

Concept Elevation Duanesburg, NY.

May 16, 2022



Rear Parking
Side Elevation



PRIMAX

DOLLAR GENERAL

Save time. Save money. Every day!

Front Left
Elevation

Metal Wall Panel -
Light Stone



Front Right Elevation





ORIGINAL

TOWN OF DUANESBURG

APPLICATION FOR SITE/ SKETCH DEVELOPMENT PLAN APPROVAL

Preliminary Date: June 6, 2022 Final Date: _____
(Check appropriate box)

Name of proposed development Wishy Wash

Applicant:

Name Spiro Kagas
Address 9938 Western Turnpike
Duanesburg, NY 12056
Telephone _____

Plans Prepared by:

Name Joseph J. Bianchine, P.E., ABD Engineers, LLP
Address 411 Union Street
Schenectady, NY 12305
Telephone 518-377-0315

Owner (if different):

(if more than one owner, provide information for each)

Name _____
Address _____
Telephone _____

Ownership intentions, i.e., purchase options
Existing owner to retain

Location of site

9938 Western Turnpike

Section 53.00 Block 1 Lot 29.21

Current zoning classification C-1 Commercial

State and federal permits needed (list type and appropriate department)

N/A

Proposed use(s) of site

Car/truck wash facility

Total site area (square feet or acres) 4.75 AC

Anticipated construction time 3 Months

Will development be phased? Yes

Over →



ORIGINAL.

Current land use of site (agricultural, commercial, underdeveloped, etc.)

Commercial

Current condition of site (buildings, brush, etc.) Existing building, asphalt pavement, crusher run stone

Character of surrounding lands (suburban, agricultural, wetlands, etc.) Residential/Agricultural

Estimated cost of proposed improvement \$ 50,000

Anticipated increase in number of residents, shoppers, employees, etc. (as applicable)

1 additional truck customer per day, no new employees, 15-20 trips for food

Describe proposed use, including primary and secondary uses; ground floor area; height; and number of stories for each building:

- for residential buildings include number of dwelling units by size (efficiency, one-bedroom, two-bedroom, three or more bedrooms) and number of parking spaces to be provided.
- For non-residential buildings, include total floor area sales area; number of automobile and truck parking spaces,
- Other proposed structures.

(Use separate sheet if needed)

Primary: 985± square foot building addition to provide one (1) new truck bay on the west side of the existing wash facility.

Secondary: Crusher run stone parking area for temporary staging of vehicles prior to entering wash facility.

Future food wagon.

NOTICE OF DETERMINATION
of the Town of Duanesburg

Date of Determination June 9, 2022

Application of Wisky Wash (Spirid Kugal) under section _____
of the (Village of Delanson/ Town of Duanesburg)
Ordinance.

Applicant MOJ Engineering
Address 411 Union St.
Schenectady, NY 12305

Phone 518-377-0315 Zoning District C-1 SBL# 53.00-1-29.21

Description of
Project: storm water control plan for additional parking
Avee and new truck wash bay

Determination: special use + site plan approval

Reason supporting determination:
Town of Duanesburg zoning Ordinance adopted 6/11/15
section 14.6.2.1, 5.2.2, 14.6.1.1, 14.6.1.2, 14.6.1.3, 14.6.1.4,
14.6.1.5, 14.6.1.6, 14.6.1.7, 14.6.1.8, 14.6.1.9, 14.6.2

Action: Refer to Planning Board for the purpose of special use + site plan
approval

Code Enforcement Officer: Dale W... ..

DRAINAGE NARRATIVE

**Car Wash – Truck Parking Area
9938 Western Turnpike
Town of Duanesburg**

May 12, 2022

The Ultimate Wishy Wash car wash is located at 9938 Western Turnpike in the Town of Duanesburg. The Owner has recently constructed a crusher run stone parking area on the east side of the property to provide temporary staging of trucks as they wait to be washed. A minimum of 8” of crusher run stone was installed with an underlying layer of stabilization fabric to provide an even surface for vehicles to maneuver. Concrete blocks have been placed along the western and northern perimeter of the parking area to delineate the extent of the lot. A gate is located at the entrance of the parking area in the southwest corner. Along the north side of the parking area, an earthen swale was constructed to intercept incoming runoff from the northern slope. The water is conveyed east around the crusher run stone and enters another stone lined swale that was constructed along the eastern edge of the parking area. This swale runs south and ultimately discharges to the existing swale located on the Thomas property. An additional stone trench was constructed along the southern edge of the parking area which will collect surface runoff from the crusher run as well as intercept any subsurface drainage prior to reaching the Wren property. The stone trench also outlets east to the existing swale.

According to the NRCS “Soil Survey of Schenectady County, New York” the existing soil composition in this area consists of channery silt loams. The hydrologic soil group is C/D and the drainage class is somewhat poorly drained. Hydrologic soil groups are based on estimates of runoff potential and are assigned to one of four groups (A, B, C, D) according to the rate of water infiltration. Group D represents soils having a very slow infiltration rate (high runoff potential) and that have a high water table. The presence of Group D soils within the contributing drainage area will lead to a greater amount of runoff generated due to the inability of the ground to absorb water during storm events. As a result, undeveloped land consisting of Group D soils can produce large amounts of stormwater runoff even with no impervious surfaces present. Moderate to steep slopes can also exacerbate peak runoff rates as water flows down at

higher velocities and reduces the time of concentration. Based on the soil composition and existing topography in the vicinity of the Wishy Wash property, it can be ascertained that there was a high potential for runoff from the meadow and wooded areas prior to the construction of the parking area.

The existing topography of the subject parcel and surrounding properties is predominantly sloping from north to south. An existing stream is present to the east of the project which flows southwest and ultimately crosses under Western Turnpike via a culvert in front of the residence at 9848 Western Turnpike. This stream is a tributary of the Schoharie Creek and has a total contributing drainage area of 2± square miles prior to crossing Western Turnpike (refer to the attached USGS StreamStats report). There is an existing swale along the adjoining boundary between the Ultimate Wishy Wash and Thomas properties which runs north to south. The swale then turns east at the common property corner of the Ultimate Wishy Wash, Wren, Chilton, and Thomas. The swale continues east along the rear boundary of the Chilton property and ultimately discharges into the existing stream. Contributing runoff to the swale extends approximately 3,000 feet to the north and originates from grass fields and wooded areas. Upon inspection, the swale appears to have adequate capacity to convey the incoming flow of runoff. However, there appears to be debris and obstructions present which should be removed to ensure the continuous flow of water along the Chilton and Thomas properties.

There is a portion of land to the west of the existing swale which is sloped north to south and flows parallel to the swale through the Wishy Wash parcel (refer to the attached drainage map). The pre-development ground cover in the location of the parking area consisted of a meadow which contained three tile drains running north to south. The drain tiles discharged at the adjoining property line with lands of Wren. During construction of the parking area, the drain tiles were terminated in order to prevent future runoff to the Wren property. A diversion swale was installed along the northern side of the parking area to convey incoming runoff around the crusher run stone and down to the existing eastern swale. A portion of rainfall from the northern slope will percolate through the existing 8"-12" of topsoil, but will then be unable to penetrate the underlying Group D soil. This water will continue to flow down the slope along the subsurface soil interface where it will be intercepted and rerouted by the diversion swale. As a

result of the modifications, the amount of runoff flowing to the Wren property is now significantly reduced.

Installation of the crusher run stone began once clearing and grubbing operations were complete. The topography of the existing meadow was revealed once the vegetation was removed and consisted of a cross slope from the northwest to the southeast corner. The final grade of the crusher run surface was constructed to match the existing slope and maintain the pre-development drainage pattern running to the southeast corner. A stone berm is present along the eastern edge of the parking area and a southern impervious clay berm will be added along the southern edge in order to attenuate runoff on the low end of the crusher run surface during larger storm events. The existing southern stone trench will remain along the north side of the berm to provide additional storage within the stone voids. Water is then slowly released beyond the berm to the existing eastern swale via a new 6" diameter pipe to be installed through the southeast corner of the berm. The post-development peak flow rates are reduced to below the pre-development condition up to the 100-year storm event (refer to the attached HydroCAD runoff calculations).

A car wash addition is also proposed which will consist of a new truck bay adjacent to the existing building. Construction of the new structure will occur over existing crusher run stone. The area of existing crusher run stone to the north is to be paved where vehicles will be maneuvering as they enter the building. Two new stone trenches are proposed along the edge of pavement that will collect stormwater from the asphalt surface. There is a negligible difference in runoff volume generated from the existing impervious crusher run stone and proposed impervious asphalt.

Summary

As constructed, the parking area features three drainage conveyance systems along the northern, eastern, and southern boundaries of the crusher run stone. The northern earthen diversion swale intercepts both incoming surface and subsurface runoff from the northern slope. The water is then conveyed east around the parking area and enters the eastern stone lined swale. The eastern stone swale flows south and discharges to the existing swale along the adjoining boundary between the Ultimate Wishy Wash and Thomas properties. The remaining rainfall, limited to the crusher run surface itself, flows southeast to the southern stone trench. The trench

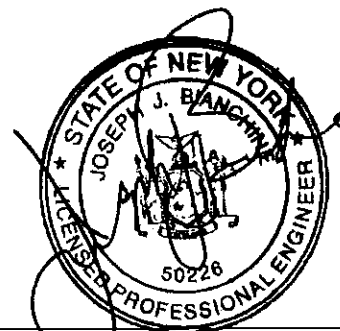
also intercepts any subsurface drainage present below the crusher run stone and prevents runoff from reaching the Wren property. The eastern end of the stone trench ties into the stone swale and allows runoff to outlet to the existing swale. The combination of all three conveyance systems is adequate to control stormwater from smaller rainfall events, as confirmed during a site inspection which occurred after an extended rainfall period of 2.5 inches.

Minor modifications to the parking area are proposed to provide additional attenuation for larger rainfall events such as the 100-year storm. An impervious berm will be construction along the south side of the existing stone trench and will extend to connect to the existing stone berm at the southeast corner. The new L-shaped barrier will create available surface storage at the low end of the parking area up to elevation 884.75 for runoff generated on the crusher run. A new 6" pipe will be installed in the southeast corner of the berm to slowly release ponding water at rates less than the pre-development condition for the 1, 10, and 100-year storm events.

The HydroCAD results are summarized as follows:

Area 1	Peak Runoff Generated (ft ³ /s)			Peak Discharge (ft ³ /s)		
	1-Year	10-Year	100-Year	1-Year	10-Year	100-Year
Total Pre	2.81	7.42	16.35	2.81	7.42	16.35
Post 1A	2.09	5.67	12.68	1.96	5.47	12.39
Post 1B	2.25	4.29	7.75	0.54	0.89	1.14
Total Post	4.34	9.96	20.43	2.50	6.36	13.53
<i>Net Change</i>	<i>1.53</i>	<i>2.54</i>	<i>4.08</i>	<i>-0.31</i>	<i>-1.06</i>	<i>-2.82</i>

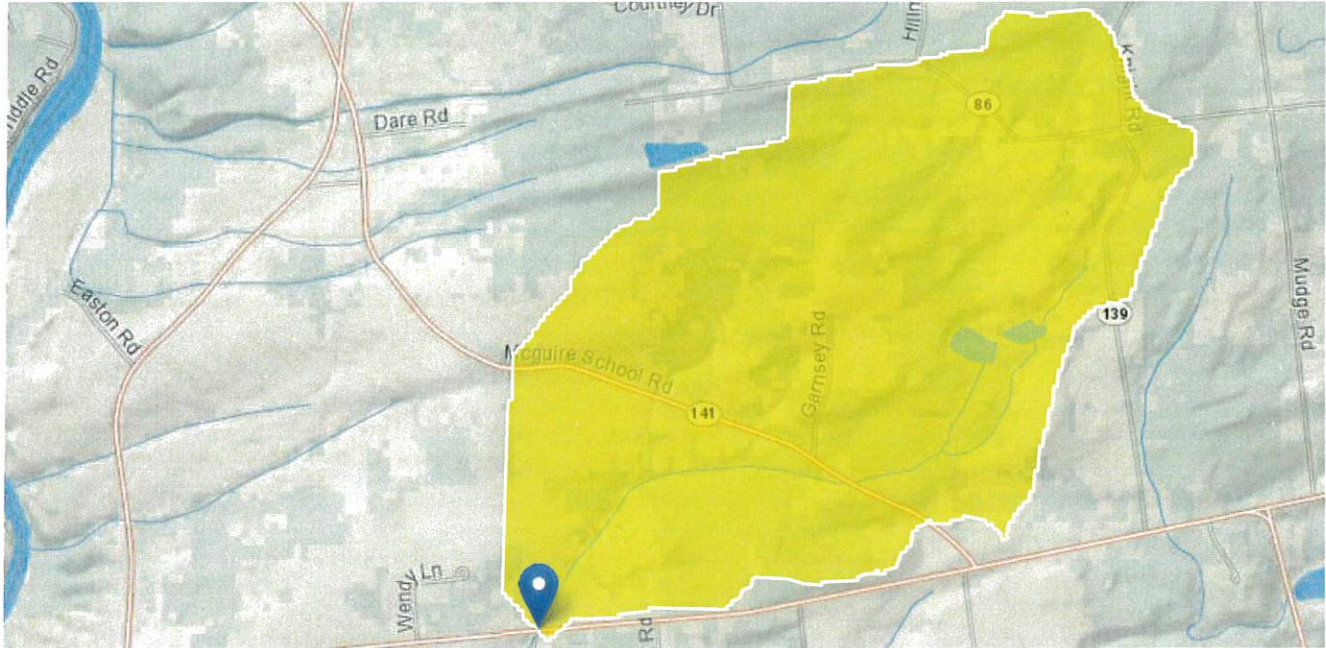
Therefore, when the area is constructed as proposed, runoff to the neighboring properties will be controlled to slightly less than the pre-development condition.



