Micro Stormwater Study

for:

Main Street of Lansing Paint Shop Addition

211 Plaza Drive
Lansing, Jackson County, Kansas 66043
Section 24 – T09S – R22E

Prepared for:
Main Street of Lansing
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Table of Contents

Appendices

General Information

The project property is located at 211 Plaza Drive, immediately adjacent to the MainStreet of Lansing automotive dealership located at 555 N Main Street.

The site is located within Sections 24 and 35, T09S, R22E. The project will consist of a 6,080 sq. ft. addition to an existing 2,844 sq. ft. metal building, with associated new sidewalks and concrete door aprons. Refer to Figure 1 for location map.

The project is located within the Little Blue River watershed. The majority of the site (95%) is hydrological soil group C and is classified as Sharpsburg silty clay loam complex with 1 to 4 percent slopes.

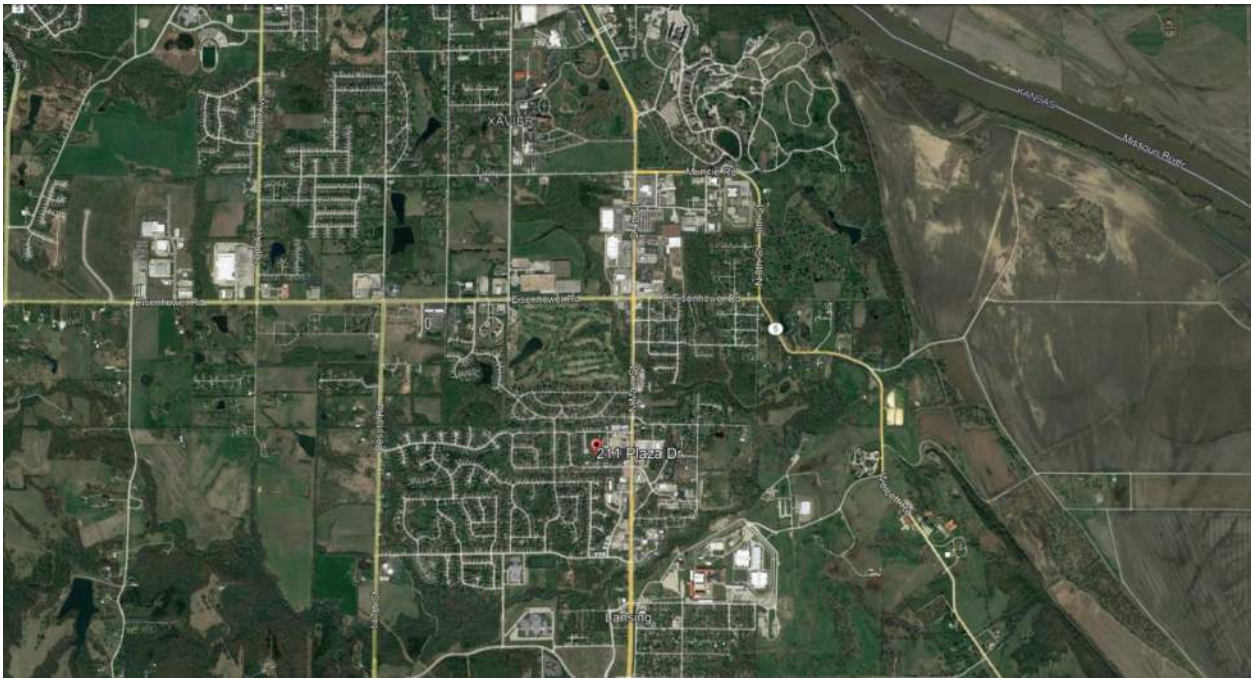


Figure 1 – Location Map (no scale)

Methodology

Existing and Proposed conditions were modeled and analyzed using Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2020 (Hydraflow). Hydraflow Hydrographs Extension for AutoCAD 2021 is used to determine runoff flow amounts for existing and proposed site conditions. Hydraflow computes the rational method runoff hydrographs by convoluting a rainfall hyetograph through a unit hydrograph. Convolution is known as linear superpositioning and means that each ordinate of the rainfall hyetograph is multiplied by each ordinate of the unit hydrograph, thus creating a series of hydrographs. These hydrographs are then summed to form the final runoff hydrograph.

Existing Condition Analysis

The existing metal building is located near the north edge of the project property with an access drive connection to the private Plaza Drive. There is no onsite storm water runoff collection infrastructure. Runoff from the small site generally sheet flows in multiple directions away from the existing building onto adjacent private property. The existing **0.41**-acre project property is 20% impervious (C=0.41).

Soils encountered near the site are primarily (95.0%) Sharpsburg silty clay loam complex, 1 to 4 percent slopes, hydrological soil group C. A small portion (5%) of the site is classified as Sharpsburg silty clay loam with 4 to 8 percent slopes, hydrological soil group C. See Appendix A.

The site lies within Flood Zone X, areas determined to be outside the 0.2% annual chance floodplain, as depicted on the FEMA Flood Insurance Rate Map (FIRM) Map No. 20103C0144G, Effective Date: 7/16/2015. The Flood Insurance Rate Map is included in Appendix A.

Table 1: Existing Runoff Comparison

	Drainage Area (Ac.)	10-year event (cfs)	25-year event (cfs)	100-year event (cfs)	10-year volume (cu. ft.)	25-year vol. (cu. ft.)	100-year vol. (cu. ft.)
Ex. Area A-1	0.41	1.33	1.62	2.08	479	582	748

Proposed Condition Analysis

The proposed development consists of a 6,080 sq. ft. metal building addition with associated sidewalks and concrete door aprons. The proposed runoff was analyzed using the Rational Method. The proposed **0.41**-acre building addition site was analyzed with 0.26-acre of impervious area and 0.15-acre of pervious area (C=0.68). Weighted impervious values were calculated for each area, and Rational "C" coefficients were then determined from the weighted imperviousness.

The increase in hydrograph volume from existing to proposed conditions is addressed by the proposed extended dry detention. See the Pond Report included on page 11 of Appendix D.

Table 2: Proposed Runoff Comparison (Gross totals, no detention factored in)

	Drainage Area (Ac.)	10-year (cfs)	25-year (cfs)	100-year (cfs)	10-year volume (cu. ft.)	25-year vol. (cu. ft.)	100-year vol. (cu. ft.)
Onsite Detained	0.23	1.18	1.43	1.85	426	517	665
Onsite Undetained	0.18	0.99	1.20	1.55	357	433	557
Onsite Total**	**0.41**	**2.17**	**2.64**	**3.40**	**782**	**951**	**1,222**

See Appendix C for Hydraflow results.

Table 3: Existing and Proposed Peak Runoff Comparison

		Drainage Area (ac)	10-year event (cfs)	25-year event(cfs)	100-year event (cfs)
Existing	Onsite Area Peak Q	0.41	1.33	1.62	2.10
Proposed	Onsite Area Peak Q	0.41	2.17	2.64	3.40

Detention and water quality measures are required as the total imperviousness of the project site was increased by approximately 0.18-acres.

The drainage map, provided in Appendix B, depicts the existing and proposed drainage patterns for the site.

Table 4: Existing and Proposed Hydrograph Volume Comparison

	Onsite Area, 0.41 Acres		
	10-year volume	25-year volume	100-year volume
Existing	479	582	748
Proposed	782	951	1,222
Difference	**303**	**369**	**474**

The western half of the building roof (existing & addition) will be collected via gutters & downspouts and released above grade to the proposed detention basin located to the south of the building. The basin will be constructed with a Nyloplast drain basin outlet perforated riser structure with 3x 1" diameter orifice holes leading to the 6" diameter lower primary outlet pipe (862.50') to provide the necessary temporary detention and metered release of accumulated runoff storage. A 10' emergency spillway will be located just beyond the primary outlet structure to release accumulated runoff storage beyond the 100-year storm event. The 10' long emergency spillway will be at an elevation of 863.60. The eastern half of the roof will also be collected via gutters and released to daylight above grade – the southern 0.3-acre portion of the east roof will be directed into the basin; the remainder will not be detained. This outlet structure has been designed to detain accumulated runoff to discharge at a peak flow rate, that when combined with the site's undetained runoff, is less than or equal to the existing conditions, see Table 7.

This runoff will be released to sheet flow on the adjacent existing paved parking lot. The adjacent paved parking lot is a ±3.46 ac. and is essentially 100% impervious with roofs, concrete, & asphalt. The existing flow pattern is generally west-to-east and diverts to each side of the existing dealership building. There is no apparent on site storm water infrastructure; Overland sheet flow eventually makes it way to the K-7 (Main Street) right-of-way before being captured by the public storm sewer infrastructure network.

Table 5: Extended Dry Detention Stage vs Storage

Elevation	Contour Area, S.F.	Incremental Storage, C.F.	Total Storage, C.F.
862.50	1	0	0
863.0	793	137	137
863.60*	2,268	880	1,017

*Emergency Spillway Elevation

Table 6: Extended Dry Detention Peak Q vs Max Storage

Storm Event	Peak Flow Out, Q, CFS	Max Elevation, Ft.	Max Storage, C.F.
10 Yr	0.42	863.08	261
25 Yr	0.48	863.13	329
100 Yr	0.56	863.21	439

Table 7: Overall Existing and Proposed Peak Runoff Comparison with Detention

		Drainage Area (ac)	10-year event (cfs)	25-year event(cfs)	100-year event (cfs)
Existing	Onsite Area Peak Q	0.41	1.33	1.62	2.1
Proposed	Onsite Area Peak Q	0.41	1.33	1.58	1.98

Summary

The onsite existing flow patterns will be modified as the large building addition and majority of roof square footage will be rerouted to a new dry detention basin to be constructed on the south green area of the property. The on-site increase in stormwater runoff peak flow due to added impervious area (roof, sidewalk, drive apron, etc.) will be offset by the proposed on-site dry detention basin that will temporarily detain the excess stormwater flow and act to reduce the overall site peak flow runoff to less than, or equal to, existing conditions. Temporary erosion and sediment controls will be implemented and maintained throughout construction.

Appendix A:

NRCS Web Soil Survey Information

FIRM Map

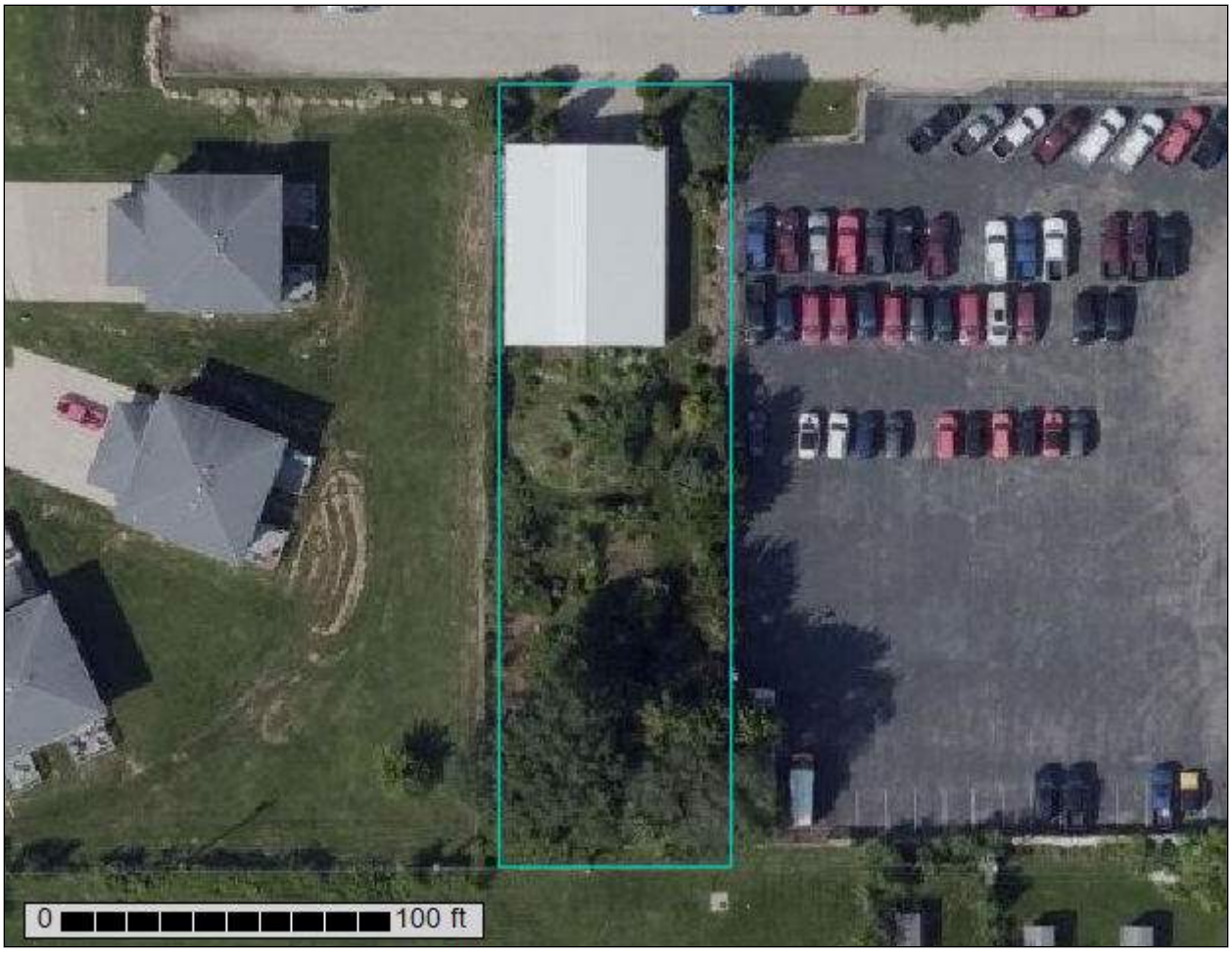
United States Department of Agriculture

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 Leavenworth County, Kansas



December 29, 2021

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://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

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 Web Soil Survey, the site for official soil survey information.

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Contents

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 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.

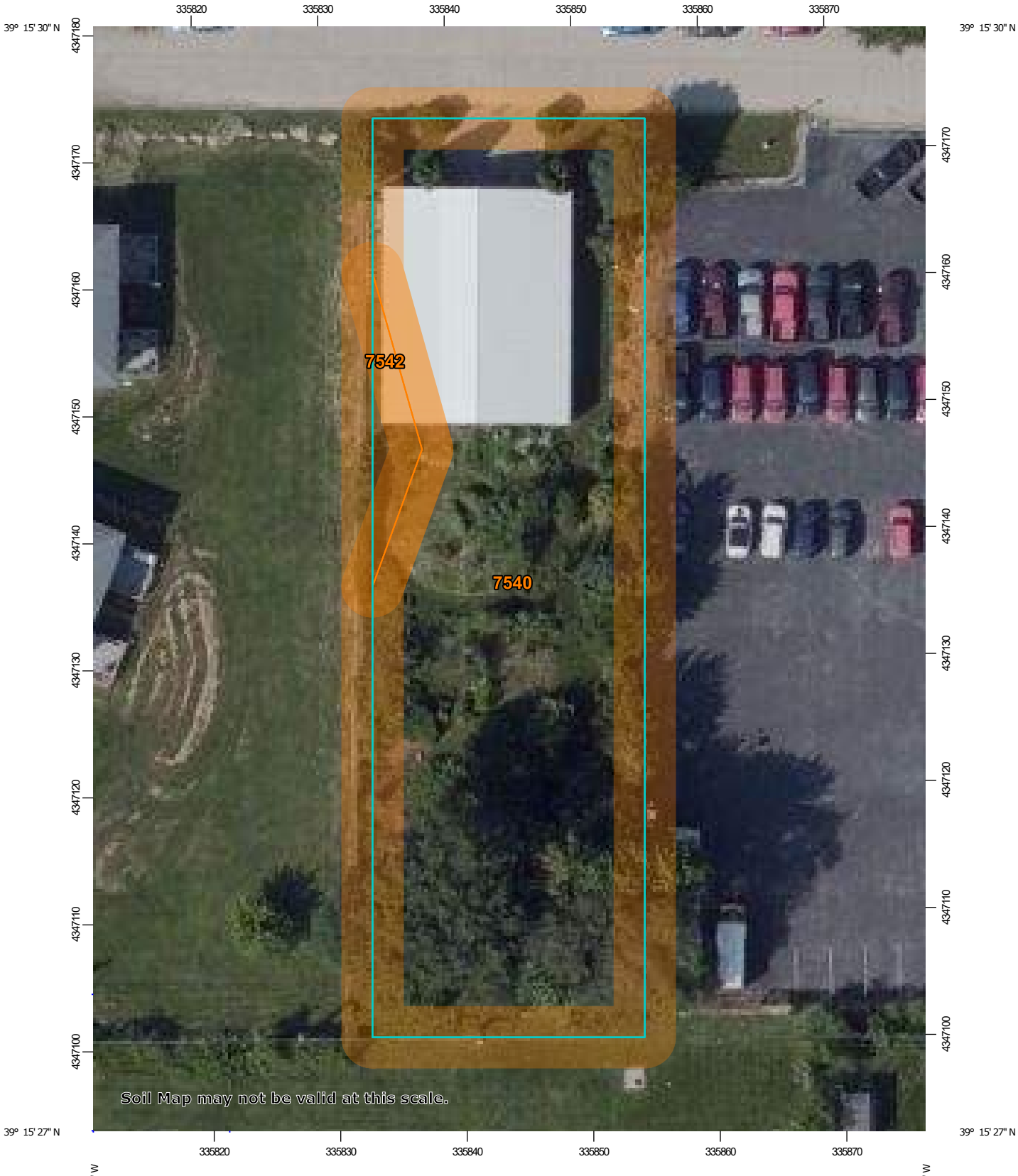
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map



Map Scale: 1:424 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 20 40 80 120

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Leavenworth County, Kansas
Survey Area Data: Version 16, Sep 14, 2021

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

Date(s) aerial images were photographed: Jul 16, 2019—Sep 23, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7540	Sharpsburg silty clay loam, 1 to 4 percent slopes	0.4	96.9%
7542	Sharpsburg silty clay loam, 4 to 8 percent slopes, eroded	0.0	3.1%
Totals for Area of Interest		**0.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Leavenworth County, Kansas

7540—Sharpsburg silty clay loam, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2q4rw
Elevation: 980 to 1,660 feet
Mean annual precipitation: 28 to 39 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 158 to 203 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sharpsburg and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silty clay loam
A - 6 to 12 inches: silty clay loam
Bt1 - 12 to 18 inches: silty clay loam
Bt2 - 18 to 46 inches: silty clay loam
BC - 46 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
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 45 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R106XY015KS - Loamy Upland (PE 30-37)
Forage suitability group: Loam (G106XY100NE)

Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

Minor Components

Wymore
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R106XY007KS - Clay Upland (PE 30-37)
Other vegetative classification: Clayey Subsoil (G106XY210NE)
Hydric soil rating: No

Pawnee
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R106XY007KS - Clay Upland (PE 30-37)
Other vegetative classification: Clayey Subsoil (G106XY210NE)
Hydric soil rating: No

Sarcoxie
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: R106XY015KS - Loamy Upland (PE 30-37)
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

7542—Sharpsburg silty clay loam, 4 to 8 percent slopes, eroded

Map Unit Setting
National map unit symbol: 2q4rx
Elevation: 980 to 1,660 feet
Mean annual precipitation: 28 to 39 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 158 to 203 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Sharpsburg, eroded, and similar soils: 85 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silty clay loam
A - 6 to 10 inches: silty clay loam
Bt1 - 10 to 14 inches: silty clay loam
Bt2 - 14 to 46 inches: silty clay loam
BC - 46 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
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 45 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R106XY015KS - Loamy Upland (PE 30-37)
Forage suitability group: Loam (G106XY100NE)
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

Minor Components

Sarcoxie, eroded

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY015KS - Loamy Upland (PE 30-37)
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

Shelby, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY015KS - Loamy Upland (PE 30-37)
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

Grundy, eroded

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY007KS - Clay Upland (PE 30-37)
Other vegetative classification: Clayey Subsoil (G106XY210NE)
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Map Unit Description (Brief, Generated) (211 Plaza Dr Paint Shop)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous

areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated) (211 Plaza Dr Paint Shop)

Leavenworth County, Kansas

Map Unit: 7540—Sharpsburg silty clay loam, 1 to 4 percent slopes

Component: Sharpsburg (85%)

The Sharpsburg component makes up 85 percent of the map unit. Slopes are 1 to 4 percent. This component is on hillslopes on uplands. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 47 inches during February, March, April, May. Organic matter content in the surface horizon is about 3 percent. This component is in the R106XY015KS Loamy Upland (PE 30-37) ecological site. Nonirrigated land capability classification is 2e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Wymore (5%)

Generated brief soil descriptions are created for major soil components. The Wymore soil is a minor component.

