convey the 50-year peak storm event and have a cleaning flow rate of 3 feet per second.

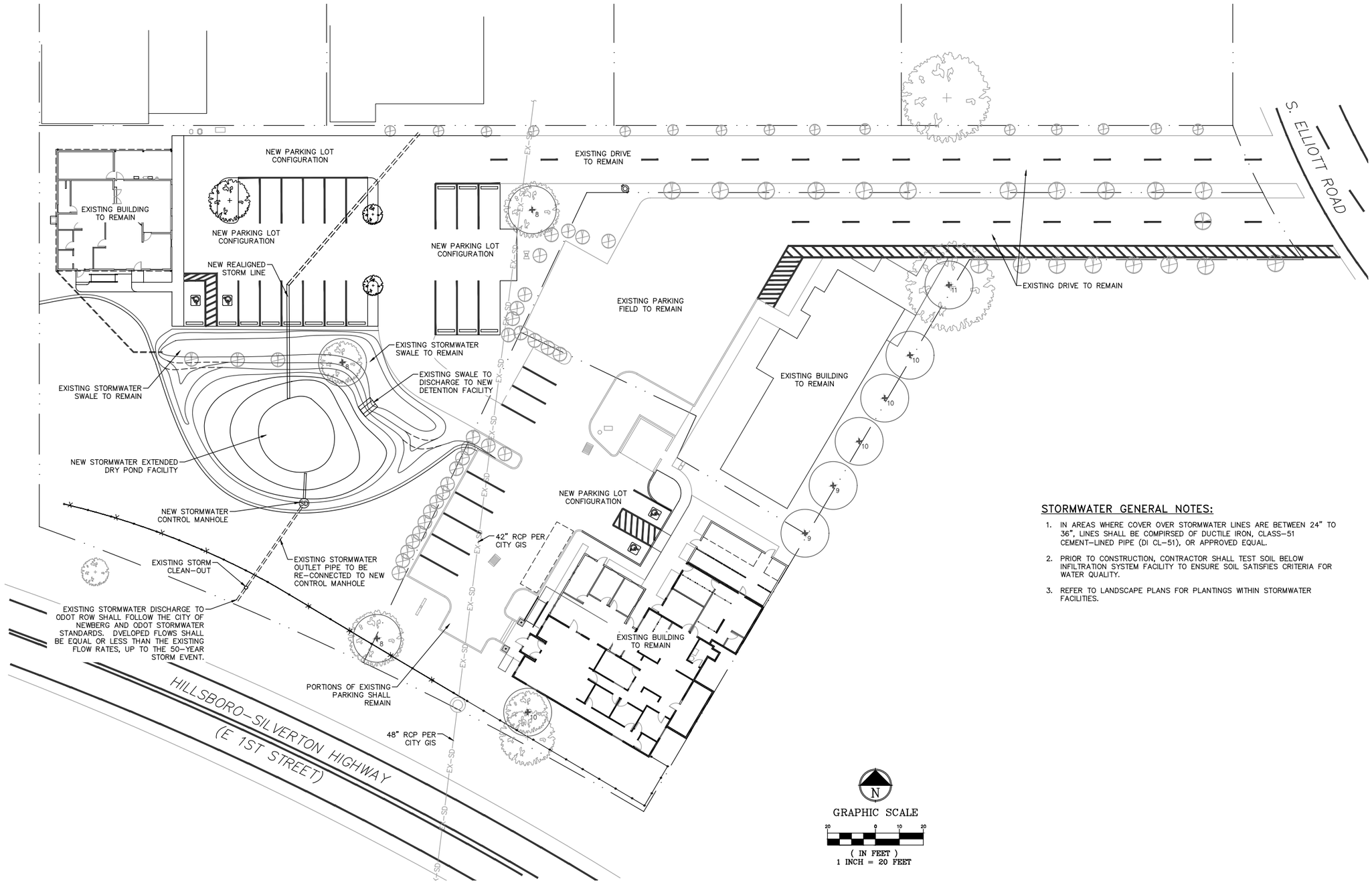
Stormwater Quality Control

The preliminary water quality volumes and flowrates for the facilities have been calculated and are in Section II-2 of this report. The Newberg water quality event is 1.0”/24 hr over the new impervious areas. The extended dry detention pond is designed to have a water quality drawdown period of 48 hours. The engineered topsoil media mix uses a design rate of 2.0 inches/hour. The swale is also intended to be used for water quality treatment and infiltration and will utilize the existing soils and vegetation.

Stormwater Quantity Control (Detention)

The extended dry detention pond is designed to detain water at flow rates that are restricted to existing conditions. Soils on the site are not ideal for full infiltration, so stormwater controls are designed to release runoff into the public system at controlled peak rates, mentioned previously.

For detention design, the existing conditions for the site were calculated from sheet flow using the longest Tc (less than 300’ in length, see exhibit), and have a time of concentration of approximately 5 minutes. The developed conditions of the site were designed with a time of concentration of 5 minutes.



N

GRAPHIC SCALE

20 0 10 20

(IN FEET)
1 INCH = 20 FEET

STORMWATER GENERAL NOTES:

1. IN AREAS WHERE COVER OVER STORMWATER LINES ARE BETWEEN 24" TO 36", LINES SHALL BE COMPIRSED OF DUCTILE IRON, CLASS-51 CEMENT-LINED PIPE (DI CL-51), OR APPROVED EQUAL.
2. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL TEST SOIL BELOW INFILTRATION SYSTEM FACILITY TO ENSURE SOIL SATISFIES CRITERIA FOR WATER QUALITY.
3. REFER TO LANDSCAPE PLANS FOR PLANTINGS WITHIN STORMWATER FACILITIES.

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REGISTERED PROFESSIONAL ENGINEER
61270PE
OREGON
JULY 15, 2003
ROBERT JAMES LEGER
EXPIRES: 12/31/2022

FAMILY PET CLINIC - ADDITIONS
LAND-USE APPLICATIONS
NEWBERG, OREGON 97132

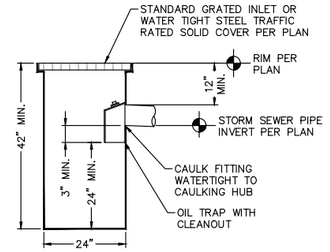
STORMWATER PLAN

Revisions:
Date: Issued For:

Date: APRIL 21, 2022
Issued For:
CoN LU APPLICATION

Job No: 22032-0016

1 OF 2
C1.0
LAND-USE SET

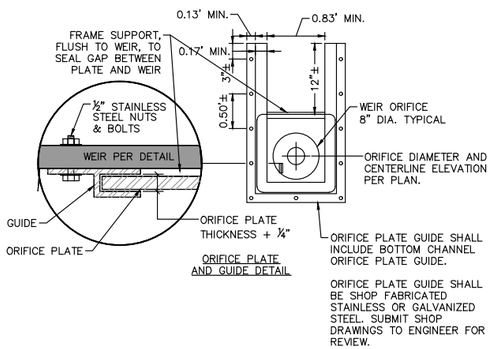


NOTES

1. CATCH BASIN TO BE CONSTRUCTED OF 10 GAUGE (MINIMUM) STEEL WITH ALL JOINTS WELDED.
2. STEEL OIL TRAP CLEANOUT TO BE PLUGGED OR HINGED ACCESS.
3. CAULK PIPE TO CAULKING HUB.
4. SET CATCH BASIN ON 6" THICK COMPACTED CRUSHED ROCK BASE.
5. BACKFILL AROUND CATCH BASIN WITH COMPACTED CRUSHED ROCK.

CATCH BASIN
SCALE: N.T.S.

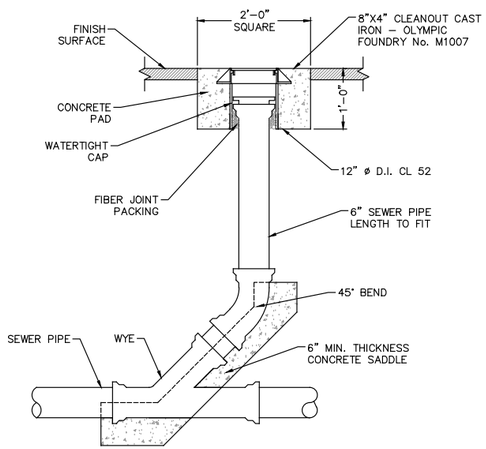
1
C3.0



ORIFICE PLATE AND GUIDE DETAIL

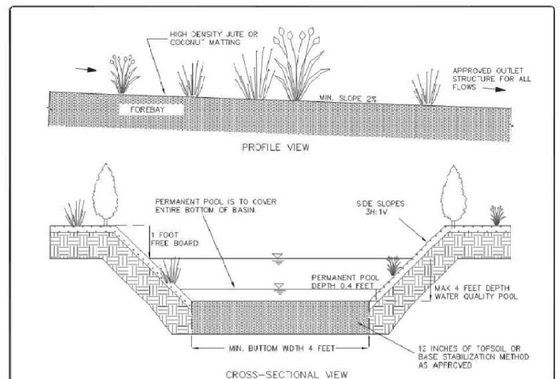
CONTROL MANHOLE – ORIFICE PLATE DETAIL
SCALE: N.T.S.

3
C3.0



CLEANOUT
SCALE: N.T.S.

2
C3.0



HYDRAULIC DESIGN CRITERIA:

1. MIN. WATER QUALITY DETENTION VOLUME: 1.0 X WATER QUALITY VOLUME (WQV)
2. 48 HOURS WATER QUALITY DRAWDOWN TIME
3. FOR ORIFICE SIZE USE:
   D=24*[Q/(C[2gh]^0.5)/pie]^0.5 WHERE:
   D(in)= DIAMETER OF ORIFICE
   Q(cfs)= WQV(cf)/(48*60*60)
   C=0.62
   H(ft)=3 + (TEMPORARY WATER QUALITY DETENTION HEIGHT TO CENTERLINE OF ORIFICE)

FACILITY DESIGN CRITERIA:

1. UP UNTILL THE MAX WATER SURFACE, INTERIOR SIDE SLOPES, MAX SLOPE IS 3H:1V
2. ABOVE MAX WATER SURFACE, INTERIOR SIDE SLOPES, MAX SLOPE IS 2H:1V
3. IF INTERIOR SIDE SLOPES MUST BE MOWED SIDE SLOPE THEN THE MAX SLOPE IS 4H:1V
4. EXTERIOR SIDE SLOPES MAX 2H:1V, UNLESS ANALYZED FOR STABILITY BY A GEOTECHNICAL ENGINEER
5. MINIMUM FREEBOARD 1 FOOT FROM 25 YEAR DESIGN WATER SURFACE ELEVATION

FACILITY DESIGN CRITERIA:

6. MINIMUM OF 2 CELLS, WITH THE FIRST CELL (FOREBAY) AT LEAST 10% OF SURFACE AREA. THE FOREBAY SHALL ALSO CONSTITUTE 20-PERCENT OF THE TREATMENT VOLUME. WHERE SPACE LIMITS MULTI-CELL DESIGN, USE ONE CELL WITH A FOREBAY AT THE INLET TO SETTLE SEDIMENTS AND DISTRIBUTE FLOW ACROSS THE WET POND.
7. INLET AND OUTLET STRUCTURES SHALL BE DESIGNED TO AVOID DIRECT FLOW BETWEEN STRUCTURES WITHOUT RECEIVING TREATMENT (ie SHORT CIRCUITING OF FLOW)
8. MINIMUM FREEBOARD: 1 FOOT FROM 25 YEAR DESIGN WATER SURFACE ELEVATION.
9. EXTEND RIVER ROCK, TOPSOIL AND HIGH DENSITY JUTE OR COCONUT MATTING TO TOP OF TREATMENT AREA (OR WQV LEVEL). EXTEND TOPSOIL AND LOW DENSITY JUTE MATTING TO THE EDGE OF WATER QUALITY TRACT OR EASEMENT AREA.
10. THE ENGINEER SHALL CERTIFY THAT THE POND STORM SEWER DESIGN WILL PASS THE 25 AND 100 YEAR STORM EVENTS AND THAT AT NORMAL DESIGN WATER SURFACE THAT THE UPSTREAM STORM SEWER WILL NOT BE IN A SURCHARGED CONDITION FOR LONGER THAN 24 HOURS.

City of Newberg
PUBLIC WORKS ENGINEERING DIVISION
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REVISIONS

EXTENDED DRY BASIN

SCALE: N.T.S.
DATE: MARCH 2014
APPROVED BY: JAY H.
STANDARD DRAWING 461

FAMILY PET CLINIC - ADDITIONS

LAND-USE APPLICATIONS
NEWBERG, OREGON 97132

EXTERIOR ELEVATIONS / BUILDING SECTIONS

Revisions:
Date: Issued For:

Date: APRIL 21, 2022
Issued For:
CoN LU APPLICATION

Job No: 22032-0016

2 OF 2
C2.0
LAND-USE SET

Section II: Onsite Stormwater Design Information

Section II-1
Detention Flow Rate Summary

For the total site:

Annual Storm Event (years)	Total Precipitation Depth (in)	Pre-Developed Flow Rate (cfs)	Post-Developed Flow Rate (cfs)	Does the post-developed flow rate exceed the pre-developed flow rate?
50% of 2-year	1.25	0.05	0.03	No
2	2.50	0.29	0.20	No
10	3.50	0.53	0.42	No
25	4.00	0.66	0.54	No
50	4.20	0.71	0.58	No

Based on preliminary area values, detention requirements are designed to be met.

The 50-year storm event is listed for the ODOT requirements for discharging to their right-of-way.

Job Name: Family Pet Clinic
Job No.: 22032-0016
Date: June 2022

Water Quality Calculations

Based on the CWS December 2019 Design and Construction Standards

Site Area: 20,789 sf (Impervious surface area)

Water Quality Volume (V_{wq}):

V_{wq} = Impervious Area • 1.00"

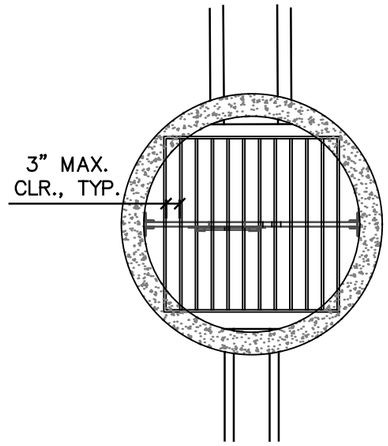
V_{wq} = 20,789 sf • 1.00 in • 1/12 ft/in

V_{wq} = 1,732 cf

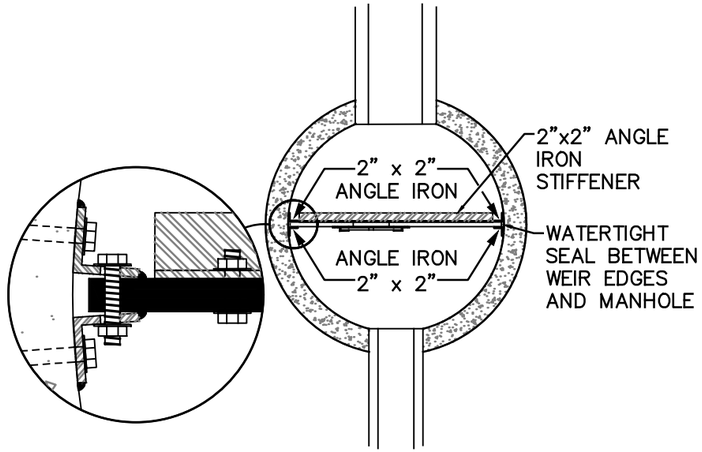
Water Quality Flowrate (Q_{wq}):

Q_{wq} = V_{wq} / Time Time = 48 hours

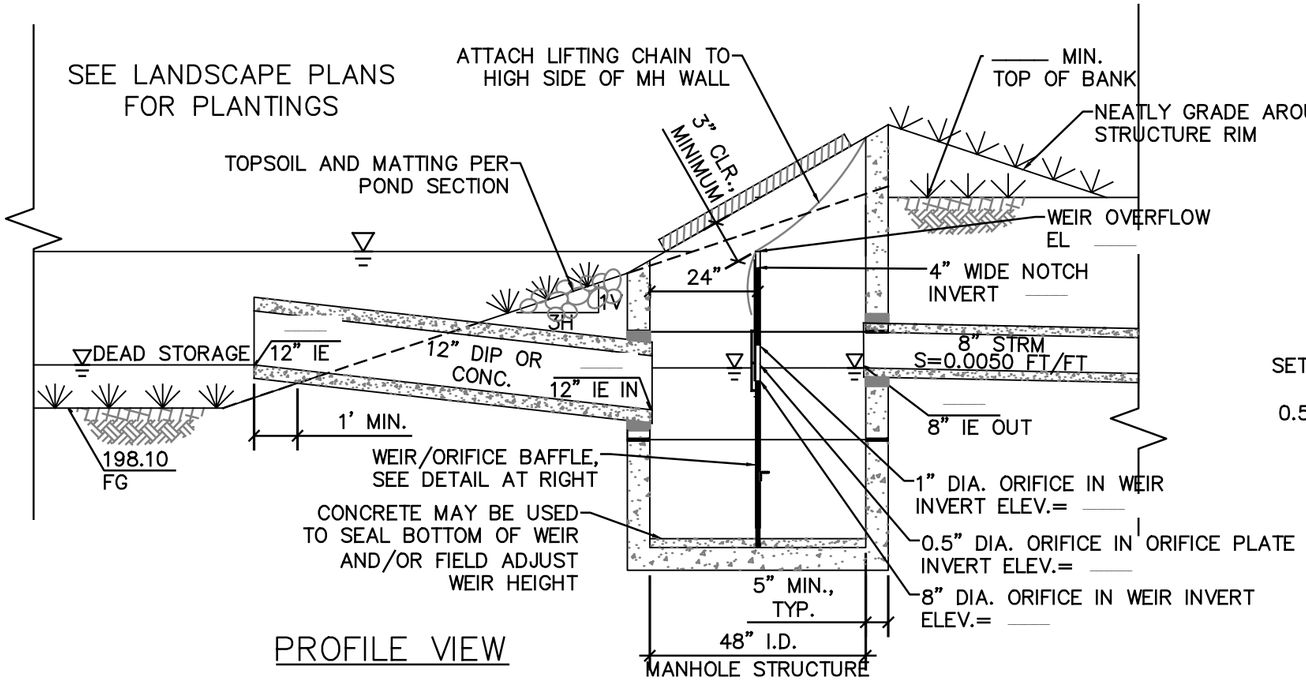
Q_{wq} = 0.010 cfs



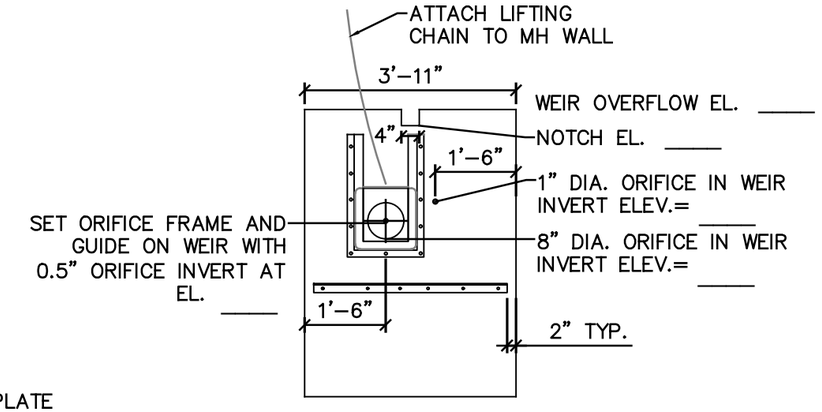
PLAN VIEW OF CONTROL
STRUCTURE M.H. GRATE



PLAN VIEW OF CONTROL
STRUCTURE M.H. WEIR



PROFILE VIEW



WEIR DETAIL

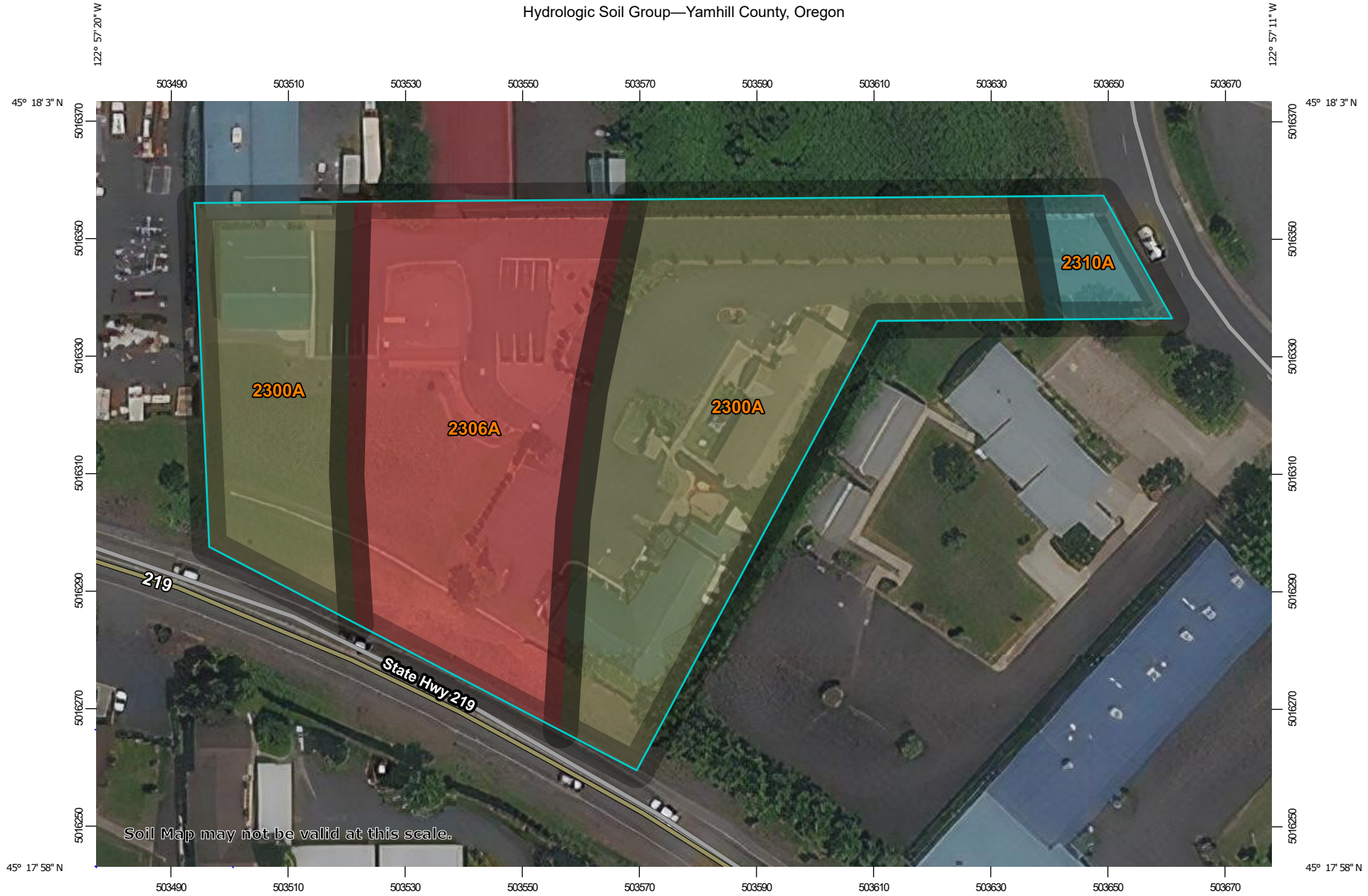
WEIR SHALL BE 1" SOLID WALL HDPE. ANCHOR WEIR TO STAINLESS STEEL (SS) 2" x 2" ANGLE IRON EVERY 12" MAXIMUM WITH SS HARDWARE (BOTH SIDES). CREATE WATER TIGHT SEAL ALONG ALL EDGES AFTER INSTALLATION.

