Appendix E. Preliminary Hydrology Report

Appendix

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Preliminary Hydrology Report

VIVANTE – SENIOR ASSISTED LIVING

850 AND 856 SAN CLEMENTE DRIVE

Newport Beach, CA

May 24, 2019

This Hydraulic Study has been prepared by, and under the direction of, the undersigned, a duly Registered Civil Engineer in the State of California. Except as noted, the undersigned attests to the technical information contained herein, and has judged to be acceptable the qualifications of any technical specialists providing engineering data for this report, upon which findings, conclusions, and recommendations are based.

Bart J. Mink, P.E.
Registered Civil Engineer No. C82953
Exp.: 09/30/20

Prepared for:

Nexus Company
1 MacArthur Place, Suite 300
Santa Ana, CA 92707

Prepared by:

Tait & Associates, Inc.
701 N. Parkcenter Drive
Santa Ana, CA 92705
(714) 560-8200

TAIT JOB # **SP8384**

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Section 1 Purpose and Scope

This hydrology study presents an analysis of the hydrologic effects of the development of a 2.9 acre Multi-Residential development known as Vivante - Senior Assisted Living in the City of Newport Beach, California.

This report addresses runoff from the project site and its impact to the existing downstream storm drainage system. This hydrology study was prepared in accordance with the Orange County Drainage Area Management Plan (DAMP 2011) and the Orange County Hydrology Manual (October 1986 and 1996 Addendum). The study includes calculations for the 2, 25 and 100-year storms for both the existing and the proposed developments. The study also details the general project characteristics, the design, criteria and methodology applied to the analysis of the project. The report provides a design analysis for the drainage facilities proposed as part of the project, with the drainage improvements being designed to convey all rainfall event frequencies up to a 24-hour, 25-year storm event.

The plans and specifications in the Hydrology Study are not for construction purposes; the contractor shall refer to final approved construction documents for plans and specifications.

Section 2 Project Information

2.1 Project Description

The proposed construction involves the demolition of two existing buildings, concrete flatwork parking lot and conflicting underground utilities located on two existing developed parcels totaling approximately 2.91 Acres. Furthermore, the proposed Project includes the construction of a multi-story senior assisted living facility above and below grade as well as surface parking and associated appurtenances.

2.1.1 Project Location

The project is located at 850 and 856 San Clemente Drive in the City of Newport Beach, California. The site is currently occupied by the Orange County Museum of Art and its associated administration building. The site is roughly bounded by Bombero Street/Private Drive to the north, San Clemente Drive to the south, Santa Barbara Drive to the west and Santa Cruz Drive to the east as graphically shown in Figure 1, below.

Figure 1 – Vicinity Map (Not To Scale)

2.2 Hydrologic Setting

This section summarizes the project's size and location in the context of the larger watershed perspective, topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, and other relevant hydrologic and environmental factors to be protected specific to the project area's watershed.

2.2.1 Watershed

The project site is located within the Santa Ana Watershed, located between the cities of Huntington Beach and Newport Beach, and locally drains into to the Upper Newport Bay (the Back Bay) which ultimately flows to Pacific Ocean.

2.2.2 Existing Topography and Facilities

The site currently consists of two existing buildings with surrounding sidewalk, parking lot, drive isles and landscaping. The ground surface elevation at the site varies from approximately 164 feet to 180 feet based on the NAVD 88 Survey Datum. Existing ground generally slopes from the northeast corner to the southeast corner at an approximate slope of 1%. The site then slopes from this southeast corner to the southwest corner at an approximate slope of 3%. The existing easterly 1.996 AC parcel (850 San Clemente Drive) contains the Orange County Museum (OCMA) Building which is approximately 23,900 sf. The existing westerly 0.910 AC parcel (856 San Clemente Drive) contains the approximate 14,556 sf OCMA Galleries/Administration Building.

2.2.3 Adjacent Land Use

The project is bounded by an existing multi-level parking structure to the east and northwest, a multi-level office building to the west and south and an apartment community to the north.

Per the City of Newport Beach zoning map, the proposed area is zoned “PC-19” Planned Community “San Joaquin Plaza”. The project site is bounded by “PC-56, PC-23” and “OR” which are planned Communities “North Newport Center”, “Block 800 Newport Center” and Office Regional Commercial, respectively.

2.2.4 Soil Conditions

In accordance with the Natural Resources Conservation Service Soil Survey published in 2006, the project is within soil group B.

The project site location has been graphically shown on a soil group map and a USDA Soil Resource map, which have been included in *Appendix A*.

2.2.5 Impervious Cover

In the current condition, this property is part of an existing commercial development and its impervious cover is approximately 74%. The proposed residential development's impervious cover is approximately 81%.

Minor improvements are proposed in portion adjacent to the project site to close an existing drive entrance. The proposed improvements consist of adding landscape at previous location of paved aisle. A breakdown of the cover is provided on the table below.

Summary of Pervious vs. Impervious Cover

	Total Area (sf)	Impervious Cover (sf)	Pervious Cover (sf)	% Impervious	% Pervious
Existing On-Site	126,619	93,192	33,427	73.6%	26.4%
Proposed On-Site	126,619	102,879	23,740	81.3%	18.7%
Existing Off-site	7,743	2,677	5,066	31.5%	68.4%
Proposed Off-site	7,743	1,588	6,155	20.5%	79.5%

2.2.6 Existing Drainage Patterns

Currently, storm water runoff sheet flows from the northeast to the southwest along V-gutters/curb & gutters and discharges to a private storm drain catch basin located offsite (888 San Clemente Drive) near the southwest corner of the proposed project property. This existing private catch basin and storm drain system flows to the local storm drain located in Bombero Drive. Storm water runoff behind the existing buildings drains toward the north and west onto the adjacent parcels where it is then picked up in concrete swales which ultimately drain to offsite storm drain systems, thence to public storm drain systems located in Santa Barbara Drive and thence ultimately to the Back Bay.

2.2.7 Proposed Drainage Patterns

In general, the proposed on-site surface water runoff mimics that of the existing conditions. Storm water runoff sheet flows from the parking lot into curb and gutter and V-gutters which flow to onsite catch basins that are part of the private storm drain system. An underground detention basin will detain the 98th percentile storm and downstream of the basin a Modular

Wetland bio-filtration basins is proposed that provide water quality treatment before releasing treated storm water to the private storm drain system. The on-site storm drain system will consist of onsite concrete swales and HDPE pipes that range in sizes from 6-inch to 15-inch. Hydraulic calculations can be found in Appendix C.

A small drainage area off-site will be disturbed to close out an existing driveway southwest of the site. Runoff from this area will keep the existing drainage patterns and will sheet flow to a private catch basin northwest of the site. This area will be primarily a vegetated slope so it is mostly pervious with the exception of a walkway that provides connectivity with other adjacent buildings.

Both off-site catch basins that receive runoff from the project improvements area part of a private storm drain system that ultimately discharges runoff to a Public 24" RCP along Bombero Drive. The proposed condition Hydrology map and the AES calculation results are included in Appendix B.

2.2.8 Downstream Conditions

Mimicking the existing onsite storm drain system, the proposed project conditions discharge directly to a local private storm drain catch basin and storm drain system (18" RCP) adjacent to the southwest corner of the property via curb & gutter/V-Gutter and piped flow. The site eventually flows into Upper Newport Bay (the Back Bay), thence ultimately to the Pacific Ocean. Furthermore, the City have reported that there have been no issues with the downstream storm drain system.

Section 3 Design Criteria and Methodology

3.1 Design Criteria

This section summarizes the design criteria and methodology applied to the drainage analysis of the project site. The design criteria and methodology follow the DAMP 2011 and the Orange County Hydrology Manual (OCHM) requirements.

3.1.1 Drainage Design Criteria

The project storm drain facilities discussed in *Section 2.2.7 Proposed Drainage Patterns* (catch basins, storm drain piping and modular wetland systems) have been designed to conform to the Orange County standards outlined above.

3.1.2 Runoff Calculation Method

Runoff calculations for this study were accomplished using the Rational Method. The Rational Method is used to determine peak storm water runoff flows for watershed areas that are less than 640 acre in accordance with the recommendations of the Orange County Hydrology Manual. This method was used to determine storm water runoff through each subarea using elevations, slopes, flow lengths, soil type, land use and area inputs to calculate time of concentration for the 2-, 25- and 100-year storm events. The Rational Method was modeled using the Advance Engineering Software (AES) program which is based on the equation below:

The Rational Method is based on the equation: $(Q = C \times I \times A)$
Where:

Q = runoff (cfs)
C = runoff coefficient representing the ratio of runoff depth to rainfall depth
I = the time-averaged rainfall intensity in inches per hour corresponding to the time of concentration
A = drainage area (acres).

3.1.3 Runoff and Detention

The calculations per this report result in post-development runoff values less than the existing; however, per record plans and reports, it has been documented that the storm drain system that receives runoff from the site was designed for a 25 year storm of 8.2cfs peak for the project site. See referenced Hydrology map on appendix B. T

The project has a proposed detention system that will store stormwater to be treated as required for the project Water Quality Management Plan. The total detention consist of an underground basin with storage capacity of 6,300cf. This detention system has been design to mitigate the project peak flows so the 25 year peak does not exceed 8.2cfs.

Flow-through Detention Basin modeling hydrographs calculations produced by AES are included in *Appendix E* and demonstrate the detention basin is adequately sized for the 25-year storm while reducing the peak flow to less than the existing condition as indicated on the record documents.

Section 4 Hydrology and Drainage Analysis

This section summarizes the quantitative hydrologic analysis of the existing and proposed conditions of the site.

4.1 Summary of Results

The hydrology analysis was prepared for the 2-, 25- and 100-year storm events for both the existing and proposed conditions as outlined in Appendix B. A summary of the development flows are provided below:

TABLE 4.1
Existing vs. Proposed Development Flowrate Comparison

Outfall #1: Existing Catch basin	2 Year Storm (cfs)	25 Year Storm (cfs)	100 Year Storm (cfs)
Pre-developed Condition Flowrate	5.19	11.65	15.04
Post-developed Condition Flowrate (Unmitigated)	4.50	9.81	12.63
Post-development (mitigated)	--	4.22	--
Outfall for Off-site area:			
Existing	0.34	0.76	0.97
Proposed	0.31	0.71	0.91

In conclusion, this report demonstrates that the development of Vivante-Senior Assisted Living will not increase the amount of storm water runoff over the current existing site's storm water runoff. Furthermore, as the proposed storm drain system mimics the existing site's storm drain system, no detrimental conditions are expected in the existing downstream storm drain system.

Also, as described on section 3.1.3, record documents indicate that the catch basin/private storm drain that receives runoff from the site was designed for a 25 year peak flow of 8.2cfs. Since the runoff calculations for the proposed 25 year results in 9.81 cfs, the proposed detention will mitigate the peak flow increase. The peak mitigated runoff is **4.22. CFS** for the 25 year storm.

A small drainage area off-site will be disturbed to close out an existing driveway southwest of the site. Runoff from this area will keep the existing drainage patterns and will sheet flow to a

private catch basin northwest of the site. This area will be primarily a vegetated slope so it is mostly pervious with the exception of a walkway that provides connectivity with other adjacent buildings. In the existing condition the off-site area has a small portion, O-1a with total area of 896sf that drains to the catch basin that serves the project (SW of the site) ; the remaining off-site area consist of aprox. 6,847sf that drain to an existing catch basin west of the site. In the proposed condition all off-site drainage area drains to the catch basin to the west. Although the drainage area directly contributing to the western catch basin increased by 896sf; there is no negative impact to the system since overall there is a decrease of peak flow to the private storm drain from the off-site area due to increase in pervious area.

In conclusion the proposed improvements will not result in a increase of the project calculated peak flows. Additionally, the project proposed detention will further reduce peak flows to ensure the existing private storm drain system can handle the project stormwater runoff.

APPENDIX

Appendix A – Soil Group Map

Soil Group 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 Orange County and Part of Riverside County, California

August 21, 2018

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: 1:910 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N 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: Orange County and Part of Riverside County, California
Survey Area Data: Version 11, Sep 12, 2017

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

Date(s) aerial images were photographed: Jan 3, 2015—Jan 17, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	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
162	Marina loamy sand, 2 to 9 percent slopes	3.0	100.0%
Totals for Area of Interest		**3.0**	**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.

Orange County and Part of Riverside County, California

162—Marina loamy sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hcn7
Mean annual air temperature: 57 to 61 degrees F
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Marina

Setting

Landform: Dunes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Old eolian sands

Typical profile

H1 - 0 to 33 inches: loamy sand
H2 - 33 to 60 inches: sand, loamy sand, loamy fine sand
H2 - 33 to 60 inches: sand, coarse sand
H2 - 33 to 60 inches:
H3 - 60 to 80 inches:
H3 - 60 to 80 inches:

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: SANDY (1975) (R019XD035CA)
Hydric soil rating: No

Minor Components

Marina, less sloping or steeper

Percent of map unit: 10 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Myford, sandy loam, thick surface

Percent of map unit: 2 percent
Hydric soil rating: No

References

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Appendix B – Existing Hydrology Map & AES Calculations

Existing Hydrology Map & AES Calculations

LEGEND:

A / 0.74 — SUBAREA ID / SUBAREA AREA (AC)

10 — ELEV=76.9' / Q_{25}=3.4 — HYDROLOGY NODE ID / ELEVATION (FT) / Q/25= 25-YEAR STORM EVENT DISCHARGE (CFS)

DRAINAGE AREA BOUNDARY

FLOWPATH

EL.=171.9' 5 Q_{25}=4.63

A1 / 1.08

TOTAL AREA = 46,987 SF (1.08 AC)
IMPERVIOUS = 39,736 SF (0.91 AC)
PERVIOUS = 7,251 SF (0.17 AC)

PARCEL "A"
PARCEL 2,
P.M.B. 81/8-9
1.996 ACRES / 86,962 SQ. FT.
A.P.N. 442-261-05

ORANGE COUNTY MUSEUM OF ART
850 SAN CLEMENTE DRIVE
NEWPORT BEACH, CA

EL.=178.2' 1

B1 / 0.47

TOTAL AREA = 20,331 SF (0.47 AC)
IMPERVIOUS = 13,622 SF (0.35 AC)
PERVIOUS = 6709 SF (0.12 AC)

ORANGE COUNTY MUSEUM OF ART
856 SAN CLEMENTE DRIVE
NEWPORT BEACH, CA

EXISTING SINGLE STORY CONCRETE BUILDING
BUILDING AREA = 14,580 SQ. FT. AT GROUND LEVEL

PARCEL "B"
PARCEL 2
LL95-3 INST NO. 199500483821, O.R.
0.910 ACRE / 39,634 SQ. FT.
A.P.N. 442-261-17

EXISTING SINGLE STORY CONCRETE BUILDING
BUILDING AREA = 23,745 SQ. FT. AT GROUND LEVEL

EL.=176.7' 4

B2 / 1.36

TOTAL AREA = 59,242 SF (1.36 AC)
IMPERVIOUS = 39,692 SF (0.91 AC)
PERVIOUS = 19,550 SF (0.43 AC)

EL.=155' 20 OFF-SITE Q_{25}=0.67cfs

OFF-SITE CATCH BASIN RECEIVES RUNOFF FROM AREA O-1

O-1 / 0.15

TOTAL AREA = 6,847 SF (0.16AC)
IMPERVIOUS = 2,217 SF (0.05 AC)
PERVIOUS = 4,630 SF (0.11 AC)

EL.=162.54 11 OFF-SITE Q_{25}=0.02cfs

OFF-SITE CATCH BASIN RECEIVES RUNOFF FROM ALL ON-SITE AREAS AND FROM AREA O-1a

TOTAL AREA = 896 SF 0.02. AC)
IMPERVIOUS = 730 SF (0.0167 AC)
PERVIOUS = 166 SF (0.003 AC)

O-1a / 0.02

EL.=163.3' 3 Q_{25}=5.53

EL.=166.00 8

EL.=166.00 10

EL.=176.1' 2 Q_{25}=1.49

EX. SEWER EASEMENT
EX. WATER EASEMENT
EX. SCE EASEMENT
EX. SCE EASEMENT

EX. R/W
EX. R/W

BASIS OF BEARINGS
N 79°22'13" W 689.63' (689.72' R1)
SAN CLEMENTE DRIVE
(PUBLIC STREET)

0 20 30 40
(IN FEET)
1 INCH = 20 FEET

N

UNDERGROUND SERVICE ALERT
811
Call: TOLL FREE
1-800-422-4133
KNOW WHAT'S BELOW.
CALL BEFORE YOU DIG.
TWO WORKING DAYS BEFORE YOU DIG

UNAUTHORIZED CHANGES & USES:

THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

ENGINEERS NOTE TO CONTRACTOR:

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES, PIPES, AND/OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION OF THOSE UNDERGROUND UTILITIES TO BE USED AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON. IF THE CONTRACTOR ENCOUNTERS ANY DISCREPANCIES, CONFLICTS OR AREAS WHICH HE FEELS UNWORKABLE, HE SHALL NOTIFY THE GRADING ENGINEER IMMEDIATELY PRIOR TO CONTINUING OR DEVIATING FROM THIS PLAN.

AREA SUMMARY ON-SITE:

TOTAL AREA = 126,619 SF (2.91 AC)
IMPERVIOUS = 93,192 SF (2.14 AC) = 73.6%
PERVIOUS = 33,427 SF (0.77 AC) = 26.4%

AREA SUMMARY- OFF-SITE

TOTAL AREA = 7,743 SF (0.17 AC)
IMPERVIOUS = 2,677 SF (0.06 AC) = 31.5%
PERVIOUS = 5,066 SF (0.11 AC) = 68.4%

PLOT DATE: Tuesday, May 28, 2019 9:50:12 AM VERSION: 3.0.0.20170623

HKS

ARCHITECT
HKS ARCHITECTS, INC.
539 BRYANT STREET, SUITE 100
SAN FRANCISCO, CA 94107

LANDSCAPE
PERRY BURR & ASSOCIATES
27 MARINITA AVENUE
SAN RAFAEL, CA 94901

STRUCTURAL ENGINEER
SIMPSON GUMPERTZ & HEGER
100 PINE STREET, SUITE 600
SAN FRANCISCO, CA 94111

MEP ENGINEER
SCHNACKEL ENGINEERS
80 SOUTH LAKE AVENUE, SUITE 640
PASADENA, CA 91101

OWNER
NEXUS COMPANIES
1 MacARARTHUR PLACE; SUITE 300
SANTA ANA, CA 92707

OWNER CONSULTANTS

CIVIL ENGINEER
TAIT & ASSOCIATES, INC
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705

UTILITY ENGINEER
BJ PALMER & ASSOCIATES, INC
ONE RIDGEGATE DRIVE SUITE 105
TEMECULA, CA 92590

GEOTECHINICAL ENGINEER
GEOTECHNICAL PROFESSIONALS INC. (GPI)
5736 CORPORATE AVENUE
CYPRES, CA 90630

VIVANTE - SENIOR ASSISTED LIVING
NEWPORT BEACH, CA

REVISION

HKS PROJECT NUMBER
22222

DATE
2019/05/28

ISSUE
PLANNING RESUBMITAL 3

SHEET TITLE
EXISTING HYDROLOGY MAP

SHEET NO.
EX.HYD.

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                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* VIVANTE-SENIOR ASSISTED LIVING                                         *
* EXISTING CONDITION                                                     *
* 2-YEAR STORM EVENT                                                     *
 ************************************************************************

  FILE NAME: VSAL002E.DAT
  TIME/DATE OF STUDY: 09:22 05/28/2019
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   321.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.20  DOWNSTREAM(FEET) =    176.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.362
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.685
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.35      0.30      0.100    36    8.36
  PUBLIC PARK                B        0.12      0.30      0.850    36   13.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.291
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      0.68

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =    176.10
 DOWNSTREAM NODE ELEVATION(FEET) =    163.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   417.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.03000
 MAXIMUM DEPTH(FEET) =   0.19
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.537
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.91      0.30     0.100    36
 PUBLIC PARK                B        0.45      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.53
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.80
 AVERAGE FLOW DEPTH(FEET) =   0.19   FLOOD WIDTH(FEET) =    3.67
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    9.81
 SUBAREA AREA(ACRES) =    1.36       SUBAREA RUNOFF(CFS) =    1.75
 EFFECTIVE AREA(ACRES) =    1.83     AREA-AVERAGED Fm(INCH/HR) =   0.10
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.33
 TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       2.37

        ==>>ERROR:FLOW EXCEEDS CAPACITY OF CHANNEL WITH
            NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM ALLOWABLE DEPTH.
            AS AN APPROXIMATION, TRAVEL TIME CALCULATIONS ARE BASED
            ON FLOW DEPTH EQUAL TO THE SPECIFIED MAXIMUM ALLOWABLE DEPTH.


