HYDROLOGIC REPORT

APNS 090-150-001 & 090-160-010
ANDERSON, CALIFORNIA

Prepared for

Zane Peterson

Prepared by

VESTRA Resources Inc.
5300 Aviation Drive
Redding, California 96002

72210

APRIL 2024

REGISTERED PROFESSIONAL ENGINEER
SUSAN DIANE GOODWIN
No. 61687
Exp 6/30/25
CIVIL
STATE OF CALIFORNIA

TABLE OF CONTENTS

SECTION

TABLES

APPENDICES

HYDROLOGIC REPORT

INTRODUCTION

This hydrology report has been prepared for the proposed outdoor storage, shop and office for APNs 090-150-001 and 090-160-010 on Kimberly Road.

SITE DESCRIPTION

Currently, the majority of the site is vacant and covered with grasses. There is a small portion of the site that was part of the developed area of the adjacent abandoned mill. The majority of the trees and shrubs are outside of the developed area and will remain. The project will be developed in phases. Phase 1 consists of removing the grasses and few trees and grading the site to allow for outdoor storage of equipment. Phases 2 and 3 will include the installation of a shop and office along with associated parking. A site plan is included in Appendix A.

The site currently sheet flows to wetland features that will remain onsite and undisturbed. The wetland in the front overflows to a swale that crosses the road through dual concrete culverts. Direction of flow onsite will not be changed by the project. The area of the site that will be used for the project drains to the front wetland area.

Sub-basins

For the hydrologic model, only the project site that is to be disturbed was analyzed. This area drains to the front as one basin, which was included in this analysis.

Soils

The soils information was obtained from the Natural Resources Conservation Service (NRCS) web soil survey for the project area. The soils for the site are loam and gravelly loam. The soils are Hydrologic Soil Group D. A soils map and description are included in Appendix B.

Land Use

The land use for the current project area is vacant with the area to be developed containing annual grasses. The proposed project will be two buildings, minor area of pavement and concrete with some landscaping along the property frontage and adjacent to the parking. Curve numbers for the pre-development and post development conditions were determined using the Shasta County standard curve numbers. CN values are a runoff coefficient that is used in the calculation of runoff. The CN value is based on soil type and ground cover. The higher the number, the more rainfall runoff is produced. For Hydrologic Soil Group D, pre-development CN for annual grass is 81. Post development dirt and building/paved area is 89.

METHODOLOGY

The SCS method was used to develop 10-, 25-, and 100-year flows for the pre- and post-project conditions. Hydroflow Hydrographs was used to analyze pre- and post-development flows for the project site, utilizing curve numbers noted above.

RESULTS OF THE HYDROLOGIC ANALYSIS

The SCS method was used to develop 10-, 25-, and 100-year flows for the pre- and post-project conditions. Appendix A contains a base map of the site with basin area, based on SCS "CN" numbers, which was then input into the hydrograph program for use in determining the pre- and post-peak flows. The curve numbers are from the Shasta County Standards contained in Appendix C. Results of the analysis are included herein in Appendix D. Table 1 includes the pre and post flows for the site.

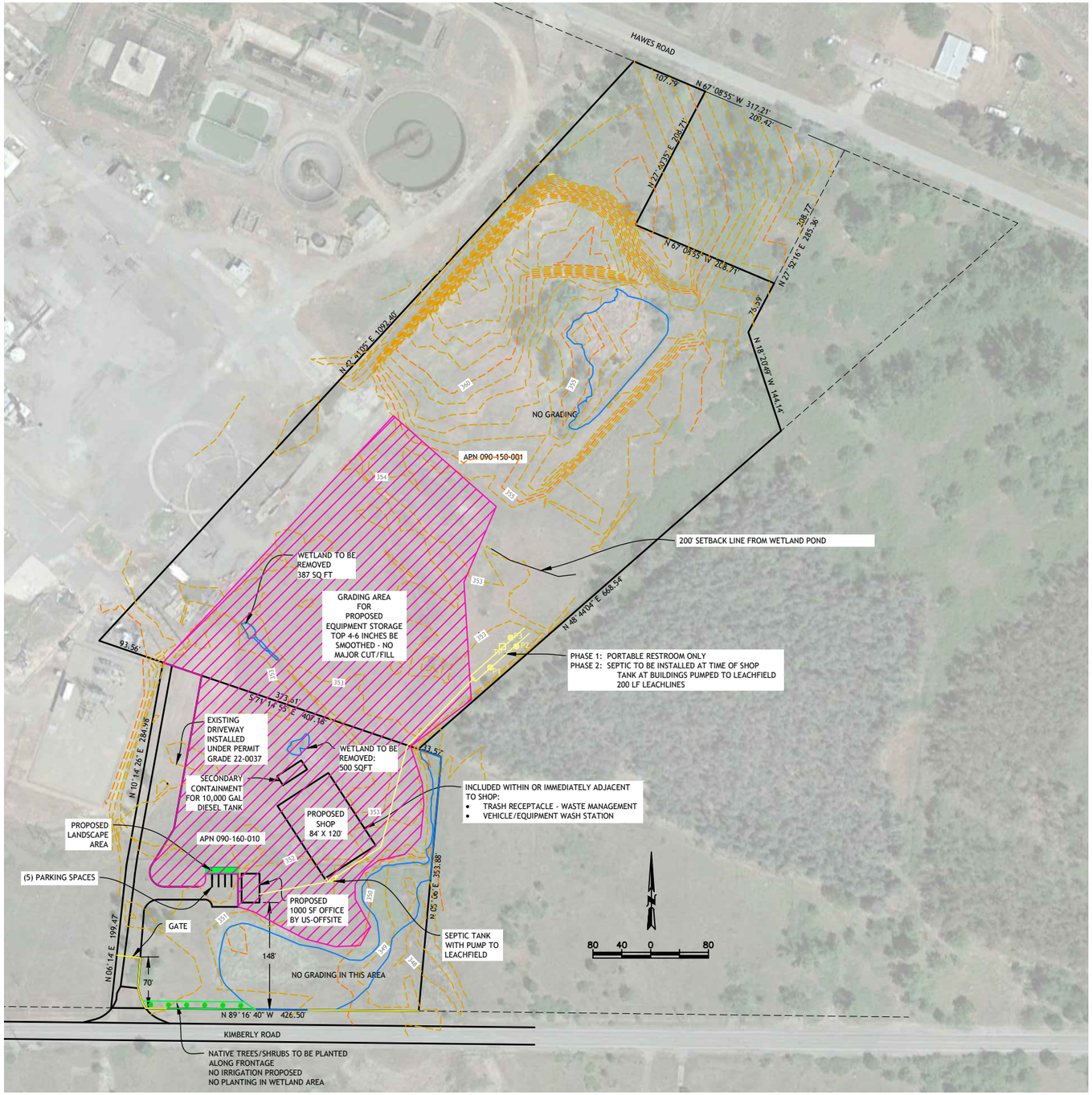
Table 1
SUMMARY OF FLOWS

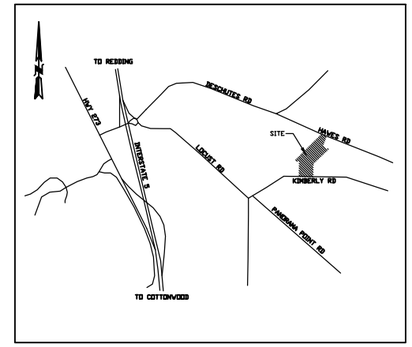
Event	Pre-Development (cfs)	Phase 1 Post Development (cfs)	Phase 2 & 3 Post Development (cfs)
10-year	1.86	2.78	2.90
25-year	2.48	3.49	3.60
100-year	3.45	4.57	4.69

The development of the site will slightly increase the runoff from the site, which will be directed to the wetland area at the front of the site where it currently flows. The wetland area serves as a detention basin for the stormwater flows. A channel exits the site at the southeast corner of the site through dual concrete pipes that cross Kimberly Road.

