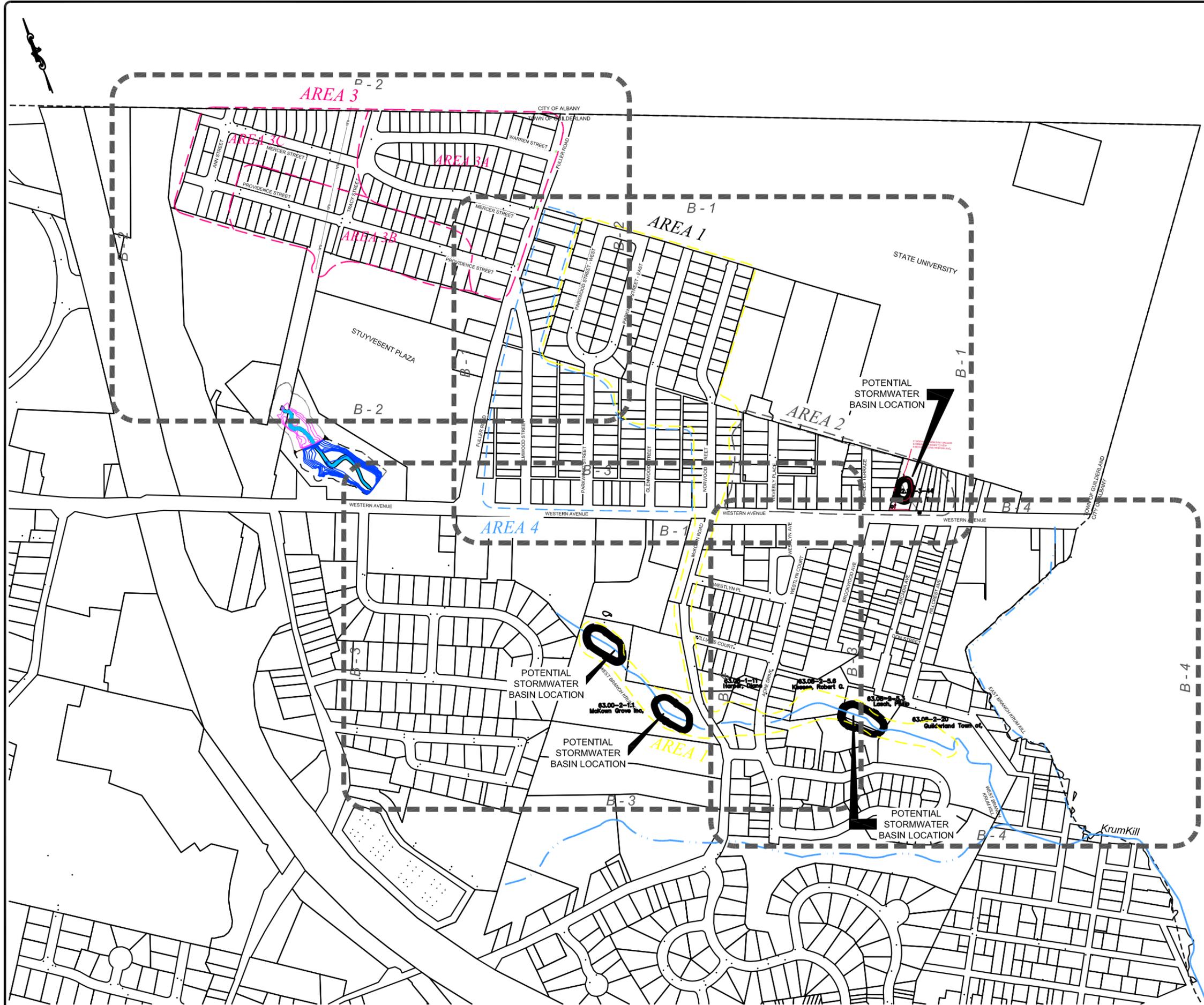


APPENDIX A
Existing Conditions Map

APPENDIX B
Conceptual Improvements Plans
Sheets B1-B-4



INDEX MAP 0' 300'

DATE: SEPT. 2009
 DRAWN BY: KJ
 SCALE: AS SHOWN
 REVIEWED BY: FMG
 PROJECT NO.:
 FILE:

DELAWARE ENGINEERING, P.C.
 CIVIL AND ENVIRONMENTAL ENGINEERING
 8-17 DIETZ STREET, SUITE 303, ONEONTA, NY 13820 - 607.452.8073
 28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1280
 6 TOWNSEND STREET, WALTON, NY 13856 - 607.865.92354

NO.	DATE	DESCRIPTION

McKOWNVILLE DRAINAGE SYSTEM
 TOWN OF GUILDERLAND, NY

CONCEPTUAL IMPROVEMENTS MAP

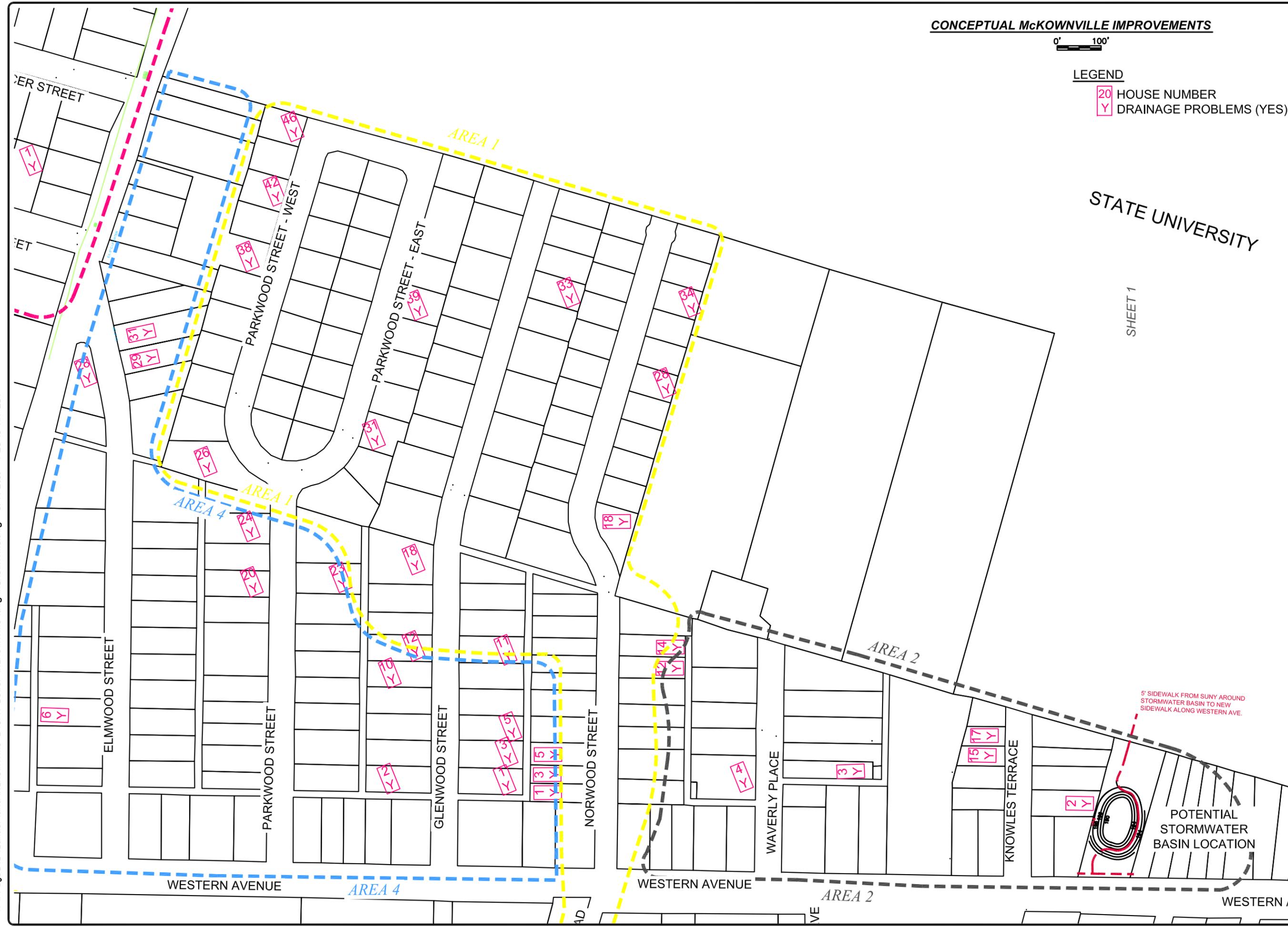
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CONCEPTUAL McKOWNVILLE IMPROVEMENTS

0' 100'

LEGEND

- 20 HOUSE NUMBER
- Y DRAINAGE PROBLEMS (YES)



STATE UNIVERSITY

SHEET 1

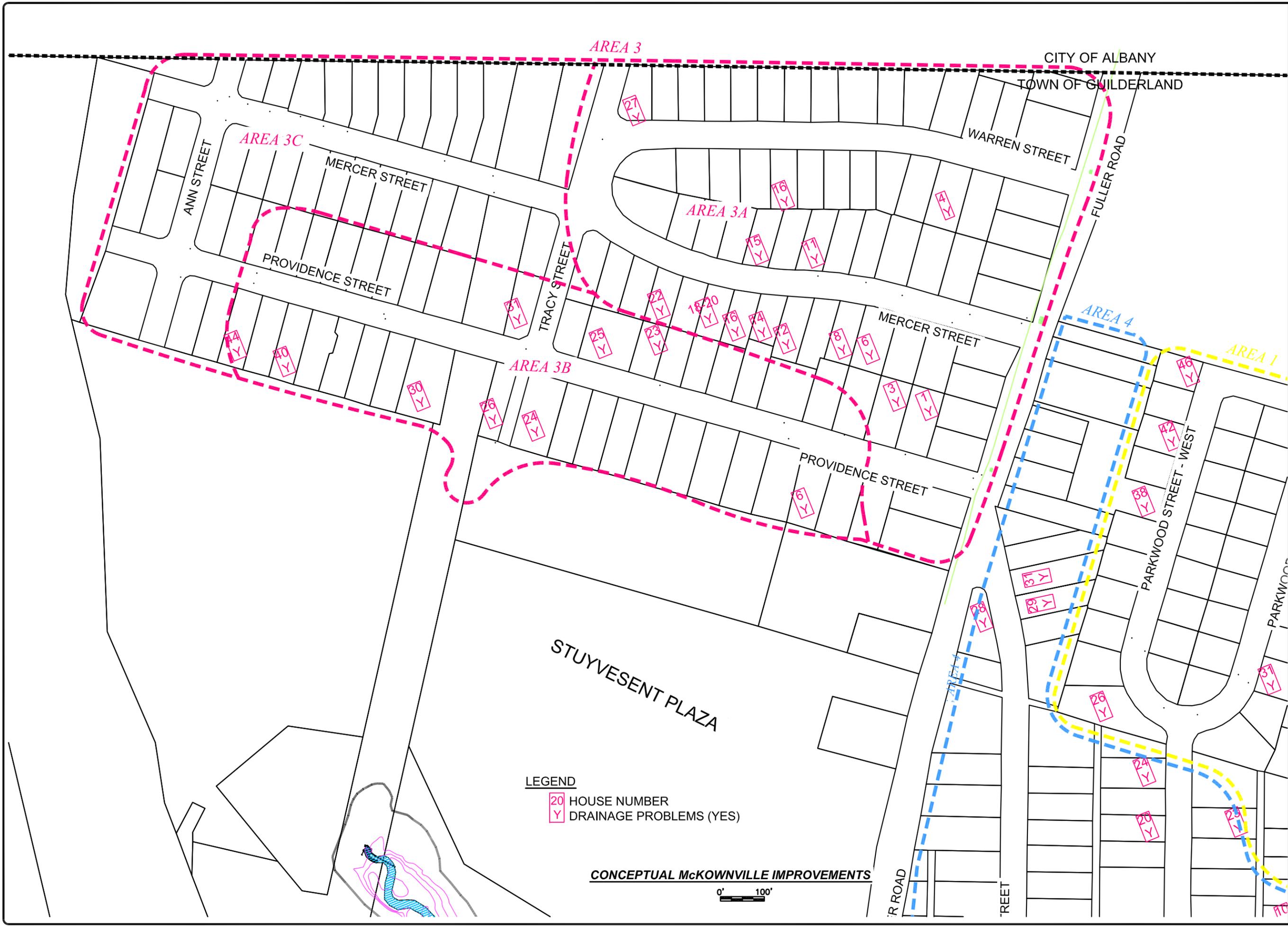
DATE: SEPT. 2009
 DRAWN BY:
 SCALE:
 REVIEWED BY:
 PROJECT NO.:
 FILE:

DELAWARE ENGINEERING, P.C.
 CIVIL AND ENVIRONMENTAL ENGINEERING
 8-12 DIETZ STREET, SUITE 303, ONEONTA, NY 13820 - 607.432.8073
 28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
 6 TOWNSEND STREET, WALTON, NY 13856 - 607.865.92354

NO.	DATE	REVISIONS DESCRIPTION

McKOWNVILLE DRAINAGE SYSTEM
 TOWN OF GUILDERLAND, NY

CONCEPTUAL McKOWNVILLE IMPROVEMENTS



LEGEND
 [Pink box with house number and Y] HOUSE NUMBER
 [Pink box with Y] DRAINAGE PROBLEMS (YES)

CONCEPTUAL McKOWNVILLE IMPROVEMENTS



SECT. 2008
 DATE: _____
 DRAWN BY: _____
 SCALE: _____
 REVIEWED BY: _____
 PROJECT NO.: _____
 FILE: _____

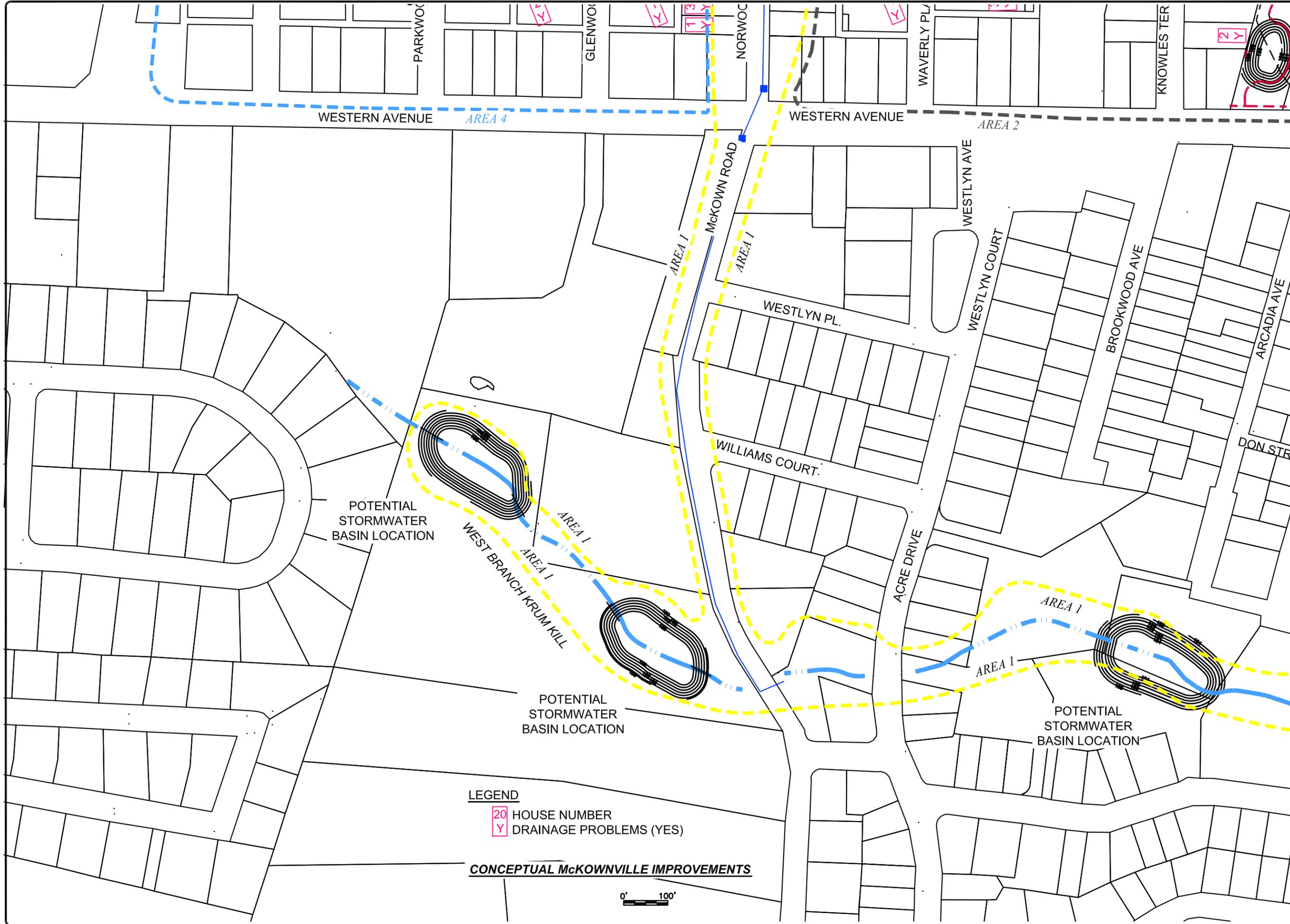
DELAWARE ENGINEERING, P.C.
 CIVIL AND ENVIRONMENTAL ENGINEERING
 8-12 DIETZ STREET, SUITE 303, ONEONTA, NY 13920-6074, 607.452.8073
 28 MADISON AVENUE EXTENSION, ALBANY, NY 12203-5118, 452.1290
 6 TOWNSEND STREET, WALTON, NY 13866-6074, 607.865.9234

NO.	DATE	REVISIONS DESCRIPTION

McKOWNVILLE DRAINAGE SYSTEM
 TOWN OF GUILDERLAND, NY

**CONCEPTUAL
 McKOWNVILLE
 IMPROVEMENTS**

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LEGEND
 20 HOUSE NUMBER
 Y DRAINAGE PROBLEMS (YES)

CONCEPTUAL McKOWNVILLE IMPROVEMENTS



DATE: SECT. 2008
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 SCALE:
 REVIEWED BY:
 PROJECT NO.:
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DELAWARE ENGINEERING, P.C.
 CIVIL AND ENVIRONMENTAL ENGINEERING

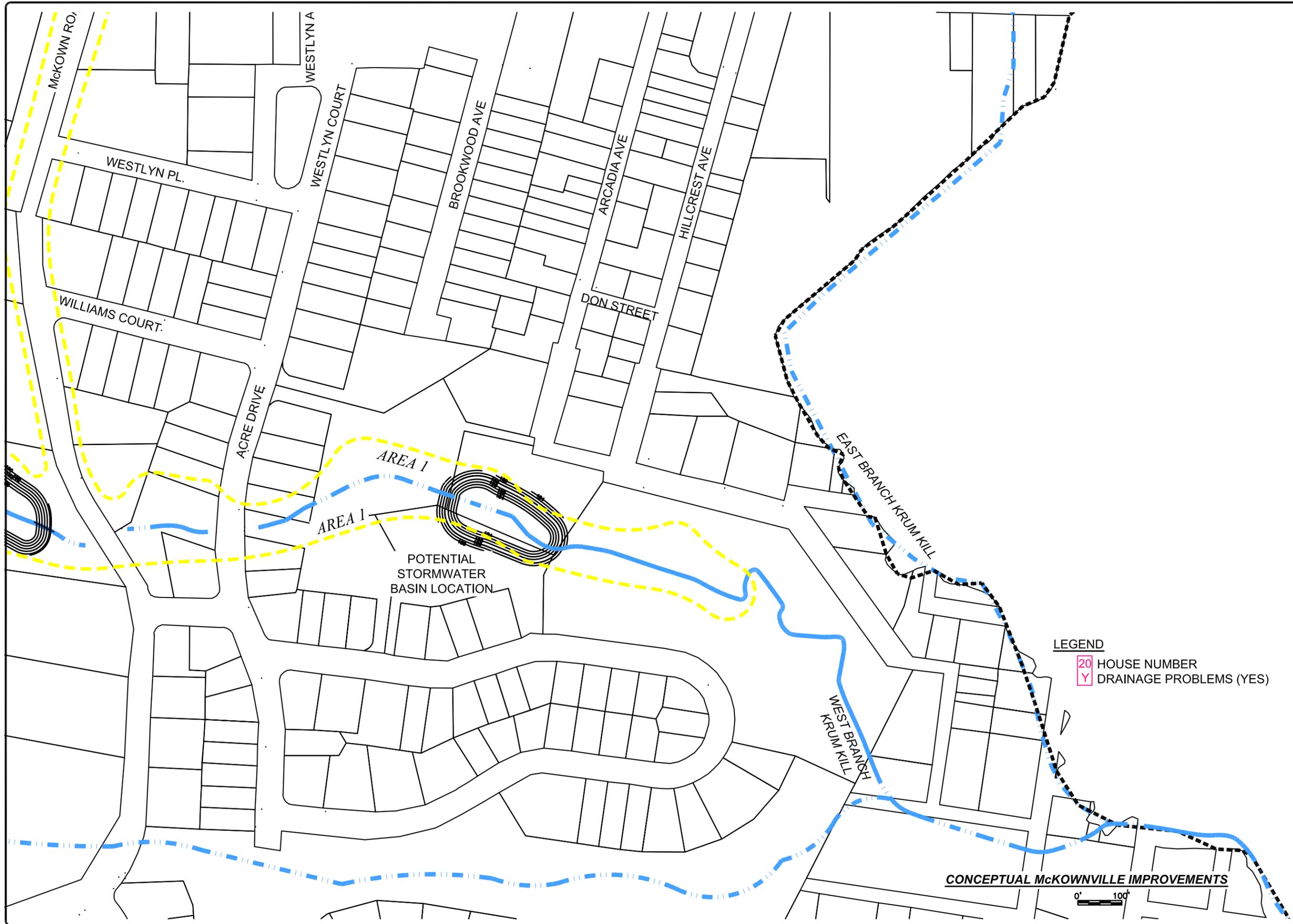
8-12 DIETZ STREET, SUITE 303, ONEONTA, NY 13820 - 607.432.8073
 28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
 6 TOWNSEND STREET, WALTON, NY 13856 - 607.865.9234

NO.	DATE	DESCRIPTION

McKOWNVILLE DRAINAGE SYSTEM
 TOWN OF GUILDERLAND, NY

**CONCEPTUAL
 McKOWNVILLE
 IMPROVEMENTS**

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DATE: SEPT. 2009
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 SCALE:
 REVIEWED BY:
 PROJECT NO.:
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DELAWARE ENGINEERING, P.C.
 CIVIL AND ENVIRONMENTAL ENGINEERING
 8-13 DIETZ STREET, SUITE 303, CHEMUNTA, NY 13820 - 607.452.8973
 28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
 6 TOWNSEND STREET, WALTON, NY 13856 - 607.486.9234

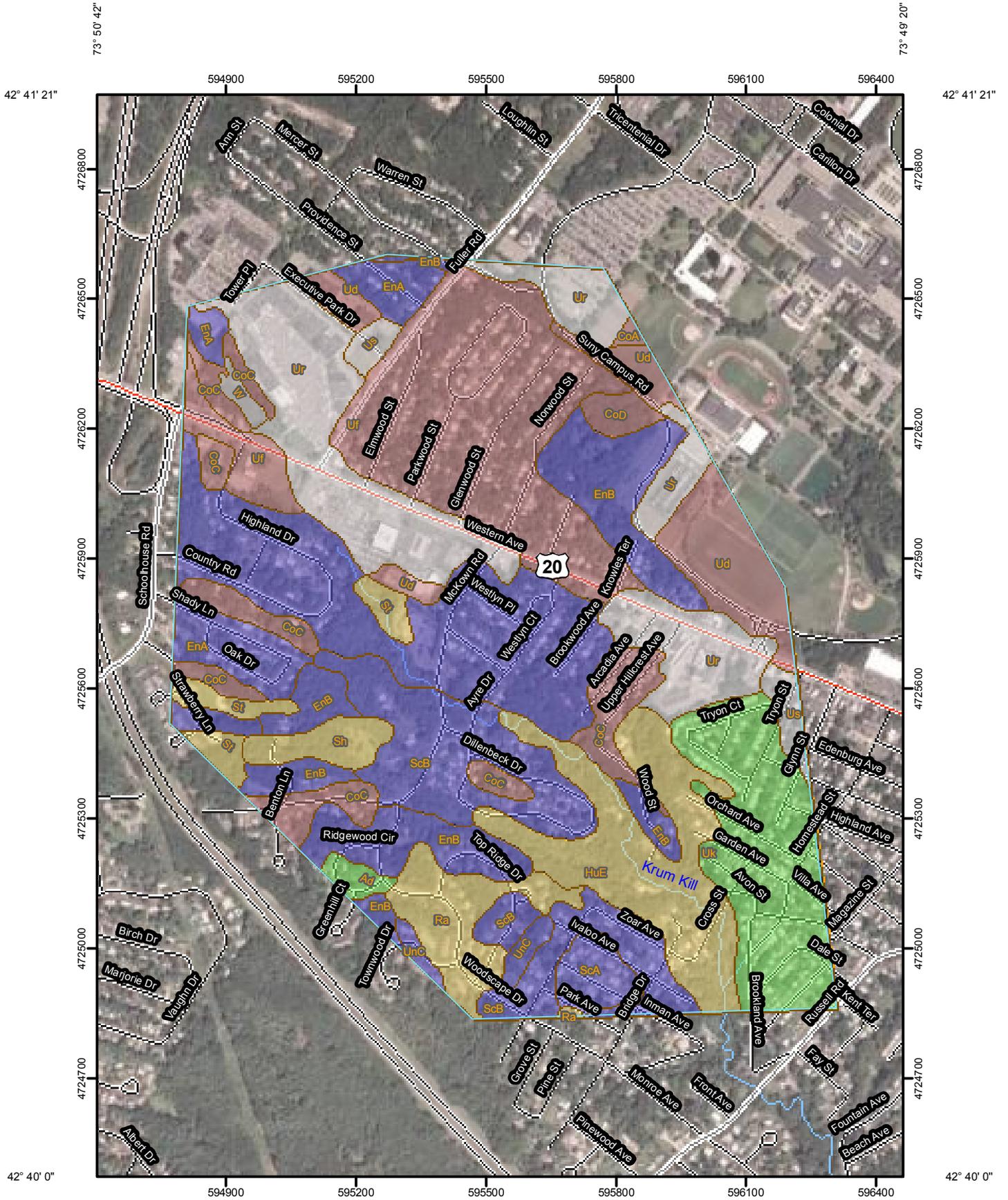
NO.	DATE	REVISIONS DESCRIPTION

McKOWNVILLE DRAINAGE SYSTEM
 TOWN OF GUILDERLAND, NY

**CONCEPTUAL
 McKOWNVILLE
 IMPROVEMENTS**

APPENDIX C
Soil Mapping

Hydrologic Soil Group—Albany County, New York
(McKownville Stormwater Project Soils)



Map Scale: 1:11,900 if printed on A size (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units

Soil Ratings

 A

 A/D

 B

 B/D

 C

 C/D

 D

 Not rated or not available

Political Features

 Cities

Water Features

 Oceans

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

MAP INFORMATION

Map Scale: 1:11,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 18N NAD83

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

Soil Survey Area: Albany County, New York
Survey Area Data: Version 6, Mar 24, 2008

Date(s) aerial images were photographed: 9/11/2006; 8/2/2006

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

Hydrologic Soil Group— Summary by Map Unit — Albany County, New York				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ad	Adrian muck	A/D	2.6	0.5%
CoA	Colonie loamy fine sand, 0 to 3 percent slopes	A	0.7	0.1%
CoC	Colonie loamy fine sand, rolling	A	28.0	5.4%
CoD	Colonie loamy fine sand, hilly	A	3.4	0.7%
EnA	Elnora loamy fine sand, 0 to 3 percent slopes	B	81.6	15.8%
EnB	Elnora loamy fine sand, 3 to 8 percent slopes	B	46.0	8.9%
HuE	Hudson silt loam, 25 to 45 percent slopes	C	40.5	7.8%
Ra	Raynham very fine sandy loam	C	16.7	3.2%
ScA	Scio silt loam, 0 to 3 percent slopes	B	6.7	1.3%
ScB	Scio silt loam, 3 to 8 percent slopes	B	47.9	9.3%
Sh	Shaker fine sandy loam	C	6.8	1.3%
St	Stafford loamy fine sand	C	8.7	1.7%
Ud	Udipsamments, smoothed	A	26.9	5.2%
Uf	Udipsamments-Urban land complex	A	76.3	14.8%
Uk	Udorthents, loamy-Urban land complex	A/D	41.1	8.0%
UnC	Unadilla silt loam, 8 to 15 percent slopes	B	3.6	0.7%
Ur	Urban land		71.4	13.8%
Us	Urban land-Udipsamments complex, 0 to 8 percent slopes		6.1	1.2%
W	Water		1.7	0.3%
Totals for Area of Interest			516.7	100.0%



United States
Department of
Agriculture



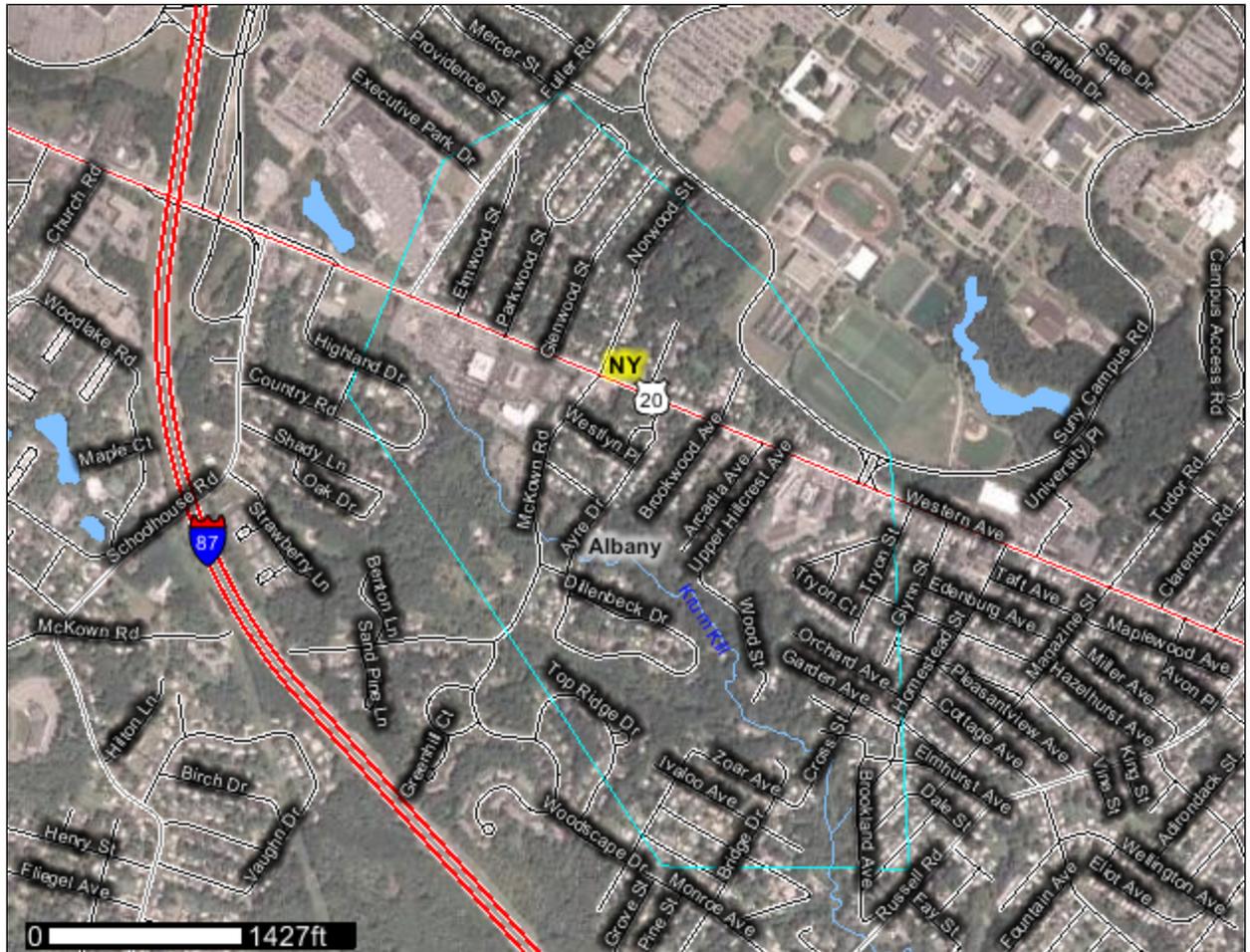
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Albany County, New York

McKownville



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://soils.usda.gov/sqi/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrsc>) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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Sh—Shaker fine sandy loam.....	18
St—Stafford loamy fine sand.....	19
Ud—Udipsamments, smoothed.....	20
Uf—Udipsamments-Urban land complex.....	20
Uk—Udorthents, loamy-Urban land complex.....	21
UnC—Unadilla silt loam, 8 to 15 percent slopes.....	21
Ur—Urban land.....	22
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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

Custom Soil Resource Report

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Albany County, New York

CoC—Colonie loamy fine sand, rolling

Map Unit Setting

Elevation: 150 to 1,000 feet

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Colonie, rolling, and similar soils: 85 percent

Description of Colonie, Rolling

Setting

Landform: Beach ridges, deltas

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Sandy glaciofluvial or eolian deposits

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 7 inches: Loamy fine sand

7 to 68 inches: Loamy fine sand

68 to 74 inches: Loamy fine sand

CoD—Colonie loamy fine sand, hilly

Map Unit Setting

Elevation: 150 to 1,000 feet

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Colonie, hilly, and similar soils: 80 percent

Description of Colonie, Hilly

Setting

Landform: Beach ridges, deltas
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial or eolian deposits

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 7 inches: Loamy fine sand
7 to 68 inches: Loamy fine sand
68 to 74 inches: Loamy fine sand

EnA—Elnora loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days

Map Unit Composition

Elnora and similar soils: 85 percent

Description of Elnora

Setting

Landform: Beach ridges, deltas
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Sandy glaciofluvial, eolian, or deltaic deposits

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Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.1 inches)

Interpretive groups

Land capability (nonirrigated): 2w

Typical profile

0 to 11 inches: Loamy fine sand
11 to 27 inches: Fine sand
27 to 65 inches: Loamy fine sand

EnB—Elnora loamy fine sand, 3 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days

Map Unit Composition

Elnora and similar soils: 85 percent

Description of Elnora

Setting

Landform: Beach ridges, deltas
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Sandy glaciofluvial, eolian, or deltaic deposits

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.1 inches)

Interpretive groups

Land capability (nonirrigated): 2w

Typical profile

0 to 11 inches: Loamy fine sand

Custom Soil Resource Report

11 to 27 inches: Fine sand
27 to 65 inches: Loamy fine sand

HuE—Hudson silt loam, 25 to 45 percent slopes

Map Unit Setting

Elevation: 300 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days

Map Unit Composition

Hudson and similar soils: 85 percent

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well 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 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: High (about 9.7 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 11 inches: Silt loam
11 to 16 inches: Silty clay loam
16 to 31 inches: Silty clay
31 to 60 inches: Clay

Ra—Raynham very fine sandy loam

Map Unit Setting

Elevation: 50 to 500 feet

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Raynham, poorly drained, and similar soils: 80 percent

Description of Raynham, Poorly Drained

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Glaciolacustrine, eolian, or old alluvial deposits, comprised mainly of silt and very fine sand

Properties and qualities

Slope: 0 to 3 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 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Available water capacity: High (about 11.7 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 11 inches: Very fine sandy loam

11 to 24 inches: Very fine sandy loam

24 to 60 inches: Very fine sandy loam

ScA—Scio silt loam, 0 to 3 percent slopes

Map Unit Setting

Elevation: 100 to 1,000 feet

Mean annual precipitation: 36 to 41 inches

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Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days

Map Unit Composition

Scio and similar soils: 80 percent

Description of Scio

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Glaciolacustrine deposits, eolian deposits, or old alluvium, comprised mainly of silt and very fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.4 inches)

Interpretive groups

Land capability (nonirrigated): 2w

Typical profile

0 to 8 inches: Silt loam
8 to 65 inches: Silt loam

ScB—Scio silt loam, 3 to 8 percent slopes

Map Unit Setting

Elevation: 100 to 1,000 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days

Map Unit Composition

Scio and similar soils: 80 percent

Description of Scio

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave

Custom Soil Resource Report

Across-slope shape: Convex

Parent material: Glaciolacustrine deposits, eolian deposits, or old alluvium, comprised mainly of silt and very fine sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 18 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: High (about 11.4 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 8 inches: Silt loam

8 to 65 inches: Silt loam

Sh—Shaker fine sandy loam

Map Unit Setting

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Shaker and similar soils: 80 percent

Description of Shaker

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Loamy over clayey glaciolacustrine or glaciomarine deposits

Properties and qualities

Slope: 0 to 3 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 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent

Available water capacity: Moderate (about 8.4 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 11 inches: Fine sandy loam

11 to 31 inches: Fine sandy loam

31 to 62 inches: Clay

St—Stafford loamy fine sand

Map Unit Setting

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Stafford and similar soils: 80 percent

Description of Stafford

Setting

Landform: Beach ridges, deltas

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Sandy glaciofluvial or glaciolacustrine deposits

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 12 inches: Loamy fine sand

12 to 30 inches: Loamy fine sand

30 to 60 inches: Fine sand

Ud—Udipsamments, smoothed

Map Unit Setting

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Udipsamments, smoothed, and similar soils: 70 percent

Description of Udipsamments, Smoothed

Properties and qualities

Slope: 0 to 45 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.6 inches)

Typical profile

0 to 70 inches: Coarse sand

Uf—Udipsamments-Urban land complex

Map Unit Setting

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Udipsamments and similar soils: 50 percent

Urban land: 30 percent

Description of Udipsamments

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.6 inches)

Typical profile

0 to 70 inches: Coarse sand

Description of Urban Land

Typical profile

0 to 6 inches: Variable

Uk—Udorthents, loamy-Urban land complex

Map Unit Setting

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Udorthents, loamy, and similar soils: 40 percent

Urban land: 30 percent

Description of Udorthents, Loamy

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

*Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 5.95 in/hr)*

Depth to water table: About 36 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Available water capacity: Low (about 5.5 inches)

Typical profile

0 to 4 inches: Loam

4 to 70 inches: Channery loam

UnC—Unadilla silt loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 600 to 1,800 feet

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Unadilla and similar soils: 85 percent

Description of Unadilla

Setting

Landform: Lake plains

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Glaciolacustrine deposits, eolian deposits, or old alluvium, comprised mainly of silt and very fine sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: High (about 11.5 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 9 inches: Silt loam

9 to 64 inches: Silt loam

Ur—Urban land

Map Unit Setting

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Urban land: 85 percent

Description of Urban Land

Typical profile

0 to 6 inches: Variable

Us—Urban land-Udipsamments complex, 0 to 8 percent slopes

Map Unit Setting

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Map Unit Composition

Urban land: 50 percent

Udipsamments and similar soils: 30 percent

Description of Urban Land

Typical profile

0 to 6 inches: Variable

Description of Udipsamments

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.6 inches)

Typical profile

0 to 70 inches: Coarse sand

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Custom Soil Resource Report

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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

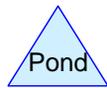
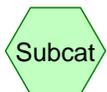
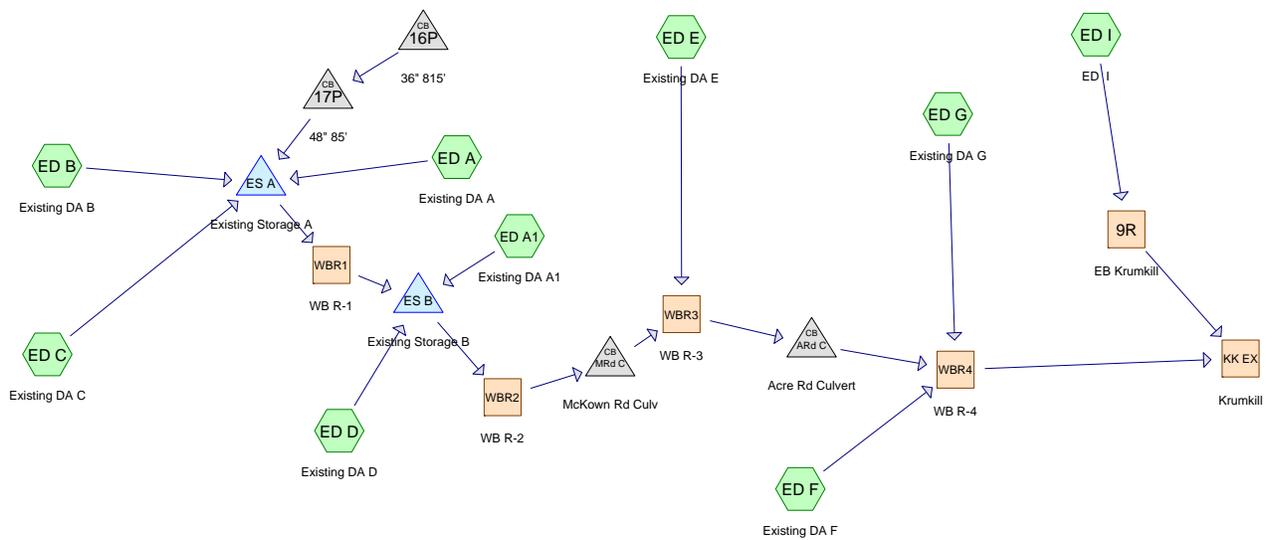
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

APPENDIX D
Hydrological Study

Existing Conditions



Drainage Diagram for Existing Drainage McKownville RT 20 Area
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Existing Drainage McKownville RT 20 Area

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.300	43	Woods/grass comb., Fair, HSG A (ED G)
12.700	55	Woods, Good, HSG B (ED I)
20.440	57	1/3 acre lots, 30% imp, HSG A (ED G)
18.160	58	Woods/grass comb., Good, HSG B (ED D)
65.010	61	1/4 acre lots, 38% imp, HSG A (ED I)
4.780	69	50-75% Grass cover, Fair, HSG B (ED A,ED A1)
36.500	70	1/2 acre lots, 25% imp, HSG B (ED C)
15.170	72	1/3 acre lots, 30% imp, HSG B (ED E)
6.950	76	Woods/grass comb., Fair, HSG C (ED F)
9.430	81	1/3 acre lots, 30% imp, HSG C (ED F)
19.400	98	Paved parking & roofs (ED A,ED A1,ED B,ED D)
214.840		TOTAL AREA

Existing Drainage McKownville RT 20 Area

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Soil Listing (selected nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
91.750	HSG A	ED G, ED I
87.310	HSG B	ED A, ED A1, ED C, ED D, ED E, ED I
16.380	HSG C	ED F
0.000	HSG D	
19.400	Other	ED A, ED A1, ED B, ED D
214.840		TOTAL AREA

Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 2

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ED A: Existing DA A Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=3.11"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=22.72 cfs 2.117 af

Subcatchment ED A1: Existing DA A1 Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=3.11"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=22.72 cfs 2.117 af

Subcatchment ED B: Existing DA B Runoff Area=7.240 ac 100.00% Impervious Runoff Depth=3.96"
Flow Length=363' Slope=0.0275 '/' Tc=4.0 min CN=98 Runoff=45.99 cfs 2.392 af

Subcatchment ED C: Existing DA C Runoff Area=36.500 ac 25.00% Impervious Runoff Depth=1.46"
Flow Length=1,133' Slope=0.0335 '/' Tc=25.6 min CN=70 Runoff=48.94 cfs 4.456 af

Subcatchment ED D: Existing DA D Runoff Area=18.760 ac 3.20% Impervious Runoff Depth=0.81"
Flow Length=1,139' Slope=0.0237 '/' Tc=40.7 min CN=59 Runoff=8.16 cfs 1.265 af

Subcatchment ED E: Existing DA E Runoff Area=15.170 ac 30.00% Impervious Runoff Depth=1.60"
Flow Length=1,334' Slope=0.0150 '/' Tc=41.3 min CN=72 Runoff=16.18 cfs 2.025 af

Subcatchment ED F: Existing DA F Runoff Area=16.380 ac 17.27% Impervious Runoff Depth=2.13"
Flow Length=661' Slope=0.0290 '/' Tc=13.8 min CN=79 Runoff=47.00 cfs 2.903 af

Subcatchment ED G: Existing DA G Runoff Area=26.740 ac 22.93% Impervious Runoff Depth=0.57"
Flow Length=1,244' Slope=0.0160 '/' Tc=60.3 min CN=54 Runoff=5.09 cfs 1.261 af

Subcatchment ED I: ED I Runoff Area=77.710 ac 31.79% Impervious Runoff Depth=0.86"
Flow Length=3,076' Slope=0.0160 '/' Tc=106.9 min CN=60 Runoff=18.41 cfs 5.582 af

Reach 9R: EB Krumkill Avg. Depth=0.90' Max Vel=2.04 fps Inflow=18.41 cfs 5.582 af
n=0.040 L=1,755.0' S=0.0046 '/' Capacity=293.49 cfs Outflow=17.86 cfs 5.577 af

Reach KK EX: Krumkill Inflow=393.19 cfs 216.474 af
Outflow=393.19 cfs 216.474 af

Reach WBR1: WB R-1 Avg. Depth=3.40' Max Vel=6.24 fps Inflow=788.81 cfs 202.962 af
n=0.040 L=300.0' S=0.0100 '/' Capacity=966.62 cfs Outflow=428.26 cfs 202.879 af

Reach WBR2: WB R-2 Avg. Depth=2.34' Max Vel=10.97 fps Inflow=429.55 cfs 205.735 af
n=0.040 L=150.0' S=0.0467 '/' Capacity=2,088.13 cfs Outflow=437.17 cfs 205.711 af

Reach WBR3: WB R-3 Avg. Depth=2.97' Max Vel=7.54 fps Inflow=440.13 cfs 207.736 af
n=0.040 L=230.0' S=0.0170 '/' Capacity=1,258.70 cfs Outflow=423.98 cfs 207.683 af

Reach WBR4: WB R-4 Avg. Depth=3.98' Max Vel=4.30 fps Inflow=432.41 cfs 211.847 af
n=0.040 L=2,510.0' S=0.0040 '/' Capacity=610.12 cfs Outflow=375.76 cfs 210.897 af

Pond 16P: 36" 815' Peak Elev=3,719.19' Inflow=694.79 cfs 194.473 af
36.0" x 815.0' Culvert Outflow=694.79 cfs 194.473 af

Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Pond 17P: 48" 85'

Peak Elev=341.52' Inflow=694.79 cfs 194.473 af
48.0" x 85.0' Culvert Outflow=694.79 cfs 194.473 af

Pond ARd C: Acre Rd Culvert

Peak Elev=342.99' Inflow=423.98 cfs 207.683 af
36.0" x 30.0' Culvert Outflow=423.98 cfs 207.683 af

Pond ES A: Existing Storage A

Peak Elev=198.49' Storage=57,579 cf Inflow=709.58 cfs 203.438 af
Outflow=788.81 cfs 202.962 af

Pond ES B: Existing Storage B

Peak Elev=191.68' Storage=61,135 cf Inflow=432.23 cfs 206.261 af
Outflow=429.55 cfs 205.735 af

Pond MRd C: McKown Rd Culv

Peak Elev=345.36' Inflow=437.17 cfs 205.711 af
36.0" x 30.0' Culvert Outflow=437.17 cfs 205.711 af

Total Runoff Area = 214.840 ac Runoff Volume = 24.118 af Average Runoff Depth = 1.35"
68.93% Pervious = 148.099 ac 31.07% Impervious = 66.741 ac

Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED A: Existing DA A

Runoff = 22.72 cfs @ 12.21 hrs, Volume= 2.117 af, Depth= 3.11"

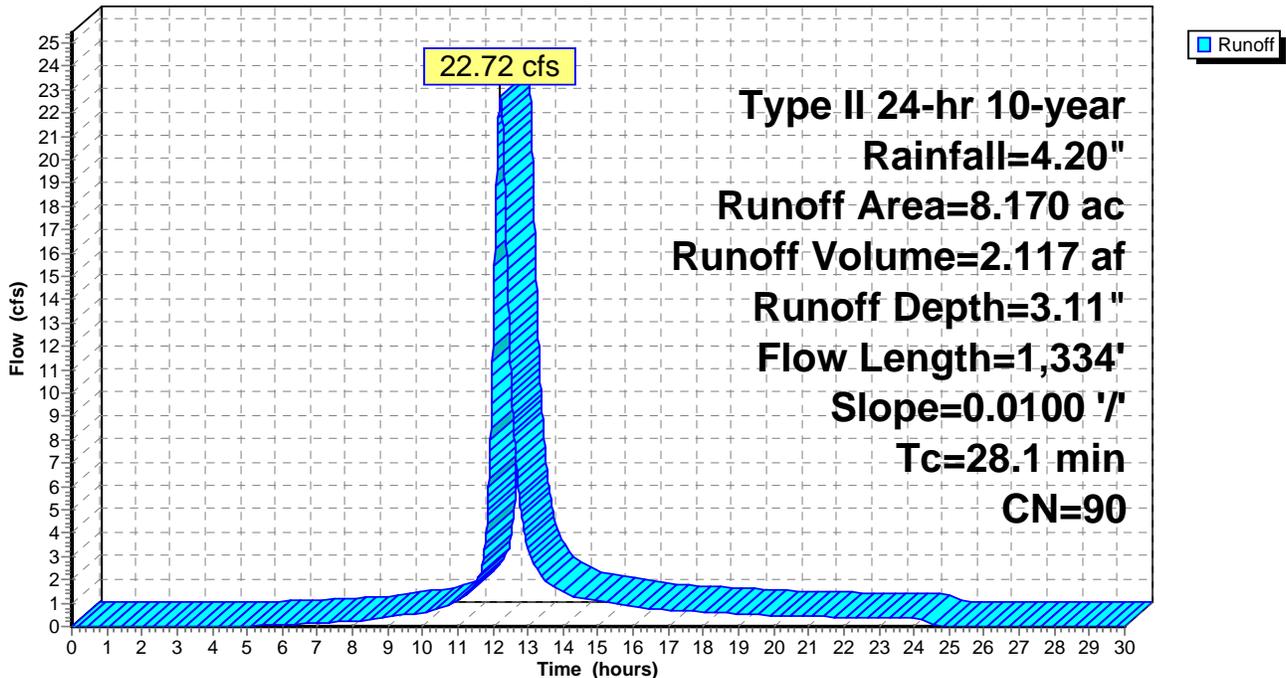
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A: Existing DA A

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED A1: Existing DA A1

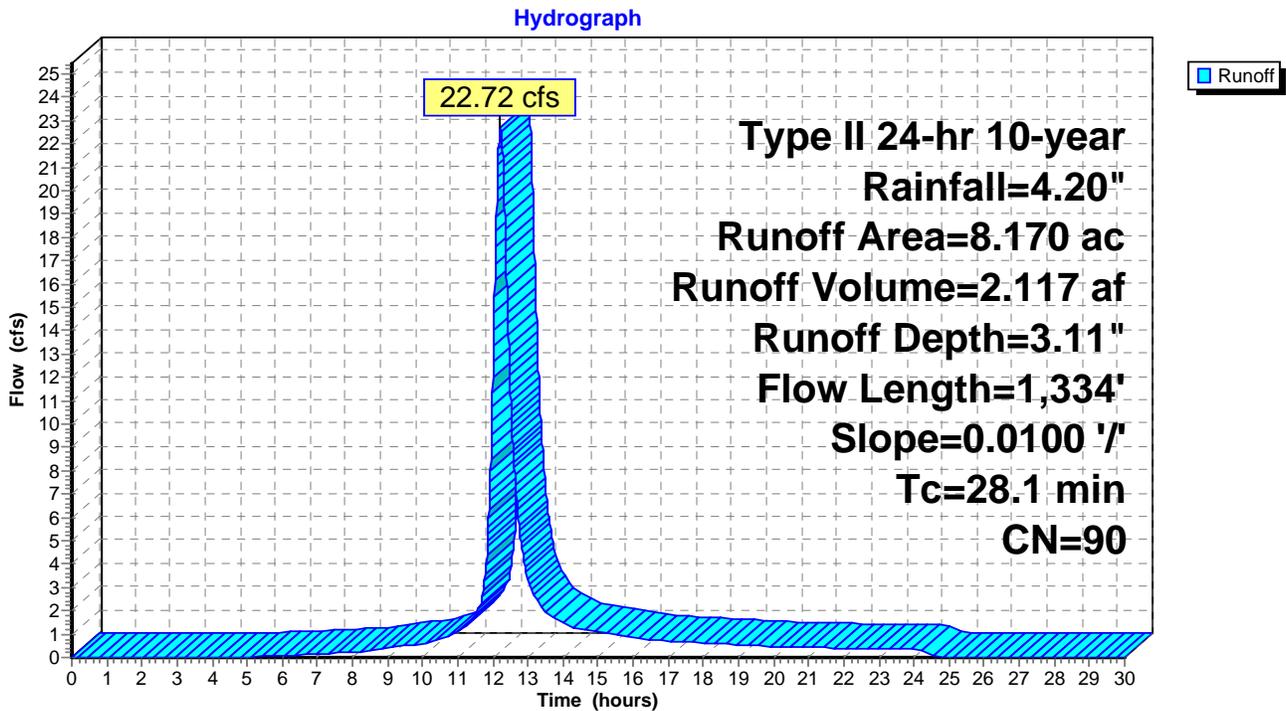
Runoff = 22.72 cfs @ 12.21 hrs, Volume= 2.117 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A1: Existing DA A1



Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED B: Existing DA B

Runoff = 45.99 cfs @ 11.94 hrs, Volume= 2.392 af, Depth= 3.96"

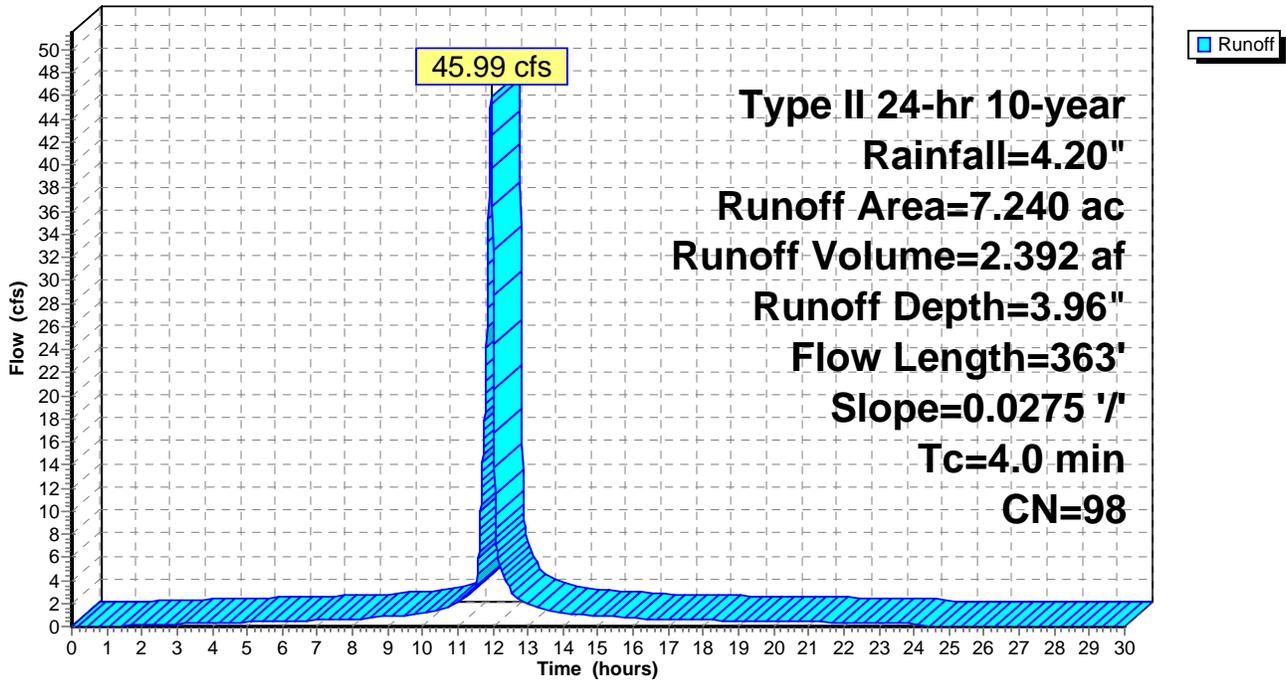
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
7.240	98	Paved parking & roofs
7.240		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	363	0.0275	1.50		Lag/CN Method,

Subcatchment ED B: Existing DA B

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED C: Existing DA C

Runoff = 48.94 cfs @ 12.20 hrs, Volume= 4.456 af, Depth= 1.46"

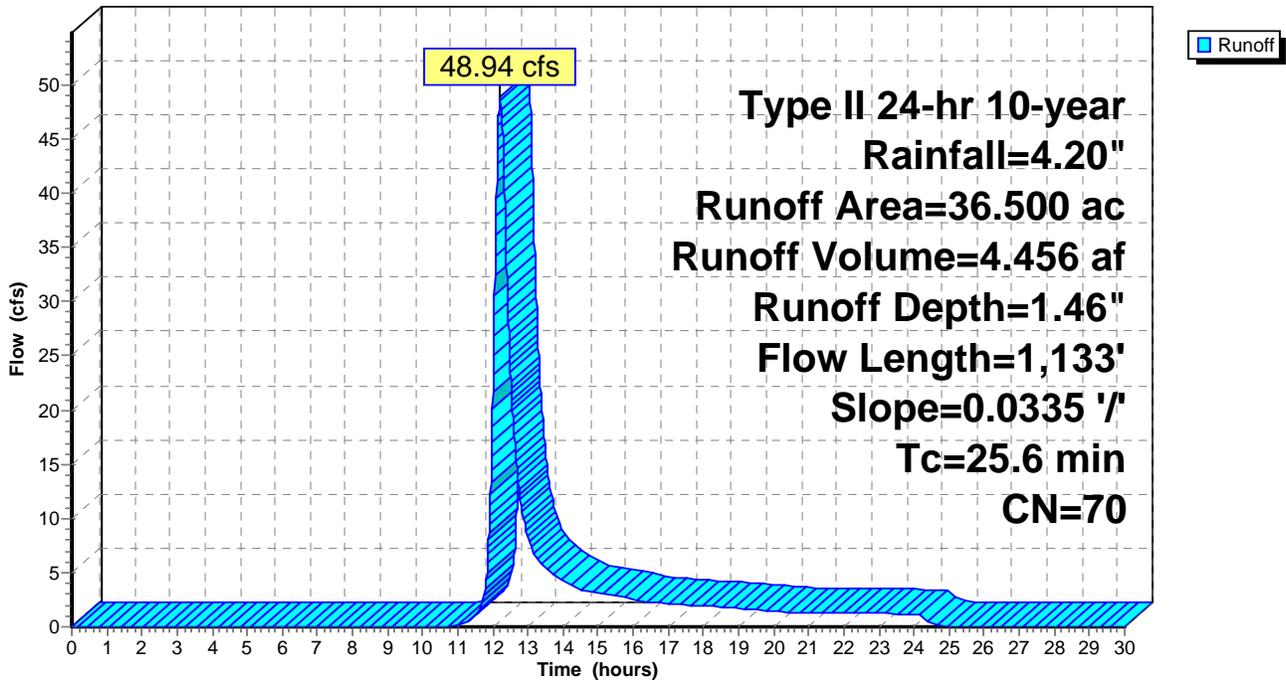
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
36.500	70	1/2 acre lots, 25% imp, HSG B
27.375		Pervious Area
9.125		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,133	0.0335	0.74		Lag/CN Method,

Subcatchment ED C: Existing DA C

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED D: Existing DA D

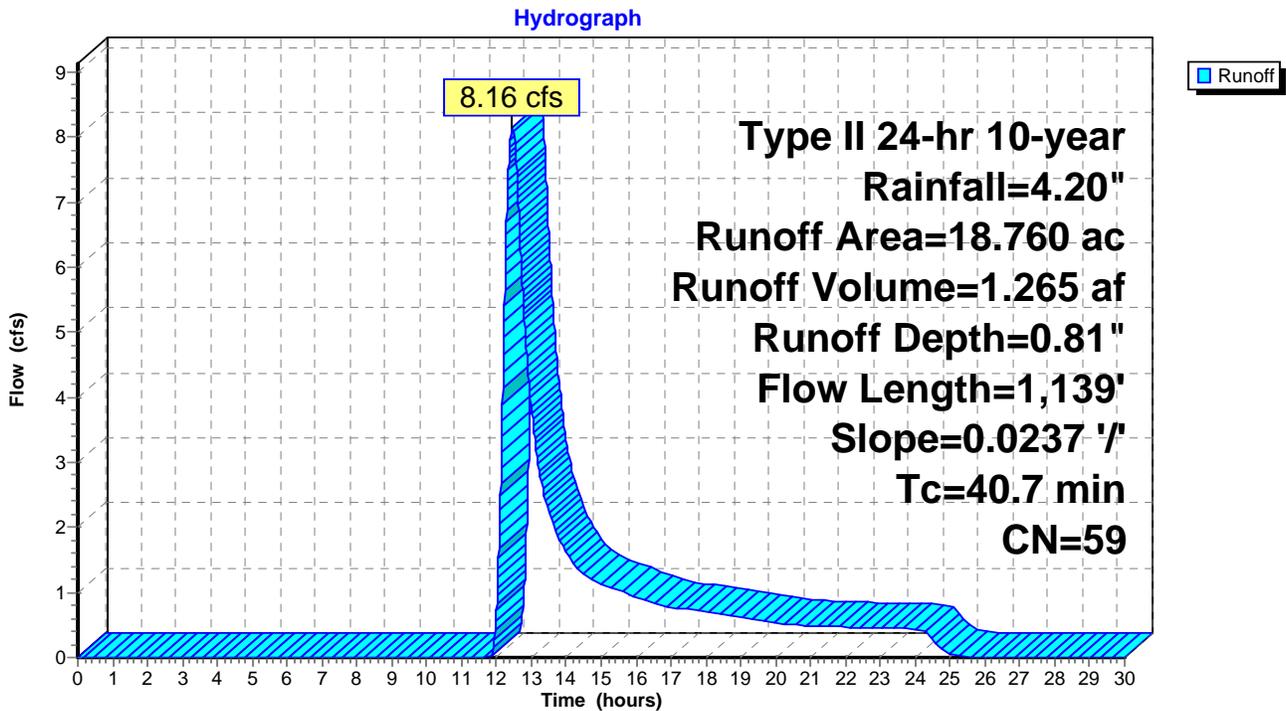
Runoff = 8.16 cfs @ 12.44 hrs, Volume= 1.265 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
18.160	58	Woods/grass comb., Good, HSG B
0.600	98	Paved parking & roofs
18.760	59	Weighted Average
18.160		Pervious Area
0.600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.7	1,139	0.0237	0.47		Lag/CN Method,

Subcatchment ED D: Existing DA D



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED E: Existing DA E

Runoff = 16.18 cfs @ 12.40 hrs, Volume= 2.025 af, Depth= 1.60"

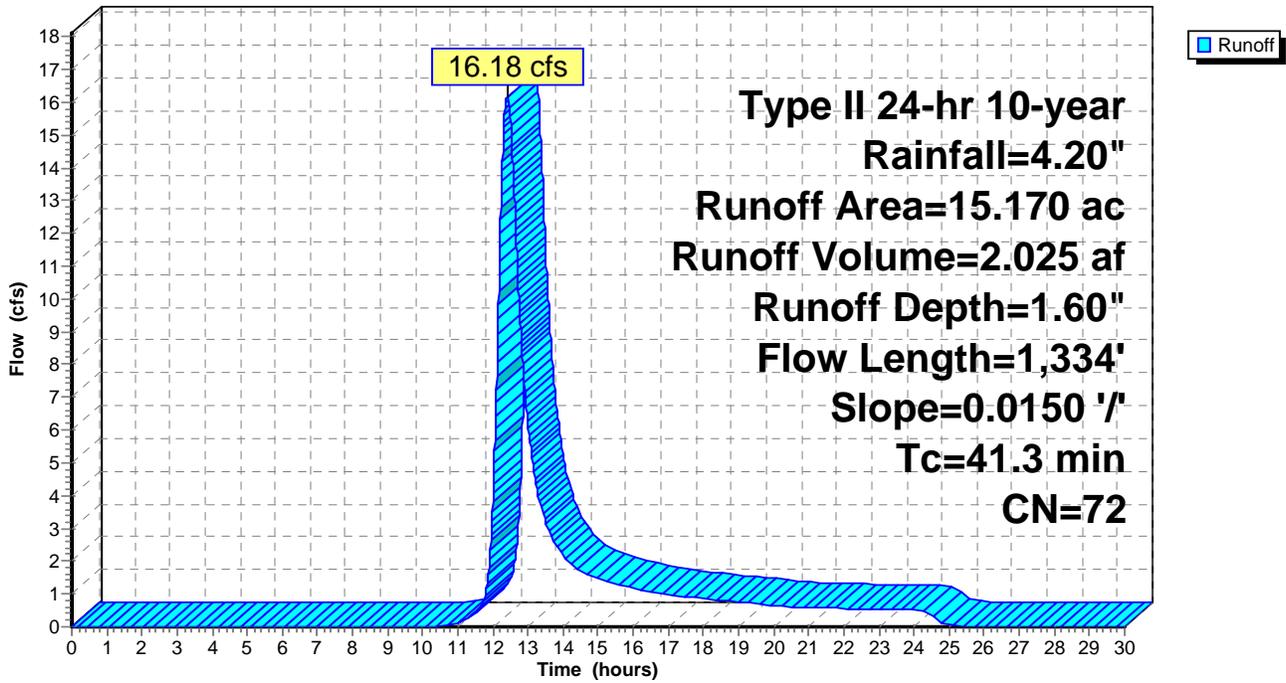
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
15.170	72	1/3 acre lots, 30% imp, HSG B
10.619		Pervious Area
4.551		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
41.3	1,334	0.0150	0.54		Lag/CN Method,

Subcatchment ED E: Existing DA E

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED F: Existing DA F

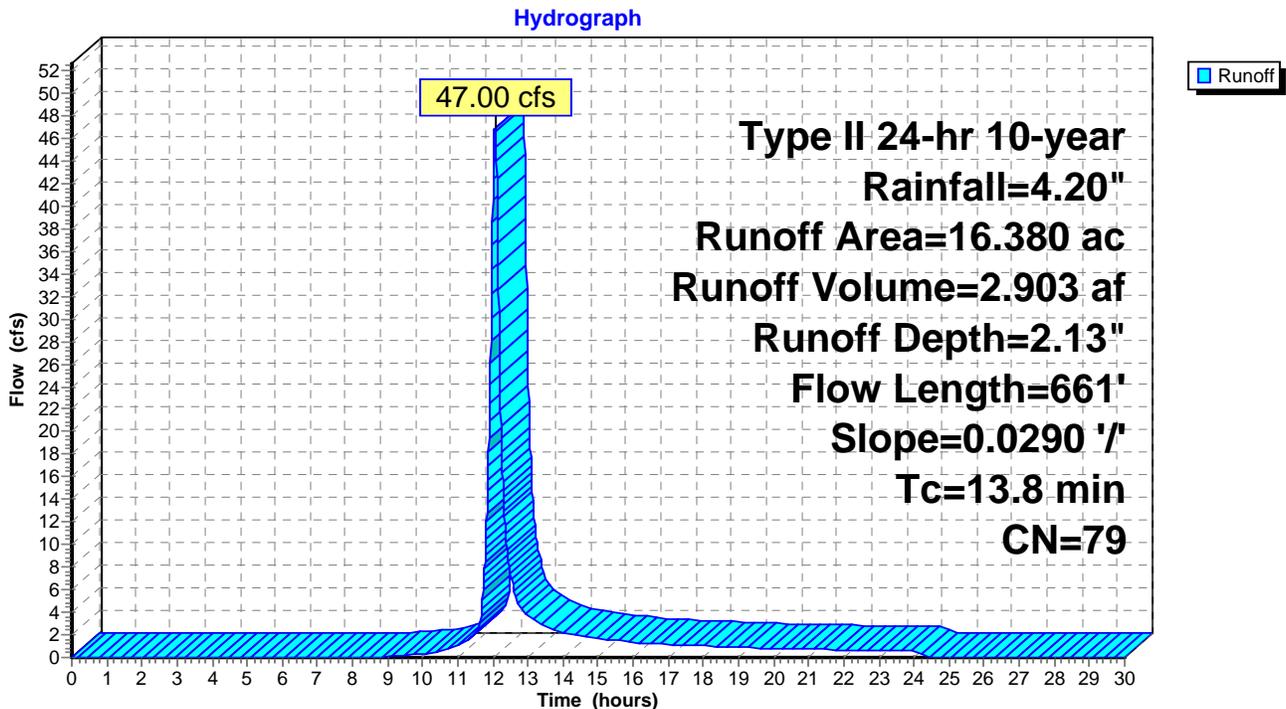
Runoff = 47.00 cfs @ 12.06 hrs, Volume= 2.903 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
9.430	81	1/3 acre lots, 30% imp, HSG C
6.950	76	Woods/grass comb., Fair, HSG C
16.380	79	Weighted Average
13.551		Pervious Area
2.829		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	661	0.0290	0.80		Lag/CN Method,

