

**HYDROLOGY ANALYSIS
FOR
SAN CLEMENTE
SENIOR HOUSING AND HEALTH CENTER**

**City of San Clemente
County of Orange**

PREPARED FOR:

SADDLEBACK MEMORIAL MEDICAL CENTER

24451 HEALTH CENTER DRIVE

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PREPARED BY:

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AUGUST 31, 2022

W.O. #4479-1X

HYDROLOGY ANALYSIS
FOR
SAN CLEMENTE
SENIOR HOUSING AND HEALTH CENTER

City of San Clemente
County of Orange



PREPARED UNDER THE SUPERVISION OF:

Tu Trinh

Tu Trinh, R.C.E. 71555

08/31/2022

Date

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SECTION 1

PROJECT LOCATION

The project site is San Clemente Senior Housing and Health Center (SCSH&HC) located in City of San Clemente (City), County of Orange, and bounded on the north by Camino De Los Mares, on the west by the existing Ocean View Plaza, on the south by the San Diego Freeway, and on the east by the existing San Clemente Villas (see Vicinity Map for more details).

STUDY PURPOSE

The purpose of this hydrology study is to accompany the submittal of a Vesting Tentative Parcel Map No. 2022-116 and to determine the flow rates produced from the existing and proposed site.

METHODOLOGY

The methodology used to determine the peak discharges for SCSH&HC is based upon the criteria set forth in the *Orange County Flood Control District Hydrology Manual* dated 1986 as incorporated in the Advanced Engineering Software (AES) “RATSC” Program. The hydrologic soil types were determined from the Hydrologic Classification of Soils map contained in the *Orange County Hydrology Manual*.

DISCUSSION

Existing Condition

The project site is the existing abandoned Medical Office buildings with parking lots located at 654 Camino De Los Mares.

West Drainage Area

The 2-, 10- and 100-year storm runoff produced from sub-areas A1 and A2 are 2.6cfs, 4.8cfs, and 7.5cfs, respectively, at node 3. Flow is picked up at the existing catch basin and discharged into the existing 12” storm drain line as shown on the reference storm drain improvement plan for Ocean View Plaza, sheet 2 of 2, dated 12/30/88.

Southeast Drainage Area

The 2-, 10- and 100-year storm runoff produced from sub-areas A3 and A4 are 4.2cfs, 7.7cfs, and 11.8cfs, respectively, at node 13. Flows are picked up at two existing catch basins and discharged into the existing 24" RCP.

Northeast Drainage Area

The 2-, 10- and 100-year storm runoff produced from sub-areas A5 and A6 are 2.9cfs, 5.3cfs, and 8.2cfs, respectively, at node 23. Flows are picked up at several existing catch basins (shown on topo) and discharged into the existing 18" RCP.

Flows produced from sub-areas A3 to A6 will eventually confluence and be discharged into the existing 30" CMP as shown on the reference precise grading plan for Assisted Living Center, sheet 3 of 7, dated 7/19/00.

Proposed Condition

The existing site is converted to two residential buildings, one medical office building, and parking lots. Drainage patterns will be the same as in the existing condition.

West Drainage Area

The 2-, 10- and 100-year storm runoff produced from sub-areas A1 and A2 are 2.6cfs, 4.7cfs, and 7.1cfs, respectively, at node 3. Flow is picked up at the existing catch basin and discharged into the existing 12" storm drain line as shown on the reference storm drain improvement plan for Ocean View Plaza, sheet 2 of 2, dated 12/30/88.

Southeast Drainage Area

The 2-, 10- and 100-year storm runoff produced from sub-areas A3, A4 and A5 are 4.8cfs, 8.6cfs, and 13.2cfs, respectively, at node 15. Flows are picked up at two proposed catch basins and discharged into the existing 24" RCP.

Northeast Drainage Area

The 2-, 10- and 100-year storm runoff produced from sub-areas A6 and A7 are 2.9cfs, 5.2cfs, and 8.0cfs, respectively, at node 25. Flows are picked up at two proposed catch basins and discharged into the existing 18" RCP.

Flows produced from sub-areas A3 to A7 will eventually confluence and be discharged into the existing 30" CMP as shown on the reference precise grading plan for Assisted Living Center, sheet 3 of 7, dated 7/19/00.

First flush and dry weather flows produced from the project site will be treated with water quality structures and discussed in a separate Water Quality Report.

Hydro-modification issue due to the new development will be addressed with three proposed underground vaults, calculated and presented in a separate Hydro-modification Report.

A summary table is provided in this section. With three proposed detention vaults discussed in the Hydro-modification Report and shown on the proposed hydrology map, there won't be any increase in flow rates produced from the development compared to the existing condition.

8/31/2022

SAN CLEMENTE SENIOR HOUSING AND HEALTH CENTER

WEST

EXISTING				PROPOSED				DELTA Q			DELTA Q		
AREA	Q2	Q10	Q100	AREA	Q2	Q10	Q100	Q2	Q10	Q100	Q2	Q10	Q100
(ac)	(cfs)	(cfs)	(cfs)	(ac)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1.51	2.60	4.80	7.50	1.66	2.60	4.70	7.10	0.00	-0.10	-0.40	*	*	-0.75

WITH A DETENTION VAULT
(SEE NOTES BELOW)

NORTH-EAST

EXISTING				PROPOSED				DELTA Q		
AREA	Q2	Q10	Q100	AREA	Q2	Q10	Q100	Q2	Q10	Q100
(ac)	(cfs)	(cfs)	(cfs)	(ac)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1.90	2.90	5.30	8.20	1.76	2.90	5.20	8.00	0.00	-0.10	-0.20

SOUTH-EAST

EXISTING				PROPOSED				DELTA Q			DELTA Q		
AREA	Q2	Q10	Q100	AREA	Q2	Q10	Q100	Q2	Q10	Q100	Q2	Q10	Q100
(ac)	(cfs)	(cfs)	(cfs)	(ac)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
2.35	4.20	7.70	11.80	2.68	4.80	8.60	13.20	0.60	0.90	1.40	**	**	-3.56

WITHOUT DETENTION VAULTS

WITH 2 DETENTION VAULTS
(SEE NOTES BELOW)

NOTES:

1/. Q's SHOWN IN THESE TABLES WERE OBTAINED FROM RATIONAL METHOD CALCULATIONS INCLUDED IN THIS HYDROLOGY REPORT

2/. FROM HYDRO-MODIFICATION TECHNICAL MEMORANDUM BY REC CONSUTANTS DATED SEPTEMBER 2022

WEST

MAXIMUM Q OUTLET FROM THE PROPOSED VAULT (WEST) IS 6.75cfs _ (6.75cfs - 7.50cfs = -0.75cfs)

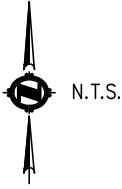
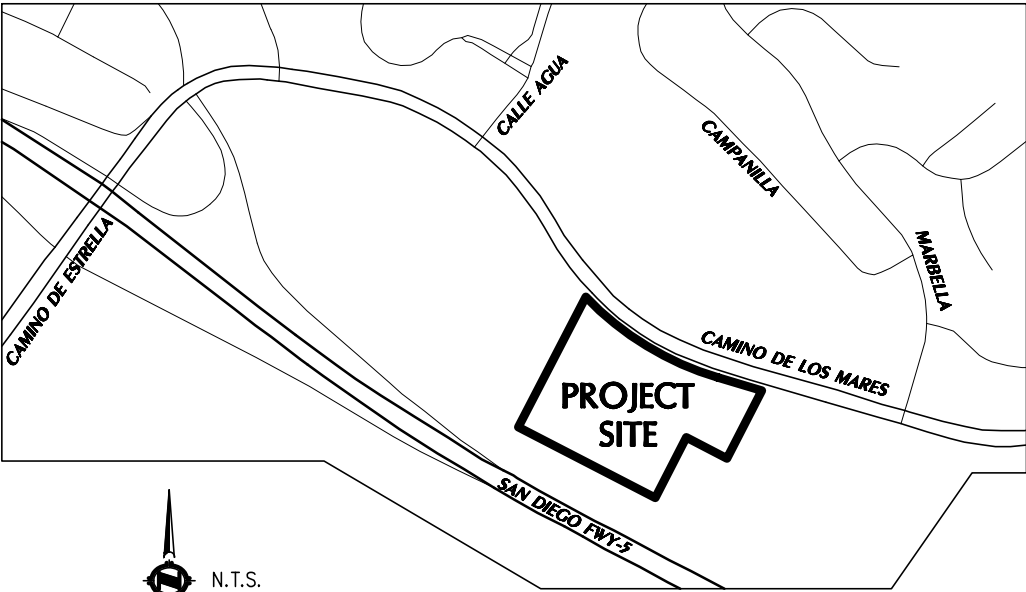
* DRAINAGE IS LESS OR EQUAL TO EXISTING CONDITION REFER TO Q2 TO Q10 COMPARISON TABLE - POC 1

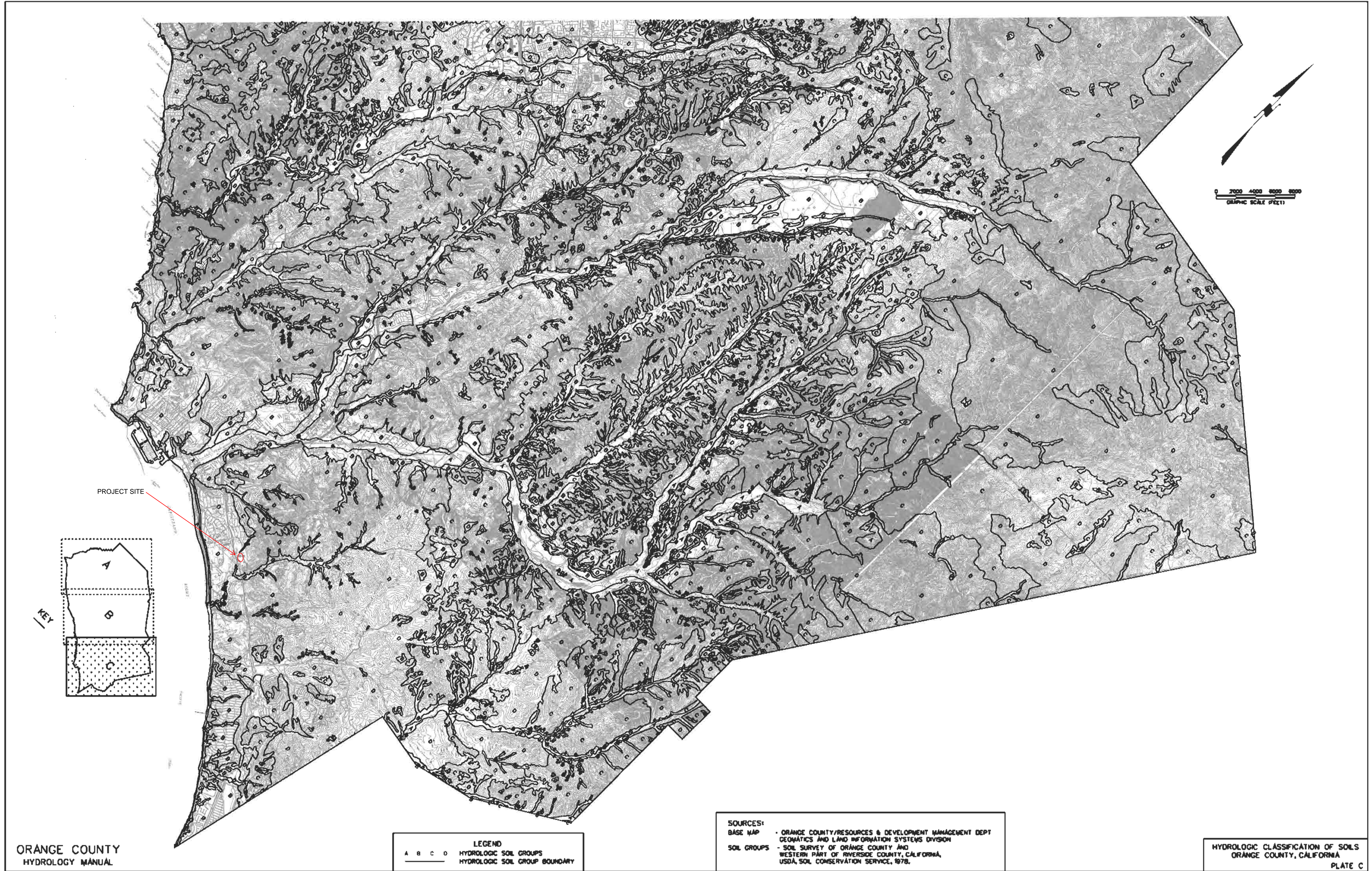
SOUTH-EAST

MAXIMUM Q OUTLET FROM THE PROPOSED VAULTS (SOUTHEAST) IS 8.24cfs _ (8.24cfs - 11.80cfs = -3.56cfs)

** DRAINAGE IS LESS OR EQUAL TO EXISTING CONDITION REFER TO Q2 TO Q10 COMPARISON TABLE - POC 2

VICINITY MAP





ORANGE COUNTY
HYDROLOGY MANUAL

LEGEND
A B C D HYDROLOGIC SOIL GROUPS
— HYDROLOGIC SOIL GROUP BOUNDARY

SOURCES:
BASE MAP - ORANGE COUNTY/RESOURCES & DEVELOPMENT MANAGEMENT DEPT
GEOMATICS AND LAND INFORMATION SYSTEMS DIVISION
SOIL GROUPS - SOIL SURVEY OF ORANGE COUNTY AND
WESTERN PART OF RIVERSIDE COUNTY, CALIFORNIA,
USDA, SOIL CONSERVATION SERVICE, 1978.