Appendix A

Site Plan





VICINITY MAP
N.T.S.

NOTES:

TOTAL AREA =	13.9 ACRES (606,835 SF)
GRADED AREA =	5 ACRES
PROPOSED STRUCTURE AREA =	11,080 SF

PROJECT PHASES:

PHASE 1) SMOOTH AND LEVEL SITE WITHIN "GRADING AREA",
TOUCH UP DRIVEWAY AREA,
AND GRADE PAD FOR SHOP

PHASE 2) INSTALL SHOP, FUEL STORAGE TANK
WITH SECONDARY CONTAINMENT AND SEPTIC

PHASE 3) INSTALL OFFICE - BY US-OFFSITE, REDDING
(STICK BUILT AT OFFSITE LOCATION AND DELIVERED
TO SITE & PLACED ON PERMANENT FOUNDATION)

EARTHWORK:

2,490 CY CUT/FILL
203,750 SF OF DISTURBED AREA

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY
1"

VESTRA
www.vestra.com
(530) 223-2585
FAX (530) 223-1145
5300 AVIATION DRIVE ~ REDDING, CA 96002

NO.	DATE	BY	REVISION

DSGN: CS DR: SG CHK: SG APVD: SG

SITE PLAN
KIMBERLY ROAD APN 090-150-001 AND 191-160-010
MOSSBACK LAND CO. LLC.
SHASTA COUNUTY, CALIFORNIA

SHEET 1 OF 1
DATE 04/30/24
JOB NO.

P:\CAD\22210 MOSSBACK-PETERSON TIMBER\MINORUSE_GRADINGPLAN.DWG

Appendix B

Soils Information

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 Shasta County Area, California

Zane Peterson

April 27, 2024

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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.


122° 16' 8" W
122° 15' 50" W
562000
562070
562140
562210
562280
562350
562420
40° 26' 15" N
40° 25' 56" N
4476580
4476510
4476440
4476370
4476300
4476230
4476160
4476090
4476020
Hawes Rd
MgA
MgA
PmA
MgA
PmA
PlA
PoA
MhA
PoA
Kimberly
Soil Map may not be valid at this scale.
Map Scale: 1:2,750 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0
40
80
160
240
Feet
0
100
200
400
600
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Shasta County Area, California
Survey Area Data: Version 19, Aug 28, 2023

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

Date(s) aerial images were photographed: May 8, 2019—Jun 21, 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
MgA	Moda loam, 0 to 3 percent slopes, MLRA 17	3.0	20.1%
MhA	Moda loam, seeped, 0 to 3 percent slopes	5.3	35.6%
PlA	Perkins loam, moist, 0 to 3 percent slopes, MLRA 17	0.0	0.0%
PmA	Perkins gravelly loam, gravelly clay loam substratum, 0 to 3 percent slopes, MLRA 17	2.6	17.4%
PoA	Perkins gravelly loam, moderately deep, 0 to 3 percent slopes	4.0	26.9%
Totals for Area of Interest		**14.9**	**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.

Shasta County Area, California

MgA—Moda loam, 0 to 3 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2w8c8
Elevation: 70 to 630 feet
Mean annual precipitation: 22 to 45 inches
Mean annual air temperature: 62 degrees F
Frost-free period: 185 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Moda

Setting

Landform: Fan remnants, stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock

Typical profile

Ap1 - 0 to 1 inches: loam
Ap2 - 1 to 7 inches: loam
Bt - 7 to 14 inches: loam
2Bt - 14 to 21 inches: clay
2Btqm1 - 21 to 23 inches: cemented material
2Btqm2 - 23 to 30 inches: cemented material
2C - 30 to 54 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 3 to 37 inches to abrupt textural change; 18 to 39 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 14 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: R015XY007CA - Alluvial Fan

Other vegetative classification: LOAMY (015XD047CA_1)
Hydric soil rating: No

Minor Components

Perkins
Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Corning
Percent of map unit: 5 percent
Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Kimball
Percent of map unit: 5 percent
Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

MhA—Moda loam, seeped, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: hfqv
Elevation: 170 to 500 feet
Mean annual precipitation: 25 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 270 days
Farmland classification: Not prime farmland

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

Description of Moda

Setting
Landform: Drainageways on fan remnants, drainageways on stream terraces
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Alluvium

Typical profile

H1 - 0 to 19 inches: loam
H2 - 19 to 24 inches: clay
H3 - 24 to 39 inches: indurated

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches; 24 to 39 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: R017XY901CA - Clayey Basin Group
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 10 percent
Landform: Drainageways on fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Unnamed, ponded

Percent of map unit: 5 percent
Landform: Drainageways on fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

PlA—Perkins loam, moist, 0 to 3 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2t7r4
Elevation: 390 to 760 feet
Mean annual precipitation: 27 to 50 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 220 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Perkins

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: loam
AB - 6 to 10 inches: loam
BAt1 - 10 to 18 inches: clay loam
BAt2 - 18 to 32 inches: clay loam
Bt1 - 32 to 41 inches: clay loam
Bt2 - 41 to 54 inches: clay loam
Bt3 - 54 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s

Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R017XY905CA - Dry Alluvial Fans and Terraces
Hydric soil rating: No

Minor Components

Redding
Percent of map unit: 10 percent
Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Red bluff
Percent of map unit: 5 percent
Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

PmA—Perkins gravelly loam, gravelly clay loam substratum, 0 to 3 percent slopes, MLRA 17

Map Unit Setting
National map unit symbol: 2t7qd
Elevation: 390 to 890 feet
Mean annual precipitation: 27 to 43 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 220 to 310 days
Farmland classification: Prime farmland if irrigated

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

Description of Perkins

Setting
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: gravelly loam
AB - 6 to 10 inches: gravelly loam
BAt1 - 10 to 18 inches: gravelly clay loam
BAt2 - 18 to 32 inches: gravelly clay loam
Bt1 - 32 to 41 inches: gravelly clay loam
Bt2 - 41 to 54 inches: gravelly clay loam
Bt3 - 54 to 60 inches: gravelly clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R017XY905CA - Dry Alluvial Fans and Terraces
Hydric soil rating: No

Minor Components

Moda

Percent of map unit: 5 percent
Landform: Drainageways on stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Churn

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Red bluff

Percent of map unit: 5 percent
Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Hydric soil rating: No

PoA—Perkins gravelly loam, moderately deep, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hfrp
Elevation: 60 to 1,700 feet
Mean annual precipitation: 14 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 220 to 310 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Perkins

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: gravelly loam
H2 - 10 to 30 inches: gravelly clay loam
H3 - 30 to 60 inches: cemented

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 30 to 60 inches to densic material
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: R017XY905CA - Dry Alluvial Fans and Terraces
Hydric soil rating: No

Minor Components

Red bluff

Percent of map unit: 5 percent
Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Newtown

Percent of map unit: 5 percent
Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Redding

Percent of map unit: 5 percent
Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix C

