Snipes-Dye associates

PRELIMINARY HYDROLOGY/DRAINAGE STUDY

For

7248 Encelia/7231 Romero CDP

7248 Encelia Dr. & 7231 Romero Dr.
La Jolla, CA, 92037
City of San Diego
Parcel 1 of Parcel Map No. 13064 and
Lot 11, Block "E" of La Jolla Country Club Heights,
Map 1975
PTS No. 624464

Applicant/Developer:
Ihor A. Lys
7248 Encelia Drive
San Diego, CA 92122
(619) 470-2740

Snipes-Dye Associates
civil engineers and land surveyors
8348 Center Drive, Suite G
La Mesa, CA 91942-2910
(619) 697-9234, Fax (619) 460-2033
LJ500x

Dated: July 22, 2019

DECLARATION OF RESPONSIBLE CHARGE

I, HEREBY DECLARE THAT I AM THE CIVIL ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITY FOR PROJECT DESIGN.

SON P. NGUYEN
R.C.E. 86249
EXP. 03-31-21

DATE 7-22-19

TABLE OF CONTENTS

PRELIMINARY HYDROLOGY CALCULATIONS
FOR
Encelia/Romero Residence CDP

The project is located on 7248 Encelia Drive and 7231 Romero Drive, in La Jolla.

Parcel 1 of Parcel Map No. 13064 is located at 7248 Encelia Drive, in La Jolla with Assessor's Parcel No. 352-262-14-00. The project proposes the demolition of an existing two-story residential building and the construction of a three-story residential building with a concrete paved driveway. There will also be some right-of-way improvements that include the construction of a 29-ft. concrete driveway and replacing an existing driveway with new curb and gutter and sidewalk.

Lot 11 of Block "E" of the La Jolla Country Club Heights, Map 1975 is located at 7231 Romero Drive, in La Jolla with Assessor's Parcel No. 352-262-01. The project proposes the construction of a proposed 3-story residence with an adjacent garage and the addition of a concrete paved driveway. There will also be some right-of-way improvements that include the construction of a standard residential 20-ft. concrete driveway.

PRE-DEVELOPMENT CONDITIONS: The site consists of three major basins, Basin A's topography consists mainly of a sloped property that mostly drains in a general southwesterly direction with a two-story single family house on Parcel 1. Flow drains from the northwestern corner of Parcel 1 southeasterly and then into Romero Drive where the water then sheet flows and eventually drains into a cobblestone drainage swale. The 100-yr peak flow for the basin is approximately 1.78 cfs. A portion of the site along the frontage with Encelia Drive drains into the street gutter system (existing cobblestone drainage swale), this portion is divided into Basins B and C. Basin B sheet flows into the cobblestone drainage swale northwesterly with a 100-yr peak flow rate of approximately 0.08 cfs. Basin C sheet flows into the cobblestone drainage swale southeasterly with a 100-yr peak flow rate of approximately 0.17 cfs. The total site drainage for the existing condition is 2.03 cfs for the 100-year storm event.

POST-DEVELOPMENT CONDITIONS: The proposed development for Parcel 1 consists of the construction of a new three-story residence with driveway. The site will also have landscape areas along the southerly boundary line with a retaining wall. Drainage patterns for the proposed development will be similar to the current condition. Runoff from the proposed residence and main portion of the site (denoted as sub-basin A1 in the enclosed Post-Development Drainage Map) consists of surface flow with a 100-yr peak discharge of approximately 0.99 cfs. The drainage sub-basin A2 located on Lot 11 consists of the construction of a new 3-story residential building with an attached car garage and the addition of a concrete paved driveway. This sub-basin will surface flow onto Romero Drive cobblestone drainage swale in a general westerly direction with a total 100-yr peak discharge of approximately 1.53 cfs for Basin A (A1 + A2). The portion of the site along the frontage with Encelia Drive drains in a similar manner into the street gutter system (cobblestone drainage swale). This portion is divided into Basins B and C. Basin B sheet flows into the cobblestone drainage swale northwesterly

with a 100-yr peak flow rate of approximately 0.09 cfs. Basin C sheet flows into the cobblestone drainage swale southeasterly with a 100-yr peak flow rate of approximately 0.15 cfs. The site's total peak discharge for the 100-year frequency is 1.77 cfs for the proposed development, a decrease of 0.26 cfs when compared to the pre-development condition. This decrease in flow is mainly due to the lengthening of the flow paths as a result the grading of the residential pads, hence yielding a higher time of concentration for drainage Basin A.