Joseph J. Bianchine, P.E.

Wishy Wash - StreamStats Report

Region ID: NY
Workspace ID: NY20220425200937221000
Clicked Point (Latitude, Longitude): 42.76289, -74.22388
Time: 2022-04-25 16:10:04 -0400



9938 Western Turnpike

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	564789.5	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	4736085.3	meters
CSL1085LO	10-85 slope of lower half of main channel in feet per mile.	192	feet per mi
DRNAREA	Area that drains to a point on a stream	1.98	square miles
EL1200	Percentage of basin at or above 1200 ft elevation	45.8	percent
JULAVPRE	Mean July Precipitation	3.83	inches
JUNAVPRE	Mean June Precipitation	3.95	inches
JUNMAXTMP	Maximum June Temperature, in degrees F	74.9	degrees F
LAGFACTOR	Lag Factor as defined in SIR 2006-5112	0.0156	dimensionless
LENGTH	Length along the main channel from the measuring location extended to the basin divide	3.01	miles
MAR	Mean annual runoff for the period of record in inches	15.4	inches

Parameter Code	Parameter Description	Value	Unit
MAYAVPRE	Mean May Precipitation	3.77	inches
MXSNO	50th percentile of seasonal maximum snow depth from Northeast Regional Climate Center atlas by Cember and Wilks, 1993	16.8	inches
PRJUNAUG00	Basin average mean precip for June to August from PRISM 1971-2000	11.4	inches
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	0	percent

Peak-Flow Statistics Parameters [100.0 Percent (1.98 square miles) 2006 Full Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.98	square miles	0.41	3480
LAGFACTOR	Lag Factor	0.0156	dimensionless	0.002	20.582
MAR	Mean Annual Runoff in inches	15.4	inches	16.86	40.73
MXSNO	Median Seasonal Maximum Snow Depth	16.8	inches	13.02	20.42

Peak-Flow Statistics Disclaimers [100.0 Percent (1.98 square miles) 2006 Full Region 3]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [100.0 Percent (1.98 square miles) 2006 Full Region 3]

Statistic	Value	Unit
80-percent AEP flood	39.8	ft ³ /s
66.7-percent AEP flood	52	ft ³ /s
50-percent AEP flood	71.8	ft ³ /s
20-percent AEP flood	133	ft ³ /s
10-percent AEP flood	189	ft ³ /s
4-percent AEP flood	277	ft ³ /s
2-percent AEP flood	360	ft ³ /s
1-percent AEP flood	453	ft ³ /s
0.5-percent AEP flood	561	ft ³ /s
0.2-percent AEP flood	718	ft ³ /s

Peak-Flow Statistics Citations

Lumia, Richard, Freehafer, D.A., and Smith, M.J., 2006, Magnitude and Frequency of Floods in New York: U.S. Geological Survey Scientific Investigations Report 2006-5112, 152 p. (<http://pubs.usgs.gov/sir/2006/5112/>)

Flow-Duration Statistics Parameters [Statewide duration flows excl LongIsI 2014 5220]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.98	square miles	3.14	4780
JUNAVPRE	Mean June Precipitation	3.95	inches	3.59	5.33
CENTROIDX	CENTROIDX	564789.5	meters	166000	658000
CENTROIDY	CENTROIDY	4736085.3	meters	4560000	4920000
CSL1085LO	10-85 slope of lower half of main channel	192	feet per mi	1.56	152
LENGTH	Main Channel Length	3.01	miles	0.88	305
MAR	Mean Annual Runoff in inches	15.4	inches	11.6	37.4
SSURGOB	SSURGO Percent Hydrologic Soil Type B	0	percent	1.14	65.7
JULAVPRE	Mean July Precipitation	3.83	inches	3.2	5.26
MAYAVPRE	Mean May Precipitation	3.77	inches	3.15	5.68
PRJUNAUG00	Basin average mean precip for June to August	11.4	inches	10.5	15.5
JUNMAXTMP	Maximum June Temperature	74.9	degrees F	68.8	78.8
SSURGOA	SSURGO Percent Hydrologic Soil Type A	0	percent	0.62	51.2
EL1200	Percentage of Basin Above 1200 ft	45.8	percent	0	100

Flow-Duration Statistics Flow Report [Statewide duration flows excl LongIsI 2014 5220]

Statistic	Value	Unit
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Flow-Duration Statistics Citations

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.8.1

StreamStats Services Version: 1.2.22

NSS Services Version: 2.1.2

Soil Map—Schenectady County, New York

74° 13' 40" W

74° 13' 22" W

42° 46' 2" N

42° 46' 2" N



42° 45' 44" N

42° 45' 44" N

74° 13' 40" W

74° 13' 22" W



Map Scale: 1:2,680 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84

MAP LEGEND

MAP INFORMATION

- 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

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

Soil Survey Area: Schenectady County, New York
 Survey Area Data: Version 20, Sep 1, 2021

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

Date(s) aerial images were photographed: Oct 7, 2013—Nov 9, 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BvB	Burdett-Scriba channery silt loams, 3 to 8 percent slopes	15.7	91.5%
IIB	Ilion silt loam, 3 to 8 percent slopes	1.5	8.5%
Totals for Area of Interest		17.2	100.0%

Schenectady County, New York

BvB—Burdett-Scriba channery silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: bd3j
Elevation: 200 to 1,600 feet
Mean annual precipitation: 38 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 170 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Burdett and similar soils: 50 percent
Scriba and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burdett

Setting

Landform: Till plains, hills, drumlinoid ridges
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: A thin silt mantle overlying till that is strongly influenced by shale

Typical profile

H1 - 0 to 9 inches: channery silt loam
H2 - 9 to 16 inches: channery silt loam
H3 - 16 to 44 inches: very gravelly silty clay loam
H4 - 44 to 60 inches: very gravelly silty clay loam

Properties and qualities

Slope: 3 to 8 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 low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F101XY013NY - Moist Till
Hydric soil rating: No

Description of Scriba

Setting

Landform: Till plains, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till dominated by sandstone, with lesser amounts of limestone and shale

Typical profile

H1 - 0 to 7 inches: channery silt loam
H2 - 7 to 15 inches: channery silt loam
Bx - 15 to 43 inches: very gravelly loam
C - 43 to 60 inches: very gravelly loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 12 to 18 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Darien

Percent of map unit: 5 percent
Hydric soil rating: No

Ilion

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Varick

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Angola

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Schenectady County, New York

Survey Area Data: Version 20, Sep 1, 2021

Schenectady County, New York

IIB—Illion silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: bd4v

Elevation: 600 to 1,800 feet

Mean annual precipitation: 38 to 44 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 110 to 170 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Illion and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Illion

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Loamy till derived from calcareous dark shale

Typical profile

Ap - 0 to 9 inches: silt loam

E - 9 to 14 inches: silty clay loam

2B - 14 to 39 inches: channery silty clay loam

3C - 39 to 60 inches: gravelly silt loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum content: 10 percent

Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F101XY014NY - Wet Till Depression

Hydric soil rating: Yes

Minor Components

Fonda

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Burdett

Percent of map unit: 5 percent

Hydric soil rating: No

Varick

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Scriba

Percent of map unit: 5 percent

Hydric soil rating: No

Madalin

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Schenectady County, New York

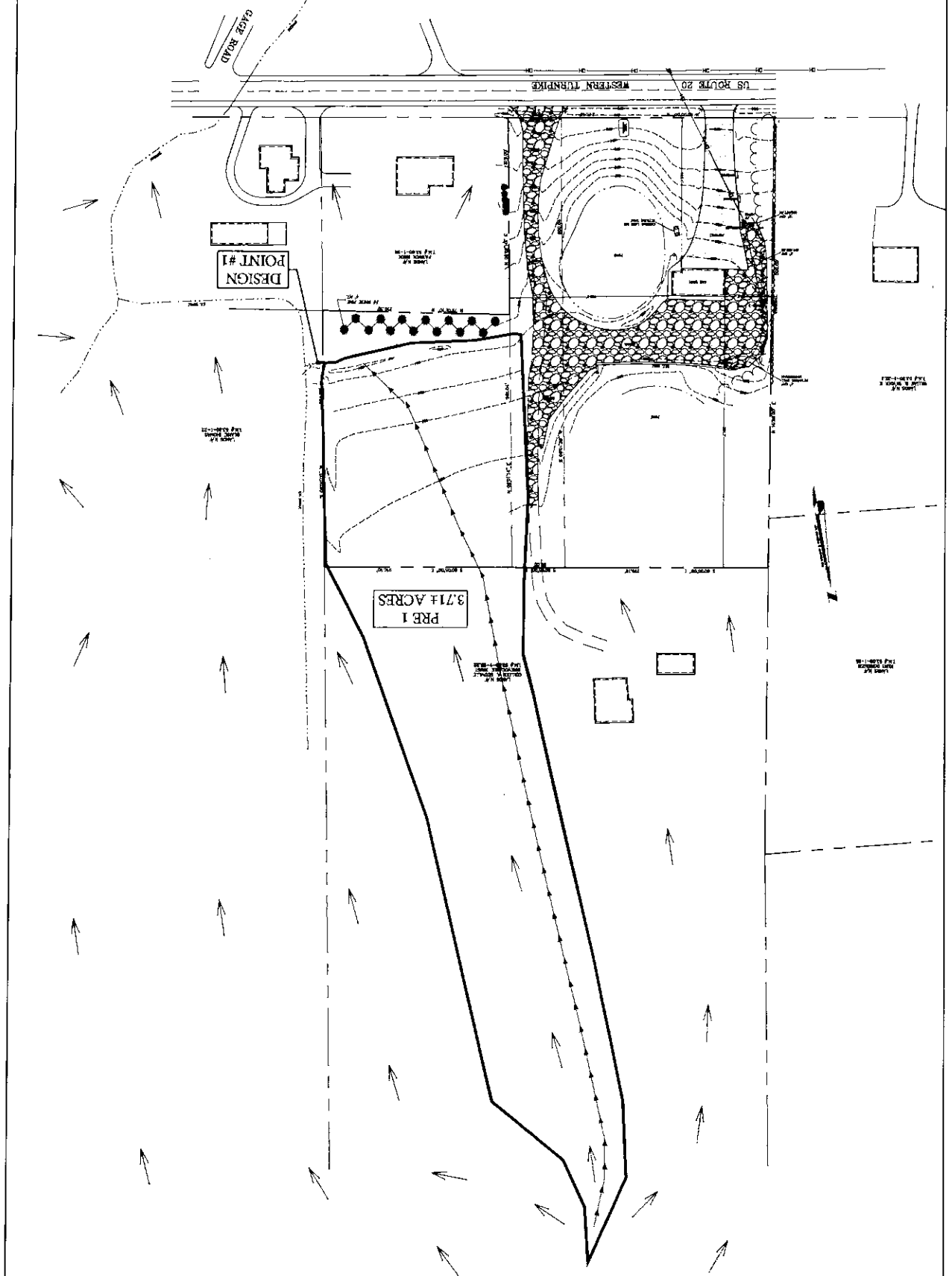
Survey Area Data: Version 20, Sep 1, 2021

ENGINEERS, LLP
411 Union Street
Schenectady, NY 12305
518-377-0315 Fax 518-377-0379
www.abdeng.com