HYDROLOGIC CLASSIFICATION OF SOILS
ORANGE COUNTY, CALIFORNIA
PLATE C

SECTION 2

HYDROLOGY CALCULATIONS

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 1239

Analysis prepared by:

HUNSAKER & ASSOCIATES
Irvine, Inc
Planning * Engineering * Surveying
Three Hughes * Irvine, California 92618 * (949)583-1010

***** DESCRIPTION OF STUDY *****
* W.O. #4479-1, SAN CLEMENTE SENIOR HOUSING *
* 2-YR STUDY *
* EXISTING CONDITION *

FILE NAME: SCSH-E.DAT
TIME/DATE OF STUDY: 20:10 03/16/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312	0.167	0.0150

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

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 196.00
ELEVATION DATA: UPSTREAM (FEET) = 232.00 DOWNSTREAM (FEET) = 224.50

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

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	D	0.62	0.20	0.100	57	5.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 1.25
TOTAL AREA (ACRES) = 0.62 PEAK FLOW RATE (CFS) = 1.25

FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	224.50	DOWNSTREAM(FEET) =	223.00		
CHANNEL LENGTH THRU SUBAREA(FEET) =	230.00	CHANNEL SLOPE =	0.0065		
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	5.000		
MANNING'S FACTOR =	0.015	MAXIMUM DEPTH(FEET) =	1.00		
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.956				
SUBAREA LOSS RATE DATA(AMC I):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	D	0.89	0.20	0.100	57

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.64
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 1.45
 T_c (MIN.) = 6.45
SUBAREA AREA(ACRES) = 0.89 SUBAREA RUNOFF(CFS) = 1.55
EFFECTIVE AREA(ACRES) = 1.51 AREA-AVERAGED F_m (INCH/HR) = 0.02
AREA-AVERAGED F_p (INCH/HR) = 0.20 AREA-AVERAGED A_p = 0.10
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 2.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 2.84
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 426.00 FEET.

FLOW PROCESS FROM NODE 11.00 TO NODE 12.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) =	280.00		
ELEVATION DATA: UPSTREAM(FEET) =	223.50	DOWNSTREAM(FEET) =	211.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$						
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.392						
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.168						
SUBAREA T_c AND LOSS RATE DATA(AMC I):						
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS	T_c
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN	(MIN.)
COMMERCIAL	D	0.84	0.20	0.100	57	5.39

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
SUBAREA RUNOFF(CFS) = 1.62
TOTAL AREA(ACRES) = 0.84 PEAK FLOW RATE(CFS) = 1.62

FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	211.00	DOWNSTREAM(FEET) =	209.00
FLOW LENGTH(FEET) =	190.00	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000			
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.9 INCHES			
PIPE-FLOW VELOCITY(FEET/SEC.) =	4.22		
ESTIMATED PIPE DIAMETER(INCH) =	18.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	1.62		
PIPE TRAVEL TIME(MIN.) =	0.75	T_c (MIN.) =	6.14
LONGEST FLOWPATH FROM NODE	11.00	TO NODE	13.00 = 470.00 FEET.

FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 81

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

=====

MAINLINE T_c (MIN.) =	6.14
-------------------------	------

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 2.011
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL D 1.51 0.20 0.100 57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 1.51 SUBAREA RUNOFF (CFS) = 2.71
 EFFECTIVE AREA (ACRES) = 2.35 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 2.3 PEAK FLOW RATE (CFS) = 4.21

 FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 270.00
 ELEVATION DATA: UPSTREAM (FEET) = 230.00 DOWNSTREAM (FEET) = 224.50

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.218
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.998
 SUBAREA Tc AND LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL D 0.50 0.20 0.100 57 6.22
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 0.89
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 0.89

 FLOW PROCESS FROM NODE 22.00 TO NODE 23.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM (FEET) = 224.50 DOWNSTREAM (FEET) = 219.10
 CHANNEL LENGTH THRU SUBAREA (FEET) = 400.00 CHANNEL SLOPE = 0.0135
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 1.00
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.708
 SUBAREA LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL D 1.40 0.20 0.100 57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.96
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.42
 AVERAGE FLOW DEPTH (FEET) = 0.34 TRAVEL TIME (MIN.) = 1.95
 Tc (MIN.) = 8.17
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF (CFS) = 2.13
 EFFECTIVE AREA (ACRES) = 1.90 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 1.9 PEAK FLOW RATE (CFS) = 2.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.39 FLOW VELOCITY (FEET/SEC.) = 3.87
 LONGEST FLOWPATH FROM NODE 21.00 TO NODE 23.00 = 670.00 FEET.
 =====

END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) = 1.9 TC (MIN.) = 8.17
 EFFECTIVE AREA (ACRES) = 1.90 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.100
 PEAK FLOW RATE (CFS) = 2.89
 =====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 23.0 Release Date: 07/01/2016 License ID 1239

Analysis prepared by:

HUNSAKER & ASSOCIATES
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Planning * Engineering * Surveying
Three Hughes * Irvine, California 92618 * (949)583-1010

***** DESCRIPTION OF STUDY *****
* W.O. #4479-1, SAN CLEMENTE SENIOR HOUSING *
* 10-YR STUDY *
* EXISTING CONDITION *

FILE NAME: SCSH-E.DAT
TIME/DATE OF STUDY: 20:11 03/16/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
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

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

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

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 196.00
ELEVATION DATA: UPSTREAM (FEET) = 232.00 DOWNSTREAM (FEET) = 224.50

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.000
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 4.060
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.)
COMMERCIAL	D	0.62	0.20	0.100	75	5.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 2.25
TOTAL AREA (ACRES) = 0.62 PEAK FLOW RATE (CFS) = 2.25

FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51


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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 224.50 DOWNSTREAM(FEET) = 223.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 230.00 CHANNEL SLOPE = 0.0065
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 5.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 1.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.570
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL D 0.89 0.20 0.100 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.05
AVERAGE FLOW DEPTH (FEET) = 0.49 TRAVEL TIME (MIN.) = 1.26
Tc (MIN.) = 6.26
SUBAREA AREA (ACRES) = 0.89 SUBAREA RUNOFF (CFS) = 2.84
EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.02
AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 4.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.54 FLOW VELOCITY (FEET/SEC.) = 3.32
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 426.00 FEET.

*****
FLOW PROCESS FROM NODE 11.00 TO NODE 12.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 280.00
ELEVATION DATA: UPSTREAM (FEET) = 223.50 DOWNSTREAM (FEET) = 211.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.392
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.887
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL D 0.84 0.20 0.100 75 5.39
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 2.92
TOTAL AREA (ACRES) = 0.84 PEAK FLOW RATE (CFS) = 2.92

*****
FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 211.00 DOWNSTREAM (FEET) = 209.00
FLOW LENGTH (FEET) = 190.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.99
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 2.92
PIPE TRAVEL TIME (MIN.) = 0.63 Tc (MIN.) = 6.03
LONGEST FLOWPATH FROM NODE 11.00 TO NODE 13.00 = 470.00 FEET.