Curve Numbers

ATTACHMENT NO. 3

HYDROLOGY ANALYSIS
FOR
SMALL WATERSHEDS

"CN" RUNOFF CURVE NUMBERS FOR HYDROLOGIC SOIL-COVER COMPLEXES IN SHASTA COUNTY

LAND USE [3]		HYDROLOGIC SOIL GROUP [2]			
		A	B	C	D
Irrigated pasture		32	58	72	79
Annual grass		38	61	75	81
Broadleaf chaparral		31	57	71	78
Meadow		30	58	72	78
Open brush		41	63	75	81
Woodland-grass		32	58	72	79
Woods (Woodland)		27	55	70	77
Barren		77	86	91	93
Urban Land [1]					
Average Lot size	Average % Impervious				
⅛ acre	65	77	85	90	92
¼ acre	38	61	75	83	87
⅓ acre	30	57	72	81	86
½ acre	25	54	70	80	85
1 acre [1]	20	51	68	79	84
Commercial and business area (85% impervious)		89	92	94	95
Open spaces, lawns, parks, golf courses, cemeteries		39	61	74	80
Industrial districts (72% impervious)		81	88	91	93
Paved parking lots, roofs, driveways		98	98	98	98
Streets and roads					
Paved with curbs and storm sewers		98	98	98	98
Gravel and hard surface		76	85	89	91
Dirt		72	82	87	89

[1] For urban lands with lots greater than 1 acre, use native cover.

[2] Where hydrologic soil group is not known, use group D.

[3] All facilities shall be designed based on ultimate land use using current general plan densities for the entire drainage area.

Will have some grass remain use 88

0.5 AC @ 98 AVG CN = 89
4.5 AC @ 88

SUPPLEMENT TO

ATTACHMENT NO. 3

HYDROLOGY ANALYSIS
FOR
SMALL WATERSHEDS

DESCRIPTIONS OF LAND USE COVER TYPES

Irrigated pasture - Irrigated land that is planted to perennial grasses and legumes for production of forage and which is cultivated only to establish or renew the stand of plants. For hydrologic purposes, dryland pasture is considered as annual grass.

Annual grass - Areas on which the principal vegetation consists of annual grasses and weeds.

Broadleaf chaparral - Areas where the principal vegetation consists of evergreen shrubs with broad, hard, and stiff leaves. The brush cover is usually dense or moderately dense.

Meadow - Areas with seasonally high water tables, locally called cienegas, on which the principal vegetation consists of sod-forming grasses and other plants.

Open brush - Areas on which the principal vegetation consists of soft-woody shrubs which are grayish in color. It also includes vegetation on desert-facing slopes where Broadleaf chaparral species predominate in an open shrub cover.

Woodland-grass - Areas with an open cover of broadleaf or coniferous trees and with the intervening ground space occupied by annual grasses or weeds. The trees may occur singly or in small clumps. Canopy density, the amount of ground surface shaded at high noon, is from twenty to fifty percent.

Woods (Woodland) - Areas where coniferous or broadleaf trees predominate. The crown or canopy density is at least 50 percent. Open areas may have a cover of annual or perennial grasses or of brush. Herbaceous plant cover under the trees is usually sparse because of leaf or needle litter accumulation.

Barren - Areas with no, or practically no, plant cover; where 15 percent or less of the ground surface is protected by plants or litter. This includes rocklands, land destroyed by erosion, and shaped or graded land.

Urban Land - Urban, industrial, roads, open space, and other lands where the amount of pavements and other impervious surfaces significantly effect the runoff. Individual items are not discussed here as the table is fairly complete.

Appendix D

Hydroflow Hydrographs Analysis

NOAA Atlas 14, Volume 6, Version 2
Location name: Anderson, California, USA*
Latitude: 40.4346°, Longitude: -122.2667°
Elevation: 458 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.191 (0.164-0.223)	0.231 (0.199-0.271)	0.287 (0.246-0.338)	0.334 (0.284-0.397)	0.402 (0.328-0.497)	0.456 (0.364-0.579)	0.514 (0.398-0.671)	0.577 (0.432-0.778)	0.666 (0.475-0.942)	0.738 (0.506-1.09)
10-min	0.273 (0.236-0.320)	0.331 (0.285-0.389)	0.411 (0.353-0.484)	0.479 (0.407-0.569)	0.576 (0.470-0.712)	0.654 (0.521-0.829)	0.737 (0.571-0.962)	0.827 (0.619-1.12)	0.954 (0.681-1.35)	1.06 (0.725-1.56)
15-min	0.331 (0.285-0.387)	0.401 (0.345-0.470)	0.497 (0.427-0.585)	0.579 (0.492-0.688)	0.696 (0.569-0.861)	0.791 (0.630-1.00)	0.892 (0.690-1.16)	1.00 (0.749-1.35)	1.15 (0.823-1.63)	1.28 (0.877-1.88)
30-min	0.444 (0.383-0.520)	0.539 (0.464-0.632)	0.668 (0.574-0.786)	0.778 (0.662-0.925)	0.936 (0.765-1.16)	1.06 (0.847-1.35)	1.20 (0.928-1.56)	1.34 (1.01-1.81)	1.55 (1.11-2.20)	1.72 (1.18-2.53)
60-min	0.626 (0.540-0.733)	0.759 (0.653-0.890)	0.941 (0.808-1.11)	1.10 (0.932-1.30)	1.32 (1.08-1.63)	1.50 (1.19-1.90)	1.69 (1.31-2.20)	1.89 (1.42-2.55)	2.18 (1.56-3.09)	2.42 (1.66-3.57)
2-hr	0.863 (0.744-1.01)	1.02 (0.874-1.19)	1.23 (1.05-1.44)	1.41 (1.20-1.68)	1.68 (1.37-2.08)	1.90 (1.52-2.42)	2.15 (1.66-2.80)	2.41 (1.81-3.25)	2.80 (2.00-3.96)	3.12 (2.14-4.60)
3-hr	1.02 (0.875-1.19)	1.18 (1.02-1.39)	1.42 (1.22-1.67)	1.62 (1.38-1.93)	1.92 (1.57-2.38)	2.18 (1.73-2.76)	2.45 (1.89-3.19)	2.74 (2.06-3.70)	3.18 (2.27-4.51)	3.55 (2.43-5.23)
6-hr	1.34 (1.16-1.57)	1.56 (1.34-1.82)	1.85 (1.59-2.18)	2.11 (1.79-2.50)	2.48 (2.03-3.07)	2.79 (2.22-3.54)	3.12 (2.42-4.07)	3.48 (2.61-4.70)	4.02 (2.87-5.69)	4.47 (3.06-6.58)
12-hr	1.72 (1.48-2.02)	2.04 (1.75-2.39)	2.46 (2.11-2.89)	2.81 (2.39-3.34)	3.30 (2.69-4.08)	3.68 (2.93-4.67)	4.08 (3.16-5.33)	4.51 (3.38-6.08)	5.10 (3.64-7.22)	5.57 (3.82-8.20)
24-hr	2.31 (2.04-2.68)	2.82 (2.48-3.27)	3.47 (3.04-4.03)	3.99 (3.48-4.68)	4.69 (3.96-5.67)	5.22 (4.33-6.43)	5.76 (4.67-7.25)	6.30 (4.98-8.14)	7.03 (5.36-9.43)	7.59 (5.60-10.5)
2-day	2.98 (2.63-3.46)	3.64 (3.20-4.22)	4.48 (3.93-5.22)	5.17 (4.50-6.06)	6.08 (5.14-7.35)	6.78 (5.62-8.35)	7.49 (6.07-9.42)	8.21 (6.49-10.6)	9.18 (6.99-12.3)	9.92 (7.32-13.7)
3-day	3.43 (3.02-3.97)	4.17 (3.66-4.84)	5.14 (4.50-5.98)	5.92 (5.16-6.94)	6.98 (5.90-8.43)	7.80 (6.46-9.60)	8.62 (6.99-10.8)	9.47 (7.49-12.2)	10.6 (8.08-14.2)	11.5 (8.48-15.9)
4-day	3.80 (3.35-4.41)	4.62 (4.07-5.37)	5.70 (5.00-6.64)	6.58 (5.73-7.71)	7.76 (6.56-9.37)	8.66 (7.18-10.7)	9.58 (7.77-12.0)	10.5 (8.32-13.6)	11.8 (8.97-15.8)	12.8 (9.42-17.7)
7-day	4.65 (4.09-5.39)	5.67 (4.98-6.58)	6.99 (6.13-8.14)	8.06 (7.02-9.45)	9.49 (8.02-11.5)	10.6 (8.77-13.0)	11.7 (9.46-14.7)	12.8 (10.1-16.5)	14.2 (10.8-19.1)	15.4 (11.3-21.3)
10-day	5.30 (4.67-6.15)	6.48 (5.70-7.53)	8.01 (7.02-9.32)	9.23 (8.04-10.8)	10.9 (9.17-13.1)	12.1 (10.0-14.9)	13.3 (10.8-16.7)	14.5 (11.5-18.8)	16.2 (12.3-21.7)	17.4 (12.8-24.1)
20-day	7.07 (6.22-8.20)	8.72 (7.67-10.1)	10.8 (9.49-12.6)	12.5 (10.9-14.6)	14.7 (12.4-17.7)	16.3 (13.5-20.0)	17.9 (14.5-22.5)	19.4 (15.4-25.1)	21.5 (16.4-28.8)	23.0 (17.0-31.8)
30-day	8.64 (7.61-10.0)	10.7 (9.41-12.4)	13.3 (11.7-15.5)	15.3 (13.4-18.0)	18.0 (15.2-21.7)	19.9 (16.5-24.5)	21.8 (17.7-27.4)	23.7 (18.7-30.5)	26.0 (19.8-34.9)	27.8 (20.5-38.4)
45-day	10.7 (9.46-12.5)	13.3 (11.7-15.5)	16.6 (14.5-19.3)	19.1 (16.6-22.4)	22.3 (18.8-26.9)	24.6 (20.4-30.3)	26.9 (21.8-33.8)	29.1 (23.0-37.5)	31.9 (24.3-42.7)	33.9 (25.0-46.9)
60-day	12.7 (11.2-14.8)	15.8 (13.9-18.4)	19.6 (17.2-22.8)	22.6 (19.6-26.4)	26.3 (22.2-31.7)	29.0 (24.0-35.6)	31.5 (25.6-39.7)	34.0 (26.9-43.9)	37.1 (28.3-49.7)	39.3 (29.0-54.4)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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	SCS Runoff	------	0.563	0.922	-------	1.430	1.864	2.476	2.955	3.451	pre-development
2	SCS Runoff	------	1.247	1.734	-------	2.375	2.897	3.605	4.143	4.691	post development
3	SCS Runoff	------	1.155	1.632	-------	2.265	2.782	3.487	4.024	4.572	phase 1 only

