ERB ENGINEERING, INC.
AMERICAN INDIAN FIRM

ERB ENGINEERING, INC.
12320 STOWE DRIVE, SUITE E
POWAY, CALIFORNIA 92064
(858) 748-2130 • Fax (858)748-6089

100 YEAR CEQA STORM STUDY
FOR:
ROBERT KRUSE

04.04.06
A.P.N. 283-011-11

LOCATION: HIGHLAND VALLEY ROAD RAMPNA CA.

EDDIE M. JOHNSON R.C.E. 40318

ADDENDUM

Per 1/11/07 Scoping Letter Included

Charles S. Little, RCE 65179

JO-05-25

REGISTERED PROFESSIONAL ENGINEER
EDDIE MICHAEL JOHNSON
C040318
Exp. 12/31/06
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
CHARLES STARK LITTLE
C 65129
Exp. 9/30/07
CIVIL
STATE OF CALIFORNIA

COMPUTER CODES

SUBAREA HYDROLOGIC PROCESSES:

1: Confluence analysis at node
2: Initial subarea analysis
3: Pipeflow traveltime (COMPUTER ESTIMATED pipesize)
4: Pipeflow traveltime . . . . . (USER SPECIFIED pipesize)
5: Trapezoidal channel travel time
6: Street-Flow analysis thru subarea
7: User-specified information at node
8: Addition of subarea runoff to mainline
9: V-gutter flow thru subarea

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(619) 748-2130 • FAX (619) 748-6089

W.O. No. 05-25
DATE: 4/4/06
BY: EMJ CK:
SHEET 1 OF: 1

DRAINAGE DATA WORKSHEET FOR: 100 year Storm
SURFACE FLOW TABLE

ANALYSIS PT FROM	TO	LINK DESC.	CODE	HIGH PT (ft)	LOW PT (ft)	FLOW PATH (ft)	AREA (acs)	"C"	REMARKS
100	102	Init Area	2	1511.5	1510.0	90	0.13		Area [1]
102	104	Channel	5	1510	1437	830			
104	104	Add Area	8				8.1		Area [2]
Note		Area [3] = 0.2 Acres has not affect on project							

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2005 Advanced Engineering Software (aes)
             Ver. 2.0 Release Date: 06/01/2005  License ID 1432

                          Analysis prepared by:

                        E.R.B. ENGINEERING, INC.
                        12320 STOWE DRIVE STE E
                            POWAY CA. 92063


 ************************** DESCRIPTION OF STUDY **************************
* 100 YEAR EVENT STORM                                                    *
* PROJECT 05-25 PRELIMENARY STUDY                                         *
* 4.4.06                                                                  *
 **************************************************************************

  FILE NAME: 0525PREL.DAT
  TIME/DATE OF STUDY: 09:23 04/04/2006
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  79
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
UPSTREAM ELEVATION(FEET) =   1511.50
DOWNSTREAM ELEVATION(FEET) =   1510.00
ELEVATION DIFFERENCE(FEET) =      1.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.234
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.208
SUBAREA RUNOFF(CFS) =      0.34
TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1510.00  DOWNSTREAM(FEET) =   1437.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   830.00   CHANNEL SLOPE =  0.0880
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) =      0.34
FLOW VELOCITY(FEET/SEC) =   4.45 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   3.11   Tc(MIN.) =  12.34
LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =   920.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.148
RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  79
AREA-AVERAGE RUNOFF COEFFICIENT = 0.4200
SUBAREA AREA(ACRES) =     8.10   SUBAREA RUNOFF(CFS) =   17.51
TOTAL AREA(ACRES) =       8.23   TOTAL RUNOFF(CFS) =   17.80
TC(MIN.) =  12.34
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =      8.23  TC(MIN.) =     12.34
PEAK FLOW RATE(CFS)    =     17.80
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

Hydraulic
Calculations.

10-05-25
4.4.06

Hydraulic Calculation of
D-40 Energy Dissipator
@ Node 200

Q(100) = 17.8 CFS
See Calc Sheet for
D-75 @ $S = \frac{4}{28} = 14.3\%$

D-75 AT NODE 200

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.016	
Channel Slope	0.14300	ft/ft
Diameter	24.00	in
Discharge	17.80	ft^3/s

Results

Normal Depth	0.69	ft
Flow Area	0.96	ft^2
Wetted Perimeter	2.51	ft
Top Width	1.90	ft
Critical Depth	1.52	ft
Percent Full	34.5	%
Critical Slope	0.01094	ft/ft
Velocity	~~18.51~~	~~ft/s~~
Velocity Head	5.33	ft
Specific Energy	6.02	ft
Froude Number	4.59	
Maximum Discharge	74.77	ft^3/s
Discharge Full	69.50	ft^3/s
Slope Full	0.00938	ft/ft
Flow Type	SuperCritical	

Use Rock Class Light T = 2.0

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

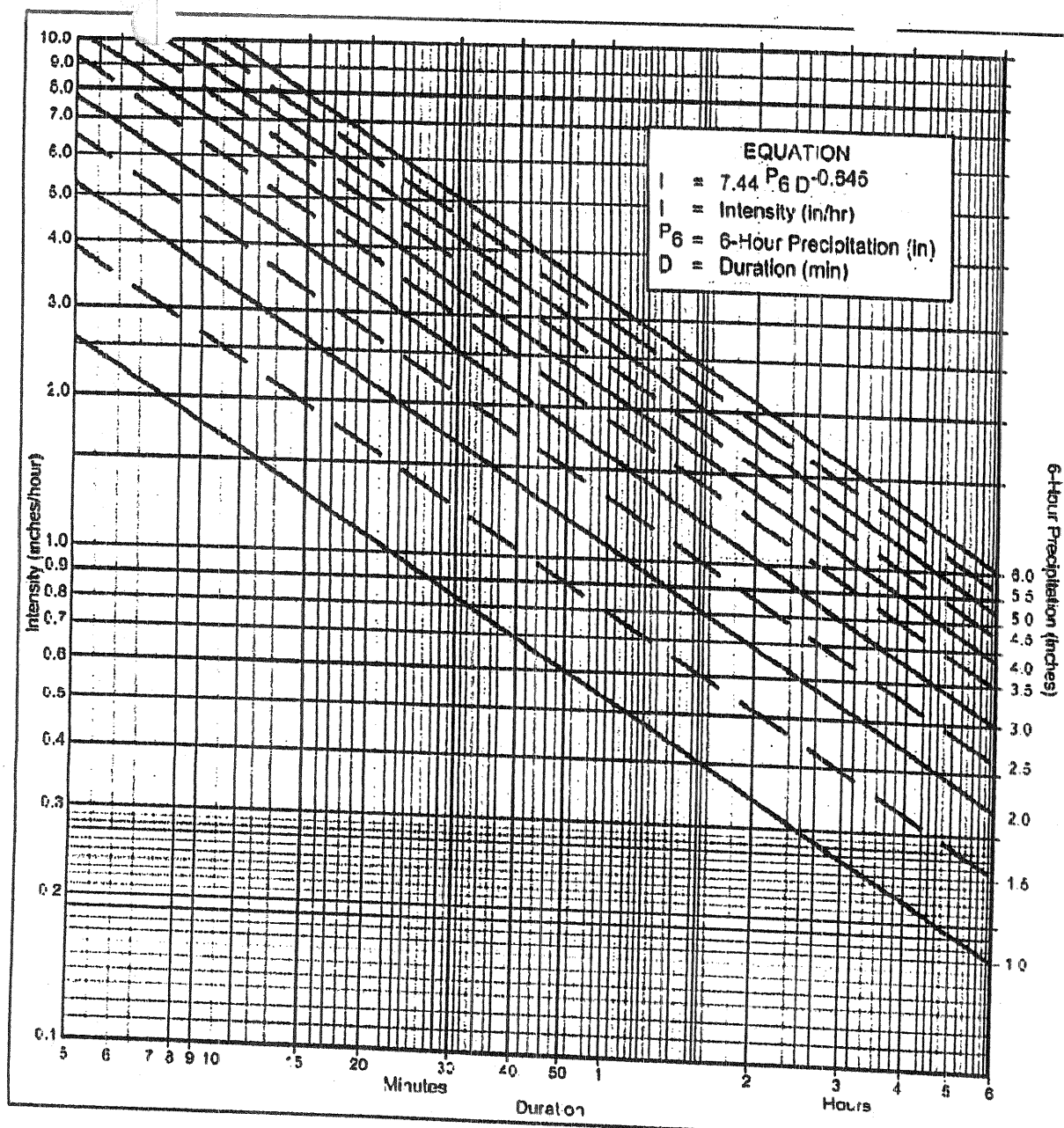
GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	34.51	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s

D-75 AT NODE 200

GVF Output Data

Normal Depth	0.69	ft
Critical Depth	1.52	ft
Channel Slope	0.14300	ft/ft
Critical Slope	0.01094	ft/ft



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency _____ year

(b) P_6 = 3.5 in., P_{24} = 6.0, $\frac{P_6}{P_{24}}$ = 58.3 %[2]

(c) Adjusted P_6[2] = 3.5 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6 / Duration	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.85	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.99	3.29	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