Component: Pawnee (5%)

Generated brief soil descriptions are created for major soil components. The Pawnee soil is a minor component.

Component: Sarcoxie (5%)

Generated brief soil descriptions are created for major soil components. The Sarcoxie soil is a minor component.

Map Unit: 7542—Sharpsburg silty clay loam, 4 to 8 percent slopes, eroded

Component: Sharpsburg, eroded (85%)

The Sharpsburg, eroded component makes up 85 percent of the map unit. Slopes are 4 to 8 percent. This component is on hillslopes on uplands. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 47 inches during February, March, April, May. Organic matter content in the surface horizon is about 3 percent. This component is in the R106XY015KS Loamy Upland (PE 30-37) ecological site. Nonirrigated land capability classification is 3e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Sarcoxie, eroded (8%)

Generated brief soil descriptions are created for major soil components. The Sarcoxie, eroded soil is a minor component.

Component: Shelby, eroded (5%)

Generated brief soil descriptions are created for major soil components. The Shelby, eroded soil is a minor component.

Component: Grundy, eroded (2%)

Generated brief soil descriptions are created for major soil components. The Grundy, eroded soil is a minor component.

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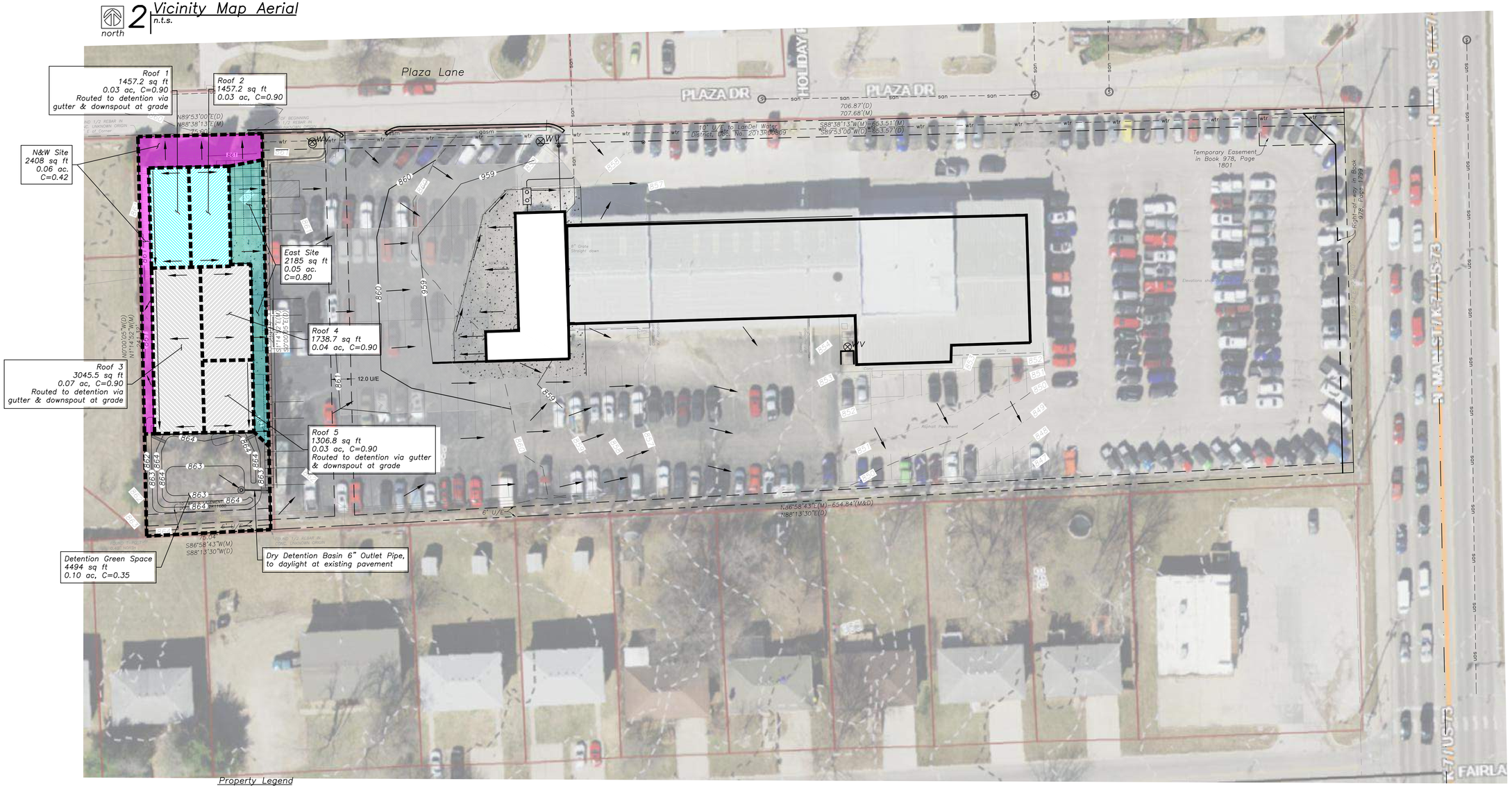
Appendix B:

Existing Condition Drainage Map
Proposed Condition Drainage Map

davidson
architecture&engineering
4301 Indian Creek Parkway
Overland Park, KS 66207
phone: 913.451.9390
fax: 913.451.9391
www.davidsonae.com

north 2 *Vicinity Map Aerial*
n.t.s.



north 1 *Drainage Plan*
1" = 30'
0 15 30 60

Property Legend

- right of way
- property lines
- easements
- setbacks

Grading Legend

- existing minor contour
- existing major contour
- proposed minor contour
- proposed major contour

ONE CALL KANSAS 811
Know what's below.
Call before you dig.

Floodplain Note:

This property lies within Flood Zone X, defined as areas outside the 0.2% annual chance floodplain, as shown on the Flood Insurance Rate Map, prepared by Federal Emergency Agency's National Flood Insurance Program for the City of Lansing, Leavenworth County, Kansas, Map Number 20103C0144G, dated July 16, 2015.

A Proposed Body Shop Addition and Remodel for

MainStreet of Lansing

555 N Main Street
Lansing, KS 66043

date
11.08.2021
drawn by
DAE
checked by
LDM
revisions

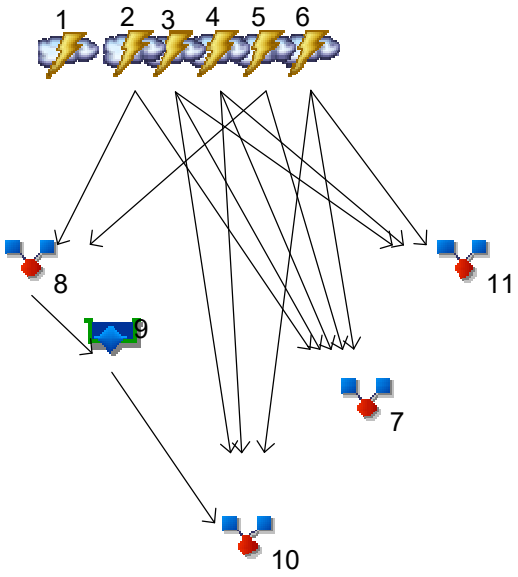
sheet number
C3.1
drawing type
preliminary
project number
21148

Appendix C:

Hydraflow Output Data

Hydraflow Table of Contents

Watershed Model Schematic



Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Rational	------	0.764	0.900	-------	1.134	1.331	1.617	1.845	2.078	ExCon
2	Rational	------	0.519	0.612	-------	0.770	0.904	1.099	1.253	1.412	Roofs to Detention
3	Rational	------	0.279	0.329	-------	0.415	0.487	0.592	0.675	0.760	Roofs to Daylight
4	Rational	------	0.112	0.132	-------	0.166	0.195	0.237	0.270	0.304	NW Undetained
5	Rational	------	0.160	0.188	-------	0.237	0.279	0.339	0.386	0.435	South Green Space Basin
6	Rational	------	0.177	0.209	-------	0.263	0.309	0.376	0.428	0.483	east side undetained
7	Combine	2, 3, 4, 5, 6	1.247	1.470	-------	1.852	2.173	2.642	3.013	3.395	Post Dev Gross
8	Combine	2, 5,	0.679	0.800	-------	1.008	1.183	1.437	1.640	1.847	to basin
9	Reservoir	8	0.303	0.333	-------	0.385	0.424	0.478	0.518	0.558	Basin
10	Combine	3, 4, 6, 9	0.805	0.948	-------	1.152	1.325	1.578	1.775	1.976	Post Dev Net
11	Combine	3, 4, 6,	0.569	0.670	-------	0.844	0.991	1.204	1.373	1.547	undetained

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

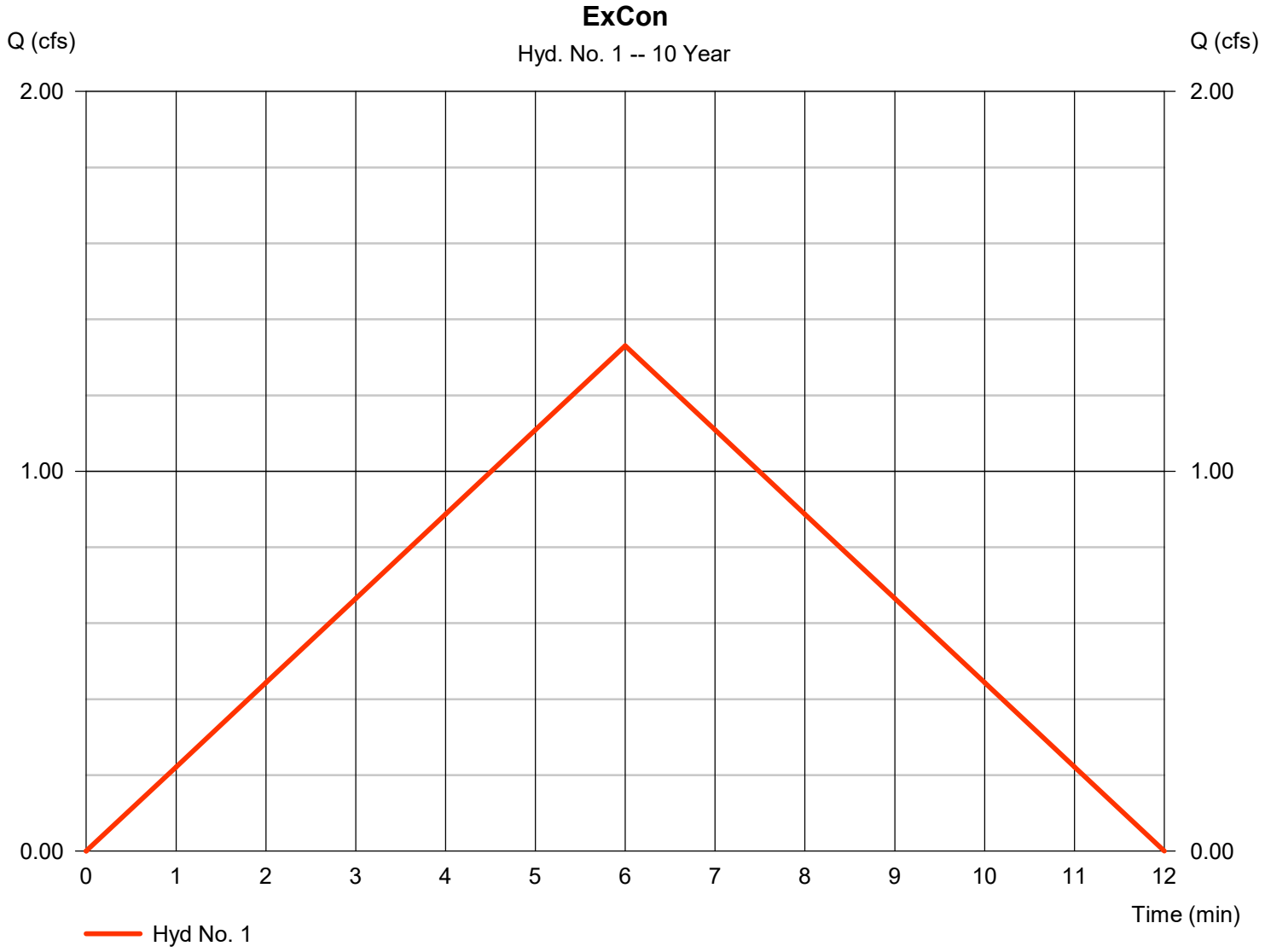
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.331	1	6	479	------	------	------	ExCon
2	Rational	0.904	1	6	325	------	------	------	Roofs to Detention
3	Rational	0.487	1	6	175	------	------	------	Roofs to Daylight
4	Rational	0.195	1	6	70	------	------	------	NW Undetained
5	Rational	0.279	1	6	100	------	------	------	South Green Space Basin
6	Rational	0.309	1	6	111	------	------	------	east side undetained
7	Combine	2.173	1	6	782	2, 3, 4, 5, 6	------	------	Post Dev Gross
8	Combine	1.183	1	6	426	2, 5,	------	------	to basin
9	Reservoir	0.424	1	10	424	8	863.08	261	Basin
10	Combine	1.325	1	6	781	3, 4, 6, 9	------	------	Post Dev Net
11	Combine	0.991	1	6	357	3, 4, 6,	------	------	undetained

Hydrograph Report

Hyd. No. 1

ExCon

Hydrograph type	=	Rational	Peak discharge	=	1.331 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	479 cuft
Drainage area	=	0.410 ac	Runoff coeff.	=	0.42
Intensity	=	7.727 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

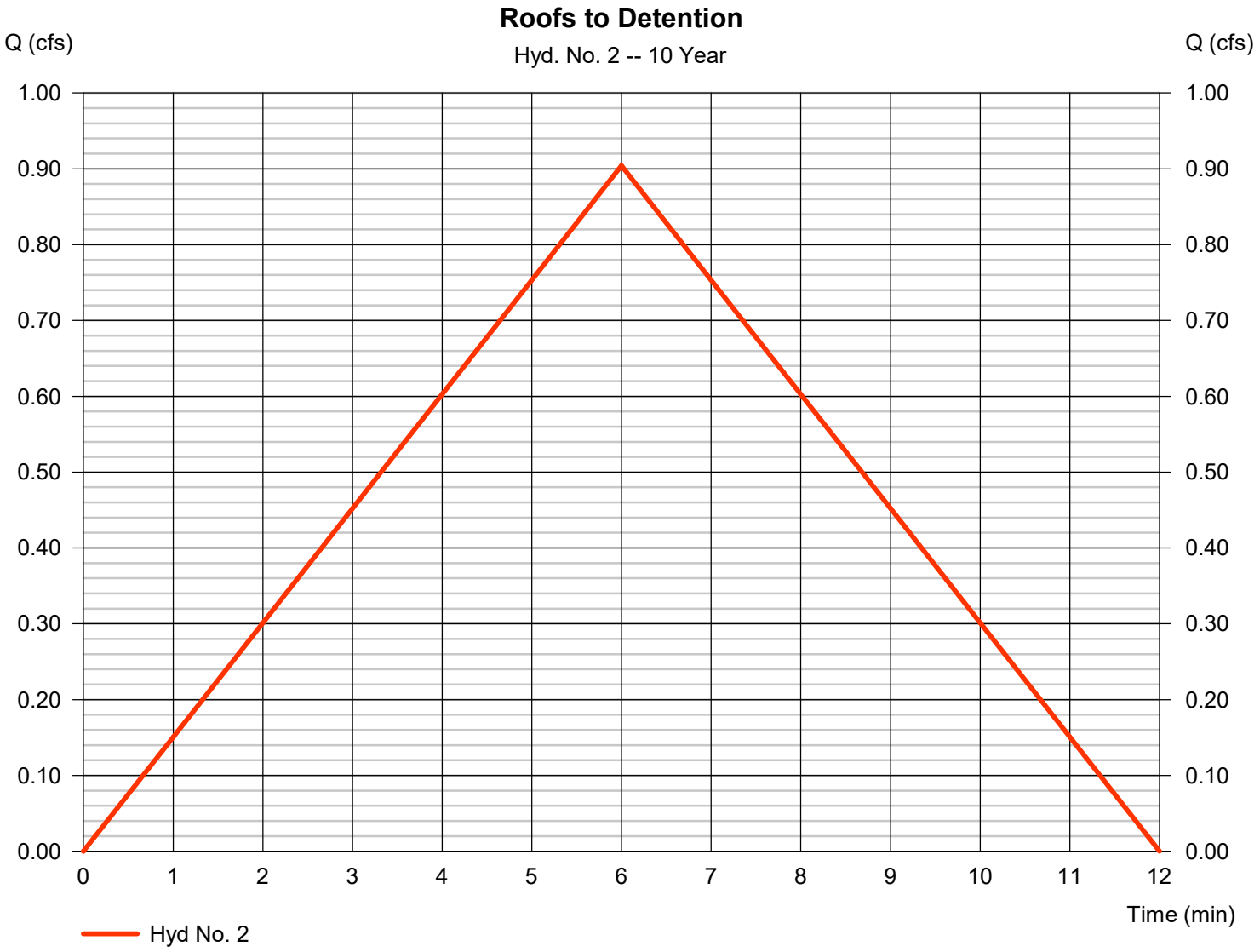


Hydrograph Report

Hyd. No. 2

Roofs to Detention

Hydrograph type	=	Rational	Peak discharge	=	0.904 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	325 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.9
Intensity	=	7.727 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