*****
FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 6.03

```

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.648
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL D 1.51 0.20 0.100 75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 1.51 SUBAREA RUNOFF (CFS) = 4.93
 EFFECTIVE AREA (ACRES) = 2.35 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 2.3 PEAK FLOW RATE (CFS) = 7.67

 FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 270.00
 ELEVATION DATA: UPSTREAM (FEET) = 230.00 DOWNSTREAM (FEET) = 224.50

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.218
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.583
 SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL D 0.50 0.20 0.100 75 6.22
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 1.60
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.60

 FLOW PROCESS FROM NODE 22.00 TO NODE 23.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM (FEET) = 224.50 DOWNSTREAM (FEET) = 219.10
 CHANNEL LENGTH THRU SUBAREA (FEET) = 400.00 CHANNEL SLOPE = 0.0135
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 1.00
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.127
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL D 1.40 0.20 0.100 75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.57
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.00
 AVERAGE FLOW DEPTH (FEET) = 0.42 TRAVEL TIME (MIN.) = 1.67
 Tc (MIN.) = 7.89
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF (CFS) = 3.91
 EFFECTIVE AREA (ACRES) = 1.90 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 1.9 PEAK FLOW RATE (CFS) = 5.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 4.40
 LONGEST FLOWPATH FROM NODE 21.00 TO NODE 23.00 = 670.00 FEET.
 =====

END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) = 1.9 TC (MIN.) = 7.89
 EFFECTIVE AREA (ACRES) = 1.90 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.100
 PEAK FLOW RATE (CFS) = 5.31
 =====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****
* W.O. #4479-1, SAN CLEMENTE SENIOR HOUSING *
* 100-YR STUDY *
* EXISTING CONDITION *

FILE NAME: SCSH-E.DAT
TIME/DATE OF STUDY: 20:13 03/16/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET- / SIDE / SIDE / WAY	CROSSFALL IN- / OUT- / PARK- (FT)	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES LIP (FT)	MANNING HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150	

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

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 196.00
ELEVATION DATA: UPSTREAM(FEET) = 232.00 DOWNSTREAM(FEET) = 224.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.187
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	D	0.62	0.20	0.100	91	5.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 3.44
TOTAL AREA(ACRES) = 0.62 PEAK FLOW RATE(CFS) = 3.44

FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	224.50	DOWNSTREAM(FEET) =	223.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	230.00	CHANNEL SLOPE =	0.0065
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	5.000
MANNING'S FACTOR =	0.015	MAXIMUM DEPTH(FEET) =	1.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	5.509		

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.89	0.20	0.100	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.41
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 1.12
Tc(MIN.) = 6.12
SUBAREA AREA(ACRES) = 0.89 SUBAREA RUNOFF(CFS) = 4.40
EFFECTIVE AREA(ACRES) = 1.51 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 7.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.64 FLOW VELOCITY(FEET/SEC.) = 3.69
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 426.00 FEET.

FLOW PROCESS FROM NODE 11.00 TO NODE 12.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 280.00
ELEVATION DATA: UPSTREAM(FEET) = 223.50 DOWNSTREAM(FEET) = 211.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.392
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.925
SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	D	0.84	0.20	0.100	91	5.39

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 4.46
TOTAL AREA(ACRES) = 0.84 PEAK FLOW RATE(CFS) = 4.46

FLOW PROCESS FROM NODE 12.00 TO NODE 13.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 211.00 DOWNSTREAM(FEET) = 209.00
FLOW LENGTH(FEET) = 190.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.59
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.46
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 5.96
LONGEST FLOWPATH FROM NODE 11.00 TO NODE 13.00 = 470.00 FEET.

FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 5.96

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.596
 SUBAREA LOSS RATE DATA (AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL D 1.51 0.20 0.100 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA (ACRES) = 1.51 SUBAREA RUNOFF (CFS) = 7.58
 EFFECTIVE AREA (ACRES) = 2.35 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 2.3 PEAK FLOW RATE (CFS) = 11.79

 FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 270.00
 ELEVATION DATA: UPSTREAM (FEET) = 230.00 DOWNSTREAM (FEET) = 224.50

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.218
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.461
 SUBAREA Tc AND LOSS RATE DATA (AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL D 0.50 0.20 0.100 91 6.22
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 2.45
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.45

 FLOW PROCESS FROM NODE 22.00 TO NODE 23.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM (FEET) = 224.50 DOWNSTREAM (FEET) = 219.10
 CHANNEL LENGTH THRU SUBAREA (FEET) = 400.00 CHANNEL SLOPE = 0.0135
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 1.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.833
 SUBAREA LOSS RATE DATA (AMC III):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL D 1.40 0.20 0.100 91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.48
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.51
 AVERAGE FLOW DEPTH (FEET) = 0.49 TRAVEL TIME (MIN.) = 1.48
 Tc (MIN.) = 7.70
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF (CFS) = 6.06
 EFFECTIVE AREA (ACRES) = 1.90 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA (ACRES) = 1.9 PEAK FLOW RATE (CFS) = 8.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.58 FLOW VELOCITY (FEET/SEC.) = 4.94
 LONGEST FLOWPATH FROM NODE 21.00 TO NODE 23.00 = 670.00 FEET.
 =====

END OF STUDY SUMMARY:
 TOTAL AREA (ACRES) = 1.9 TC (MIN.) = 7.70
 EFFECTIVE AREA (ACRES) = 1.90 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.100
 PEAK FLOW RATE (CFS) = 8.23
 =====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****
* W.O. #4479-1, SAN CLEMENTE SENIOR HOUSING *
* 2-YR STUDY *
* PROPOSED CONDITION *

FILE NAME: SCSH-P.DAT
TIME/DATE OF STUDY: 10:05 08/16/2022

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
Table with 9 columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY, PARK- HEIGHT (FT), GUTTER-GEOMETRIES: WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n). Row 1: 1, 30.0, 20.0, 0.018/0.018/0.020, 0.67, 2.00, 0.0312, 0.167, 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 300.00
ELEVATION DATA: UPSTREAM (FEET) = 229.00 DOWNSTREAM (FEET) = 225.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.250