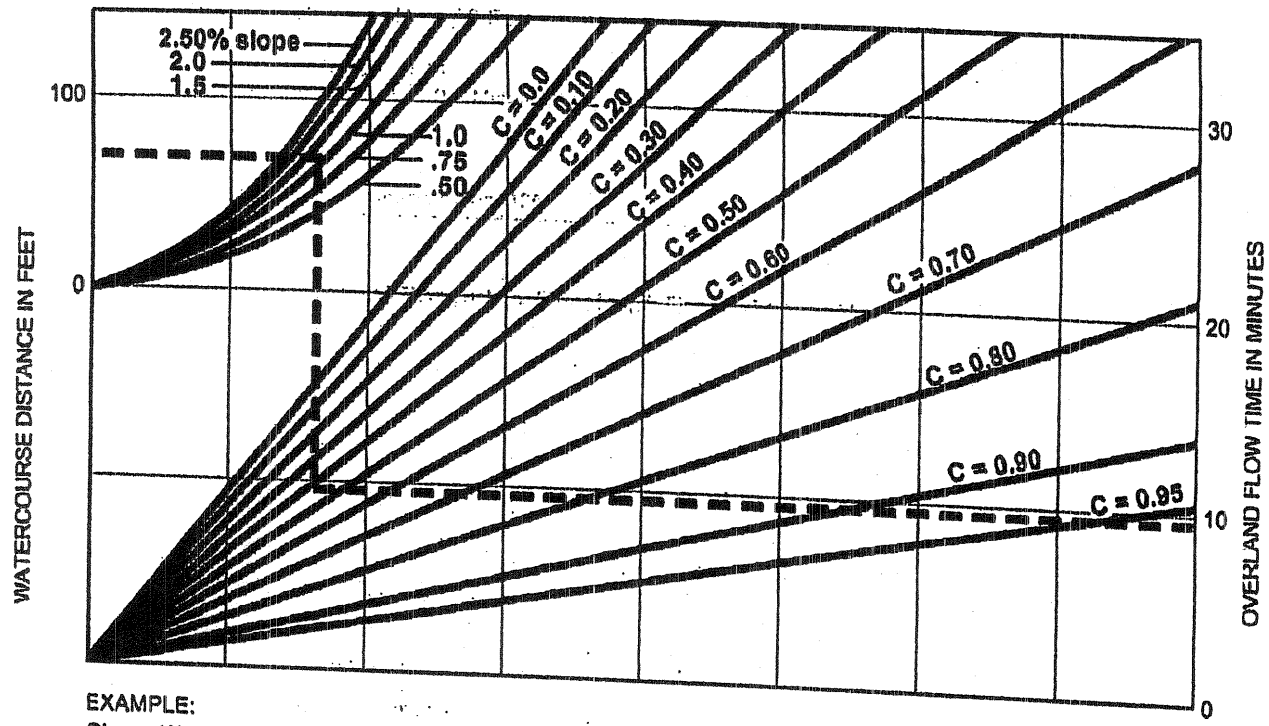
FIGURE

3-1

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

Rational Formula - Overland Time of Flow Nomograph

FIGURE

3-3

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

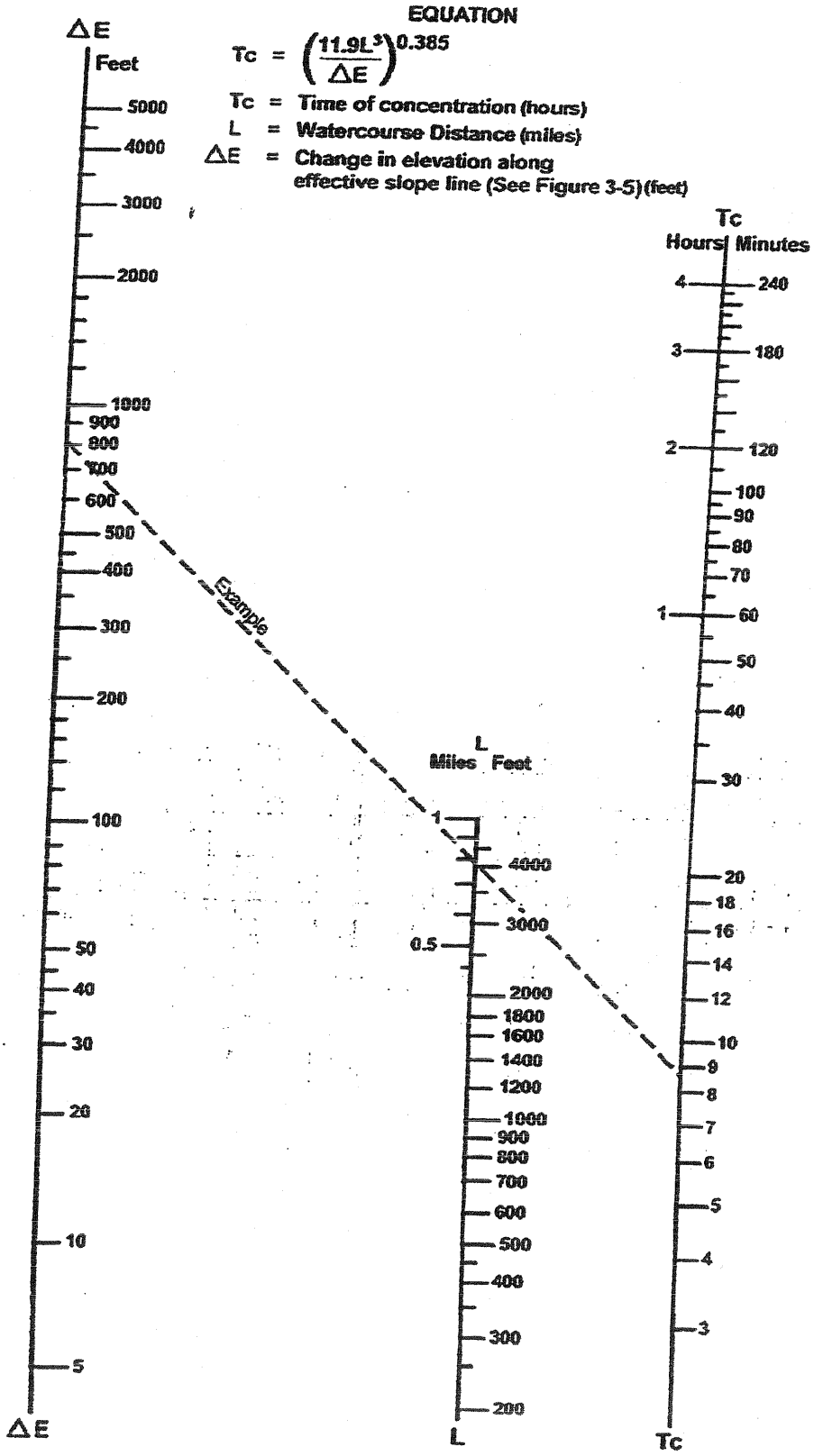
Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M) & INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/	.5%		1%		2%		3%		5%		10%	
	Acre	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