The following table is a summary of the 100-year peak discharges for the pre- and post-development conditions:

PRE & POST DEVELOPMENT 100-YR. PEAK DISCHARGES

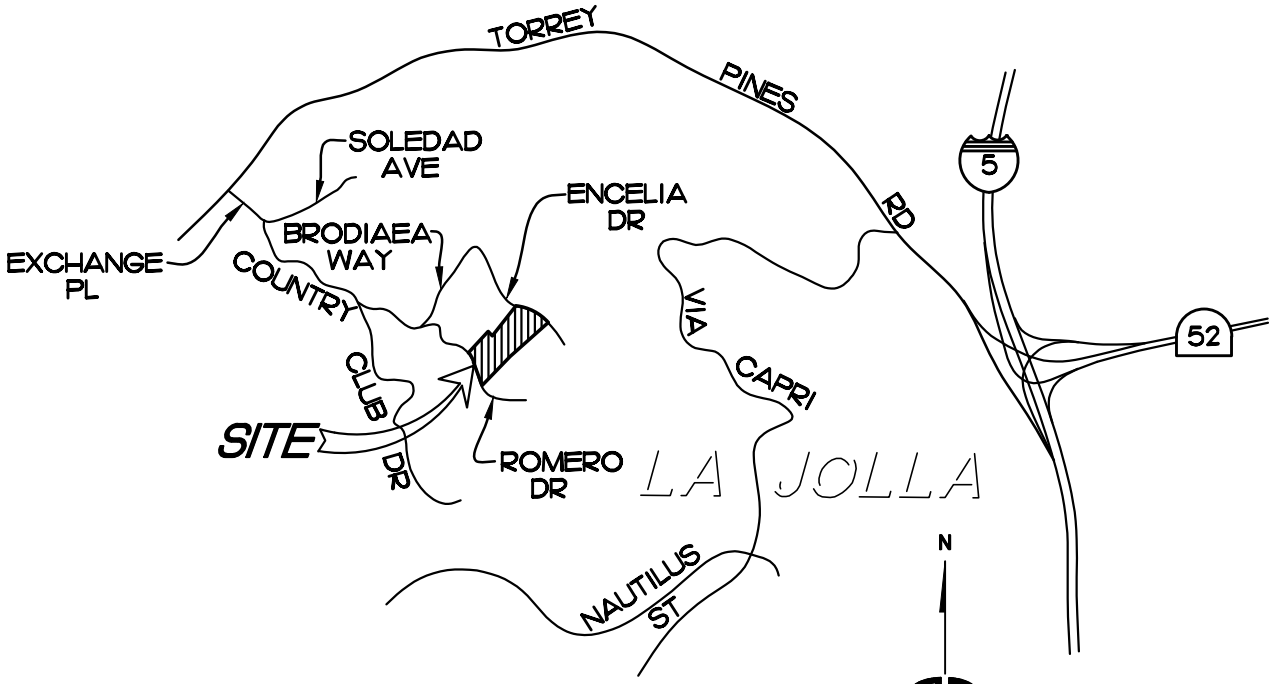
BASIN ⬡	PRE-DEVELOPMENT			POST DEVELOPMENT		
	TIME OF CONCENTRATION Tc (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q_{100} (IN CFS)	TIME OF CONCENTRATION Tc (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q_{100} (IN CFS)
A	5.0	0.79	1.78	8.1	0.79	1.53
B	5.0	0.02	0.08	5.0	0.02	0.09
C	5.0	0.04	0.17	5.0	0.04	0.15
TOTAL	--	0.85	2.03	--	0.85	1.77

CONCLUSION:

- The outfall locations in the post-development condition are at a similar location as in the pre-development condition.

- There will be no negative impacts to downstream and/or adjacent properties due to the development of the site.

- The project site does not impact waters of the U.S., therefore it is not subject to CWA 401/404 regulations.

