APPENDIX F1
DRAINAGE STUDY

PRELIMINARY DRAINAGE STUDY
TTM 38577
Coronado At Menifee
APN # 335-400-002,001
Menifee, Riverside County, California
June 14, 2022
REV 1: May 2, 2023

Prepared for:

Floit Properties
C/O Quinn Communities
364 2nd Street, #5
Encinitas, CA
Contact: Stefan Lacasse
Ph. (760) 942-9991

Report Prepared By:

FM CIVIL ENGINEERS INC.

29995 Technology Drive, Suite 306
Murrieta, CA 92563

Engineer of Work/ Contact Person:
Francisco Martinez Jr., PE, QSD

This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

Francisco Martinez RCE Registered Civil Engineer	05/02/2023 Date	Seal

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FIGURES

APPENDICES

I. PURPOSE AND SCOPE

The purpose of this study is to determine the necessary drainage and increased runoff mitigation improvements required for the Coronado at Menifee project and proposed for industrial development in the City of Perris, County of Riverside.

The scope of the preliminary study includes the following:

1. Determination of points of flow concentration and watershed subareas for onsite and offsite areas.
2. Determination of the 100-year peak storm flows based upon the post-project onsite and existing condition offsite areas utilizing the Rational Method as outlined in the Riverside County Flood Control & Conservation District Manual (ref 1).
3. Determine the 100-year peak storm flows based upon the pre-project and post-project condition for the 24-hour storm duration utilizing the Unit Hydrograph Method as outlined in the Riverside County Flood Control & Water Conservation District Hydrology Manual.
4. Determine the required facilities to mitigate the 100-year peak storm flows for the 24-hour storm duration in the post-project condition to flows less than or equal to the existing condition flow rates.
5. Determine the required storm drain infrastructure to flood protect the project site for the 100-year storm event.
6. Preparation of a hydrology report, which consist of hydrological and analytical results and exhibits.

II. PROJECT SITE AND DRAINAGE AREA OVERVIEW

The property proposed for development is for a single-family rental (SFR) community, half-width street improvements on Thornton Ave, and half width improvements on the northerly portion of Esther Lane with partial 12' street improvements with a 3' shoulder on the southerly half, landscaped area, storm drain infrastructure, infiltration subsurface system and a small basin for water quality purposes. The project site is 9.66 acres and it is in Sun City, a neighborhood of the City of Menifee, County of Riverside, bounded by Thornton Ave to the north, Upper Crest Court to the west and vacant land to both the south and east of the project (See Figure 1).

The existing project site is currently vacant and zoned for low medium density residential (LMDR). The project site is currently on undeveloped vacant land with grasslands and shrubs. The site is considered relatively flat, and generally drains in an eastern direction. The site has an existing Riverside County Flood Control and Water Conservation District (RCFC & WCD) facility that outlets onto the property (See Appendix D7). The flows from the existing storm drain then travel in an easterly direction via an earthen swale. Offsite flows from the properties to the south are tributary to this stream and ultimately end up in an existing depressed inlet that is located on Murrieta Road east of our project site (See Figure 2). From there the flows enter Lateral E-1 of the Thornton Ave Storm Drain (See Appendix D8) and into Line E. The Line E storm drain outlets into the Sun City Channels. Ultimately, these flows will be conveyed via a series of natural swales into the Canyon Lake Reservoir.

During the proposed condition the offsite drainage areas will not enter the site. The combined offsite drainage areas total approximately 6.11 acres. 4.14 acres of the total offsite area is tributary to the partial 12' street improvements that are done on the southerly street width of Esther Lane. An earthen swale will intercept these flows and bypass the site and convey the flows to Murrieta Road. The remaining offsite area is tributary to the northerly half width of Esther Lane. Here the flows will bypass the site and make its way onto Murrieta Road. Once the flows enter Murrieta Road, they will follow the natural drainage course and enter the existing inlet that is on Murrieta Road.

III. HYDROLOGY

The Riverside County Flood Control and Water Conservation District Hydrology Manual (Reference 1), was used to develop the hydrological parameters for the hydrology analyses. The rational method was used for the analyses and the computations were performed using the computer program developed by Civil CADD/Civil Design.

The intensity (in/hour) for the 10-year and 100-year storm frequency and the 10-minute and 60-minute duration was obtained using Plate D-4.1 of the Hydrology Manual and summarized in the table below; a copy of the District's table is included in this report in Appendix D.

Rainfall Intensity Table:

Storm Event & Duration	Rainfall (inches/hour)
10-Year, 10-Minute	2.25
10-Year, 60-Minute	0.87
100-Year, 10-Minute	3.36
100-Year, 1-Hour	1.30

The project site is underlain by B and C type soils (See Figure 6), as show in the Onsite Hydrologic Soil Unit Exhibit; this GIS exhibit is based on the U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey. A Web Soil map was generated for the project site and included in Appendix D.

For all storm events, Antecedent Moisture Condition (AMC) II shall be utilized.

The hydrology utilized condominium subarea type with an average runoff index of 74.3 for the existing condition and 73.9 for the proposed condition.

The existing rational method was analyzed as a single watershed area designated as "A" with numerical sub-designations. The existing sub area "A" analysis was split up in two parts. The first analysis done was on the northerly half of the project site, where the flows ultimately exit the site on the eastern property line (See Figure 2). The other analysis that was done during the existing condition accounted for the southerly half of the project site and the offsite flows coming from the neighboring properties to the south. The proposed condition hydrology analyzed two separate watershed areas designated as "A" and "X", with numerical sub-designations. The proposed sub area "A" was split up in three different analysis. An onsite hydrology was analyzed in order to properly size the extension of the Hillman Street Storm Drain Line A, that ultimately will tie into Line E of the Thornton Ave Storm Drain. Line E has already considered the flows from the project site. The other two analyses on watershed "A" involved splitting the proposed extension of Ester Lane into northerly and southerly sub areas. The proposed sub area "X" was analyzed separately in order to determine the flow rate and necessary infrastructure needed to safely bypass the offsite flows that are conveyed on Thornton Ave. The existing project rational method and hydrology map has been included as Figure 2, the proposed project rational method hydrology map as Figure 3.

Below is a summary flow rate table between existing and proposed conditions:

TABLE 1. EXISTING RATIONAL METHOD - ONSITE (Q_{100} YEAR, 1-HOUR)

WATERSHED AREA	STORM EVENT (1-HOUR)	EXISTING CONDITION (CFS)	AREA (ac)
A (THORNTON)	100	26.7	9.71
A (N'LY SUB AREA)	100	0.5	0.32
A (N'LY SUB AREA)	100	6.3	5.23
A (S'LY SUB AREA)	100	216.2	113.66

TABLE 2. PROPOSED RATIONAL METHOD - ONSITE (Q_{100} YEAR, 1-HOUR)			
WATERSHED AREA	STORM EVENT (1-HOUR)	PROPOSED CONDITION (CFS)	AREA (ac)
A (ONSITE)	100	215.3	114.07
A (S'LY ESTHER)	100	11.4	4.17
A (N'LY ESTHER)	100	5.7	2.6
X	100	27.9	10.07

Per hydrology flow rates results shown in summary table above, the proposed pipe system will capture the full 215.3 cfs generated from watershed A. During the existing condition 216.2 cfs made its way off the project site and is conveyed into a natural channel which ultimately enters the existing inlet on Murrieta Rd, into lateral E-1 and finally enters Line E of the Thornton Ave Storm Drain Plan. During the proposed condition 215.3 cfs is directed into the pipe system from our site and the existing inlet on Murrieta Road sees 11.4 cfs. Since this area was already accounted for in the Line E Thornton Ave Storm Drain no increased runoff mitigation is required. The onsite water quality infiltration basin will be used for water quality purposes only.

IV. HYDRAULICS

The project will utilize a subsurface storm drain, drainage inlets, and underground infiltration system (chambers) to convey peak flows and to serve as the water treatment for the project site.

All onsite storm flow will be directed to onsite drop inlets and conveyed via the storm drainpipe system to the extension of Line A of the Hillman Street Storm Drain plan. A normal depth analysis was done on the extension of Line A in order to determine the minimum pipe size.

Baesd on the CivilDesign runs for the proposed condition, the flows on Esther Lane and Thornton Ave remain within the street right-of-way for the 100-year storm event and also remain under the top of curb for the 10-year storm event. A separate analysis was done for the onsite streets. Since the CivilDesign run said the water surface elevation exceeded the street section a separate street analysis was done on the onsite streets. The 100-year storm (13.3 cfs) was the only one analyzed and the results concluded that the water surface elevation remained below the curb but overtopped the centerline by 1”, this is considered negligible. Since the 100-year storm was contained within the curb there was no need to run a 10-year analysis.

V. WATER QUALITY MITIGATION

Under the ultimate conditions the project site will utilize an infiltration basin to serve as the water quality treatment facility for the project site. The water quality calculations and discussion have been provided in the Water Quality Management Plan.

VI. FINDINGS

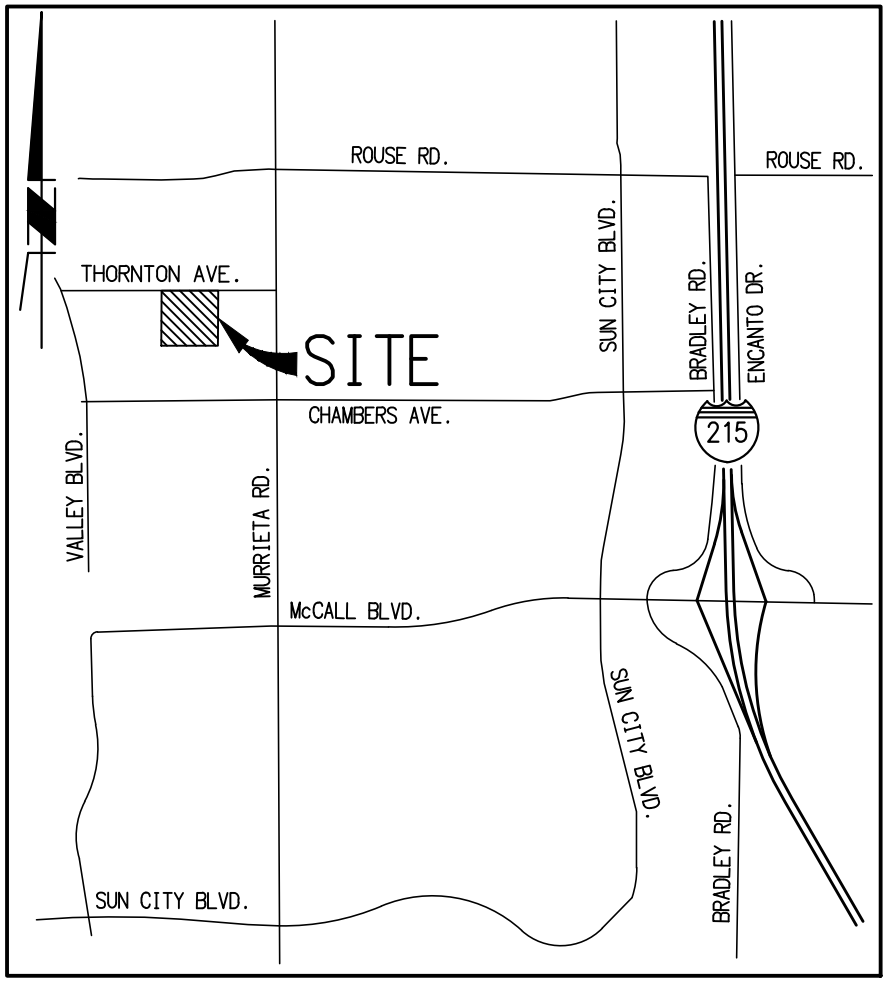
The hydrology analyses evaluated the proposed development to determine the necessary drainage improvements required to mitigate flows for increased runoff. It has been concluded that:

1. The proposed drainage facilities will adequately convey the 100-year flows and provide flood protection to the project site.
2. The proposed infiltration subsurface system will adequately mitigate for water quality.
3. The proposed master storm drain needs to be a 60″ pipe in order to safely handle the proposed flows form the project site.

VII. REFERENCES

1. Riverside County Rational Method from RCFC & WCD Hydrology Manual, dated April 1978
2. CIVILDESIGN Engineering Software, 1989-2014; Riverside County Rational Method Module, version 9.0.

FIGURE 1:
VICINITY MAP



VICINITY MAP

NOT TO SCALE

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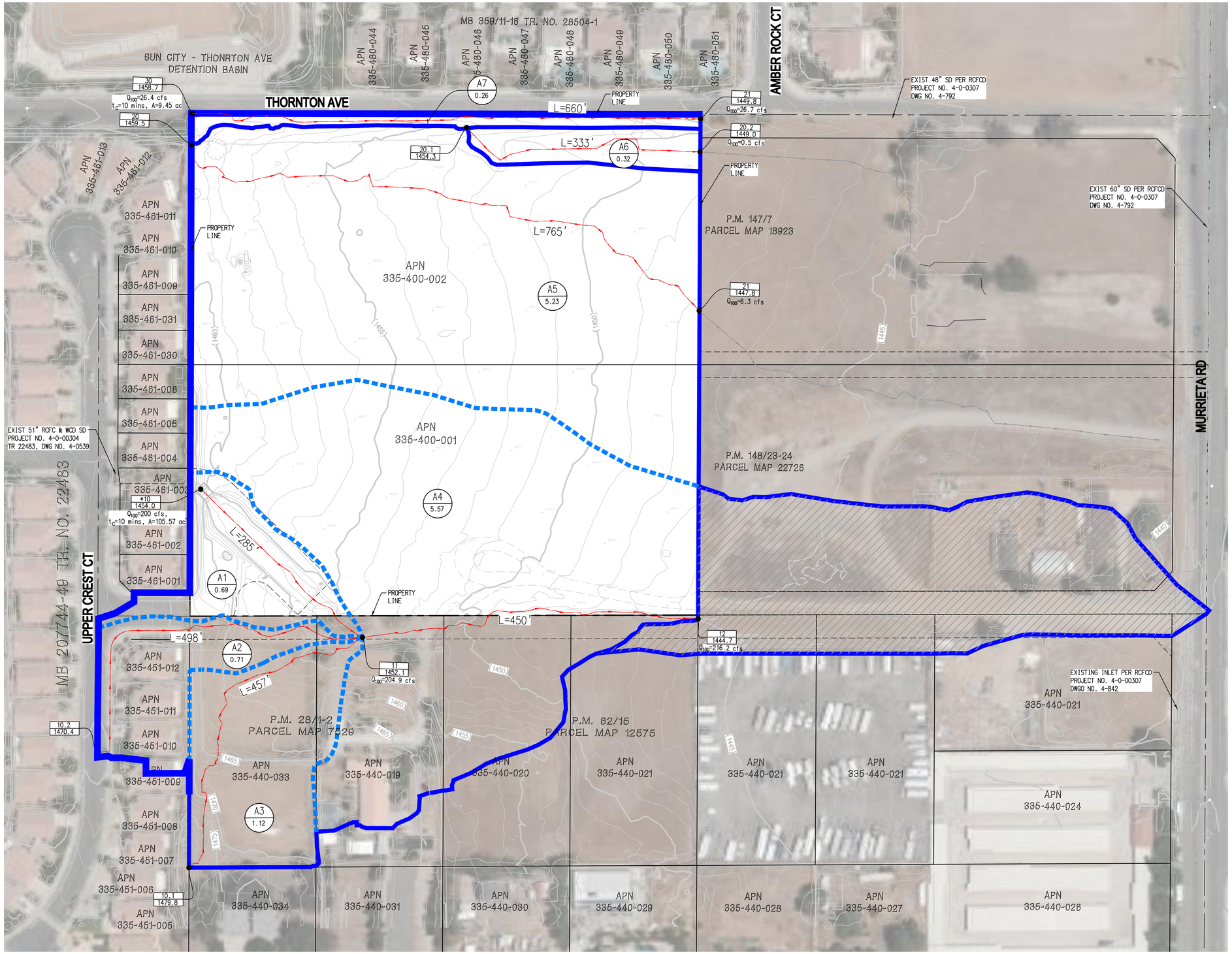
CORONADO AT MENIFEE

FIGURE 1
VICINITY MAP

H:\PDATA\22-003 QUINN MENIFEE 10\DOCS\HYDRO\1. PRELIMINARY\CAD\22-003-VICINITY-MAP.DWG DANIEL 4/6/2022 11:36 AM

FIGURE 2:
EXISTING CONDITION HYDROLOGY MAP



LEGEND

- D-2 / 2.16 — DRAINAGE BASIN NAME; DRAINAGE BASIN AREA(AC.)
- 11 / 1027.0 — NODE I.D.; ELEVATION
- WATERSHED BOUNDARY
- SUB-WATERSHED BOUNDARY
- FLOW DIRECTION
- NAP – OFFSITE AREA TO BE ANALYZED IN PROPOSED CONDITION

* – USER INPUT NODE FROM DRAINAGE REPORT FILED AT RCFC & WCD, TITLED TR 22483 DATED JUNE 8, 1989 (SEE APPENDIX E)

SCALE 1"=60'

60 30 0 60 120 180

SCALE: 1"=60'

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CORONADO AT MENIFEE

EXISTING CONDITION HYDROLOGY MAP

FIGURE 3:
PROPOSED CONDITION HYDROLOGY MAP

THORNTON AVE

SUN CITY - THORNTON AVE DETENTION BASIN

AMBER ROCK CT

UPPER CREST CT

MURRIETA RD

ESTHER LANE

STREET "D"

O.S.

O.S. & WQ / BMP's

UNDERGROUND INFILTRATION CHAMBERS

INFILTRATION BASIN

WQ / BMP

PROP CDS UNIT

PROP LOW FLOW WQ LINE

PROP V-DITCH

SD PIPE #1

SD PIPE #2

SD PIPE #3

SD PIPE #4

SD PIPE #5

INLET #1

INLET #2

INLET #3

EXIST 48" SD PER RCFCD PROJECT NO. 4-0-0307 DWG NO. 4-792

EXIST 60" SD PER RCFCD PROJECT NO. 4-0-0307 DWG NO. 4-792

EXIST 51" SD PER RCFCD PROJECT NO. 4-0-0304 DWG NO. 4-339

EXISTING INLET PER RCFCD PROJECT NO. 4-0-00307 DWG NO. 4-842

MB 207/44-48 TR. NO. 22483

P.M. 147/7 PARCEL MAP 18023

P.M. 148/23-24 PARCEL MAP 22726

P.M. 28/1-2 PARCEL MAP 7529

P.M. 62/15 PARCEL MAP 12575

P.M. 52/10 PARCEL MAP 11133

39 1458.1 Q_{100}=26.4 cfs t_c=10 mins, A=9.45 ac

40 1449.7 Q_{100}=27.9 cfs

11 1458.3

12.1 1457.6

10.1 1457.1

10.2 1446.7 1443.2 Q_{100}=2.3 cfs

12.2 1446.3 Q_{100}=5.9 cfs

10.3 1438.0 Q_{100}=202.2 cfs

12 1445.7 1441.6 Q_{100}=5.6 cfs

13 1445.7 1441.6 Q_{100}=11.7 cfs

14 1436.4 Q_{100}=215.3 cfs

31 1444.1 Q_{100}=1.7 cfs

32 1439.7 Q_{100}=5.7 cfs

10 1454.0 Q_{100}=200 cfs, t_c=10 mins, A=105.57 ac

30 1468.9

20 1470.4

20.1 1479.8

21 1449.8 Q_{100}=5.7 cfs

22 1443.7 Q_{100}=10.6 cfs

23 1440.3 Q_{100}=11.4 cfs

L=653'

L=886'

L=725'

L=726'

L=866'

L=776'

L=485'

L=454'

L=434'

L=581'

L=609'

A1 2.61

A2 2.53

A3 1.25

A4 0.87

A5 1.24

A6 0.08

A7 0.55

A8 1.97

A9 0.77

A10 1.10

A11 1.68

A12 0.62

X 0.62

LEGEND

- D-2 / 2.16 — DRAINAGE BASIN NAME / DRAINAGE BASIN AREA(AC.)
- 11 / 1027.0 — NODE I.D. / ELEVATION
- WATERSHED BOUNDARY
- SUB-WATERSHED BOUNDARY
- FLOW DIRECTION

SCALE 1"=60'

60 30 0 60 120 180

SCALE: 1"=60'

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CORONADO AT MENIFEE

PROPOSED CONDITION HYDROLOGY MAP

FIGURE 4:
ONSITE HYDROLOGICAL SOIL UNIT EXHIBIT

Planning Application No.

APPLICANT / LANDOWNER:
FLOIT PROPERTIES / QUINN COMMUNITIES
364 2ND STREET, SUITE #5, ENCINITAS, CALIFORNIA 92024

HYDROLOGIC SOIL GROUP

- Onsite Boundary
- C
- B

0 250 500 ft

FMCIVIL ENGINEERS INC.

Source: USDA Web Soil Survey

Coronado at Menifee

Onsite Hydrologic Soil Unit Exhibit

FIGURE 5:
HYDROLOGICAL SOIL UNIT EXHIBIT (DRAINAGE AREA)

Planning Application No.

APPLICANT / LANDOWNER:
FLOIT PROPERTIES / QUINN COMMUNITIES
364 2ND STREET, SUITE #5, ENCINITAS, CALIFORNIA 92024

HYDROLOGIC SOIL GROUP

- Overall Drainage Boundary
- B
- C
- D

0 300 600 ft

FMCIVIL ENGINEERS INC.