ULTIMATE WISHY WASH

PRE-DEVELOPMENT DRAINAGE

9938 WESTERN TURNPIKE

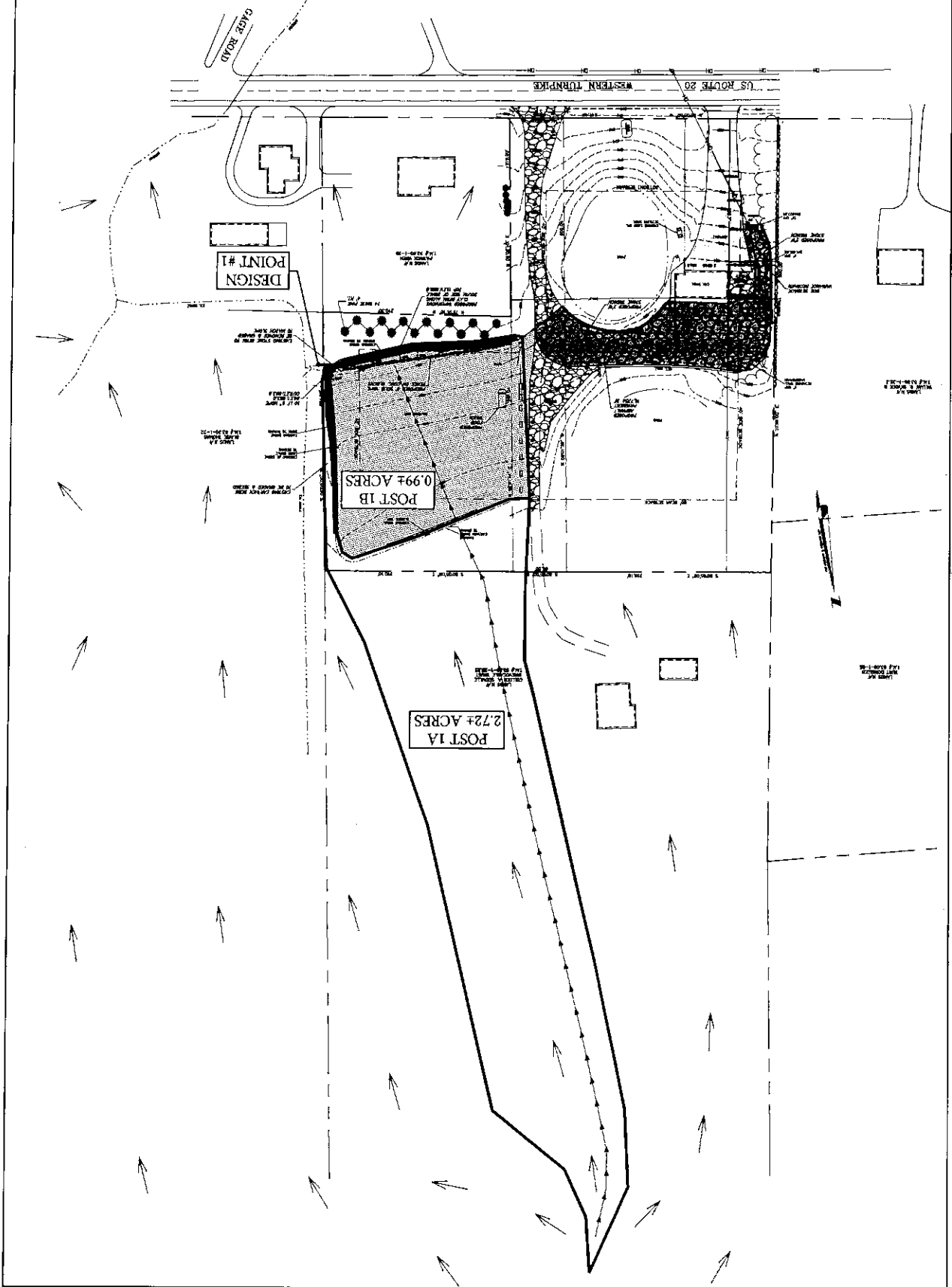


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ULTIMATE WISHY WASH

POST-DEVELOPMENT DRAINAGE

9938 WESTERN TURNPIKE



PRE-DEVELOPMENT



PRE 1



EXISTING SWALE
(PRE)

POST-DEVELOPMENT



POST 1A



NEW DIVERSION
SWALE (NORTH)



POST 1B



STORAGE 1B



EXISTING SWALE
(POST)



Routing Diagram for 5461-HydroCAD S4

Prepared by ABD Engineers, LLP

HydroCAD® 10.00-18 s/n 00936 © 2016 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: PRE 1

Runoff = 2.81 cfs @ 12.12 hrs, Volume= 9,101 cf, Depth= 0.68"

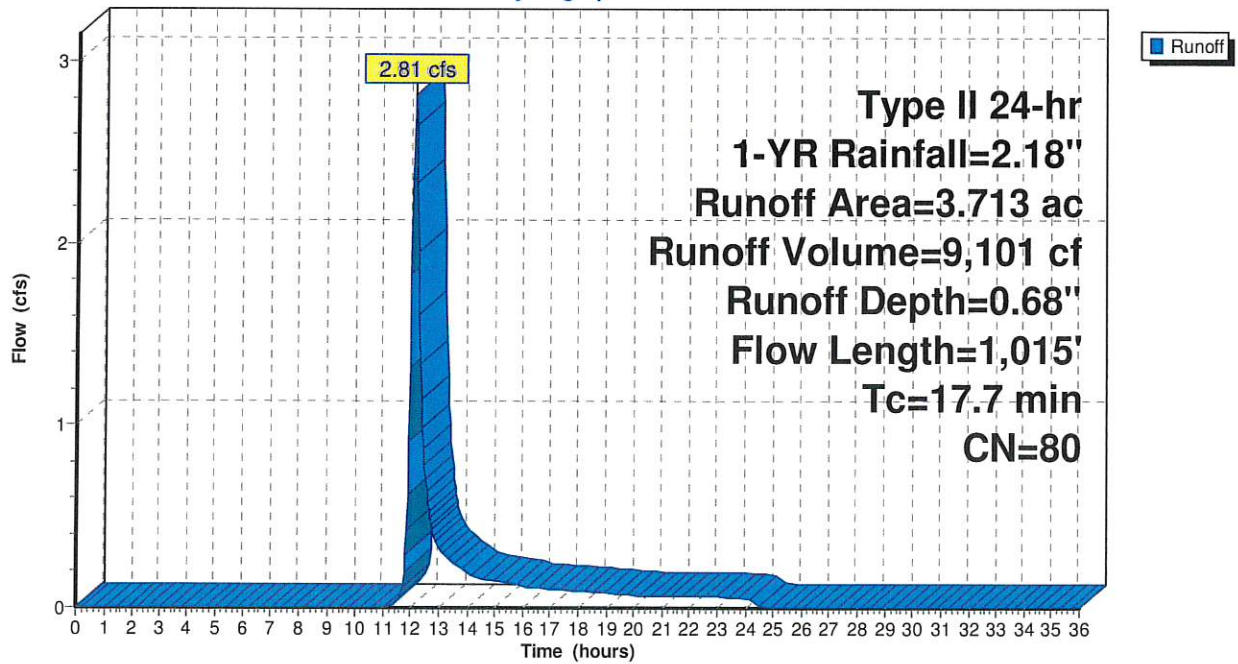
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Type II 24-hr 1-YR Rainfall=2.18"

Area (ac)	CN	Description
1.943	77	Woods, Good, HSG D
1.770	84	Pasture/grassland/range, Fair, HSG D
3.713	80	Weighted Average
3.713		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0450	0.25		Sheet Flow, Range n= 0.130 P2= 2.80"
6.2	555	0.0880	1.48		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.7	360	0.0330	1.27		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
17.7	1,015	Total			

Subcatchment 1S: PRE 1

Hydrograph



5461-HydroCAD S4

Type II 24-hr 1-YR Rainfall=2.18"

Prepared by ABD Engineers, LLP

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Summary for Subcatchment 2S: POST 1A

Runoff = 2.09 cfs @ 12.09 hrs, Volume= 6,239 cf, Depth= 0.63"

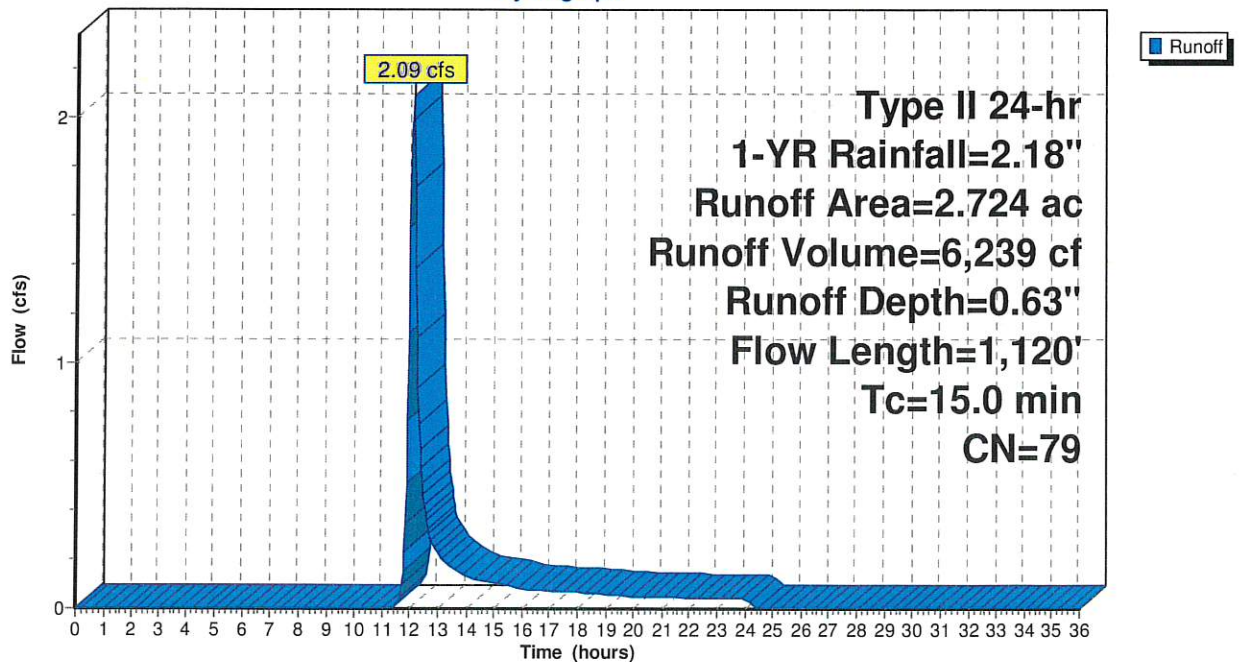
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-YR Rainfall=2.18"

Area (ac)	CN	Description
1.943	77	Woods, Good, HSG D
0.781	84	Pasture/grassland/range, Fair, HSG D
2.724	79	Weighted Average
2.724		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0450	0.25		Sheet Flow, Range n= 0.130 P2= 2.80"
6.2	555	0.0880	1.48		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	135	0.0330	1.27		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	330	1.0000	33.30	324.71	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=1.50' Z= 3.0 ' Top.W=11.00' n= 0.040 Earth, cobble bottom, clean sides
15.0	1,120	Total			

Subcatchment 2S: POST 1A

Hydrograph



5461-HydroCAD S4

Type II 24-hr 1-YR Rainfall=2.18"

Prepared by ABD Engineers, LLP

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Summary for Subcatchment 3S: POST 1B

Runoff = 2.25 cfs @ 11.97 hrs, Volume= 4,733 cf, Depth= 1.32"

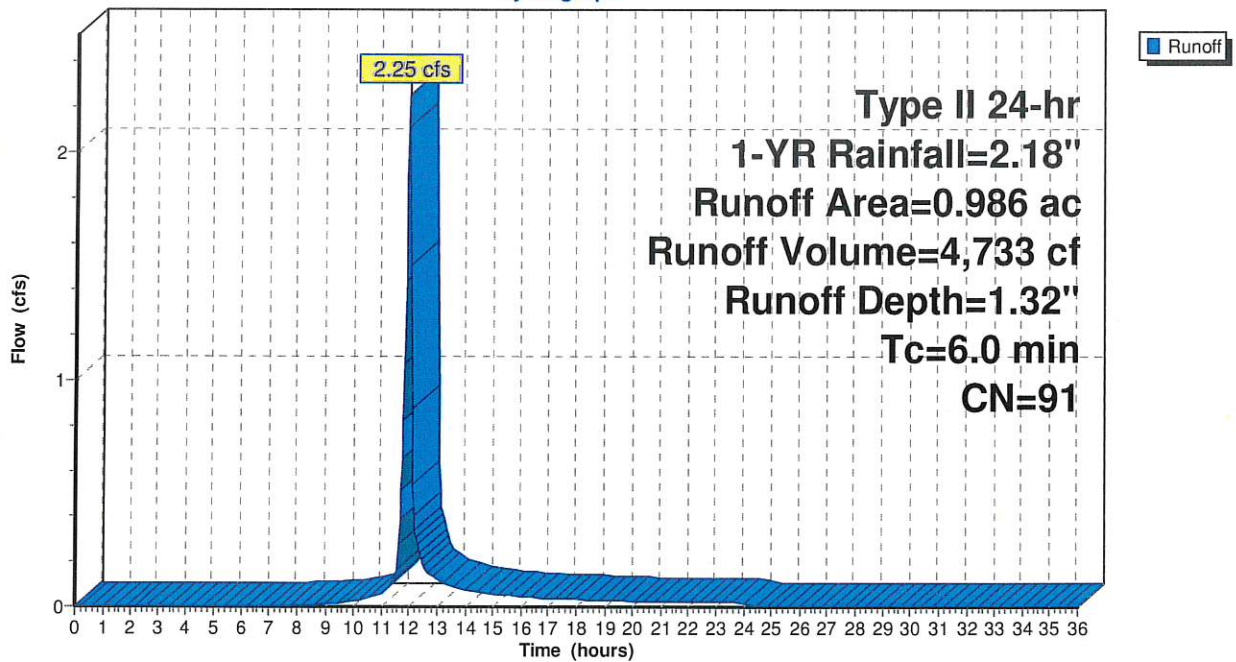
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-YR Rainfall=2.18"

Area (ac)	CN	Description
0.986	91	Gravel roads, HSG D
0.986		100.00% Pervious Area

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

Subcatchment 3S: POST 1B

Hydrograph



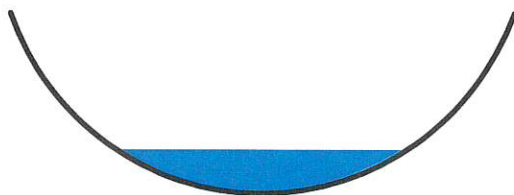
Summary for Reach 1R: EXISTING SWALE (PRE)