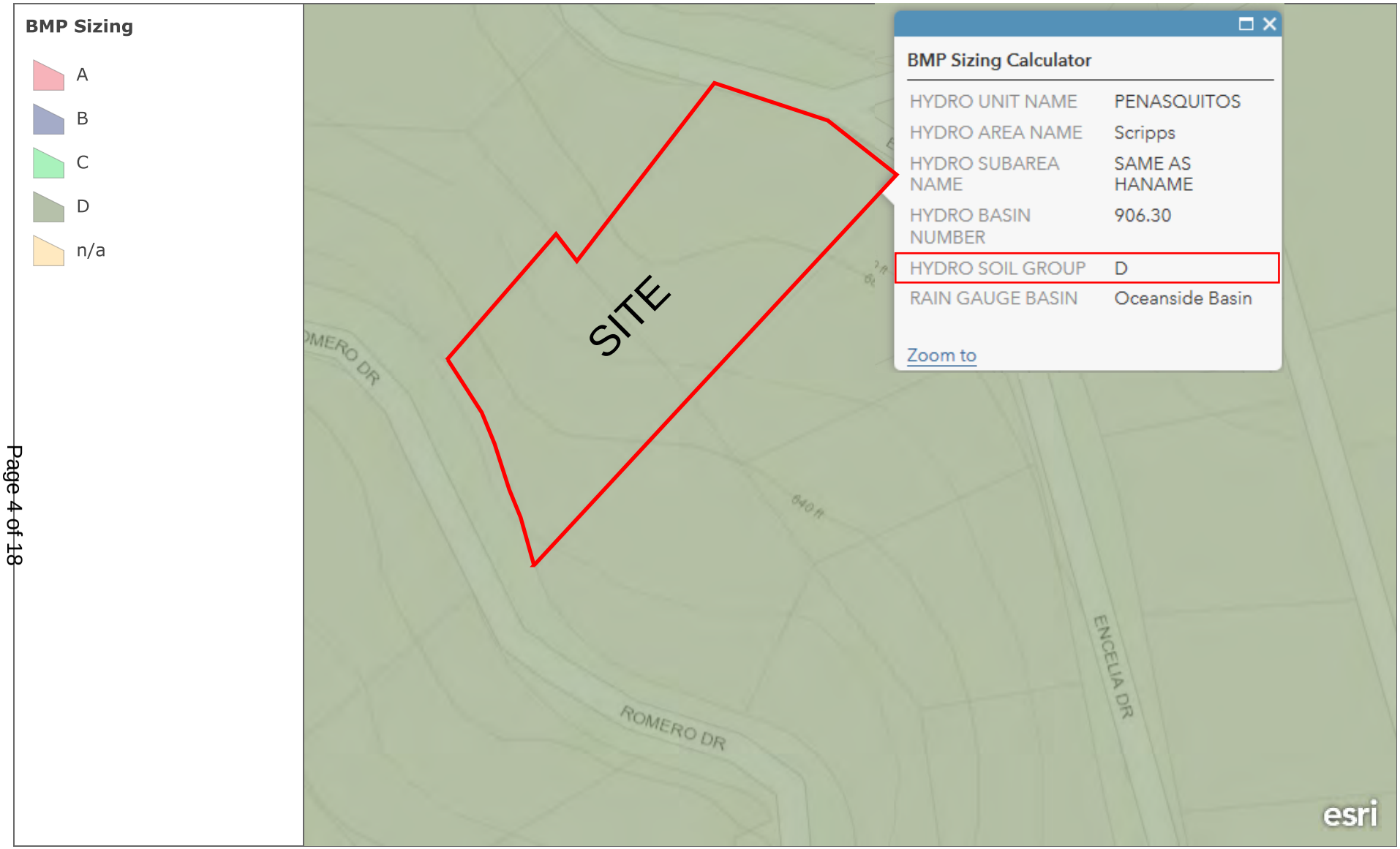


VICINITY MAP

NO SCALE

THOMAS BROS.
PG. 1227 (H-7)

BMP Sizing Calculator



This map is intended to assist in BMP sizing for the unincorporated portion of the County of San Diego.

