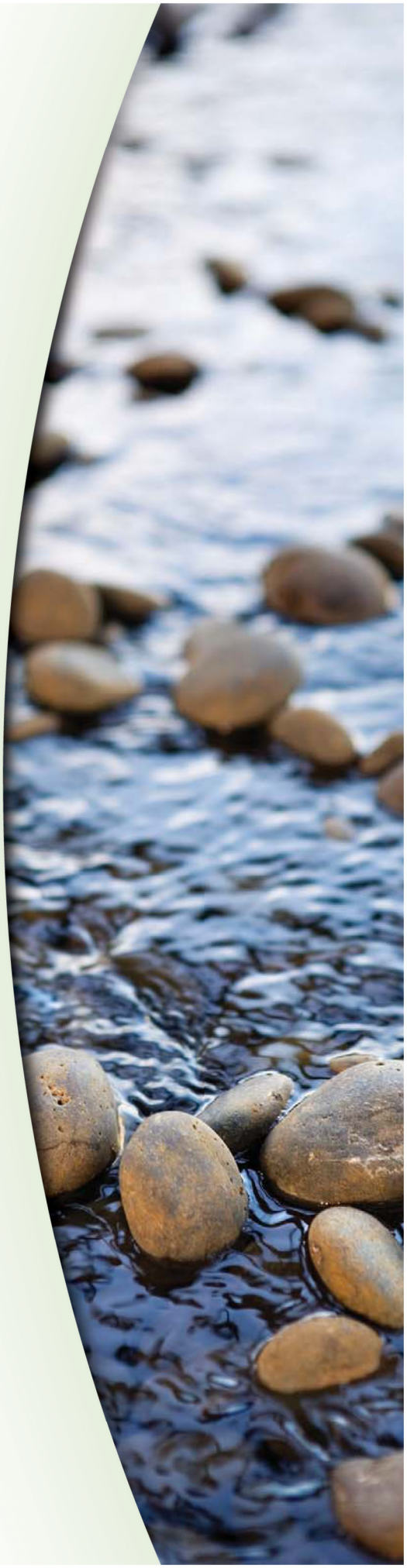

PRELIMINARY HYDROLOGY STUDY

MOIOLA PARK RESIDENCES

Fountain Valley, California

prepared for

Brookfield Residential

Fuscoe Engineering
16795 Von Karman
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Project Manager:
John Olivier, P.E.

January 2020

Job Number: 308.084.01

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PRELIMINARY HYDROLOGY STUDY

MOIOLA PARK RESIDENCES

FOUNTAIN VALLEY, CA JANUARY 2020

308-084-01

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PRELIMINARY HYDROLOGY STUDY

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MOIOLA PARK RESIDENCES

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PRELIMINARY HYDROLOGY REPORT

Moiola Park Residences

Fountain Valley, California

PREPARED BY:

Fuscoe Engineering

16795 Von Karman, Suite 100

Irvine, CA 92130

(949) 474-1960

Project Number:

308-084-01

Project Manager:

John Olivier, P.E.

Date Prepared:

January 2020

Table of Contents

1.0 INTRODUCTION

1.1 Geographic Setting

The project site is located on a vacant lot that was a formerly an elementary school (K-8th). The site is situated to the south of Finch Avenue, and to the east of Redwood Street, in the City of Fountain Valley. A Vicinity Map is included as Figure 1, below.

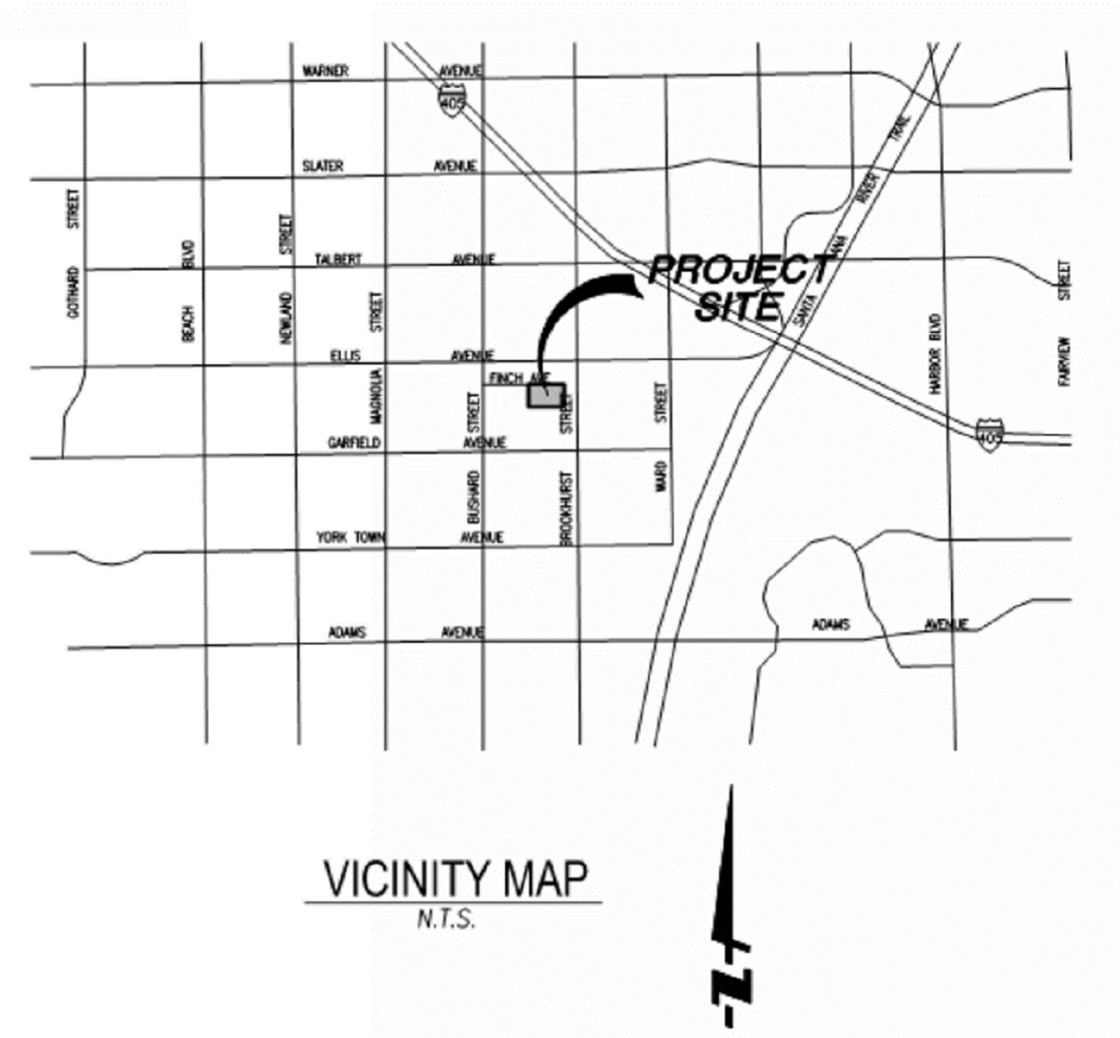


FIGURE 1

1.2 Project Description

The proposed Moiola Park Residential project site encompasses approximately 13 acres, in the City of Fountain Valley. The project site is bounded by Finch Avenue to the north, Redwood Street to the west, and Orange County Flood Control District (OCFCD) Facility No. D05 (Fountain Valley Channel) to the south.

The proposed residential development will include demolishing the existing vacant school building and associated onsite development, and constructing 74 single-family lots, residential streets, and a 1-acre community park. The architect's site plan is included in this report as Appendix 1.

1.3 Purpose of this Report

The purpose of this report is to provide calculations and exhibits to estimate the values for the existing and proposed condition stormwater flows. The information presented in this report demonstrates that the proposed stormwater design will not adversely impact the existing drainage infrastructure.

1.4 References

- Orange County Hydrology Manual & Local Drainage Manual
- AES Hydrologic Software
- USDA NRCS Web soil Survey
- OCFCD Channel Plans for Fountain Valley Channel (Facility No. D05)
- City of Fountain Valley Atlas Map
- City of Fountain Valley Master Plan of Drainage
- FEMA

2.0 HYDROLOGY

2.1 Existing Condition

The existing site includes a vacant area, that was formerly an elementary school (Fred Moiola). Adjacent land uses include commercial to the east, residential to the south and west, and a small farm to the north. The project is within Soil Type "C", based on the USDA Web Soil Survey, included in Appendix 2 of this report.

There is an existing 36" City of Fountain Valley storm drain, which collects area from Finch Avenue and northerly, and conveys the drainage through the site within an easement, before discharging into D05 Channel. In addition, the channel drawings also show three 18" storm drain inlets into the channel from the property, two to the east of the 36" drain, and one to the west of the 36" drain. A portion of the site drainage discharges into the 36" drain, and the remainder of the site drains to the three 18" inlets, into the channel. The entire site is tributary to the D05 channel, between Station 50+96 and Station 58+77. Applicable sheets of the OCFCD channel plans, dated March 1993, are included in Appendix 3 of this report.

The City of Fountain Valley has published atlas maps (Map D-7; January 2016), and Master Plan of Drainage (MPD; March 2003). The City's Atlas Map D-7 shows the 36" City storm drain, which originates at Finch Avenue, and continues through the property, before discharging into the channel. The MPD shows the 10-year calculations of the offsite drainage, which enter the 36" storm drain at Finch Avenue. The Atlas Map is included in Appendix 4 of this report. The Master Plan of Drainage excerpts are included in Appendix 5 of this report.

The existing condition hydrology was performed for the site, and includes the offsite drainage into the 36" storm drain. The calculations and map are included in Appendix 6 of this report.

2.2 Proposed Condition

The proposed residential development will include demolishing the existing vacant building and associated onsite development, and constructing 74 single-family lots, residential streets, and a 1-acre community park.

The proposed condition hydrology was performed for the site, and includes the offsite drainage from Finch Avenue, discussed previously in this report. The calculations and map are included in Appendix 7 of this report.

3.0 REFERENCE DOCUMENTATION

The project is primarily within Soil Type "C", as shown on the Web Soil Survey report, which is included herein as Appendix 2.

The OCFCD channel drawings (Appendix 3) have been obtained from County of Orange/Public Works. The City of Fountain Valley published Atlas Maps (Appendix 4) a Master Plan of Drainage (MPD) (Appendix 5) which includes 10-year calculations and maps.

4.0 FEMA

The project is within FEMA Map 06059C0254J (12/3/2009). The site is entirely within Zone X, which depicts area of reduced flood risk due to levee. A CLOMR or LOMR will not be required. A FEMA Map (Firmette) is included in this report as Appendix 8.

5.0 RESULTS AND CONCLUSIONS

The results of the hydrologic analyses are shown on the following tables.

TABLE 1 – EXISTING CONDITON

Sub-Area	D05 Station	Acres	Q10 (cfs)	Time of Concentration (Tc) minutes
A	50+96	2.64 (onsite)	5.5 (onsite)	11.9
B	55+57	13.30 (total) 7.17 (onsite) 6.13 (offsite)	20.9 (total) 12.2 (onsite) 8.7 (offsite)	14.1
C	56+81	2.31(onsite)	4.2 (onsite)	14.9
D	58+77	0.87 (onsite)	1.6 (onsite)	14.6
		19.12 (total) (12.99 onsite)	32.2 (total) 23.5 (onsite)	

TABLE 2 – PROPOSED CONDITON

Sub-Area	D05 Station	Acres	Q10 (cfs)	Time of Concentration (Tc) minutes
A	51+56	5.47 (onsite)	8.8 (onsite)	12.8
B	58+16	13.30 (total) 7.52 (onsite) 13.65 (offsite)	21.6 (total) 12.9 (onsite) 8.7 (offsite)	13.4
		19.12 (total) (12.99 onsite)	30.4 (total) 21.7 (onsite)	

Based on the hydrologic and hydraulic analyses included in this report, the proposed project will not adversely impact the drainage systems or OCFCD channel. The back-up calculations and exhibits area included in the appendices of this report.

6.0 APPENDICES

Appendix 1 Architect's Site Plan

Appendix 2 Web Soil Survey

Appendix 3 OCFCD Channel Plans

Appendix 4 City of Fountain Valley Atlas Map

Appendix 5 City of Fountain Valley Master Plan Information

Appendix 6 Existing Condition Hydrology

Appendix 7 Proposed Condition Hydrology

Appendix 8 FEMA Map

APPENDIX 1

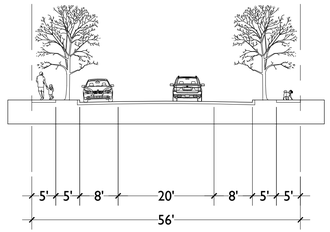
Architect's Site Plan

Site Summary:

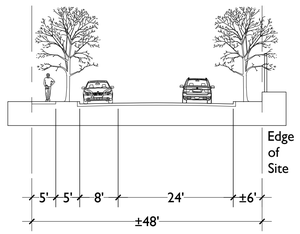
7,200 sf Lots and 4,500 sf Lots with Private Streets

Total Homes:	74
Site Area:	±12.99 Acres
Density:	±5.70 Homes/Acre
Typ. Lot Size:	60' x 120' (10)
	50' x 90' (64)

Street Sections



Typical Private Street



Street at Northeast Corner

Legend

- Pedestrian access to park
- New community wall against existing wall
- New community wall
- Existing community wall to remain

CONCEPTUAL SITE PLAN - 74 HOMES

MOIOLA PARK RESIDENCES

Fountain Valley, California

0 25 50 100

SCALE: 1" = 50'-0"

369.18338

Bassenian | Lagoni
ARCHITECTURE • PLANNING • INTERIORS

2031 Orchard Drive, Suite 100
Newport Beach, CA USA 92660
tel. +1 949 553 9100
fax +1 949 553 0548

Note:
This yield study is for the purpose of estimating the maximum density of a residential product type on a site of a given configuration. If specific entitlement requirements differ from the criteria shown on the plan (such as setbacks, minimum lot sizes, street standards, retention requirements, etc.) then the actual possible density may vary substantially.