Hydrograph Report

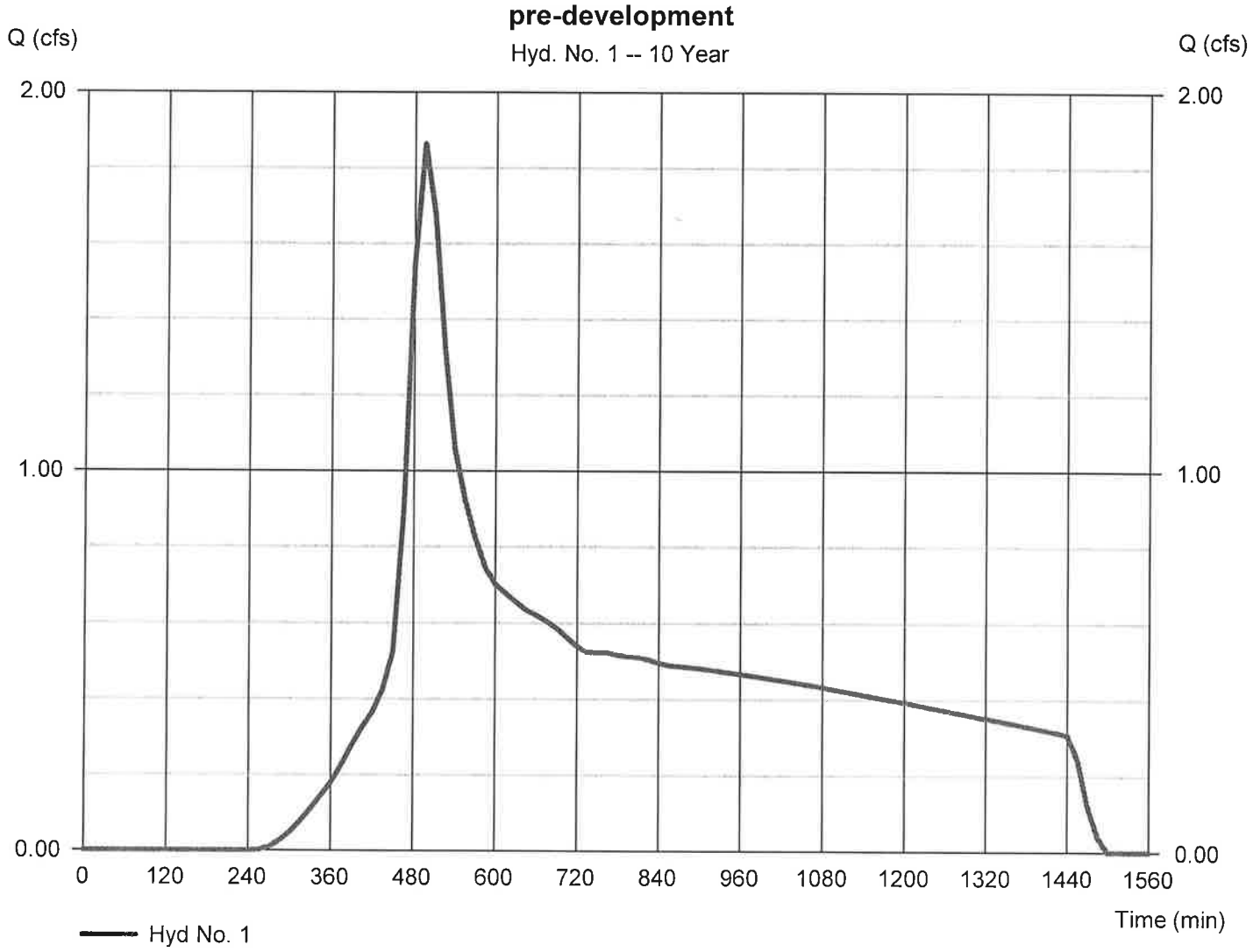
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

Wednesday, 05 / 1 / 2024

Hyd. No. 1

pre-development

Hydrograph type	= SCS Runoff	Peak discharge	= 1.864 cfs
Storm frequency	= 10 yrs	Time to peak	= 495 min
Time interval	= 15 min	Hyd. volume	= 35,955 cuft
Drainage area	= 5.000 ac	Curve number	= 81
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 29.25 min
Total precip.	= 3.99 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484