Inflow Area = 161,738 sf, 0.00% Impervious, Inflow Depth = 0.68" for 1-YR event
 Inflow = 2.81 cfs @ 12.12 hrs, Volume= 9,101 cf
 Outflow = 2.80 cfs @ 12.13 hrs, Volume= 9,101 cf, Atten=0%, Lag=0.8 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Max. Velocity= 3.01 fps, Min. Travel Time= 1.1 min
 Avg. Velocity = 1.12 fps, Avg. Travel Time= 3.0 min

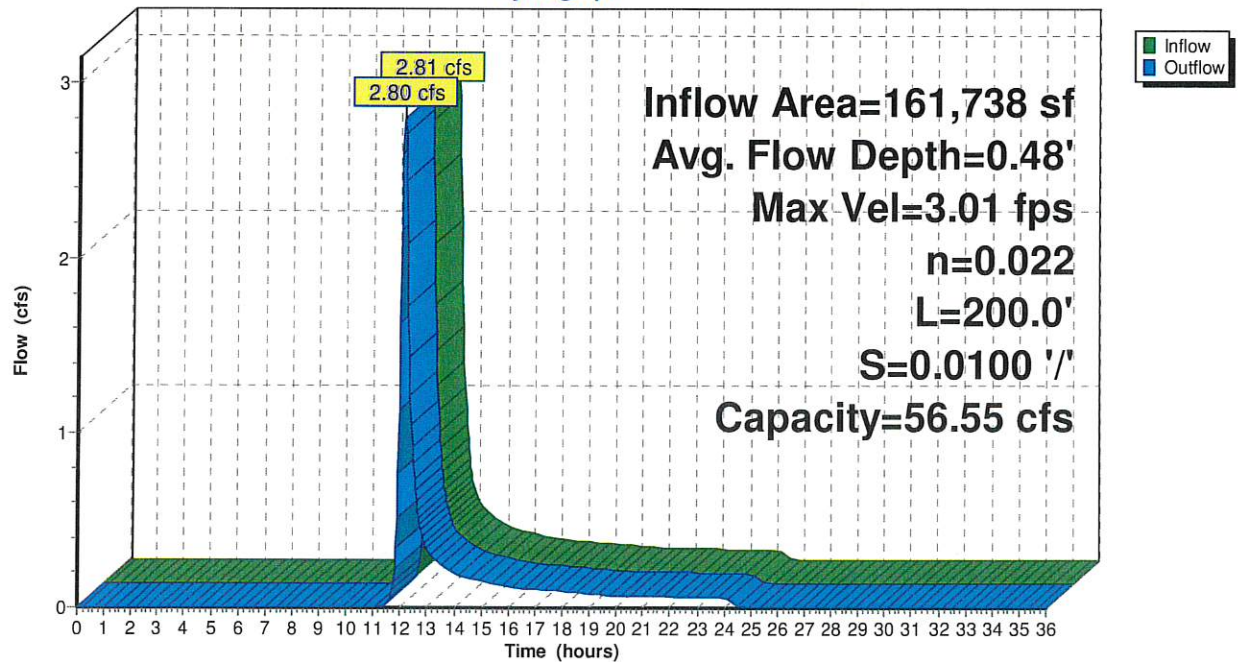
Peak Storage= 186 cf @ 12.13 hrs
 Average Depth at Peak Storage= 0.48'
 Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 56.55 cfs

6.00' x 2.00' deep Parabolic Channel, n=0.022 Earth, clean & straight
 Length= 200.0' Slope= 0.0100 '/'
 Inlet Invert= 882.00', Outlet Invert= 880.00'



Reach 1R: EXISTING SWALE (PRE)

Hydrograph



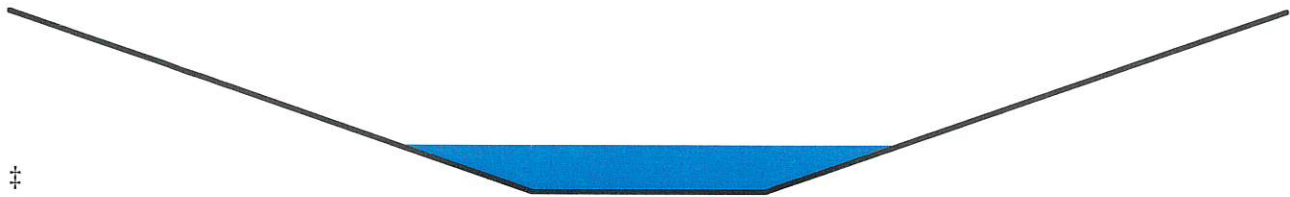
Summary for Reach 2R: NEW DIVERSION SWALE (NORTH)

Inflow Area = 118,657 sf, 0.00% Impervious, Inflow Depth = 0.63" for 1-YR event
 Inflow = 2.09 cfs @ 12.09 hrs, Volume= 6,239 cf
 Outflow = 1.96 cfs @ 12.13 hrs, Volume= 6,239 cf, Atten= 6%, Lag= 2.5 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Max. Velocity= 1.58 fps, Min. Travel Time= 3.4 min
 Avg. Velocity = 0.52 fps, Avg. Travel Time= 10.4 min

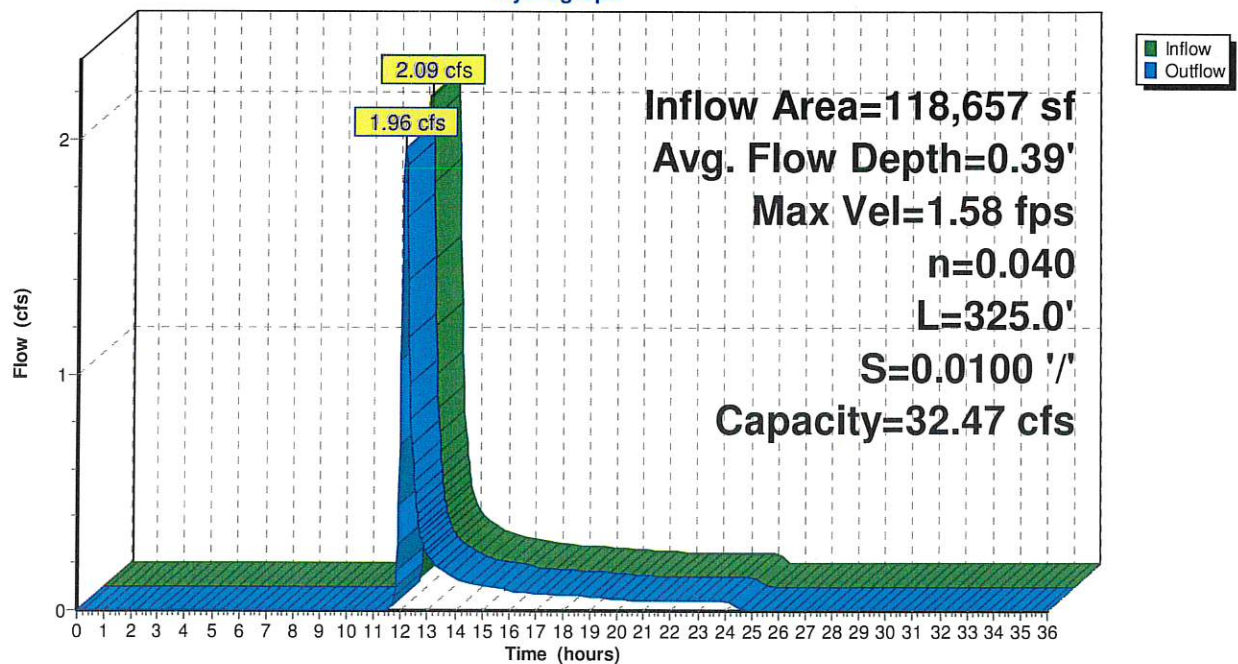
Peak Storage= 403 cf @ 12.13 hrs
 Average Depth at Peak Storage= 0.39'
 Bank-Full Depth= 1.50' Flow Area= 9.8 sf, Capacity= 32.47 cfs

2.00' x 1.50' deep channel, n=0.040 Earth, cobble bottom, clean sides
 Side Slope Z-value= 3.0 ' Top Width= 11.00'
 Length= 325.0' Slope= 0.0100 '/
 Inlet Invert= 889.00', Outlet Invert= 885.75'



Reach 2R: NEW DIVERSION SWALE (NORTH)

Hydrograph



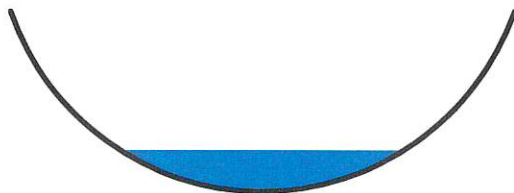
Summary for Reach 3R: EXISTING SWALE (POST)

Inflow Area = 161,608 sf, 0.00% Impervious, Inflow Depth > 0.78" for 1-YR event
 Inflow = 2.50 cfs @ 12.13 hrs, Volume= 10,500 cf
 Outflow = 2.48 cfs @ 12.14 hrs, Volume= 10,500 cf, Atten= 1%, Lag= 0.8 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Max. Velocity= 2.90 fps, Min. Travel Time= 1.1 min
 Avg. Velocity = 0.85 fps, Avg. Travel Time= 3.9 min

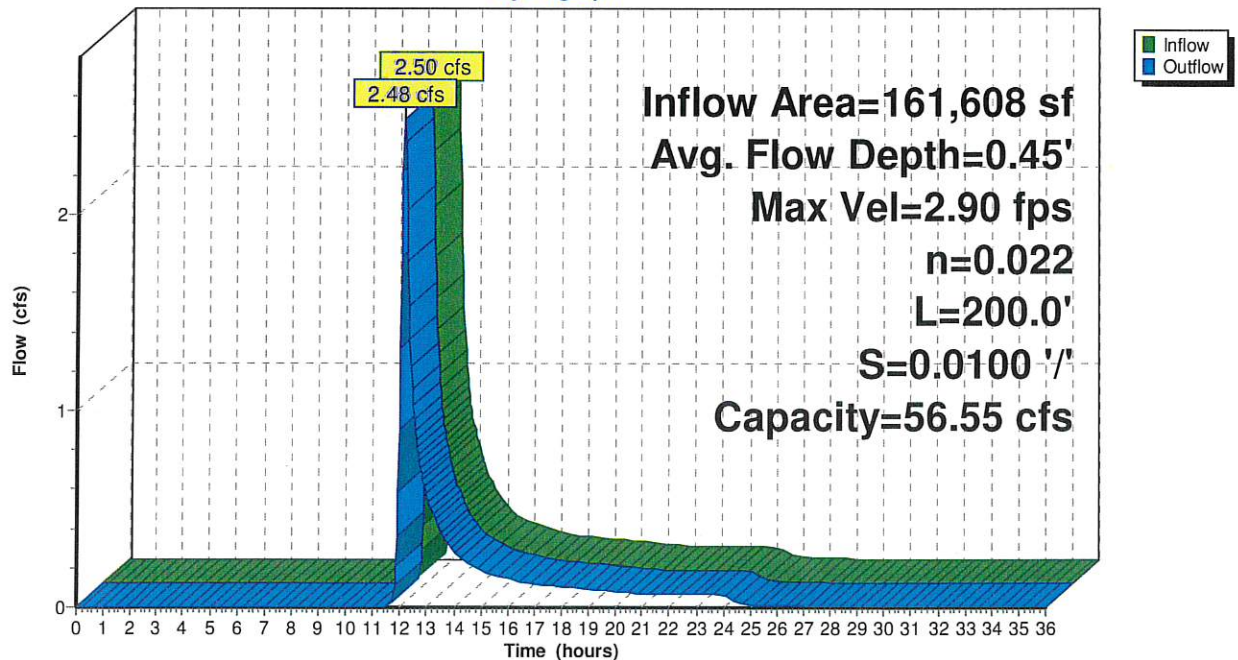
Peak Storage= 171 cf @ 12.14 hrs
 Average Depth at Peak Storage= 0.45'
 Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 56.55 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
 Length= 200.0' Slope= 0.0100 '/'
 Inlet Invert= 882.00', Outlet Invert= 880.00'



Reach 3R: EXISTING SWALE (POST)

Hydrograph



Summary for Pond 1P: STORAGE 1B

Inflow Area = 42,950 sf, 0.00% Impervious, Inflow Depth = 1.32" for 1-YR event
 Inflow = 2.25 cfs @ 11.97 hrs, Volume= 4,733 cf
 Outflow = 0.54 cfs @ 12.13 hrs, Volume= 4,262 cf, Atten= 76%, Lag= 9.6 min
 Primary = 0.54 cfs @ 12.13 hrs, Volume= 4,262 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Peak Elev= 883.77' @ 12.13 hrs Surf.Area= 3,606 sf Storage= 2,088 cf

Plug-Flow detention time= 135.0 min calculated for 4,257 cf (90% of inflow)
 Center-of-Mass det. time= 85.1 min (899.7 - 814.6)

Volume	Invert	Avail.Storage	Storage Description
#1	881.50'	352 cf	2.00'W x 220.00'L x 2.00'H Stone 880 cf Overall x 40.0% Voids
#2	882.60'	10,030 cf	Surface (Prismatic) Listed below (Recalc)
		10,382 cf	Total Available Storage