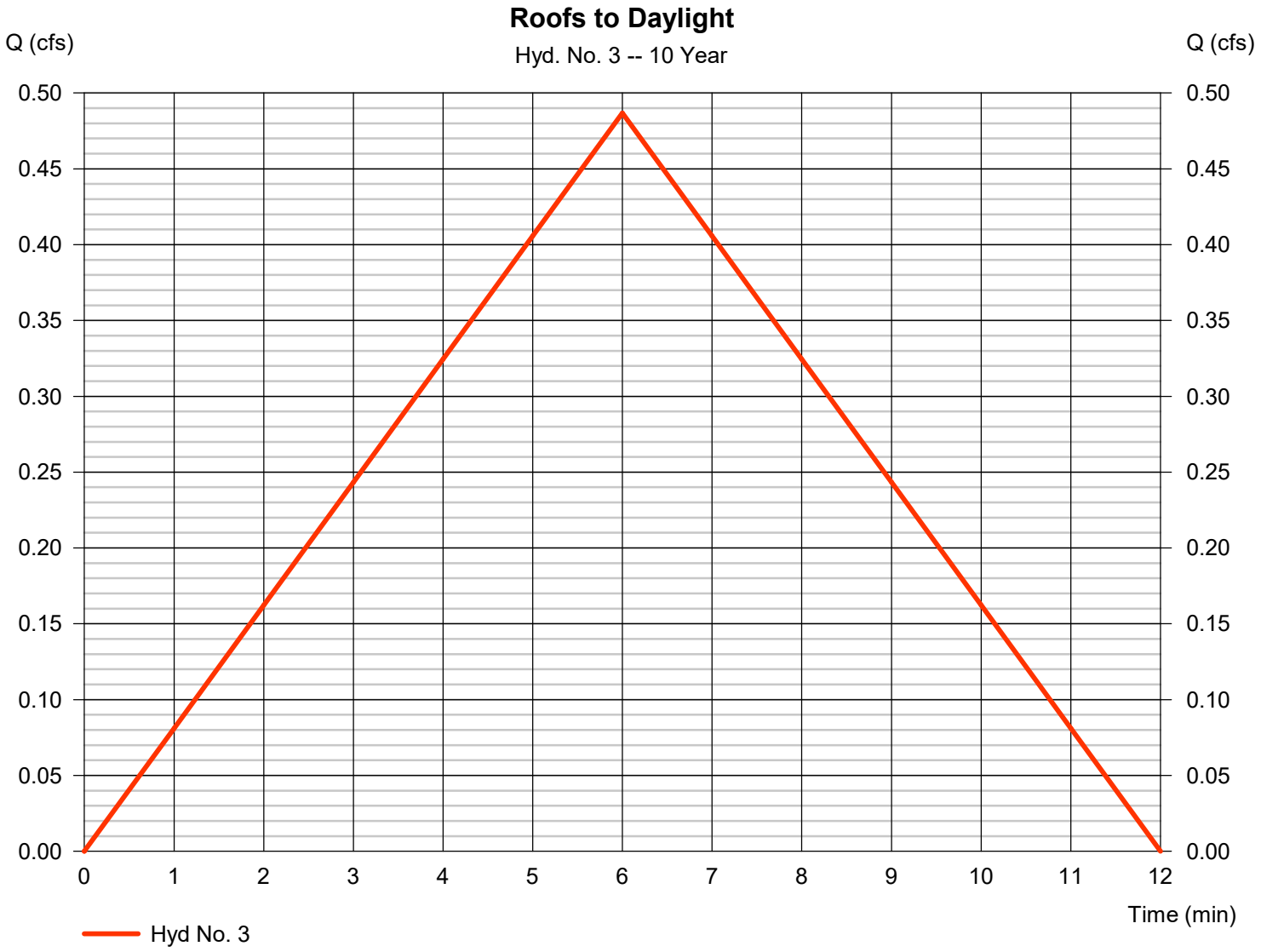


Hydrograph Report

Hyd. No. 3

Roofs to Daylight

Hydrograph type	=	Rational	Peak discharge	=	0.487 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	175 cuft
Drainage area	=	0.070 ac	Runoff coeff.	=	0.9
Intensity	=	7.727 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

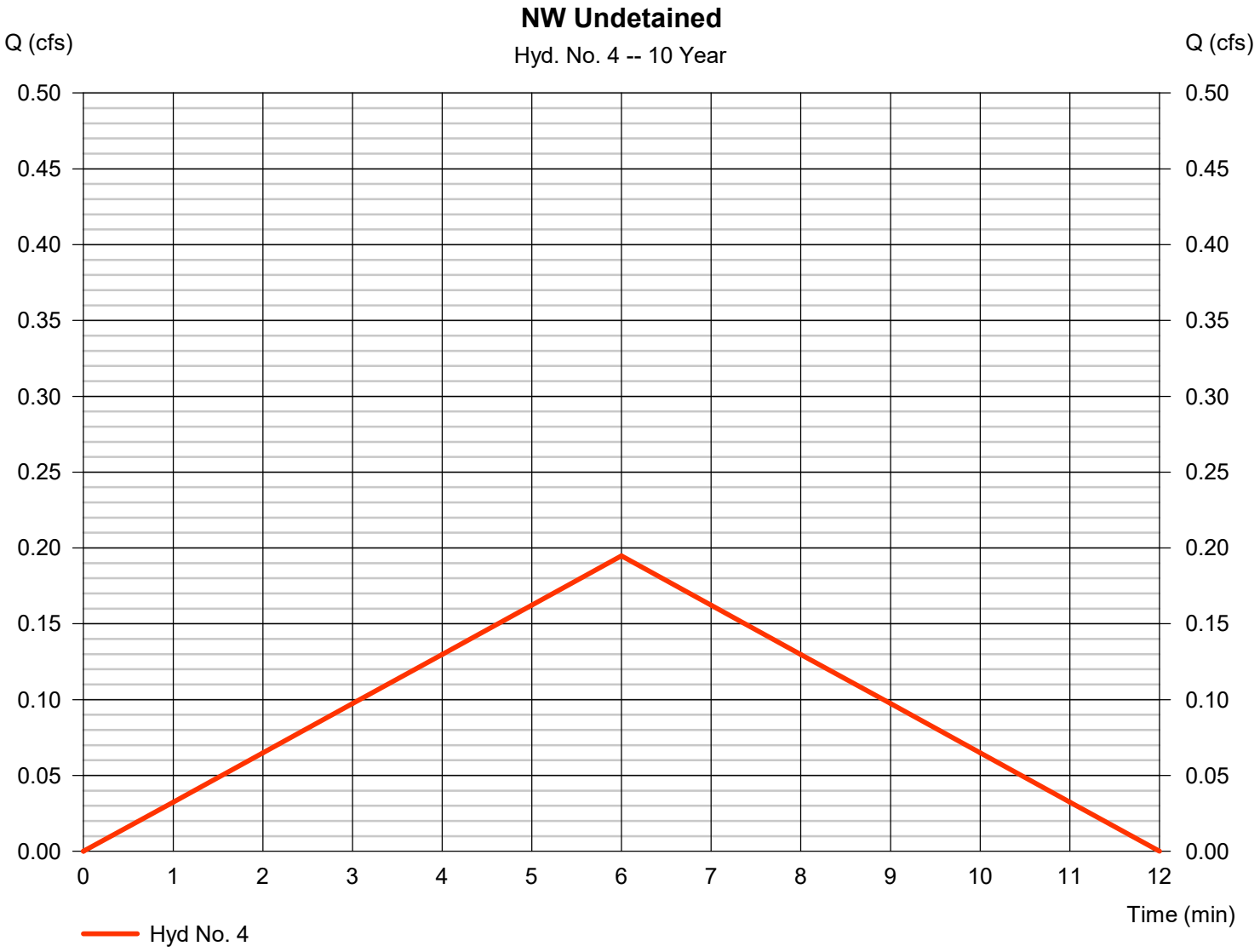


Hydrograph Report

Hyd. No. 4

NW Undetained

Hydrograph type	=	Rational	Peak discharge	=	0.195 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	70 cuft
Drainage area	=	0.060 ac	Runoff coeff.	=	0.42
Intensity	=	7.727 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

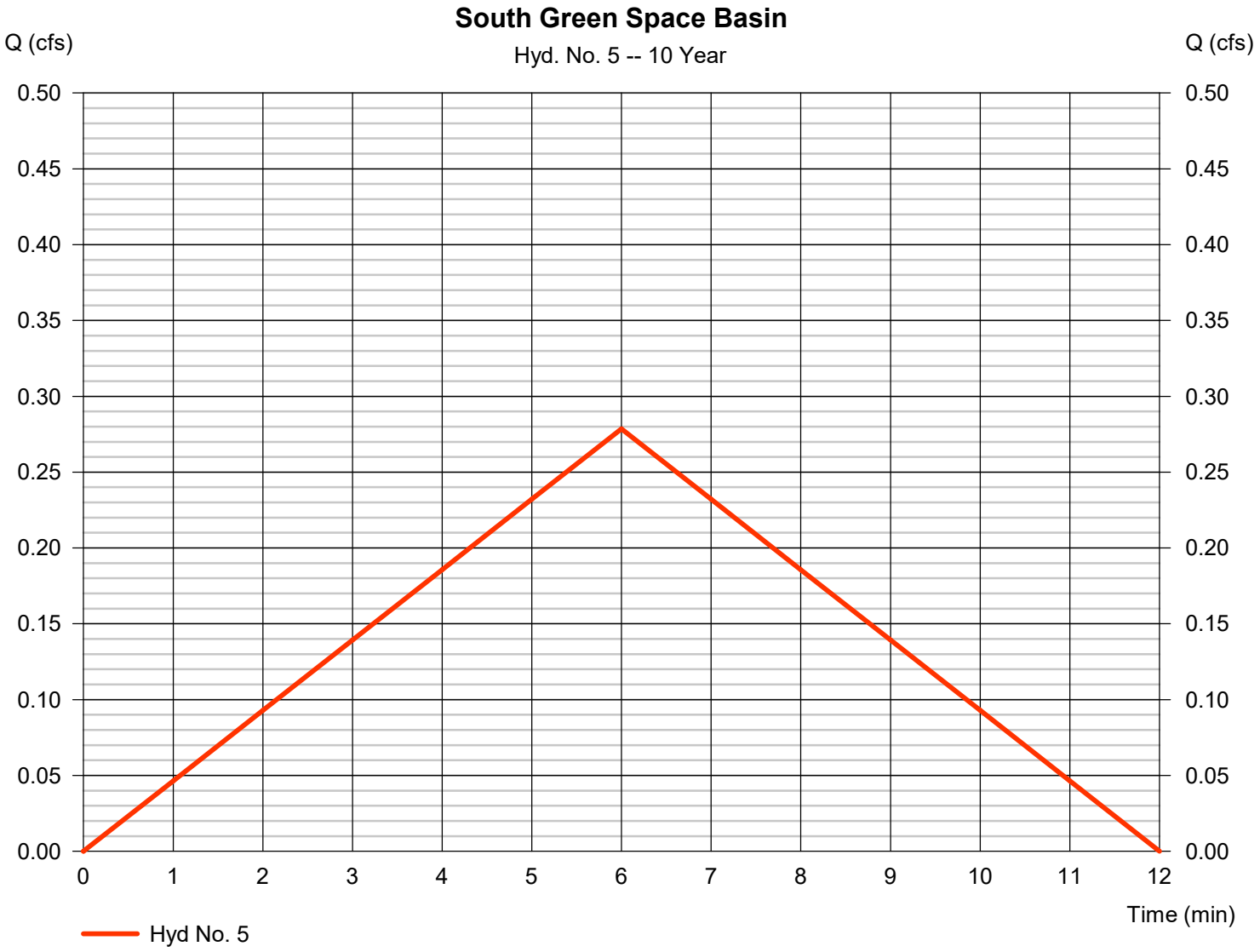


Hydrograph Report

Hyd. No. 5

South Green Space Basin

Hydrograph type	=	Rational	Peak discharge	=	0.279 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	100 cuft
Drainage area	=	0.103 ac	Runoff coeff.	=	0.35
Intensity	=	7.727 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

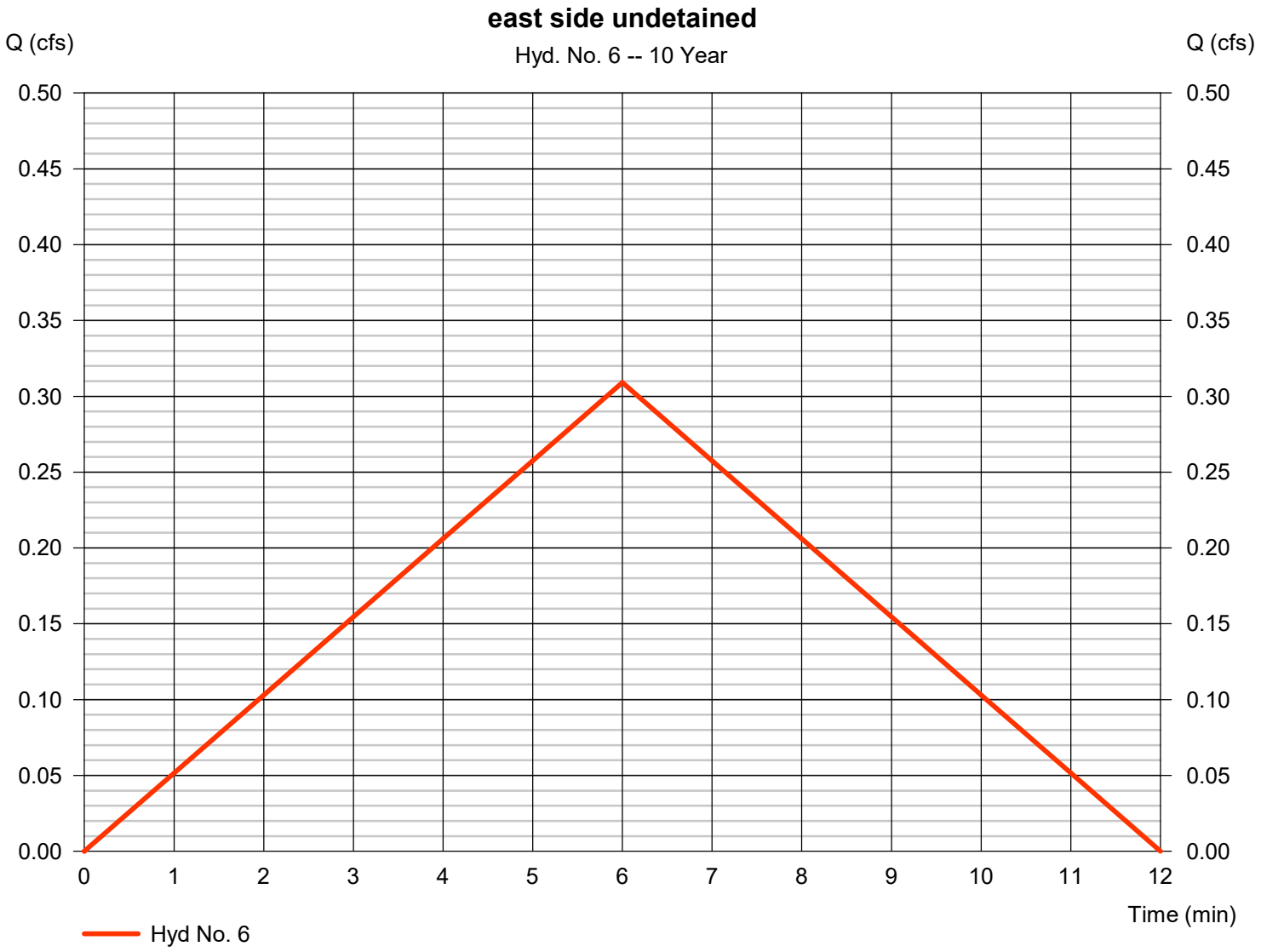


Hydrograph Report

Hyd. No. 6

east side undetained

Hydrograph type	=	Rational	Peak discharge	=	0.309 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	111 cuft
Drainage area	=	0.050 ac	Runoff coeff.	=	0.8
Intensity	=	7.727 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

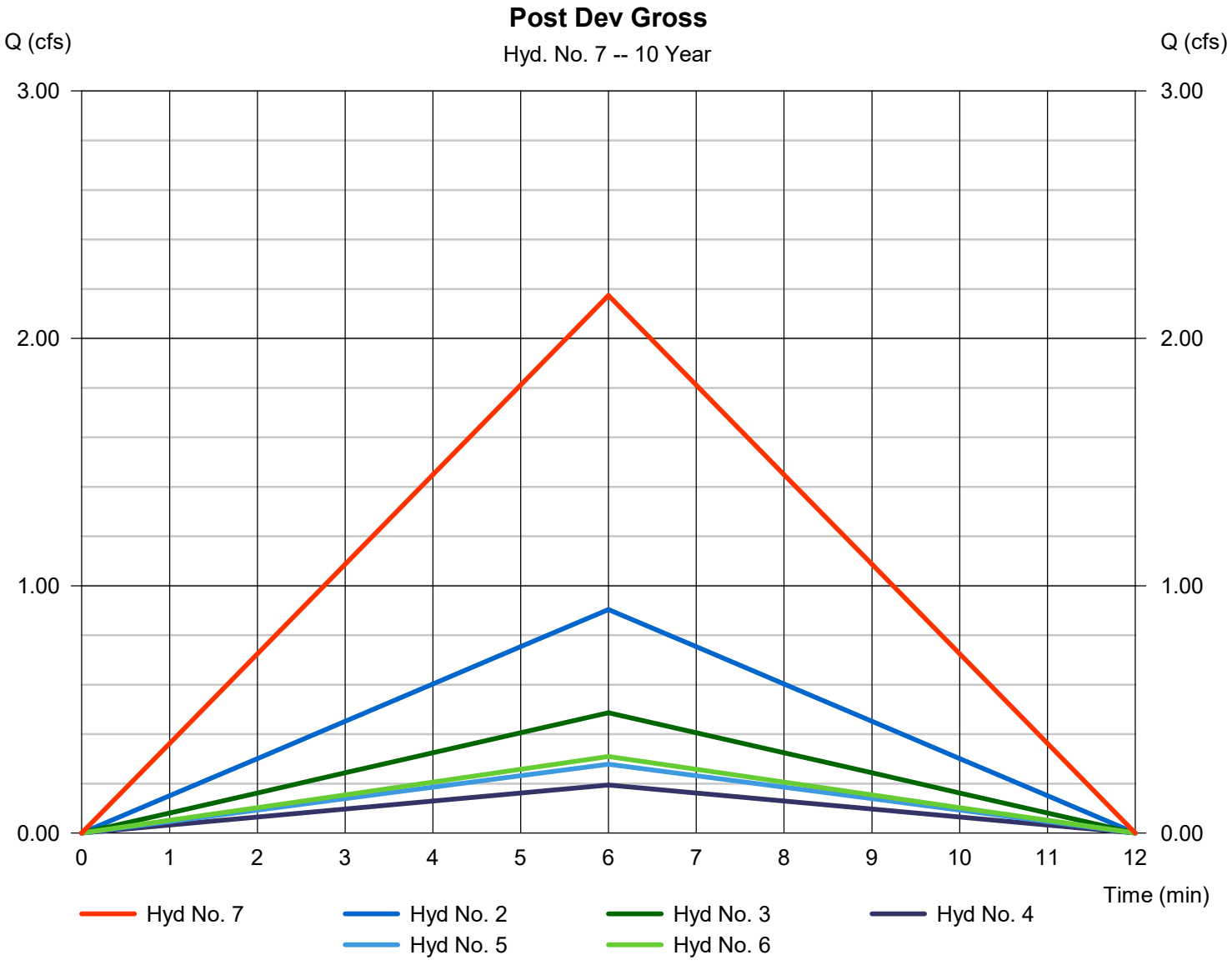


Hydrograph Report

Hyd. No. 7

Post Dev Gross

Hydrograph type	= Combine	Peak discharge	= 2.173 cfs
Storm frequency	= 10 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 782 cuft
Inflow hyds.	= 2, 3, 4, 5, 6	Contrib. drain. area	= 0.413 ac