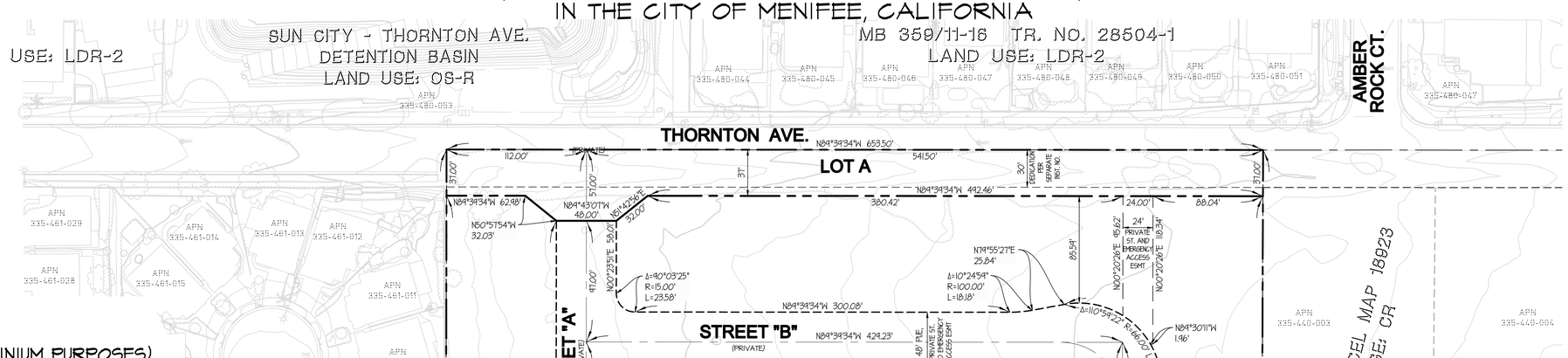
Source: USDA Web Soil Survey

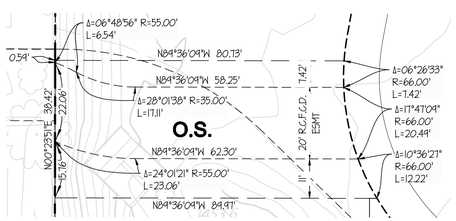
Coronado at Menifee

Overall Drainage Boundary Soil Unit Exhibit

FIGURE 6:
CONCEPTUAL GRADING

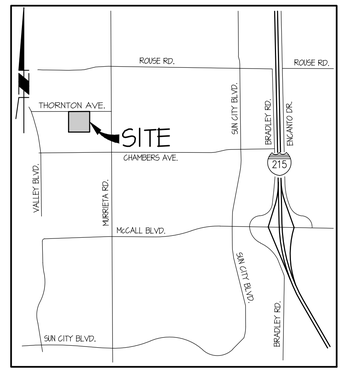
TENTATIVE TRACT MAP NO. 38577
(FOR CONDOMINIUM PURPOSES)
IN THE CITY OF MENIFEE, CALIFORNIA





R.C.F.C.D EASEMENT DETAIL

1" = 20'



VICINITY MAP
T05S, R03W, SEC20
NOT TO SCALE

ACREAGE
GROSS ACREAGE: 9.66 AC.

LOT AREAS (FOR CONDOMINIUM PURPOSES)

LOT NO.	ADJUSTED GROSS AREA	PROPOSED USE	EXISTING USE
LOT 1	7.62 AC	RESIDENTIAL	VACANT
LOT 2	0.90 AC	OPEN SPACE / WQ	VACANT
LOT 3	0.08 AC	BASIN	VACANT
LOT A	0.59 AC	PUBLIC RIGHT-OF-WAY	VACANT
LOT B	0.47 AC	PUBLIC RIGHT-OF-WAY	VACANT

ASSESSORS PARCEL NO.
335-440-001 AND 335-440-002

GENERAL PLAN LAND USE / ZONING
EXISTING: 5.1-8 DU/ACRE RESIDENTIAL (LMDR)
PROPOSED: 5.1-8 DU/ACRE RESIDENTIAL (LMDR)
SURROUNDING: LOW DENSITY RESIDENTIAL (LDR-2)
OPEN SPACE RECREATION (OS-R)
COMMERCIAL/RETAIL (GR)

LEGAL DESCRIPTION
PARCEL A: (APN: 335-440-001)

THE SOUTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 20, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

PARCEL B:

AN EASEMENT FOR INGRESS AND EGRESS OVER THE NORTH 16.5 FEET OF THE SOUTH HALF OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 20,TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

PARCEL C: (APN: 335-440-002)

THE NORTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

PARCEL D:

AN EASEMENT FOR INGRESS AND EGRESS OVER THE SOUTH 16.5 FEET OF THE NORTH HALF OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 20,TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

APPLICANT / OWNER
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C/O QUINN COMMUNITIES
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CONTACT: FRANCISCO MARTINEZ
(TEL)951-973-0201

ARCHITECT
ARCHITECTS BP ASSOCIATES, INC.
11858 BERNARDO PLAZA CT. SUITE 120
SAN DIEGO, CA 92128
CONTACT: ROGER BASINGER
(TEL)858-542-4110

SHEET INDEX:

SCALE: 1"=50'
50 25 0 50 100 150

NO.	DATE	REVISION

REGISTERED PROFESSIONAL ENGINEER FRANCISCO MARTINEZ JR. C-84640 CIVIL STATE OF CALIFORNIA

PREPARED BY:
FMCIVIL ENGINEERS INC.
24995 TECHNOLOGY DRIVE, SUITE 306 | MURRIETA | CA 92563
951.331.9873 - FMCIVIL.COM

FRANCISCO MARTINEZ JR. — DATE: R.C.E. #84640

CITY OF MENIFEE
CORONADO SITE MAP
FOR
FLOIT PROPERTIES / QUINN COMMUNITIES

DATE: 2/6/23
1
OF 2 SHEETS
PROJECT NO. 22-003

M:\PDATA\22-003 QUINN MENIFEE \DOING\PLNG\ENTITLEMENT\TM\22-003-TTM_SP OOLDKG ALLAN 2/6/2023 9:16 AM

TENTATIVE TRACT MAP NO. 38577
(FOR CONDOMINIUM PURPOSES)
CONCEPTUAL GRADING
IN THE CITY OF MENIFEE, CALIFORNIA

LEGEND

- 1025 — INDEX CONTOUR
- RETAINING WALL
- FENCE
- EDGE OF PAVEMENT
- SIGN
- MH — MANHOLE
- RIGHT OF WAY (R/W)
- EASEMENT
- PARCEL LINE
- PARCEL MAP BOUNDARY
- STREET CENTER LINE
- RETAINING WALL
- EXISTING LOT LINE
- PROPOSED EDGE OF PAVEMENT
- W — EXISTING WATER LINE
- SS — EXISTING SEWER LINE
- SD — EXISTING STORM DRAIN PIPE
- SD — PROPOSED STORM DRAIN PIPE
- CUT/FILL LINE
- SLOPE SYMBOL
- 49 — RESIDENTIAL DWELLING UNIT NUMBER

UTILITIES

WATER: EASTERN MUNICIPAL WATER DISTRICT

SEWER: EASTERN MUNICIPAL WATER DISTRICT

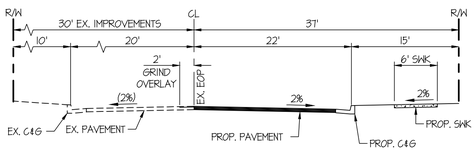
GAS: SOUTHERN CALIFORNIA GAS CO.

ELECTRICAL: SOUTHERN CALIFORNIA EDISON

EARTHWORK QUANTITIES

DESCRIPTION	CUT (CY)	FILL (CY)	NET (CY)
RAW	13,800	12,200	1,600 (EXPORT)

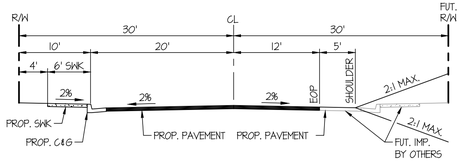
NOTE: THESE EARTHWORK QUANTITIES ARE RAW AND FOR REFERENCE ONLY.



*TYPICAL SECTION PER CITY OF MENIFEE STD. NO. 113

TYPICAL SECTION THORNTON AVENUE

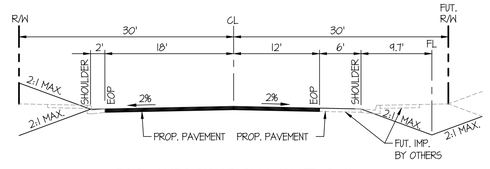
*COLLECTOR STREET
HOR. SCALE: 1"=10'



*TYPICAL SECTION PER CITY OF MENIFEE STD. NO. 115B

TYPICAL SECTION ESTHER LANE

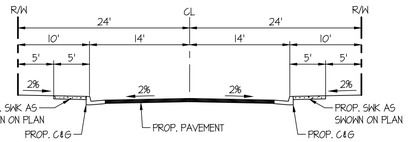
*GENERAL LOCAL STREET
HOR. SCALE: 1"=10'



*TYPICAL SECTION PER CITY OF MENIFEE STD. NO. 115B

TYPICAL SECTION ESTHER LANE (OFFSITE)

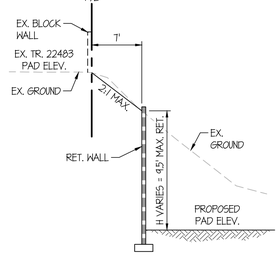
*GENERAL LOCAL STREET
HOR. SCALE: 1"=10'



*TYPICAL SECTION PER CITY OF MENIFEE STD. NO. 124

TYPICAL SECTION STREETS A, B, C, & D

*PRIVATE RESIDENTIAL STREET
HOR. SCALE: 1"=10'



SECTION A-A

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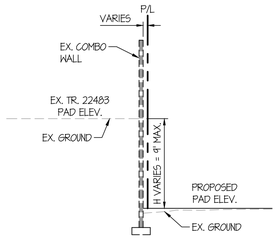
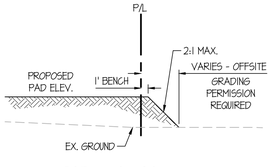


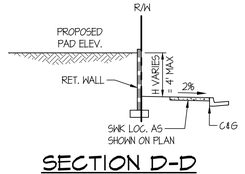
SECTION B-B

N.T.S.



SECTION C-C

N.T.S.



SECTION D-D

N.T.S.

SCALE 1"=50'

NO.	DATE	REVISION

REGISTERED PROFESSIONAL ENGINEER — FRANCISCO MARTINEZ JR. — C-84640 — CIVIL — STATE OF CALIFORNIA

PREPARED BY:
FMCIVIL ENGINEERS INC.
24985 TECHNOLOGY DRIVE, SUITE 306 | MURRIETA | CA 92563
951.331.0213 - FMCIVIL.COM
FRANCISCO MARTINEZ JR. — DATE: R.C.E. #84640

CITY OF MENIFEE
SITE PLAN, CONCEPTUAL GRADING & CONCEPTUAL UTILITY PLAN FOR FLOIT PROPERTIES / QUINN COMMUNITIES

DATE: 2/6/23

2 OF 2 SHEETS

PROJECT NO. 22-003

H:\PDATA\22-003 QUINN MENIFEE (OAKS)\PLNG\ENTITLEMENT\TTM22-003-TTM_SP-002_REV.DWG DANNY 4/21/2023 11:30 AM

APPENDIX A

EXISTING CONDITION RATIONAL METHOD HYDROLOGY (ONSITE AND OFFSITE)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 05/26/22 File:100xn.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
EXISTING CONDITION - N'LY ONSITE AREA
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 20.000 to Point/Station 21.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 765.000(Ft.)
Top (of initial area) elevation = 1459.500(Ft.)
Bottom (of initial area) elevation = 1447.800(Ft.)
Difference in elevation = 11.700(Ft.)
Slope = 0.01529 s(percent)= 1.53
TC = k(0.940)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =   30.881 min.
Rainfall intensity =      1.849(In/Hr) for a   100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.642
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.750
Decimal fraction soil group C = 0.250
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  64.25
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.209(CFS)
Total initial stream area =        5.230(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            5.23 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  64.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 05/25/22 File:100x.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
EXISTING CONDITION - S'LY ONSITE AREA W/OFFSITES
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 10.000 to Point/Station 10.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 3.360(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000

```
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       3.36(In/Hr)
Total area =       105.57(Ac.)  Total runoff =    200.00(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =    200.847(CFS)
Depth of flow =   0.609(Ft.), Average velocity =   2.527(Ft/s)
!!Warning: Water is above left or right bank elevations
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              0.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =    200.848(CFS)
  '     '    flow top width =    160.922(Ft.)
  '     '    velocity=    2.527(Ft/s)
  '     '    area =     79.480(Sq.Ft)
  '     '    Froude number =     0.634

Upstream point elevation =  1454.000(Ft.)
Downstream point elevation =  1452.100(Ft.)
Flow length =   285.000(Ft.)
Travel time  =    1.88 min.
Time of concentration =   11.88 min.
Depth of flow =   0.609(Ft.)
Average velocity =   2.527(Ft/s)
Total irregular channel flow =   200.847(CFS)
Irregular channel normal depth above invert elev. =   0.609(Ft.)
Average velocity of channel(s) =   2.527(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.067(In/Hr) for a   100.0 year storm
Subarea runoff =      1.749(CFS) for      0.690(Ac.)
Total runoff =    201.749(CFS)      Total area =     106.260(Ac.)
Depth of flow =   0.611(Ft.), Average velocity =   2.531(Ft/s)
!!Warning: Water is above left or right bank elevations
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    106.260(Ac.)
Runoff from this stream =    201.749(CFS)
Time of concentration =   11.88 min.
Rainfall intensity =     3.067(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   457.000(Ft.)
Top (of initial area) elevation =  1479.800(Ft.)
Bottom (of initial area) elevation =  1452.100(Ft.)
Difference in elevation =    27.700(Ft.)
Slope =    0.06061  s(percent)=       6.06
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.080 min.
Rainfall intensity =      2.386(In/Hr) for a   100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.754
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.960
Decimal fraction soil group D = 0.040
RI index for soil(AMC 2)  =  74.24
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.014(CFS)
Total initial stream area =        1.120(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.120(Ac.)
Runoff from this stream =      2.014(CFS)
Time of concentration =   19.08 min.
Rainfall intensity =     2.386(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   498.000(Ft.)
Top (of initial area) elevation =  1470.400(Ft.)
```

```
Bottom (of initial area) elevation =  1452.100(Ft.)
Difference in elevation =    18.300(Ft.)
Slope =    0.03675  s(percent)=       3.67
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.591 min.
Rainfall intensity =      3.642(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  69.60
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.215(CFS)
Total initial stream area =        0.710(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      0.710(Ac.)
Runoff from this stream =      2.215(CFS)
Time of concentration =    8.59 min.
Rainfall intensity =     3.642(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1      201.749     11.88               3.067
2        2.014     19.08               2.386
3        2.215      8.59               3.642
Largest stream flow has longer or shorter time of concentration
Qp =    201.749 + sum of
        Qa          Tb/Ta
         2.014 *    0.623 =      1.254
        Qb          Ia/Ib
         2.215 *    0.842 =      1.865
Qp =    204.868

Total of 3 main streams to confluence:
Flow rates before confluence point:
     201.749       2.014       2.215
Area of streams before confluence:
      106.260        1.120        0.710


Results of confluence:
Total flow rate =    204.868(CFS)
Time of concentration =    11.880 min.
Effective stream area after confluence  =    108.090(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =    210.467(CFS)
Depth of flow =   0.786(Ft.), Average velocity =   3.408(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2            200.00              0.00
      3            400.00              2.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =    210.468(CFS)
  '     '    flow top width =    157.180(Ft.)
  '     '    velocity=    3.408(Ft/s)
  '     '    area =     61.764(Sq.Ft)
  '     '    Froude number =     0.958

Upstream point elevation =  1452.100(Ft.)
Downstream point elevation =  1444.700(Ft.)
Flow length =   450.000(Ft.)
Travel time  =    2.20 min.
Time of concentration =   14.08 min.
Depth of flow =   0.786(Ft.)
Average velocity =   3.408(Ft/s)
Total irregular channel flow =   210.467(CFS)
Irregular channel normal depth above invert elev. =   0.786(Ft.)
Average velocity of channel(s) =   3.408(Ft/s)
 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.723
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  63.00
Pervious area fraction =  0.900; Impervious fraction =  0.100
Rainfall intensity =      2.803(In/Hr) for a   100.0 year storm
Subarea runoff =     11.289(CFS) for      5.570(Ac.)
Total runoff =    216.158(CFS)      Total area =     113.660(Ac.)
Depth of flow =   0.794(Ft.), Average velocity =   3.430(Ft/s)
End of computations, total study area =          113.66 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.524
Area averaged RI index number =  74.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/03/23 File:1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
EXISTING CONDITION - NORTHERLY OFFSITE FLOWS AT THORNTON AVE
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 30.000 to Point/Station 30.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 3.360(In/Hr) for a 100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.718
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  61.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       3.36(In/Hr)
Total area =         9.45(Ac.)  Total runoff =     26.40(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       30.100
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     26.687(CFS)
Depth of flow =   1.492(Ft.), Average velocity =   3.364(Ft/s)
!!Warning: Water is above left or right bank elevations
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              4.00              0.00
      3              8.00              1.00
Manning's 'N' friction factor =   0.050
------------------------------------------------------------------
Sub-Channel flow  =     26.687(CFS)
  '     '    flow top width =      8.000(Ft.)
  '     '    velocity=    3.364(Ft/s)
  '     '    area =      7.934(Sq.Ft)
  '     '    Froude number =     0.595

Upstream point elevation =  1458.700(Ft.)
Downstream point elevation =  1449.800(Ft.)
Flow length =   660.000(Ft.)
Travel time  =    3.27 min.
Time of concentration =   13.27 min.
Depth of flow =   1.492(Ft.)
Average velocity =   3.364(Ft/s)
Total irregular channel flow =    26.687(CFS)
Irregular channel normal depth above invert elev. =   1.492(Ft.)
Average velocity of channel(s) =   3.364(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.695
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  61.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.892(In/Hr) for a   100.0 year storm
Subarea runoff =      0.523(CFS) for      0.260(Ac.)
Total runoff =     26.923(CFS)      Total area =       9.710(Ac.)
Depth of flow =   1.497(Ft.), Average velocity =   3.375(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, total study area =            9.71 (Ac.)
The following figures may
```

be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 61.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/03/23 File:1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
EXISTING CONDITION - N'LY WATERSHED A-6
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 20.100 to Point/Station 20.200
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 333.000(Ft.)
Top (of initial area) elevation = 1454.300(Ft.)
Bottom (of initial area) elevation = 1449.000(Ft.)
Difference in elevation = 5.300(Ft.)
Slope = 0.01592 s(percent)= 1.59
TC = k(0.940)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =   21.965 min.
Rainfall intensity =      2.214(In/Hr) for a   100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.650
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  61.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.460(CFS)
Total initial stream area =        0.320(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            0.32 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  61.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/15/22 File:10xn.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
EXISTING CONDITION - N'LY ONSITE AREA
10-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 20.000 to Point/Station 21.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 765.000(Ft.)
Top (of initial area) elevation = 1459.500(Ft.)
Bottom (of initial area) elevation = 1447.800(Ft.)
Difference in elevation = 11.700(Ft.)

```
Slope =    0.01529  s(percent)=       1.53
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   30.881 min.
Rainfall intensity =      1.237(In/Hr) for a    10.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.563
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.750
Decimal fraction soil group C = 0.250
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  64.25
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.640(CFS)
Total initial stream area =        5.230(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            5.23 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  64.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 06/15/22 File:10x.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
EXISTING CONDITION - S'LY ONSITE AREA W/ OFFSITES
10-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 10.000 to Point/Station 10.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.249(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000

```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       2.25(In/Hr)
Total area =       105.57(Ac.)  Total runoff =    126.00(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =    126.521(CFS)
Depth of flow =   0.470(Ft.), Average velocity =   2.178(Ft/s)
!!Warning: Water is above left or right bank elevations
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              0.00
      2            100.00              0.00
      3            200.00              1.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =    126.521(CFS)
  '     '    flow top width =    147.036(Ft.)
  '     '    velocity=    2.178(Ft/s)
  '     '    area =     58.098(Sq.Ft)
  '     '    Froude number =     0.611

Upstream point elevation =  1454.000(Ft.)
Downstream point elevation =  1452.100(Ft.)
Flow length =   285.000(Ft.)
Travel time  =    2.18 min.
Time of concentration =   12.18 min.
Depth of flow =   0.470(Ft.)
Average velocity =   2.178(Ft/s)
Total irregular channel flow =   126.521(CFS)
Irregular channel normal depth above invert elev. =   0.470(Ft.)
Average velocity of channel(s) =   2.178(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.797
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  69.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.025(In/Hr) for a    10.0 year storm
Subarea runoff =      1.114(CFS) for      0.690(Ac.)
Total runoff =    127.114(CFS)      Total area =     106.260(Ac.)
Depth of flow =   0.472(Ft.), Average velocity =   2.181(Ft/s)
!!Warning: Water is above left or right bank elevations
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    106.260(Ac.)
Runoff from this stream =    127.114(CFS)
Time of concentration =   12.18 min.
Rainfall intensity =     2.025(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   457.000(Ft.)
Top (of initial area) elevation =  1479.800(Ft.)
Bottom (of initial area) elevation =  1452.100(Ft.)
Difference in elevation =    27.700(Ft.)
Slope =    0.06061  s(percent)=       6.06
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.080 min.
Rainfall intensity =      1.597(In/Hr) for a    10.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.698
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.960
Decimal fraction soil group D = 0.040
RI index for soil(AMC 2)  =  74.24
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.248(CFS)
Total initial stream area =        1.120(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.120(Ac.)
Runoff from this stream =      1.248(CFS)
Time of concentration =   19.08 min.
Rainfall intensity =     1.597(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
```

```
Initial area flow distance =   498.000(Ft.)
Top (of initial area) elevation =  1470.400(Ft.)
Bottom (of initial area) elevation =  1452.100(Ft.)
Difference in elevation =    18.300(Ft.)
Slope =    0.03675  s(percent)=       3.67
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.591 min.
Rainfall intensity =      2.437(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.900
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  69.60
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.452(CFS)
Total initial stream area =        0.710(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       11.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      0.710(Ac.)
Runoff from this stream =      1.452(CFS)
Time of concentration =    8.59 min.
Rainfall intensity =     2.437(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      127.114     12.18               2.025
2        1.248     19.08               1.597
3        1.452      8.59               2.437
Largest stream flow has longer or shorter time of concentration
Qp =    127.114 + sum of
        Qa          Tb/Ta
         1.248 *    0.638 =      0.797
        Qb          Ia/Ib
         1.452 *    0.831 =      1.207
Qp =    129.118

Total of 3 main streams to confluence:
Flow rates before confluence point:
     127.114       1.248       1.452
Area of streams before confluence:
      106.260        1.120        0.710


Results of confluence:
Total flow rate =    129.118(CFS)
```

```
Time of concentration =    12.181 min.
Effective stream area after confluence  =    108.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =    132.445(CFS)
Depth of flow =   0.661(Ft.), Average velocity =   3.035(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2            200.00              0.00
      3            400.00              2.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =    132.445(CFS)
  '     '    flow top width =    132.119(Ft.)
  '     '    velocity=    3.035(Ft/s)
  '     '    area =     43.639(Sq.Ft)
  '     '    Froude number =     0.931

Upstream point elevation =  1452.100(Ft.)
Downstream point elevation =  1444.700(Ft.)
Flow length =   450.000(Ft.)
Travel time  =    2.47 min.
Time of concentration =   14.65 min.
Depth of flow =   0.661(Ft.)
Average velocity =   3.035(Ft/s)
Total irregular channel flow =   132.445(CFS)
Irregular channel normal depth above invert elev. =   0.661(Ft.)
Average velocity of channel(s) =   3.035(Ft/s)
 Adding area flow to channel
USER INPUT of soil data for subarea
Runoff Coefficient = 0.658
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  63.00
Pervious area fraction =  0.900; Impervious fraction =  0.100
Rainfall intensity =      1.837(In/Hr) for a    10.0 year storm
Subarea runoff =      6.730(CFS) for      5.570(Ac.)
Total runoff =    135.848(CFS)      Total area =     113.660(Ac.)
Depth of flow =   0.667(Ft.), Average velocity =   3.054(Ft/s)
End of computations, total study area =          113.66 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.524
Area averaged RI index number =  74.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/06/23 File:1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
EXISTING CONDITION - NORTHERLY OFFSITE FLOWS AT THORNTON AVE
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 30.000 to Point/Station 30.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.249(In/Hr) for a 10.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.653
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  61.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       2.25(In/Hr)
Total area =         9.45(Ac.)  Total runoff =     26.40(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       30.100
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     26.583(CFS)
Depth of flow =   1.489(Ft.), Average velocity =   3.358(Ft/s)
!!Warning: Water is above left or right bank elevations
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2              4.00              0.00
      3              8.00              1.00
Manning's 'N' friction factor =   0.050
------------------------------------------------------------------
Sub-Channel flow  =     26.583(CFS)
  '     '    flow top width =      8.000(Ft.)
  '     '    velocity=    3.358(Ft/s)
  '     '    area =      7.916(Sq.Ft)
  '     '    Froude number =     0.595

Upstream point elevation =  1458.700(Ft.)
Downstream point elevation =  1449.800(Ft.)
Flow length =   660.000(Ft.)
Travel time  =    3.28 min.
Time of concentration =   13.28 min.
Depth of flow =   1.489(Ft.)
Average velocity =   3.358(Ft/s)
Total irregular channel flow =    26.583(CFS)
Irregular channel normal depth above invert elev. =   1.489(Ft.)
Average velocity of channel(s) =   3.358(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.625
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  61.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.935(In/Hr) for a    10.0 year storm
Subarea runoff =      0.314(CFS) for      0.260(Ac.)
Total runoff =     26.714(CFS)      Total area =       9.710(Ac.)
Depth of flow =   1.492(Ft.), Average velocity =   3.365(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, total study area =            9.71 (Ac.)
```

The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 61.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/06/23 File:1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
EXISTING CONDITION - N'LY WATERSHED A-6
10-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 20.100 to Point/Station 20.200
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 333.000(Ft.)
Top (of initial area) elevation = 1454.300(Ft.)
Bottom (of initial area) elevation = 1449.000(Ft.)
Difference in elevation = 5.300(Ft.)
Slope = 0.01592 s(percent)= 1.59

```
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   21.965 min.
Rainfall intensity =      1.482(In/Hr) for a    10.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.571
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  61.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.271(CFS)
Total initial stream area =        0.320(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            0.32 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  61.0
```

APPENDIX B

PROPOSED CONDITION RATIONAL METHOD HYDROLOGY (ONSITE AND OFFSITE)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 04/27/23 File:1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
PROPSOED CONDITION - ONSITE WATERSHED A
100-YR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 11.000 to Point/Station 13.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 886.000(Ft.)
Top (of initial area) elevation = 1458.300(Ft.)
Bottom (of initial area) elevation = 1445.700(Ft.)
Difference in elevation = 12.600(Ft.)