Subcatchment ED F: Existing DA F



Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED G: Existing DA G

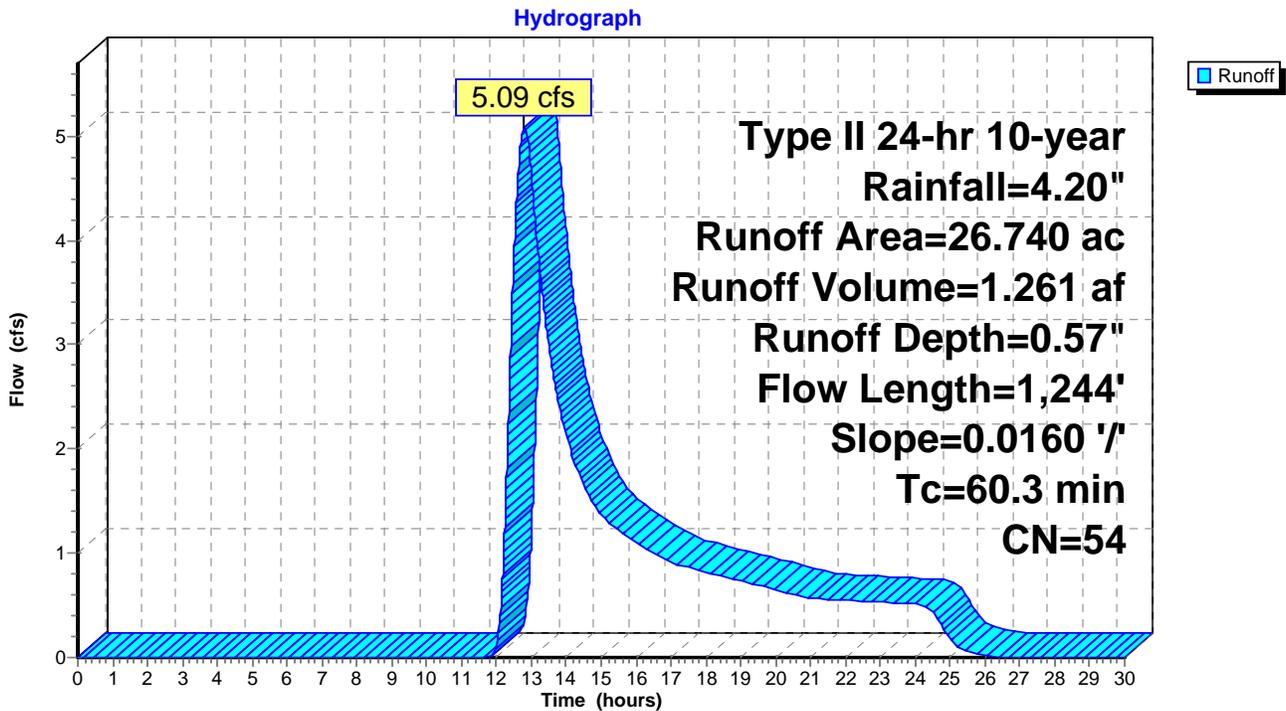
Runoff = 5.09 cfs @ 12.80 hrs, Volume= 1.261 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
20.440	57	1/3 acre lots, 30% imp, HSG A
6.300	43	Woods/grass comb., Fair, HSG A
26.740	54	Weighted Average
20.608		Pervious Area
6.132		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.3	1,244	0.0160	0.34		Lag/CN Method,

Subcatchment ED G: Existing DA G



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED I: ED I

Runoff = 18.41 cfs @ 13.42 hrs, Volume= 5.582 af, Depth= 0.86"

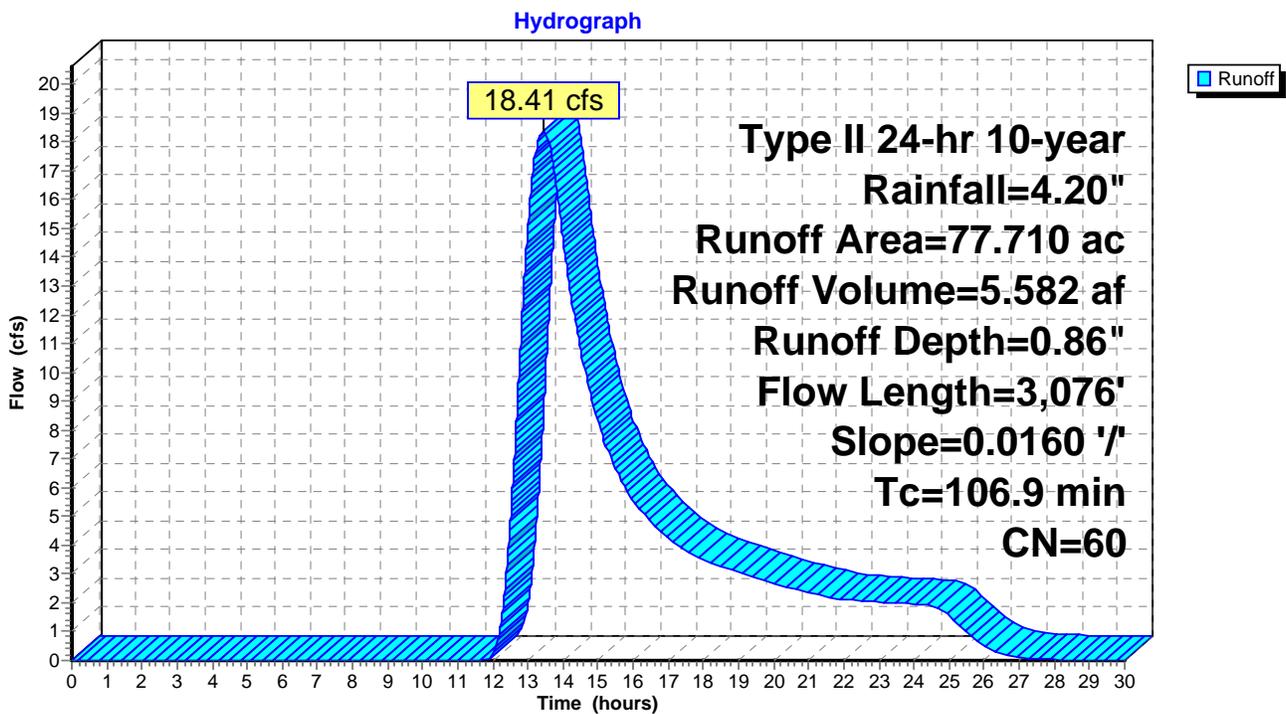
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
65.010	61	1/4 acre lots, 38% imp, HSG A
12.700	55	Woods, Good, HSG B
77.710	60	Weighted Average
53.006		Pervious Area
24.704		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
106.9	3,076	0.0160	0.48		Lag/CN Method,

Subcatchment ED I: ED I



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach 9R: EB Krumkill

Inflow Area = 77.710 ac, 31.79% Impervious, Inflow Depth = 0.86" for 10-year event
Inflow = 18.41 cfs @ 13.42 hrs, Volume= 5.582 af
Outflow = 17.86 cfs @ 13.61 hrs, Volume= 5.577 af, Atten= 3%, Lag= 11.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 2.04 fps, Min. Travel Time= 14.4 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 29.0 min

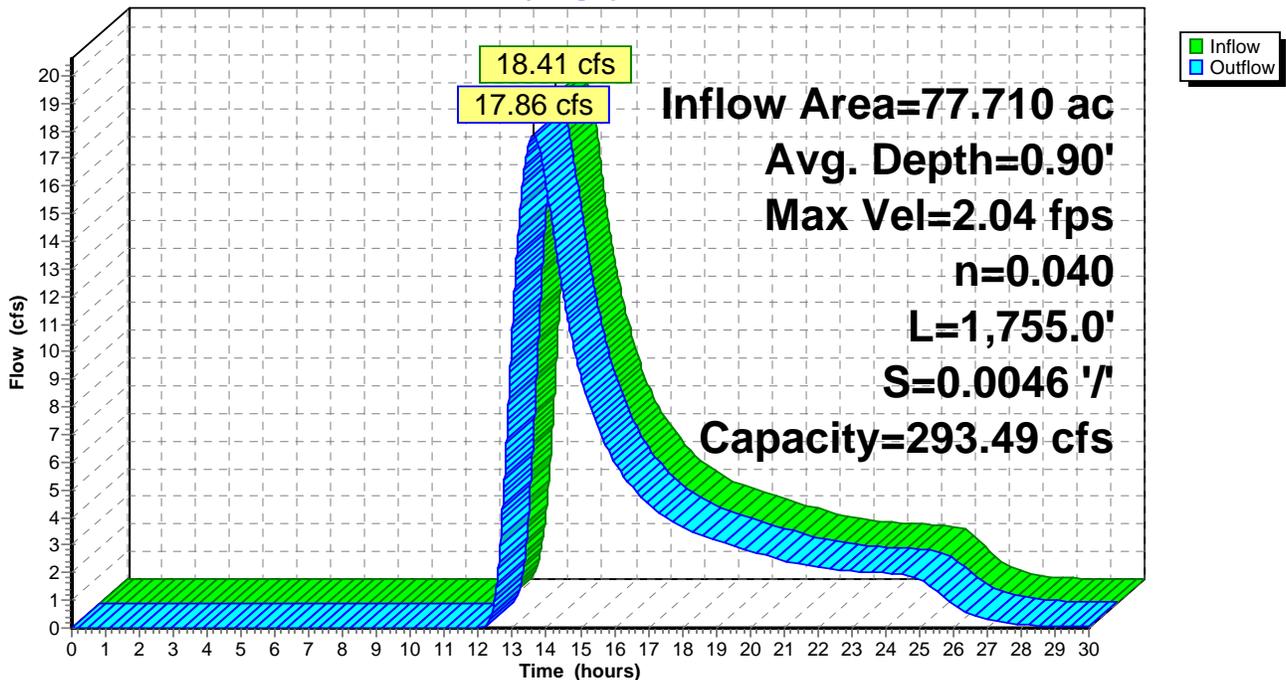
Peak Storage= 15,399 cf @ 13.61 hrs, Average Depth at Peak Storage= 0.90'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 293.49 cfs

8.00' x 4.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 24.00'
Length= 1,755.0' Slope= 0.0046 '/'
Inlet Invert= 186.00', Outlet Invert= 178.00'



Reach 9R: EB Krumkill

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach KK EX: Krumkill

Inflow Area = 1,100.500 ac, 34.10% Impervious, Inflow Depth > 2.36" for 10-year event

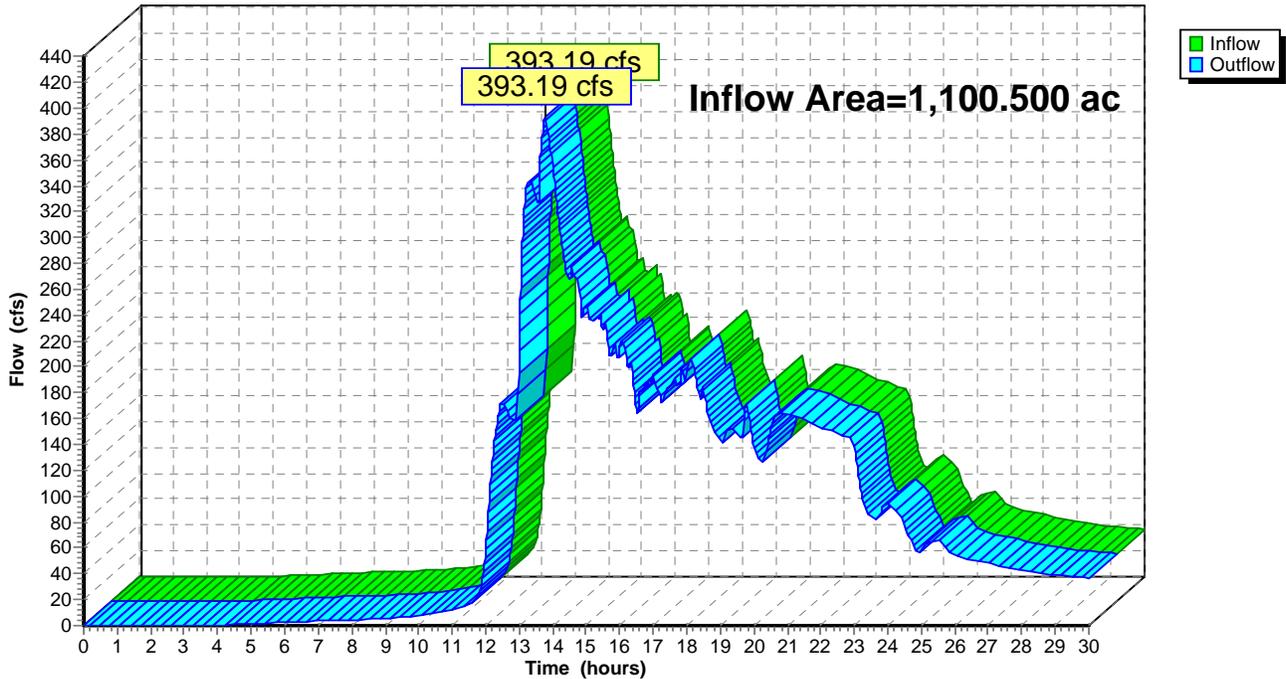
Inflow = 393.19 cfs @ 13.79 hrs, Volume= 216.474 af

Outflow = 393.19 cfs @ 13.79 hrs, Volume= 216.474 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach KK EX: Krumkill

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WBR1: WB R-1

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 2.60" for 10-year event
Inflow = 788.81 cfs @ 13.57 hrs, Volume= 202.962 af
Outflow = 428.26 cfs @ 13.58 hrs, Volume= 202.879 af, Atten= 46%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 6.24 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 3.22 fps, Avg. Travel Time= 1.6 min

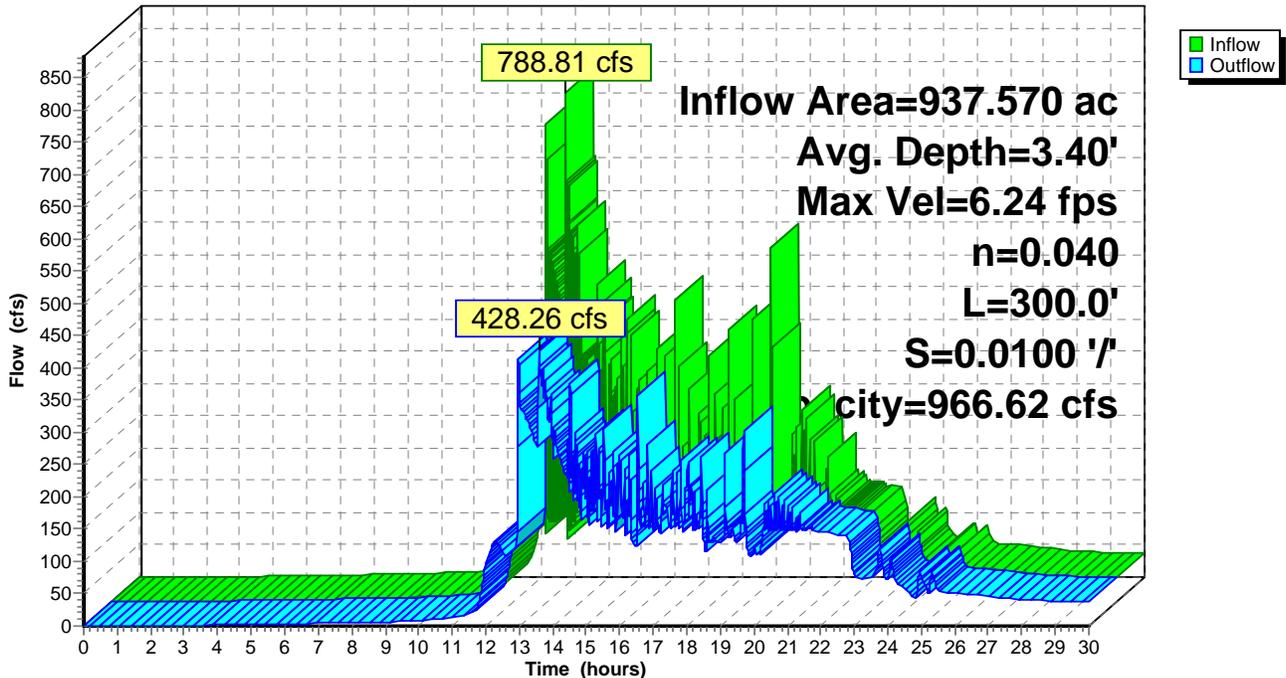
Peak Storage= 20,579 cf @ 13.58 hrs, Average Depth at Peak Storage= 3.40'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 966.62 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 300.0' Slope= 0.0100 '/
Inlet Invert= 189.00', Outlet Invert= 186.00'



Reach WBR1: WB R-1

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WBR2: WB R-2

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 2.56" for 10-year event
Inflow = 429.55 cfs @ 13.58 hrs, Volume= 205.735 af
Outflow = 437.17 cfs @ 13.58 hrs, Volume= 205.711 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 10.97 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.58 fps, Avg. Travel Time= 0.4 min

Peak Storage= 5,964 cf @ 13.58 hrs, Average Depth at Peak Storage= 2.34'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 2,088.13 cfs

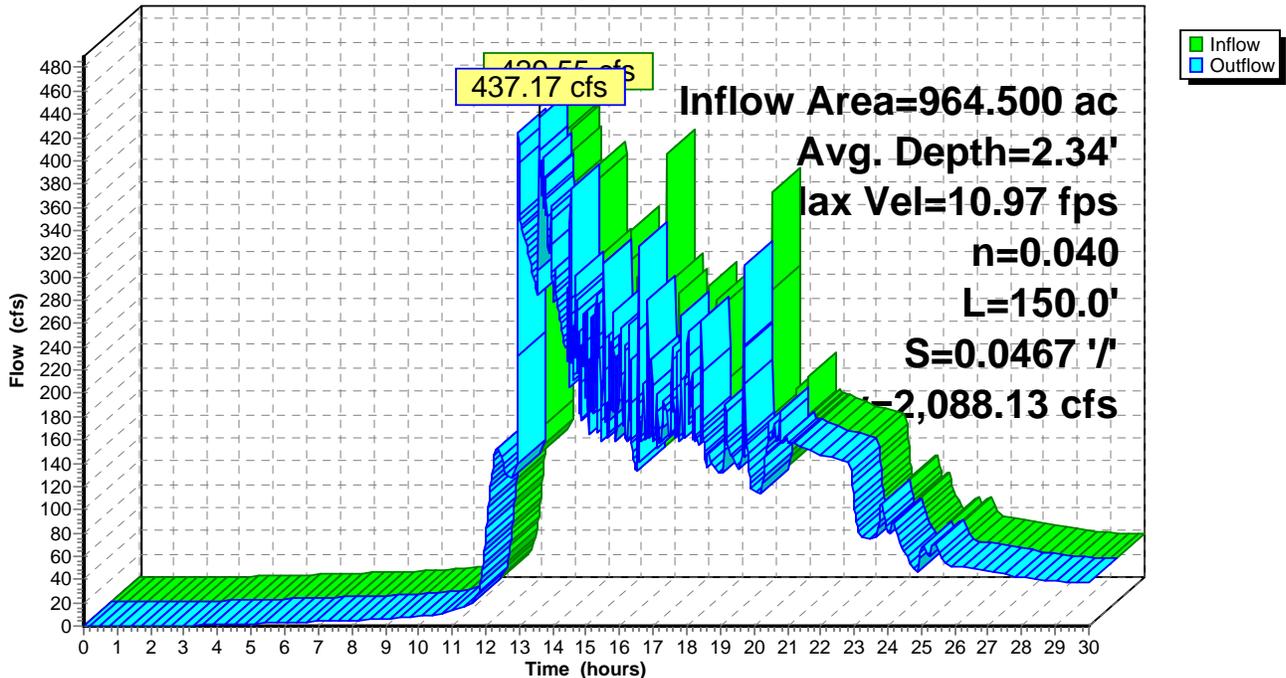
10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 40.00'
Length= 150.0' Slope= 0.0467 '/'
Inlet Invert= 185.00', Outlet Invert= 178.00'



‡

Reach WBR2: WB R-2

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WBR3: WB R-3

Inflow Area = 979.670 ac, 34.87% Impervious, Inflow Depth > 2.54" for 10-year event
Inflow = 440.13 cfs @ 13.58 hrs, Volume= 207.736 af
Outflow = 423.98 cfs @ 12.99 hrs, Volume= 207.683 af, Atten= 4%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 7.54 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.94 fps, Avg. Travel Time= 1.0 min

Peak Storage= 12,912 cf @ 12.99 hrs, Average Depth at Peak Storage= 2.97'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 1,258.70 cfs

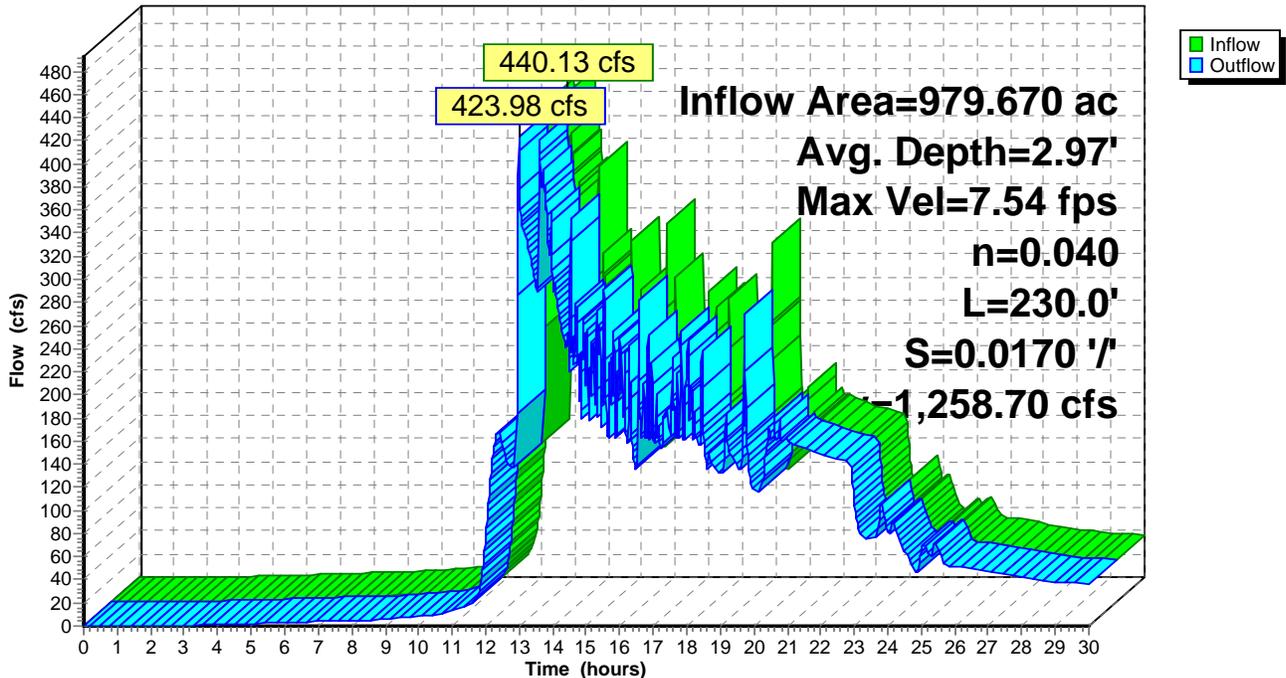
10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 230.0' Slope= 0.0170 '/
Inlet Invert= 177.90', Outlet Invert= 174.00'



‡

Reach WBR3: WB R-3

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WBR4: WB R-4

Inflow Area = 1,022.790 ac, 34.28% Impervious, Inflow Depth > 2.49" for 10-year event
Inflow = 432.41 cfs @ 12.99 hrs, Volume= 211.847 af
Outflow = 375.76 cfs @ 13.79 hrs, Volume= 210.897 af, Atten= 13%, Lag= 47.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.30 fps, Min. Travel Time= 9.7 min
Avg. Velocity = 2.37 fps, Avg. Travel Time= 17.7 min

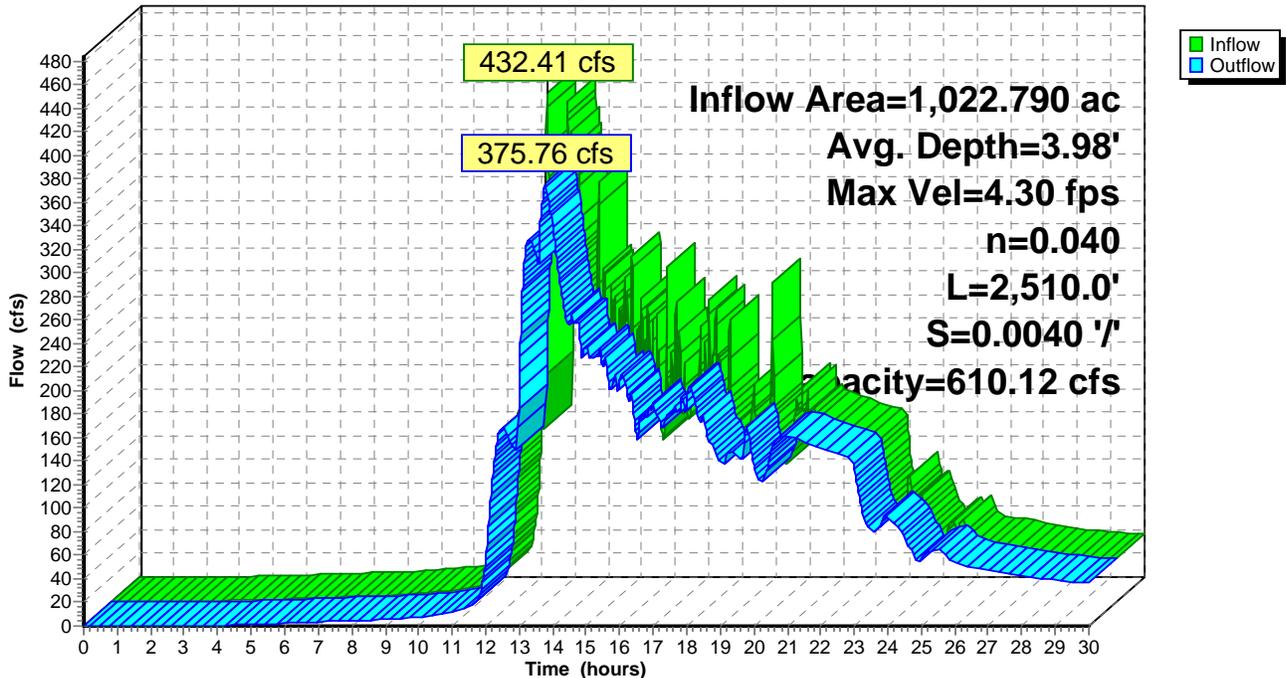
Peak Storage= 219,316 cf @ 13.79 hrs, Average Depth at Peak Storage= 3.98'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 610.12 cfs

10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 2,510.0' Slope= 0.0040 '/
Inlet Invert= 186.00', Outlet Invert= 176.00'



Reach WBR4: WB R-4

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond 16P: 36" 815'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 2.63" for 10-year event
 Inflow = 694.79 cfs @ 12.94 hrs, Volume= 194.473 af
 Outflow = 694.79 cfs @ 12.94 hrs, Volume= 194.473 af, Atten= 0%, Lag= 0.0 min
 Primary = 694.79 cfs @ 12.94 hrs, Volume= 194.473 af

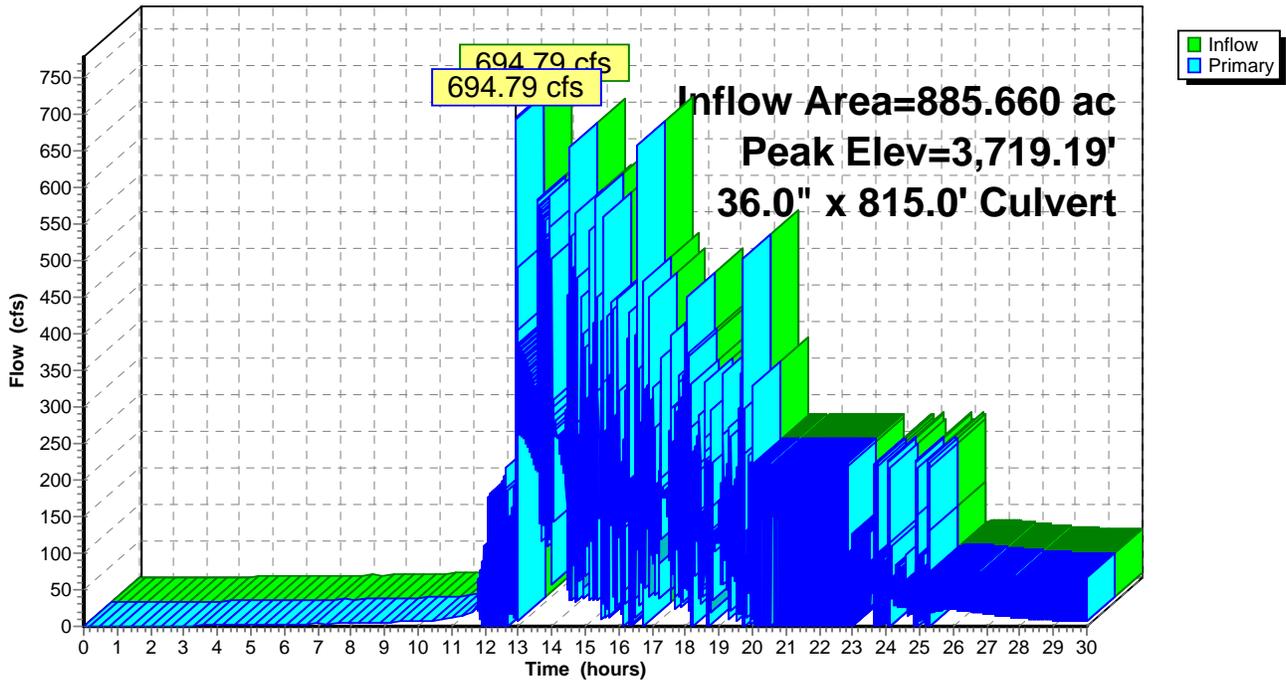
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 3,719.19' @ 12.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	196.46'	36.0" x 815.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 194.00' S= 0.0030 '/ Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=666.98 cfs @ 12.94 hrs HW=3,567.65' TW=335.30' (Dynamic Tailwater)
 ←**1=Culvert** (Outlet Controls 666.98 cfs @ 94.36 fps)

Pond 16P: 36" 815'

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond 17P: 48" 85'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 2.63" for 10-year event
Inflow = 694.79 cfs @ 12.94 hrs, Volume= 194.473 af
Outflow = 694.79 cfs @ 12.94 hrs, Volume= 194.473 af, Atten= 0%, Lag= 0.0 min
Primary = 694.79 cfs @ 12.94 hrs, Volume= 194.473 af

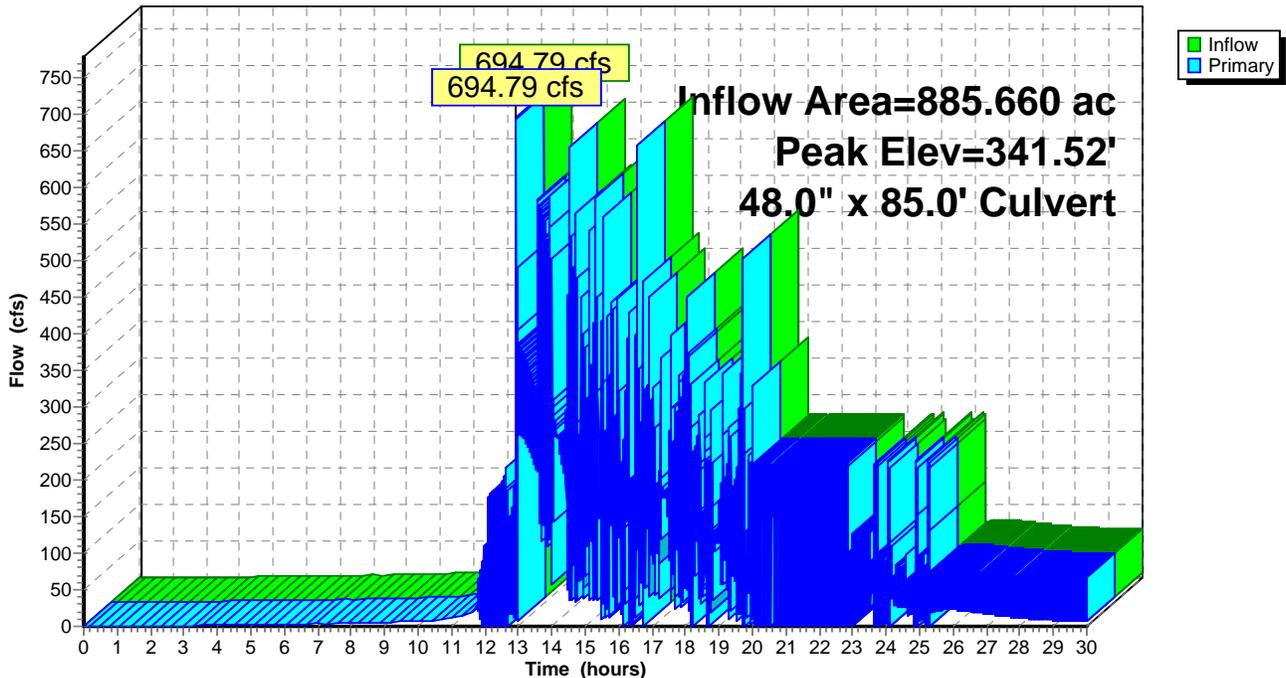
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 341.52' @ 12.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	48.0" x 85.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 193.00' S= 0.0118 '/ Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=678.49 cfs @ 12.94 hrs HW=335.30' TW=195.11' (Dynamic Tailwater)
↑=Culvert (Barrel Controls 678.49 cfs @ 53.99 fps)

Pond 17P: 48" 85'

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond ARd C: Acre Rd Culvert

Inflow Area = 979.670 ac, 34.87% Impervious, Inflow Depth > 2.54" for 10-year event
Inflow = 423.98 cfs @ 12.99 hrs, Volume= 207.683 af
Outflow = 423.98 cfs @ 12.99 hrs, Volume= 207.683 af, Atten= 0%, Lag= 0.0 min
Primary = 423.98 cfs @ 12.99 hrs, Volume= 207.683 af

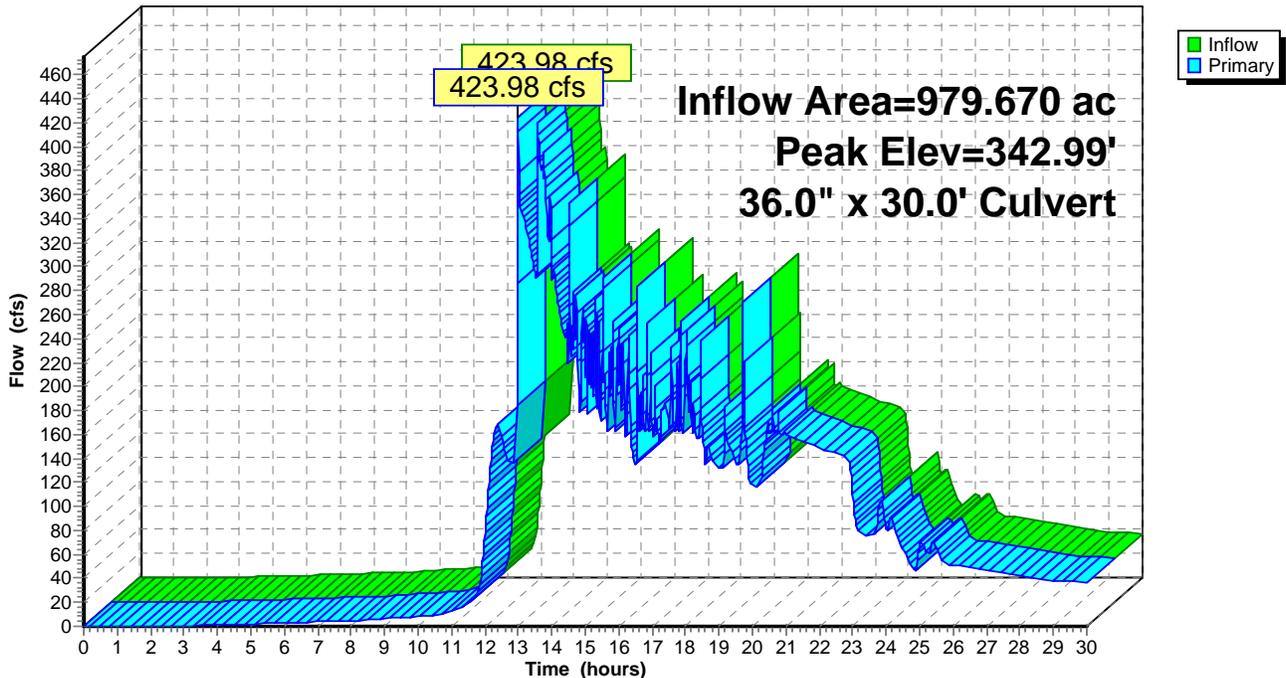
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 342.99' @ 13.59 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	174.00'	36.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 173.90' S= 0.0033 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=419.83 cfs @ 12.99 hrs HW=341.03' TW=188.87' (Dynamic Tailwater)
↑=Culvert (Inlet Controls 419.83 cfs @ 59.39 fps)

Pond ARd C: Acre Rd Culvert

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond ES A: Existing Storage A

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 2.60" for 10-year event
 Inflow = 709.58 cfs @ 12.94 hrs, Volume= 203.438 af
 Outflow = 788.81 cfs @ 13.57 hrs, Volume= 202.962 af, Atten= 0%, Lag= 37.8 min
 Primary = 788.81 cfs @ 13.57 hrs, Volume= 202.962 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 198.49' @ 13.57 hrs Surf.Area= 22,244 sf Storage= 57,579 cf

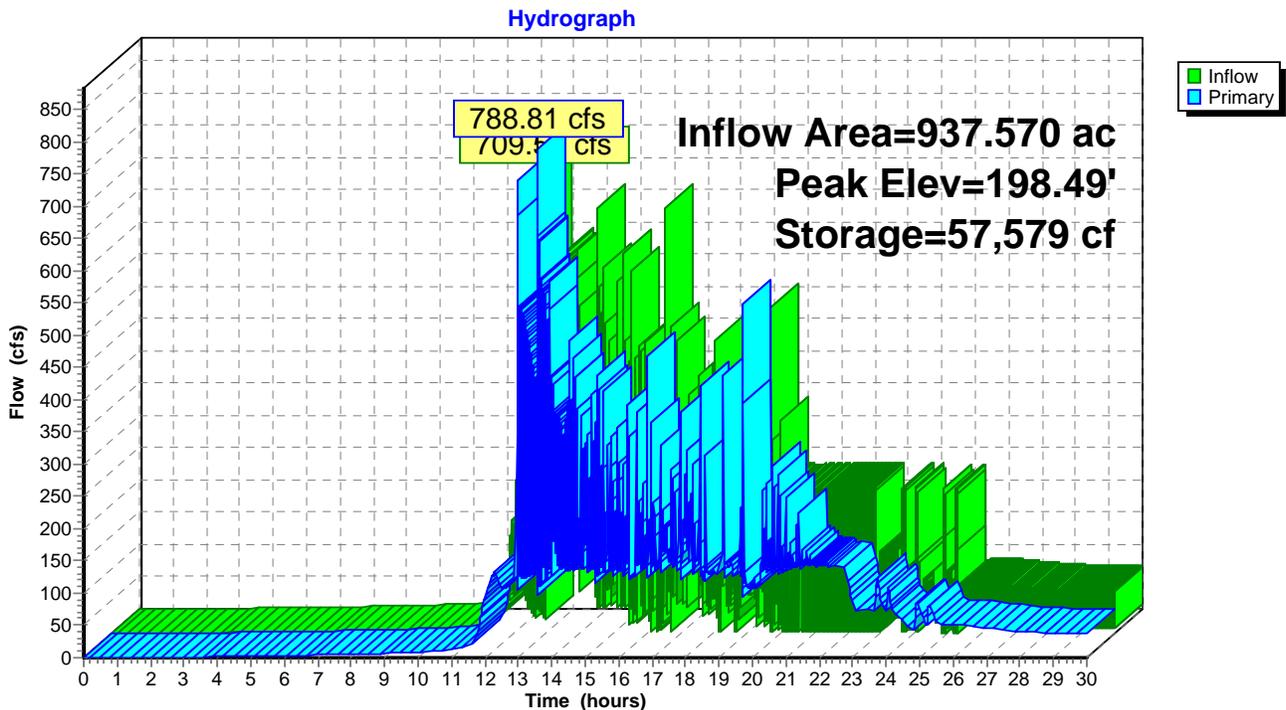
Plug-Flow detention time= 5.8 min calculated for 202.962 af (100% of inflow)
 Center-of-Mass det. time= 4.1 min (1,086.0 - 1,081.9)

Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	57,579 cf	65.00'W x 250.00'L x 3.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=763.77 cfs @ 13.57 hrs HW=198.41' TW=192.27' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 763.77 cfs @ 9.08 fps)

Pond ES A: Existing Storage A



Existing Drainage McKownville RT 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond ES B: Existing Storage B

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 2.57" for 10-year event
 Inflow = 432.23 cfs @ 13.58 hrs, Volume= 206.261 af
 Outflow = 429.55 cfs @ 13.58 hrs, Volume= 205.735 af, Atten= 1%, Lag= 0.0 min
 Primary = 429.55 cfs @ 13.58 hrs, Volume= 205.735 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 191.68' @ 13.58 hrs Surf.Area= 23,122 sf Storage= 61,135 cf

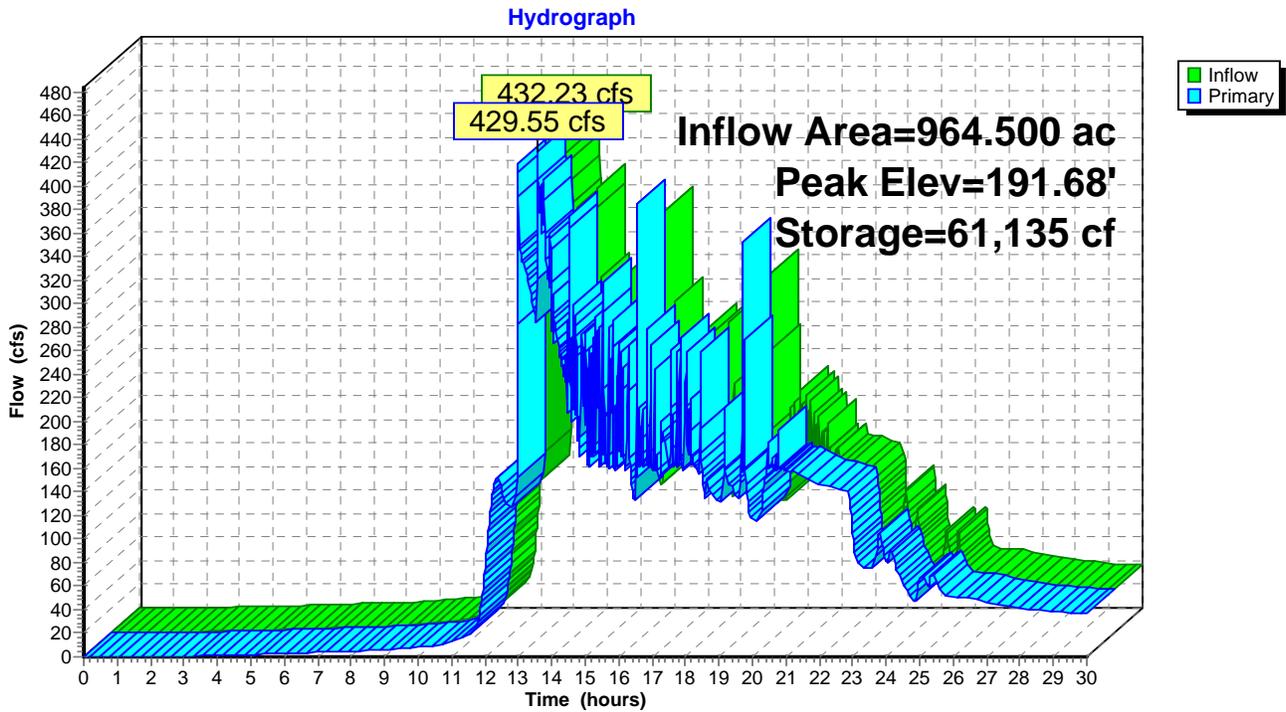
Plug-Flow detention time= 6.0 min calculated for 205.667 af (100% of inflow)
 Center-of-Mass det. time= 4.2 min (1,087.3 - 1,083.1)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	61,135 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
186.00	17,576	0	0
188.00	21,332	38,908	38,908
189.00	23,122	22,227	61,135

Device	Routing	Invert	Outlet Devices
#1	Primary	186.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=428.02 cfs @ 13.58 hrs HW=191.67' TW=187.32' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 428.02 cfs @ 7.55 fps)

Pond ES B: Existing Storage B



Existing Drainage McKownville RT 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond MRd C: McKown Rd Culv

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 2.56" for 10-year event
Inflow = 437.17 cfs @ 13.58 hrs, Volume= 205.711 af
Outflow = 437.17 cfs @ 13.58 hrs, Volume= 205.711 af, Atten= 0%, Lag= 0.0 min
Primary = 437.17 cfs @ 13.58 hrs, Volume= 205.711 af

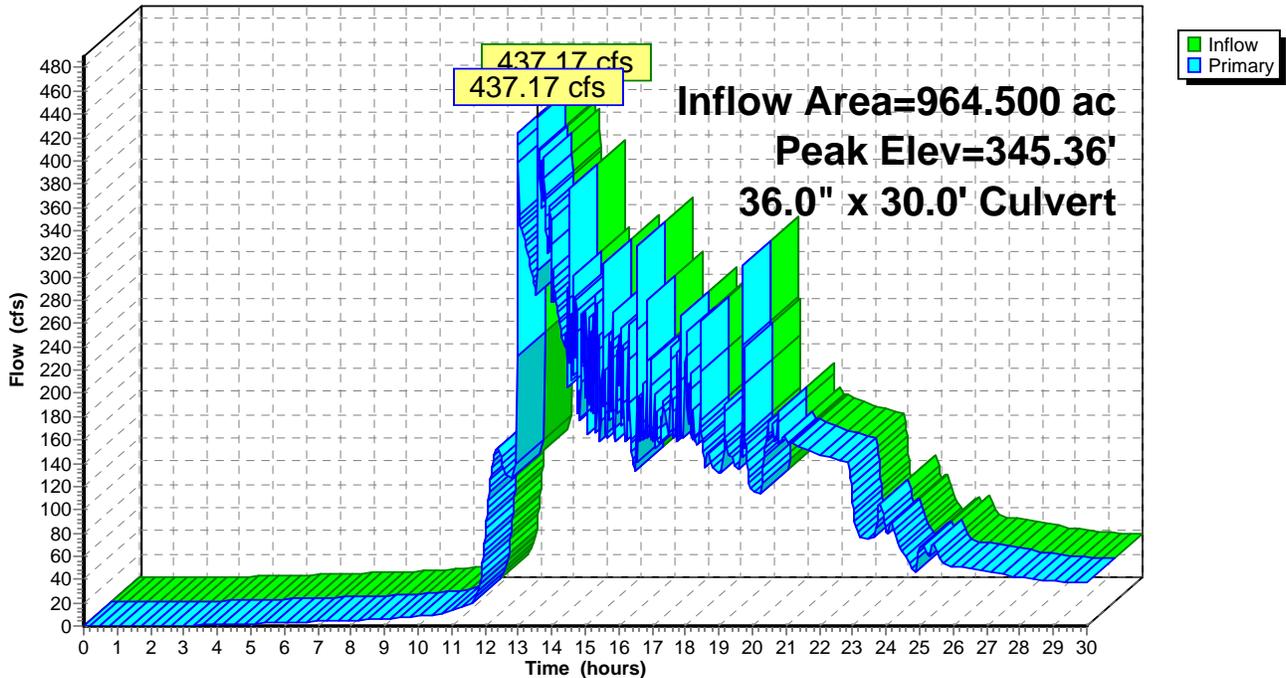
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 345.36' @ 13.58 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.00'	36.0" x 30.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 177.00' S= 0.0333 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=427.59 cfs @ 13.58 hrs HW=338.60' TW=180.77' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 427.59 cfs @ 60.49 fps)

Pond MRd C: McKown Rd Culv

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 2
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ED A: Existing DA A Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=2.21"
 Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=16.35 cfs 1.508 af

Subcatchment ED A1: Existing DA A1 Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=2.21"
 Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=16.35 cfs 1.508 af

Subcatchment ED B: Existing DA B Runoff Area=7.240 ac 100.00% Impervious Runoff Depth=3.02"
 Flow Length=363' Slope=0.0275 '/' Tc=4.0 min CN=98 Runoff=35.43 cfs 1.820 af

Subcatchment ED C: Existing DA C Runoff Area=36.500 ac 25.00% Impervious Runoff Depth=0.86"
 Flow Length=1,133' Slope=0.0335 '/' Tc=25.6 min CN=70 Runoff=26.63 cfs 2.608 af

Subcatchment ED D: Existing DA D Runoff Area=18.760 ac 3.20% Impervious Runoff Depth=0.39"
 Flow Length=1,139' Slope=0.0237 '/' Tc=40.7 min CN=59 Runoff=2.99 cfs 0.614 af

Subcatchment ED E: Existing DA E Runoff Area=15.170 ac 30.00% Impervious Runoff Depth=0.96"
 Flow Length=1,334' Slope=0.0150 '/' Tc=41.3 min CN=72 Runoff=9.16 cfs 1.215 af

Subcatchment ED F: Existing DA F Runoff Area=16.380 ac 17.27% Impervious Runoff Depth=1.37"
 Flow Length=661' Slope=0.0290 '/' Tc=13.8 min CN=79 Runoff=30.18 cfs 1.876 af

Subcatchment ED G: Existing DA G Runoff Area=26.740 ac 22.93% Impervious Runoff Depth=0.24"
 Flow Length=1,244' Slope=0.0160 '/' Tc=60.3 min CN=54 Runoff=1.40 cfs 0.529 af

Subcatchment ED I: ED I Runoff Area=77.710 ac 31.79% Impervious Runoff Depth=0.43"
 Flow Length=3,076' Slope=0.0160 '/' Tc=106.9 min CN=60 Runoff=7.63 cfs 2.772 af

Reach 9R: EB Krumkill Avg. Depth=0.53' Max Vel=1.51 fps Inflow=7.63 cfs 2.772 af
 n=0.040 L=1,755.0' S=0.0046 '/' Capacity=293.49 cfs Outflow=7.32 cfs 2.768 af

Reach KK EX: Krumkill Inflow=153.11 cfs 110.662 af
 Outflow=153.11 cfs 110.662 af

Reach WBR1: WB R-1 Avg. Depth=2.44' Max Vel=5.19 fps Inflow=270.34 cfs 105.519 af
 n=0.040 L=300.0' S=0.0100 '/' Capacity=966.62 cfs Outflow=219.91 cfs 105.349 af

Reach WBR2: WB R-2 Avg. Depth=1.37' Max Vel=8.21 fps Inflow=158.88 cfs 106.419 af
 n=0.040 L=150.0' S=0.0467 '/' Capacity=2,088.13 cfs Outflow=158.79 cfs 106.369 af

Reach WBR3: WB R-3 Avg. Depth=1.80' Max Vel=5.75 fps Inflow=159.86 cfs 107.584 af
 n=0.040 L=230.0' S=0.0170 '/' Capacity=1,258.70 cfs Outflow=159.21 cfs 107.475 af

Reach WBR4: WB R-4 Avg. Depth=2.52' Max Vel=3.35 fps Inflow=161.23 cfs 109.880 af
 n=0.040 L=2,510.0' S=0.0040 '/' Capacity=610.12 cfs Outflow=147.75 cfs 107.895 af

Pond 16P: 36" 815' Peak Elev=1,522.10' Inflow=423.25 cfs 100.642 af
 36.0" x 815.0' Culvert Outflow=423.25 cfs 100.642 af

Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Pond 17P: 48" 85'

Peak Elev=250.81' Inflow=423.25 cfs 100.642 af
48.0" x 85.0' Culvert Outflow=423.25 cfs 100.642 af

Pond ARd C: Acre Rd Culvert

Peak Elev=210.36' Inflow=159.21 cfs 107.475 af
36.0" x 30.0' Culvert Outflow=159.22 cfs 107.475 af

Pond ES A: Existing Storage A

Peak Elev=194.24' Storage=57,579 cf Inflow=427.30 cfs 106.578 af
Outflow=270.34 cfs 105.519 af

Pond ES B: Existing Storage B

Peak Elev=188.95' Storage=60,027 cf Inflow=221.56 cfs 107.471 af
Outflow=158.88 cfs 106.419 af

Pond MRd C: McKown Rd Culv

Peak Elev=201.46' Inflow=158.79 cfs 106.369 af
36.0" x 30.0' Culvert Outflow=158.79 cfs 106.369 af

Total Runoff Area = 214.840 ac Runoff Volume = 14.450 af Average Runoff Depth = 0.81"
68.93% Pervious = 148.099 ac 31.07% Impervious = 66.741 ac

Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED A: Existing DA A

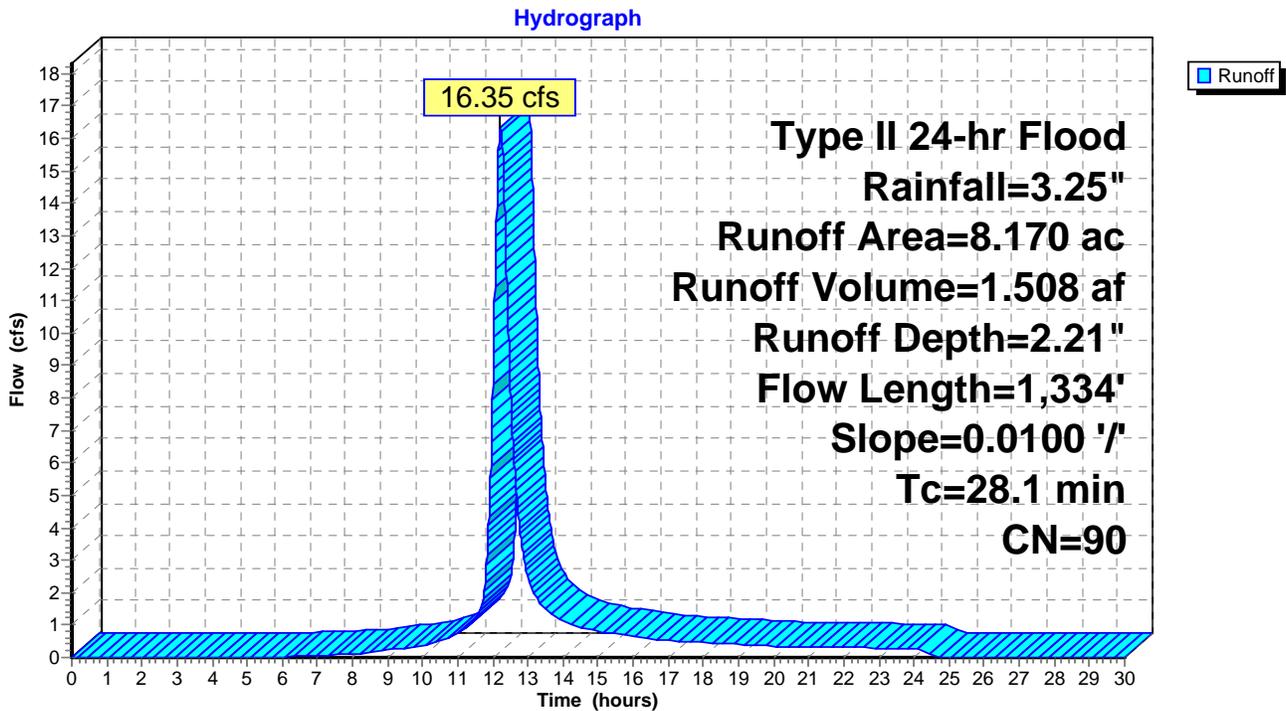
Runoff = 16.35 cfs @ 12.21 hrs, Volume= 1.508 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A: Existing DA A



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED A1: Existing DA A1

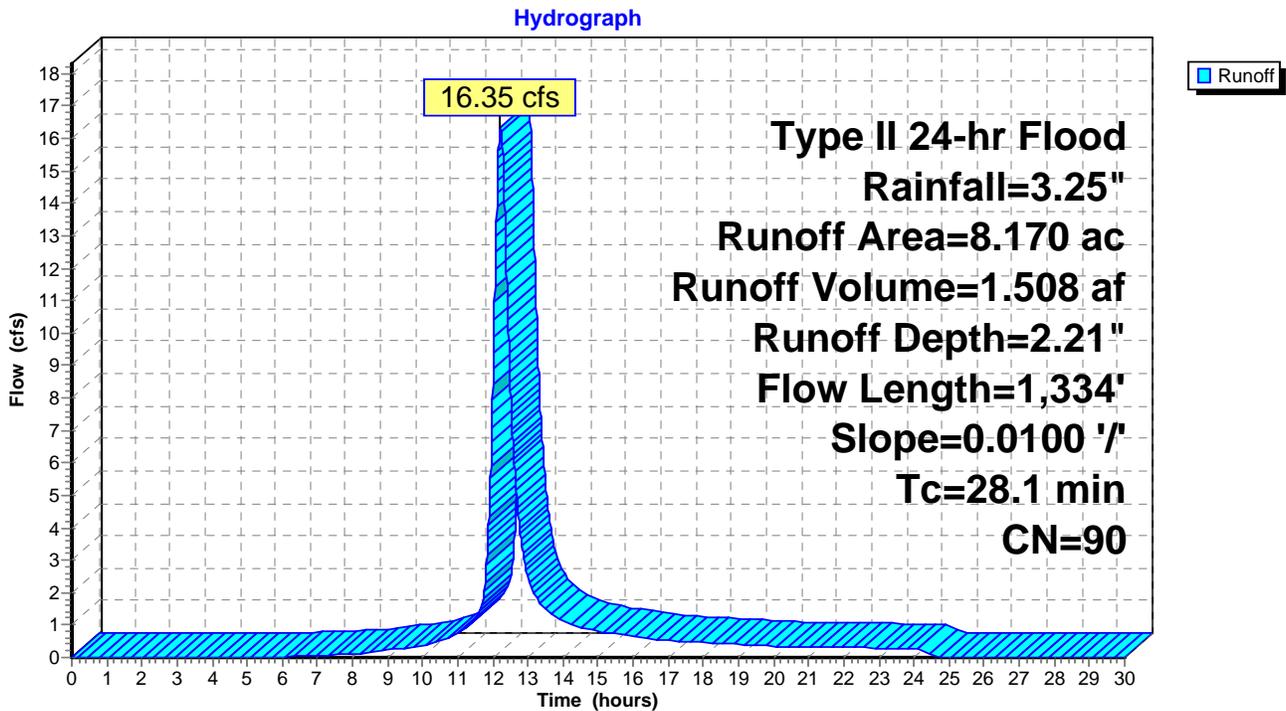
Runoff = 16.35 cfs @ 12.21 hrs, Volume= 1.508 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A1: Existing DA A1



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED B: Existing DA B

Runoff = 35.43 cfs @ 11.94 hrs, Volume= 1.820 af, Depth= 3.02"

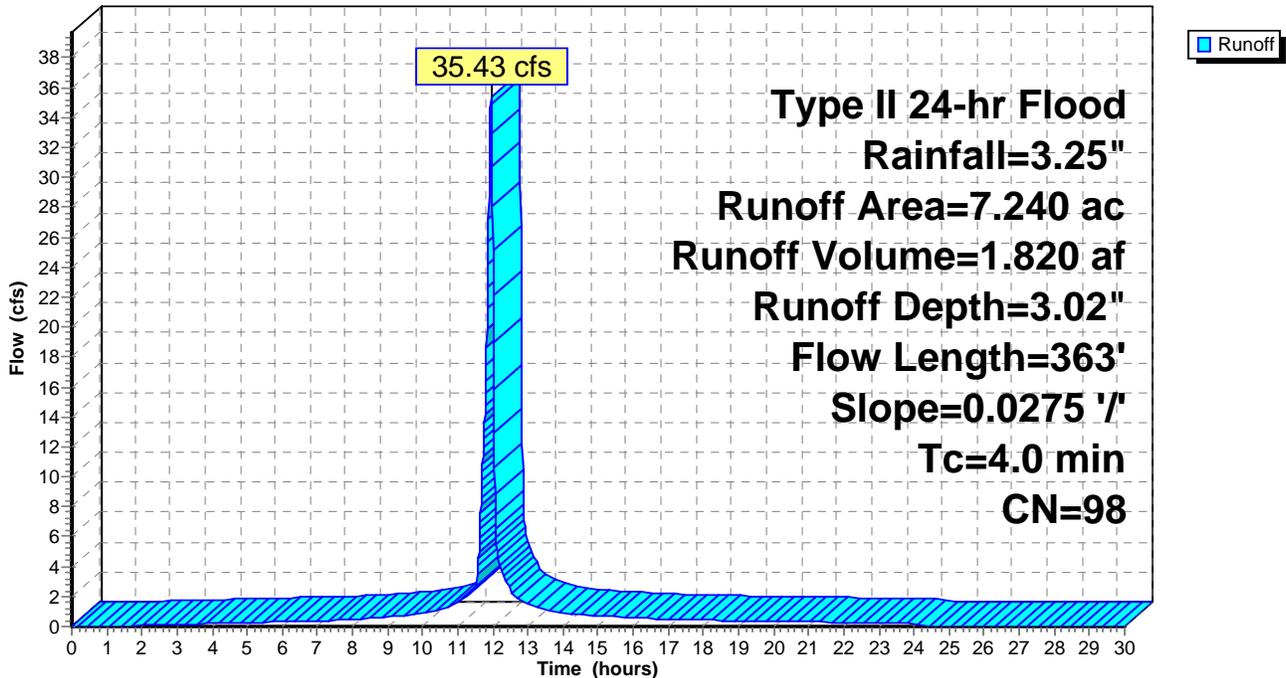
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
7.240	98	Paved parking & roofs
7.240		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	363	0.0275	1.50		Lag/CN Method,

Subcatchment ED B: Existing DA B

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED C: Existing DA C

Runoff = 26.63 cfs @ 12.21 hrs, Volume= 2.608 af, Depth= 0.86"

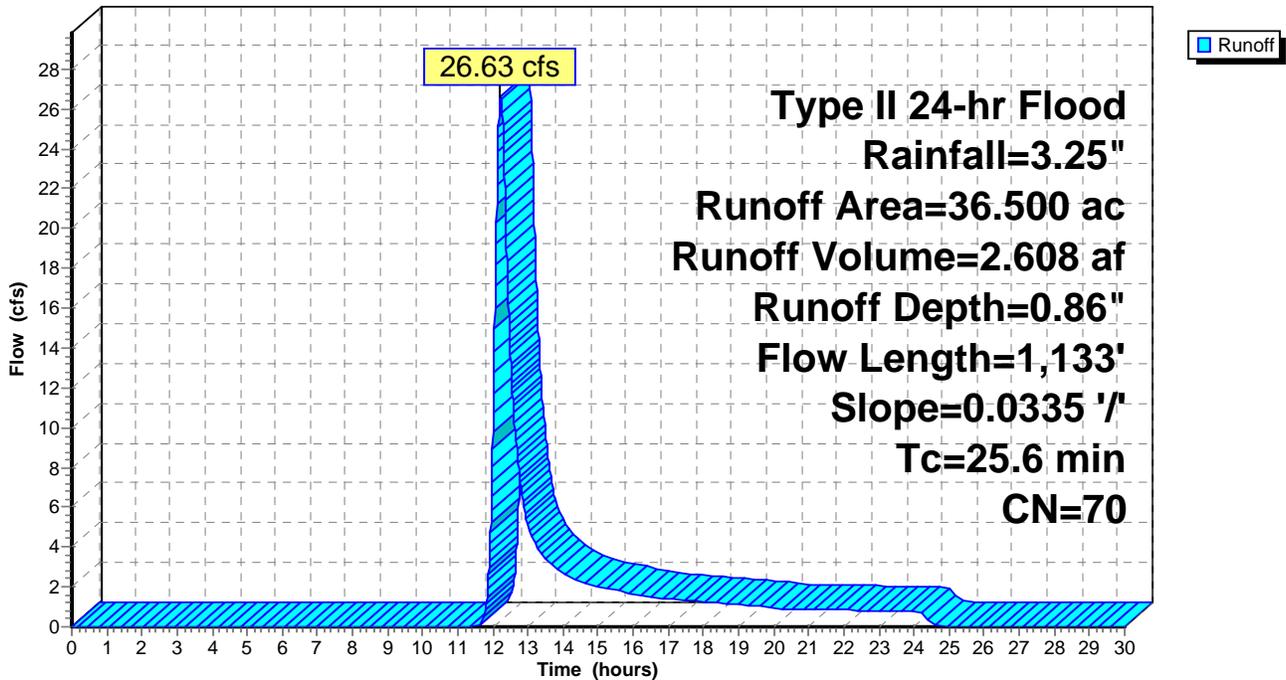
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
36.500	70	1/2 acre lots, 25% imp, HSG B
27.375		Pervious Area
9.125		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,133	0.0335	0.74		Lag/CN Method,