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.829
SUBAREA Tc AND LOSS RATE DATA (AMC I):

Table with 7 columns: DEVELOPMENT TYPE / LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.)

COMMERCIAL D 0.98 0.20 0.100 57 7.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 1.60
 TOTAL AREA(ACRES) = 0.98 PEAK FLOW RATE(CFS) = 1.60

 FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 225.50 DOWNSTREAM(FEET) = 223.30
 CHANNEL LENGTH THRU SUBAREA(FEET) = 150.00 CHANNEL SLOPE = 0.0147
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 1.00
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.737
 SUBAREA LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL D 0.68 0.20 0.100 57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.66
 AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.68
 Tc(MIN.) = 7.93
 SUBAREA AREA(ACRES) = 0.68 SUBAREA RUNOFF(CFS) = 1.05
 EFFECTIVE AREA(ACRES) = 1.66 AREA-AVERAGED Fm(INCH/HR) = 0.02
 AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 2.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 3.77
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 450.00 FEET.

 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) = 300.00
 ELEVATION DATA: UPSTREAM(FEET) = 227.00 DOWNSTREAM(FEET) = 216.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.820
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.075
 SUBAREA Tc AND LOSS RATE DATA(AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL D 0.48 0.20 0.100 57 5.82
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 0.89
 TOTAL AREA(ACRES) = 0.48 PEAK FLOW RATE(CFS) = 0.89

 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) = 216.50 DOWNSTREAM(FEET) = 214.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 75.00 CHANNEL SLOPE = 0.0307
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 1.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.033

SUBAREA LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL D 1.75 0.20 0.100 57
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.47
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.98
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.21
Tc(MIN.) = 6.03
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 3.17
EFFECTIVE AREA(ACRES) = 2.23 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 4.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 6.77
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 12.00 = 375.00 FEET.

FLOW PROCESS FROM NODE 12.00 TO NODE 15.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 214.20 DOWNSTREAM(FEET) = 213.10
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.66
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.04
PIPE TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 7.39
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 15.00 = 675.00 FEET.

FLOW PROCESS FROM NODE 15.00 TO NODE 15.00 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.) = 7.39
RAINFALL INTENSITY(INCH/HR) = 1.81
AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 2.23
TOTAL STREAM AREA(ACRES) = 2.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.04

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) = 290.00
ELEVATION DATA: UPSTREAM(FEET) = 224.00 DOWNSTREAM(FEET) = 215.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.949
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 2.049
 SUBAREA T_c AND LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) F_p (INCH/HR) A_p (DECIMAL) SCS CN T_c (MIN.)
 COMMERCIAL D 0.45 0.20 0.100 57 5.95
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA RUNOFF (CFS) = 0.82
 TOTAL AREA (ACRES) = 0.45 PEAK FLOW RATE (CFS) = 0.82

 FLOW PROCESS FROM NODE 14.00 TO NODE 15.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====
 ELEVATION DATA: UPSTREAM (FEET) = 215.50 DOWNSTREAM (FEET) = 213.10
 FLOW LENGTH (FEET) = 12.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 1.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.77
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 0.82
 PIPE TRAVEL TIME (MIN.) = 0.02 T_c (MIN.) = 5.97
 LONGEST FLOWPATH FROM NODE 13.00 TO NODE 15.00 = 302.00 FEET.

 FLOW PROCESS FROM NODE 15.00 TO NODE 15.00 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.) = 5.97
 RAINFALL INTENSITY (INCH/HR) = 2.04
 AREA-AVERAGED F_m (INCH/HR) = 0.02
 AREA-AVERAGED F_p (INCH/HR) = 0.20
 AREA-AVERAGED A_p = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 0.45
 TOTAL STREAM AREA (ACRES) = 0.45
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 0.82

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	4.04	7.39	1.808	0.20 (0.02)	0.10	2.2	10.00
2	0.82	5.97	2.045	0.20 (0.02)	0.10	0.4	13.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	4.51	5.97	2.045	0.20 (0.02)	0.10	2.3	13.00
2	4.77	7.39	1.808	0.20 (0.02)	0.10	2.7	10.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 4.77 T_c (MIN.) = 7.39

EFFECTIVE AREA(ACRES) = 2.68 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.7
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 15.00 = 675.00 FEET.

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.00
ELEVATION DATA: UPSTREAM(FEET) = 227.00 DOWNSTREAM(FEET) = 224.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 7.477
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.797
SUBAREA T_c AND LOSS RATE DATA(AMC I):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL D 0.87 0.20 0.100 57 7.48
SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
SUBAREA RUNOFF(CFS) = 1.39
TOTAL AREA(ACRES) = 0.87 PEAK FLOW RATE(CFS) = 1.39

FLOW PROCESS FROM NODE 22.00 TO NODE 25.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 224.00 DOWNSTREAM(FEET) = 218.80
FLOW LENGTH(FEET) = 170.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.91
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.39
PIPE TRAVEL TIME(MIN.) = 0.48 T_c (MIN.) = 7.96
LONGEST FLOWPATH FROM NODE 21.00 TO NODE 25.00 = 470.00 FEET.

FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 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.) = 7.96
RAINFALL INTENSITY(INCH/HR) = 1.73
AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 0.87
TOTAL STREAM AREA(ACRES) = 0.87
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.39

FLOW PROCESS FROM NODE 23.00 TO NODE 24.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 205.00
 ELEVATION DATA: UPSTREAM (FEET) = 222.30 DOWNSTREAM (FEET) = 219.30

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.950
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 2.049
 SUBAREA Tc AND LOSS RATE DATA (AMC I):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL D 0.89 0.20 0.100 57 5.95
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF (CFS) = 1.62
 TOTAL AREA (ACRES) = 0.89 PEAK FLOW RATE (CFS) = 1.62

 FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 31

 >>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 219.30 DOWNSTREAM (FEET) = 218.80
 FLOW LENGTH (FEET) = 90.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.36
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1.62
 PIPE TRAVEL TIME (MIN.) = 0.45 Tc (MIN.) = 6.40
 LONGEST FLOWPATH FROM NODE 23.00 TO NODE 25.00 = 295.00 FEET.

 FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 IS CODE = 1