```
Slope =    0.01422  s(percent)=       1.42
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.786 min.
Rainfall intensity =      2.834(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.800
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      6.018(CFS)
Total initial stream area =        2.610(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.610(Ac.)
Runoff from this stream =      6.018(CFS)
Time of concentration =   13.79 min.
Rainfall intensity =     2.834(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.100 to Point/Station       12.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   726.000(Ft.)
Top (of initial area) elevation =  1457.600(Ft.)
Bottom (of initial area) elevation =  1446.300(Ft.)
Difference in elevation =    11.300(Ft.)
Slope =    0.01556  s(percent)=       1.56
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.503 min.
Rainfall intensity =      2.985(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.798
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.660
Decimal fraction soil group C = 0.340
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  60.42
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      2.978(CFS)
Total initial stream area =        1.250(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.100 to Point/Station       12.200
```

**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 1.250(Ac.)
Runoff from this stream = 2.978(CFS)
Time of concentration = 12.50 min.
Rainfall intensity = 2.985(In/Hr)

++
Process from Point/Station 12.100 to Point/Station 12.200
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 725.000(Ft.)
Top (of initial area) elevation = 1457.600(Ft.)
Bottom (of initial area) elevation = 1446.300(Ft.)
Difference in elevation = 11.300(Ft.)
Slope = 0.01559 s(percent)= 1.56
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.493 min.
Rainfall intensity = 2.986(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.783
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 2.900(CFS)
Total initial stream area = 1.240(Ac.)
Pervious area fraction = 0.500

++
Process from Point/Station 12.100 to Point/Station 12.200
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 1.240(Ac.)
Runoff from this stream = 2.900(CFS)
Time of concentration = 12.49 min.
Rainfall intensity = 2.986(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	2.978	12.50	2.985
2	2.900	12.49	2.986

Largest stream flow has longer time of concentration
Qp = 2.978 + sum of
Qb Ia/Ib
2.900 * 1.000 = 2.899
Qp = 5.877

```
Total of 2 streams to confluence:
Flow rates before confluence point:
       2.978       2.900
Area of streams before confluence:
        1.250        1.240
Results of confluence:
Total flow rate =      5.877(CFS)
Time of concentration =    12.503 min.
Effective stream area after confluence =      2.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.200 to Point/Station       13.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1446.300(Ft.)
Downstream point elevation =  1445.700(Ft.)
Channel length thru subarea  =    68.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      5.877(CFS)
Depth of flow =   0.774(Ft.), Average velocity =   5.612(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    2.000(Ft.)
Flow Velocity =    5.61(Ft/s)
Travel time  =    0.20 min.
Time of concentration =   12.70 min.

Sub-Channel No. 1 Critical depth =      0.891(Ft.)
  '     '       '     Critical flow top width =      2.000(Ft.)
  '     '       '     Critical flow velocity=    4.587(Ft/s)
  '     '       '     Critical flow area =      1.281(Sq.Ft)

ERROR - Channel depth exceeds maximum allowable depth


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.200 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.490(Ac.)
Runoff from this stream =      5.877(CFS)
Time of concentration =   12.70 min.
Rainfall intensity =     2.960(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1        6.018     13.79              2.834
2        5.877     12.70              2.960
```

```
Largest stream flow has longer time of concentration
Qp =      6.018 + sum of
        Qb         Ia/Ib
         5.877 *    0.958 =      5.628
Qp =     11.646

Total of 2 main streams to confluence:
Flow rates before confluence point:
       6.018       5.877
Area of streams before confluence:
        2.610        2.490


Results of confluence:
Total flow rate =     11.646(CFS)
Time of concentration =    13.786 min.
Effective stream area after confluence  =      5.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1441.600(Ft.)
Downstream point/station elevation =  1436.400(Ft.)
Pipe length  =    15.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.646(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =    11.646(CFS)
Normal flow depth in pipe =    6.39(In.)
Flow top width inside pipe =   11.98(In.)
Critical depth could not be calculated.
Pipe flow velocity =     27.40(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    13.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.100(Ac.)
Runoff from this stream =     11.646(CFS)
Time of concentration =   13.80 min.
Rainfall intensity =     2.833(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       10.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
________________________________________________________________________
Rainfall intensity =      3.360(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.847
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       3.36(In/Hr)
Total area =       105.57(Ac.)  Total runoff =    200.00(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       10.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1454.000(Ft.)
Downstream point/station elevation =  1438.000(Ft.)
Pipe length  =   547.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   200.000(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   200.000(CFS)
Normal flow depth in pipe =   35.63(In.)
Flow top width inside pipe =   36.55(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.33(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    10.43 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       10.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =    105.570(Ac.)
Runoff from this stream =    200.000(CFS)
Time of concentration =   10.43 min.
Rainfall intensity =     3.286(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       10.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   295.000(Ft.)
Top (of initial area) elevation =  1457.100(Ft.)
Bottom (of initial area) elevation =  1446.700(Ft.)
Difference in elevation =    10.400(Ft.)
Slope =    0.03525  s(percent)=       3.53
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.114 min.
Rainfall intensity =      3.529(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.735
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      2.258(CFS)
Total initial stream area =        0.870(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       10.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1443.200(Ft.)
Downstream point/station elevation =  1438.000(Ft.)
Pipe length  =   308.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.258(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.258(CFS)
Normal flow depth in pipe =    5.91(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    7.72(In.)
Pipe flow velocity =      5.86(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =     9.99 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       10.300
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.870(Ac.)
Runoff from this stream =      2.258(CFS)
Time of concentration =    9.99 min.
Rainfall intensity =     3.362(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      200.000     10.43                3.286
2        2.258      9.99                3.362
Largest stream flow has longer time of concentration
Qp =    200.000 + sum of
        Qb         Ia/Ib
         2.258 *    0.978 =      2.207
Qp =    202.207

Total of 2 streams to confluence:
Flow rates before confluence point:
     200.000       2.258
Area of streams before confluence:
      105.570        0.870
Results of confluence:
Total flow rate =    202.207(CFS)
Time of concentration =    10.427 min.
```

```
Effective stream area after confluence =    106.440(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.300 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1438.000(Ft.)
Downstream point/station elevation =  1436.400(Ft.)
Pipe length  =    39.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   202.207(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   202.207(CFS)
Normal flow depth in pipe =   34.13(In.)
Flow top width inside pipe =   32.79(In.)
Critical depth could not be calculated.
Pipe flow velocity =     24.15(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    10.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.300 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =    106.440(Ac.)
Runoff from this stream =    202.207(CFS)
Time of concentration =   10.45 min.
Rainfall intensity =     3.282(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       11.646     13.80               2.833
2      202.207     10.45               3.282
Largest stream flow has longer or shorter time of concentration
Qp =    202.207 + sum of
        Qa          Tb/Ta
        11.646 *    0.758 =      8.825
Qp =    211.032

Total of 2 main streams to confluence:
Flow rates before confluence point:
      11.646     202.207
Area of streams before confluence:
        5.100      106.440


Results of confluence:
Total flow rate =    211.032(CFS)
Time of concentration =    10.454 min.
Effective stream area after confluence  =    111.540(Ac.)
```

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Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   886.000(Ft.)
Top (of initial area) elevation =  1458.300(Ft.)
Bottom (of initial area) elevation =  1445.700(Ft.)
Difference in elevation =    12.600(Ft.)
Slope =    0.01422  s(percent)=       1.42
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.786 min.
Rainfall intensity =      2.834(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.779
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      5.583(CFS)
Total initial stream area =        2.530(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  1441.600(Ft.)
Downstream point/station elevation =  1436.400(Ft.)
Pipe length  =    16.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.583(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     5.583(CFS)
Normal flow depth in pipe =    4.98(In.)
Flow top width inside pipe =    8.95(In.)
Critical depth could not be calculated.
Pipe flow velocity =     22.24(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    13.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.530(Ac.)
Runoff from this stream =      5.583(CFS)
Time of concentration =   13.80 min.
Rainfall intensity =     2.833(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

```
 No.       (CFS)       (min)                  (In/Hr)


1       11.646     13.80               2.833
2      202.207     10.45               3.282
3        5.583     13.80               2.833
Largest stream flow has longer or shorter time of concentration
Qp =    202.207 + sum of
        Qa          Tb/Ta
        11.646 *    0.758 =      8.825
        Qa          Tb/Ta
         5.583 *    0.758 =      4.230
Qp =    215.262

Total of 3 main streams to confluence:
Flow rates before confluence point:
      11.646     202.207       5.583
Area of streams before confluence:
        5.100      106.440        2.530


Results of confluence:
Total flow rate =    215.262(CFS)
Time of concentration =    10.454 min.
Effective stream area after confluence  =    114.070(Ac.)
End of computations, total study area =          114.07 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.502
Area averaged RI index number =  73.9
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/06/23 File:100nes.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
PROPOSED CONDITION - WATERSHED A N'LY ESTHER LANE
100-YR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 30.000 to Point/Station 31.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 776.000(Ft.)
Top (of initial area) elevation = 1468.900(Ft.)
Bottom (of initial area) elevation = 1444.100(Ft.)
Difference in elevation = 24.800(Ft.)
Slope = 0.03196 s(percent)= 3.20

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.120 min.
Rainfall intensity =      3.176(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.814
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  64.06
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.422(CFS)
Total initial stream area =        0.550(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       31.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.788
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    11.12 min.
Rainfall intensity =      3.176(In/Hr) for a   100.0 year storm
Subarea runoff =      0.200(CFS) for      0.080(Ac.)
Total runoff =      1.623(CFS)      Total area =       0.630(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1444.100(Ft.)
End of street segment elevation =  1439.700(Ft.)
Length of street segment  =   581.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  1.840(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.685(CFS)
Depth of flow =   0.363(Ft.), Average velocity =   2.211(Ft/s)
Streetflow hydraulics at midpoint of street travel:
```

```
Halfstreet flow width =  12.463(Ft.)
Flow velocity =   2.21(Ft/s)
Travel time =    4.38 min.     TC =   15.50  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.773
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.664(In/Hr) for a   100.0 year storm
Subarea runoff =      4.056(CFS) for      1.970(Ac.)
Total runoff =      5.679(CFS)      Total area =       2.600(Ac.)
Street flow at end of street =      5.679(CFS)
Half street flow at end of street =      5.679(CFS)
Depth of flow =   0.410(Ft.), Average velocity =   2.453(Ft/s)
Flow width (from curb towards crown)=  14.839(Ft.)
End of computations, total study area =            2.60 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  57.7
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/07/23 File:100sep.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
PROPOSED CONDITION - WATERSHED A S'LY ESTHER LANE
100-YR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 20.000 to Point/Station 21.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 485.000(Ft.)
Top (of initial area) elevation = 1470.400(Ft.)
Bottom (of initial area) elevation = 1449.800(Ft.)
Difference in elevation = 20.600(Ft.)
Slope = 0.04247 s(percent)= 4.25
TC = k(0.390)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =    8.704 min.
Rainfall intensity =      3.617(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.910
Decimal fraction soil group D = 0.090
RI index for soil(AMC 2)  =  69.54
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      2.332(CFS)
Total initial stream area =        0.770(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.770(Ac.)
Runoff from this stream =      2.332(CFS)
Time of concentration =    8.70 min.
Rainfall intensity =     3.617(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       21.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   454.000(Ft.)
Top (of initial area) elevation =  1479.800(Ft.)
Bottom (of initial area) elevation =  1449.800(Ft.)
Difference in elevation =    30.000(Ft.)
Slope =    0.06608  s(percent)=       6.61
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.760 min.
Rainfall intensity =      3.844(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.950
Decimal fraction soil group D = 0.050
RI index for soil(AMC 2)  =  69.30
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.552(CFS)
Total initial stream area =        1.100(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station       20.100 to Point/Station       21.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.100(Ac.)
Runoff from this stream =      3.552(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     3.844(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        2.332      8.70               3.617
2        3.552      7.76               3.844
Largest stream flow has longer or shorter time of concentration
Qp =      3.552 + sum of
        Qa          Tb/Ta
         2.332 *    0.892 =      2.079
Qp =      5.631

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.332       3.552
Area of streams before confluence:
        0.770        1.100


Results of confluence:
Total flow rate =      5.631(CFS)
Time of concentration =     7.760 min.
Effective stream area after confluence  =      1.870(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       22.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1449.800(Ft.)
Downstream point elevation =  1443.700(Ft.)
Channel length thru subarea  =   434.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      8.160(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      8.160(CFS)
Depth of flow =   0.823(Ft.), Average velocity =   6.030(Ft/s)
Channel flow top width =    3.290(Ft.)
Flow Velocity =    6.03(Ft/s)
Travel time  =    1.20 min.
Time of concentration =    8.96 min.

Sub-Channel No. 1 Critical depth =      1.008(Ft.)
  '     '       '     Critical flow top width =      4.031(Ft.)
  '     '       '     Critical flow velocity=    4.017(Ft/s)
  '     '       '     Critical flow area =      2.031(Sq.Ft)
```

```
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.170
Decimal fraction soil group C = 0.830
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.79
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.562(In/Hr) for a   100.0 year storm
Subarea runoff =      4.963(CFS) for      1.680(Ac.)
Total runoff =     10.593(CFS)      Total area =       3.550(Ac.)
Depth of flow =   0.907(Ft.), Average velocity =   6.436(Ft/s)

Sub-Channel No. 1 Critical depth =      1.117(Ft.)
  '     '       '     Critical flow top width =      4.469(Ft.)
  '     '       '     Critical flow velocity=    4.244(Ft/s)
  '     '       '     Critical flow area =      2.496(Sq.Ft)



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Process from Point/Station       22.000 to Point/Station       23.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1443.700(Ft.)
Downstream point elevation =  1440.300(Ft.)
Channel length thru subarea  =   609.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     11.406(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     11.406(CFS)

Depth of flow =   1.109(Ft.), Average velocity =   4.638(Ft/s)
Channel flow top width =    4.436(Ft.)
Flow Velocity =    4.64(Ft/s)
Travel time  =    2.19 min.
Time of concentration =   11.15 min.

Sub-Channel No. 1 Critical depth =      1.148(Ft.)
  '     '       '     Critical flow top width =      4.594(Ft.)
  '     '       '     Critical flow velocity=    4.324(Ft/s)
  '     '       '     Critical flow area =      2.638(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.788
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
```

```
Rainfall intensity =      3.172(In/Hr) for a   100.0 year storm
Subarea runoff =      1.550(CFS) for      0.620(Ac.)
Total runoff =     12.144(CFS)      Total area =       4.170(Ac.)
Depth of flow =   1.135(Ft.), Average velocity =   4.711(Ft/s)

Sub-Channel No. 1 Critical depth =      1.180(Ft.)
  '     '       '     Critical flow top width =      4.719(Ft.)
  '     '       '     Critical flow velocity=    4.363(Ft/s)
  '     '       '     Critical flow area =      2.783(Sq.Ft)

End of computations, total study area =            4.17 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  66.4
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/06/23 File:100pqo.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
PROPOSED CONDITION - WATERSHED X - OFFSITE THORNTON AVE
100-YR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 39.000 to Point/Station 39.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 3.360(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.793
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000

```
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       3.36(In/Hr)
Total area =         9.45(Ac.)  Total runoff =     26.40(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       39.000 to Point/Station       40.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1458.100(Ft.)
End of street segment elevation =  1449.700(Ft.)
Length of street segment  =   653.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  0.160(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     27.164(CFS)
Depth of flow =   0.463(Ft.), Average velocity =   4.606(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  22.000(Ft.)
Flow velocity =   4.61(Ft/s)
Travel time =    2.36 min.     TC =   12.36  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.784
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.003(In/Hr) for a   100.0 year storm
Subarea runoff =      1.459(CFS) for      0.620(Ac.)
Total runoff =     27.859(CFS)      Total area =      10.070(Ac.)
Street flow at end of street =     27.859(CFS)
Half street flow at end of street =     27.859(CFS)
Depth of flow =   0.467(Ft.), Average velocity =   4.653(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  22.000(Ft.)
End of computations, total study area =           10.07 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  56.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 04/27/23 File:1.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
PROPOSED CONDITION - ONSITE WATERSHED A
10-YR STROM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 11.000 to Point/Station 13.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 886.000(Ft.)
Top (of initial area) elevation = 1458.300(Ft.)
Bottom (of initial area) elevation = 1445.700(Ft.)
Difference in elevation = 12.600(Ft.)
Slope = 0.01422 s(percent)= 1.42

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.786 min.
Rainfall intensity =      1.897(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.782
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.200
Decimal fraction soil group C = 0.800
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.871(CFS)
Total initial stream area =        2.610(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.610(Ac.)
Runoff from this stream =      3.871(CFS)
Time of concentration =   13.79 min.
Rainfall intensity =     1.897(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.100 to Point/Station       12.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   726.000(Ft.)
Top (of initial area) elevation =  1457.600(Ft.)
Bottom (of initial area) elevation =  1446.300(Ft.)
Difference in elevation =    11.300(Ft.)
Slope =    0.01556  s(percent)=       1.56
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.503 min.
Rainfall intensity =      1.998(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.763
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.660
Decimal fraction soil group C = 0.340
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  60.42
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.906(CFS)
Total initial stream area =        1.250(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.100 to Point/Station       12.200
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.250(Ac.)
Runoff from this stream =      1.906(CFS)
Time of concentration =   12.50 min.
Rainfall intensity =     1.998(In/Hr)


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Process from Point/Station       12.100 to Point/Station       12.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   725.000(Ft.)
Top (of initial area) elevation =  1457.600(Ft.)
Bottom (of initial area) elevation =  1446.300(Ft.)
Difference in elevation =    11.300(Ft.)
Slope =    0.01559  s(percent)=       1.56
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.493 min.
Rainfall intensity =      1.999(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.745
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.847(CFS)
Total initial stream area =        1.240(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station       12.100 to Point/Station       12.200
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.240(Ac.)
Runoff from this stream =      1.847(CFS)
Time of concentration =   12.49 min.
Rainfall intensity =     1.999(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1        1.906     12.50                1.998
2        1.847     12.49                1.999
Largest stream flow has longer time of concentration
Qp =      1.906 + sum of
        Qb         Ia/Ib
         1.847 *    1.000 =      1.846
Qp =      3.752

Total of 2 streams to confluence:
```

```
Flow rates before confluence point:
       1.906       1.847
Area of streams before confluence:
        1.250        1.240
Results of confluence:
Total flow rate =      3.752(CFS)
Time of concentration =    12.503 min.
Effective stream area after confluence =      2.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.200 to Point/Station       13.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1446.300(Ft.)
Downstream point elevation =  1445.700(Ft.)
Channel length thru subarea  =    68.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      3.752(CFS)
Depth of flow =   0.650(Ft.), Average velocity =   4.690(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =    2.000(Ft.)
Flow Velocity =    4.69(Ft/s)
Travel time  =    0.24 min.
Time of concentration =   12.74 min.

Sub-Channel No. 1 Critical depth =      0.727(Ft.)
  '     '       '     Critical flow top width =      2.000(Ft.)
  '     '       '     Critical flow velocity=    3.936(Ft/s)
  '     '       '     Critical flow area =      0.953(Sq.Ft)

ERROR - Channel depth exceeds maximum allowable depth


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Process from Point/Station       12.200 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.490(Ac.)
Runoff from this stream =      3.752(CFS)
Time of concentration =   12.74 min.
Rainfall intensity =     1.978(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.871     13.79               1.897
2        3.752     12.74               1.978
Largest stream flow has longer time of concentration
```

```
Qp =      3.871 + sum of
        Qb         Ia/Ib
         3.752 *    0.959 =      3.599
Qp =      7.470

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.871       3.752
Area of streams before confluence:
        2.610        2.490


Results of confluence:
Total flow rate =      7.470(CFS)
Time of concentration =    13.786 min.
Effective stream area after confluence  =      5.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1441.600(Ft.)
Downstream point/station elevation =  1436.400(Ft.)
Pipe length  =    15.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.470(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     7.470(CFS)
Normal flow depth in pipe =    5.91(In.)
Flow top width inside pipe =    8.55(In.)
Critical depth could not be calculated.
Pipe flow velocity =     24.30(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    13.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.100(Ac.)
Runoff from this stream =      7.470(CFS)
Time of concentration =   13.80 min.
Rainfall intensity =     1.896(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       10.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
________________________________________________________________________
Rainfall intensity =      2.249(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000
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Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       2.25(In/Hr)
Total area =       105.57(Ac.)  Total runoff =    200.00(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       10.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1454.000(Ft.)
Downstream point/station elevation =  1438.000(Ft.)
Pipe length  =   547.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   200.000(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   200.000(CFS)
Normal flow depth in pipe =   35.63(In.)
Flow top width inside pipe =   36.55(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.33(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    10.43 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       10.300
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =    105.570(Ac.)
Runoff from this stream =    200.000(CFS)
Time of concentration =   10.43 min.
Rainfall intensity =     2.199(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.100 to Point/Station       10.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   295.000(Ft.)
Top (of initial area) elevation =  1457.100(Ft.)
Bottom (of initial area) elevation =  1446.700(Ft.)
Difference in elevation =    10.400(Ft.)
Slope =    0.03525  s(percent)=       3.53
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.114 min.
Rainfall intensity =      2.362(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.679
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      1.395(CFS)
Total initial stream area =        0.870(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       10.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1443.200(Ft.)
Downstream point/station elevation =  1438.000(Ft.)
Pipe length  =   308.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.395(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.395(CFS)
Normal flow depth in pipe =    5.28(In.)
Flow top width inside pipe =    8.86(In.)
Critical Depth =    6.53(In.)
Pipe flow velocity =      5.18(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =    10.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.200 to Point/Station       10.300
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.870(Ac.)
Runoff from this stream =      1.395(CFS)
Time of concentration =   10.11 min.
Rainfall intensity =     2.236(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      200.000     10.43                2.199
2        1.395     10.11                2.236
Largest stream flow has longer time of concentration
Qp =    200.000 + sum of
        Qb         Ia/Ib
         1.395 *    0.984 =      1.372
Qp =    201.372

Total of 2 streams to confluence:
Flow rates before confluence point:
     200.000       1.395
Area of streams before confluence:
      105.570        0.870
Results of confluence:
Total flow rate =    201.372(CFS)
Time of concentration =    10.427 min.
Effective stream area after confluence =    106.440(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.300 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1438.000(Ft.)
Downstream point/station elevation =  1436.400(Ft.)
Pipe length  =    39.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   201.372(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   201.372(CFS)
Normal flow depth in pipe =   33.98(In.)
Flow top width inside pipe =   33.01(In.)
Critical depth could not be calculated.
Pipe flow velocity =     24.15(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    10.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.300 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =    106.440(Ac.)
Runoff from this stream =    201.372(CFS)
Time of concentration =   10.45 min.
Rainfall intensity =     2.196(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1        7.470     13.80               1.896
2      201.372     10.45               2.196
Largest stream flow has longer or shorter time of concentration
Qp =    201.372 + sum of
        Qa          Tb/Ta
         7.470 *    0.758 =      5.660
Qp =    207.032

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.470     201.372
Area of streams before confluence:
        5.100      106.440


Results of confluence:
Total flow rate =    207.032(CFS)
Time of concentration =    10.454 min.
Effective stream area after confluence  =    111.540(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   886.000(Ft.)
Top (of initial area) elevation =  1458.300(Ft.)
Bottom (of initial area) elevation =  1445.700(Ft.)
Difference in elevation =    12.600(Ft.)
Slope =    0.01422  s(percent)=       1.42
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.786 min.
Rainfall intensity =      1.897(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.740
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.551(CFS)
Total initial stream area =        2.530(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station       12.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1441.600(Ft.)
Downstream point/station elevation =  1436.400(Ft.)
Pipe length  =    16.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.551(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.551(CFS)
Normal flow depth in pipe =    3.83(In.)
Flow top width inside pipe =    8.90(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.84(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    13.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.530(Ac.)
Runoff from this stream =      3.551(CFS)
Time of concentration =   13.80 min.
Rainfall intensity =     1.896(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)
```

```
1        7.470     13.80               1.896
2      201.372     10.45               2.196
3        3.551     13.80               1.896
Largest stream flow has longer or shorter time of concentration
Qp =    201.372 + sum of
        Qa          Tb/Ta
         7.470 *    0.758 =      5.660
        Qa          Tb/Ta
         3.551 *    0.758 =      2.690
Qp =    209.722

Total of 3 main streams to confluence:
Flow rates before confluence point:
       7.470     201.372       3.551
Area of streams before confluence:
        5.100      106.440        2.530


Results of confluence:
Total flow rate =    209.722(CFS)
Time of concentration =    10.454 min.
Effective stream area after confluence  =    114.070(Ac.)
End of computations, total study area =          114.07 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.502
Area averaged RI index number =  73.9
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/06/23 File:10nes.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
PROPOSED CONDITION - WATERSHED A N'LY ESTHER LANE
10-YR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 30.000 to Point/Station 31.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 776.000(Ft.)
Top (of initial area) elevation = 1468.900(Ft.)
Bottom (of initial area) elevation = 1444.100(Ft.)
Difference in elevation = 24.800(Ft.)
Slope = 0.03196 s(percent)= 3.20