19 DEC 2019

Brookfield Residential

APPENDIX 2

Web Soil Survey

United States Department of Agriculture

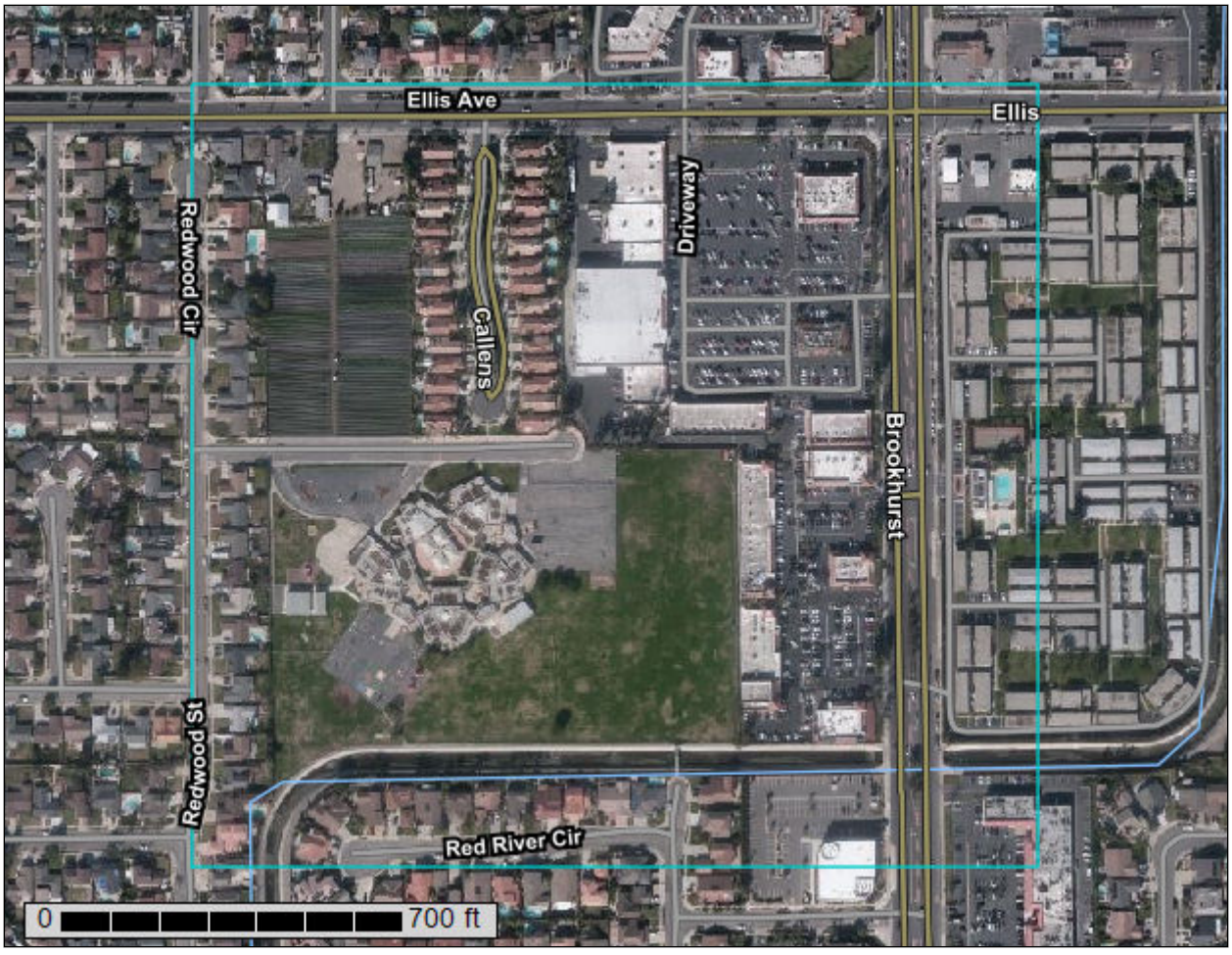
NRCS

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

Moiola Park Residences - Fountain Valley



January 6, 2020

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 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 13, Sep 16, 2019

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

Date(s) aerial images were photographed: Apr 13, 2018—Jan 25, 2019

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
123	Bolsa silt loam, drained	54.5	85.1%
158	Hueneme fine sandy loam, drained	9.5	14.9%
Totals for Area of Interest		**64.0**	**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

123—Bolsa silt loam, drained

Map Unit Setting

National map unit symbol: hclz
Elevation: 0 to 680 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 62 to 65 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bolsa and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bolsa

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap1 - 0 to 6 inches: silt loam
Ap2 - 6 to 12 inches: silt loam
C1 - 12 to 18 inches: silt loam
C2 - 18 to 29 inches: silt loam
C3 - 29 to 39 inches: silty clay loam
C4 - 39 to 49 inches: silty clay loam
C5 - 49 to 55 inches: silty clay loam
Cg - 55 to 69 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Hueneme, fine sandy loam
Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Chino, silty clay loam
Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Metz, loamy sand
Percent of map unit: 4 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

San emigdio, fine sandy loam
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Bolsa, sandy loam overwash
Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Omni, drained
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

158—Hueneme fine sandy loam, drained

Map Unit Setting

National map unit symbol: hcn3
Mean annual precipitation: 15 inches
Frost-free period: 300 to 350 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Hueneme

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Stratified alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 27 inches: fine sandy loam
H2 - 27 to 60 inches: stratified sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: A
Hydric soil rating: Yes

Minor Components

Bolsa, silt loam, drained
Percent of map unit: 5 percent
Hydric soil rating: No

Hueneme, fine sandy loam
Percent of map unit: 5 percent
Hydric soil rating: No

San emigdio, fine sandy loam
Percent of map unit: 5 percent
Hydric soil rating: No

References

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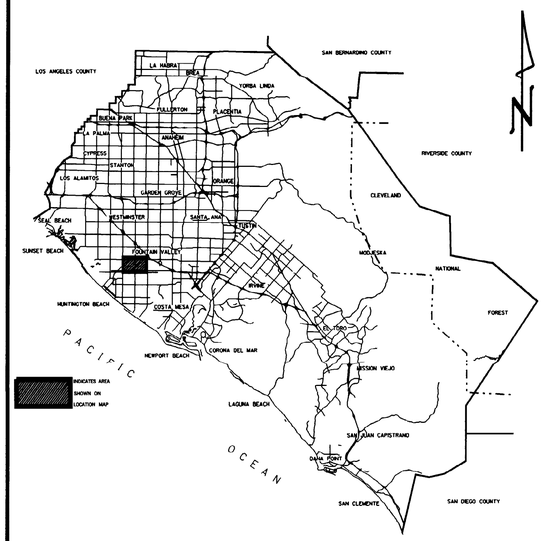
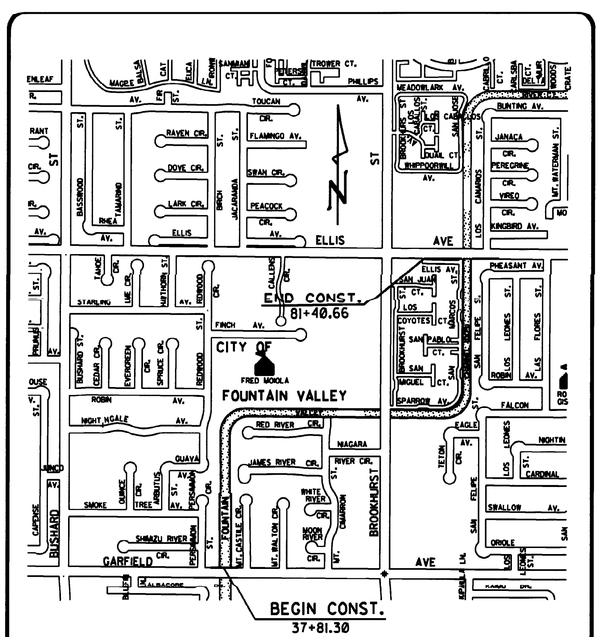
APPENDIX 3

OCFCD Channel Plans



VICINITY MAP



LOCATION MAP

ORANGE COUNTY
ENVIRONMENTAL MANAGEMENT AGENCY

SANTA ANA, CALIFORNIA

MICHAEL M. RUANE, DIRECTOR

PLANS FOR CONSTRUCTION OF

FOUNTAIN VALLEY CHANNEL

FACILITY NO. D05

FROM

GARFIELD AVENUE

TO

ELLIS AVENUE

MARCH 1993

FUNDED BY: ORANGE COUNTY FLOOD CONTROL DISTRICT

INDEX OF SHEETS

UTILITY OWNER	PHONE NO.	CONTACT
CITY OF FOUNTAIN VALLEY	(714)965-4400	BOB KILLISON
SOUTHERN CAL. GAS COMPANY	(714)634-3115	DON JONES
SOUTHERN CAL. EDISON CO.	(714)895-0363	J. CHARLESWORTH
ORANGE COUNTY SAN. DISTRICTS	(714)962-2411	RUSS WOLD
GENERAL TELEPHONE	(714)373-2613	G. CALDWELL
PARAGON CABLE	(714)895-6886	MIKE BOGNER
ORANGE CO. WATER DISTRICTS	(714)963-5661	STEVE CONKLIN
UNDERGROUND SERVICE ALERT	1-800-422-4133	

BENCH MARK: HB-264-86

NEAR THE INTERSECTION OF BUSHARD STREET AND VELARDO DRIVE; 194 FEET SOUTH OF VELARDO DRIVE; 48 FEET WEST OF BUSHARD ST.; SET ON TOP OF THE SOUTHERLY END OF A 39 FOOT CONC. HEADWALL FOR REINFORCED CONC. BOX CROSSING BUSHARD STREET.

1976 ADJUSTMENT ELEVATION: 13.559

BASIS OF BEARINGS:

BASIS OF BEARINGS DERIVED FROM THE GRID BEARING OF GARFIELD AVENUE DETERMINED BY ORANGE COUNTY SURVEY CONTROL MONUMENTS BRK-GAR AND BUSH-GAR.

APPROVALS

APPROVED: Wayne S. Osborne 2-11-93
DATE
WAYNE S. OSBORNE RCE 13579
DIRECTOR OF PUBLIC WORKS
CITY OF FOUNTAIN VALLEY

EMA - PUBLIC WORKS

SUBMITTED: James A. Miller 2/12/93
FLOOD CONTROL DESIGN DATE

JAMES A. MILLER No. 27177 Exp. 3/31/93 CIVIL STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER

RECOMMENDED: A.W. Williams 3-2-94 2-10-93
DESIGN DIVISION MANAGER DATE

APPROVED: William S. Zaun 2-10-93
DIRECTOR OF PUBLIC WORKS DATE

RECORD DRAWINGS

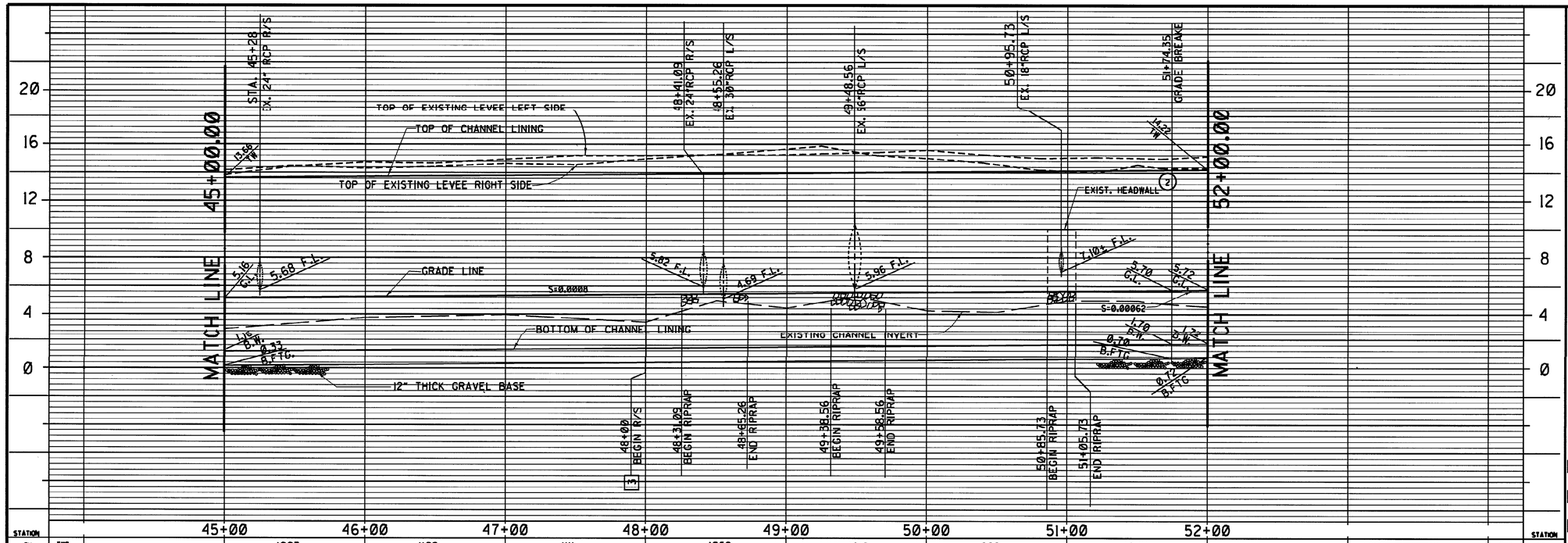
CONTRACTOR : LUMSDAINE CONSTRUCTION
INSPECTOR : ART ADAMS
RESIDENT ENGINEER : STAN VANDERMEY
COMPLETION DATE : 10-22-93