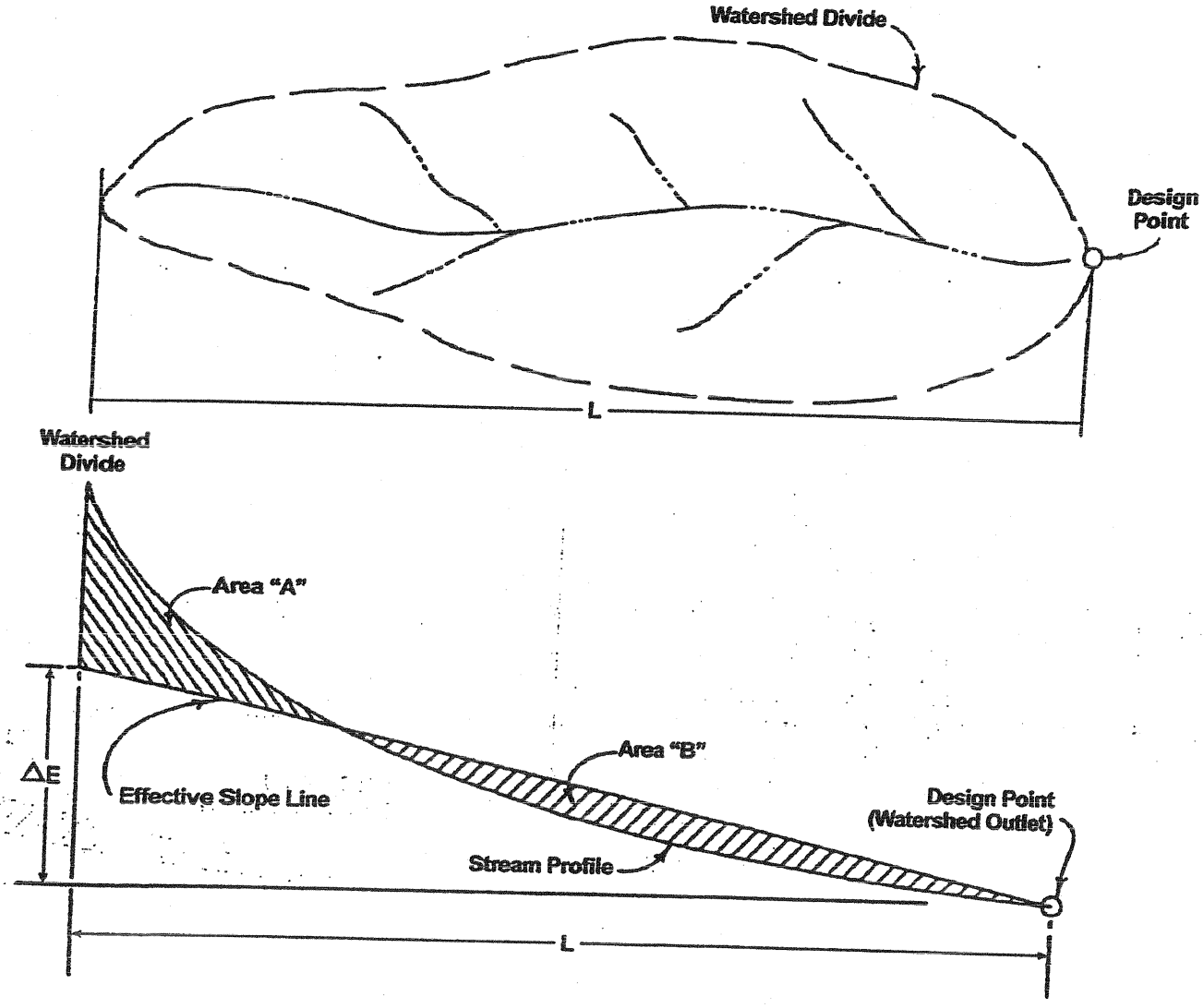


SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE

3-4

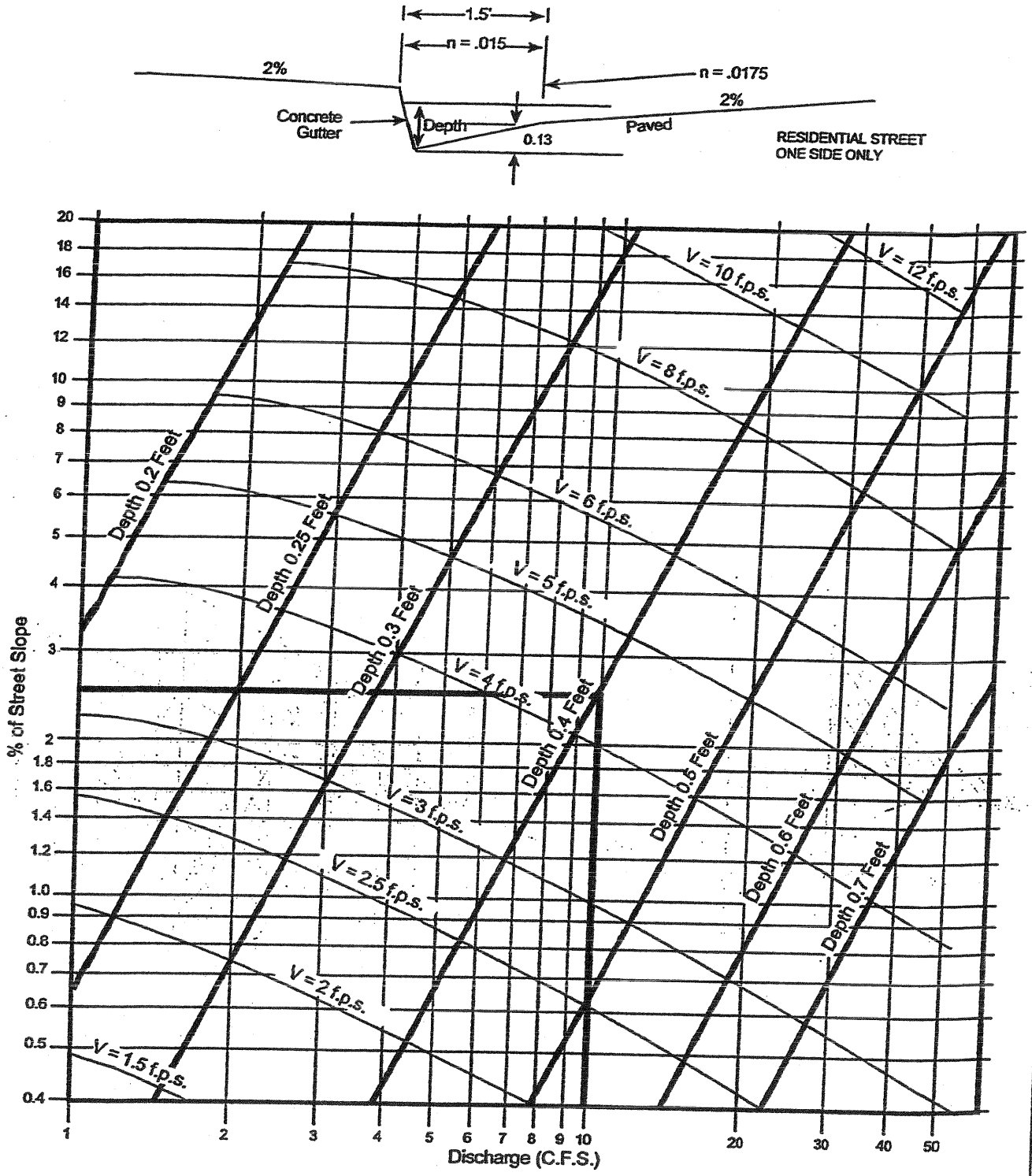
Nomograph for Determination of
Time of Concentration (Tc) or Travel Time (Tt) for Natural Watersheds



SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE 3-5

Computation of Effective Slope for Natural Watersheds



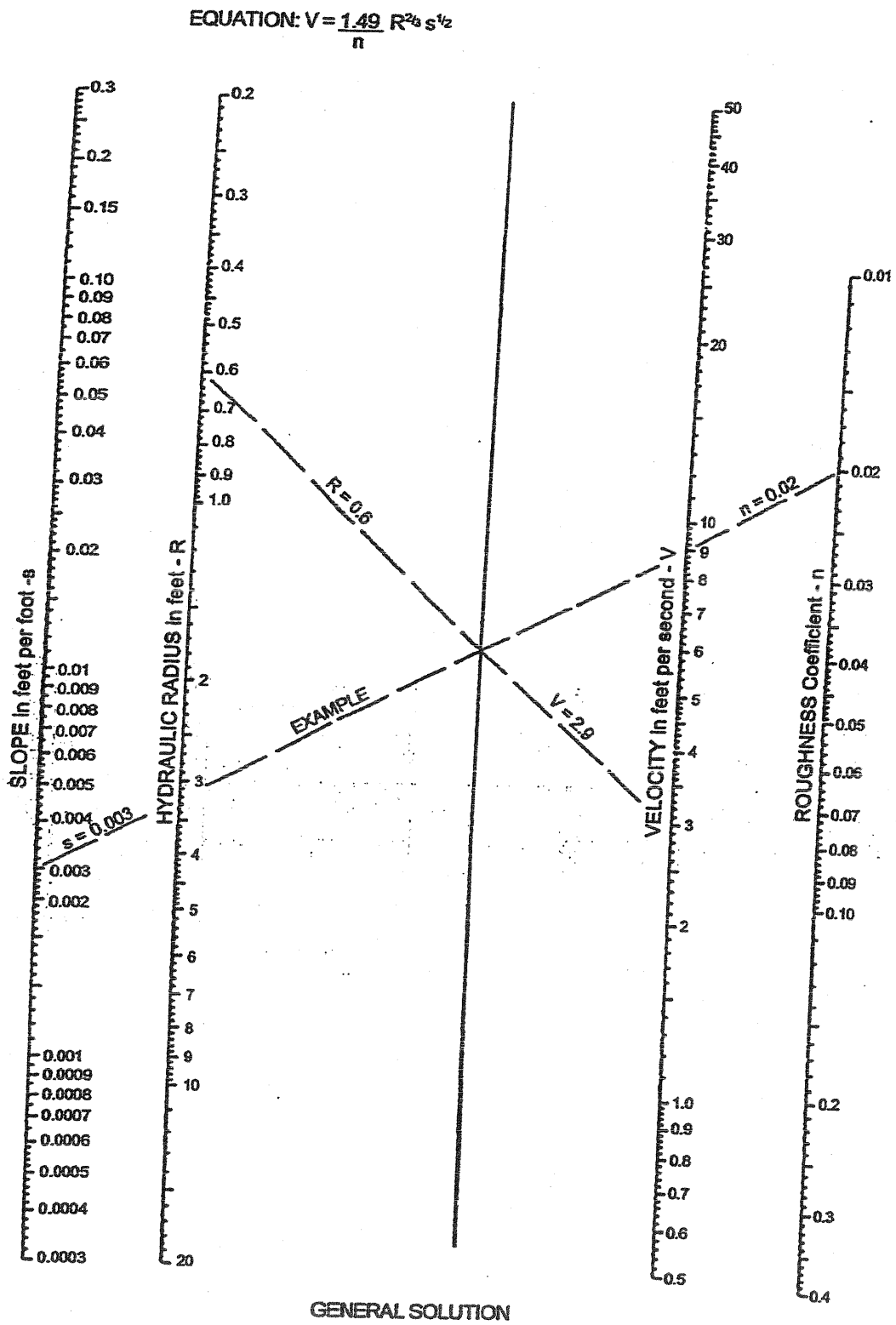
EXAMPLE:
Given: Q = 10 S = 2.5%
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