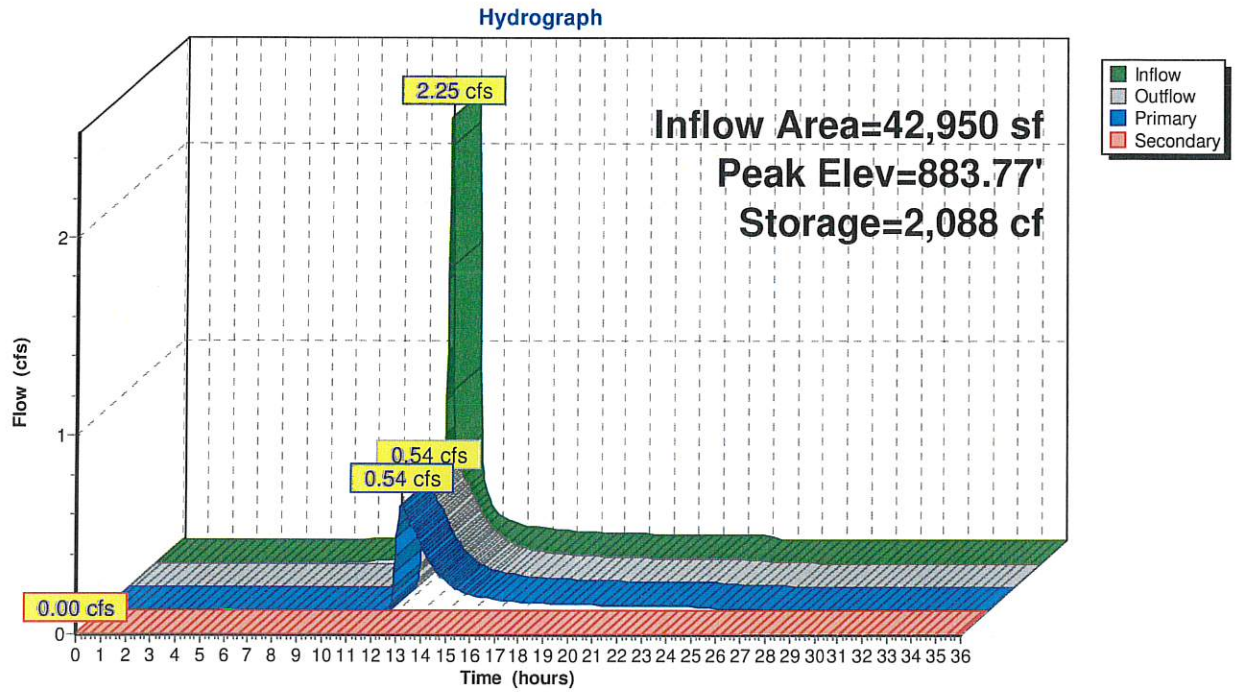
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.60	0	0	0
883.00	900	180	180
884.00	3,860	2,380	2,560
885.00	11,080	7,470	10,030

Device	Routing	Invert	Outlet Devices
#1	Primary	883.00'	6.0" Round Culvert L= 10.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 883.00' / 883.00' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	884.75'	5.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.54 cfs @ 12.13 hrs HW=883.76' (Free Discharge)
 ↑1=Culvert (Barrel Controls 0.54 cfs @ 2.73 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=881.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: STORAGE 1B



5461-HydroCAD S4

Type II 24-hr 10-YR Rainfall=3.57"

Prepared by ABD Engineers, LLP

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Summary for Subcatchment 1S: PRE 1

Runoff = 7.42 cfs @ 12.10 hrs, Volume= 22,806 cf, Depth= 1.69"

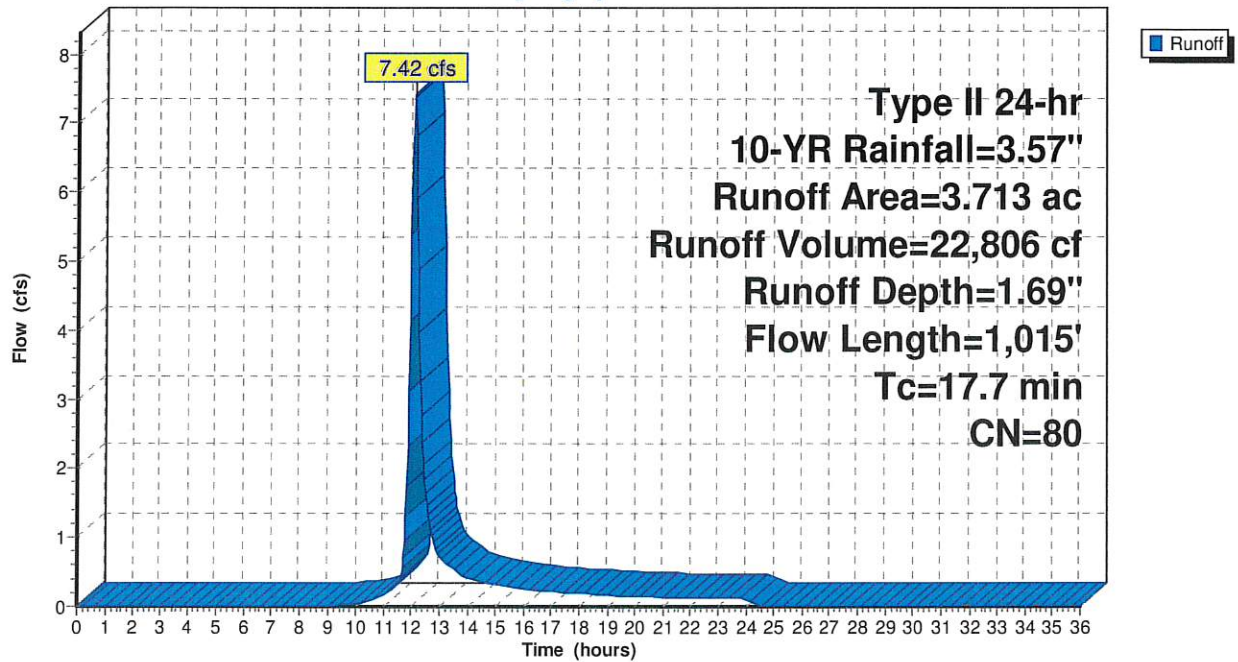
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR Rainfall=3.57"

Area (ac)	CN	Description
1.943	77	Woods, Good, HSG D
1.770	84	Pasture/grassland/range, Fair, HSG D
3.713	80	Weighted Average
3.713		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0450	0.25		Sheet Flow, Range n= 0.130 P2= 2.80"
6.2	555	0.0880	1.48		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.7	360	0.0330	1.27		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
17.7	1,015	Total			

Subcatchment 1S: PRE 1

Hydrograph



Summary for Subcatchment 2S: POST 1A

Runoff = 5.67 cfs @ 12.08 hrs, Volume= 16,024 cf, Depth= 1.62"

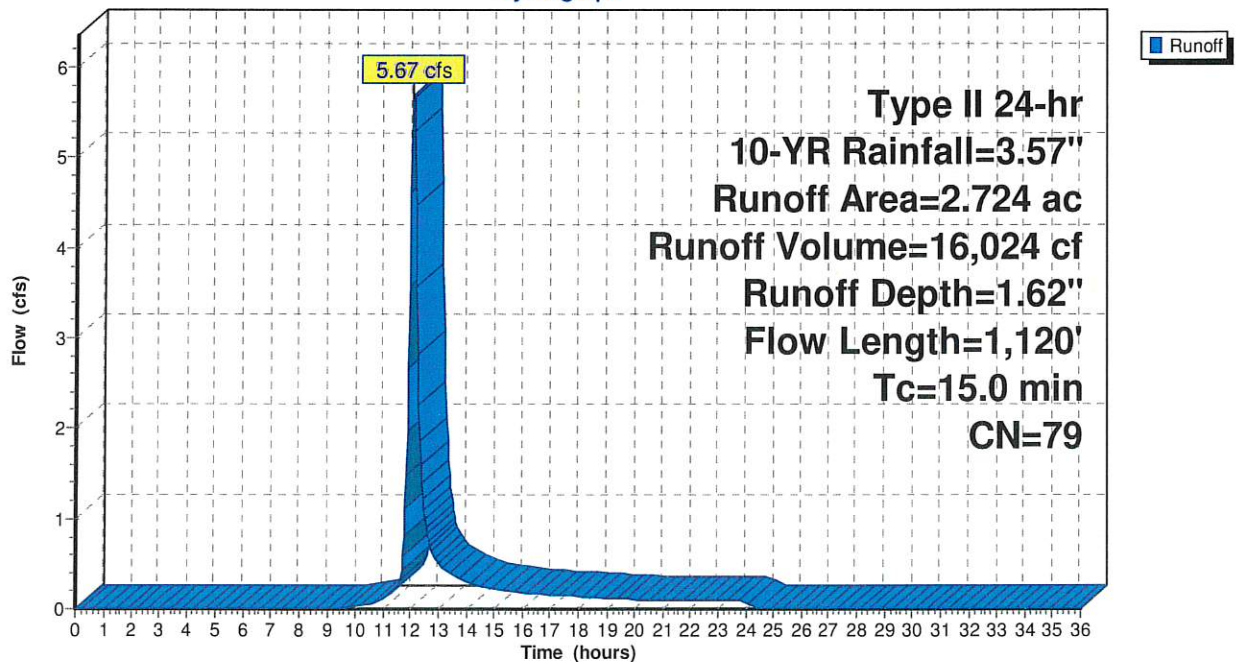
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Type II 24-hr 10-YR Rainfall=3.57"

Area (ac)	CN	Description
1.943	77	Woods, Good, HSG D
0.781	84	Pasture/grassland/range, Fair, HSG D
2.724	79	Weighted Average
2.724		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0450	0.25		Sheet Flow, Range n= 0.130 P2= 2.80"
6.2	555	0.0880	1.48		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	135	0.0330	1.27		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	330	1.0000	33.30	324.71	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=1.50' Z= 3.0' Top.W=11.00' n= 0.040 Earth, cobble bottom, clean sides
15.0	1,120	Total			

Subcatchment 2S: POST 1A

Hydrograph



Summary for Subcatchment 3S: POST 1B

Runoff = 4.29 cfs @ 11.97 hrs, Volume= 9,333 cf, Depth= 2.61"

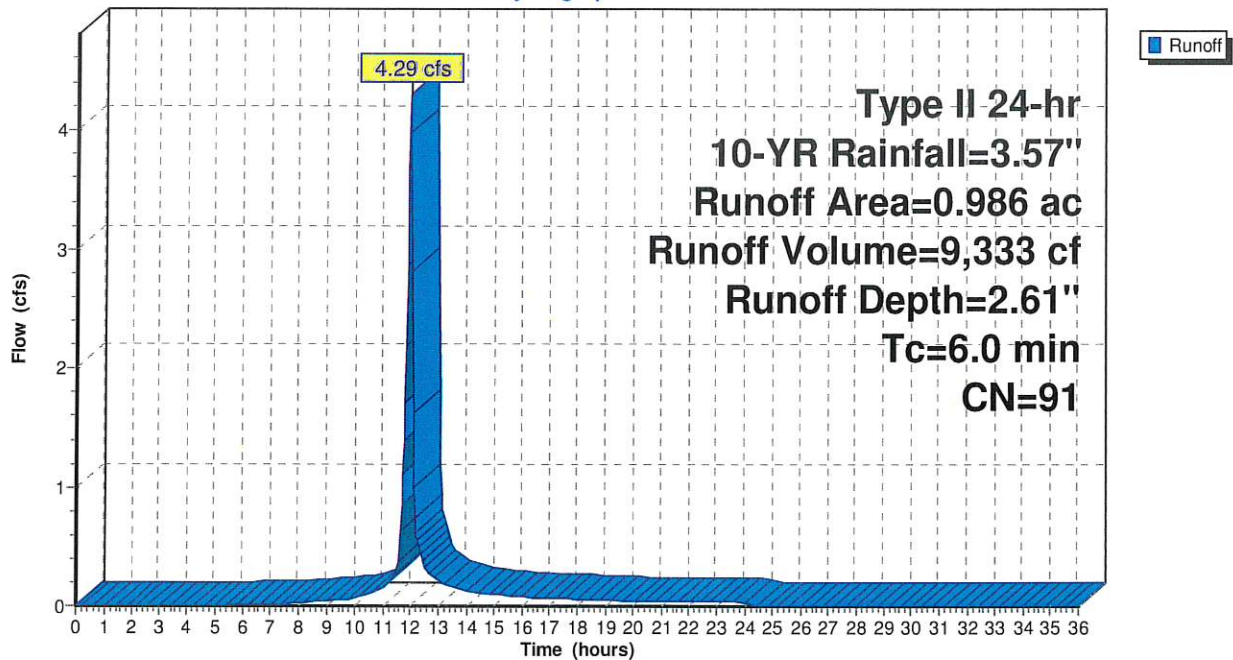
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Type II 24-hr 10-YR Rainfall=3.57"

Area (ac)	CN	Description
0.986	91	Gravel roads, HSG D
0.986		100.00% Pervious Area