Subcatchment ED C: Existing DA C

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED D: Existing DA D

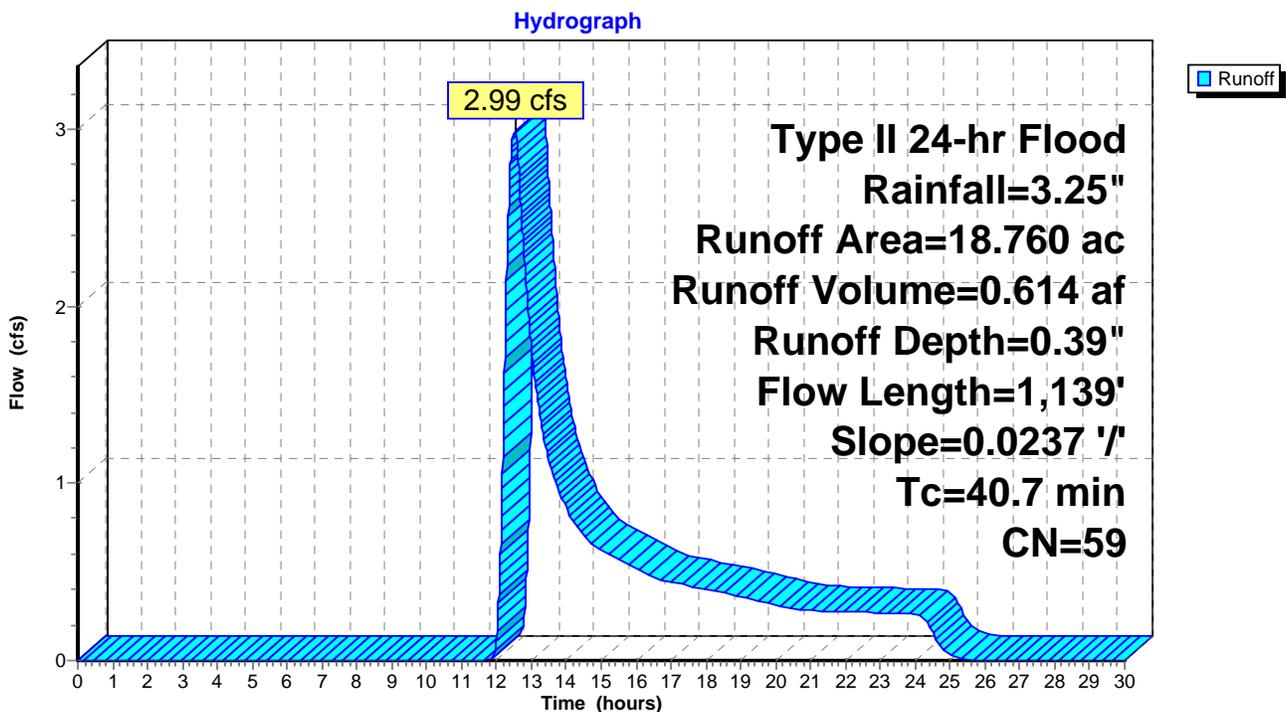
Runoff = 2.99 cfs @ 12.52 hrs, Volume= 0.614 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
18.160	58	Woods/grass comb., Good, HSG B
0.600	98	Paved parking & roofs
18.760	59	Weighted Average
18.160		Pervious Area
0.600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.7	1,139	0.0237	0.47		Lag/CN Method,

Subcatchment ED D: Existing DA D



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED E: Existing DA E

Runoff = 9.16 cfs @ 12.43 hrs, Volume= 1.215 af, Depth= 0.96"

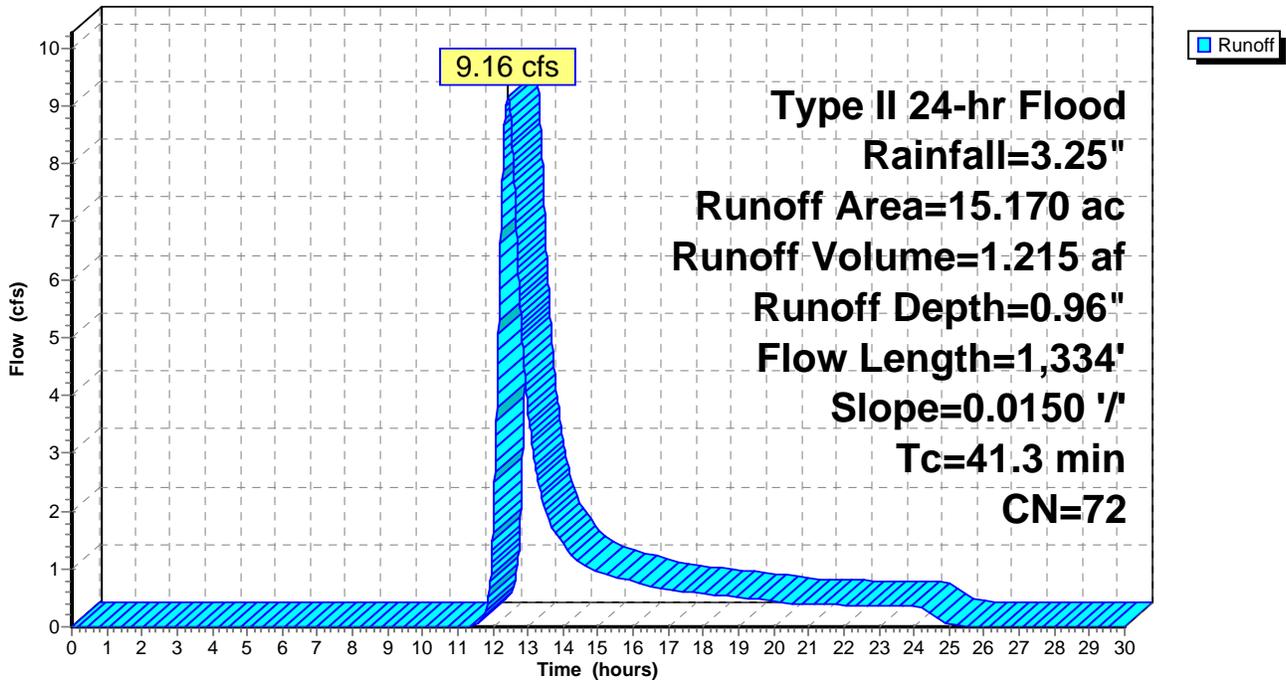
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
15.170	72	1/3 acre lots, 30% imp, HSG B
10.619		Pervious Area
4.551		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
41.3	1,334	0.0150	0.54		Lag/CN Method,

Subcatchment ED E: Existing DA E

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED F: Existing DA F

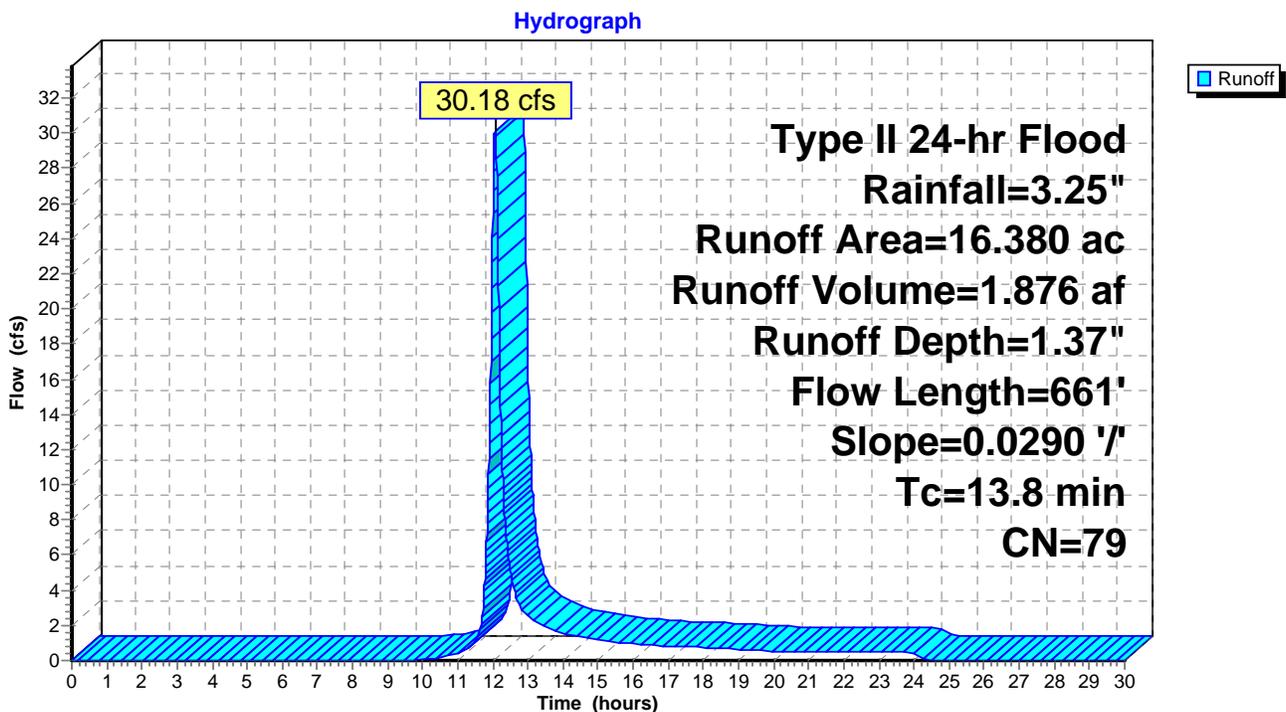
Runoff = 30.18 cfs @ 12.06 hrs, Volume= 1.876 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
9.430	81	1/3 acre lots, 30% imp, HSG C
6.950	76	Woods/grass comb., Fair, HSG C
16.380	79	Weighted Average
13.551		Pervious Area
2.829		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	661	0.0290	0.80		Lag/CN Method,

Subcatchment ED F: Existing DA F



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED G: Existing DA G

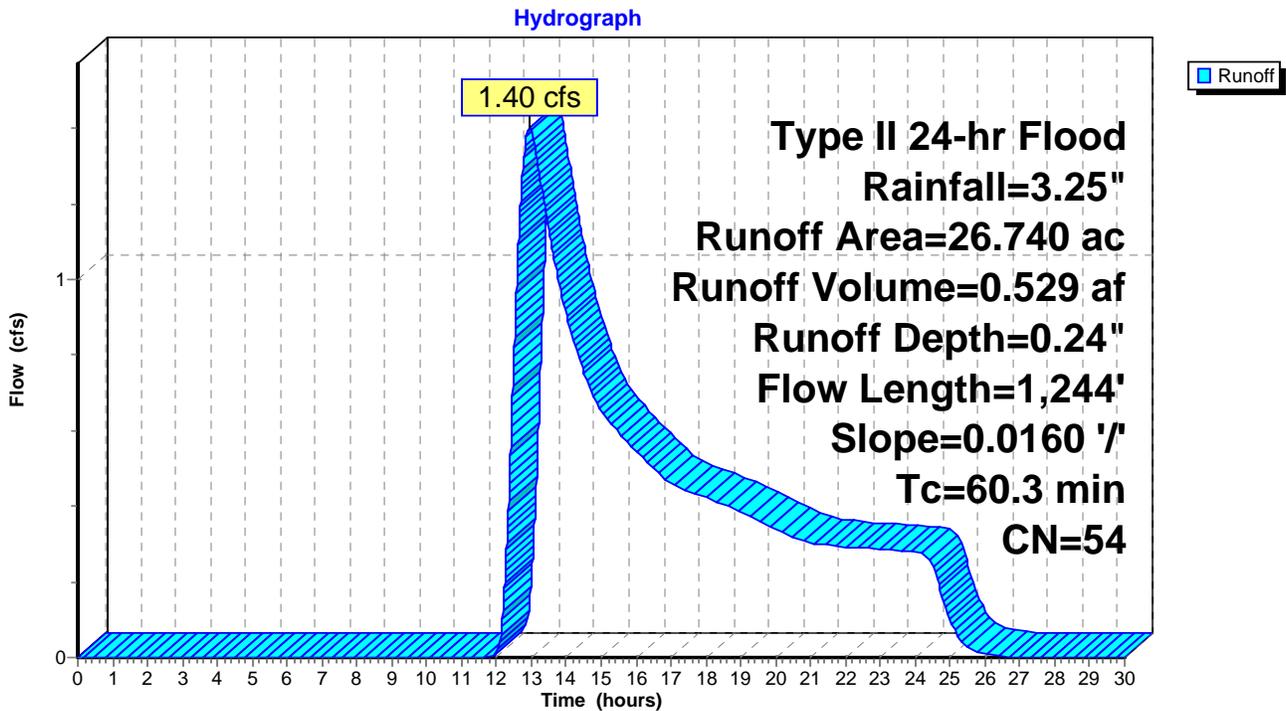
Runoff = 1.40 cfs @ 12.94 hrs, Volume= 0.529 af, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
20.440	57	1/3 acre lots, 30% imp, HSG A
6.300	43	Woods/grass comb., Fair, HSG A
26.740	54	Weighted Average
20.608		Pervious Area
6.132		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.3	1,244	0.0160	0.34		Lag/CN Method,

Subcatchment ED G: Existing DA G



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED I: ED I

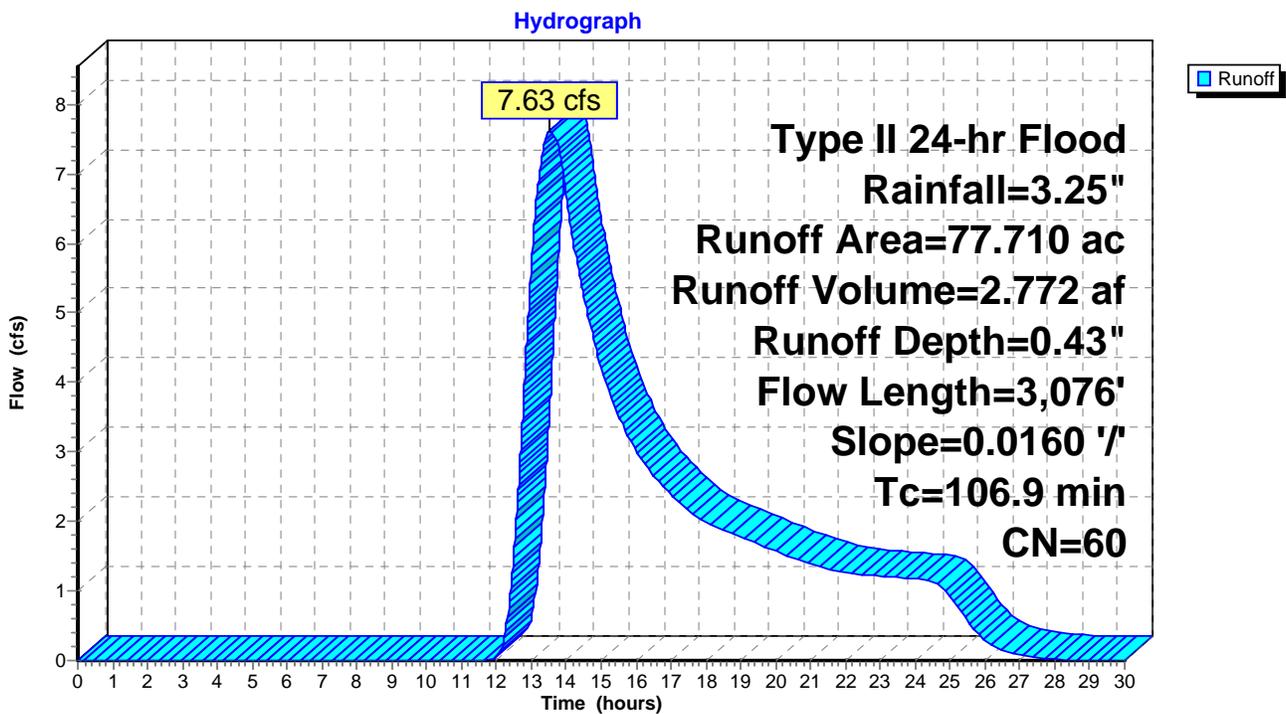
Runoff = 7.63 cfs @ 13.54 hrs, Volume= 2.772 af, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
65.010	61	1/4 acre lots, 38% imp, HSG A
12.700	55	Woods, Good, HSG B
77.710	60	Weighted Average
53.006		Pervious Area
24.704		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
106.9	3,076	0.0160	0.48		Lag/CN Method,

Subcatchment ED I: ED I



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach 9R: EB Krumkill

Inflow Area = 77.710 ac, 31.79% Impervious, Inflow Depth = 0.43" for Flood event
Inflow = 7.63 cfs @ 13.54 hrs, Volume= 2.772 af
Outflow = 7.32 cfs @ 13.80 hrs, Volume= 2.768 af, Atten= 4%, Lag= 15.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.51 fps, Min. Travel Time= 19.4 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 36.2 min

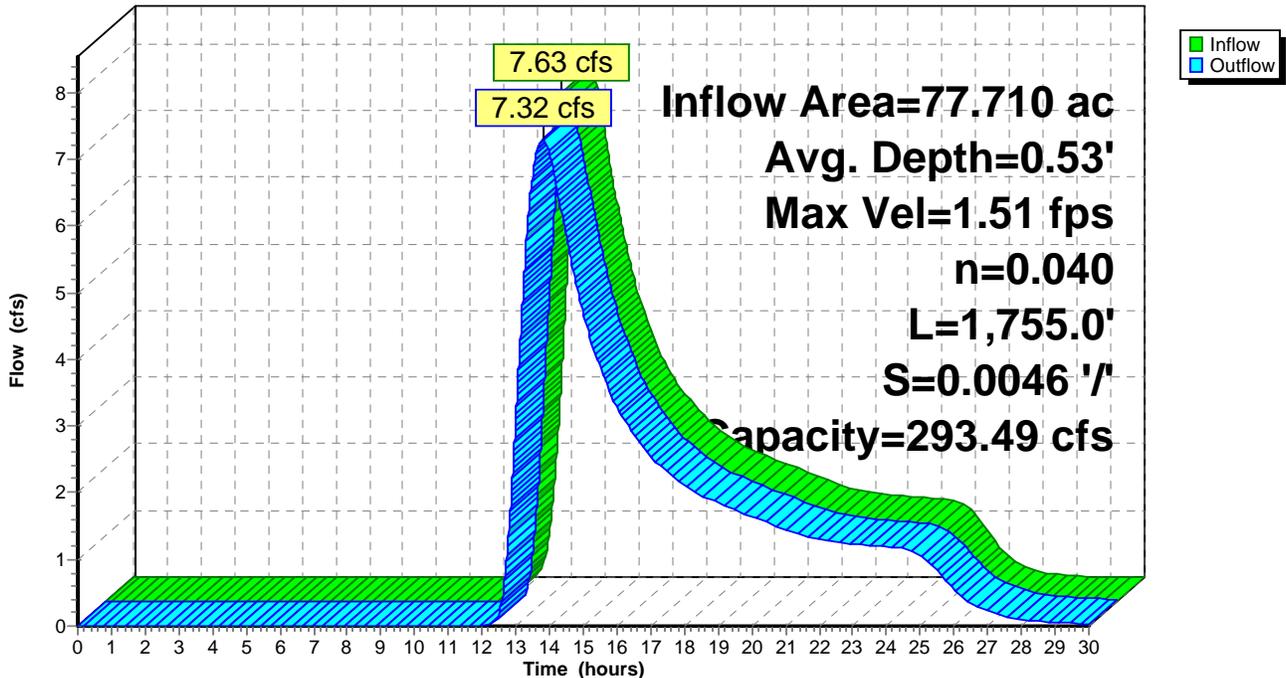
Peak Storage= 8,508 cf @ 13.80 hrs, Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 293.49 cfs

8.00' x 4.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 24.00'
Length= 1,755.0' Slope= 0.0046 '/'
Inlet Invert= 186.00', Outlet Invert= 178.00'



Reach 9R: EB Krumkill

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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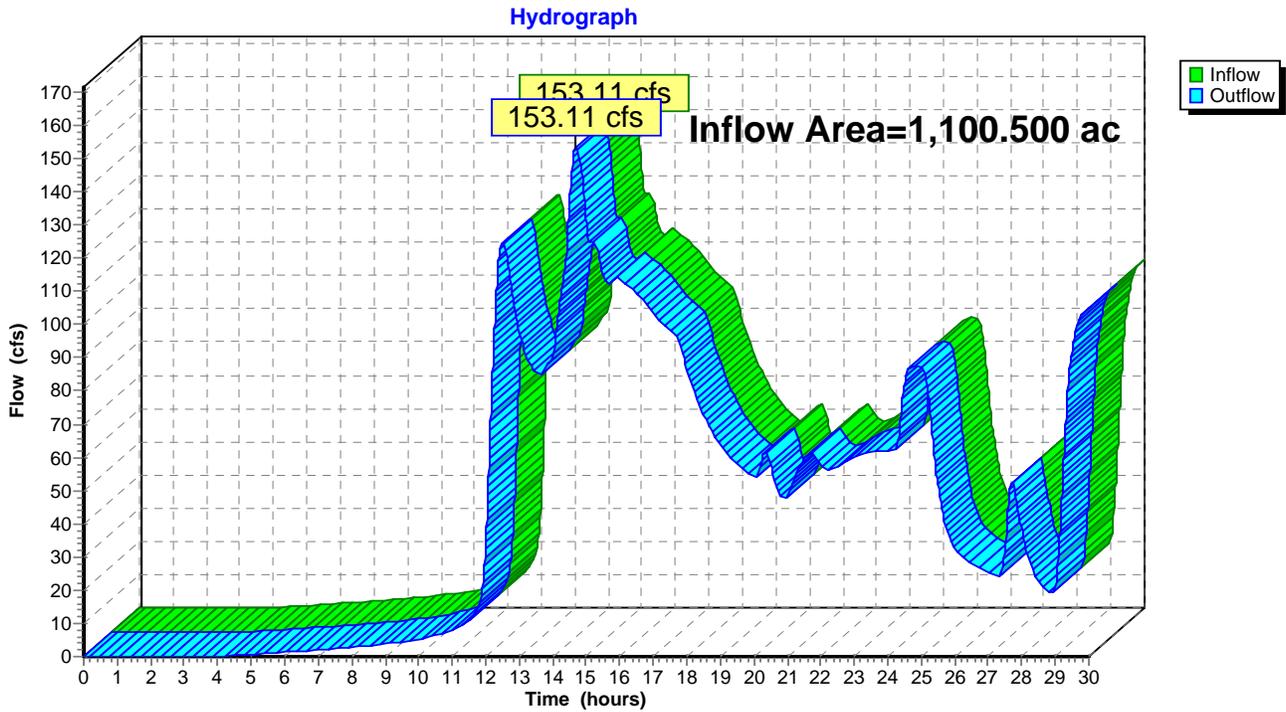
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Summary for Reach KK EX: Krumkill

Inflow Area = 1,100.500 ac, 34.10% Impervious, Inflow Depth > 1.21" for Flood event
Inflow = 153.11 cfs @ 14.69 hrs, Volume= 110.662 af
Outflow = 153.11 cfs @ 14.69 hrs, Volume= 110.662 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach KK EX: Krumkill



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach WBR1: WB R-1

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 1.35" for Flood event
Inflow = 270.34 cfs @ 14.40 hrs, Volume= 105.519 af
Outflow = 219.91 cfs @ 14.40 hrs, Volume= 105.349 af, Atten= 19%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.19 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.74 fps, Avg. Travel Time= 1.8 min

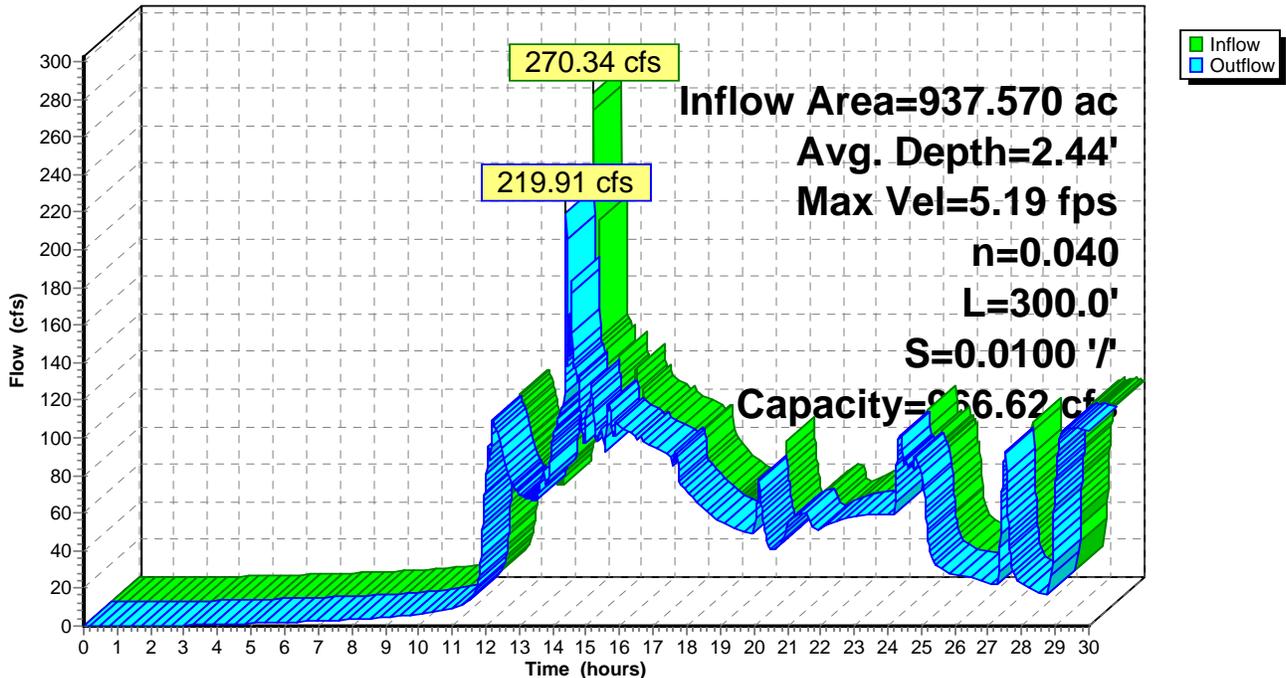
Peak Storage= 12,669 cf @ 14.40 hrs, Average Depth at Peak Storage= 2.44'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 966.62 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 40.00'
Length= 300.0' Slope= 0.0100 '/'
Inlet Invert= 189.00', Outlet Invert= 186.00'



Reach WBR1: WB R-1

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach WBR2: WB R-2

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.32" for Flood event
Inflow = 158.88 cfs @ 14.58 hrs, Volume= 106.419 af
Outflow = 158.79 cfs @ 14.58 hrs, Volume= 106.369 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 8.21 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 4.70 fps, Avg. Travel Time= 0.5 min

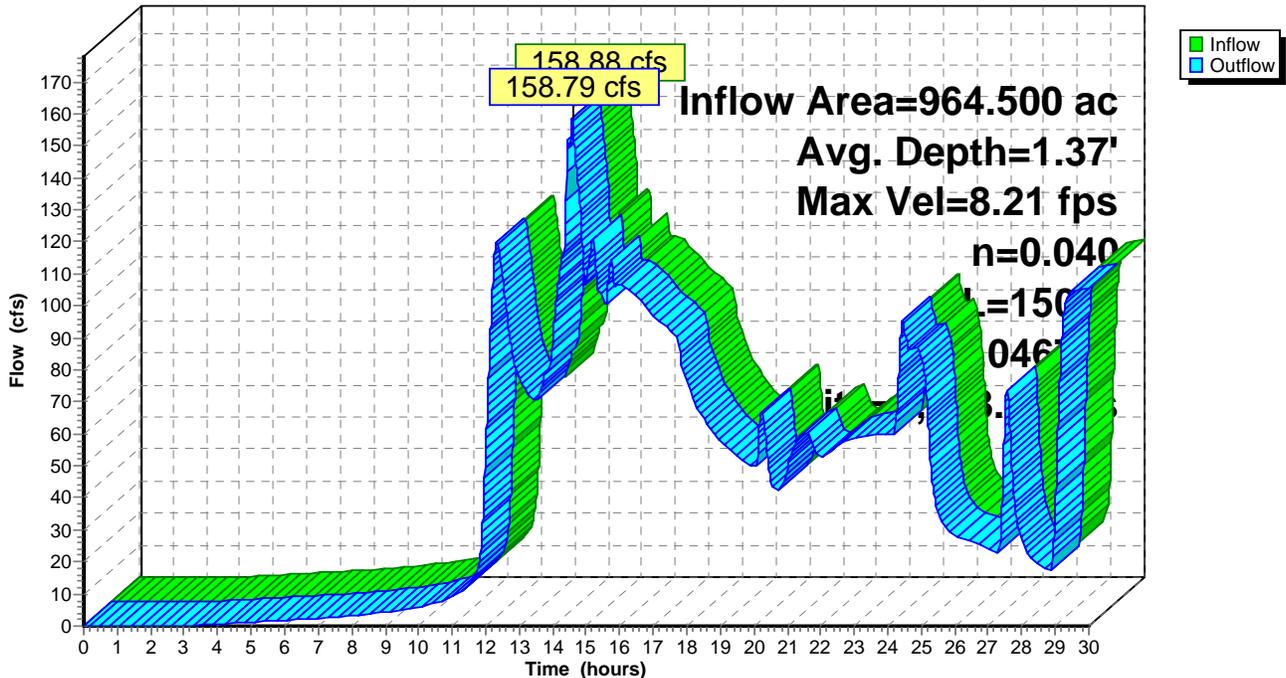
Peak Storage= 2,899 cf @ 14.58 hrs, Average Depth at Peak Storage= 1.37'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 2,088.13 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 40.00'
Length= 150.0' Slope= 0.0467 '/'
Inlet Invert= 185.00', Outlet Invert= 178.00'



Reach WBR2: WB R-2

Hydrograph



Existing Drainage McKownville RT 20 Area

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Summary for Reach WBR3: WB R-3

Inflow Area = 979.670 ac, 34.87% Impervious, Inflow Depth > 1.32" for Flood event
Inflow = 159.86 cfs @ 14.58 hrs, Volume= 107.584 af
Outflow = 159.21 cfs @ 14.59 hrs, Volume= 107.475 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.75 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 3.33 fps, Avg. Travel Time= 1.1 min

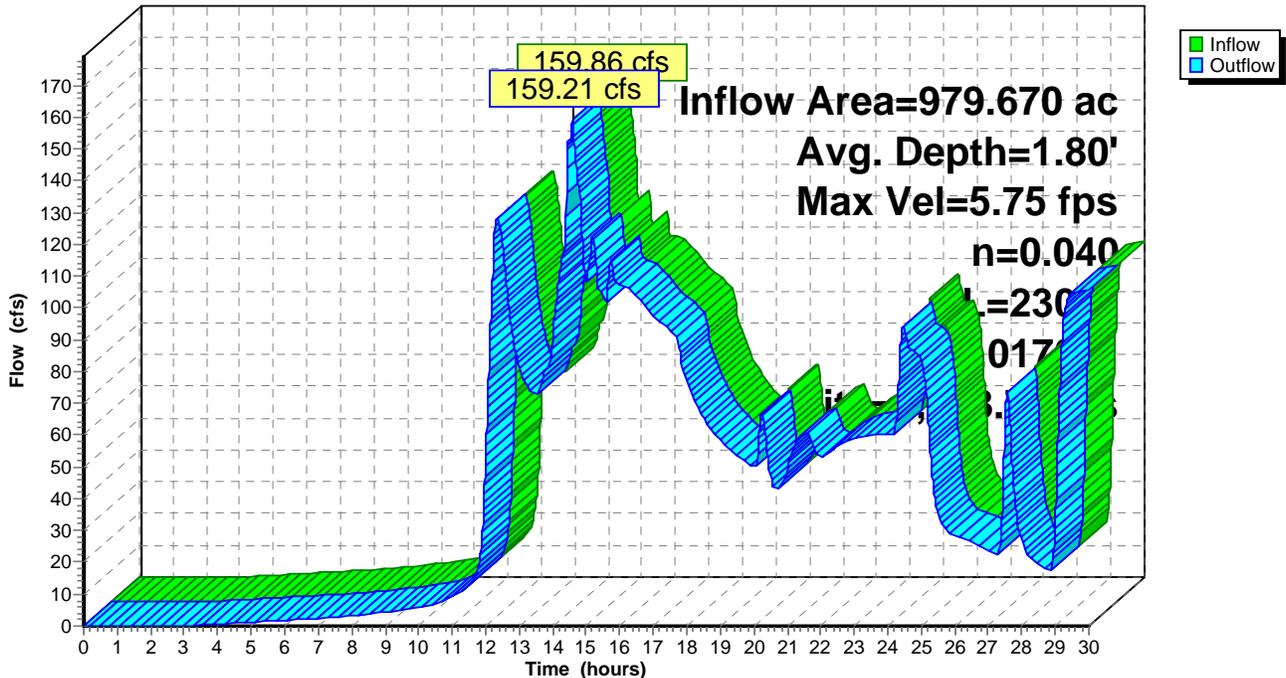
Peak Storage= 6,370 cf @ 14.59 hrs, Average Depth at Peak Storage= 1.80'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 1,258.70 cfs

10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 230.0' Slope= 0.0170 '/
Inlet Invert= 177.90', Outlet Invert= 174.00'



Reach WBR3: WB R-3

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach WBR4: WB R-4

Inflow Area = 1,022.790 ac, 34.28% Impervious, Inflow Depth > 1.29" for Flood event
Inflow = 161.23 cfs @ 14.59 hrs, Volume= 109.880 af
Outflow = 147.75 cfs @ 14.69 hrs, Volume= 107.895 af, Atten= 8%, Lag= 5.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.35 fps, Min. Travel Time= 12.5 min
Avg. Velocity = 2.01 fps, Avg. Travel Time= 20.8 min

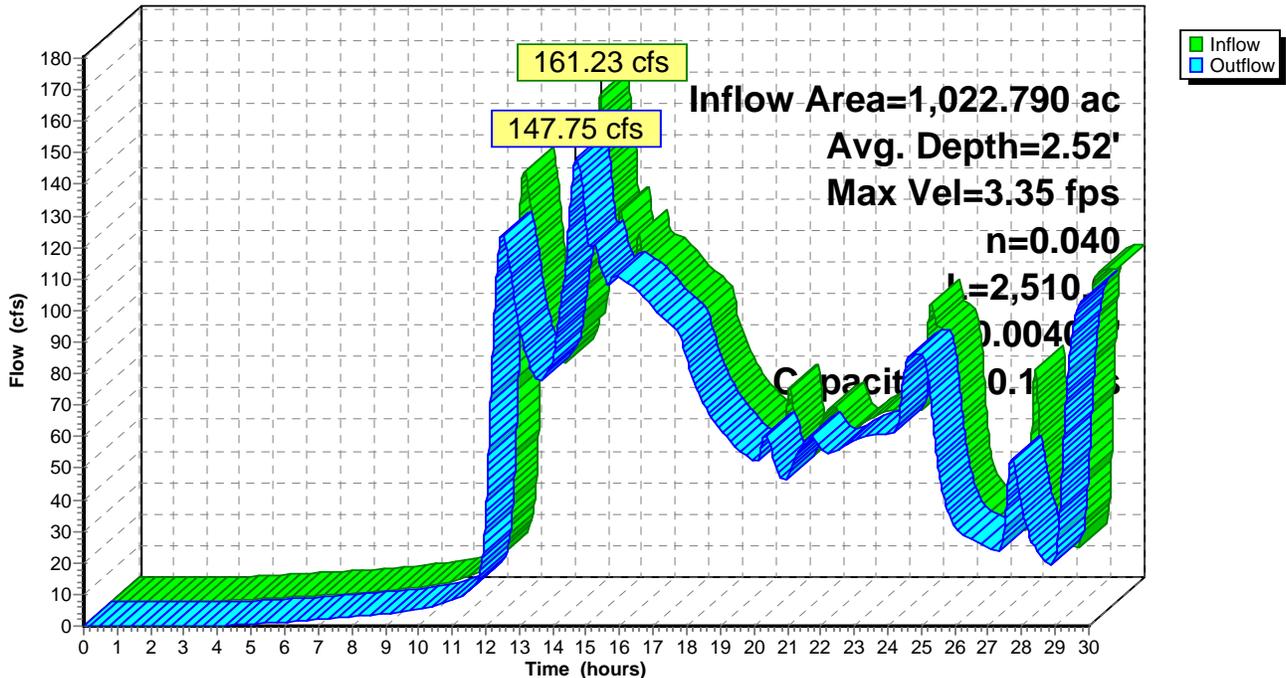
Peak Storage= 110,849 cf @ 14.69 hrs, Average Depth at Peak Storage= 2.52'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 610.12 cfs

10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 2,510.0' Slope= 0.0040 '/
Inlet Invert= 186.00', Outlet Invert= 176.00'



Reach WBR4: WB R-4

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond 16P: 36" 815'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 1.36" for Flood event
 Inflow = 423.25 cfs @ 14.39 hrs, Volume= 100.642 af
 Outflow = 423.25 cfs @ 14.39 hrs, Volume= 100.642 af, Atten= 0%, Lag= 0.0 min
 Primary = 423.25 cfs @ 14.39 hrs, Volume= 100.642 af

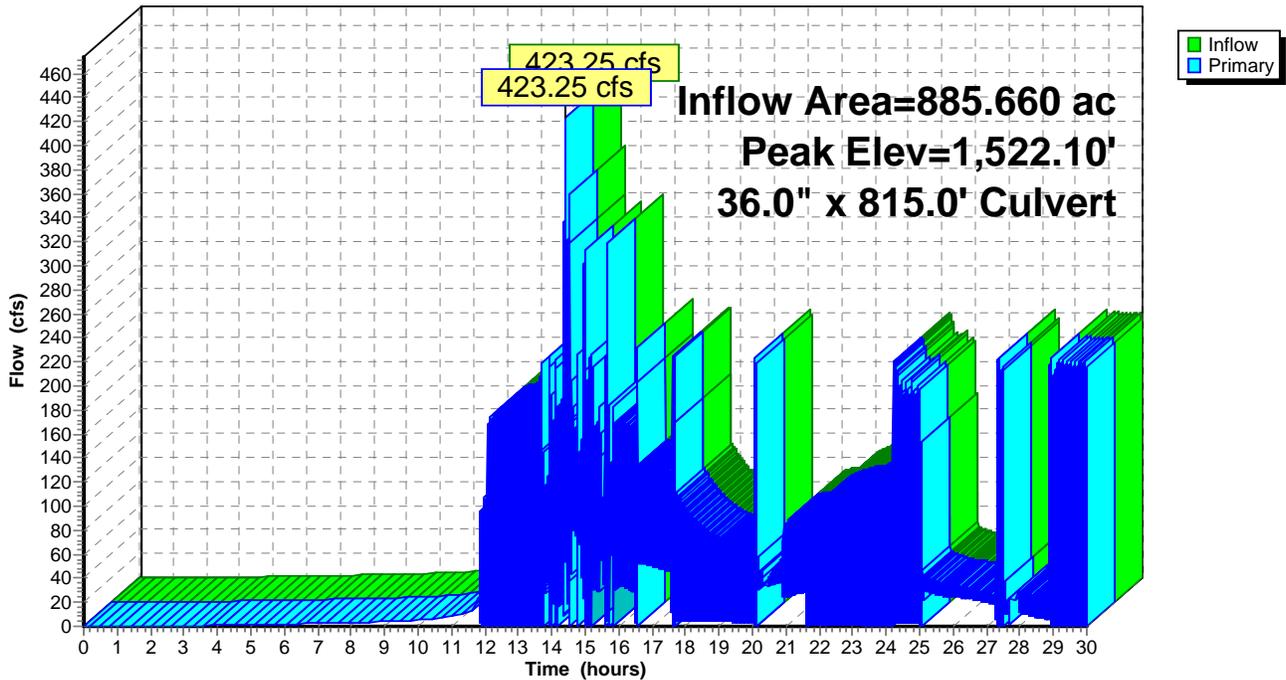
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 1,522.10' @ 14.39 hrs

Device #1	Routing	Invert	Outlet Devices
	Primary	196.46'	36.0" x 815.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 194.00' S= 0.0030 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=416.09 cfs @ 14.39 hrs HW=1,508.20' TW=250.24' (Dynamic Tailwater)
 ←=Culvert (Outlet Controls 416.09 cfs @ 58.86 fps)

Pond 16P: 36" 815'

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond 17P: 48" 85'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 1.36" for Flood event
 Inflow = 423.25 cfs @ 14.39 hrs, Volume= 100.642 af
 Outflow = 423.25 cfs @ 14.39 hrs, Volume= 100.642 af, Atten= 0%, Lag= 0.0 min
 Primary = 423.25 cfs @ 14.39 hrs, Volume= 100.642 af

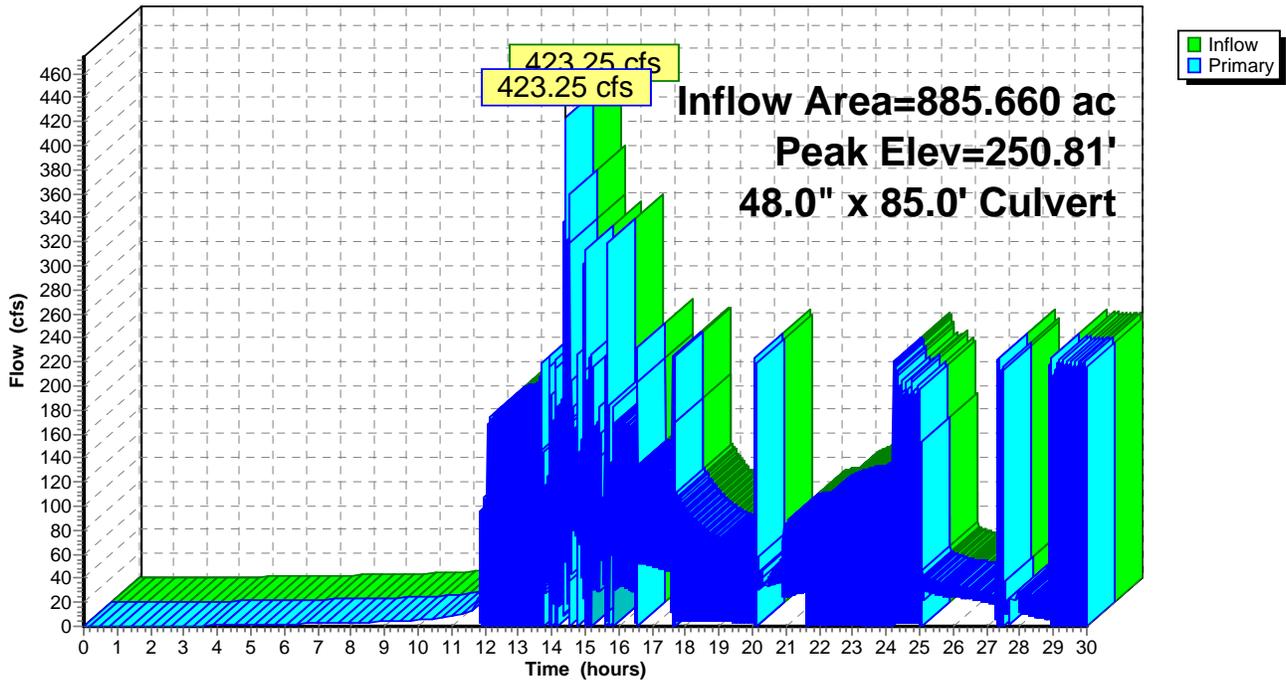
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 250.81' @ 14.39 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	48.0" x 85.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 193.00' S= 0.0118 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=420.97 cfs @ 14.39 hrs HW=250.24' TW=193.87' (Dynamic Tailwater)
 ↳=Culvert (Barrel Controls 420.97 cfs @ 33.50 fps)

Pond 17P: 48" 85'

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond ARd C: Acre Rd Culvert

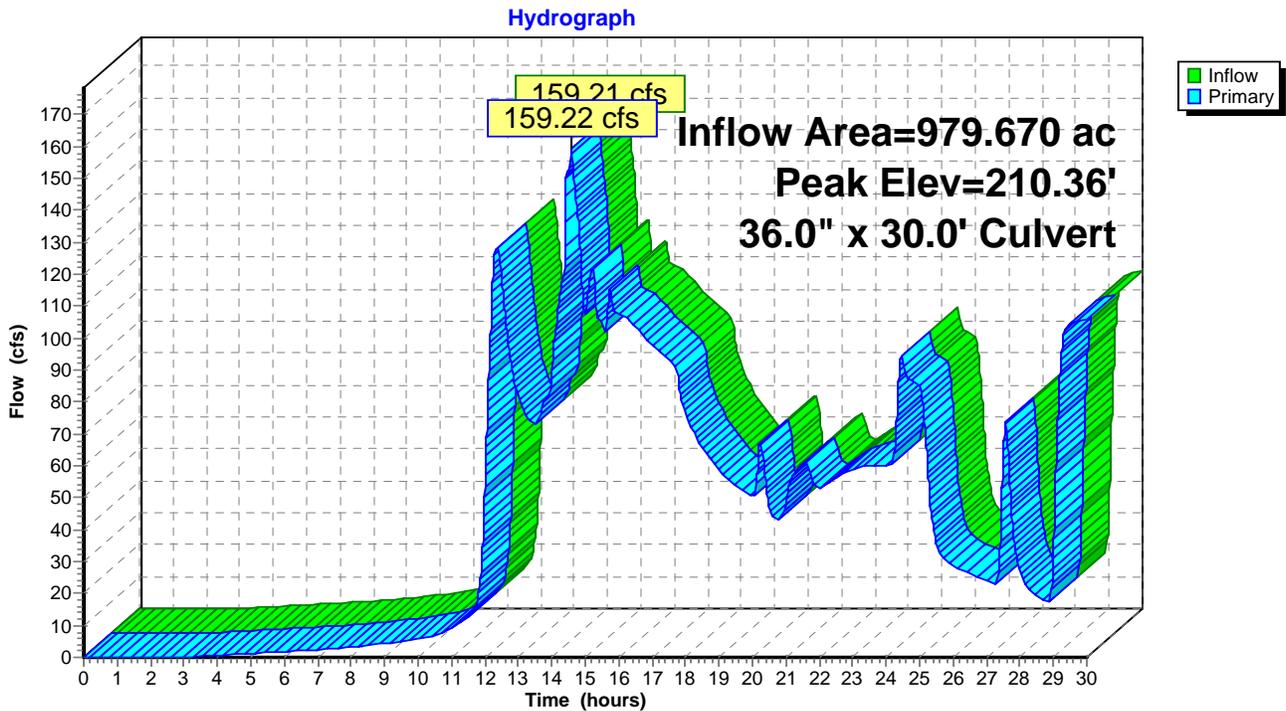
Inflow Area = 979.670 ac, 34.87% Impervious, Inflow Depth > 1.32" for Flood event
 Inflow = 159.21 cfs @ 14.59 hrs, Volume= 107.475 af
 Outflow = 159.22 cfs @ 14.59 hrs, Volume= 107.475 af, Atten= 0%, Lag= 0.0 min
 Primary = 159.22 cfs @ 14.59 hrs, Volume= 107.475 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 210.36' @ 14.59 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	174.00'	36.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 173.90' S= 0.0033 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=159.02 cfs @ 14.59 hrs HW=210.30' TW=188.47' (Dynamic Tailwater)
 ←**1=Culvert** (Inlet Controls 159.02 cfs @ 22.50 fps)

Pond ARd C: Acre Rd Culvert



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond ES A: Existing Storage A

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 1.36" for Flood event
 Inflow = 427.30 cfs @ 14.39 hrs, Volume= 106.578 af
 Outflow = 270.34 cfs @ 14.40 hrs, Volume= 105.519 af, Atten= 37%, Lag= 0.4 min
 Primary = 270.34 cfs @ 14.40 hrs, Volume= 105.519 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 194.24' @ 14.40 hrs Surf.Area= 22,244 sf Storage= 57,579 cf

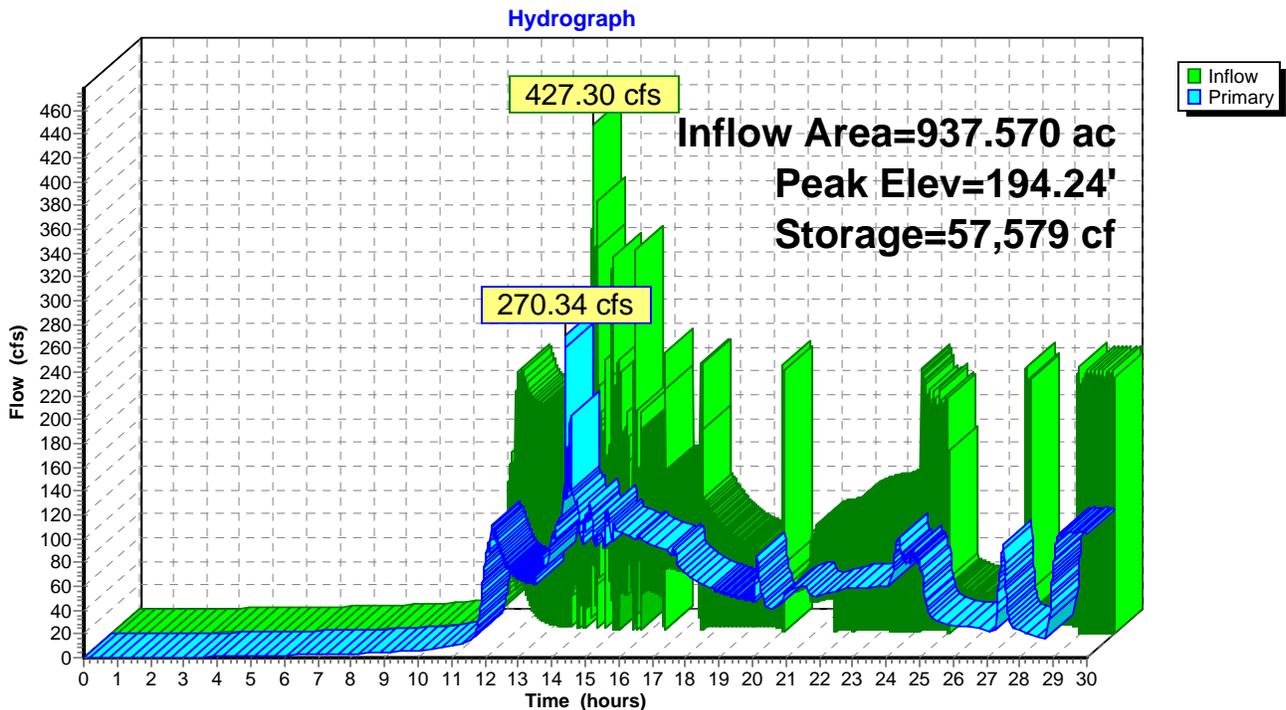
Plug-Flow detention time= 8.1 min calculated for 105.519 af (99% of inflow)
 Center-of-Mass det. time= 1.7 min (1,161.4 - 1,159.7)

Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	57,579 cf	65.00'W x 250.00'L x 3.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=250.30 cfs @ 14.40 hrs HW=194.05' TW=191.32' (Dynamic Tailwater)
 ←1=Broad-Crested Rectangular Weir (Weir Controls 250.30 cfs @ 6.18 fps)

Pond ES A: Existing Storage A



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond ES B: Existing Storage B

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.34" for Flood event
 Inflow = 221.56 cfs @ 14.40 hrs, Volume= 107.471 af
 Outflow = 158.88 cfs @ 14.58 hrs, Volume= 106.419 af, Atten= 28%, Lag= 10.7 min
 Primary = 158.88 cfs @ 14.58 hrs, Volume= 106.419 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 188.95' @ 14.58 hrs Surf.Area= 23,036 sf Storage= 60,027 cf

Plug-Flow detention time= 8.4 min calculated for 106.419 af (99% of inflow)
 Center-of-Mass det. time= 2.1 min (1,157.9 - 1,155.8)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	61,135 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
186.00	17,576	0	0
188.00	21,332	38,908	38,908
189.00	23,122	22,227	61,135

Device	Routing	Invert	Outlet Devices
#1	Primary	186.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=158.79 cfs @ 14.58 hrs HW=188.95' TW=186.37' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 158.79 cfs @ 5.38 fps)

Existing Drainage McKownville RT 20 Area

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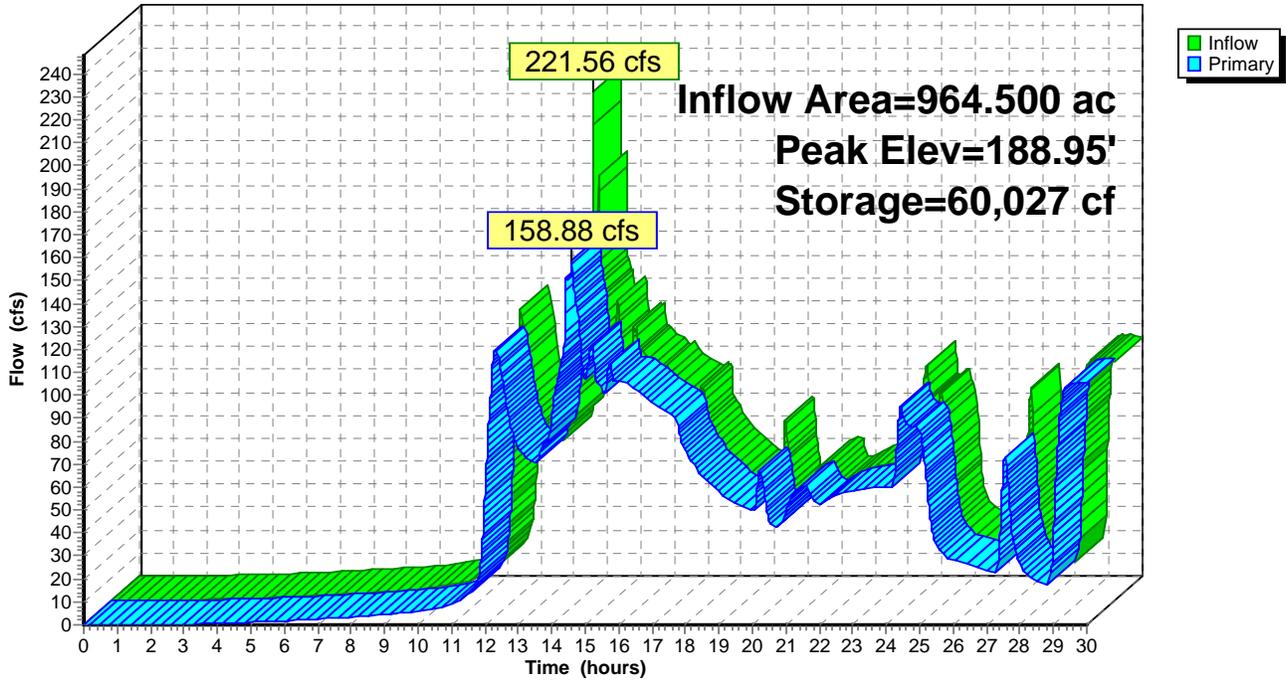
Type II 24-hr Flood Rainfall=3.25"

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Pond ES B: Existing Storage B

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond MRd C: McKown Rd Culv

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.32" for Flood event
Inflow = 158.79 cfs @ 14.58 hrs, Volume= 106.369 af
Outflow = 158.79 cfs @ 14.58 hrs, Volume= 106.369 af, Atten= 0%, Lag= 0.0 min
Primary = 158.79 cfs @ 14.58 hrs, Volume= 106.369 af

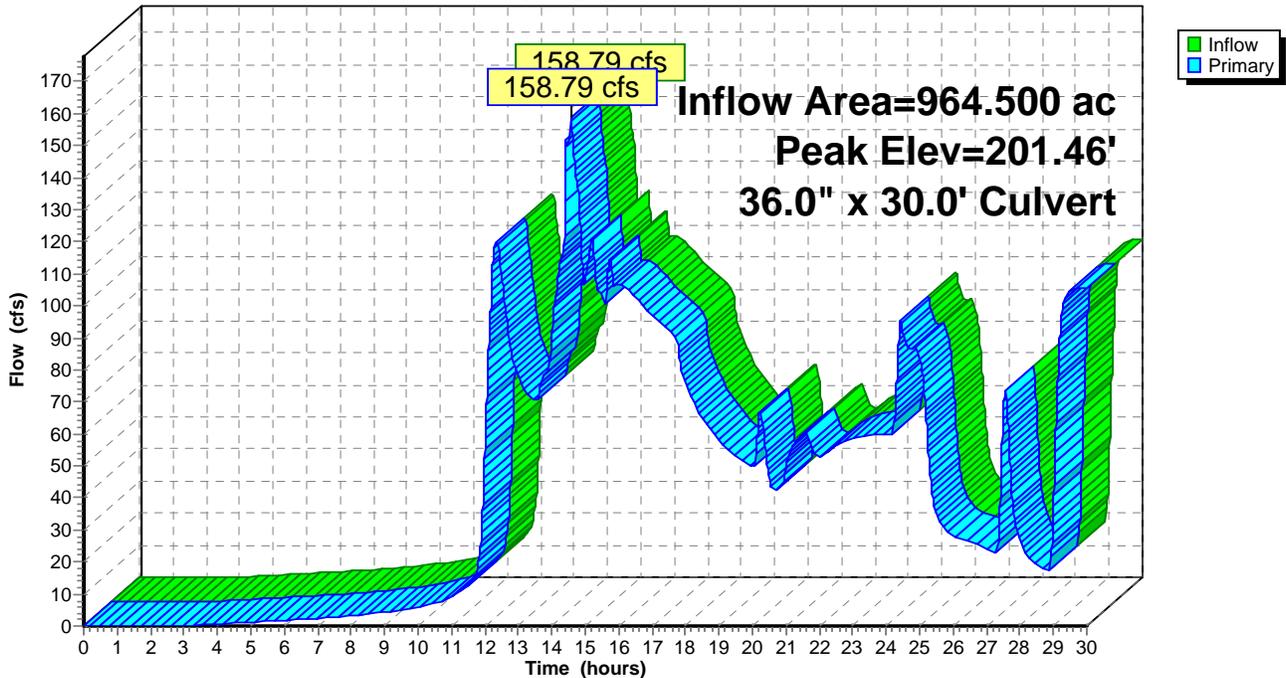
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 201.46' @ 14.58 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.00'	36.0" x 30.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 177.00' S= 0.0333 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=158.49 cfs @ 14.58 hrs HW=201.38' TW=179.69' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 158.49 cfs @ 22.42 fps)

Pond MRd C: McKown Rd Culv

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 2

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ED A: Existing DA A Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=2.55"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=18.76 cfs 1.737 af

Subcatchment ED A1: Existing DA A1 Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=2.55"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=18.76 cfs 1.737 af

Subcatchment ED B: Existing DA B Runoff Area=7.240 ac 100.00% Impervious Runoff Depth=3.38"
Flow Length=363' Slope=0.0275 '/' Tc=4.0 min CN=98 Runoff=39.44 cfs 2.037 af

Subcatchment ED C: Existing DA C Runoff Area=36.500 ac 25.00% Impervious Runoff Depth=1.08"
Flow Length=1,133' Slope=0.0335 '/' Tc=25.6 min CN=70 Runoff=34.69 cfs 3.275 af

Subcatchment ED D: Existing DA D Runoff Area=18.760 ac 3.20% Impervious Runoff Depth=0.54"
Flow Length=1,139' Slope=0.0237 '/' Tc=40.7 min CN=59 Runoff=4.69 cfs 0.840 af

Subcatchment ED E: Existing DA E Runoff Area=15.170 ac 30.00% Impervious Runoff Depth=1.19"
Flow Length=1,334' Slope=0.0150 '/' Tc=41.3 min CN=72 Runoff=11.71 cfs 1.509 af

Subcatchment ED F: Existing DA F Runoff Area=16.380 ac 17.27% Impervious Runoff Depth=1.65"
Flow Length=661' Slope=0.0290 '/' Tc=13.8 min CN=79 Runoff=36.42 cfs 2.255 af

Subcatchment ED G: Existing DA G Runoff Area=26.740 ac 22.93% Impervious Runoff Depth=0.35"
Flow Length=1,244' Slope=0.0160 '/' Tc=60.3 min CN=54 Runoff=2.53 cfs 0.777 af

Subcatchment ED I: ED I Runoff Area=77.710 ac 31.79% Impervious Runoff Depth=0.58"
Flow Length=3,076' Slope=0.0160 '/' Tc=106.9 min CN=60 Runoff=11.24 cfs 3.753 af

Reach 9R: EB Krumkill Avg. Depth=0.67' Max Vel=1.73 fps Inflow=11.24 cfs 3.753 af
n=0.040 L=1,755.0' S=0.0046 '/' Capacity=293.49 cfs Outflow=10.85 cfs 3.749 af

Reach KK EX: Krumkill Inflow=234.26 cfs 134.471 af
Outflow=234.26 cfs 134.471 af

Reach WBR1: WB R-1 Avg. Depth=2.89' Max Vel=5.70 fps Inflow=481.58 cfs 126.984 af
n=0.040 L=300.0' S=0.0100 '/' Capacity=966.62 cfs Outflow=308.70 cfs 126.812 af

Reach WBR2: WB R-2 Avg. Depth=1.95' Max Vel=9.92 fps Inflow=320.87 cfs 128.337 af
n=0.040 L=150.0' S=0.0467 '/' Capacity=2,088.13 cfs Outflow=308.97 cfs 128.287 af

Reach WBR3: WB R-3 Avg. Depth=2.50' Max Vel=6.87 fps Inflow=310.37 cfs 129.796 af
n=0.040 L=230.0' S=0.0170 '/' Capacity=1,258.70 cfs Outflow=300.76 cfs 129.686 af

Reach WBR4: WB R-4 Avg. Depth=3.11' Max Vel=3.75 fps Inflow=303.46 cfs 132.718 af
n=0.040 L=2,510.0' S=0.0040 '/' Capacity=610.12 cfs Outflow=225.76 cfs 130.722 af

Pond 16P: 36" 815' Peak Elev=2,158.25' Inflow=519.37 cfs 121.008 af
36.0" x 815.0' Culvert Outflow=519.37 cfs 121.008 af

Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Pond 17P: 48" 85'

Peak Elev=277.65' Inflow=519.37 cfs 121.008 af
48.0" x 85.0' Culvert Outflow=519.37 cfs 121.008 af

Pond ARd C: Acre Rd Culvert

Peak Elev=267.11' Inflow=300.76 cfs 129.686 af
36.0" x 30.0' Culvert Outflow=300.75 cfs 129.686 af

Pond ES A: Existing Storage A

Peak Elev=196.10' Storage=57,579 cf Inflow=524.25 cfs 128.057 af
Outflow=481.58 cfs 126.984 af

Pond ES B: Existing Storage B

Peak Elev=190.62' Storage=61,135 cf Inflow=312.04 cfs 129.389 af
Outflow=320.87 cfs 128.337 af

Pond MRd C: McKown Rd Culv

Peak Elev=262.31' Inflow=308.97 cfs 128.287 af
36.0" x 30.0' Culvert Outflow=308.97 cfs 128.287 af

Total Runoff Area = 214.840 ac Runoff Volume = 17.919 af Average Runoff Depth = 1.00"
68.93% Pervious = 148.099 ac 31.07% Impervious = 66.741 ac

Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED A: Existing DA A

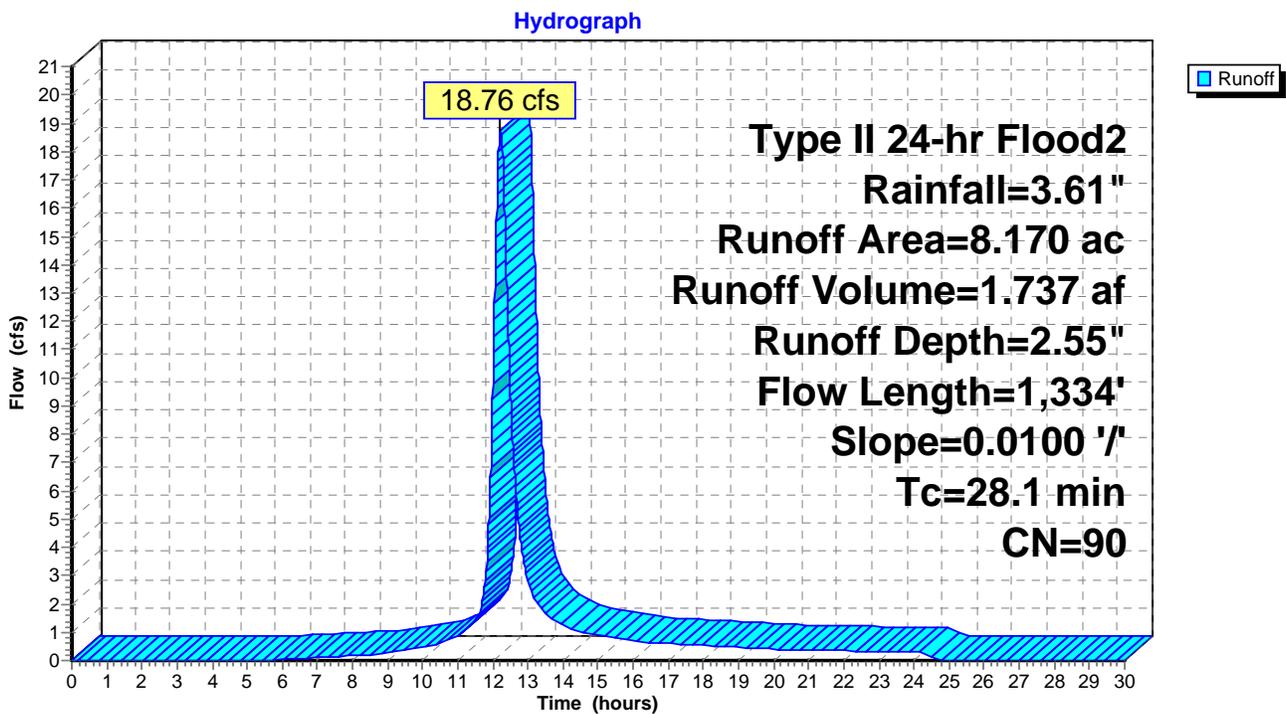
Runoff = 18.76 cfs @ 12.21 hrs, Volume= 1.737 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A: Existing DA A



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED A1: Existing DA A1

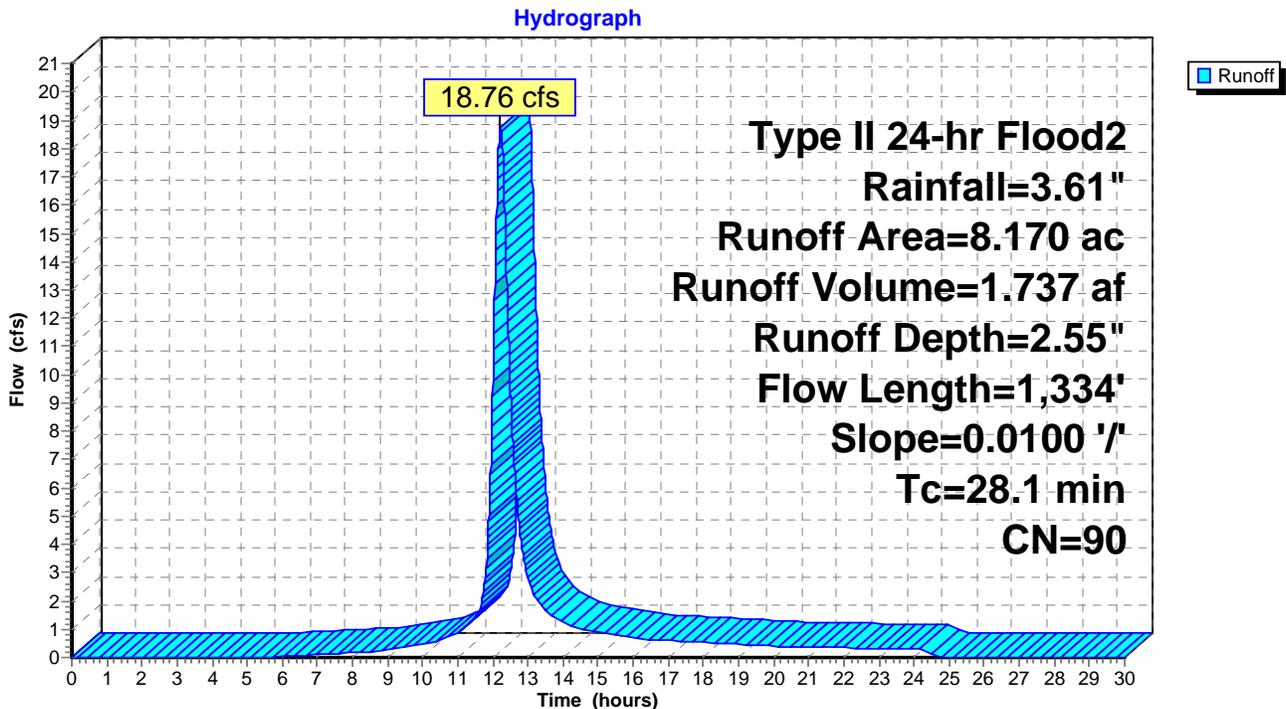
Runoff = 18.76 cfs @ 12.21 hrs, Volume= 1.737 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A1: Existing DA A1