SEE ORIFICE PLATE AND GUIDE DETAIL.

INSTALL AN SS ANGLE IRON STIFFENER ON BACK OF WEIR (3'-7"), CENTERED AND ANCHORED TO WEIR, WITH SS HARDWARE AT 6 POINTS. SPACE OR COUNTERSINK HARDWARE TO NOT INTERFERE WITH ORIFICE PLATE EXTRACTION.

SECTION II-4
STORMWATER CONTROL STRUCTURE DETAIL

Appendix



Map Scale: 1:918 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

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 Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Yamhill County, Oregon
Survey Area Data: Version 10, Oct 27, 2021

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

Date(s) aerial images were photographed: Aug 19, 2015—Sep 13, 2016

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2300A	Aloha silt loam, 0 to 3 percent slopes	C/D	1.4	59.9%
2306A	Dayton silt loam, 0 to 2 percent slopes	D	0.8	36.1%
2310A	Woodburn silt loam, 0 to 3 percent slopes	C	0.1	4.0%
Totals for Area of Interest			**2.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

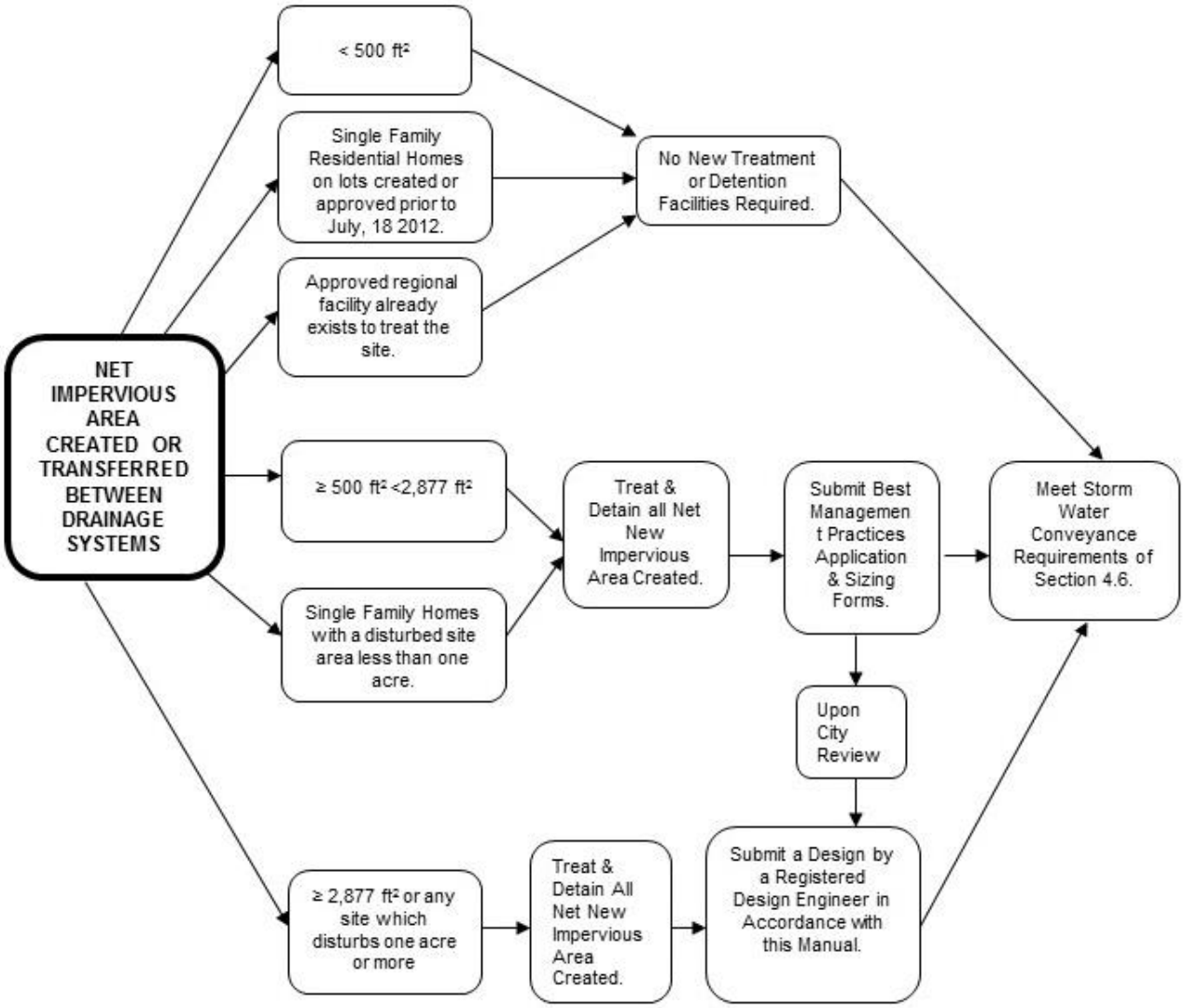
[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

4.6 Water Quantity and Quality Facilities

Figure 4.4 Storm water Quality & Quantity Design Flow Chart



4.6.1 Impervious Surface Area

I. For all sites, the threshold and approach for the design of water quality and quantity facilities shall be based on Figure 4-4 (above).

II. For single family and duplex residential subdivisions, stormwater quality and quality facilities shall be sized for all net impervious area created by the subdivision. For design purposed, the impervious area on an individual single family lot may be estimated at the rate of 2877-square feet of impervious surface area per dwelling unit. If design approach for the subdivision included private LIDA facilities on individual lots, actual impervious area shall be used at the time of the building permit. Concept facility design shall be shown on the subdivision plan.

III. Except as noted in Section (I) above, for all developments other than single family and duplex, including row houses and condominiums, the sizing of stormwater quality facilities shall be based on the net impervious area created by the development, including structures, roads, and other impervious areas. Impervious areas shall be determined based upon building

Table 4.2 Rainfall Depths

24 Hour Rainfall Depths Newberg, Oregon	
Recurrence Interval (years)	**Total Precipitation Depth (inches)**
2	2.5
5	3.0
10	3.5
25	4.0
50	4.2
100	4.5

4.5.2 Computational Methods for Runoff Calculations

Design of conveyance systems shall be based on full build-out of the upstream basin based upon the most recent approved City comprehensive Land Use Plan and realistic estimates of development densities in areas included in recent additions to the Urban Growth Boundary.

Unless an alternative method is approved by the City in writing, calculation of storm runoff used for conveyance design shall be based on one of the following methods with the limitations on use of each listed. A maximum overland distance for sheet flow used in calculations shall be 100 feet.

4.5.3 Rational Method

The rational method is allowed with the following limitations:

I. Drainage sub-basin area cannot exceed 1 acre for a single calculation without approval from the City.
II. The time of concentration shall be a minimum of five minutes.
III. The calculation methodology shall conform to the procedures outlined in Chapter 7 and Appendix A & F of the 2011 Oregon Department of Transportation (ODOT) Hydraulics Manual. The City of Newberg Intensity, Duration, and Frequency (IDF) recurrence interval curves to be used in the calculations shall be ODOT Zone 7.

4.5.4 Santa Barbara Urban Hydrograph (SBUH)

SBUH methods shall be based on the following information:

I. The rainfall distribution to be used within the City is the design storm of 24-hour duration based on the standard NRCS Type 1A rainfall distribution using the chart included herein.
II. Curve numbers shall be derived from the National Resources Conservation Service's (NRCS) runoff curve numbers contained in Technical Release 55 (TR-55)-Urban Hydrology for Small Watersheds.
III. Soil types shall be derived from the NRCS Soil Survey for Yamhill County.

4.5.5 TR-55

The TR-55 method developed by NRCS when used for runoff calculations shall be based on the following information:

4.8.5 Water Quality Storm

The storm defines both the volume and rate of runoff. The stormwater quality only facilities shall be designed for a dry weather storm event totaling 1.0 inches of precipitation falling in 24 hours with an average storm return period of 96 hours using Figure 4-3, rainfall distribution.

4.8.6 Water Quality Pretreatment

Incoming flows to a regional water quality facility shall be pretreated using a water quality manhole or other pre-treatment methods such as forebays, or other methods, as approved by the City.

4.8.7 Water Quality Manholes

I. Hydraulic Criteria:
   a. Minimum Design Flow: Water Quality Flow
   b. Upstream flow splitter may be used to bypass conveyance flows in excess of the Water Quality flow.

II. Design Criteria:
   a. Shall conform to City Standard Drawings
   b. Minimum Manhole Diameter: 60-inch
   c. Maximum size of incoming pipe: 18-inch (high flow splitter may be required.)
   d. Sump Depth: No deeper than 5 feet from invert out to bottom of sump
   e. Volume of sump: 20 cubic feet/ 1.0 cfs of flow into the water quality manhole, up to the 25-year flow. Flow calculations shall include the effect of an upstream flow splitter.
   f. Maintain a 3-foot clear access zone between the inside structure.
   g. Orient access to structure in a clear zone.

4.9 Low Impact Development Approaches (LIDA)

LIDAs offer options to comply with stormwater management requirements. The five objectives of LIDA are to:

I. Conserve Existing Resources
II. Minimize Disturbance
III. Minimize Soil Compaction
IV. Minimize Imperviousness
V. Direct Runoff from Impervious Areas onto Pervious Areas

4.9.1 LIDA Design Considerations

I. LIDA may be used in combination with standard water quantity and quality facilities to meet the requirements of this Chapter. The engineer shall maximize LIDA to the extent practicable.
II. The applicant shall provide an analysis in the drainage report of the ability of any proposed LIDA to meet the water quantity and quality requirements for a project.
III. For developers creating less than 2877 square feet of impervious surface Drawing No. 451, LIDA Sizing Form may be used. Projects creating more than 2877 square feet of impervious area shall be designed by registered design professional in accordance with the Standards.

Figure 4.5 Approvable Low Impact Development Approaches

Application	Green Roof	Porous Pavement/Pavers	Flow-through Planter	Infiltration Planter[1] / Rain Garden	Vegetated Filter Strip	Swale
Quantity Control	✓	✓	✓	✓		
Quality Control	✓	✓	✓	✓	✓	✓
Impervious Area Reduction	✓	✓				
Infiltrate		✓		✓	✓	✓
Private Property	✓	✓	✓	✓	✓	✓
Public Street/ROW			✓		✓	✓
Steep Slope	✓		✓			
Soils with Low Infiltration Rate[2]	✓	✓	✓		✓	✓
High GW Table	✓		✓		✓	✓
Contaminated Soils	✓		✓			

[1] Water proofing maybe required for the building, foundation or a crawlspace.

[2] Infiltration testing is required to determine rate.

4.10 Materials

4.10.1 Aggregate and Cement

Aggregate shall meet the standards set forth in ODOT SSC Section 02001, "PCC Aggregates"; Portland cement shall meet the standards set forth in ODOT SSC Section 02010, "Portland Cement."

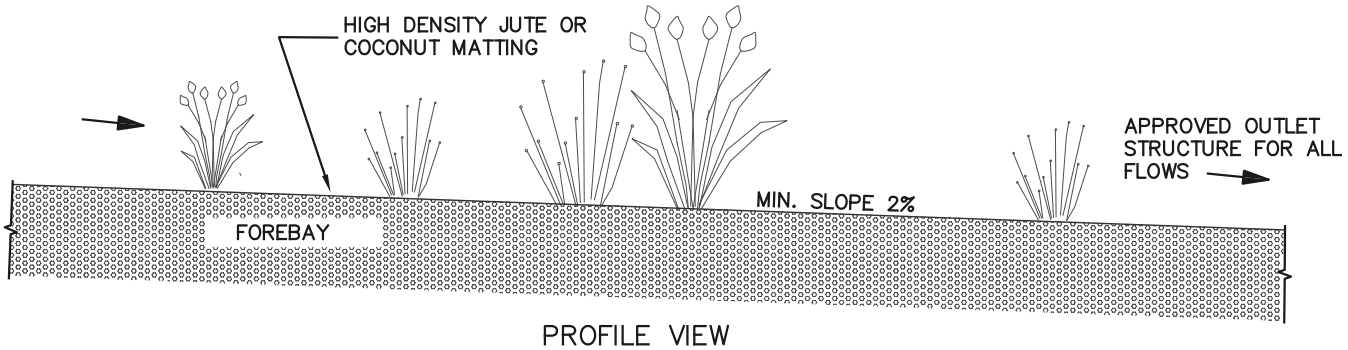
4.10.2 Concrete

PCC for poured in place manholes and structures shall conform to ODOT Class 3000 - 12, Commercial Grade Concrete. Slump shall be between 2 and 4 inches.

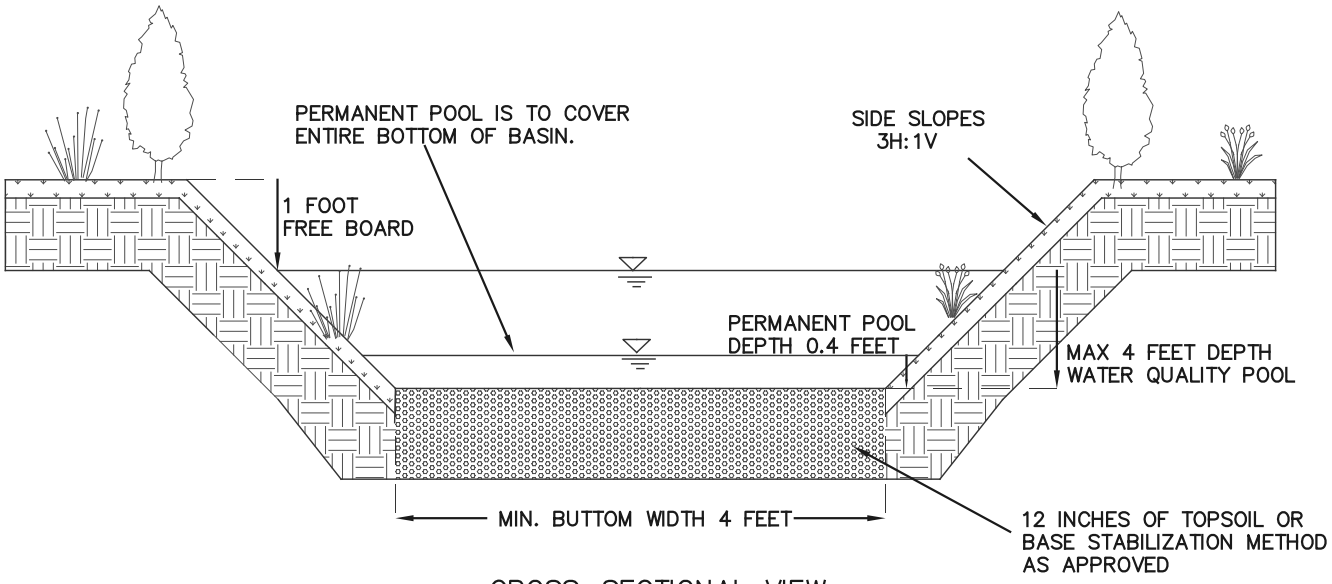
4.10.3 Manhole Frames and Covers

I. Casting shall be of new material, tough, close-grained gray iron conforming to ASTM A-48, Class 30B and AASHTO M 105, Class 30B. Where the ASTM and AASHTO specifications differ, the more stringent shall apply. Castings shall be smooth and clean, free of blisters, blowholes, and all defects. Bearing surfaces shall be planed or ground to ensure flat, true surfaces. Covers shall be true and set within rings at all points.

II. Rings shall be grouted in place and made watertight with a high-strength, non-shrink grout meeting ODOT SSC Section 2080.40, "Non-Shrink Grout," such as Alcrete Twenty



PROFILE VIEW



CROSS–SECTIONAL VIEW

HYDRAULIC DESIGN CRITERIA:

1. MIN. WATER QUALITY DETENTION VOLUME:
   1.0 X WATER QUALITY VOLUME (WQV)

2. 48 HOURS WATER QUALITY DRAWDOWN TIME

3. FOR ORIFICE SIZE USE:
D=24*[(Q/(C[2gH]^0.5)/pie]^0.5 WHERE:
D(in)= DIAMETER OF ORIFICE
Q(cfs)= WQV(cf)/(48*60*60)
C=0.62
H(ft)=⅔ * (TEMPORARY WATER QUALITY DETENTION HEIGHT TO CENTERLINE OF ORIFICE)

FACILITY DESIGN CRITERIA:

1. UP UNTILL THE MAX WATER SURFACE, INTERIOR SIDE SLOPES, MAX SLOPE IS 3H:1V

2. ABOVE MAX WATER SURFACE, INTERIOR SIDE SLOPES, MAX SLOPE IS 2H:1V

3. IF INTERIOR SIDE SLOPES MUST BE MOWED SIDE SLOPE THEN THE MAX SLOPE IS 4H:1V

4. EXTERIOR SIDE SLOPES MAX 2H:1V, UNLESS ANALYZED FOR STABILITY BY A GEOTECHNICAL ENGINEER

5. MINIMUM FREEBOARD 1 FOOT FROM 25 YEAR DESIGN WATER SURFACE ELEVATION

FACILITY DESIGN CRITERIA:

6. MINIMUM OF 2 CELLS, WITH THE FIRST CELL (FOREBAY) AT LEAST 10% OF SURFACE AREA. THE FOREBAY SHALL ALSO CONSTITUTE 20–PERCENT OF THE TREATMENT VOLUME. WHERE SPACE LIMITS MULTI–CELL DESIGN, USE ONE CELL WITH A FOREBAY AT THE INLET TO SETTLE SEDIMENTS AND DISTRIBUTE FLOW ACROSS THE WET POND.

7. INLET AND OUTLET STRUCTURES SHALL BE DESIGNED TO AVOID DIRECT FLOW BETWEEN STRUCTURES WITHOUT RECEIVING TREATMENT (ie SHORT CIRCUITING OF FLOW)

8. MINIMUM FREEBOARD: 1 FOOT FROM 25 YEAR DESIGN WATER SURFACE ELEVATION.

9. EXTEND RIVER ROCK, TOPSOIL, AND HIGH DENSITY JUTE OR COCONUT MATTING TO TOP OF TREATMENT AREA (OR WQV LEVEL). EXTEND TOPSOIL AND LOW DENSITY JUTE MATTING TO THE EDGE OF WATER QUALITY TRACT OR EASEMENT AREA.