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

Subcatchment 3S: POST 1B

Hydrograph



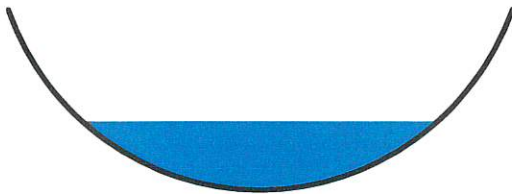
Summary for Reach 1R: EXISTING SWALE (PRE)

Inflow Area = 161,738 sf, 0.00% Impervious, Inflow Depth = 1.69" for 10-YR event
 Inflow = 7.42 cfs @ 12.10 hrs, Volume= 22,806 cf
 Outflow = 7.41 cfs @ 12.12 hrs, Volume= 22,806 cf, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Max. Velocity= 4.00 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 1.36 fps, Avg. Travel Time= 2.4 min

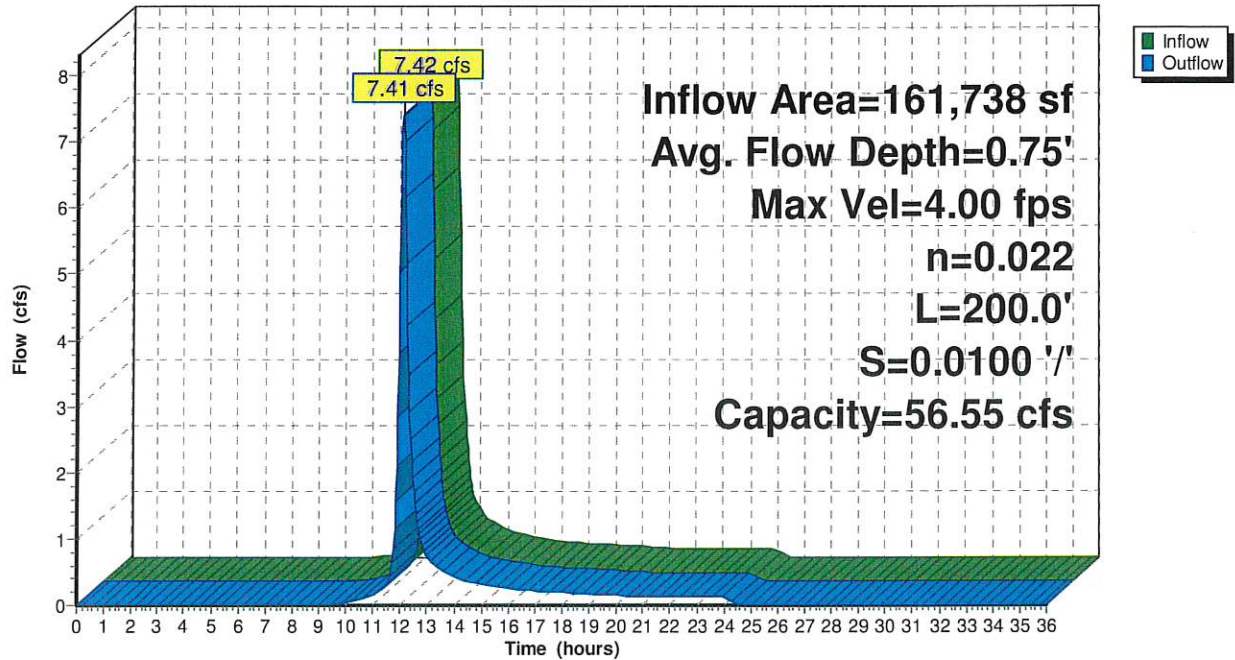
Peak Storage= 370 cf @ 12.12 hrs
 Average Depth at Peak Storage= 0.75'
 Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 56.55 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
 Length= 200.0' Slope= 0.0100 '/'
 Inlet Invert= 882.00', Outlet Invert= 880.00'



Reach 1R: EXISTING SWALE (PRE)

Hydrograph



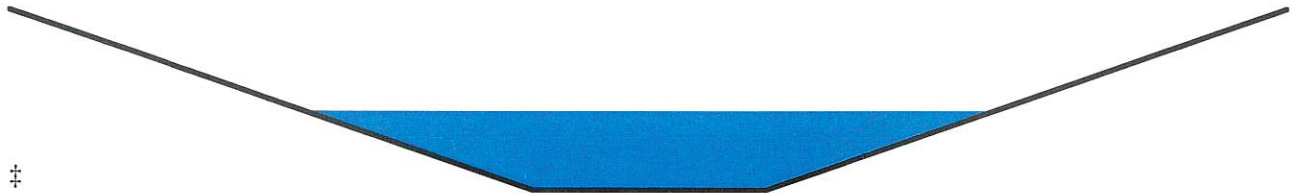
Summary for Reach 2R: NEW DIVERSION SWALE (NORTH)

Inflow Area = 118,657 sf, 0.00% Impervious, Inflow Depth = 1.62" for 10-YR event
 Inflow = 5.67 cfs @ 12.08 hrs, Volume= 16,024 cf
 Outflow = 5.47 cfs @ 12.11 hrs, Volume= 16,024 cf, Atten=4%, Lag= 1.9 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Max. Velocity= 2.09 fps, Min. Travel Time= 2.6 min
 Avg. Velocity = 0.65 fps, Avg. Travel Time= 8.3 min

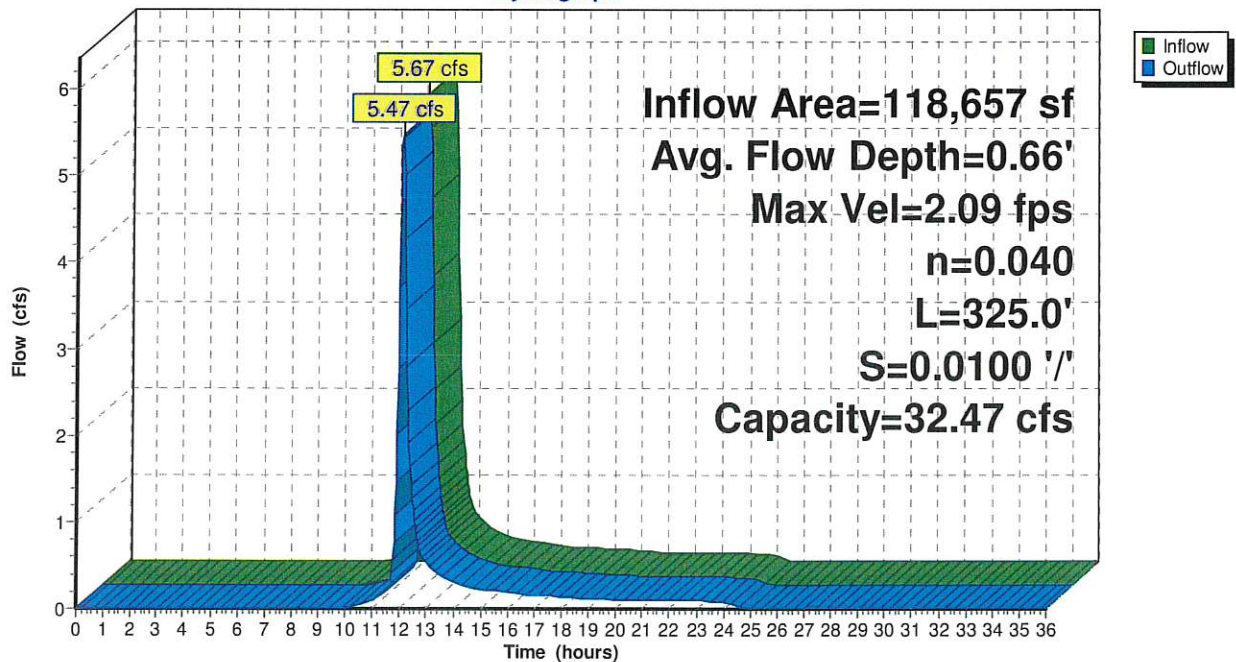
Peak Storage= 848 cf @ 12.11 hrs
 Average Depth at Peak Storage= 0.66'
 Bank-Full Depth= 1.50' Flow Area= 9.8 sf, Capacity= 32.47 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
 Side Slope Z-value= 3.0 ' Top Width= 11.00'
 Length= 325.0' Slope= 0.0100 ' /'
 Inlet Invert= 889.00', Outlet Invert= 885.75'



Reach 2R: NEW DIVERSION SWALE (NORTH)

Hydrograph



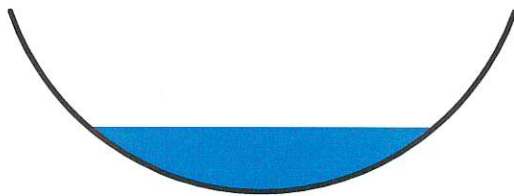
Summary for Reach 3R: EXISTING SWALE (POST)

Inflow Area = 161,608 sf, 0.00% Impervious, Inflow Depth > 1.85" for 10-YR event
Inflow = 6.36 cfs @ 12.11 hrs, Volume= 24,884 cf
Outflow = 6.35 cfs @ 12.12 hrs, Volume= 24,884 cf, Atten=0%, Lag=0.7 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
Max. Velocity= 3.83 fps, Min. Travel Time= 0.9 min
Avg. Velocity= 1.03 fps, Avg. Travel Time= 3.2 min

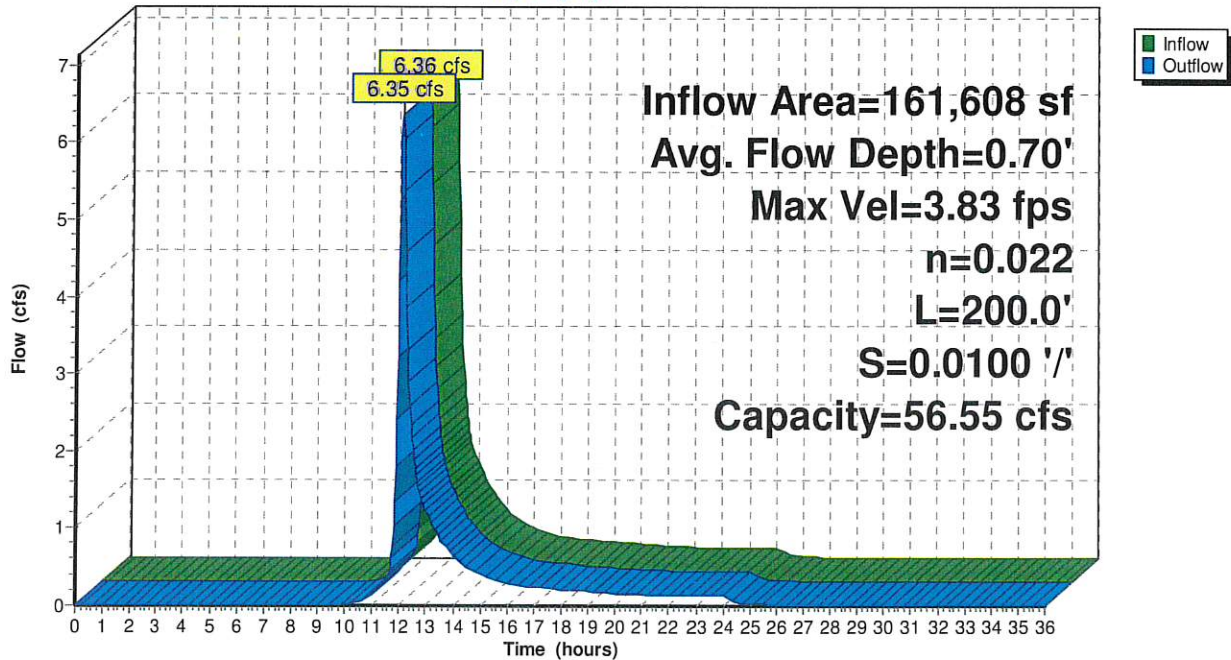
Peak Storage= 332 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 56.55 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 882.00', Outlet Invert= 880.00'



Reach 3R: EXISTING SWALE (POST)

Hydrograph



Summary for Pond 1P: STORAGE 1B

Inflow Area = 42,950 sf, 0.00% Impervious, Inflow Depth = 2.61" for 10-YR event
 Inflow = 4.29 cfs @ 11.97 hrs, Volume= 9,333 cf
 Outflow = 0.89 cfs @ 12.14 hrs, Volume= 8,860 cf, Atten= 79%, Lag= 10.2 min
 Primary = 0.89 cfs @ 12.14 hrs, Volume= 8,860 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Peak Elev= 884.24' @ 12.14 hrs Surf.Area= 6,017 sf Storage= 4,034 cf

Plug-Flow detention time= 105.9 min calculated for 8,860 cf (95% of inflow)
 Center-of-Mass det. time= 76.8 min (872.1 - 795.3)

Volume	Invert	Avail.Storage	Storage Description
#1	881.50'	352 cf	2.00'W x 220.00'L x 2.00'H Stone 880 cf Overall x 40.0% Voids
#2	882.60'	10,030 cf	Surface (Prismatic) Listed below (Recalc)
		10,382 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.60	0	0	0
883.00	900	180	180
884.00	3,860	2,380	2,560
885.00	11,080	7,470	10,030