 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOOD WIDTH(FEET) =    3.67
 FLOW VELOCITY(FEET/SEC.) =   7.44   DEPTH*VELOCITY(FT*FT/SEC) =   1.41
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     738.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   143.00
 ELEVATION DATA: UPSTREAM(FEET) =    176.70  DOWNSTREAM(FEET) =    171.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.91      0.30     0.100    36    5.00
 PUBLIC PARK                B        0.17      0.30     0.850    36    6.93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.218
 SUBAREA RUNOFF(CFS) =      2.14
 TOTAL AREA(ACRES) =      1.08   PEAK FLOW RATE(CFS) =      2.14
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.1  TC(MIN.) =      5.00
 EFFECTIVE AREA(ACRES) =      1.08  AREA-AVERAGED Fm(INCH/HR)=  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.218
 PEAK FLOW RATE(CFS)   =       2.14
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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******************************************************************************
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                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* VIVANTE-SENIOR ASSISTED LIVING                                         *
* EXISTING CONDITION                                                     *
* 25-YEAR STORM EVENT                                                    *
 ************************************************************************

  FILE NAME: VSAL025E.DAT
  TIME/DATE OF STUDY: 09:29 05/28/2019
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   321.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.20  DOWNSTREAM(FEET) =    176.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.362
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.605
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.35      0.30      0.100    56    8.36
  PUBLIC PARK                B        0.12      0.30      0.850    56   13.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.291
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.49

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =    176.10
 DOWNSTREAM NODE ELEVATION(FEET) =    163.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   417.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.03000
 MAXIMUM DEPTH(FEET) =   0.19
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.460
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.91      0.30     0.100    56
 PUBLIC PARK                B        0.45      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.50
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.98
 AVERAGE FLOW DEPTH(FEET) =   0.19   FLOOD WIDTH(FEET) =    3.67
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =    9.00
 SUBAREA AREA(ACRES) =    1.36       SUBAREA RUNOFF(CFS) =    4.11
 EFFECTIVE AREA(ACRES) =    1.83     AREA-AVERAGED Fm(INCH/HR) =   0.10
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.33
 TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       5.53

        ==>>ERROR:FLOW EXCEEDS CAPACITY OF CHANNEL WITH
            NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM ALLOWABLE DEPTH.
            AS AN APPROXIMATION, TRAVEL TIME CALCULATIONS ARE BASED
            ON FLOW DEPTH EQUAL TO THE SPECIFIED MAXIMUM ALLOWABLE DEPTH.


 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOOD WIDTH(FEET) =    3.67
 FLOW VELOCITY(FEET/SEC.) =  17.38   DEPTH*VELOCITY(FT*FT/SEC) =   3.30
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     738.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   143.00
 ELEVATION DATA: UPSTREAM(FEET) =    176.70  DOWNSTREAM(FEET) =    171.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.91      0.30     0.100    56    5.00
 PUBLIC PARK                B        0.17      0.30     0.850    56    6.93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.218
 SUBAREA RUNOFF(CFS) =      4.63
 TOTAL AREA(ACRES) =      1.08   PEAK FLOW RATE(CFS) =      4.63
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.1  TC(MIN.) =      5.00
 EFFECTIVE AREA(ACRES) =      1.08  AREA-AVERAGED Fm(INCH/HR)=  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.218
 PEAK FLOW RATE(CFS)   =       4.63
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* VIVANTE-SENIOR ASSISTED LIVING                                        *
* EXISTING CONDITION                                                    *
* 100-YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: VSAL100E.DAT
  TIME/DATE OF STUDY: 09:32 05/28/2019
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   321.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.20  DOWNSTREAM(FEET) =    176.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.362
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.608
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.35      0.30      0.100    76    8.36
  PUBLIC PARK                B        0.12      0.30      0.850    76   13.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.291
  SUBAREA RUNOFF(CFS) =      1.91
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.91

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =    176.10
 DOWNSTREAM NODE ELEVATION(FEET) =    163.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   417.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.03000
 MAXIMUM DEPTH(FEET) =   0.19
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.461
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.91      0.30     0.100    76
 PUBLIC PARK                B        0.45      0.30     0.850    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.53
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.23
 AVERAGE FLOW DEPTH(FEET) =   0.19   FLOOD WIDTH(FEET) =    3.67
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.49   Tc(MIN.) =    8.85
 SUBAREA AREA(ACRES) =    1.36       SUBAREA RUNOFF(CFS) =    5.33
 EFFECTIVE AREA(ACRES) =    1.83     AREA-AVERAGED Fm(INCH/HR) =   0.10
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.33
 TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       7.18

        ==>>ERROR:FLOW EXCEEDS CAPACITY OF CHANNEL WITH
            NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM ALLOWABLE DEPTH.
            AS AN APPROXIMATION, TRAVEL TIME CALCULATIONS ARE BASED
            ON FLOW DEPTH EQUAL TO THE SPECIFIED MAXIMUM ALLOWABLE DEPTH.


 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOOD WIDTH(FEET) =    3.67
 FLOW VELOCITY(FEET/SEC.) =  22.56   DEPTH*VELOCITY(FT*FT/SEC) =   4.29
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     738.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   143.00
 ELEVATION DATA: UPSTREAM(FEET) =    176.70  DOWNSTREAM(FEET) =    171.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.91      0.30     0.100    76    5.00
 PUBLIC PARK                B        0.17      0.30     0.850    76    6.93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.218
 SUBAREA RUNOFF(CFS) =      5.95
 TOTAL AREA(ACRES) =      1.08   PEAK FLOW RATE(CFS) =      5.95
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.1  TC(MIN.) =      5.00
 EFFECTIVE AREA(ACRES) =      1.08  AREA-AVERAGED Fm(INCH/HR)=  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.218
 PEAK FLOW RATE(CFS)   =       5.95
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
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            Ver. 21.0  Release Date: 06/01/2014  License ID 1334

                        Analysis prepared by:
                            Tait & Associates
                  Pre-development Off-site areas O-1 and O-1a
```

```
------------------------------------------------------------------------------
  FILE NAME: SP8384.DAT
  TIME/DATE OF STUDY: 06:31 05/07/2019
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
  AREA O-1
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   158.00
  ELEVATION DATA: UPSTREAM(FEET) =    166.00  DOWNSTREAM(FEET) =    155.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.11      0.30     0.850    56    6.24
```

```
  COMMERCIAL                  B        0.05      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.16   PEAK FLOW RATE(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  21
  AREA O-1a
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  ELEVATION DATA: UPSTREAM(FEET) =    166.00  DOWNSTREAM(FEET) =    162.54

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  B        0.02      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.04
  TOTAL AREA(ACRES) =      0.02   PEAK FLOW RATE(CFS) =      0.04
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.0  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.02  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.04
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                        Analysis prepared by:

                            Tait & Associates
                  Pre-development Off-site areas O-1 and O-1a


--------------------------------------------------------------------------
  FILE NAME: SP8384O.DAT
  TIME/DATE OF STUDY: 06:20 05/07/2019
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
  Area O-1
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   158.00
  ELEVATION DATA: UPSTREAM(FEET) =    166.00  DOWNSTREAM(FEET) =    155.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.11      0.30     0.850    56    6.24
  COMMERCIAL                 B        0.05      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.16   PEAK FLOW RATE(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  21
  Area O-1a
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  ELEVATION DATA: UPSTREAM(FEET) =    166.00  DOWNSTREAM(FEET) =    162.54

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.02      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.09
  TOTAL AREA(ACRES) =      0.02   PEAK FLOW RATE(CFS) =      0.09
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.0  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.02  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.09
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
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                        Analysis prepared by:
                            Tait & Associates
                  Pre-development Off-site areas O-1 and O-1a



------------------------------------------------------------------------------
  FILE NAME: SP8384.DAT
  TIME/DATE OF STUDY: 06:26 05/07/2019
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
  AREA O-1
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   158.00
  ELEVATION DATA: UPSTREAM(FEET) =    166.00  DOWNSTREAM(FEET) =    155.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.11      0.30     0.850    56    6.24
```

```
  COMMERCIAL                  B        0.05      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.16   PEAK FLOW RATE(CFS) =      0.86

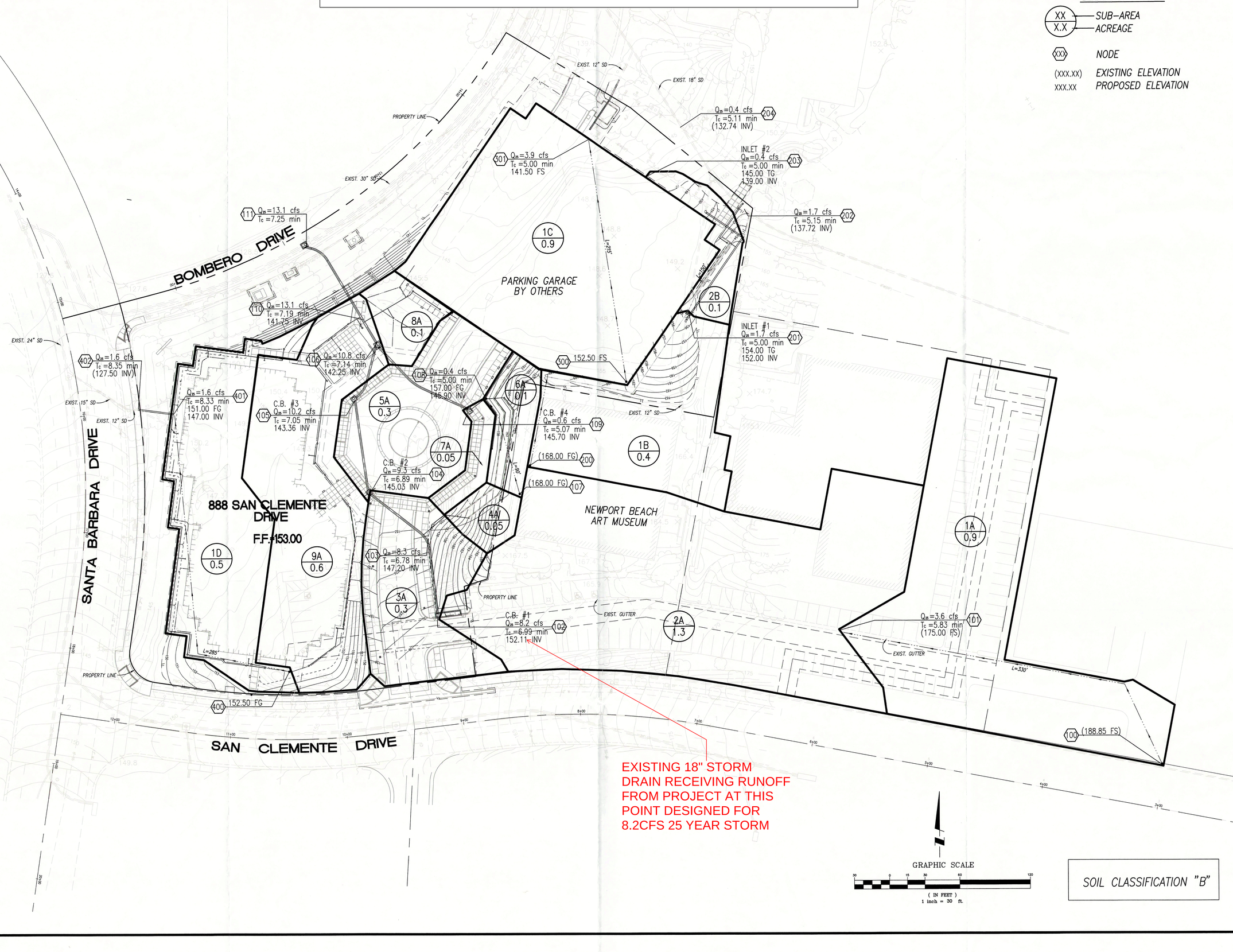
****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  21
  AREA O-1a
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  ELEVATION DATA: UPSTREAM(FEET) =    166.00  DOWNSTREAM(FEET) =    162.54

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  B        0.02      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.02   PEAK FLOW RATE(CFS) =      0.11
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.0  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.02  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.11
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

RECORD EX. HYDROLOGY MAP USED TO VERIFY ORIGINAL DESIGN CAPACITY OF EXISTING PRIVATE STORM DRAIN

LEGEND

- XX / X.X — SUB-AREA / ACREAGE
- ⟨XX⟩ — NODE
- (XXX.XX) — EXISTING ELEVATION
- XXX.XX — PROPOSED ELEVATION



GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

SOIL CLASSIFICATION "B"

NO.	DATE	REVISIONS
1		
2		
3		
4		
5		
6		
7		

DESIGNED BY: MM
DRAFTED BY: MM/JLW
CHECKED BY: DJJ

THE KEITH COMPANIES
Civil Engineering • Land Surveying
Mapping • Environmental Services
Water Resources • Land Planning
2955 Red Hill Avenue
Costa Mesa, CA 92626
(714)540-0800
DOUGLAS J. JOHNSON R.C.E. 47447 (EXP. 12/31/99)

888 SAN CLEMENTE DRIVE
HYDROLOGY MAP
CITY OF NEWPORT BEACH
BUILDING AND SAFETY DEPARTMENT

JOB No. 13261.000
PERMIT NO. XXXXX
SHEET 1 OF 1

Appendix C – Proposed Hydrology Map & AES Calculations

Proposed Hydrology Map and AES Calculations

LEGEND:

A / 0.74 — SUBAREA ID / SUBAREA AREA (AC)

10 ELEV=76.9' / Q_{25}=3.4 — HYDROLOGY NODE ID / ELEVATION (FT) / Q_{25}= 25-YEAR STORM EVENT DISCHARGE (CFS)

DRAINAGE AREA BOUNDARY

FLOWPATH

M.W.S — PROPOSED MODULAR WETLAND

EXISTING 18" PRIVATE STORM DRAIN CONNECTS TO PUBLIC SD AT BOMBERO DRIVE

EXISTING CATCH BASIN. OFF-SITE DRAINAGE AREA O-1 TRIBUTARY TO THIS CATCH BASIN. EL.=155' 90

EXISTING 18" PRIVATE STORM DRAIN

(154.82) INV

PROPOSED 18" STORM DRAIN SITE OUTFALL/RECEIVES RUNOFF FROM PROJECT AREAS

PROPOSED DETENTION

166.40 INV

PROP. POOL BASEMENT LEVEL

L=270'

ELEV=180.1' 1

ELEV=177.1' INV=176.1' 2

INV=174.4' 3

EL.=178.8' INV.=176.6 6

INV.=171.92 7

EL.=181.0' 5

ELEV=181.0' 8

EL.=174.8' INV.=171.4 9

INV.=169.01' 11

EL.=176.3' 12

ELEV=173.2' INV.=169.7' 13

INV.=178.0 14

EL=174.04 INV=170.04 15

INV.=168.71 16

INV=159.72 17

EL.=178.7' 18

ELEV=167.05' INV=163.55' 19

INV=157.0 20

EL.=165' 80

A-1 / 0.73

A-2 / 0.52

A-3 / 0.35

A-4 / 0.65

A-5 / 0.37

A-6 / 0.15

A-7 / 0.14

O-1 / 0.17

BASIS OF BEARINGS
N 79°22'13" W 689.63' (689.72' R1)
SAN CLEMENTE DRIVE
(PUBLIC STREET)

(IN FEET)
1 INCH = 20 FEET

UNDERGROUND SERVICE ALERT

811

Call: TOLL FREE 1-800-422-4133

KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

TWO WORKING DAYS BEFORE YOU DIG

UNAUTHORIZED CHANGES & USES:

THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

ENGINEERS NOTE TO CONTRACTOR:

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES, PIPES, AND/OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION OF THOSE UNDERGROUND UTILITIES TO BE USED AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON. IF THE CONTRACTOR ENCOUNTERS ANY DISCREPANCIES, CONFLICTS OR AREAS WHICH HE FEELS UNWORKABLE, HE SHALL NOTIFY THE GRADING ENGINEER IMMEDIATELY PRIOR TO CONTINUING OR DEVIATING FROM THIS PLAN.

AREA SUMMARY ON-SITE:

TOTAL AREA = 126,619 SF (2.91 AC)

IMPERVIOUS = 102,879 SF (2.36 AC)= 81%

PERVIOUS = 23,740 SF (0.55 AC)= 19%

AREA SUMMARY OFF-SITE:

TOTAL AREA = 7,743 (0.17 AC)

IMPERVIOUS = 1,588 SF (0.03 AC)= 20.5%

PERVIOUS = 6,155 SF (0.14 AC)= 79.5%

PLOT DATE: Friday, May 24, 2019 1:19:00 PM VERSION: 3.0.0.20170623

HKS

ARCHITECT
HKS ARCHITECTS, INC.
539 BRYANT STREET, SUITE 100
SAN FRANCISCO, CA 94107

LANDSCAPE
PERRY BURR & ASSOCIATES
27 MARINITA AVENUE
SAN RAFAEL, CA 94901

STRUCTURAL ENGINEER
SIMPSON GUMPERTZ & HEGER
100 PINE STREET, SUITE 600
SAN FRANCISCO, CA 94111

MEP ENGINEER
SCHNACKEL ENGINEERS
80 SOUTH LAKE AVENUE, SUITE 640
PASADENA, CA 91101

OWNER
NEXUS COMPANIES
1 MacARARTHUR PLACE; SUITE 300
SANTA ANA, CA 92707

OWNER CONSULTANTS

CIVIL ENGINEER
TAIT & ASSOCIATES, INC
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705