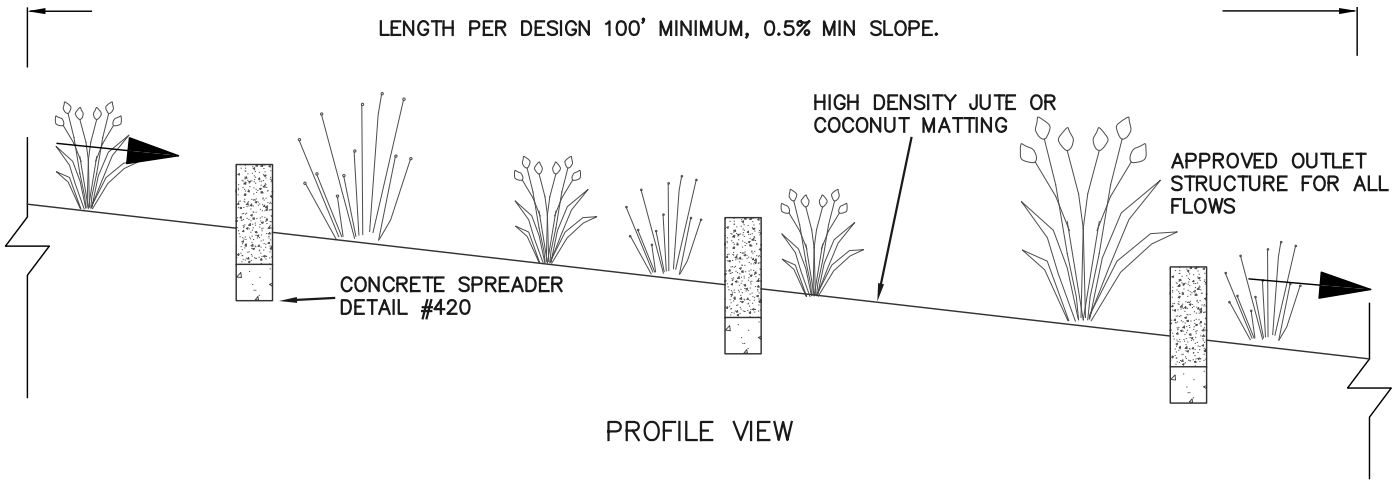
10. THE ENGINEER SHALL CERTIFY THAT THE POND STORM SEWER DESIGN WILL PASS THE 25 AND 100 YEAR STORM EVENTS AND THAT AT NORMAL DESIGN WATER SURFACE THAT THE UPSTREAM STORM SEWER WILL NOT BE IN A SURCHARGED CONDITION FOR LONGER THAN 24 HOURS.

City of Newberg
PUBLIC WORKS ENGINEERING DIVISION
414 E. FIRST STREET NEWBERG, OR 97132
PHONE: 503-537-1240
FAX: 503-537-1277

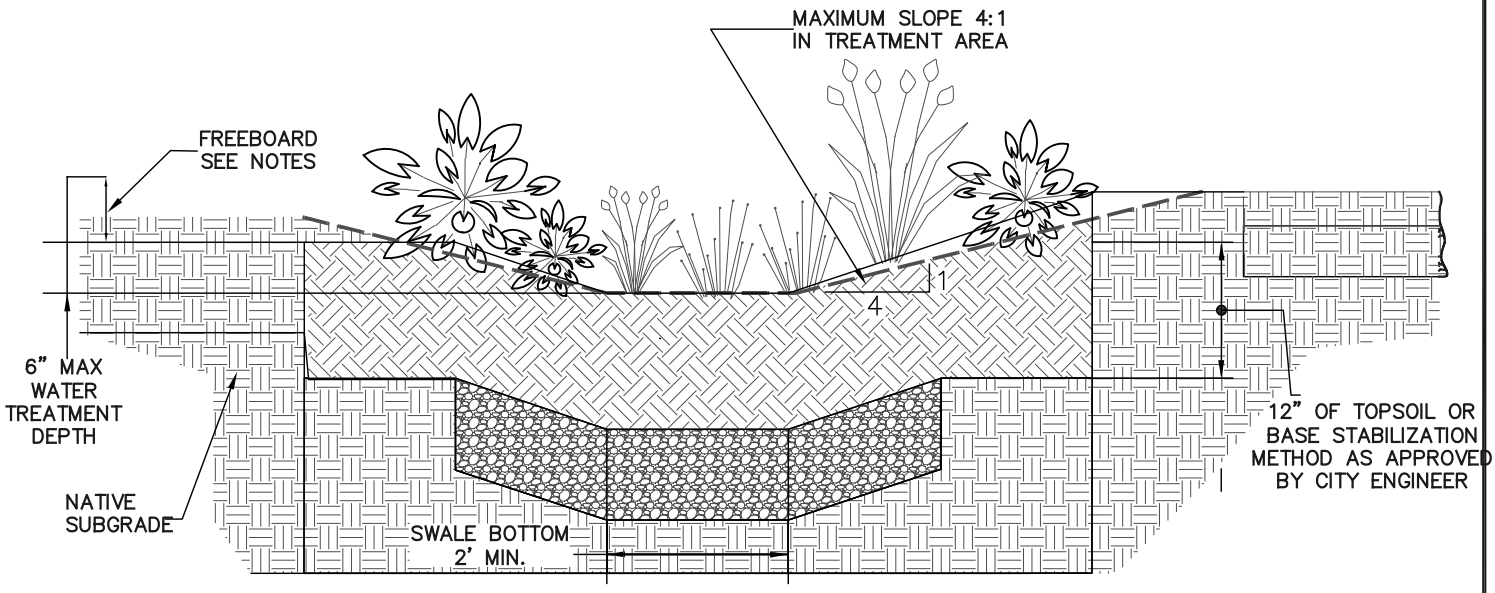
REVISIONS:

EXTENDED DRY BASIN

SCALE: N.T.S.
DATE: MARCH 2014
APPROVED BY: JAY H.
STANDARD DRAWING 461



PROFILE VIEW



CROSS-SECTIONAL VIEW WITH ON STREET PARKING

HYDRAULIC DESIGN CRITERIA:

1. DESIGN FLOW: WATER QUALITY FLOW
2. MIN. HYDRAULIC RESIDENCE TIME: 9 MINUTES
3. MAXIMUM WATER DESIGN DEPTH: 0.5 FEET
4. MINIMUM FREE BOARD: 1.0 FOOT (FOR FACILITIES NOT NOT PROTECTED FROM HIGH FLOWS)
5. MANNING "n" VALUE: 0.24
6. MAXIMUM VELOCITY: 2.0 fps BASED ON 25-YEAR FLOW

FACILITY DESIGN CRITERIA:

1. UP UNTIL THE MAX WATER SURFACE, INTERIOR SIDE SLOPES, MAX SLOPE IS 4H:1V
2. ABOVE MAX WATER SURFACE, INTERIOR SIDE SLOPES, MAX SLOPE IS 2H:1V
3. IF INTERIOR SIDE SLOPES MUST BE MOWED SIDE SLOPE THEN THE MAX SLOPE IS 4H:1V
4. EXTERIOR SIDE SLOPES MAX 2H:1V
5. MINIMUM FREEBOARD 1 FOOT FROM 25 YEAR DESIGN WATER SURFACE ELEVATION
6. PROVIDE AN ENERGY DISSIPATER AT THE ENTRANCE OF SWALE, WITH A MINIMUM LENGTH OF 4 FEET. IT WILL BE DESIGNED TO REDUCE VELOCITIES AND SPREAD THE FLOW ACROSS THE TREATMENT CROSS SECTION.

FACILITY DESIGN CRITERIA:

7. THE USE OF INTERMEDIATE FLOW SPREADERS IS REQUIRED, SPACING FOR CONCRETE SPREADERS TO BE DETERMINED BY DESIGN ENGINEER.
8. EXTEND RIVER ROCK, TOPSOIL, AND HIGH DENSITY JUTE OR COCONUT MATTING TO TOP OF TREATMENT AREA (OR WQV LEVEL). EXTEND TOPSOIL AND LOW DENSITY JUTE MATTING TO THE EDGE OF WATER QUALITY TRACT.
9. WHERE SWALES WRAP 180-DEGREES FORMING PARALLEL CHANNELS, FREEBOARD SHALL BE PROVIDED BETWEEN EACH OF THE PARALLEL CHANNELS. A 1 FOOT WALL ABOVE GROUND SURFACE MAY ALSO BE USED. ALTERNATIVE: A SOIL BASED BERM WITH A MIN. TOP WIDTH OF 1 FOOT & MAX 2.5H:1V SIDE SLOPES MAY BE USED.
10. WHERE SWALES ARE DESIGNED WITH DITCH INLETS & OUTLET STRUCTURES & DESIGN OF MAINTENANCE ACCESS TO SUCH STRUCTURES MAY BE DIFFICULT DUE TO SWALE LOCATION, SWALES MAYBE DESIGNED AS FLOW THROUGH FACILITIES WITH UNSUMPED STRUCTURES. MAINTENANCE ACCESS TO STRUCTURE END OF THE FACILITY IS REQUIRED.

City of Newberg
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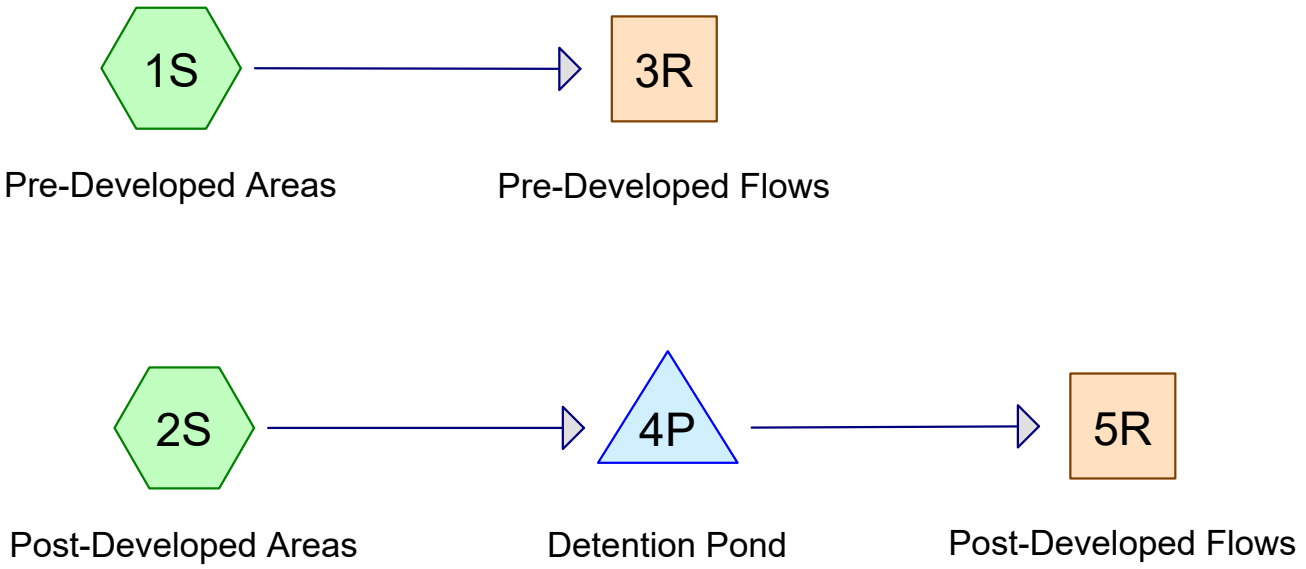
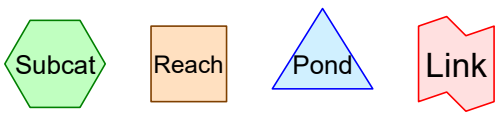
REVISIONS:

VEGETATED SWALE

SCALE: N.T.S.
DATE: MARCH 2014
APPROVED BY: JAY H.
STANDARD DRAWING 460





Routing Diagram for Newberg Family Pet Clinic_Pre-App Storm Areas
Prepared by DCI Engineers, Printed 6/7/2022

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.212	77	>75% Grass cover, Good, HSG C/D (1S, 2S)
0.782	98	Paved parking, HSG C (1S, 2S)
0.110	98	Roofs, HSG C (1S, 2S)
2.105	**86**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.105	HSG C	1S, 2S
0.000	HSG D	
0.000	Other	
2.105		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.212	0.000	0.000	1.212	>75% Grass cover, Good	1S, 2S
0.000	0.000	0.782	0.000	0.000	0.782	Paved parking	1S, 2S
0.000	0.000	0.110	0.000	0.000	0.110	Roofs	1S, 2S
0.000	**0.000**	**2.105**	**0.000**	**0.000**	**2.105**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	4P	97.00	96.80	20.0	0.0100	0.013	12.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Pre-DevelopedAreas Runoff Area=45,845 sf 39.47% Impervious Runoff Depth>0.24"
Tc=0.0 min CN=85 Runoff=0.05 cfs 0.021 af

Subcatchment2S: Post-DevelopedAreas Runoff Area=45,845 sf 45.35% Impervious Runoff Depth>0.30"
Tc=5.0 min CN=87 Runoff=0.07 cfs 0.027 af

Reach 3R: Pre-DevelopedFlows Inflow=0.05 cfs 0.021 af
Outflow=0.05 cfs 0.021 af

Pond 4P: Detention Pond Peak Elev=97.08' Storage=213 cf Inflow=0.07 cfs 0.027 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.03 cfs 0.022 af

Reach 5R: Post-DevelopedFlows Inflow=0.03 cfs 0.022 af
Outflow=0.03 cfs 0.022 af

Total Runoff Area = 2.105 ac Runoff Volume = 0.048 af Average Runoff Depth = 0.27"
57.59% Pervious = 1.212 ac 42.41% Impervious = 0.893 ac

Summary for Subcatchment 1S: Pre-Developed Areas

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

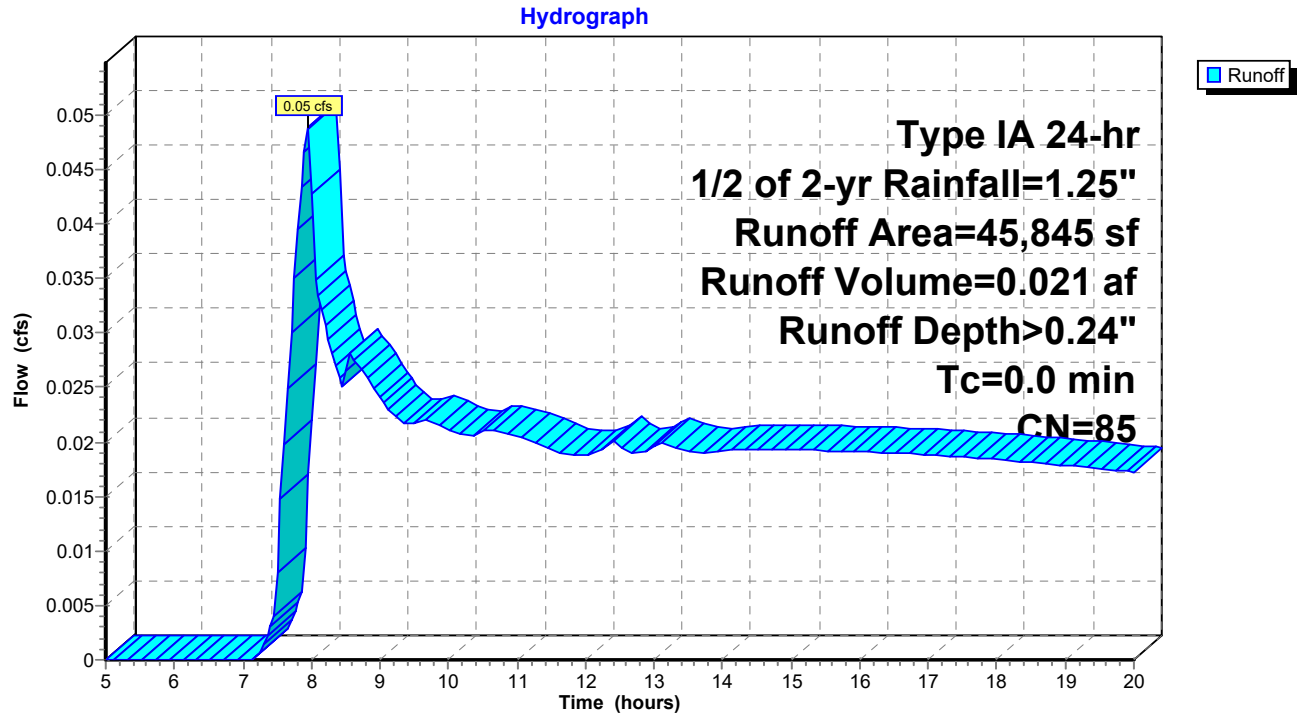
Runoff = 0.05 cfs @ 7.94 hrs, Volume= 0.021 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 of 2-yr Rainfall=1.25"

	Area (sf)	CN	Description
	15,694	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	27,751	77	>75% Grass cover, Good, HSG C/D
	45,845	85	Weighted Average
	27,751		60.53% Pervious Area
	18,094		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 5**

Subcatchment 1S: Pre-Developed Areas



Summary for Subcatchment 2S: Post-Developed Areas

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

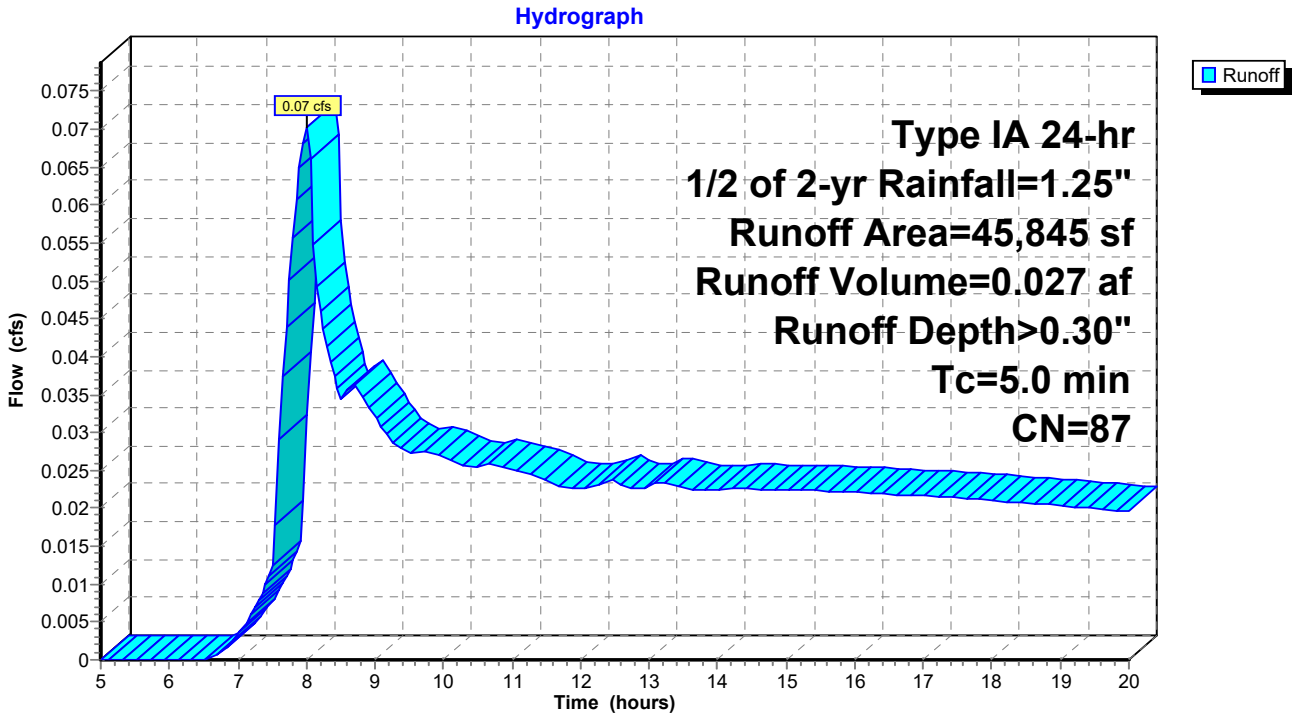
Runoff = 0.07 cfs @ 7.99 hrs, Volume= 0.027 af, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 of 2-yr Rainfall=1.25"

	Area (sf)	CN	Description
	18,389	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	25,056	77	>75% Grass cover, Good, HSG C/D
	45,845	87	Weighted Average
	25,056		54.65% Pervious Area
	20,789		45.35% Impervious Area