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED B: Existing DA B

Runoff = 39.44 cfs @ 11.94 hrs, Volume= 2.037 af, Depth= 3.38"

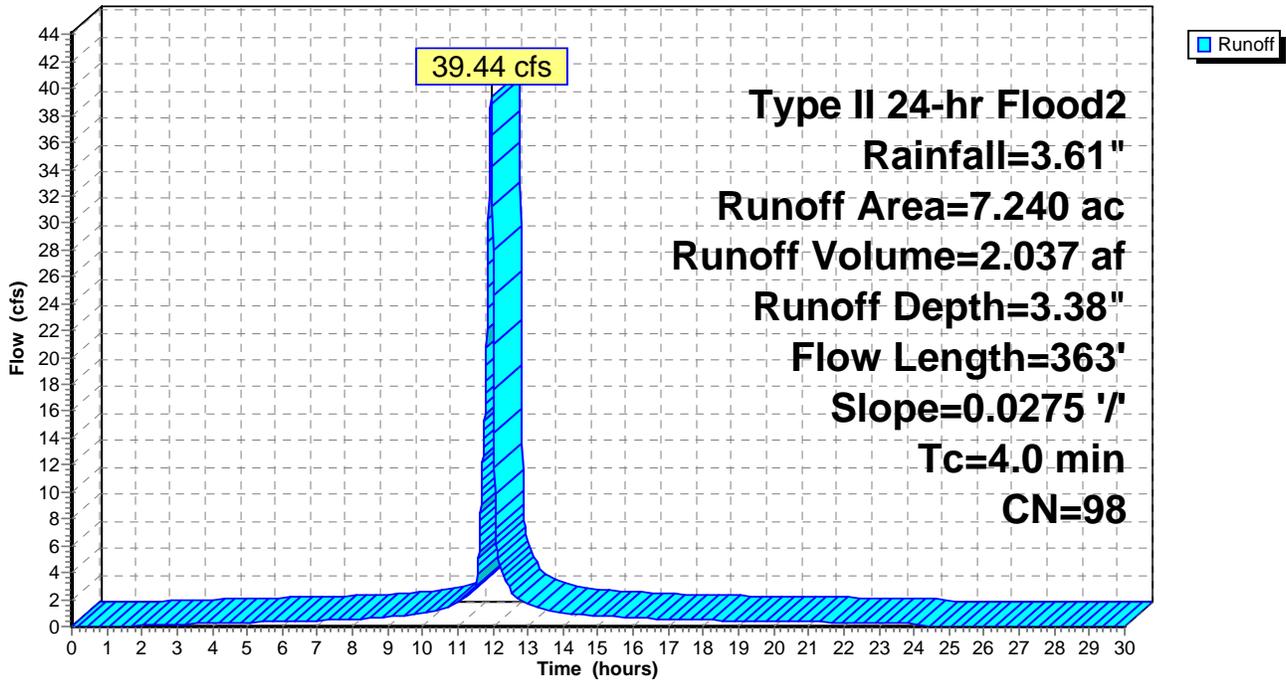
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
7.240	98	Paved parking & roofs
7.240		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	363	0.0275	1.50		Lag/CN Method,

Subcatchment ED B: Existing DA B

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED C: Existing DA C

Runoff = 34.69 cfs @ 12.21 hrs, Volume= 3.275 af, Depth= 1.08"

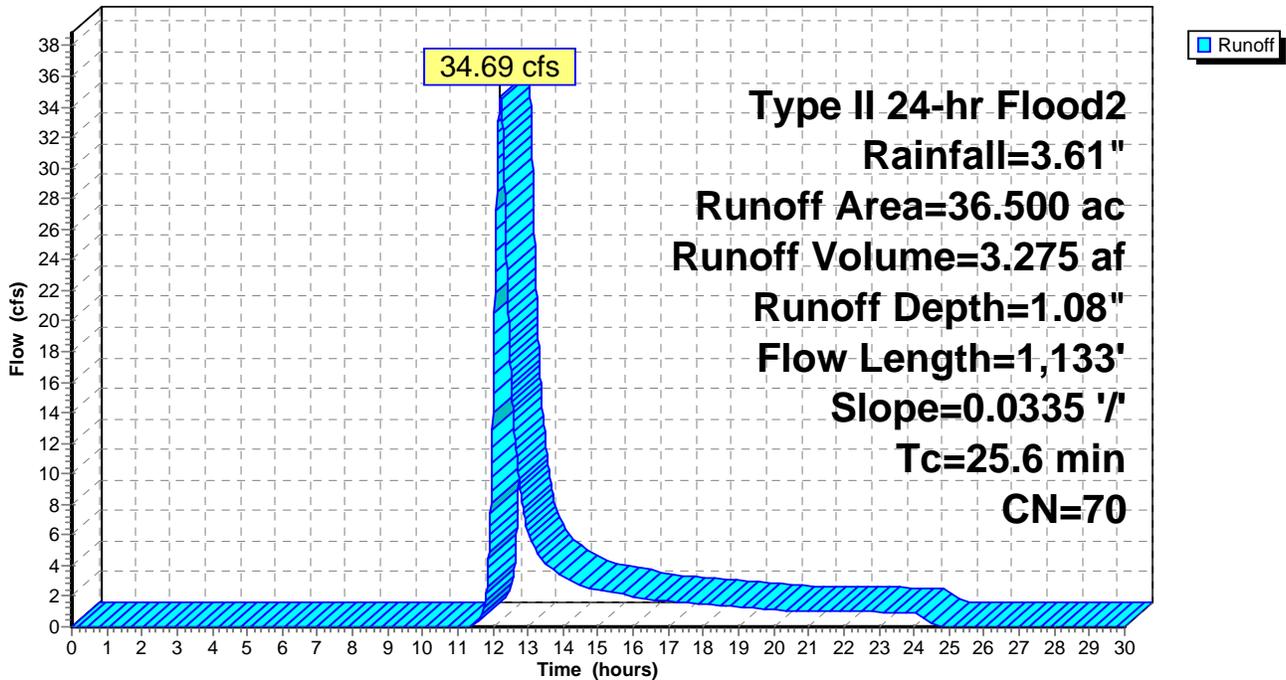
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
36.500	70	1/2 acre lots, 25% imp, HSG B
27.375		Pervious Area
9.125		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,133	0.0335	0.74		Lag/CN Method,

Subcatchment ED C: Existing DA C

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED D: Existing DA D

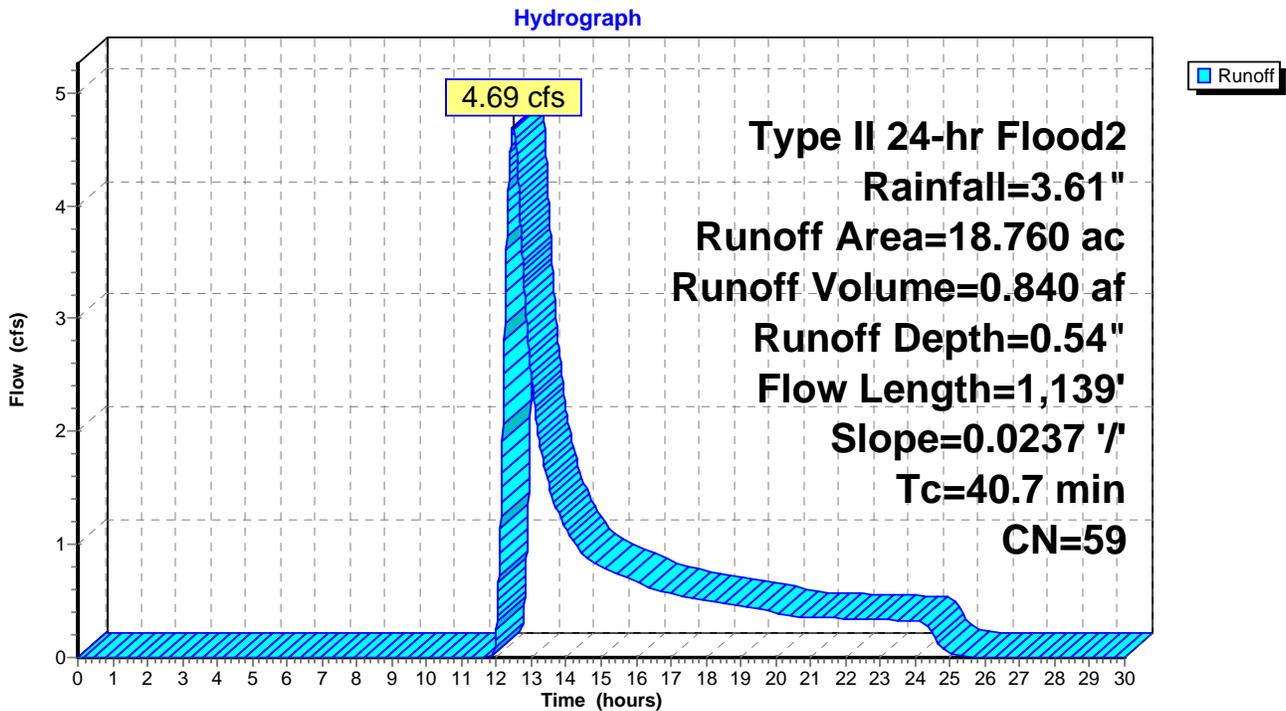
Runoff = 4.69 cfs @ 12.48 hrs, Volume= 0.840 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
18.160	58	Woods/grass comb., Good, HSG B
0.600	98	Paved parking & roofs
18.760	59	Weighted Average
18.160		Pervious Area
0.600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.7	1,139	0.0237	0.47		Lag/CN Method,

Subcatchment ED D: Existing DA D



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED E: Existing DA E

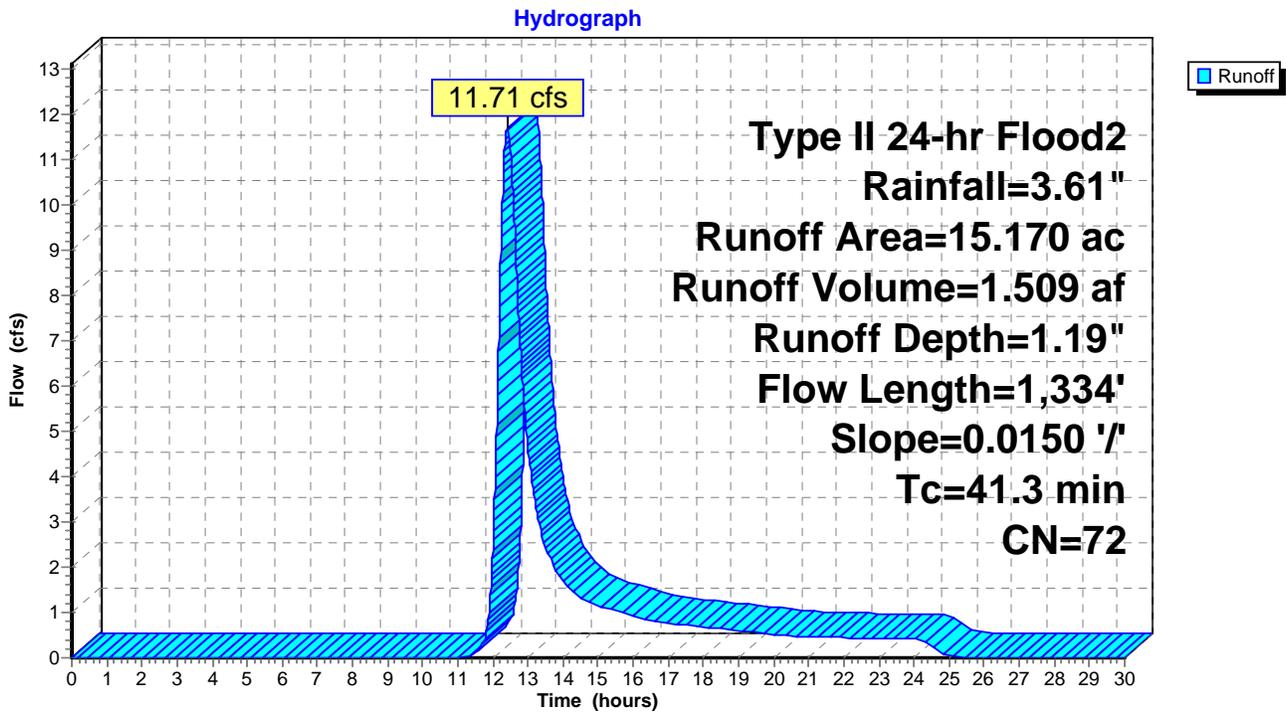
Runoff = 11.71 cfs @ 12.43 hrs, Volume= 1.509 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
15.170	72	1/3 acre lots, 30% imp, HSG B
10.619		Pervious Area
4.551		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
41.3	1,334	0.0150	0.54		Lag/CN Method,

Subcatchment ED E: Existing DA E



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED F: Existing DA F

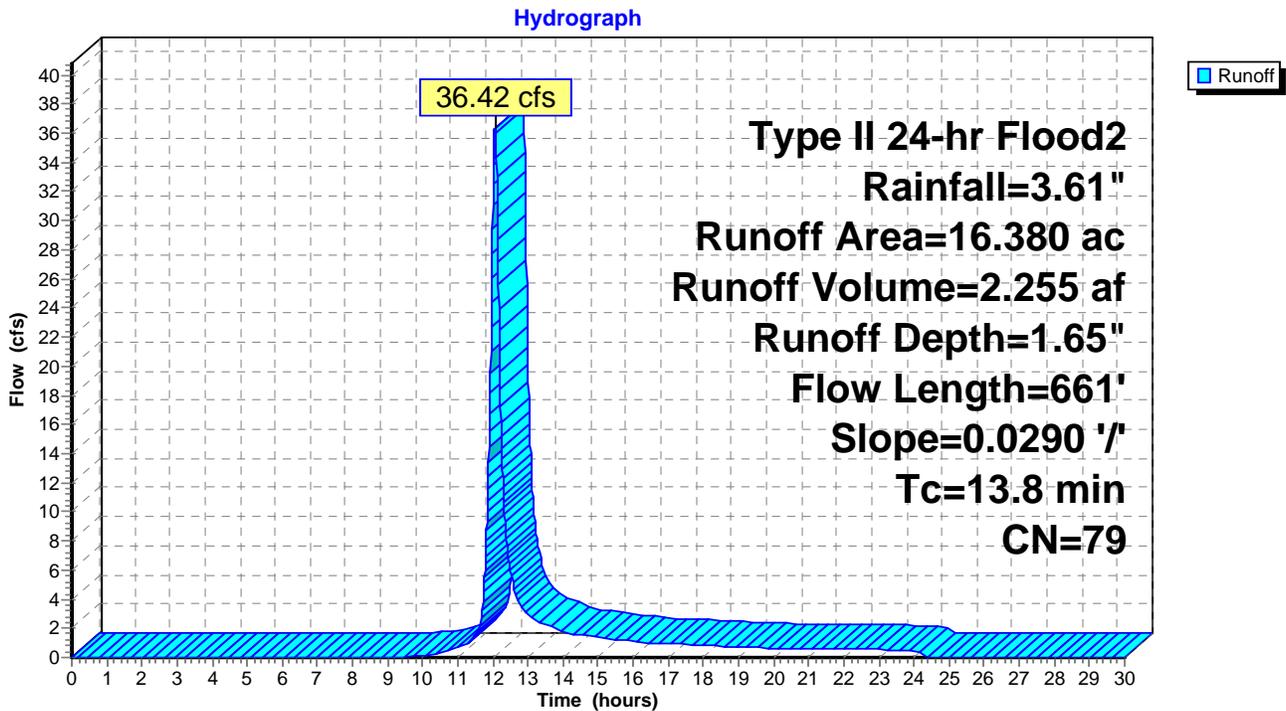
Runoff = 36.42 cfs @ 12.06 hrs, Volume= 2.255 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
9.430	81	1/3 acre lots, 30% imp, HSG C
6.950	76	Woods/grass comb., Fair, HSG C
16.380	79	Weighted Average
13.551		Pervious Area
2.829		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	661	0.0290	0.80		Lag/CN Method,

Subcatchment ED F: Existing DA F



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED G: Existing DA G

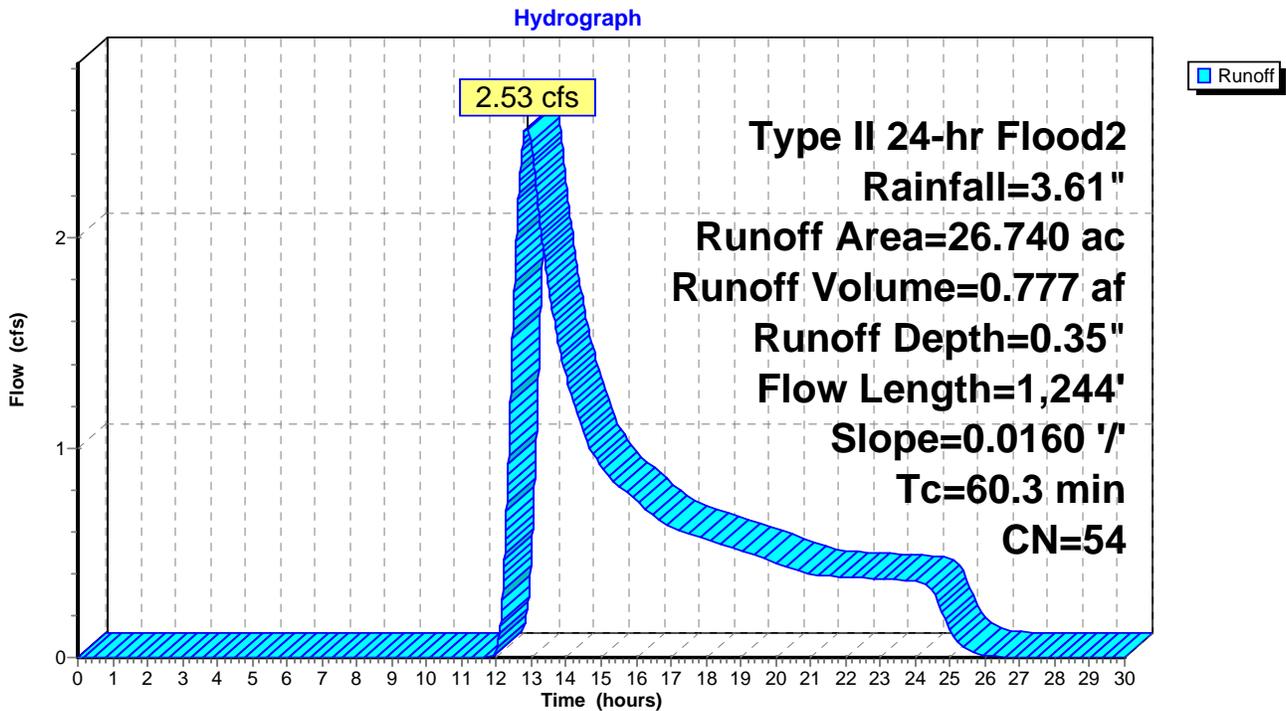
Runoff = 2.53 cfs @ 12.87 hrs, Volume= 0.777 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
20.440	57	1/3 acre lots, 30% imp, HSG A
6.300	43	Woods/grass comb., Fair, HSG A
26.740	54	Weighted Average
20.608		Pervious Area
6.132		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.3	1,244	0.0160	0.34		Lag/CN Method,

Subcatchment ED G: Existing DA G



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED I: ED I

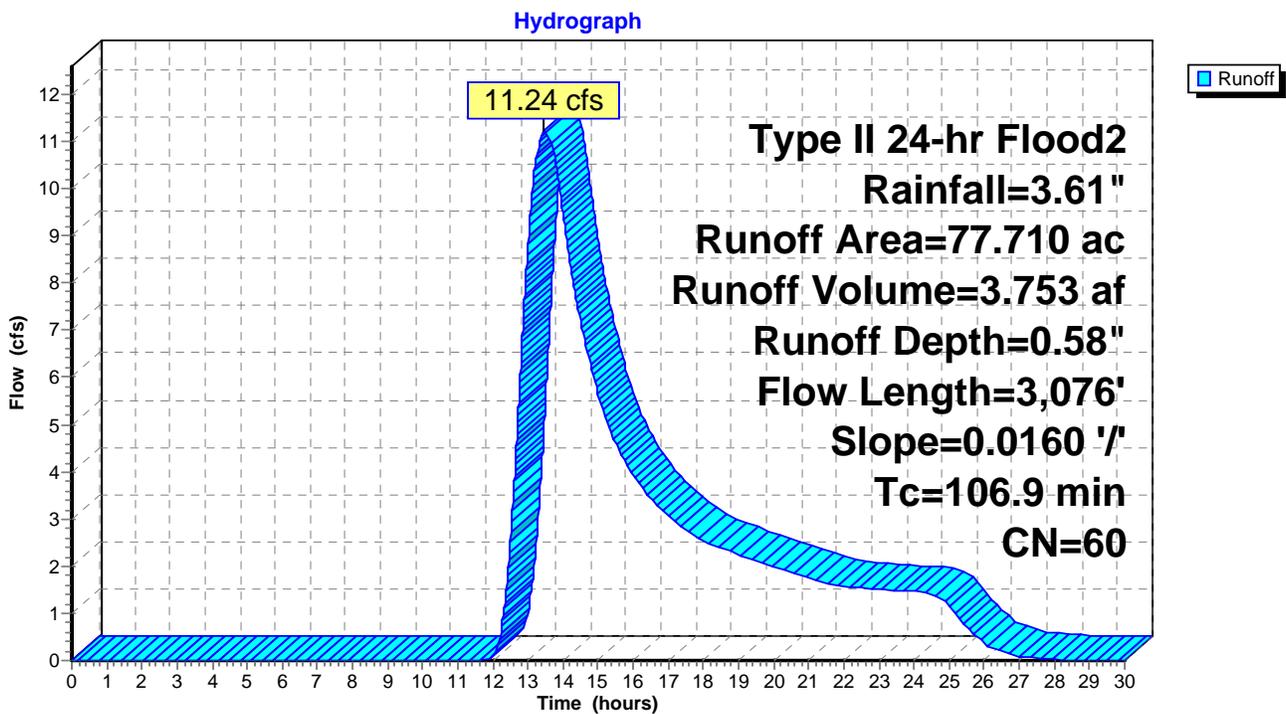
Runoff = 11.24 cfs @ 13.43 hrs, Volume= 3.753 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
65.010	61	1/4 acre lots, 38% imp, HSG A
12.700	55	Woods, Good, HSG B
77.710	60	Weighted Average
53.006		Pervious Area
24.704		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
106.9	3,076	0.0160	0.48		Lag/CN Method,

Subcatchment ED I: ED I



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach 9R: EB Krumkill

Inflow Area = 77.710 ac, 31.79% Impervious, Inflow Depth = 0.58" for Flood2 event
Inflow = 11.24 cfs @ 13.43 hrs, Volume= 3.753 af
Outflow = 10.85 cfs @ 13.71 hrs, Volume= 3.749 af, Atten= 3%, Lag= 16.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.73 fps, Min. Travel Time= 16.9 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 32.9 min

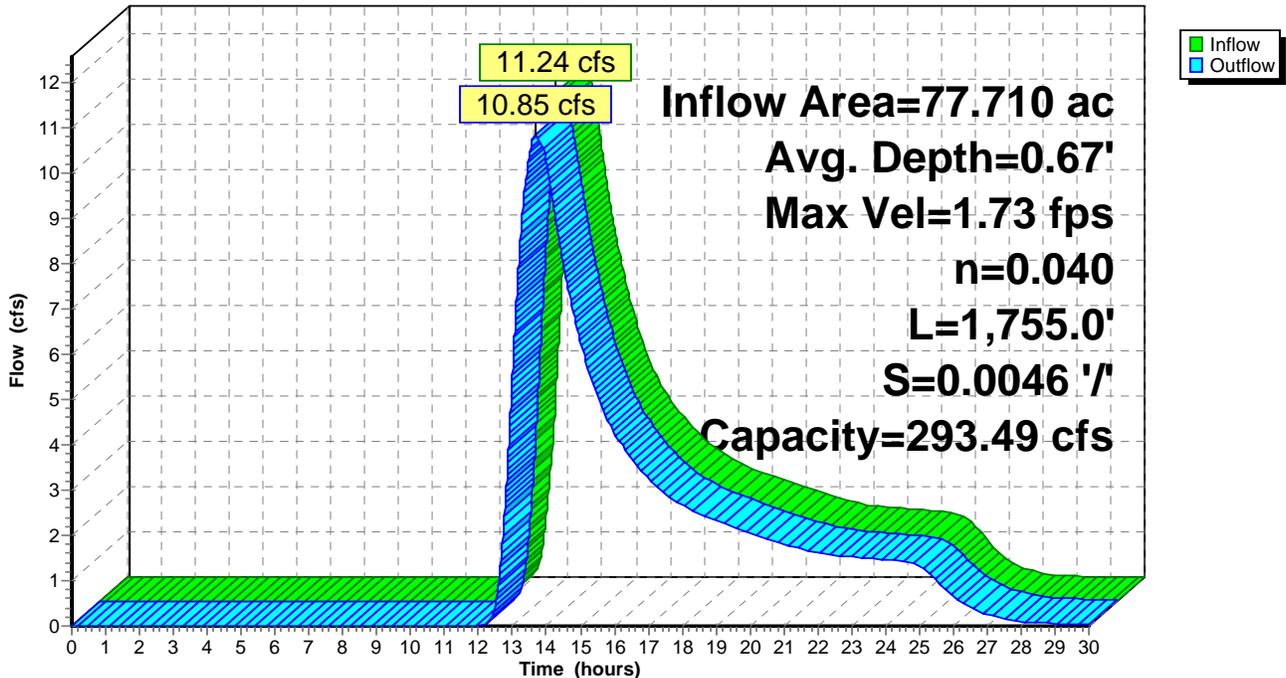
Peak Storage= 11,028 cf @ 13.71 hrs, Average Depth at Peak Storage= 0.67'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 293.49 cfs

8.00' x 4.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 24.00'
Length= 1,755.0' Slope= 0.0046 '/'
Inlet Invert= 186.00', Outlet Invert= 178.00'



Reach 9R: EB Krumkill

Hydrograph

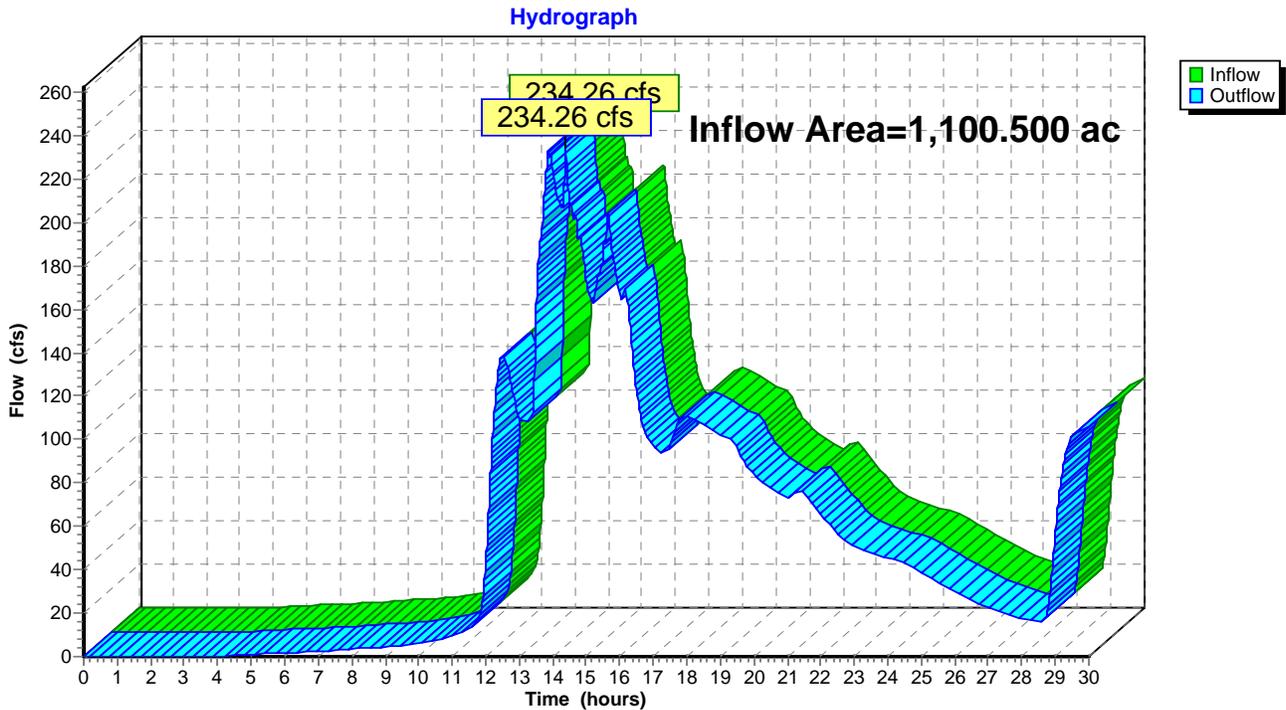


Summary for Reach KK EX: Krumkill

Inflow Area = 1,100.500 ac, 34.10% Impervious, Inflow Depth > 1.47" for Flood2 event
Inflow = 234.26 cfs @ 14.38 hrs, Volume= 134.471 af
Outflow = 234.26 cfs @ 14.38 hrs, Volume= 134.471 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach KK EX: Krumkill



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WBR1: WB R-1

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 1.63" for Flood2 event
Inflow = 481.58 cfs @ 14.33 hrs, Volume= 126.984 af
Outflow = 308.70 cfs @ 13.43 hrs, Volume= 126.812 af, Atten= 36%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.70 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.83 fps, Avg. Travel Time= 1.8 min

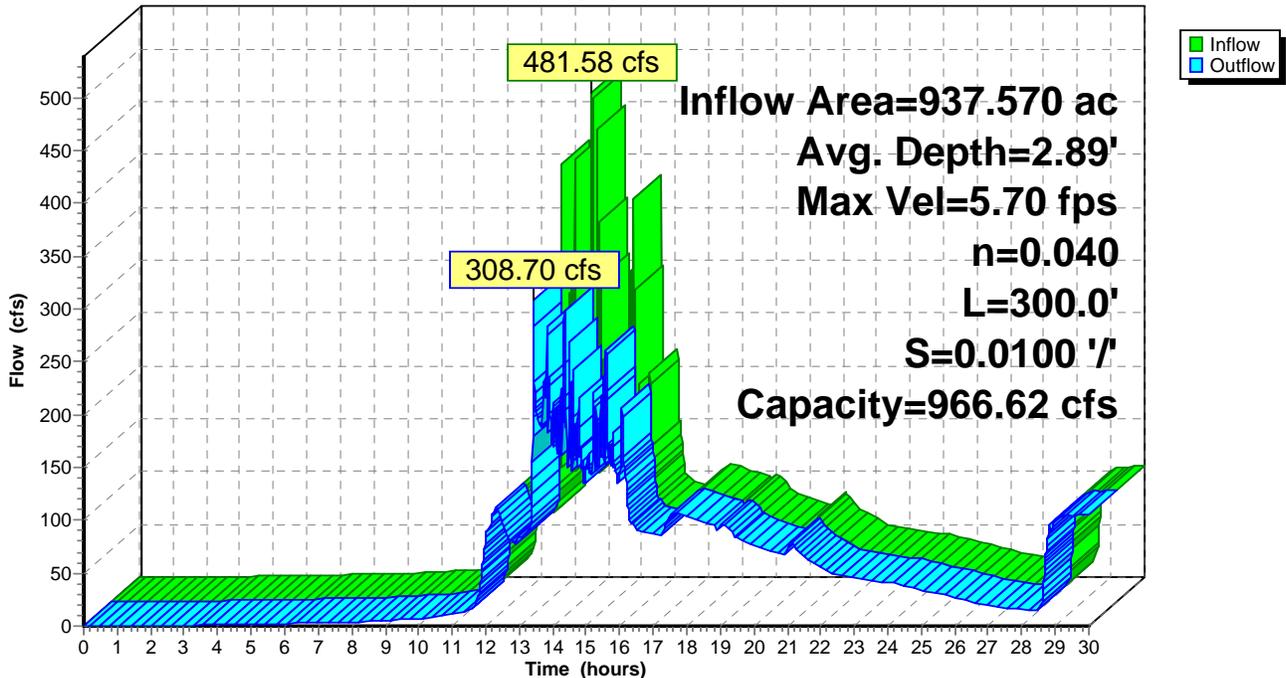
Peak Storage= 16,209 cf @ 13.43 hrs, Average Depth at Peak Storage= 2.89'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 966.62 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 300.0' Slope= 0.0100 '/
Inlet Invert= 189.00', Outlet Invert= 186.00'



Reach WBR1: WB R-1

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WBR2: WB R-2

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.60" for Flood2 event
Inflow = 320.87 cfs @ 13.44 hrs, Volume= 128.337 af
Outflow = 308.97 cfs @ 14.36 hrs, Volume= 128.287 af, Atten= 4%, Lag= 54.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 9.92 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 4.86 fps, Avg. Travel Time= 0.5 min

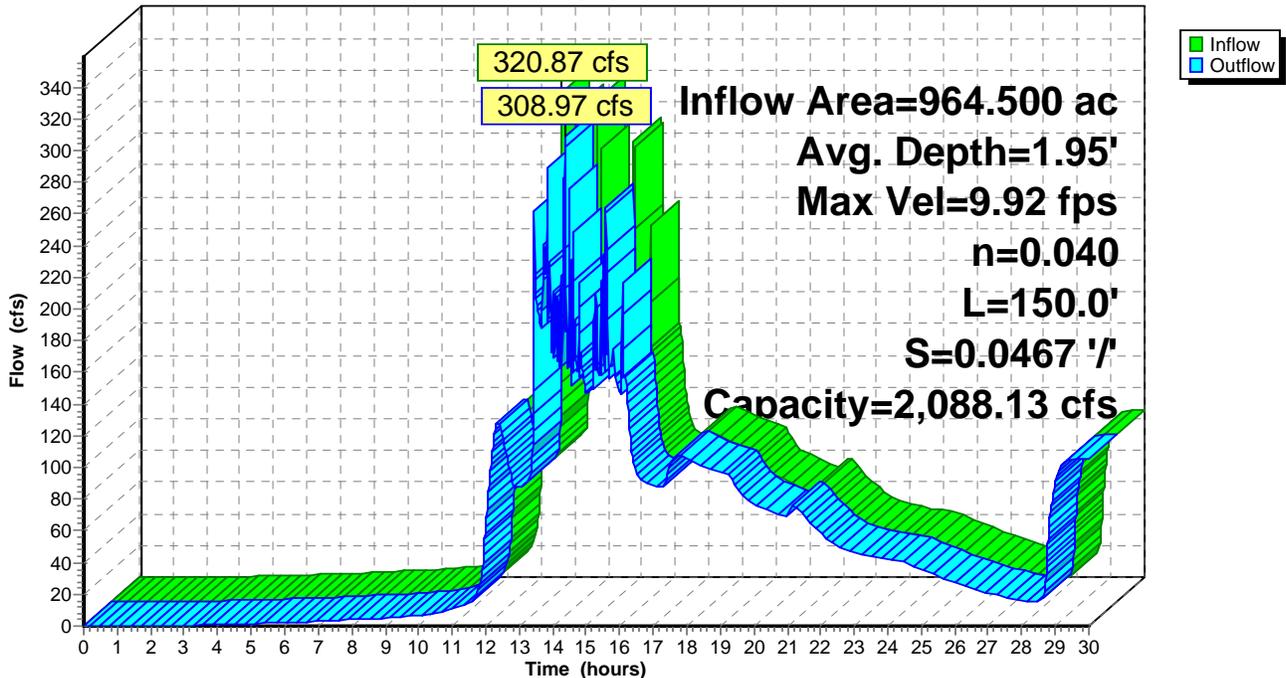
Peak Storage= 4,649 cf @ 14.36 hrs, Average Depth at Peak Storage= 1.95'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 2,088.13 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 150.0' Slope= 0.0467 '/
Inlet Invert= 185.00', Outlet Invert= 178.00'



Reach WBR2: WB R-2

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WBR3: WB R-3

Inflow Area = 979.670 ac, 34.87% Impervious, Inflow Depth > 1.59" for Flood2 event
Inflow = 310.37 cfs @ 14.36 hrs, Volume= 129.796 af
Outflow = 300.76 cfs @ 14.36 hrs, Volume= 129.686 af, Atten= 3%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 6.87 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 3.45 fps, Avg. Travel Time= 1.1 min

Peak Storage= 10,060 cf @ 14.36 hrs, Average Depth at Peak Storage= 2.50'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 1,258.70 cfs

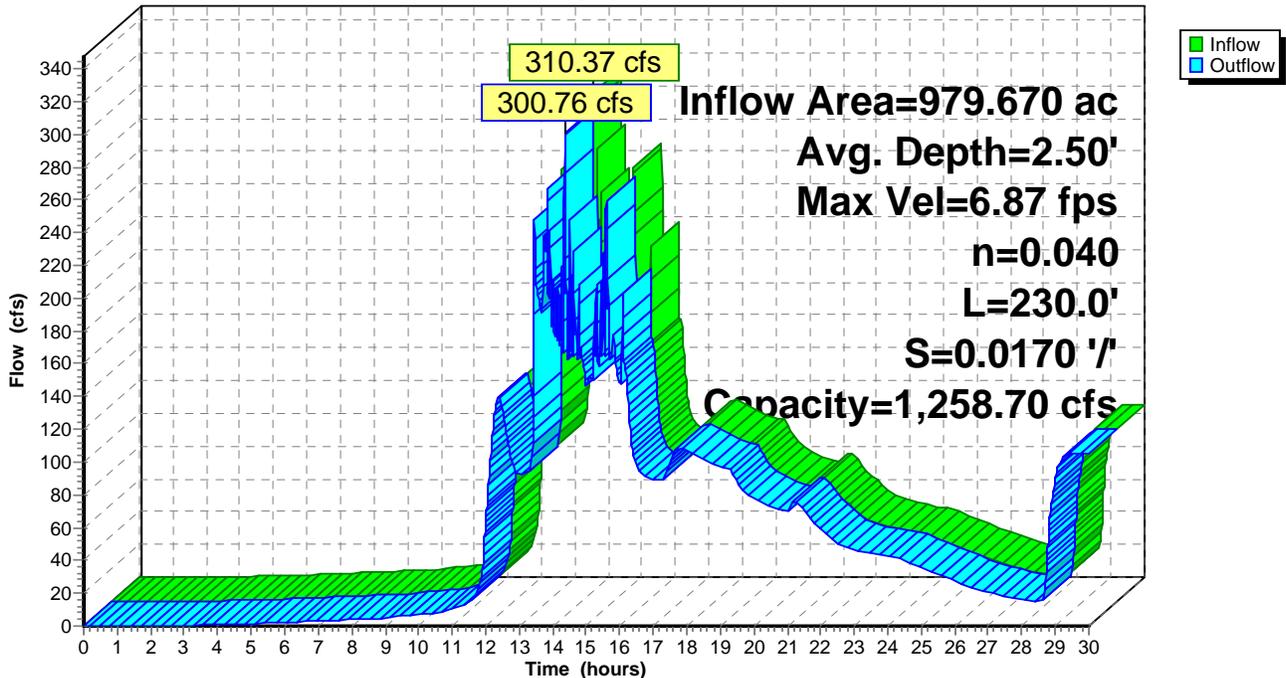
10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 230.0' Slope= 0.0170 '/
Inlet Invert= 177.90', Outlet Invert= 174.00'



‡

Reach WBR3: WB R-3

Hydrograph



Existing Drainage McKownville RT 20 Area

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Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WBR4: WB R-4

Inflow Area = 1,022.790 ac, 34.28% Impervious, Inflow Depth > 1.56" for Flood2 event
Inflow = 303.46 cfs @ 14.36 hrs, Volume= 132.718 af
Outflow = 225.76 cfs @ 14.38 hrs, Volume= 130.722 af, Atten= 26%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.75 fps, Min. Travel Time= 11.1 min
Avg. Velocity = 2.08 fps, Avg. Travel Time= 20.1 min

Peak Storage= 150,911 cf @ 14.38 hrs, Average Depth at Peak Storage= 3.11'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 610.12 cfs

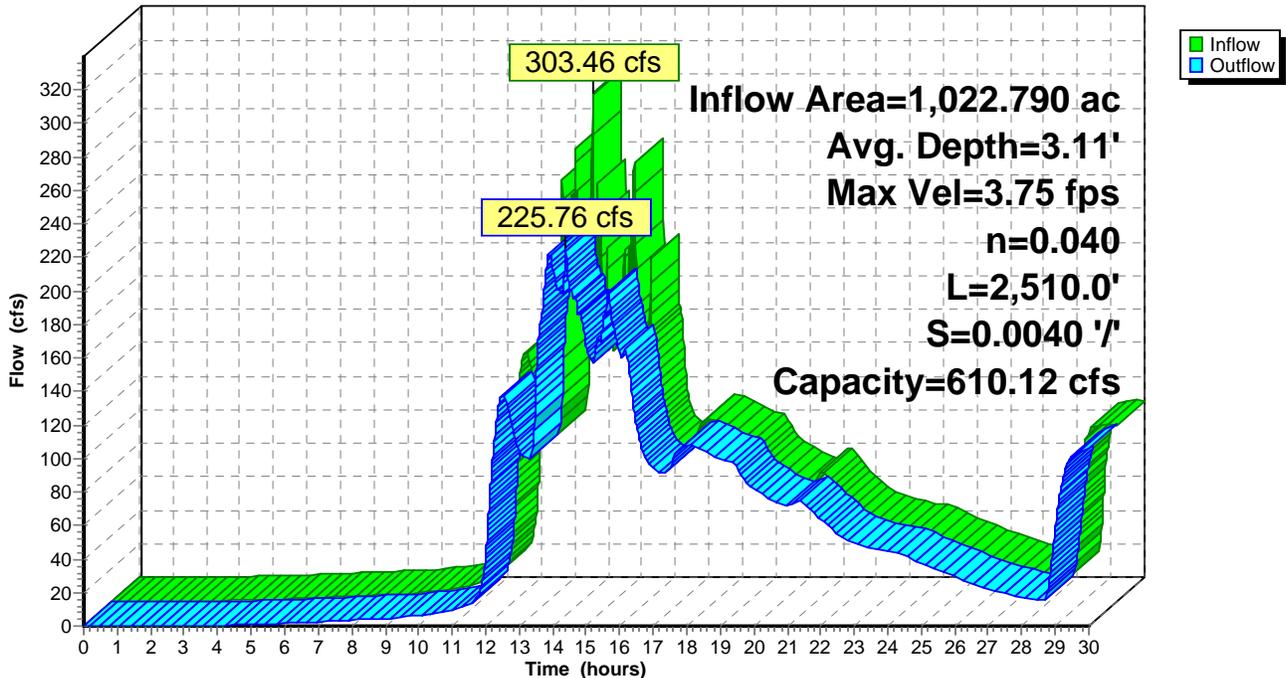
10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 2,510.0' Slope= 0.0040 '/
Inlet Invert= 186.00', Outlet Invert= 176.00'



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Reach WBR4: WB R-4

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond 16P: 36" 815'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 1.64" for Flood2 event
Inflow = 519.37 cfs @ 14.30 hrs, Volume= 121.008 af
Outflow = 519.37 cfs @ 14.30 hrs, Volume= 121.008 af, Atten= 0%, Lag= 0.0 min
Primary = 519.37 cfs @ 14.30 hrs, Volume= 121.008 af

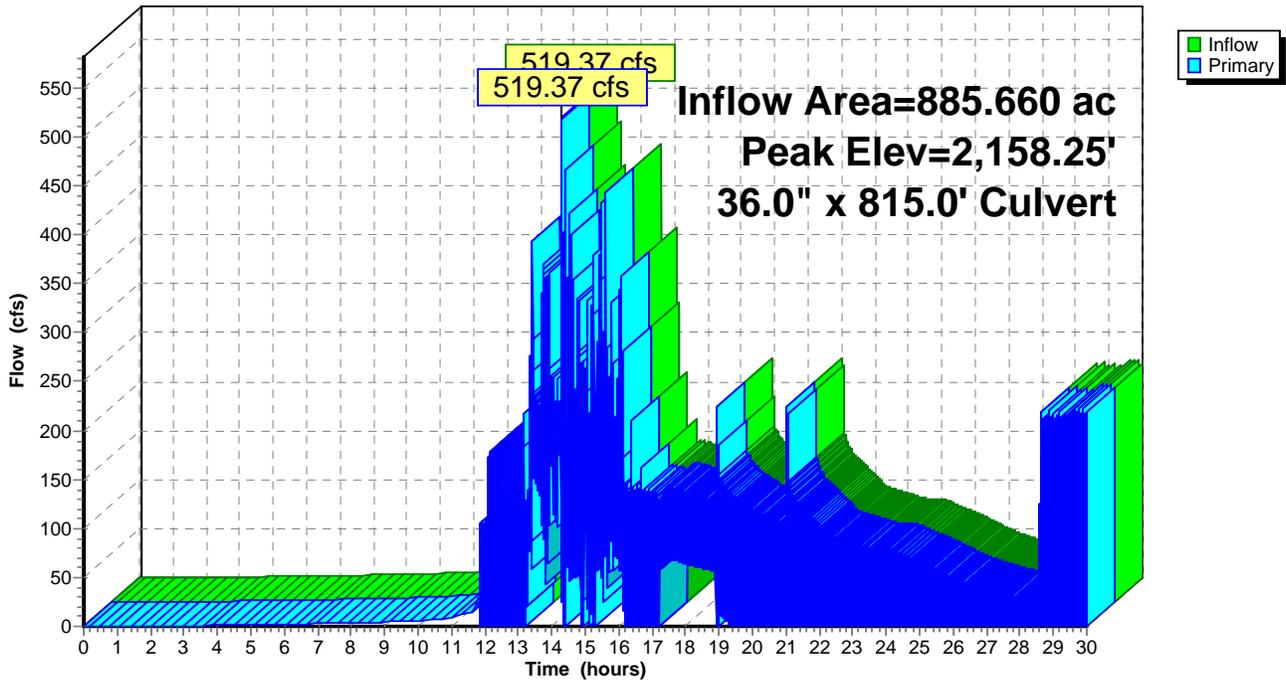
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 2,158.25' @ 14.30 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	196.46'	36.0" x 815.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 194.00' S= 0.0030 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=495.54 cfs @ 14.30 hrs HW=2,057.74' TW=273.51' (Dynamic Tailwater)
←1=Culvert (Outlet Controls 495.54 cfs @ 70.10 fps)

Pond 16P: 36" 815'

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond 17P: 48" 85'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 1.64" for Flood2 event
 Inflow = 519.37 cfs @ 14.30 hrs, Volume= 121.008 af
 Outflow = 519.37 cfs @ 14.30 hrs, Volume= 121.008 af, Atten= 0%, Lag= 0.0 min
 Primary = 519.37 cfs @ 14.30 hrs, Volume= 121.008 af

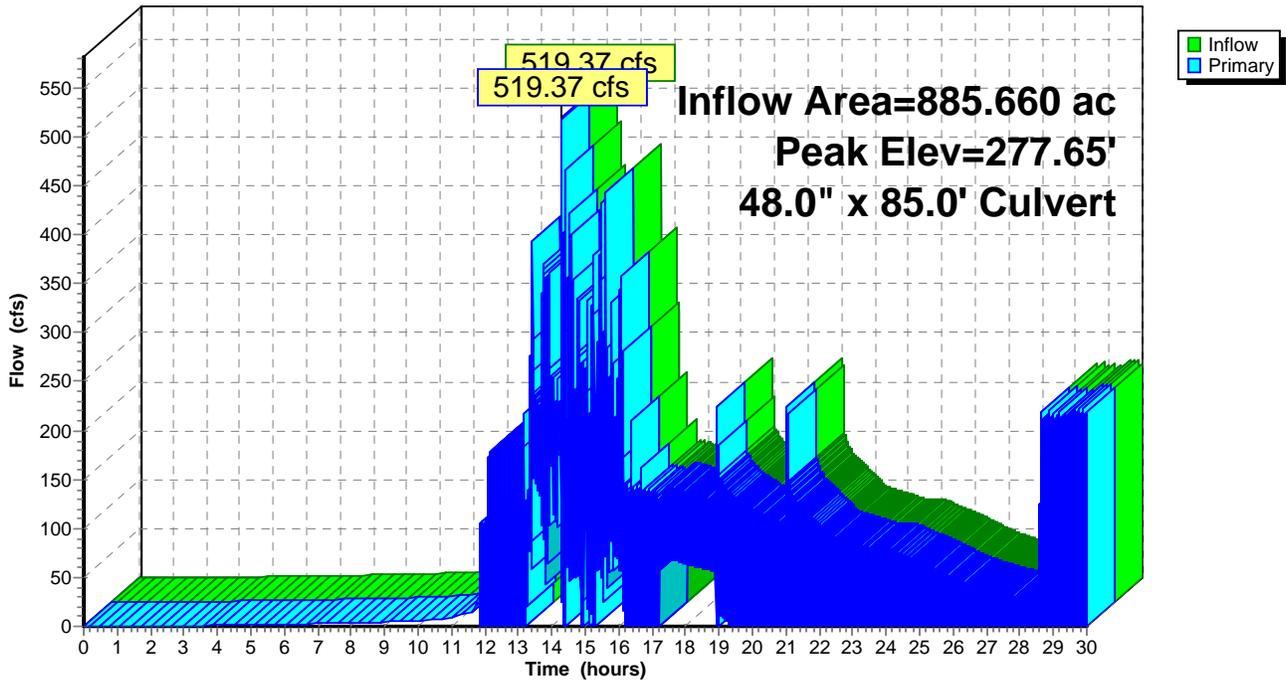
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 277.65' @ 14.30 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	48.0" x 85.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 193.00' S= 0.0118 '/ Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=504.67 cfs @ 14.30 hrs HW=273.51' TW=195.87' (Dynamic Tailwater)
 ↳ **1=Culvert** (Barrel Controls 504.67 cfs @ 40.16 fps)

Pond 17P: 48" 85'

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond ARd C: Acre Rd Culvert

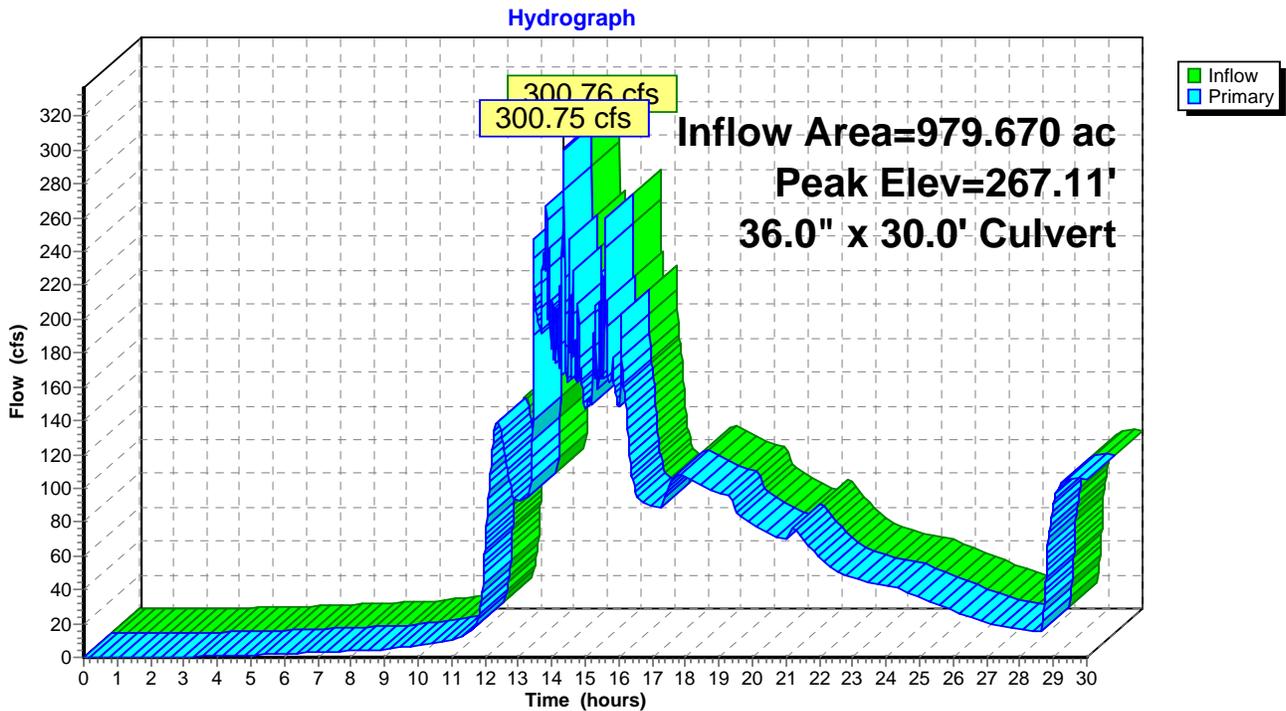
Inflow Area = 979.670 ac, 34.87% Impervious, Inflow Depth > 1.59" for Flood2 event
 Inflow = 300.76 cfs @ 14.36 hrs, Volume= 129.686 af
 Outflow = 300.75 cfs @ 14.36 hrs, Volume= 129.686 af, Atten= 0%, Lag= 0.0 min
 Primary = 300.75 cfs @ 14.36 hrs, Volume= 129.686 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 267.11' @ 14.36 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	174.00'	36.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 173.90' S= 0.0033 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=297.99 cfs @ 14.36 hrs HW=265.71' TW=189.05' (Dynamic Tailwater)
 ←**1=Culvert** (Inlet Controls 297.99 cfs @ 42.16 fps)

Pond ARd C: Acre Rd Culvert



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond ES A: Existing Storage A

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 1.64" for Flood2 event
 Inflow = 524.25 cfs @ 14.30 hrs, Volume= 128.057 af
 Outflow = 481.58 cfs @ 14.33 hrs, Volume= 126.984 af, Atten= 8%, Lag= 1.8 min
 Primary = 481.58 cfs @ 14.33 hrs, Volume= 126.984 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 196.10' @ 14.33 hrs Surf.Area= 22,244 sf Storage= 57,579 cf

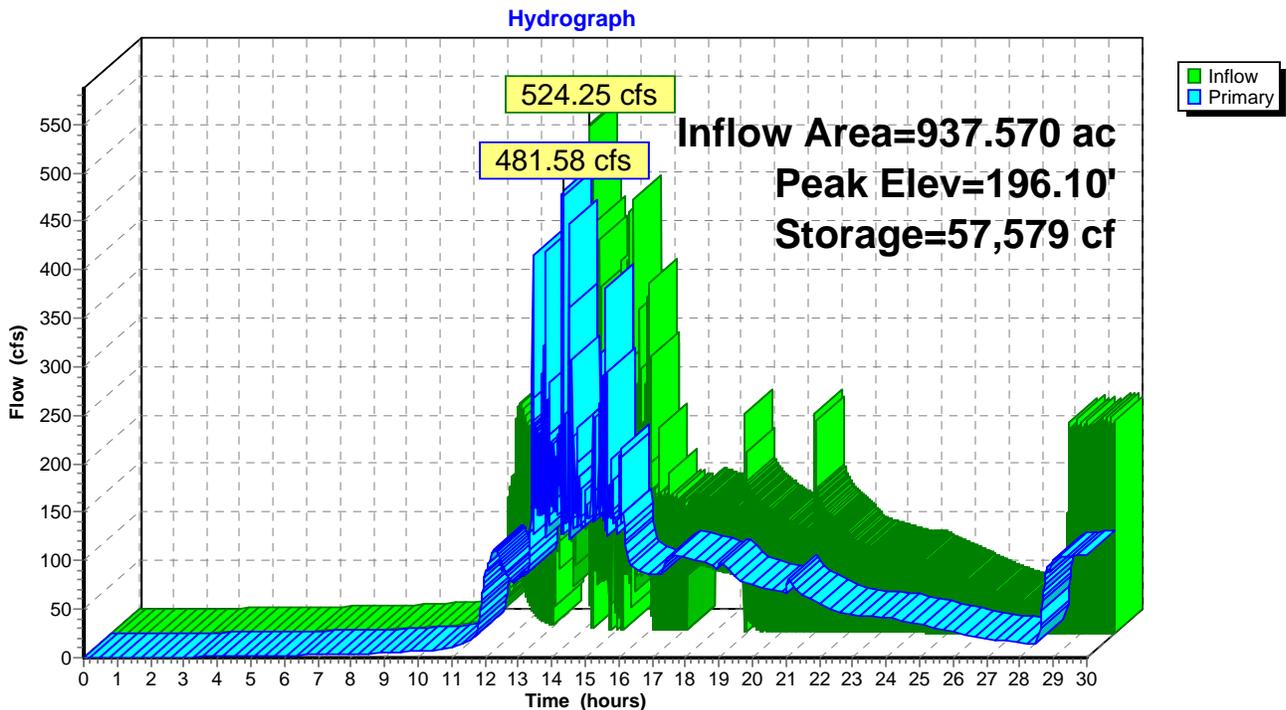
Plug-Flow detention time= 7.3 min calculated for 126.942 af (99% of inflow)
 Center-of-Mass det. time= 1.4 min (1,101.5 - 1,100.1)

Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	57,579 cf	65.00'W x 250.00'L x 3.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=470.93 cfs @ 14.33 hrs HW=196.10' TW=191.69' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 470.93 cfs @ 7.72 fps)

Pond ES A: Existing Storage A



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond ES B: Existing Storage B

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.61" for Flood2 event
 Inflow = 312.04 cfs @ 13.43 hrs, Volume= 129.389 af
 Outflow = 320.87 cfs @ 13.44 hrs, Volume= 128.337 af, Atten= 0%, Lag= 0.5 min
 Primary = 320.87 cfs @ 13.44 hrs, Volume= 128.337 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 190.62' @ 13.44 hrs Surf.Area= 23,122 sf Storage= 61,135 cf

Plug-Flow detention time= 7.6 min calculated for 128.294 af (99% of inflow)
 Center-of-Mass det. time= 1.9 min (1,098.9 - 1,097.0)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	61,135 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
186.00	17,576	0	0
188.00	21,332	38,908	38,908
189.00	23,122	22,227	61,135

Device	Routing	Invert	Outlet Devices
#1	Primary	186.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=309.68 cfs @ 13.44 hrs HW=190.51' TW=186.77' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 309.68 cfs @ 6.86 fps)

Existing Drainage McKownville RT 20 Area

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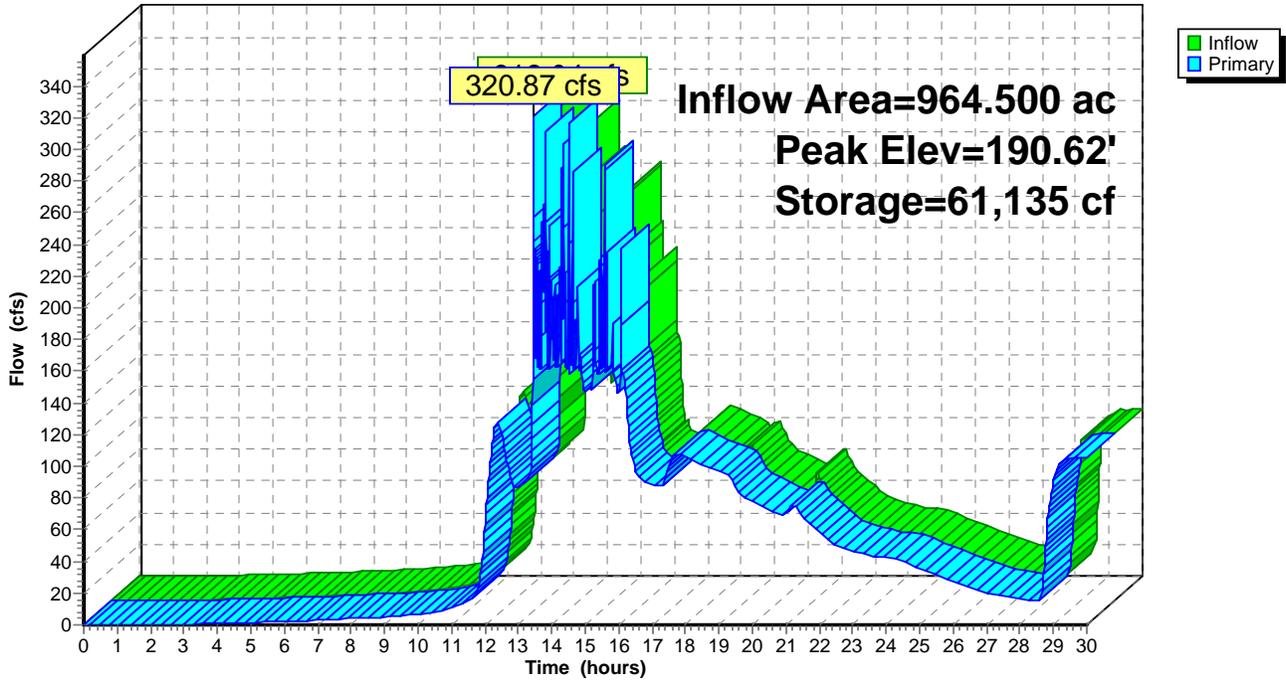
Type II 24-hr Flood2 Rainfall=3.61"

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Pond ES B: Existing Storage B

Hydrograph



Existing Drainage McKownville RT 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond MRd C: McKown Rd Culv

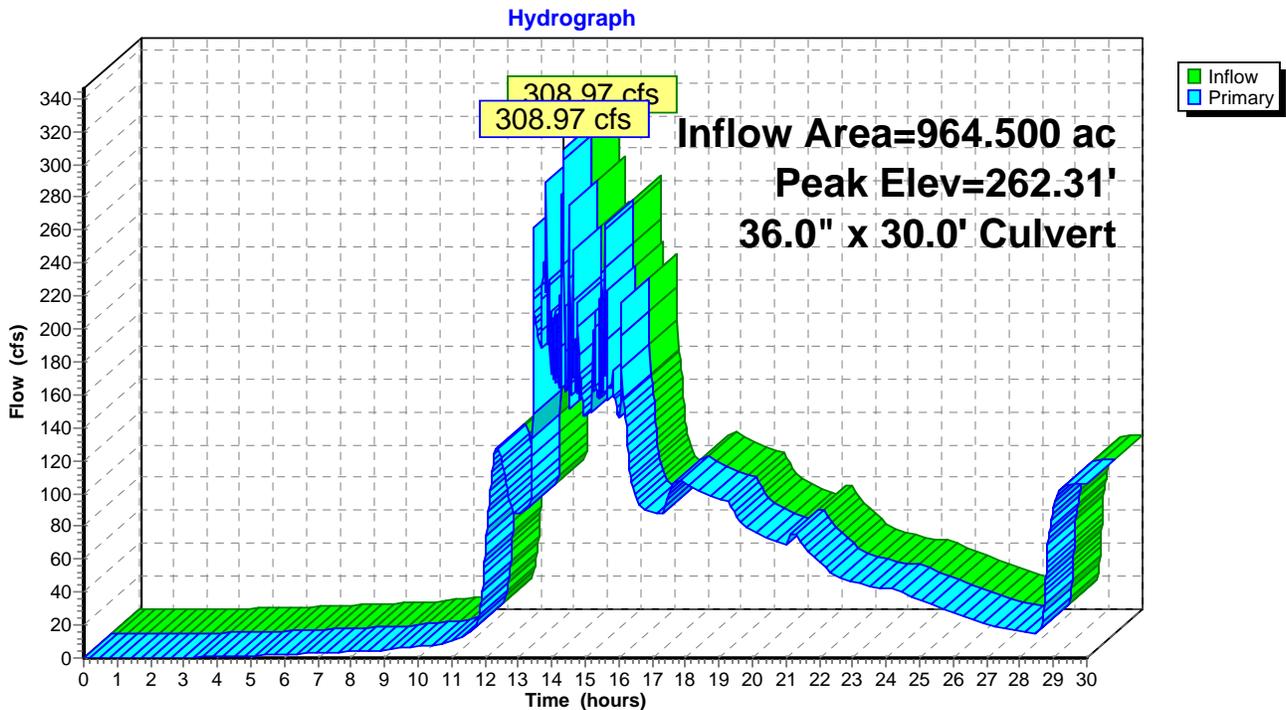
Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.60" for Flood2 event
Inflow = 308.97 cfs @ 14.36 hrs, Volume= 128.287 af
Outflow = 308.97 cfs @ 14.36 hrs, Volume= 128.287 af, Atten= 0%, Lag= 0.0 min
Primary = 308.97 cfs @ 14.36 hrs, Volume= 128.287 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 262.31' @ 14.36 hrs

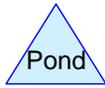
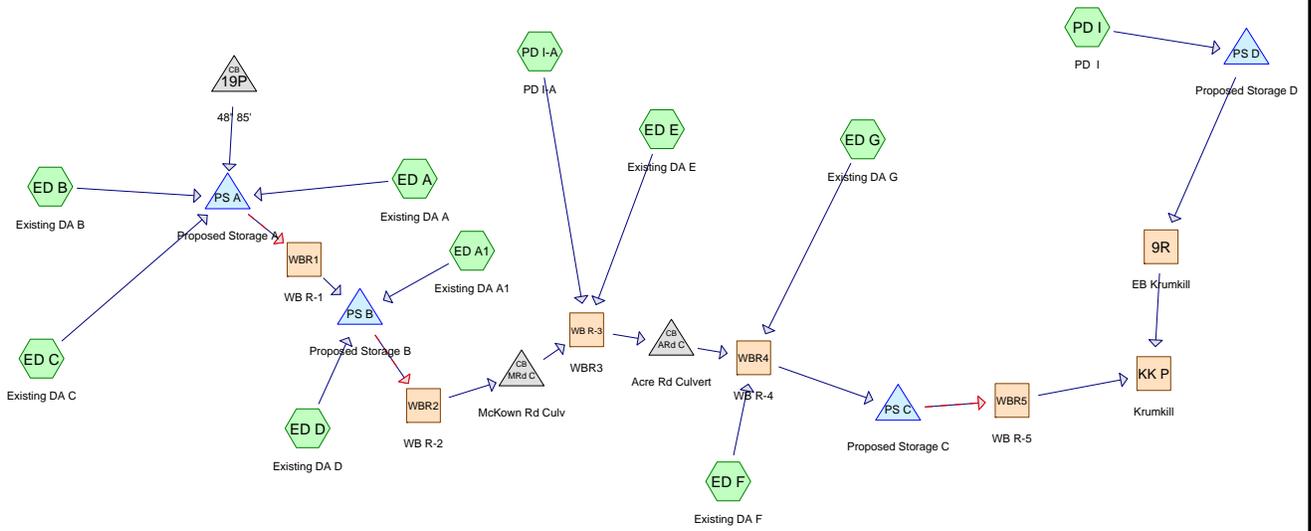
Device	Routing	Invert	Outlet Devices
#1	Primary	178.00'	36.0" x 30.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 177.00' S= 0.0333 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=300.49 cfs @ 14.36 hrs HW=258.33' TW=180.38' (Dynamic Tailwater)
1=Culvert (Inlet Controls 300.49 cfs @ 42.51 fps)