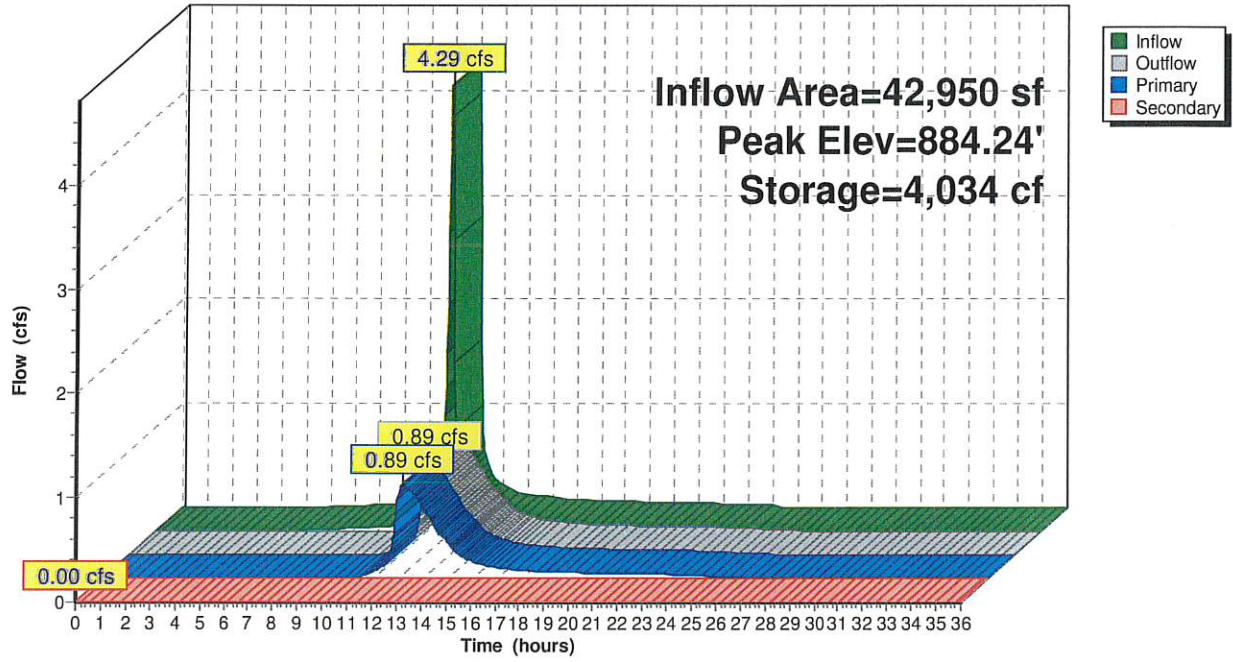
Device	Routing	Invert	Outlet Devices
#1	Primary	883.00'	6.0" Round Culvert L= 10.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 883.00' / 883.00' S= 0.0000 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	884.75'	5.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.89 cfs @ 12.14 hrs HW=884.24' (Free Discharge)
 ↳1=Culvert (Barrel Controls 0.89 cfs @ 4.55 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=881.50' (Free Discharge)
 ↳2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: STORAGE 1B

Hydrograph



Summary for Subcatchment 1S: PRE 1

Runoff = 16.35 cfs @ 12.10 hrs, Volume= 50,235 cf, Depth= 3.73"

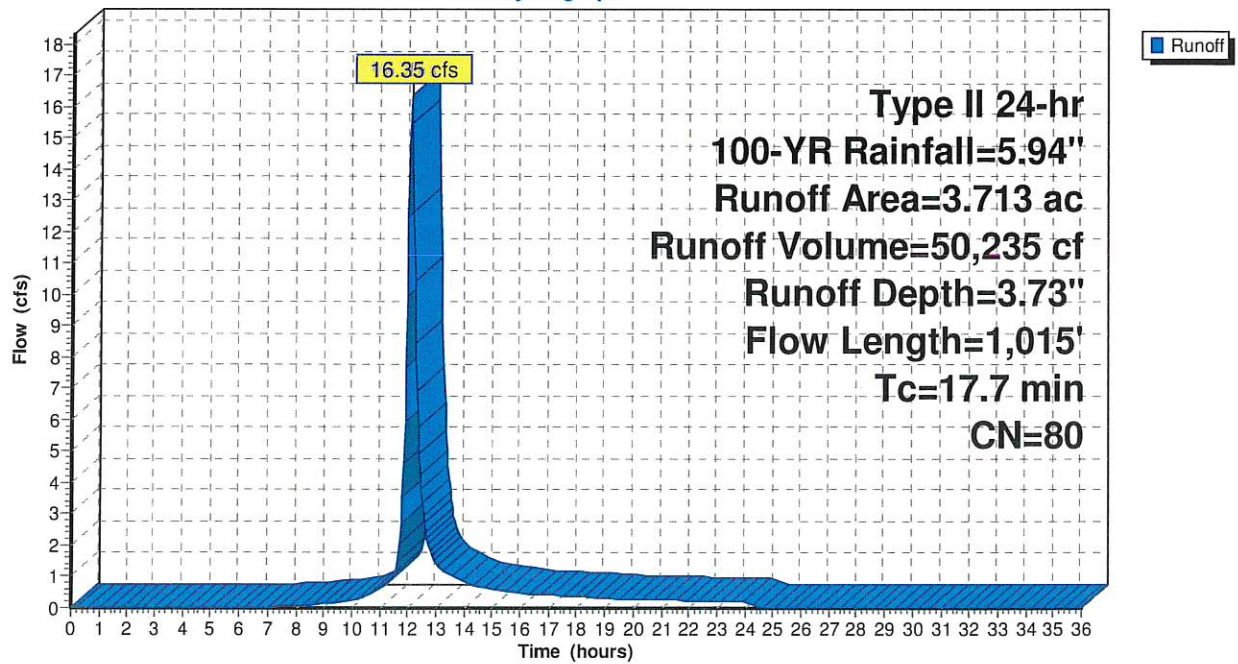
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Type II 24-hr 100-YR Rainfall=5.94"

Area (ac)	CN	Description
1.943	77	Woods, Good, HSG D
1.770	84	Pasture/grassland/range, Fair, HSG D
3.713	80	Weighted Average
3.713		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0450	0.25		Sheet Flow, Range n= 0.130 P2= 2.80"
6.2	555	0.0880	1.48		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.7	360	0.0330	1.27		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
17.7	1,015	Total			

Subcatchment 1S: PRE 1

Hydrograph



Summary for Subcatchment 2S: POST 1A

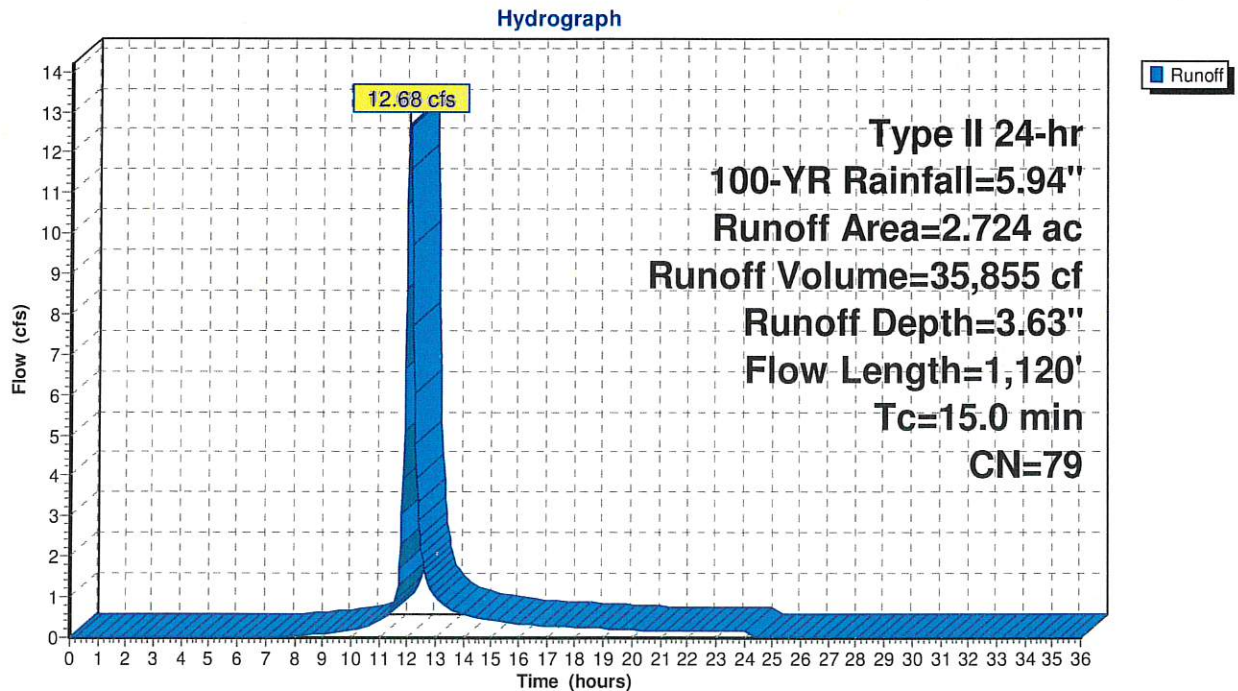
Runoff = 12.68 cfs @ 12.07 hrs, Volume= 35,855 cf, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Type II 24-hr 100-YR Rainfall=5.94"

Area (ac)	CN	Description
1.943	77	Woods, Good, HSG D
0.781	84	Pasture/grassland/range, Fair, HSG D
2.724	79	Weighted Average
2.724		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0450	0.25		Sheet Flow, Range n= 0.130 P2= 2.80"
6.2	555	0.0880	1.48		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	135	0.0330	1.27		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	330	1.0000	33.30	324.71	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=1.50' Z= 3.0' Top.W=11.00' n= 0.040 Earth, cobble bottom, clean sides
15.0	1,120	Total			

Subcatchment 2S: POST 1A



Summary for Subcatchment 3S: POST 1B

Runoff = 7.75 cfs @ 11.97 hrs, Volume= 17,533 cf, Depth= 4.90"

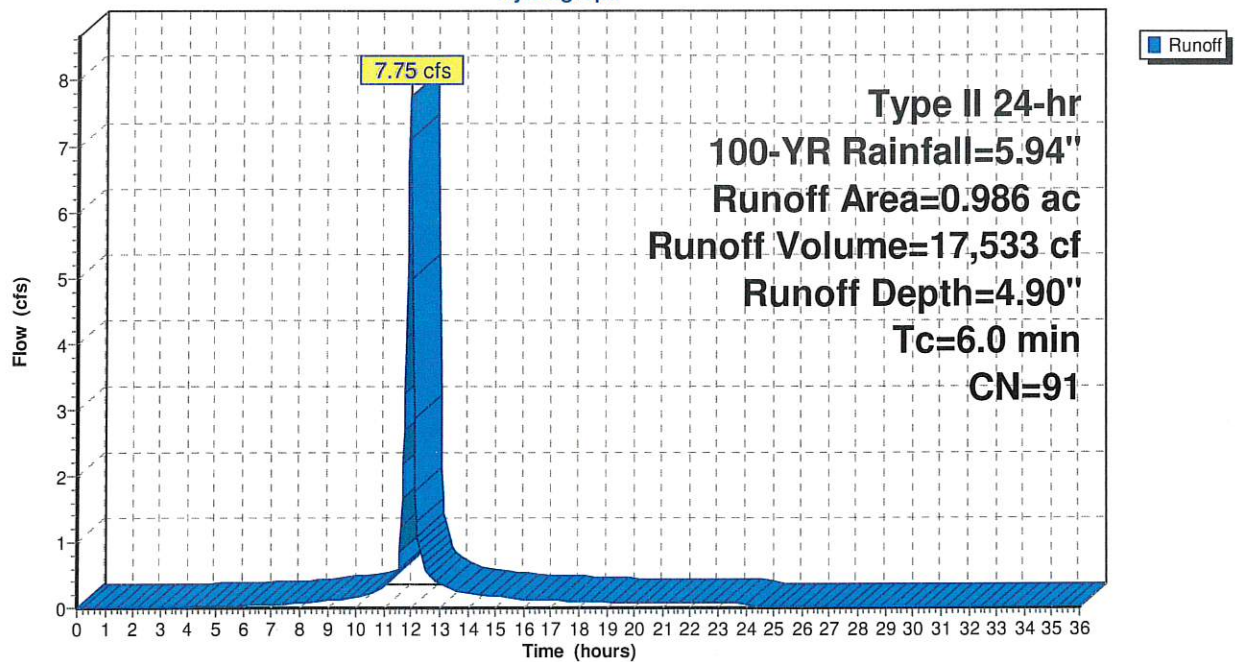
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Type II 24-hr 100-YR Rainfall=5.94"

Area (ac)	CN	Description
0.986	91	Gravel roads, HSG D
0.986		100.00% Pervious Area

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

Subcatchment 3S: POST 1B

Hydrograph



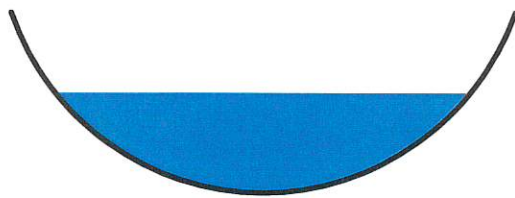
Summary for Reach 1R: EXISTING SWALE (PRE)