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

Subcatchment 2S: Post-Developed Areas



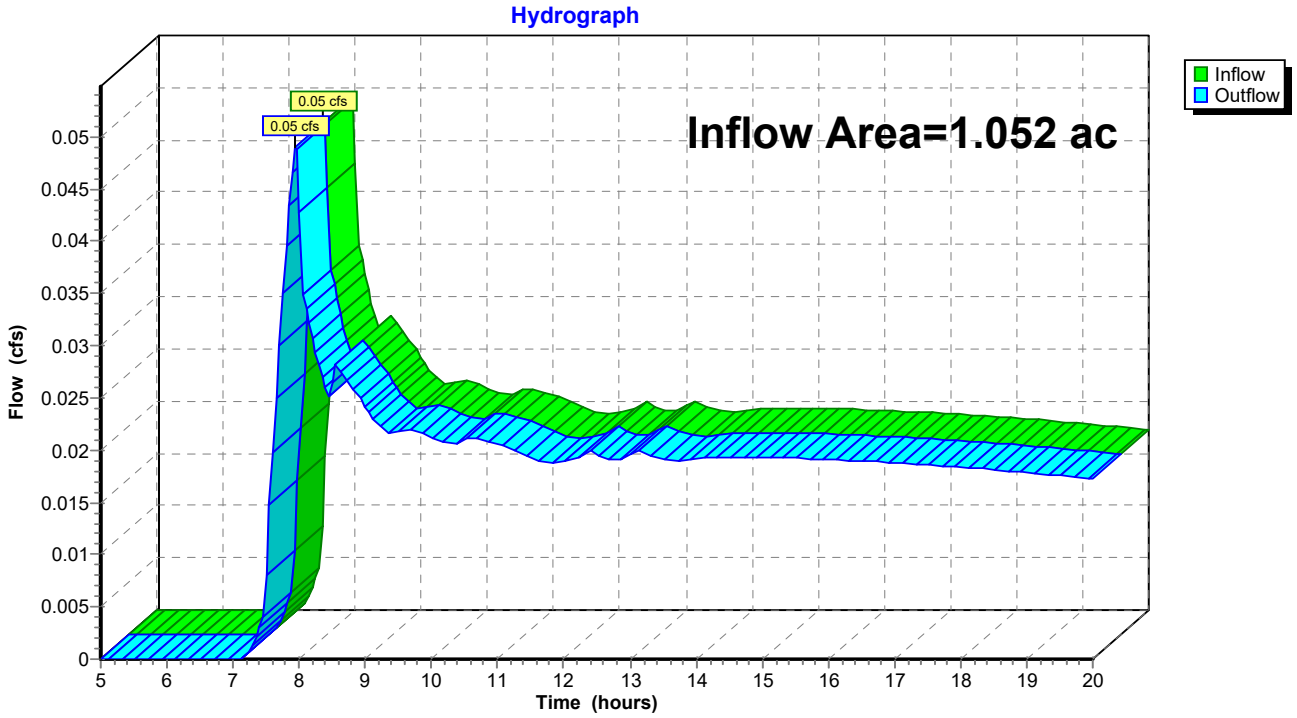
Summary for Reach 3R: Pre-Developed Flows

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

Inflow Area = 1.052 ac, 39.47% Impervious, Inflow Depth > 0.24" for 1/2 of 2-yr event
Inflow = 0.05 cfs @ 7.94 hrs, Volume= 0.021 af
Outflow = 0.05 cfs @ 7.94 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: Pre-Developed Flows



Summary for Pond 4P: Detention Pond

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 0.30" for 1/2 of 2-yr event
Inflow = 0.07 cfs @ 7.99 hrs, Volume= 0.027 af
Outflow = 0.03 cfs @ 11.02 hrs, Volume= 0.022 af, Atten= 64%, Lag= 182.0 min
Primary = 0.03 cfs @ 11.02 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 97.08' @ 11.02 hrs Surf.Area= 2,562 sf Storage= 213 cf

Plug-Flow detention time= 134.2 min calculated for 0.022 af (84% of inflow)
Center-of-Mass det. time= 65.9 min (841.7 - 775.8)

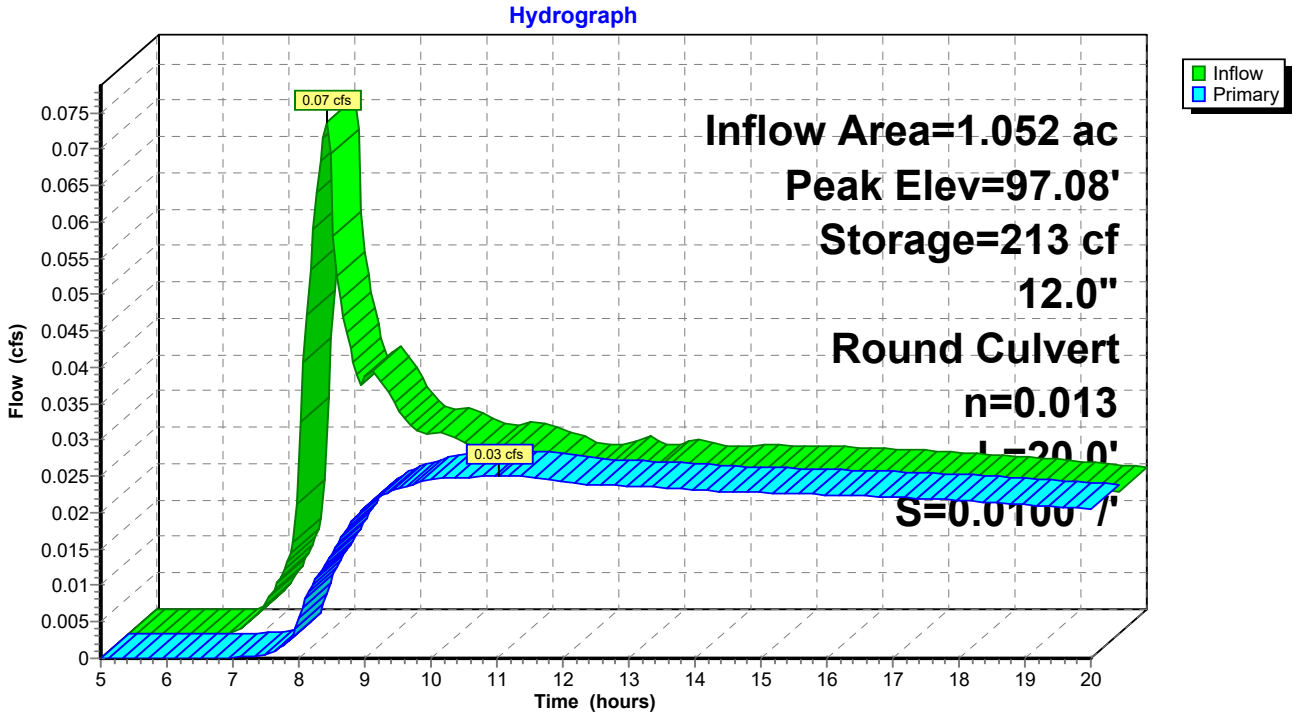
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	10,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	2,500	0	0
100.00	4,700	10,800	10,800

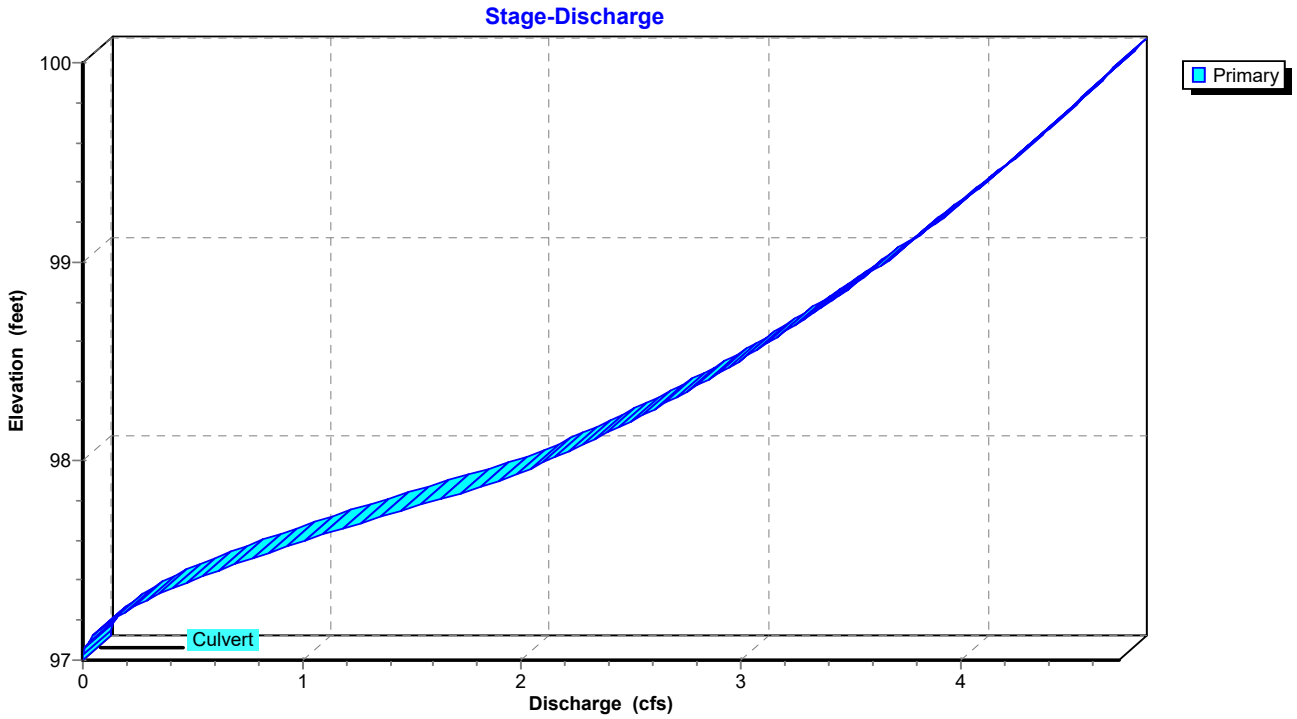
Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**12.0" Round Culvert** L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 97.00' / 96.80' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.02 cfs @ 11.02 hrs HW=97.08' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.02 cfs @ 0.78 fps)

Pond 4P: Detention Pond



Pond 4P: Detention Pond



Stage-Area-Storage for Pond 4P: Detention Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
97.00	2,500	0
97.05	2,537	126
97.10	2,573	254
97.15	2,610	383
97.20	2,647	515
97.25	2,683	648
97.30	2,720	783
97.35	2,757	920
97.40	2,793	1,059
97.45	2,830	1,199
97.50	2,867	1,342
97.55	2,903	1,486
97.60	2,940	1,632
97.65	2,977	1,780
97.70	3,013	1,930
97.75	3,050	2,081
97.80	3,087	2,235
97.85	3,123	2,390
97.90	3,160	2,547
97.95	3,197	2,706
98.00	3,233	2,867
98.05	3,270	3,029
98.10	3,307	3,194
98.15	3,343	3,360
98.20	3,380	3,528
98.25	3,417	3,698
98.30	3,453	3,870
98.35	3,490	4,043
98.40	3,527	4,219
98.45	3,563	4,396
98.50	3,600	4,575
98.55	3,637	4,756
98.60	3,673	4,939
98.65	3,710	5,123
98.70	3,747	5,310
98.75	3,783	5,498
98.80	3,820	5,688
98.85	3,857	5,880
98.90	3,893	6,074
98.95	3,930	6,269
99.00	3,967	6,467
99.05	4,003	6,666
99.10	4,040	6,867
99.15	4,077	7,070
99.20	4,113	7,275
99.25	4,150	7,481
99.30	4,187	7,690
99.35	4,223	7,900
99.40	4,260	8,112
99.45	4,297	8,326
99.50	4,333	8,542
99.55	4,370	8,759
99.60	4,407	8,979
99.65	4,443	9,200
99.70	4,480	9,423
99.75	4,517	9,648
99.80	4,553	9,875
99.85	4,590	10,103
99.90	4,627	10,334
99.95	4,663	10,566
100.00	**4,700**	**10,800**

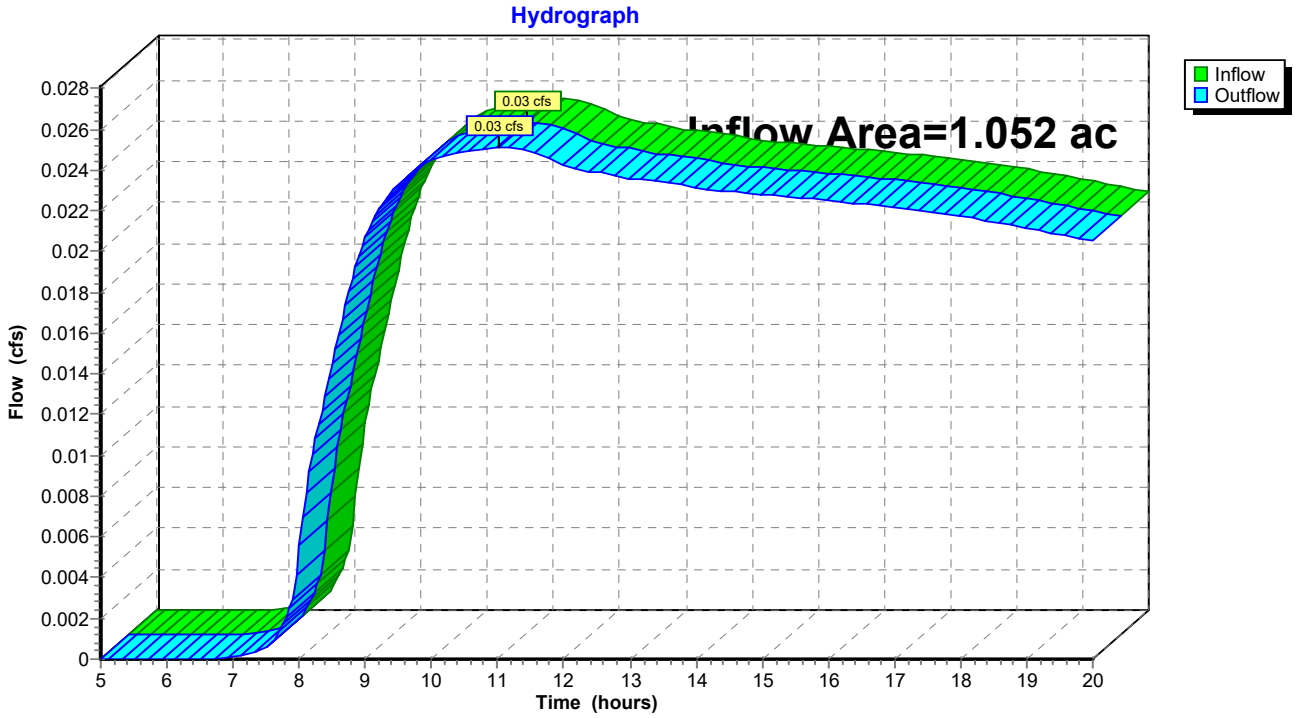
Summary for Reach 5R: Post-Developed Flows

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

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 0.25" for 1/2 of 2-yr event
Inflow = 0.03 cfs @ 11.02 hrs, Volume= 0.022 af
Outflow = 0.03 cfs @ 11.02 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: Post-Developed Flows



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Pre-DevelopedAreas Runoff Area=45,845 sf 39.47% Impervious Runoff Depth>1.01"
Tc=0.0 min CN=85 Runoff=0.29 cfs 0.088 af

Subcatchment2S: Post-DevelopedAreas Runoff Area=45,845 sf 45.35% Impervious Runoff Depth>1.12"
Tc=5.0 min CN=87 Runoff=0.33 cfs 0.099 af

Reach 3R: Pre-DevelopedFlows Inflow=0.29 cfs 0.088 af
Outflow=0.29 cfs 0.088 af

Pond 4P: Detention Pond Peak Elev=97.25' Storage=639 cf Inflow=0.33 cfs 0.099 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.20 cfs 0.091 af

Reach 5R: Post-DevelopedFlows Inflow=0.20 cfs 0.091 af
Outflow=0.20 cfs 0.091 af

Total Runoff Area = 2.105 ac Runoff Volume = 0.187 af Average Runoff Depth = 1.07"
57.59% Pervious = 1.212 ac 42.41% Impervious = 0.893 ac

Summary for Subcatchment 1S: Pre-Developed Areas

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

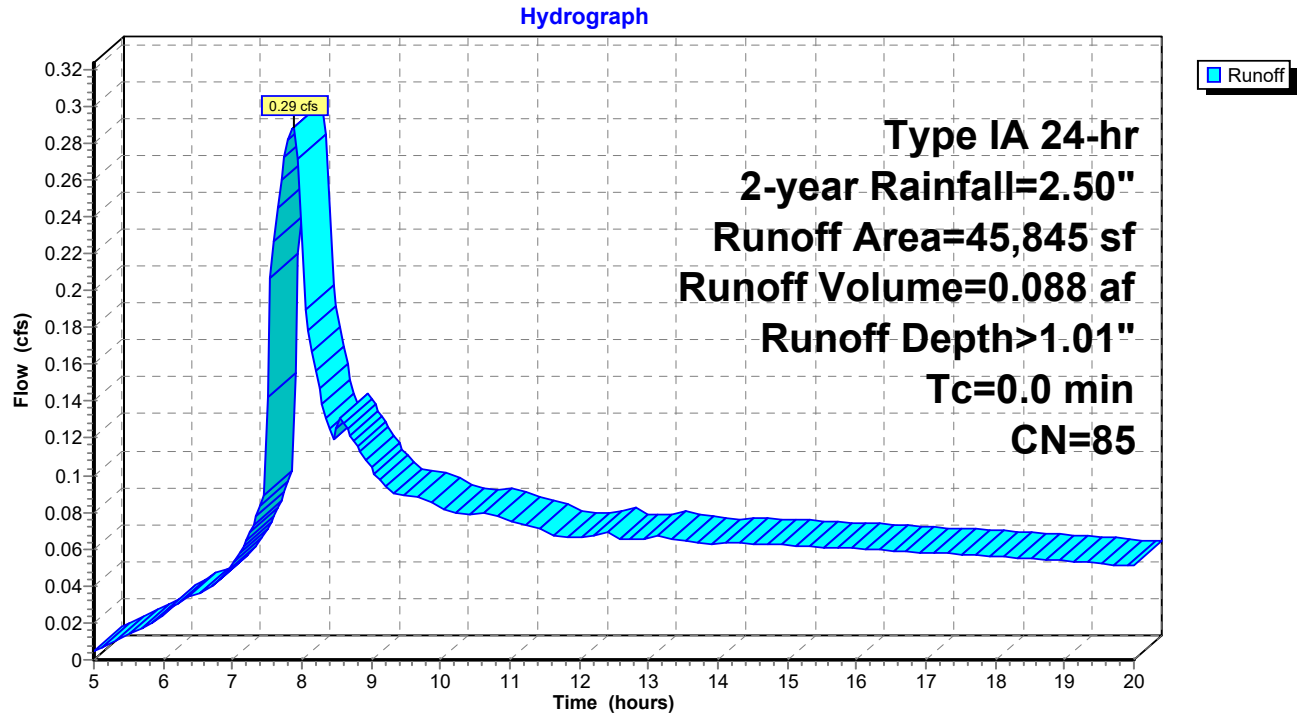
Runoff = 0.29 cfs @ 7.90 hrs, Volume= 0.088 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-year Rainfall=2.50"

	Area (sf)	CN	Description
	15,694	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	27,751	77	>75% Grass cover, Good, HSG C/D
	45,845	85	Weighted Average
	27,751		60.53% Pervious Area
	18,094		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 5**