Pond MRd C: McKown Rd Culv



Proposed Conditions



Drainage Diagram for Proposed Drainage McKownville Rt 20 Area
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Proposed Drainage McKownville Rt 20 Area

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Page 2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.300	43	Woods/grass comb., Fair, HSG A (ED G)
12.700	55	Woods, Good, HSG B (PD I)
20.440	57	1/3 acre lots, 30% imp, HSG A (ED G)
18.160	58	Woods/grass comb., Good, HSG B (ED D)
65.010	61	1/4 acre lots, 38% imp, HSG A (PD I,PD I-A)
4.780	69	50-75% Grass cover, Fair, HSG B (ED A,ED A1)
36.500	70	1/2 acre lots, 25% imp, HSG B (ED C)
15.170	72	1/3 acre lots, 30% imp, HSG B (ED E)
6.950	76	Woods/grass comb., Fair, HSG C (ED F)
9.430	81	1/3 acre lots, 30% imp, HSG C (ED F)
19.400	98	Paved parking & roofs (ED A,ED A1,ED B,ED D)
214.840		TOTAL AREA

Proposed Drainage McKownville Rt 20 Area

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Soil Listing (selected nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
91.750	HSG A	ED G, PD I, PD I-A
87.310	HSG B	ED A, ED A1, ED C, ED D, ED E, PD I
16.380	HSG C	ED F
0.000	HSG D	
19.400	Other	ED A, ED A1, ED B, ED D
214.840		TOTAL AREA

Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 2

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ED A: Existing DA A Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=3.11"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=22.72 cfs 2.117 af

Subcatchment ED A1: Existing DA A1 Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=3.11"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=22.72 cfs 2.117 af

Subcatchment ED B: Existing DA B Runoff Area=7.240 ac 100.00% Impervious Runoff Depth=3.96"
Flow Length=363' Slope=0.0275 '/' Tc=4.0 min CN=98 Runoff=45.99 cfs 2.392 af

Subcatchment ED C: Existing DA C Runoff Area=36.500 ac 25.00% Impervious Runoff Depth=1.46"
Flow Length=1,133' Slope=0.0335 '/' Tc=25.6 min CN=70 Runoff=48.94 cfs 4.456 af

Subcatchment ED D: Existing DA D Runoff Area=18.760 ac 3.20% Impervious Runoff Depth=0.81"
Flow Length=1,139' Slope=0.0237 '/' Tc=40.7 min CN=59 Runoff=8.16 cfs 1.265 af

Subcatchment ED E: Existing DA E Runoff Area=15.170 ac 30.00% Impervious Runoff Depth=1.60"
Flow Length=1,334' Slope=0.0150 '/' Tc=41.3 min CN=72 Runoff=16.18 cfs 2.025 af

Subcatchment ED F: Existing DA F Runoff Area=16.380 ac 17.27% Impervious Runoff Depth=2.13"
Flow Length=661' Slope=0.0290 '/' Tc=13.8 min CN=79 Runoff=47.00 cfs 2.903 af

Subcatchment ED G: Existing DA G Runoff Area=26.740 ac 22.93% Impervious Runoff Depth=0.57"
Flow Length=1,244' Slope=0.0160 '/' Tc=60.3 min CN=54 Runoff=5.09 cfs 1.261 af

Subcatchment PD I: PD I Runoff Area=49.920 ac 28.33% Impervious Runoff Depth=0.81"
Flow Length=1,990' Slope=0.0340 '/' Tc=53.1 min CN=59 Runoff=17.83 cfs 3.366 af

Subcatchment PD I-A: PD I-A Runoff Area=27.790 ac 38.00% Impervious Runoff Depth=0.92"
Tc=0.0 min CN=61 Runoff=54.20 cfs 2.122 af

Reach 9R: EB Krumkill Avg. Depth=0.81' Max Vel=1.92 fps Inflow=16.43 cfs 3.363 af
n=0.040 L=1,755.0' S=0.0046 '/' Capacity=293.49 cfs Outflow=14.98 cfs 3.359 af

Reach KK P: Krumkill Inflow=383.98 cfs 212.835 af
Outflow=383.98 cfs 212.835 af

Reach WB R-3: WBR3 Avg. Depth=2.84' Max Vel=7.37 fps Inflow=388.71 cfs 207.229 af
n=0.040 L=230.0' S=0.0170 '/' Capacity=1,258.70 cfs Outflow=387.59 cfs 207.160 af

Reach WBR1: WB R-1 Avg. Depth=3.32' Max Vel=6.17 fps Inflow=569.77 cfs 201.320 af
n=0.040 L=300.0' S=0.0100 '/' Capacity=966.62 cfs Outflow=409.04 cfs 201.166 af

Reach WBR2: WB R-2 Avg. Depth=2.19' Max Vel=10.61 fps Inflow=383.72 cfs 203.115 af
n=0.040 L=150.0' S=0.0467 '/' Capacity=2,088.13 cfs Outflow=383.81 cfs 203.082 af

Reach WBR4: WB R-4 Avg. Depth=3.95' Max Vel=4.52 fps Inflow=392.94 cfs 211.324 af
n=0.040 L=450.0' S=0.0044 '/' Capacity=644.41 cfs Outflow=391.24 cfs 211.125 af

Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Reach WBR5: WB R-5 Avg. Depth=4.29' Max Vel=3.84 fps Inflow=406.47 cfs 210.071 af
n=0.040 L=2,050.0' S=0.0029 '/ Capacity=522.94 cfs Outflow=376.34 cfs 209.477 af

Pond 19P: 48" 85' Peak Elev=341.52' Inflow=694.79 cfs 194.320 af
48.0" x 85.0' Culvert Outflow=694.79 cfs 194.320 af

Pond ARd C: Acre Rd Culvert Peak Elev=319.89' Inflow=387.59 cfs 207.160 af
36.0" x 30.0' Culvert Outflow=387.97 cfs 207.159 af

Pond MRd C: McKown Rd Culv Peak Elev=307.91' Inflow=383.81 cfs 203.082 af
36.0" x 30.0' Culvert Outflow=383.81 cfs 203.082 af

Pond PS A: Proposed Storage A Peak Elev=199.37' Storage=128,832 cf Inflow=709.58 cfs 203.284 af
Primary=156.24 cfs 134.116 af Secondary=413.54 cfs 67.205 af Outflow=569.77 cfs 201.315 af

Pond PS B: Proposed Storage B Peak Elev=191.66' Storage=123,570 cf Inflow=412.96 cfs 204.548 af
Primary=114.20 cfs 112.502 af Secondary=269.61 cfs 90.612 af Outflow=383.72 cfs 203.115 af

Pond PS C: Proposed Storage C Peak Elev=191.60' Storage=135,312 cf Inflow=391.24 cfs 211.125 af
Primary=81.16 cfs 87.890 af Secondary=327.32 cfs 122.181 af Outflow=406.47 cfs 210.071 af

Pond PS D: Proposed Storage D Peak Elev=192.18' Storage=0.233 af Inflow=17.83 cfs 3.366 af
Outflow=16.43 cfs 3.363 af

Total Runoff Area = 214.840 ac Runoff Volume = 24.023 af Average Runoff Depth = 1.34"
68.93% Pervious = 148.099 ac 31.07% Impervious = 66.741 ac

Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED A: Existing DA A

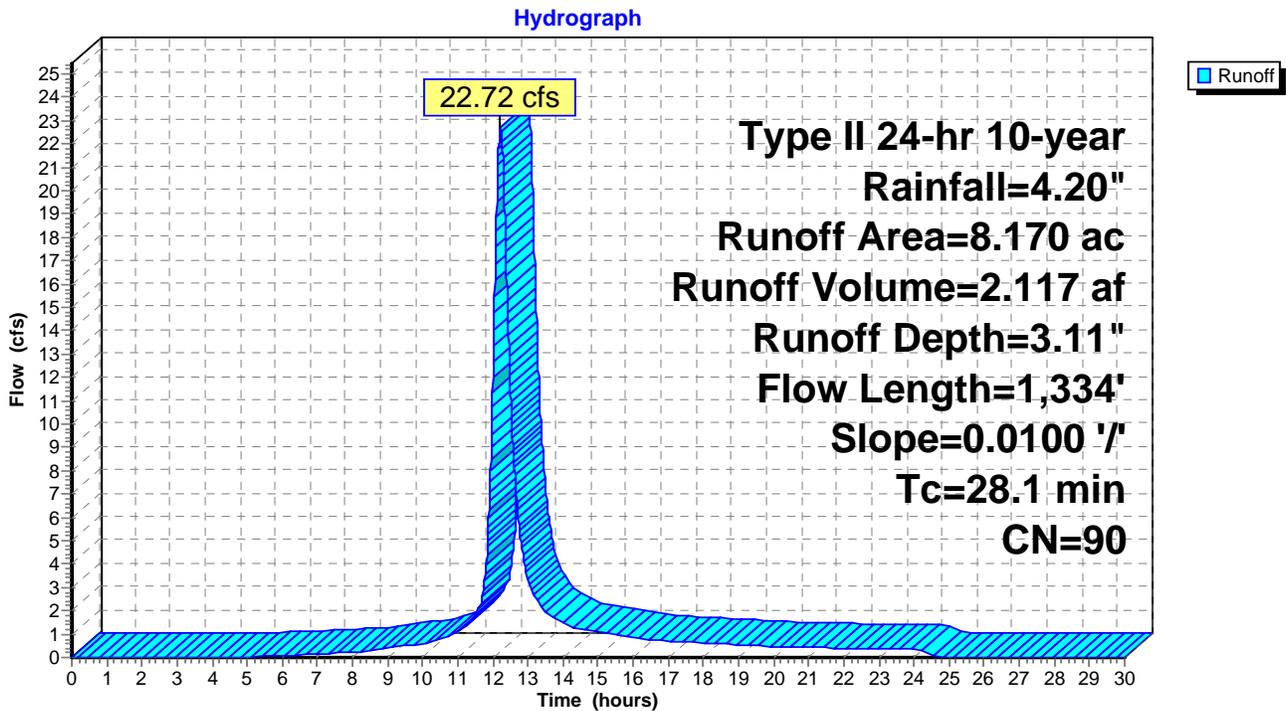
Runoff = 22.72 cfs @ 12.21 hrs, Volume= 2.117 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A: Existing DA A



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED A1: Existing DA A1

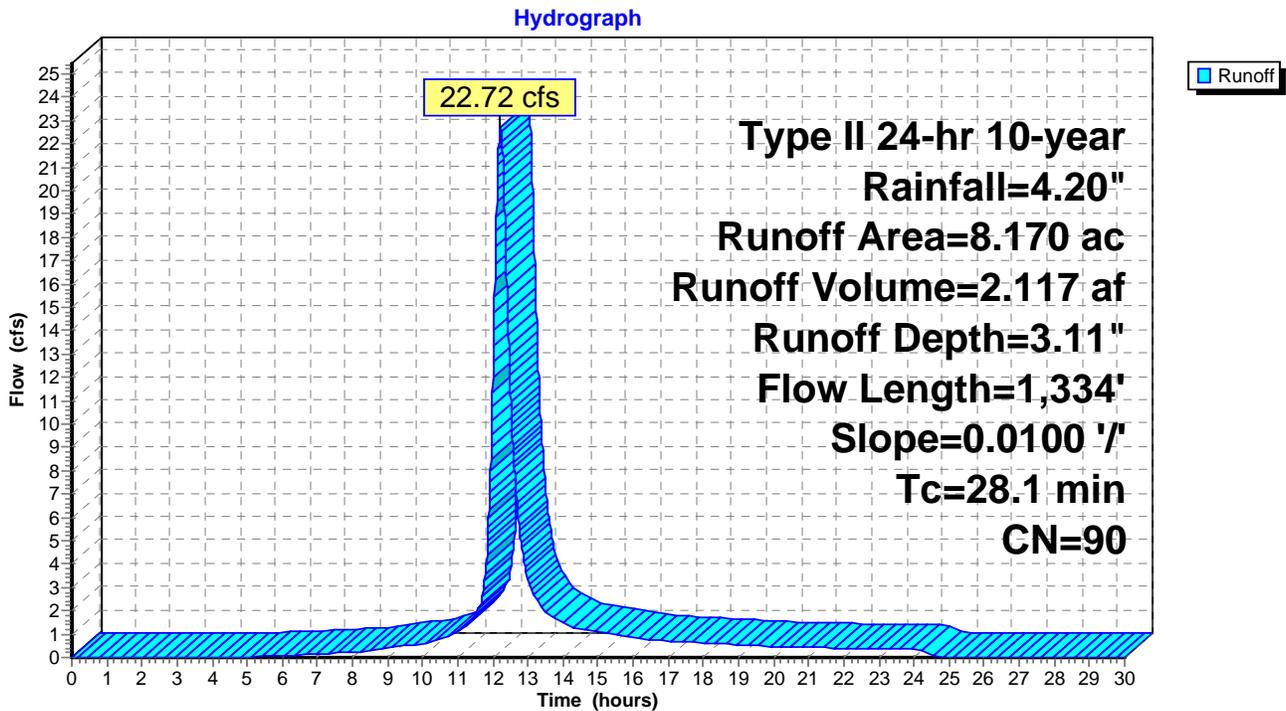
Runoff = 22.72 cfs @ 12.21 hrs, Volume= 2.117 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A1: Existing DA A1



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED B: Existing DA B

Runoff = 45.99 cfs @ 11.94 hrs, Volume= 2.392 af, Depth= 3.96"

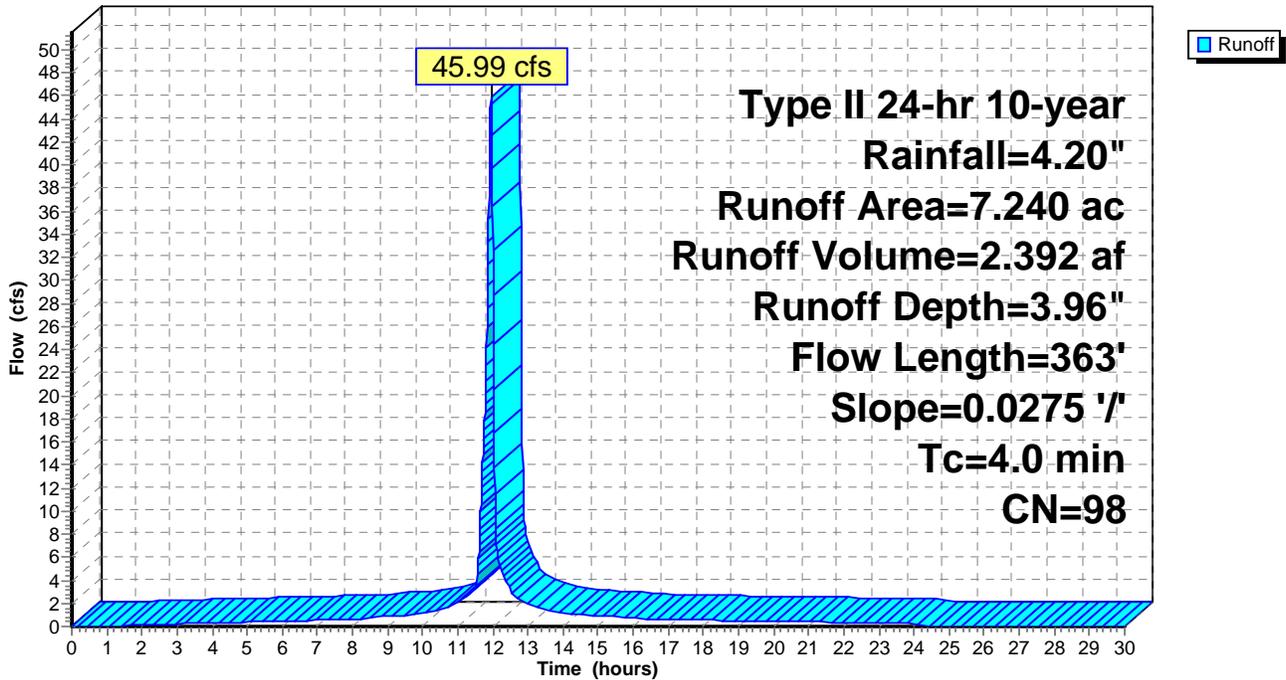
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
7.240	98	Paved parking & roofs
7.240		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	363	0.0275	1.50		Lag/CN Method,

Subcatchment ED B: Existing DA B

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED C: Existing DA C

Runoff = 48.94 cfs @ 12.20 hrs, Volume= 4.456 af, Depth= 1.46"

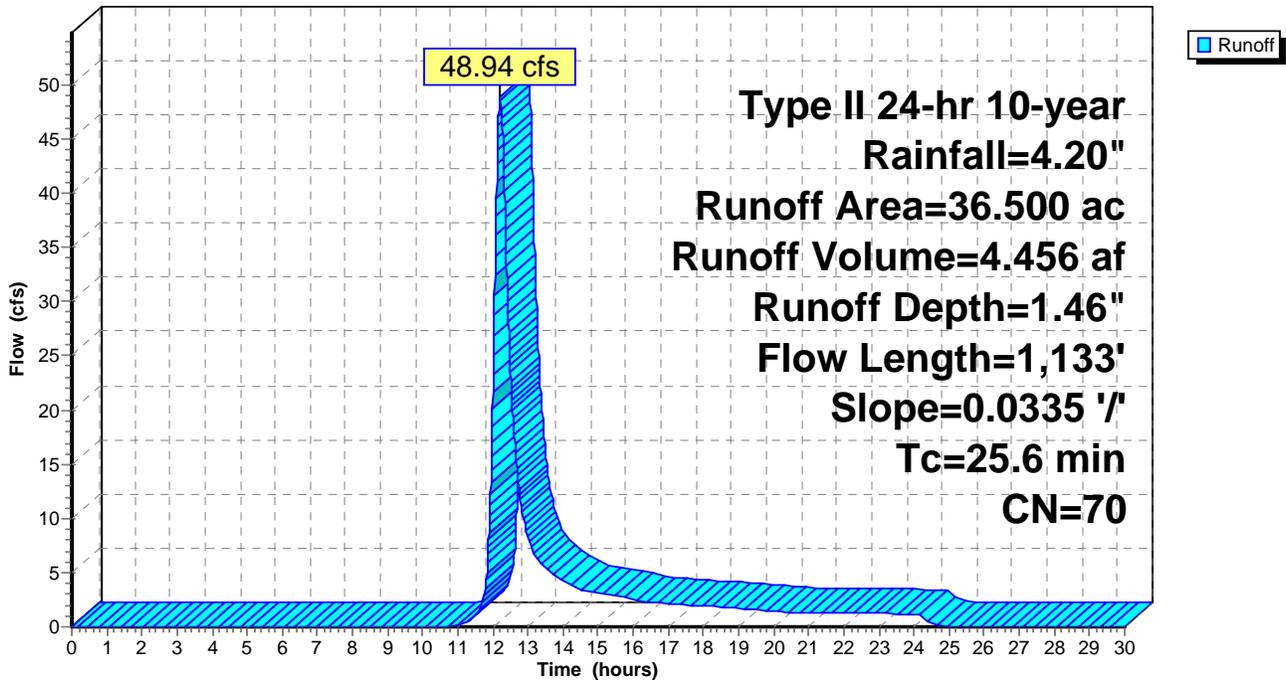
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
36.500	70	1/2 acre lots, 25% imp, HSG B
27.375		Pervious Area
9.125		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,133	0.0335	0.74		Lag/CN Method,

Subcatchment ED C: Existing DA C

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED D: Existing DA D

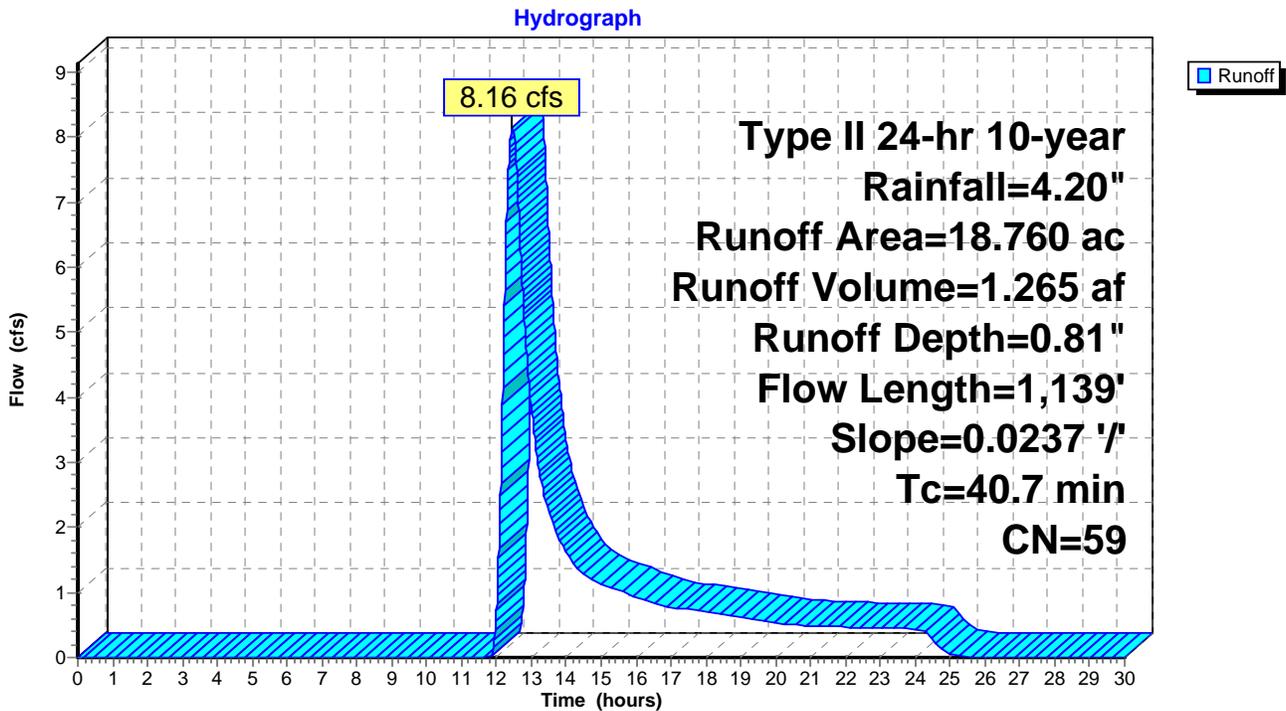
Runoff = 8.16 cfs @ 12.44 hrs, Volume= 1.265 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
18.160	58	Woods/grass comb., Good, HSG B
0.600	98	Paved parking & roofs
18.760	59	Weighted Average
18.160		Pervious Area
0.600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.7	1,139	0.0237	0.47		Lag/CN Method,

Subcatchment ED D: Existing DA D



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED E: Existing DA E

Runoff = 16.18 cfs @ 12.40 hrs, Volume= 2.025 af, Depth= 1.60"

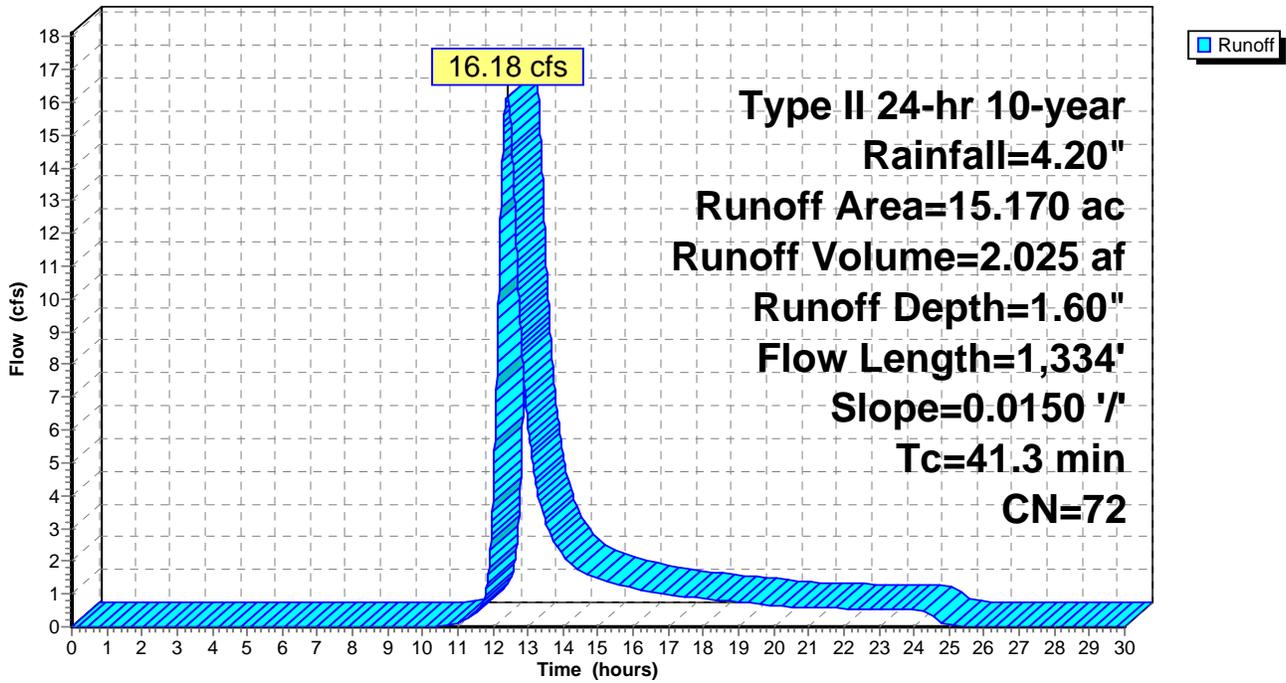
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
15.170	72	1/3 acre lots, 30% imp, HSG B
10.619		Pervious Area
4.551		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
41.3	1,334	0.0150	0.54		Lag/CN Method,

Subcatchment ED E: Existing DA E

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED F: Existing DA F

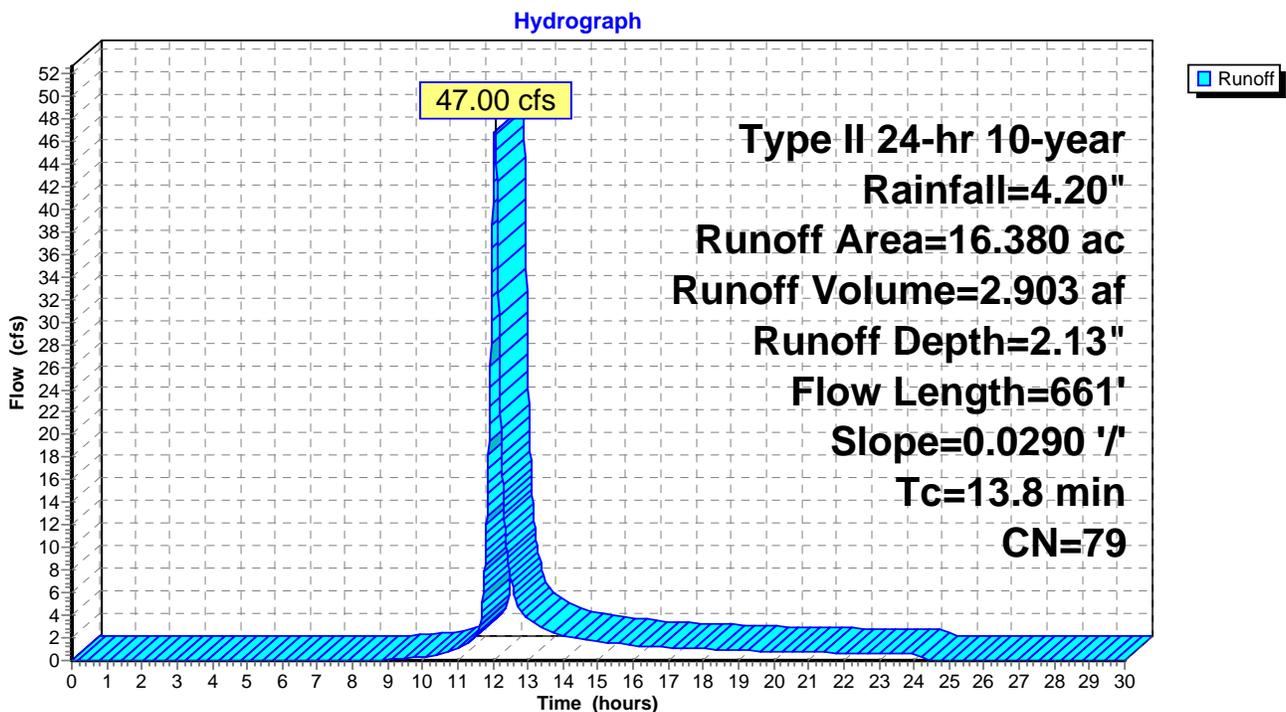
Runoff = 47.00 cfs @ 12.06 hrs, Volume= 2.903 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
9.430	81	1/3 acre lots, 30% imp, HSG C
6.950	76	Woods/grass comb., Fair, HSG C
16.380	79	Weighted Average
13.551		Pervious Area
2.829		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	661	0.0290	0.80		Lag/CN Method,

Subcatchment ED F: Existing DA F



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment ED G: Existing DA G

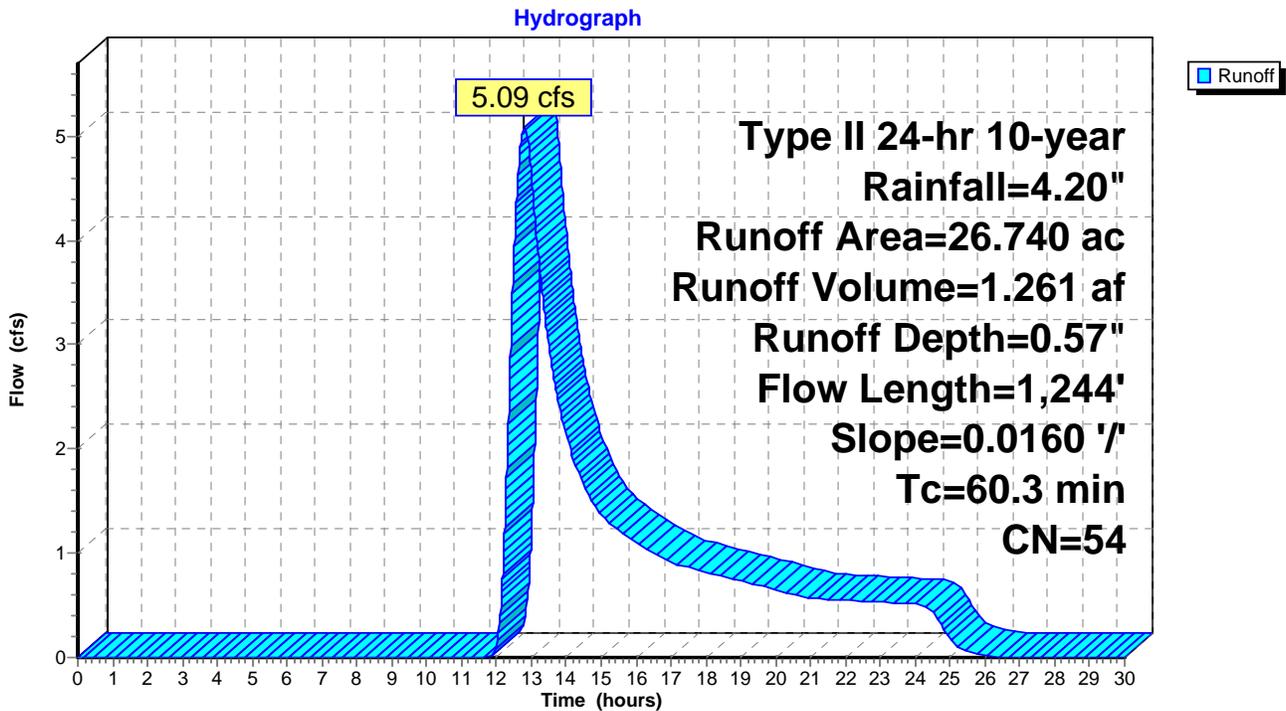
Runoff = 5.09 cfs @ 12.80 hrs, Volume= 1.261 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
20.440	57	1/3 acre lots, 30% imp, HSG A
6.300	43	Woods/grass comb., Fair, HSG A
26.740	54	Weighted Average
20.608		Pervious Area
6.132		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.3	1,244	0.0160	0.34		Lag/CN Method,

Subcatchment ED G: Existing DA G



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Subcatchment PD I: PD I

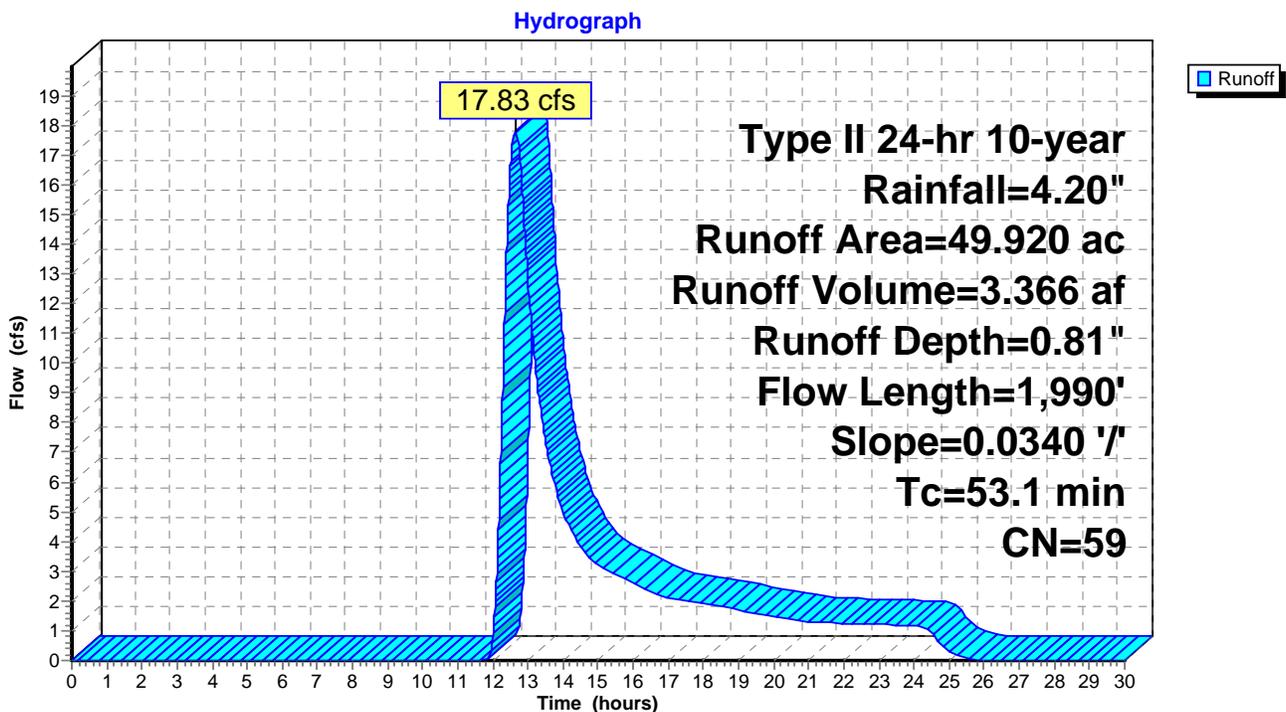
Runoff = 17.83 cfs @ 12.63 hrs, Volume= 3.366 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
37.220	61	1/4 acre lots, 38% imp, HSG A
12.700	55	Woods, Good, HSG B
49.920	59	Weighted Average
35.776		Pervious Area
14.144		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.1	1,990	0.0340	0.63		Lag/CN Method,

Subcatchment PD I: PD I



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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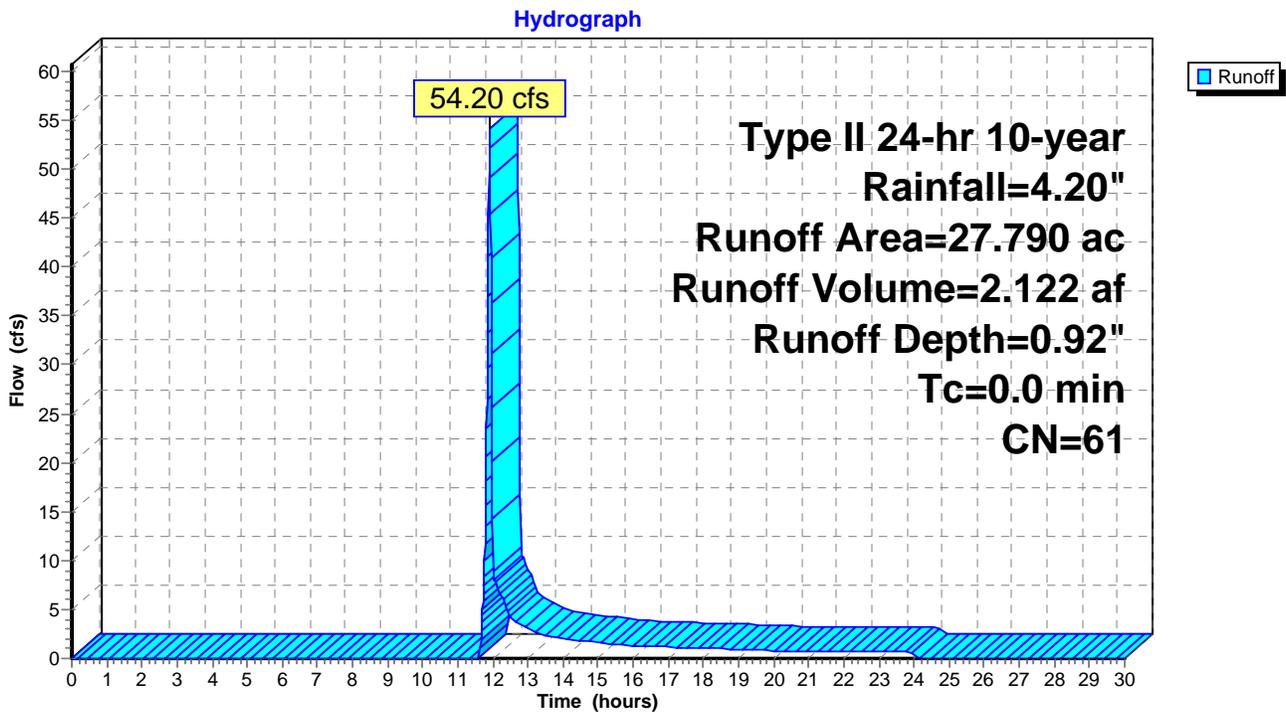
Summary for Subcatchment PD I-A: PD I-A

Runoff = 54.20 cfs @ 11.90 hrs, Volume= 2.122 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.20"

Area (ac)	CN	Description
27.790	61	1/4 acre lots, 38% imp, HSG A
17.230		Pervious Area
10.560		Impervious Area

Subcatchment PD I-A: PD I-A



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach 9R: EB Krumkill

Inflow Area = 49.920 ac, 28.33% Impervious, Inflow Depth > 0.81" for 10-year event
Inflow = 16.43 cfs @ 12.80 hrs, Volume= 3.363 af
Outflow = 14.98 cfs @ 13.01 hrs, Volume= 3.359 af, Atten= 9%, Lag= 12.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.92 fps, Min. Travel Time= 15.2 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 35.1 min

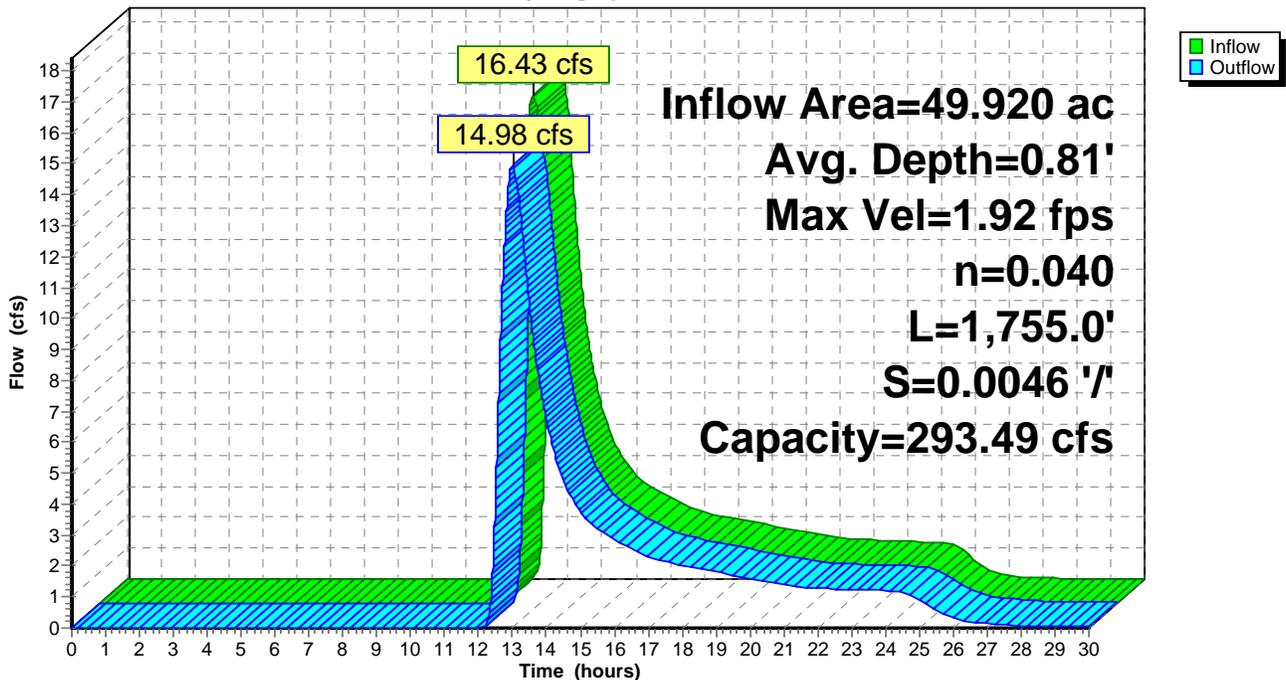
Peak Storage= 13,676 cf @ 13.01 hrs, Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 293.49 cfs

8.00' x 4.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/ Top Width= 24.00'
Length= 1,755.0' Slope= 0.0046 '/
Inlet Invert= 186.00', Outlet Invert= 178.00'



Reach 9R: EB Krumkill

Hydrograph

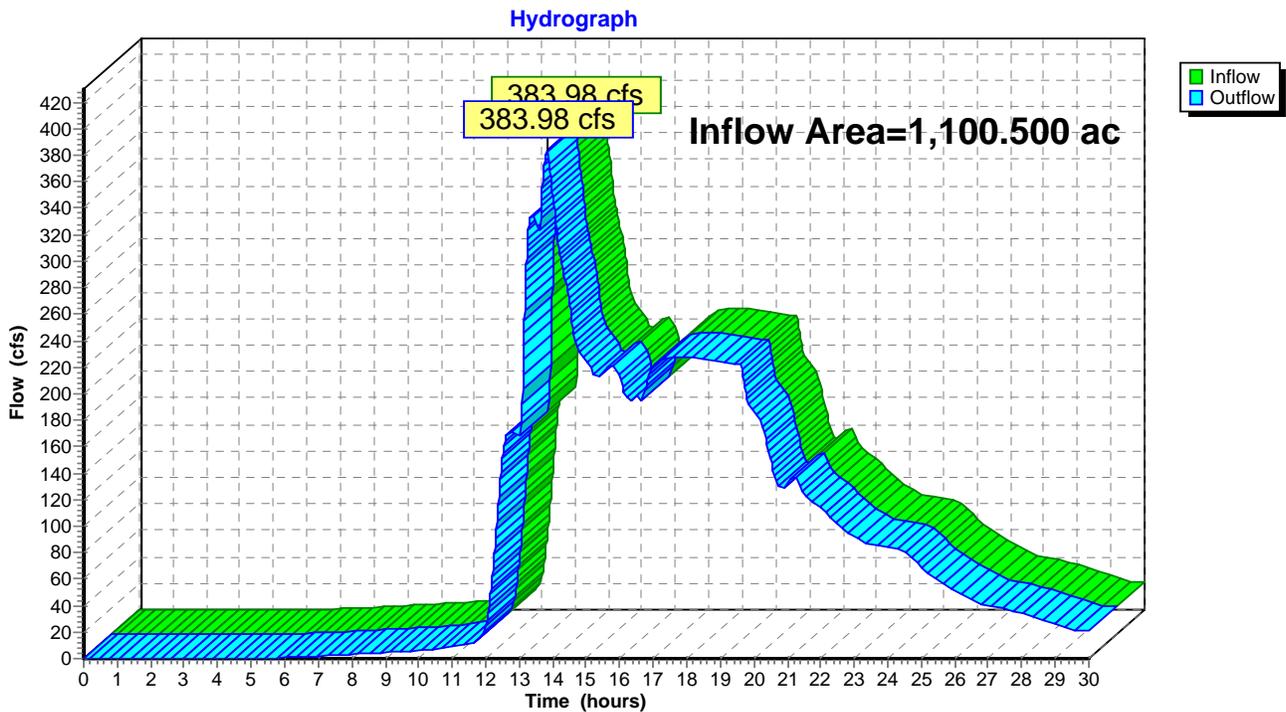


Summary for Reach KK P: Krumkill

Inflow Area = 1,100.500 ac, 34.10% Impervious, Inflow Depth > 2.32" for 10-year event
Inflow = 383.98 cfs @ 13.84 hrs, Volume= 212.835 af
Outflow = 383.98 cfs @ 13.84 hrs, Volume= 212.835 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach KK P: Krumkill



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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WB R-3: WBR3

Inflow Area = 1,007.460 ac, 34.96% Impervious, Inflow Depth > 2.47" for 10-year event
Inflow = 388.71 cfs @ 13.70 hrs, Volume= 207.229 af
Outflow = 387.59 cfs @ 13.70 hrs, Volume= 207.160 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 7.37 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.87 fps, Avg. Travel Time= 1.0 min

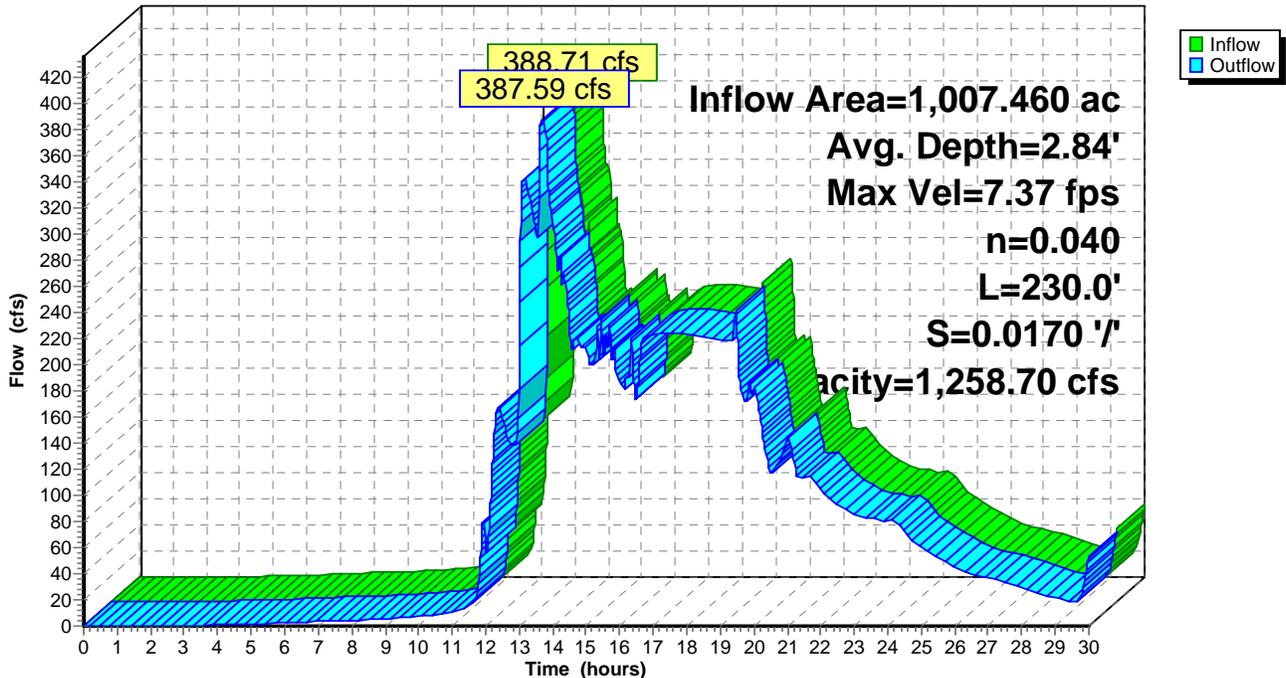
Peak Storage= 12,094 cf @ 13.70 hrs, Average Depth at Peak Storage= 2.84'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 1,258.70 cfs

10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 230.0' Slope= 0.0170 '/
Inlet Invert= 177.90', Outlet Invert= 174.00'



Reach WB R-3: WBR3

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WBR1: WB R-1

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 2.58" for 10-year event
Inflow = 569.77 cfs @ 13.57 hrs, Volume= 201.320 af
Outflow = 409.04 cfs @ 13.60 hrs, Volume= 201.166 af, Atten= 28%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 6.17 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 3.16 fps, Avg. Travel Time= 1.6 min

Peak Storage= 19,897 cf @ 13.60 hrs, Average Depth at Peak Storage= 3.32'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 966.62 cfs

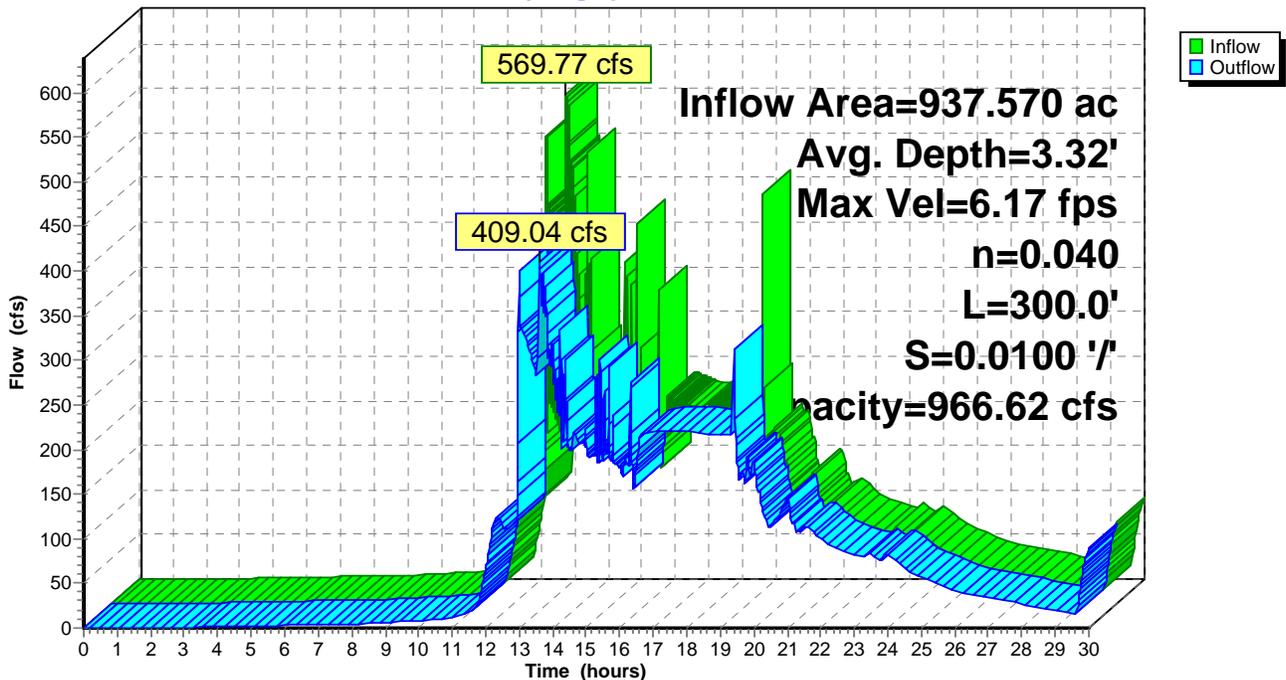
10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 300.0' Slope= 0.0100 '/
Inlet Invert= 189.00', Outlet Invert= 186.00'



‡

Reach WBR1: WB R-1

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WBR2: WB R-2

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 2.53" for 10-year event
Inflow = 383.72 cfs @ 13.74 hrs, Volume= 203.115 af
Outflow = 383.81 cfs @ 13.70 hrs, Volume= 203.082 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 10.61 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.46 fps, Avg. Travel Time= 0.5 min

Peak Storage= 5,428 cf @ 13.70 hrs, Average Depth at Peak Storage= 2.19'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 2,088.13 cfs

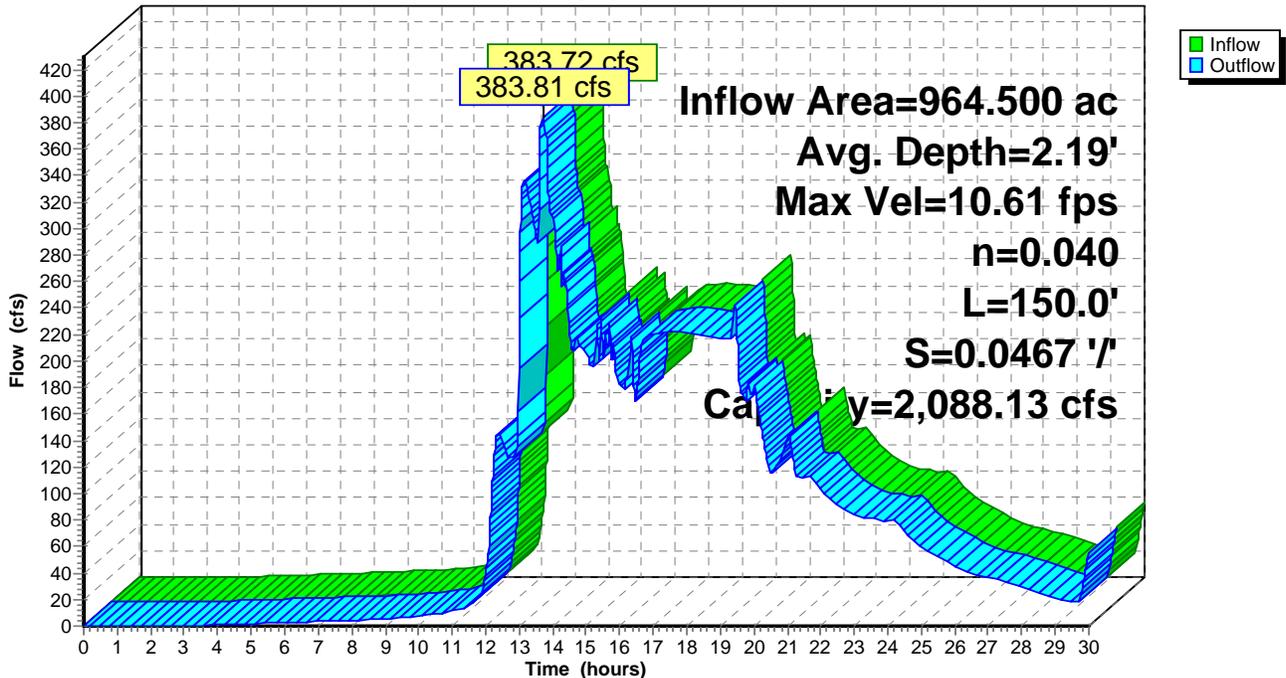
10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 150.0' Slope= 0.0467 '/
Inlet Invert= 185.00', Outlet Invert= 178.00'



‡

Reach WBR2: WB R-2

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WBR4: WB R-4

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 2.41" for 10-year event
Inflow = 392.94 cfs @ 13.75 hrs, Volume= 211.324 af
Outflow = 391.24 cfs @ 13.71 hrs, Volume= 211.125 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.52 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.43 fps, Avg. Travel Time= 3.1 min

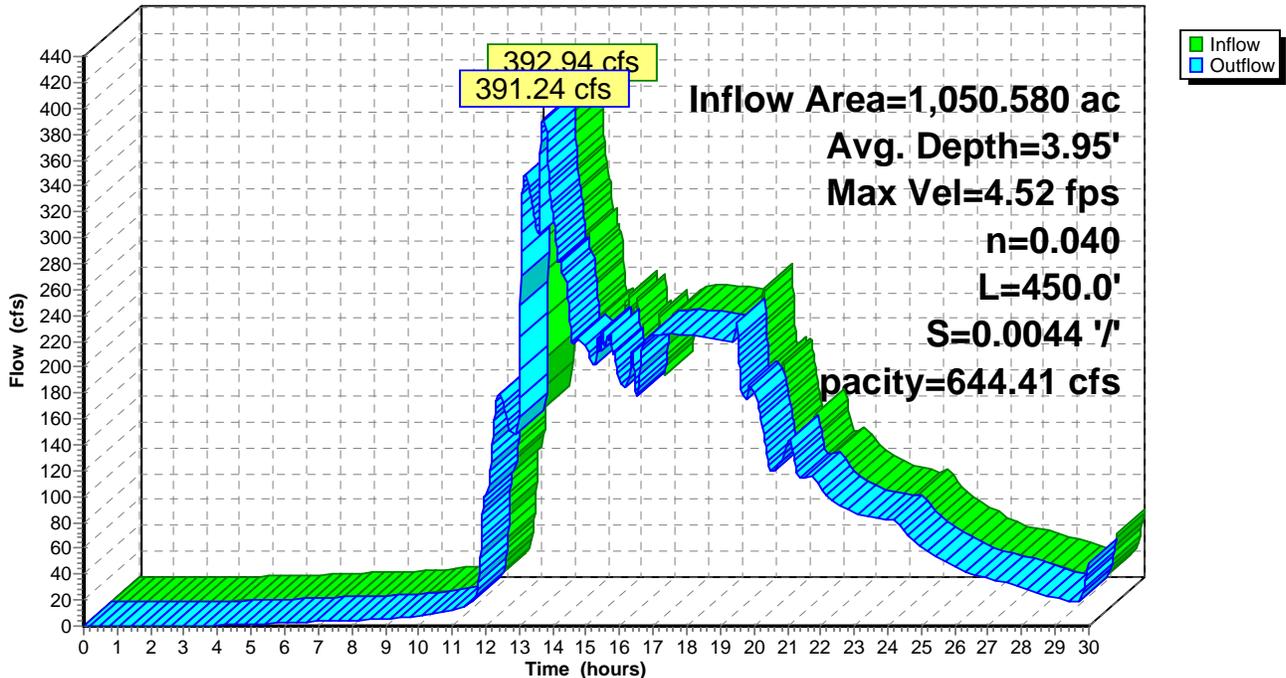
Peak Storage= 38,908 cf @ 13.71 hrs, Average Depth at Peak Storage= 3.95'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 644.41 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 40.00'
Length= 450.0' Slope= 0.0044 '/'
Inlet Invert= 186.00', Outlet Invert= 184.00'



Reach WBR4: WB R-4

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr 10-year Rainfall=4.20"

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Summary for Reach WBR5: WB R-5

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 2.40" for 10-year event
Inflow = 406.47 cfs @ 13.71 hrs, Volume= 210.071 af
Outflow = 376.34 cfs @ 13.84 hrs, Volume= 209.477 af, Atten= 7%, Lag= 7.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.84 fps, Min. Travel Time= 8.9 min
Avg. Velocity = 2.14 fps, Avg. Travel Time= 16.0 min

Peak Storage= 200,918 cf @ 13.84 hrs, Average Depth at Peak Storage= 4.29'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 522.94 cfs

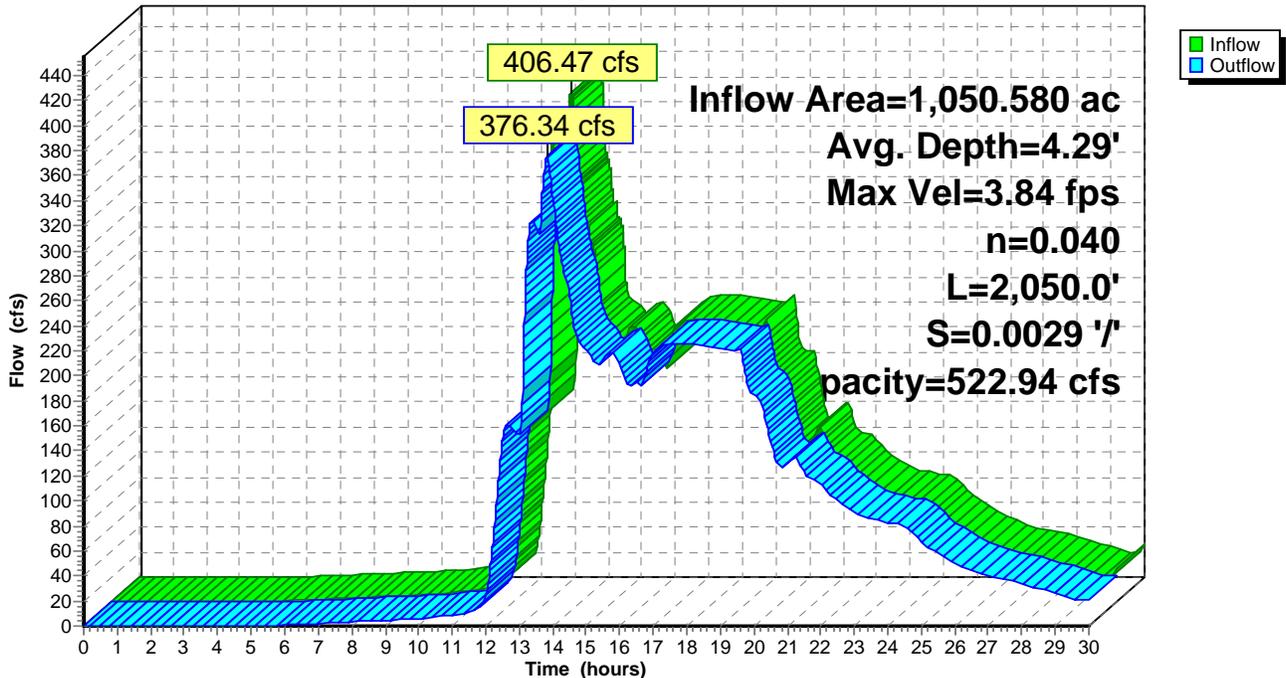
10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 2,050.0' Slope= 0.0029 '/
Inlet Invert= 182.00', Outlet Invert= 176.00'



±

Reach WBR5: WB R-5

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond 19P: 48" 85'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 2.63" for 10-year event
 Inflow = 694.79 cfs @ 12.94 hrs, Volume= 194.320 af
 Outflow = 694.79 cfs @ 12.94 hrs, Volume= 194.320 af, Atten= 0%, Lag= 0.0 min
 Primary = 694.79 cfs @ 12.94 hrs, Volume= 194.320 af

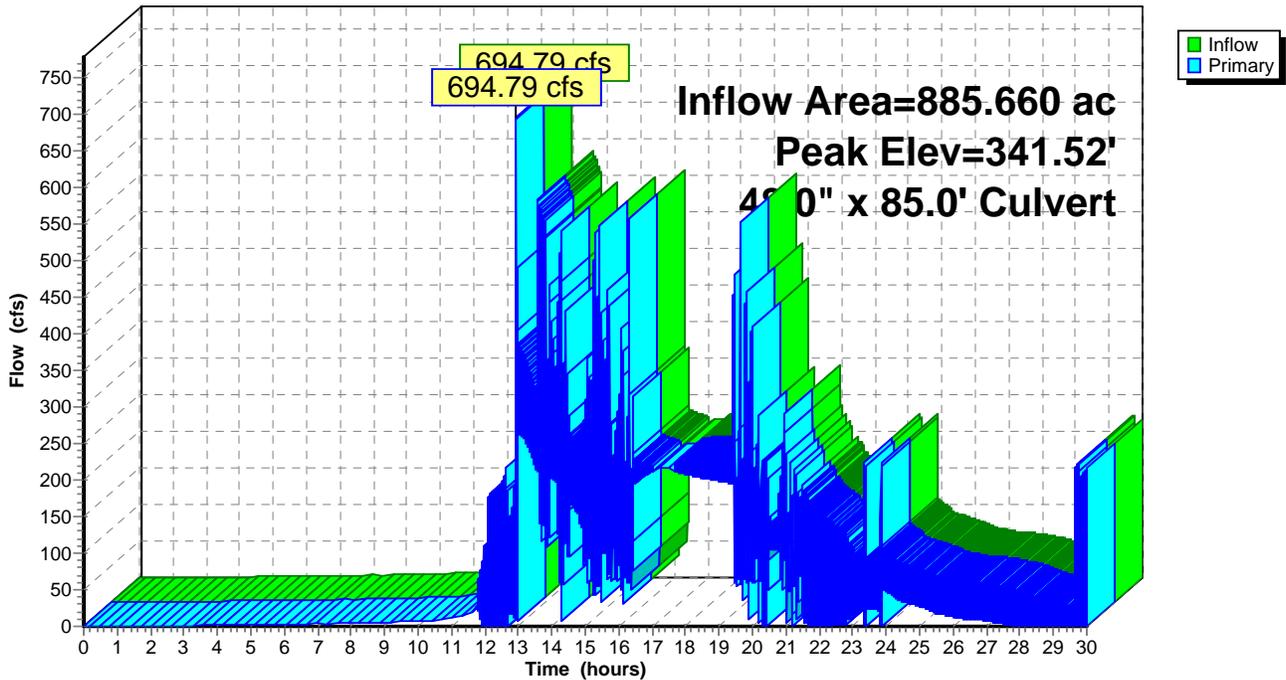
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 341.52' @ 12.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	48.0" x 85.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 193.00' S= 0.0118 '/ Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=678.49 cfs @ 12.94 hrs HW=335.30' TW=195.28' (Dynamic Tailwater)
 ↳=Culvert (Barrel Controls 678.49 cfs @ 53.99 fps)

Pond 19P: 48" 85'

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond ARd C: Acre Rd Culvert

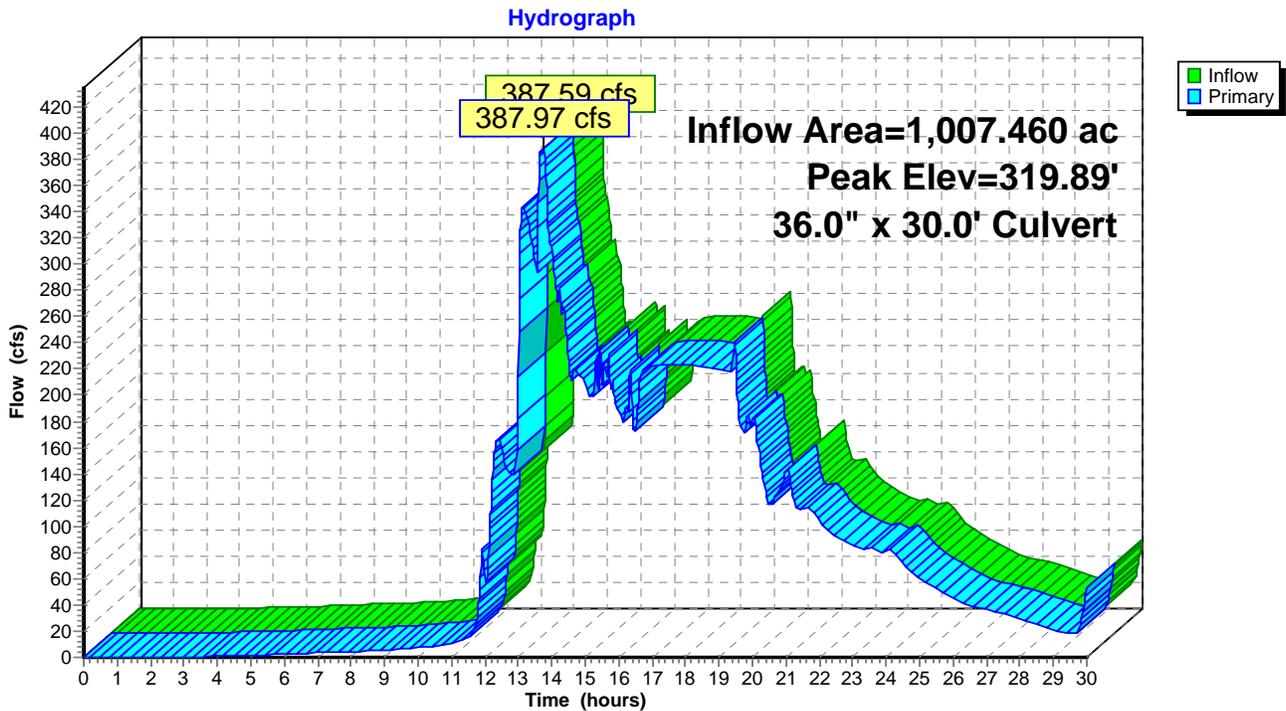
Inflow Area = 1,007.460 ac, 34.96% Impervious, Inflow Depth > 2.47" for 10-year event
 Inflow = 387.59 cfs @ 13.70 hrs, Volume= 207.160 af
 Outflow = 387.97 cfs @ 13.75 hrs, Volume= 207.159 af, Atten= 0%, Lag= 2.7 min
 Primary = 387.97 cfs @ 13.75 hrs, Volume= 207.159 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 319.89' @ 13.75 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	174.00'	36.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 173.90' S= 0.0033 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=387.70 cfs @ 13.75 hrs HW=319.71' TW=189.95' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 387.70 cfs @ 54.85 fps)