NO.	DESCRIPTION	SHT.	APPROVED	DATE
1	PER PLAN CORRECTION	5,6,7	DES. BULLET. 1	3-24-93
2	PER PLAN CORRECTION	5	DESIGN	5-3-93
3	RECORD DRAWINGS SHT: 3,4,5,6,7,8,	10,11		5-2000

REVISIONS

W. O. NO. F07200
DWG. NO. D05-101-7R

SHEET 1 OF 13



CONSTRUCTION NOTES

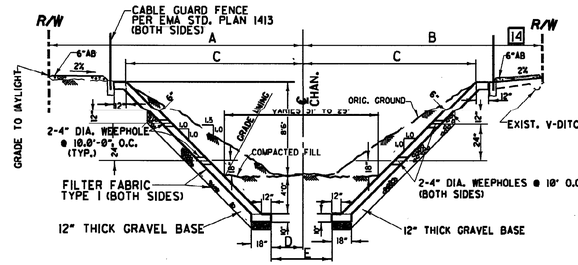
1. CONST. R.C. TRAPEZOIDAL CHANNEL WALLS PER PLAN PROFILE AND TYPICAL SECTION THIS SHEET AND DETAILS SHEET 9
2. CONSTRUCT R.C. TRANSITION PER PLAN, PROFILE AND DETAIL SHEET 9,10 & 11
3. FURNISH AND PLACE 4" THICK ASPHALT CONCRETE PAVING PER PLAN AND PROFILE THIS SHEET AND DETAILS SHEET
4. CONSTRUCT CABLE GUARD FENCE PER EMA STANDARD PLAN 1413
5. CONSTRUCT CHAIN LINK FENCE & GATES PER EMA STANDARD PLAN 600-0-0C
6. REMOVE INTERFERING PORTIONS AND SEE DETAILS SHEET FOR INSTALLATION.
7. CUT AND CAP AT RIGHT OF WAY LINE
8. INSTALL 33" THICK RIPRAP PER PLAN AND PROFILE AND EMA STANDARD PLAN 1809.
9. INSTALL INLET PER DETAIL SHEET 8 AND REPLACE 18" DIA. CMP WITH 18" DIA. RCP.
10. INSTALL RET. WALL PER DETAIL SHT. 8 OR ALT. SHT. II 5' HIGH CHAIN LINK FENCE PER EMA STD. PLAN 600-0-0C
11. CONSTRUCT CUT OFF WALL PER DETAIL SHEET 8
12. COMPACT INVERT TO MINIMUM RELATIVE COMPACTION OF 90% PER PLAN, PROFILE & SPECIAL PROVISIONS
13. CONST. CONSTRUCTION JOINT PER DETAIL SHEET 9.
14. CONSTRUCT 6" AB ROADWAY PER PLAN, PROFILE AND TYPICAL SECTION
15. INSTALL DRIVEWAY APPROACH AND SIDEWALK CURB AND GUTTER PER SHEET NO.11
16. CONST. 4" CONC. DRIVE APRON WITH 6X6; WI.9XWI.9 WWF OVER 6" A.B. FINAL SURFACE HEAVY BROOM FINISH
17. CONSTRUCT STRUCTURAL JOINT PER DETAIL SHEET 9
18. (NOT USED)
19. (NOT USED)
20. 2.0' / 1'-6" RETAINING WALL PER SHT. NO. 10 WITH 8'-0" HIGH C.L. FENCE ON WALL.

HYDRAULIC DATA

Station to Station	Q	b	z	S	n=0.018 Dn	n=0.018 Vn	F	n=0.020 Dn	n=0.020 Vn	F	Dc
45+00.00 TO 48+32.38	1300	31	1.0	0.0008	5.79	6.36	0.50	6.16	5.92	0.45	3.74
48+32.38 TO 48+52.38	1300			TRANSITION							
48+52.38 TO 51+74.35	1300	29	1.0	0.0008	5.85	6.34	0.50	6.23	5.90	0.45	3.78
51+74.35 TO 52+00.00	1100	29	1.0	0.00062	5.69	5.50	0.44	6.05	5.12	0.40	3.38

LEGEND

1. PROTECT IN PLACE
2. REMOVE
3. REMOVE INTERFERING PORTIONS
4. REMOVE AND REPLACE
5. REMOVE AND SALVAGE



TYPICAL SECTION
NTS

SECTION SCHEDULE

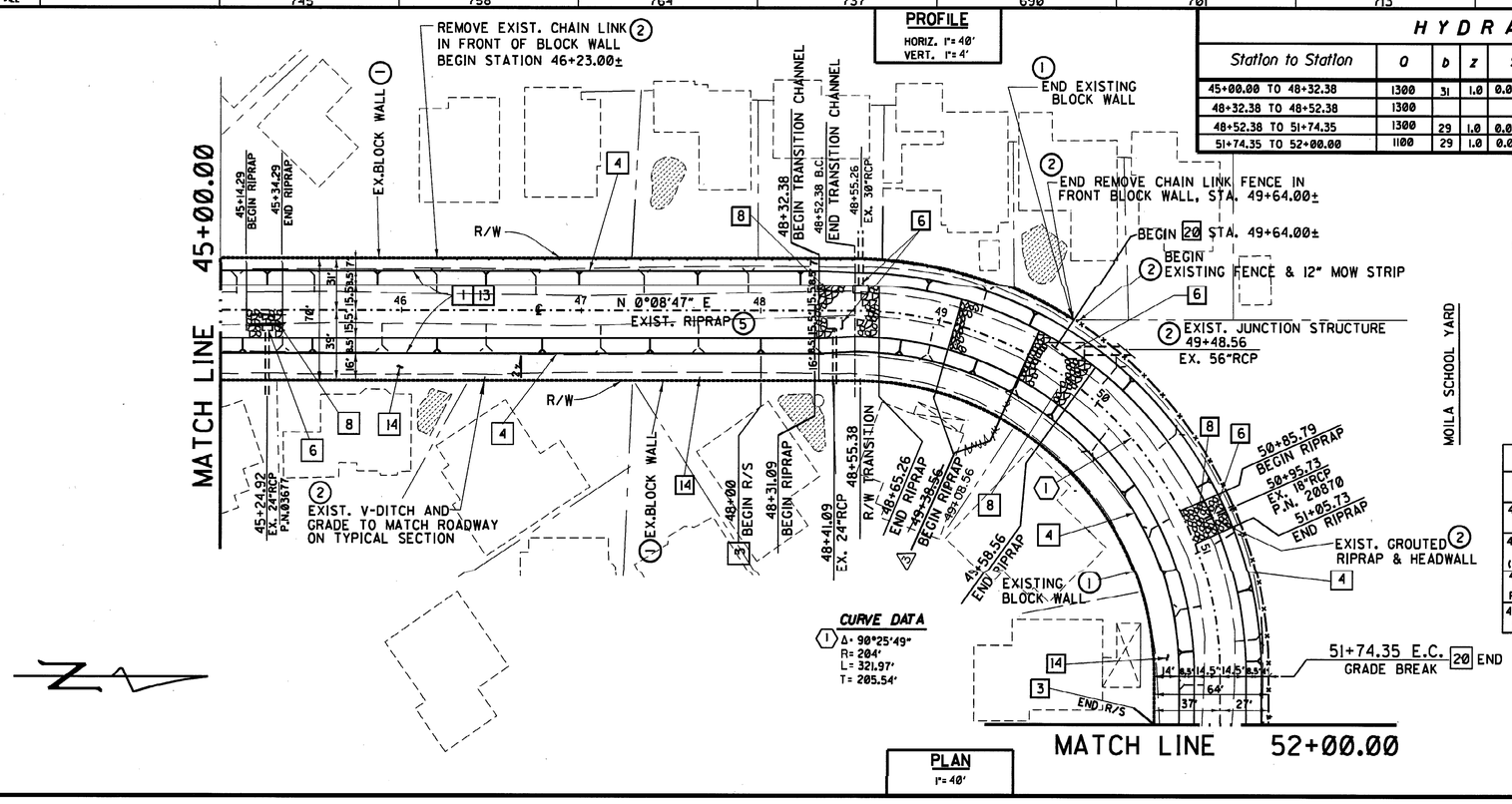
STATIONS D/S	STATIONS U/S	A	B	C	D	E
45+00.00 TO 48+32.38		31'	39'	24'	10.50'	21.0'
48+32.38 TO 48+52.38 (TRANSITION)		31'	39'	24' TO 23'	10.50 TO 9.50'	21' TO 19.0'
48+52.38 TO 48+55.38 R/W TRANS.		VAR. 31' TO 27'	VAR. 39' TO 37'	23'	9.50'	19.0'
48+52.38 TO 52+00.00		27'	37'	23'	9.50'	19.0'

CURVE DATA

1. Δ= 90°25'49"
   R= 204'
   L= 321.97'
   T= 205.54'

PROFILE
HORIZ. 1"= 40'
VERT. 1"= 4'

PLAN
1"= 40'



BENCH MARK:

RECORD DRAWINGS

MARK	DATE	DESCRIPTION
3	5-00	RECORD DRAWINGS

REVISIONS

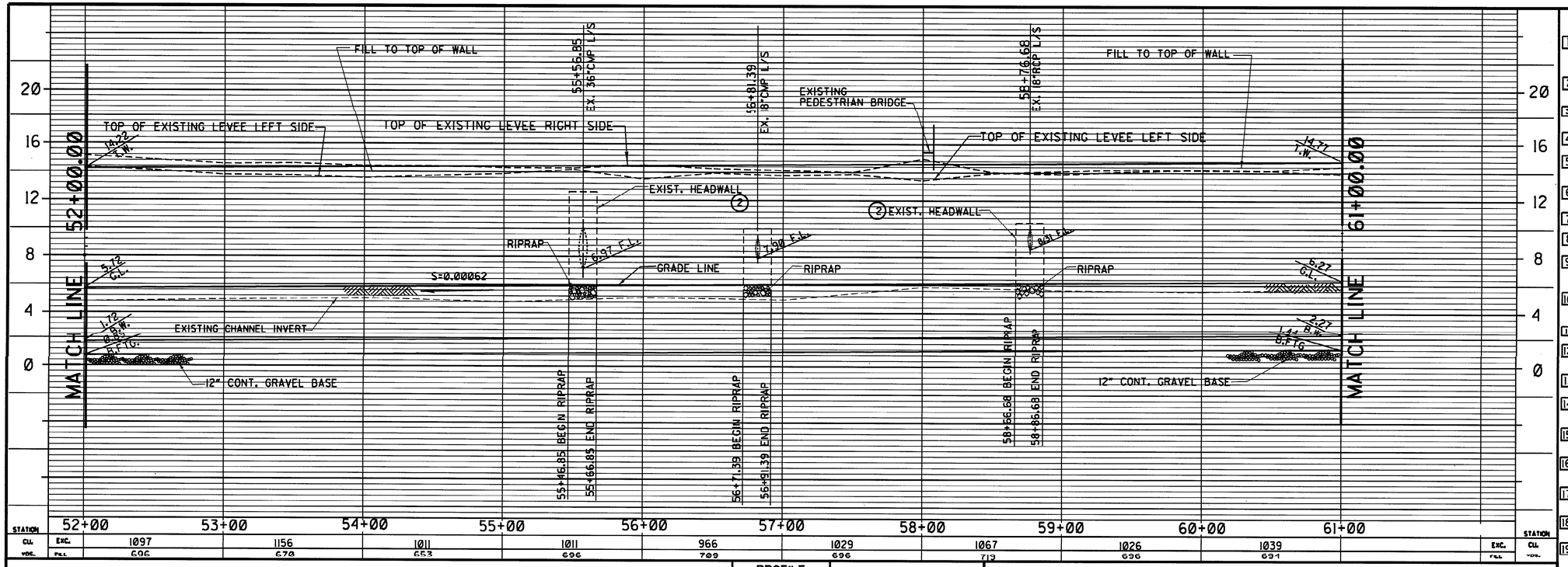
PREPARED UNDER SUPERVISION OF
REGISTERED PROFESSIONAL ENGINEER
PHILLIP M. JONES
No. C 44010
Exp. 6-30-93
CIVIL
STATE OF CALIFORNIA
2-10-93
DATE