Subcatchment 1S: Pre-Developed Areas



Summary for Subcatchment 2S: Post-Developed Areas

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

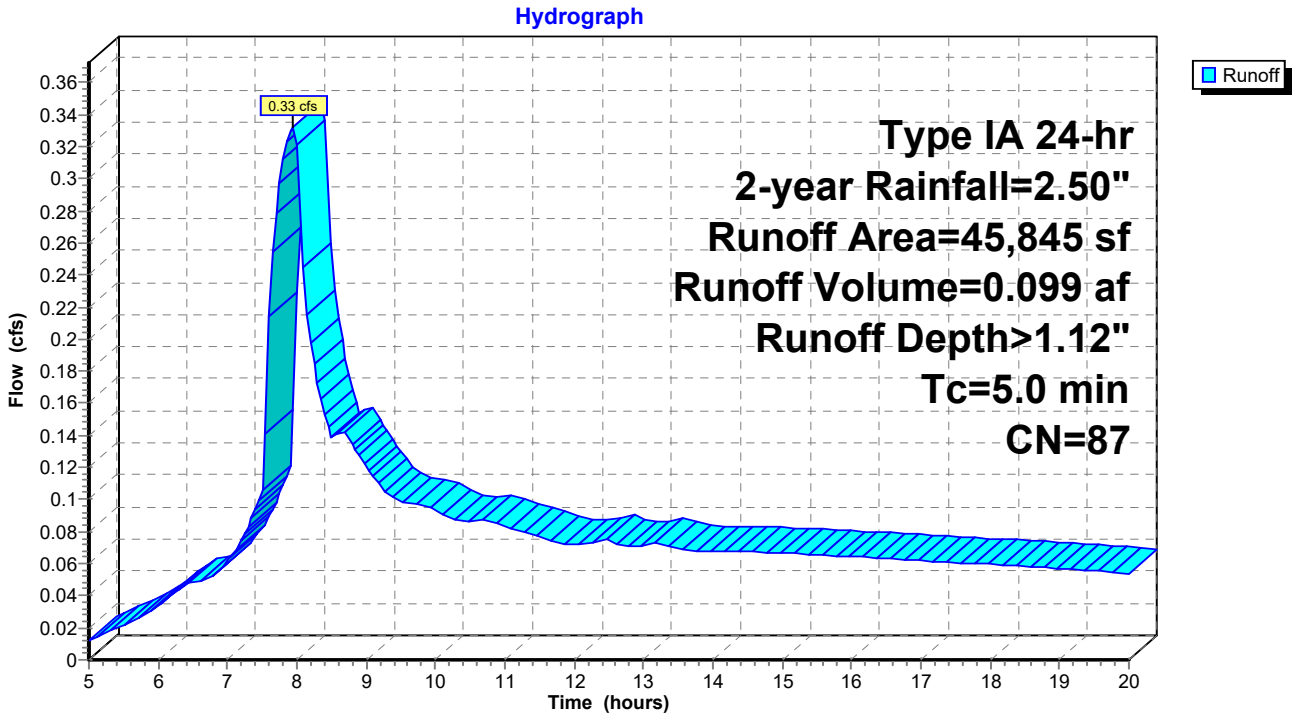
Runoff = 0.33 cfs @ 7.95 hrs, Volume= 0.099 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-year Rainfall=2.50"

	Area (sf)	CN	Description
	18,389	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	25,056	77	>75% Grass cover, Good, HSG C/D
	45,845	87	Weighted Average
	25,056		54.65% Pervious Area
	20,789		45.35% Impervious Area

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

Subcatchment 2S: Post-Developed Areas



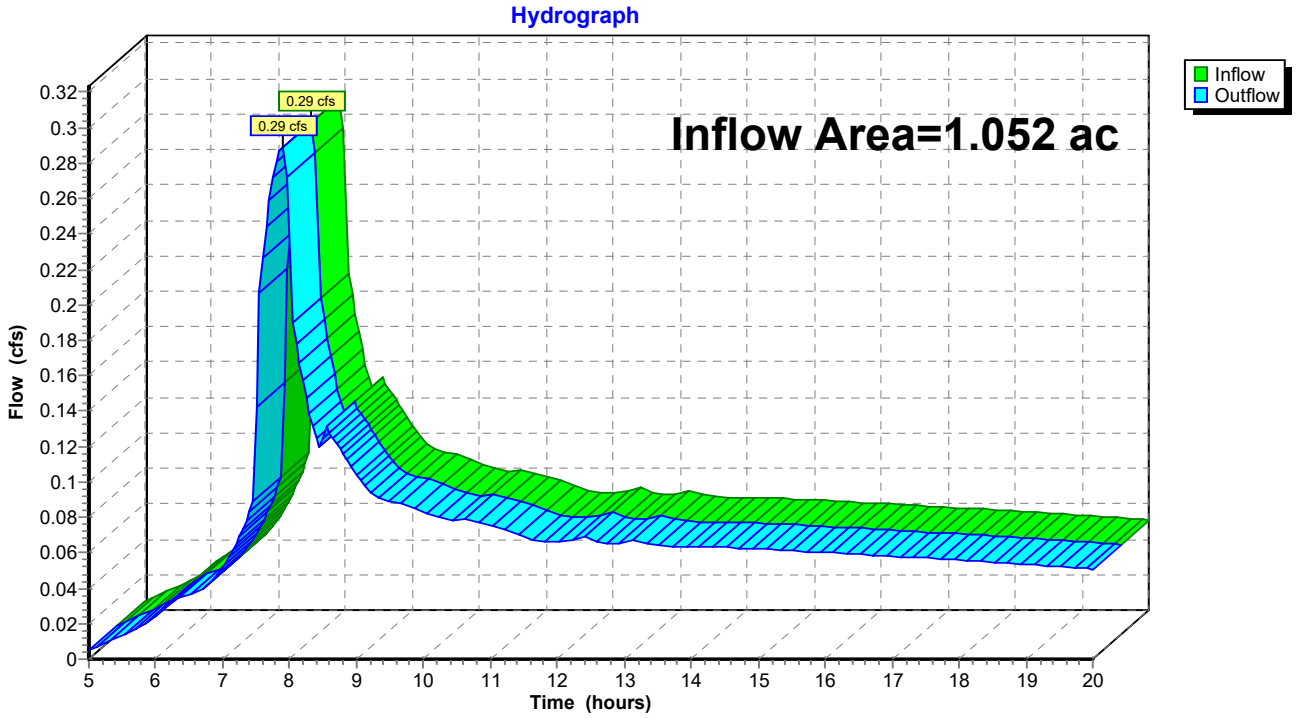
Summary for Reach 3R: Pre-Developed Flows

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

Inflow Area = 1.052 ac, 39.47% Impervious, Inflow Depth > 1.01" for 2-year event
Inflow = 0.29 cfs @ 7.90 hrs, Volume= 0.088 af
Outflow = 0.29 cfs @ 7.90 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: Pre-Developed Flows



Summary for Pond 4P: Detention Pond

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 1.12" for 2-year event
Inflow = 0.33 cfs @ 7.95 hrs, Volume= 0.099 af
Outflow = 0.20 cfs @ 8.19 hrs, Volume= 0.091 af, Atten= 39%, Lag= 14.4 min
Primary = 0.20 cfs @ 8.19 hrs, Volume= 0.091 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 97.25' @ 8.19 hrs Surf.Area= 2,681 sf Storage= 639 cf

Plug-Flow detention time= 76.0 min calculated for 0.091 af (92% of inflow)
Center-of-Mass det. time= 39.5 min (748.1 - 708.6)

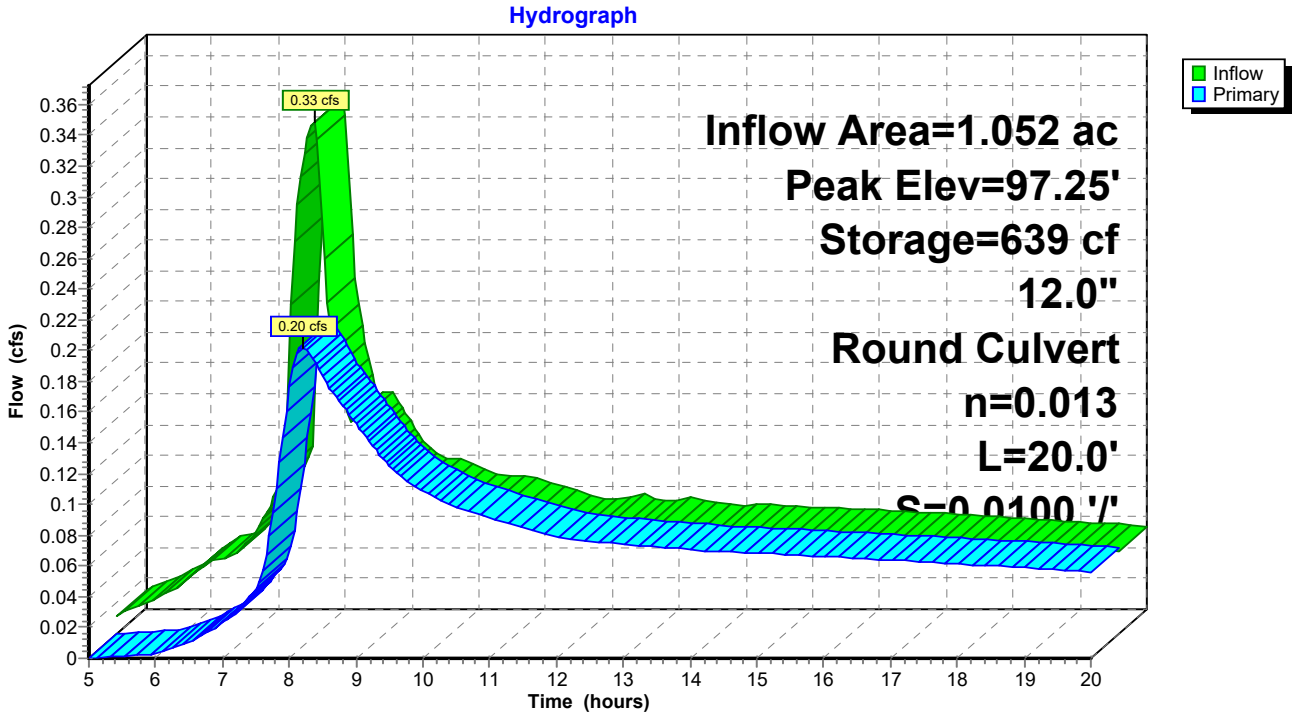
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	10,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	2,500	0	0
100.00	4,700	10,800	10,800

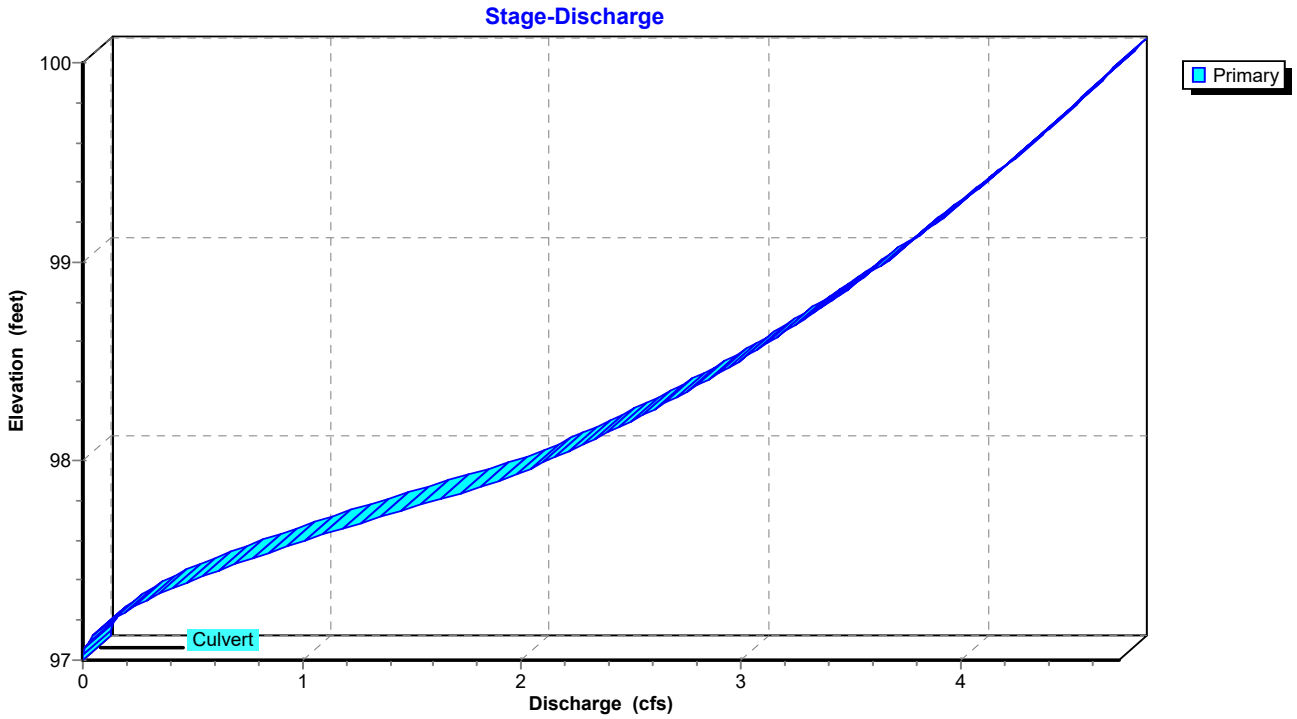
Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**12.0" Round Culvert** L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 97.00' / 96.80' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.20 cfs @ 8.19 hrs HW=97.25' (Free Discharge)
1=Culvert (Inlet Controls 0.20 cfs @ 1.33 fps)

Pond 4P: Detention Pond



Pond 4P: Detention Pond



Stage-Area-Storage for Pond 4P: Detention Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
97.00	2,500	0
97.05	2,537	126
97.10	2,573	254
97.15	2,610	383
97.20	2,647	515
97.25	2,683	648
97.30	2,720	783
97.35	2,757	920
97.40	2,793	1,059
97.45	2,830	1,199
97.50	2,867	1,342
97.55	2,903	1,486
97.60	2,940	1,632
97.65	2,977	1,780
97.70	3,013	1,930
97.75	3,050	2,081
97.80	3,087	2,235
97.85	3,123	2,390
97.90	3,160	2,547
97.95	3,197	2,706
98.00	3,233	2,867
98.05	3,270	3,029
98.10	3,307	3,194
98.15	3,343	3,360
98.20	3,380	3,528
98.25	3,417	3,698
98.30	3,453	3,870
98.35	3,490	4,043
98.40	3,527	4,219
98.45	3,563	4,396
98.50	3,600	4,575
98.55	3,637	4,756
98.60	3,673	4,939
98.65	3,710	5,123
98.70	3,747	5,310
98.75	3,783	5,498
98.80	3,820	5,688
98.85	3,857	5,880
98.90	3,893	6,074
98.95	3,930	6,269
99.00	3,967	6,467
99.05	4,003	6,666
99.10	4,040	6,867
99.15	4,077	7,070
99.20	4,113	7,275
99.25	4,150	7,481
99.30	4,187	7,690
99.35	4,223	7,900
99.40	4,260	8,112
99.45	4,297	8,326
99.50	4,333	8,542
99.55	4,370	8,759
99.60	4,407	8,979
99.65	4,443	9,200
99.70	4,480	9,423
99.75	4,517	9,648
99.80	4,553	9,875
99.85	4,590	10,103
99.90	4,627	10,334
99.95	4,663	10,566
100.00	**4,700**	**10,800**

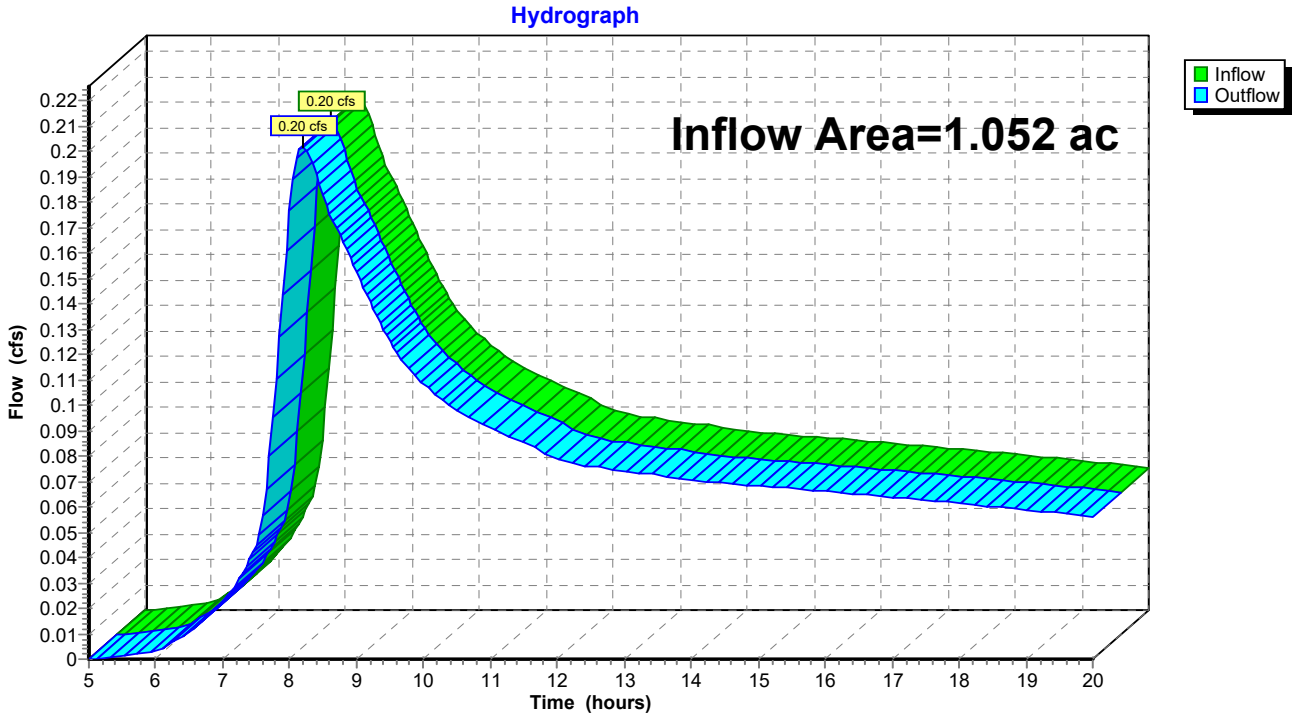
Summary for Reach 5R: Post-Developed Flows

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

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 1.04" for 2-year event
Inflow = 0.20 cfs @ 8.19 hrs, Volume= 0.091 af
Outflow = 0.20 cfs @ 8.19 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: Post-Developed Flows



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Pre-DevelopedAreas Runoff Area=45,845 sf 39.47% Impervious Runoff Depth>1.74"
Tc=0.0 min CN=85 Runoff=0.53 cfs 0.152 af

Subcatchment2S: Post-DevelopedAreas Runoff Area=45,845 sf 45.35% Impervious Runoff Depth>1.87"
Tc=5.0 min CN=87 Runoff=0.58 cfs 0.164 af

Reach 3R: Pre-DevelopedFlows Inflow=0.53 cfs 0.152 af
Outflow=0.53 cfs 0.152 af

Pond 4P: Detention Pond Peak Elev=97.36' Storage=961 cf Inflow=0.58 cfs 0.164 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.42 cfs 0.155 af

Reach 5R: Post-DevelopedFlows Inflow=0.42 cfs 0.155 af
Outflow=0.42 cfs 0.155 af

Total Runoff Area = 2.105 ac Runoff Volume = 0.317 af Average Runoff Depth = 1.81"
57.59% Pervious = 1.212 ac 42.41% Impervious = 0.893 ac

Summary for Subcatchment 1S: Pre-Developed Areas

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

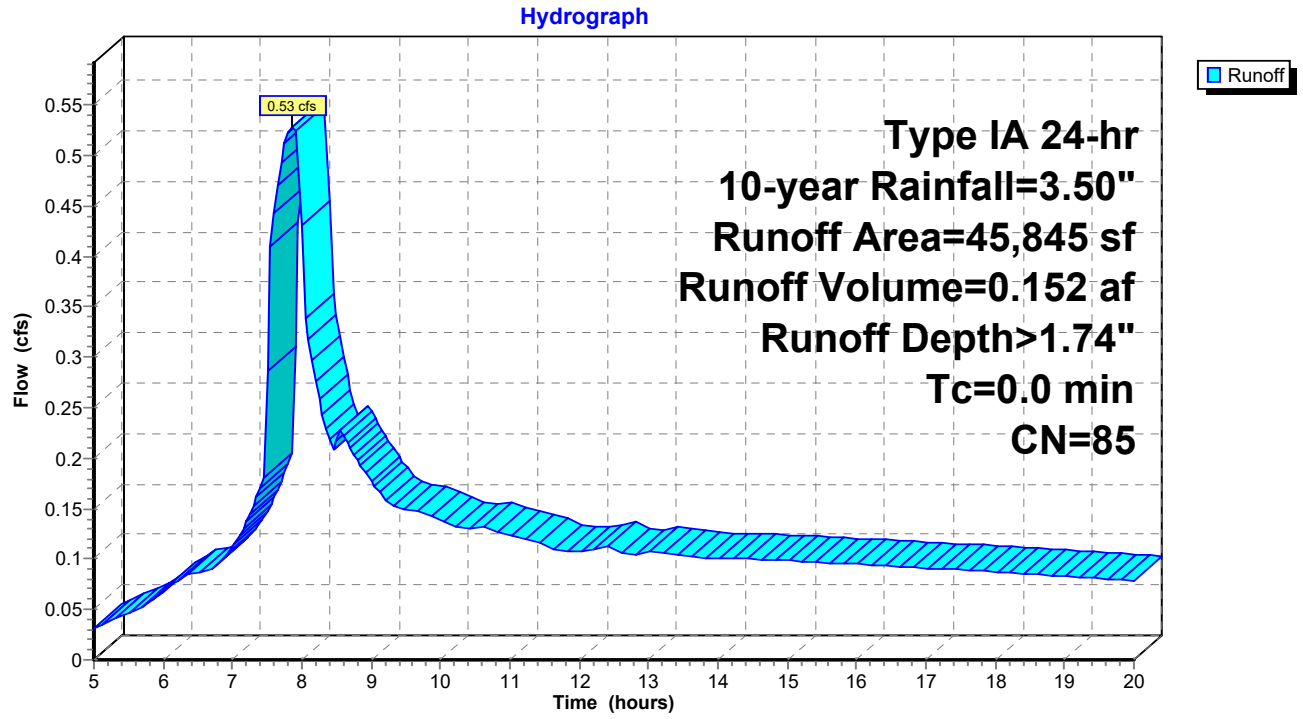
Runoff = 0.53 cfs @ 7.86 hrs, Volume= 0.152 af, Depth> 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-year Rainfall=3.50"