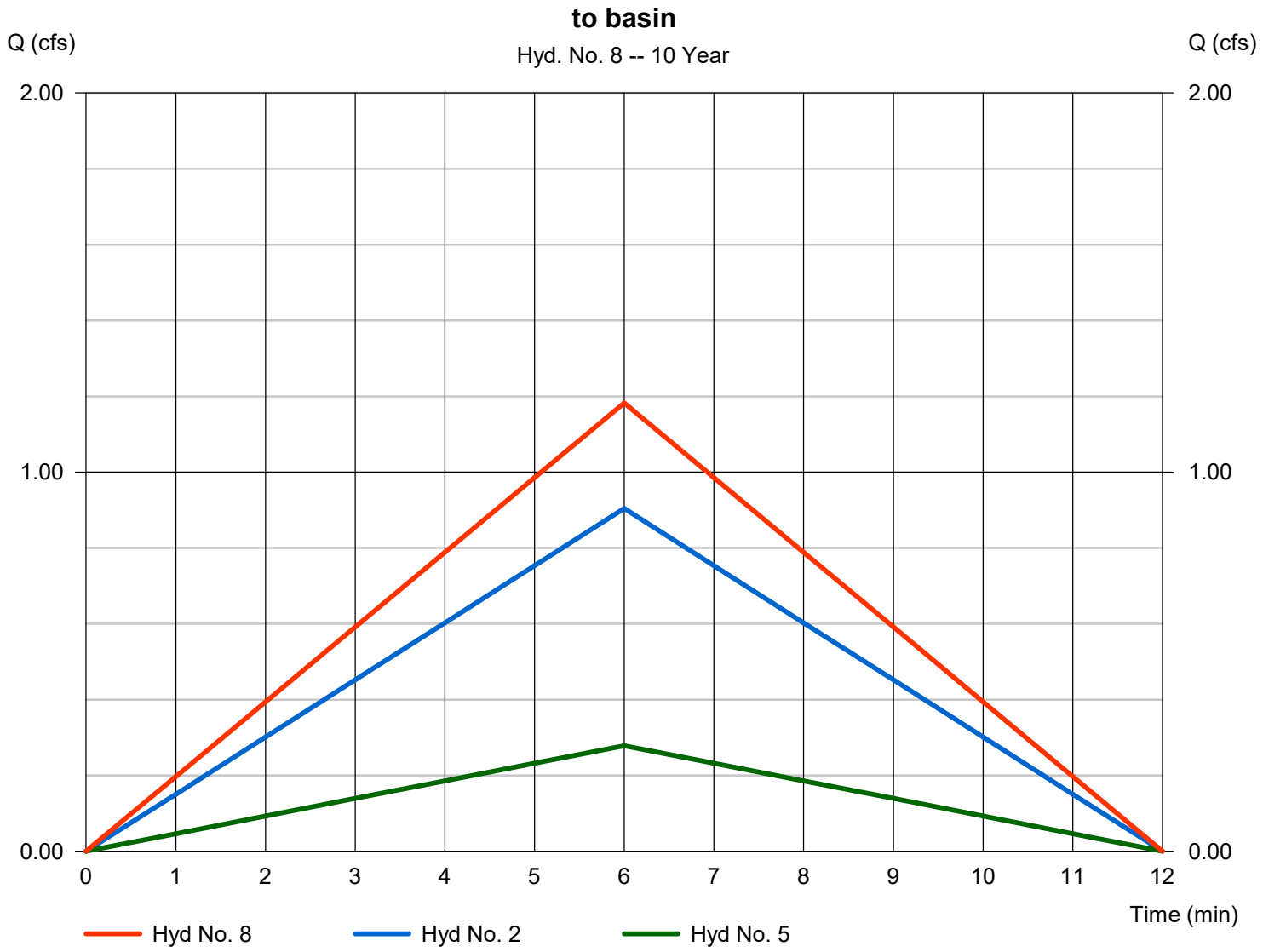


Hydrograph Report

Hyd. No. 8

to basin

Hydrograph type	= Combine	Peak discharge	= 1.183 cfs
Storm frequency	= 10 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 426 cuft
Inflow hyds.	= 2, 5	Contrib. drain. area	= 0.233 ac



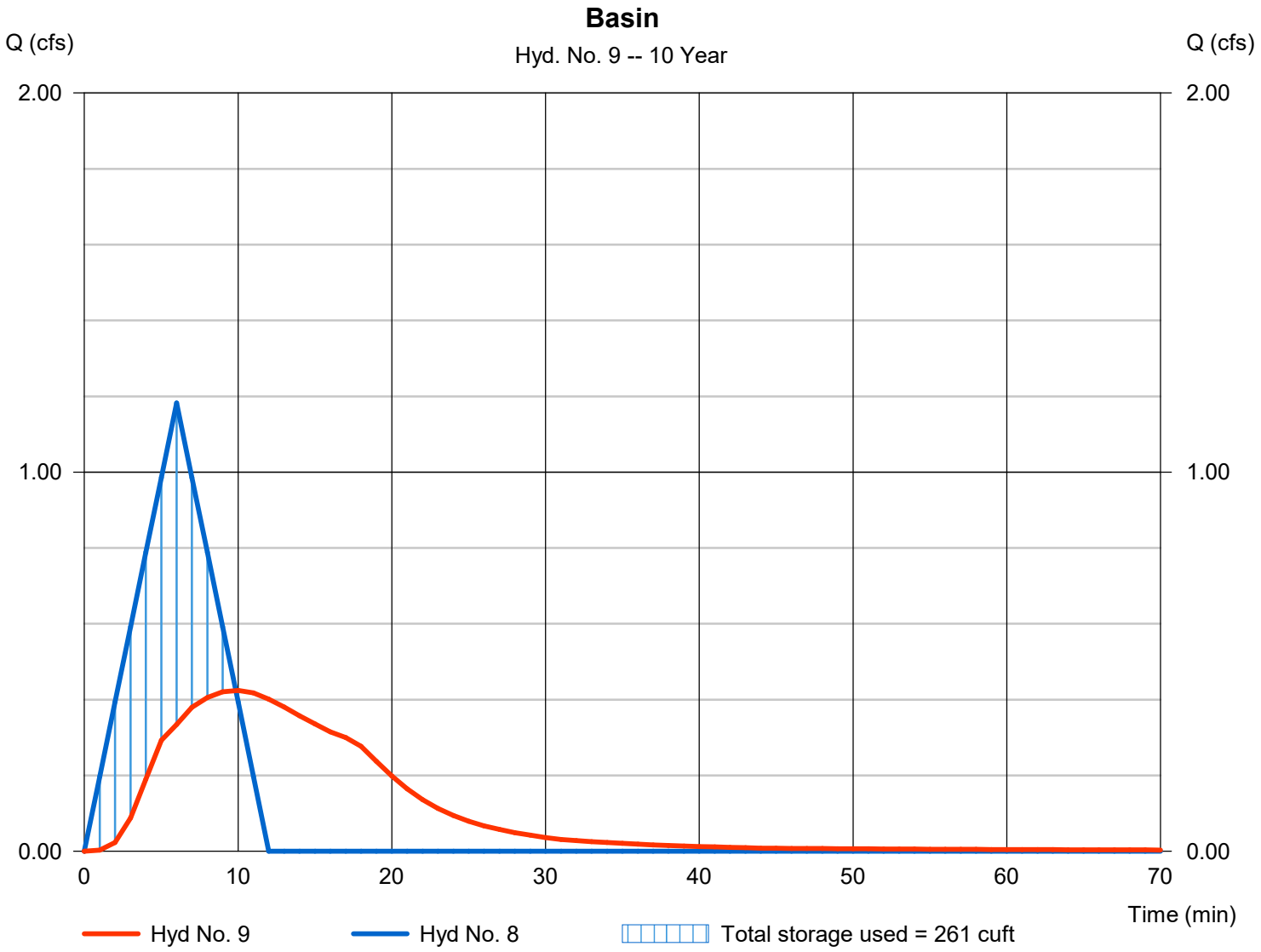
Hydrograph Report

Hyd. No. 9

Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.424 cfs
Storm frequency	=	10 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	424 cuft
Inflow hyd. No.	=	8 - to basin	Max. Elevation	=	863.08 ft
Reservoir name	=	South Basin	Max. Storage	=	261 cuft

Storage Indication method used.

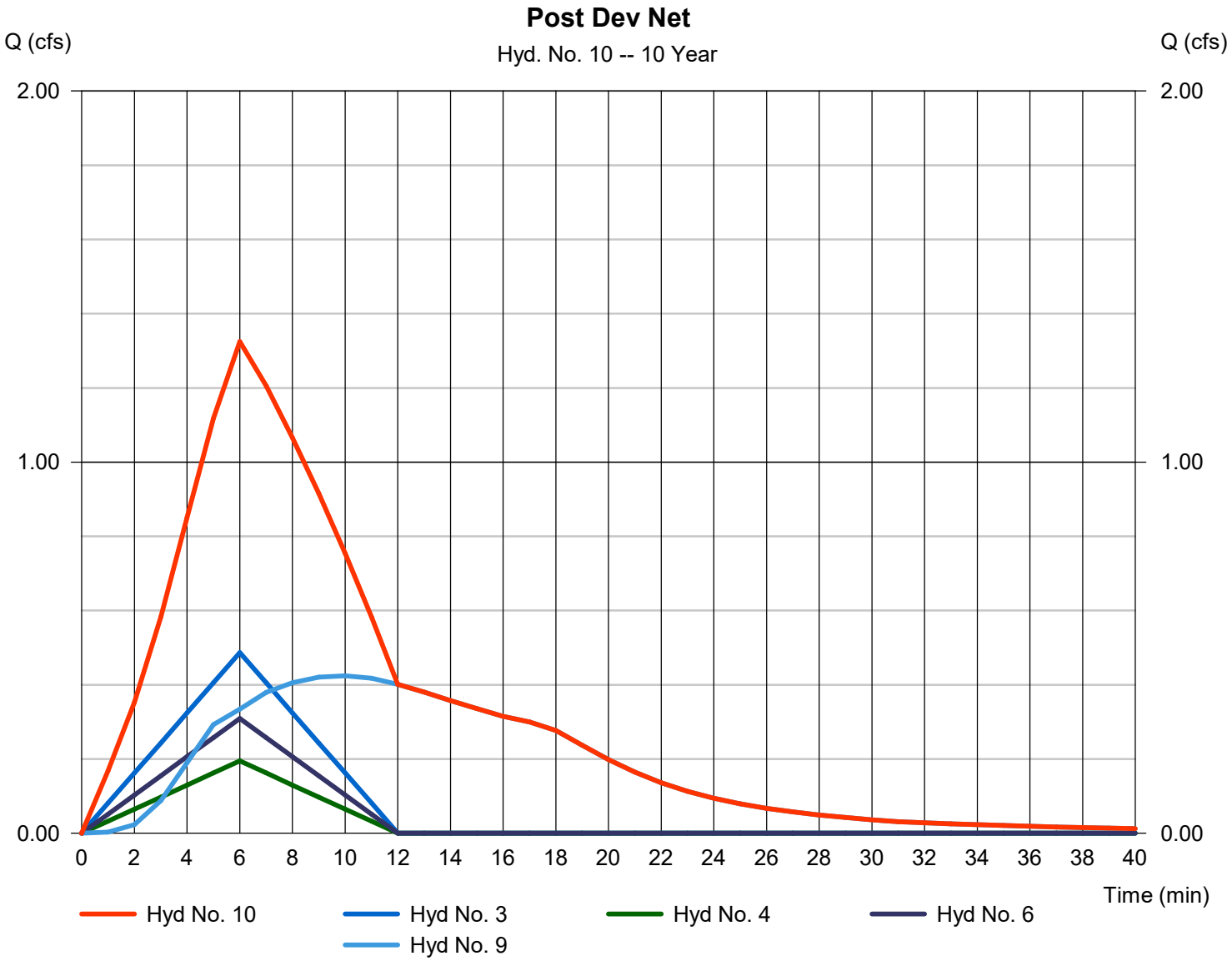


Hydrograph Report

Hyd. No. 10

Post Dev Net

Hydrograph type	= Combine	Peak discharge	= 1.325 cfs
Storm frequency	= 10 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 781 cuft
Inflow hyds.	= 3, 4, 6, 9	Contrib. drain. area	= 0.180 ac

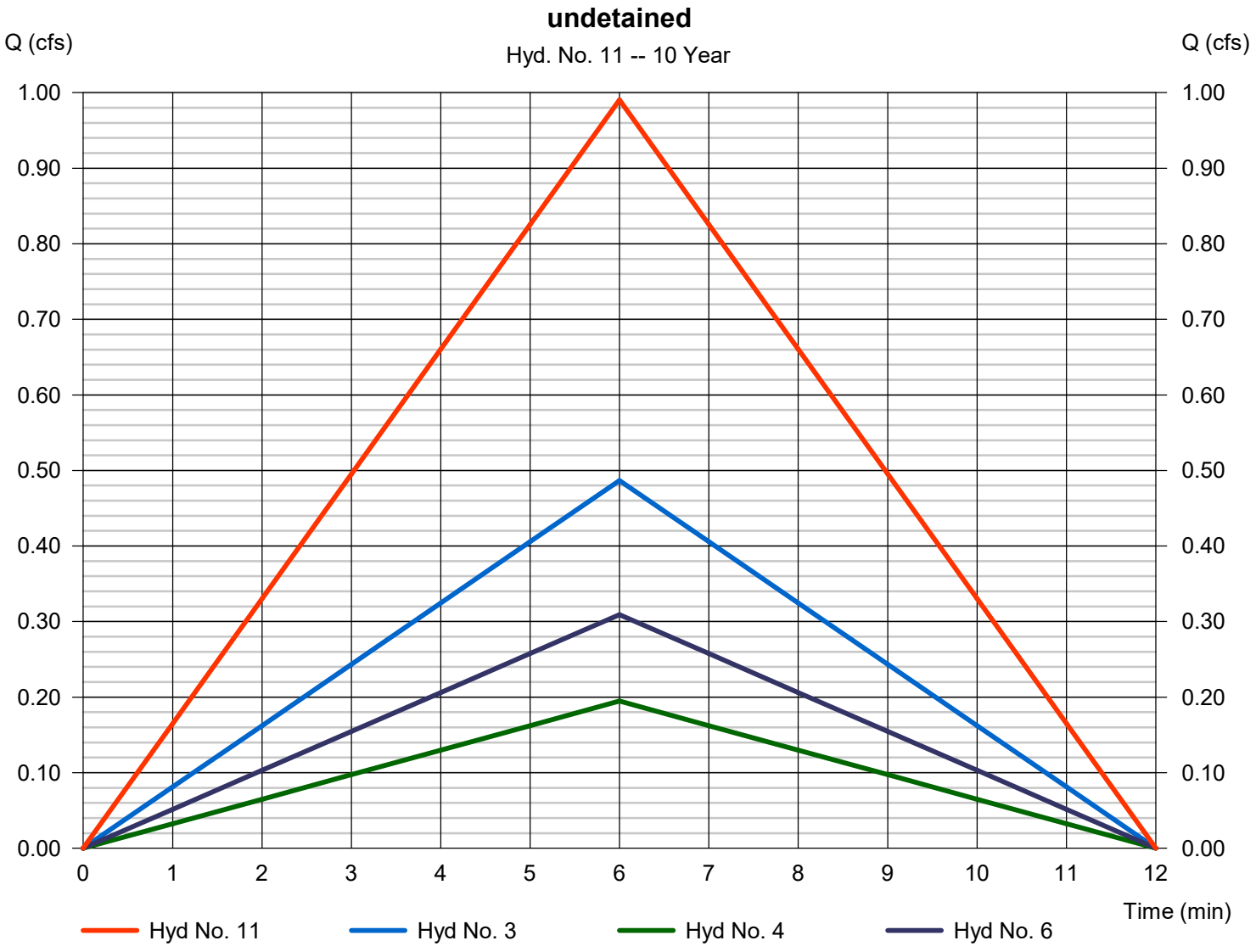


Hydrograph Report

Hyd. No. 11

undetained

Hydrograph type	=	Combine	Peak discharge	=	0.991 cfs
Storm frequency	=	10 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	357 cuft
Inflow hyds.	=	3, 4, 6	Contrib. drain. area	=	0.180 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

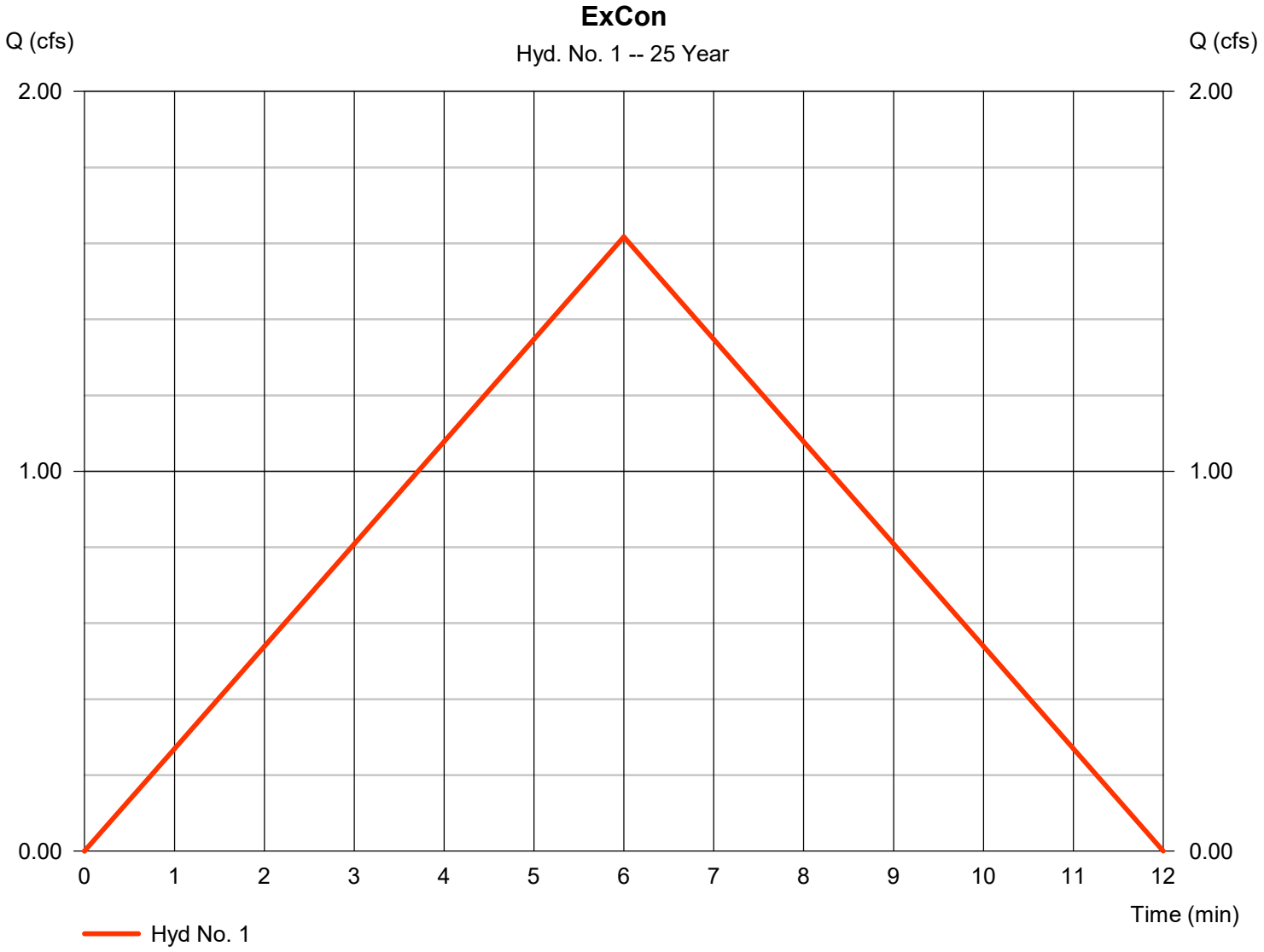
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.617	1	6	582	------	------	------	ExCon
2	Rational	1.099	1	6	396	------	------	------	Roofs to Detention
3	Rational	0.592	1	6	213	------	------	------	Roofs to Daylight
4	Rational	0.237	1	6	85	------	------	------	NW Undetained
5	Rational	0.339	1	6	122	------	------	------	South Green Space Basin
6	Rational	0.376	1	6	135	------	------	------	east side undetained
7	Combine	2.642	1	6	951	2, 3, 4, 5, 6	------	------	Post Dev Gross
8	Combine	1.437	1	6	517	2, 5,	------	------	to basin
9	Reservoir	0.478	1	10	516	8	863.13	329	Basin
10	Combine	1.578	1	6	949	3, 4, 6, 9	------	------	Post Dev Net
11	Combine	1.204	1	6	433	3, 4, 6,	------	------	undetained