SanGIS, Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, USDA

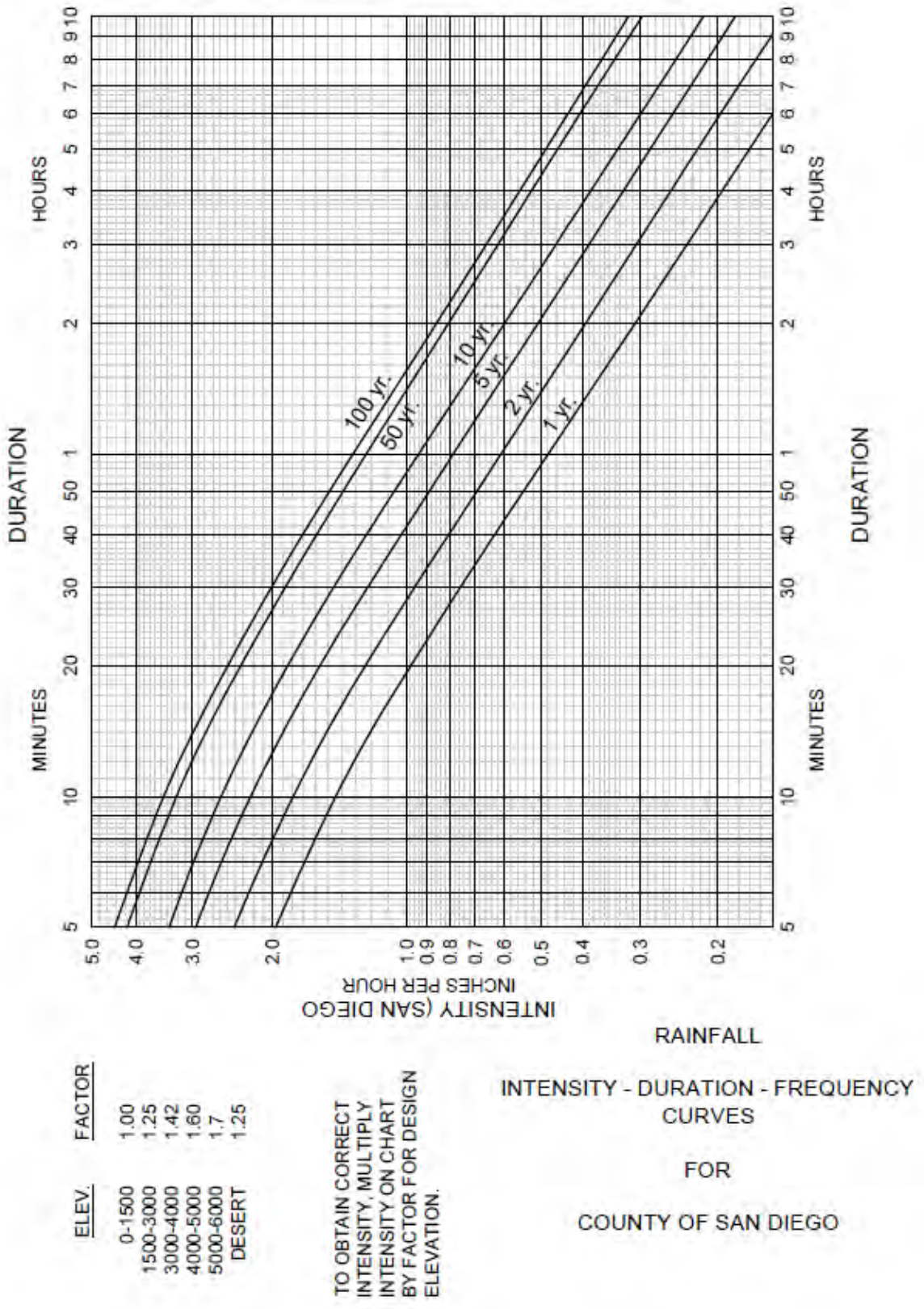


Figure A-1. Intensity-Duration-Frequency Design Chart

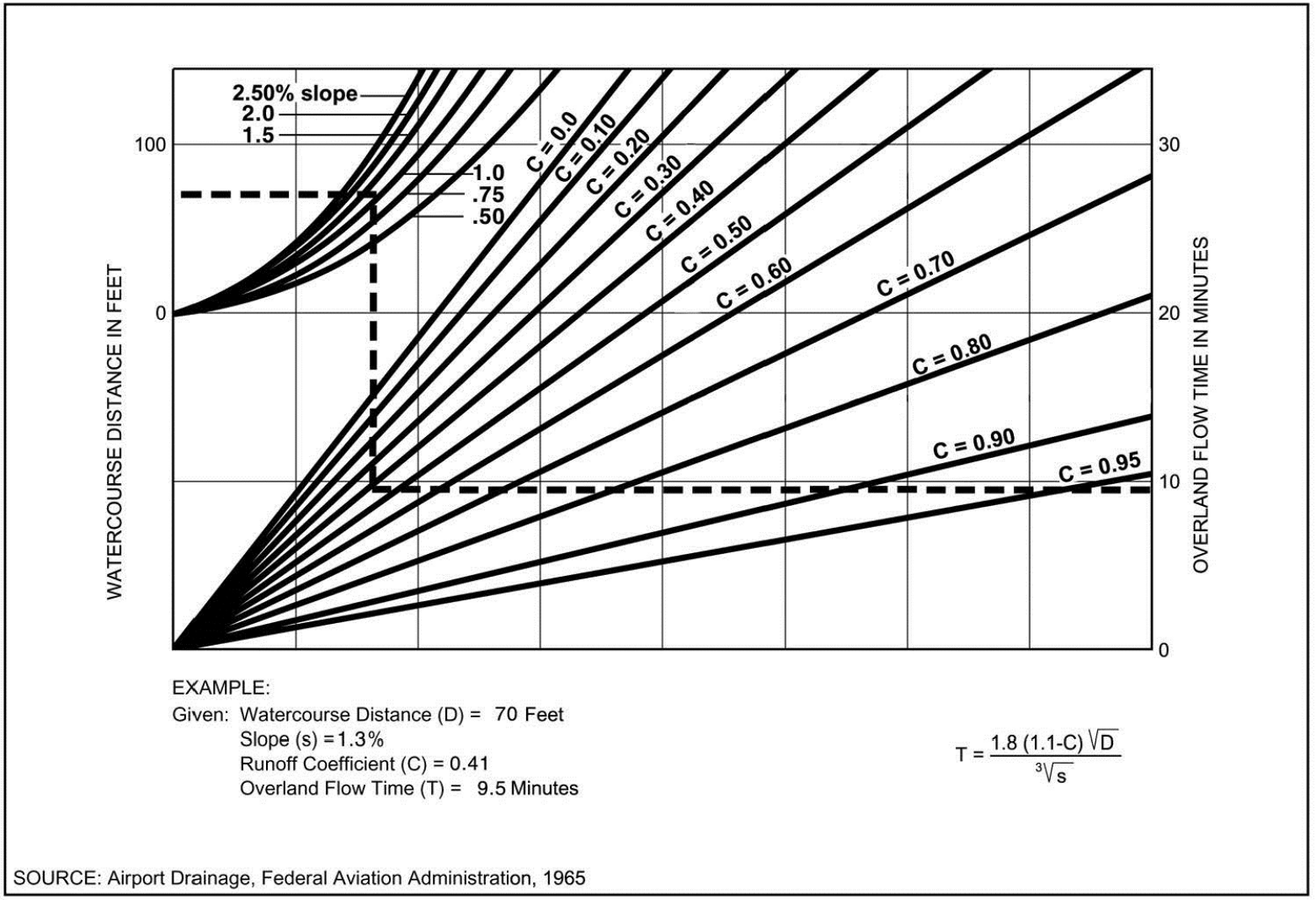


Figure A-4. Rational Formula – Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.

APPENDIX A: RATIONAL METHOD AND MODIFIED RATIONAL METHOD

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C) Soil Type [1]
Residential:	
Single Family (Assumed 50% Imperviousness)	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:

[1] Type D soil to be used for all areas.

[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness	=	60%
Tabulated imperviousness (For Single-Family)	=	50%
Revised C = (60/50) x 0.55	=	0.66

The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

Pre-Development - Encelia/Romero CDP

Basin	A	B	C
Impervious Area (SF)	8,342	743	1,584
Total Basin Area (SF)	34,214	909	1,853
Actual imperviousness **(AI)** = Imp. Area/Total Area	24%	82%	85%
Tabulated imperviousness =	50%	50%	50%