SOURCE: San Diego County Department of Special District Services Design Manual

FIGURE

Gutter and Roadway Discharge - Velocity Chart

3-6

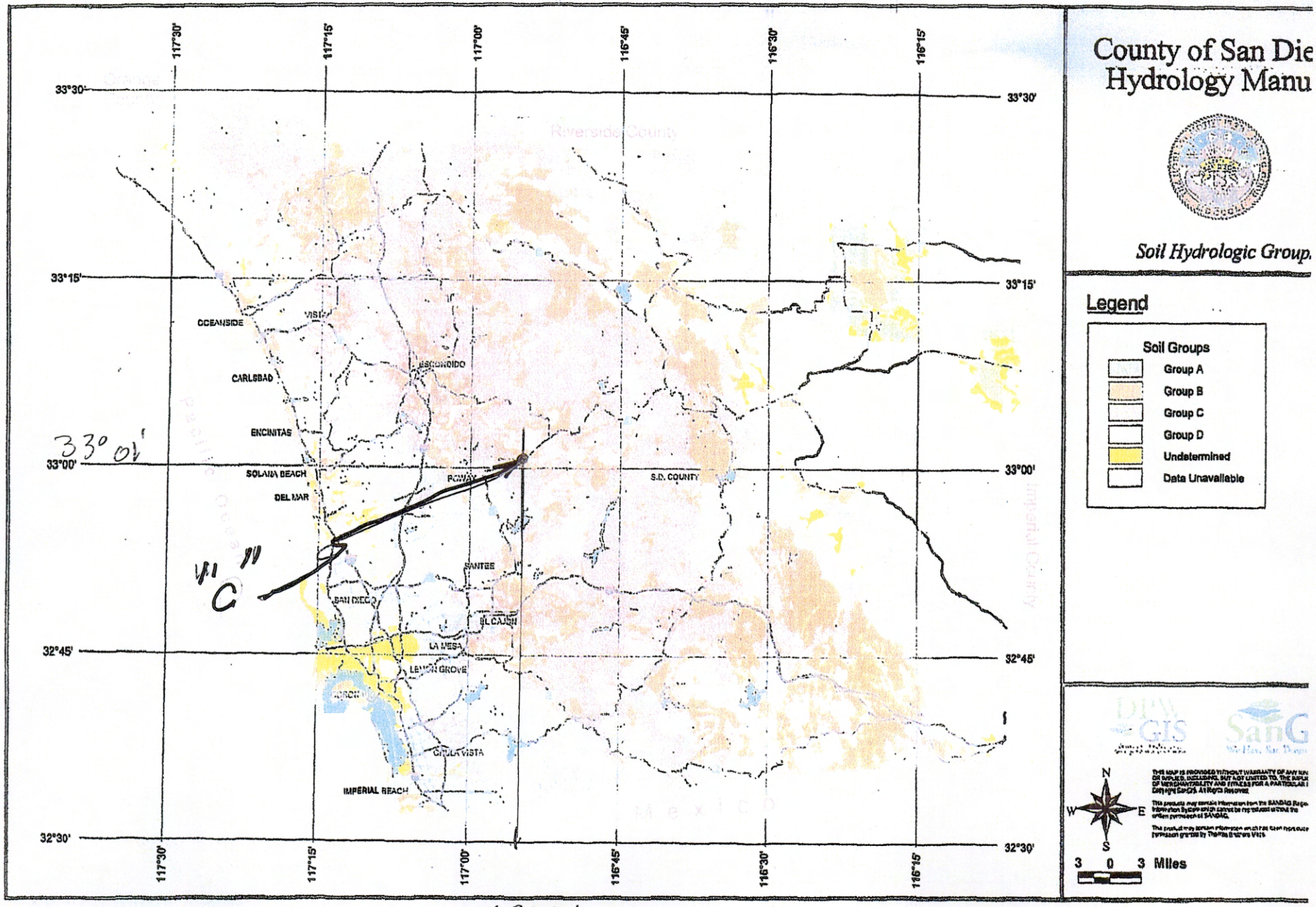


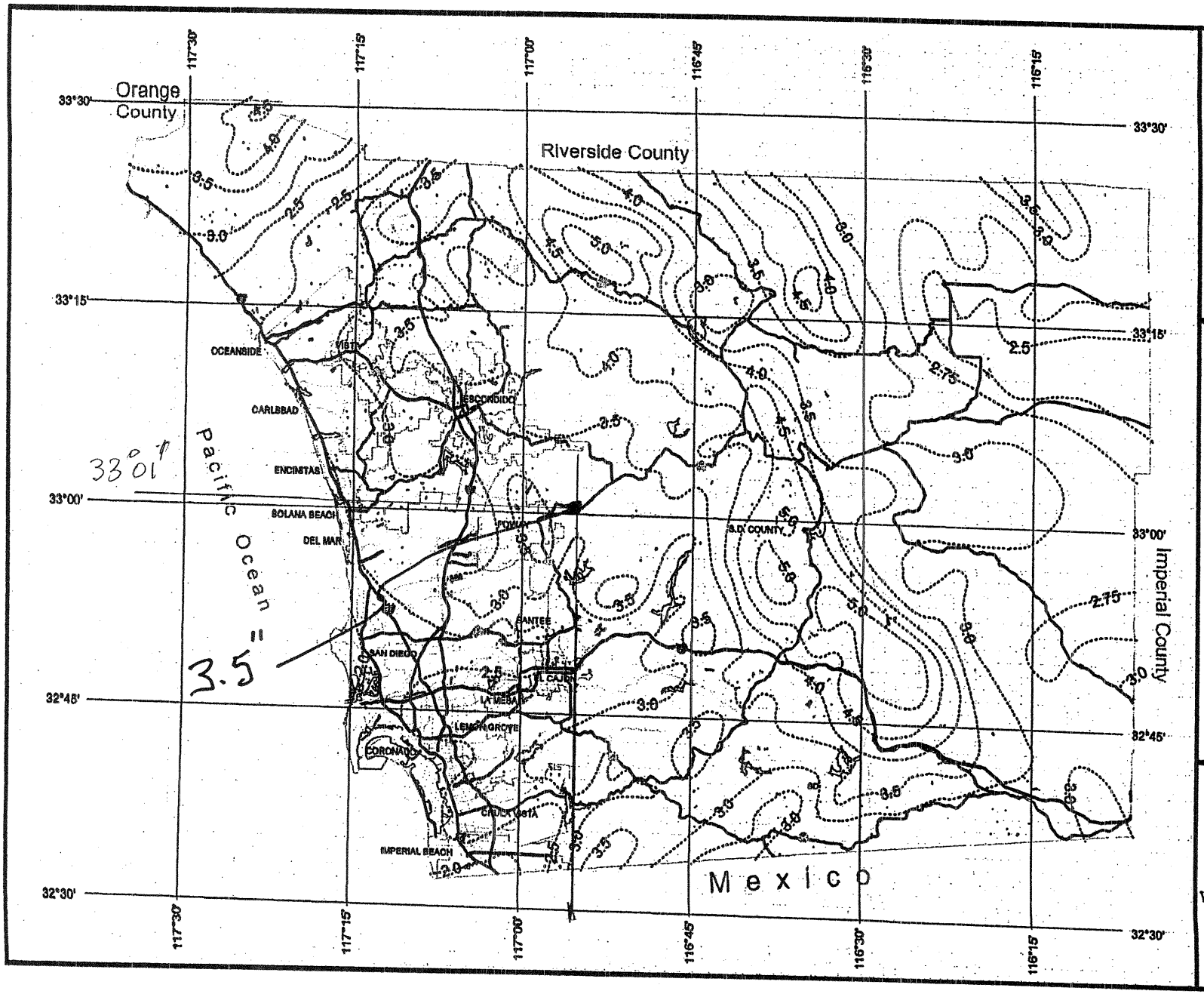
SOURCE: USDOT, FHWA, HDS-3 (1961)

FIGURE

Manning's Equation Nomograph

3-7


County of San Die
Hydrology Manu
Soil Hydrologic Group
Legend
Soil Groups
Group A
Group B
Group C
Group D
Undetermined
Data Unavailable
117°30'
117°15'
117°00'
116°45'
116°30'
116°15'
33°30'
33°15'
33°00'
32°45'
32°30'
OCEANSIDE
VISTA
CARLSBAD
ENCINITAS
SOLANA BEACH
DEL MAR
ESCONDIDO
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CHULA VISTA
IMPERIAL BEACH
Riverside County
Imperial County
33° 01'
"C"
116°55'
N
S
E
W
3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS

SanGIS
We Have San Diego Covered

N
W E
S

3 0 3 Miles

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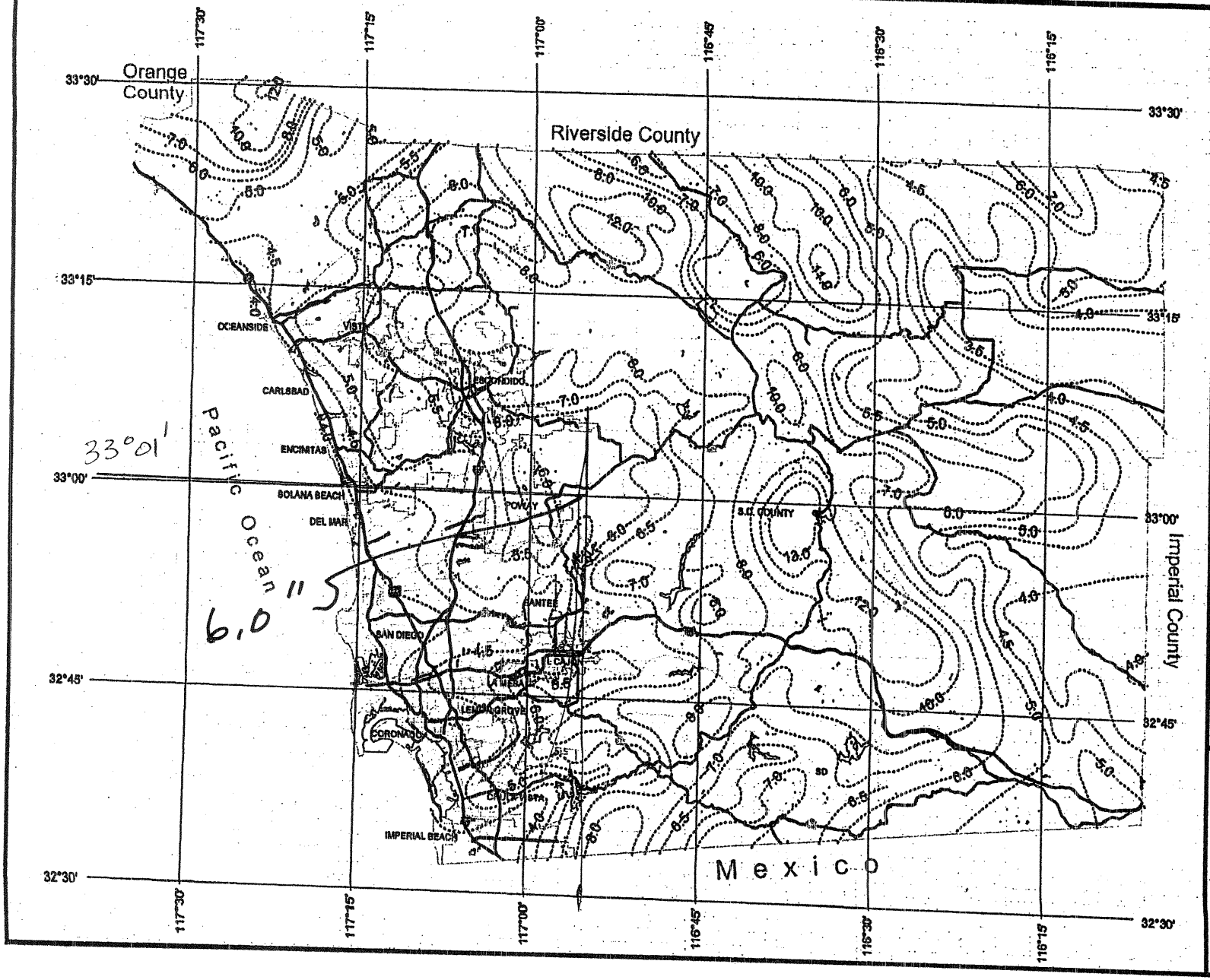
33°01' 116°55'30"

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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N W E S

3 0 3 Miles

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POWAY, CALIFORNIA 92064
(858) 748-2130 • Fax (858)748-6089

ADDENDUM

PER 1/11/07 SCOPING LETTER

Charles S. Little, 5/09/07

C. Little 1/2
5/09/07

Sizing & Cross Section for Vegetated Swale for TPM 21031

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.250	
Channel Slope	0.09670	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	3.00	ft
Discharge	19.14	ft^3/s

Results

Normal Depth	1.49	ft
Flow Area	11.14	ft^2
Wetted Perimeter	12.43	ft
Top Width	11.95	ft
Critical Depth	0.82	ft
Critical Slope	1.15071	ft/ft
Velocity	1.72	ft/s
Velocity Head	0.05	ft
Specific Energy	1.54	ft
Froude Number	0.31	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.49	ft
Critical Depth	0.82	ft
Channel Slope	0.09670	ft/ft
Critical Slope	1.15071	ft/ft

C. Little
5/09/07

2/2

Sizing & Cross Section for Vegetated Swale for TPM 21031

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.250	
Channel Slope	0.09670	ft/ft
Normal Depth	1.49	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	3.00	ft
Discharge	19.14	ft^3/s

Cross Section Image

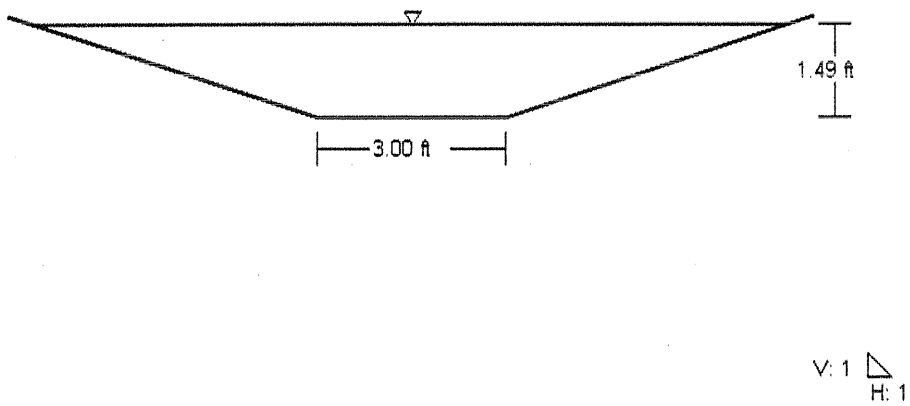


TABLE 11.--INTERPRETATIONS FOR LAND MANAGEMENT--Continued

Map symbol	Soil	Hydrologic group	Erodibility	Limitations for conversion from brush to grass
DcD	Diablo-Urban land complex, 5 to 15 percent slopes:			
	Diablo	D		
	Urban land	D		
DcF	Diablo-Urban land complex, 15 to 50 percent slopes:			
	Diablo	D		
	Urban land	D		
DoE	Diablo-Olivenhain complex, 9 to 30 percent slopes:			
	Diablo	D	Moderate 1	Slight.
	Olivenhain	D	Moderate 1	Severe.
EdC	Elder shaly fine sandy loam, 2 to 9 percent slopes	B	Moderate 2	Slight.
EsC	Escondido very fine sandy loam, 5 to 9 percent slopes.	C	Severe 16	Slight.
EsD2	Escondido very fine sandy loam, 9 to 15 percent slopes, eroded.	C	Severe 16	Slight.
EsE2	Escondido very fine sandy loam, 15 to 30 percent slopes, eroded.	C	Severe 16	Slight.
EvC	Escondido very fine sandy loam, deep, 5 to 9 percent slopes.	C	Severe 16	Slight.
ExE	Exchequer rocky silt loam, 9 to 30 percent slopes	D	Severe 9	Severe.
ExG	Exchequer rocky silt loam, 30 to 70 percent slopes	D	Severe 1	Severe.
FaB	Fallbrook sandy loam, 2 to 5 percent slopes	C	Severe 16	Slight.
FaC	Fallbrook sandy loam, 5 to 9 percent slopes	C	Severe 16	Slight.
FaC2	Fallbrook sandy loam, 5 to 9 percent slopes, eroded	C	Severe 16	Slight.
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	C	Severe 16	Slight.
FaE2	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	C	Severe 16	Slight.
FaE3	Fallbrook sandy loam, 9 to 30 percent slopes, severely eroded.	C	Severe 16	Severe.
FeC	Fallbrook rocky sandy loam, 5 to 9 percent slopes	C	Severe 16	Slight.
FeE	Fallbrook rocky sandy loam, 9 to 30 percent slopes	C	Severe 16	Moderate.
FeE2	Fallbrook rocky sandy loam, 9 to 30 percent slopes, eroded.	C	Severe 16	Moderate.
FvD	Fallbrook-Vista sandy loams, 9 to 15 percent slopes:			
	Fallbrook	C	Severe 16	Slight.
	Vista	B	Severe 16	Moderate.
FvE	Fallbrook-Vista sandy loams, 15 to 30 percent slopes:			
	Fallbrook	C	Severe 16	Slight.
	Vista	B	Severe 16	Moderate.
FwF	Friant fine sandy loam, 30 to 50 percent slopes	D	Severe 9	Severe.
FxE	Friant rocky fine sandy loam, 9 to 30 percent slopes.	D	Severe 9	Severe.
FxG	Friant rocky fine sandy loam, 30 to 70 percent slopes.	D	Severe 1	Severe.
GaE	Gaviota fine sandy loam, 9 to 30 percent slopes	D	Severe 9	Severe.
GaF	Gaviota fine sandy loam, 30 to 50 percent slopes	D	Severe 1	Severe.
GoA	Grangeville fine sandy loam, 0 to 2 percent slopes	B	Severe 16	Slight.
GrA	Greenfield sandy loam, 0 to 2 percent slopes	B	Severe 16	Slight.
GrB	Greenfield sandy loam, 2 to 5 percent slopes	B	Severe 16	Slight.
GrC	Greenfield sandy loam, 5 to 9 percent slopes	B	Severe 16	Slight.
GrD	Greenfield sandy loam, 9 to 15 percent slopes	B	Severe 16	Slight.