 >>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<
 >>>> AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES <<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 6.40
 RAINFALL INTENSITY (INCH/HR) = 1.97
 AREA-AVERAGED Fm (INCH/HR) = 0.02
 AREA-AVERAGED Fp (INCH/HR) = 0.20
 AREA-AVERAGED Ap = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 0.89
 TOTAL STREAM AREA (ACRES) = 0.89
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.62

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.39	7.96	1.734	0.20 (0.02)	0.10	0.9	21.00
2	1.62	6.40	1.965	0.20 (0.02)	0.10	0.9	23.00

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	2.89	6.40	1.965	0.20 (0.02)	0.10	1.6	23.00
2	2.82	7.96	1.734	0.20 (0.02)	0.10	1.8	21.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 2.89 Tc(MIN.) = 6.40
EFFECTIVE AREA(ACRES) = 1.59 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.8
LONGEST FLOWPATH FROM NODE 21.00 TO NODE 25.00 = 470.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.8 TC(MIN.) = 6.40
EFFECTIVE AREA(ACRES) = 1.59 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.100
PEAK FLOW RATE(CFS) = 2.89

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.89	6.40	1.965	0.20(0.02)	0.10	1.6	23.00
2	2.82	7.96	1.734	0.20(0.02)	0.10	1.8	21.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

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***** DESCRIPTION OF STUDY *****
* W.O. #4479-1, SAN CLEMENTE SENIOR HOUSING *
* 10-YR STUDY *
* PROPOSED CONDITION *

FILE NAME: SCSH-P.DAT
TIME/DATE OF STUDY: 10:07 08/16/2022

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT (YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE (INCH) = 18.00
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

Table with 9 columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY, PARK- HEIGHT (FT), GUTTER-GEOMETRIES: WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n). Row 1: 1, 30.0, 20.0, 0.018/0.018/0.020, 0.67, 2.00, 0.0312, 0.167, 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 300.00
ELEVATION DATA: UPSTREAM (FEET) = 229.00 DOWNSTREAM (FEET) = 225.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.250
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.281

SUBAREA Tc AND LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE / LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.)

COMMERCIAL D 0.98 0.20 0.100 75 7.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 2.88
 TOTAL AREA(ACRES) = 0.98 PEAK FLOW RATE(CFS) = 2.88

 FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 225.50 DOWNSTREAM(FEET) = 223.30
 CHANNEL LENGTH THRU SUBAREA(FEET) = 150.00 CHANNEL SLOPE = 0.0147
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 1.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.138
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.68	0.20	0.100	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.83
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.25
 AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.59
 Tc(MIN.) = 7.84
 SUBAREA AREA(ACRES) = 0.68 SUBAREA RUNOFF(CFS) = 1.91
 EFFECTIVE AREA(ACRES) = 1.66 AREA-AVERAGED Fm(INCH/HR) = 0.02
 AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 4.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 4.39
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 450.00 FEET.

 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) = 300.00
 ELEVATION DATA: UPSTREAM(FEET) = 227.00 DOWNSTREAM(FEET) = 216.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.820
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.721
 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.)
COMMERCIAL	D	0.48	0.20	0.100	75	5.82

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 1.60
 TOTAL AREA(ACRES) = 0.48 PEAK FLOW RATE(CFS) = 1.60

 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) = 216.50 DOWNSTREAM(FEET) = 214.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 75.00 CHANNEL SLOPE = 0.0307
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 1.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.657

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	1.75	0.20	0.100	75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.46

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.93

AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.18

Tc(MIN.) = 6.00

SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 5.73

EFFECTIVE AREA(ACRES) = 2.23 AREA-AVERAGED Fm(INCH/HR) = 0.02

AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 7.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 7.85

LONGEST FLOWPATH FROM NODE 10.00 TO NODE 12.00 = 375.00 FEET.

FLOW PROCESS FROM NODE 12.00 TO NODE 15.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 214.20 DOWNSTREAM(FEET) = 213.10
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.20
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.30
PIPE TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 7.19
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 15.00 = 675.00 FEET.

FLOW PROCESS FROM NODE 15.00 TO NODE 15.00 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.) = 7.19
RAINFALL INTENSITY(INCH/HR) = 3.30
AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 2.23
TOTAL STREAM AREA(ACRES) = 2.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.30

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) = 290.00
ELEVATION DATA: UPSTREAM(FEET) = 224.00 DOWNSTREAM(FEET) = 215.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.949
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.675
 SUBAREA T_c AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS T_c
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL D 0.45 0.20 0.100 75 5.95
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA RUNOFF (CFS) = 1.48
 TOTAL AREA (ACRES) = 0.45 PEAK FLOW RATE (CFS) = 1.48

 FLOW PROCESS FROM NODE 14.00 TO NODE 15.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====
 ELEVATION DATA: UPSTREAM (FEET) = 215.50 DOWNSTREAM (FEET) = 213.10
 FLOW LENGTH (FEET) = 12.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.64
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1.48
 PIPE TRAVEL TIME (MIN.) = 0.02 T_c (MIN.) = 5.97
 LONGEST FLOWPATH FROM NODE 13.00 TO NODE 15.00 = 302.00 FEET.

 FLOW PROCESS FROM NODE 15.00 TO NODE 15.00 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.) = 5.97
 RAINFALL INTENSITY (INCH/HR) = 3.67
 AREA-AVERAGED F_m (INCH/HR) = 0.02
 AREA-AVERAGED F_p (INCH/HR) = 0.20
 AREA-AVERAGED A_p = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 0.45
 TOTAL STREAM AREA (ACRES) = 0.45
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.48

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	7.30	7.19	3.297	0.20 (0.02)	0.10	2.2	10.00
2	1.48	5.97	3.669	0.20 (0.02)	0.10	0.4	13.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	8.22	5.97	3.669	0.20 (0.02)	0.10	2.3	13.00
2	8.63	7.19	3.297	0.20 (0.02)	0.10	2.7	10.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 8.63 T_c (MIN.) = 7.19

EFFECTIVE AREA(ACRES) = 2.68 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.7
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 15.00 = 675.00 FEET.

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.00