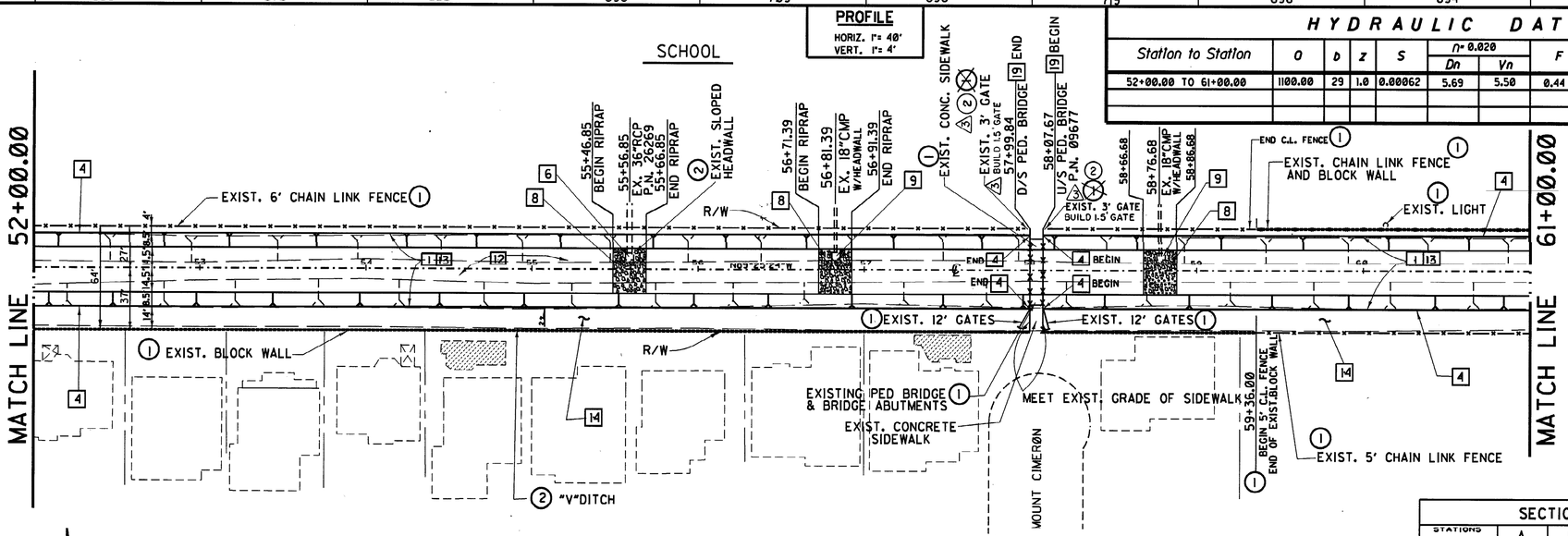
ORANGE COUNTY ENVIRONMENTAL MANAGEMENT AGENC

FOUNTAIN VALLEY CHANNEL (D05)

PLAN AND PROFILE
45+00.00 TO 52+00.00

DESIGNED	HC/JFL		
DRAWN	LBF	CHECKED	PMJ
SCALE	DATE	DRAWING NO.	SHEET
AS SHOWN	MAR'93	D05-101-7 R	3 OF





HYDRAULIC DATA

Station to Station	Q	b	z	S	n= 0.020 Dn	n= 0.020 Vn	F	n= 0.024 Dn	n= 0.024 Vn	F	Dc
52+00.00 TO 61+00.00	1100.00	29	1.0	0.00062	5.69	5.50	0.44	6.05	5.12	0.40	3.38

CONSTRUCTION NOTES

1. CONST. R.C. TRAPEZOIDAL CHANNEL WALLS PER PLAN PROFILE AND TYPICAL SECTION THIS SHEET AND DETAILS SHEET 9
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9. INSTALL INLET PER DETAIL SHEET 8 AND REPLACE 18" DIA. CMP WITH 18" DIA. RCP.
10. INSTALL RET. WALL PER DETAIL SHT. 8 OR ALTERNATE SHEET 11 W/ 5 FT. HIGH CHAIN LINK FENCE PER EMA ST PLAN 600-0-0C
11. CONSTRUCT CUT OFF WALL PER DETAIL SHEET 8
12. COMPACT INVERT TO MINIMUM RELATIVE COMPACTION OF 90% PER PLAN, PROFILE & SPECIAL PROVISIONS
13. CONST. CONSTRUCTION JOINT PER DETAIL SHEET 9.
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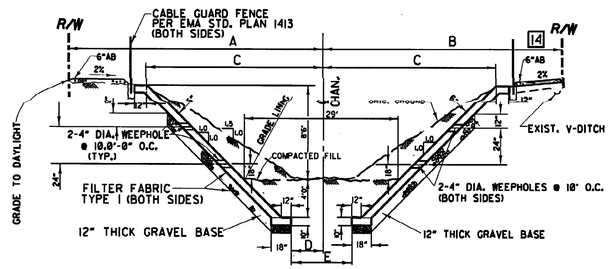
16. CONST. 4" CONC. DRIVE APRON WITH 6X6; W1.9XW1.9 WWF OVER 6" A.B. FINAL SURFACE HEAVY BROOM FINISH
17. CONSTRUCT STRUCTURAL JOINT PER DETAIL SHEET 9
18. (NOT USED)
19. (NOT USED)
20. 2.0' ~~1'-6"~~ RETAINING WALL PER SHT. NO. 10 WITH 8'-0" HIGH C.L. FENCE ON WALL.



TYPICAL SECTION
NTS

RECORD DRAWINGS

SECTION SCHEDULE

STATIONS D/S U/S	A	B	C	D	E
52+00.00 TO 61+00.00	27'	37'	23.0'	9.5'	19.0'

LEGEND

1. PROTECT IN PLACE
2. REMOVE
3. REMOVE INTERFERING PORTIONS
4. REMOVE AND REPLACE
5. REMOVE AND SALVAGE

PLAN
1"= 40'

BENCH MARK:

MARK	DATE	DESCRIPTION
3	5-00	RECORD DRAWINGS

REVISIONS

PREPARED UNDER SUPERVISION OF:
REGISTERED PROFESSIONAL ENGINEER PHILLIP M. JONES No. C 44010 Exp 6-30-95 CIVIL STATE OF CALIFORNIA
2-10-93 DATE

ORANGE COUNTY ENVIRONMENTAL MANAGEMENT AGENC
FOUNTAIN VALLEY CHANNEL (D05)

PLAN AND PROFILE
52+00.00 TO 61+00.00

DESIGNED	HC/JFL		
DRAWN	LBF	CHECKED	PMJ
SCALE AS SHOWN	DATE MAR.'93	DRAWING NO. D05-101-7 R	SHEET 4 OF

APPENDIX 4

City of Fountain Valley Atlas Map

C-6 D-6 E-6

C-7 E-7

ELLIS AVE
ELLIS FRONTAGE #3
ELLIS FRONTAGE #4
BUSHARD FRONTAGE #5
BUSHARD FRONTAGE #6
TAHOE CIR
LIME CIR
HAWTHORN ST
REDWOOD CIR
REDWOOD ST
CALLENSOR
STARLING AVE
FINCH AVE
PRUNUS ST
TANAGER AVE
GROUSE AVE
CEDAR CIR
EVERGREEN CIR
SPRUCE CIR
ROBIN AVE
BUSHARD ST
CAPENSE ST
NIGHTINGALE AVE
JUNCO AVE
COLUMBUS CRT
QUINCE CIR
ARBUTUS ST
GUAVA AVE
PERSIMMON CIR
PERSIMMON ST
SMOKE TREE AVE
SHIMIZU RIVER CIR
MT CASTILE CIR
MT WALTON CIR
MT CIMARRON ST
WHITE RIVER CIR
MOON RIVER CIR
RED RIVER CIR
JAMES RIVER CIR
GUAVA AVE
NIAGARA RIVER AVE
GARFIELD AVE
BROOKHURST ST
SAN JUAN CRT
LOS COYOTES CRT
SAN MIGUEL CRT
WINDRIDGE LN
BLUE FIN LN

Leport School

Project Site

Fountain Valley Channel (D05)

D6043 D6044 D6042 D6046 D6047 D6041 D6040 D6045 D6048 D6049 D6050
D7041 D7043 D7044 D7045 D7049 D7050 D7047 D7046 D7051
D7052 D7053 D7054 D7055 D7056 D7057 D7058 D7059
D7048 D7042 D7027 D7029 D7028 D7030 D7038 D7037
D7039 D7040 D7020 D7021 D7022 D7023 D7024 D7025 D7026
D7018 D7017 D7036 D7035 D7034 D7033 D7032 D7031 D7016 D7014 D7002
D7019
D7007 D7006 D7008 D7009 D7010 D7011 D7005 D7004 D7002 D7003 D7001 D7012 D7013
D7015
E7033 E7034 E7035 E7036 E7048 E7049 E7037 E7038 E7039 E7040 E7060 E7001

1. 18" RCP 42'
2. 18" RCP 8'
3. 30" RCP 71'
4. 18" RCP 41'
5. 8" ACP 4'

10. 2X18" RCP 14'
11. 2X8" ACP 20'
12. 2X18" RCP 21'
13. 18"
14. 24" RCP

15. 24" RCP 15'
16. 8" ACP 4'

Public Storm Structures

- Manhole
- Junction Structure
- Catch Basin
- Catch Basin w/ BMP
- Catch Basin w/ Filter
- Transition Structure
- Bubble Basin
- Burper
- CDS
- Inlet Structure
- Clean Out
- Settling Basin
- Channel Outfall
- Plug
- Exits City
- Grade Break
- Pump Station
- Public Storm Pipes

Private Storm Structures

- Manhole
- Junction Structure
- Catch Basin
- BMP
- CDS
- Transition Structure
- Channel Outfall
- Inlet Structure

- Street Flow Directions
- Private Storm Pipes
- Cross Gutters
- Buildings
- Channels
- Freeway
- City Boundary

		D-1	E-1	F-1	G-1	H-1	J-1
	C-2	D-2	E-2	F-2	G-2	H-2	J-2
	C-3	D-3	E-3	F-3	G-3	H-3	J-3
B-4	C-4	D-4	E-4	F-4	G-4	H-4	
B-5	C-5	D-5	E-5	F-5	G-5	H-5	
B-6	C-6	D-6	E-6	F-6	G-6		
B-7	C-7	D-7	E-7	F-7	G-7		

0 200 400 Feet

1 Inch = 175 Feet

CITY OF FOUNTAIN VALLEY

STORM DRAIN ATLAS MAP

BUCKNAM | INFRASTRUCTURE GROUP INC.

CREATED: Jan 2016

SHEET NO: 17 of 46

GRID: **D-7**

APPENDIX 5

City of Fountain Valley Master Plan Information

CITY OF FOUNTAIN VALLEY

DRAFT

MASTER PLAN OF DRAINAGE UPDATE

PROJECT NO. DF 3994

DATE: MARCH 2003

PREPARED FOR

CITY OF FOUNTAIN VALLEY
PUBLIC WORKS DEPARTMENT
10200 SLATER AVENUE
FOUNTAIN VALLEY, CA 92708

PREPARED BY

WILLDAN
27042 TOWNE CENTRE DRIVE
FOOTHILL RANCH, CA 92610
(949) 470-8840

CITY OF FOUNTAIN VALLEY
MASTER PLAN OF DRAINAGE
Area Designation: 28.00

offsite drainage to S.d. (28.09) @ Finch Ave

NODE	ELEVATION ft	ACREAGE acres	FLOW LENGTH ft	Q_{10} ft^3/s
28.00	18.4	0.53	300	0.81
28.01	18			
28.01	18	1.88	380	2.84
28.02	17.8			
28.02		2.31		5.79
28.02				
28.02	17.8	0.13	100	5.81
28.03	17.6			
28.03	11.96		14.3	5.81
28.04	11.93			
28.04	11.9		21	5.81
28.05	11.43			
28.05	11.43		21	5.81
28.09	11.35			
28.09				5.81
28.09				
28.06	18	1.28	300	2.94
28.07	17.6			
28.07	11.5		15	2.94
28.08	11.46			
28.08	11.46		110	2.94
28.09	11.35			
28.09		10.4		24.33
28.09				
28.09				28.59
28.09				
28.09	11.35		585	28.59
28.10	10.77			

node 28.09 offsite
$Q_{10} = 5.8 + 2.9$
$= 8.7$ cfs
(6.13 AC)