	Area (sf)	CN	Description
	15,694	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	27,751	77	>75% Grass cover, Good, HSG C/D
	45,845	85	Weighted Average
	27,751		60.53% Pervious Area
	18,094		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 5**

Subcatchment 1S: Pre-Developed Areas



Summary for Subcatchment 2S: Post-Developed Areas

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

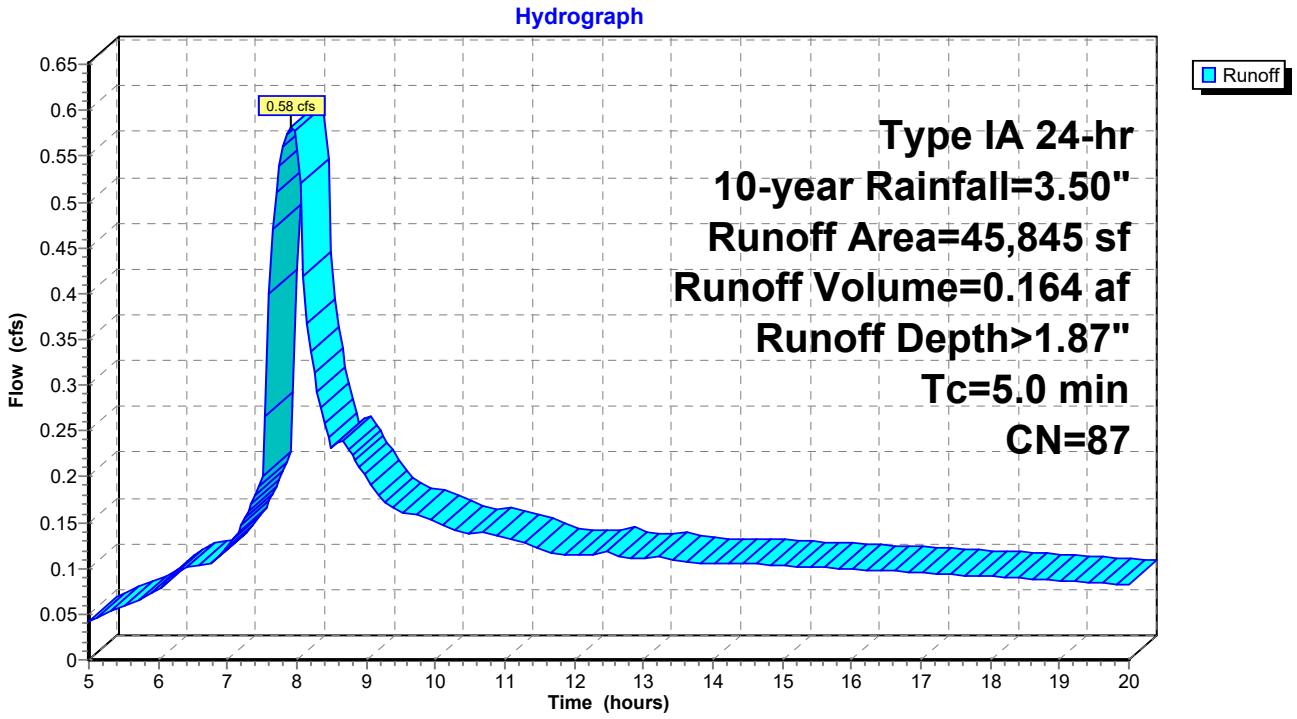
Runoff = 0.58 cfs @ 7.93 hrs, Volume= 0.164 af, Depth> 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-year Rainfall=3.50"

	Area (sf)	CN	Description
	18,389	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	25,056	77	>75% Grass cover, Good, HSG C/D
	45,845	87	Weighted Average
	25,056		54.65% Pervious Area
	20,789		45.35% Impervious Area

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

Subcatchment 2S: Post-Developed Areas



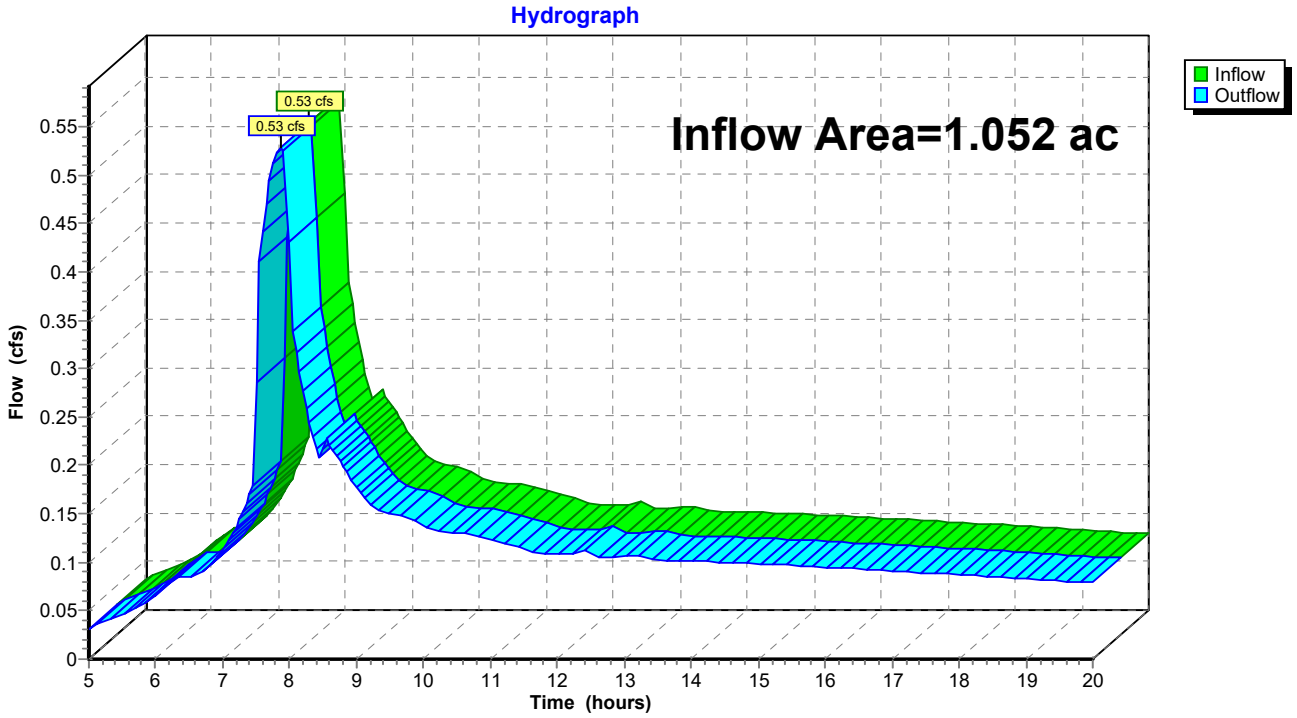
Summary for Reach 3R: Pre-Developed Flows

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

Inflow Area = 1.052 ac, 39.47% Impervious, Inflow Depth > 1.74" for 10-year event
Inflow = 0.53 cfs @ 7.86 hrs, Volume= 0.152 af
Outflow = 0.53 cfs @ 7.86 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: Pre-Developed Flows



Summary for Pond 4P: Detention Pond

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 1.87" for 10-year event
Inflow = 0.58 cfs @ 7.93 hrs, Volume= 0.164 af
Outflow = 0.42 cfs @ 8.11 hrs, Volume= 0.155 af, Atten= 28%, Lag= 10.9 min
Primary = 0.42 cfs @ 8.11 hrs, Volume= 0.155 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 97.36' @ 8.11 hrs Surf.Area= 2,768 sf Storage= 961 cf

Plug-Flow detention time= 60.7 min calculated for 0.155 af (94% of inflow)
Center-of-Mass det. time= 32.2 min (721.0 - 688.8)

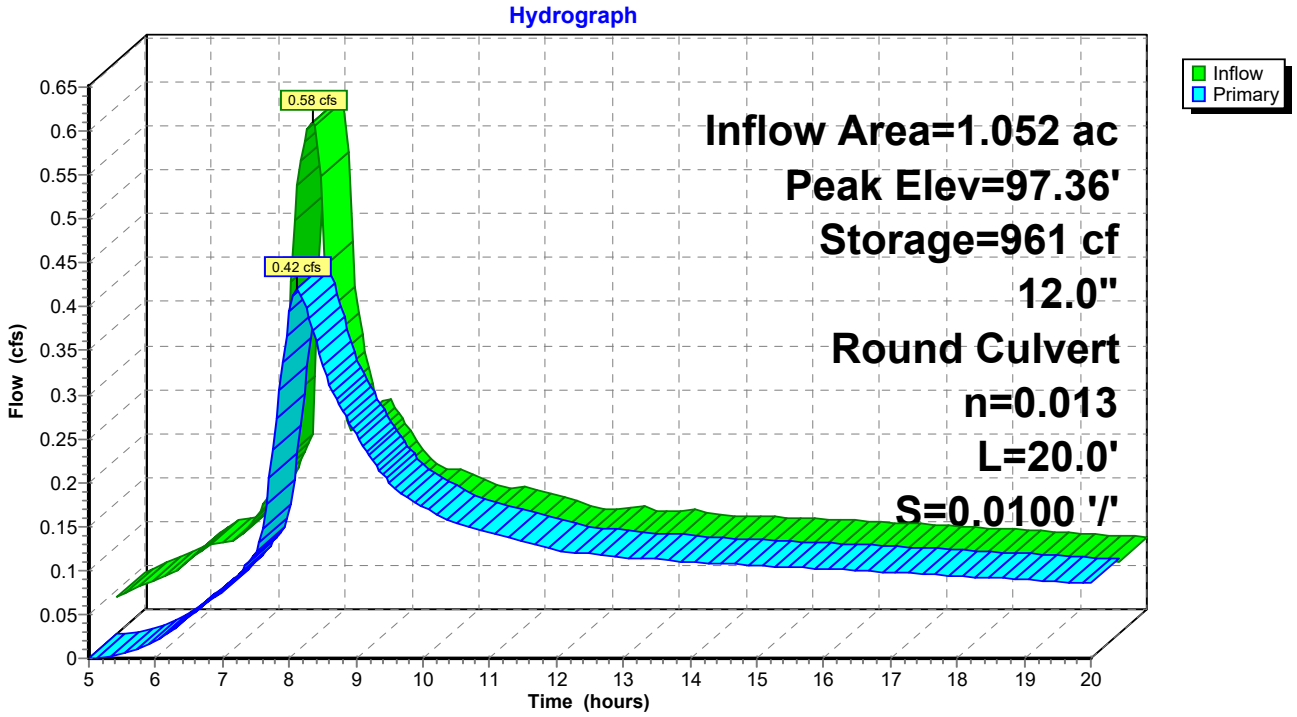
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	10,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	2,500	0	0
100.00	4,700	10,800	10,800

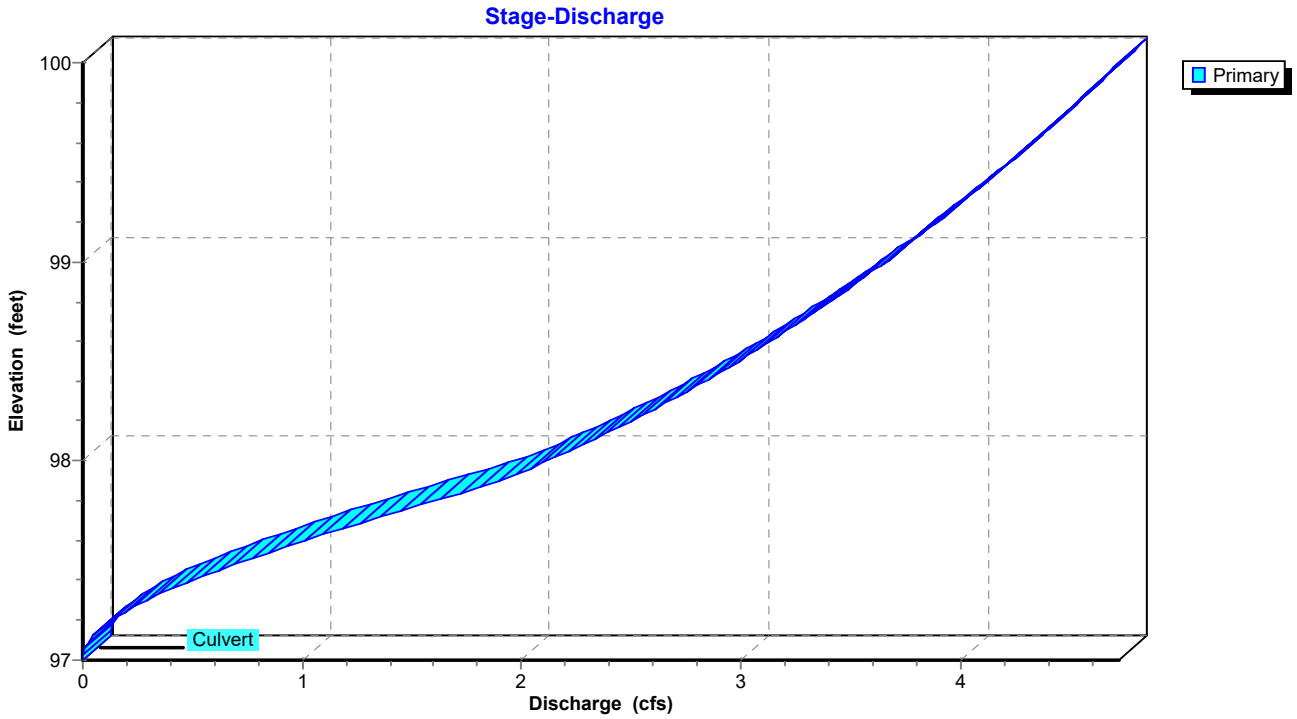
Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**12.0" Round Culvert** L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 97.00' / 96.80' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 8.11 hrs HW=97.36' (Free Discharge)
1=Culvert (Inlet Controls 0.42 cfs @ 1.62 fps)

Pond 4P: Detention Pond



Pond 4P: Detention Pond



Stage-Area-Storage for Pond 4P: Detention Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
97.00	2,500	0
97.05	2,537	126
97.10	2,573	254
97.15	2,610	383
97.20	2,647	515
97.25	2,683	648
97.30	2,720	783
97.35	2,757	920
97.40	2,793	1,059
97.45	2,830	1,199
97.50	2,867	1,342
97.55	2,903	1,486
97.60	2,940	1,632
97.65	2,977	1,780
97.70	3,013	1,930
97.75	3,050	2,081
97.80	3,087	2,235
97.85	3,123	2,390
97.90	3,160	2,547
97.95	3,197	2,706
98.00	3,233	2,867
98.05	3,270	3,029
98.10	3,307	3,194
98.15	3,343	3,360
98.20	3,380	3,528
98.25	3,417	3,698
98.30	3,453	3,870
98.35	3,490	4,043
98.40	3,527	4,219
98.45	3,563	4,396
98.50	3,600	4,575
98.55	3,637	4,756
98.60	3,673	4,939
98.65	3,710	5,123
98.70	3,747	5,310
98.75	3,783	5,498
98.80	3,820	5,688
98.85	3,857	5,880
98.90	3,893	6,074
98.95	3,930	6,269
99.00	3,967	6,467
99.05	4,003	6,666
99.10	4,040	6,867
99.15	4,077	7,070
99.20	4,113	7,275
99.25	4,150	7,481
99.30	4,187	7,690
99.35	4,223	7,900
99.40	4,260	8,112
99.45	4,297	8,326
99.50	4,333	8,542
99.55	4,370	8,759
99.60	4,407	8,979
99.65	4,443	9,200
99.70	4,480	9,423
99.75	4,517	9,648
99.80	4,553	9,875
99.85	4,590	10,103
99.90	4,627	10,334
99.95	4,663	10,566
100.00	**4,700**	**10,800**

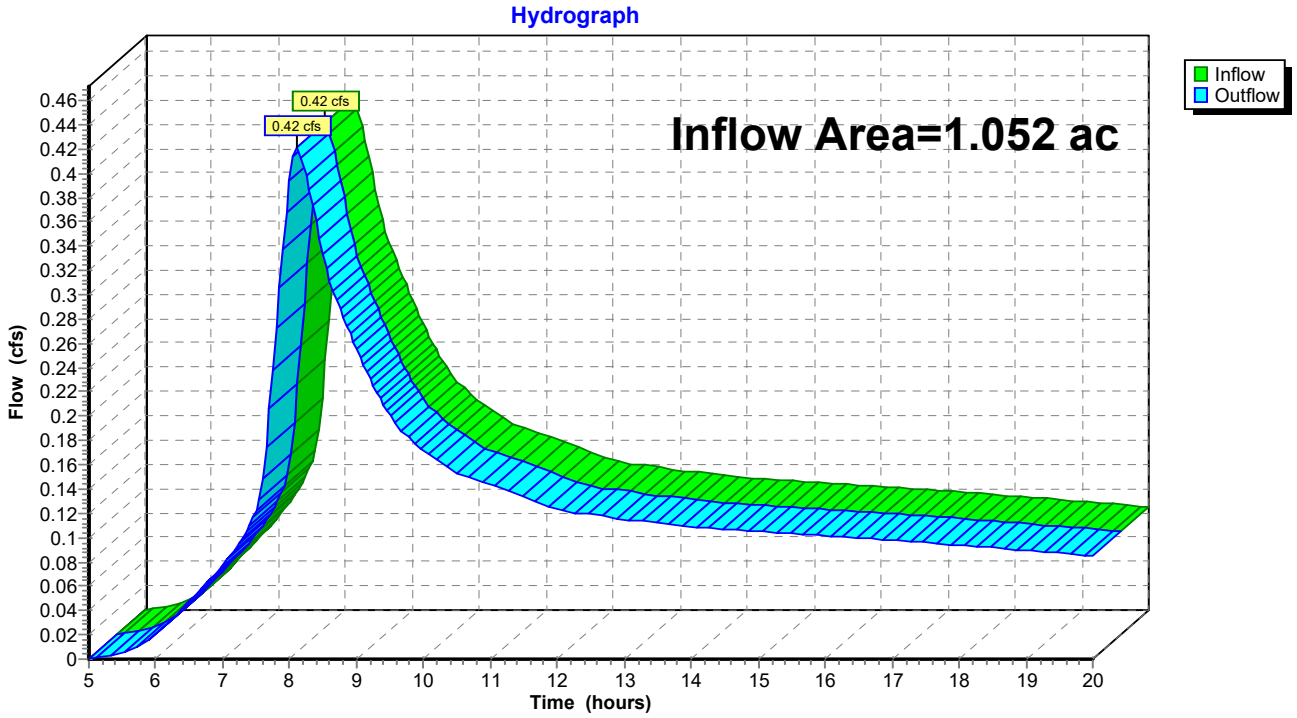
Summary for Reach 5R: Post-Developed Flows

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

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 1.77" for 10-year event
Inflow = 0.42 cfs @ 8.11 hrs, Volume= 0.155 af
Outflow = 0.42 cfs @ 8.11 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: Post-Developed Flows



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Pre-DevelopedAreas Runoff Area=45,845 sf 39.47% Impervious Runoff Depth>2.12"
Tc=0.0 min CN=85 Runoff=0.66 cfs 0.186 af

Subcatchment2S: Post-DevelopedAreas Runoff Area=45,845 sf 45.35% Impervious Runoff Depth>2.26"
Tc=5.0 min CN=87 Runoff=0.71 cfs 0.198 af

Reach 3R: Pre-DevelopedFlows Inflow=0.66 cfs 0.186 af
Outflow=0.66 cfs 0.186 af

Pond 4P: Detention Pond Peak Elev=97.42' Storage=1,105 cf Inflow=0.71 cfs 0.198 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.54 cfs 0.188 af

Reach 5R: Post-DevelopedFlows Inflow=0.54 cfs 0.188 af
Outflow=0.54 cfs 0.188 af

Total Runoff Area = 2.105 ac Runoff Volume = 0.384 af Average Runoff Depth = 2.19"
57.59% Pervious = 1.212 ac 42.41% Impervious = 0.893 ac