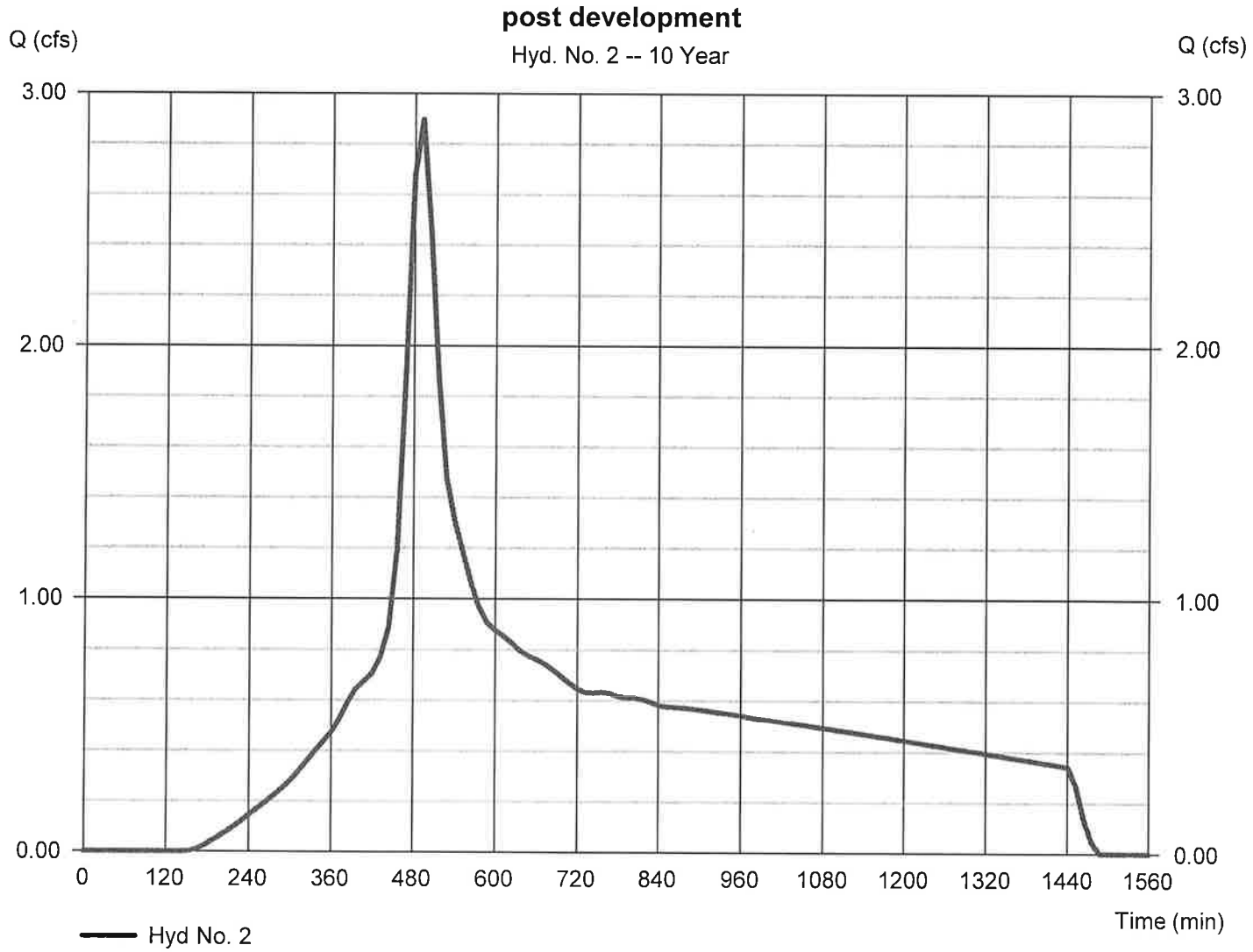
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Wednesday, 05 / 1 / 2024

Hyd. No. 2

post development

Hydrograph type	= SCS Runoff	Peak discharge	= 2.897 cfs
Storm frequency	= 10 yrs	Time to peak	= 492 min
Time interval	= 12 min	Hyd. volume	= 47,876 cuft
Drainage area	= 5.000 ac	Curve number	= 89
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 22.06 min
Total precip.	= 3.99 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

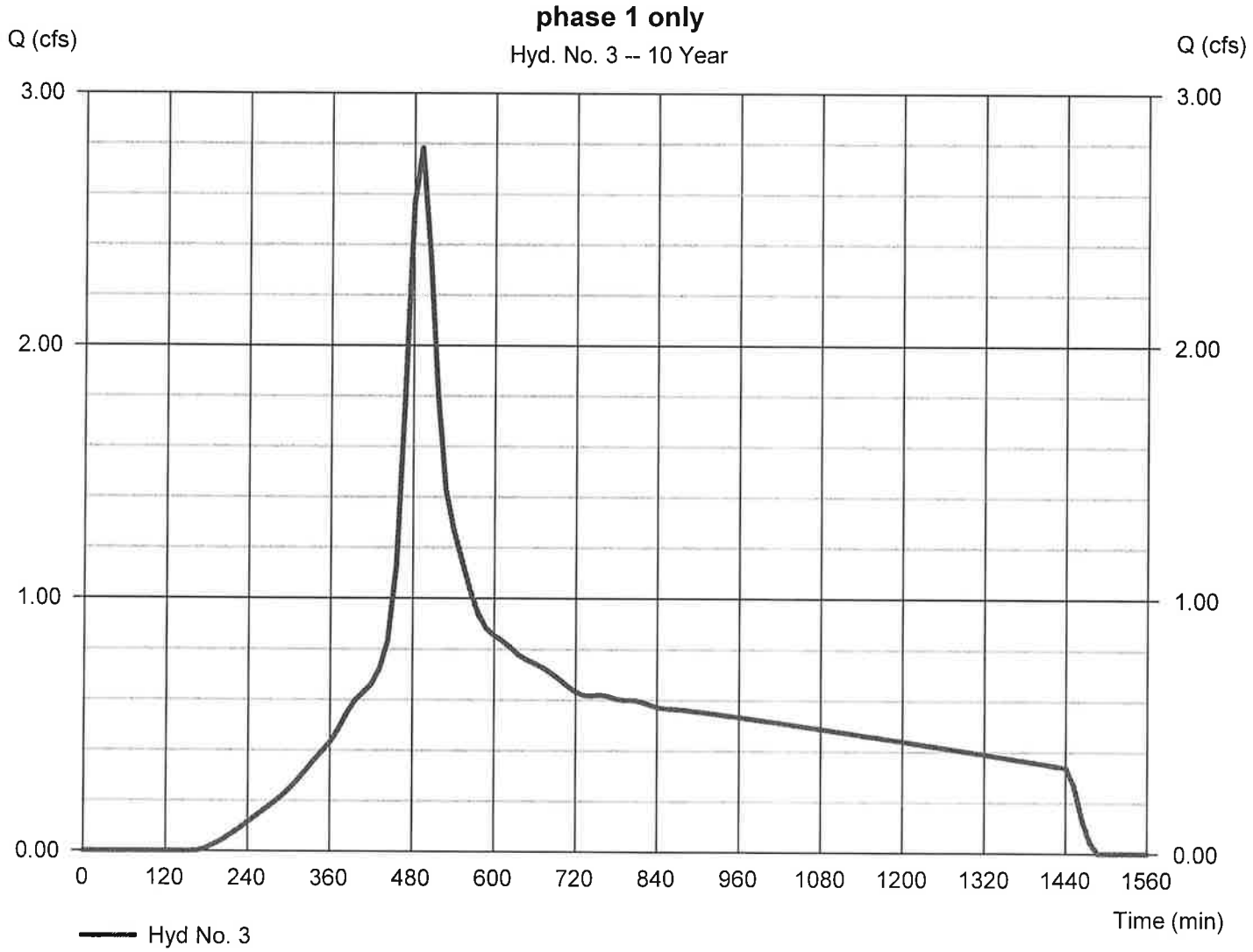


Hydrograph Report

Hyd. No. 3

phase 1 only

Hydrograph type	= SCS Runoff	Peak discharge	= 2.782 cfs
Storm frequency	= 10 yrs	Time to peak	= 492 min
Time interval	= 12 min	Hyd. volume	= 46,276 cuft
Drainage area	= 5.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 22.94 min
Total precip.	= 3.99 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484