For Single-Family: Revised C = (**AI**/50) x 0.55, 0.50 Min., 0.95 Max.	0.27	0.90	0.94
Use	**0.50**	**0.90**	**0.94**

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C) Soil Type [1]
Residential:	
Single Family (Assumed 50% Imperviousness)	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:

[1] Type D soil to be used for all areas.

[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness	=	60%
Tabulated imperviousness (For Single-Family)	=	50%
Revised C = (60/50) x 0.55	=	0.66

The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

Post-Development - Encilia/Romero CDP

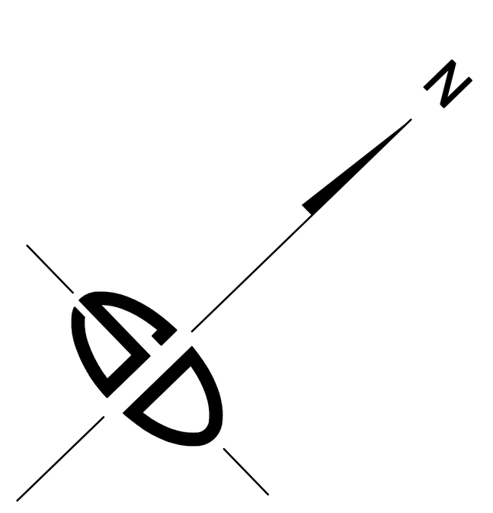
Basin	A1	A2	B	C
Impervious Area (SF)	8,572	5,011	803	1,422
Total Basin Area (SF)	19,176	14,986	909	1,853
Actual imperviousness **(AI)** = Imp. Area/Total Area	45%	33%	88%	77%
Tabulated imperviousness =	50%	50%	50%	50%
For Single-Family: Revised C = (**AI**/50) x 0.55, 0.50 Minimum **For Rural:** C = 0.45	0.49	0.37	0.97	0.84
Use	**0.50**	**0.50**	**0.95**	**0.84**