$Q = 0.9(I - f_m)A$
(Hyd manual)
$8.7 \text{ cfs} = 0.9(I - a_p f_p)6.13$

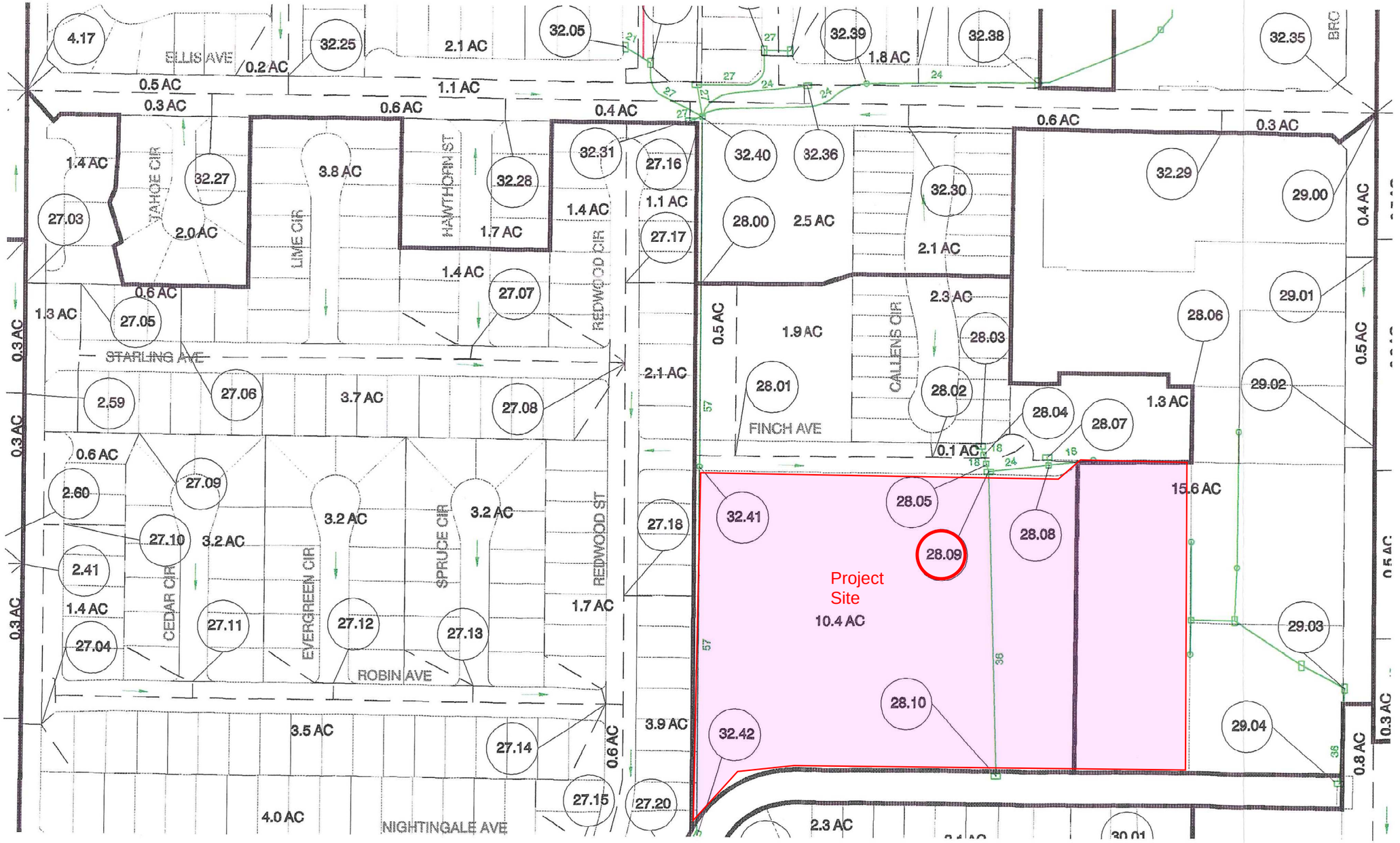
$a_p = 0.50$ (SF/residential)
$f_p = 0.25$ (soil type "C")

$8.7 \text{ cfs} = 0.9(I - (0.5)(0.25)6.13$
$I = 1.7$ in/hr

Using O.C. Hydrology Manual
Fig B-3 $I(t) = at^b$
10-yr → $1.7 = 10.209t^{-0.573}$
chart → $t_c = 28$ → $T_c = 23$ min

Offsite to 28.09 :
$Q_{10} = 8.7$ cfs 6.13 acres
$a_p = 0.50$, $f_p = 0.25$ } $f_m = 0.125$
$I = 1.7$ in/hr
$T_c = 23$ minutes

DETAILED FACILITIES MAPS



LEGEND

	SURFACE FLOW
1.2 AC	ACREAGE
54.23	NODE NUMBER
12	PROPOSED STORM DRAIN (INCHES)
24	REPLACE EXIST STORM DRAIN (INCHES)
24	EXIST STORM DRAIN (INCHES)
BXD	EXIST RCP BOX
D Z B	EXIST CONCRETE CHANNEL (FEET)
	CITY BOUNDARY
	MAJOR DRAINAGE BOUNDARY
	MINOR DRAINAGE BOUNDARY
	REPLACE EXIST STORM DRAIN
	NEW STORM DRAIN
	EXIST. SD

0 50 100 200
SCALE: 1" = 200'

NORTH

KEY MAP

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	32	33	34
35	36	37	38	39	40	41
42	43	44	45	46	47	48
49	50	51	52	53	54	55
56	57	58	59	60	61	
62	63	64	65	66	67	
68	69	70	71	72	73	
74	75	76	77	78	79	
80	81	82	83	84		

WILLDAN
Serving Public Agencies
27042 Towne Centre Drive, Suite 270
Foothill Ranch, California 92610
949/470-8840 fax 949/770-9041

DATE:

SHEET 76 OF 84

3/20/2003 14:26:38 U:\jn12565_FV_MDP_Update\Drawings\Sht-74_79.

APPENDIX 6

Existing Condition Hydrology

 10-yr ~ existing

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************* DESCRIPTION OF STUDY *************************
* Moiola Park Residences                                                *
* Fountain Valley, CA                                                   *
* Existing Condition Hydrology 10-year storm event                      *
 ************************************************************************

  FILE NAME: FV10EX.DAT
  TIME/DATE OF STUDY: 12:03 01/15/2020
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *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     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     18.40  DOWNSTREAM(FEET) =     15.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.041
```

A1

A1

```
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.578
 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.)
 SCHOOL                      C        1.20      0.25      0.600    69   11.04
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      2.62
 TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     15.80  DOWNSTREAM(FEET) =     13.70
 CHANNEL LENGTH THRU SUBAREA(FEET) =   166.00   CHANNEL SLOPE =  0.0127
 CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.470
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 SCHOOL                      C        1.44      0.25      0.600    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.13
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.21
 AVERAGE FLOW DEPTH(FEET) =   0.21   TRAVEL TIME(MIN.) =   0.86
 Tc(MIN.) =   11.90
 SUBAREA AREA(ACRES) =     1.44       SUBAREA RUNOFF(CFS) =    3.01
 EFFECTIVE AREA(ACRES) =      2.64     AREA-AVERAGED Fm(INCH/HR) =   0.15
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.60
 TOTAL AREA(ACRES) =        2.6         PEAK FLOW RATE(CFS) =       5.51

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   3.56
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     496.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   223.00
 ELEVATION DATA: UPSTREAM(FEET) =     18.90  DOWNSTREAM(FEET) =     16.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.198
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.863
 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.)
 SCHOOL                      C        0.93      0.25      0.600    69    9.20
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      2.27
```

A2

Area "A" @ Channel Sta. 50+96

B1

B1

TOTAL AREA(ACRES) = 0.93 PEAK FLOW RATE(CFS) = 2.27

****
FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 12.00 DOWNSTREAM(FEET) = 11.00
FLOW LENGTH(FEET) = 224.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.89
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.27
PIPE TRAVEL TIME(MIN.) = 1.29 Tc(MIN.) = 10.49
LONGEST FLOWPATH FROM NODE 20.00 TO NODE 22.00 = 447.00 FEET.

****
FLOW PROCESS FROM NODE 22.00 TO NODE 22.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

B2

==========
MAINLINE Tc(MIN.) = 10.49
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.655
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
SCHOOL	C	0.57	0.25	0.600	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 0.57 SUBAREA RUNOFF(CFS) = 1.29
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 3.38

****
FLOW PROCESS FROM NODE 22.00 TO NODE 23.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 11.00 DOWNSTREAM(FEET) = 10.50
FLOW LENGTH(FEET) = 108.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.31
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.38
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.91
LONGEST FLOWPATH FROM NODE 20.00 TO NODE 23.00 = 555.00 FEET.

****
FLOW PROCESS FROM NODE 23.00 TO NODE 23.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

B3

==========
MAINLINE Tc(MIN.) = 10.91
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.596

B3

```
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 SCHOOL                      C        0.24      0.25     0.600    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =     0.24      SUBAREA RUNOFF(CFS) =     0.53
 EFFECTIVE AREA(ACRES) =      1.74   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.7       PEAK FLOW RATE(CFS) =       3.83

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    10.50  DOWNSTREAM(FEET) =    10.00
 FLOW LENGTH(FEET) =   122.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.65
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.83
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   11.46
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     677.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

B4

```
============================================================================
 MAINLINE Tc(MIN.) =   11.46
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.523
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 SCHOOL                      C        1.12      0.25     0.600    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =     1.12      SUBAREA RUNOFF(CFS) =     2.39
 EFFECTIVE AREA(ACRES) =      2.86   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        2.9       PEAK FLOW RATE(CFS) =       6.11

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    10.00  DOWNSTREAM(FEET) =     9.40
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.11
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   12.02
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =     842.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     28.09 TO NODE     28.09 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN.) =   23.00   RAINFALL INTENSITY(INCH/HR) =  1.69
 EFFECTIVE AREA(ACRES) =     6.13
 TOTAL AREA(ACRES) =     6.13        PEAK FLOW RATE(CFS) =      8.70
 AREA-AVERAGED Fm(INCH/HR) =   0.12  AREA-AVERAGED Fp(INCH/HR) =   0.25
 AREA-AVERAGED Ap =  0.50
 NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
       CONFLUENCE ANALYSES.

****************************************************************************
 FLOW PROCESS FROM NODE     28.09 TO NODE     28.09 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   145.00
 ELEVATION DATA: UPSTREAM(FEET) =     18.90  DOWNSTREAM(FEET) =     17.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.177
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.300
 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.)
 SCHOOL                     C        0.15      0.25     0.600    69    7.18
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE     20.10 TO NODE     27.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =   17.00  DOWNSTREAM ELEVATION(FEET) =   16.00
 STREET LENGTH(FEET) =   459.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
```

From Fountain Valley M.P.D. (node 28.09)

B5.1

Finch Ave

Finch Ave

```
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.43
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.43
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    0.80
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.20
 STREET FLOW TRAVEL TIME(MIN.) =   9.56   Tc(MIN.) =   16.73
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.032
 SUBAREA AREA(ACRES) =    0.00      SUBAREA RUNOFF(CFS) =    0.00
 EFFECTIVE AREA(ACRES) =      0.15    AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.43
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.43
 FLOW VELOCITY(FEET/SEC.) =  0.80   DEPTH*VELOCITY(FT*FT/SEC.) =   0.20
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =     604.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 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.) =   16.73
 RAINFALL INTENSITY(INCH/HR) =   2.03
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       0.15
 TOTAL STREAM AREA(ACRES) =       0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.43

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   103.00
 ELEVATION DATA: UPSTREAM(FEET) =     18.20  DOWNSTREAM(FEET) =     16.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.677
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.775
 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.)
 SCHOOL                     C        0.51      0.25     0.600    69    5.68
```

B5.2

B5.2


```
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      1.66
 TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.66

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 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.) =    5.68
 RAINFALL INTENSITY(INCH/HR) =   3.77
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       0.51
 TOTAL STREAM AREA(ACRES) =       0.51
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.66

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        0.43   16.73    2.032  0.25( 0.15) 0.60       0.2      20.00
     2        1.66    5.68    3.775  0.25( 0.15) 0.60       0.5      26.00

 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        1.94    5.68    3.775  0.25( 0.15) 0.60       0.6      26.00
     2        1.29   16.73    2.032  0.25( 0.15) 0.60       0.7      20.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       1.94    Tc(MIN.) =     5.68
 EFFECTIVE AREA(ACRES) =       0.56   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        0.7
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =     604.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.09 TO NODE     27.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 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        1.94    5.68    3.775  0.25( 0.15) 0.60       0.6      26.00
     2        1.29   16.73    2.032  0.25( 0.15) 0.60       0.7      20.00
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =     604.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	8.70	23.00	1.693	0.25(0.12)	0.50	6.1	28.09

LONGEST FLOWPATH FROM NODE 28.09 TO NODE 27.00 = 842.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.94	5.68	3.775	0.25(0.13)	0.53	2.1	26.00
2	8.99	16.73	2.032	0.25(0.13)	0.51	5.1	20.00
3	9.76	23.00	1.693	0.25(0.13)	0.51	6.8	28.09

TOTAL AREA(ACRES) = 6.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 9.76 Tc(MIN.) = 23.000
EFFECTIVE AREA(ACRES) = 6.79 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 6.8
LONGEST FLOWPATH FROM NODE 28.09 TO NODE 27.00 = 842.00 FEET.

****
FLOW PROCESS FROM NODE 27.00 TO NODE 25.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 11.35 DOWNSTREAM(FEET) = 9.40
FLOW LENGTH(FEET) = 308.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 10.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.51
GIVEN PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.76
PIPE TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 23.93
LONGEST FLOWPATH FROM NODE 28.09 TO NODE 25.00 = 1150.00 FEET.

****
FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==========

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.94	6.70	3.432	0.25(0.13)	0.53	2.1	26.00
2	8.99	17.69	1.968	0.25(0.13)	0.51	5.1	20.00
3	9.76	23.93	1.655	0.25(0.13)	0.51	6.8	28.09

LONGEST FLOWPATH FROM NODE 28.09 TO NODE 25.00 = 1150.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.11	12.02	2.456	0.25(0.15)	0.60	2.9	20.00

LONGEST FLOWPATH FROM NODE 20.00 TO NODE 25.00 = 842.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.79	6.70	3.432	0.25(0.14)	0.56	3.7	26.00
2	14.04	12.02	2.456	0.25(0.14)	0.56	6.4	20.00

```
     3       13.80   17.69    1.968  0.25( 0.14) 0.54       8.0      20.00
     4       13.74   23.93    1.655  0.25( 0.13) 0.54       9.6      28.09
   TOTAL AREA(ACRES) =         9.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       14.04  Tc(MIN.) =   12.017
  EFFECTIVE AREA(ACRES) =      6.41  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        9.6
  LONGEST FLOWPATH FROM NODE     28.09 TO NODE     25.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     28.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     9.40  DOWNSTREAM(FEET) =     7.56
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.04
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   12.54
  LONGEST FLOWPATH FROM NODE     28.09 TO NODE     28.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 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.) =   12.54
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.41
  TOTAL STREAM AREA(ACRES) =       9.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.04