Hydrograph Report

Hyd. No. 1

ExCon

Hydrograph type	=	Rational	Peak discharge	=	1.617 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	582 cuft
Drainage area	=	0.410 ac	Runoff coeff.	=	0.42
Intensity	=	9.392 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

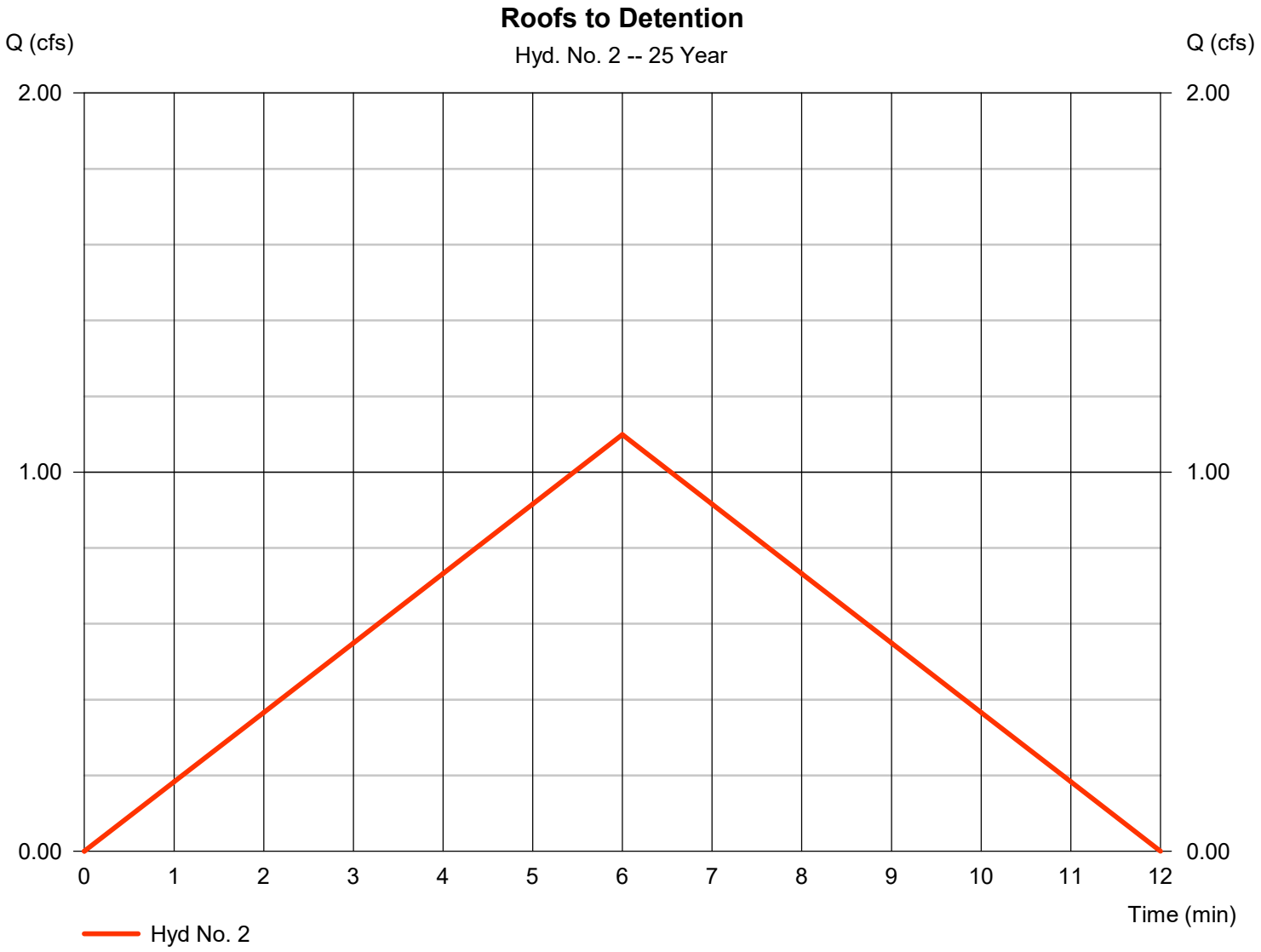


Hydrograph Report

Hyd. No. 2

Roofs to Detention

Hydrograph type	=	Rational	Peak discharge	=	1.099 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	396 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.9
Intensity	=	9.392 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

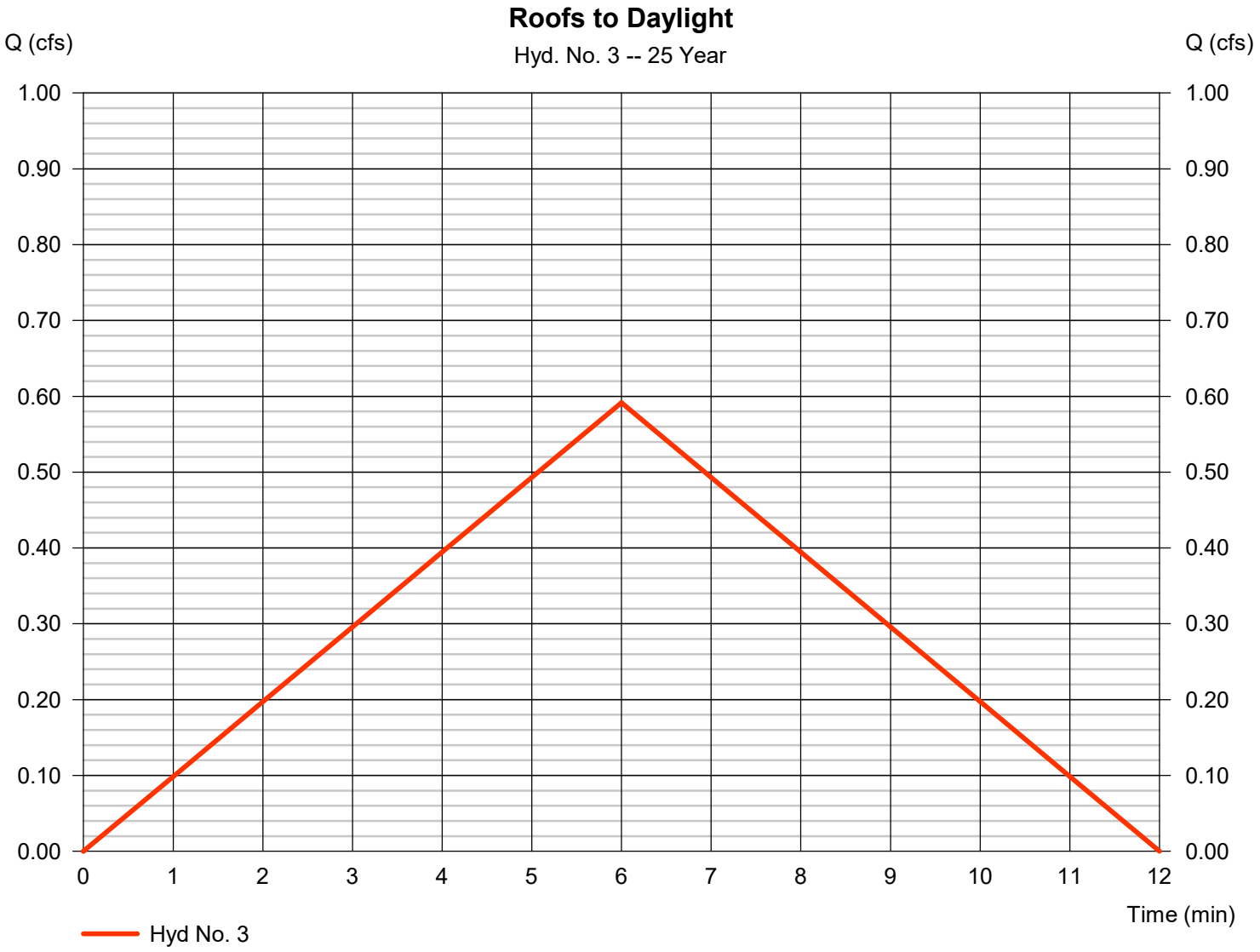


Hydrograph Report

Hyd. No. 3

Roofs to Daylight

Hydrograph type	=	Rational	Peak discharge	=	0.592 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	213 cuft
Drainage area	=	0.070 ac	Runoff coeff.	=	0.9
Intensity	=	9.392 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

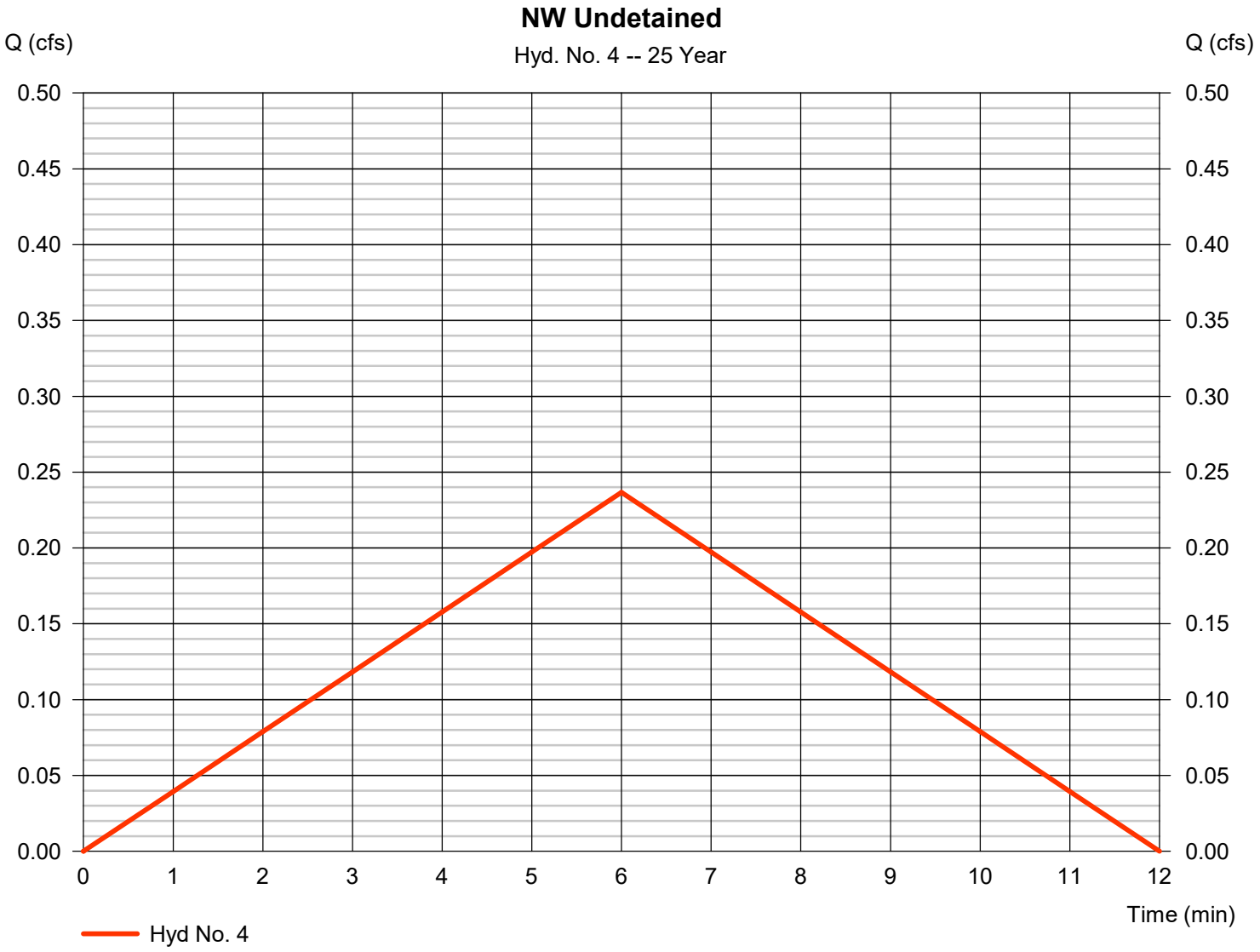


Hydrograph Report

Hyd. No. 4

NW Undetained

Hydrograph type	=	Rational	Peak discharge	=	0.237 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	85 cuft
Drainage area	=	0.060 ac	Runoff coeff.	=	0.42
Intensity	=	9.392 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

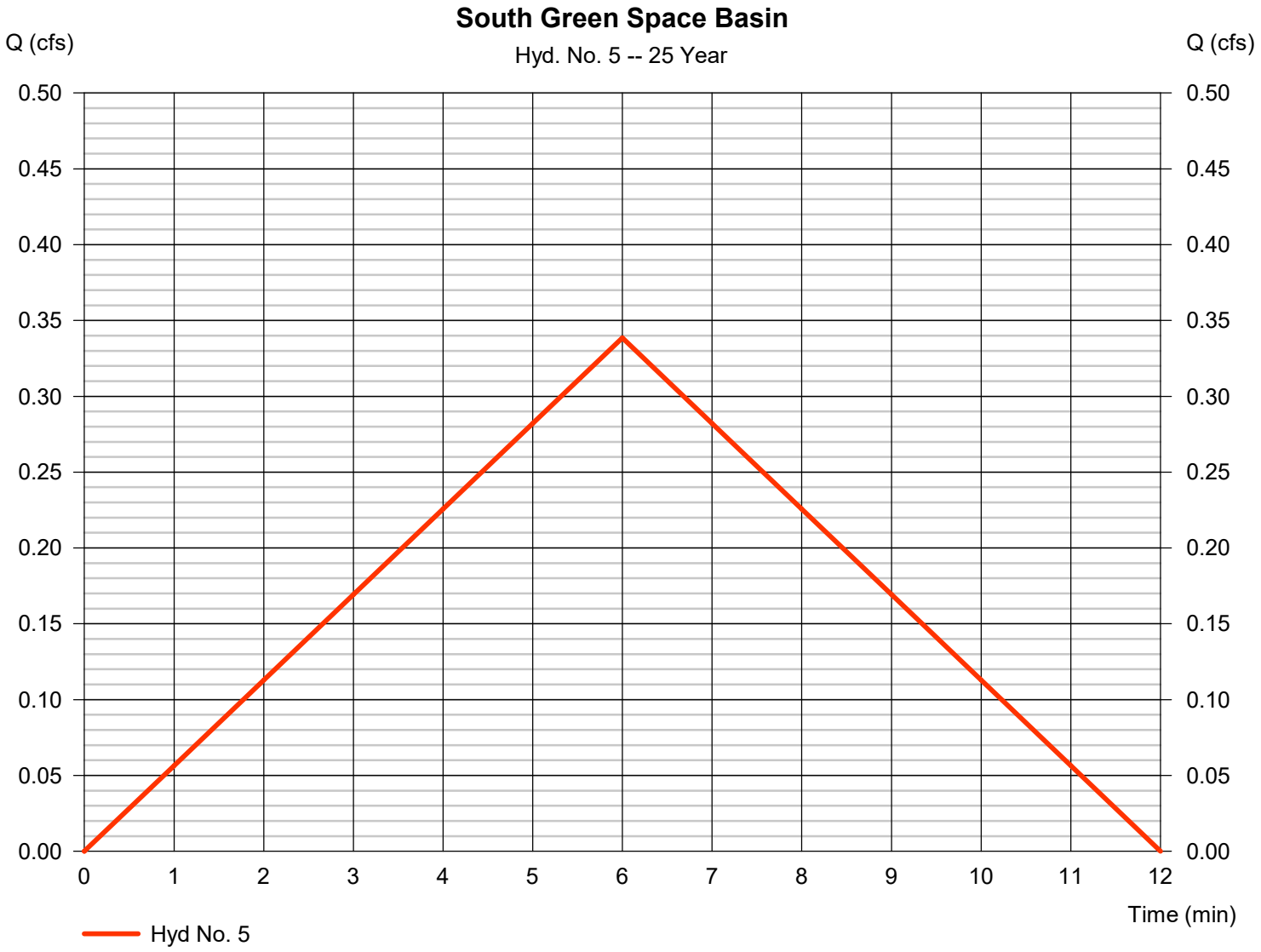


Hydrograph Report

Hyd. No. 5

South Green Space Basin

Hydrograph type	=	Rational	Peak discharge	=	0.339 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	122 cuft
Drainage area	=	0.103 ac	Runoff coeff.	=	0.35
Intensity	=	9.392 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

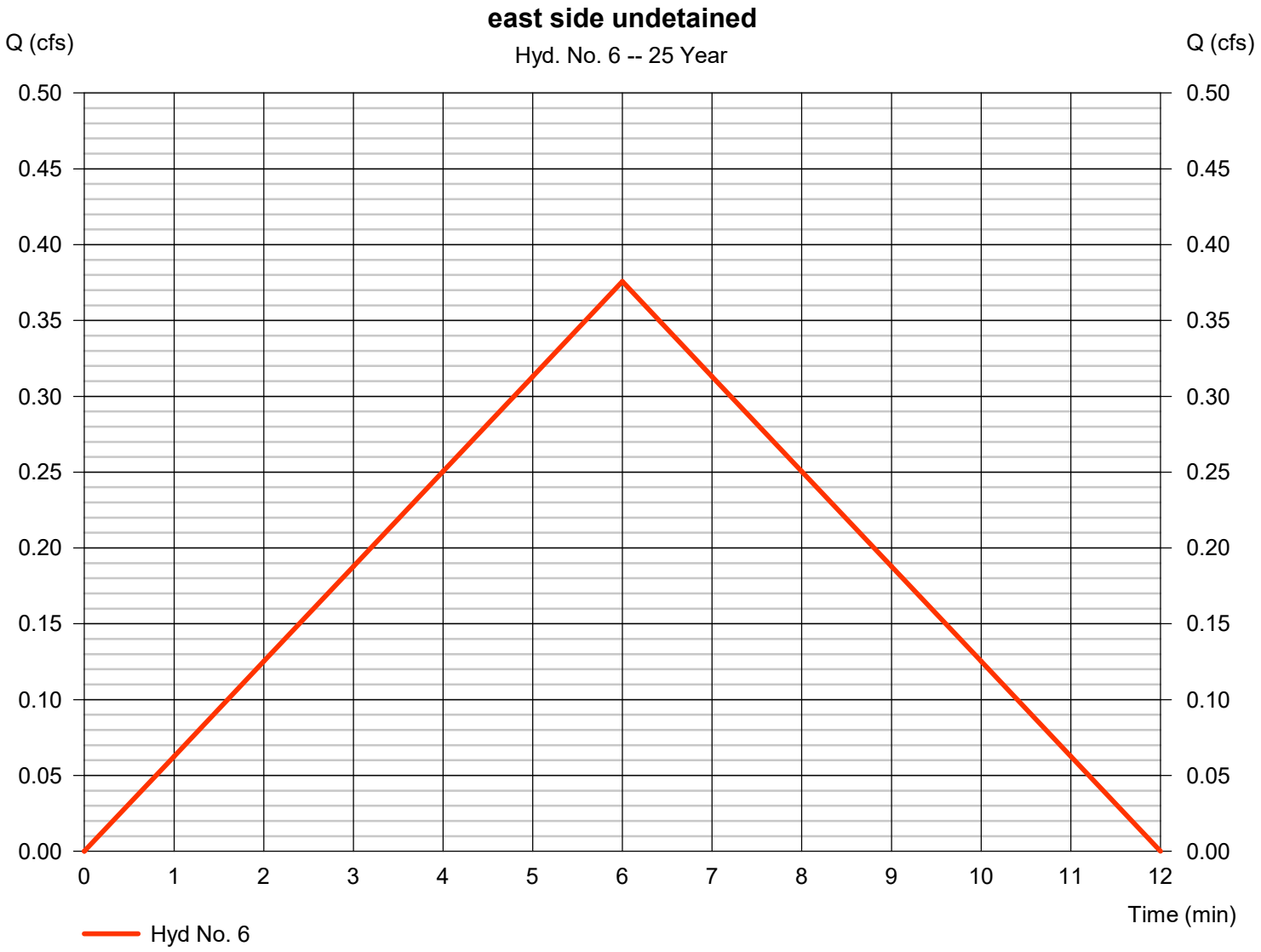


Hydrograph Report

Hyd. No. 6

east side undetained

Hydrograph type	=	Rational	Peak discharge	=	0.376 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	135 cuft
Drainage area	=	0.050 ac	Runoff coeff.	=	0.8
Intensity	=	9.392 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