Pond ARd C: Acre Rd Culvert



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond MRd C: McKown Rd Culv

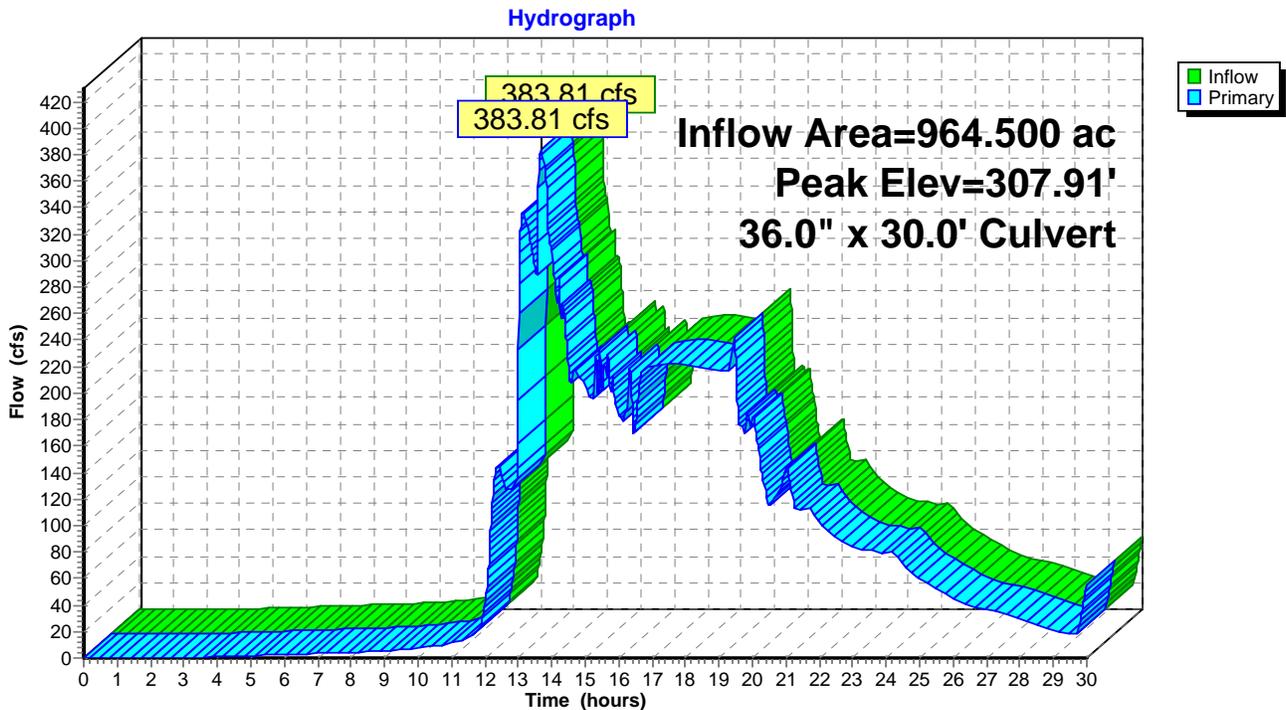
Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 2.53" for 10-year event
 Inflow = 383.81 cfs @ 13.70 hrs, Volume= 203.082 af
 Outflow = 383.81 cfs @ 13.70 hrs, Volume= 203.082 af, Atten= 0%, Lag= 0.0 min
 Primary = 383.81 cfs @ 13.70 hrs, Volume= 203.082 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 307.91' @ 13.70 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.00'	36.0" x 30.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 177.00' S= 0.0333 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=383.52 cfs @ 13.70 hrs HW=307.72' TW=180.74' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 383.52 cfs @ 54.26 fps)

Pond MRd C: McKown Rd Culv



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond PS A: Proposed Storage A

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 2.60" for 10-year event
 Inflow = 709.58 cfs @ 12.94 hrs, Volume= 203.284 af
 Outflow = 569.77 cfs @ 13.57 hrs, Volume= 201.315 af, Atten= 20%, Lag= 37.8 min
 Primary = 156.24 cfs @ 13.57 hrs, Volume= 134.116 af
 Secondary = 413.54 cfs @ 13.57 hrs, Volume= 67.205 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 199.37' @ 13.57 hrs Surf.Area= 27,376 sf Storage= 128,832 cf

Plug-Flow detention time= 11.5 min calculated for 201.248 af (99% of inflow)
 Center-of-Mass det. time= 4.4 min (1,071.5 - 1,067.0)

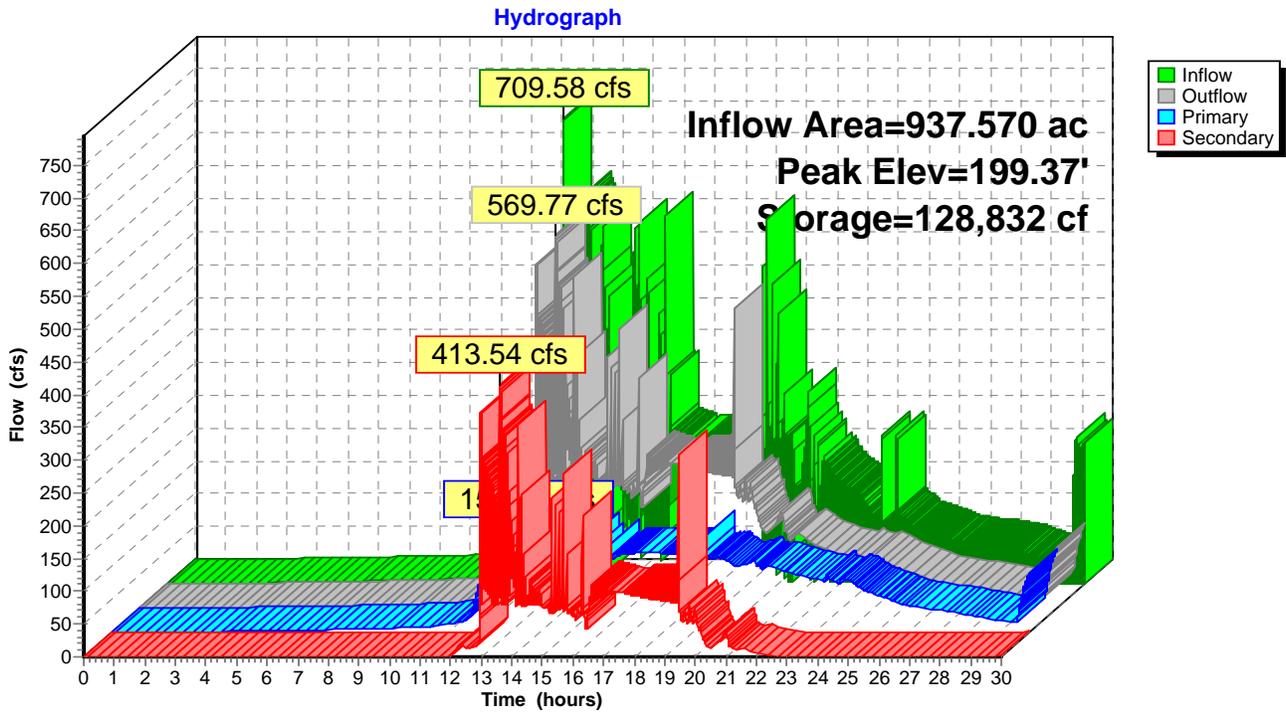
Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	128,832 cf	80.00'W x 200.00'L x 6.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	4.00' W x 3.00' H x 10.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 189.90' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	194.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=152.96 cfs @ 13.57 hrs HW=199.37' TW=192.28' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 152.96 cfs @ 12.75 fps)

Secondary OutFlow Max=413.54 cfs @ 13.57 hrs HW=199.37' TW=192.28' (Dynamic Tailwater)
 ↑**2=Broad-Crested Rectangular Weir** (Weir Controls 413.54 cfs @ 7.70 fps)

Pond PS A: Proposed Storage A



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond PS B: Proposed Storage B

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 2.54" for 10-year event
 Inflow = 412.96 cfs @ 13.60 hrs, Volume= 204.548 af
 Outflow = 383.72 cfs @ 13.74 hrs, Volume= 203.115 af, Atten= 7%, Lag= 8.5 min
 Primary = 114.20 cfs @ 13.69 hrs, Volume= 112.502 af
 Secondary = 269.61 cfs @ 13.74 hrs, Volume= 90.612 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 191.66' @ 13.74 hrs Surf.Area= 25,577 sf Storage= 123,570 cf

Plug-Flow detention time= 9.8 min calculated for 203.047 af (99% of inflow)
 Center-of-Mass det. time= 4.7 min (1,073.1 - 1,068.4)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	132,402 cf	85.00'W x 215.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	186.00'	4.00' W x 3.00' H x 10.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 185.90' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	189.00'	20.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=114.07 cfs @ 13.69 hrs HW=191.66' TW=187.18' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 114.07 cfs @ 9.51 fps)

Secondary OutFlow Max=269.29 cfs @ 13.74 hrs HW=191.66' TW=187.18' (Dynamic Tailwater)
 ↑**2=Broad-Crested Rectangular Weir** (Weir Controls 269.29 cfs @ 5.07 fps)

Proposed Drainage McKownville Rt 20 Area

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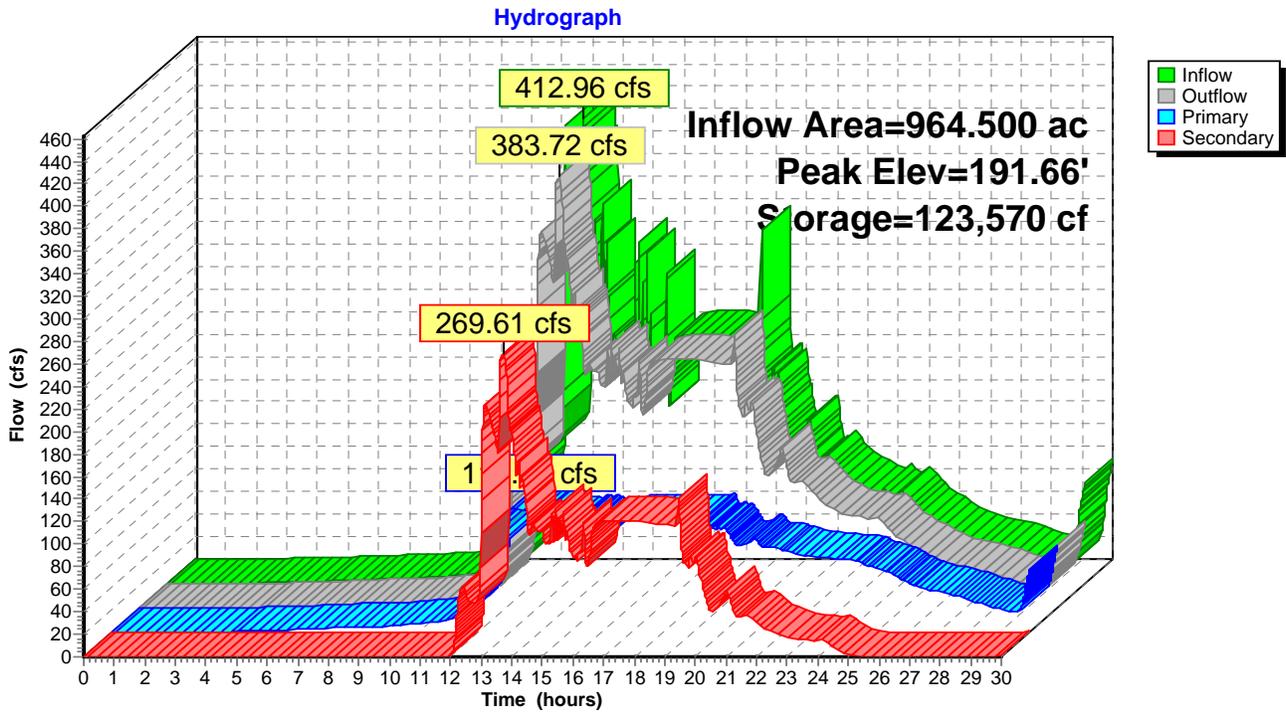
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Type II 24-hr 10-year Rainfall=4.20"

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Pond PS B: Proposed Storage B



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond PS C: Proposed Storage C

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 2.41" for 10-year event
 Inflow = 391.24 cfs @ 13.71 hrs, Volume= 211.125 af
 Outflow = 406.47 cfs @ 13.71 hrs, Volume= 210.071 af, Atten= 0%, Lag= 0.0 min
 Primary = 81.16 cfs @ 13.15 hrs, Volume= 87.890 af
 Secondary = 327.32 cfs @ 13.75 hrs, Volume= 122.181 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 191.60' @ 13.75 hrs Surf.Area= 26,596 sf Storage= 135,312 cf

Plug-Flow detention time= 12.3 min calculated for 210.001 af (99% of inflow)
 Center-of-Mass det. time= 8.7 min (1,076.3 - 1,067.5)

Volume	Invert	Avail.Storage	Storage Description
#1	184.00'	135,312 cf	85.00'W x 220.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	36.0" x 30.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 183.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Secondary	187.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=81.15 cfs @ 13.15 hrs HW=191.18' TW=185.46' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 81.15 cfs @ 11.48 fps)

Secondary OutFlow Max=327.09 cfs @ 13.75 hrs HW=191.60' TW=186.22' (Dynamic Tailwater)
 ↑**2=Broad-Crested Rectangular Weir** (Weir Controls 327.09 cfs @ 7.12 fps)

Proposed Drainage McKownville Rt 20 Area

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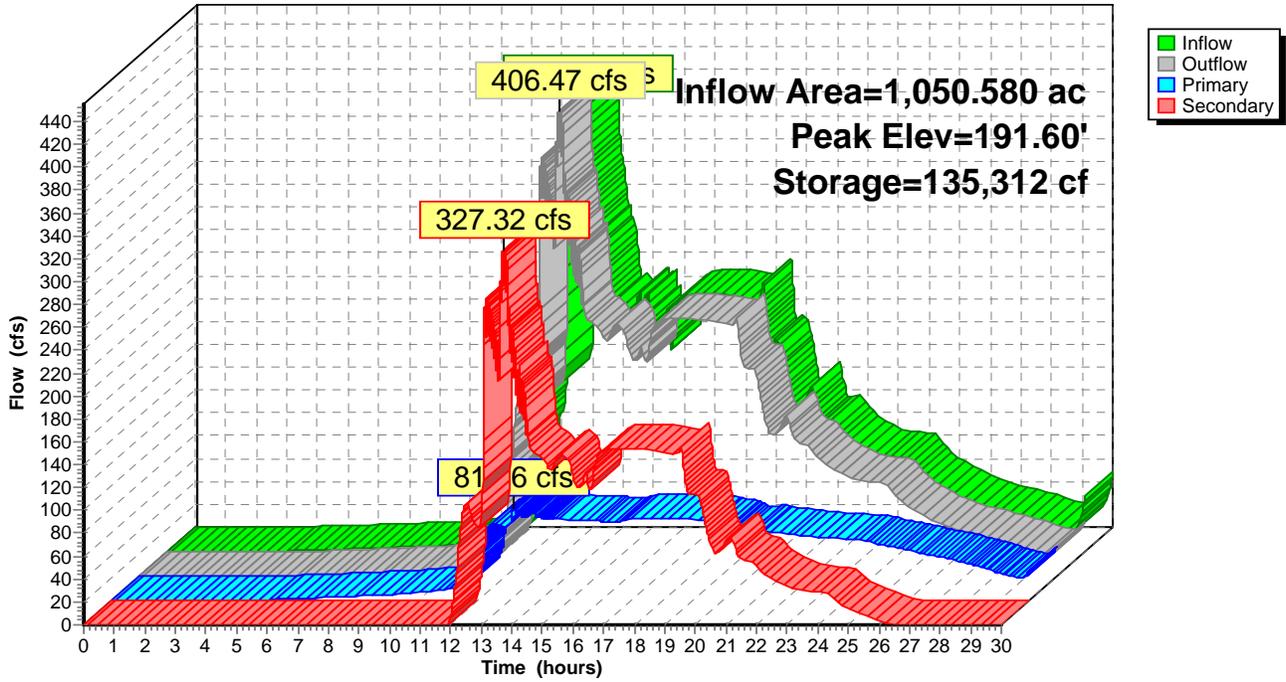
Type II 24-hr 10-year Rainfall=4.20"

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Pond PS C: Proposed Storage C

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr 10-year Rainfall=4.20"

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Summary for Pond PS D: Proposed Storage D

Inflow Area = 49.920 ac, 28.33% Impervious, Inflow Depth = 0.81" for 10-year event
 Inflow = 17.83 cfs @ 12.63 hrs, Volume= 3.366 af
 Outflow = 16.43 cfs @ 12.80 hrs, Volume= 3.363 af, Atten= 8%, Lag= 10.3 min
 Primary = 16.43 cfs @ 12.80 hrs, Volume= 3.363 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 192.18' @ 12.80 hrs Surf.Area= 0.122 ac Storage= 0.233 af

Plug-Flow detention time= 16.4 min calculated for 3.363 af (100% of inflow)
 Center-of-Mass det. time= 15.9 min (950.8 - 934.9)

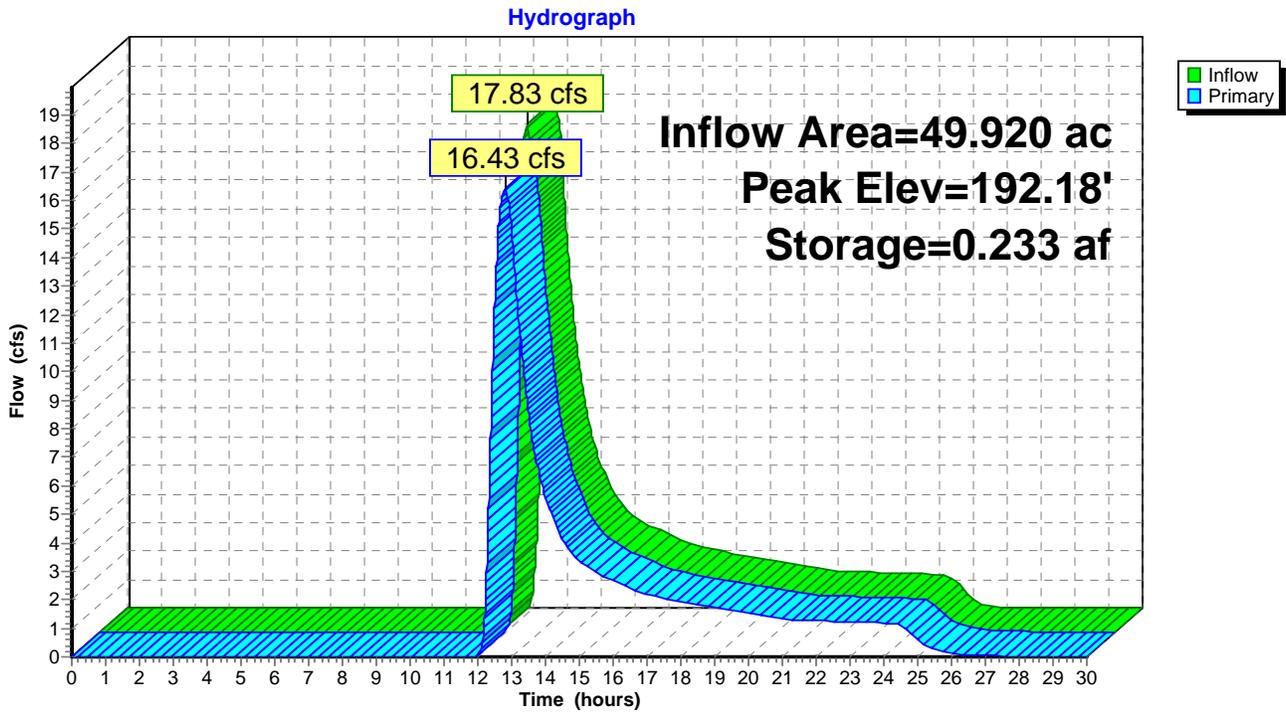
Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	0.807 af	45.00'W x 90.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	24.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 189.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Primary	195.00'	5.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=16.43 cfs @ 12.80 hrs HW=192.18' TW=186.75' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 16.43 cfs @ 5.23 fps)
- 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PS D: Proposed Storage D



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ED A: Existing DA A Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=2.21"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=16.35 cfs 1.508 af

Subcatchment ED A1: Existing DA A1 Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=2.21"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=16.35 cfs 1.508 af

Subcatchment ED B: Existing DA B Runoff Area=7.240 ac 100.00% Impervious Runoff Depth=3.02"
Flow Length=363' Slope=0.0275 '/' Tc=4.0 min CN=98 Runoff=35.43 cfs 1.820 af

Subcatchment ED C: Existing DA C Runoff Area=36.500 ac 25.00% Impervious Runoff Depth=0.86"
Flow Length=1,133' Slope=0.0335 '/' Tc=25.6 min CN=70 Runoff=26.63 cfs 2.608 af

Subcatchment ED D: Existing DA D Runoff Area=18.760 ac 3.20% Impervious Runoff Depth=0.39"
Flow Length=1,139' Slope=0.0237 '/' Tc=40.7 min CN=59 Runoff=2.99 cfs 0.614 af

Subcatchment ED E: Existing DA E Runoff Area=15.170 ac 30.00% Impervious Runoff Depth=0.96"
Flow Length=1,334' Slope=0.0150 '/' Tc=41.3 min CN=72 Runoff=9.16 cfs 1.215 af

Subcatchment ED F: Existing DA F Runoff Area=16.380 ac 17.27% Impervious Runoff Depth=1.37"
Flow Length=661' Slope=0.0290 '/' Tc=13.8 min CN=79 Runoff=30.18 cfs 1.876 af

Subcatchment ED G: Existing DA G Runoff Area=26.740 ac 22.93% Impervious Runoff Depth=0.24"
Flow Length=1,244' Slope=0.0160 '/' Tc=60.3 min CN=54 Runoff=1.40 cfs 0.529 af

Subcatchment PD I: PD I Runoff Area=49.920 ac 28.33% Impervious Runoff Depth=0.39"
Flow Length=1,990' Slope=0.0340 '/' Tc=53.1 min CN=59 Runoff=6.71 cfs 1.634 af

Subcatchment PD I-A: PD I-A Runoff Area=27.790 ac 38.00% Impervious Runoff Depth=0.46"
Tc=0.0 min CN=61 Runoff=24.23 cfs 1.076 af

Reach 9R: EB Krumkill Avg. Depth=0.44' Max Vel=1.34 fps Inflow=6.24 cfs 1.631 af
n=0.040 L=1,755.0' S=0.0046 '/' Capacity=293.49 cfs Outflow=5.21 cfs 1.627 af

Reach KK P: Krumkill Inflow=154.44 cfs 109.540 af
Outflow=154.44 cfs 109.540 af

Reach WB R-3: WBR3 Avg. Depth=1.84' Max Vel=5.82 fps Inflow=166.19 cfs 108.226 af
n=0.040 L=230.0' S=0.0170 '/' Capacity=1,258.70 cfs Outflow=165.90 cfs 108.177 af

Reach WBR1: WB R-1 Avg. Depth=2.13' Max Vel=4.84 fps Inflow=172.84 cfs 104.858 af
n=0.040 L=300.0' S=0.0100 '/' Capacity=966.62 cfs Outflow=168.87 cfs 104.792 af

Reach WBR2: WB R-2 Avg. Depth=1.39' Max Vel=8.30 fps Inflow=164.20 cfs 105.959 af
n=0.040 L=150.0' S=0.0467 '/' Capacity=2,088.13 cfs Outflow=164.11 cfs 105.936 af

Reach WBR4: WB R-4 Avg. Depth=2.60' Max Vel=3.60 fps Inflow=167.92 cfs 110.582 af
n=0.040 L=450.0' S=0.0044 '/' Capacity=644.41 cfs Outflow=166.56 cfs 110.427 af

Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Reach WBR5: WB R-5 Avg. Depth=2.76' Max Vel=3.02 fps Inflow=160.05 cfs 108.970 af
n=0.040 L=2,050.0' S=0.0029 1' Capacity=522.94 cfs Outflow=152.20 cfs 107.913 af

Pond 19P: 48" 85' Peak Elev=242.63' Inflow=398.21 cfs 99.669 af
48.0" x 85.0' Culvert Outflow=398.21 cfs 99.669 af

Pond ARd C: Acre Rd Culvert Peak Elev=212.35' Inflow=165.90 cfs 108.177 af
36.0" x 30.0' Culvert Outflow=165.89 cfs 108.177 af

Pond MRd C: McKown Rd Culv Peak Elev=202.99' Inflow=164.11 cfs 105.936 af
36.0" x 30.0' Culvert Outflow=164.11 cfs 105.936 af

Pond PS A: Proposed Storage A Peak Elev=195.61' Storage=118,307 cf Inflow=401.75 cfs 105.605 af
Primary=113.80 cfs 101.102 af Secondary=59.04 cfs 3.756 af Outflow=172.84 cfs 104.857 af

Pond PS B: Proposed Storage B Peak Elev=190.24' Storage=88,594 cf Inflow=170.45 cfs 106.914 af
Primary=89.61 cfs 88.313 af Secondary=74.59 cfs 17.646 af Outflow=164.20 cfs 105.959 af

Pond PS C: Proposed Storage C Peak Elev=189.19' Storage=114,112 cf Inflow=166.56 cfs 110.427 af
Primary=65.34 cfs 75.805 af Secondary=94.71 cfs 33.165 af Outflow=160.05 cfs 108.970 af

Pond PS D: Proposed Storage D Peak Elev=191.11' Storage=0.110 af Inflow=6.71 cfs 1.634 af
Outflow=6.24 cfs 1.631 af

Total Runoff Area = 214.840 ac Runoff Volume = 14.388 af Average Runoff Depth = 0.80"
68.93% Pervious = 148.099 ac 31.07% Impervious = 66.741 ac

Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED A: Existing DA A

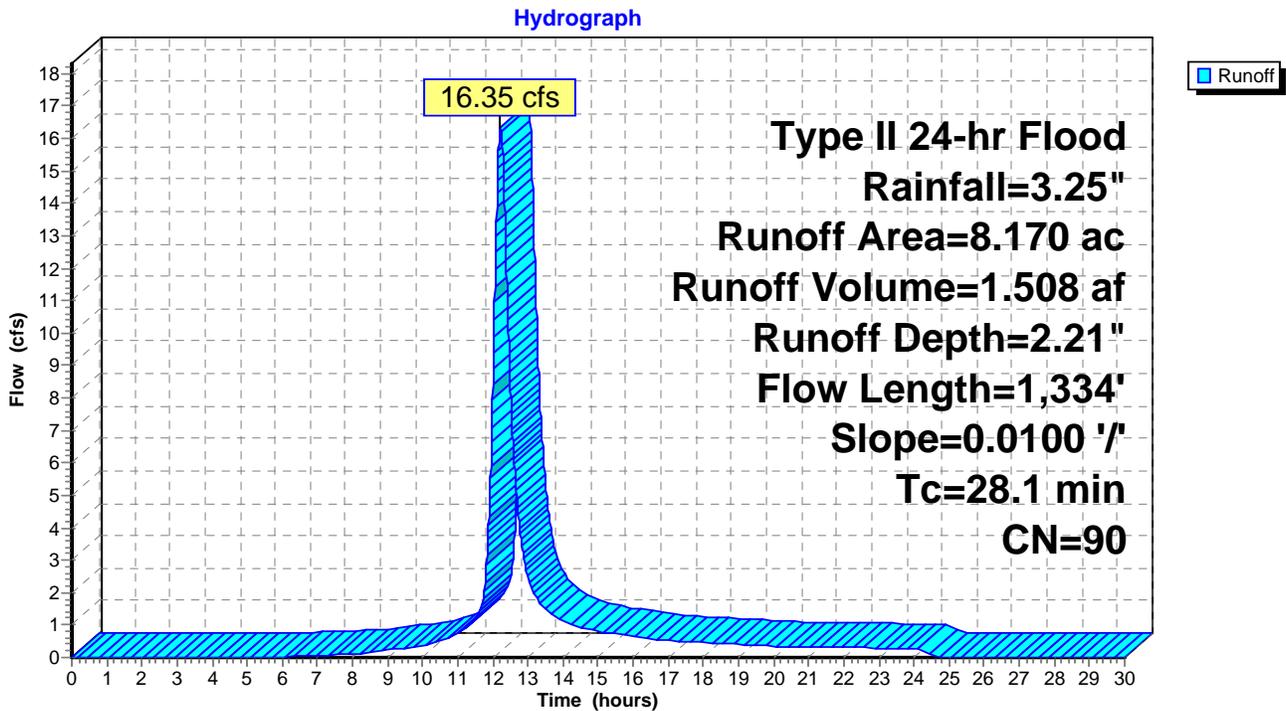
Runoff = 16.35 cfs @ 12.21 hrs, Volume= 1.508 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A: Existing DA A



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED A1: Existing DA A1

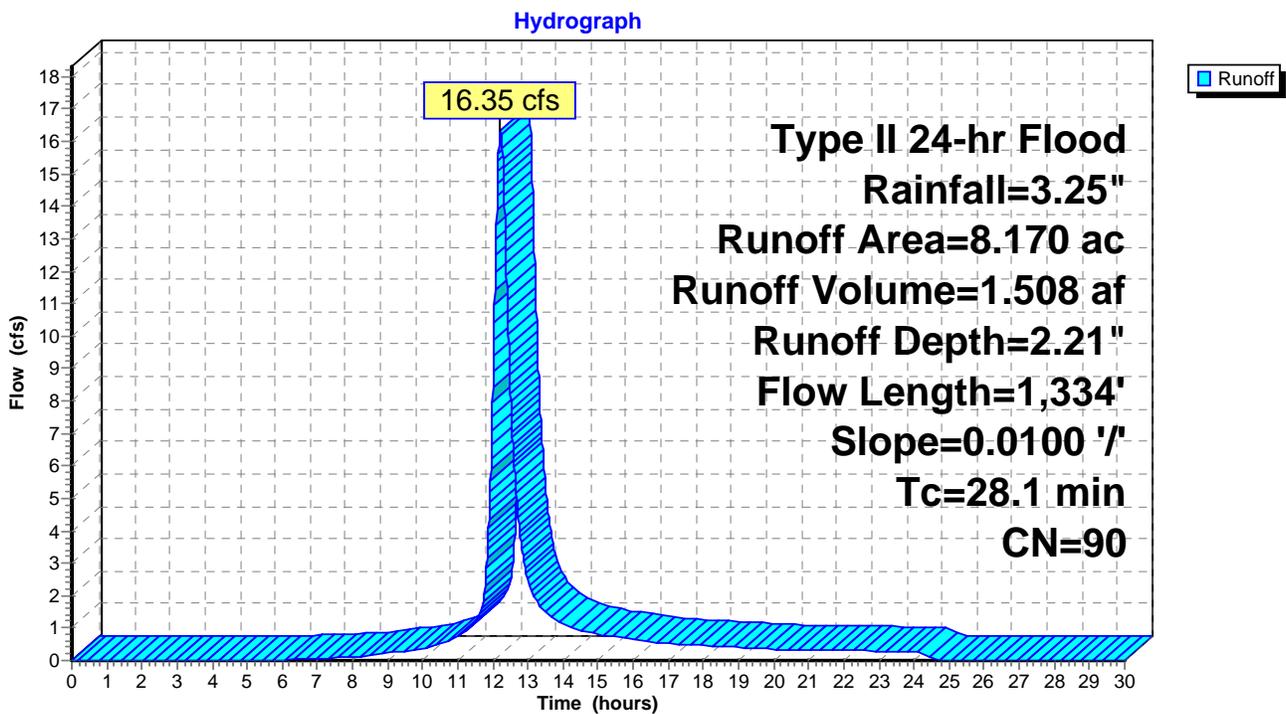
Runoff = 16.35 cfs @ 12.21 hrs, Volume= 1.508 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A1: Existing DA A1



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED B: Existing DA B

Runoff = 35.43 cfs @ 11.94 hrs, Volume= 1.820 af, Depth= 3.02"

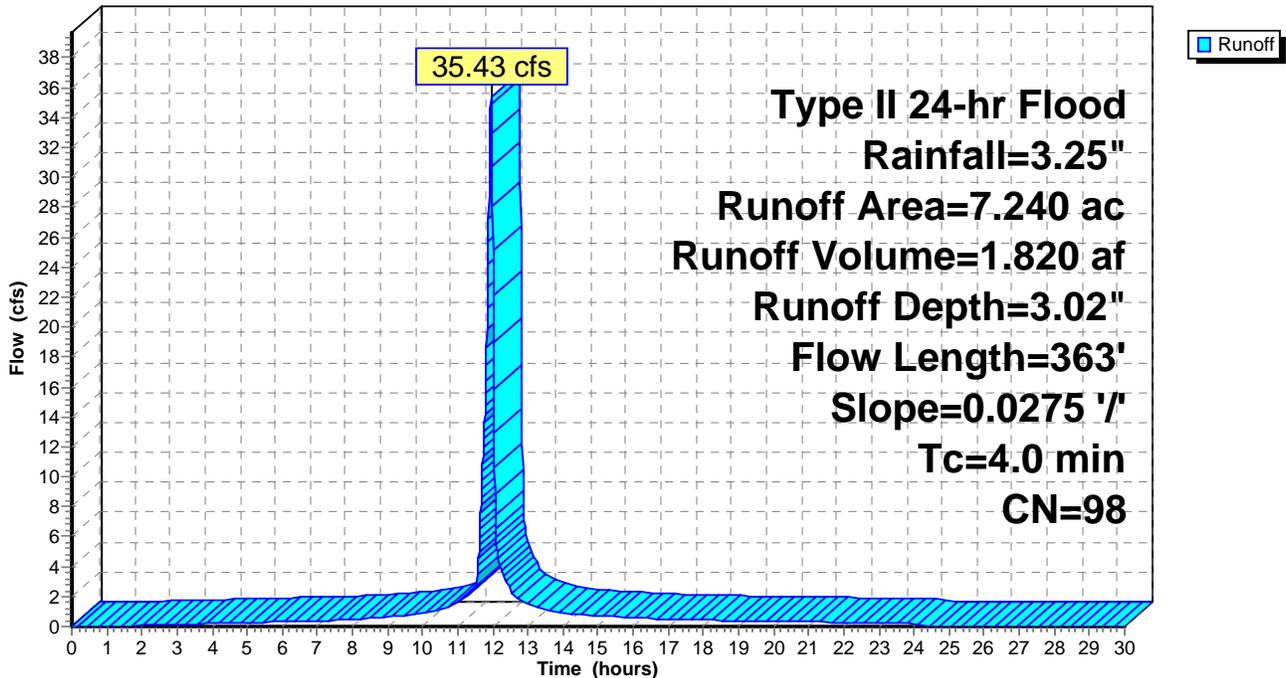
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
7.240	98	Paved parking & roofs
7.240		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	363	0.0275	1.50		Lag/CN Method,

Subcatchment ED B: Existing DA B

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED C: Existing DA C

Runoff = 26.63 cfs @ 12.21 hrs, Volume= 2.608 af, Depth= 0.86"

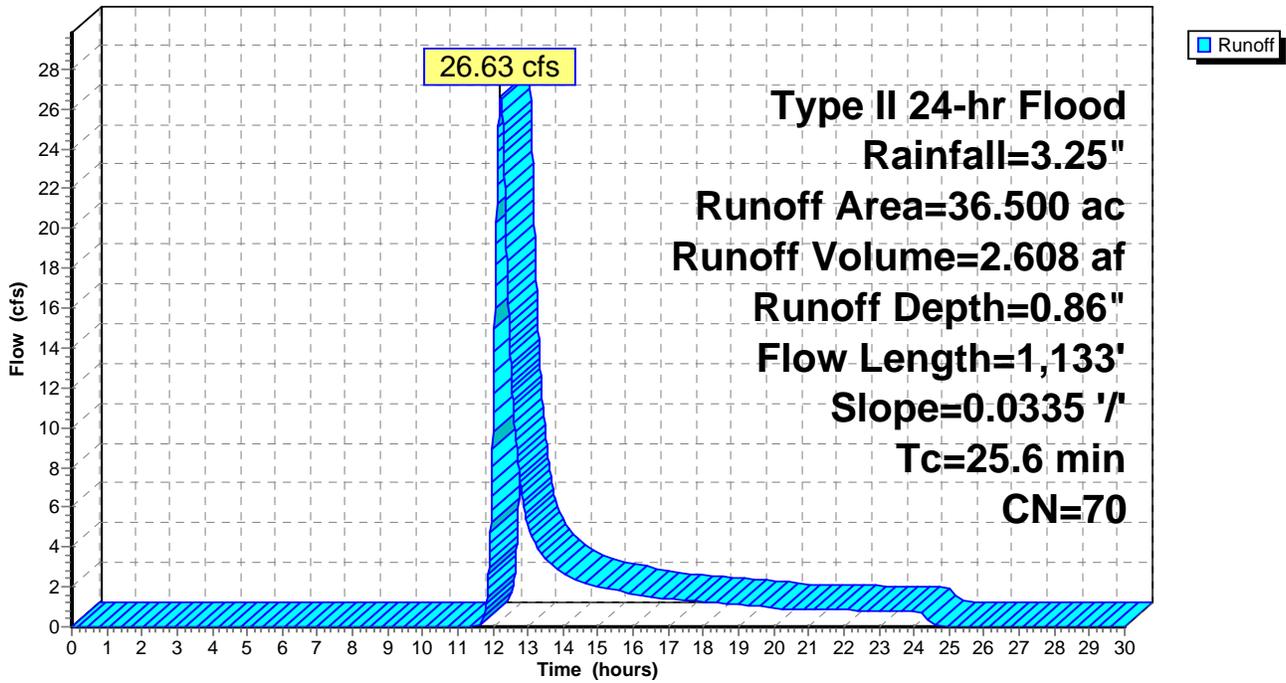
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
36.500	70	1/2 acre lots, 25% imp, HSG B
27.375		Pervious Area
9.125		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,133	0.0335	0.74		Lag/CN Method,

Subcatchment ED C: Existing DA C

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED D: Existing DA D

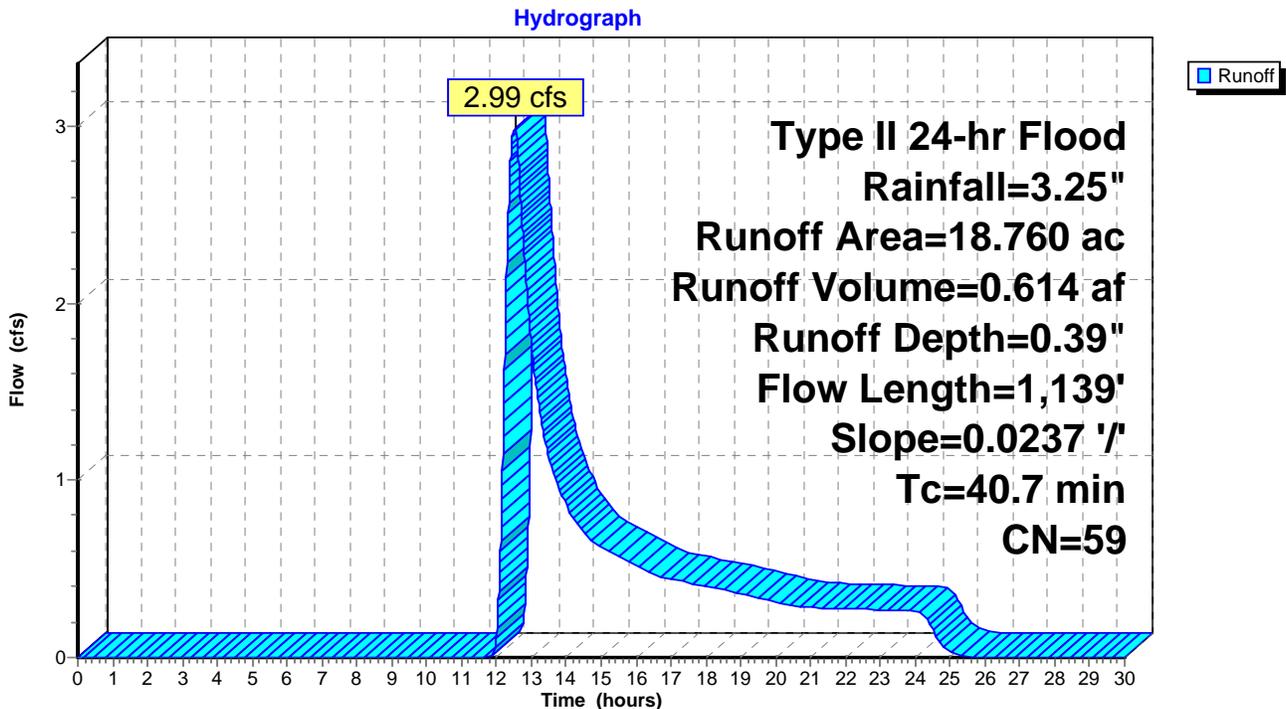
Runoff = 2.99 cfs @ 12.52 hrs, Volume= 0.614 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
18.160	58	Woods/grass comb., Good, HSG B
0.600	98	Paved parking & roofs
18.760	59	Weighted Average
18.160		Pervious Area
0.600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.7	1,139	0.0237	0.47		Lag/CN Method,

Subcatchment ED D: Existing DA D



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED E: Existing DA E

Runoff = 9.16 cfs @ 12.43 hrs, Volume= 1.215 af, Depth= 0.96"

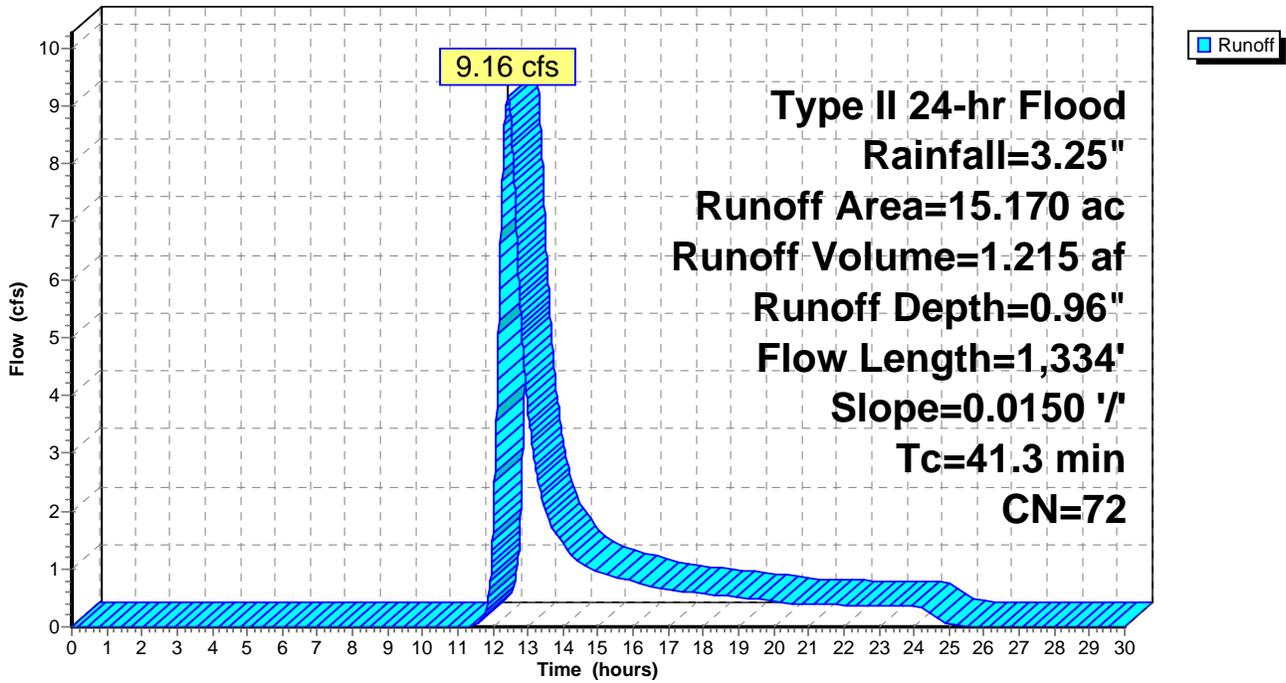
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
15.170	72	1/3 acre lots, 30% imp, HSG B
10.619		Pervious Area
4.551		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
41.3	1,334	0.0150	0.54		Lag/CN Method,

Subcatchment ED E: Existing DA E

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED F: Existing DA F

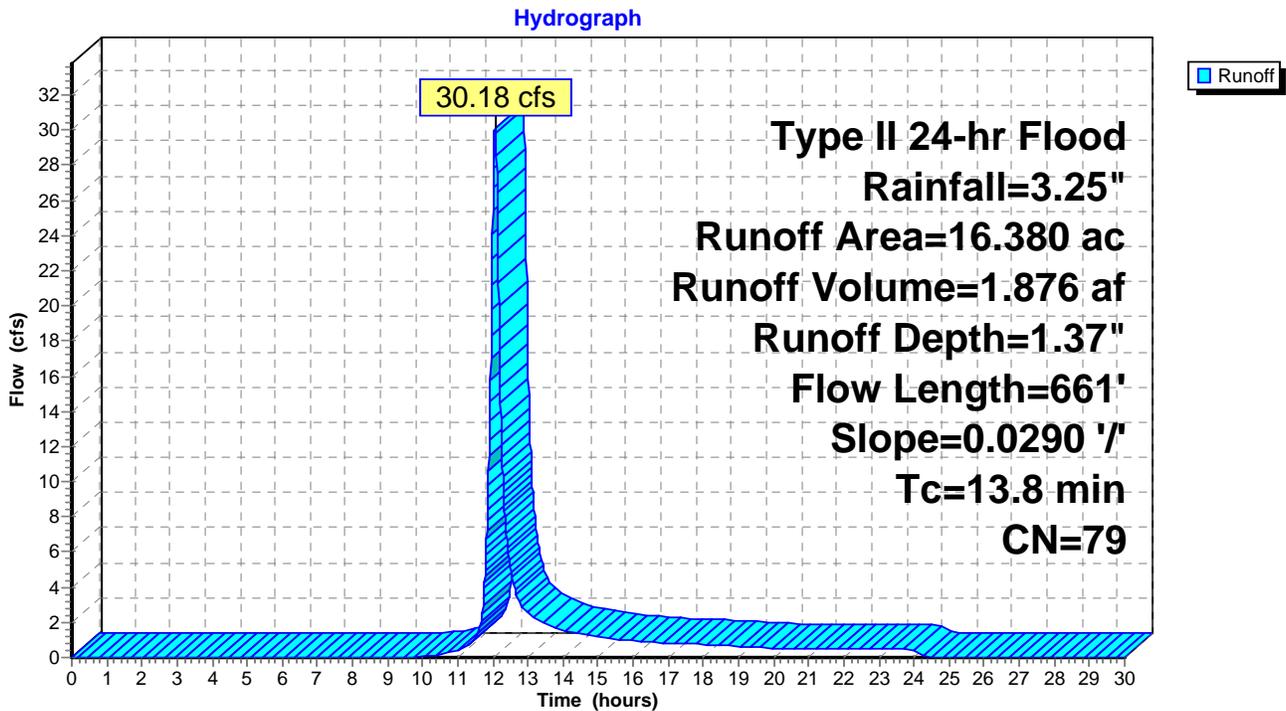
Runoff = 30.18 cfs @ 12.06 hrs, Volume= 1.876 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
9.430	81	1/3 acre lots, 30% imp, HSG C
6.950	76	Woods/grass comb., Fair, HSG C
16.380	79	Weighted Average
13.551		Pervious Area
2.829		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	661	0.0290	0.80		Lag/CN Method,

Subcatchment ED F: Existing DA F



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment ED G: Existing DA G

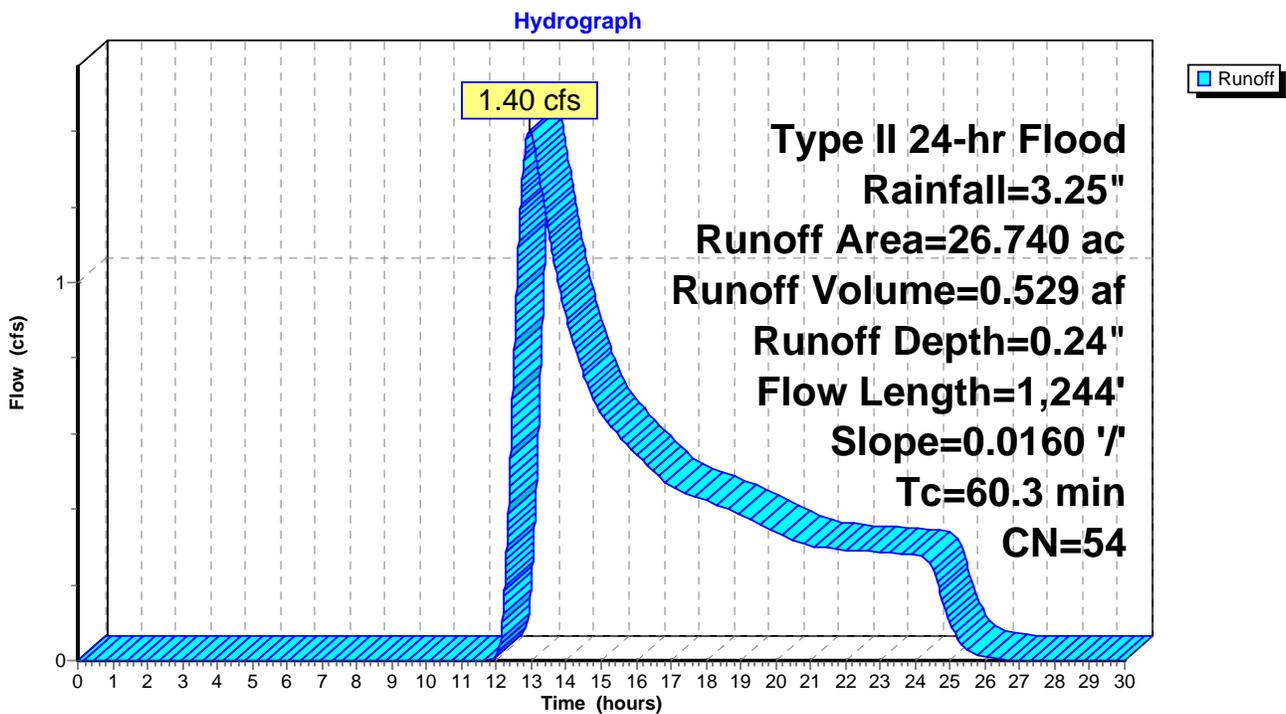
Runoff = 1.40 cfs @ 12.94 hrs, Volume= 0.529 af, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
20.440	57	1/3 acre lots, 30% imp, HSG A
6.300	43	Woods/grass comb., Fair, HSG A
26.740	54	Weighted Average
20.608		Pervious Area
6.132		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.3	1,244	0.0160	0.34		Lag/CN Method,

Subcatchment ED G: Existing DA G



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment PD I: PD I

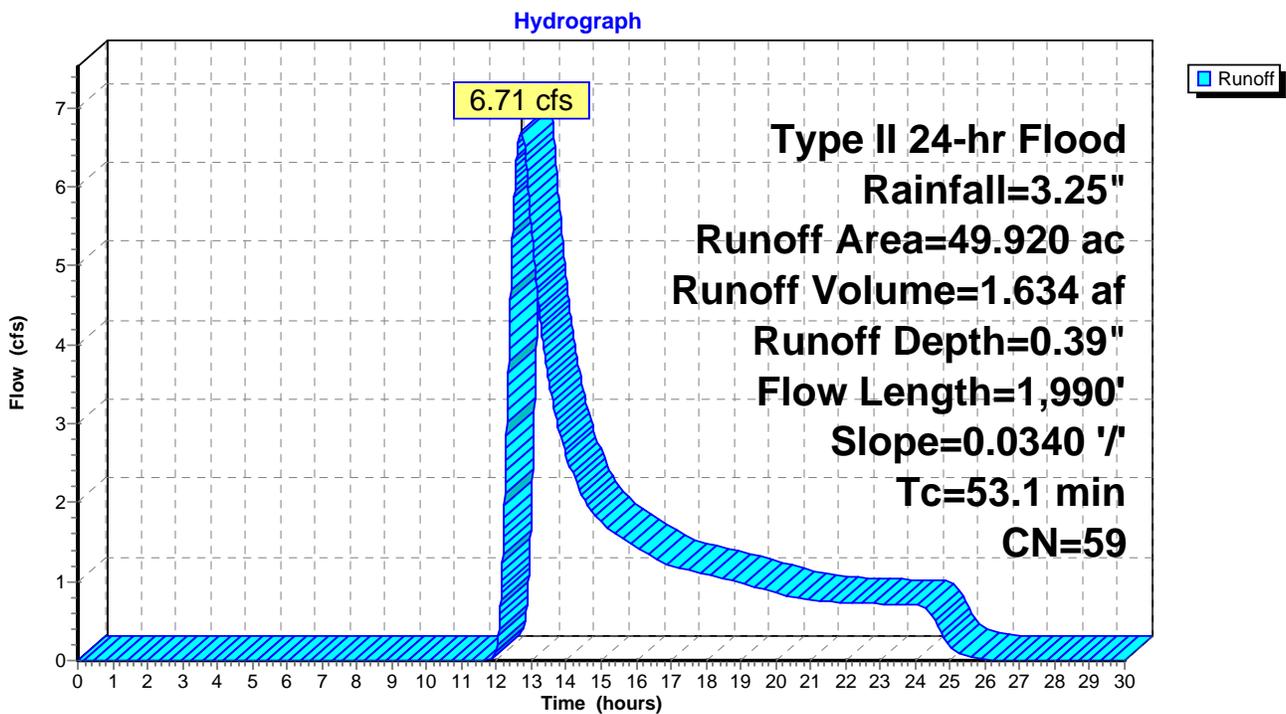
Runoff = 6.71 cfs @ 12.69 hrs, Volume= 1.634 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
37.220	61	1/4 acre lots, 38% imp, HSG A
12.700	55	Woods, Good, HSG B
49.920	59	Weighted Average
35.776		Pervious Area
14.144		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.1	1,990	0.0340	0.63		Lag/CN Method,

Subcatchment PD I: PD I



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Subcatchment PD I-A: PD I-A

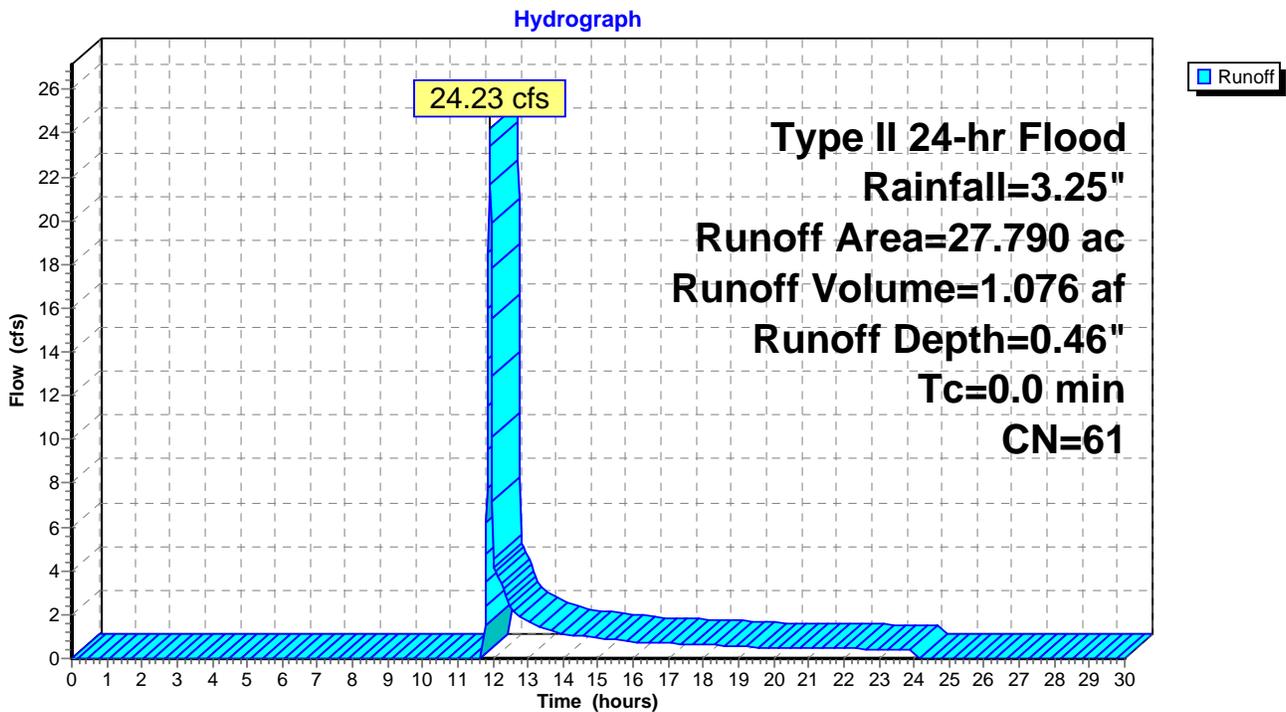
Runoff = 24.23 cfs @ 11.90 hrs, Volume= 1.076 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type II 24-hr Flood Rainfall=3.25"

Area (ac)	CN	Description
27.790	61	1/4 acre lots, 38% imp, HSG A
17.230		Pervious Area
10.560		Impervious Area

Subcatchment PD I-A: PD I-A



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach 9R: EB Krumkill

Inflow Area = 49.920 ac, 28.33% Impervious, Inflow Depth > 0.39" for Flood event
Inflow = 6.24 cfs @ 12.87 hrs, Volume= 1.631 af
Outflow = 5.21 cfs @ 13.19 hrs, Volume= 1.627 af, Atten= 17%, Lag= 19.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.34 fps, Min. Travel Time= 21.8 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 43.5 min

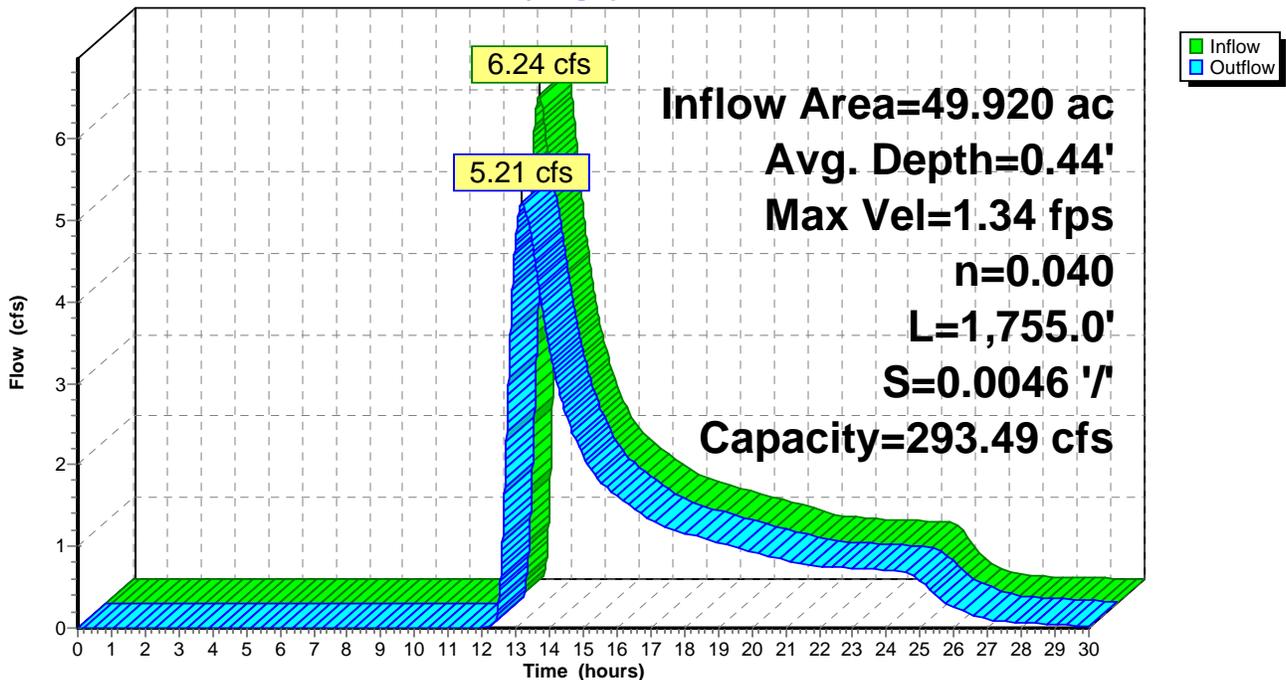
Peak Storage= 6,822 cf @ 13.19 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 293.49 cfs

8.00' x 4.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/ Top Width= 24.00'
Length= 1,755.0' Slope= 0.0046 '/
Inlet Invert= 186.00', Outlet Invert= 178.00'



Reach 9R: EB Krumkill

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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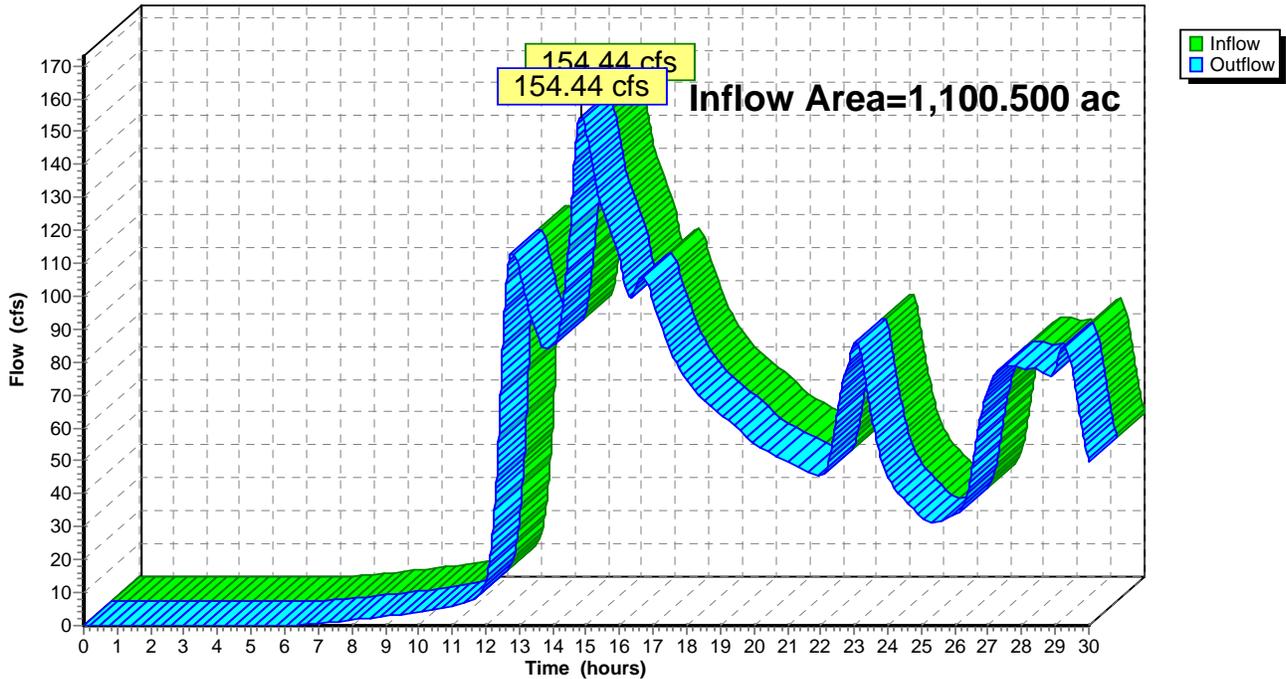
Summary for Reach KK P: Krumkill

Inflow Area = 1,100.500 ac, 34.10% Impervious, Inflow Depth > 1.19" for Flood event
Inflow = 154.44 cfs @ 14.84 hrs, Volume= 109.540 af
Outflow = 154.44 cfs @ 14.84 hrs, Volume= 109.540 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach KK P: Krumkill

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach WB R-3: WBR3

Inflow Area = 1,007.460 ac, 34.96% Impervious, Inflow Depth > 1.29" for Flood event
Inflow = 166.19 cfs @ 14.56 hrs, Volume= 108.226 af
Outflow = 165.90 cfs @ 14.57 hrs, Volume= 108.177 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.82 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 3.36 fps, Avg. Travel Time= 1.1 min

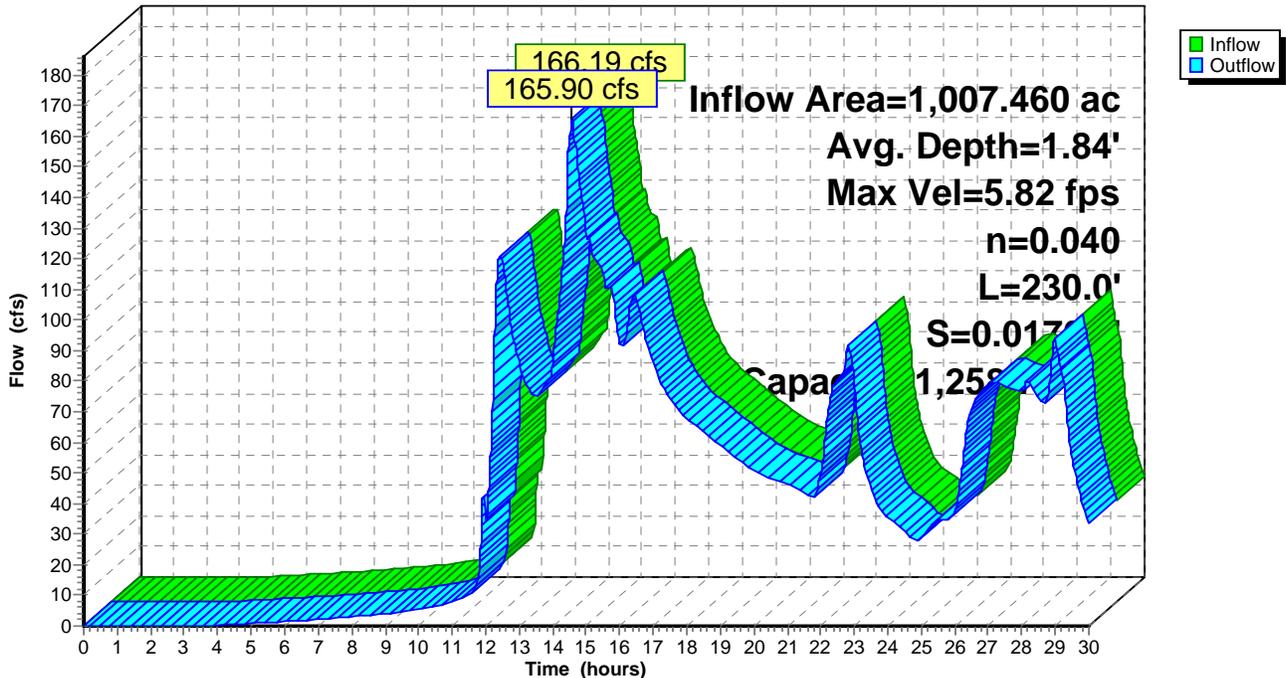
Peak Storage= 6,559 cf @ 14.57 hrs, Average Depth at Peak Storage= 1.84'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 1,258.70 cfs