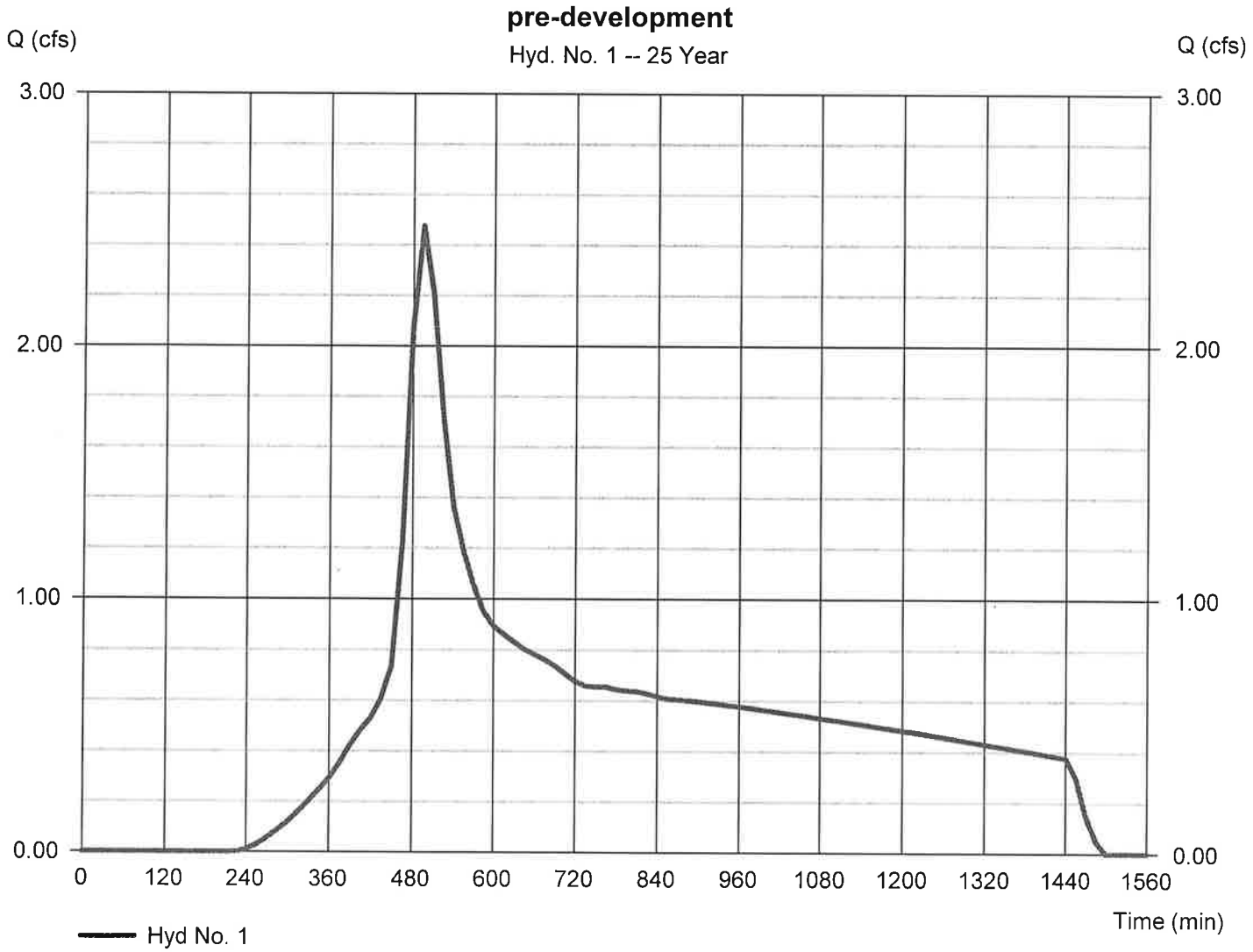
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Wednesday, 05 / 1 / 2024

Hyd. No. 1

pre-development

Hydrograph type	= SCS Runoff	Peak discharge	= 2.476 cfs
Storm frequency	= 25 yrs	Time to peak	= 495 min
Time interval	= 15 min	Hyd. volume	= 46,164 cuft
Drainage area	= 5.000 ac	Curve number	= 81
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 29.25 min
Total precip.	= 4.69 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484



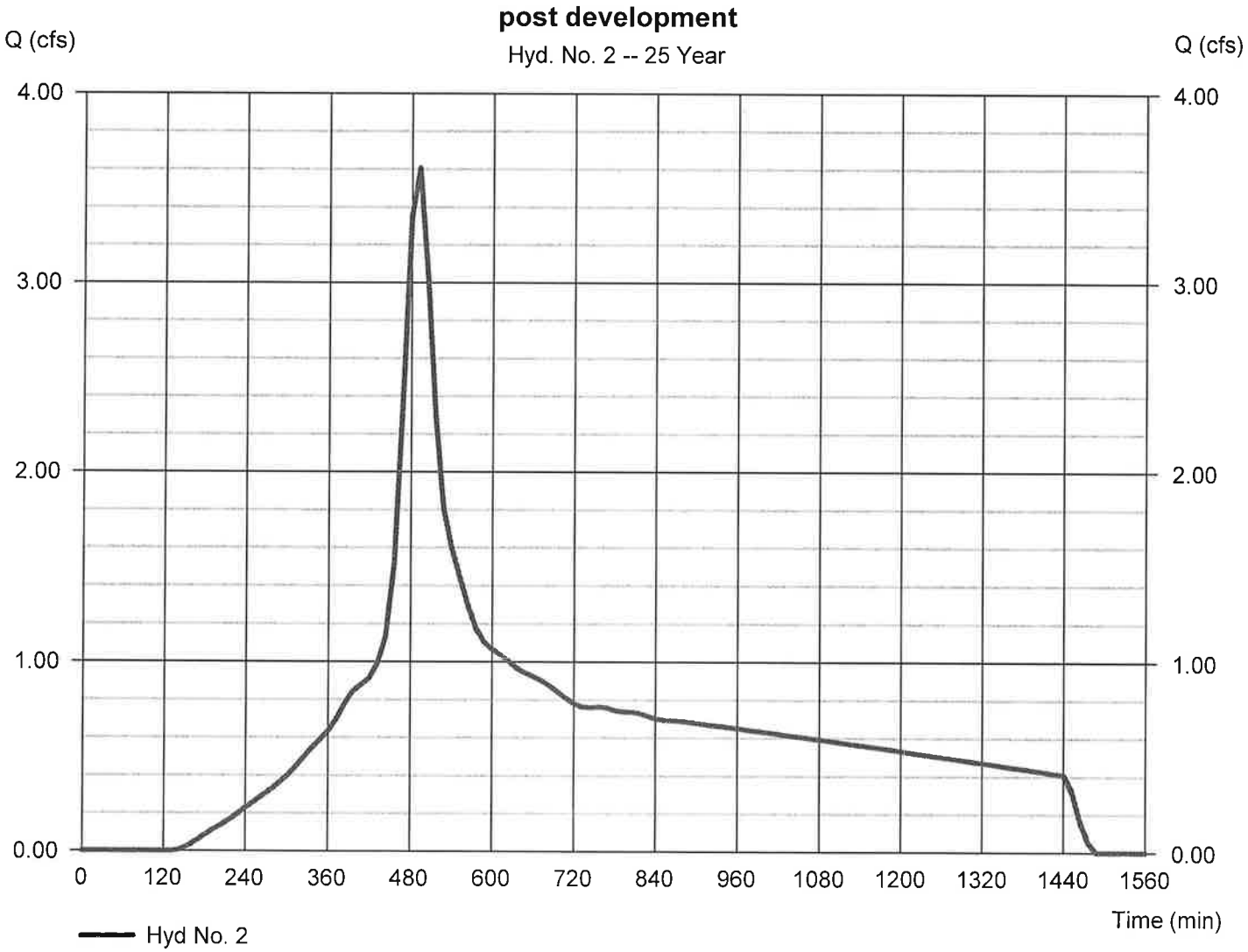
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Wednesday, 05 / 1 / 2024