```
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.120 min.
Rainfall intensity =      2.126(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.783
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  64.06
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.915(CFS)
Total initial stream area =        0.550(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       31.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.751
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    11.12 min.
Rainfall intensity =      2.126(In/Hr) for a    10.0 year storm
Subarea runoff =      0.128(CFS) for      0.080(Ac.)
Total runoff =      1.043(CFS)      Total area =       0.630(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1444.100(Ft.)
End of street segment elevation =  1439.700(Ft.)
Length of street segment  =   581.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  1.840(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.355(CFS)
Depth of flow =   0.320(Ft.), Average velocity =   1.990(Ft/s)
Streetflow hydraulics at midpoint of street travel:
```

```
Halfstreet flow width =  10.345(Ft.)
Flow velocity =   1.99(Ft/s)
Travel time =    4.87 min.     TC =   15.99  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.732
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.754(In/Hr) for a    10.0 year storm
Subarea runoff =      2.528(CFS) for      1.970(Ac.)
Total runoff =      3.571(CFS)      Total area =       2.600(Ac.)
Street flow at end of street =      3.571(CFS)
Half street flow at end of street =      3.571(CFS)
Depth of flow =   0.359(Ft.), Average velocity =   2.194(Ft/s)
Flow width (from curb towards crown)=  12.304(Ft.)
End of computations, total study area =            2.60 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  57.7
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/07/23 File:10sep.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
PROPOSED CONDITION - WATERSHED A S'LY ESTHER LANE
10-YR STORM ANALYIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 20.000 to Point/Station 21.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 485.000(Ft.)
Top (of initial area) elevation = 1470.400(Ft.)
Bottom (of initial area) elevation = 1449.800(Ft.)
Difference in elevation = 20.600(Ft.)
Slope = 0.04247 s(percent)= 4.25
TC = k(0.390)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =    8.704 min.
Rainfall intensity =      2.420(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.910
Decimal fraction soil group D = 0.090
RI index for soil(AMC 2)  =  69.54
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.514(CFS)
Total initial stream area =        0.770(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.770(Ac.)
Runoff from this stream =      1.514(CFS)
Time of concentration =    8.70 min.
Rainfall intensity =     2.420(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       21.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   454.000(Ft.)
Top (of initial area) elevation =  1479.800(Ft.)
Bottom (of initial area) elevation =  1449.800(Ft.)
Difference in elevation =    30.000(Ft.)
Slope =    0.06608  s(percent)=       6.61
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.760 min.
Rainfall intensity =      2.572(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.950
Decimal fraction soil group D = 0.050
RI index for soil(AMC 2)  =  69.30
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      2.309(CFS)
Total initial stream area =        1.100(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.100 to Point/Station       21.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.100(Ac.)
Runoff from this stream =      2.309(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     2.572(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        1.514      8.70               2.420
2        2.309      7.76               2.572
Largest stream flow has longer or shorter time of concentration
Qp =      2.309 + sum of
        Qa          Tb/Ta
         1.514 *    0.892 =      1.350
Qp =      3.659

Total of 2 main streams to confluence:
Flow rates before confluence point:
       1.514       2.309
Area of streams before confluence:
        0.770        1.100


Results of confluence:
Total flow rate =      3.659(CFS)
Time of concentration =     7.760 min.
Effective stream area after confluence  =      1.870(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       21.000 to Point/Station       22.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1449.800(Ft.)
Downstream point elevation =  1443.700(Ft.)
Channel length thru subarea  =   434.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      5.276(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      5.276(CFS)
Depth of flow =   0.699(Ft.), Average velocity =   5.407(Ft/s)
Channel flow top width =    2.794(Ft.)
Flow Velocity =    5.41(Ft/s)
Travel time  =    1.34 min.
Time of concentration =    9.10 min.

Sub-Channel No. 1 Critical depth =      0.844(Ft.)
  '     '       '     Critical flow top width =      3.375(Ft.)
  '     '       '     Critical flow velocity=    3.706(Ft/s)
  '     '       '     Critical flow area =      1.424(Sq.Ft)
```

```
 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.801
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.170
Decimal fraction soil group C = 0.830
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  66.79
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.364(In/Hr) for a    10.0 year storm
Subarea runoff =      3.183(CFS) for      1.680(Ac.)
Total runoff =      6.842(CFS)      Total area =       3.550(Ac.)
Depth of flow =   0.770(Ft.), Average velocity =   5.770(Ft/s)

Sub-Channel No. 1 Critical depth =      0.938(Ft.)
  '     '       '     Critical flow top width =      3.750(Ft.)
  '     '       '     Critical flow velocity=    3.892(Ft/s)
  '     '       '     Critical flow area =      1.758(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       22.000 to Point/Station       23.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =  1443.700(Ft.)
Downstream point elevation =  1440.300(Ft.)
Channel length thru subarea  =   609.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      7.355(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      7.355(CFS)
Depth of flow =   0.941(Ft.), Average velocity =   4.156(Ft/s)
Channel flow top width =    3.763(Ft.)
Flow Velocity =    4.16(Ft/s)
Travel time  =    2.44 min.
Time of concentration =   11.54 min.

Sub-Channel No. 1 Critical depth =      0.969(Ft.)
  '     '       '     Critical flow top width =      3.875(Ft.)
  '     '       '     Critical flow velocity=    3.918(Ft/s)
  '     '       '     Critical flow area =      1.877(Sq.Ft)

 Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.749
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.084(In/Hr) for a    10.0 year storm
```

```
Subarea runoff =      0.969(CFS) for      0.620(Ac.)
Total runoff =      7.811(CFS)      Total area =       4.170(Ac.)
Depth of flow =   0.962(Ft.), Average velocity =   4.219(Ft/s)

Sub-Channel No. 1 Critical depth =      0.992(Ft.)
  '     '       '     Critical flow top width =      3.969(Ft.)
  '     '       '     Critical flow velocity=    3.967(Ft/s)
  '     '       '     Critical flow area =      1.969(Sq.Ft)

End of computations, total study area =            4.17 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  66.4
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 02/06/23 File:10pqo.out

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

CORONADO AT MENIFEE
PROPOSED CONDITION - WATERSHED X - OFFSITE THORNTON AVE
10-YR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [Sun City] area used.
10 year storm 10 minute intensity = 2.250(In/Hr)
10 year storm 60 minute intensity = 0.870(In/Hr)
100 year storm 10 minute intensity = 3.360(In/Hr)
100 year storm 60 minute intensity = 1.300(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.870(In/Hr)
Slope of intensity duration curve = 0.5300