10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 230.0' Slope= 0.0170 '/
Inlet Invert= 177.90', Outlet Invert= 174.00'



Reach WB R-3: WBR3

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach WBR1: WB R-1

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 1.34" for Flood event
Inflow = 172.84 cfs @ 14.53 hrs, Volume= 104.858 af
Outflow = 168.87 cfs @ 14.54 hrs, Volume= 104.792 af, Atten= 2%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.84 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.75 fps, Avg. Travel Time= 1.8 min

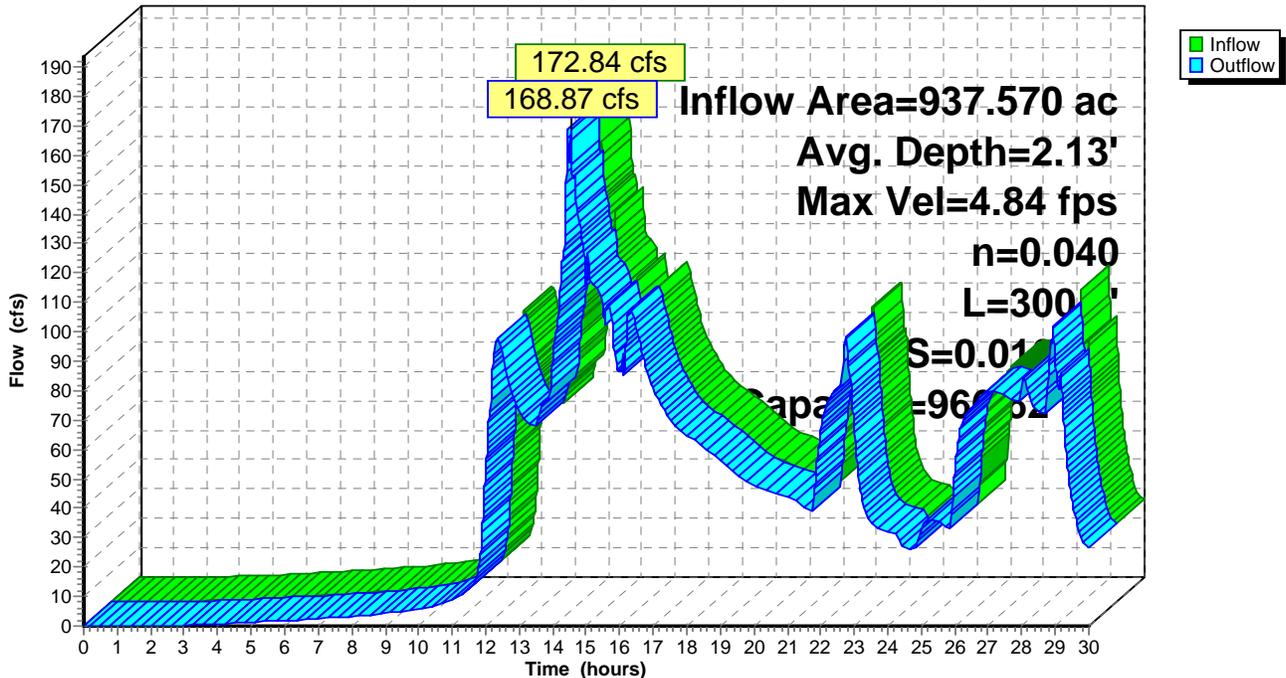
Peak Storage= 10,467 cf @ 14.54 hrs, Average Depth at Peak Storage= 2.13'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 966.62 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 300.0' Slope= 0.0100 '/
Inlet Invert= 189.00', Outlet Invert= 186.00'



Reach WBR1: WB R-1

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach WBR2: WB R-2

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.32" for Flood event
Inflow = 164.20 cfs @ 14.56 hrs, Volume= 105.959 af
Outflow = 164.11 cfs @ 14.56 hrs, Volume= 105.936 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 8.30 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 4.71 fps, Avg. Travel Time= 0.5 min

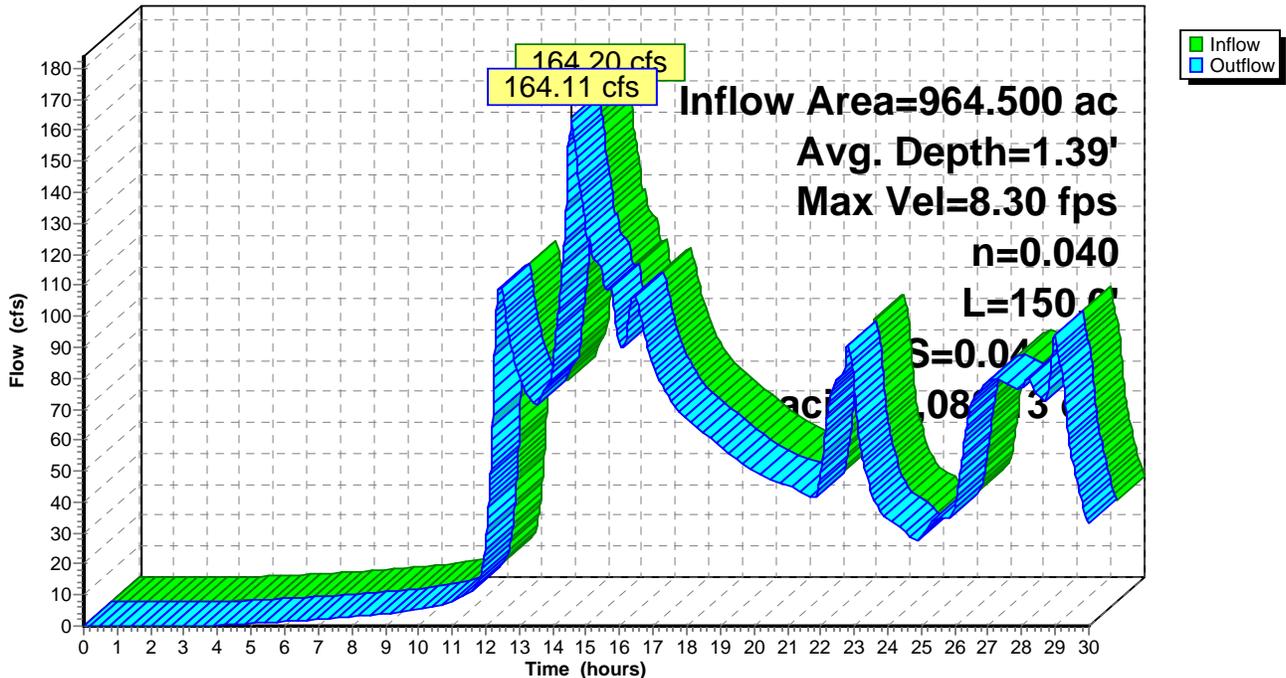
Peak Storage= 2,967 cf @ 14.56 hrs, Average Depth at Peak Storage= 1.39'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 2,088.13 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 150.0' Slope= 0.0467 '/
Inlet Invert= 185.00', Outlet Invert= 178.00'



Reach WBR2: WB R-2

Hydrograph



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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach WBR4: WB R-4

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 1.26" for Flood event
Inflow = 167.92 cfs @ 14.57 hrs, Volume= 110.582 af
Outflow = 166.56 cfs @ 14.59 hrs, Volume= 110.427 af, Atten= 1%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.60 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 3.5 min

Peak Storage= 20,835 cf @ 14.59 hrs, Average Depth at Peak Storage= 2.60'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 644.41 cfs

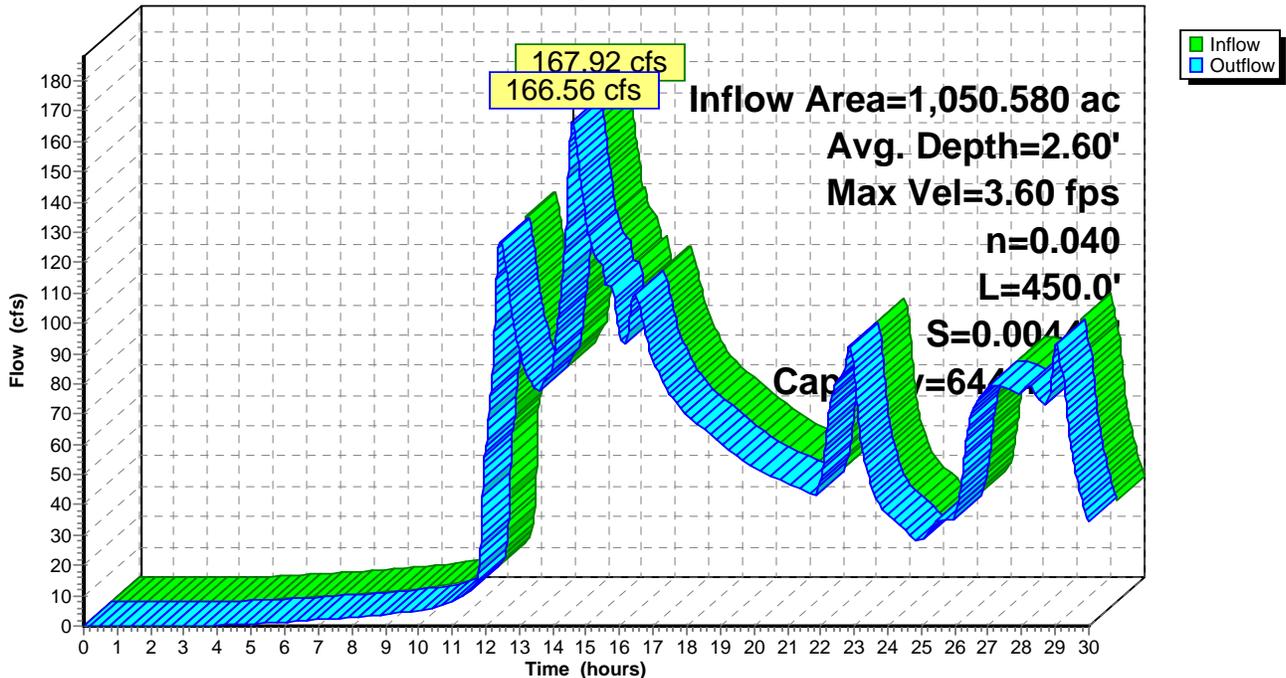
10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 450.0' Slope= 0.0044 '/
Inlet Invert= 186.00', Outlet Invert= 184.00'



‡

Reach WBR4: WB R-4

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Reach WBR5: WB R-5

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 1.24" for Flood event
Inflow = 160.05 cfs @ 14.70 hrs, Volume= 108.970 af
Outflow = 152.20 cfs @ 14.84 hrs, Volume= 107.913 af, Atten= 5%, Lag= 8.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.02 fps, Min. Travel Time= 11.3 min
Avg. Velocity = 1.86 fps, Avg. Travel Time= 18.4 min

Peak Storage= 103,461 cf @ 14.84 hrs, Average Depth at Peak Storage= 2.76'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 522.94 cfs

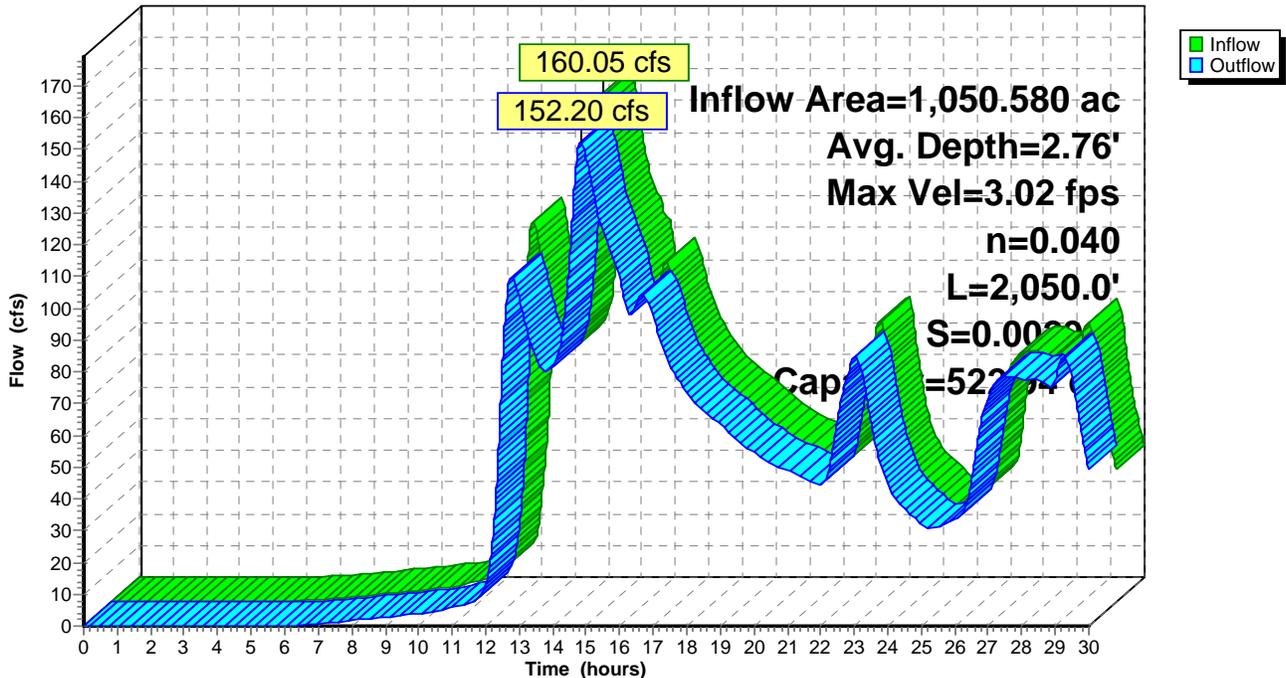
10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 2,050.0' Slope= 0.0029 '/
Inlet Invert= 182.00', Outlet Invert= 176.00'



‡

Reach WBR5: WB R-5

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond 19P: 48" 85'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 1.35" for Flood event
 Inflow = 398.21 cfs @ 15.00 hrs, Volume= 99.669 af
 Outflow = 398.21 cfs @ 15.00 hrs, Volume= 99.669 af, Atten= 0%, Lag= 0.0 min
 Primary = 398.21 cfs @ 15.00 hrs, Volume= 99.669 af

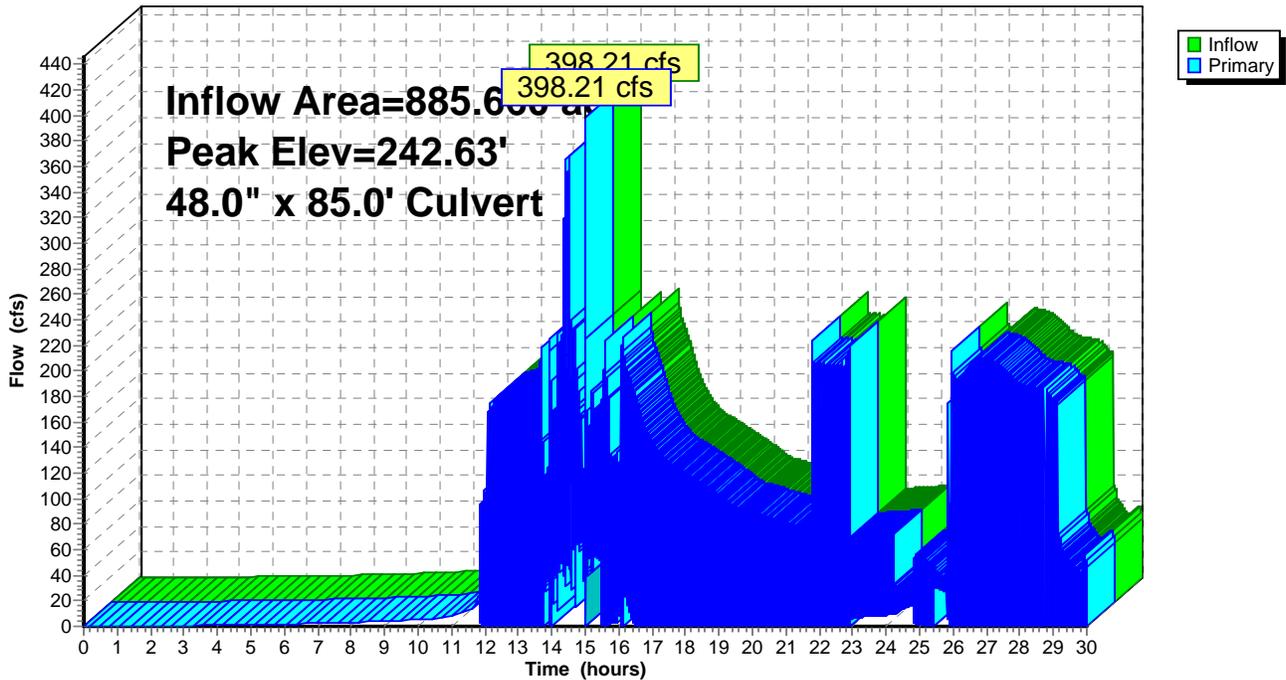
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 242.63' @ 15.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	48.0" x 85.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 193.00' S= 0.0118 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=361.58 cfs @ 15.00 hrs HW=236.28' TW=194.79' (Dynamic Tailwater)
 ↳=Culvert (Barrel Controls 361.58 cfs @ 28.77 fps)

Pond 19P: 48" 85'

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond ARd C: Acre Rd Culvert

Inflow Area = 1,007.460 ac, 34.96% Impervious, Inflow Depth > 1.29" for Flood event
 Inflow = 165.90 cfs @ 14.57 hrs, Volume= 108.177 af
 Outflow = 165.89 cfs @ 14.57 hrs, Volume= 108.177 af, Atten= 0%, Lag= 0.0 min
 Primary = 165.89 cfs @ 14.57 hrs, Volume= 108.177 af

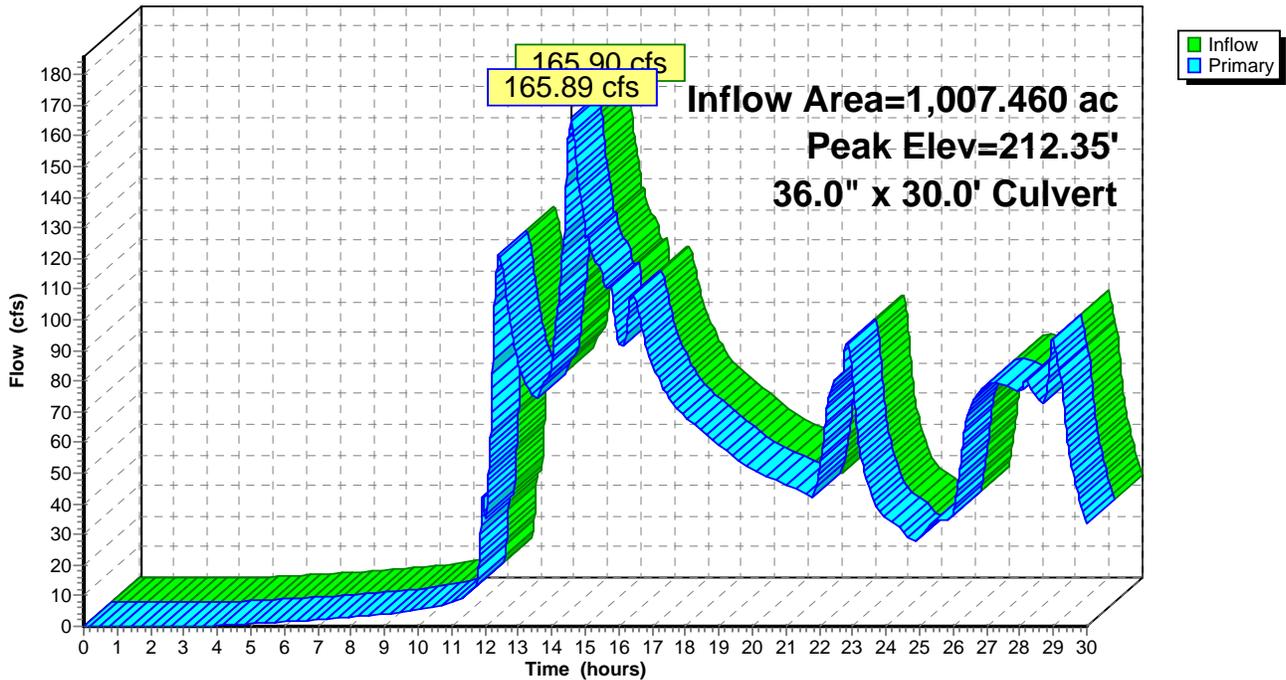
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 212.35' @ 14.57 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	174.00'	36.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 173.90' S= 0.0033 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=165.84 cfs @ 14.57 hrs HW=212.34' TW=188.59' (Dynamic Tailwater)
 ←**1=Culvert** (Inlet Controls 165.84 cfs @ 23.46 fps)

Pond ARd C: Acre Rd Culvert

Hydrograph



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond MRd C: McKown Rd Culv

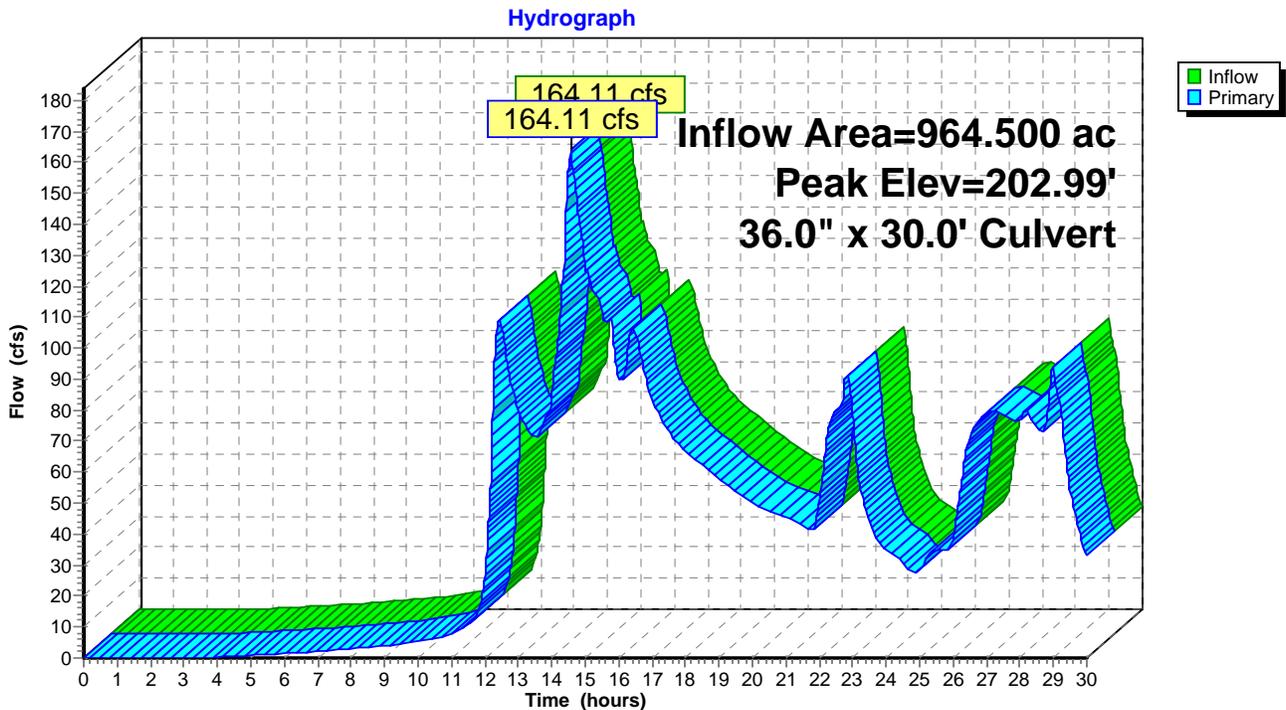
Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.32" for Flood event
Inflow = 164.11 cfs @ 14.56 hrs, Volume= 105.936 af
Outflow = 164.11 cfs @ 14.56 hrs, Volume= 105.936 af, Atten= 0%, Lag= 0.0 min
Primary = 164.11 cfs @ 14.56 hrs, Volume= 105.936 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 202.99' @ 14.56 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.00'	36.0" x 30.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 177.00' S= 0.0333 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=163.98 cfs @ 14.56 hrs HW=202.95' TW=179.74' (Dynamic Tailwater)
↑=Culvert (Inlet Controls 163.98 cfs @ 23.20 fps)

Pond MRd C: McKown Rd Culv



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond PS A: Proposed Storage A

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 1.35" for Flood event
 Inflow = 401.75 cfs @ 15.00 hrs, Volume= 105.605 af
 Outflow = 172.84 cfs @ 14.53 hrs, Volume= 104.857 af, Atten= 57%, Lag= 0.0 min
 Primary = 113.80 cfs @ 14.53 hrs, Volume= 101.102 af
 Secondary = 59.04 cfs @ 14.53 hrs, Volume= 3.756 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 195.61' @ 14.53 hrs Surf.Area= 26,557 sf Storage= 118,307 cf

Plug-Flow detention time= 16.3 min calculated for 104.857 af (99% of inflow)
 Center-of-Mass det. time= 11.9 min (1,180.7 - 1,168.8)

Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	128,832 cf	80.00'W x 200.00'L x 6.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	4.00' W x 3.00' H x 10.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 189.90' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	194.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=113.64 cfs @ 14.53 hrs HW=195.60' TW=191.11' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 113.64 cfs @ 9.47 fps)

Secondary OutFlow Max=58.40 cfs @ 14.53 hrs HW=195.60' TW=191.11' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 58.40 cfs @ 3.65 fps)

Proposed Drainage McKownville Rt 20 Area

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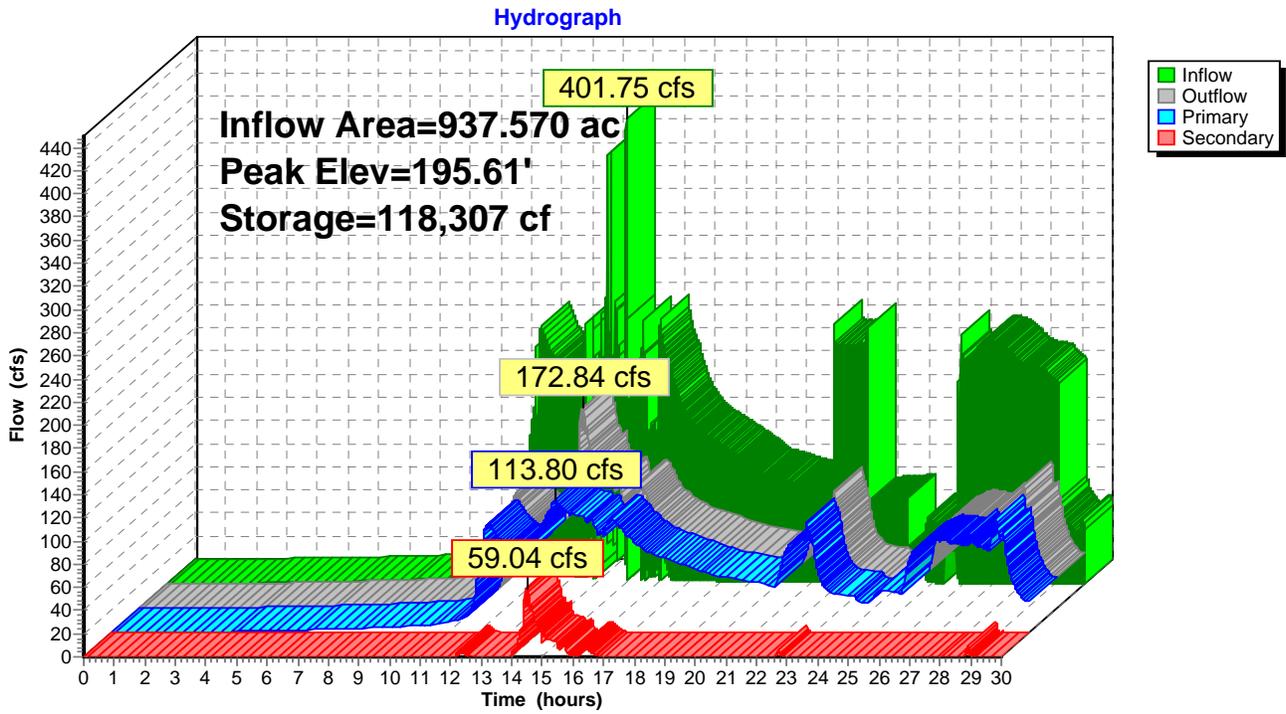
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Type II 24-hr Flood Rainfall=3.25"

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Pond PS A: Proposed Storage A



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond PS B: Proposed Storage B

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.33" for Flood event
 Inflow = 170.45 cfs @ 14.54 hrs, Volume= 106.914 af
 Outflow = 164.20 cfs @ 14.56 hrs, Volume= 105.959 af, Atten= 4%, Lag= 1.1 min
 Primary = 89.61 cfs @ 14.56 hrs, Volume= 88.313 af
 Secondary = 74.59 cfs @ 14.56 hrs, Volume= 17.646 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 190.24' @ 14.56 hrs Surf.Area= 23,646 sf Storage= 88,594 cf

Plug-Flow detention time= 15.6 min calculated for 105.959 af (99% of inflow)
 Center-of-Mass det. time= 10.0 min (1,185.4 - 1,175.3)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	132,402 cf	85.00'W x 215.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	186.00'	4.00' W x 3.00' H x 10.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 185.90' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	189.00'	20.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=89.60 cfs @ 14.56 hrs HW=190.24' TW=186.39' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 89.60 cfs @ 7.47 fps)

Secondary OutFlow Max=74.58 cfs @ 14.56 hrs HW=190.24' TW=186.39' (Dynamic Tailwater)
 ↑**2=Broad-Crested Rectangular Weir** (Weir Controls 74.58 cfs @ 3.02 fps)

Proposed Drainage McKownville Rt 20 Area

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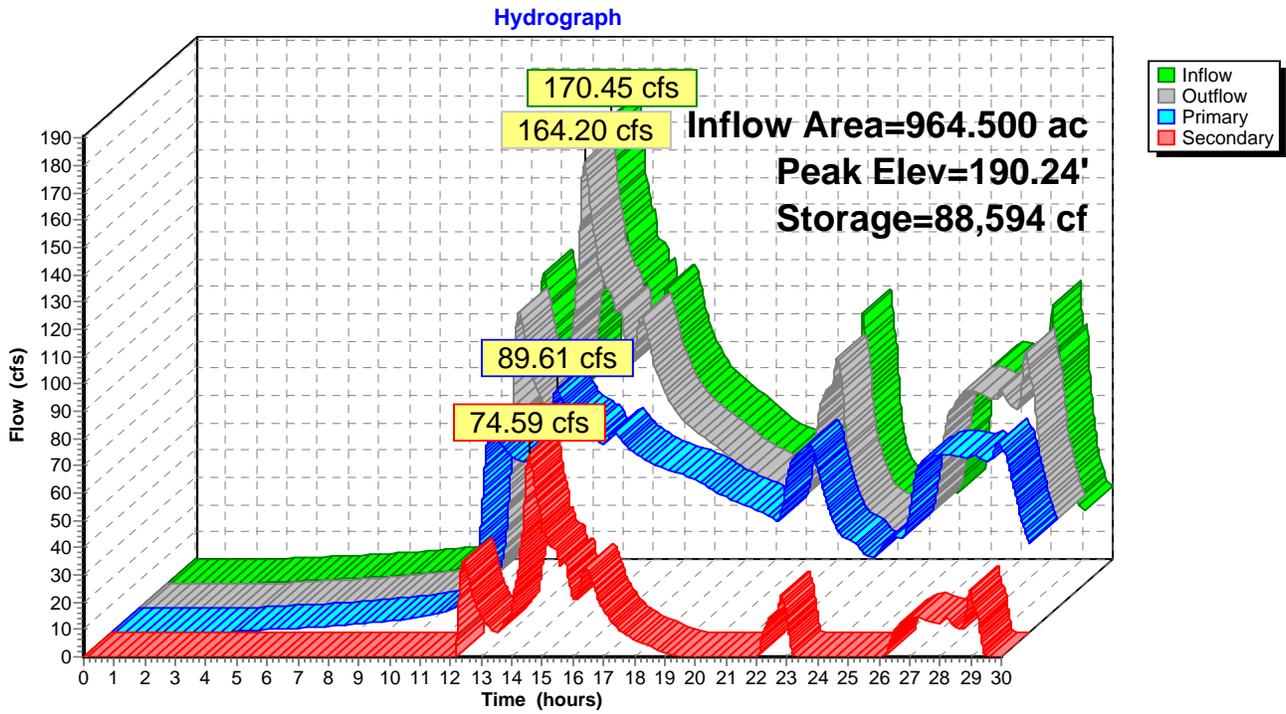
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Pond PS B: Proposed Storage B



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Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond PS C: Proposed Storage C

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 1.26" for Flood event
 Inflow = 166.56 cfs @ 14.59 hrs, Volume= 110.427 af
 Outflow = 160.05 cfs @ 14.70 hrs, Volume= 108.970 af, Atten= 4%, Lag= 6.3 min
 Primary = 65.34 cfs @ 14.70 hrs, Volume= 75.805 af
 Secondary = 94.71 cfs @ 14.70 hrs, Volume= 33.165 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 189.19' @ 14.70 hrs Surf.Area= 25,456 sf Storage= 114,112 cf

Plug-Flow detention time= 18.8 min calculated for 108.970 af (99% of inflow)
 Center-of-Mass det. time= 10.7 min (1,186.3 - 1,175.6)

Volume	Invert	Avail.Storage	Storage Description
#1	184.00'	135,312 cf	85.00'W x 220.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	36.0" x 30.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 183.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Secondary	187.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=65.34 cfs @ 14.70 hrs HW=189.19' TW=184.69' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 65.34 cfs @ 9.24 fps)

Secondary OutFlow Max=94.70 cfs @ 14.70 hrs HW=189.19' TW=184.69' (Dynamic Tailwater)
 ↑**2=Broad-Crested Rectangular Weir** (Weir Controls 94.70 cfs @ 4.33 fps)

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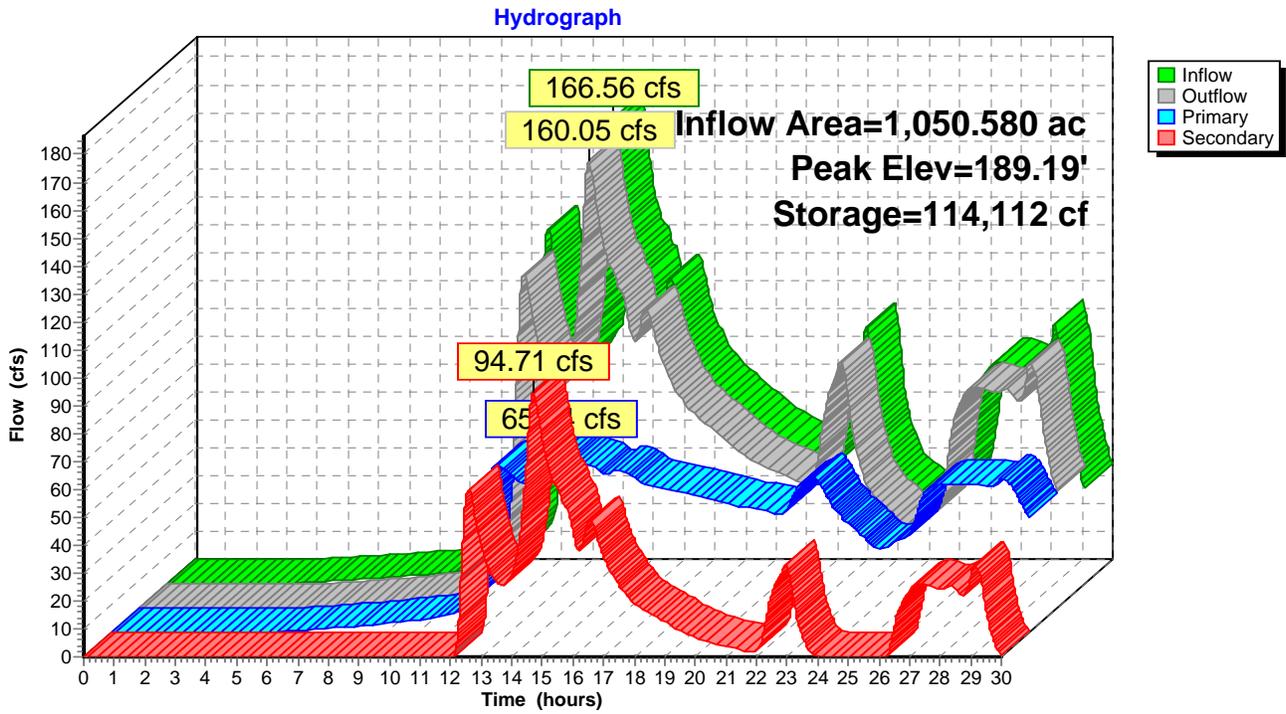
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Pond PS C: Proposed Storage C



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood Rainfall=3.25"

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Summary for Pond PS D: Proposed Storage D

Inflow Area = 49.920 ac, 28.33% Impervious, Inflow Depth = 0.39" for Flood event
 Inflow = 6.71 cfs @ 12.69 hrs, Volume= 1.634 af
 Outflow = 6.24 cfs @ 12.87 hrs, Volume= 1.631 af, Atten= 7%, Lag= 10.5 min
 Primary = 6.24 cfs @ 12.87 hrs, Volume= 1.631 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 191.11' @ 12.87 hrs Surf.Area= 0.107 ac Storage= 0.110 af

Plug-Flow detention time= 22.6 min calculated for 1.630 af (100% of inflow)
 Center-of-Mass det. time= 21.7 min (988.5 - 966.9)

Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	0.807 af	45.00'W x 90.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	24.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 189.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Primary	195.00'	5.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=6.24 cfs @ 12.87 hrs HW=191.11' TW=186.37' (Dynamic Tailwater)

- 1=Culvert (Barrel Controls 6.24 cfs @ 5.07 fps)
- 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Proposed Drainage McKownville Rt 20 Area

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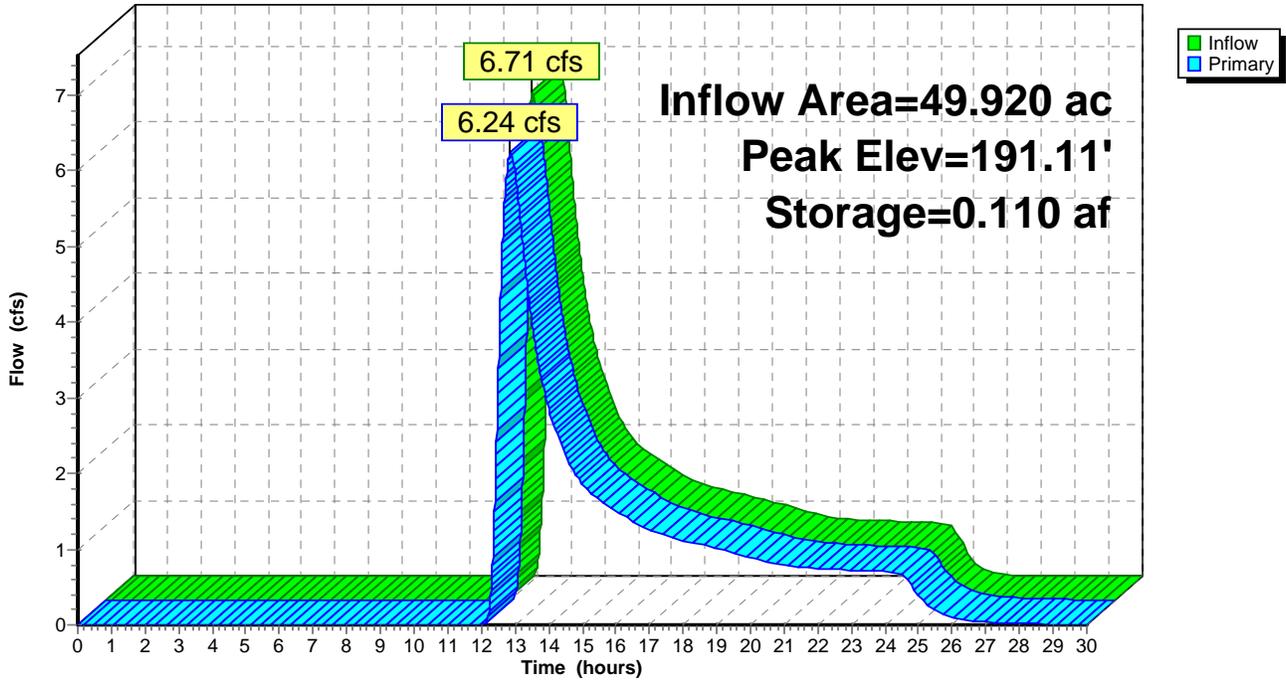
Type II 24-hr Flood Rainfall=3.25"

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Pond PS D: Proposed Storage D

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ED A: Existing DA A Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=2.55"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=18.76 cfs 1.737 af

Subcatchment ED A1: Existing DA A1 Runoff Area=8.170 ac 70.75% Impervious Runoff Depth=2.55"
Flow Length=1,334' Slope=0.0100 '/' Tc=28.1 min CN=90 Runoff=18.76 cfs 1.737 af

Subcatchment ED B: Existing DA B Runoff Area=7.240 ac 100.00% Impervious Runoff Depth=3.38"
Flow Length=363' Slope=0.0275 '/' Tc=4.0 min CN=98 Runoff=39.44 cfs 2.037 af

Subcatchment ED C: Existing DA C Runoff Area=36.500 ac 25.00% Impervious Runoff Depth=1.08"
Flow Length=1,133' Slope=0.0335 '/' Tc=25.6 min CN=70 Runoff=34.69 cfs 3.275 af

Subcatchment ED D: Existing DA D Runoff Area=18.760 ac 3.20% Impervious Runoff Depth=0.54"
Flow Length=1,139' Slope=0.0237 '/' Tc=40.7 min CN=59 Runoff=4.69 cfs 0.840 af

Subcatchment ED E: Existing DA E Runoff Area=15.170 ac 30.00% Impervious Runoff Depth=1.19"
Flow Length=1,334' Slope=0.0150 '/' Tc=41.3 min CN=72 Runoff=11.71 cfs 1.509 af

Subcatchment ED F: Existing DA F Runoff Area=16.380 ac 17.27% Impervious Runoff Depth=1.65"
Flow Length=661' Slope=0.0290 '/' Tc=13.8 min CN=79 Runoff=36.42 cfs 2.255 af

Subcatchment ED G: Existing DA G Runoff Area=26.740 ac 22.93% Impervious Runoff Depth=0.35"
Flow Length=1,244' Slope=0.0160 '/' Tc=60.3 min CN=54 Runoff=2.53 cfs 0.777 af

Subcatchment PD I: PD I Runoff Area=49.920 ac 28.33% Impervious Runoff Depth=0.54"
Flow Length=1,990' Slope=0.0340 '/' Tc=53.1 min CN=59 Runoff=10.41 cfs 2.236 af

Subcatchment PD I-A: PD I-A Runoff Area=27.790 ac 38.00% Impervious Runoff Depth=0.62"
Tc=0.0 min CN=61 Runoff=34.86 cfs 1.443 af

Reach 9R: EB Krumkill Avg. Depth=0.58' Max Vel=1.58 fps Inflow=9.75 cfs 2.233 af
n=0.040 L=1,755.0' S=0.0046 '/' Capacity=293.49 cfs Outflow=8.40 cfs 2.229 af

Reach KK P: Krumkill Inflow=217.91 cfs 125.470 af
Outflow=217.91 cfs 125.470 af

Reach WB R-3: WBR3 Avg. Depth=2.20' Max Vel=6.42 fps Inflow=236.62 cfs 124.419 af
n=0.040 L=230.0' S=0.0170 '/' Capacity=1,258.70 cfs Outflow=234.89 cfs 124.316 af

Reach WBR1: WB R-1 Avg. Depth=2.79' Max Vel=5.59 fps Inflow=391.00 cfs 120.819 af
n=0.040 L=300.0' S=0.0100 '/' Capacity=966.62 cfs Outflow=286.99 cfs 120.654 af

Reach WBR2: WB R-2 Avg. Depth=1.69' Max Vel=9.20 fps Inflow=234.02 cfs 121.516 af
n=0.040 L=150.0' S=0.0467 '/' Capacity=2,088.13 cfs Outflow=233.56 cfs 121.468 af

Reach WBR4: WB R-4 Avg. Depth=3.06' Max Vel=3.93 fps Inflow=237.97 cfs 127.348 af
n=0.040 L=450.0' S=0.0044 '/' Capacity=644.41 cfs Outflow=231.07 cfs 127.022 af

Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Reach WBR5: WB R-5 Avg. Depth=3.27' Max Vel=3.31 fps Inflow=220.86 cfs 124.909 af
n=0.040 L=2,050.0' S=0.0029 '/ Capacity=522.94 cfs Outflow=213.74 cfs 123.241 af

Pond 19P: 48" 85' Peak Elev=262.16' Inflow=466.02 cfs 115.733 af
48.0" x 85.0' Culvert Outflow=466.02 cfs 115.733 af

Pond ARd C: Acre Rd Culvert Peak Elev=236.67' Inflow=234.89 cfs 124.316 af
36.0" x 30.0' Culvert Outflow=234.92 cfs 124.316 af

Pond MRd C: McKown Rd Culv Peak Elev=227.18' Inflow=233.56 cfs 121.468 af
36.0" x 30.0' Culvert Outflow=233.56 cfs 121.468 af

Pond PS A: Proposed Storage A Peak Elev=197.84' Storage=128,832 cf Inflow=470.84 cfs 122.782 af
Primary=141.61 cfs 106.901 af Secondary=249.40 cfs 13.918 af Outflow=391.00 cfs 120.816 af

Pond PS B: Proposed Storage B Peak Elev=190.74' Storage=100,621 cf Inflow=289.36 cfs 123.231 af
Primary=101.91 cfs 91.069 af Secondary=132.11 cfs 30.446 af Outflow=234.02 cfs 121.516 af

Pond PS C: Proposed Storage C Peak Elev=189.83' Storage=130,756 cf Inflow=231.07 cfs 127.022 af
Primary=70.81 cfs 76.266 af Secondary=150.05 cfs 48.643 af Outflow=220.86 cfs 124.909 af

Pond PS D: Proposed Storage D Peak Elev=191.47' Storage=0.150 af Inflow=10.41 cfs 2.236 af
Outflow=9.75 cfs 2.233 af

Total Runoff Area = 214.840 ac Runoff Volume = 17.845 af Average Runoff Depth = 1.00"
68.93% Pervious = 148.099 ac 31.07% Impervious = 66.741 ac

Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED A: Existing DA A

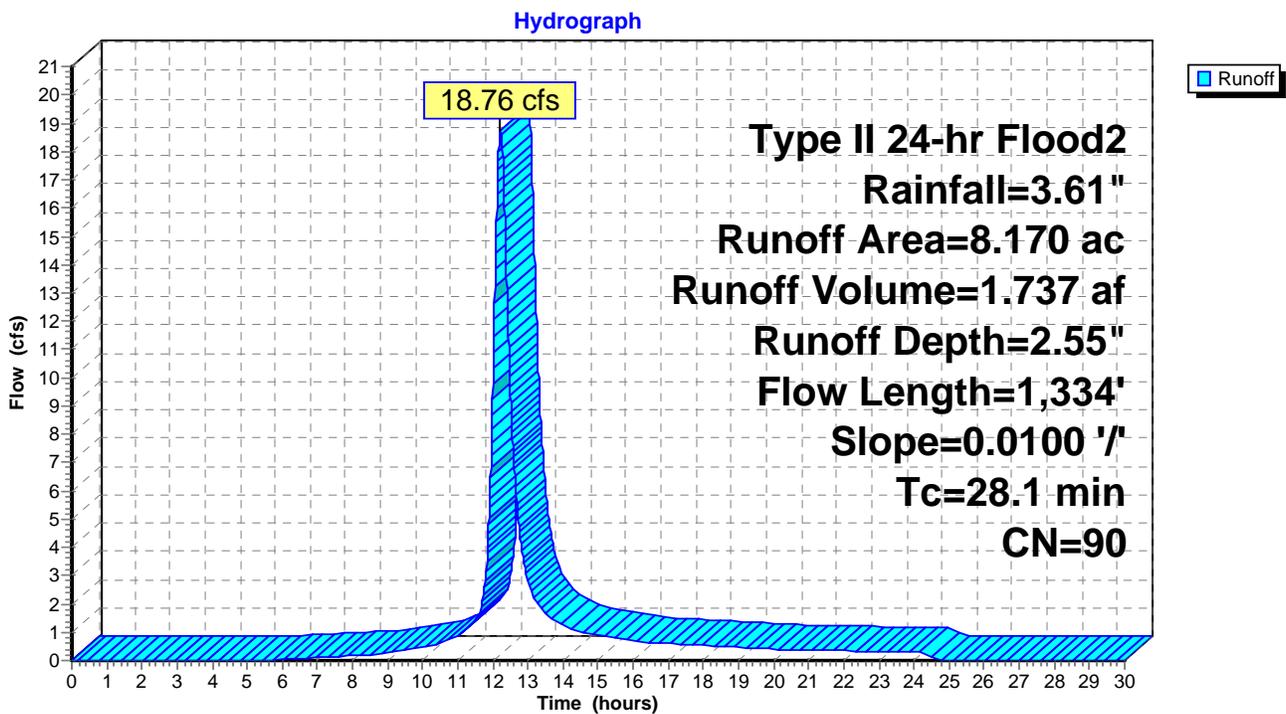
Runoff = 18.76 cfs @ 12.21 hrs, Volume= 1.737 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A: Existing DA A



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED A1: Existing DA A1

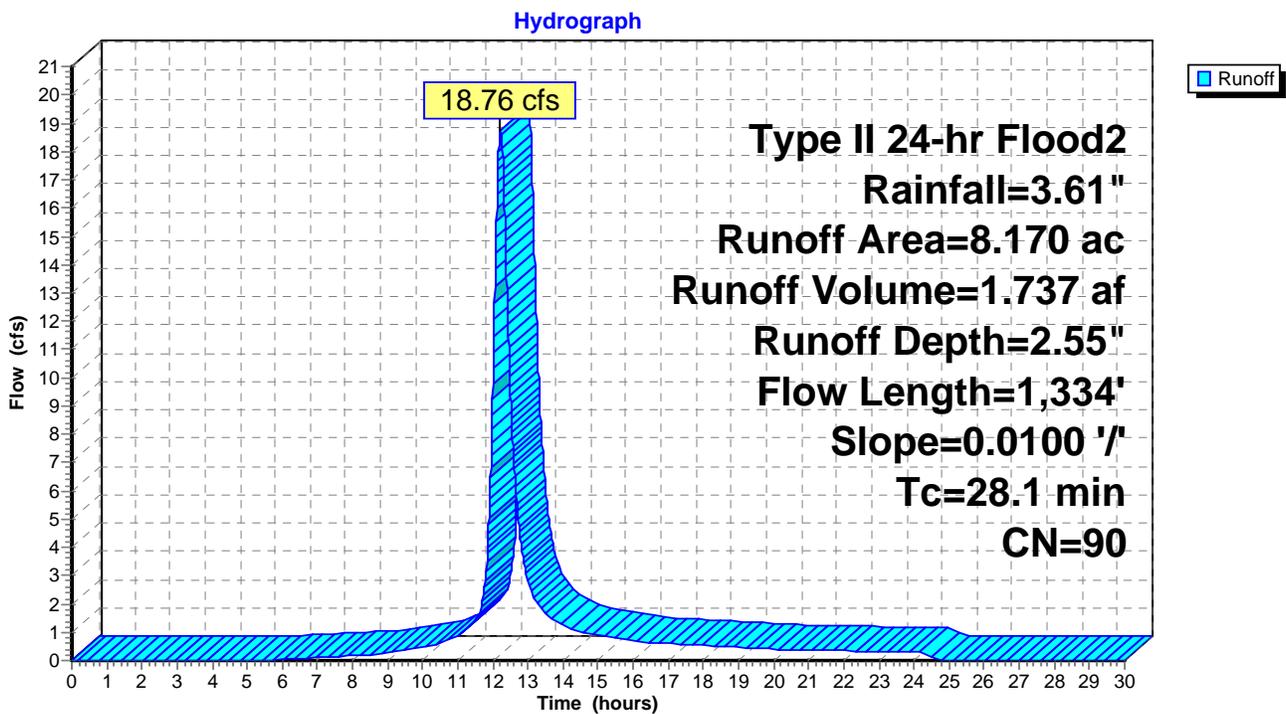
Runoff = 18.76 cfs @ 12.21 hrs, Volume= 1.737 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
5.780	98	Paved parking & roofs
2.390	69	50-75% Grass cover, Fair, HSG B
8.170	90	Weighted Average
2.390		Pervious Area
5.780		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	1,334	0.0100	0.79		Lag/CN Method,

Subcatchment ED A1: Existing DA A1



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED B: Existing DA B

Runoff = 39.44 cfs @ 11.94 hrs, Volume= 2.037 af, Depth= 3.38"

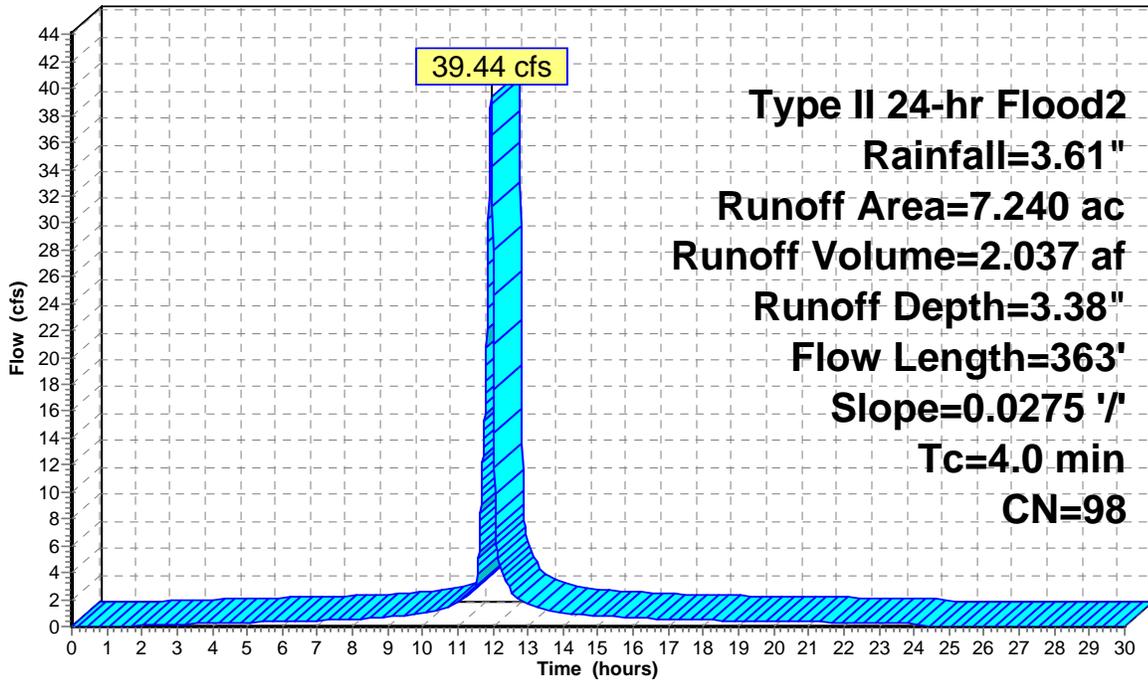
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
7.240	98	Paved parking & roofs
7.240		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	363	0.0275	1.50		Lag/CN Method,

Subcatchment ED B: Existing DA B

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED C: Existing DA C

Runoff = 34.69 cfs @ 12.21 hrs, Volume= 3.275 af, Depth= 1.08"

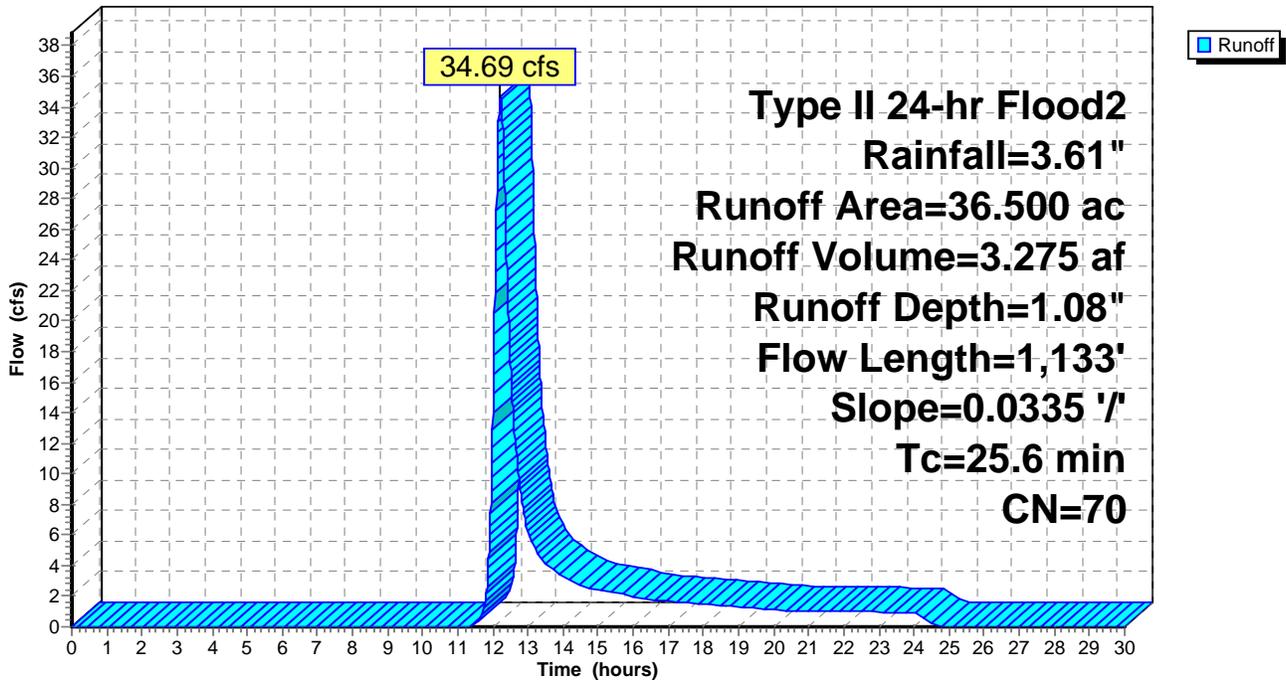
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
36.500	70	1/2 acre lots, 25% imp, HSG B
27.375		Pervious Area
9.125		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,133	0.0335	0.74		Lag/CN Method,

Subcatchment ED C: Existing DA C

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED D: Existing DA D

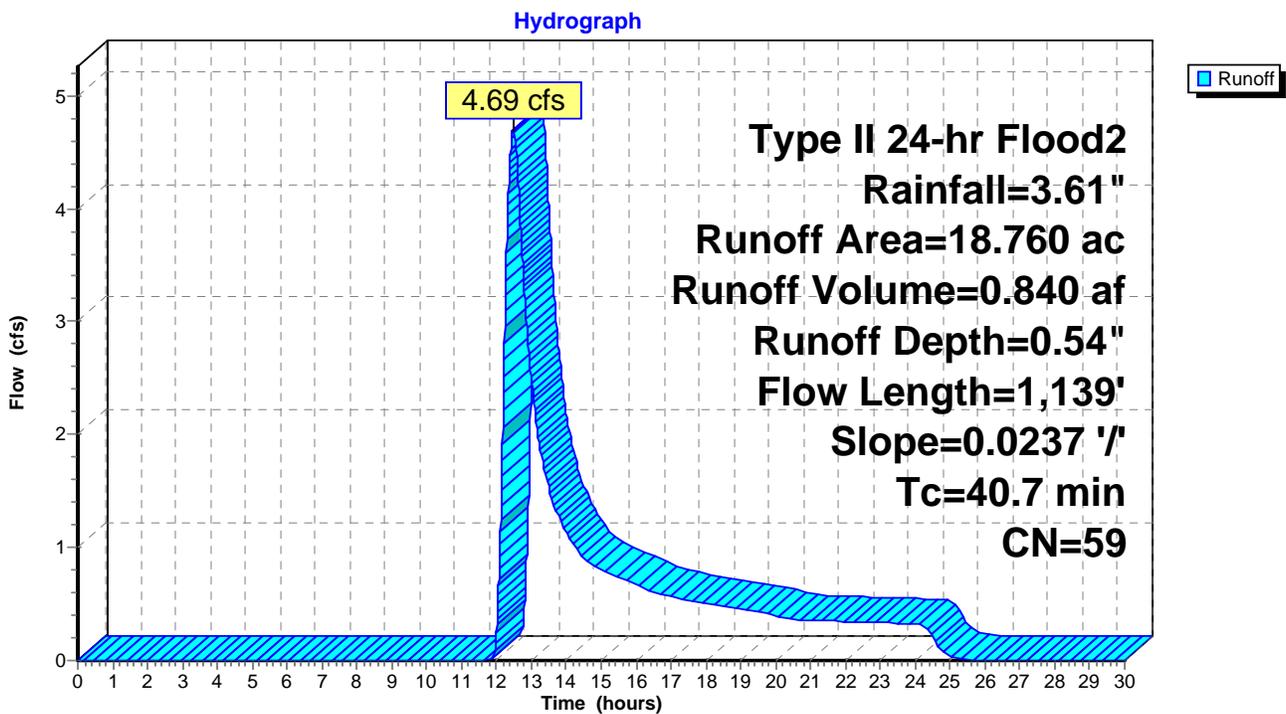
Runoff = 4.69 cfs @ 12.48 hrs, Volume= 0.840 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
18.160	58	Woods/grass comb., Good, HSG B
0.600	98	Paved parking & roofs
18.760	59	Weighted Average
18.160		Pervious Area
0.600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.7	1,139	0.0237	0.47		Lag/CN Method,

Subcatchment ED D: Existing DA D



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED E: Existing DA E

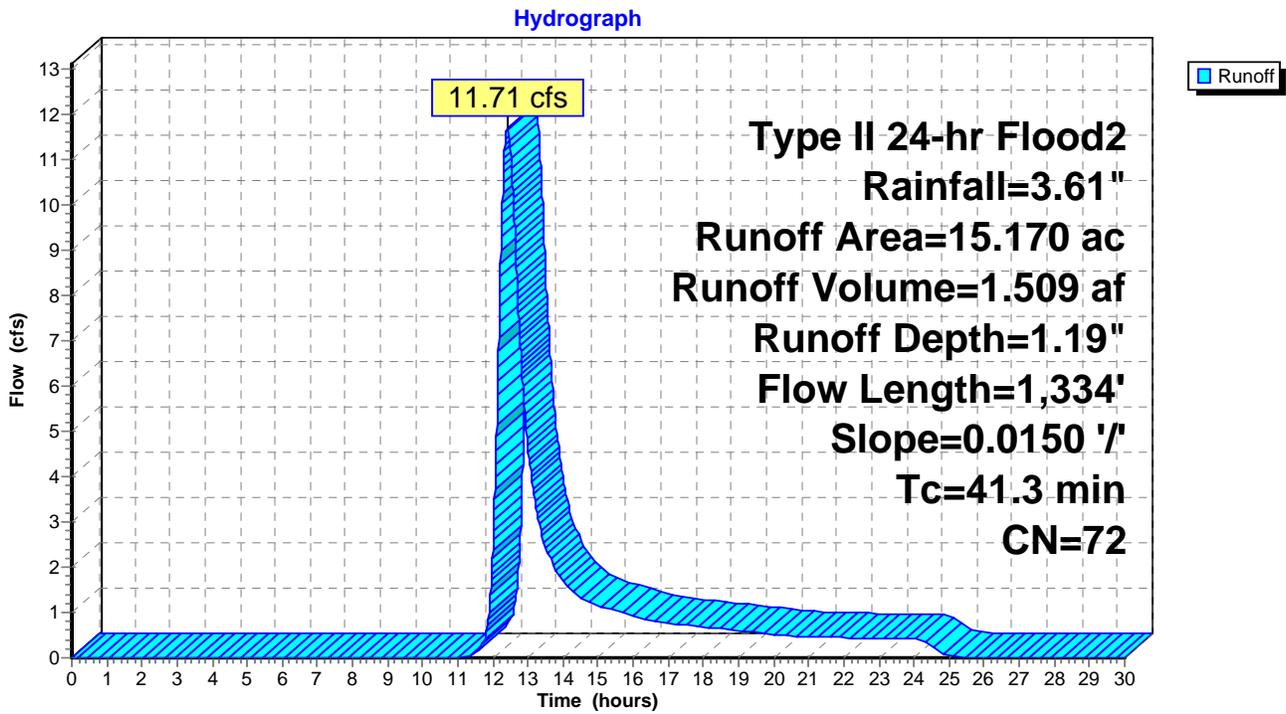
Runoff = 11.71 cfs @ 12.43 hrs, Volume= 1.509 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
15.170	72	1/3 acre lots, 30% imp, HSG B
10.619		Pervious Area
4.551		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
41.3	1,334	0.0150	0.54		Lag/CN Method,