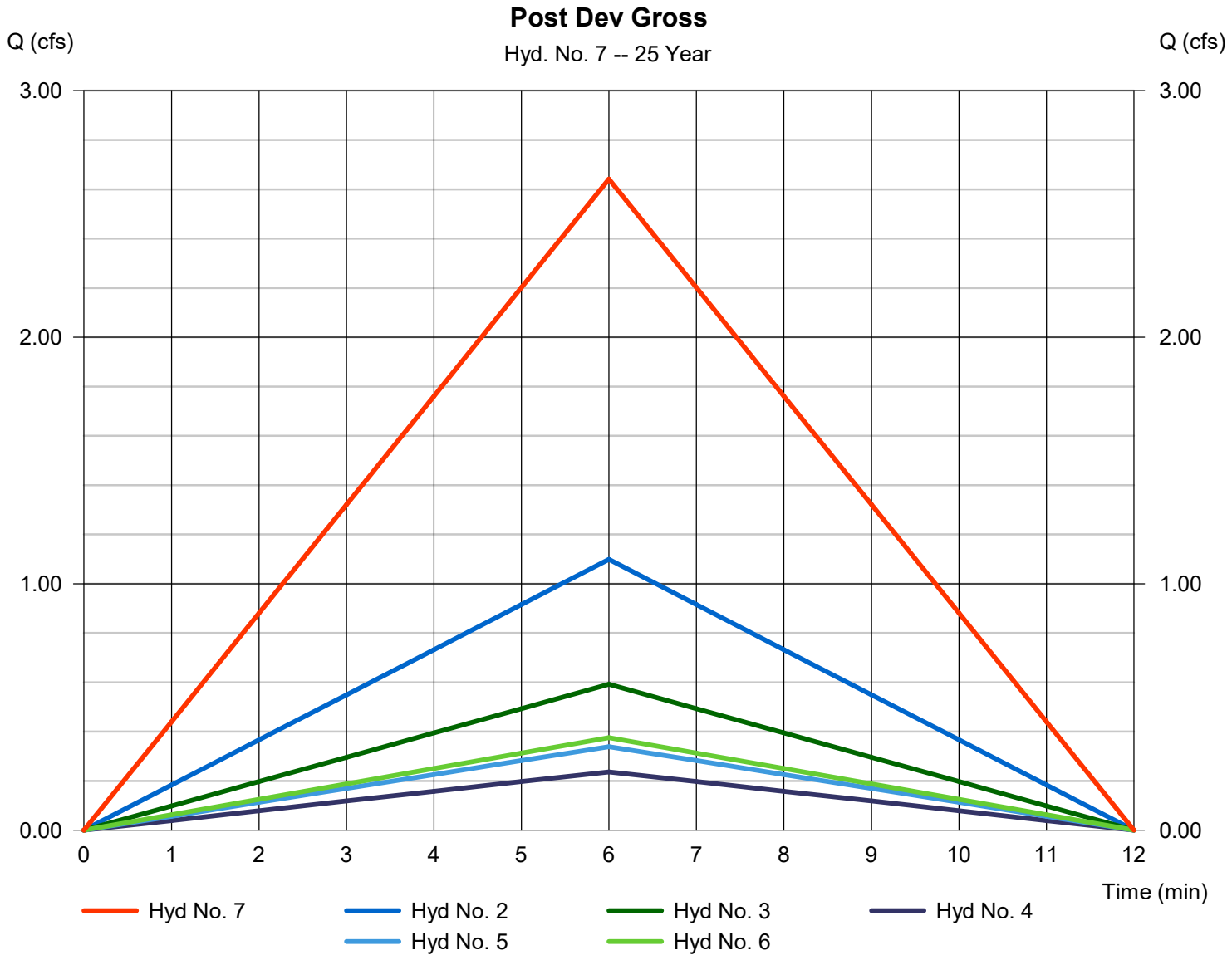


Hydrograph Report

Hyd. No. 7

Post Dev Gross

Hydrograph type	=	Combine	Peak discharge	=	2.642 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	951 cuft
Inflow hyds.	=	2, 3, 4, 5, 6	Contrib. drain. area	=	0.413 ac

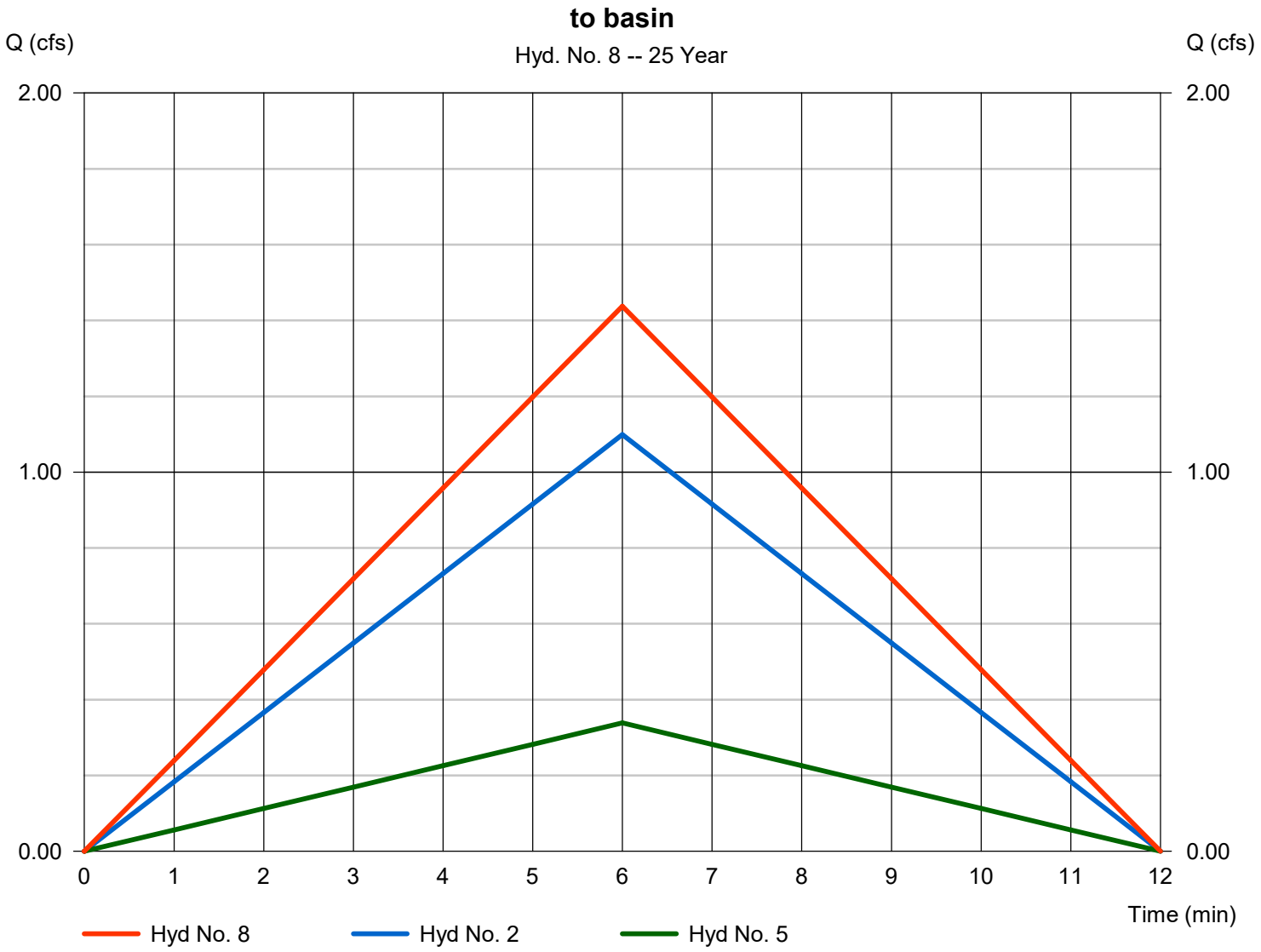


Hydrograph Report

Hyd. No. 8

to basin

Hydrograph type	=	Combine	Peak discharge	=	1.437 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	517 cuft
Inflow hyds.	=	2, 5	Contrib. drain. area	=	0.233 ac



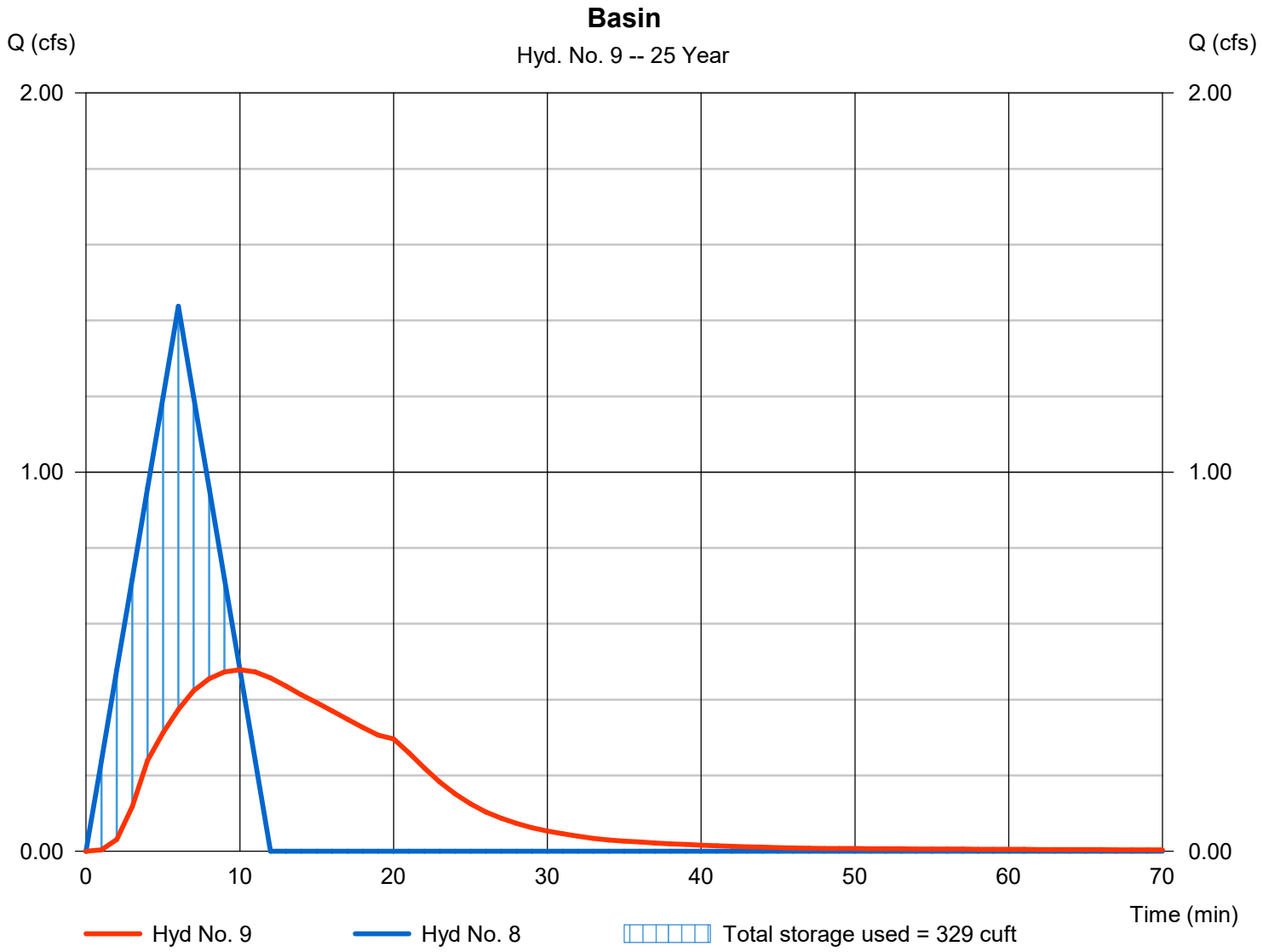
Hydrograph Report

Hyd. No. 9

Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.478 cfs
Storm frequency	=	25 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	516 cuft
Inflow hyd. No.	=	8 - to basin	Max. Elevation	=	863.13 ft
Reservoir name	=	South Basin	Max. Storage	=	329 cuft

Storage Indication method used.

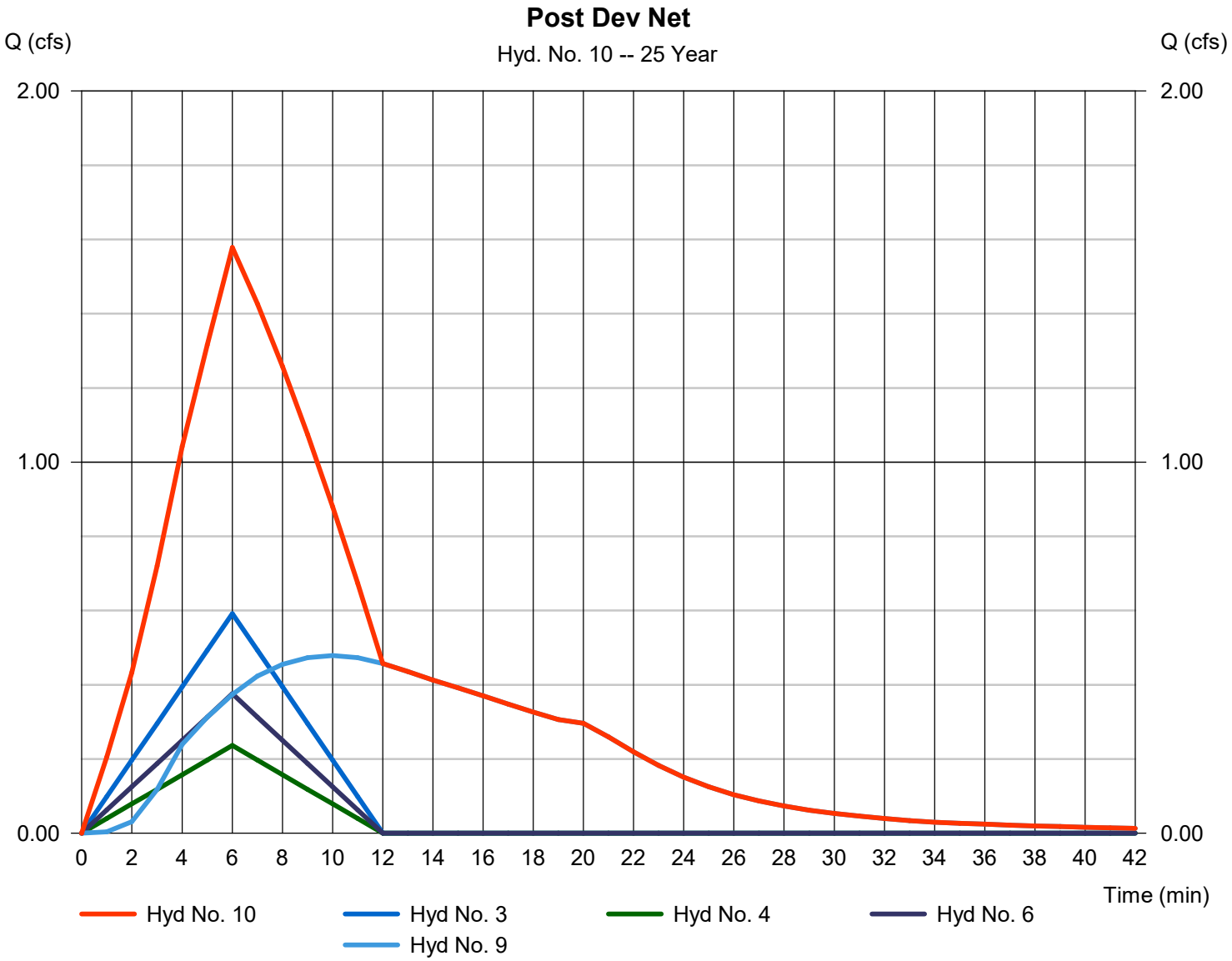


Hydrograph Report

Hyd. No. 10

Post Dev Net

Hydrograph type	=	Combine	Peak discharge	=	1.578 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	949 cuft
Inflow hyds.	=	3, 4, 6, 9	Contrib. drain. area	=	0.180 ac

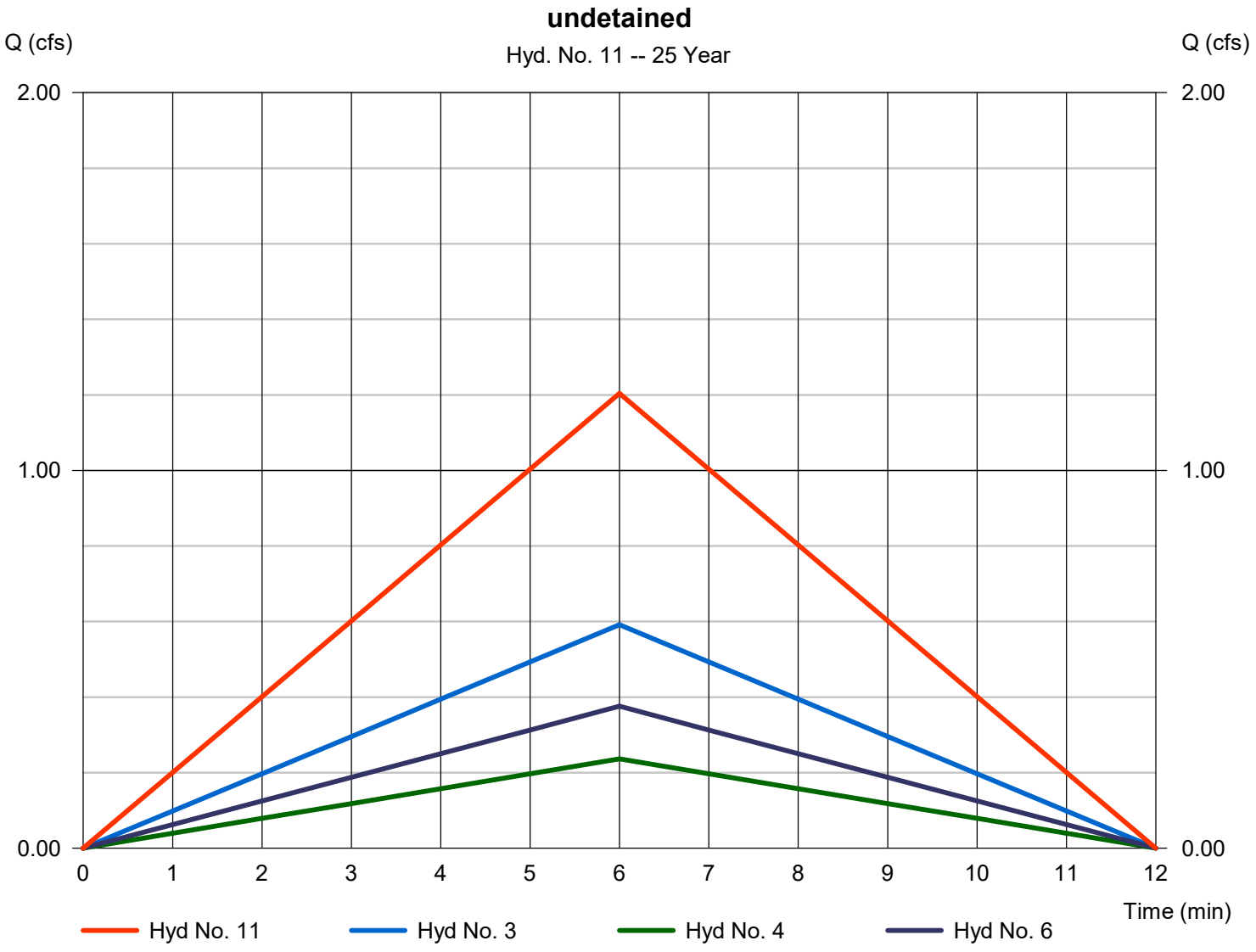


Hydrograph Report

Hyd. No. 11

undetained

Hydrograph type	=	Combine	Peak discharge	=	1.204 cfs
Storm frequency	=	25 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	433 cuft
Inflow hyds.	=	3, 4, 6	Contrib. drain. area	=	0.180 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	2.078	1	6	748	------	------	------	ExCon
2	Rational	1.412	1	6	508	------	------	------	Roofs to Detention
3	Rational	0.760	1	6	274	------	------	------	Roofs to Daylight
4	Rational	0.304	1	6	109	------	------	------	NW Undetained
5	Rational	0.435	1	6	157	------	------	------	South Green Space Basin
6	Rational	0.483	1	6	174	------	------	------	east side undetained
7	Combine	3.395	1	6	1,222	2, 3, 4, 5, 6	------	------	Post Dev Gross
8	Combine	1.847	1	6	665	2, 5,	------	------	to basin
9	Reservoir	0.558	1	10	663	8	863.21	439	Basin
10	Combine	1.976	1	6	1,220	3, 4, 6, 9	------	------	Post Dev Net
11	Combine	1.547	1	6	557	3, 4, 6,	------	------	undetained