DRAINAGE MAPS

LEGEND

- BASIN ID NO. — (B)
- DRAINAGE BASIN BOUNDARY
- FLOW PATH
- DIRECTION OF FLOW
- STUDY NODE W/ ELEVATION — 2.1 / 688.02
- BASIN AREA W/ RUNOFF COEFFICIENT — 0.02 AC / C = 0.90
- FLOW LENGTH — L = 47'
- 100-YR PEAK DISCHARGE — 0.08 CFS

	PRE & POST DEVELOPMENT 100-YR. PEAK DISCHARGES					
	PRE-DEVELOPMENT			POST DEVELOPMENT		
BASIN	TIME OF CONCENTRATION Tc (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q100 (IN CFS)	TIME OF CONCENTRATION Tc (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q100 (IN CFS)
A	5.0	0.79	1.78	8.1	0.79	1.53
B	5.0	0.02	0.08	5.0	0.02	0.09
C	5.0	0.04	0.17	5.0	0.04	0.15
TOTAL	--	0.85	2.03	--	0.85	1.77



10 5 0 10 20 30
SCALE: 1"=10'

7248 ENCELIA/7231 ROMERO CDP
PRE-DEVELOPMENT DRAINAGE MAP

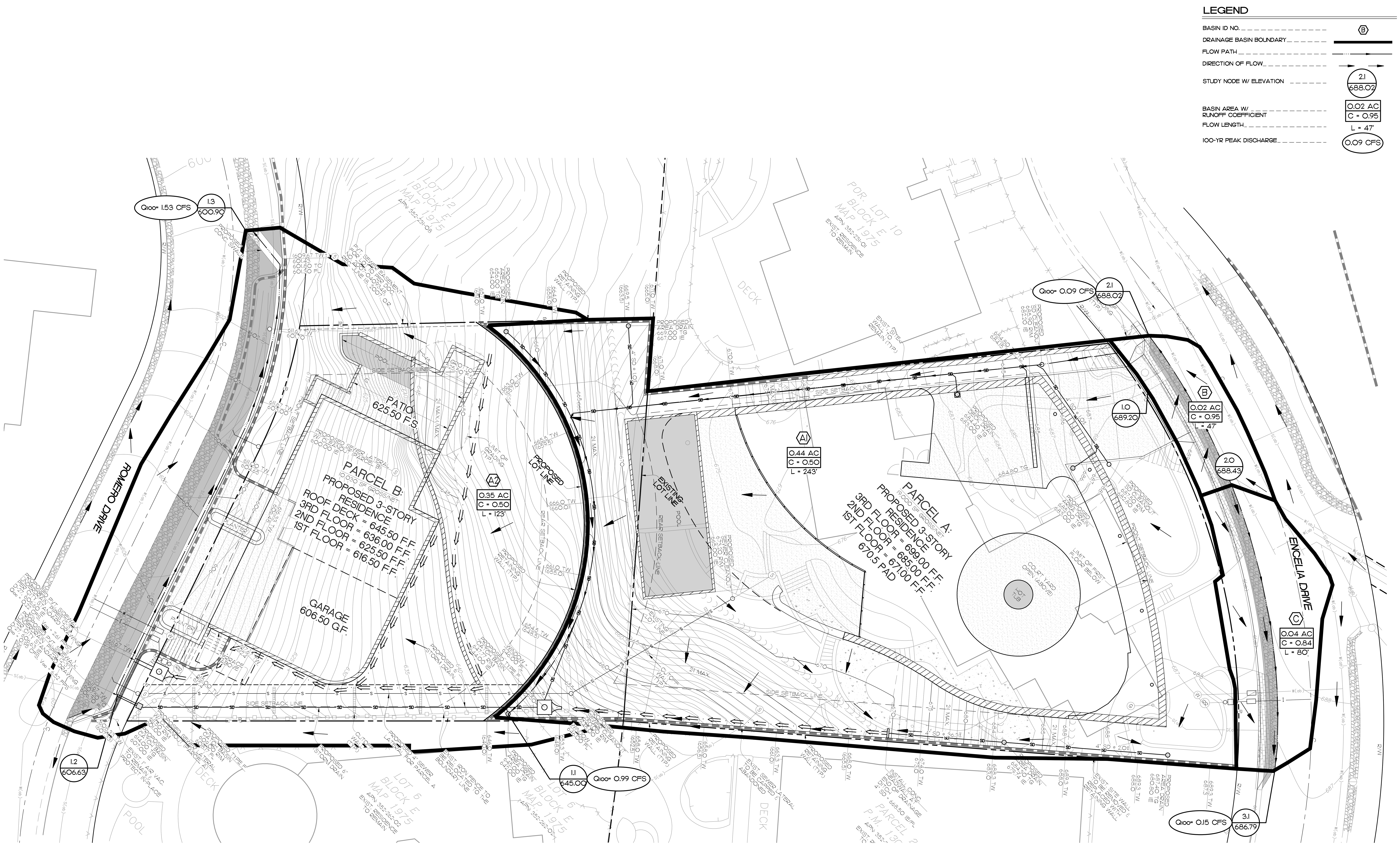
SHEET TITLE: PRE-DEVELOPMENT DRAINAGE MAP
JOB NAME: 7248 ENCELIA/7231 ROMERO CDP