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     17.10  DOWNSTREAM(FEET) =     15.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.167
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.439
  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.)
  SCHOOL                     C        1.16      0.25     0.600    69   12.17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

B6

B6

```
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      2.39
 TOTAL AREA(ACRES) =      1.16   PEAK FLOW RATE(CFS) =      2.39

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     28.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

B7

```
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     15.50  DOWNSTREAM(FEET) =     13.80
 CHANNEL LENGTH THRU SUBAREA(FEET) =   289.00   CHANNEL SLOPE =  0.0059
 CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.243
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 SCHOOL                     C        2.49      0.25     0.600    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.74
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.52
 AVERAGE FLOW DEPTH(FEET) =   0.28   TRAVEL TIME(MIN.) =   1.91
 Tc(MIN.) =   14.08
 SUBAREA AREA(ACRES) =     2.49       SUBAREA RUNOFF(CFS) =    4.69
 EFFECTIVE AREA(ACRES) =      3.65     AREA-AVERAGED Fm(INCH/HR) =   0.15
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.60
 TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       6.88

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   2.84
 LONGEST FLOWPATH FROM NODE     29.00 TO NODE     28.00 =     619.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 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.) =   14.08
 RAINFALL INTENSITY(INCH/HR) =   2.24
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       3.65
 TOTAL STREAM AREA(ACRES) =       3.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.88

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.79    7.26    3.279  0.25( 0.14) 0.56       3.7      26.00
     1       14.04   12.54    2.397  0.25( 0.14) 0.56       6.4      20.00
     1       13.80   18.22    1.935  0.25( 0.14) 0.54       8.0      20.00
     1       13.74   24.46    1.635  0.25( 0.13) 0.54       9.6      28.09
     2        6.88   14.08    2.243  0.25( 0.15) 0.60       3.7      29.00
```

```
 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       17.09    7.26    3.279  0.25( 0.14) 0.57       5.6      26.00
     2       20.61   12.54    2.397  0.25( 0.14) 0.57       9.7      20.00
     3       20.85   14.08    2.243  0.25( 0.14) 0.57      10.5      29.00
     4       19.67   18.22    1.935  0.25( 0.14) 0.56      11.6      20.00
     5       18.62   24.46    1.635  0.25( 0.14) 0.55      13.3      28.09

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      20.85    Tc(MIN.) =    14.08
 EFFECTIVE AREA(ACRES) =      10.48   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =       13.3
 LONGEST FLOWPATH FROM NODE     28.09 TO NODE     28.00 =    1365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =     17.10  DOWNSTREAM(FEET) =     15.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.167
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.439
 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.)
 SCHOOL                     C        0.93      0.25     0.600    69   12.17
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      1.92
 TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      1.92

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     15.50  DOWNSTREAM(FEET) =     14.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   340.00   CHANNEL SLOPE =  0.0044
 CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.169
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 SCHOOL                     C        1.38      0.25     0.600    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.17
```

Area "B" @ Ch. Sta 55+57
onsite: 7.17 AC
offsite: 6.13 AC

C1

C2

C2

```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.05
 AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   2.76
 Tc(MIN.) =   14.93
 SUBAREA AREA(ACRES) =     1.38       SUBAREA RUNOFF(CFS) =    2.51
 EFFECTIVE AREA(ACRES) =      2.31     AREA-AVERAGED Fm(INCH/HR) =   0.15
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.60
 TOTAL AREA(ACRES) =        2.3         PEAK FLOW RATE(CFS) =       4.20

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   2.23
 LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =     17.00  DOWNSTREAM(FEET) =     15.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.325
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.421
 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.)
 SCHOOL                     C        0.40      0.25     0.600    69   12.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      0.82
 TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      0.82

****************************************************************************
 FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     15.50  DOWNSTREAM(FEET) =     14.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   237.00   CHANNEL SLOPE =  0.0063
 CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.201
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 SCHOOL                     C        0.47      0.25     0.600    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.77
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.23
 Tc(MIN.) =   14.55
 SUBAREA AREA(ACRES) =     0.47       SUBAREA RUNOFF(CFS) =    0.87
 EFFECTIVE AREA(ACRES) =      0.87     AREA-AVERAGED Fm(INCH/HR) =   0.15
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.60
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       1.61
```

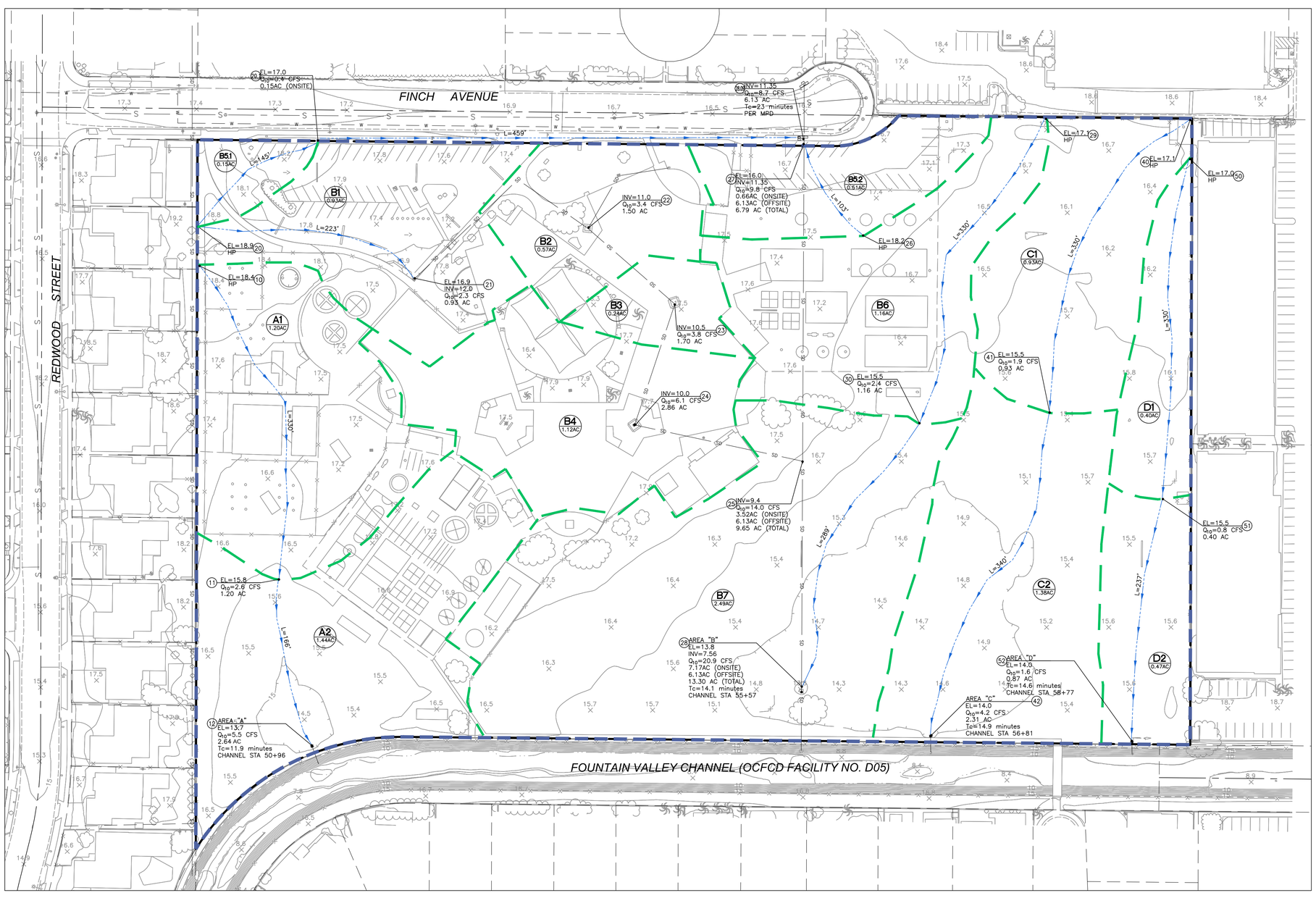
Area "C" @ ch. Sta 56+81

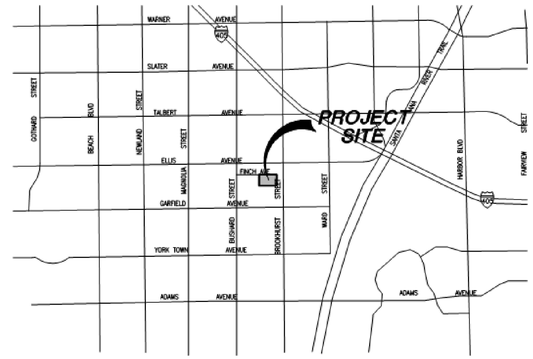
D1

D2

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     567.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.9  TC(MIN.) =     14.55
  EFFECTIVE AREA(ACRES) =       0.87  AREA-AVERAGED Fm(INCH/HR)=  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.600
  PEAK FLOW RATE(CFS)    =       1.61
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Area "D" @ Ch Sta 58+77





VICINITY MAP
N.T.S.

LEGEND

- HYDROLOGIC FLOWPATH/DIRECTION OF FLOW
- MAJOR/PROJECT BOUNDARY
- MINOR/SUB BOUNDARY
- A1 (0.53AC) — DRAINAGE AREA DESIGNATION
- ACRES
- (16) — HYDROLOGIC NODE
- HP — HIGH POINT
- EL — SURFACE ELEVATION
- INV — PIPE INVERT ELEVATION
- Tc — TIME OF CONCENTRATION

SOIL TYPE "C"
SITE: 12.99 ACRES
OFFSITE: 6.13 ACRES
TOTAL TO CHANNEL: 19.12 ACRES

N

50' 0' 25' 50'
SCALE: 1" = 50'

NO.	DATE	REVISION	DESCRIPTION

FUSCOE ENGINEERING
full circle thinking

MOIOLA PARK RESIDENCES
EXISTING HYDROLOGY MAP
Fountain Valley, CA

DATE:	01/2020
SCALE:	AS SHOWN
JOB NO.:	308-084

SHEET 1 OF 1

APPENDIX 7

Proposed Condition Hydrology

10-Year Proposed

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1355

                          Analysis prepared by:

                            fuscoe engineering
                             16795 Von Karman
                                Suite 100
                                Irvine, CA

 ************************** DESCRIPTION OF STUDY **************************
* Moiola Park Residences                                                  *
* Fountain Valley, CA                                                     *
* Proposed Condition Hydrology 10-year storm event                        *
 **************************************************************************

  FILE NAME: FV10PR.DAT
  TIME/DATE OF STUDY: 14:56 01/15/2020
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *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     11.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     19.60  DOWNSTREAM(FEET) =     16.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.880
```

A1

A1

```
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.748
 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.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        C        0.75      0.25     0.500    69    9.88
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      1.77
 TOTAL AREA(ACRES) =      0.75   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =   16.20  DOWNSTREAM ELEVATION(FEET) =   14.69
 STREET LENGTH(FEET) =   303.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 16.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.86
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.72
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
 STREET FLOW TRAVEL TIME(MIN.) =   2.93   Tc(MIN.) =   12.81
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.368
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        C        1.27      0.25     0.500    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    1.27      SUBAREA RUNOFF(CFS) =    2.56
 EFFECTIVE AREA(ACRES) =      2.02    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.08

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.50
 FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     633.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 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.) =   12.81
  RAINFALL INTENSITY(INCH/HR) =   2.37
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       2.02
  TOTAL STREAM AREA(ACRES) =       2.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.08

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     17.50  DOWNSTREAM(FEET) =     16.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.670
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.110
  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                C        0.88      0.25     0.850    69   15.67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.50
  TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     16.50  DOWNSTREAM(FEET) =     16.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0046
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.065
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       C        0.67      0.25     0.500    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.82
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   0.60
  Tc(MIN.) =   16.27
  SUBAREA AREA(ACRES) =     0.67       SUBAREA RUNOFF(CFS) =    1.17
  EFFECTIVE AREA(ACRES) =      1.55     AREA-AVERAGED Fm(INCH/HR) =   0.17
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.70
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       2.64
```

A3 (portion of park)

A4

A4

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 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   1.98
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =     395.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     12.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =   16.20  DOWNSTREAM ELEVATION(FEET) =   14.69
 STREET LENGTH(FEET) =   277.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 16.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.16
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.41
   HALFSTREET FLOOD WIDTH(FEET) =   14.32
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.92
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
 STREET FLOW TRAVEL TIME(MIN.) =   2.41   Tc(MIN.) =   18.67
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.908
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       C        1.90      0.25     0.500    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    3.05
 EFFECTIVE AREA(ACRES) =      3.45    AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =        3.4        PEAK FLOW RATE(CFS) =       5.47

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.96
 FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     12.00 =     672.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 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.) =   18.67
 RAINFALL INTENSITY(INCH/HR) =   1.91
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A5

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 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.59
 EFFECTIVE STREAM AREA(ACRES) =       3.45
 TOTAL STREAM AREA(ACRES) =       3.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.47

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        4.08   12.81    2.368  0.25( 0.12) 0.50       2.0      10.00
     2        5.47   18.67    1.908  0.25( 0.15) 0.59       3.4      13.00