UTILITY ENGINEER
BJ PALMER & ASSOCIATES, INC
ONE RIDGEGATE DRIVE SUITE 105
TEMECULA, CA 92590

GEOTECHINICAL ENGINEER
GEOTECHNICAL PROFESSIONALS INC. (GPI)
5736 CORPORATE AVENUE
CYPRES, CA 90630

VIVANTE - SENIOR ASSISTED LIVING NEWPORT BEACH, CA

REVISION

HKS PROJECT NUMBER
22222

DATE
2019/0□/12

ISSUE
PLANNING RESUBMITAL 2

SHEET TITLE
PROPOSED HYDROLOGY MAP

SHEET NO.
C1.0□

```
_____________________________________________________________________________
*****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2014 Advanced Engineering Software (aes)
             Ver. 21.0  Release Date: 06/01/2014  License ID 1334

                          Analysis prepared by:

                                  Post-development 2 year



----------------------------------------------------------------------------
  FILE NAME: VSAL025P.DAT
  TIME/DATE OF STUDY: 17:19 05/23/2019
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

*****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    180.10  DOWNSTREAM(FEET) =    177.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.481
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.796
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 B        0.73      0.30     0.200    56    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.14
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.14

*****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   176.10  DOWNSTREAM(FEET) =   174.40
```

```
  FLOW LENGTH(FEET) =   132.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.14
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.99
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.730
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.52      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    0.78
  EFFECTIVE AREA(ACRES) =      1.25   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       1.88

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   174.00  DOWNSTREAM(FEET) =   171.91
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.35
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.88
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    8.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     632.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.87
  RAINFALL INTENSITY(INCH/HR) =   1.63
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.88

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   112.00
  ELEVATION DATA: UPSTREAM(FEET) =    181.00  DOWNSTREAM(FEET) =    178.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 B        0.35      0.30     0.200    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.69
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      0.69

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   176.60  DOWNSTREAM(FEET) =   171.92
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.05
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.69
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    5.04
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   2.25
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.35
  TOTAL STREAM AREA(ACRES) =       0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.88    8.87    1.629  0.30( 0.06) 0.20       1.2       1.00
      2        0.69    5.04    2.254  0.30( 0.06) 0.20       0.3       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.19    5.04    2.254  0.30( 0.06) 0.20       1.1       5.00
      2        2.38    8.87    1.629  0.30( 0.06) 0.20       1.6       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.38    Tc(MIN.) =     8.87
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     632.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   191.92  DOWNSTREAM(FEET) =   169.01
  FLOW LENGTH(FEET) =   272.00   MANNING'S N =  0.013
```

```
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.48
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.38
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.30
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =     904.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.30
  RAINFALL INTENSITY(INCH/HR) =   1.59
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.38

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   252.00
  ELEVATION DATA: UPSTREAM(FEET) =    181.00  DOWNSTREAM(FEET) =    174.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.207
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.999
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                B        0.65      0.30     0.200    56    6.21
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.40  DOWNSTREAM(FEET) =   169.01
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.99
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.13
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.25
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE     11.00 =     276.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.25
  RAINFALL INTENSITY(INCH/HR) =   1.99
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.65
  TOTAL STREAM AREA(ACRES) =       0.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.13

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.19    5.48    2.148  0.30( 0.06) 0.20       1.1       5.00
      1        2.38    9.30    1.585  0.30( 0.06) 0.20       1.6       1.00
      2        1.13    6.25    1.991  0.30( 0.06) 0.20       0.6       8.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.26    5.48    2.148  0.30( 0.06) 0.20       1.6       5.00
      2        3.36    6.25    1.991  0.30( 0.06) 0.20       1.8       8.00
      3        3.27    9.30    1.585  0.30( 0.06) 0.20       2.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.36    Tc(MIN.) =     6.25
  EFFECTIVE AREA(ACRES) =       1.82   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =     904.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.01  DOWNSTREAM(FEET) =   168.71
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.39
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.36
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    6.43
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   102.00
  ELEVATION DATA: UPSTREAM(FEET) =    176.30  DOWNSTREAM(FEET) =    173.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.37      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.74
```

```
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.70  DOWNSTREAM(FEET) =   168.71
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.04
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.74
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    5.82
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     16.00 =     252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.74    5.82    2.074  0.30( 0.03) 0.10       0.4      12.00
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     16.00 =     252.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.26    5.66    2.108  0.30( 0.06) 0.20       1.6       5.00
      2        3.36    6.43    1.959  0.30( 0.06) 0.20       1.8       8.00
      3        3.27    9.48    1.568  0.30( 0.06) 0.20       2.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.00    5.66    2.108  0.30( 0.05) 0.18       2.0       5.00
      2        4.03    5.82    2.074  0.30( 0.05) 0.18       2.0      12.00
      3        4.06    6.43    1.959  0.30( 0.05) 0.18       2.2       8.00
      4        3.83    9.48    1.568  0.30( 0.06) 0.19       2.6       1.00
    TOTAL AREA(ACRES) =         2.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        4.06  Tc(MIN.) =    6.430
  EFFECTIVE AREA(ACRES) =      2.19  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   168.71  DOWNSTREAM(FEET) =   159.72
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.28
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.06
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.44
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =     965.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.44
  RAINFALL INTENSITY(INCH/HR) =   1.96
  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.00  DOWNSTREAM(FEET) =    159.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.15      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   170.04  DOWNSTREAM(FEET) =   159.72
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   0.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.30
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     17.00 =     127.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.01
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.30

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.00    5.67    2.106  0.30( 0.05) 0.18       2.0       5.00
      1        4.03    5.83    2.073  0.30( 0.05) 0.18       2.0      12.00
      1        4.06    6.44    1.958  0.30( 0.05) 0.18       2.2       8.00
      1        3.83    9.49    1.567  0.30( 0.06) 0.19       2.6       1.00
      2        0.30    5.01    2.261  0.30( 0.03) 0.10       0.2      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.10    5.01    2.261  0.30( 0.05) 0.18       1.9      14.00
      2        4.28    5.67    2.106  0.30( 0.05) 0.18       2.1       5.00
      3        4.30    5.83    2.073  0.30( 0.05) 0.18       2.2      12.00
      4        4.32    6.44    1.958  0.30( 0.05) 0.18       2.3       8.00
      5        4.04    9.49    1.567  0.30( 0.05) 0.18       2.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.32    Tc(MIN.) =     6.44
  EFFECTIVE AREA(ACRES) =       2.34   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =     965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   159.72  DOWNSTREAM(FEET) =   157.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.32
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.46
  RAINFALL INTENSITY(INCH/HR) =   1.95
  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       2.34
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.32

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   231.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.70  DOWNSTREAM(FEET) =    167.05

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.742
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.761
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                 B        0.14      0.30     0.850    56    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   163.55  DOWNSTREAM(FEET) =   157.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.87
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.19
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.88
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     281.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.88
  RAINFALL INTENSITY(INCH/HR) =   1.74
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.14
  TOTAL STREAM AREA(ACRES) =       0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.10    5.04    2.255  0.30( 0.05) 0.18       1.9      14.00
      1        4.28    5.69    2.101  0.30( 0.05) 0.18       2.1       5.00
      1        4.30    5.85    2.068  0.30( 0.05) 0.18       2.2      12.00
      1        4.32    6.46    1.954  0.30( 0.05) 0.18       2.3       8.00
      1        4.04    9.51    1.565  0.30( 0.05) 0.18       2.8       1.00
      2        0.19    7.88    1.743  0.30( 0.25) 0.85       0.1      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.26    5.04    2.255  0.30( 0.06) 0.21       2.0      14.00
      2        4.45    5.69    2.101  0.30( 0.06) 0.21       2.2       5.00
      3        4.47    5.85    2.068  0.30( 0.06) 0.21       2.3      12.00
      4        4.50    6.46    1.954  0.30( 0.06) 0.21       2.5       8.00
      5        4.38    7.88    1.743  0.30( 0.06) 0.21       2.7      18.00
      6        4.21    9.51    1.565  0.30( 0.06) 0.21       2.9       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.50    Tc(MIN.) =     6.46
  EFFECTIVE AREA(ACRES) =       2.45   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =     985.00 FEET.
============================================================================
```

```
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.9  TC(MIN.) =      6.46
  EFFECTIVE AREA(ACRES) =      2.45  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.209
  PEAK FLOW RATE(CFS)   =       4.50

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.26    5.04    2.255  0.30( 0.06) 0.21       2.0      14.00
      2        4.45    5.69    2.101  0.30( 0.06) 0.21       2.2       5.00
      3        4.47    5.85    2.068  0.30( 0.06) 0.21       2.3      12.00
      4        4.50    6.46    1.954  0.30( 0.06) 0.21       2.5       8.00
      5        4.38    7.88    1.743  0.30( 0.06) 0.21       2.7      18.00
      6        4.21    9.51    1.565  0.30( 0.06) 0.21       2.9       1.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2014 Advanced Engineering Software (aes)
             Ver. 21.0  Release Date: 06/01/2014  License ID 1334

                          Analysis prepared by:

                         Post-development 25year



--------------------------------------------------------------------------
  FILE NAME: VSAL025P.DAT
  TIME/DATE OF STUDY: 17:14 05/23/2019
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    180.10  DOWNSTREAM(FEET) =    177.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.481
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.840
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 B        0.73      0.30     0.200    56    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.48
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.48

**************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   176.10  DOWNSTREAM(FEET) =   174.40
```

```
  FLOW LENGTH(FEET) =   132.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    7.90
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.90
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.725
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.52      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.72
  EFFECTIVE AREA(ACRES) =      1.25   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       4.12

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   174.00  DOWNSTREAM(FEET) =   171.91
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.12
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    8.62
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     632.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.62
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.12

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   112.00
  ELEVATION DATA: UPSTREAM(FEET) =    181.00  DOWNSTREAM(FEET) =    178.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                B        0.35      0.30     0.200    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.50
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   176.60  DOWNSTREAM(FEET) =   171.92
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.60
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.50
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.03
  RAINFALL INTENSITY(INCH/HR) =   4.81
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.35
  TOTAL STREAM AREA(ACRES) =       0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.50

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.12    8.62    3.543  0.30( 0.06) 0.20       1.2       1.00
      2        1.50    5.03    4.807  0.30( 0.06) 0.20       0.3       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.78    5.03    4.807  0.30( 0.06) 0.20       1.1       5.00
      2        5.22    8.62    3.543  0.30( 0.06) 0.20       1.6       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.22    Tc(MIN.) =     8.62
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     632.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   191.92  DOWNSTREAM(FEET) =   169.01
  FLOW LENGTH(FEET) =   272.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.95
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.22
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    8.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =     904.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.97
  RAINFALL INTENSITY(INCH/HR) =   3.46
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.22

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   252.00
  ELEVATION DATA: UPSTREAM(FEET) =    181.00  DOWNSTREAM(FEET) =    174.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.207
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.268
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 B        0.65      0.30      0.200    56    6.21
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.40  DOWNSTREAM(FEET) =   169.01
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.25
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.46
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.24
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE     11.00 =     276.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.24
  RAINFALL INTENSITY(INCH/HR) =   4.25
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.65
  TOTAL STREAM AREA(ACRES) =       0.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.78    5.39    4.624  0.30( 0.06) 0.20       1.1       5.00
      1        5.22    8.97    3.464  0.30( 0.06) 0.20       1.6       1.00
      2        2.46    6.24    4.254  0.30( 0.06) 0.20       0.6       8.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.09    5.39    4.624  0.30( 0.06) 0.20       1.6       5.00
      2        7.35    6.24    4.254  0.30( 0.06) 0.20       1.9       8.00
      3        7.22    8.97    3.464  0.30( 0.06) 0.20       2.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.35    Tc(MIN.) =     6.24
  EFFECTIVE AREA(ACRES) =       1.85   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =     904.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.01  DOWNSTREAM(FEET) =   168.71
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.35
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   102.00
  ELEVATION DATA: UPSTREAM(FEET) =    176.30  DOWNSTREAM(FEET) =    173.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.37      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.60
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.60
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.70  DOWNSTREAM(FEET) =   168.71
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.69
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.60
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    5.68
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     16.00 =     252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.60    5.68    4.489  0.30( 0.03) 0.10       0.4      12.00
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     16.00 =     252.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.09    5.54    4.552  0.30( 0.06) 0.20       1.6       5.00
      2        7.35    6.39    4.198  0.30( 0.06) 0.20       1.9       8.00
      3        7.22    9.12    3.432  0.30( 0.06) 0.20       2.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.67    5.54    4.552  0.30( 0.05) 0.18       2.0       5.00
      2        8.73    5.68    4.489  0.30( 0.05) 0.18       2.0      12.00
      3        8.84    6.39    4.198  0.30( 0.06) 0.18       2.2       8.00
      4        8.44    9.12    3.432  0.30( 0.06) 0.19       2.6       1.00
    TOTAL AREA(ACRES) =         2.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        8.84  Tc(MIN.) =    6.392
  EFFECTIVE AREA(ACRES) =      2.22  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   168.71  DOWNSTREAM(FEET) =   159.72
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.46
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.84
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.40
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =     965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       2.22
  TOTAL STREAM AREA(ACRES) =       2.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.84

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.00  DOWNSTREAM(FEET) =    159.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.15      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   170.04  DOWNSTREAM(FEET) =   159.72
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.31
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.65
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     17.00 =     127.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.01
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.67    5.55    4.549  0.30( 0.05) 0.18       2.0       5.00
      1        8.73    5.68    4.486  0.30( 0.05) 0.18       2.0      12.00
```

```
     1        8.84    6.40    4.195  0.30( 0.06) 0.18       2.2       8.00
     1        8.44    9.13    3.430  0.30( 0.06) 0.19       2.6       1.00
     2        0.65    5.01    4.818  0.30( 0.03) 0.10       0.2      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.95    5.01    4.818  0.30( 0.05) 0.18       2.0      14.00
     2        9.28    5.55    4.549  0.30( 0.05) 0.18       2.2       5.00
     3        9.33    5.68    4.486  0.30( 0.05) 0.18       2.2      12.00
     4        9.40    6.40    4.195  0.30( 0.05) 0.18       2.4       8.00
     5        8.90    9.13    3.430  0.30( 0.05) 0.18       2.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.40    Tc(MIN.) =     6.40
  EFFECTIVE AREA(ACRES) =       2.37   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =     965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   159.72  DOWNSTREAM(FEET) =   157.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.82
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.40
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.42
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       2.37
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.40

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   231.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.70  DOWNSTREAM(FEET) =    167.05

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.742
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.766
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.14      0.30     0.850    56    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   163.55  DOWNSTREAM(FEET) =   157.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.44
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.85
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     281.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.85
  RAINFALL INTENSITY(INCH/HR) =   3.74
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.14
  TOTAL STREAM AREA(ACRES) =       0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.44

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.95    5.03    4.808  0.30( 0.05) 0.18       2.0      14.00
      1        9.28    5.57    4.540  0.30( 0.05) 0.18       2.2       5.00
      1        9.33    5.70    4.478  0.30( 0.05) 0.18       2.2      12.00
      1        9.40    6.42    4.188  0.30( 0.05) 0.18       2.4       8.00
      1        8.90    9.15    3.426  0.30( 0.05) 0.18       2.8       1.00
      2        0.44    7.85    3.736  0.30( 0.25) 0.85       0.1      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.32    5.03    4.808  0.30( 0.06) 0.21       2.0      14.00
      2        9.67    5.57    4.540  0.30( 0.06) 0.21       2.3       5.00
      3        9.72    5.70    4.478  0.30( 0.06) 0.21       2.3      12.00
      4        9.81    6.42    4.188  0.30( 0.06) 0.21       2.5       8.00
      5        9.58    7.85    3.736  0.30( 0.06) 0.21       2.7      18.00
      6        9.30    9.15    3.426  0.30( 0.06) 0.21       2.9       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.81    Tc(MIN.) =     6.42
  EFFECTIVE AREA(ACRES) =       2.49   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =     985.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.9  TC(MIN.) =      6.42
  EFFECTIVE AREA(ACRES) =      2.49  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.209
```

PEAK FLOW RATE(CFS) = 9.81

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.32	5.03	4.808	0.30(0.06)	0.21	2.0	14.00
2	9.67	5.57	4.540	0.30(0.06)	0.21	2.3	5.00
3	9.72	5.70	4.478	0.30(0.06)	0.21	2.3	12.00
4	9.81	6.42	4.188	0.30(0.06)	0.21	2.5	8.00
5	9.58	7.85	3.736	0.30(0.06)	0.21	2.7	18.00
6	9.30	9.15	3.426	0.30(0.06)	0.21	2.9	1.00

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2014 Advanced Engineering Software (aes)
             Ver. 21.0  Release Date: 06/01/2014  License ID 1334

                          Analysis prepared by:

                         Post –development 100 year



--------------------------------------------------------------------------
  FILE NAME: VSAL025P.DAT
  TIME/DATE OF STUDY: 17:27 05/23/2019
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    180.10  DOWNSTREAM(FEET) =    177.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.481
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.912
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 B        0.73      0.30     0.200    56    7.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.19
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.19

**************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   176.10  DOWNSTREAM(FEET) =   174.40
```

```
  FLOW LENGTH(FEET) =   132.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.58
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.19
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    7.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.87
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.769
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.52      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.20
  EFFECTIVE AREA(ACRES) =      1.25   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       5.30

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   174.00  DOWNSTREAM(FEET) =   171.91
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.52
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.30
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    8.57
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     632.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.57
  RAINFALL INTENSITY(INCH/HR) =   4.54
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.30

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   112.00
  ELEVATION DATA: UPSTREAM(FEET) =    181.00  DOWNSTREAM(FEET) =    178.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                B        0.35      0.30     0.200    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.93
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      1.93

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   176.60  DOWNSTREAM(FEET) =   171.92
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.55
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.93
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.03
  RAINFALL INTENSITY(INCH/HR) =   6.17
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.35
  TOTAL STREAM AREA(ACRES) =       0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.93

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.30    8.57    4.544  0.30( 0.06) 0.20       1.2       1.00
      2        1.93    5.03    6.167  0.30( 0.06) 0.20       0.3       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.16    5.03    6.167  0.30( 0.06) 0.20       1.1       5.00
      2        6.72    8.57    4.544  0.30( 0.06) 0.20       1.6       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.72    Tc(MIN.) =     8.57
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     632.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   191.92  DOWNSTREAM(FEET) =   169.01
  FLOW LENGTH(FEET) =   272.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.73
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.72
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    8.90
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =     904.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.90
  RAINFALL INTENSITY(INCH/HR) =   4.45
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.72

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   252.00
  ELEVATION DATA: UPSTREAM(FEET) =    181.00  DOWNSTREAM(FEET) =    174.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.207
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.466
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 B        0.65      0.30      0.200    56    6.21
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   171.40  DOWNSTREAM(FEET) =   169.01
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.06
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.16
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.24
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE     11.00 =     276.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.24
  RAINFALL INTENSITY(INCH/HR) =   5.45
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.65
  TOTAL STREAM AREA(ACRES) =       0.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.16    5.36    5.943  0.30( 0.06) 0.20       1.1       5.00
      1        6.72    8.90    4.447  0.30( 0.06) 0.20       1.6       1.00
      2        3.16    6.24    5.449  0.30( 0.06) 0.20       0.6       8.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.13    5.36    5.943  0.30( 0.06) 0.20       1.6       5.00
      2        9.46    6.24    5.449  0.30( 0.06) 0.20       1.9       8.00
      3        9.29    8.90    4.447  0.30( 0.06) 0.20       2.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.46    Tc(MIN.) =     6.24
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =     904.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.01  DOWNSTREAM(FEET) =   168.71
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.46
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.38
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   102.00
  ELEVATION DATA: UPSTREAM(FEET) =    176.30  DOWNSTREAM(FEET) =    173.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.37      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.05
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      2.05
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   169.70  DOWNSTREAM(FEET) =   168.71
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.91
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.05
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    5.64
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     16.00 =     252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.05    5.64    5.775  0.30( 0.03) 0.10       0.4      12.00
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     16.00 =     252.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.13    5.50    5.856  0.30( 0.06) 0.20       1.6       5.00
      2        9.46    6.38    5.381  0.30( 0.06) 0.20       1.9       8.00
      3        9.29    9.04    4.407  0.30( 0.06) 0.20       2.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.16    5.50    5.856  0.30( 0.05) 0.18       2.0       5.00
      2       11.23    5.64    5.775  0.30( 0.05) 0.18       2.0      12.00
      3       11.37    6.38    5.381  0.30( 0.06) 0.18       2.2       8.00
      4       10.85    9.04    4.407  0.30( 0.06) 0.19       2.6       1.00
    TOTAL AREA(ACRES) =         2.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       11.37  Tc(MIN.) =    6.379
  EFFECTIVE AREA(ACRES) =      2.23  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =     951.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   168.71  DOWNSTREAM(FEET) =   159.72
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.64
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.37
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =     965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.37

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.00  DOWNSTREAM(FEET) =    159.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.15      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   170.04  DOWNSTREAM(FEET) =   159.72
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.66
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.83
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     17.00 =     127.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.01
  RAINFALL INTENSITY(INCH/HR) =   6.18
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.16    5.51    5.851  0.30( 0.05) 0.18       2.0       5.00
      1       11.23    5.65    5.771  0.30( 0.05) 0.18       2.0      12.00
```

```
     1       11.37    6.39    5.378  0.30( 0.06) 0.18       2.2       8.00
     1       10.85    9.04    4.406  0.30( 0.06) 0.19       2.6       1.00
     2        0.83    5.01    6.181  0.30( 0.03) 0.10       0.2      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       11.55    5.01    6.181  0.30( 0.05) 0.18       2.0      14.00
     2       11.95    5.51    5.851  0.30( 0.05) 0.18       2.2       5.00
     3       12.01    5.65    5.771  0.30( 0.05) 0.18       2.2      12.00
     4       12.10    6.39    5.378  0.30( 0.05) 0.18       2.4       8.00
     5       11.44    9.04    4.406  0.30( 0.05) 0.18       2.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.10    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.38   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =     965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   159.72  DOWNSTREAM(FEET) =   157.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.55
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.10
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.40
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   5.37
  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       2.38
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   231.00
  ELEVATION DATA: UPSTREAM(FEET) =    178.70  DOWNSTREAM(FEET) =    167.05

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.742
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.816
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.14      0.30     0.850    56    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.57