Hydrograph Report

Hyd. No. 1

ExCon

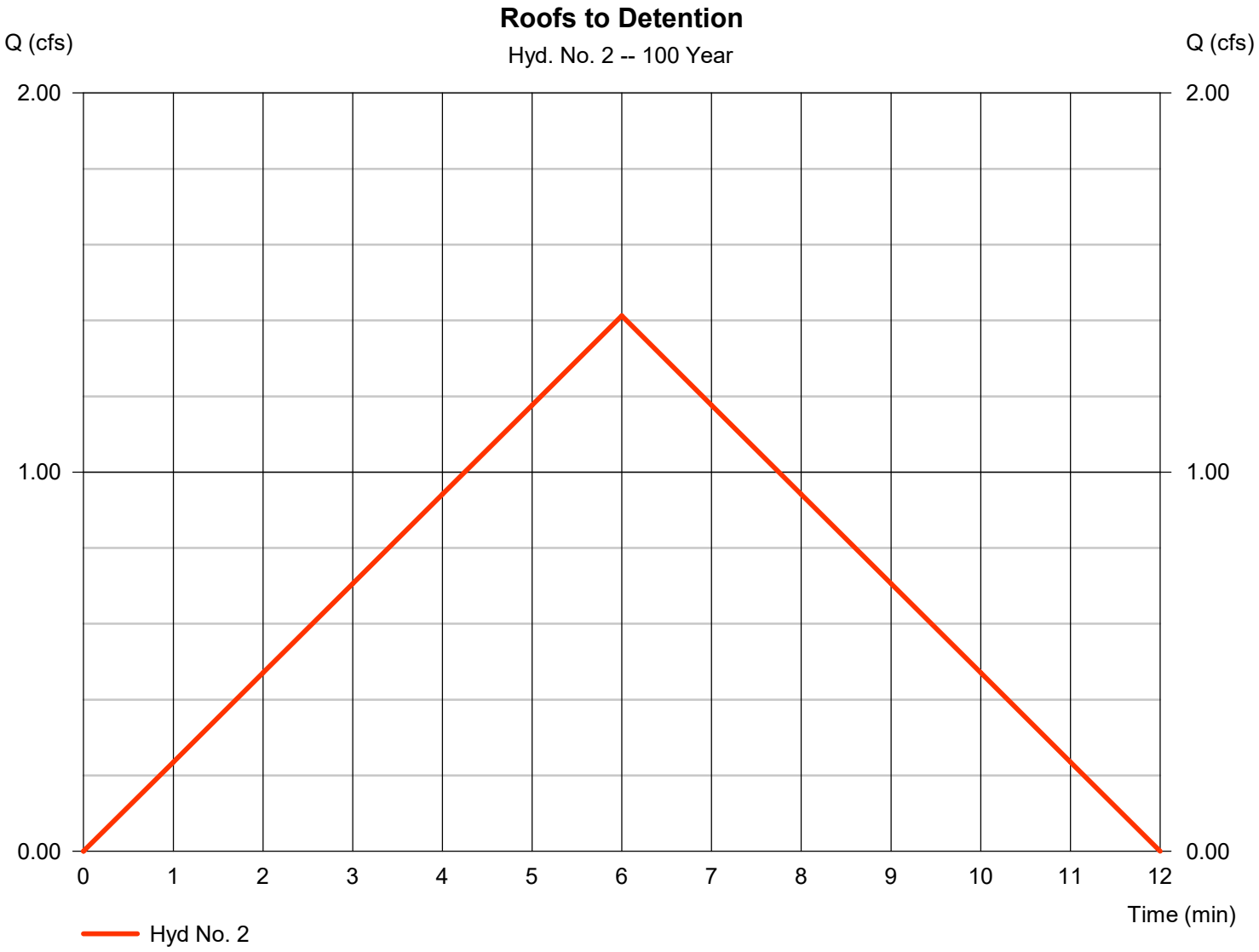
Hydrograph type	=	Rational	Peak discharge	=	2.078 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	748 cuft
Drainage area	=	0.410 ac	Runoff coeff.	=	0.42
Intensity	=	12.069 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 2

Roofs to Detention

Hydrograph type	=	Rational	Peak discharge	=	1.412 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	508 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.9
Intensity	=	12.069 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

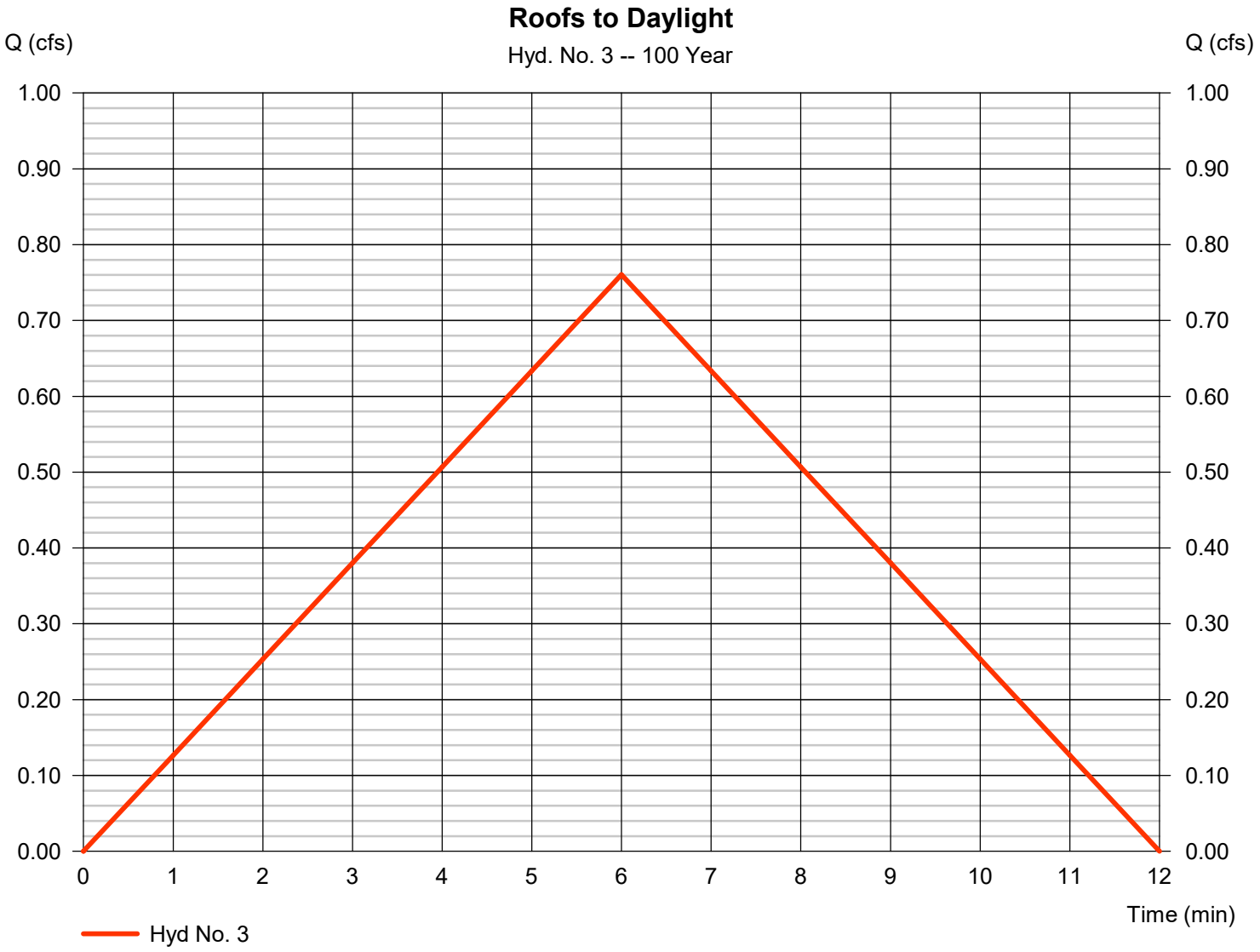


Hydrograph Report

Hyd. No. 3

Roofs to Daylight

Hydrograph type	= Rational	Peak discharge	= 0.760 cfs
Storm frequency	= 100 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 274 cuft
Drainage area	= 0.070 ac	Runoff coeff.	= 0.9
Intensity	= 12.069 in/hr	Tc by User	= 6.00 min
IDF Curve	= Lansing KS.IDF	Asc/Rec limb fact	= 1/1

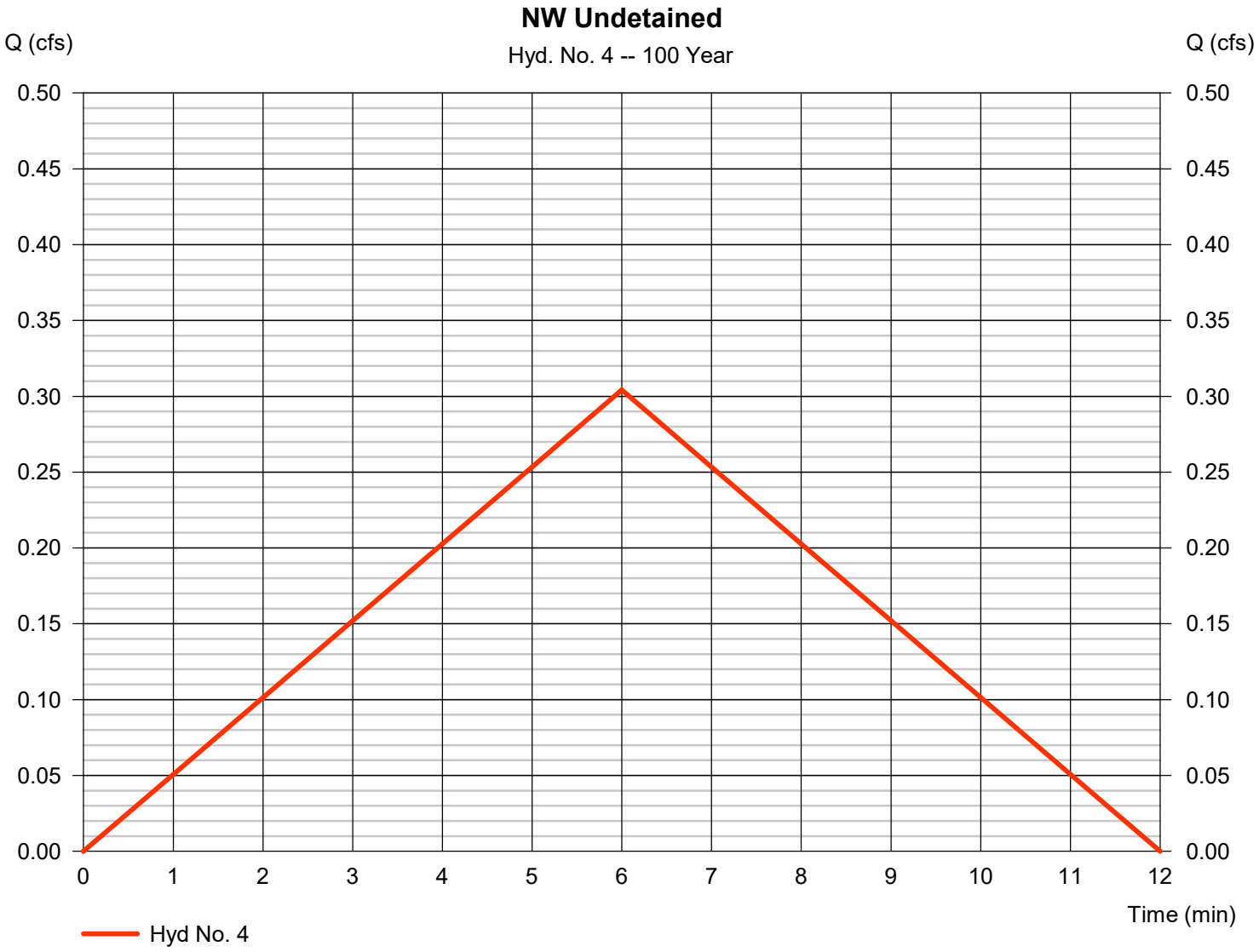


Hydrograph Report

Hyd. No. 4

NW Undetained

Hydrograph type	=	Rational	Peak discharge	=	0.304 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	109 cuft
Drainage area	=	0.060 ac	Runoff coeff.	=	0.42
Intensity	=	12.069 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

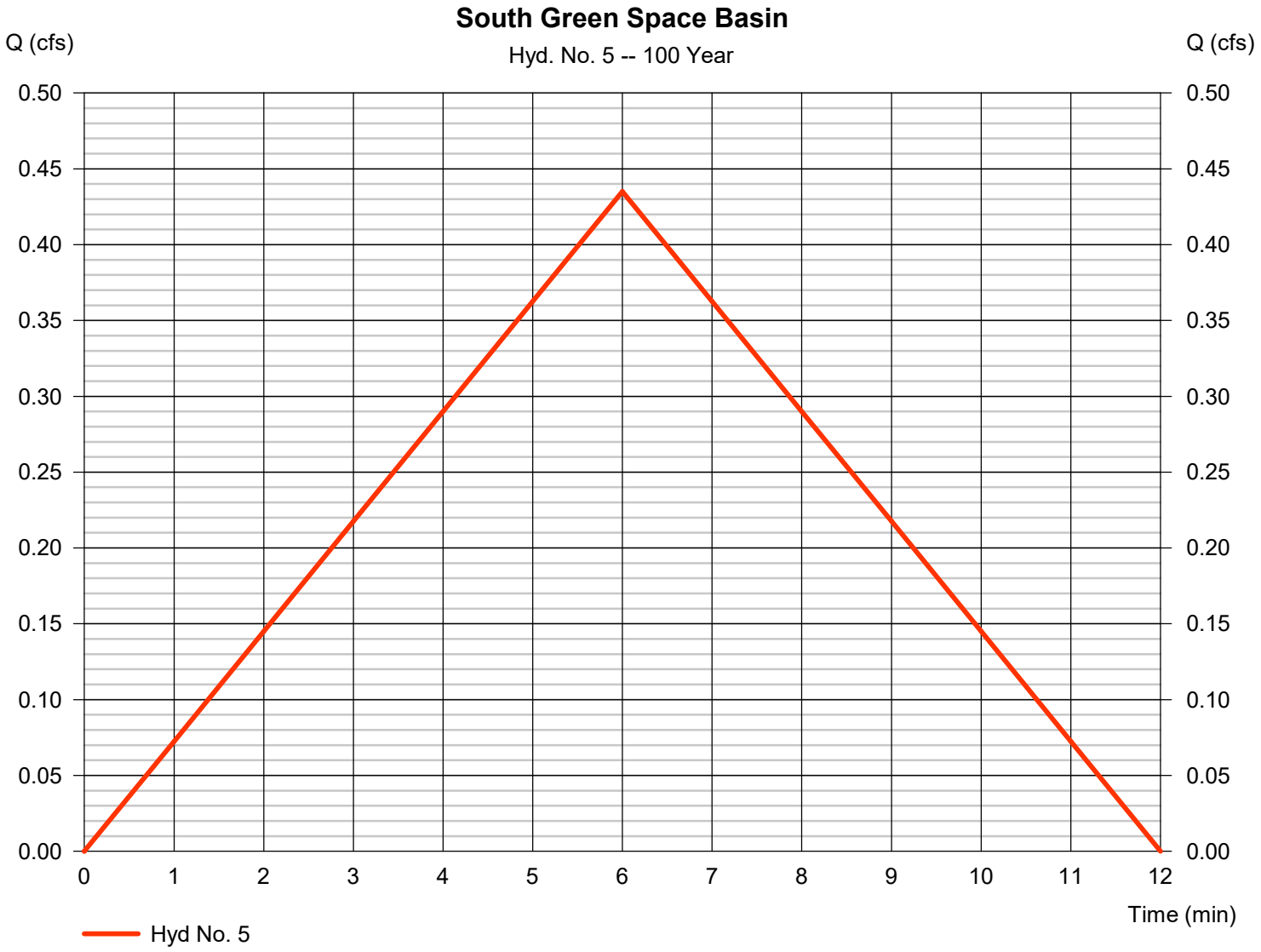


Hydrograph Report

Hyd. No. 5

South Green Space Basin

Hydrograph type	=	Rational	Peak discharge	=	0.435 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	157 cuft
Drainage area	=	0.103 ac	Runoff coeff.	=	0.35
Intensity	=	12.069 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