 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        8.81   12.81    2.368  0.25( 0.14) 0.55       4.4      10.00
     2        8.71   18.67    1.908  0.25( 0.14) 0.56       5.5      13.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:                    10-YR Prop.
 PEAK FLOW RATE(CFS) =       8.81    Tc(MIN.) =    12.81
 EFFECTIVE AREA(ACRES) =       4.39   AREA-AVERAGED Fm(INCH/HR) =  0.14   Area "A"
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        5.5                                  @ ch Sta 51+56
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     12.00 =     672.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<          B1
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
 ELEVATION DATA: UPSTREAM(FEET) =     19.60  DOWNSTREAM(FEET) =     17.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.076
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.327
 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.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       C        0.15      0.25     0.500    69    7.08
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<          Finch Ave.
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =   17.00  DOWNSTREAM ELEVATION(FEET) =   16.00
 STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  6.0
```

Finch Ave

```
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.43
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.43
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    0.81
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.21
 STREET FLOW TRAVEL TIME(MIN.) =   8.91   Tc(MIN.) =   15.99
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.086
 SUBAREA AREA(ACRES) =    0.00      SUBAREA RUNOFF(CFS) =    0.00
 EFFECTIVE AREA(ACRES) =      0.15    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.43
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.43
 FLOW VELOCITY(FEET/SEC.) =  0.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.21
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     608.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 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.) =   15.99
 RAINFALL INTENSITY(INCH/HR) =   2.09
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       0.15
 TOTAL STREAM AREA(ACRES) =       0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.43

****************************************************************************
 FLOW PROCESS FROM NODE     21.10 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<   B2
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   251.00
 ELEVATION DATA: UPSTREAM(FEET) =     18.50  DOWNSTREAM(FEET) =     16.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.916
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.914
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
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B2

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	C	0.60	0.25	0.500	69	8.92

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 1.51
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.51

****
FLOW PROCESS FROM NODE 21.00 TO NODE 21.00 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.) = 8.92
RAINFALL INTENSITY(INCH/HR) = 2.91
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.50
EFFECTIVE STREAM AREA(ACRES) = 0.60
TOTAL STREAM AREA(ACRES) = 0.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.51

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	0.43	15.99	2.086	0.25(0.12)	0.50	0.2	10.00
2	1.51	8.92	2.914	0.25(0.12)	0.50	0.6	21.10

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.85	8.92	2.914	0.25(0.12)	0.50	0.7	21.10
2	1.49	15.99	2.086	0.25(0.12)	0.50	0.8	10.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 1.85 Tc(MIN.) = 8.92
EFFECTIVE AREA(ACRES) = 0.68 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 0.8
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 21.00 = 608.00 FEET.

****
FLOW PROCESS FROM NODE 21.00 TO NODE 28.09 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.) = 8.92
RAINFALL INTENSITY(INCH/HR) = 2.91
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25

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 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       0.68
 TOTAL STREAM AREA(ACRES) =       0.75
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.85

****************************************************************************
 FLOW PROCESS FROM NODE     28.09 TO NODE     28.09 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN.) =   23.00   RAINFALL INTENSITY(INCH/HR) =  1.69
 EFFECTIVE AREA(ACRES) =     6.13
 TOTAL AREA(ACRES) =     6.13        PEAK FLOW RATE(CFS) =      8.70
 AREA-AVERAGED Fm(INCH/HR) =   0.12  AREA-AVERAGED Fp(INCH/HR) =   0.25
 AREA-AVERAGED Ap =  0.50
 NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
       CONFLUENCE ANALYSES.

****************************************************************************
 FLOW PROCESS FROM NODE     28.09 TO NODE     21.00 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.) =   23.00
 RAINFALL INTENSITY(INCH/HR) =   1.69
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       6.13
 TOTAL STREAM AREA(ACRES) =       6.13
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.70

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        1.85    8.92    2.914  0.25( 0.12) 0.50       0.7      21.10
     1        1.49   15.99    2.086  0.25( 0.12) 0.50       0.8      10.00
     2        8.70   23.00    1.693  0.25( 0.12) 0.50       6.1      28.09

 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        7.85    8.92    2.914  0.25( 0.12) 0.50       3.1      21.10
     2        9.05   15.99    2.086  0.25( 0.12) 0.50       5.0      10.00
     3        9.89   23.00    1.693  0.25( 0.12) 0.50       6.9      28.09

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.89    Tc(MIN.) =    23.00
 EFFECTIVE AREA(ACRES) =       6.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        6.9
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     608.00 FEET.
```

From Fountain Valley MPD (node 28.09)

```
****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    11.35  DOWNSTREAM(FEET) =    11.00
 FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.89
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   23.05
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     22.00 =     630.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    11.00  DOWNSTREAM(FEET) =     9.40
 FLOW LENGTH(FEET) =   496.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.32
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.89
 PIPE TRAVEL TIME(MIN.) =   1.91    Tc(MIN.) =   24.96
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     23.00 =    1126.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<      B3
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =     19.20  DOWNSTREAM(FEET) =     15.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.768
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
 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.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       C        0.50      0.25     0.500    69    9.77
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      1.19
 TOTAL AREA(ACRES) =      0.50   PEAK FLOW RATE(CFS) =      1.19
```

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**************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  61
--------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
==========================================================================
 UPSTREAM ELEVATION(FEET) =   15.60  DOWNSTREAM ELEVATION(FEET) =   15.10
 STREET LENGTH(FEET) =    82.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 16.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.19
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.22
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.50
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
 STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =   10.68
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.628
 SUBAREA AREA(ACRES) =    0.00      SUBAREA RUNOFF(CFS) =    0.00
 EFFECTIVE AREA(ACRES) =      0.50    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.19
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.22
 FLOW VELOCITY(FEET/SEC.) =  1.50   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
 LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     412.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 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.) =   10.68
 RAINFALL INTENSITY(INCH/HR) =   2.63
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       0.50
 TOTAL STREAM AREA(ACRES) =       0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.19

**************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

B4

B4

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==============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =     19.20  DOWNSTREAM(FEET) =     16.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.064
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.719
 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.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       C        1.41      0.25     0.500    69   10.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      3.29
 TOTAL AREA(ACRES) =      1.41   PEAK FLOW RATE(CFS) =      3.29

******************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     26.00 IS CODE =  61
------------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
```

B5

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==============================================================================
 UPSTREAM ELEVATION(FEET) =   16.10  DOWNSTREAM ELEVATION(FEET) =   15.10
 STREET LENGTH(FEET) =   226.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 16.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.45
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.57
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.53
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
 STREET FLOW TRAVEL TIME(MIN.) =  2.47   Tc(MIN.) =   12.53
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.398
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       C        1.13      0.25     0.500    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.31
 EFFECTIVE AREA(ACRES) =      2.54    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       5.20

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.35
 FLOW VELOCITY(FEET/SEC.) =  1.58   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
```

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 LONGEST FLOWPATH FROM NODE     27.00 TO NODE     26.00 =     556.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 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.) =   12.53
 RAINFALL INTENSITY(INCH/HR) =   2.40
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       2.54
 TOTAL STREAM AREA(ACRES) =       2.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.20

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        1.19   10.68    2.628  0.25( 0.12) 0.50       0.5      24.00
     2        5.20   12.53    2.398  0.25( 0.12) 0.50       2.5      27.00

 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        6.06   10.68    2.628  0.25( 0.12) 0.50       2.7      24.00
     2        6.27   12.53    2.398  0.25( 0.12) 0.50       3.0      27.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.27    Tc(MIN.) =    12.53
 EFFECTIVE AREA(ACRES) =       3.04   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        3.0
 LONGEST FLOWPATH FROM NODE     27.00 TO NODE     26.00 =     556.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     29.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<                              B6
============================================================================
 UPSTREAM ELEVATION(FEET) =   15.10  DOWNSTREAM ELEVATION(FEET) =   14.90
 STREET LENGTH(FEET) =    45.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 16.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.53
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   16.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    1.84
    SPLIT DEPTH(FEET) =    0.33   SPLIT FLOOD WIDTH(FEET) =   10.03
    SPLIT FLOW(CFS) =    1.59   SPLIT VELOCITY(FEET/SEC.) =    1.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   0.41   Tc(MIN.) =   12.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.354
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       C        0.25      0.25     0.500    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      3.29    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =       6.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.00
  FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.82
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     29.00 =     601.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    10.00  DOWNSTREAM(FEET) =     9.40
  FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.93
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.60
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     23.00 =     617.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 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.) =   12.97
  RAINFALL INTENSITY(INCH/HR) =   2.35
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.29
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 TOTAL STREAM AREA(ACRES) =       3.29
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.60

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =     17.10  DOWNSTREAM(FEET) =     15.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.488
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.520
 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.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        C        0.62      0.25     0.500    69   11.49
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      1.34
 TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.34

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =   15.50  DOWNSTREAM ELEVATION(FEET) =   14.90
 STREET LENGTH(FEET) =    87.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 16.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.99
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =   10.11
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.74
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
 STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =   12.32
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.421
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        C        0.63      0.25     0.500    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
```

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 SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.30
 EFFECTIVE AREA(ACRES) =      1.25    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       2.58

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.23
 FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.66
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     417.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    10.00  DOWNSTREAM(FEET) =     9.40
 FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.73
 ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.58
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.35
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     23.00 =     433.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 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.) =   12.35
 RAINFALL INTENSITY(INCH/HR) =   2.42
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.25
 TOTAL STREAM AREA(ACRES) =       1.25
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.58

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.42   11.12    2.568  0.25( 0.12) 0.50       2.9      24.00
     1        6.60   12.97    2.351  0.25( 0.12) 0.50       3.3      27.00
     2        2.58   12.35    2.418  0.25( 0.12) 0.50       1.2      30.00

 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        8.90   11.12    2.568  0.25( 0.12) 0.50       4.0      24.00
     2        9.12   12.35    2.418  0.25( 0.12) 0.50       4.4      30.00
     3        9.11   12.97    2.351  0.25( 0.12) 0.50       4.5      27.00
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.12    Tc(MIN.) =    12.35
 EFFECTIVE AREA(ACRES) =       4.42   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        4.5
 LONGEST FLOWPATH FROM NODE     27.00 TO NODE     23.00 =     617.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 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        8.90   11.12    2.568  0.25( 0.12) 0.50       4.0      24.00
     2        9.12   12.35    2.418  0.25( 0.12) 0.50       4.4      30.00
     3        9.11   12.97    2.351  0.25( 0.12) 0.50       4.5      27.00
 LONGEST FLOWPATH FROM NODE     27.00 TO NODE     23.00 =     617.00 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        7.85   11.02    2.581  0.25( 0.12) 0.50       3.1      21.10
     2        9.05   17.98    1.950  0.25( 0.12) 0.50       5.0      10.00
     3        9.89   24.96    1.616  0.25( 0.12) 0.50       6.9      28.09
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     23.00 =    1126.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       16.71   11.02    2.581  0.25( 0.12) 0.50       7.1      21.10
     2       16.76   11.12    2.568  0.25( 0.12) 0.50       7.1      24.00
     3       17.20   12.35    2.418  0.25( 0.12) 0.50       7.9      30.00
     4       17.29   12.97    2.351  0.25( 0.12) 0.50       8.1      27.00
     5       16.52   17.98    1.950  0.25( 0.12) 0.50       9.6      10.00
     6       15.99   24.96    1.616  0.25( 0.12) 0.50      11.4      28.09
   TOTAL AREA(ACRES) =        11.4

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       17.29  Tc(MIN.) =   12.967
 EFFECTIVE AREA(ACRES) =       8.15  AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       11.4
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     23.00 =    1126.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     9.40  DOWNSTREAM(FEET) =     8.60
 FLOW LENGTH(FEET) =   267.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.83
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.29
```

```
 PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   13.89
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     33.00 =    1393.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =     18.70  DOWNSTREAM(FEET) =     14.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.663
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.783
 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.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       C        1.43      0.25     0.500    69    9.66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      3.42
 TOTAL AREA(ACRES) =      1.43   PEAK FLOW RATE(CFS) =      3.42