Map symbol	
HnG	Holland stony f slopes.
HoC	Holland fine sa slopes.
HrC	Huerhuero loam,
HrC2	Huerhuero loam,
HrD	Huerhuero loam,
HrD2	Huerhuero loam,
HrE2	Huerhuero loam,
HuC	Huerhuero-Urbar Huerhuero-- Urban land-
HuE	Huerhuero-Urbar Huerhuero-- Urban land-
InA	Indio silt loa
InB	Indio silt loa
IoA	Indio silt loa
IsA	Indio silt loa
KcC	Kitchen Creek slopes.
KcD2	Kitchen Creek slopes, erod
LaE2	La Posta loamy eroded.
LaE3	La Posta loamy severely ero
LcE	La Posta rocky slopes.
LcE2	La Posta rocky slopes, eroc
LcF2	La Posta rocky slopes, eroc
LdE	La Posta-Shee La Posta-- Sheephead
LdG	La Posta-Shee La Posta- Sheephead
LeC	Las Flores lo
LeC2	Las Flores lo eroded.
LeD	Las Flores lo
LeD2	Las Flores lo eroded.
LeE	Las Flores lo
LeE2	Las Flores lo eroded.
LeE3	Las Flores lo

C. Little
5/09/07

Addendum to:
100 Year CEQA Storm Study For: Robert Kruse
A.P.N. 283-011-11

This addendum is in response to the County of San Diego's scoping letter of January 11, 2007. The comments and response to those comments are as follows:

1. Include land use and soils group maps showing grids in developing "C" values. Show method/calculations of "C" values used for developed conditions.

   Response: The area of watershed contributing to discharge at node 104 (northeastern corner of Parcel 2) is approximately 8.23 acres. Since neither the pre and post development land use nor the soil type vary, it is not necessary to calculate a weighted "C" value. However, this addendum does confirm that the soil of the watershed is predominately within the "C" hydrological group. This soil information from USDA's Soil Survey of San Diego County has been included in this addendum.

2. Include a table for pre-development versus post-development drainage showing all points of concentration (on-site and off-site) and data including a narrative on the adequacy of all drainage facilities impacted directly by proposed development.

   Response: A table showing the pre and post development drainage at the northwestern corner the lowest point on the site (node 104) is shown on the next page of this addendum.
   The existing drainage facilities consist of a concrete gutter on the east side of the private road that connects to the driveway for the existing residence on Parcel 1. The concrete gutter ends at about 150 feet north of the southwest property corner and transitions into an asphalt berm. These existing drainage facilities will be improved by the proposed development using vegetated swales.

3. Address all flow paths (on-site and off-site) on hydrology map. The preliminary drainage study specifies rip rap size for "node 200" this node is not indicated on the basin map or in the hydrology

Addendum to:
100 Year CEQA Storm Study For: Robert Kruse
A.P.N. 283-011-11

calculations. Please indicated location of node 200, also rip rap specifications shall meet current "greenbook" requirements for rock class with a given discharge velocity.

Response: Node 200 has been removed from the post-development hydrology and replaced with node 104 that coincides with node 104 of the pre-development hydrology. A post-development hydrology map has been revised because of changes to the preliminary grading plan and has been included in this report. The location of node 104 is also shown on this post-development hydrology map.

Comparison of Pre-development and Post-development Node

Pre-development Node	Post-development Node	Post-development Q(cfs)&V(fps)	Pre-development Q(cfs)&V(fps)
104	104	19.14 & 1.7 fps (vegetated swale)	17.80 cfs & 4.4 fps

C. Little
May 9, 2007

Hydrology Calculation to Determine Post Development Flows
For 100 CEQA Storm Study For:
Robert Kruse

This project proposes subdividing an existing 4.67 acre lot into two parcels, each approximately 2.33 acres. One parcel, parcel 1 to the south, has an existing residential unit. The second parcel, parcel 2 to the north, proposes a new residential unit. The improvements associated with this subdivision include widening the existing private road from 14 feet to 20 feet paved width.

Therefore, the only factors that will increase runoff because of an increase of impervious areas are the additional pavement to increase the private road width, the construction of new driveway to the proposed residential unit for parcel 2, and construction of the roof for the proposed residential unit for parcel 2. These areas total 0.30 acres. Therefore to calculate the additional runoff from these areas the intensity (I) of 5.15 inches/hour (from the 100-Year CEQA Storm Study) will be used. For the C-value, a value of 0.87 for a 95% impervious area from Table 3-1 will be used.

Using the Rational Method as shown below, the difference of runoff between post development and pre development at Node 104 will be 1.34 ft^3/s.

The calculation is as follows:

Q = CIA (Modified Rational Method)

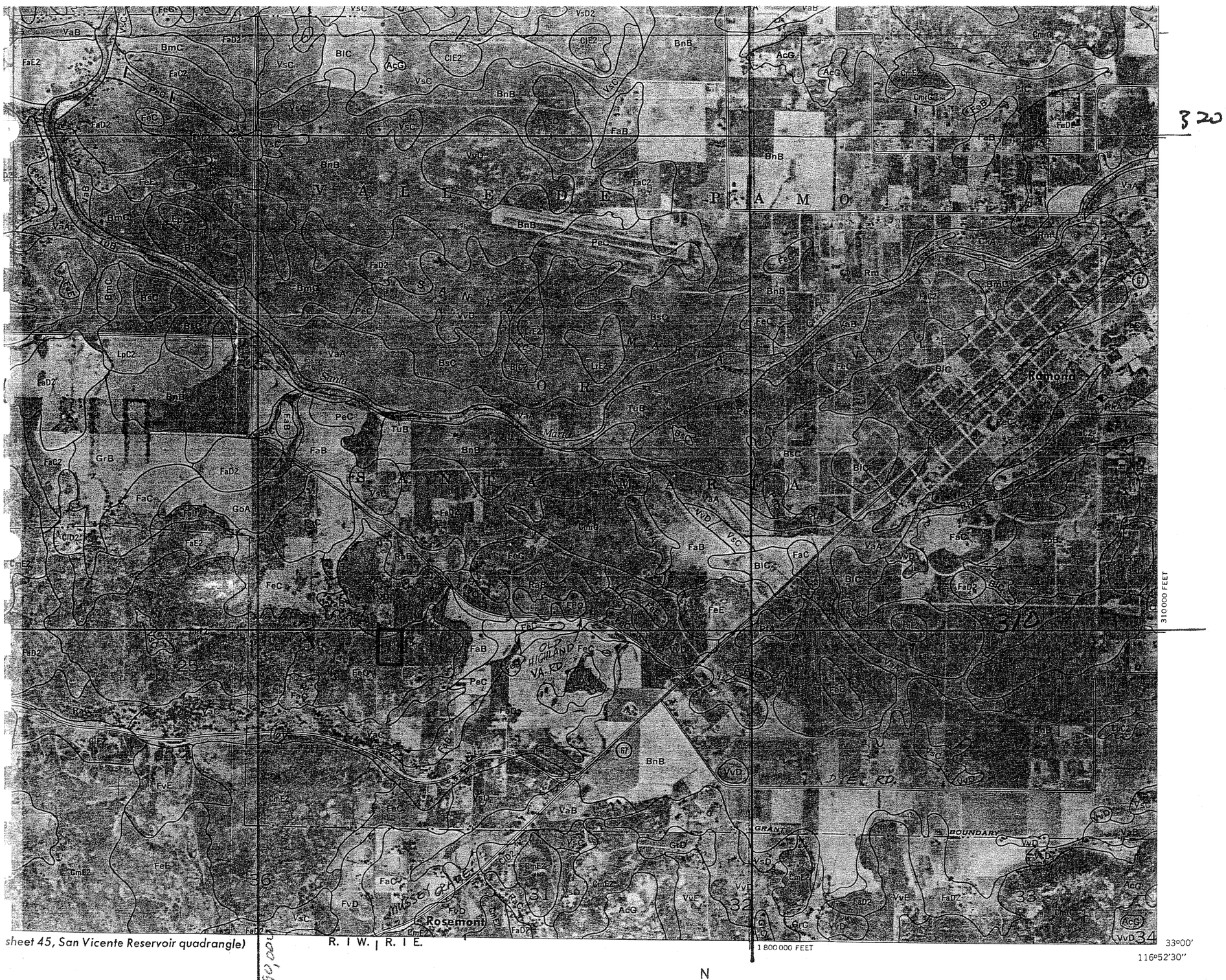
A = 0.23 acres (additional pavement)

A = 0.07 acres (roof top)

A = 0.30 acres (total)

Q = 0.87 (5.15 inches/hour) 0.30 acres

Q = 1.34 ft^3/s



Scale 1:24 000

¼ 0 1 2 Miles

1 000 0 5 000 10 000 Feet

N

Cooperating Agencies
San Diego County Planning Department
San Diego County Comprehensive Planning Organization
U.S. Dept. of Agriculture-Forest Service
U.S. Dept. of the Interior, Bureau ...