Hyd. No. 2

post development

Hydrograph type	= SCS Runoff	Peak discharge	= 3.605 cfs
Storm frequency	= 25 yrs	Time to peak	= 492 min
Time interval	= 12 min	Hyd. volume	= 59,142 cuft
Drainage area	= 5.000 ac	Curve number	= 89
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 22.06 min
Total precip.	= 4.69 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

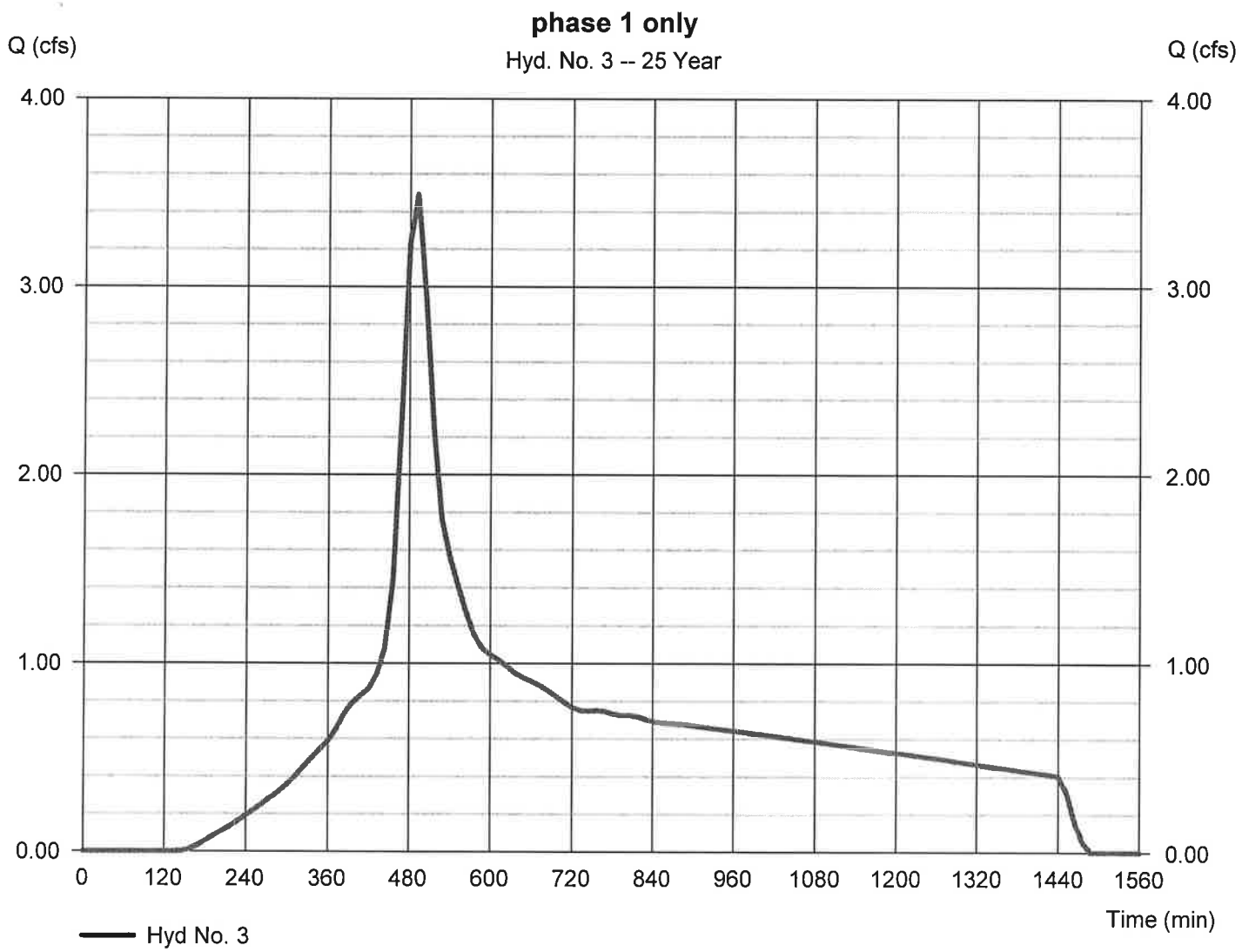


Hydrograph Report

Hyd. No. 3

phase 1 only

Hydrograph type	= SCS Runoff	Peak discharge	= 3.487 cfs
Storm frequency	= 25 yrs	Time to peak	= 492 min
Time interval	= 12 min	Hyd. volume	= 57,432 cuft
Drainage area	= 5.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 22.94 min
Total precip.	= 4.69 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484