Summary for Subcatchment 1S: Pre-Developed Areas

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

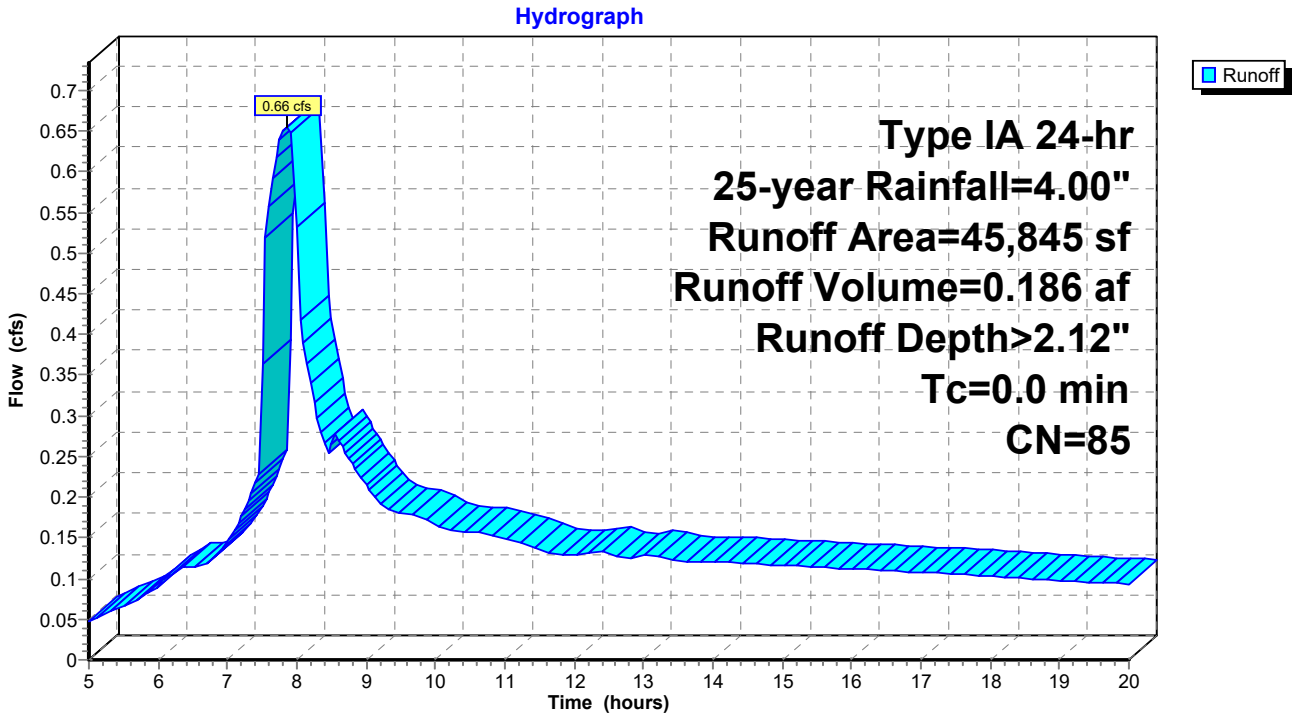
Runoff = 0.66 cfs @ 7.85 hrs, Volume= 0.186 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-year Rainfall=4.00"

	Area (sf)	CN	Description
	15,694	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	27,751	77	>75% Grass cover, Good, HSG C/D
	45,845	85	Weighted Average
	27,751		60.53% Pervious Area
	18,094		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 5**

Subcatchment 1S: Pre-Developed Areas



Summary for Subcatchment 2S: Post-Developed Areas

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

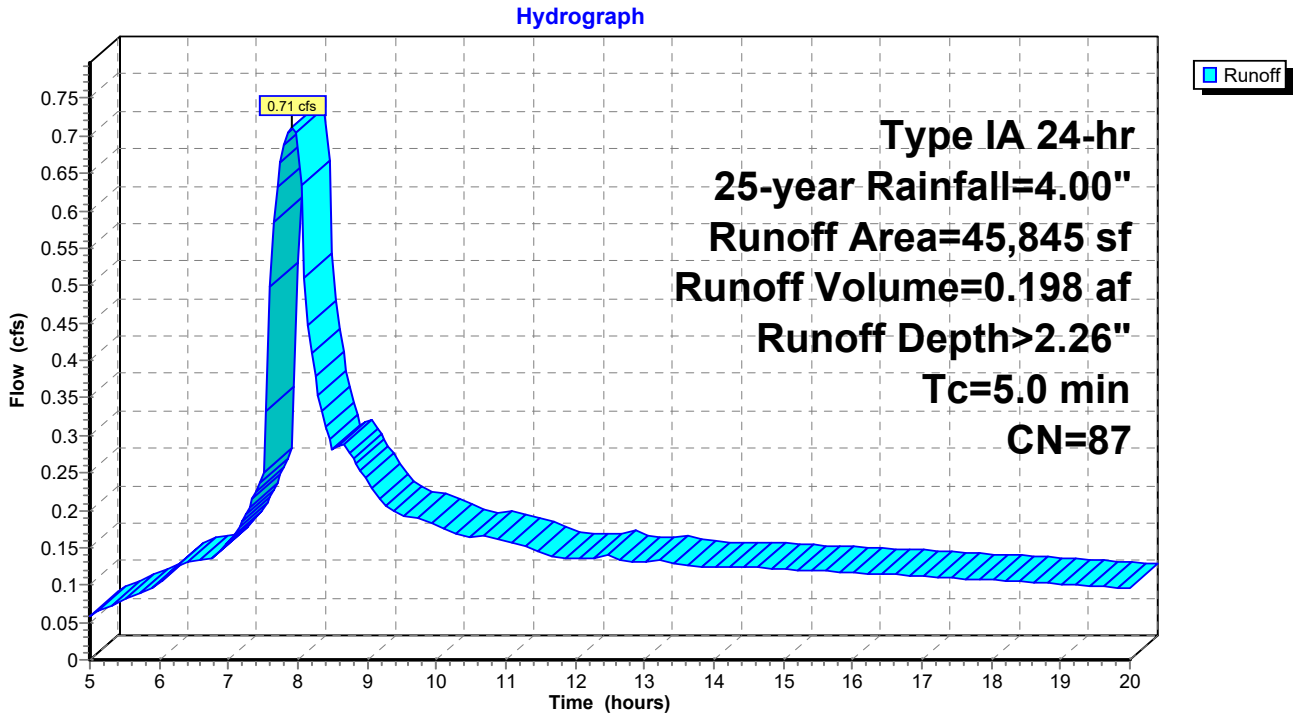
Runoff = 0.71 cfs @ 7.92 hrs, Volume= 0.198 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-year Rainfall=4.00"

	Area (sf)	CN	Description
	18,389	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	25,056	77	>75% Grass cover, Good, HSG C/D
	45,845	87	Weighted Average
	25,056		54.65% Pervious Area
	20,789		45.35% Impervious Area

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

Subcatchment 2S: Post-Developed Areas



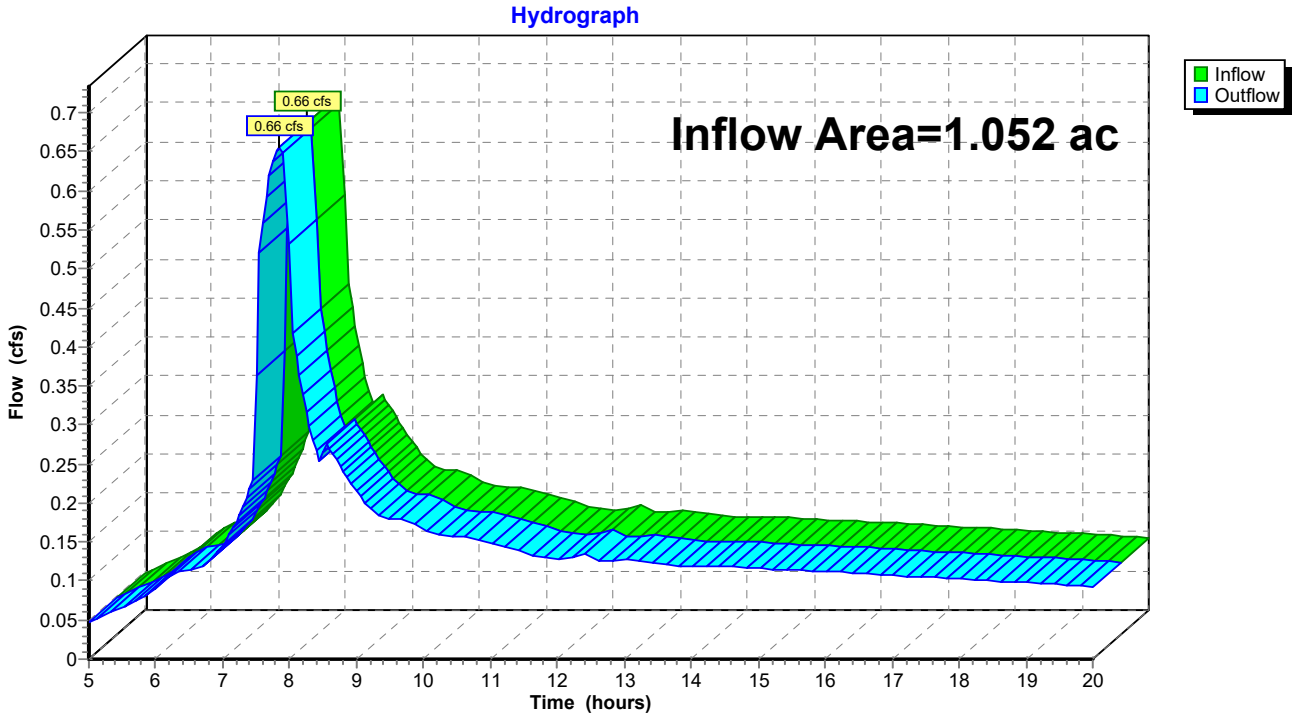
Summary for Reach 3R: Pre-Developed Flows

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

Inflow Area = 1.052 ac, 39.47% Impervious, Inflow Depth > 2.12" for 25-year event
Inflow = 0.66 cfs @ 7.85 hrs, Volume= 0.186 af
Outflow = 0.66 cfs @ 7.85 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: Pre-Developed Flows



Summary for Pond 4P: Detention Pond

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 2.26" for 25-year event
Inflow = 0.71 cfs @ 7.92 hrs, Volume= 0.198 af
Outflow = 0.54 cfs @ 8.09 hrs, Volume= 0.188 af, Atten= 25%, Lag= 10.7 min
Primary = 0.54 cfs @ 8.09 hrs, Volume= 0.188 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 97.42' @ 8.09 hrs Surf.Area= 2,806 sf Storage= 1,105 cf

Plug-Flow detention time= 56.1 min calculated for 0.188 af (95% of inflow)
Center-of-Mass det. time= 29.8 min (712.3 - 682.5)

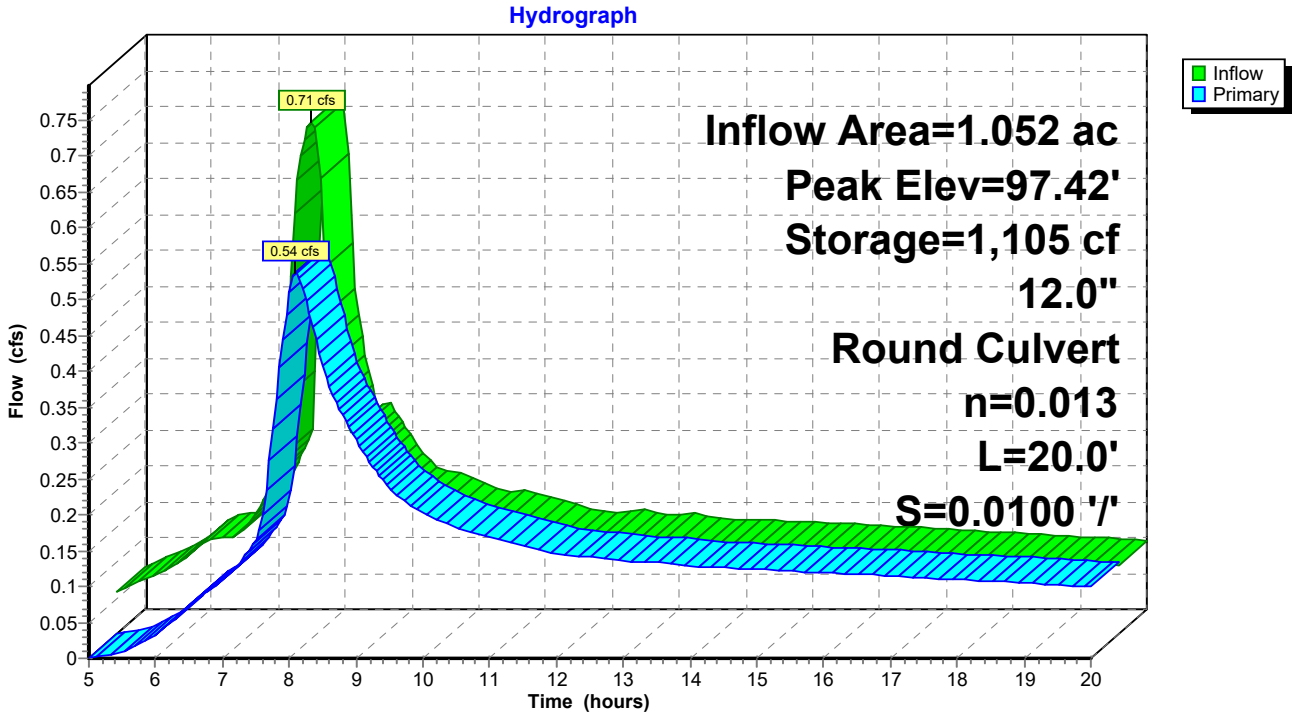
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	10,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	2,500	0	0
100.00	4,700	10,800	10,800

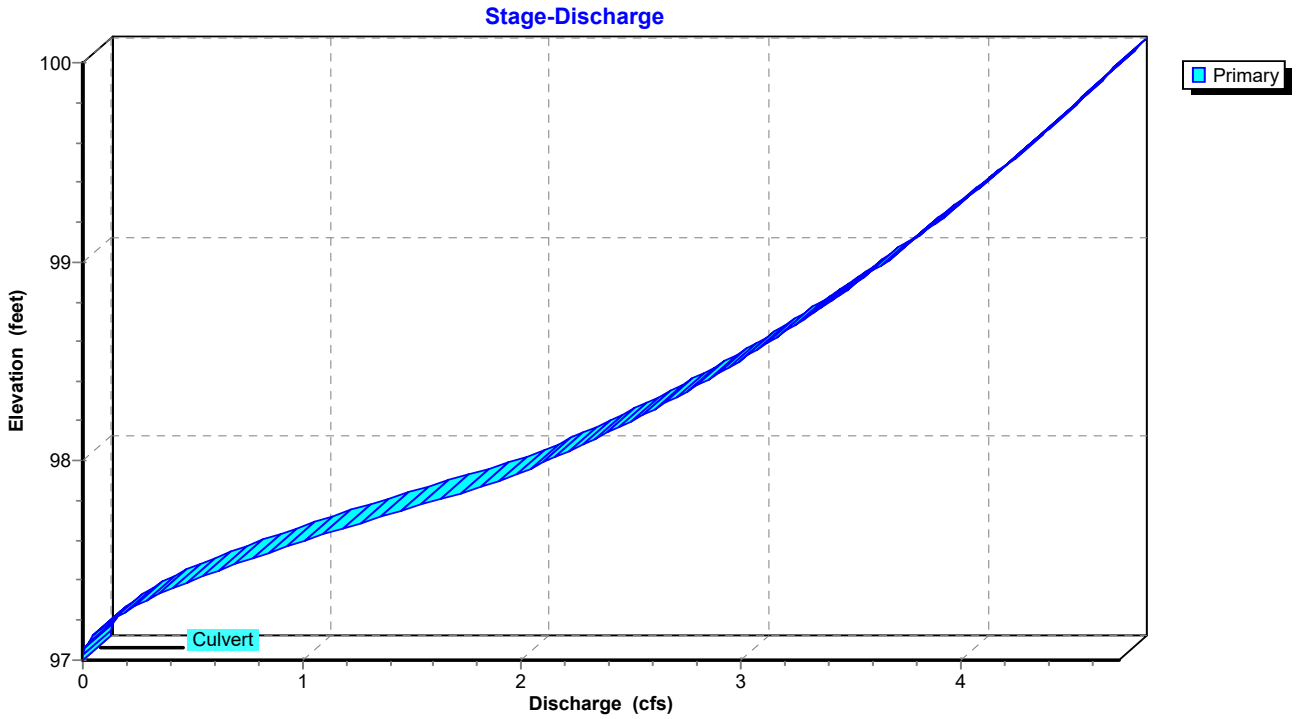
Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**12.0" Round Culvert** L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 97.00' / 96.80' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.54 cfs @ 8.09 hrs HW=97.42' (Free Discharge)
1=Culvert (Inlet Controls 0.54 cfs @ 1.73 fps)

Pond 4P: Detention Pond



Pond 4P: Detention Pond



Stage-Area-Storage for Pond 4P: Detention Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
97.00	2,500	0
97.05	2,537	126
97.10	2,573	254
97.15	2,610	383
97.20	2,647	515
97.25	2,683	648
97.30	2,720	783
97.35	2,757	920
97.40	2,793	1,059
97.45	2,830	1,199
97.50	2,867	1,342
97.55	2,903	1,486
97.60	2,940	1,632
97.65	2,977	1,780
97.70	3,013	1,930
97.75	3,050	2,081
97.80	3,087	2,235
97.85	3,123	2,390
97.90	3,160	2,547
97.95	3,197	2,706
98.00	3,233	2,867
98.05	3,270	3,029
98.10	3,307	3,194
98.15	3,343	3,360
98.20	3,380	3,528
98.25	3,417	3,698
98.30	3,453	3,870
98.35	3,490	4,043
98.40	3,527	4,219
98.45	3,563	4,396
98.50	3,600	4,575
98.55	3,637	4,756
98.60	3,673	4,939
98.65	3,710	5,123
98.70	3,747	5,310
98.75	3,783	5,498
98.80	3,820	5,688
98.85	3,857	5,880
98.90	3,893	6,074
98.95	3,930	6,269
99.00	3,967	6,467
99.05	4,003	6,666
99.10	4,040	6,867
99.15	4,077	7,070
99.20	4,113	7,275
99.25	4,150	7,481
99.30	4,187	7,690
99.35	4,223	7,900
99.40	4,260	8,112
99.45	4,297	8,326
99.50	4,333	8,542
99.55	4,370	8,759
99.60	4,407	8,979
99.65	4,443	9,200
99.70	4,480	9,423
99.75	4,517	9,648
99.80	4,553	9,875
99.85	4,590	10,103
99.90	4,627	10,334
99.95	4,663	10,566
100.00	**4,700**	**10,800**

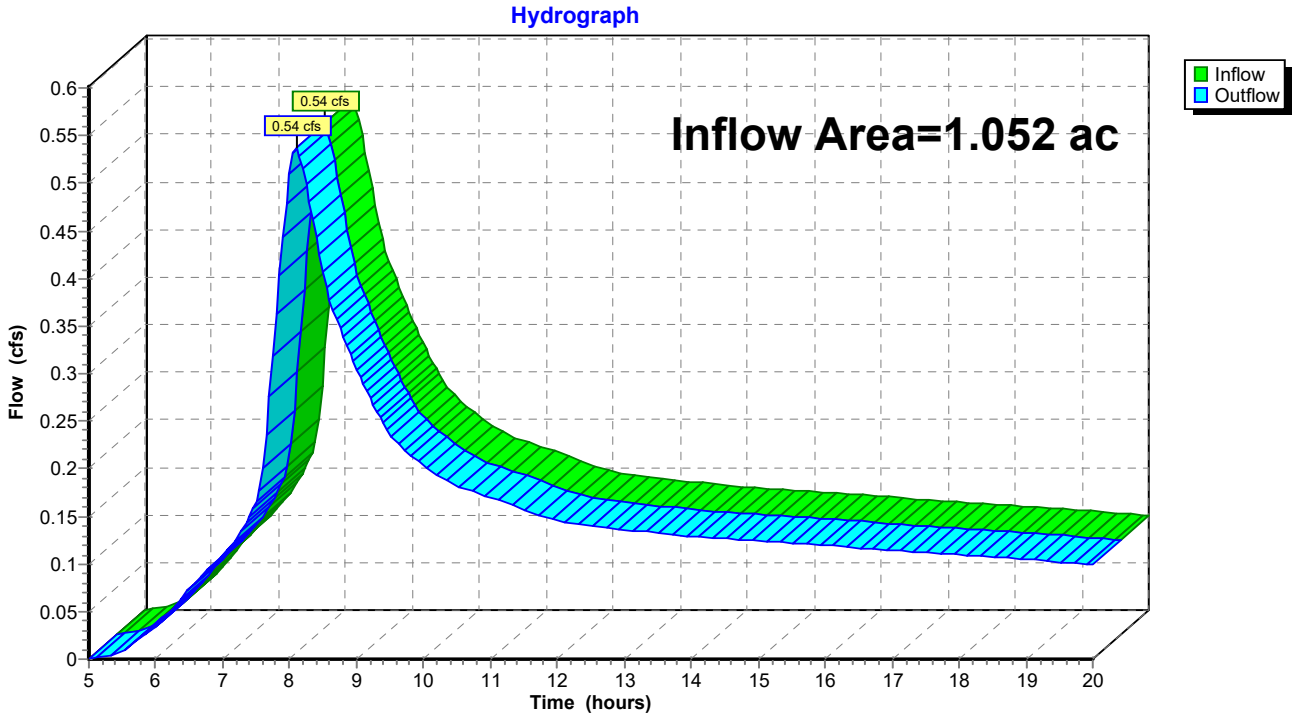
Summary for Reach 5R: Post-Developed Flows