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   163.55  DOWNSTREAM(FEET) =   157.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.57
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.84
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     281.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.84
  RAINFALL INTENSITY(INCH/HR) =   4.78
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       0.14
  TOTAL STREAM AREA(ACRES) =       0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.57

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.55    5.03    6.168  0.30( 0.05) 0.18       2.0      14.00
      1       11.95    5.53    5.841  0.30( 0.05) 0.18       2.2       5.00
      1       12.01    5.66    5.761  0.30( 0.05) 0.18       2.2      12.00
      1       12.10    6.40    5.369  0.30( 0.05) 0.18       2.4       8.00
      1       11.44    9.06    4.400  0.30( 0.05) 0.18       2.8       1.00
      2        0.57    7.84    4.780  0.30( 0.25) 0.85       0.1      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.03    5.03    6.168  0.30( 0.06) 0.21       2.1      14.00
      2       12.45    5.53    5.841  0.30( 0.06) 0.21       2.3       5.00
      3       12.51    5.66    5.761  0.30( 0.06) 0.21       2.3      12.00
      4       12.63    6.40    5.369  0.30( 0.06) 0.21       2.5       8.00
      5       12.32    7.84    4.780  0.30( 0.06) 0.21       2.7      18.00
      6       11.97    9.06    4.400  0.30( 0.06) 0.21       2.9       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.63    Tc(MIN.) =     6.40
  EFFECTIVE AREA(ACRES) =       2.50   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =     985.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.9  TC(MIN.) =      6.40
  EFFECTIVE AREA(ACRES) =      2.50  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.209
```

PEAK FLOW RATE(CFS) = 12.63

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	12.03	5.03	6.168	0.30(0.06)	0.21	2.1	14.00
2	12.45	5.53	5.841	0.30(0.06)	0.21	2.3	5.00
3	12.51	5.66	5.761	0.30(0.06)	0.21	2.3	12.00
4	12.63	6.40	5.369	0.30(0.06)	0.21	2.5	8.00
5	12.32	7.84	4.780	0.30(0.06)	0.21	2.7	18.00
6	11.97	9.06	4.400	0.30(0.06)	0.21	2.9	1.00

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
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             Ver. 21.0  Release Date: 06/01/2014  License ID 1334

                          Analysis prepared by:


                      Off-Site Area O- 2 year storm


--------------------------------------------------------------------------
  FILE NAME: SP8384O.DAT
  TIME/DATE OF STUDY: 17:33 05/23/2019
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     90.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   168.00
  ELEVATION DATA: UPSTREAM(FEET) =    165.00  DOWNSTREAM(FEET) =    155.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK               B        0.14      0.30     0.850    56    6.59
  COMMERCIAL                B        0.03      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.718
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.31
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.2  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.17  AREA-AVERAGED Fm(INCH/HR)=  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.718
  PEAK FLOW RATE(CFS)   =       0.31
==========================================================================
```

```
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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            Ver. 21.0  Release Date: 06/01/2014  License ID 1334

                        Analysis prepared by:
                              Tait & Associates
                       Post-Development -Off-site area O



--------------------------------------------------------------------------
  FILE NAME: SP8384O.DAT
  TIME/DATE OF STUDY: 06:38 05/07/2019
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     90.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   168.00
  ELEVATION DATA: UPSTREAM(FEET) =    165.00  DOWNSTREAM(FEET) =    155.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.14      0.30     0.850    56    6.59
  COMMERCIAL                 B        0.03      0.30     0.100    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.718
  SUBAREA RUNOFF(CFS) =      0.71
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.71
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.2  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.17  AREA-AVERAGED Fm(INCH/HR)=  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.718
  PEAK FLOW RATE(CFS)   =       0.71
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
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          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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            Ver. 21.0  Release Date: 06/01/2014  License ID 1334

                        Analysis prepared by:
                              Tait & Associates
                       Post- Developed off-site area O
```

```
------------------------------------------------------------------------------
  FILE NAME: SP8384O.DAT
  TIME/DATE OF STUDY: 06:41 05/07/2019
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     90.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   168.00
  ELEVATION DATA: UPSTREAM(FEET) =    165.00  DOWNSTREAM(FEET) =    155.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.14      0.30     0.850    56    6.59
  COMMERCIAL                 B        0.03      0.30     0.100    56    5.00
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.718
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.91
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.2  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.17  AREA-AVERAGED Fm(INCH/HR)=  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.718
  PEAK FLOW RATE(CFS)   =       0.91
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix D – Hydraulic Pipe Calculations

Normal Depth Calculations

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD01

Circular

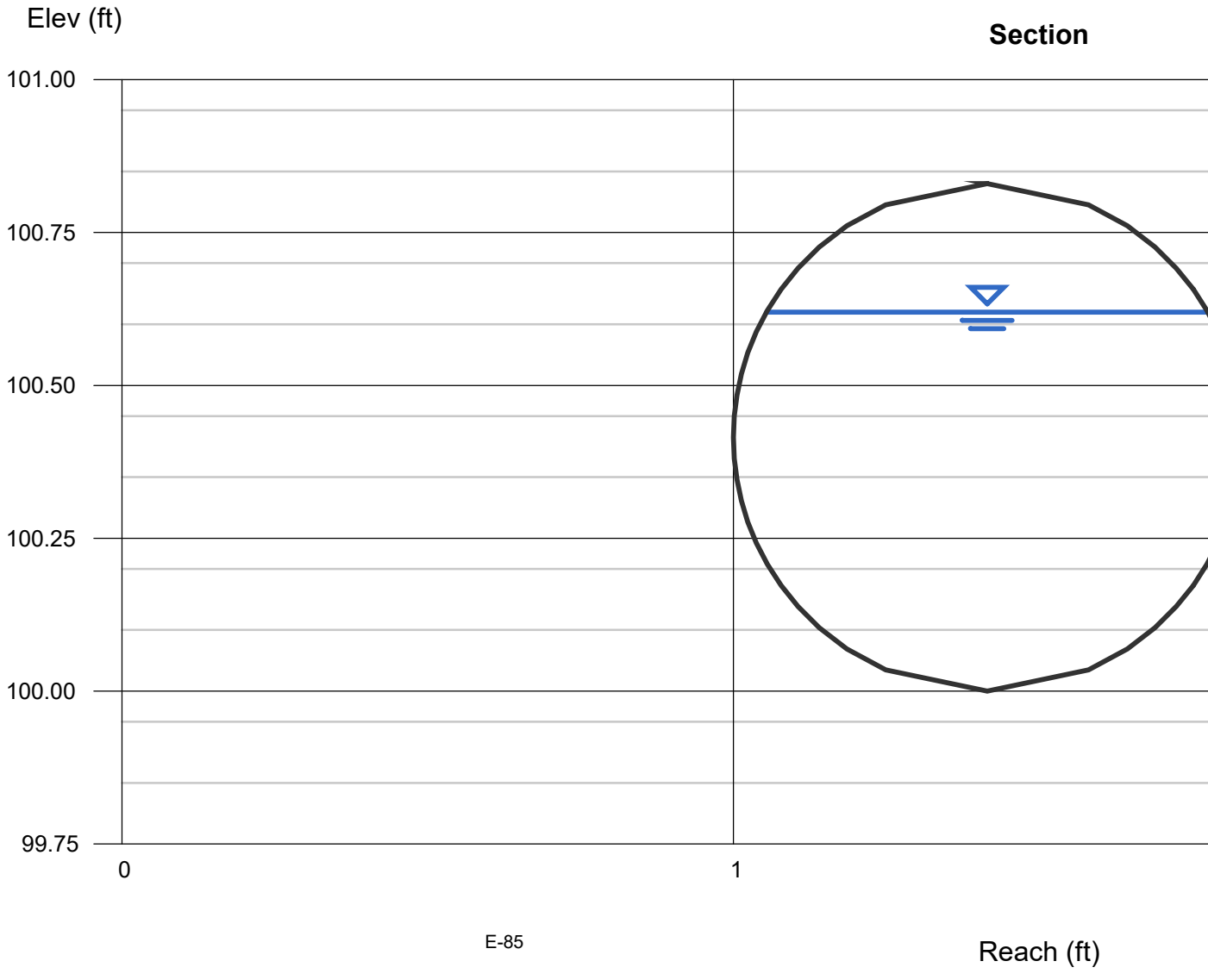
Diameter (ft)	= 0.83
Invert Elev (ft)	= 100.00
Slope (%)	= 0.75
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.70

Highlighted

Depth (ft)	= 0.62
Q (cfs)	= 1.700
Area (sqft)	= 0.43
Velocity (ft/s)	= 3.92
Wetted Perim (ft)	= 1.73
Crit Depth, Yc (ft)	= 0.59
Top Width (ft)	= 0.72
EGL (ft)	= 0.86



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD02

Circular

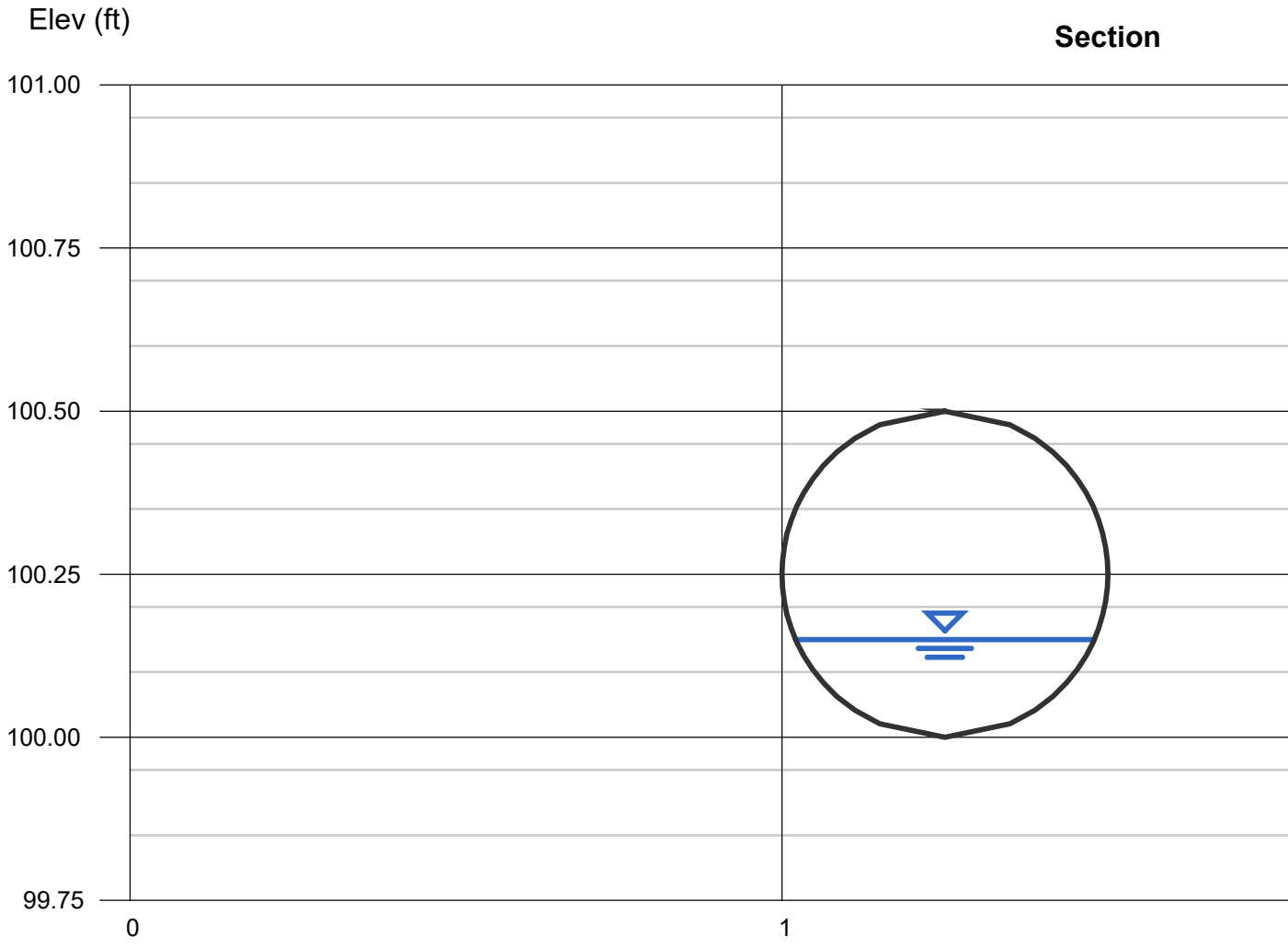
Diameter (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 0.90
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.10

Highlighted

Depth (ft)	= 0.15
Q (cfs)	= 0.100
Area (sqft)	= 0.05
Velocity (ft/s)	= 2.02
Wetted Perim (ft)	= 0.58
Crit Depth, Yc (ft)	= 0.16