DESIGNER: RE
DRAWN: RE
CHECKED: SPN
DATE: 07/01/19

NO	DATE	REVISION DESCRIPTION	BY

SNIPES-DYE ASSOCIATES
8348 CENTER DRIVE, SUITE G, LA MESA, CA 91942-2910 (619) 697-9234, FAX (619) 460-2033

SHEET 1 OF 1 SHEETS
JOB NO. L5002



PRE & POST DEVELOPMENT 100-YR. PEAK DISCHARGES

BASIN ⬡	PRE-DEVELOPMENT TIME OF CONCENTRATION Tc (IN MINUTES)	PRE-DEVELOPMENT AREA A (IN ACRES)	PRE-DEVELOPMENT DISCHARGE Q100 (IN CFS)	POST DEVELOPMENT TIME OF CONCENTRATION Tc (IN MINUTES)	POST DEVELOPMENT AREA A (IN ACRES)	POST DEVELOPMENT DISCHARGE Q100 (IN CFS)
A	5.0	0.79	1.78	8.1	0.79	1.53
B	5.0	0.02	0.08	5.0	0.02	0.09
C	5.0	0.04	0.17	5.0	0.04	0.15
TOTAL	--	0.85	2.03	--	0.85	1.77

SCALE: 1"=10'

7248 ENCELIA/7231 ROMERO CDP
POST-DEVELOPMENT DRAINAGE MAP

SHEET TITLE	POST-DEVELOPMENT DRAINAGE MAP
JOB NAME	7248 ENCELIA/7231 ROMERO CDP
DESIGNER	RE
DRAWN	RE
CHECKED	SPN
DATE	07/01/19
SHEET	1 OF 1 SHEETS
JOB NO.	LJ5002

SNIPES-DYE ASSOCIATES
8348 CENTER DRIVE, SUITE G, LA MESA, CA 91942-2910 (619) 697-9234, FAX (619) 460-2033

PRE-DEVELOPMENT DRAINAGE CALCULATIONS

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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              Ver. 23.0 Release Date: 07/01/2016  License ID 1305