ELEVATION DATA: UPSTREAM(FEET) = 227.00 DOWNSTREAM(FEET) = 224.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 7.477
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.224
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL D 0.87 0.20 0.100 75 7.48
SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
SUBAREA RUNOFF(CFS) = 2.51
TOTAL AREA(ACRES) = 0.87 PEAK FLOW RATE(CFS) = 2.51

FLOW PROCESS FROM NODE 22.00 TO NODE 25.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 224.00 DOWNSTREAM(FEET) = 218.80
FLOW LENGTH(FEET) = 170.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.01
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.51
PIPE TRAVEL TIME(MIN.) = 0.40 T_c (MIN.) = 7.88
LONGEST FLOWPATH FROM NODE 21.00 TO NODE 25.00 = 470.00 FEET.

FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 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.) = 7.88
RAINFALL INTENSITY(INCH/HR) = 3.13
AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 0.87
TOTAL STREAM AREA(ACRES) = 0.87
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.51

FLOW PROCESS FROM NODE 23.00 TO NODE 24.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 205.00
ELEVATION DATA: UPSTREAM (FEET) = 222.30 DOWNSTREAM (FEET) = 219.30

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.950
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.674
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL D 0.89 0.20 0.100 75 5.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 2.93
TOTAL AREA (ACRES) = 0.89 PEAK FLOW RATE (CFS) = 2.93

FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 219.30 DOWNSTREAM (FEET) = 218.80
FLOW LENGTH (FEET) = 90.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 3.95
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 2.93
PIPE TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 6.33
LONGEST FLOWPATH FROM NODE 23.00 TO NODE 25.00 = 295.00 FEET.

FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<
>>>> AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES <<<<<

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 6.33
RAINFALL INTENSITY (INCH/HR) = 3.55
AREA-AVERAGED Fm (INCH/HR) = 0.02
AREA-AVERAGED Fp (INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA (ACRES) = 0.89
TOTAL STREAM AREA (ACRES) = 0.89
PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.93

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 5.21 Tc(MIN.) = 6.33
EFFECTIVE AREA(ACRES) = 1.59 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.8
LONGEST FLOWPATH FROM NODE 21.00 TO NODE 25.00 = 470.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.8 TC(MIN.) = 6.33
EFFECTIVE AREA(ACRES) = 1.59 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
PEAK FLOW RATE(CFS) = 5.21

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	5.21	6.33	3.547	0.20(0.02)	0.10	1.6	23.00
2	5.09	7.88	3.128	0.20(0.02)	0.10	1.8	21.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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***** DESCRIPTION OF STUDY *****
* W.O. #4479-1, SAN CLEMENTE SENIOR HOUSING *
* 100-YR STUDY *
* PROPOSED CONDITION *

FILE NAME: SCSH-P.DAT
TIME/DATE OF STUDY: 10:10 08/16/2022

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY, PARK- HEIGHT (FT), CURB GUTTER-GEOMETRIES: WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n)

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.00
ELEVATION DATA: UPSTREAM(FEET) = 229.00 DOWNSTREAM(FEET) = 225.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.250
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.001
SUBAREA Tc AND LOSS RATE DATA(AMC III):

Table with columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.)

COMMERCIAL D 0.98 0.20 0.100 91 7.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 4.39
 TOTAL AREA(ACRES) = 0.98 PEAK FLOW RATE(CFS) = 4.39

 FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 225.50 DOWNSTREAM(FEET) = 223.30
 CHANNEL LENGTH THRU SUBAREA(FEET) = 150.00 CHANNEL SLOPE = 0.0147
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.802
 SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	0.68	0.20	0.100	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.86
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.71
 AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 0.53
 Tc(MIN.) = 7.78
 SUBAREA AREA(ACRES) = 0.68 SUBAREA RUNOFF(CFS) = 2.93
 EFFECTIVE AREA(ACRES) = 1.66 AREA-AVERAGED Fm(INCH/HR) = 0.02
 AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
 TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 7.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 4.92
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 450.00 FEET.

 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) = 300.00
 ELEVATION DATA: UPSTREAM(FEET) = 227.00 DOWNSTREAM(FEET) = 216.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.820
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.672
 SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	D	0.48	0.20	0.100	91	5.82

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA RUNOFF(CFS) = 2.44
 TOTAL AREA(ACRES) = 0.48 PEAK FLOW RATE(CFS) = 2.44

 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) = 216.50 DOWNSTREAM(FEET) = 214.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 75.00 CHANNEL SLOPE = 0.0307
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 1.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.583

SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	D	1.75	0.20	0.100	91

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.82
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.68
AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.16
Tc(MIN.) = 5.98
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 8.76
EFFECTIVE AREA(ACRES) = 2.23 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 11.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.80 FLOW VELOCITY(FEET/SEC.) = 8.76
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 12.00 = 375.00 FEET.

FLOW PROCESS FROM NODE 12.00 TO NODE 15.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 214.20 DOWNSTREAM(FEET) = 213.10
FLOW LENGTH(FEET) = 300.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.65
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 11.16
PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 7.06
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 15.00 = 675.00 FEET.

FLOW PROCESS FROM NODE 15.00 TO NODE 15.00 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.) = 7.06
RAINFALL INTENSITY(INCH/HR) = 5.08
AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 2.23
TOTAL STREAM AREA(ACRES) = 2.23
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.16

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) = 290.00
ELEVATION DATA: UPSTREAM(FEET) = 224.00 DOWNSTREAM(FEET) = 215.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.949
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.601
 SUBAREA T_c AND LOSS RATE DATA (AMC III):
 DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) F_p (INCH/HR) A_p (DECIMAL) SCS CN T_c (MIN.)
 COMMERCIAL D 0.45 0.20 0.100 91 5.95
 SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
 SUBAREA RUNOFF (CFS) = 2.26
 TOTAL AREA (ACRES) = 0.45 PEAK FLOW RATE (CFS) = 2.26