This map is one of a set of 76 compiled 1969-70 by the Soil Conservation Service

Sheet No 36

COUNTY OF SAN DIEGO — TOPOGRAPHIC SURVEY

-LEGEND-

- Horizontal Control Monument, *Third Order*; Vertical Control Monument, *Second Order or Better*
- Horizontal Control Monument, *Second Order or Better*; Vertical Control Monument, *Third Order*
- Horizontal Control Monument, *Second Order or Better*
- Horizontal Control Monument & Bench Mark, *Second Order or Better*
- Horizontal Control Monument, *Third Order*
- Horizontal Control Monument & Bench Mark, *Third Order*
- Bench Mark, *Second Order or Better*
- Vertical Control Monument, *Third Order*
- Property Corner Found & Coordinated (California Coordinate System, Zone 6)
- 36 31 / 16 T 19 S / T 13 S / R 2 W / R 1 W — Found Section, Grant or Subdivision Corner
- Photograph, Nadir Point
- Geographic Tick

BOUNDARIES IN ORDER OF PRECEDENCE
(Land Lines Shown are Approximate)

- .025" — National
- Name .025" / Name — County
- .015" — City
- Name within Bdry. .015" — Reservation
- Name within Bdry. .015" — National, State or County Park
- Name within Bdry. .015" — Land Grant
- T 2 S / T 3 S .015" — Township, Range or Section

PREPARED UNDER THE DIRECTION
of
DEPARTMENT OF PUBLIC WORKS
County of San Diego

CONTROL DATA FURNISHED
by
SURVEY SECTION
Department of Public Works

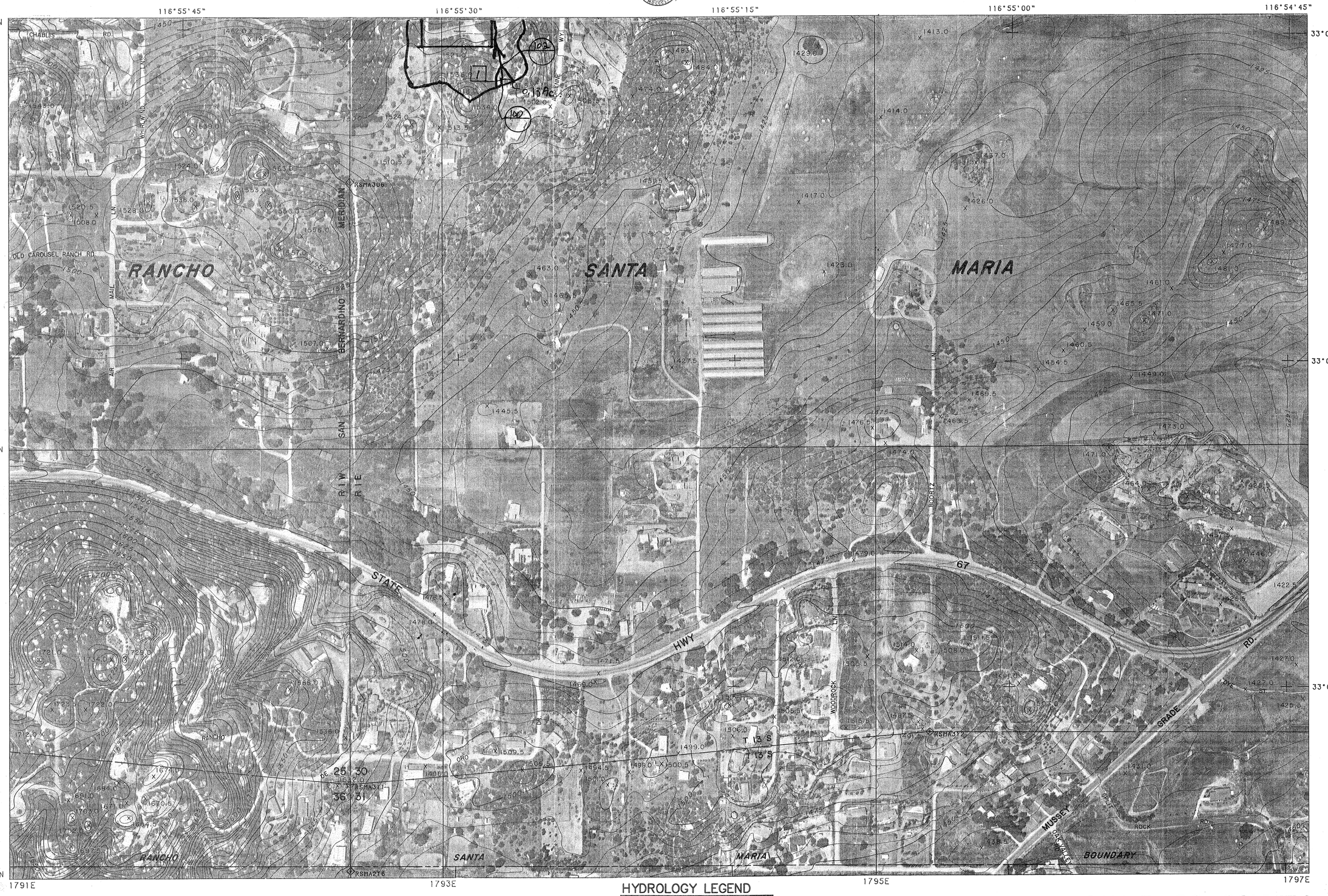
HORIZONTAL CONTROL BASED
on
NORTH AMERICAN 1927 DATUM

VERTICAL CONTROL BASED
on
U.S.C. & G.S. 1929 SEA LEVEL DATUM

ORTHOPHOTO IMAGE PREPARED
from
PHOTOGRAPHY DATED: APRIL 13, 1984
by
AMERICAN AERIAL SURVEYS, INC.

TOPOGRAPHY COMPILED
by
PHOTOGRAMMETRIC METHODS
from
PHOTOGRAPHY DATED: APRIL 13, 1984
by
BARTON WALTERS & ASSOCIATES, INC.

FINAL MAP PREPARED
by
MAPPING SECTION
Department of Public Works



This Map Complies with
NATIONAL MAP ACCURACY STANDARDS

200 0 200 400 600 800 1000 (Feet)
100 0 100 200 300 (Meters)

SCALE 1: 2400 (1" = 200')

INDEX CONTOUR INTERVAL: 25 FEET
CONTOUR INTERVAL: 5 FEET

TWO THOUSAND FOOT CALIFORNIA RECTANGULAR GRID (ZONE VI)
THE LAST THREE DIGITS OF THE GRID NUMBERS ARE OMITTED
THE RECTANGULAR COORDINATE VALUES ARE SHOWN ON THE SOUTH AND WEST MARGINS
THE GEOGRAPHIC VALUES ARE SHOWN ON THE NORTH AND EAST MARGINS

HYDROLOGY LEGEND

- 4 — DRAINAGE AREA
- 100 — NODE NUMBER
- DIRECTION OF DRAINAGE
- INITIAL AREA

INDEX TO ADJOINING SHEETS

310-1785	310-1791	310-1797
306-1785	306-1791	306-1797
302-1785	302-1791	302-1797

SAN DIEGO COUNTY CALIFORNIA

SHEET NO. 306-1791

05-25 Hydrology Exhibit off site 4.4.06

S

COUNTY OF SAN DIEGO

TOPOGRAPHIC SURVEY

-LEGEND-

- Horizontal Control Monument *Third Order* / Vertical Control Monument *Second Order or Better*
- Horizontal Control Monument *Second Order or Better* / Vertical Control Monument *Third Order*
- Horizontal Control Monument *Second Order or Better*
- Horizontal Control Monument & Bench Mark *Second Order or Better*
- Horizontal Control Monument *Third Order.*
- Horizontal Control Monument & Bench Mark *Third Order*
- Bench Mark *Second Order or Better*
- Vertical Control Monument *Third Order*
- Found Section, Grant or Subdivision Corner.
- Photograph, Nadir Point
- Geographic Tick

BOUNDARIES IN ORDER OF PRECEDENCE

- .025" National
- Name .025" Name County
- .015 City (*Use at Border with County*)
- Name within Bdry .015" Reservation
- Name within Bdry. .015" National, State or County Park
- Name within Bdry. .015" Land Grant
- T2S T3S .015" Township, Range, Section or Subdivision (*Name of Subdivision within Bdry.*)

PREPARED UNDER THE DIRECTION OF THE COUNTY ENGINEER OF THE COUNTY OF SAN DIEGO, CALIFORNIA.

MAP CONTROL DATA FURNISHED BY THE COUNTY OF SAN DIEGO.

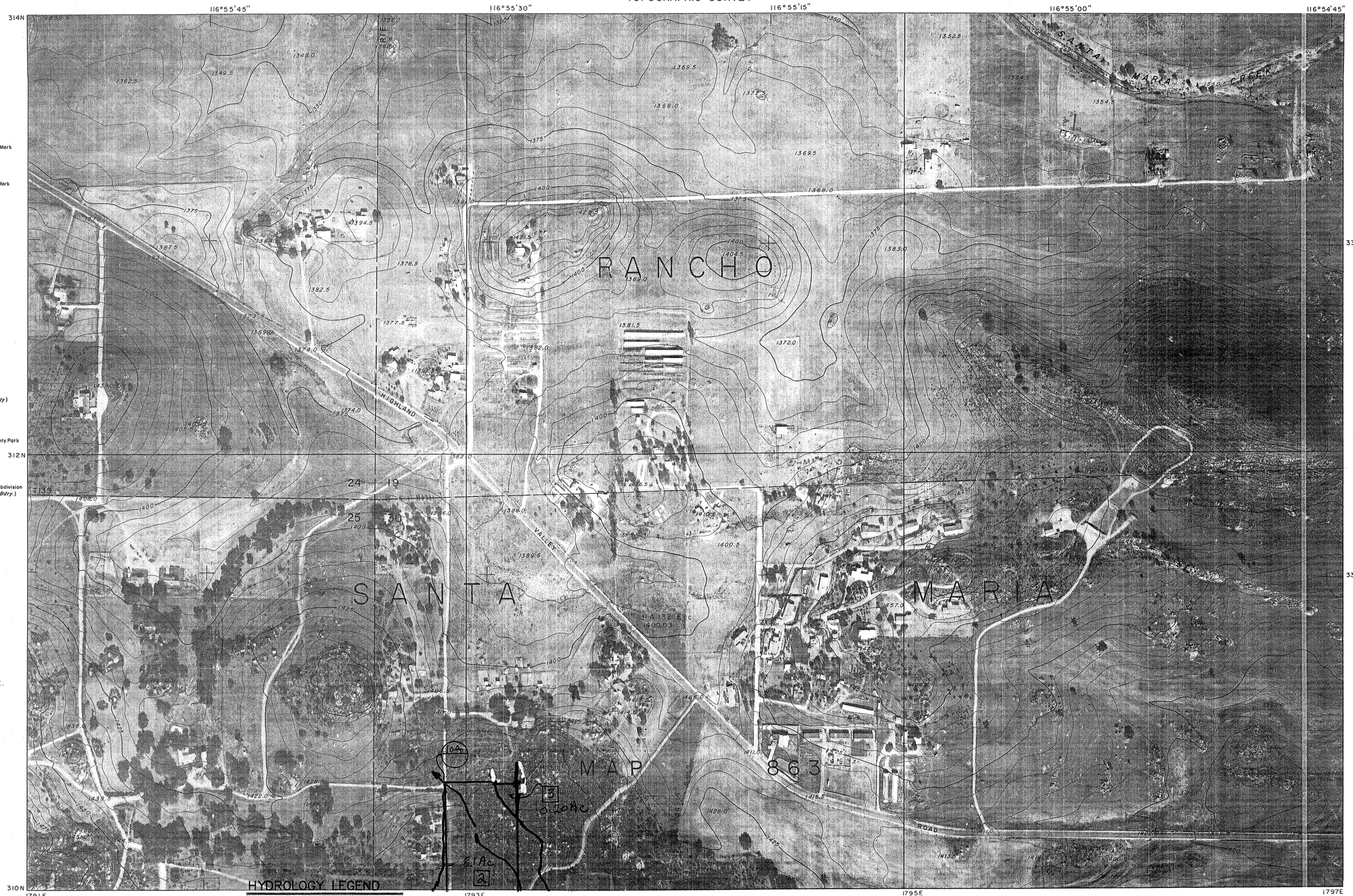
HORIZONTAL CONTROL IS BASED ON NORTH AMERICAN 1927 DATUM.