++
Process from Point/Station 39.000 to Point/Station 39.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 2.249(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.757
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       2.25(In/Hr)
Total area =         9.45(Ac.)  Total runoff =     17.20(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       39.000 to Point/Station       40.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  1458.100(Ft.)
End of street segment elevation =  1449.700(Ft.)
Length of street segment  =   653.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  15.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  0.160(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     17.683(CFS)
Depth of flow =   0.398(Ft.), Average velocity =   3.937(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  21.257(Ft.)
Flow velocity =   3.94(Ft/s)
Travel time =    2.76 min.     TC =   12.76  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.744
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.976(In/Hr) for a    10.0 year storm
Subarea runoff =      0.912(CFS) for      0.620(Ac.)
Total runoff =     18.112(CFS)      Total area =      10.070(Ac.)
Street flow at end of street =     18.112(CFS)
Half street flow at end of street =     18.112(CFS)
Depth of flow =   0.402(Ft.), Average velocity =   3.960(Ft/s)
Flow width (from curb towards crown)=  21.447(Ft.)
End of computations, total study area =           10.07 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  56.0
```

APPENDIX C

Hydraulic Calculations

C.1: PIPE HYDRAULICS CALCULATIONS

C.2: STREET CAPACITY CALCULATIONS

C.3: INLET CALCULATIONS

Hydraulic Analysis Report

Project Data

Project Title: Coronado at Menifee

Designer: DJV

Project Date: Wednesday, June 15, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: SD PIPE #1

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter 5.00 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0150

Flow 215.3000 cfs

Result Parameters

Depth 3.9052 ft

Area of Flow 16.4535 ft^2

Wetted Perimeter 10.8384 ft

Hydraulic Radius 1.5181 ft

Average Velocity 13.0853 ft/s

Top Width 4.1355 ft

Froude Number: 1.1561

Critical Depth 4.1699 ft

Critical Velocity 12.3056 ft/s

Critical Slope: 0.0088 ft/ft

Critical Top Width 3.72 ft

Calculated Max Shear Stress 2.4368 lb/ft^2

Calculated Avg Shear Stress 0.9473 lb/ft^2

Channel Analysis: SD PIPE #2

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter 2.00 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow 11.7000 cfs

Result Parameters

Depth 1.4086 ft

Area of Flow 2.3646 ft^2

Wetted Perimeter 3.9834 ft

Hydraulic Radius 0.5936 ft

Average Velocity 4.9479 ft/s

Top Width 1.8254 ft

Froude Number: 0.7661

Critical Depth 1.2285 ft

Critical Velocity 5.7812 ft/s

Critical Slope: 0.0073 ft/ft

Critical Top Width 1.95 ft

Calculated Max Shear Stress 0.4395 lb/ft^2

Calculated Avg Shear Stress 0.1852 lb/ft^2

Channel Analysis: SD PIPE #3

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter 1.50 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow 5.6000 cfs

Result Parameters

Depth 1.0819 ft

Area of Flow 1.3647 ft^2

Wetted Perimeter 3.0439 ft

Hydraulic Radius 0.4483 ft

Average Velocity 4.1034 ft/s

Top Width 1.3451 ft

Froude Number: 0.7179

Critical Depth 0.9126 ft

Critical Velocity 4.9754 ft/s

Critical Slope: 0.0080 ft/ft

Critical Top Width 1.46 ft

Calculated Max Shear Stress 0.3376 lb/ft^2

Calculated Avg Shear Stress 0.1399 lb/ft^2

Channel Analysis: SD PIPE #4

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter 1.50 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow 1.7000 cfs

Result Parameters

Depth 0.5262 ft

Area of Flow 0.5529 ft^2

Wetted Perimeter 1.9017 ft

Hydraulic Radius 0.2908 ft

Average Velocity 3.0745 ft/s

Top Width 1.4317 ft

Froude Number: 0.8718

Critical Depth 0.4900 ft

Critical Velocity 3.3897 ft/s

Critical Slope: 0.0066 ft/ft

Critical Top Width 1.41 ft

Calculated Max Shear Stress 0.1642 lb/ft^2

Calculated Avg Shear Stress 0.0907 lb/ft^2

Channel Analysis: SD PIPE #5

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter 1.00 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0150

Flow 2.3000 cfs

Result Parameters

Depth 0.6431 ft

Area of Flow 0.5338 ft^2

Wetted Perimeter 1.8610 ft

Hydraulic Radius 0.2868 ft

Average Velocity 4.3086 ft/s

Top Width 0.9582 ft

Froude Number: 1.0173

Critical Depth 0.6489 ft

Critical Velocity 4.2641 ft/s

Critical Slope: 0.0097 ft/ft

Critical Top Width 0.95 ft

Calculated Max Shear Stress 0.4013 lb/ft^2

Calculated Avg Shear Stress 0.1790 lb/ft^2

Hydraulic Analysis Report

Project Data

Project Title: Coronado at Menifee

Designer: DJV

Project Date: Wednesday, June 15, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: N'LY Half Width Esther Lane - 100 Year Storm

Notes:

Input Parameters

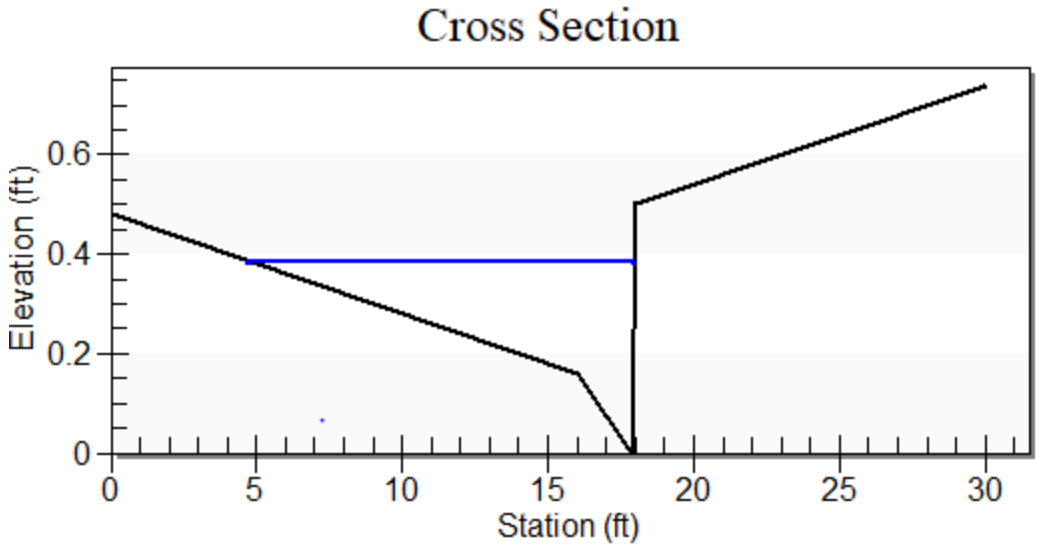
Channel Type: Custom Cross Section

Cross Section Data

Station (ft	Elevation (ft)	Manning's n
0.00	0.48	0.0130
16.00	0.16	0.0130
17.87	0.00	0.0130
18.00	0.50	0.0130
30.00	0.74	-----

Longitudinal Slope: 0.0100 ft/ft

Flow 5.7000 cfs



Result Parameters

Depth 0.3861 ft

Area of Flow 1.8702 ft^2

Wetted Perimeter 13.5847 ft

Hydraulic Radius 0.1377 ft

Average Velocity 3.0477 ft/s

Top Width 13.2770 ft

Froude Number: 1.4310

Critical Depth 0.4299 ft

Critical Velocity 2.2804 ft/s

Critical Slope: 0.0047 ft/ft

Critical Top Width 15.48 ft

Calculated Max Shear Stress 0.2409 lb/ft^2

Calculated Avg Shear Stress 0.0859 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0130

Channel Analysis: Onsite Street Capacity Half Width – 100 Year Storm

Notes:

Input Parameters

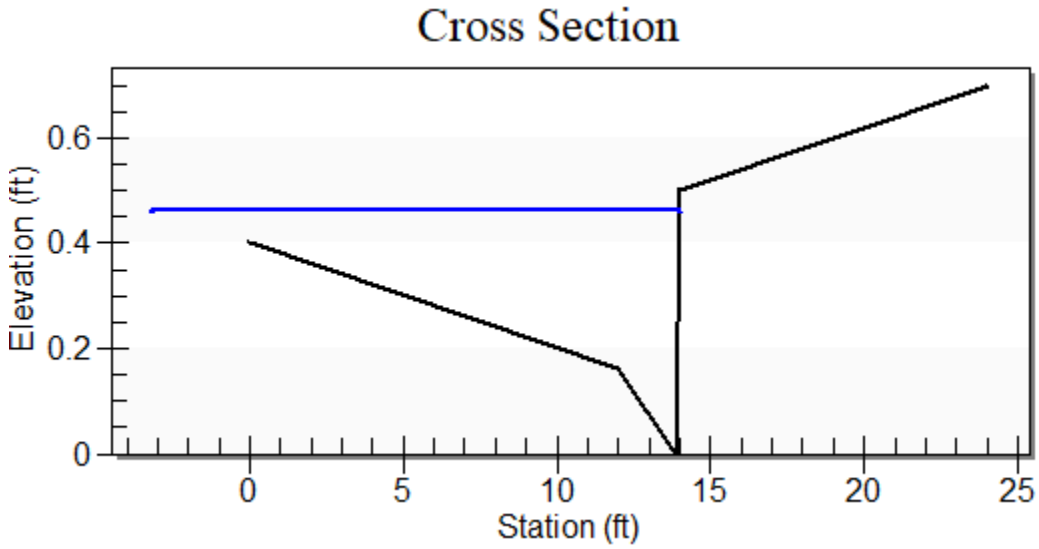
Channel Type: Custom Cross Section

Cross Section Data

Station (ft	Elevation (ft)	Manning's n
0.00	0.40	0.0130
12.00	0.16	0.0130
13.87	0.00	0.0130
14.00	0.50	0.0130
24.00	0.70	-----

Longitudinal Slope: 0.0100 ft/ft

Flow 11.7000 cfs



Result Parameters

Depth 0.4633 ft

Area of Flow 2.9438 ft^2

Wetted Perimeter 14.4212 ft

Hydraulic Radius 0.2041 ft

Average Velocity 3.9745 ft/s

Top Width 13.9904 ft

Froude Number: 1.5269

Critical Depth 0.5420 ft

Critical Velocity 2.8602 ft/s

Critical Slope: 0.0040 ft/ft

Critical Top Width 16.10 ft

Calculated Max Shear Stress 0.2891 lb/ft^2

Calculated Avg Shear Stress 0.1274 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0130

Channel Analysis: Onsite Street Capacity Full Width – 100 Year Storm

Notes:

Input Parameters

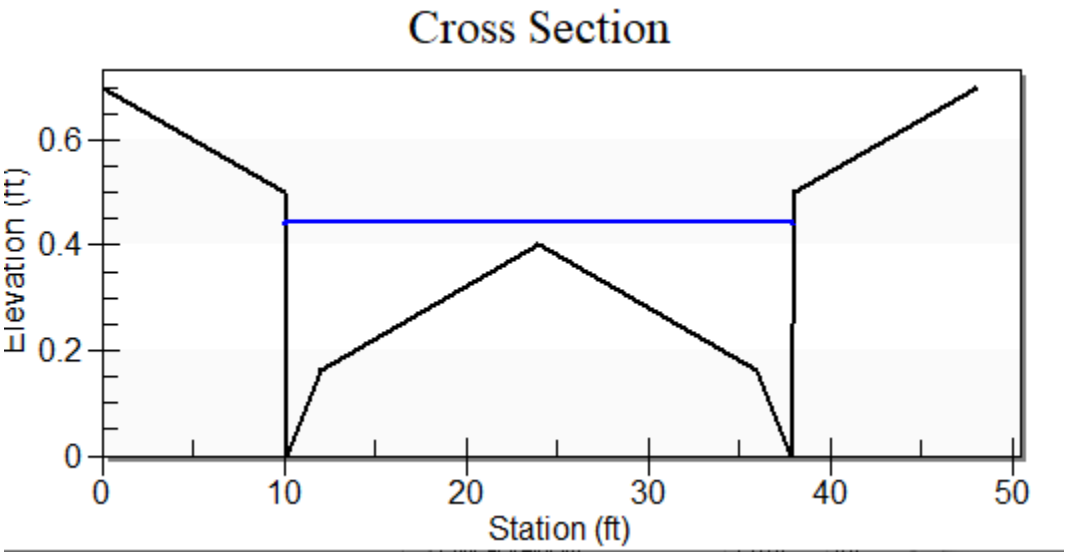
Channel Type: Custom Cross Section

Cross Section Data

Station (ft	Elevation (ft)	Manning's n
0.00	0.70	0.0130
10.00	0.50	0.0130
10.13	0.00	0.0130
12.00	0.16	0.0130
24.00	0.40	0.0130
36.00	0.16	0.0130
37.87	0.00	0.0130
38.00	0.50	0.0130
48.00	0.70	-----

Longitudinal Slope: 0.0100 ft/ft

Flow 20.0000 cfs



Result Parameters

Depth 0.4442 ft

Area of Flow 5.3553 ft^2

Wetted Perimeter 28.6765 ft

Hydraulic Radius 0.1867 ft

Average Velocity 3.7346 ft/s

Top Width 27.9710 ft

Froude Number: 1.5041

Critical Depth 0.5058 ft

Critical Velocity 2.8243 ft/s

Critical Slope: 0.0041 ft/ft

Critical Top Width 28.58 ft

Calculated Max Shear Stress 0.2772 lb/ft^2

Calculated Avg Shear Stress 0.1165 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0130

Channel Analysis: Thornton Ave Full Width - 100 Year Storm

Notes:

Input Parameters

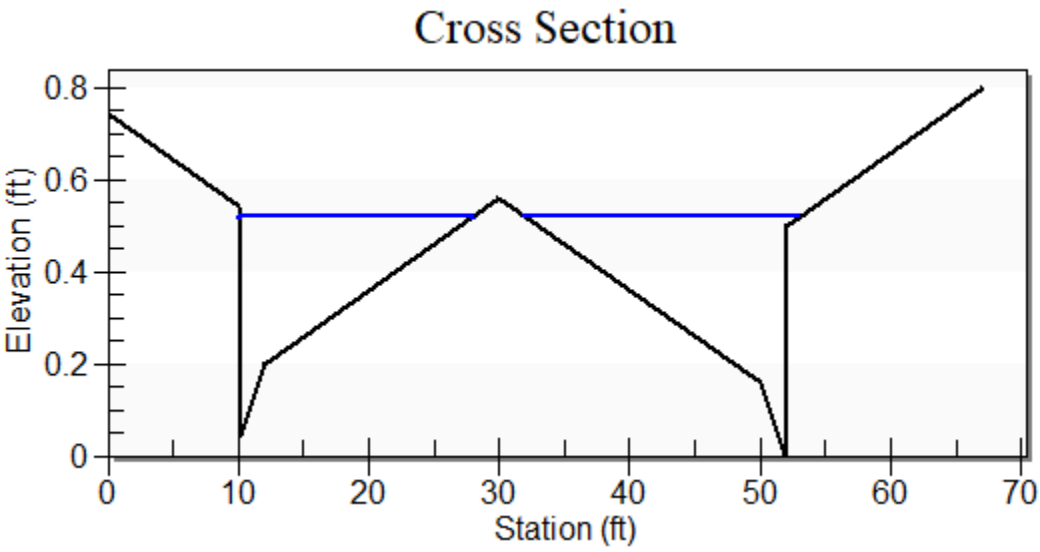
Channel Type: Custom Cross Section

Cross Section Data

Station (ft	Elevation (ft)	Manning's n
0.00	0.74	0.0130
10.00	0.54	0.0130
10.13	0.04	0.0130
12.00	0.20	0.0130
30.00	0.56	0.0130
50.00	0.16	0.0130
51.87	0.00	0.0130
52.00	0.50	0.0130
67.00	0.80	-----

Longitudinal Slope: 0.0100 ft/ft

Flow 27.9000 cfs



Result Parameters

Depth 0.5203 ft

Area of Flow 7.4565 ft^2

Wetted Perimeter 39.8143 ft

Hydraulic Radius 0.1873 ft

Average Velocity 3.7417 ft/s

Top Width 39.0357 ft

Froude Number: 1.5087

Critical Depth 0.5905 ft

Critical Velocity 2.6360 ft/s

Critical Slope: 0.0042 ft/ft

Critical Top Width 49.05 ft

Calculated Max Shear Stress 0.3246 lb/ft^2

Calculated Avg Shear Stress 0.1169 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0130

Channel Analysis: Prop V-Ditch

Notes:

Input Parameters

Channel Type: Triangular

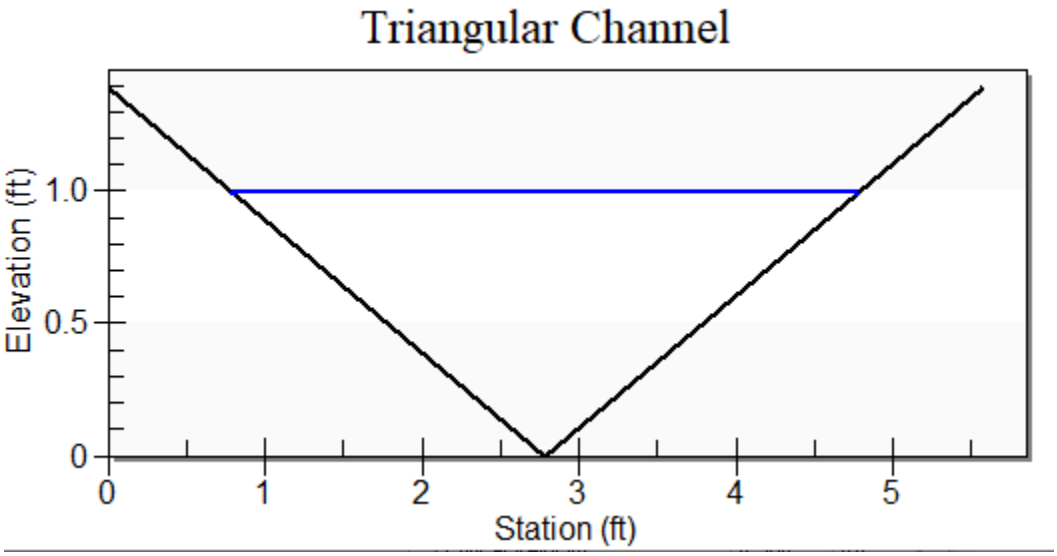
Side Slope 1 (Z1): 2.0000 ft/ft

Side Slope 2 (Z2): 2.0000 ft/ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0150

Flow 11.4000 cfs



Result Parameters

Depth 0.9939 ft

Area of Flow 1.9758 ft^2

Wetted Perimeter 4.4449 ft

Hydraulic Radius 0.4445 ft

Average Velocity 5.7699 ft/s

Top Width 3.9757 ft

Froude Number: 1.4424

Critical Depth 1.1508 ft

Critical Velocity 4.3043 ft/s

Critical Slope: 0.0046 ft/ft

Critical Top Width 4.60 ft

Calculated Max Shear Stress 0.6202 lb/ft^2

Calculated Avg Shear Stress 0.2774 lb/ft^2

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Wednesday, June 15, 2022

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: Inlet #1

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0000 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Gutter Result Parameters

Design Flow: 11.7000 cfs

Gutter Result Parameters

Width of Spread: 17.0675 ft

Gutter Depression: 1.5120 in

Area of Flow: 3.0390 ft^2

Eo (Gutter Flow to Total Flow): 0.3492

Gutter Depth at Curb: 5.6082 in

Inlet Input Parameters

Inlet Location: Inlet in Sag

Percent Clogging: 20.0000 %

Inlet Type: Curb Opening

Length of Inlet: 24.0000 ft

Curb opening height: 6.0000 in

Local Depression: 2.0000 in

Inlet Result Parameters

Perimeter: 24.0000 ft

Effective Perimeter: 19.2000 ft

Area: 16.0000 ft^2

Effective Area: 12.8000 ft^2

Depth at curb face (upstream of local depression): 0.3455 ft

Computed Width of Spread at Sag: 10.9774 ft

Flow type: Weir Flow

Efficiency: 1.0000

Curb and Gutter Analysis: Inlet #2

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0000 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Gutter Result Parameters

Design Flow: 5.6000 cfs

Gutter Result Parameters

Width of Spread: 12.5770 ft

Gutter Depression: 1.5120 in

Area of Flow: 1.7078 ft^2

Eo (Gutter Flow to Total Flow): 0.4710

Gutter Depth at Curb: 4.5305 in

Inlet Input Parameters

Inlet Location: Inlet in Sag

Percent Clogging: 50.0000 %

Inlet Type: Curb Opening

Length of Inlet: 10.0000 ft

Curb opening height: 6.0000 in

Local Depression: 2.0000 in

Inlet Result Parameters

Perimeter: 13.6000 ft

Effective Perimeter: 6.8000 ft

Area: 6.6667 ft^2

Effective Area: 3.3333 ft^2

Depth at curb face (upstream of local depression): 0.5042 ft

Computed Width of Spread at Sag: 18.9118 ft

Flow type: Weir Flow

Efficiency: 1.0000

Curb and Gutter Analysis: Inlet #3

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0000 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0830 ft/ft

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Gutter Result Parameters

Design Flow: 1.7000 cfs

Gutter Result Parameters

Width of Spread: 7.1804 ft

Gutter Depression: 1.5120 in

Area of Flow: 0.6416 ft^2