Top Width (ft)	= 0.46
EGL (ft)	= 0.21



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD03

Circular

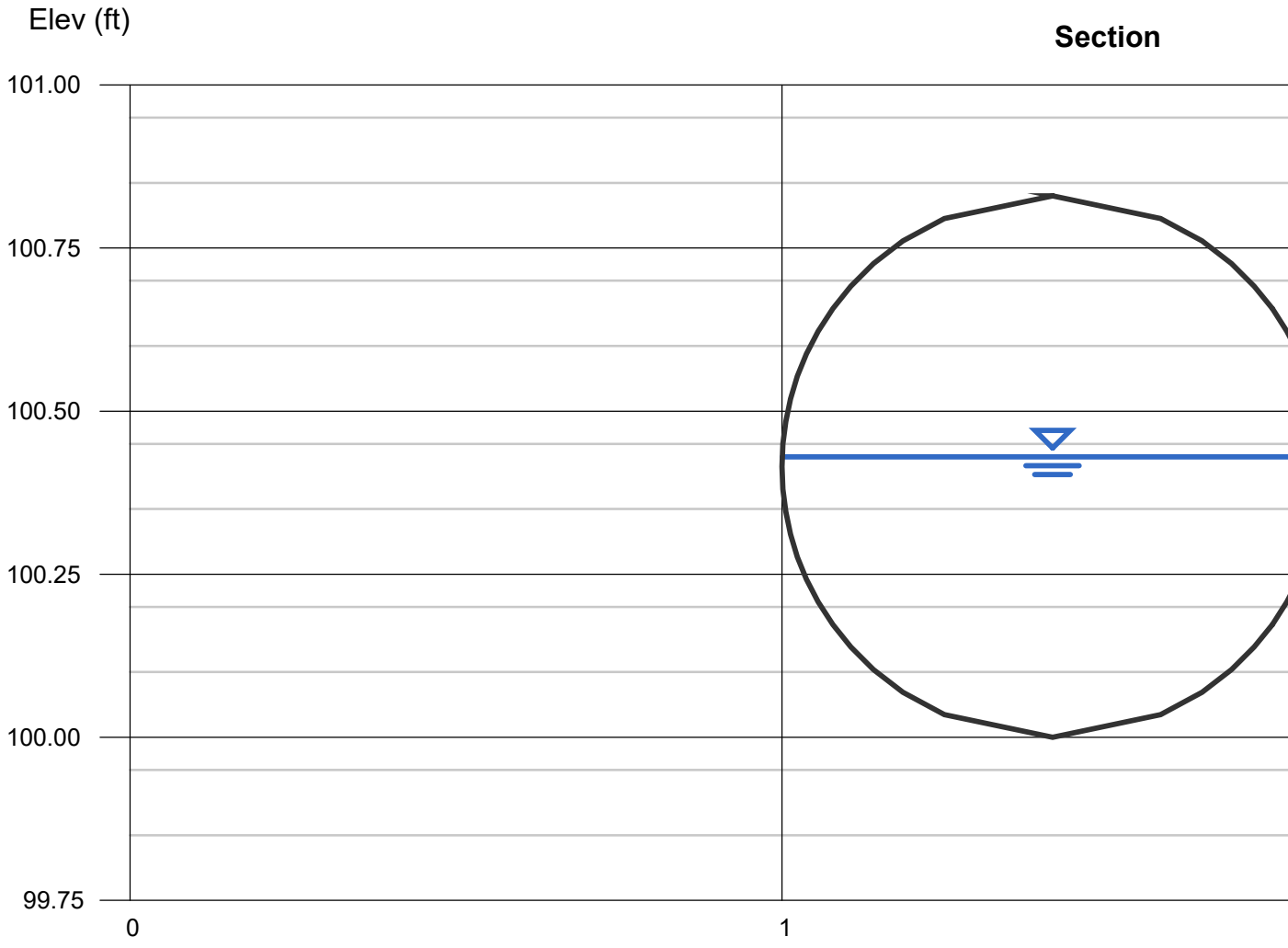
Diameter (ft)	= 0.83
Invert Elev (ft)	= 100.00
Slope (%)	= 2.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.80

Highlighted

Depth (ft)	= 0.43
Q (cfs)	= 1.800
Area (sqft)	= 0.28
Velocity (ft/s)	= 6.34
Wetted Perim (ft)	= 1.34
Crit Depth, Yc (ft)	= 0.61
Top Width (ft)	= 0.83
EGL (ft)	= 1.05



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD04

Circular

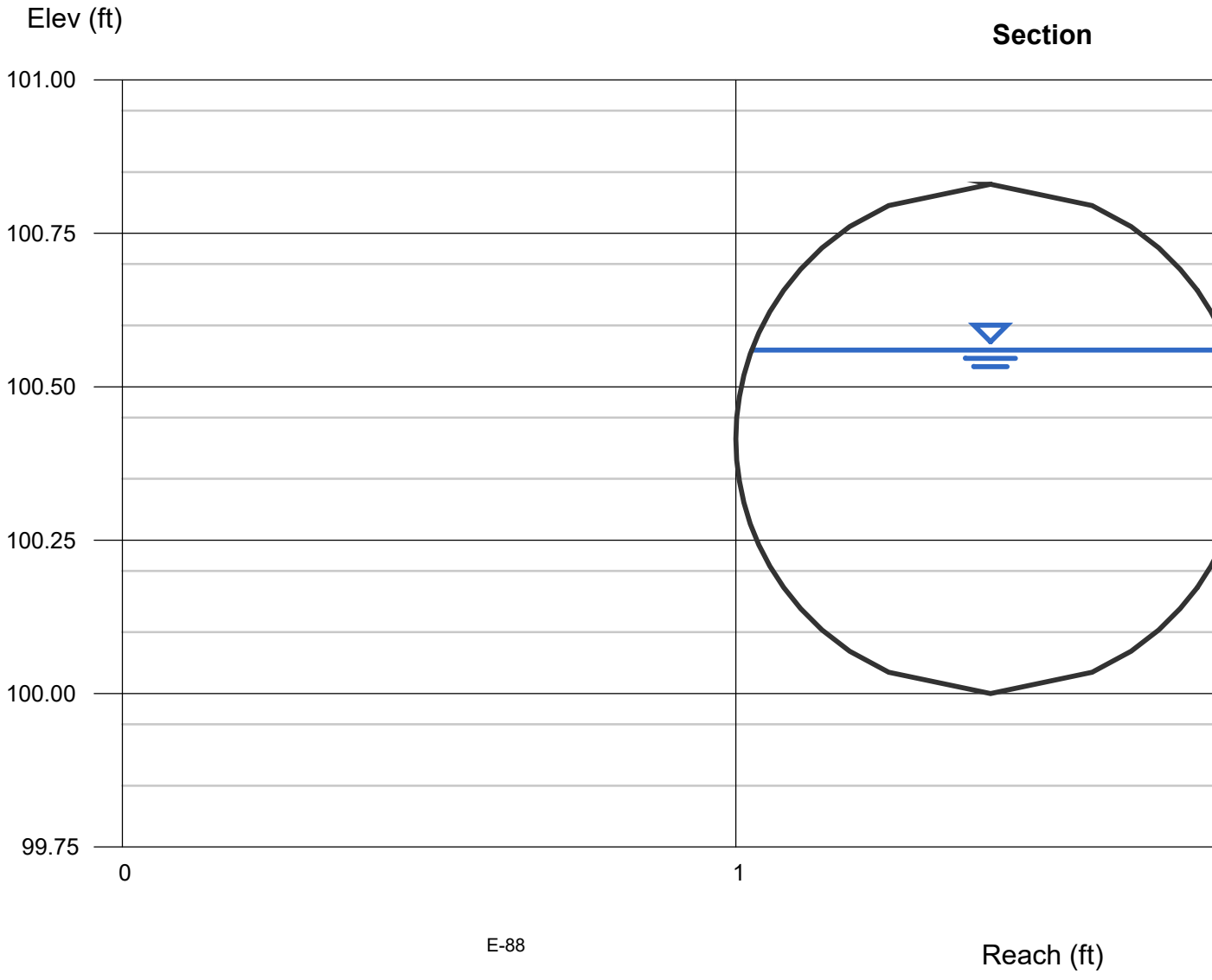
Diameter (ft)	= 0.83
Invert Elev (ft)	= 100.00
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.40

Highlighted

Depth (ft)	= 0.56
Q (cfs)	= 2.400
Area (sqft)	= 0.39
Velocity (ft/s)	= 6.17
Wetted Perim (ft)	= 1.60
Crit Depth, Yc (ft)	= 0.69
Top Width (ft)	= 0.78
EGL (ft)	= 1.15



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD05

Circular

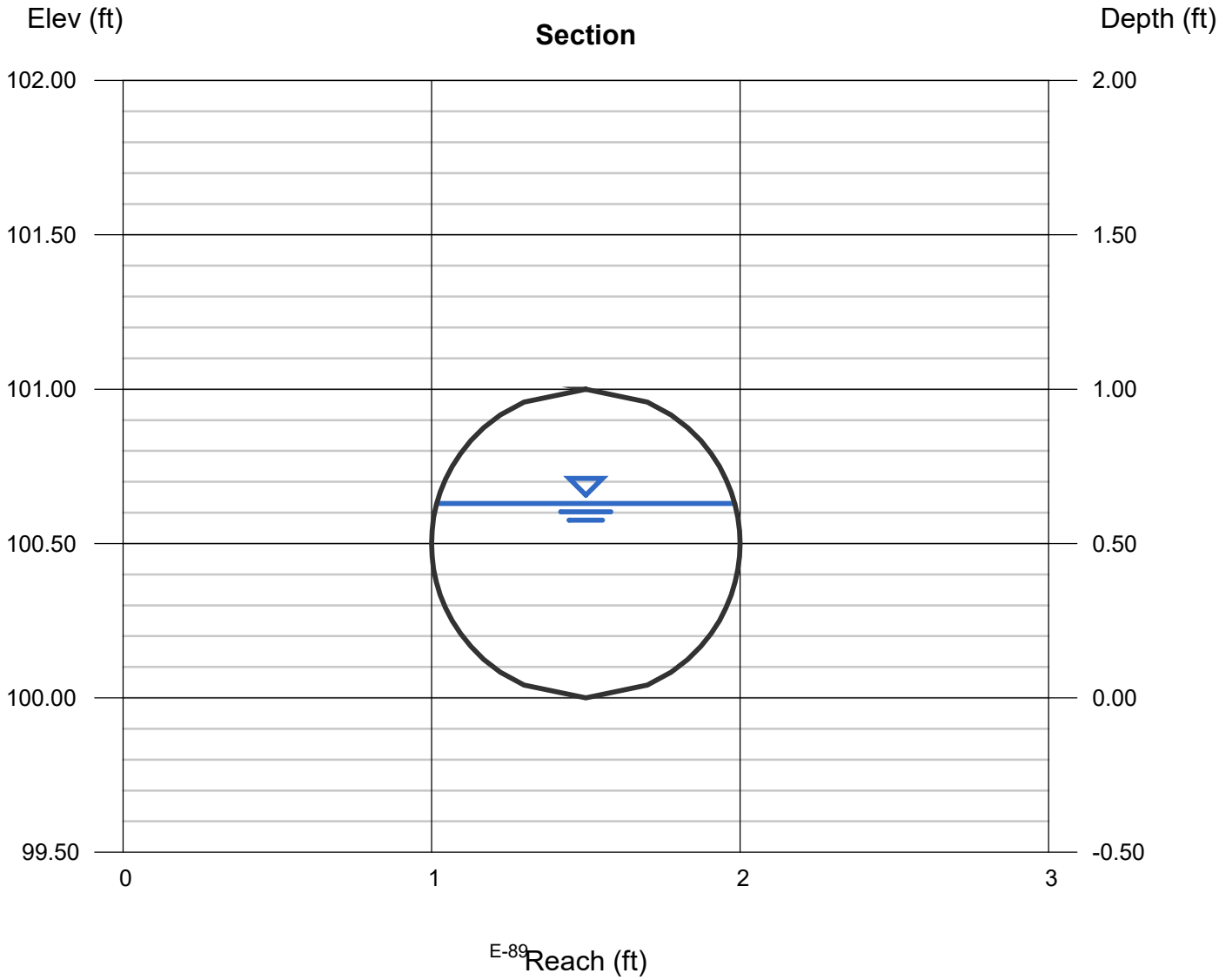
Diameter (ft)	= 1.00
Invert Elev (ft)	= 100.00
Slope (%)	= 2.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 4.00

Highlighted

Depth (ft)	= 0.63
Q (cfs)	= 4.000
Area (sqft)	= 0.52
Velocity (ft/s)	= 7.67
Wetted Perim (ft)	= 1.83
Crit Depth, Yc (ft)	= 0.85
Top Width (ft)	= 0.97
EGL (ft)	= 1.54



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD06

Circular

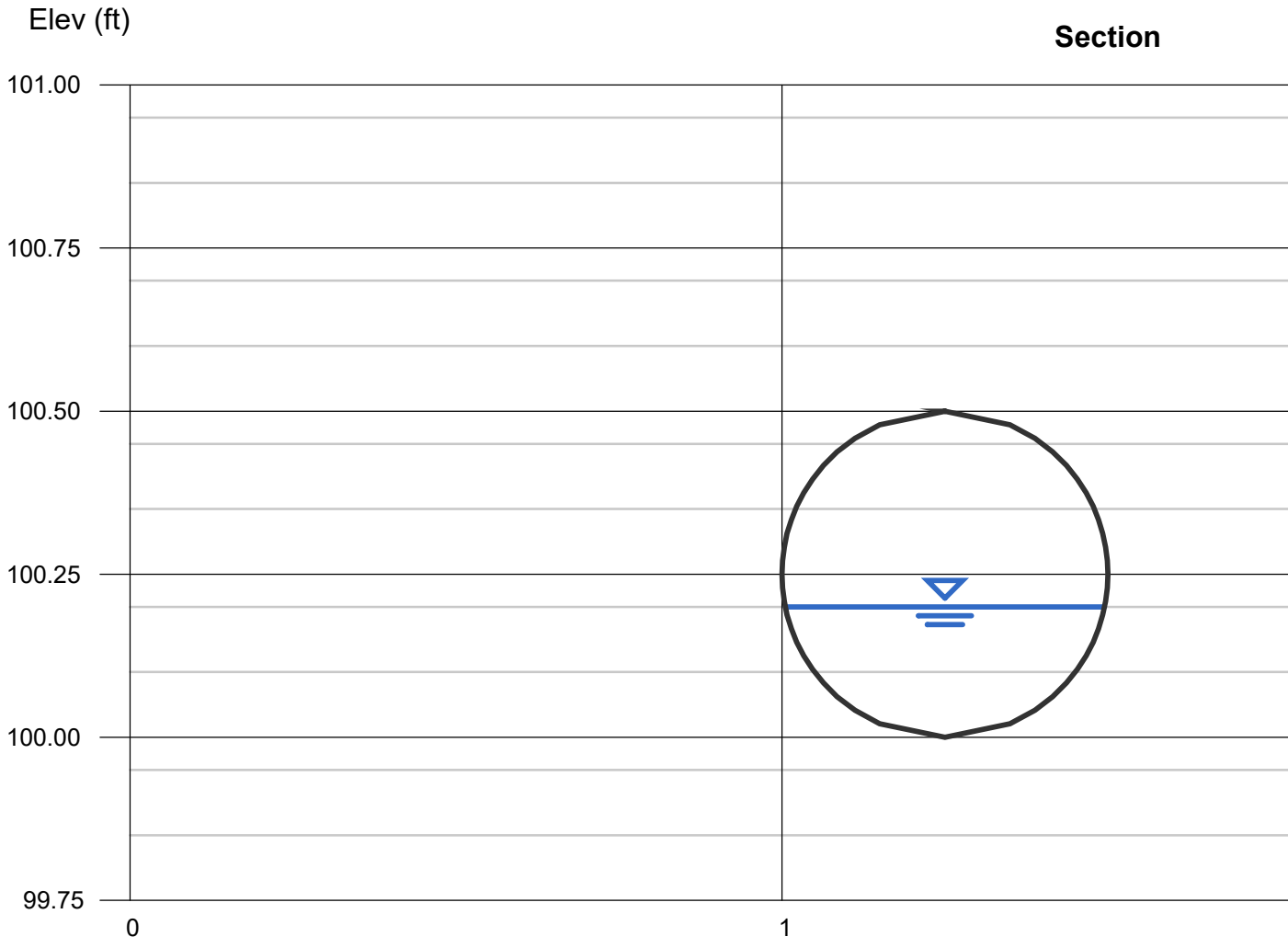
Diameter (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 23.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.90

Highlighted

Depth (ft)	= 0.20
Q (cfs)	= 0.900
Area (sqft)	= 0.07
Velocity (ft/s)	= 12.26
Wetted Perim (ft)	= 0.68
Crit Depth, Yc (ft)	= 0.47
Top Width (ft)	= 0.49
EGL (ft)	= 2.54



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD07

Circular

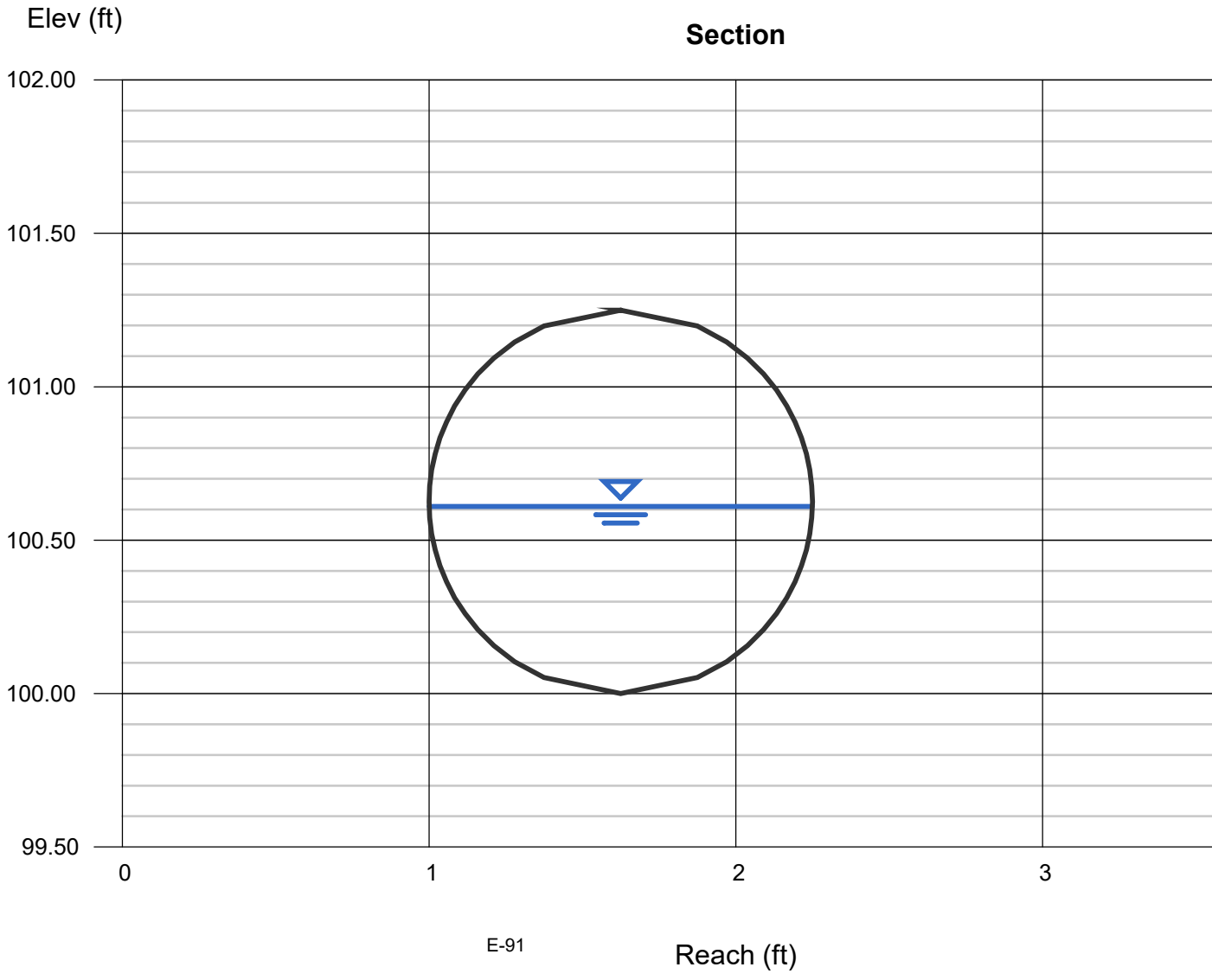
Diameter (ft)	= 1.25
Invert Elev (ft)	= 100.00
Slope (%)	= 2.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 4.90

Highlighted

Depth (ft)	= 0.61
Q (cfs)	= 4.900
Area (sqft)	= 0.60
Velocity (ft/s)	= 8.20
Wetted Perim (ft)	= 1.94
Crit Depth, Yc (ft)	= 0.90
Top Width (ft)	= 1.25
EGL (ft)	= 1.66



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD08

Circular

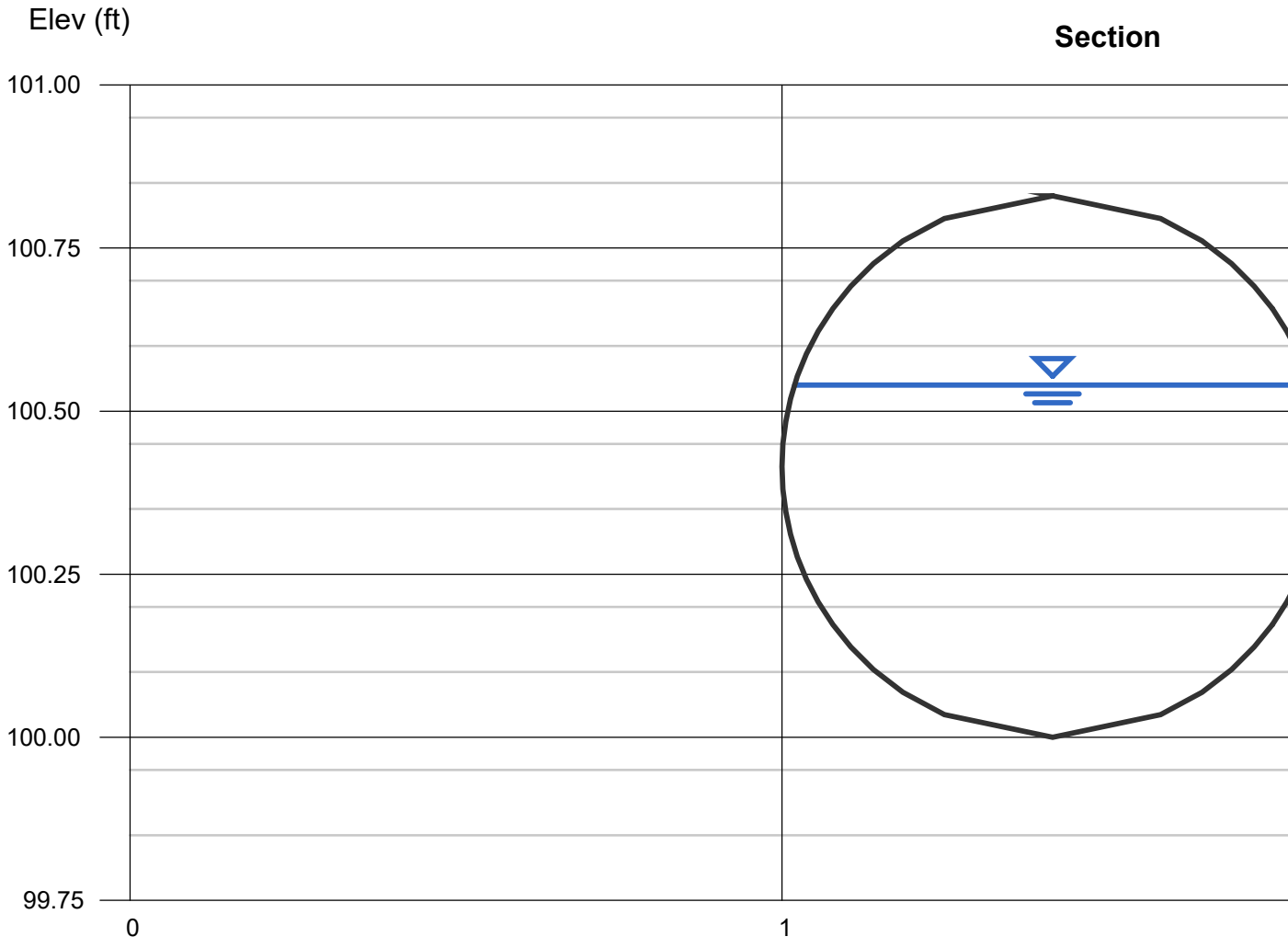
Diameter (ft)	= 0.83
Invert Elev (ft)	= 100.00
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.30

Highlighted

Depth (ft)	= 0.54
Q (cfs)	= 2.300
Area (sqft)	= 0.37
Velocity (ft/s)	= 6.15
Wetted Perim (ft)	= 1.56
Crit Depth, Yc (ft)	= 0.68
Top Width (ft)	= 0.79
EGL (ft)	= 1.13



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD09

Circular

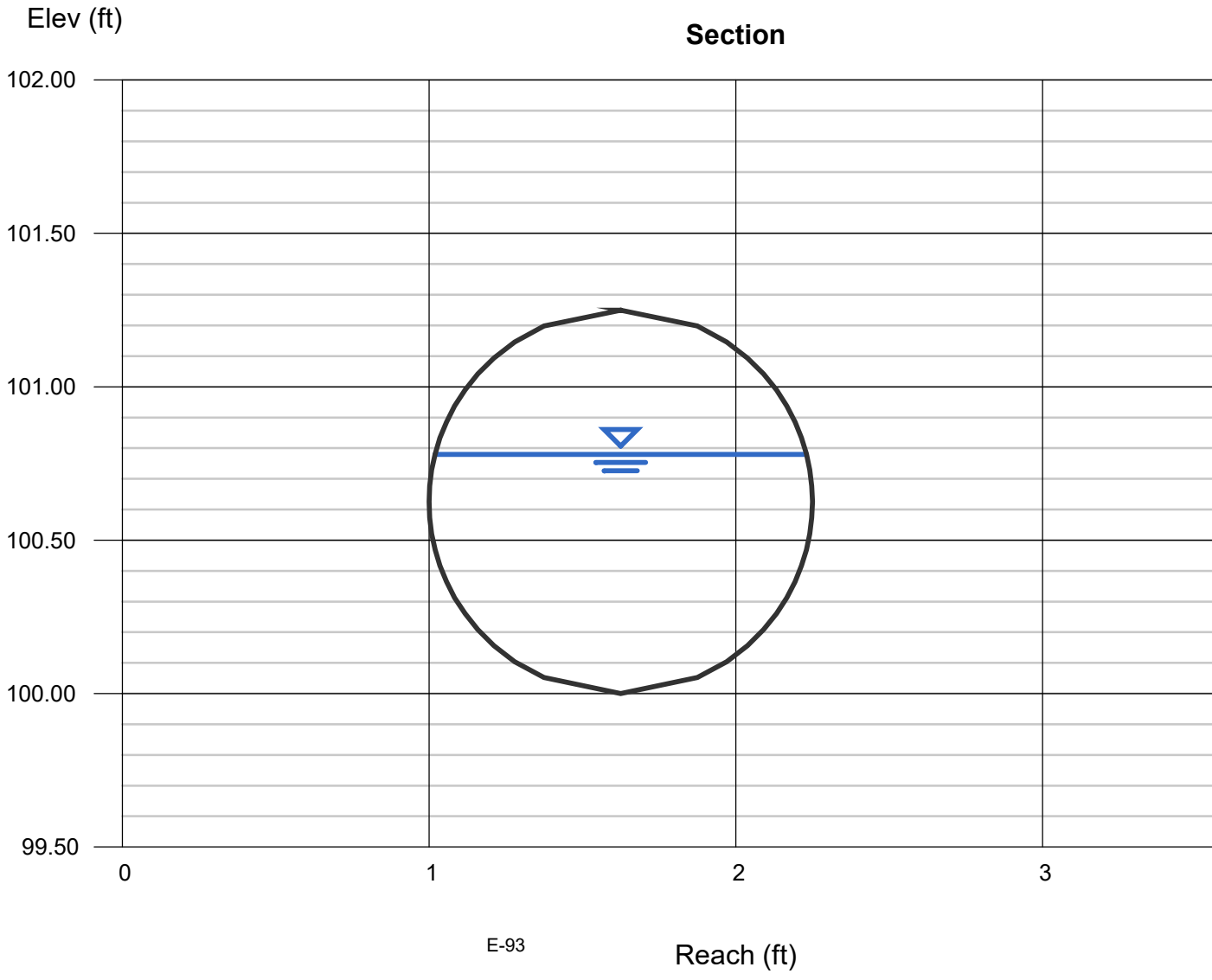
Diameter (ft)	= 1.25
Invert Elev (ft)	= 100.00
Slope (%)	= 2.80
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 7.60

Highlighted

Depth (ft)	= 0.78
Q (cfs)	= 7.600
Area (sqft)	= 0.81
Velocity (ft/s)	= 9.41
Wetted Perim (ft)	= 2.28
Crit Depth, Yc (ft)	= 1.10
Top Width (ft)	= 1.21
EGL (ft)	= 2.16



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD10

Circular

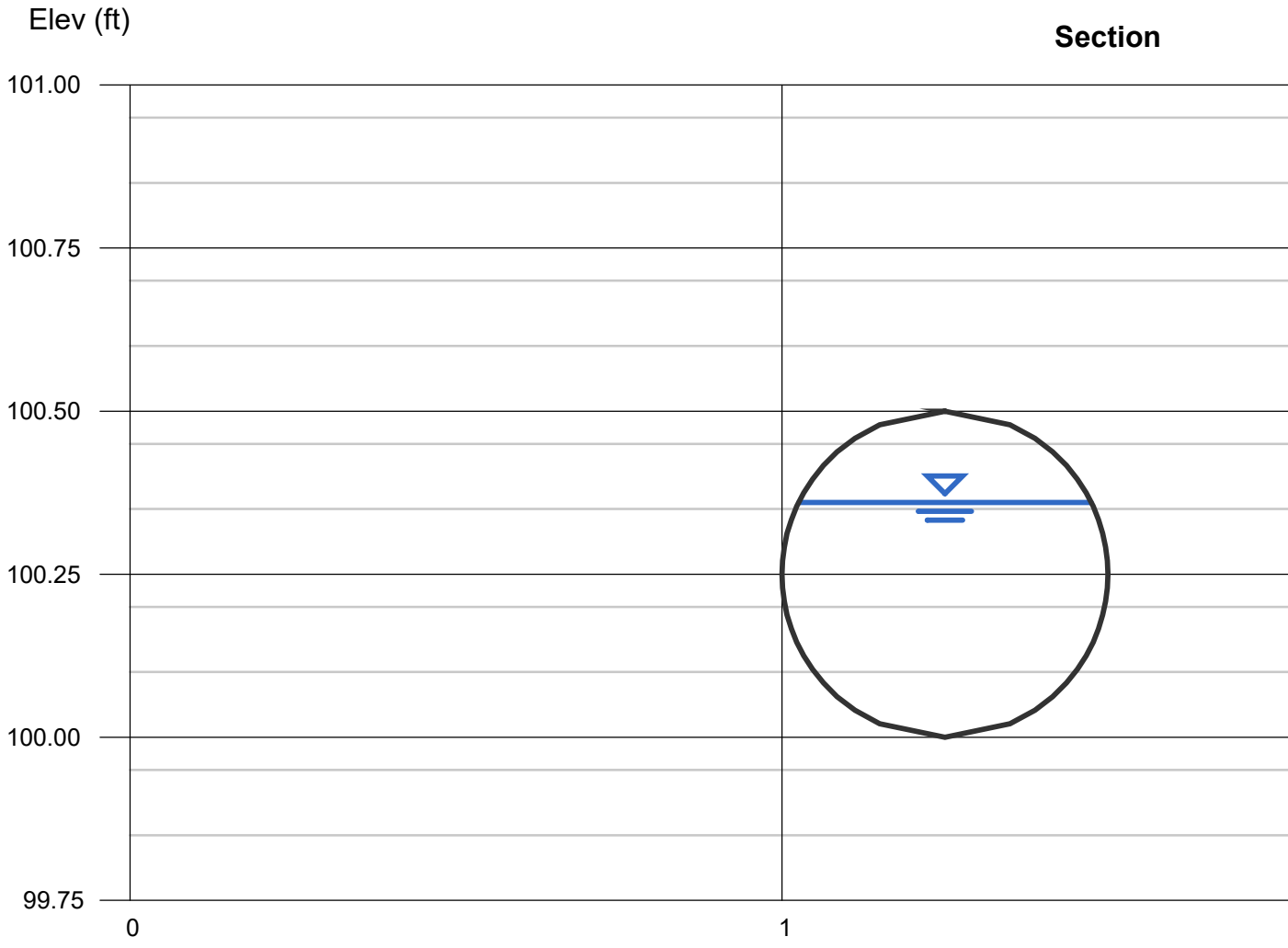
Diameter (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 3.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.90

Highlighted

Depth (ft)	= 0.36
Q (cfs)	= 0.900
Area (sqft)	= 0.15
Velocity (ft/s)	= 5.93
Wetted Perim (ft)	= 1.02
Crit Depth, Yc (ft)	= 0.47
Top Width (ft)	= 0.45
EGL (ft)	= 0.91



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Dec 17 2018

SD11

Circular

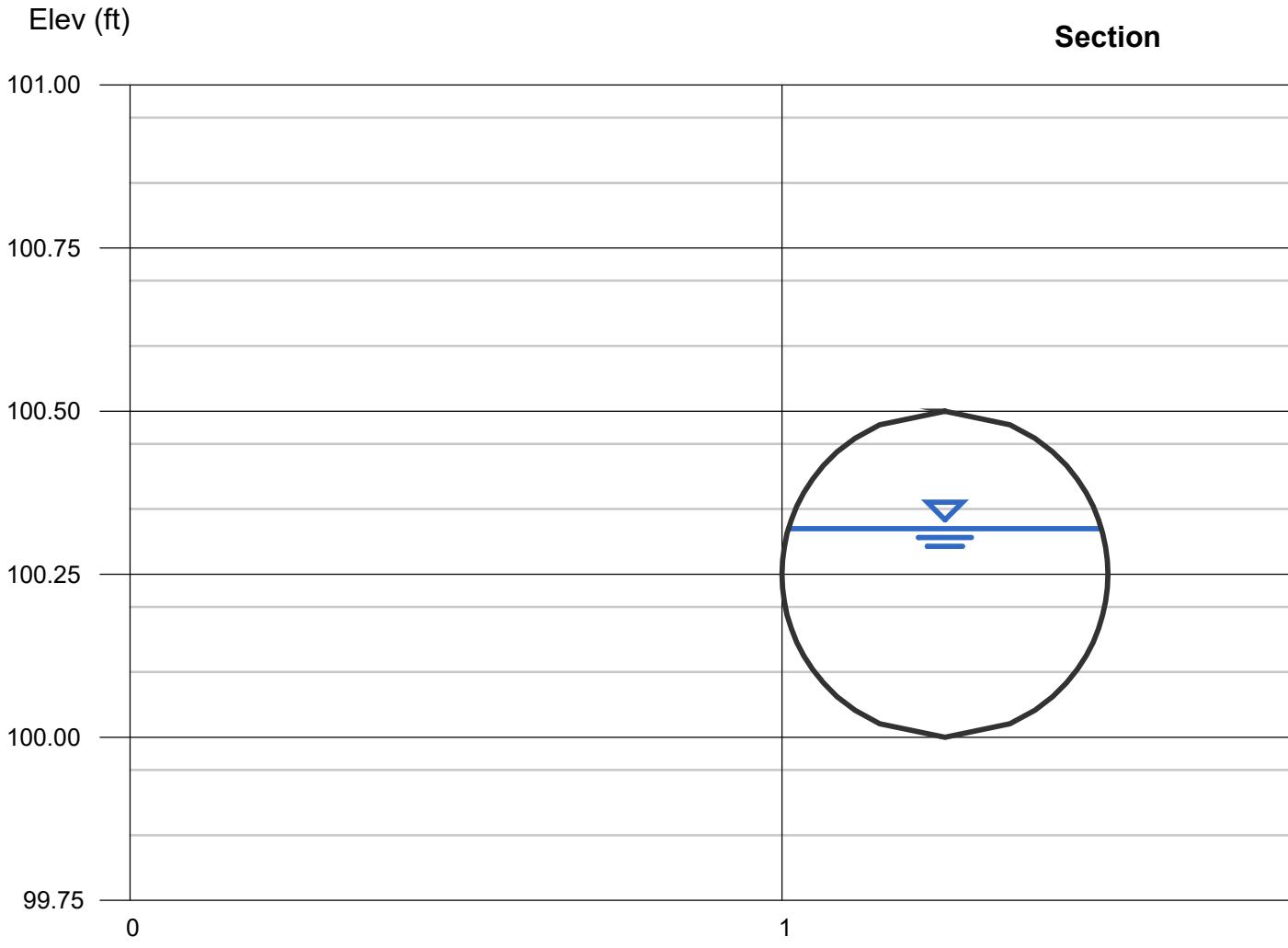
Diameter (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 5.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.90

Highlighted

Depth (ft)	= 0.32
Q (cfs)	= 0.900
Area (sqft)	= 0.13
Velocity (ft/s)	= 6.78
Wetted Perim (ft)	= 0.93
Crit Depth, Yc (ft)	= 0.47
Top Width (ft)	= 0.48
EGL (ft)	= 1.03



Appendix E – Detention Design Calculations

Basin - Area A (on-site flows)

AMC II

25 Year Storm - Proposed Condition

P25 4.49 in.

CN	S	Ia	Y	Ybar	Total A	Fm	Tc	Calibration Co.
90	1.11	0.22	0.75	0.25	2.91	0.057	6.42	0.82

Rainfall	Depth (in)
5 min	0.40
30 min	0.87
1 hr	1.15
3 hr	1.94
6 hr	2.71
24 hr	4.49

Circlular Orifice Diameter (in) =	8		
Orifice center elev =	0.00		
Footprint (sf) *=	30	x	17.5
Void Space =	1.00		
Dead Space Storage Vol (af) =	0.0000	ac-ft	
Infiltration Rate	0.00	in/hr	0 cfs

NOT USED IN CALS

Elevation	Area (sf)	Area (ac)	Inc. Vol (af)	Total. Vol (af)	discharge Q (cfs)
0.00	525	0.0121	0.0000	0.0000	0.00
1.00	525	0.0121	0.0121	0.0121	0.01
2.00	525	0.0121	0.0121	0.0241	2.38
4.00	525	0.0121	0.0241	0.0482	3.36
6.00	525	0.0121	0.0241	0.0723	4.12
8.00	525	0.0121	0.0241	0.0964	4.75
10.00	525	0.0121	0.0241	0.1205	5.31
12.00	525	0.0121	0.0241	0.1446	5.82

$$Qo = KA\sqrt{2gHo}$$

Qo = Orifice Outflow (cfs)

Ho = Water height above orifice center (ft)

K = Orifice flow coef., 0.6

A = Cross sectional area of orifice (ft^2)

g = gravitational accel., 32.2 ft/sec^2

*Stormtech units are 8x16 footprint but actual storage is 7'x15'

5 units with height of 12ft are used and total footprint of 525sf

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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                          Analysis prepared by:

                           Tait & Associates


**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  25 year storm detention design


--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.82
    TOTAL CATCHMENT AREA(ACRES) =    2.91
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.057
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) =  6.42
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.73
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.36

**************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.06      0.0003      0.12  Q         .         .         .         .
  0.16      0.0014      0.12  Q         .         .         .         .
  0.27      0.0025      0.12  Q         .         .         .         .
  0.38      0.0035      0.12  Q         .         .         .         .
  0.48      0.0046      0.12  Q         .         .         .         .
  0.59      0.0057      0.12  Q         .         .         .         .
  0.70      0.0068      0.13  Q         .         .         .         .
  0.81      0.0079      0.13  Q         .         .         .         .
  0.91      0.0091      0.13  Q         .         .         .         .
  1.02      0.0102      0.13  Q         .         .         .         .
  1.13      0.0113      0.13  Q         .         .         .         .
  1.23      0.0124      0.13  Q         .         .         .         .
  1.34      0.0136      0.13  Q         .         .         .         .
  1.45      0.0147      0.13  Q         .         .         .         .
  1.55      0.0158      0.13  Q         .         .         .         .
  1.66      0.0170      0.13  Q         .         .         .         .
```