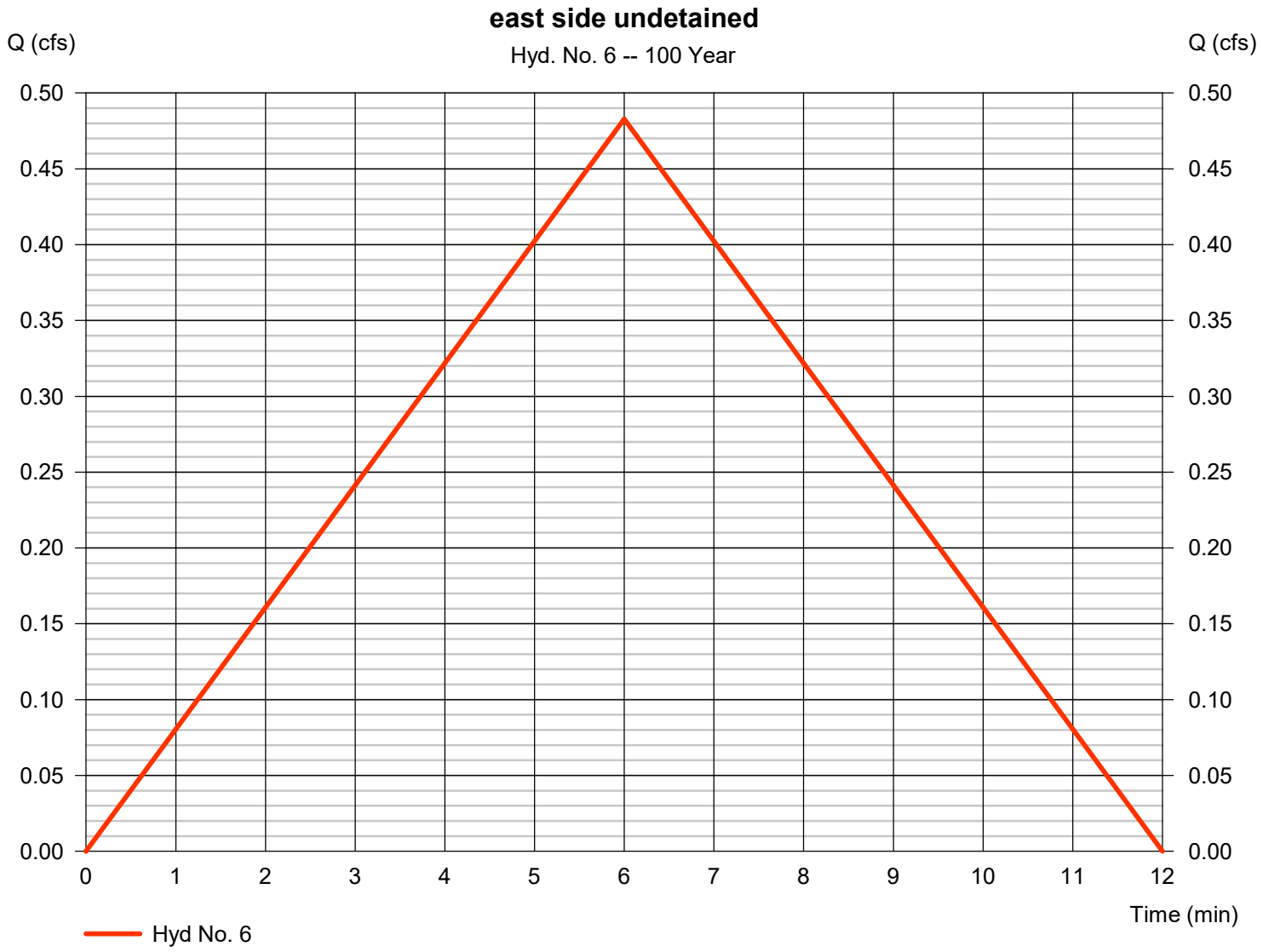


Hydrograph Report

Hyd. No. 6

east side undetained

Hydrograph type	=	Rational	Peak discharge	=	0.483 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	174 cuft
Drainage area	=	0.050 ac	Runoff coeff.	=	0.8
Intensity	=	12.069 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Lansing KS.IDF	Asc/Rec limb fact	=	1/1

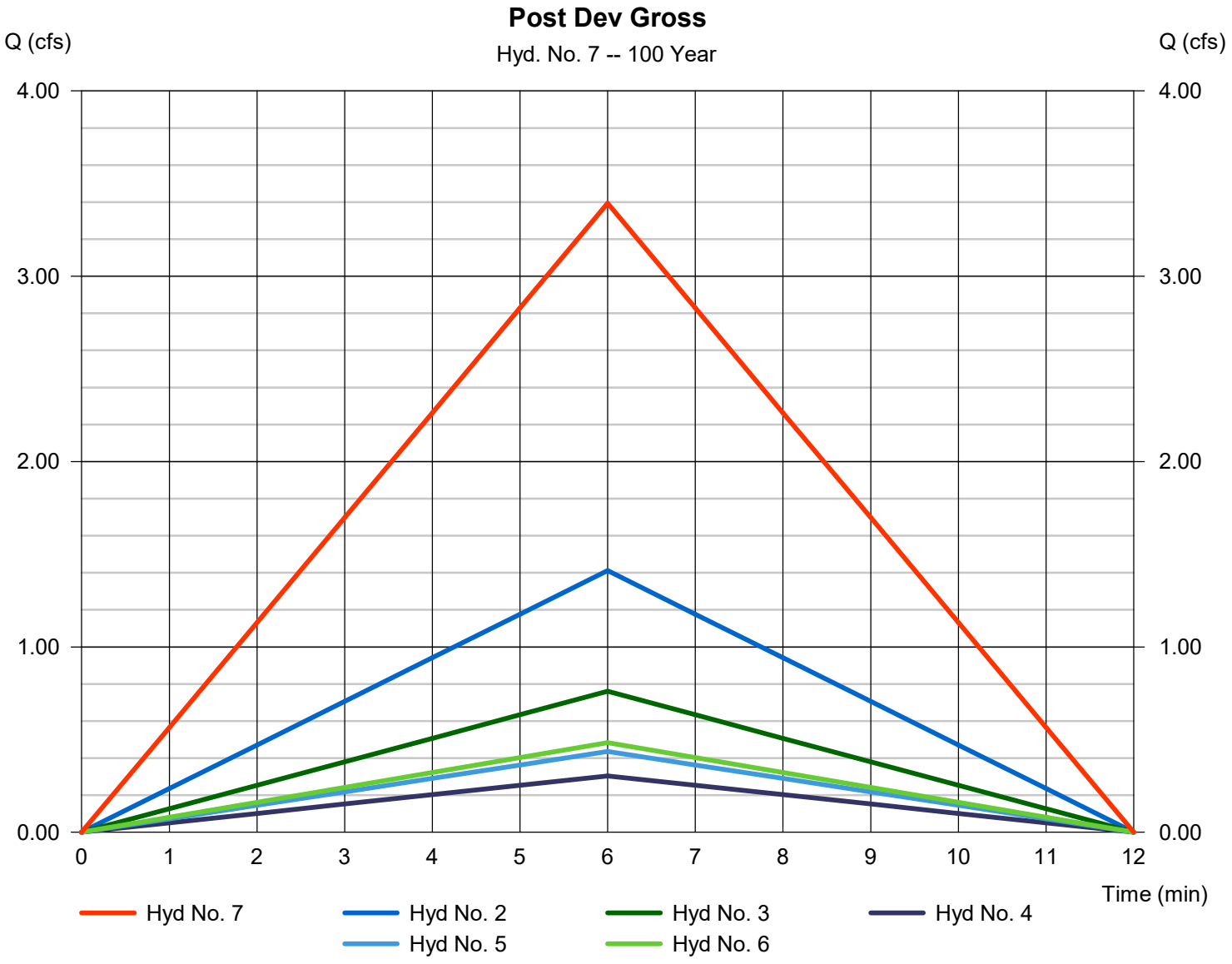


Hydrograph Report

Hyd. No. 7

Post Dev Gross

Hydrograph type	= Combine	Peak discharge	= 3.395 cfs
Storm frequency	= 100 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 1,222 cuft
Inflow hyds.	= 2, 3, 4, 5, 6	Contrib. drain. area	= 0.413 ac

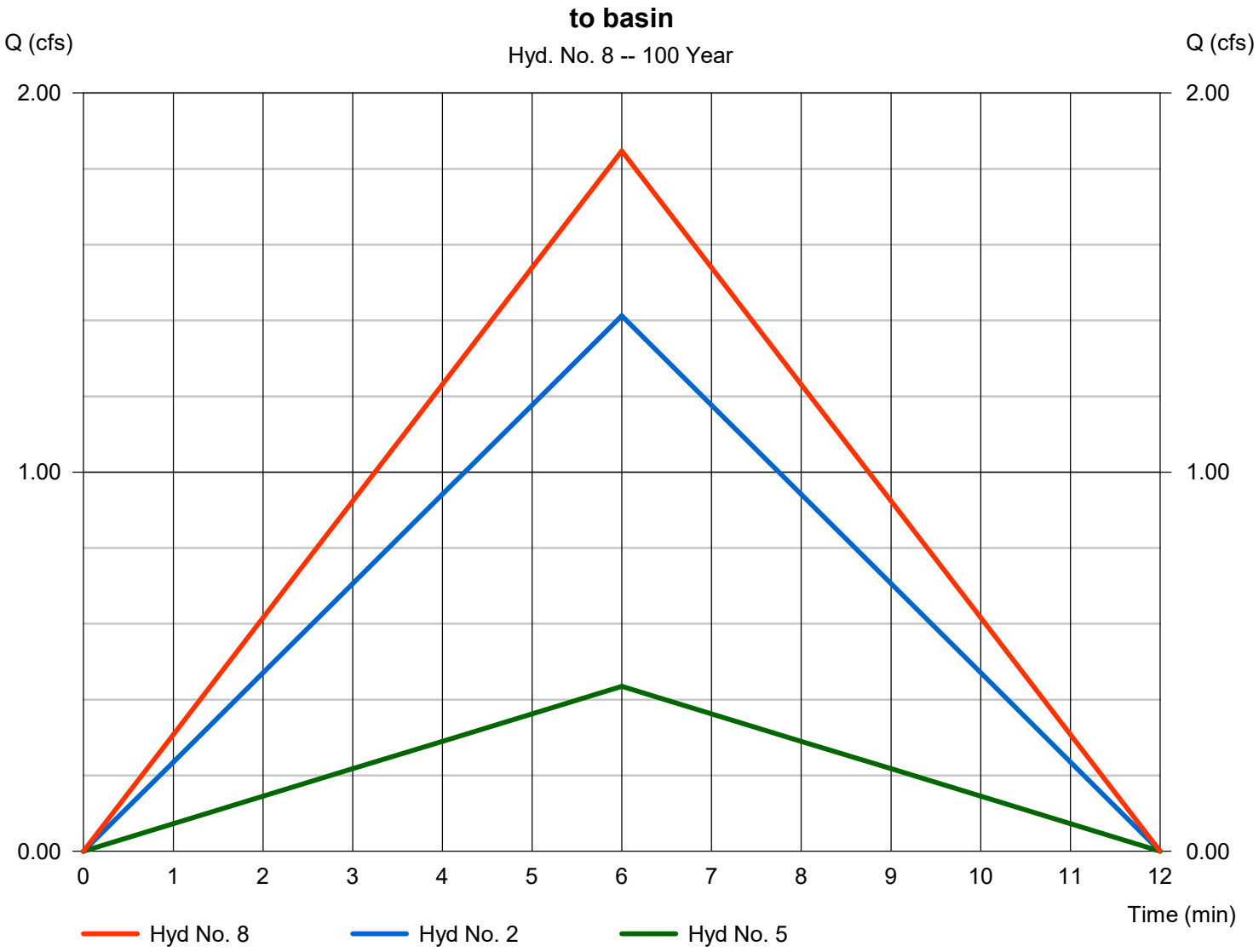


Hydrograph Report

Hyd. No. 8

to basin

Hydrograph type	= Combine	Peak discharge	= 1.847 cfs
Storm frequency	= 100 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 665 cuft
Inflow hyds.	= 2, 5	Contrib. drain. area	= 0.233 ac



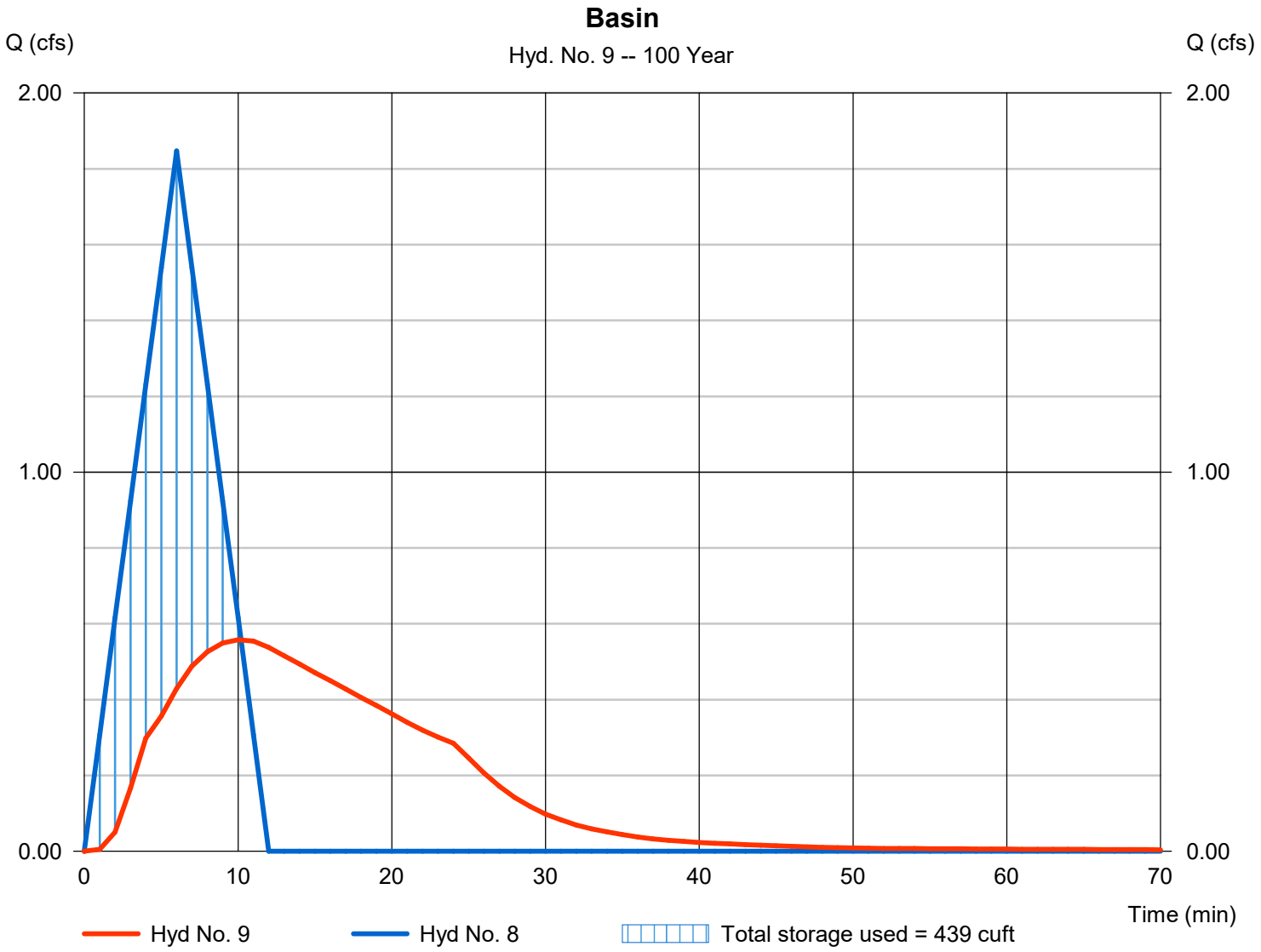
Hydrograph Report

Hyd. No. 9

Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.558 cfs
Storm frequency	=	100 yrs	Time to peak	=	10 min
Time interval	=	1 min	Hyd. volume	=	663 cuft
Inflow hyd. No.	=	8 - to basin	Max. Elevation	=	863.21 ft
Reservoir name	=	South Basin	Max. Storage	=	439 cuft

Storage Indication method used.

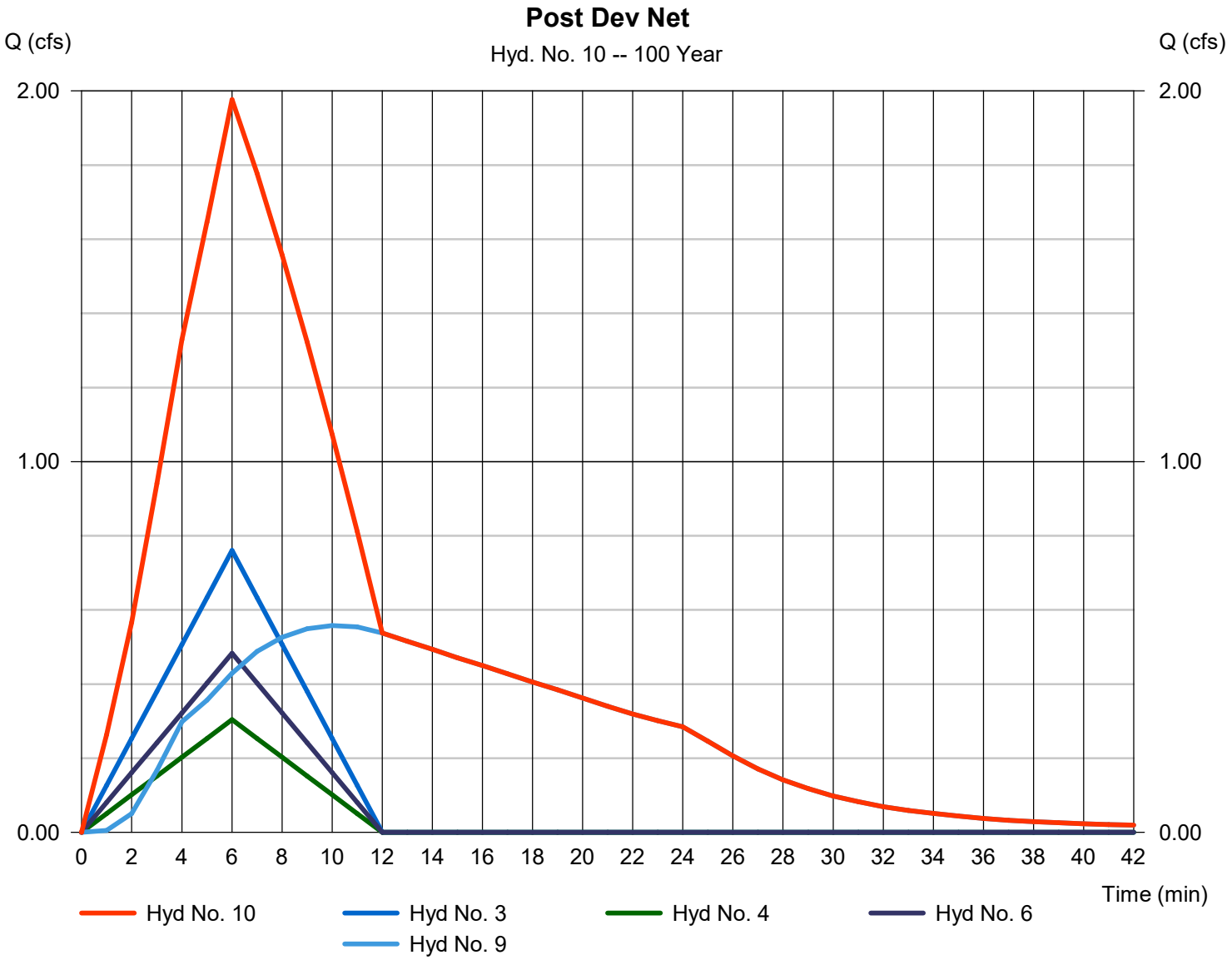


Hydrograph Report

Hyd. No. 10

Post Dev Net

Hydrograph type	= Combine	Peak discharge	= 1.976 cfs
Storm frequency	= 100 yrs	Time to peak	= 6 min
Time interval	= 1 min	Hyd. volume	= 1,220 cuft
Inflow hyds.	= 3, 4, 6, 9	Contrib. drain. area	= 0.180 ac



Hydrograph Report

Hyd. No. 11

undetained

Hydrograph type	=	Combine	Peak discharge	=	1.547 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	557 cuft
Inflow hyds.	=	3, 4, 6	Contrib. drain. area	=	0.180 ac