Eo (Gutter Flow to Total Flow): 0.7407

Gutter Depth at Curb: 3.2353 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 3.5000 ft

Local Depression: 2.0000 in

Inlet Result Parameters

Intercepted Flow: 1.0944 cfs

Bypass Flow: 0.6056 cfs

Efficiency: 0.6438

APPENDIX D

REFERENCE DATA

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Western Riverside Area, California

April 8, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,670 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GaC	Garretson very fine sandy loam, 2 to 8 percent slopes	7.8	80.3%
PoC	Porterville clay, 0 to 8 percent slopes	1.9	19.7%
Totals for Area of Interest		**9.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

GaC—Garretson very fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcv2
Elevation: 430 to 1,740 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 220 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Garretson

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metasedimentary rock

Typical profile

H1 - 0 to 10 inches: very fine sandy loam
H2 - 10 to 60 inches: loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Cortina

Percent of map unit: 5 percent
Hydric soil rating: No

Perkins

Percent of map unit: 5 percent
Hydric soil rating: No

Arbuckle

Percent of map unit: 5 percent
Hydric soil rating: No

PoC—Porterville clay, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcxy
Elevation: 50 to 300 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 150 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Porterville

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 15 inches: clay
H2 - 15 to 66 inches: clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD001CA - CLAYEY (1975)
Hydric soil rating: No

Minor Components

Cajalco

Percent of map unit: 5 percent
Hydric soil rating: No

Yokohl

Percent of map unit: 5 percent
Hydric soil rating: No

Las posas

Percent of map unit: 5 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map Scale: 1:1,670 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
GaC	Garretson very fine sandy loam, 2 to 8 percent slopes	B	7.8	80.3%
PoC	Porterville clay, 0 to 8 percent slopes	C	1.9	19.7%
Totals for Area of Interest			**9.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

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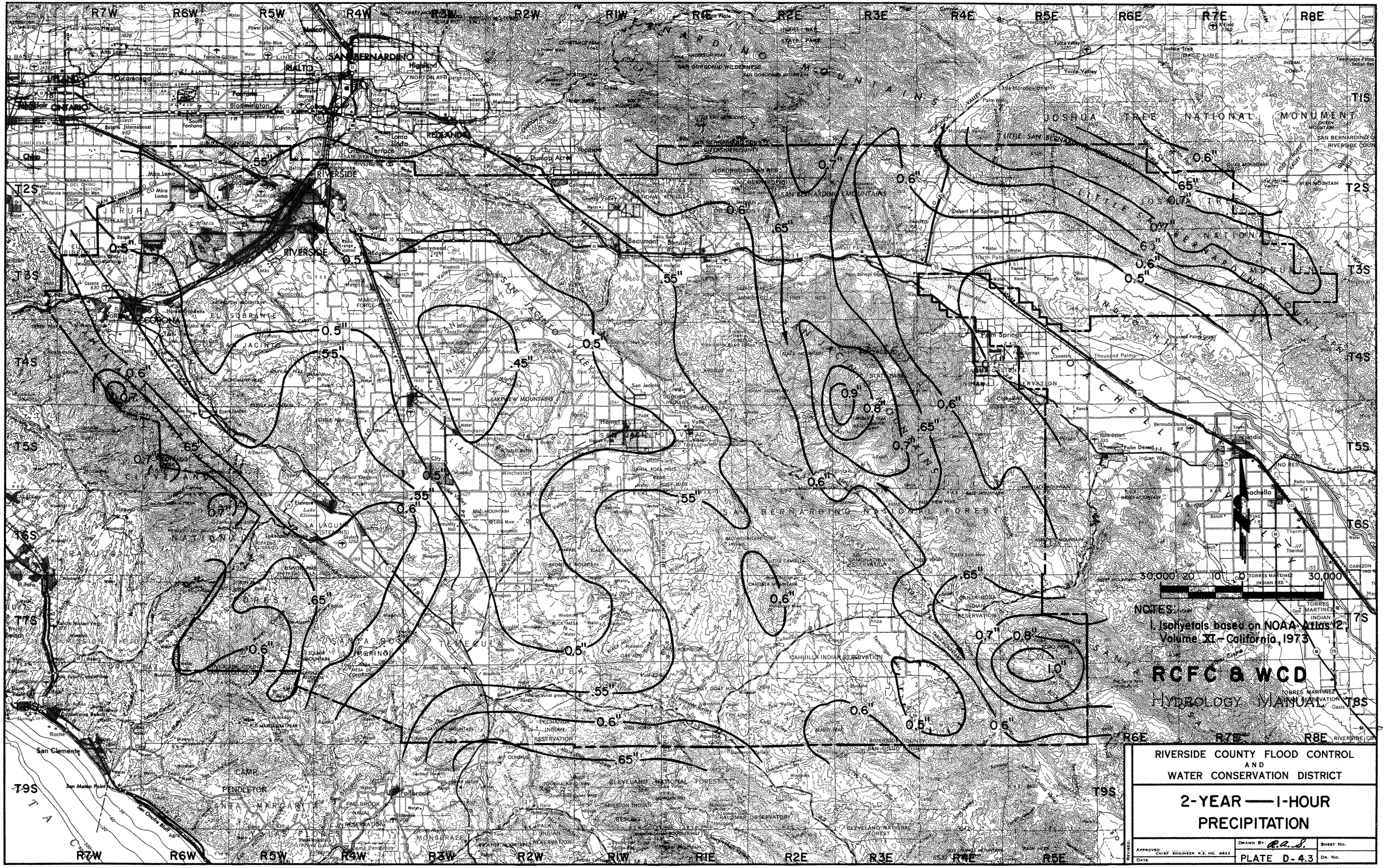
RAINFALL INTENSITY—INCHES PER HOUR

MIRA LOMA			MURRIETA - TEMECULA & RANCHO CALIFORNIA			NORCO			PALM SPRINGS			PERRIS VALLEY		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.48	5	3.45	5.10	5	2.77	4.16	5	4.23	6.76	5	2.64	3.78
6	2.58	4.07	6	3.12	4.61	6	2.53	3.79	6	3.80	6.08	6	2.41	3.46
7	2.37	3.75	7	2.87	4.24	7	2.34	3.51	7	3.48	5.56	7	2.24	3.21
8	2.21	3.49	8	2.67	3.94	8	2.19	3.29	8	3.22	5.15	8	2.09	3.01
9	2.08	3.28	9	2.50	3.69	9	2.07	3.10	9	3.01	4.81	9	1.98	2.84
10	1.96	3.10	10	2.36	3.48	10	1.96	2.94	10	2.83	4.52	10	1.88	2.69
11	1.87	2.95	11	2.24	3.30	11	1.87	2.80	11	2.67	4.28	11	1.79	2.57
12	1.78	2.82	12	2.13	3.15	12	1.79	2.68	12	2.54	4.07	12	1.72	2.46
13	1.71	2.70	13	2.04	3.01	13	1.72	2.58	13	2.43	3.88	13	1.65	2.37
14	1.64	2.60	14	1.96	2.89	14	1.66	2.48	14	2.33	3.72	14	1.59	2.29
15	1.58	2.50	15	1.89	2.79	15	1.60	2.40	15	2.23	3.58	15	1.54	2.21
16	1.53	2.42	16	1.82	2.69	16	1.55	2.32	16	2.15	3.44	16	1.49	2.14
17	1.48	2.34	17	1.76	2.60	17	1.50	2.25	17	2.08	3.32	17	1.45	2.08
18	1.44	2.27	18	1.71	2.52	18	1.46	2.19	18	2.01	3.22	18	1.41	2.02
19	1.40	2.21	19	1.66	2.45	19	1.42	2.13	19	1.95	3.12	19	1.37	1.97
20	1.36	2.15	20	1.61	2.38	20	1.39	2.08	20	1.89	3.03	20	1.34	1.92
22	1.29	2.04	22	1.53	2.26	22	1.32	1.98	22	1.79	2.86	22	1.28	1.83
24	1.24	1.95	24	1.46	2.15	24	1.26	1.90	24	1.70	2.72	24	1.22	1.75
26	1.18	1.87	26	1.39	2.06	26	1.22	1.82	26	1.62	2.60	26	1.18	1.69
28	1.14	1.80	28	1.34	1.98	28	1.17	1.76	28	1.56	2.49	28	1.13	1.63
30	1.10	1.73	30	1.29	1.90	30	1.13	1.70	30	1.49	2.39	30	1.10	1.57
32	1.06	1.67	32	1.24	1.84	32	1.10	1.64	32	1.44	2.30	32	1.06	1.52
34	1.03	1.62	34	1.20	1.78	34	1.06	1.59	34	1.39	2.22	34	1.03	1.48
36	1.00	1.57	36	1.17	1.72	36	1.03	1.55	36	1.34	2.15	36	1.00	1.44
38	.97	1.53	38	1.13	1.67	38	1.01	1.51	38	1.30	2.09	38	.98	1.40
40	.94	1.49	40	1.10	1.62	40	.98	1.47	40	1.27	2.02	40	.95	1.37
45	.89	1.40	45	1.03	1.52	45	.92	1.39	45	1.18	1.89	45	.90	1.29
50	.84	1.32	50	.97	1.44	50	.88	1.31	50	1.11	1.78	50	.85	1.22
55	.80	1.26	55	.92	1.36	55	.84	1.25	55	1.05	1.68	55	.81	1.17
60	.76	1.20	60	.88	1.30	60	.80	1.20	60	1.00	1.60	60	.78	1.12
65	.73	1.15	65	.84	1.24	65	.77	1.15	65	.95	1.53	65	.75	1.08
70	.70	1.11	70	.81	1.19	70	.74	1.11	70	.91	1.46	70	.72	1.04
75	.68	1.07	75	.78	1.15	75	.72	1.07	75	.88	1.41	75	.70	1.00
80	.65	1.03	80	.75	1.11	80	.69	1.04	80	.85	1.35	80	.68	.97
85	.63	1.00	85	.73	1.07	85	.67	1.01	85	.82	1.31	85	.66	.94
SLOPE = .530			SLOPE = .550			SLOPE = .500			SLOPE = .580			SLOPE = .490		

STANDARD
INTENSITY-DURATION
CURVES DATA


0.5"
.55"
0.6"
0.7"
.65"
.45"
0.9"
0.8"
1.0"
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
APPROVED CHIEF ENGINEER R.E. NO. 8822
DATE
DRAWN BY: R.A.S.
PLATE D-4.3
SHEET No.
DR. No.
REVISED:

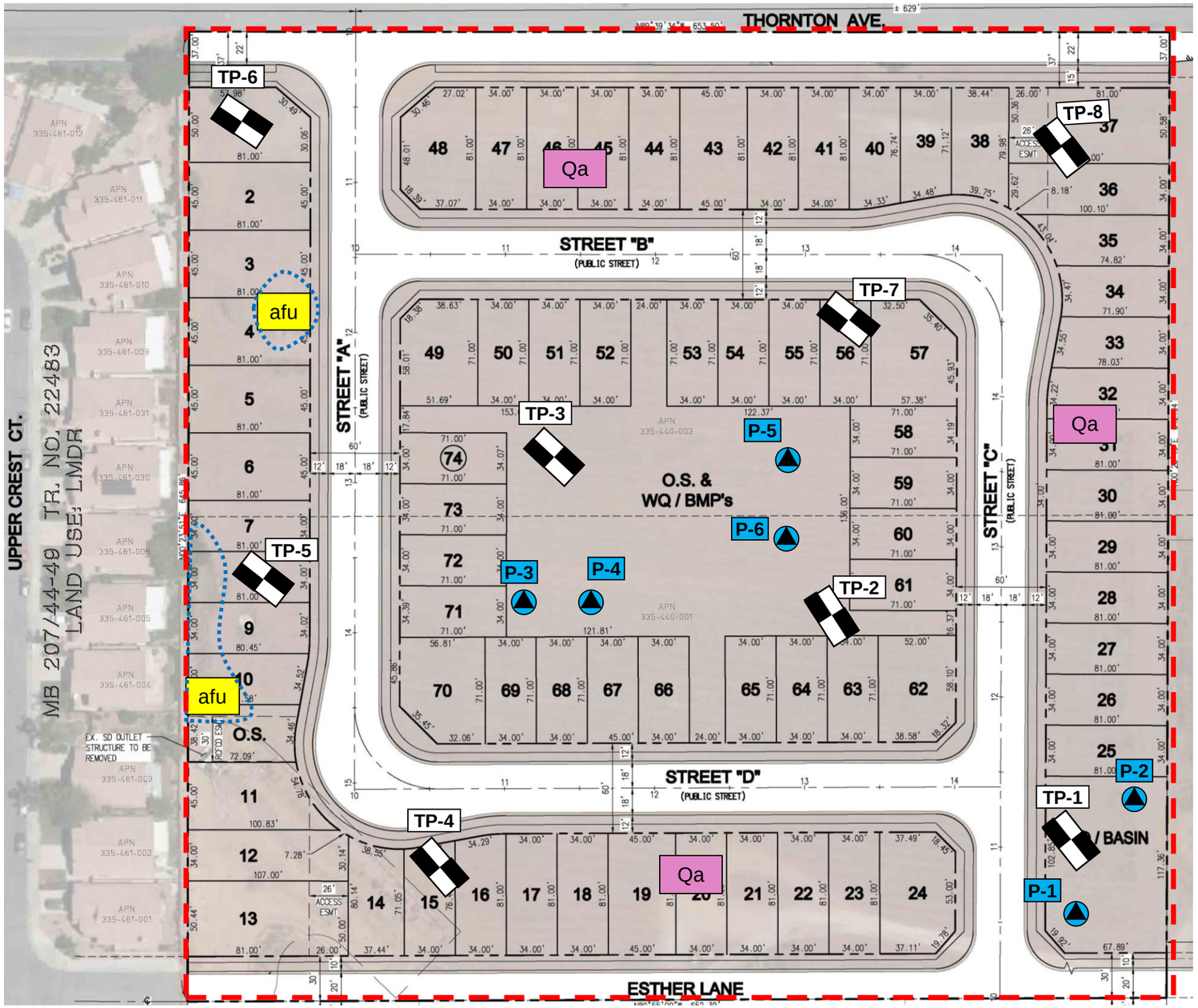
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100-YEAR — 1-HOUR PRECIPITATION

APPROVED: CHIEF ENGINEER R.E. NO. 6822
DATE
REVISED
DRAWN BY: A.A.S.
SHEET NO.
PLATE D-4.4
DR. NO.



GEOCON LEGEND

Locations are approximate

TP-8 .....GEOTEHCNICAL TEST PIT LOCATION

P-6 ..... PERCOLATION TEST LOCATION

.....PROJECT LIMITS

..... GEOLOGIC CONTACT

afu ..... UNDOCUMENTED FILL

Qa ..... ALLUVIUM

N

40 20 0 40 80 120

SCALE: 1"=40'

Source: FM Civil Engineers, Inc., *City of Menifee Coronado Site Plan*, dated March 28, 2022.

GEOCON WEST, INC.
GEOTECHNICAL, ENVIRONMENTAL, MATERIALS
41571 CORNING PLACE #101, MURRIETA, CALIFORNIA 92562
PHONE 951-304-2300 FAX 951-304-2392

GEOLOGIC MAP

CORONADO RESIDENTIAL
THORNTON AVENUE
MENIFEE, CALIFORNIA

HD			MAY 2022	PROJECT NO. T2974-22-01	FIG. 2

TABLE 6
INFILTRATION TEST RATES FOR PERCOLATION AREAS

Parameter	P-1	P-2	P-3	P-4	P-5	P-6
Depth (inches)	60	60	120	120	84	96
Test Type	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy
Change in head over time: ΔH (inches)	5.4	3.8	3.4	5.5	9.6	7.4
Average head: Havg (inches)	9.3	10.1	10.3	9.2	19.2	20.3
Time Interval (minutes): Δt (minutes)	10	10	10	10	10	10
Radius of test hole: r (inches)	4	4	4	4	4	4
Tested Infiltration Rate: It (inches/hour)	5.7	3.8	3.3	5.9	5.4	4.0

The results of the infiltration testing indicate that infiltration at the locations tested ranged from 3.3 to 5.9 inches per hour.

The in-situ field percolation tests performed provide short-term infiltration rates, which apply mainly to the initiation of the infiltration process due to the short time of the test (hours instead of days) and the amount of water used. Where appropriate, the short-term infiltration rates shall be converted to long-term infiltration rates using reduction factors depending on the degree of infiltrate quality, maintenance access and frequency, site variability, subsurface stratigraphy variation, and other factors. The small-scale percolation testing cannot model the complexity of the effect of interbedded layers of different soil composition, and our test results should be considered only as index values of infiltration rates.

The infiltration feasibility per the *Water Quality Management Plan for the Santa Margarita Region of Riverside County* was evaluated for this site. Based on site typography and the lack of stream channels within or near the site, infiltration is not expected to negatively impact downstream water rights or other beneficial uses. The site is not located in an industrial area. Seasonal high ground water is expected to be more than 10 feet below the basin bottom elevations at the property. No water wells are known to be within 100 feet of the proposed infiltration basins. The site is likely not within a 2:1 (horizontal: vertical) projection of a septic leach line associated with the residence to the south or east. The soils in which the basins will be excavated are expected to have adequate physical and chemical properties for infiltration. The project civil engineer should review the infiltration rates and determine the storm water treatment structure most appropriate for this project.

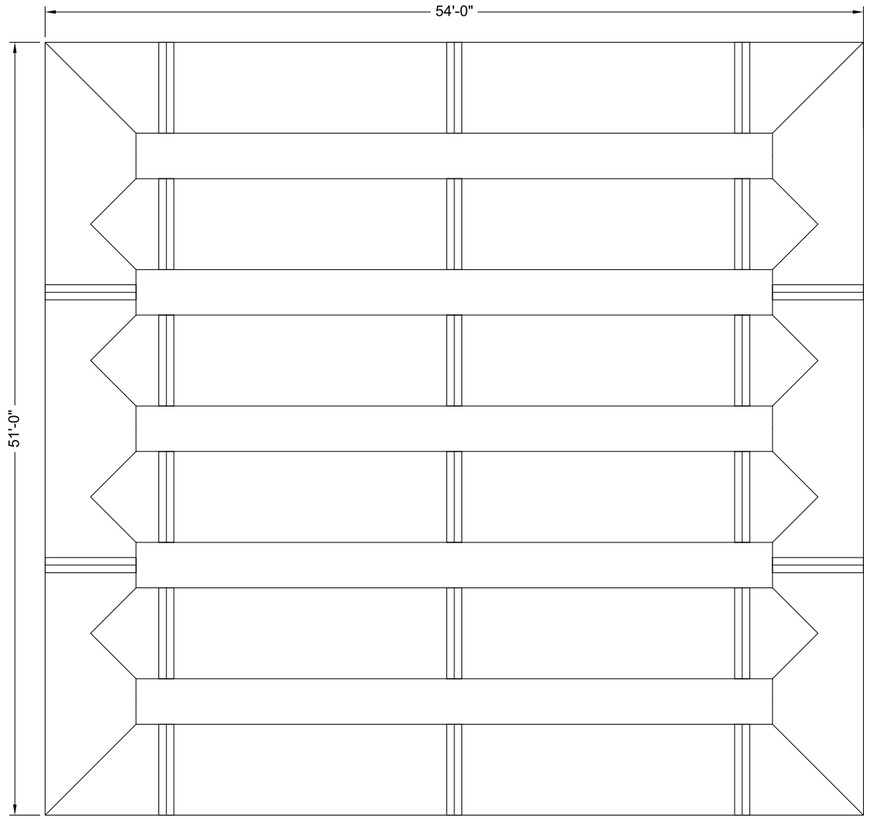
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 354 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 15,000 CF
- PIPE STORAGE VOLUME = 10,009 CF
- BACKFILL STORAGE VOLUME = 5,197 CF
- TOTAL STORAGE PROVIDED = 15,206 CF

PIPE DETAILS
- DIAMETER = 72"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 12"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 9"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 10'

DATE	REVISION DESCRIPTION	BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO16282 Quinn Communities Menifee
Central Chamber
Sun City, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
10422	16282	4/25/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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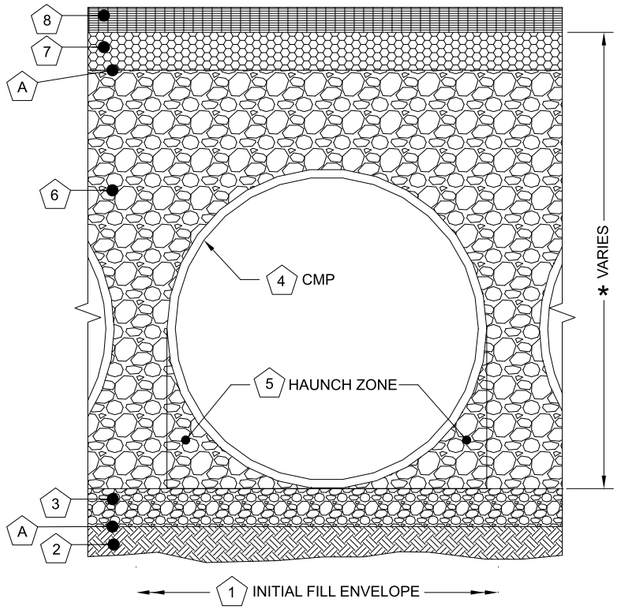


	Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
6	Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction"
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
A	Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.
*	Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

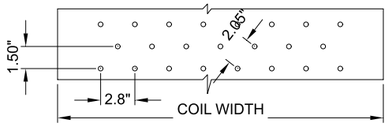
BACKFILL

MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

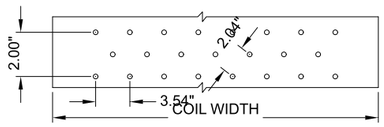
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



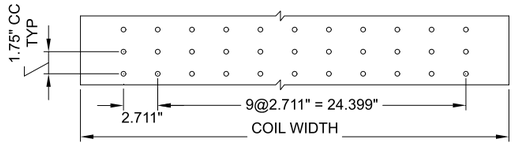
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY
EDGE SPACING EQUAL ON BOTH SIDES



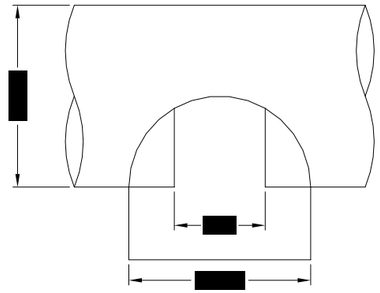
OPEN AREA = 3.33 SQ IN/SQ FT

NOTES:

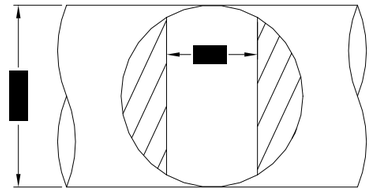
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES ⌀3/8".

TYPICAL PERFORATION DETAIL

SCALE: N.T.S.



PLAN

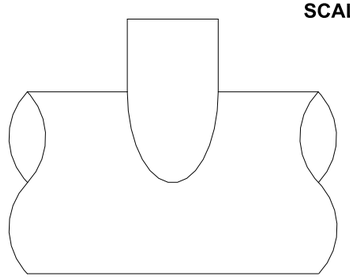


FRONT

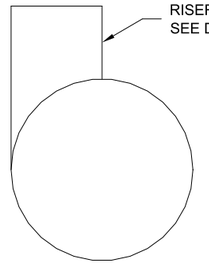
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

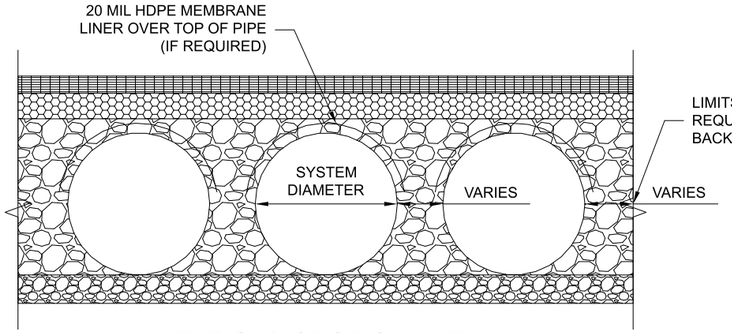


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

DATE	REVISION DESCRIPTION	BY

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SHEET NO.: 1		

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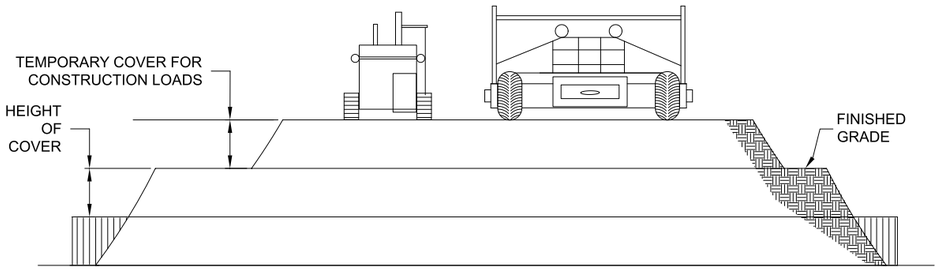


CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

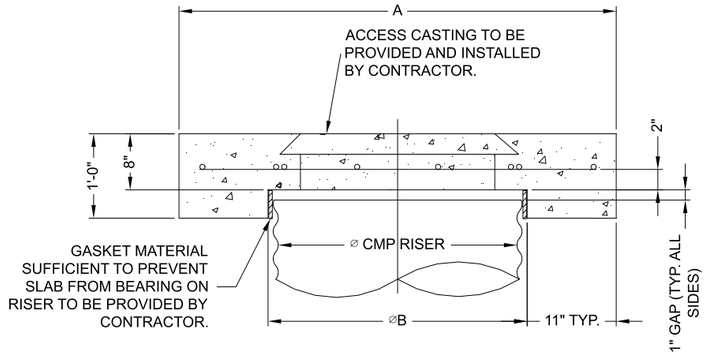
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

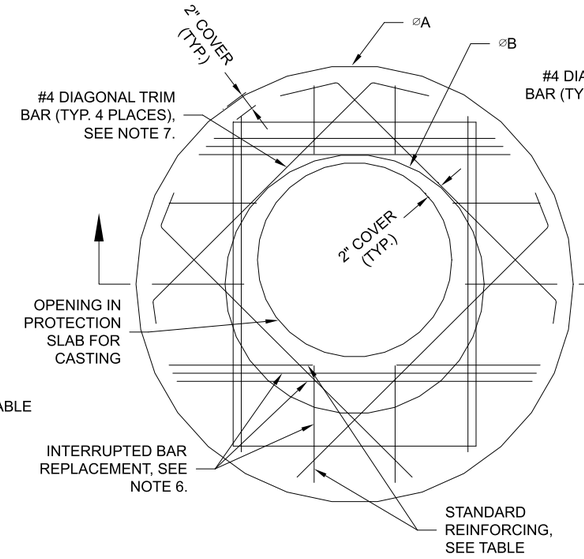
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



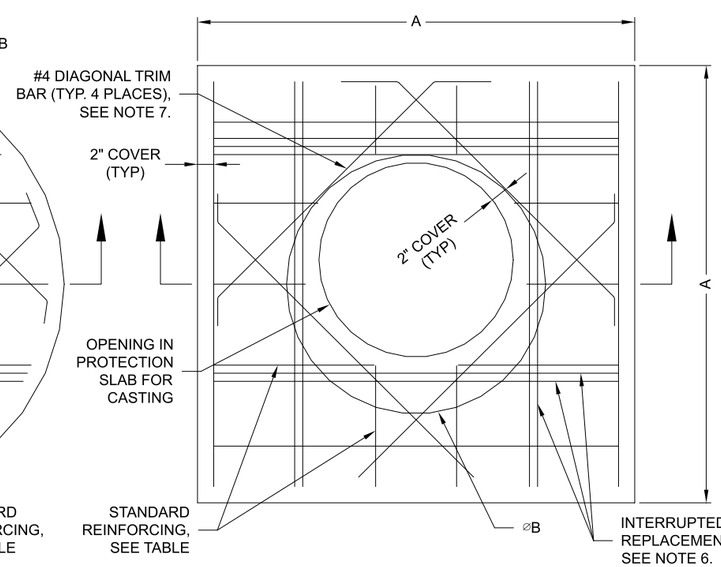
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO16282 Quinn Communities Menifee
Central Chamber
Sun City, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
10422	16282	4/25/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

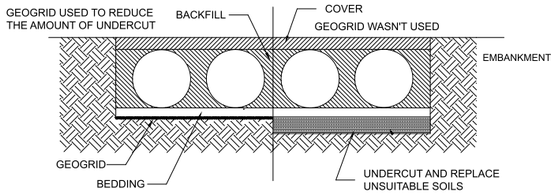
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

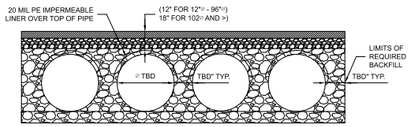


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