1.77	0.0181	0.13	Q	.	.	.	.
1.88	0.0193	0.13	Q	.	.	.	.
1.98	0.0205	0.13	Q	.	.	.	.
2.09	0.0216	0.13	Q	.	.	.	.
2.20	0.0228	0.13	Q	.	.	.	.
2.30	0.0240	0.13	Q	.	.	.	.
2.41	0.0252	0.13	Q	.	.	.	.
2.52	0.0264	0.14	Q	.	.	.	.
2.62	0.0276	0.14	Q	.	.	.	.
2.73	0.0288	0.14	Q	.	.	.	.
2.84	0.0300	0.14	Q	.	.	.	.
2.95	0.0312	0.14	Q	.	.	.	.
3.05	0.0324	0.14	Q	.	.	.	.
3.16	0.0337	0.14	Q	.	.	.	.
3.27	0.0349	0.14	Q	.	.	.	.
3.37	0.0362	0.14	Q	.	.	.	.
3.48	0.0374	0.14	Q	.	.	.	.
3.59	0.0387	0.14	Q	.	.	.	.
3.69	0.0399	0.14	Q	.	.	.	.
3.80	0.0412	0.14	Q	.	.	.	.
3.91	0.0425	0.15	Q	.	.	.	.
4.02	0.0438	0.15	Q	.	.	.	.
4.12	0.0451	0.15	Q	.	.	.	.
4.23	0.0464	0.15	Q	.	.	.	.
4.34	0.0477	0.15	Q	.	.	.	.
4.44	0.0490	0.15	Q	.	.	.	.
4.55	0.0503	0.15	Q	.	.	.	.
4.66	0.0516	0.15	Q	.	.	.	.
4.76	0.0530	0.15	Q	.	.	.	.
4.87	0.0543	0.15	Q	.	.	.	.
4.98	0.0557	0.15	Q	.	.	.	.
5.09	0.0570	0.15	Q	.	.	.	.
5.19	0.0584	0.16	Q	.	.	.	.
5.30	0.0598	0.16	Q	.	.	.	.
5.41	0.0612	0.16	Q	.	.	.	.
5.51	0.0626	0.16	Q	.	.	.	.
5.62	0.0640	0.16	Q	.	.	.	.
5.73	0.0654	0.16	Q	.	.	.	.
5.84	0.0668	0.16	Q	.	.	.	.
5.94	0.0683	0.16	Q	.	.	.	.
6.05	0.0697	0.16	Q	.	.	.	.
6.16	0.0712	0.16	Q	.	.	.	.
6.26	0.0726	0.17	Q	.	.	.	.
6.37	0.0741	0.17	Q	.	.	.	.
6.48	0.0756	0.17	Q	.	.	.	.
6.58	0.0771	0.17	Q	.	.	.	.
6.69	0.0786	0.17	Q	.	.	.	.
6.80	0.0801	0.17	Q	.	.	.	.
6.90	0.0817	0.17	Q	.	.	.	.
7.01	0.0832	0.17	Q	.	.	.	.
7.12	0.0847	0.18	Q	.	.	.	.
7.23	0.0863	0.18	Q	.	.	.	.
7.33	0.0879	0.18	Q	.	.	.	.
7.44	0.0895	0.18	Q	.	.	.	.
7.55	0.0911	0.18	Q	.	.	.	.
7.65	0.0927	0.18	Q	.	.	.	.
7.76	0.0943	0.18	Q	.	.	.	.
7.87	0.0960	0.19	Q	.	.	.	.
7.97	0.0976	0.19	Q	.	.	.	.
8.08	0.0993	0.19	Q	.	.	.	.
8.19	0.1010	0.19	Q	.	.	.	.
8.30	0.1027	0.19	Q	.	.	.	.
8.40	0.1044	0.19	Q	.	.	.	.

8.51	0.1061	0.20	Q	.	.	.	.
8.62	0.1078	0.20	Q	.	.	.	.
8.72	0.1096	0.20	Q	.	.	.	.
8.83	0.1114	0.20	Q	.	.	.	.
8.94	0.1132	0.20	Q	.	.	.	.
9.05	0.1150	0.21	Q	.	.	.	.
9.15	0.1168	0.21	Q	.	.	.	.
9.26	0.1186	0.21	Q	.	.	.	.
9.37	0.1205	0.21	Q	.	.	.	.
9.47	0.1224	0.21	Q	.	.	.	.
9.58	0.1243	0.22	Q	.	.	.	.
9.69	0.1262	0.22	Q	.	.	.	.
9.79	0.1281	0.22	Q	.	.	.	.
9.90	0.1301	0.22	Q	.	.	.	.
10.01	0.1321	0.23	Q	.	.	.	.
10.12	0.1341	0.23	Q	.	.	.	.
10.22	0.1361	0.23	Q	.	.	.	.
10.33	0.1382	0.23	Q	.	.	.	.
10.44	0.1402	0.24	Q	.	.	.	.
10.54	0.1424	0.24	Q	.	.	.	.
10.65	0.1445	0.24	Q	.	.	.	.
10.76	0.1466	0.25	Q	.	.	.	.
10.86	0.1488	0.25	Q	.	.	.	.
10.97	0.1510	0.25	.Q	.	.	.	.
11.08	0.1533	0.25	.Q	.	.	.	.
11.18	0.1555	0.26	.Q	.	.	.	.
11.29	0.1578	0.26	.Q	.	.	.	.
11.40	0.1602	0.27	.Q	.	.	.	.
11.51	0.1626	0.27	.Q	.	.	.	.
11.61	0.1650	0.27	.Q	.	.	.	.
11.72	0.1674	0.28	.Q	.	.	.	.
11.83	0.1699	0.28	.Q	.	.	.	.
11.93	0.1724	0.29	.Q	.	.	.	.
12.04	0.1750	0.30	.Q	.	.	.	.
12.15	0.1781	0.39	.Q	.	.	.	.
12.26	0.1816	0.40	.Q	.	.	.	.
12.36	0.1851	0.40	.Q	.	.	.	.
12.47	0.1887	0.41	.Q	.	.	.	.
12.58	0.1924	0.42	.Q	.	.	.	.
12.68	0.1961	0.43	.Q	.	.	.	.
12.79	0.2000	0.44	.Q	.	.	.	.
12.90	0.2039	0.45	.Q	.	.	.	.
13.00	0.2079	0.46	.Q	.	.	.	.
13.11	0.2120	0.47	.Q	.	.	.	.
13.22	0.2162	0.48	.Q	.	.	.	.
13.32	0.2205	0.50	.Q	.	.	.	.
13.43	0.2249	0.50	. Q	.	.	.	.
13.54	0.2295	0.52	. Q	.	.	.	.
13.65	0.2341	0.53	. Q	.	.	.	.
13.75	0.2389	0.55	. Q	.	.	.	.
13.86	0.2439	0.56	. Q	.	.	.	.
13.97	0.2490	0.59	. Q	.	.	.	.
14.07	0.2542	0.60	. Q	.	.	.	.
14.18	0.2596	0.62	. Q	.	.	.	.
14.29	0.2652	0.64	. Q	.	.	.	.
14.40	0.2710	0.67	. Q	.	.	.	.
14.50	0.2770	0.69	. Q	.	.	.	.
14.61	0.2832	0.73	. Q	.	.	.	.
14.72	0.2898	0.75	. Q	.	.	.	.
14.82	0.2967	0.80	. Q	.	.	.	.
14.93	0.3039	0.83	. Q	.	.	.	.
15.04	0.3116	0.90	. Q	.	.	.	.
15.14	0.3198	0.94	. Q	.	.	.	.