Inflow Area = 161,738 sf, 0.00% Impervious, Inflow Depth = 3.73" for 100-YR event
Inflow = 16.35 cfs @ 12.10 hrs, Volume= 50,235 cf
Outflow = 16.31 cfs @ 12.11 hrs, Volume= 50,235 cf, Atten=0%, Lag= 0.5 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
Max. Velocity= 5.01 fps, Min. Travel Time= 0.7 min
Avg. Velocity= 1.61 fps, Avg. Travel Time= 2.1 min

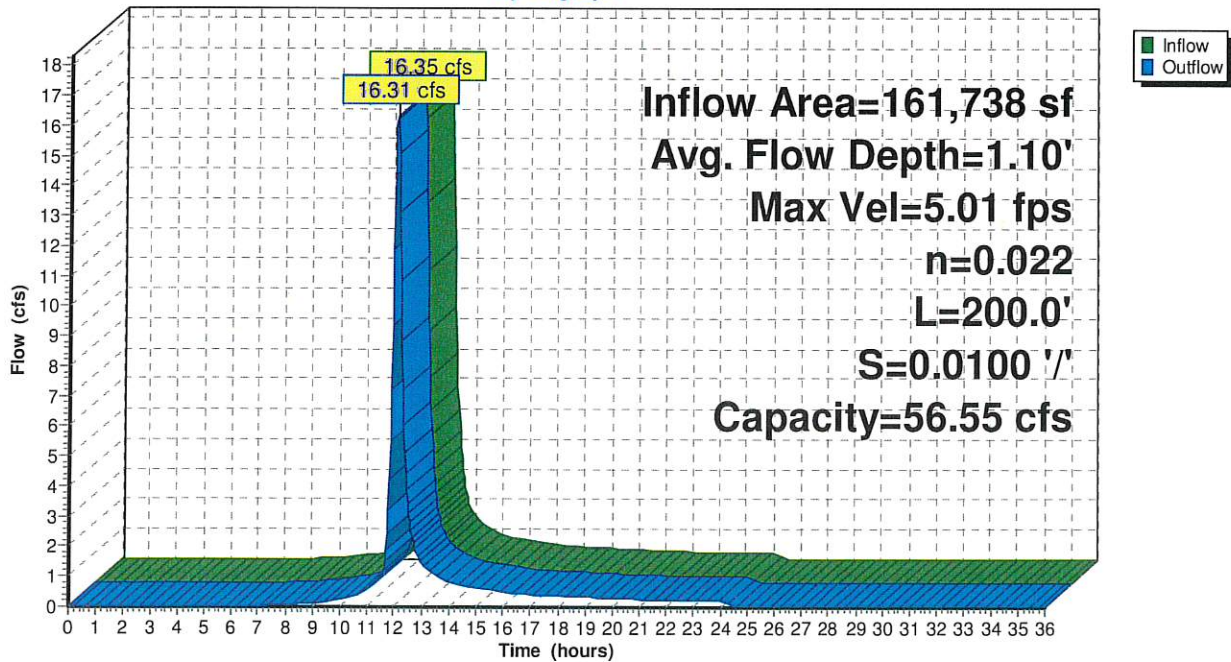
Peak Storage= 651 cf @ 12.11 hrs
Average Depth at Peak Storage= 1.10'
Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 56.55 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 882.00', Outlet Invert= 880.00'



Reach 1R: EXISTING SWALE (PRE)

Hydrograph



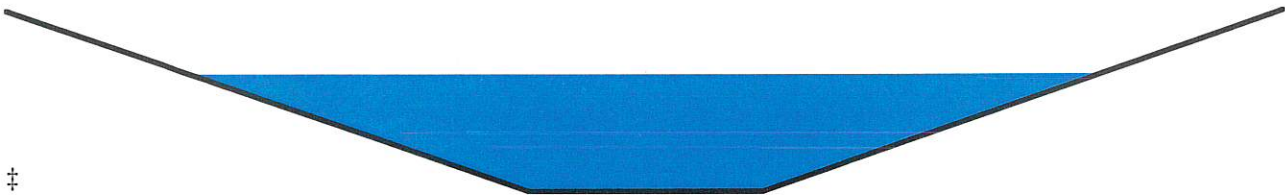
Summary for Reach 2R: NEW DIVERSION SWALE (NORTH)

Inflow Area = 118,657 sf, 0.00% Impervious, Inflow Depth = 3.63" for 100-YR event
 Inflow = 12.68 cfs @ 12.07 hrs, Volume= 35,855 cf
 Outflow = 12.39 cfs @ 12.10 hrs, Volume= 35,855 cf, Atten= 2%, Lag= 1.5 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Max. Velocity= 2.60 fps, Min. Travel Time= 2.1 min
 Avg. Velocity= 0.78 fps, Avg. Travel Time= 6.9 min

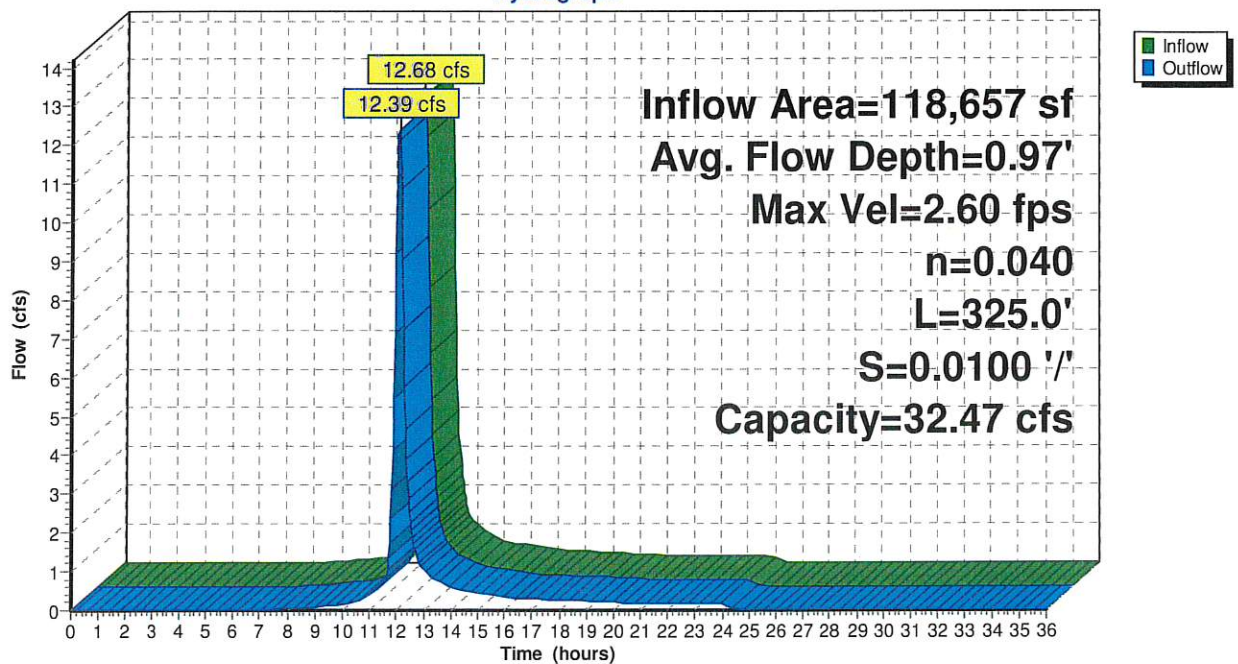
Peak Storage= 1,548 cf @ 12.10 hrs
 Average Depth at Peak Storage= 0.97'
 Bank-Full Depth= 1.50' Flow Area= 9.8 sf, Capacity= 32.47 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
 Side Slope Z-value= 3.0 ' Top Width= 11.00'
 Length= 325.0' Slope= 0.0100 '/'
 Inlet Invert= 889.00', Outlet Invert= 885.75'



Reach 2R: NEW DIVERSION SWALE (NORTH)

Hydrograph



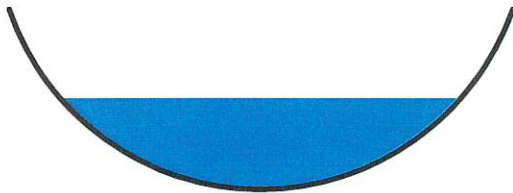
Summary for Reach 3R: EXISTING SWALE (POST)

Inflow Area = 161,608 sf, 0.00% Impervious, Inflow Depth = 3.93" for 100-YR event
 Inflow = 13.52 cfs @ 12.10 hrs, Volume= 52,914 cf
 Outflow = 13.48 cfs @ 12.10 hrs, Volume= 52,914 cf, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Max. Velocity= 4.74 fps, Min. Travel Time= 0.7 min
 Avg. Velocity = 1.24 fps, Avg. Travel Time= 2.7 min

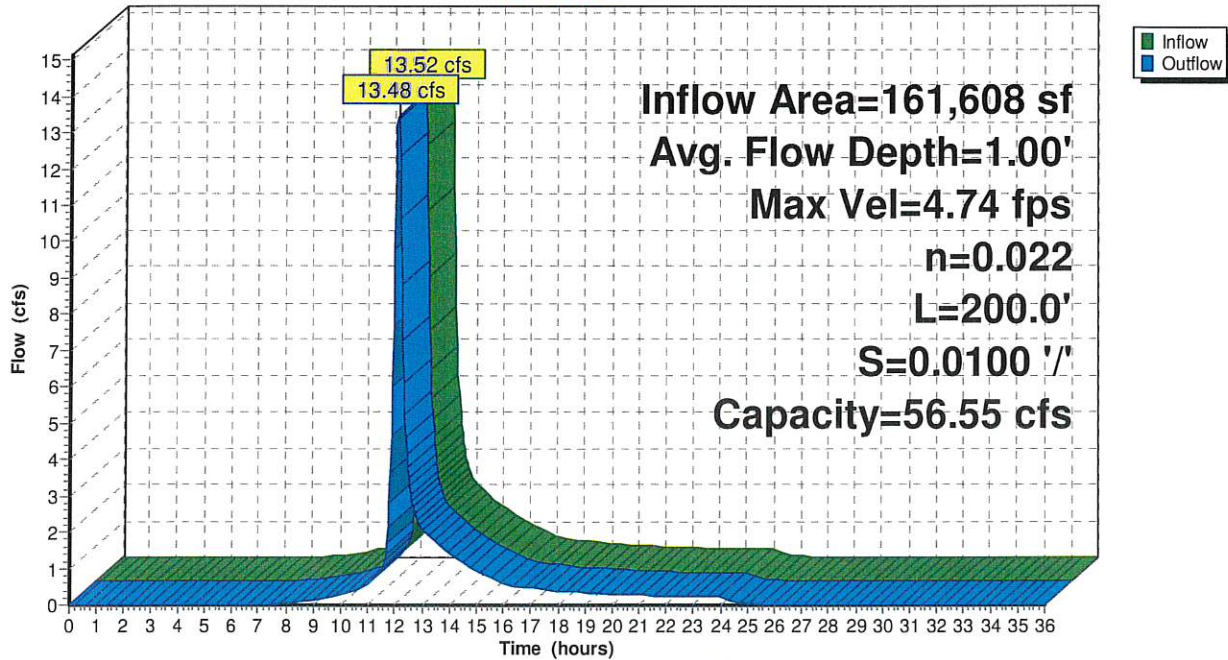
Peak Storage= 568 cf @ 12.10 hrs
 Average Depth at Peak Storage= 1.00'
 Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 56.55 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
 Length= 200.0' Slope= 0.0100 '/'
 Inlet Invert= 882.00', Outlet Invert= 880.00'



Reach 3R: EXISTING SWALE (POST)

Hydrograph



Summary for Pond 1P: STORAGE 1B

Inflow Area = 42,950 sf, 0.00% Impervious, Inflow Depth = 4.90" for 100-YR event
 Inflow = 7.75 cfs @ 11.97 hrs, Volume= 17,533 cf
 Outflow = 1.14 cfs @ 12.19 hrs, Volume= 17,059 cf, Atten= 85%, Lag= 13.6 min
 Primary = 1.14 cfs @ 12.19 hrs, Volume= 17,059 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.04 hrs
 Peak Elev= 884.71' @ 12.19 hrs Surf.Area= 9,431 sf Storage= 7,479 cf

Plug-Flow detention time= 98.4 min calculated for 17,040 cf (97% of inflow)
 Center-of-Mass det. time= 82.3 min (860.3 - 778.0)

Volume	Invert	Avail.Storage	Storage Description
#1	881.50'	352 cf	2.00'W x 220.00'L x 2.00'H Stone 880 cf Overall x 40.0% Voids
#2	882.60'	10,030 cf	Surface (Prismatic) Listed below (Recalc)
		10,382 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
882.60	0	0	0
883.00	900	180	180
884.00	3,860	2,380	2,560
885.00	11,080	7,470	10,030

Device	Routing	Invert	Outlet Devices
#1	Primary	883.00'	6.0" Round Culvert L= 10.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 883.00' / 883.00' S= 0.0000 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	884.75'	5.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=1.14 cfs @ 12.19 hrs HW=884.71' (Free Discharge)

↳ **1=Culvert** (Inlet Controls 1.14 cfs @ 5.82 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=881.50' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: STORAGE 1B

Hydrograph