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

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 2.15" for 25-year event
Inflow = 0.54 cfs @ 8.09 hrs, Volume= 0.188 af
Outflow = 0.54 cfs @ 8.09 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: Post-Developed Flows



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Pre-DevelopedAreas Runoff Area=45,845 sf 39.47% Impervious Runoff Depth>2.27"
Tc=0.0 min CN=85 Runoff=0.71 cfs 0.199 af

Subcatchment2S: Post-DevelopedAreas Runoff Area=45,845 sf 45.35% Impervious Runoff Depth>2.42"
Tc=5.0 min CN=87 Runoff=0.76 cfs 0.212 af

Reach 3R: Pre-DevelopedFlows Inflow=0.71 cfs 0.199 af
Outflow=0.71 cfs 0.199 af

Pond 4P: Detention Pond Peak Elev=97.44' Storage=1,161 cf Inflow=0.76 cfs 0.212 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.58 cfs 0.202 af

Reach 5R: Post-DevelopedFlows Inflow=0.58 cfs 0.202 af
Outflow=0.58 cfs 0.202 af

Total Runoff Area = 2.105 ac Runoff Volume = 0.411 af Average Runoff Depth = 2.34"
57.59% Pervious = 1.212 ac 42.41% Impervious = 0.893 ac

Summary for Subcatchment 1S: Pre-Developed Areas

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

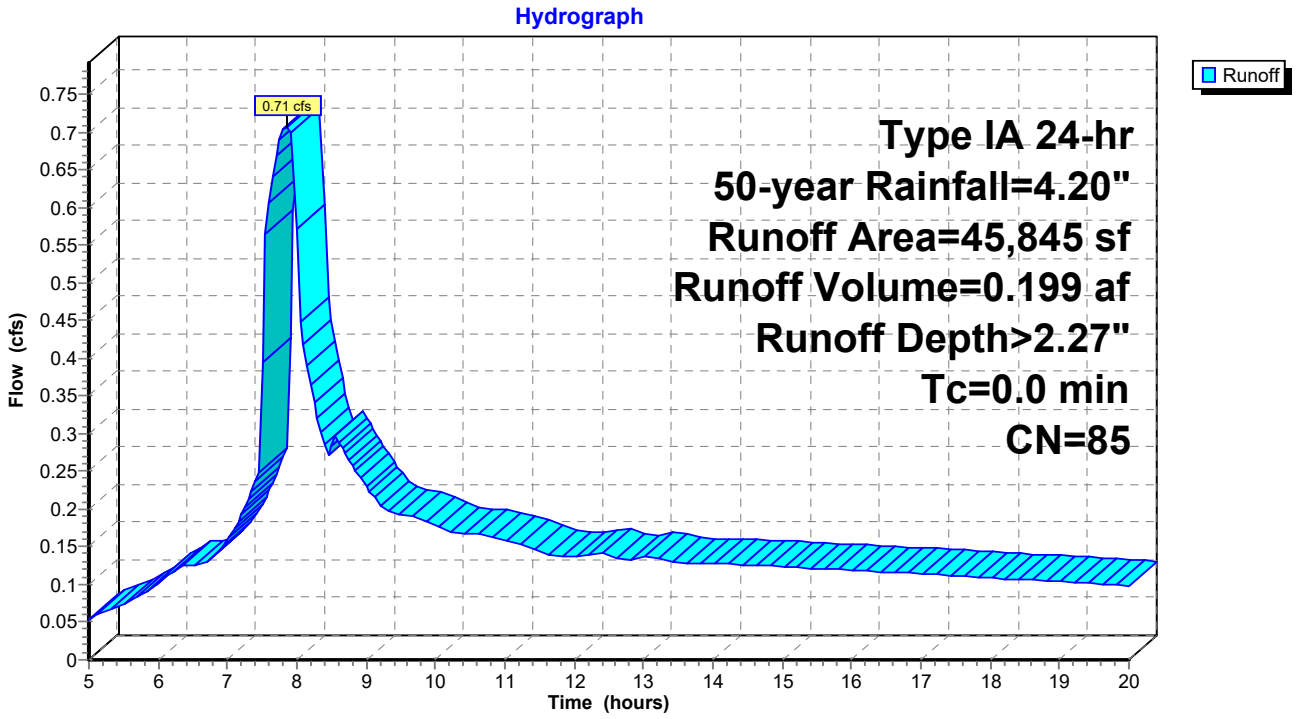
Runoff = 0.71 cfs @ 7.85 hrs, Volume= 0.199 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 50-year Rainfall=4.20"

	Area (sf)	CN	Description
	15,694	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	27,751	77	>75% Grass cover, Good, HSG C/D
	45,845	85	Weighted Average
	27,751		60.53% Pervious Area
	18,094		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 5**

Subcatchment 1S: Pre-Developed Areas



Summary for Subcatchment 2S: Post-Developed Areas

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

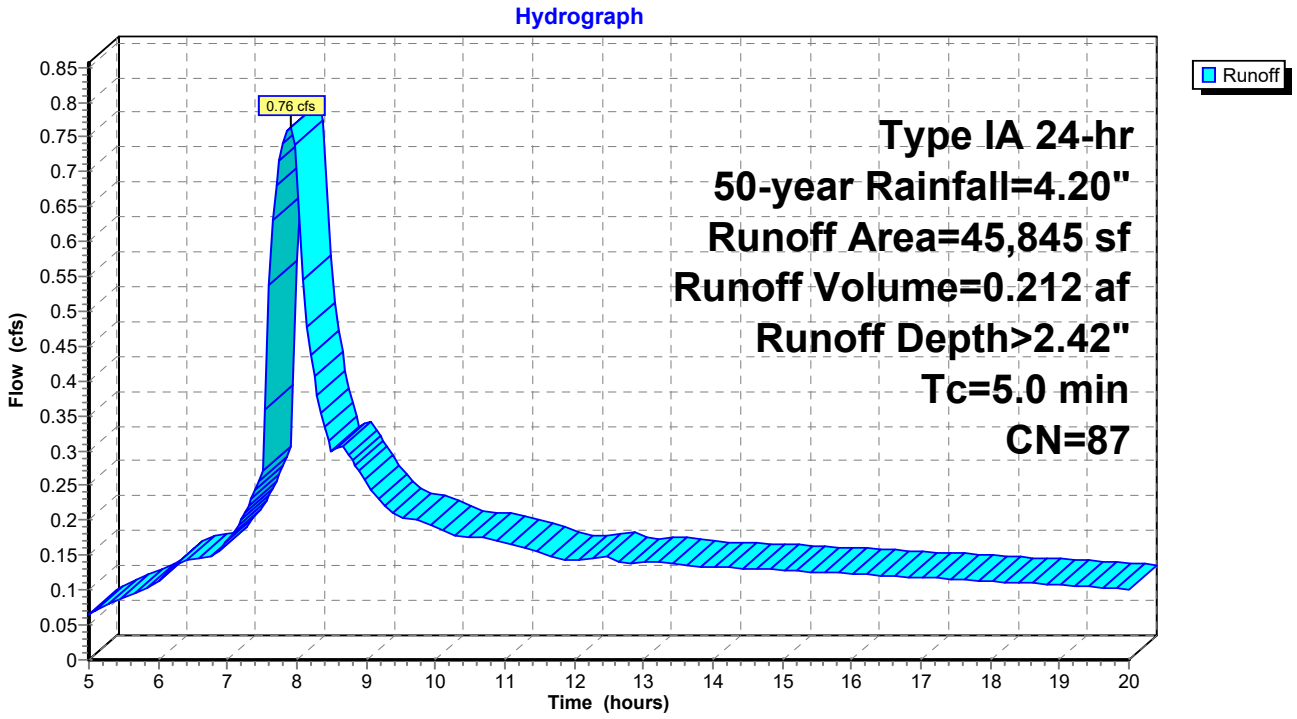
Runoff = 0.76 cfs @ 7.91 hrs, Volume= 0.212 af, Depth> 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 50-year Rainfall=4.20"

	Area (sf)	CN	Description
	18,389	98	Paved parking, HSG C
	2,400	98	Roofs, HSG C
*	25,056	77	>75% Grass cover, Good, HSG C/D
	45,845	87	Weighted Average
	25,056		54.65% Pervious Area
	20,789		45.35% Impervious Area

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

Subcatchment 2S: Post-Developed Areas



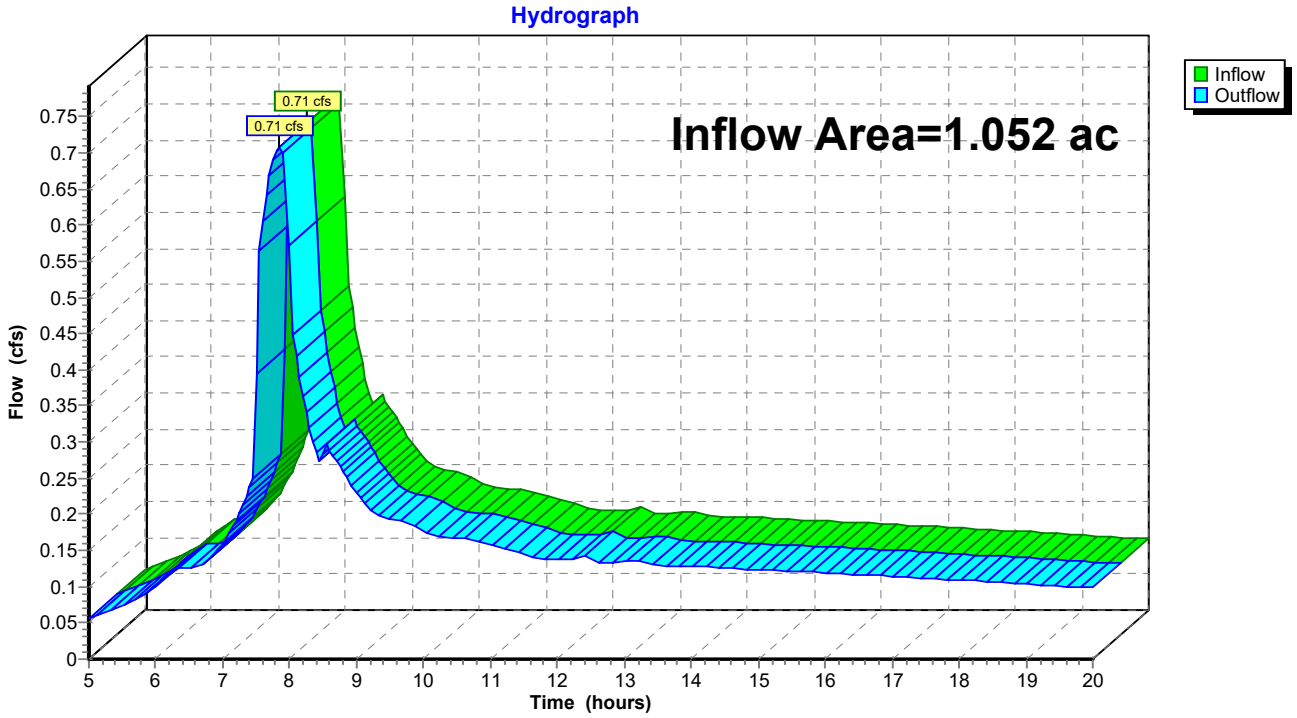
Summary for Reach 3R: Pre-Developed Flows

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

Inflow Area = 1.052 ac, 39.47% Impervious, Inflow Depth > 2.27" for 50-year event
Inflow = 0.71 cfs @ 7.85 hrs, Volume= 0.199 af
Outflow = 0.71 cfs @ 7.85 hrs, Volume= 0.199 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: Pre-Developed Flows



Summary for Pond 4P: Detention Pond

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 2.42" for 50-year event
Inflow = 0.76 cfs @ 7.91 hrs, Volume= 0.212 af
Outflow = 0.58 cfs @ 8.09 hrs, Volume= 0.202 af, Atten= 24%, Lag= 10.6 min
Primary = 0.58 cfs @ 8.09 hrs, Volume= 0.202 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 97.44' @ 8.09 hrs Surf.Area= 2,820 sf Storage= 1,161 cf

Plug-Flow detention time= 54.5 min calculated for 0.201 af (95% of inflow)
Center-of-Mass det. time= 29.0 min (709.4 - 680.4)

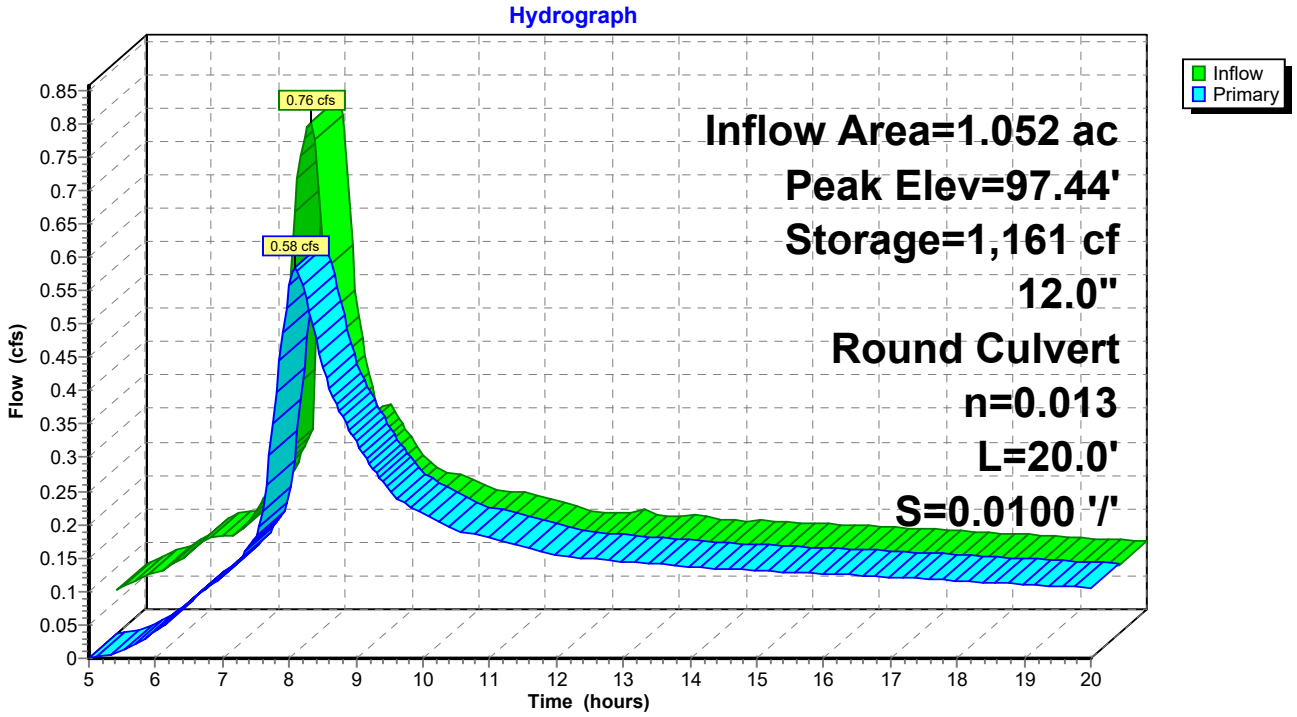
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	10,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	2,500	0	0
100.00	4,700	10,800	10,800

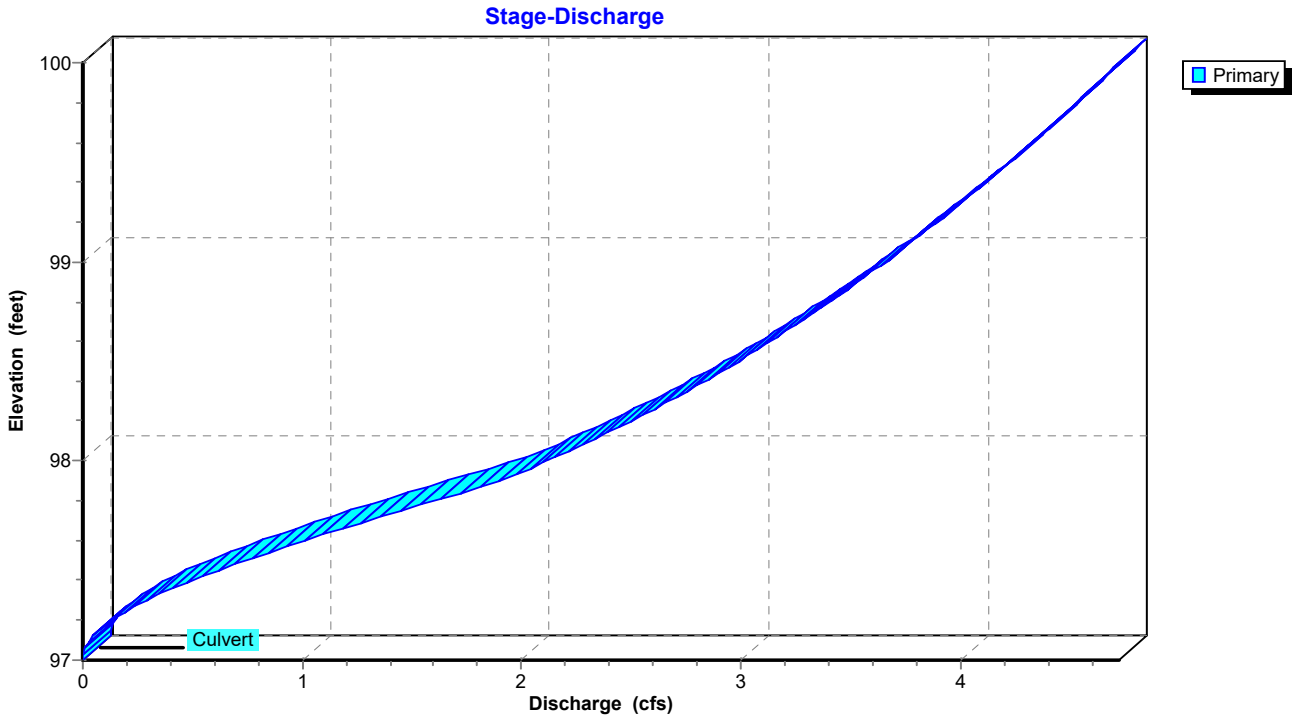
Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**12.0" Round Culvert** L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 97.00' / 96.80' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.58 cfs @ 8.09 hrs HW=97.44' (Free Discharge)
1=Culvert (Inlet Controls 0.58 cfs @ 1.77 fps)

Pond 4P: Detention Pond



Pond 4P: Detention Pond



Stage-Area-Storage for Pond 4P: Detention Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
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97.10	2,573	254
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97.20	2,647	515
97.25	2,683	648
97.30	2,720	783
97.35	2,757	920
97.40	2,793	1,059
97.45	2,830	1,199
97.50	2,867	1,342
97.55	2,903	1,486
97.60	2,940	1,632
97.65	2,977	1,780
97.70	3,013	1,930
97.75	3,050	2,081
97.80	3,087	2,235
97.85	3,123	2,390
97.90	3,160	2,547
97.95	3,197	2,706
98.00	3,233	2,867
98.05	3,270	3,029
98.10	3,307	3,194
98.15	3,343	3,360
98.20	3,380	3,528
98.25	3,417	3,698
98.30	3,453	3,870
98.35	3,490	4,043
98.40	3,527	4,219
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98.55	3,637	4,756
98.60	3,673	4,939
98.65	3,710	5,123
98.70	3,747	5,310
98.75	3,783	5,498
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99.00	3,967	6,467
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99.10	4,040	6,867
99.15	4,077	7,070
99.20	4,113	7,275
99.25	4,150	7,481
99.30	4,187	7,690
99.35	4,223	7,900
99.40	4,260	8,112
99.45	4,297	8,326
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99.55	4,370	8,759
99.60	4,407	8,979
99.65	4,443	9,200
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99.75	4,517	9,648
99.80	4,553	9,875
99.85	4,590	10,103
99.90	4,627	10,334
99.95	4,663	10,566
100.00	**4,700**	**10,800**

Summary for Reach 5R: Post-Developed Flows

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

Inflow Area = 1.052 ac, 45.35% Impervious, Inflow Depth > 2.30" for 50-year event
Inflow = 0.58 cfs @ 8.09 hrs, Volume= 0.202 af
Outflow = 0.58 cfs @ 8.09 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: Post-Developed Flows