 FLOW PROCESS FROM NODE 14.00 TO NODE 15.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====
 ELEVATION DATA: UPSTREAM (FEET) = 215.50 DOWNSTREAM (FEET) = 213.10
 FLOW LENGTH (FEET) = 12.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.21
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 2.26
 PIPE TRAVEL TIME (MIN.) = 0.02 T_c (MIN.) = 5.96
 LONGEST FLOWPATH FROM NODE 13.00 TO NODE 15.00 = 302.00 FEET.

 FLOW PROCESS FROM NODE 15.00 TO NODE 15.00 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.) = 5.96
 RAINFALL INTENSITY (INCH/HR) = 5.59
 AREA-AVERAGED F_m (INCH/HR) = 0.02
 AREA-AVERAGED F_p (INCH/HR) = 0.20
 AREA-AVERAGED A_p = 0.10
 EFFECTIVE STREAM AREA (ACRES) = 0.45
 TOTAL STREAM AREA (ACRES) = 0.45
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.26

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	11.16	7.06	5.078	0.20 (0.02)	0.10	2.2	10.00
2	2.26	5.96	5.593	0.20 (0.02)	0.10	0.4	13.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	T_c (MIN.)	Intensity (INCH/HR)	F_p (F_m) (INCH/HR)	A_p	A_e (ACRES)	HEADWATER NODE
1	12.65	5.96	5.593	0.20 (0.02)	0.10	2.3	13.00
2	13.22	7.06	5.078	0.20 (0.02)	0.10	2.7	10.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 13.22 T_c (MIN.) = 7.06

EFFECTIVE AREA(ACRES) = 2.68 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.7
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 15.00 = 675.00 FEET.

FLOW PROCESS FROM NODE 21.00 TO NODE 22.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.00
ELEVATION DATA: UPSTREAM(FEET) = 227.00 DOWNSTREAM(FEET) = 224.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.477

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.913

SUBAREA Tc AND LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	D	0.87	0.20	0.100	91	7.48

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 3.83

TOTAL AREA(ACRES) = 0.87 PEAK FLOW RATE(CFS) = 3.83

FLOW PROCESS FROM NODE 22.00 TO NODE 25.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 224.00 DOWNSTREAM(FEET) = 218.80

FLOW LENGTH(FEET) = 170.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.91

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 3.83

PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 7.84

LONGEST FLOWPATH FROM NODE 21.00 TO NODE 25.00 = 470.00 FEET.

FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 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.) = 7.84

RAINFALL INTENSITY(INCH/HR) = 4.78

AREA-AVERAGED Fm(INCH/HR) = 0.02

AREA-AVERAGED Fp(INCH/HR) = 0.20

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 0.87

TOTAL STREAM AREA(ACRES) = 0.87

PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.83

FLOW PROCESS FROM NODE 23.00 TO NODE 24.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 205.00
ELEVATION DATA: UPSTREAM (FEET) = 222.30 DOWNSTREAM (FEET) = 219.30

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.950
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.600
SUBAREA Tc AND LOSS RATE DATA (AMC III):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL D 0.89 0.20 0.100 91 5.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 4.47
TOTAL AREA (ACRES) = 0.89 PEAK FLOW RATE (CFS) = 4.47

FLOW PROCESS FROM NODE 24.00 TO NODE 25.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 219.30 DOWNSTREAM (FEET) = 218.80
FLOW LENGTH (FEET) = 90.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.40
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 4.47
PIPE TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) = 6.29
LONGEST FLOWPATH FROM NODE 23.00 TO NODE 25.00 = 295.00 FEET.

FLOW PROCESS FROM NODE 25.00 TO NODE 25.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<
>>>> AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES <<<<<

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 6.29
RAINFALL INTENSITY (INCH/HR) = 5.42
AREA-AVERAGED Fm (INCH/HR) = 0.02
AREA-AVERAGED Fp (INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA (ACRES) = 0.89
TOTAL STREAM AREA (ACRES) = 0.89
PEAK FLOW RATE (CFS) AT CONFLUENCE = 4.47

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 7.96 Tc(MIN.) = 6.29
EFFECTIVE AREA(ACRES) = 1.59 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.8
LONGEST FLOWPATH FROM NODE 21.00 TO NODE 25.00 = 470.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1.8 TC(MIN.) = 6.29
EFFECTIVE AREA(ACRES) = 1.59 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.10
PEAK FLOW RATE(CFS) = 7.96

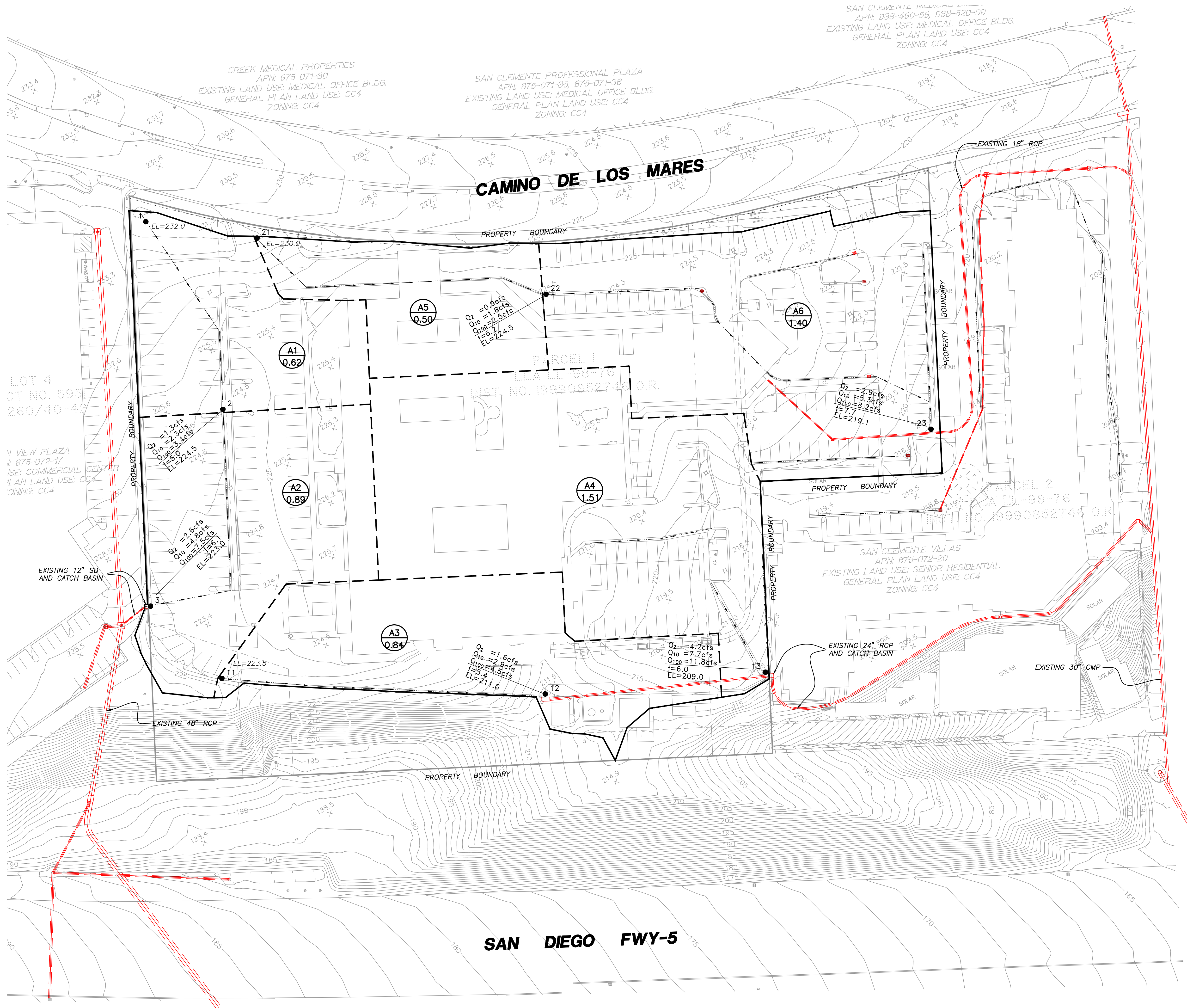
** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.96	6.29	5.424	0.20(0.02)	0.10	1.6	23.00
2	7.77	7.84	4.783	0.20(0.02)	0.10	1.8	21.00

=====
END OF RATIONAL METHOD ANALYSIS

SECTION 3

HYDROLOGY MAP



SAN CLEMENTE MEDICAL CENTER
 APN: 038-480-58, 038-520-09
 EXISTING LAND USE: MEDICAL OFFICE BLDG.
 GENERAL PLAN LAND USE: CC4
 ZONING: CC4

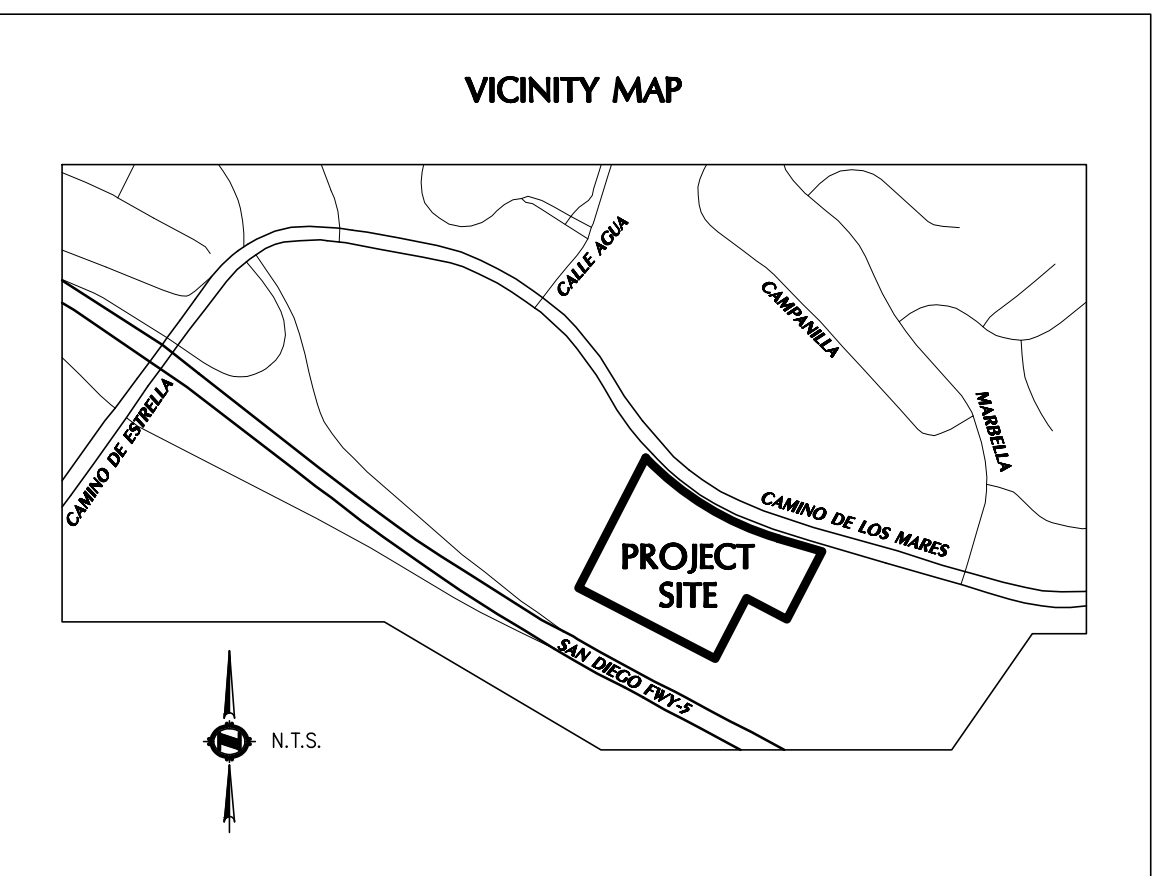
CREEK MEDICAL PROPERTIES
 APN: 876-071-30
 EXISTING LAND USE: MEDICAL OFFICE BLDG.
 GENERAL PLAN LAND USE: CC4
 ZONING: CC4

SAN CLEMENTE PROFESSIONAL PLAZA
 APN: 876-071-35, 876-071-38
 EXISTING LAND USE: MEDICAL OFFICE BLDG.
 GENERAL PLAN LAND USE: CC4
 ZONING: CC4

LOT 4
 CT NO. 595
 260/40-47

VIEW PLAZA
 # 876-072-17
 USE: COMMERCIAL CENTER
 PLAN LAND USE: CC4
 ZONING: CC4

SAN CLEMENTE VILLAS
 APN: 876-072-20
 EXISTING LAND USE: SENIOR RESIDENTIAL
 GENERAL PLAN LAND USE: CC4
 ZONING: CC4



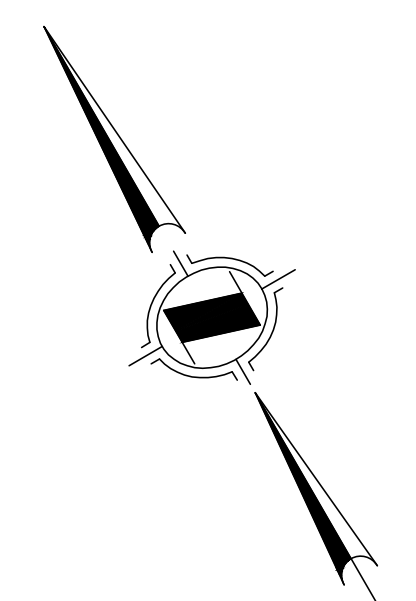
LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION
- AREA ACREAGE (IN ACRES)
- PEAK FLOW RATE
TIME OF CONCENTRATION
- PEAK CONFLUENCE FLOW RATE
TIME OF CONCENTRATION
- EXISTING STORM DRAIN
- SOIL GROUP
- FLOW DIRECTION

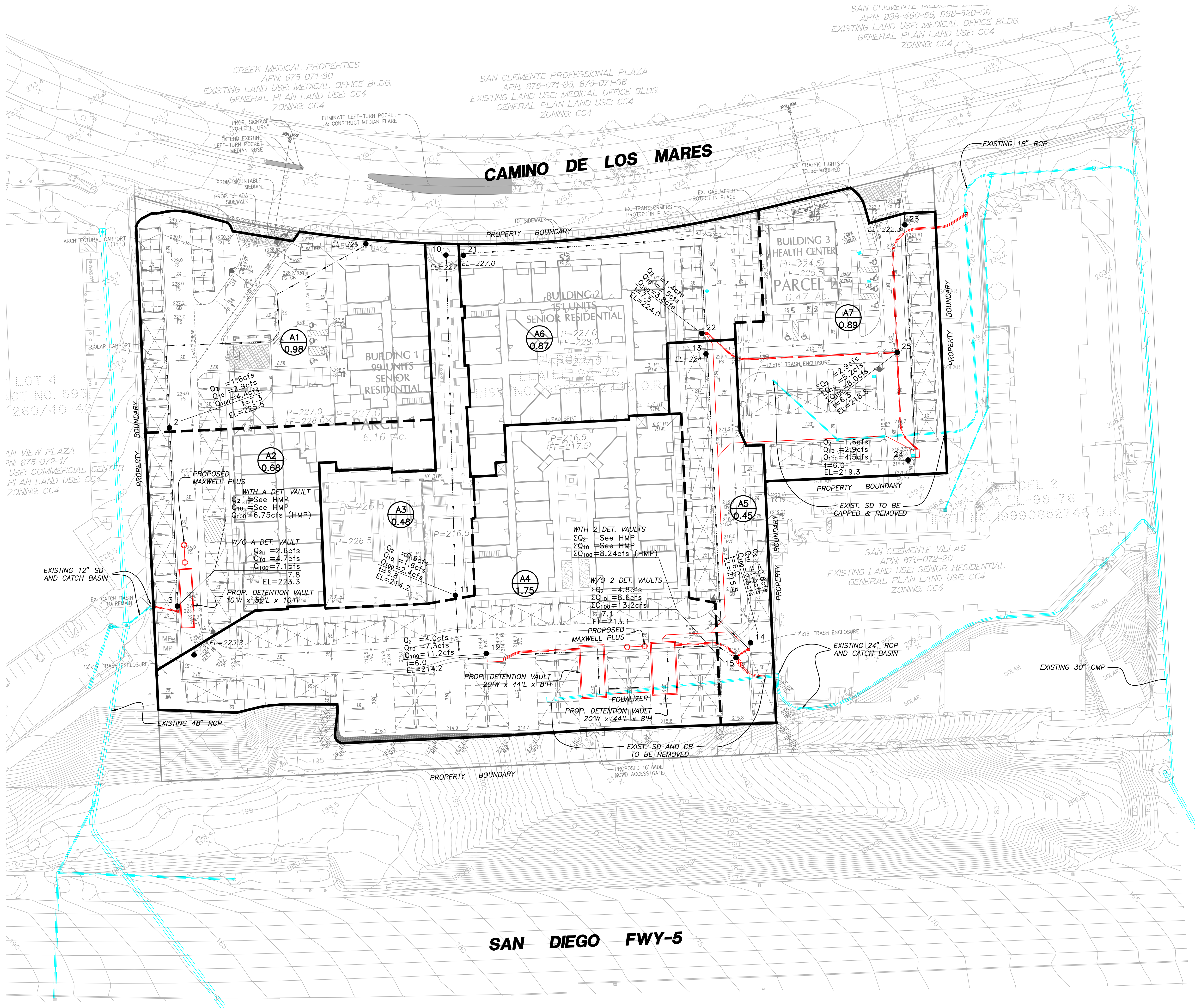
PREPARED FOR:
SADDLEBACK MEMORIAL MEDICAL CENTER

24451 HEALTH CENTER DRIVE
 LAGUNA HILLS, CA 92653
 (949) 452-3627

PREPARED BY:
HUNSAKER & ASSOCIATES
 IRVINE, INC.
 PLANNING ■ ENGINEERING ■ SURVEYING
 Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759



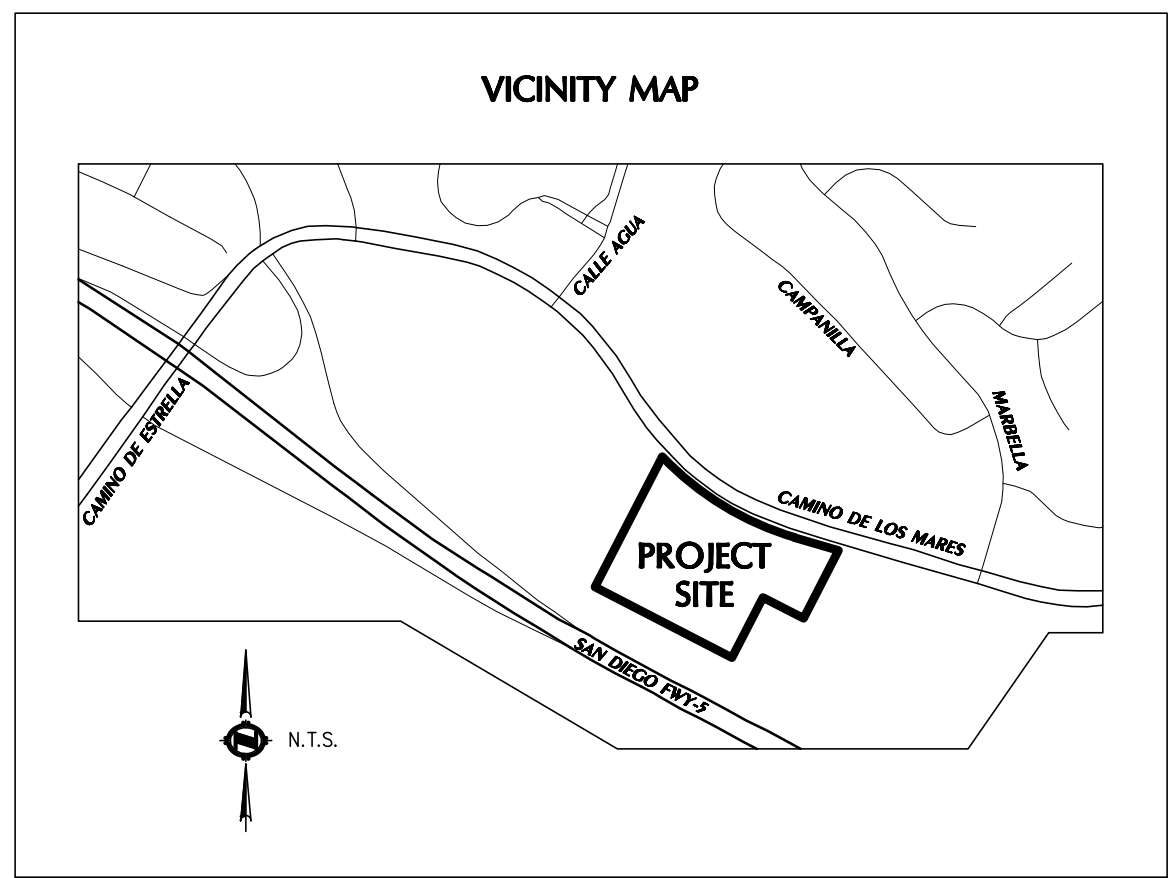
HYDROLOGY MAP
SAN CLEMENTE
SENIOR HOUSING AND HEALTH CENTER
EXISTING CONDITION



SAN CLEMENTE MEDICAL CENTER
 APN: 038-400-58, 038-520-09
 EXISTING LAND USE: MEDICAL OFFICE BLDG.
 GENERAL PLAN LAND USE: CC4
 ZONING: CC4

CREEK MEDICAL PROPERTIES
 APN: 876-071-30
 EXISTING LAND USE: MEDICAL OFFICE BLDG.
 GENERAL PLAN LAND USE: CC4
 ZONING: CC4

SAN CLEMENTE PROFESSIONAL PLAZA
 APN: 876-071-36, 876-071-38
 EXISTING LAND USE: MEDICAL OFFICE BLDG.
 GENERAL PLAN LAND USE: CC4
 ZONING: CC4



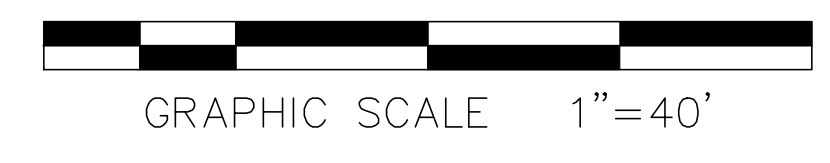
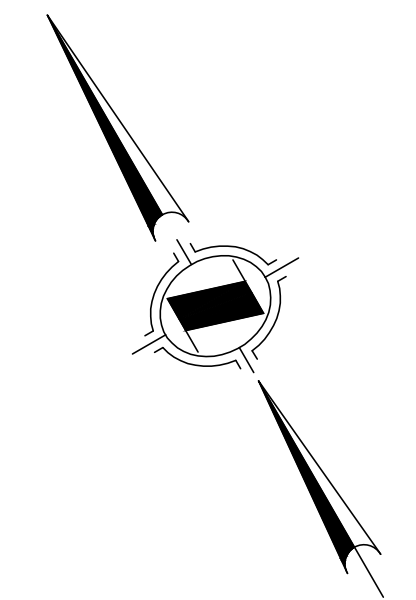
LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION
AREA ACREAGE (IN ACRES)
- PEAK FLOW RATE
TIME OF CONCENTRATION
- PEAK CONFLUENCE FLOW RATE
TIME OF CONCENTRATION
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- PROPOSED WQ/HYDROMOD STRUCTURE
- PROPOSED DRYWELL
- SOIL GROUP
- FLOW DIRECTION

NOTES:
 FOR Q2 AND Q10 STORM EVENTS AT NODES 3 AND 15, DRAINAGE IS LESS OR EQUAL TO EXISTING CONDITION WITH UNDERGROUND STORAGE RETENTION. REFER TO HYDRO-MODIFICATION TECHNICAL MEMORANDUM (HMP) BY REC CONSULTANTS, DATED SEPTEMBER 2022 FOR DETAILED ANALYSIS

PREPARED FOR:
SADDEBACK MEMORIAL MEDICAL CENTER
 24451 HEALTH CENTER DRIVE
 LAGUNA HILLS, CA 92653
 (949) 452-3627