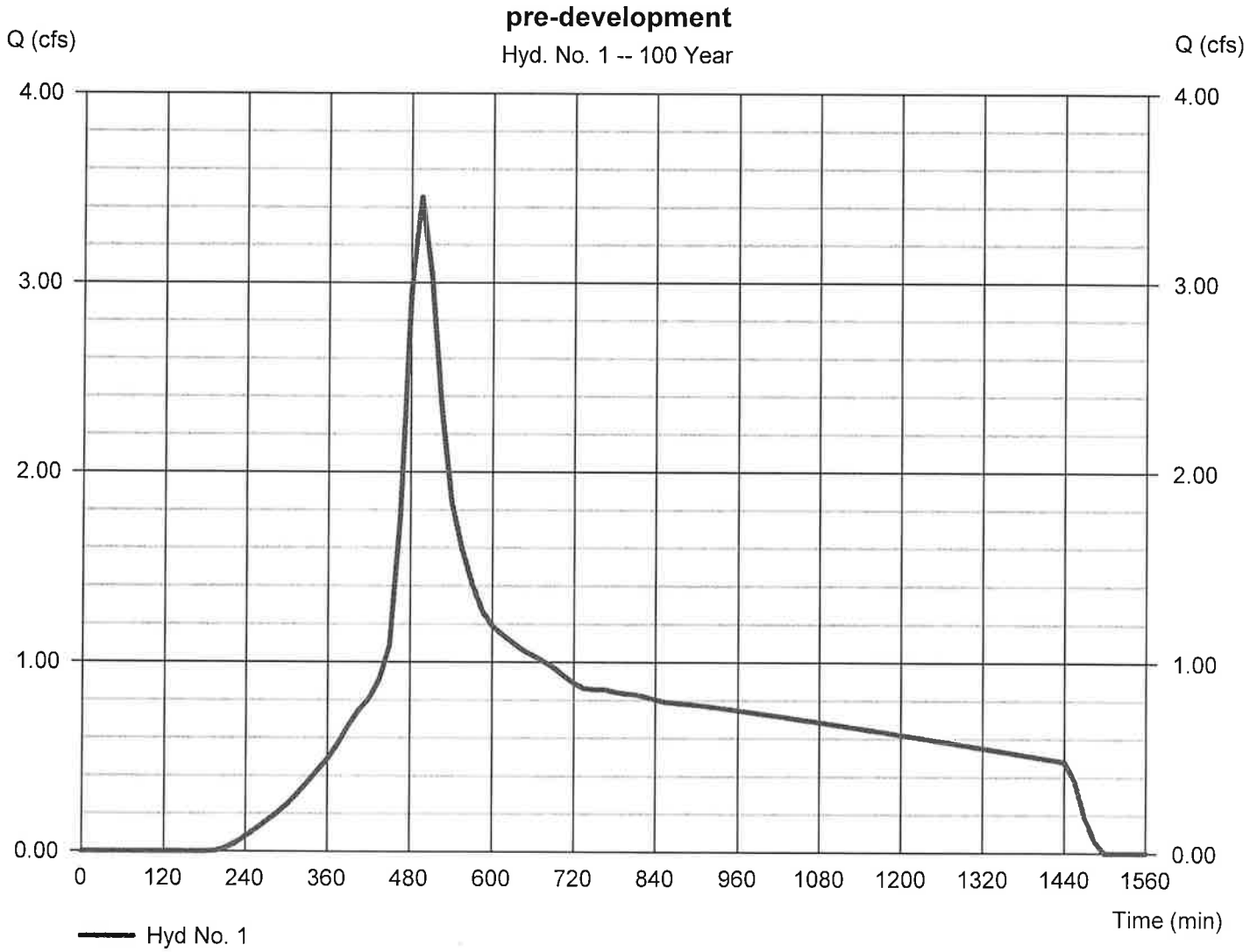
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Wednesday, 05 / 1 / 2024

Hyd. No. 1

pre-development

Hydrograph type	= SCS Runoff	Peak discharge	= 3.451 cfs
Storm frequency	= 100 yrs	Time to peak	= 495 min
Time interval	= 15 min	Hyd. volume	= 62,374 cuft
Drainage area	= 5.000 ac	Curve number	= 81
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 29.25 min
Total precip.	= 5.76 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

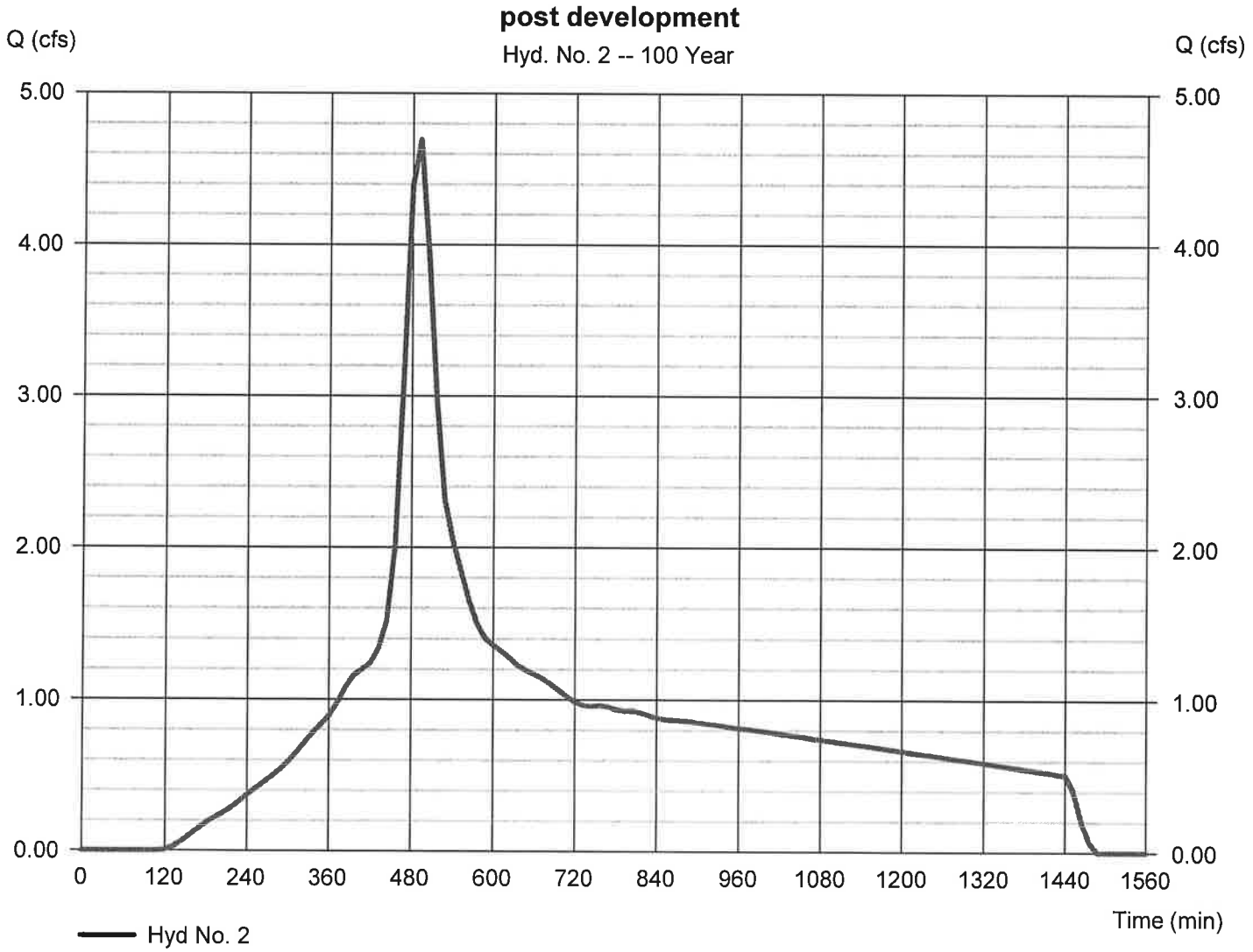


Hydrograph Report

Hyd. No. 2

post development

Hydrograph type	= SCS Runoff	Peak discharge	= 4.691 cfs
Storm frequency	= 100 yrs	Time to peak	= 492 min
Time interval	= 12 min	Hyd. volume	= 76,624 cuft
Drainage area	= 5.000 ac	Curve number	= 89
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 22.06 min
Total precip.	= 5.76 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hyd. No. 3

phase 1 only

Hydrograph type	= SCS Runoff	Peak discharge	= 4.572 cfs
Storm frequency	= 100 yrs	Time to peak	= 492 min
Time interval	= 12 min	Hyd. volume	= 74,782 cuft
Drainage area	= 5.000 ac	Curve number	= 88
Basin Slope	= 0.6 %	Hydraulic length	= 680 ft
Tc method	= LAG	Time of conc. (Tc)	= 22.94 min
Total precip.	= 5.76 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484