15.25	0.3285	1.04	. Q	.	.	.	.
15.36	0.3379	1.09	. Q	.	.	.	.
15.47	0.3473	1.03	. Q	.	.	.	.
15.57	0.3569	1.12	. Q	.	.	.	.
15.68	0.3679	1.38	. Q	.	.	.	.
15.79	0.3814	1.66	. Q	.	.	.	.
15.89	0.3996	2.45	. Q.	.	.	.	.
16.00	0.4252	3.35	. Q	.	.	.	.
16.11	0.4834	9.81	.	.	.	.	Q.
16.21	0.5355	1.99	. Q	.	.	.	.
16.32	0.5498	1.24	. Q	.	.	.	.
16.43	0.5601	1.09	. Q	.	.	.	.
16.53	0.5693	0.99	. Q	.	.	.	.
16.64	0.5775	0.87	. Q	.	.	.	.
16.75	0.5847	0.78	. Q	.	.	.	.
16.86	0.5913	0.71	. Q	.	.	.	.
16.96	0.5973	0.65	. Q	.	.	.	.
17.07	0.6029	0.61	. Q	.	.	.	.
17.18	0.6081	0.58	. Q	.	.	.	.
17.28	0.6131	0.54	. Q	.	.	.	.
17.39	0.6177	0.51	. Q	.	.	.	.
17.50	0.6222	0.49	.Q	.	.	.	.
17.61	0.6264	0.46	.Q	.	.	.	.
17.71	0.6304	0.44	.Q	.	.	.	.
17.82	0.6342	0.42	.Q	.	.	.	.
17.93	0.6379	0.41	.Q	.	.	.	.
18.03	0.6414	0.40	.Q	.	.	.	.
18.14	0.6445	0.29	.Q	.	.	.	.
18.25	0.6470	0.28	.Q	.	.	.	.
18.35	0.6494	0.27	.Q	.	.	.	.
18.46	0.6518	0.26	.Q	.	.	.	.
18.57	0.6541	0.26	.Q	.	.	.	.
18.67	0.6563	0.25	.Q	.	.	.	.
18.78	0.6585	0.24	Q	.	.	.	.
18.89	0.6607	0.24	Q	.	.	.	.
19.00	0.6627	0.23	Q	.	.	.	.
19.10	0.6648	0.23	Q	.	.	.	.
19.21	0.6667	0.22	Q	.	.	.	.
19.32	0.6687	0.22	Q	.	.	.	.
19.42	0.6706	0.21	Q	.	.	.	.
19.53	0.6724	0.21	Q	.	.	.	.
19.64	0.6743	0.20	Q	.	.	.	.
19.74	0.6761	0.20	Q	.	.	.	.
19.85	0.6778	0.20	Q	.	.	.	.
19.96	0.6795	0.19	Q	.	.	.	.
20.07	0.6812	0.19	Q	.	.	.	.
20.17	0.6829	0.19	Q	.	.	.	.
20.28	0.6846	0.18	Q	.	.	.	.
20.39	0.6862	0.18	Q	.	.	.	.
20.49	0.6878	0.18	Q	.	.	.	.
20.60	0.6893	0.18	Q	.	.	.	.
20.71	0.6909	0.17	Q	.	.	.	.
20.82	0.6924	0.17	Q	.	.	.	.
20.92	0.6939	0.17	Q	.	.	.	.
21.03	0.6953	0.17	Q	.	.	.	.
21.14	0.6968	0.16	Q	.	.	.	.
21.24	0.6982	0.16	Q	.	.	.	.
21.35	0.6997	0.16	Q	.	.	.	.
21.46	0.7011	0.16	Q	.	.	.	.
21.56	0.7024	0.16	Q	.	.	.	.
21.67	0.7038	0.15	Q	.	.	.	.
21.78	0.7051	0.15	Q	.	.	.	.
21.89	0.7065	0.15	Q	.	.	.	.

Q25 (unmitigated)

```
 21.99      0.7078      0.15  Q         .         .         .         .
 22.10      0.7091      0.15  Q         .         .         .         .
 22.21      0.7104      0.14  Q         .         .         .         .
 22.31      0.7117      0.14  Q         .         .         .         .
 22.42      0.7129      0.14  Q         .         .         .         .
 22.53      0.7142      0.14  Q         .         .         .         .
 22.63      0.7154      0.14  Q         .         .         .         .
 22.74      0.7166      0.14  Q         .         .         .         .
 22.85      0.7178      0.14  Q         .         .         .         .
 22.95      0.7190      0.13  Q         .         .         .         .
 23.06      0.7202      0.13  Q         .         .         .         .
 23.17      0.7214      0.13  Q         .         .         .         .
 23.28      0.7225      0.13  Q         .         .         .         .
 23.38      0.7237      0.13  Q         .         .         .         .
 23.49      0.7248      0.13  Q         .         .         .         .
 23.60      0.7259      0.13  Q         .         .         .         .
 23.70      0.7271      0.13  Q         .         .         .         .
 23.81      0.7282      0.12  Q         .         .         .         .
 23.92      0.7293      0.12  Q         .         .         .         .
 24.02      0.7303      0.12  Q         .         .         .         .
 24.13      0.7309      0.00  Q         .         .         .         .
 ---------------------------------------------------------------------------
---------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated              Duration
        Peak Flow Rate                   (minutes)
    ======================           =========
               0%                     1444.5
              10%                       83.5
              20%                       25.7
              30%                       12.8
              40%                        6.4
              50%                        6.4
              60%                        6.4
              70%                        6.4
              80%                        6.4
              90%                        6.4

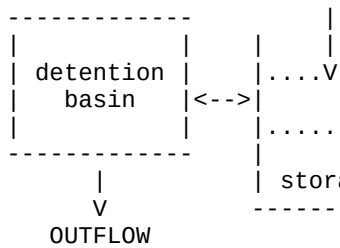
  Problem Descriptions:




===========================================================================
     FLOW-THROUGH DETENTION BASIN MODEL

     SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
     CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    6.420
     DEAD STORAGE(AF) =       0.00
     SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
     ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00


                    INFLOW
                      |
                      |
                      |
                      V              __effective depth
```



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 8

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000	**	1.000	0.012	0.010	*
2.000	0.024	2.380	**	4.000	0.048	3.360	*
6.000	0.072	4.120	**	8.000	0.096	4.750	*
10.000	0.120	5.310	**	12.000	0.145	5.820	*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	1.00	0.01206	0.01214
3	2.00	0.01358	0.03462
4	4.00	0.03334	0.06306
5	6.00	0.05408	0.09052
6	8.00	0.07540	0.11740
7	10.00	0.09702	0.14398
8	12.00	0.11887	0.17033

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

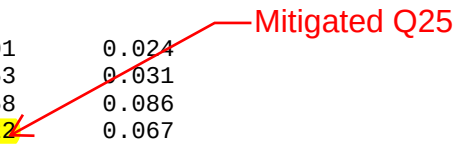
DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.057	0.000	0.12	0.09	0.00	0.001
0.164	0.000	0.12	0.18	0.00	0.002
0.271	0.000	0.12	0.27	0.00	0.003
0.378	0.000	0.12	0.35	0.00	0.004
0.485	0.000	0.12	0.44	0.00	0.005
0.592	0.000	0.12	0.53	0.00	0.006
0.699	0.000	0.13	0.62	0.01	0.007
0.806	0.000	0.13	0.70	0.01	0.008
0.913	0.000	0.13	0.79	0.01	0.010
1.020	0.000	0.13	0.88	0.01	0.011
1.127	0.000	0.13	0.96	0.01	0.012
1.234	0.000	0.13	1.03	0.04	0.012
1.341	0.000	0.13	1.05	0.10	0.013
1.448	0.000	0.13	1.05	0.13	0.013
1.555	0.000	0.13	1.05	0.13	0.013
1.662	0.000	0.13	1.05	0.13	0.013
1.769	0.000	0.13	1.05	0.13	0.013
1.876	0.000	0.13	1.05	0.13	0.013
1.983	0.000	0.13	1.05	0.13	0.013
2.090	0.000	0.13	1.05	0.13	0.013
2.197	0.000	0.13	1.05	0.13	0.013
2.304	0.000	0.13	1.05	0.13	0.013

2.411	0.000	0.13	1.05	0.13	0.013
2.518	0.000	0.14	1.05	0.14	0.013
2.625	0.000	0.14	1.05	0.14	0.013
2.732	0.000	0.14	1.05	0.14	0.013
2.839	0.000	0.14	1.05	0.14	0.013
2.946	0.000	0.14	1.05	0.14	0.013
3.053	0.000	0.14	1.05	0.14	0.013
3.160	0.000	0.14	1.05	0.14	0.013
3.267	0.000	0.14	1.06	0.14	0.013
3.374	0.000	0.14	1.06	0.14	0.013
3.481	0.000	0.14	1.06	0.14	0.013
3.588	0.000	0.14	1.06	0.14	0.013
3.695	0.000	0.14	1.06	0.14	0.013
3.802	0.000	0.14	1.06	0.14	0.013
3.909	0.000	0.15	1.06	0.14	0.013
4.016	0.000	0.15	1.06	0.15	0.013
4.123	0.000	0.15	1.06	0.15	0.013
4.230	0.000	0.15	1.06	0.15	0.013
4.337	0.000	0.15	1.06	0.15	0.013
4.444	0.000	0.15	1.06	0.15	0.013
4.551	0.000	0.15	1.06	0.15	0.013
4.658	0.000	0.15	1.06	0.15	0.013
4.765	0.000	0.15	1.06	0.15	0.013
4.872	0.000	0.15	1.06	0.15	0.013
4.979	0.000	0.15	1.06	0.15	0.013
5.086	0.000	0.15	1.06	0.15	0.013
5.193	0.000	0.16	1.06	0.16	0.013
5.300	0.000	0.16	1.06	0.16	0.013
5.407	0.000	0.16	1.06	0.16	0.013
5.514	0.000	0.16	1.06	0.16	0.013
5.621	0.000	0.16	1.06	0.16	0.013
5.728	0.000	0.16	1.06	0.16	0.013
5.835	0.000	0.16	1.06	0.16	0.013
5.942	0.000	0.16	1.06	0.16	0.013
6.049	0.000	0.16	1.07	0.16	0.013
6.156	0.000	0.16	1.07	0.16	0.013
6.263	0.000	0.17	1.07	0.17	0.013
6.370	0.000	0.17	1.07	0.17	0.013
6.477	0.000	0.17	1.07	0.17	0.013
6.584	0.000	0.17	1.07	0.17	0.013
6.691	0.000	0.17	1.07	0.17	0.013
6.798	0.000	0.17	1.07	0.17	0.013
6.905	0.000	0.17	1.07	0.17	0.013
7.012	0.000	0.17	1.07	0.17	0.013
7.119	0.000	0.18	1.07	0.18	0.013
7.226	0.000	0.18	1.07	0.18	0.013
7.333	0.000	0.18	1.07	0.18	0.013
7.440	0.000	0.18	1.07	0.18	0.013
7.547	0.000	0.18	1.07	0.18	0.013
7.654	0.000	0.18	1.07	0.18	0.013
7.761	0.000	0.18	1.07	0.18	0.013
7.868	0.000	0.19	1.07	0.19	0.013
7.975	0.000	0.19	1.08	0.19	0.013
8.082	0.000	0.19	1.08	0.19	0.013
8.189	0.000	0.19	1.08	0.19	0.013
8.296	0.000	0.19	1.08	0.19	0.013
8.403	0.000	0.19	1.08	0.19	0.013
8.510	0.000	0.20	1.08	0.20	0.013
8.617	0.000	0.20	1.08	0.20	0.013
8.724	0.000	0.20	1.08	0.20	0.013
8.831	0.000	0.20	1.08	0.20	0.013
8.938	0.000	0.20	1.08	0.20	0.013
9.045	0.000	0.21	1.08	0.20	0.013

9.152	0.000	0.21	1.08	0.21	0.013
9.259	0.000	0.21	1.08	0.21	0.013
9.366	0.000	0.21	1.08	0.21	0.013
9.473	0.000	0.21	1.09	0.21	0.013
9.580	0.000	0.22	1.09	0.21	0.013
9.687	0.000	0.22	1.09	0.22	0.013
9.794	0.000	0.22	1.09	0.22	0.013
9.901	0.000	0.22	1.09	0.22	0.013
10.008	0.000	0.23	1.09	0.22	0.013
10.115	0.000	0.23	1.09	0.23	0.013
10.222	0.000	0.23	1.09	0.23	0.013
10.329	0.000	0.23	1.09	0.23	0.013
10.436	0.000	0.24	1.10	0.23	0.013
10.543	0.000	0.24	1.10	0.24	0.013
10.650	0.000	0.24	1.10	0.24	0.013
10.757	0.000	0.25	1.10	0.24	0.013
10.864	0.000	0.25	1.10	0.25	0.013
10.971	0.000	0.25	1.10	0.25	0.013
11.078	0.000	0.25	1.10	0.25	0.013
11.185	0.000	0.26	1.11	0.26	0.013
11.292	0.000	0.26	1.11	0.26	0.013
11.399	0.000	0.27	1.11	0.26	0.013
11.506	0.000	0.27	1.11	0.27	0.013
11.613	0.000	0.27	1.11	0.27	0.013
11.720	0.000	0.28	1.11	0.28	0.013
11.827	0.000	0.28	1.12	0.28	0.013
11.934	0.000	0.29	1.12	0.28	0.013
12.041	0.000	0.30	1.12	0.29	0.014
12.148	0.000	0.39	1.16	0.34	0.014
12.255	0.000	0.40	1.16	0.39	0.014
12.362	0.000	0.40	1.17	0.40	0.014
12.469	0.000	0.41	1.17	0.41	0.014
12.576	0.000	0.42	1.17	0.42	0.014
12.683	0.000	0.43	1.18	0.42	0.014
12.790	0.000	0.44	1.18	0.43	0.014
12.897	0.000	0.45	1.19	0.44	0.014
13.004	0.000	0.46	1.19	0.45	0.014
13.111	0.000	0.47	1.19	0.46	0.014
13.218	0.000	0.48	1.20	0.47	0.014
13.325	0.000	0.50	1.20	0.49	0.015
13.432	0.000	0.50	1.21	0.50	0.015
13.539	0.000	0.52	1.22	0.51	0.015
13.646	0.000	0.53	1.22	0.53	0.015
13.753	0.000	0.55	1.23	0.54	0.015
13.860	0.000	0.56	1.23	0.56	0.015
13.967	0.000	0.59	1.24	0.58	0.015
14.074	0.000	0.60	1.25	0.59	0.015
14.181	0.000	0.62	1.26	0.61	0.015
14.288	0.000	0.64	1.26	0.63	0.015
14.395	0.000	0.67	1.28	0.65	0.015
14.502	0.000	0.69	1.29	0.68	0.016
14.609	0.000	0.73	1.30	0.71	0.016
14.716	0.000	0.75	1.31	0.74	0.016
14.823	0.000	0.80	1.33	0.78	0.016
14.930	0.000	0.83	1.35	0.82	0.016
15.037	0.000	0.90	1.37	0.86	0.017
15.144	0.000	0.94	1.39	0.92	0.017
15.251	0.000	1.04	1.43	0.98	0.017
15.358	0.000	1.09	1.46	1.06	0.018
15.465	0.000	1.03	1.43	1.06	0.017
15.572	0.000	1.12	1.47	1.08	0.018
15.679	0.000	1.38	1.57	1.24	0.019
15.786	0.000	1.66	1.69	1.50	0.020

15.893	0.000	2.45	2.01	2.01	0.024
16.000	0.000	3.35	2.61	2.53	0.031
16.107	0.000	9.81	7.17	3.58	0.086
16.214	0.000	1.99	5.54	4.22	0.067
16.321	0.000	1.24	3.80	3.60	0.046
16.428	0.000	1.09	2.45	2.93	0.030
16.535	0.000	0.99	1.65	2.08	0.020
16.642	0.000	0.87	1.38	1.23	0.017
16.749	0.000	0.78	1.33	0.85	0.016
16.856	0.000	0.71	1.30	0.75	0.016
16.963	0.000	0.65	1.27	0.68	0.015
17.070	0.000	0.61	1.25	0.63	0.015
17.177	0.000	0.58	1.24	0.59	0.015
17.284	0.000	0.54	1.23	0.56	0.015
17.391	0.000	0.51	1.21	0.53	0.015
17.498	0.000	0.49	1.20	0.50	0.015
17.605	0.000	0.46	1.19	0.48	0.014
17.712	0.000	0.44	1.18	0.46	0.014
17.819	0.000	0.42	1.18	0.44	0.014
17.926	0.000	0.41	1.17	0.42	0.014
18.033	0.000	0.40	1.16	0.40	0.014
18.140	0.000	0.29	1.12	0.35	0.014
18.247	0.000	0.28	1.11	0.29	0.013
18.354	0.000	0.27	1.11	0.28	0.013
18.461	0.000	0.26	1.11	0.27	0.013
18.568	0.000	0.26	1.10	0.26	0.013
18.675	0.000	0.25	1.10	0.25	0.013
18.782	0.000	0.24	1.10	0.25	0.013
18.889	0.000	0.24	1.10	0.24	0.013
18.996	0.000	0.23	1.09	0.24	0.013
19.103	0.000	0.23	1.09	0.23	0.013
19.210	0.000	0.22	1.09	0.22	0.013
19.317	0.000	0.22	1.09	0.22	0.013
19.424	0.000	0.21	1.09	0.22	0.013
19.531	0.000	0.21	1.08	0.21	0.013
19.638	0.000	0.20	1.08	0.21	0.013
19.745	0.000	0.20	1.08	0.20	0.013
19.852	0.000	0.20	1.08	0.20	0.013
19.959	0.000	0.19	1.08	0.20	0.013
20.066	0.000	0.19	1.08	0.19	0.013
20.173	0.000	0.19	1.07	0.19	0.013
20.280	0.000	0.18	1.07	0.19	0.013
20.387	0.000	0.18	1.07	0.18	0.013
20.494	0.000	0.18	1.07	0.18	0.013
20.601	0.000	0.18	1.07	0.18	0.013
20.708	0.000	0.17	1.07	0.17	0.013
20.815	0.000	0.17	1.07	0.17	0.013
20.922	0.000	0.17	1.07	0.17	0.013
21.029	0.000	0.17	1.07	0.17	0.013
21.136	0.000	0.16	1.06	0.16	0.013
21.243	0.000	0.16	1.06	0.16	0.013
21.350	0.000	0.16	1.06	0.16	0.013
21.457	0.000	0.16	1.06	0.16	0.013
21.564	0.000	0.16	1.06	0.16	0.013
21.671	0.000	0.15	1.06	0.15	0.013
21.778	0.000	0.15	1.06	0.15	0.013
21.885	0.000	0.15	1.06	0.15	0.013
21.992	0.000	0.15	1.06	0.15	0.013
22.099	0.000	0.15	1.06	0.15	0.013
22.206	0.000	0.14	1.06	0.15	0.013
22.313	0.000	0.14	1.06	0.14	0.013
22.420	0.000	0.14	1.06	0.14	0.013
22.527	0.000	0.14	1.05	0.14	0.013