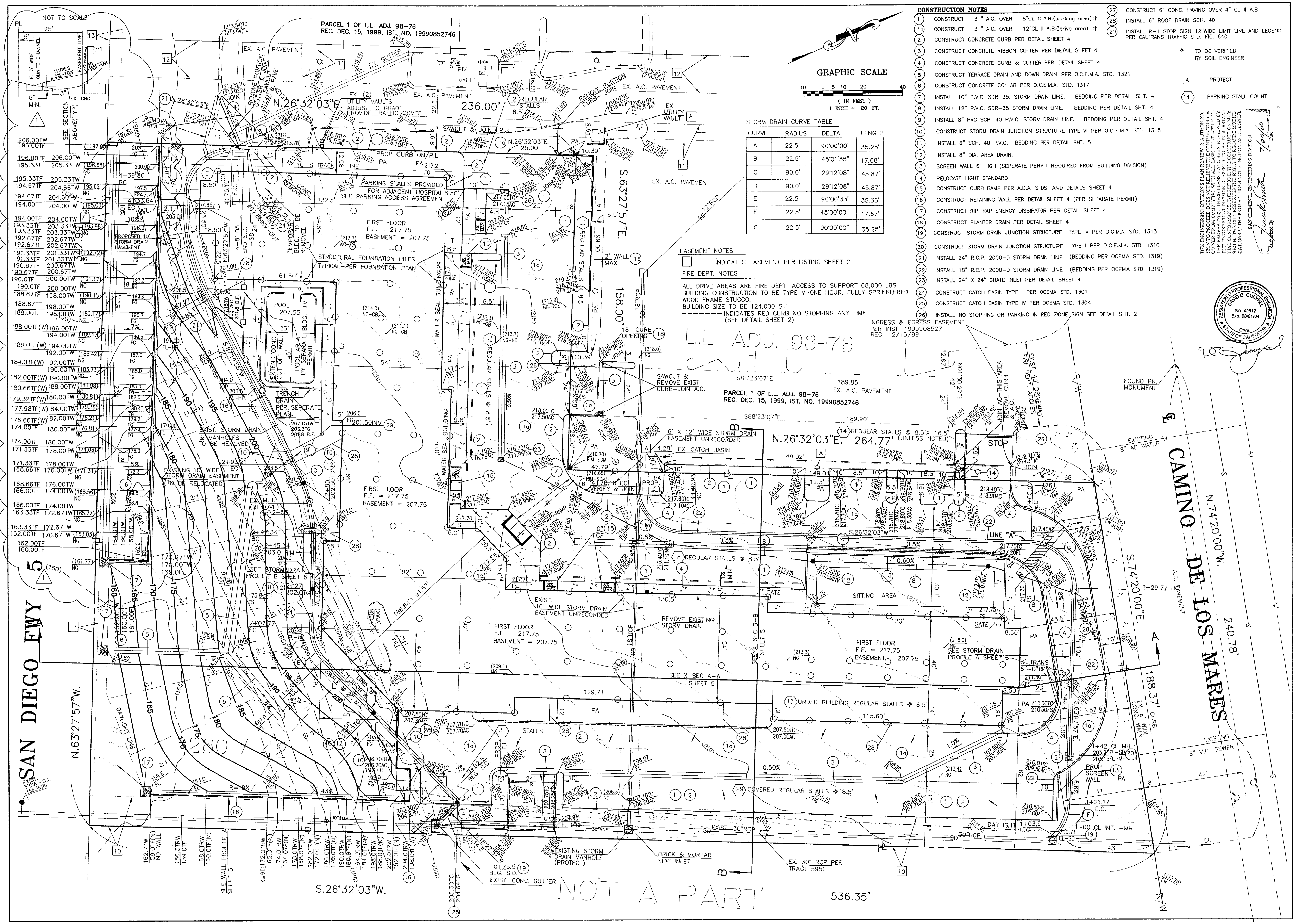
PREPARED BY:
HUNSAKER & ASSOCIATES
 IRVINE, INC.
 PLANNING ■ ENGINEERING ■ SURVEYING
 Three Hughes ■ Irvine, CA 92618 ■ PH: (949) 583-1010 ■ FX: (949) 583-0759



**HYDROLOGY MAP
 SAN CLEMENTE
 SENIOR HOUSING AND HEALTH CENTER
 PROPOSED CONDITION**

SECTION 4

REFERENCES



- CONSTRUCTION NOTES**
- CONSTRUCT 3" A.C. OVER 8" CL II A.B. (parking area) *
 - CONSTRUCT 3" A.C. OVER 12" CL II A.B. (drive area) *
 - CONSTRUCT CONCRETE CURB PER DETAIL SHEET 4
 - CONSTRUCT CONCRETE RIBBON GUTTER PER DETAIL SHEET 4
 - CONSTRUCT CONCRETE CURB & GUTTER PER DETAIL SHEET 4
 - CONSTRUCT TERRACE DRAIN AND DOWN DRAIN PER O.C.E.M.A. STD. 1321
 - CONSTRUCT CONCRETE COLLAR PER O.C.E.M.A. STD. 1317
 - INSTALL 10" P.V.C. SDR-35, STORM DRAIN LINE. BEDDING PER DETAIL SHT. 4
 - INSTALL 12" P.V.C. SDR-35 STORM DRAIN LINE. BEDDING PER DETAIL SHT. 4
 - CONSTRUCT STORM DRAIN JUNCTION STRUCTURE TYPE V PER O.C.E.M.A. STD. 1315
 - INSTALL 6" SCH. 40 P.V.C. BEDDING PER DETAIL SHT. 5
 - INSTALL 8" DIA. AREA DRAIN.
 - SCREEN WALL 6" HIGH (SEPERATE PERMIT REQUIRED FROM BUILDING DIVISION)
 - RELOCATE LIGHT STANDARD
 - CONSTRUCT CURB RAMP PER A.D.A. STDS. AND DETAILS SHEET 4
 - CONSTRUCT RETAINING WALL PER DETAIL SHEET 4 (PER SEPERATE PERMIT)
 - CONSTRUCT RIP-RAP ENERGY DISSIPATOR PER DETAIL SHEET 4
 - CONSTRUCT PLANTER DRAIN PER DETAIL SHEET 4
 - CONSTRUCT STORM DRAIN JUNCTION STRUCTURE TYPE IV PER O.C.E.M.A. STD. 1313
 - CONSTRUCT STORM DRAIN JUNCTION STRUCTURE TYPE I PER O.C.E.M.A. STD. 1310
 - INSTALL 24" R.C.P. 2000-D STORM DRAIN LINE (BEDDING PER OCEMA STD. 1319)
 - INSTALL 18" R.C.P. 2000-D STORM DRAIN LINE (BEDDING PER OCEMA STD. 1319)
 - INSTALL 24" X 24" GRATE INLET PER DETAIL SHEET 4
 - CONSTRUCT CATCH BASIN TYPE I PER OCEMA STD. 1301
 - CONSTRUCT CATCH BASIN TYPE IV PER OCEMA STD. 1304
 - INSTALL NO STOPPING OR PARKING IN RED ZONE SIGN SEE DETAIL SHT. 2
 - CONSTRUCT 6" CONC. PAVING OVER 4" CL II A.B.
 - INSTALL 6" ROOF DRAIN SCH. 40
 - INSTALL R-1 STOP SIGN 12" WIDE LIMIT LINE AND LEGEND PER CALTRANS TRAFFIC STD. FIG. 640
- * TO BE VERIFIED BY SOIL ENGINEER

STORM DRAIN CURVE TABLE

CURVE	RADIUS	DELTA	LENGTH
A	22.5'	90°00'00"	35.25'
B	22.5'	45°01'55"	17.68'
C	90.0'	29°12'08"	45.87'
D	90.0'	29°12'08"	45.87'
E	22.5'	90°00'33"	35.35'
F	22.5'	45°00'00"	17.67'

EASEMENT NOTES

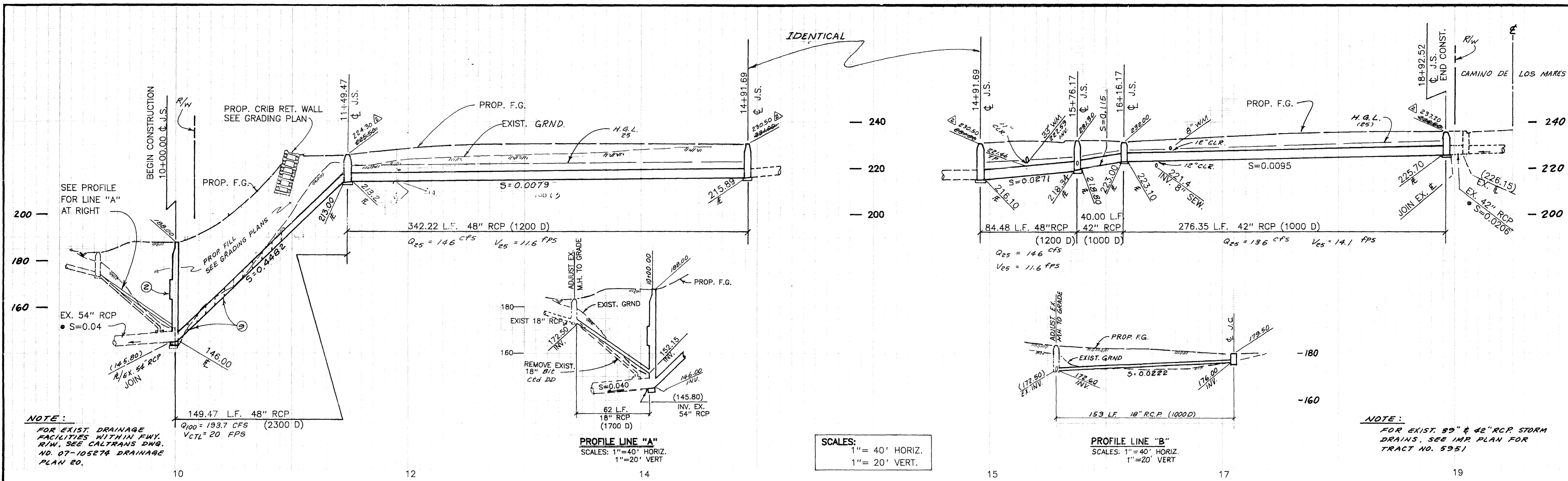
□ INDICATES EASEMENT PER LISTING SHEET 2

FIRE DEPT. NOTES

ALL DRIVE AREAS ARE FIRE DEPT. ACCESS TO SUPPORT 68,000 LBS. BUILDING CONSTRUCTION TO BE TYPE V-ONE HOUR, FULLY SPRINKLERED WOOD FRAME STUCCO. BUILDING SIZE TO BE 124,000 S.F. INDICATES RED CURB NO STOPPING ANY TIME (SEE DETAIL SHEET 2)

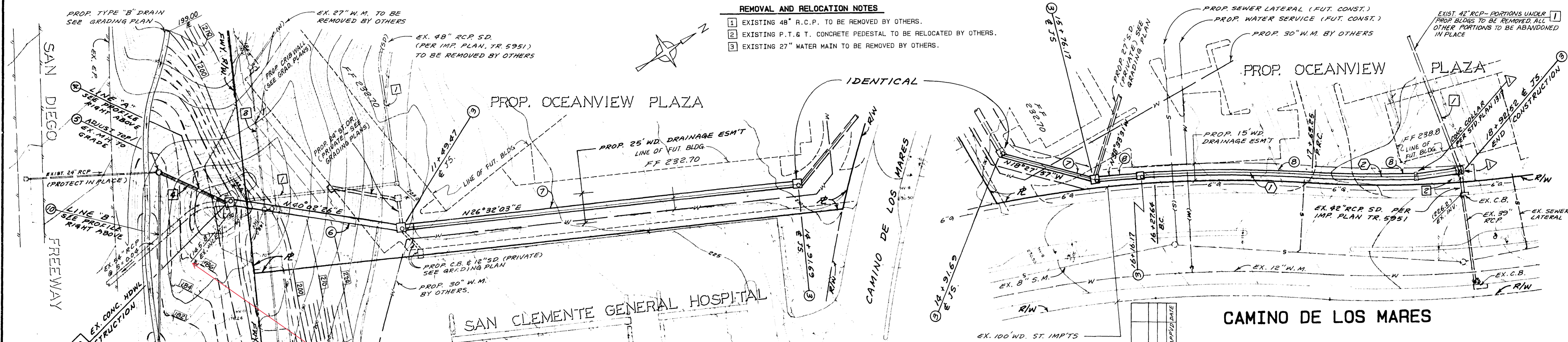


PROJECT ENGINEER	ANACAL ENGINEERING CO.	
DATE	5/11/00	SCALE 1" = 20'
DRAWN	G. A. G.	CHECKED C. J. G.
PROJECT	PRECISE GRADING PLAN ASSISTED LIVING CENTER CAMINO DE LOS MARES SPP # 99-124 PARCEL 2, LLA 98-76 SAN CLEMENTE, CALIFORNIA	
SHEET TITLE	SHEET NO. 3 7	
REVISIONS	DESCRIPTION	DATE
NO.	REVISED FOOTING GRADES TO MATCH EXIST. CONDITIONS, ADD GUNITE CHANNEL FOR DRAINAGE.	7/19/00



SCALES:
 1" = 40' HORIZ.
 1" = 20' VERT.

- REMOVAL AND RELOCATION NOTES**
- EXISTING 48" R.C.P. TO BE REMOVED BY OTHERS.
 - EXISTING P.T.G T. CONCRETE PEDESTAL TO BE RELOCATED BY OTHERS.
 - EXISTING 27" WATER MAIN TO BE REMOVED BY OTHERS.



See
 Caltrans
 Sheet 8

- CONSTRUCTION NOTES**
- CONSTRUCT TYPE III JUNCTION STRUCTURE WITH SAFETY LEDGE PER O.C.E.M.A. STD. DWG. NO. 1312. SEE NOTE ② BELOW.
 - CONSTRUCT MANHOLE SAFETY LEDGE PER L.A.C.F.C.D. STD. DWG. NO. 2-D430
 - CONSTRUCT TYPE III JUNCTION STRUCTURE PER O.C.E.M.A. STD. DWG. NO. 1312.
 - CONSTRUCT 18" R.C.P. (1700D) STORM DRAIN PER O.C.E.M.A. STD. DWG. NO. 1319.
 - ADJUST EXISTING STORM DRAIN MANHOLE TO FINISH GRADE.
 - CONSTRUCT 48" R.C.P. (2300D) PER O.C.E.M.A. STD. DWG. NO. 1319.
 - CONSTRUCT 48" R.C.P. (1200D) PER O.C.E.M.A. STD. DWG. NO. 1319.
 - CONSTRUCT 42" R.C.P. (1000D) PER O.C.E.M.A. STD. DWG. NO. 1319.
 - INSTALL VELOCITY CONTROL RING.
 - CONSTRUCT 18" R.C.P. (1000D) STORM DRAIN PER O.C.E.M.A. STD. DWG. NO. 1312.
 - CONSTRUCT JUNCTION CHAMBER 3-C PER CALTRANS DISTRICT 7 DRAINAGE DETAILS (SHT. 6).

BENCH MARK	BASIS OF BEARINGS	CURVE DATA - C STORM DRAIN			
		Δ	R	L	T
CHISLED "D" IN TOP OF CURB NORTH WEST B.C.R. ON CAMINO EL MOLINO AT THE INTERSECTION OF CAMINO EL MOLINO AND CAMINO DE LOS MARES.	BEING THE NORTHWESTERLY PROPERTY LINE OF LOT 5, TRACT 5951 SHOWN ON TRACT MAP NO. 5951 AS N 35°00' 45" W.	① 7°21'03"	1057	135.61	67.90
ELEV. = 245.10		② 8°04'52"	916.54	129.27	64.74

CAMINO DE LOS MARES

CITY OF SAN CLEMENTE
 DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION

STORM DRAIN IMPROVEMENT PLANS
 PLAN AND PROFILE

OCEANVIEW PLAZA

PREPARED BY:
 TOAL ENGINEERING, INC.
 139 AVENIDA NAVARRO
 SAN CLEMENTE, CA. 92672
 PH: (714) 492-8586

RAYMOND R. TOAL RCE 16889
 EXP 6-30-89

DATE
 12-30-88

NO.	INITIAL	DESCRIPTION	APPROVAL DATE
1		CHANGED TIGHT, ELEV. AND T.Y. PER PRECISE GRADING PLAN	
2		CHANGED T.Y. LOCATION SLIGHTLY TO AVOID ENCROACHING SCORE TRANS PAVED COLLAR	

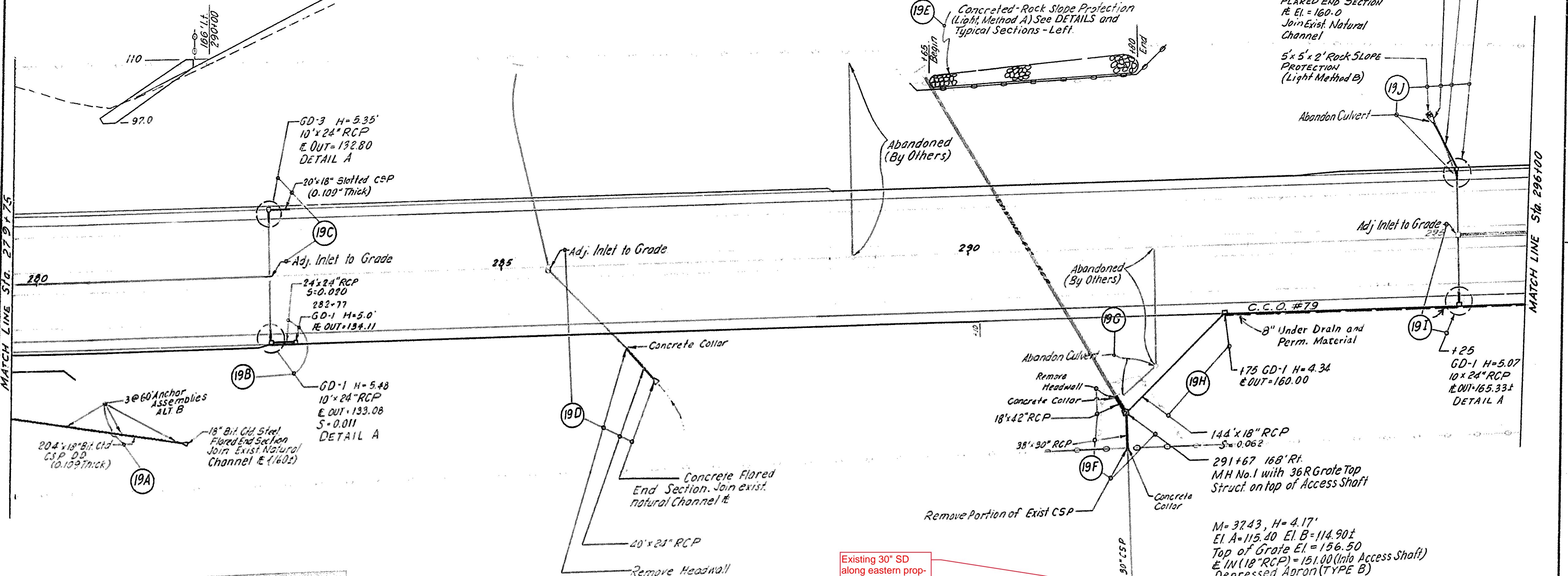
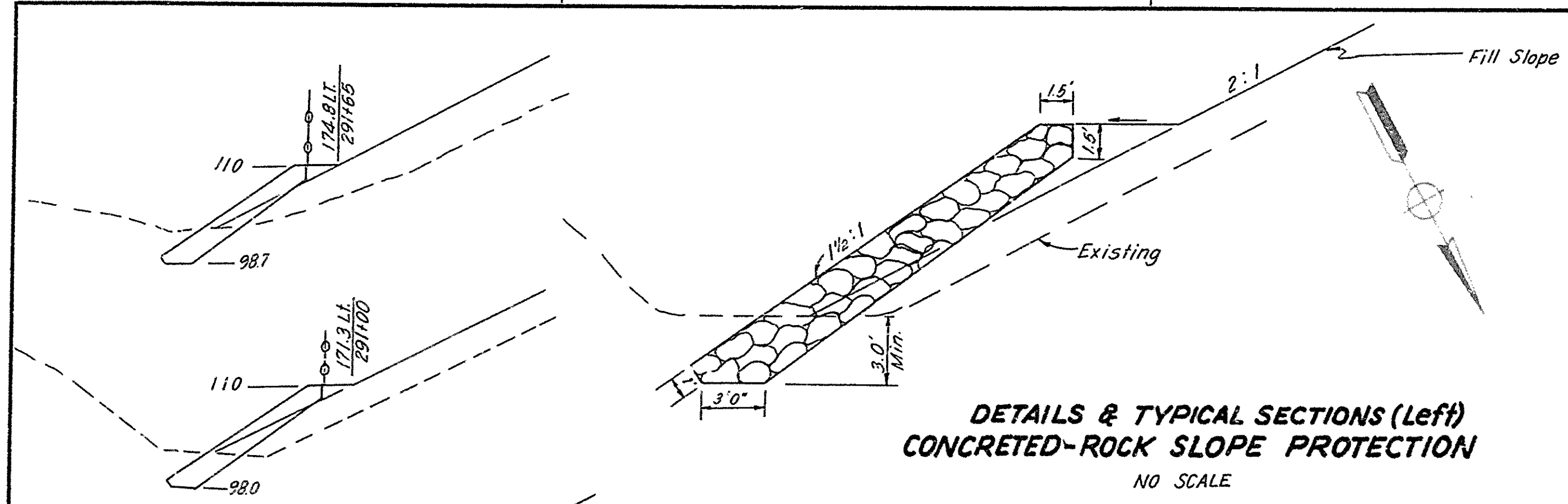
DRWN	DESIGNED	CHECKED	CITY ENGINEER
WILLIAM E. CAMERON			

SHEET
 2 OF 2

NUMBER
 DRAWING NUMBER
 DRAWING
 T. 5951
 JAN 5 1989

REG. NO.	STATE	FEDERAL PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CALIF.			80	1538

DESIGN ENGINEER: *W. D. Knutson*
 REGISTERED CIVIL ENGINEER NO. 10,127
 DATE APPROVED: March 12, 1979



AS BUILT PLANS
 Contract No. **07-105274**
 Date Completed **6-14-82**
 Document No.

AS BUILT
 CONTRACT NO. **105274**
 RESIDENT ENGR. **A. ROSSING**
 DATE **6-14-82**

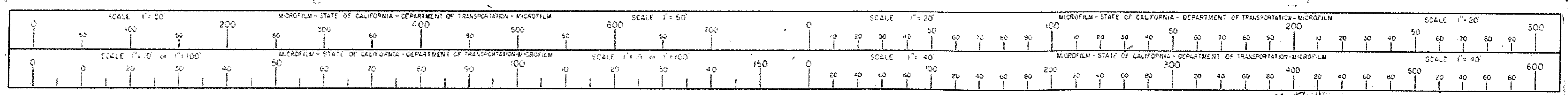
- NOTES:
 1. THIS PLAN ACCURATE FOR DRAINAGE ONLY
 2. SEE LAYOUT SHEETS FOR LOCATION AND TYPE OF AC DIKE
 3. DETAIL A = SEE DETAIL A OF DRAINAGE DETAILS SHEET ©

DRAINAGE PLAN 19

Project Engineer	Date	Design Engineer	Date	Approval Recommended by	Date	Right Of Way Engineer	Date
M. KAMIDA		W. KNUTSEN		R. BLOCKER			

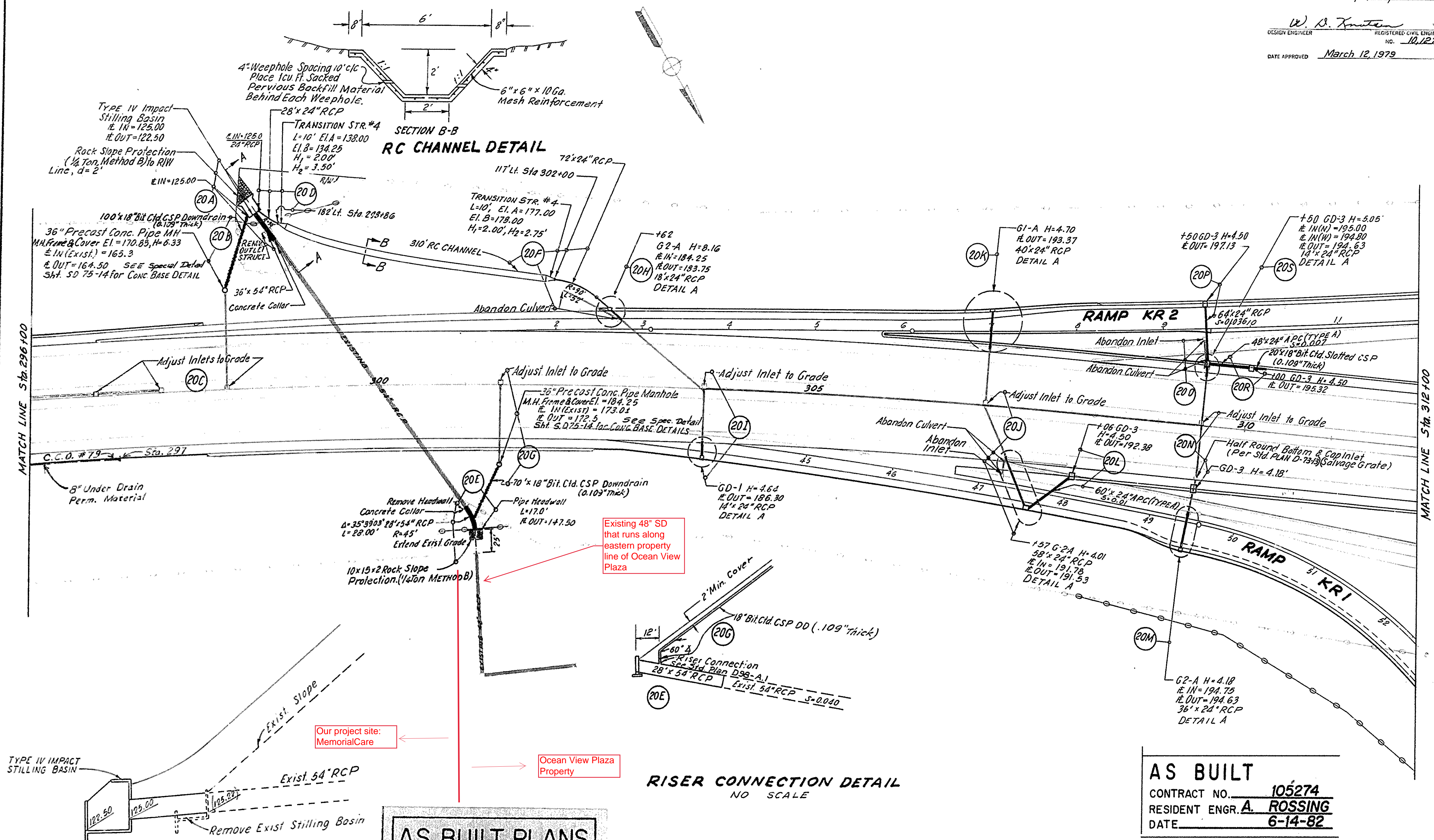
209-105271

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE BY SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
 DATE: 4-29-85 *Donald Blockford* TITLE: SUPERVISOR OF MICROFILM SERVICES



SHEET NO.	7	STATE	CALIF.	FEDERAL PROJECT NO.		FILE NO.		SHEET NO.	202	TOTAL SHEETS	202
CITY	07	COUNTY	S.D.	ROUTE	5	POST MILE-MARAL PROJECT	00/61, R12, R24	SHEET NO.	21	TOTAL SHEETS	338

W. B. Knutson
 DESIGN ENGINEER REGISTERED CIVIL ENGINEER
 NO. 10,127
 DATE APPROVED March 12, 1979



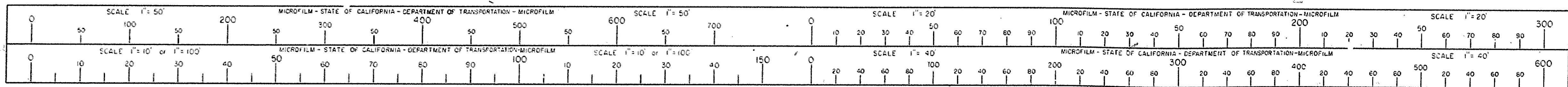
AS BUILT PLANS
 Contract No. 07-105274
 Date Completed 6-14-82
 Document No. _____

AS BUILT
 CONTRACT NO. 105274
 RESIDENT ENGR. A. ROSSING
 DATE 6-14-82

NOTES:
 1. THIS PLAN ACCURATE FOR DRAINAGE ONLY
 2. SEE LAYOUT SHEETS FOR LOCATION AND TYPE OF FAC DIKE
 3. APC = ALTERNATIVE PIPE CULVERT
 4. DETAIL A = SEE DETAIL A OF DRAINAGE DETAILS SHEET ©

DESIGN	WKNUTSEN
CHECKED	
APPROVED	
Supervised by M. KAMIDA	

Project Engineer	Date	Design Engineer	Date	Approval Recommended By	Date	Asst. City Engineer	Date
M. KAMIDA		WKNUTSEN		R. BLOCKER			



I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
 DATE 4-29-85 BY Ronald B. [Signature] TITLE SUPERVISOR OF MICROFILM SERVICES