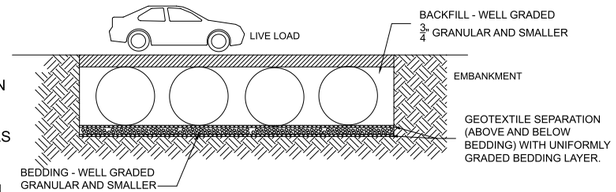
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

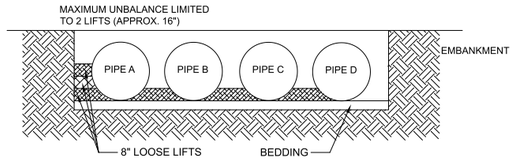
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



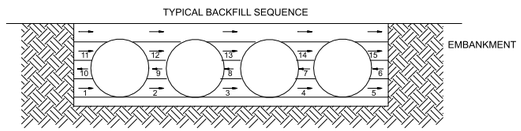
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

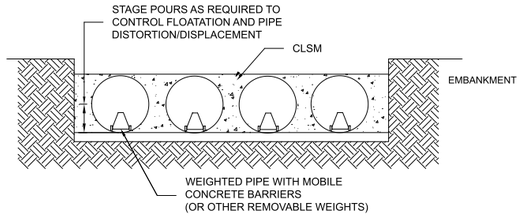


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

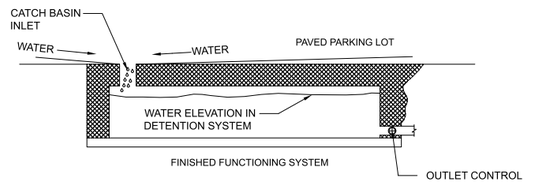


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO16282 Quinn Communities Menifee
Central Chamber
Sun City, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
10422	16282	4/25/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: FMCivil
Date: 5/2/2023
Designed by:
Case No:
Company Project Number/Name: 22-003 - Coronado Condos Menifee

BMP Identification

BMP NAME / ID: Underground Chamber 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.60 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
1A - Road	*43824.31*	*Concrete or Asphalt*	*1*	*0.89*	*39091.3*			
1B - Concrete	*69301.942*	*Concrete or Asphalt*	*1*	*0.89*	*61817.3*			
1C-LS	*142107.3*	*Ornamental Landscaping*	*0.1*	*0.11*	*15696.9*			
1D - Homes (Roof & Hardscape)	*114600.362*	*Roofs*	*1*	*0.89*	*102223.5*			
	369833.914	***Total***			**218829**	**0.60**	***10941.5***	***15206***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: FMCivil | Date: 5/2/2023

Designed by: | Case No:

Company Project Number/Name: 22-003 - Coronado Condos Menifee

BMP Identification

BMP NAME / ID: CDS Pretreatment 1 for Underground Chambers 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs								
1A - Road	*43824.31*	*Concrete or Asphalt*	*1*	*0.89*	*39091.3*			
1B - Concrete	*69301.942*	*Concrete or Asphalt*	*1*	*0.892*	*61817.3*			
1C-LS	*142107.3*	*Ornamental Landscaping*	*0.1*	*0.110458*	*15696.9*			
1D - Homes (Roof & Hardscape)	*114600.362*	*Roofs*	*1*	*0.892*	*102223.5*			
	369833.914		*Total*		**218829**	**0.20**	*1*	*1.2*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: FMCivil
Date: 5/2/2023
Designed by:
Case No:
Company Project Number/Name: 22-003 - Coronado Condos Menifee

BMP Identification

BMP NAME / ID: Infiltration Basin 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.60 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
2A	*820.2*	*Ornamental Landscaping*	*0.1*	*0.11*	*90.6*			
2B	*1403.12*	*Ornamental Landscaping*	*0.1*	*0.11*	*155*			
2C	*952.82*	*Natural (B Soil)*	*0.15*	*0.14*	*134.8*			
3A	*14191.19*	*Concrete or Asphalt*	*1*	*0.89*	*12658.5*			
3B	*6545.86*	*Concrete or Asphalt*	*1*	*0.89*	*5838.9*			
3C	*2913.62*	*Ornamental Landscaping*	*0.1*	*0.11*	*321.8*			
	26826.81	***Total***			**19199.6**	**0.60**	***960***	***1012***

Notes:

ADKAN ENGINEERS
CIVIL ENGINEERING PLANNING LAND SURVEYING
(714) 688-0241 FAX (714) 688-0599
6830 AIRPORT DRIVE - RIVERSIDE, CALIFORNIA 92504

LETTER OF TRANSMITTAL

DATE	JOB NO.
4-17-89	3399

ATTENTION: COEN COUWENBERG

RE: TRACT 22483

TO COUNTY OF RIVERSIDE/FLOOD CONTROL DISTRICT
1995 MARKET STREET
RIVERSIDE, CA 92501

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items;

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
2			STORM DRAIN PLANS WITH CHECK PRINTS
2			STREET IMPROVEMENT PLANS
2			GRADING PLANS
2			FINAL MAP
1			HYDRAULIC CALC
1			HYDRAULIC CALC
1			Easement Checkprints Checked & Forwarded To Cindy Pamp
2			Revised easements

RECEIVED
APR 24 1989
4-27-89 CRG
COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS SUBMITTED FOR 5TH CHECK

COPY TO _____

RECEIVED BY: Sharon Wallace

SIGNED: DJ Vohs
DORIS VOHS

DV:lc

Form 102

ADKAN ENGINEERS
CIVIL ENGINEERING, PLANNING, LAND SURVEYING

June 8, 1989

Riverside County Flood Control District
1995 Market Street
Riverside, Ca 92502

Attention: Jason Christie

Reference: Tract 22483, Grading Plan Check

Dear Mr. Christie:

With this letter I am returning your plan check and our revised plans for the above referenced drawings. The marked up drawings and your plan check letter dated June 7, 1989, indicate that more reference is needed on the section for our emergency overflow drain. Per your request we have added a note which denotes the lot numbers where this section occurs. Note number 5 of your plan check letter indicates this overflow should be lined. During our meeting on June 7, 1989, you indicated that this would not be necessary and the overflow could be unlined. Also indicated in this note is that details of the inlet and outlet should be provided. Per our discussion these items are being built per the street plans and per the County Standard No. 303. In our meeting you agreed with us that no further details on the grading plan is required. We are, therefore, requesting that the grading release be prepared and approved for this project.

Sincerely,

ADKAN ENGINEERS

JOHN SNELL
Director of Engineering

JS:lap

3399F.LTR

6830 AIRPORT DRIVE • RIVERSIDE • CALIFORNIA 92504 • 714/688-0241
FAX 714/688-0599

ADKAN ENGINEERS
CIVIL ENGINEERING, PLANNING, LAND SURVEYING

BY PAUL DATE FEB. 89 CLIENT _____ SHEET NO. 1 OF 30

CHECKED _____ DATE _____ JOB TR. 22483 JOB NO. 3397

HYDROLOGY STUDY

LOCATION AND TOPOGRAPHY

THE SITE IS LOCATED ON THE S.E. CORNER OF VALLEY BLVD. AND THORNTON AVE IN THE SUN CITY AREA, RIVERSIDE COUNTY. THE PROPOSED TRACT (TR No. 22483) CONTAINS 29.7 AC W/ 175 LOTS. THE SITE SLOPES WEST TO EAST AT A RATE OF 3.5% APPROX.

EXISTING CONDITIONS

THE SITE RECEIVES STORM RUNOFF AT ITS WESTERN BOUNDARY FROM THREE NATURAL WATERCOURSES FROM THE HILLS TO THE WEST. THE DRAINAGE AREA CONTAINS 135 ACRES AND GENERATES A Q_{10} = 148 cfs, Q_{100} = 237 cfs. THE SITE LIES ENTIRELY WITHIN SOIL GROUP "D" PER RIVERSIDE COUNTY HYDROLOGY MANUAL.

DEVELOPED CONDITIONS

THE 29.7 AC SITE WILL BE DIVIDED INTO 175 SINGLE FAMILY LOTS. THE STORM RUNOFF IN THE TWO CENTRAL WATER COURSES SHALL BE COLLECTED IN A 51" RCP STORM DRAIN AND CONVEYED THROUGH THE PROPERTY OUTLETING AT THE TRACT'S EASTERLY BOUNDARY. THE STORM RUNOFF IN THE MOST SOUTHERN WATERCOURSE SHALL BE COLLECTED AT CHAMBERS AVE AND DISCHARGED VIA CHAMBERS AVE. ALL LOTS WILL DRAIN TO THE ADJACENT STREETS AND CATCH BASINS THROUGHOUT THE TRACT. ALL ONSITE WATER WILL ULTIMATELY DISCHARGE TO EITHER THE 51" RCP, CHAMBERS AVE, OR THORNTON AVE.

TR. 22483

ONSITE DRAINAGE

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

PROJECT TR. 22483 - ONSITE

FREQUENCY 10-YR.

Calculated by ---------- DATE ---

Checked by ---------- DATE ---

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	v FPS	L FT.	T MIN.	Σ T	REMARKS
							H= 18'	STREET		975'	12		
(1)	"D"-SF	5.75	2.04	.84	9.8							12	INITIAL AREA
							H= 6'	STREET		430'	10		
(2)	"D"-SF	2.15	2.25	.85	4.1							10	INITIAL AREA
CONFLUENCE →	Q=	9.8+	4.1	(2.04/2.25)	=	13.5							STREAM CONFLUENCE TO CHAMBERS AVE. OFFSITE
							H= 8'	STREET		270'	8		
(3)	"D"-SF	.57	2.53	.85	1.2	1.2						8	INITIAL AREA TO ESTHER LN, OFFSITE
							H= 4'	STREET		320'	9		
(4)	"D"-SF	1.11	2.38	.85	2.2	2.2						9	INITIAL AREA TO C.B. UPPER CREST CT. LOT 33
							H= 4'	STREET		280'	8		
(5)	"D"-SF	2.69	2.25	.85	5.1	5.1						8	INITIAL AREA TO PARKWAY INLET LOT 25
							H= 12"	STREET		450'	10		
(6)	"D"-SF	1.62	2.38	.85	3.3	3.3						10	INITIAL AREA TO C.B. LOT 33
							H= 9'	STREET		250'	7		
(7)	"D"-SF	.90	2.72	.86	2.1	2.1						7	INITIAL AREA TO C.B. FAMILY CR. LOT 92
							H= 7'	STREET		500'	11		
(8)	"D"-SF	1.12	2.14	.84	2.0	2.0						11	INITIAL AREA TO C.B. FAMILY CR. LOT 92
							H= 7'	STREET		560'	11		
(9)	"D"-SF	2.12	2.14	.84	3.8	3.8						11	INITIAL AREA TO C.B. HILLMAN STREET LOT 34
							H= 2'	STREET		230'	8.5		
(10)	"D"-SF	1.23	2.46	.85	2.6	2.6						8.5	INITIAL AREA TO C.B.'S PROMINENCE RD. LOT 150 & 62

PLATE D-2

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

PROJECT TR. 22483 - ONSITE

FREQUENCY 10-YR.

Calculated by ---------- DATE ---

Checked by ---------- DATE ---

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	v FPS	L FT.	T MIN.	Σ T	REMARKS
(11)	"D"-SF	4.36	2.09	.84	7.7		H=1%	STREET		820'	11.5	11.5	INITIAL AREA TO X-GUTTER FAMILY CIRCLE
						7.7							
(12)	"D"-SF	1.60	2.53	.85	3.4		H=9%	STREET		340'	8	8	INITIAL AREA TO THORNTON AVE OFFSITE.
CONFLUENCE →	Q = 7.7 + 3.4 (2.09/2.53)				→	10.5							
(13)	"D"-PARK	1.17	1.96	.77	1.8		H=3%	PARK		300'	13	13	INITIAL AREA TO C.B. IN PARK
						1.8							
(14)	"D"-S.F.	0.80	2.25	.89	1.6		H=3%	STREET		1000'	10	10	INITIAL AREA THORNTON AVE.
				+	10.5	1.6							
				+	5.1	12.1	(11)+(12)+(5)+(14)						STREAM SUMMARY THORNTON AVE.
(15)	"D"-S.F.	0.40	2.25	.89	0.8	17.2				→	→		
						0.8	H=3%	STREET		500'	10	10	INITIAL AREA VALLEY BLVD. TO CHAMBERS
(16)	"D"-S.F.	0.90	2.25	.89	1.8								
				+	41.0	2.6	H=2%	STREET		900'	10	10	INITIAL AREA CHAMBERS TO CB LOT 1
				+	13.5	43.0	(15)+(16)+(1)+(2)+OFFSITE						
						57.1					→		STREAM SUMMARY TO CATCH BASIN CHAMBERS LOT 1

PLATE D-2

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. 6 of 36 Sheets

PROJECT TR. 22483 - ONSITE

Calculated by ---------- DATE ---

FREQUENCY 100-YR.

Checked by ---------- DATE ---

DRAINAGE AREA	Soil & Development	A Acres	I in/hr	C	AQ CFS	ΣQ CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	ΣT	REMARKS
							H= 13'	STREET		975'	12		
(1)	"D"-SF	5.75	3.05	.86	15.0							12	INITIAL AREA
							H= 6'	STREET		430'	10		
(2)	"D"-SF	2.15	3.36	.87	6.3							10	INITIAL AREA
													STREAM CONFLUENCE TO CHAMBERS AVE. OFFSITE
CONFLUENCE →	Q=	15.0	+ 6.3	(3.05/3.36)	=	20.7							
							H= 8'	STREET		270'	8		
(3)	"D"-SF	.57	3.78	.87	1.9	1.9						8	INITIAL AREA TO ESTHER LN. OFFSITE
							H= 9'	STREET		320'	9		
(4)	"D"-SF	1.11	3.55	.87	3.4	3.4						9	INITIAL AREA TO C.B. UPPER CREST CT. LOT 33
							H= 4'	STREET		280'	8		
(5)	"D"-SF	2.69	3.36	.87	7.8	7.8						8	INITIAL AREA TO PARKWAY INLET LOT 25
							H= 12'	STREET		450'	10		
(6)	"D"-SF	1.62	3.55	.87	5.0	5.0						10	INITIAL AREA TO C.B. LOT 33
							H= 9'	STREET		250'	7		
(7)	"D"-SF	.90	4.06	.88	3.2	3.2						7	INITIAL AREA TO C.B. FAMILY CR. LOT 92
							H= 7'	STREET		560'	11		
(8)	"D"-SF	1.12	3.19	.86	3.1	3.1						11	INITIAL AREA TO C.B. FAMILY CR. LOT 92
							H= 7'	STREET		560'	11		
(9)	"D"-SF	2.12	3.19	.86	5.8	5.8						11	INITIAL AREA TO HALMAN STREET C.B. LOT 34
							H= 2'	STREET		230'	8.5		
(10)	"D"-SF	1.23	3.03	.87	3.9	3.9						8.5	INITIAL AREA TO C.B. 3 PROMONTORY RD. LOT 150 & 62

PLATE D-2

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. 7 of 30 Sheets

PROJECT TR. 22483 - ONSITE

Calculated by ---------- DATE ---

FREQUENCY 100-YR.

Checked by ---------- DATE ---

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	AQ CFS	ΣQ CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	ΣT	REMARKS
(11)	"D"-SF	4.36	3.12	.87	11.8		H=17'	STREET		820'	11.5	11.5	INITIAL AREA TO X-GUTTER FAMILY CIRCLE
						11.8							
(12)	"D"-SF	1.60	3.78	.87	5.3		H=9'	STREET		340'	8	8	INITIAL AREA TO THORNTON AVE. OFFSITE
CONFLUENCE →	Q=	11.8+	5.3	(3.12/3.78)	→	16.2							
(13)	"D"-PARK	1.17	2.92	.86	2.9		H=3'	PARK		300'	13	13	INITIAL AREA TO C.B. IN PARK
						2.9							
(14)	"D"-S.F.	0.80	3.36	.90	2.4		H=31'	STREET		1000'	10	10	INITIAL AREA THORNTON AVE.