Subcatchment ED E: Existing DA E



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED F: Existing DA F

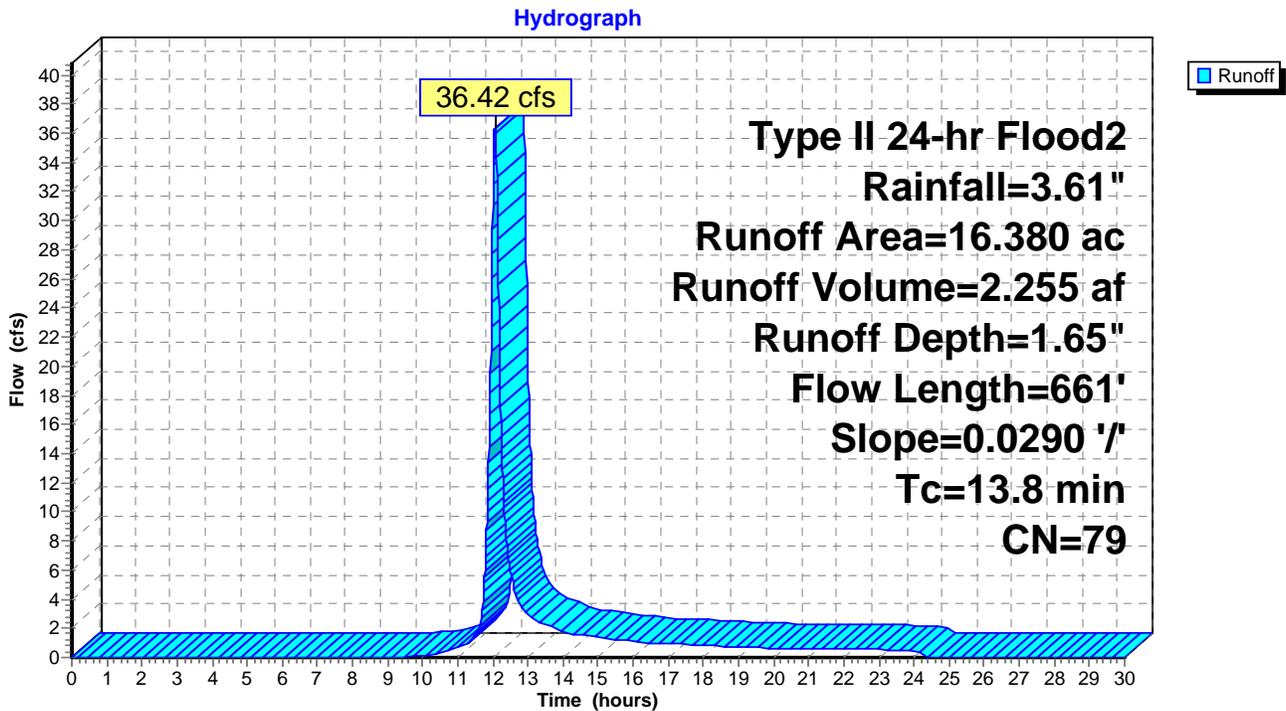
Runoff = 36.42 cfs @ 12.06 hrs, Volume= 2.255 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
9.430	81	1/3 acre lots, 30% imp, HSG C
6.950	76	Woods/grass comb., Fair, HSG C
16.380	79	Weighted Average
13.551		Pervious Area
2.829		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	661	0.0290	0.80		Lag/CN Method,

Subcatchment ED F: Existing DA F



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment ED G: Existing DA G

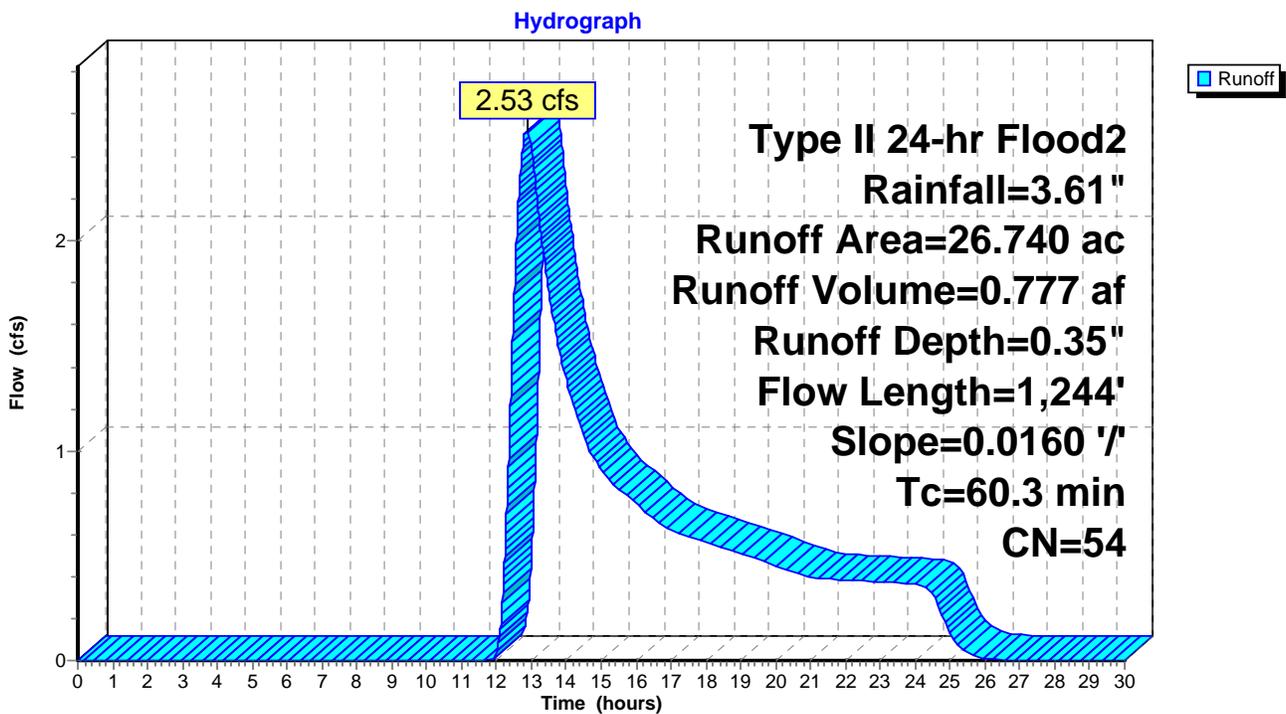
Runoff = 2.53 cfs @ 12.87 hrs, Volume= 0.777 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
20.440	57	1/3 acre lots, 30% imp, HSG A
6.300	43	Woods/grass comb., Fair, HSG A
26.740	54	Weighted Average
20.608		Pervious Area
6.132		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.3	1,244	0.0160	0.34		Lag/CN Method,

Subcatchment ED G: Existing DA G



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment PD I: PD I

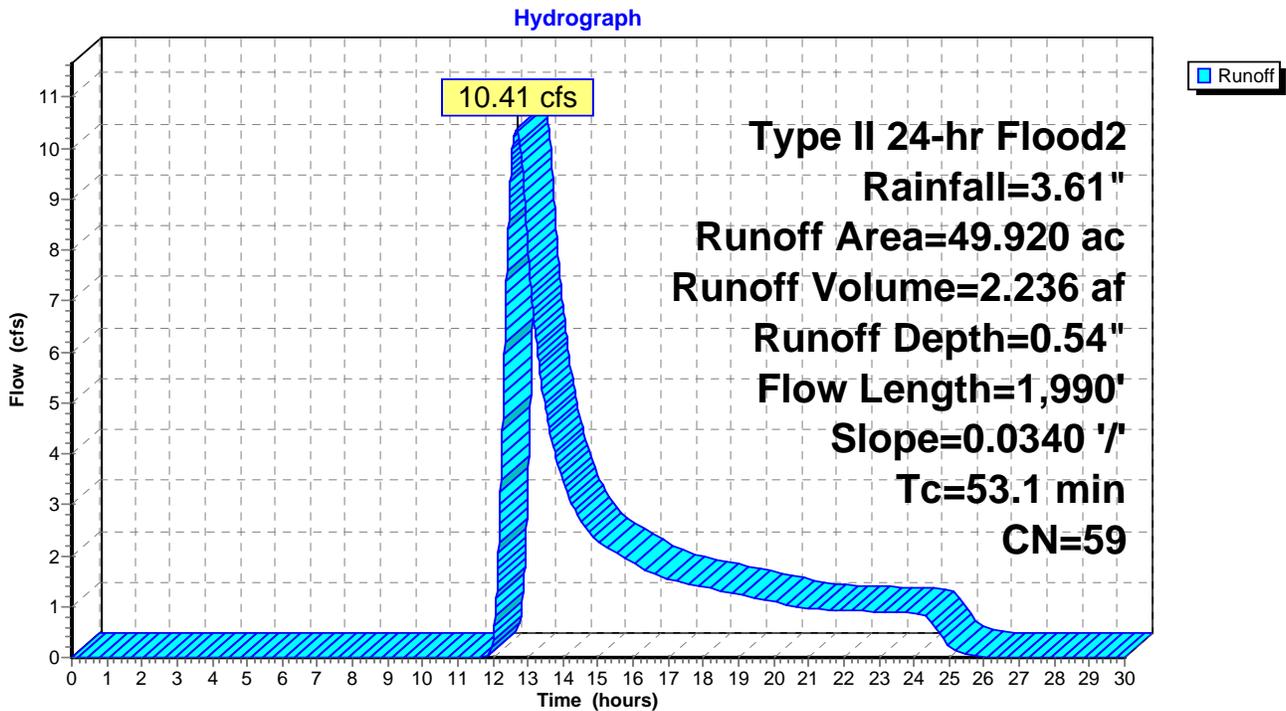
Runoff = 10.41 cfs @ 12.68 hrs, Volume= 2.236 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
37.220	61	1/4 acre lots, 38% imp, HSG A
12.700	55	Woods, Good, HSG B
49.920	59	Weighted Average
35.776		Pervious Area
14.144		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.1	1,990	0.0340	0.63		Lag/CN Method,

Subcatchment PD I: PD I



Proposed Drainage McKownville Rt 20 Area

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Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Subcatchment PD I-A: PD I-A

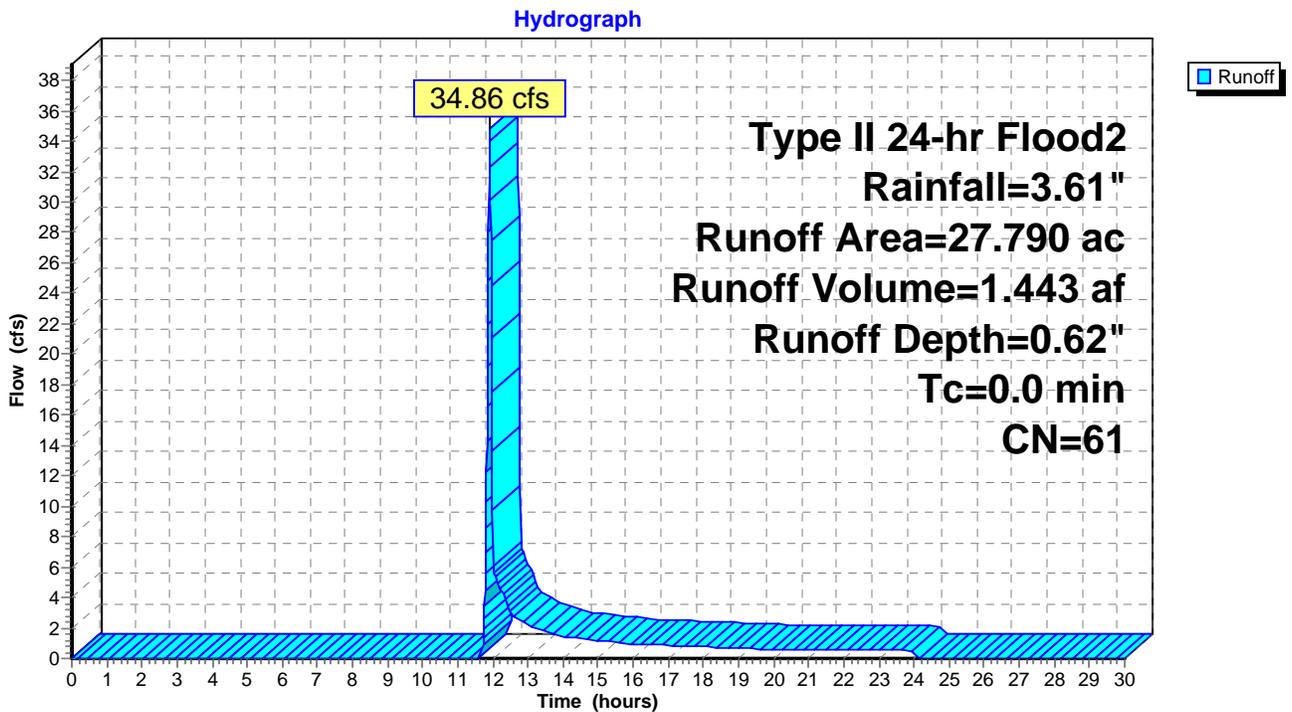
Runoff = 34.86 cfs @ 11.90 hrs, Volume= 1.443 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Type II 24-hr Flood2 Rainfall=3.61"

Area (ac)	CN	Description
27.790	61	1/4 acre lots, 38% imp, HSG A
17.230		Pervious Area
10.560		Impervious Area

Subcatchment PD I-A: PD I-A



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach 9R: EB Krumkill

Inflow Area = 49.920 ac, 28.33% Impervious, Inflow Depth > 0.54" for Flood2 event
Inflow = 9.75 cfs @ 12.82 hrs, Volume= 2.233 af
Outflow = 8.40 cfs @ 13.08 hrs, Volume= 2.229 af, Atten= 14%, Lag= 15.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.58 fps, Min. Travel Time= 18.5 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 39.6 min

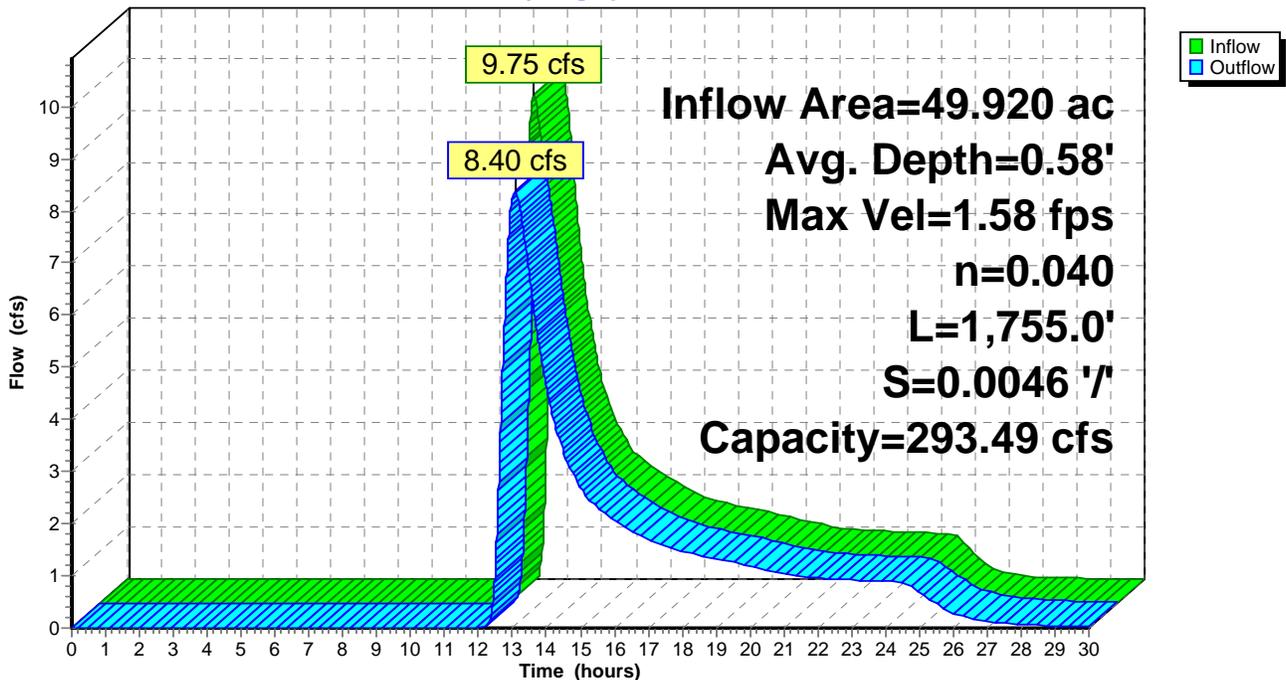
Peak Storage= 9,309 cf @ 13.08 hrs, Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 293.49 cfs

8.00' x 4.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/ Top Width= 24.00'
Length= 1,755.0' Slope= 0.0046 '/
Inlet Invert= 186.00', Outlet Invert= 178.00'



Reach 9R: EB Krumkill

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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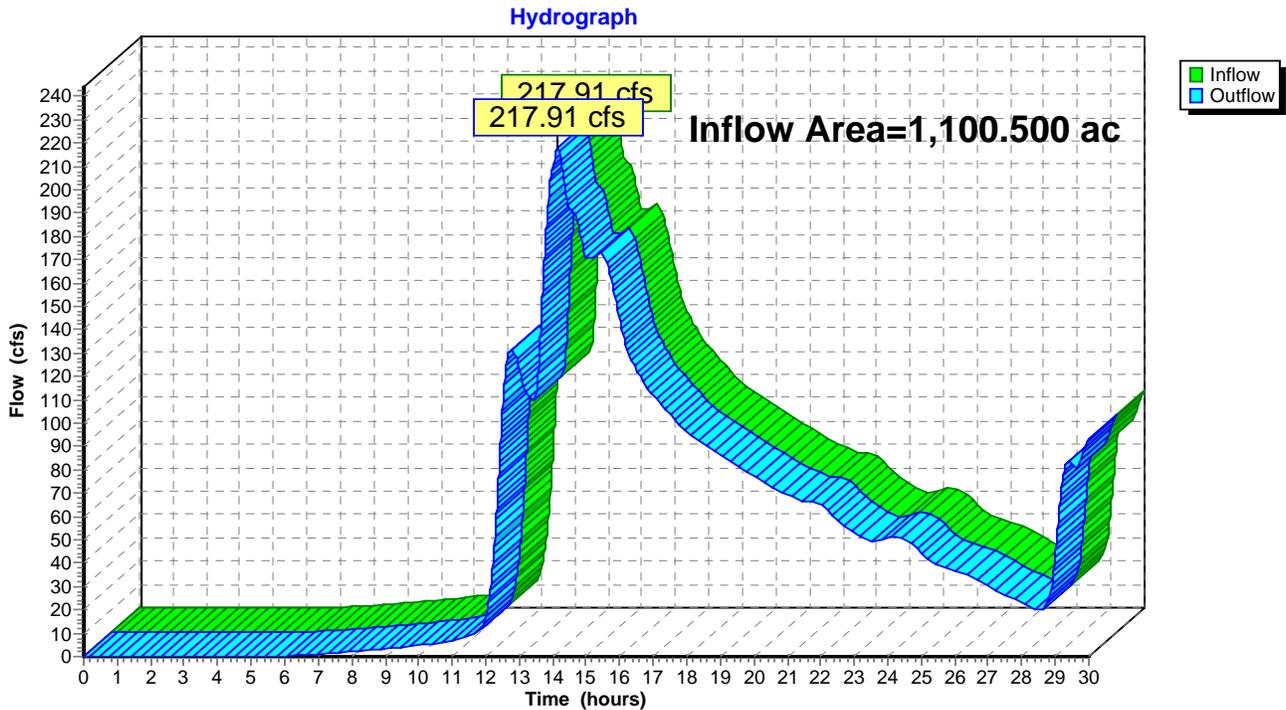
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Summary for Reach KK P: Krumkill

Inflow Area = 1,100.500 ac, 34.10% Impervious, Inflow Depth > 1.37" for Flood2 event
Inflow = 217.91 cfs @ 14.15 hrs, Volume= 125.470 af
Outflow = 217.91 cfs @ 14.15 hrs, Volume= 125.470 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach KK P: Krumkill



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WB R-3: WBR3

Inflow Area = 1,007.460 ac, 34.96% Impervious, Inflow Depth > 1.48" for Flood2 event
Inflow = 236.62 cfs @ 14.03 hrs, Volume= 124.419 af
Outflow = 234.89 cfs @ 14.04 hrs, Volume= 124.316 af, Atten= 1%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 6.42 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 3.43 fps, Avg. Travel Time= 1.1 min

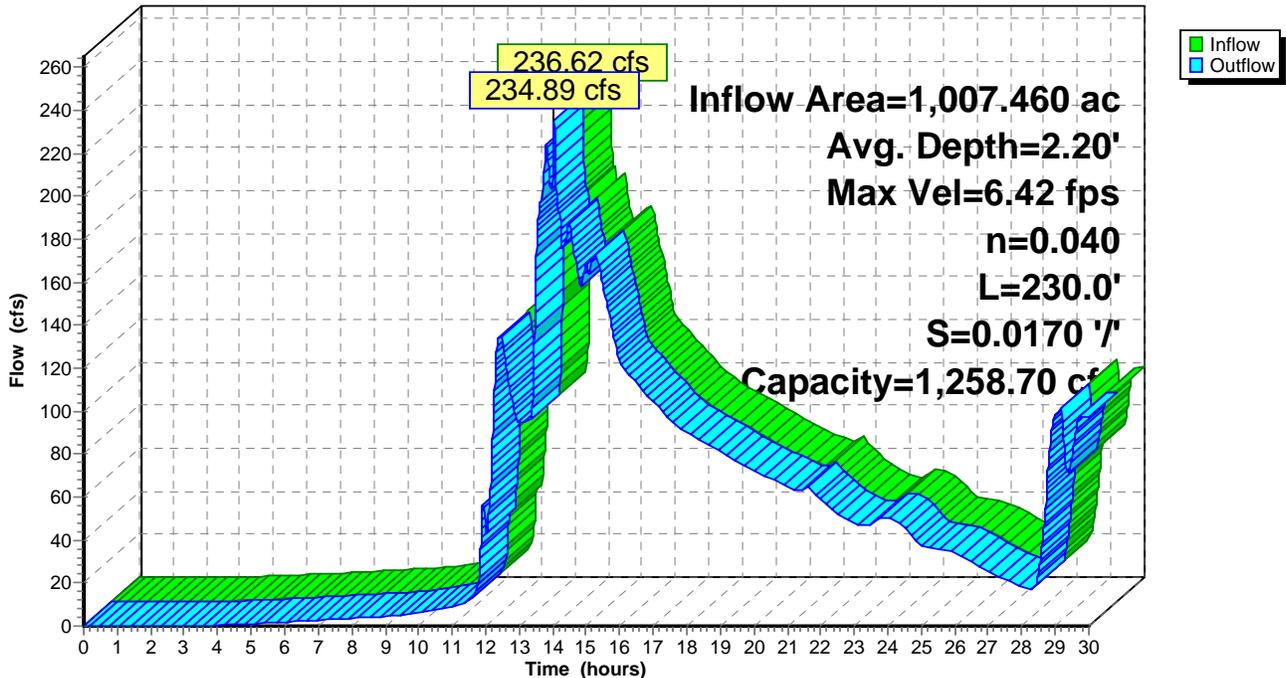
Peak Storage= 8,415 cf @ 14.04 hrs, Average Depth at Peak Storage= 2.20'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 1,258.70 cfs

10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 230.0' Slope= 0.0170 '/
Inlet Invert= 177.90', Outlet Invert= 174.00'



Reach WB R-3: WBR3

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WBR1: WB R-1

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 1.55" for Flood2 event
Inflow = 391.00 cfs @ 14.01 hrs, Volume= 120.819 af
Outflow = 286.99 cfs @ 14.02 hrs, Volume= 120.654 af, Atten= 27%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.59 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.81 fps, Avg. Travel Time= 1.8 min

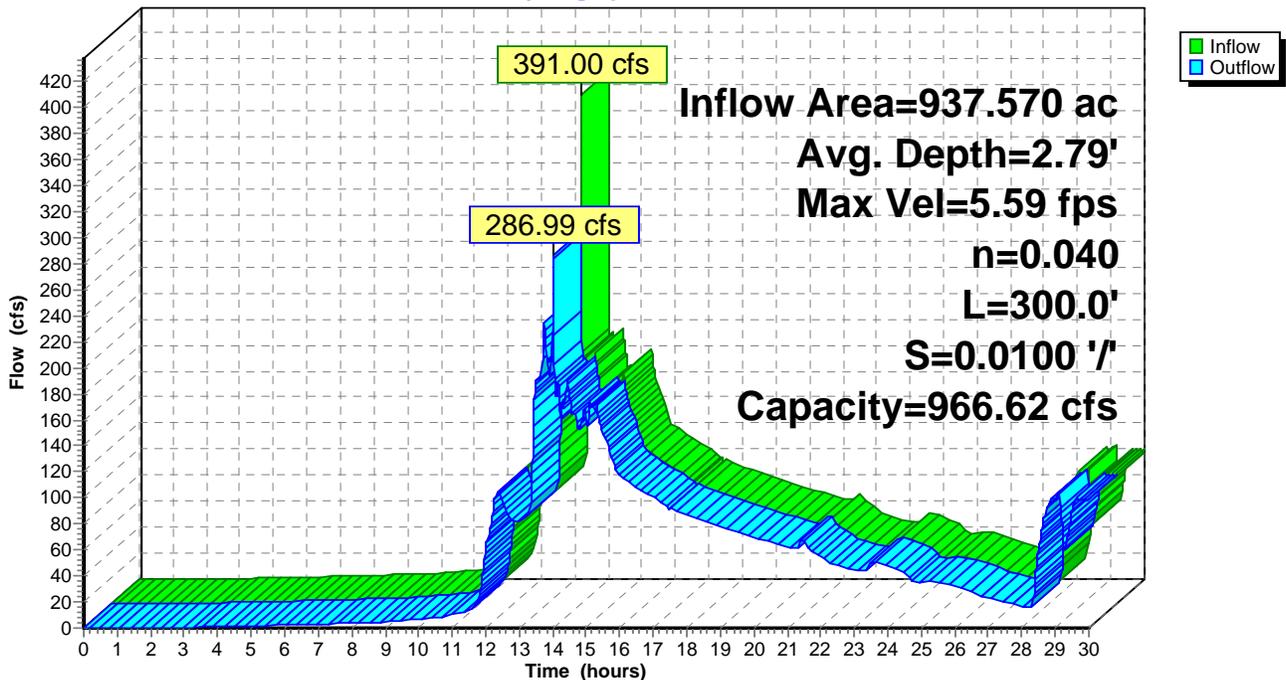
Peak Storage= 15,368 cf @ 14.02 hrs, Average Depth at Peak Storage= 2.79'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 966.62 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 300.0' Slope= 0.0100 '/
Inlet Invert= 189.00', Outlet Invert= 186.00'



Reach WBR1: WB R-1

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WBR2: WB R-2

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.51" for Flood2 event
Inflow = 234.02 cfs @ 14.03 hrs, Volume= 121.516 af
Outflow = 233.56 cfs @ 14.03 hrs, Volume= 121.468 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 9.20 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 4.82 fps, Avg. Travel Time= 0.5 min

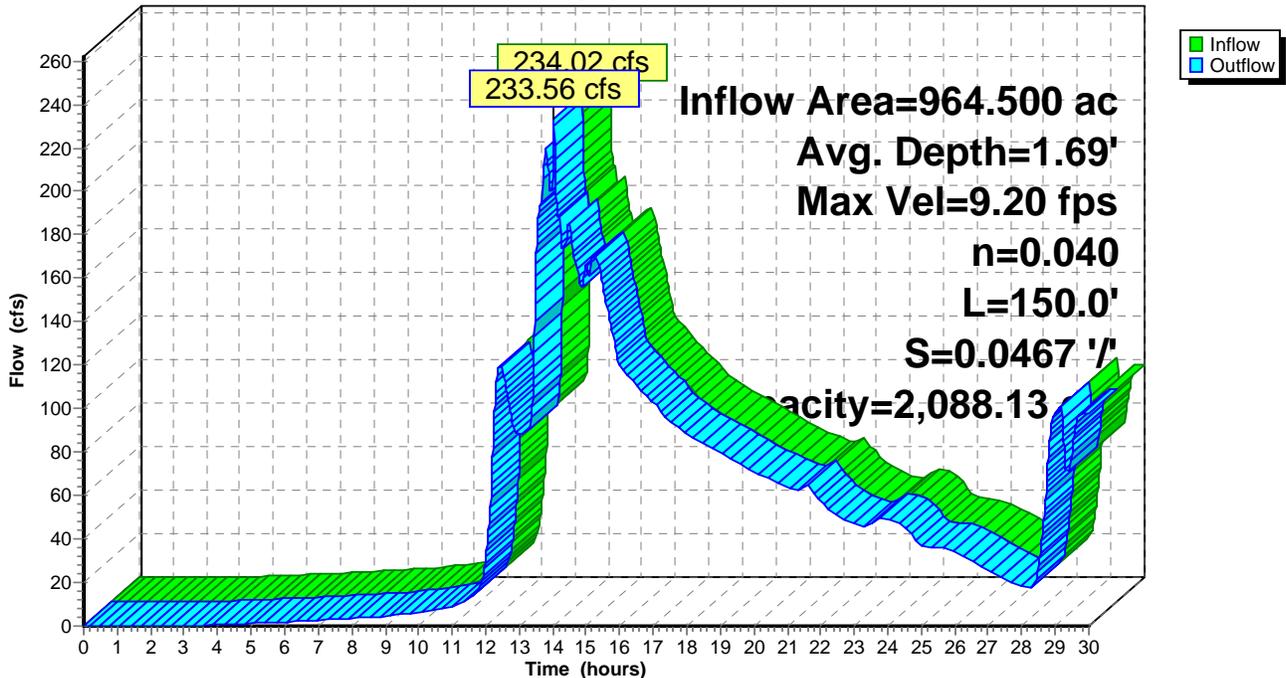
Peak Storage= 3,806 cf @ 14.03 hrs, Average Depth at Peak Storage= 1.69'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 2,088.13 cfs

10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 150.0' Slope= 0.0467 '/
Inlet Invert= 185.00', Outlet Invert= 178.00'



Reach WBR2: WB R-2

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WBR4: WB R-4

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 1.45" for Flood2 event
Inflow = 237.97 cfs @ 14.04 hrs, Volume= 127.348 af
Outflow = 231.07 cfs @ 14.06 hrs, Volume= 127.022 af, Atten= 3%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.93 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 2.17 fps, Avg. Travel Time= 3.5 min

Peak Storage= 26,441 cf @ 14.06 hrs, Average Depth at Peak Storage= 3.06'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 644.41 cfs

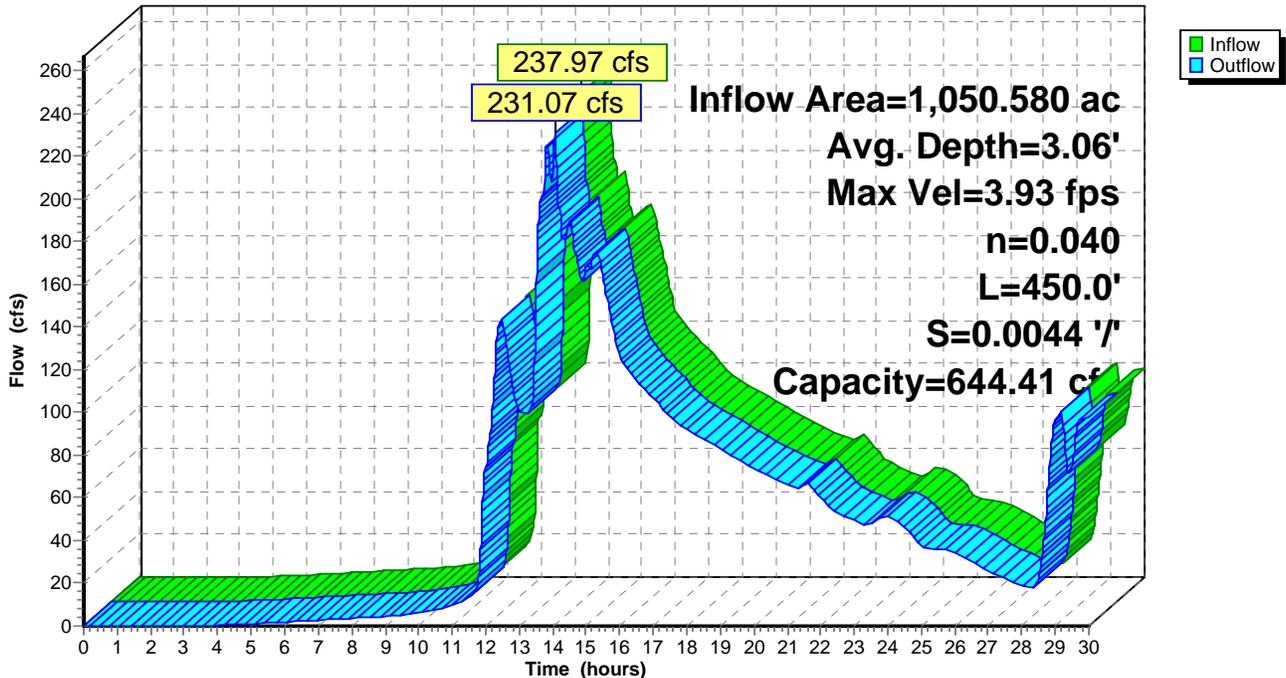
10.00' x 5.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 450.0' Slope= 0.0044 '/
Inlet Invert= 186.00', Outlet Invert= 184.00'



‡

Reach WBR4: WB R-4

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Reach WBR5: WB R-5

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 1.43" for Flood2 event
Inflow = 220.86 cfs @ 14.10 hrs, Volume= 124.909 af
Outflow = 213.74 cfs @ 14.15 hrs, Volume= 123.241 af, Atten= 3%, Lag= 3.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.31 fps, Min. Travel Time= 10.3 min
Avg. Velocity = 1.89 fps, Avg. Travel Time= 18.0 min

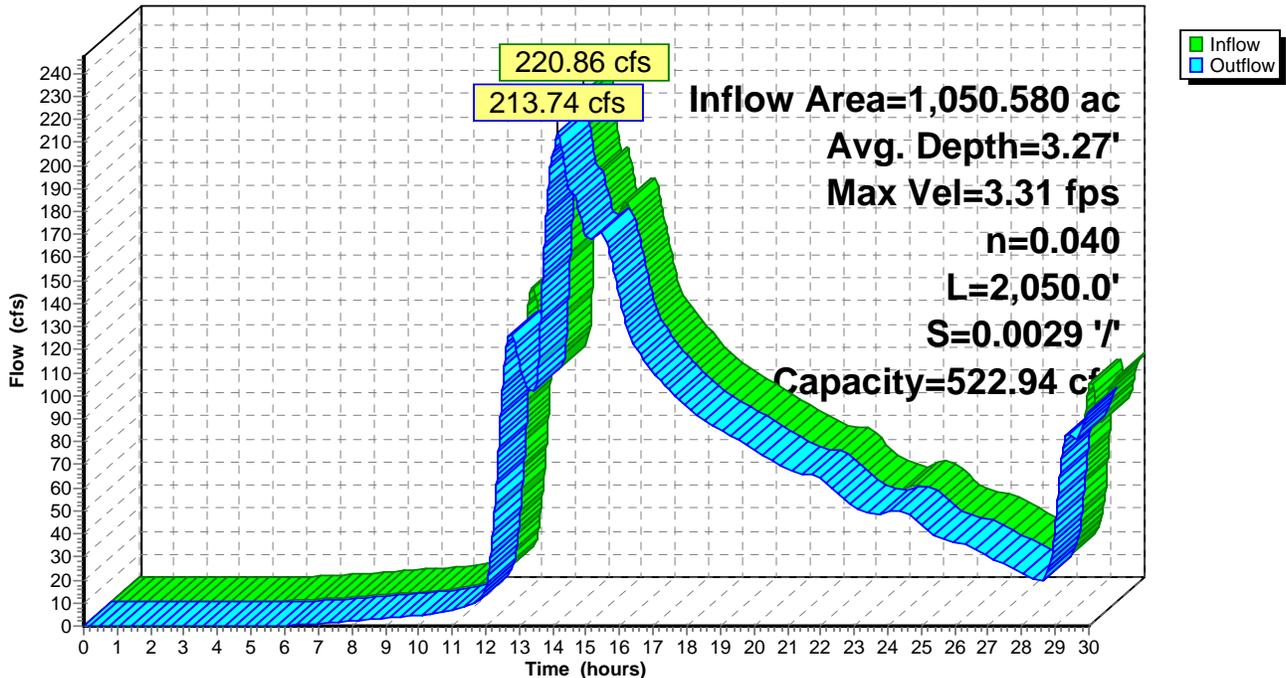
Peak Storage= 132,555 cf @ 14.15 hrs, Average Depth at Peak Storage= 3.27'
Bank-Full Depth= 5.00', Capacity at Bank-Full= 522.94 cfs

10.00' x 5.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 3.0 '/ Top Width= 40.00'
Length= 2,050.0' Slope= 0.0029 '/
Inlet Invert= 182.00', Outlet Invert= 176.00'



Reach WBR5: WB R-5

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond 19P: 48" 85'

Inflow Area = 885.660 ac, 34.84% Impervious, Inflow Depth > 1.57" for Flood2 event
 Inflow = 466.02 cfs @ 14.34 hrs, Volume= 115.733 af
 Outflow = 466.02 cfs @ 14.34 hrs, Volume= 115.733 af, Atten= 0%, Lag= 0.0 min
 Primary = 466.02 cfs @ 14.34 hrs, Volume= 115.733 af

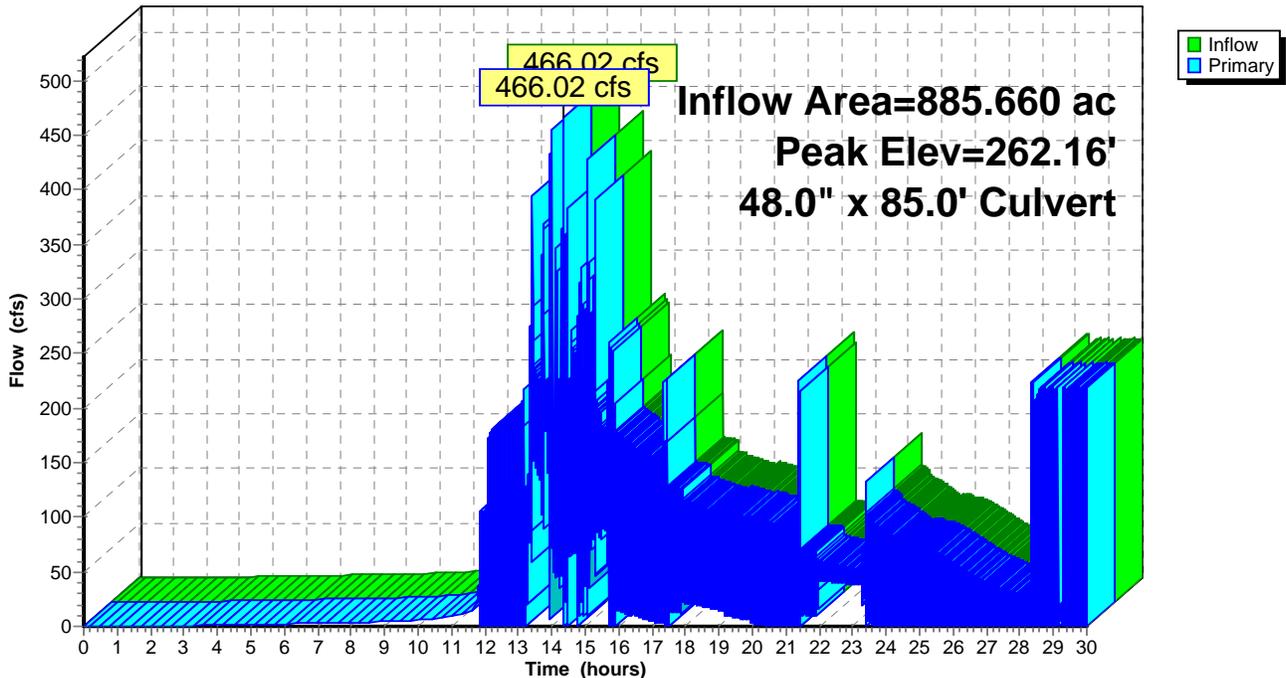
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 262.16' @ 14.34 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	48.0" x 85.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 193.00' S= 0.0118 '/ Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=459.39 cfs @ 14.34 hrs HW=260.40' TW=195.62' (Dynamic Tailwater)
 ↳ **1=Culvert** (Barrel Controls 459.39 cfs @ 36.56 fps)

Pond 19P: 48" 85'

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond ARd C: Acre Rd Culvert

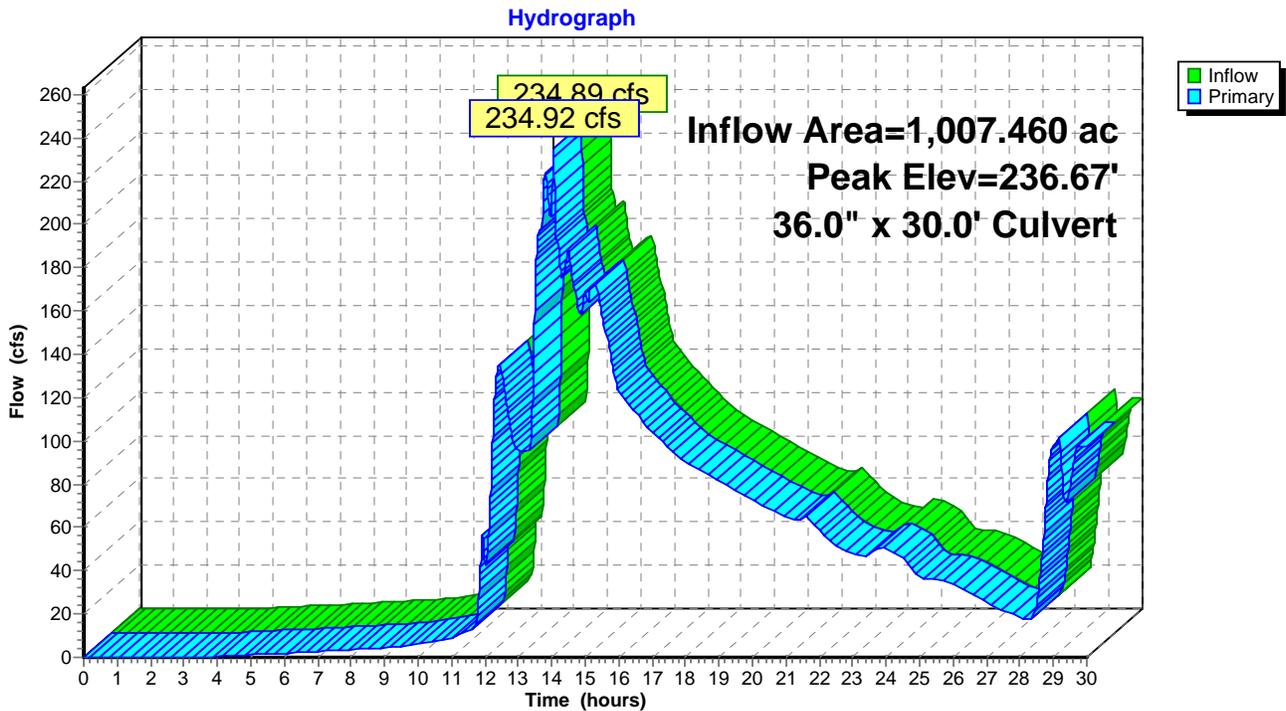
Inflow Area = 1,007.460 ac, 34.96% Impervious, Inflow Depth > 1.48" for Flood2 event
Inflow = 234.89 cfs @ 14.04 hrs, Volume= 124.316 af
Outflow = 234.92 cfs @ 14.04 hrs, Volume= 124.316 af, Atten= 0%, Lag= 0.0 min
Primary = 234.92 cfs @ 14.04 hrs, Volume= 124.316 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 236.67' @ 14.04 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	174.00'	36.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 173.90' S= 0.0033 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=234.42 cfs @ 14.04 hrs HW=236.47' TW=189.03' (Dynamic Tailwater)
←1=Culvert (Inlet Controls 234.42 cfs @ 33.16 fps)

Pond ARd C: Acre Rd Culvert



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond MRd C: McKown Rd Culv

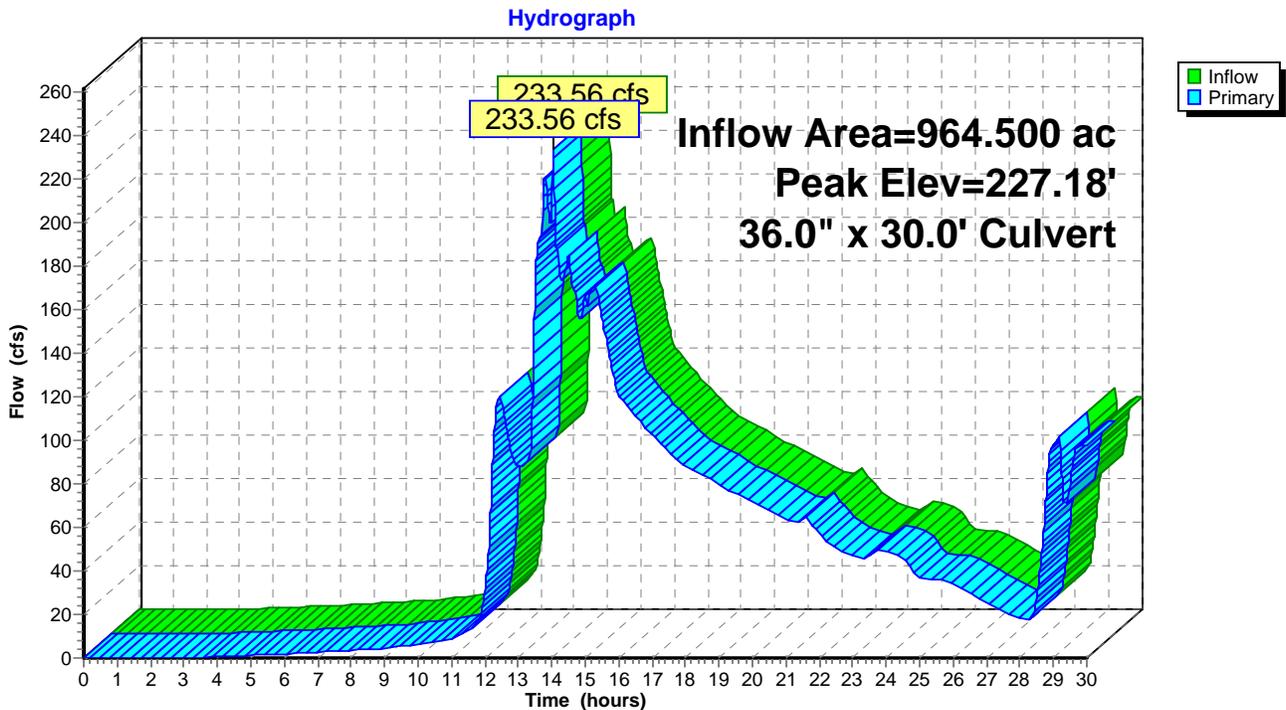
Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.51" for Flood2 event
Inflow = 233.56 cfs @ 14.03 hrs, Volume= 121.468 af
Outflow = 233.56 cfs @ 14.03 hrs, Volume= 121.468 af, Atten= 0%, Lag= 0.0 min
Primary = 233.56 cfs @ 14.03 hrs, Volume= 121.468 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 227.18' @ 14.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.00'	36.0" x 30.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 177.00' S= 0.0333 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=232.64 cfs @ 14.03 hrs HW=226.81' TW=180.09' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 232.64 cfs @ 32.91 fps)

Pond MRd C: McKown Rd Culv



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond PS A: Proposed Storage A

Inflow Area = 937.570 ac, 35.27% Impervious, Inflow Depth > 1.57" for Flood2 event
 Inflow = 470.84 cfs @ 14.34 hrs, Volume= 122.782 af
 Outflow = 391.00 cfs @ 14.01 hrs, Volume= 120.816 af, Atten= 17%, Lag= 0.0 min
 Primary = 141.61 cfs @ 14.01 hrs, Volume= 106.901 af
 Secondary = 249.40 cfs @ 14.01 hrs, Volume= 13.918 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 197.84' @ 14.01 hrs Surf.Area= 27,376 sf Storage= 128,832 cf

Plug-Flow detention time= 15.1 min calculated for 120.776 af (98% of inflow)
 Center-of-Mass det. time= 4.0 min (1,114.6 - 1,110.7)

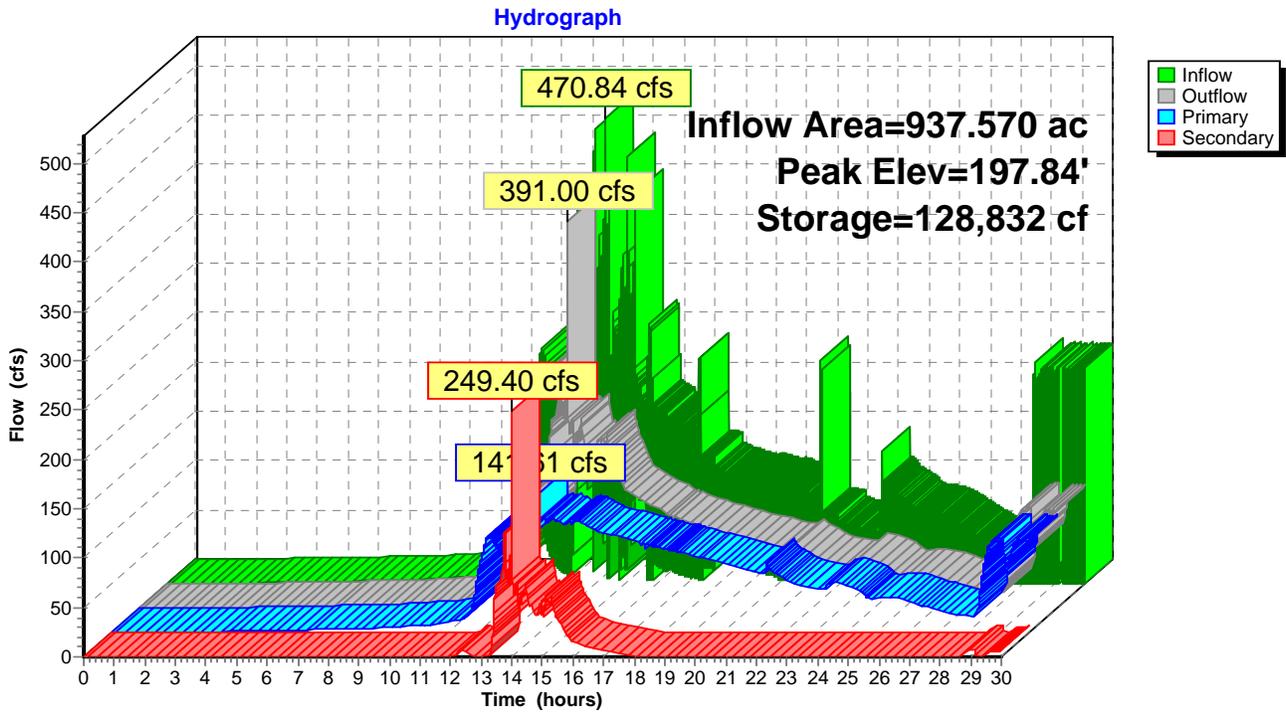
Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	128,832 cf	80.00'W x 200.00'L x 6.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	4.00' W x 3.00' H x 10.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 189.90' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	194.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=139.33 cfs @ 14.01 hrs HW=197.80' TW=191.70' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 139.33 cfs @ 11.61 fps)

Secondary OutFlow Max=249.19 cfs @ 14.01 hrs HW=197.83' TW=191.70' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 249.19 cfs @ 6.50 fps)

Pond PS A: Proposed Storage A



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond PS B: Proposed Storage B

Inflow Area = 964.500 ac, 34.95% Impervious, Inflow Depth > 1.53" for Flood2 event
 Inflow = 289.36 cfs @ 14.02 hrs, Volume= 123.231 af
 Outflow = 234.02 cfs @ 14.03 hrs, Volume= 121.516 af, Atten= 19%, Lag= 0.8 min
 Primary = 101.91 cfs @ 14.03 hrs, Volume= 91.069 af
 Secondary = 132.11 cfs @ 14.03 hrs, Volume= 30.446 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 190.74' @ 14.03 hrs Surf.Area= 24,320 sf Storage= 100,621 cf

Plug-Flow detention time= 13.8 min calculated for 121.475 af (99% of inflow)
 Center-of-Mass det. time= 4.2 min (1,113.8 - 1,109.6)

Volume	Invert	Avail.Storage	Storage Description
#1	186.00'	132,402 cf	85.00'W x 215.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	186.00'	4.00' W x 3.00' H x 10.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 185.90' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean
#2	Secondary	189.00'	20.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=101.88 cfs @ 14.03 hrs HW=190.74' TW=186.68' (Dynamic Tailwater)
 ↖**1=Culvert** (Inlet Controls 101.88 cfs @ 8.49 fps)

Secondary OutFlow Max=131.78 cfs @ 14.03 hrs HW=190.74' TW=186.68' (Dynamic Tailwater)
 ↖**2=Broad-Crested Rectangular Weir** (Weir Controls 131.78 cfs @ 3.80 fps)

Proposed Drainage McKownville Rt 20 Area

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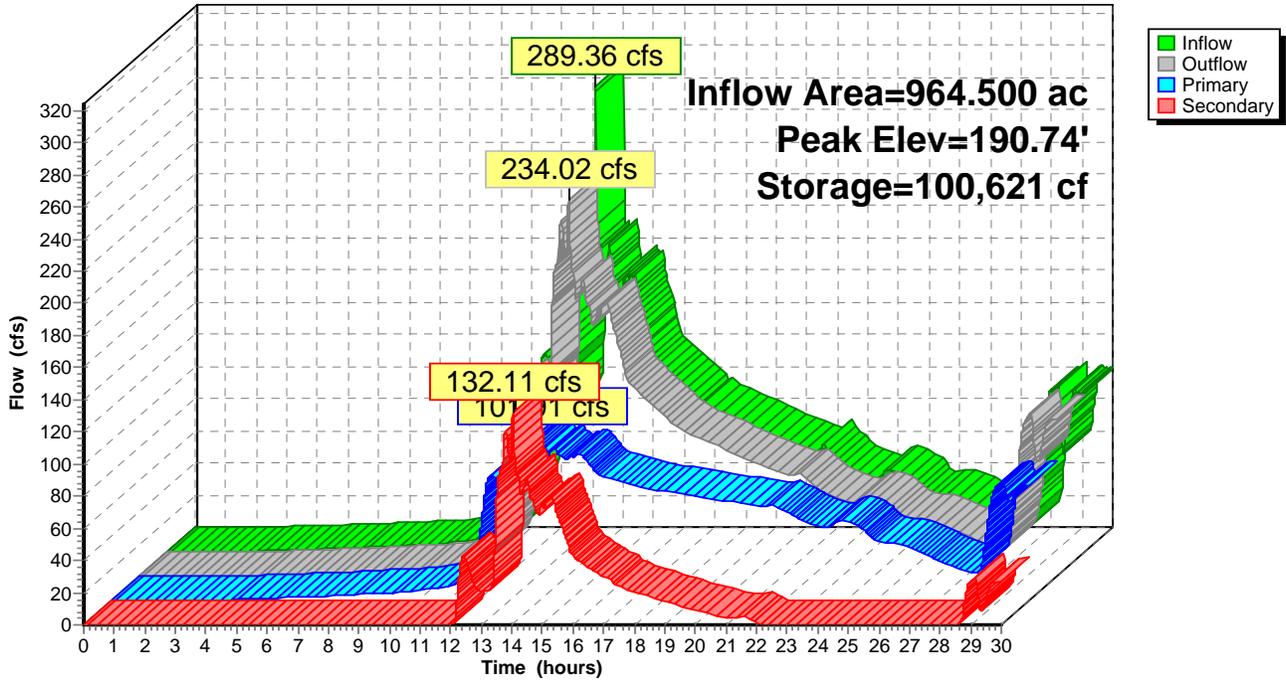
Type II 24-hr Flood2 Rainfall=3.61"

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Pond PS B: Proposed Storage B

Hydrograph



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond PS C: Proposed Storage C

Inflow Area = 1,050.580 ac, 34.38% Impervious, Inflow Depth > 1.45" for Flood2 event
 Inflow = 231.07 cfs @ 14.06 hrs, Volume= 127.022 af
 Outflow = 220.86 cfs @ 14.10 hrs, Volume= 124.909 af, Atten= 4%, Lag= 2.1 min
 Primary = 70.81 cfs @ 14.10 hrs, Volume= 76.266 af
 Secondary = 150.05 cfs @ 14.10 hrs, Volume= 48.643 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 189.83' @ 14.10 hrs Surf.Area= 26,354 sf Storage= 130,756 cf

Plug-Flow detention time= 17.0 min calculated for 124.868 af (98% of inflow)
 Center-of-Mass det. time= 5.4 min (1,109.6 - 1,104.2)

Volume	Invert	Avail.Storage	Storage Description
#1	184.00'	135,312 cf	85.00'W x 220.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	36.0" x 30.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 183.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Secondary	187.00'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=70.80 cfs @ 14.10 hrs HW=189.83' TW=185.25' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 70.80 cfs @ 10.02 fps)

Secondary OutFlow Max=149.98 cfs @ 14.10 hrs HW=189.83' TW=185.25' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 149.98 cfs @ 5.31 fps)

Proposed Drainage McKownville Rt 20 Area

Prepared by {enter your company name here}

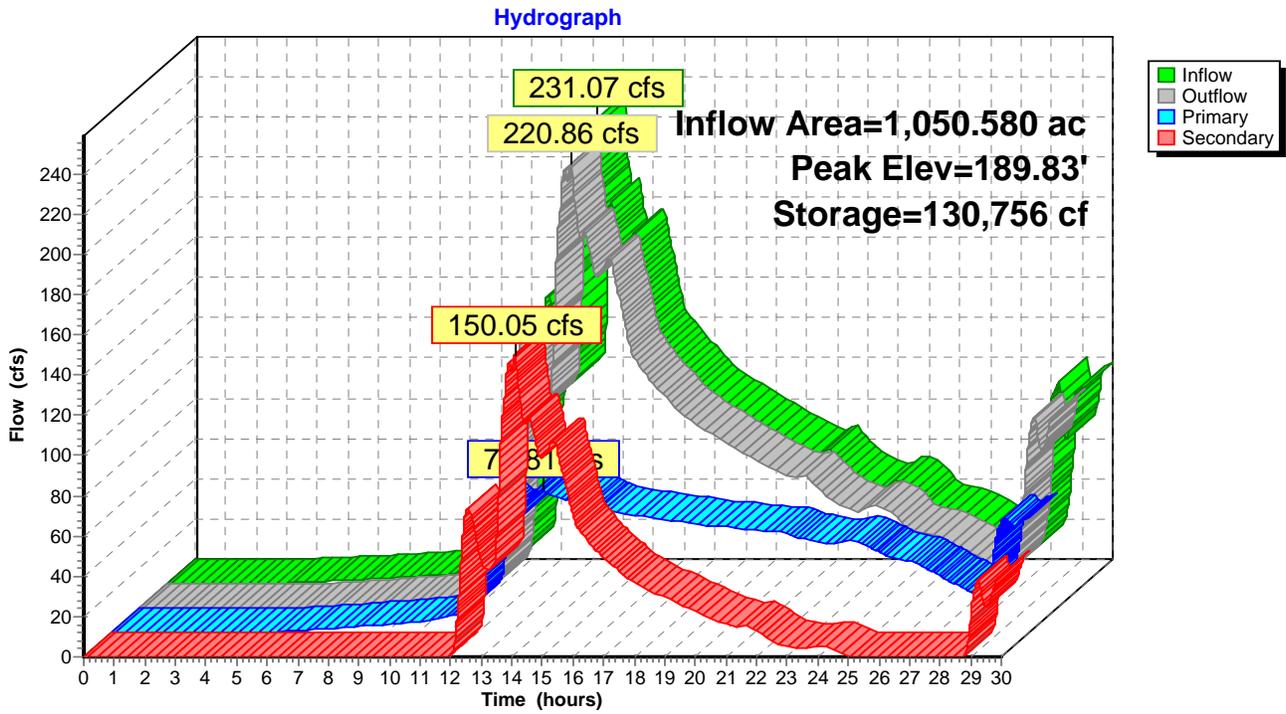
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Type II 24-hr Flood2 Rainfall=3.61"

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Pond PS C: Proposed Storage C



Proposed Drainage McKownville Rt 20 Area

Type II 24-hr Flood2 Rainfall=3.61"

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Summary for Pond PS D: Proposed Storage D

Inflow Area = 49.920 ac, 28.33% Impervious, Inflow Depth = 0.54" for Flood2 event
 Inflow = 10.41 cfs @ 12.68 hrs, Volume= 2.236 af
 Outflow = 9.75 cfs @ 12.82 hrs, Volume= 2.233 af, Atten= 6%, Lag= 8.3 min
 Primary = 9.75 cfs @ 12.82 hrs, Volume= 2.233 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 191.47' @ 12.82 hrs Surf.Area= 0.112 ac Storage= 0.150 af

Plug-Flow detention time= 19.6 min calculated for 2.233 af (100% of inflow)
 Center-of-Mass det. time= 18.8 min (970.9 - 952.1)

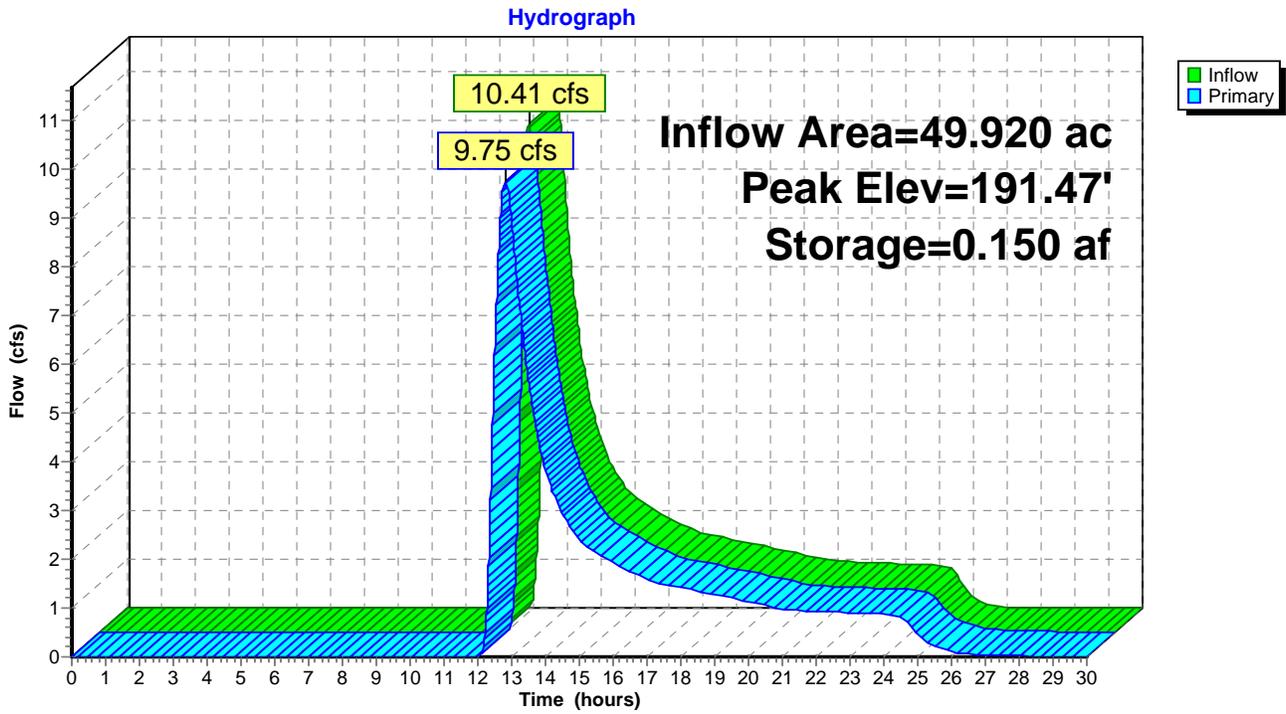
Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	0.807 af	45.00'W x 90.00'L x 6.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	24.0" x 30.0' long Culvert CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 189.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Primary	195.00'	5.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=9.75 cfs @ 12.82 hrs HW=191.47' TW=186.51' (Dynamic Tailwater)

- 1=Culvert (Barrel Controls 9.75 cfs @ 5.50 fps)
- 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

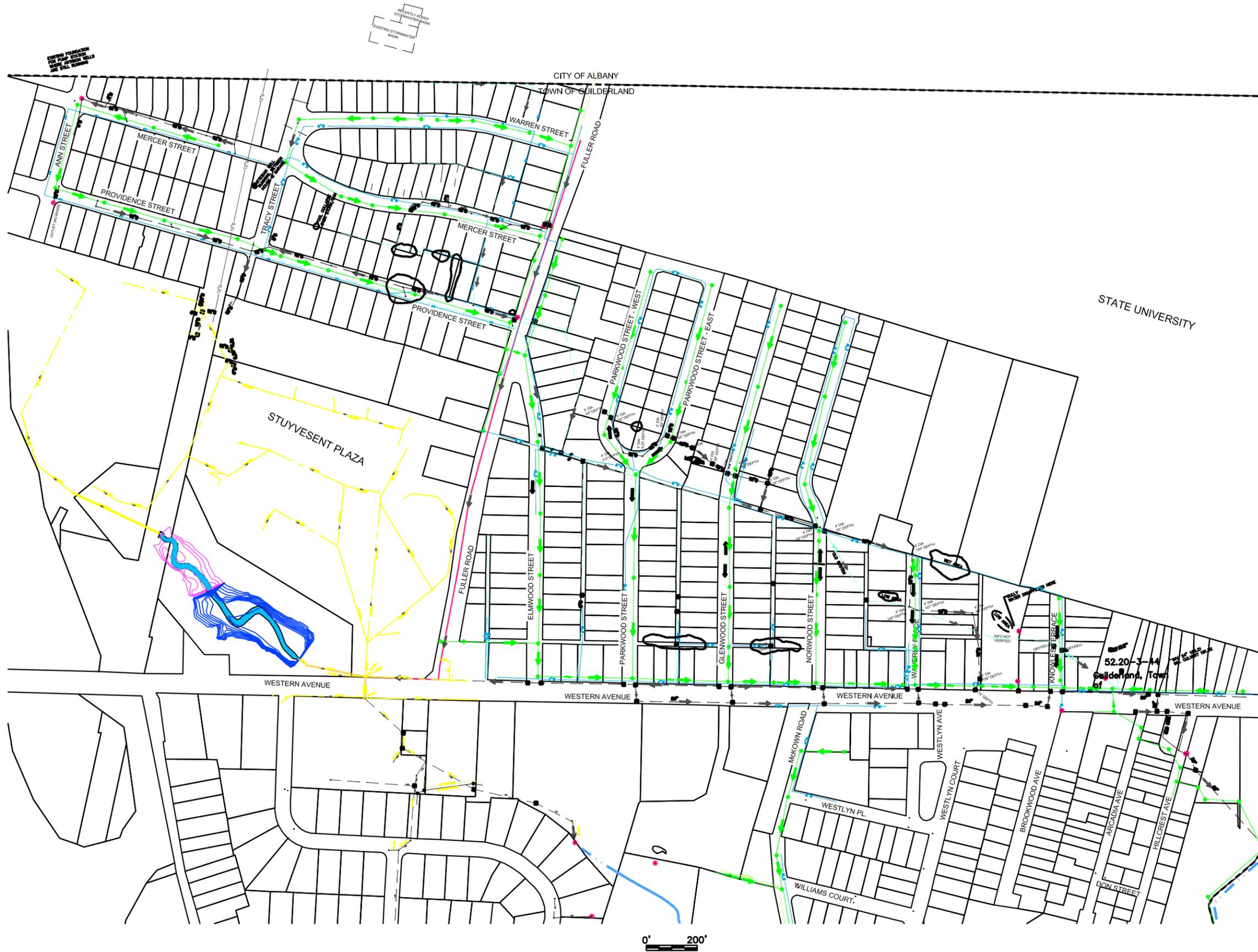
Pond PS D: Proposed Storage D



APPENDIX E
Budget Estimate

APPENDIX F
Existing Utility Map

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- LEGEND**
- EXISTING CATCH BASIN LOCATIONS
 - EXISTING STORM OUTFALL LOCATIONS
 - EXISTING SANITARY SEWER
 - 4" W EXISTING WATER MAIN
 - EXISTING STORM SEWER
- TAX MAP PARCELS
(TOWN OF GUILDERLAND)

DATE: SEPT. 2008
 DRAWN BY:
 SCALE:
 REVIEWED BY:
 PROJECT NO.:
 FILE:

DELAWARE ENGINEERING, P.C.
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NO.	DATE

McKOWNVILLE DRAINAGE SYSTEM
 TOWN OF GUILDERLAND, NY

EXISTING UTILITIES MAP