22.634	0.000	0.14	1.05	0.14	0.013
22.741	0.000	0.14	1.05	0.14	0.013
22.848	0.000	0.14	1.05	0.14	0.013
22.955	0.000	0.13	1.05	0.14	0.013
23.062	0.000	0.13	1.05	0.13	0.013
23.169	0.000	0.13	1.05	0.13	0.013
23.276	0.000	0.13	1.05	0.13	0.013
23.383	0.000	0.13	1.05	0.13	0.013
23.490	0.000	0.13	1.05	0.13	0.013
23.597	0.000	0.13	1.05	0.13	0.013
23.704	0.000	0.13	1.05	0.13	0.013
23.811	0.000	0.12	1.05	0.13	0.013
23.918	0.000	0.12	1.05	0.12	0.013
24.025	0.000	0.12	1.05	0.12	0.013
24.132	0.000	0.00	1.00	0.07	0.012
24.239	0.000	0.00	0.99	0.01	0.012
24.346	0.000	0.00	0.98	0.01	0.012
24.453	0.000	0.00	0.98	0.01	0.012
24.560	0.000	0.00	0.97	0.01	0.012
24.667	0.000	0.00	0.96	0.01	0.012
24.774	0.000	0.00	0.96	0.01	0.012
24.881	0.000	0.00	0.95	0.01	0.011
24.988	0.000	0.00	0.94	0.01	0.011
25.095	0.000	0.00	0.94	0.01	0.011
25.202	0.000	0.00	0.93	0.01	0.011
25.309	0.000	0.00	0.92	0.01	0.011
25.416	0.000	0.00	0.91	0.01	0.011
25.523	0.000	0.00	0.91	0.01	0.011
25.630	0.000	0.00	0.90	0.01	0.011
25.737	0.000	0.00	0.89	0.01	0.011
25.844	0.000	0.00	0.89	0.01	0.011
25.951	0.000	0.00	0.88	0.01	0.011
26.058	0.000	0.00	0.88	0.01	0.011
26.165	0.000	0.00	0.87	0.01	0.011
26.272	0.000	0.00	0.86	0.01	0.010
26.379	0.000	0.00	0.86	0.01	0.010
26.486	0.000	0.00	0.85	0.01	0.010
26.593	0.000	0.00	0.84	0.01	0.010
26.700	0.000	0.00	0.84	0.01	0.010
26.807	0.000	0.00	0.83	0.01	0.010
26.914	0.000	0.00	0.83	0.01	0.010
27.021	0.000	0.00	0.82	0.01	0.010
27.128	0.000	0.00	0.81	0.01	0.010
27.235	0.000	0.00	0.81	0.01	0.010
27.342	0.000	0.00	0.80	0.01	0.010
27.449	0.000	0.00	0.80	0.01	0.010
27.556	0.000	0.00	0.79	0.01	0.010
27.663	0.000	0.00	0.78	0.01	0.009
27.770	0.000	0.00	0.78	0.01	0.009
27.877	0.000	0.00	0.77	0.01	0.009
27.984	0.000	0.00	0.77	0.01	0.009
28.091	0.000	0.00	0.76	0.01	0.009
28.198	0.000	0.00	0.76	0.01	0.009
28.305	0.000	0.00	0.75	0.01	0.009
28.412	0.000	0.00	0.75	0.01	0.009
28.519	0.000	0.00	0.74	0.01	0.009
28.626	0.000	0.00	0.73	0.01	0.009
28.733	0.000	0.00	0.73	0.01	0.009
28.840	0.000	0.00	0.72	0.01	0.009
28.947	0.000	0.00	0.72	0.01	0.009
29.054	0.000	0.00	0.71	0.01	0.009
29.161	0.000	0.00	0.71	0.01	0.009
29.268	0.000	0.00	0.70	0.01	0.009

29.375	0.000	0.00	0.70	0.01	0.008
29.482	0.000	0.00	0.69	0.01	0.008
29.589	0.000	0.00	0.69	0.01	0.008
29.696	0.000	0.00	0.68	0.01	0.008
29.803	0.000	0.00	0.68	0.01	0.008
29.910	0.000	0.00	0.67	0.01	0.008
30.017	0.000	0.00	0.67	0.01	0.008
30.124	0.000	0.00	0.66	0.01	0.008
30.231	0.000	0.00	0.66	0.01	0.008
30.338	0.000	0.00	0.65	0.01	0.008
30.445	0.000	0.00	0.65	0.01	0.008
30.552	0.000	0.00	0.64	0.01	0.008
30.659	0.000	0.00	0.64	0.01	0.008
30.766	0.000	0.00	0.63	0.01	0.008
30.873	0.000	0.00	0.63	0.01	0.008
30.980	0.000	0.00	0.63	0.01	0.008
31.087	0.000	0.00	0.62	0.01	0.008
31.194	0.000	0.00	0.62	0.01	0.007
31.301	0.000	0.00	0.61	0.01	0.007
31.408	0.000	0.00	0.61	0.01	0.007
31.515	0.000	0.00	0.60	0.01	0.007
31.622	0.000	0.00	0.60	0.01	0.007
31.729	0.000	0.00	0.59	0.01	0.007
31.836	0.000	0.00	0.59	0.01	0.007
31.943	0.000	0.00	0.59	0.01	0.007
32.050	0.000	0.00	0.58	0.01	0.007
32.157	0.000	0.00	0.58	0.01	0.007
32.264	0.000	0.00	0.57	0.01	0.007
32.371	0.000	0.00	0.57	0.01	0.007
32.478	0.000	0.00	0.56	0.01	0.007
32.585	0.000	0.00	0.56	0.01	0.007
32.692	0.000	0.00	0.56	0.01	0.007
32.799	0.000	0.00	0.55	0.01	0.007
32.906	0.000	0.00	0.55	0.01	0.007
33.013	0.000	0.00	0.54	0.01	0.007
33.120	0.000	0.00	0.54	0.01	0.007
33.227	0.000	0.00	0.54	0.01	0.006
33.334	0.000	0.00	0.53	0.01	0.006
33.441	0.000	0.00	0.53	0.01	0.006
33.548	0.000	0.00	0.52	0.01	0.006
33.655	0.000	0.00	0.52	0.01	0.006
33.762	0.000	0.00	0.52	0.01	0.006
33.869	0.000	0.00	0.51	0.01	0.006
33.976	0.000	0.00	0.51	0.01	0.006
34.083	0.000	0.00	0.51	0.01	0.006
34.190	0.000	0.00	0.50	0.01	0.006
34.297	0.000	0.00	0.50	0.01	0.006
34.404	0.000	0.00	0.50	0.00	0.006
34.511	0.000	0.00	0.49	0.00	0.006
34.618	0.000	0.00	0.49	0.00	0.006
34.725	0.000	0.00	0.48	0.00	0.006
34.832	0.000	0.00	0.48	0.00	0.006
34.939	0.000	0.00	0.48	0.00	0.006
35.046	0.000	0.00	0.47	0.00	0.006
35.153	0.000	0.00	0.47	0.00	0.006
35.260	0.000	0.00	0.47	0.00	0.006
35.367	0.000	0.00	0.46	0.00	0.006
35.474	0.000	0.00	0.46	0.00	0.006
35.581	0.000	0.00	0.46	0.00	0.006
35.688	0.000	0.00	0.45	0.00	0.005
35.795	0.000	0.00	0.45	0.00	0.005
35.902	0.000	0.00	0.45	0.00	0.005
36.009	0.000	0.00	0.44	0.00	0.005

36.116	0.000	0.00	0.44	0.00	0.005
36.223	0.000	0.00	0.44	0.00	0.005
36.330	0.000	0.00	0.43	0.00	0.005
36.437	0.000	0.00	0.43	0.00	0.005
36.544	0.000	0.00	0.43	0.00	0.005
36.651	0.000	0.00	0.42	0.00	0.005
36.758	0.000	0.00	0.42	0.00	0.005
36.865	0.000	0.00	0.42	0.00	0.005
36.972	0.000	0.00	0.42	0.00	0.005
37.079	0.000	0.00	0.41	0.00	0.005
37.186	0.000	0.00	0.41	0.00	0.005
37.293	0.000	0.00	0.41	0.00	0.005
37.400	0.000	0.00	0.40	0.00	0.005
37.507	0.000	0.00	0.40	0.00	0.005
37.614	0.000	0.00	0.40	0.00	0.005
37.721	0.000	0.00	0.39	0.00	0.005
37.828	0.000	0.00	0.39	0.00	0.005
37.935	0.000	0.00	0.39	0.00	0.005
38.042	0.000	0.00	0.39	0.00	0.005
38.149	0.000	0.00	0.38	0.00	0.005
38.256	0.000	0.00	0.38	0.00	0.005
38.363	0.000	0.00	0.38	0.00	0.005
38.470	0.000	0.00	0.38	0.00	0.005
38.577	0.000	0.00	0.37	0.00	0.005
38.684	0.000	0.00	0.37	0.00	0.004
38.791	0.000	0.00	0.37	0.00	0.004
38.898	0.000	0.00	0.36	0.00	0.004
39.005	0.000	0.00	0.36	0.00	0.004
39.112	0.000	0.00	0.36	0.00	0.004
39.219	0.000	0.00	0.36	0.00	0.004
39.326	0.000	0.00	0.35	0.00	0.004
39.433	0.000	0.00	0.35	0.00	0.004
39.540	0.000	0.00	0.35	0.00	0.004
39.647	0.000	0.00	0.35	0.00	0.004
39.754	0.000	0.00	0.34	0.00	0.004
39.861	0.000	0.00	0.34	0.00	0.004
39.968	0.000	0.00	0.34	0.00	0.004
40.075	0.000	0.00	0.34	0.00	0.004
40.182	0.000	0.00	0.33	0.00	0.004
40.289	0.000	0.00	0.33	0.00	0.004
40.396	0.000	0.00	0.33	0.00	0.004
40.503	0.000	0.00	0.33	0.00	0.004
40.610	0.000	0.00	0.32	0.00	0.004
40.717	0.000	0.00	0.32	0.00	0.004
40.824	0.000	0.00	0.32	0.00	0.004
40.931	0.000	0.00	0.32	0.00	0.004
41.038	0.000	0.00	0.31	0.00	0.004
41.145	0.000	0.00	0.31	0.00	0.004
41.252	0.000	0.00	0.31	0.00	0.004
41.359	0.000	0.00	0.31	0.00	0.004
41.466	0.000	0.00	0.31	0.00	0.004
41.573	0.000	0.00	0.30	0.00	0.004
41.680	0.000	0.00	0.30	0.00	0.004
41.787	0.000	0.00	0.30	0.00	0.004
41.894	0.000	0.00	0.30	0.00	0.004
42.001	0.000	0.00	0.29	0.00	0.004
42.108	0.000	0.00	0.29	0.00	0.004
42.215	0.000	0.00	0.29	0.00	0.004
42.322	0.000	0.00	0.29	0.00	0.003
42.429	0.000	0.00	0.29	0.00	0.003
42.536	0.000	0.00	0.28	0.00	0.003
42.643	0.000	0.00	0.28	0.00	0.003
42.750	0.000	0.00	0.28	0.00	0.003

42.857	0.000	0.00	0.28	0.00	0.003
42.964	0.000	0.00	0.28	0.00	0.003
43.071	0.000	0.00	0.27	0.00	0.003
43.178	0.000	0.00	0.27	0.00	0.003
43.285	0.000	0.00	0.27	0.00	0.003
43.392	0.000	0.00	0.27	0.00	0.003
43.499	0.000	0.00	0.27	0.00	0.003
43.606	0.000	0.00	0.26	0.00	0.003
43.713	0.000	0.00	0.26	0.00	0.003
43.820	0.000	0.00	0.26	0.00	0.003
43.927	0.000	0.00	0.26	0.00	0.003
44.034	0.000	0.00	0.26	0.00	0.003
44.141	0.000	0.00	0.25	0.00	0.003
44.248	0.000	0.00	0.25	0.00	0.003
44.355	0.000	0.00	0.25	0.00	0.003
44.462	0.000	0.00	0.25	0.00	0.003
44.569	0.000	0.00	0.25	0.00	0.003
44.676	0.000	0.00	0.25	0.00	0.003
44.783	0.000	0.00	0.24	0.00	0.003
44.890	0.000	0.00	0.24	0.00	0.003
44.997	0.000	0.00	0.24	0.00	0.003
45.104	0.000	0.00	0.24	0.00	0.003
45.211	0.000	0.00	0.24	0.00	0.003
45.318	0.000	0.00	0.23	0.00	0.003
45.425	0.000	0.00	0.23	0.00	0.003
45.532	0.000	0.00	0.23	0.00	0.003
45.639	0.000	0.00	0.23	0.00	0.003
45.746	0.000	0.00	0.23	0.00	0.003
45.853	0.000	0.00	0.23	0.00	0.003
45.960	0.000	0.00	0.22	0.00	0.003
46.067	0.000	0.00	0.22	0.00	0.003
46.174	0.000	0.00	0.22	0.00	0.003
46.281	0.000	0.00	0.22	0.00	0.003
46.388	0.000	0.00	0.22	0.00	0.003
46.495	0.000	0.00	0.22	0.00	0.003
46.602	0.000	0.00	0.22	0.00	0.003
46.709	0.000	0.00	0.21	0.00	0.003
46.816	0.000	0.00	0.21	0.00	0.003
46.923	0.000	0.00	0.21	0.00	0.003
47.030	0.000	0.00	0.21	0.00	0.003
47.137	0.000	0.00	0.21	0.00	0.003
47.244	0.000	0.00	0.21	0.00	0.002
47.351	0.000	0.00	0.20	0.00	0.002
47.458	0.000	0.00	0.20	0.00	0.002
47.565	0.000	0.00	0.20	0.00	0.002
47.672	0.000	0.00	0.20	0.00	0.002
47.779	0.000	0.00	0.20	0.00	0.002
47.886	0.000	0.00	0.20	0.00	0.002
47.993	0.000	0.00	0.20	0.00	0.002
48.100	0.000	0.00	0.19	0.00	0.002
48.207	0.000	0.00	0.19	0.00	0.002
48.314	0.000	0.00	0.19	0.00	0.002
48.421	0.000	0.00	0.19	0.00	0.002
48.528	0.000	0.00	0.19	0.00	0.002
48.635	0.000	0.00	0.19	0.00	0.002
48.742	0.000	0.00	0.19	0.00	0.002
48.849	0.000	0.00	0.18	0.00	0.002
48.956	0.000	0.00	0.18	0.00	0.002
49.063	0.000	0.00	0.18	0.00	0.002
49.170	0.000	0.00	0.18	0.00	0.002
49.277	0.000	0.00	0.18	0.00	0.002
49.384	0.000	0.00	0.18	0.00	0.002
49.491	0.000	0.00	0.18	0.00	0.002

49.598	0.000	0.00	0.18	0.00	0.002
49.705	0.000	0.00	0.17	0.00	0.002
49.812	0.000	0.00	0.17	0.00	0.002
49.919	0.000	0.00	0.17	0.00	0.002
50.026	0.000	0.00	0.17	0.00	0.002
50.133	0.000	0.00	0.17	0.00	0.002
50.240	0.000	0.00	0.17	0.00	0.002
50.347	0.000	0.00	0.17	0.00	0.002
50.454	0.000	0.00	0.17	0.00	0.002
50.561	0.000	0.00	0.16	0.00	0.002
50.668	0.000	0.00	0.16	0.00	0.002
50.775	0.000	0.00	0.16	0.00	0.002
50.882	0.000	0.00	0.16	0.00	0.002
50.989	0.000	0.00	0.16	0.00	0.002
51.096	0.000	0.00	0.16	0.00	0.002
51.203	0.000	0.00	0.16	0.00	0.002
51.310	0.000	0.00	0.16	0.00	0.002
51.417	0.000	0.00	0.15	0.00	0.002
51.524	0.000	0.00	0.15	0.00	0.002
51.631	0.000	0.00	0.15	0.00	0.002
51.738	0.000	0.00	0.15	0.00	0.002
51.845	0.000	0.00	0.15	0.00	0.002
51.952	0.000	0.00	0.15	0.00	0.002
52.059	0.000	0.00	0.15	0.00	0.002
52.166	0.000	0.00	0.15	0.00	0.002
52.273	0.000	0.00	0.15	0.00	0.002
52.380	0.000	0.00	0.15	0.00	0.002
52.487	0.000	0.00	0.14	0.00	0.002
52.594	0.000	0.00	0.14	0.00	0.002
52.701	0.000	0.00	0.14	0.00	0.002
52.808	0.000	0.00	0.14	0.00	0.002
52.915	0.000	0.00	0.14	0.00	0.002
53.022	0.000	0.00	0.14	0.00	0.002
53.129	0.000	0.00	0.14	0.00	0.002
53.236	0.000	0.00	0.14	0.00	0.002
53.343	0.000	0.00	0.14	0.00	0.002
53.450	0.000	0.00	0.13	0.00	0.002
53.557	0.000	0.00	0.13	0.00	0.002
53.664	0.000	0.00	0.13	0.00	0.002
53.771	0.000	0.00	0.13	0.00	0.002
53.878	0.000	0.00	0.13	0.00	0.002
53.985	0.000	0.00	0.13	0.00	0.002
54.092	0.000	0.00	0.13	0.00	0.002
54.199	0.000	0.00	0.13	0.00	0.002
54.306	0.000	0.00	0.13	0.00	0.002
54.413	0.000	0.00	0.13	0.00	0.002
54.520	0.000	0.00	0.13	0.00	0.002
54.627	0.000	0.00	0.12	0.00	0.002
54.734	0.000	0.00	0.12	0.00	0.001
54.841	0.000	0.00	0.12	0.00	0.001
54.948	0.000	0.00	0.12	0.00	0.001
55.055	0.000	0.00	0.12	0.00	0.001
55.162	0.000	0.00	0.12	0.00	0.001
55.269	0.000	0.00	0.12	0.00	0.001
55.376	0.000	0.00	0.12	0.00	0.001
55.483	0.000	0.00	0.12	0.00	0.001
55.590	0.000	0.00	0.12	0.00	0.001
55.697	0.000	0.00	0.12	0.00	0.001
55.804	0.000	0.00	0.11	0.00	0.001
55.911	0.000	0.00	0.11	0.00	0.001
56.018	0.000	0.00	0.11	0.00	0.001
56.125	0.000	0.00	0.11	0.00	0.001
56.232	0.000	0.00	0.11	0.00	0.001

56.339	0.000	0.00	0.11	0.00	0.001
56.446	0.000	0.00	0.11	0.00	0.001
56.553	0.000	0.00	0.11	0.00	0.001
56.660	0.000	0.00	0.11	0.00	0.001
56.767	0.000	0.00	0.11	0.00	0.001
56.874	0.000	0.00	0.11	0.00	0.001
56.981	0.000	0.00	0.11	0.00	0.001
57.088	0.000	0.00	0.11	0.00	0.001
57.195	0.000	0.00	0.10	0.00	0.001
57.302	0.000	0.00	0.10	0.00	0.001
57.409	0.000	0.00	0.10	0.00	0.001
57.516	0.000	0.00	0.10	0.00	0.001
57.623	0.000	0.00	0.10	0.00	0.001
57.730	0.000	0.00	0.10	0.00	0.001
57.837	0.000	0.00	0.10	0.00	0.001
57.944	0.000	0.00	0.10	0.00	0.001
58.051	0.000	0.00	0.10	0.00	0.001
58.158	0.000	0.00	0.10	0.00	0.001
58.265	0.000	0.00	0.10	0.00	0.001
58.372	0.000	0.00	0.10	0.00	0.001
58.479	0.000	0.00	0.10	0.00	0.001
58.586	0.000	0.00	0.09	0.00	0.001
58.693	0.000	0.00	0.09	0.00	0.001
58.800	0.000	0.00	0.09	0.00	0.001
58.907	0.000	0.00	0.09	0.00	0.001
59.014	0.000	0.00	0.09	0.00	0.001
59.121	0.000	0.00	0.09	0.00	0.001
59.228	0.000	0.00	0.09	0.00	0.001
59.335	0.000	0.00	0.09	0.00	0.001
59.442	0.000	0.00	0.09	0.00	0.001
59.549	0.000	0.00	0.09	0.00	0.001
59.656	0.000	0.00	0.09	0.00	0.001
59.763	0.000	0.00	0.09	0.00	0.001
59.870	0.000	0.00	0.09	0.00	0.001
59.977	0.000	0.00	0.09	0.00	0.001
60.084	0.000	0.00	0.09	0.00	0.001
60.191	0.000	0.00	0.09	0.00	0.001
60.298	0.000	0.00	0.08	0.00	0.001
60.405	0.000	0.00	0.08	0.00	0.001
60.512	0.000	0.00	0.08	0.00	0.001
60.619	0.000	0.00	0.08	0.00	0.001