                              Analysis prepared by:
```


Snipes-Dye associates

civil engineers & land surveyors

8348 Center Drive, Suite G, La Mesa, CA 91942

(619) 697-9234 (619) 460-2033 fax

www.snipesdye.com


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 ************************** DESCRIPTION OF STUDY **************************
* 7248 ENCELIA DRIVE / 7231 ROMERO DRIVE CDP                             *
* PRELIMINARY PRE-DEVELOPMENT DRAINAGE CALCULATIONS                      *
* SDA NO. LJ5001                                                         *
 **************************************************************************

  FILE NAME: LJ5001PR.DAT
  TIME/DATE OF STUDY: 13:21 07/05/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 16
   1)   5.000;  4.500
   2)  10.000;  3.500
   3)  20.000;  2.500
   4)  30.000;  2.000
   5)  40.000;  1.700
   6)  50.000;  1.500
   7)  60.000;  1.300
   8) 120.000;  0.860
   9) 180.000;  0.760
  10) 240.000;  0.560
  11) 300.000;  0.480
  12) 360.000;  0.430
  13) 420.000;  0.400
  14) 480.000;  0.360
  15) 540.000;  0.340
  16) 600.000;  0.320
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.30 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   272.00
  UPSTREAM ELEVATION(FEET) =    688.80
  DOWNSTREAM ELEVATION(FEET) =    601.21
  ELEVATION DIFFERENCE(FEET) =     87.59
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.013
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.497
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.79   TOTAL RUNOFF(CFS) =      1.78

****************************************************************************
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----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
  UPSTREAM ELEVATION(FEET) =    688.43
  DOWNSTREAM ELEVATION(FEET) =    688.02
  ELEVATION DIFFERENCE(FEET) =      0.41
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.583
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.500
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.08
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.08

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .9400
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    688.43
  DOWNSTREAM ELEVATION(FEET) =    686.79
  ELEVATION DIFFERENCE(FEET) =      1.64
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.028
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.500
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.17
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.0  TC(MIN.) =      2.03
  PEAK FLOW RATE(CFS)   =       0.17
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

POST-DEVELOPMENT DRAINAGE CALCULATIONS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                              Analysis prepared by:
```


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8348 Center Drive, Suite G, La Mesa, CA 91942
(619) 697-9234 (619) 460-2033 fax
www.snipesdye.com


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 ************************** DESCRIPTION OF STUDY **************************
* 7248 ENCELIA DRIVE / 7231 ROMERO DRIVE CDP                             *
* PRELIMINARY POST-DEVELOPMENT DRAINAGE CALCULATIONS                     *
* SDA NO. LJ5001                                                         *
 **************************************************************************

  FILE NAME: LJ5001PO.DAT
  TIME/DATE OF STUDY: 13:37 07/05/2019
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 16
   1)   5.000;  4.500
   2)  10.000;  3.500
   3)  20.000;  2.500
   4)  30.000;  2.000
   5)  40.000;  1.700
   6)  50.000;  1.500
   7)  60.000;  1.300
   8) 120.000;  0.860
   9) 180.000;  0.760
  10) 240.000;  0.560
  11) 300.000;  0.480
  12) 360.000;  0.430
  13) 420.000;  0.400
  14) 480.000;  0.360
  15) 540.000;  0.340
  16) 600.000;  0.320
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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.*

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   243.00
  UPSTREAM ELEVATION(FEET) =    689.20
  DOWNSTREAM ELEVATION(FEET) =    645.00
  ELEVATION DIFFERENCE(FEET) =     44.20
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.013
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.497
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.44   TOTAL RUNOFF(CFS) =      0.99

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   642.00  DOWNSTREAM(FEET) =   606.63
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.75
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.99
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    5.15
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.20 =     353.00 FEET.

****************************************************************************
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----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    606.63
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 DOWNSTREAM NODE ELEVATION(FEET) =    601.21
 CHANNEL LENGTH THRU SUBAREA(FEET) =   123.00
 "V" GUTTER WIDTH(FEET) =   4.00   GUTTER HIKE(FEET) =  0.050
 PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0500
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00200
 MAXIMUM DEPTH(FEET) =   0.25
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.881
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.33
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.69
 AVERAGE FLOW DEPTH(FEET) =   3.50   FLOOD WIDTH(FEET) =   59.66
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.95   Tc(MIN.) =    8.10
 SUBAREA AREA(ACRES) =    0.35       SUBAREA RUNOFF(CFS) =    0.68
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.500
 TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.53

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOOD WIDTH(FEET) =   62.63
 FLOW VELOCITY(FEET/SEC.) =   0.73   DEPTH*VELOCITY(FT*FT/SEC) =   0.09
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.30 =     476.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      2.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .9500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    47.00
 UPSTREAM ELEVATION(FEET) =    688.43
 DOWNSTREAM ELEVATION(FEET) =    688.02
 ELEVATION DIFFERENCE(FEET) =      0.41
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.937
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.500
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.09
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.09

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.10 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .8400
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    688.43
 DOWNSTREAM ELEVATION(FEET) =    686.79
 ELEVATION DIFFERENCE(FEET) =      1.64
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.295
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 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.500
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.15
 TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.15
==========================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        0.0  TC(MIN.) =      3.30
 PEAK FLOW RATE(CFS)   =       0.15
==========================================================================
==========================================================================
 END OF RATIONAL METHOD ANALYSIS
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