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =   14.90  DOWNSTREAM ELEVATION(FEET) =   14.40
 STREET LENGTH(FEET) =   159.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 16.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   15.36
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.52
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
 STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =   11.40
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.531
 SUBAREA LOSS RATE DATA(AMC  II):
```

B9

B10

B10

FV10PR

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	C	0.32	0.25	0.500	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.32 SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 1.75 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 1.8 PEAK FLOW RATE(CFS) = 3.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.44
FLOW VELOCITY(FEET/SEC.) = 1.51 DEPTH*VELOCITY(FT*FT/SEC.) = 0.66
LONGEST FLOWPATH FROM NODE 34.00 TO NODE 36.00 = 489.00 FEET.

****
FLOW PROCESS FROM NODE 36.00 TO NODE 36.00 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.) = 11.40
RAINFALL INTENSITY(INCH/HR) = 2.53
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.50
EFFECTIVE STREAM AREA(ACRES) = 1.75
TOTAL STREAM AREA(ACRES) = 1.75
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.79

****
FLOW PROCESS FROM NODE 37.00 TO NODE 36.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
B11
==
INITIAL SUBAREA FLOW-LENGTH(FEET) = 258.00
ELEVATION DATA: UPSTREAM(FEET) = 17.80 DOWNSTREAM(FEET) = 14.40

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.524
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.990
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	C	0.48	0.25	0.500	69	8.52

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 1.24
TOTAL AREA(ACRES) = 0.48 PEAK FLOW RATE(CFS) = 1.24

****
FLOW PROCESS FROM NODE 36.00 TO NODE 36.00 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.) =    8.52
 RAINFALL INTENSITY(INCH/HR) =   2.99
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       0.48
 TOTAL STREAM AREA(ACRES) =       0.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.24

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.79   11.40    2.531  0.25( 0.12) 0.50       1.8      34.00
     2        1.24    8.52    2.990  0.25( 0.12) 0.50       0.5      37.00

 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        4.61    8.52    2.990  0.25( 0.12) 0.50       1.8      37.00
     2        4.83   11.40    2.531  0.25( 0.12) 0.50       2.2      34.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.83    Tc(MIN.) =    11.40
 EFFECTIVE AREA(ACRES) =       2.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        2.2
 LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     489.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     9.00  DOWNSTREAM(FEET) =     8.60
 FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.70
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.83
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   11.44
 LONGEST FLOWPATH FROM NODE     34.00 TO NODE     37.00 =     505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 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        4.61    8.56    2.983  0.25( 0.12) 0.50       1.8      37.00
```

```
    2        4.83   11.44    2.527  0.25( 0.12) 0.50       2.2       34.00
 LONGEST FLOWPATH FROM NODE     34.00 TO NODE     33.00 =     505.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       16.71   11.95    2.465  0.25( 0.12) 0.50       7.1       21.10
     2       16.76   12.04    2.453  0.25( 0.12) 0.50       7.1       24.00
     3       17.20   13.28    2.320  0.25( 0.12) 0.50       7.9       30.00
     4       17.29   13.89    2.261  0.25( 0.12) 0.50       8.1       27.00
     5       16.52   18.91    1.894  0.25( 0.12) 0.50       9.6       10.00
     6       15.99   25.92    1.581  0.25( 0.12) 0.50      11.4       28.09
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     33.00 =    1393.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.24    8.56    2.983  0.25( 0.12) 0.50       6.8       37.00
     2       21.26   11.44    2.527  0.25( 0.12) 0.50       9.0       34.00
     3       21.42   11.95    2.465  0.25( 0.12) 0.50       9.3       21.10
     4       21.44   12.04    2.453  0.25( 0.12) 0.50       9.4       24.00
     5       21.62   13.28    2.320  0.25( 0.12) 0.50      10.1       30.00
     6       21.59   13.89    2.261  0.25( 0.12) 0.50      10.4       27.00
     7       20.08   18.91    1.894  0.25( 0.12) 0.50      11.8       10.00
     8       18.92   25.92    1.581  0.25( 0.12) 0.50      13.6       28.09
   TOTAL AREA(ACRES) =        13.6

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       21.62  Tc(MIN.) =   13.276
 EFFECTIVE AREA(ACRES) =     10.08  AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       13.6
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     33.00 =    1393.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     8.60  DOWNSTREAM(FEET) =     8.50
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      21.62
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   13.42
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     38.00 =    1433.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       13.6  TC(MIN.) =     13.42
 EFFECTIVE AREA(ACRES) =     10.08  AREA-AVERAGED Fm(INCH/HR)=  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.500
 PEAK FLOW RATE(CFS)   =      21.62

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.24    8.71    2.954  0.25( 0.12) 0.50       6.8       37.00
```

(Proposed 10-year)

Channel Area "B" @ Sta 58+16

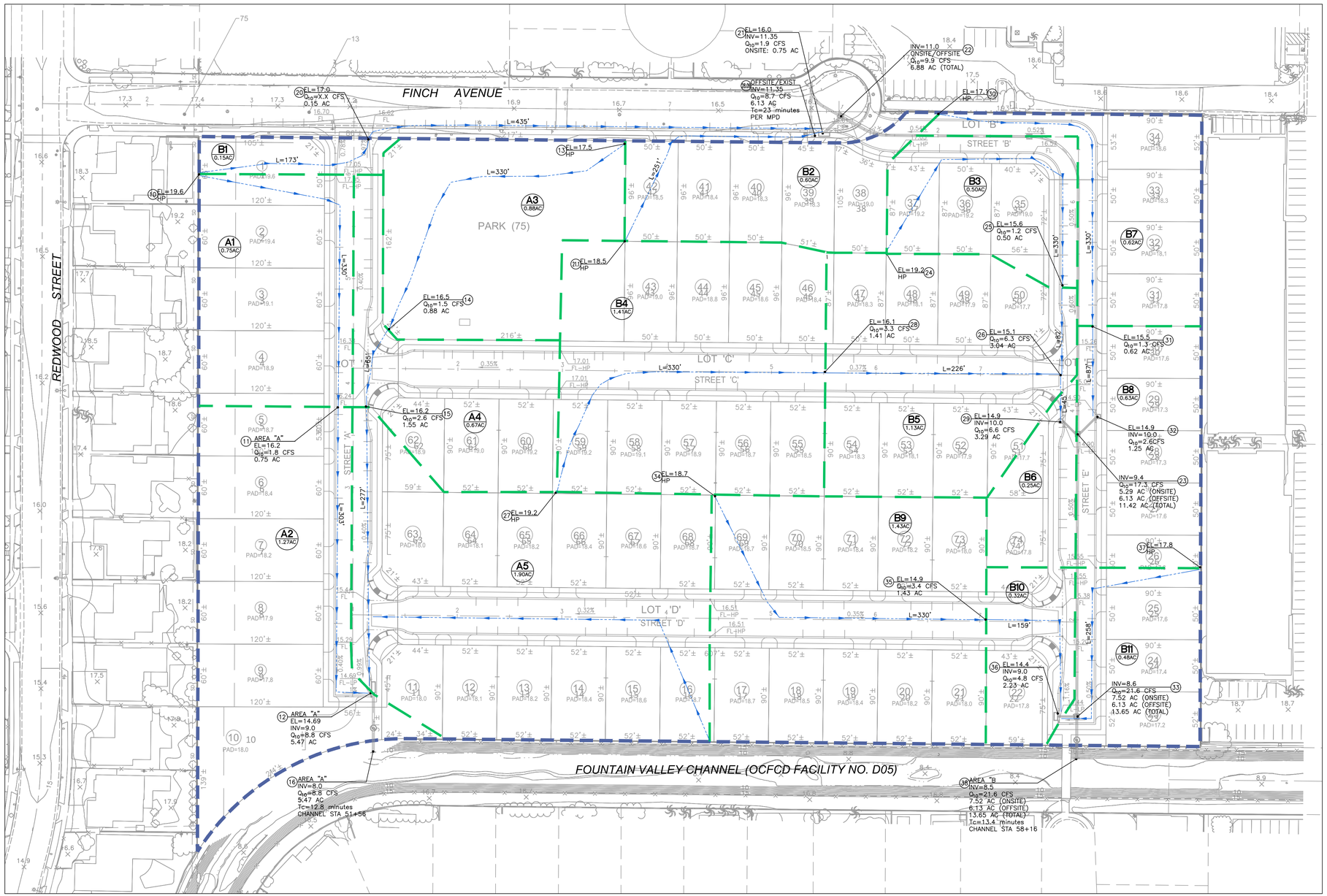
onsite: 7.52 AC

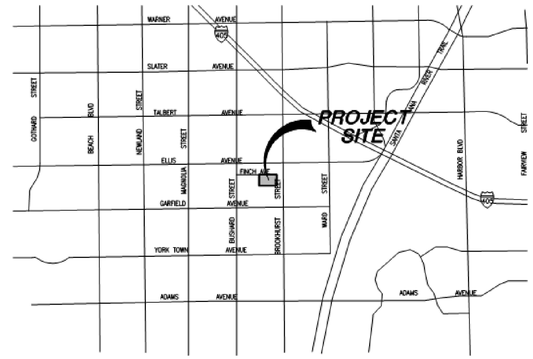
offsite: 6.13 AC

$T_c = 13.4$ min.

				FV10PR		
2	21.26	11.58	2.509	0.25(0.12) 0.50	9.0	34.00
3	21.42	12.09	2.448	0.25(0.12) 0.50	9.3	21.10
4	21.44	12.18	2.437	0.25(0.12) 0.50	9.4	24.00
5	21.62	13.42	2.306	0.25(0.12) 0.50	10.1	30.00
6	21.59	14.03	2.248	0.25(0.12) 0.50	10.4	27.00
7	20.08	19.05	1.886	0.25(0.12) 0.50	11.8	10.00
8	18.92	26.07	1.576	0.25(0.12) 0.50	13.6	28.09

END OF RATIONAL METHOD ANALYSIS





VICINITY MAP
N.T.S.

LEGEND

- HYDROLOGIC FLOWPATH/DIRECTION OF FLOW
- MAJOR/PROJECT BOUNDARY
- MINOR/SUB BOUNDARY
- A1 0.53AC — DRAINAGE AREA DESIGNATION
- ACRES
- 16 — HYDROLOGIC NODE
- HP — HIGH POINT
- EL — SURFACE ELEVATION
- INV — PIPE INVERT ELEVATION
- Tc — TIME OF CONCENTRATION

SOIL TYPE "C"
SITE: 12.99 ACRES
OFFSITE: 6.13 ACRES
TOTAL TO CHANNEL: 19.12 ACRES

N

50' 0' 25' 50'
SCALE: 1" = 50'

NO.	DATE	REVISION	DESCRIPTION

FUSCOE ENGINEERING
full circle thinking

MOIOLA PARK RESIDENCES
PROPOSED HYDROLOGY MAP
Fountain Valley, CA

DATE:	01/2020
SCALE:	AS SHOWN
JOB NO.:	308-084
SHEET 1 OF 1	

APPENDIX 8

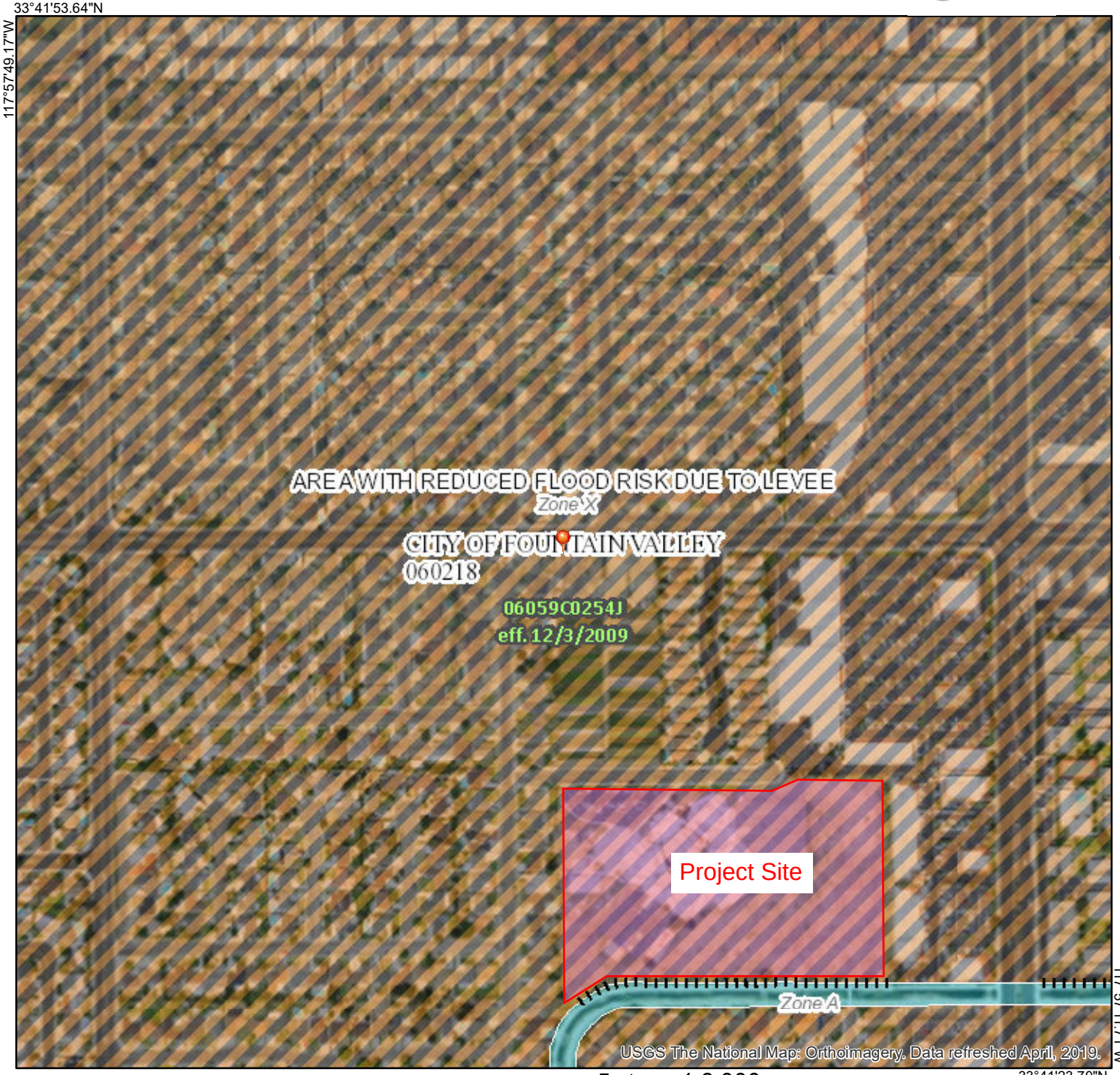
FEMA Map

National Flood Hazard Layer FIRMette

FEMA

33°41'53.64"N

117°57'49.17"W



33°41'23.70"N

117°57'11.71"W

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/10/2020 at 4:27:55 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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