LAND LINES SHOWN ARE APPROXIMATE.

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS FROM PHOTOGRAPHY DATED 11-7-74 BY

INLAND AERIAL SURVEYS, INC.
5826 Magnolia Avenue
Riverside, California 92506

ORTHOPHOTO IMAGE PREPARED FROM PHOTOGRAPHY DATED 11-7-74 BY CALIFORNIA AERO TOPO, INC.



HYDROLOGY LEGEND

- 4 DRAINAGE AREA
- 100 NODE NUMBER
- DIRECTION OF DRAINAGE
- INITIAL AREA

SCALE 1:2400

200 0 200 400 600 800 1000

CONTOUR INTERVAL 5 FEET

U.S.C. & G.S. SEA LEVEL DATUM OF 1929

TWO THOUSAND FOOT CALIFORNIA RECTANGULAR GRID (ZONE VI)

THE LAST THREE DIGITS OF THE GRID NUMBERS ARE OMITTED

THE RECTANGULAR COORDINATE VALUES ARE SHOWN ON THE SOUTH AND WEST MARGINS

THE GEOGRAPHIC VALUES ARE SHOWN ON THE NORTH AND EAST MARGINS

INDEX TO ADJOINING SHEETS

314-1785	314-1791	314-1797
310-1785	310-1791	310-1797
306-1785	306-1791	306-1797

SAN DIEGO COUNTY
CALIFORNIA

EDITION OF 1975

SHEET 310-1791

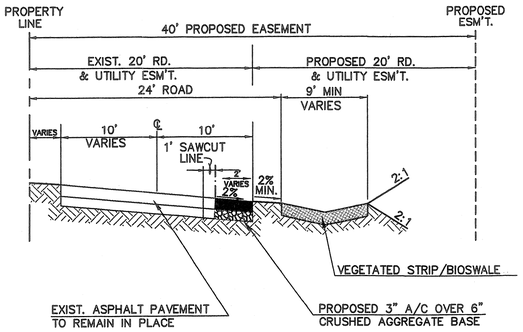
05-25

05-25 Hydrology Exhibit Off Site 9.4.06

5

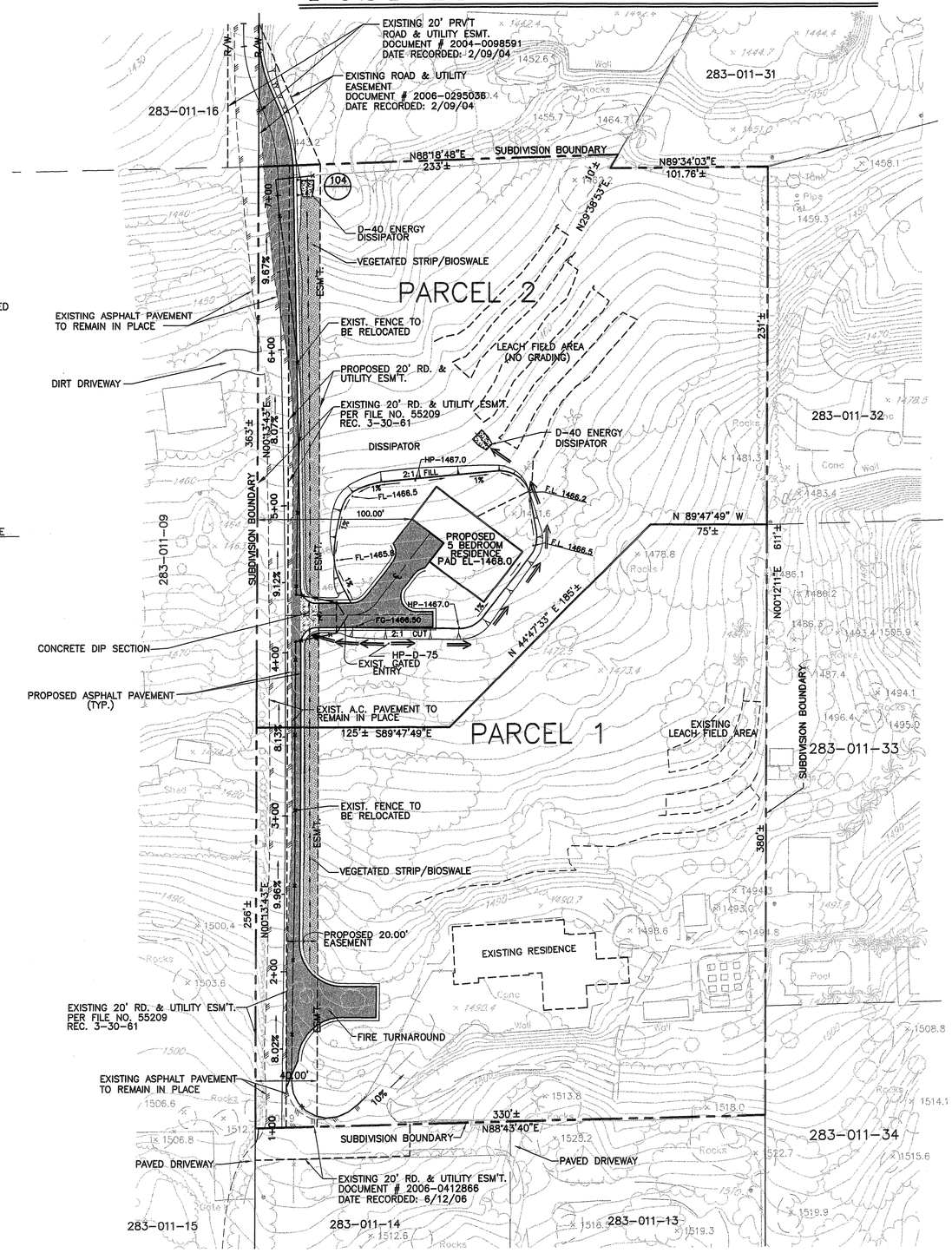
PRELIMINARY GRADING AND HYDROLGY PLAN FOR TPM 21301

POST DEVELOPMENT FLOWS



PRIVATE EASEMENT TYPICAL SECTION

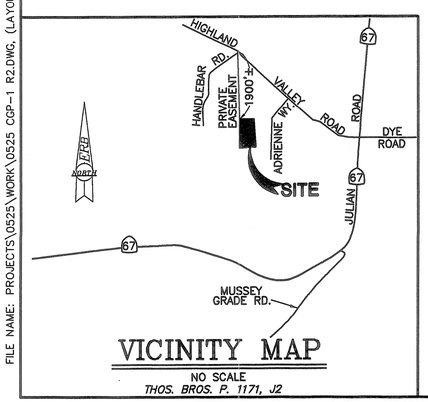
NOT TO SCALE



SCALE: 1"=40'

HYDROLOGY LEGEND

4	DRAINAGE AREA
100 / 10.6	NODE NUMBER/QUANTITY
→	DIRECTION OF FLOW
	INITIAL AREA
3	PIPE NUMBER



VICINITY MAP

NO SCALE

THOS. BROS. P. 1171, J2

FILE NAME: PROJECTS\0525\WORK\0525 CGP-1 R2.DWG, (LAYOUT HYDROLOGY EXHIBIT) 5.08.07

05-25

ERB ENGINEERING INC.
AN AMERICAN INDIAN FIRM

ERB ENGINEERING INC.
CIVIL ENGINEERS & LAND SURVEYORS
12320 STOWE DRIVE STE. E, POWAY, CA 92064
PHONE: (858)748-2130 FAX: (858)748-6089

05-25