				+	16.2	2.4							
				+	7.8	18.6	(11)+	(12) +	(5) +	(14)			STREAM SUMMARY THORNTON AVE.
(15)	"D"-S.F.	0.40	3.36	.90	1.2	26.4					→		
						1.2	H=3'	STREET		560'	10	10	INITIAL AREA VALLEY BLVD. TO CHAMBERS
(16)	"D"-S.F.	0.90	3.36	.90	2.7								
				+	65.0	3.9	H=21'	STREET		900'	10	10	INITIAL AREA CHAMBERS TO C.B. LOT 1
				+	20.7	68.9	(15)+	(16) +	(1) +	(2) +	OFFSITE		
						89.6					→		STREAM SUMMARY TO CATCH BASIN CHAMBERS LOT 1

PLATE D-2

TR. 22483

OFFSITE DRAINAGE

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

PROJECT TR 22483 - OFFSITE

FREQUENCY 10-YR.

Calculated by ---------- DATE ---

Checked by ---------- DATE ---

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	ΔQ CFS	ΣQ CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	ΣT	REMARKS
(1) (2)	"D"-UNDEV.	7.8	1.96	.73	11.2		H=20.0'	NATURAL		700	13	13	INITIAL AREA
(3) (4)	"D"-UNDEV.	11.2	1.96	.73	16.0		H=28.0'	NATURAL		800	13	13	INITIAL AREA
(5) (6)	"D"-UNDEV.	12.9	1.96	.73	18.5		H=38.0'	NATURAL		1200	13	13	INITIAL AREA
						45.7							
(7) (6)	"D"-UNDEV.	10.1	1.70	.72	12.4		H=26.0'	NATURAL		1600	17	17	INITIAL AREA
	Q = 45.7 + 12.4 $(\frac{13}{17})$ =				55.2	55.2							STREAM CONFLUENCE
(9) (12)	"D"-UNDEV.	9.9	1.16	.65	7.5		H=8.0'	NATURAL		1000	18	35	NATURAL FLOW
						62.7							
(10) (11)	"D"-UNDEV.	9.8	1.88	.73	13.4		H=28.0'	NATURAL		900	14		INITIAL AREA
(11) (23)	"D"-UNDEV.	11.0	1.14	.65	8.2		H=11.2'	NATURAL		1800	22	36	NATURAL FLOW
						84.3							
(16) (17)	"D"-UNDEV.	14.0	1.48	.69	14.3		H=8.4'	NATURAL		1300	22	22	INITIAL AREA
	Q = 84.3 + 14.3 $(\frac{11}{1.48})$ =				95.3								STREAM CONFLUENCE
						95.3							STREAM SUMMARY
(20) (21)	"D"-UNDEV.	9.6	1.81	.72	12.5		H=5.0'	NATURAL		650'	15	15	INITIAL AREA
						12.5							TO C.B. ON VALLEY BLVD.

PLATE D-2

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

Sheet No. 10 of 36 Sheets

PROJECT TR-22483 - OFFSITE

Calculated by ---------- DATE ---

FREQUENCY 10-YR.

Checked by ---------- DATE ---

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	ΔQ CFS	ΣQ CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	ΣT	REMARKS
(7) (9)	"D"-UNDEV.	8.9	2.25	.75	15.0		H=200'	NATURAL		500'	10	10	INITIAL AREA
(9) (13)	"D"-UNDEV.	9.1	1.41	.67	8.6		H=120'	NATURAL		700'	14	24	NATURAL FLOW
(13) (22)	"D"-UNDEV.	4.6	1.00	.61	2.8		H=100'	NATURAL		1300'	22	46	NATURAL FLOW
						26.4							
(14) (15)	"D"-UNDEV.	10.3	1.41	.68	9.9		H=180'	NATURAL		1500'	24	24	INITIAL AREA
						33.4							
	Q = 26.4 +	9.9	(1.00/1.41)	=	33.4								STREAM CONFLUENCE
(18) (19)	"D"-UNDEV.	5.8	1.75	.71	7.2		H=360'	NATURAL		600'	16	16	INITIAL AREA
						41							
													STREAM SUMMARY
													TO CHAMBERS AVE.

PLATE D-2

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

PROJECT TR. 22483 - OFFSITE

FREQUENCY 100-YR.

Calculated by ---------- DATE ---

Checked by ---------- DATE ---

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	AQ CFS	ΣQ CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	ΣT	REMARKS
(1) (2)	"D"-UNDEV.	7.8	2.92	.78	17.8		H=200'	NATURAL		700'	13	13	INITIAL AREA
(3) (4)	"D"-UNDEV.	11.2	2.92	.78	25.5		H=260'	NATURAL		800'	13	13	INITIAL AREA
(5) (6)	"D"-UNDEV.	12.9	2.92	.78	29.4		H=380'	NATURAL		1200'	13	13	INITIAL AREA
						72.7							
(7) (6)	"D"-UNDEV.	10.1	2.54	.76	19.5		H=200'	NATURAL		1600'	17	17	INITIAL AREA
						87.6							
	Q= 72.7+	19.5	(13/17)	=	87.6								STREAM CONFLUENCE
(6) (12)	"D"-UNDEV.	9.9	1.73	.71	12.2		H=80'	NATURAL		1000'	18	35	NATURAL FLOW
						99.8							
(10) (11)	"D"-UNDEV.	9.8	2.81	.78	21.5		H=220'	NATURAL		900'	14		INITIAL AREA
(11) (23)	"D"-UNDEV.	11.0	1.70	.71	13.3		H=112'	NATURAL		1800'	22	36	NATURAL FLOW
						134.6							
(16) (17)	"D"-UNDEV.	14.0	2.21	.75	23.2		H=84'	NATURAL		1300'	22	22	INITIAL AREA
	Q= 134.6	+23.2	(1.70/2.21)	=	152.4								STREAM CONFLUENCE
						152.4							℄ STREAM SUMMARY
(20) (21)	"D"-UNDEV.	9.6	2.71	.77	20.0		H=56'	NATURAL		650'	15	15	INITIAL AREA
						20.0							TO C.B. ON VALLEY BLVD.

PLATE D-2

RCFC & WCD HYDROLOGY MANUAL
RATIONAL METHOD CALCULATION FORM

PROJECT TR. - 22483 - OFFSITE

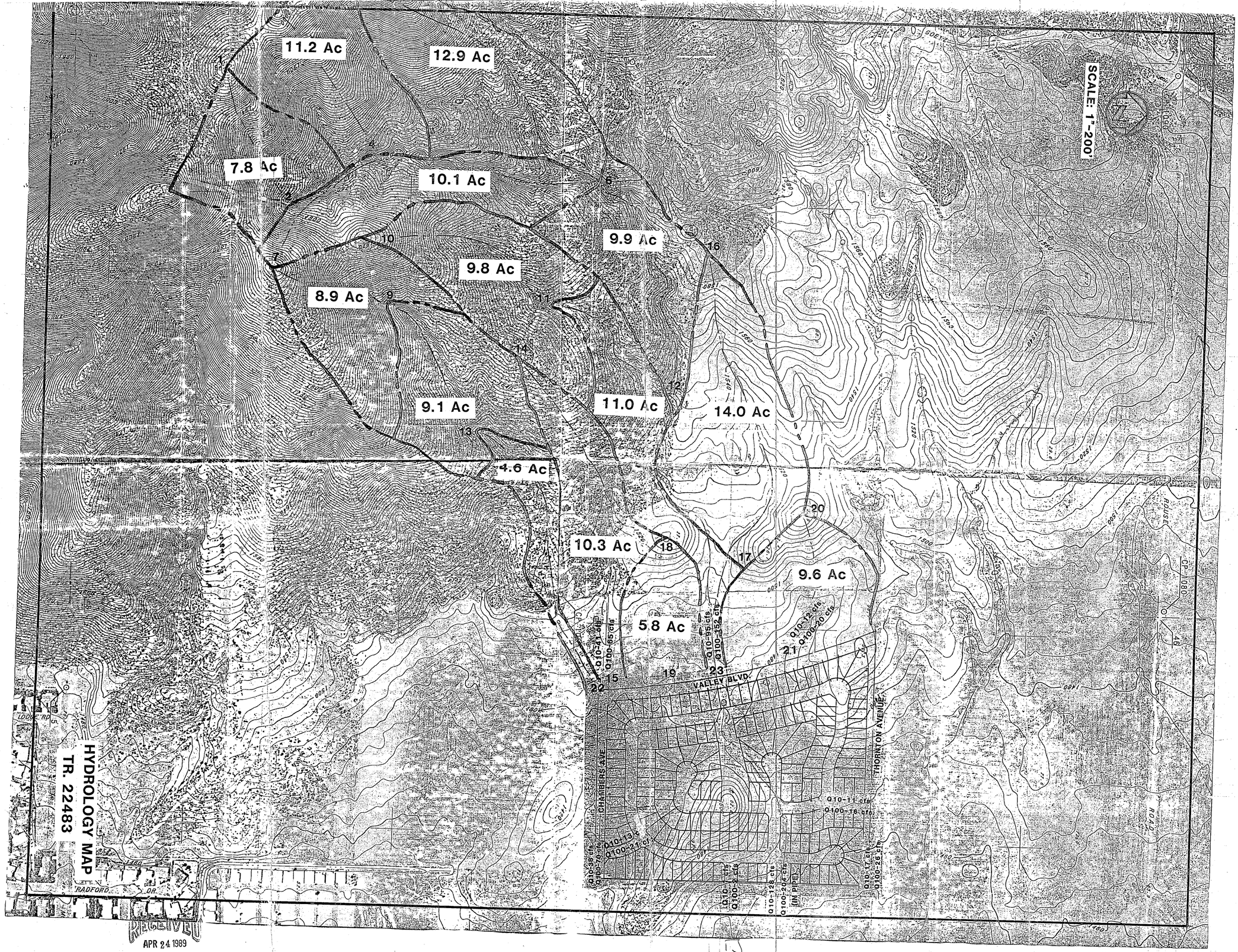
FREQUENCY 100-YR.

Calculated by ---------- DATE ----

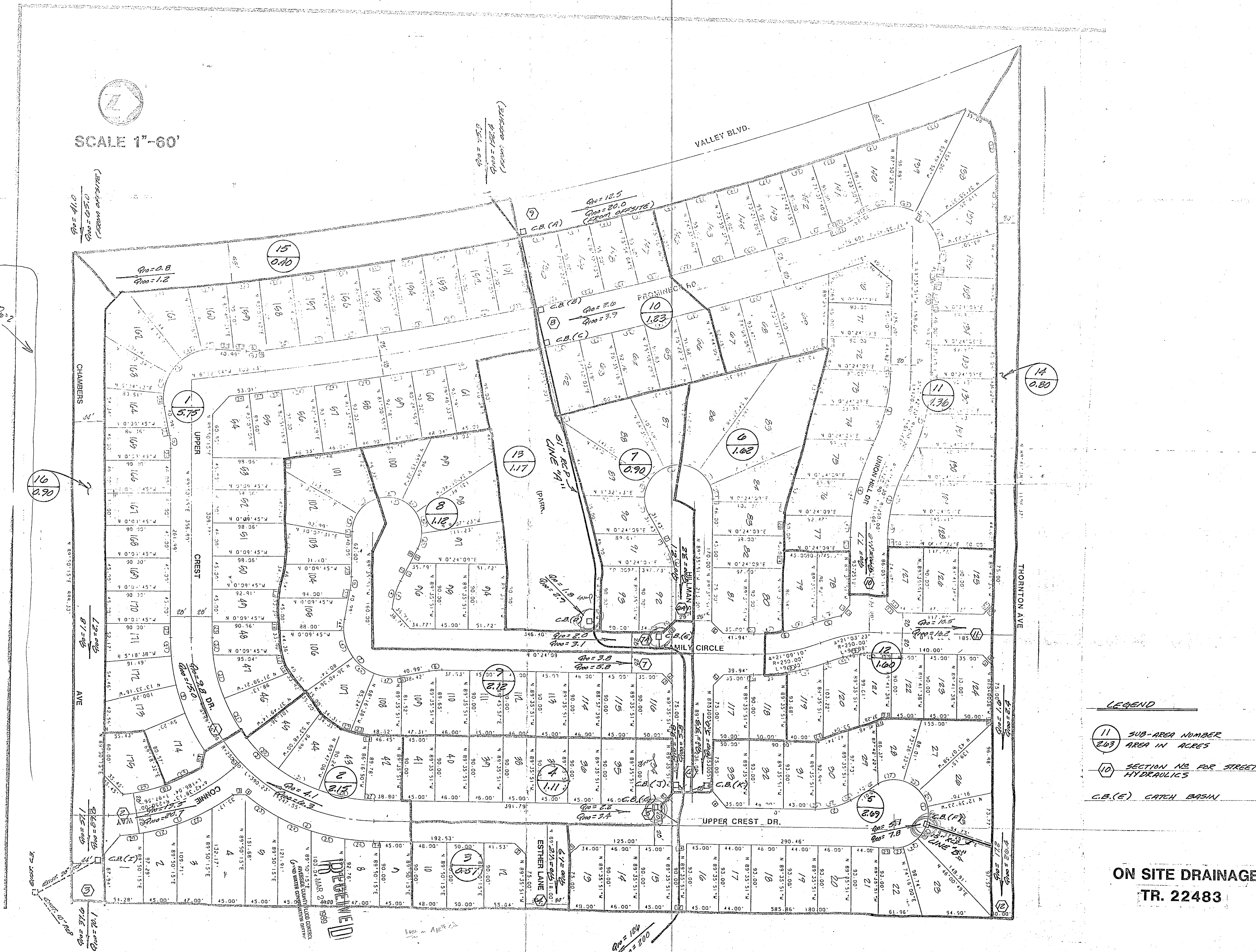
Checked by ---------- DATE ----

DRAINAGE AREA	Soil & Development	A Acres	I In/hr.	C	ΔQ CFS	Σ Q CFS	SLOPE	SECTION	V FPS	L FT.	T MIN.	Σ T	REMARKS
							H=200'	NATURAL		500'	10	10	INITIAL AREA
(7) (9)	"D"-UNDEV.	8.9	3.36	.80	23.9								
							H=120'	NATURAL		700'	14	24	NATURAL FLOW
(9) (13)	"D"-UNDEV.	9.1	2.11	.74	14.2								
							H=100'	NATURAL		1300'	22	46	NATURAL FLOW
(13) (22)	"D"-UNDEV.	4.6	1.50	.69	4.8	42.9							
							H=180'	NATURAL		1500'	24	24	INITIAL AREA
(14) (15)	"D"-UNDEV.	10.3	2.11	.74	16.1								
						54.3							STREAM CONFLUENCE
	$Q = 42.9 + 16.1 \left(\frac{1.50}{2.11}\right) =$				54.3								
							H=360'	NATURAL		1000'	16	16	INITIAL AREA
(18) (19)	"D"-UNDEV.	5.8	2.62	.67	10.2	65							
													STREAM SUMMARY
													TO CHAMBERS AVE.

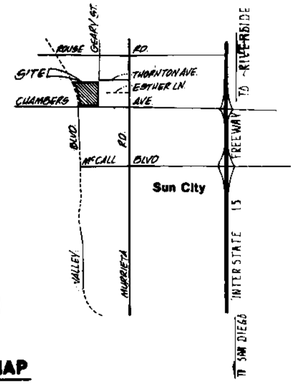
PLATE D-2



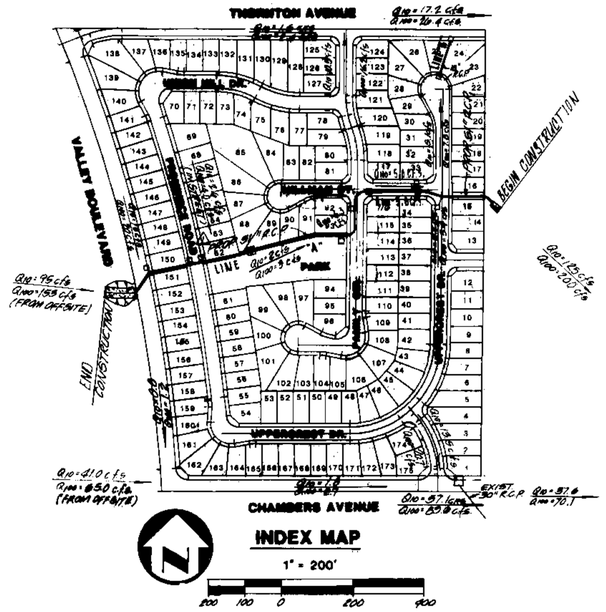
HYDROLOGY MAP
TR. 22483


SCALE 1"-60'
VALLEY BLVD.
CHAMBERS AVE
THORNTON AVE
UPPER CREST DR.
CONNIE DR.
PROMINENCE RD.
UNION HILL DR.
FAMILY CIRCLE
ESTHER LANE
LEGEND
SUB-AREA NUMBER
AREA IN ACRES
SECTION NO. FOR STREET HYDRAULICS
C.B.(E) CATCH BASIN
ON SITE DRAINAGE
TR. 22483

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



VICINITY MAP
N.T.S.



INDEX MAP
1" = 200'
200 100 0 200 400

R.C.F.C.D. STANDARD DRAWINGS

C.B.100 R.C.F.C.D. STD. C.B. 100
LOCAL DEPRESION No.2 PER R.C.F.C.D. STD. L.D. 201
J.S. No.2 R.C.F.C.D. STD. J.S.229
M.H. No.2 R.C.F.C.D. STD. M.H. 252
CONC. TRAP CHANNEL PER R.C.F.C.D. STD. CH 326
CHAINLINK FENCE PER R.C.F.C.D. M-801
CONC. COLLAR R.C.F.C.D. STD.M-803
4 STRAND BARB WIRE RCFCD STD. M 818

CAL TRANS STANDARD PLAN

CONC. SINGLE HEADWALL PER CAL-TRANS D-89
1/4 TON ROCK METHOD B PLACEMENT CAL - TRANS STD. SPECIFICATION SECTION 72-1.

NOTE:
CONTRACTOR SHALL NOTIFIY THE COUNTY (OR DISTRICT, AS APPROPIATE) IN WRITING A MINIMUM OF TWO WEEKS BEFORE BEGINNING CONSTRUCTION, AND SHALL NOT BEGIN CONSTRUCTION BEFORE OBTAINING AUTHURIZATION TO PROCEED.

GENERAL NOTES

1. The contractor shall construct the flood control improvement shown on the drawings in conformance with the requirements of Riverside County Flood Control and Water Conservation District's Special Provisions and Detailed Specifications dated September 1984, and Design Standard Drawings dated May 1971.
2. An encroachment permit is required from Riverside County Flood Control. Contact Howard Dickerson at (714) 787-6668. After the permit is issued the District must be notified two weeks prior to construction.
3. Construction inspection will be performed by Riverside County Flood Control. Contact Leonard Dunn at (714) 787-1263. The District must be notified two weeks prior to construction.
4. All stationing refers to centerline of construction unless otherwise noted.
5. Stationing for laterals and connector pipe refer to the centerline-centerline intersection station.
6. Forty-eight hours before excavation, call Underground Service Alert at 1-800-422-4133.
7. All elevations shown are in feet and decimals thereof based on U.S.C. and G.S. Datum.
8. All cross sections are taken looking downstream.
9. Elevations of utilities are approximate unless otherwise noted.
10. Opening resulting from the cutting or partial removal of existing culverts, pipes or similar structures to be abandoned shall be sealed with 6" of Class "B" concrete.
11. Pipe connected to the mainline pipe shall conform to Junction Structure No. 4 (JS 229) unless otherwise noted.
12. Bedding pipe with less than two feet of cover shall conform to Los Angeles County Flood Control District Standard Drawings 2-D213.3 and 2-D177 for concrete backfill in trenches. All other pipe shall conform to RCFC and WCD Standard Drawing M815.
13. BH-1 indicates soil boring locations based on the soils report dated NOV 13, 1987. Locations shown are approximate.
14. "V" is the depth of inlet of catch basins measured from the top of curb to invert of connector pipe.
15. Catch basins shall be located so that local depression shall begin at existing curb return joint, unless otherwise specified.
16. All curbs, gutters, sidewalks, driveways and other existing improvements to be reconstructed in kind and at the same elevation and location as the existing improvements unless otherwise noted.

1. The following items are to be inspected and maintained by Riverside County Flood Control and Water Conservation District:

   ⚠a. 51" RCP from Station 11+17.16 to Station 23+24.29 as shown on Sheets 2 and 3.

   b. All manholes and other structures required to complete the construction of the above mentioned main-line pipe; excluding catch basins and connector pipe.

Note: The concrete cover on the inside of all reinforced concrete pipe must be increased to provide a minimum of 1-1/2" over the reinforcing when the design velocities exceed 20 feet per second. The concrete design strength in these reaches shall be fc = 5,000 psi for velocities exceeding 20 feet per second and fc = 6,000 psi for velocities exceeding 30 feet per second.

⚠ *C.I.P.P. ALTERNATE SPECIAL NOTE:*

IF AND WHEN FLOW VELOCITY EXCEEDS 10 F.P.S. A 140° SEGMENT OF THE C.I.P.P. INVERT SHALL BE THICKENED 2 INCHES IN WALL THICKNESS AS "SACRIFICIAL CONCRETE" TO RESIST ABRASION. COMPRESSIVE STRENGTH OF CONCRETE FOR DESIGN VELOCITIES ≥ 20 F.P.S. SHALL BE F_c = 4,000 P.S.I. FOR DESIGN VELOCITIES ≥ 30 F.P.S., F_c = 5,000 P.S.I. SHALL BE PROVIDED.

REGISTERED PROFESSIONAL ENGINEER — ROBERT BRUCE ACKER — No. 21608 Exp. 6-30-89 — CIVIL — STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — FRANK J. PEARIS — No. 21608 Exp. 6-30-89 — CIVIL — STATE OF CALIFORNIA

AS BUILT
APPROVED BY: [signature]
DATE 6/8/90

SHEET INDEX

ADKAN ENGINEERS
CIVIL ENGINEERING, PLANNING, LAND SURVEYING
6830 AIRPORT DRIVE
RIVERSIDE, CA 92504
WILLIAM E. SNELL R.C.E. 14332 — DATE 4/10/89

BENCH MARK # 600-30-68
BRASS DISK IN TOP OF CONC. POST 2' E. OF MARKER POST ; 5' W. OF P.P. NO. 194351-E ,175' ± E. OF INT. OF MURRIETA AND ROUSE ROADS, 25' NORTH OF ROUSE ROADS.

REVISIONS			
⚠	REVISED FG ELEVS., ALT C.I.P.P.	G.C.	4/7/89
REF	DESCRIPTION	APPR	DATE

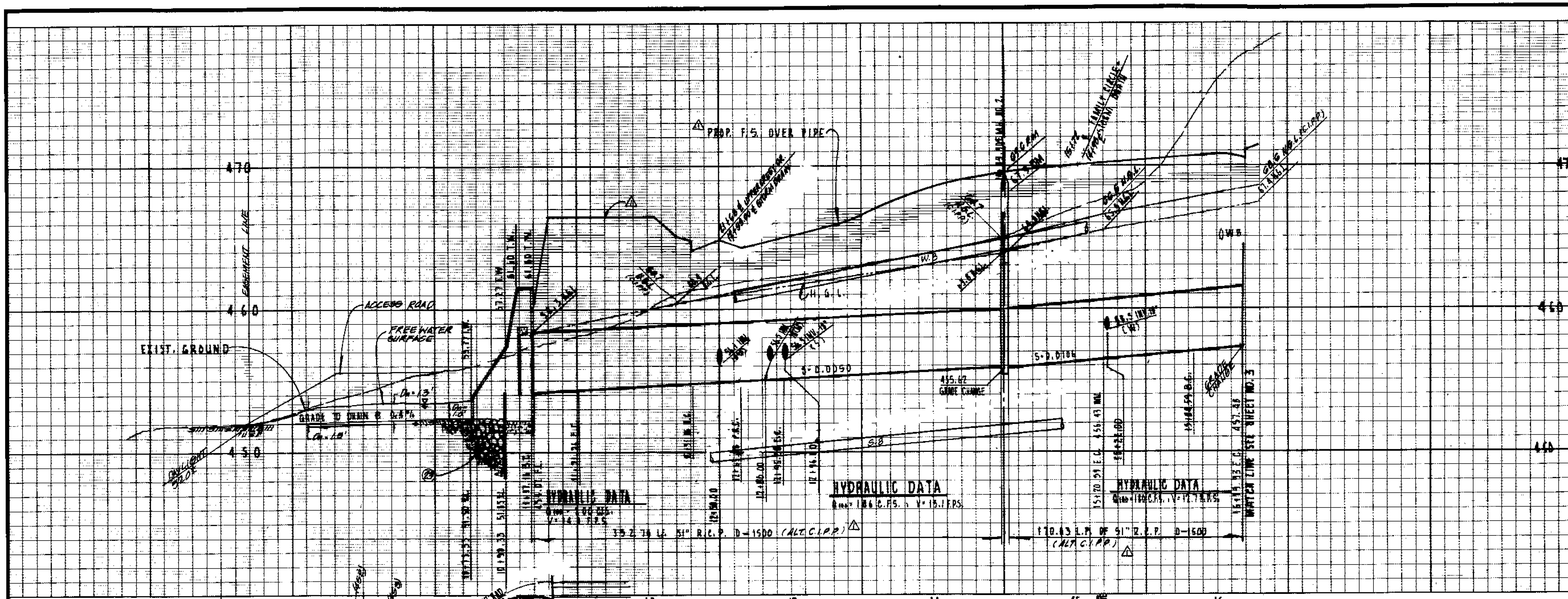
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: Frank J Pearis, PLANNING ENGR R.E. NO. 21609, DATE 8-4-89
APPROVED BY: Kenneth L Edwards, CHIEF ENGINEER R.E. NO. 12400, DATE 8-8-89

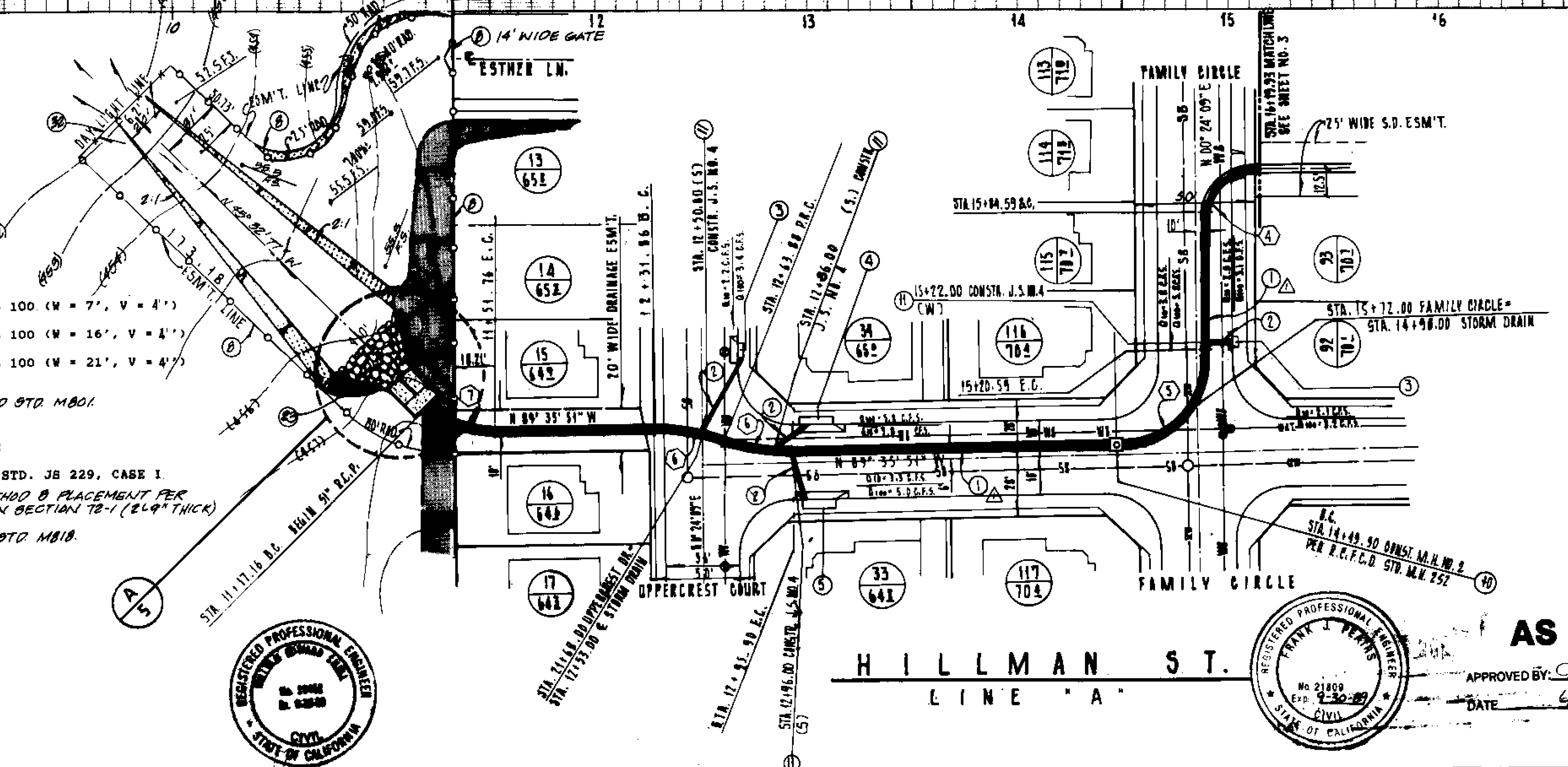
County of Riverside
APPROVED BY:
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE:

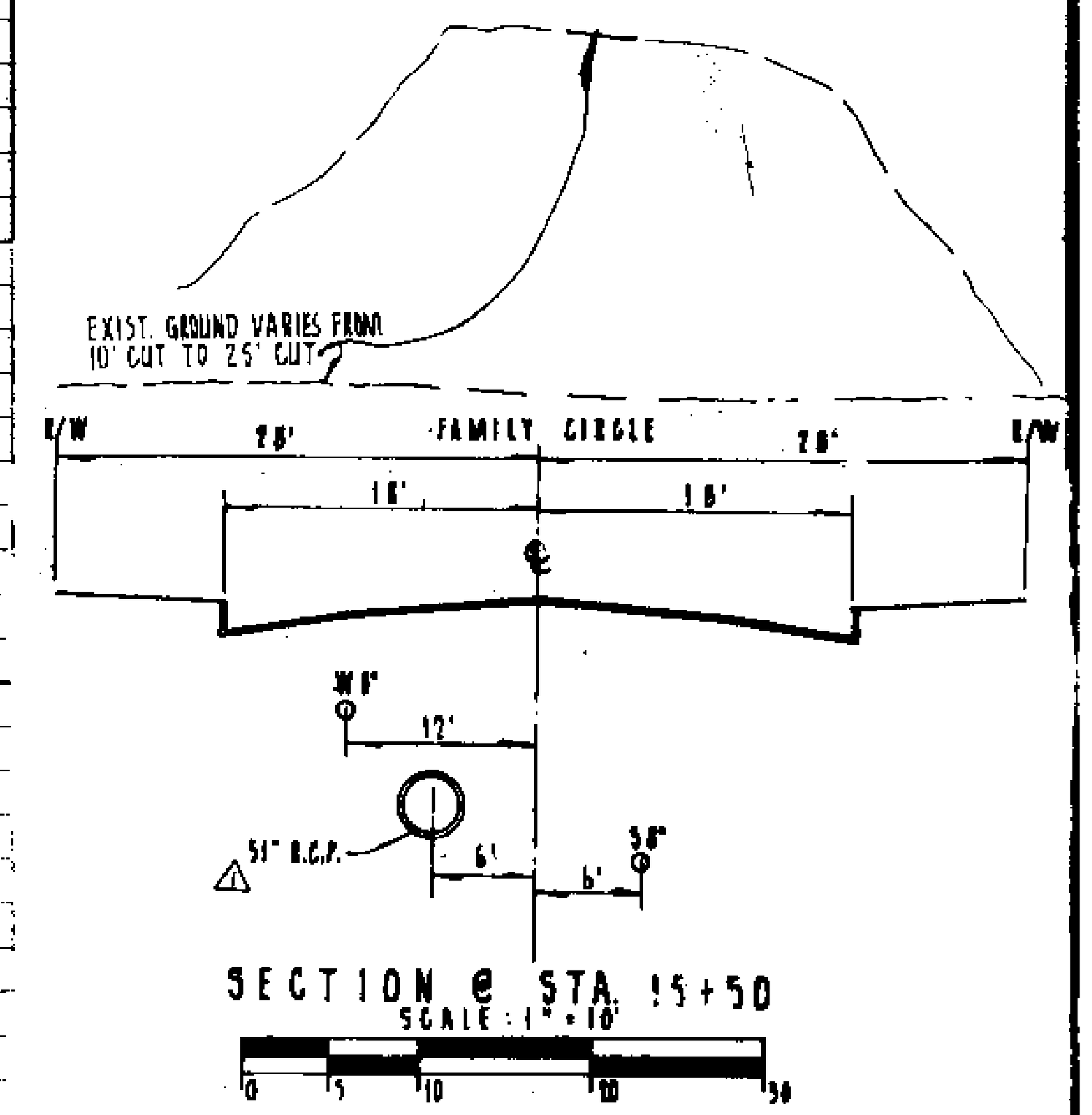
SUN CITY AREA
HILLMAN STREET
STORM DRAIN PLANS
TITLE SHEET
TRACT NO. 22483

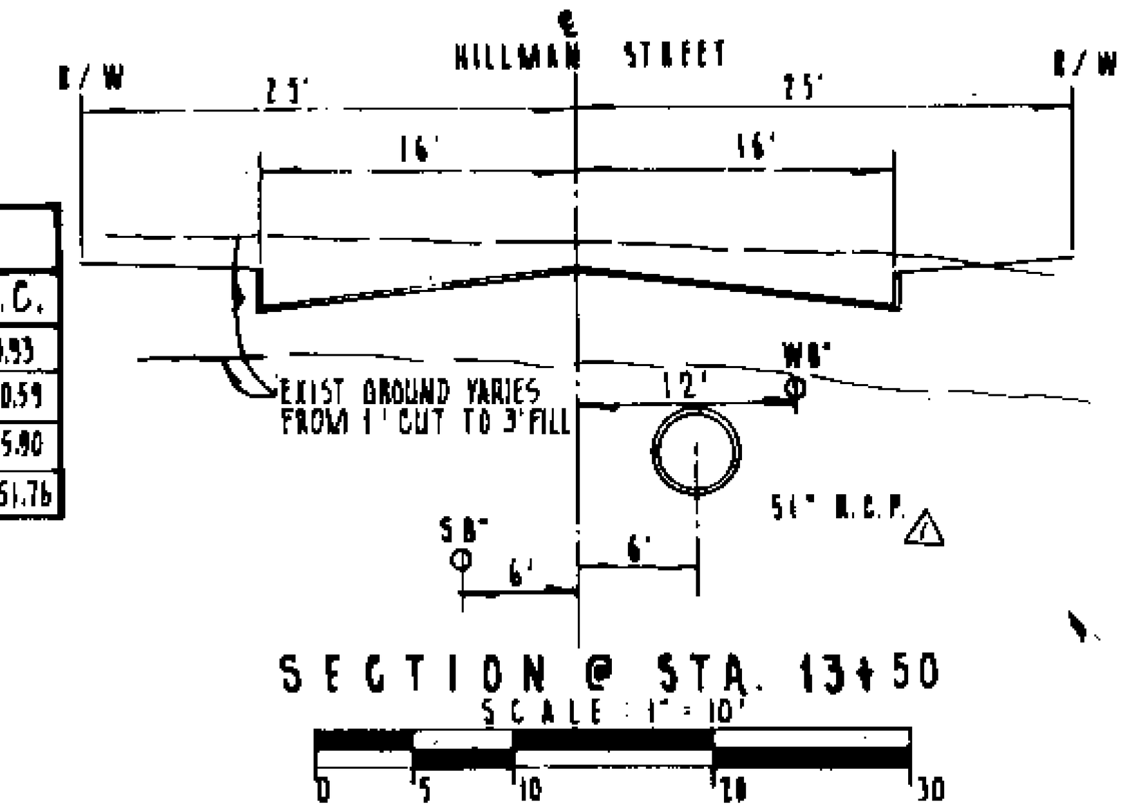
PROJECT NO. 4-0-304
DRAWING NO. 4-539
SHEET NO. 1 OF 5

3279









PLAN & PROFILE
SCALE: 1" = 40'

0 20 40 80' 120

CONSTRUCTION NOTES

1. CONSTRUCT 51" RCP (D-1500) (ALT. C.I.P.P.) SEE SPECIAL C.I.P.P. NOTE ON SHT. 1.
2. CONSTRUCT 18" RCP (CLASS IV)
3. CATCH BASIN NO. 1 PER RCFCD STD. CB 100 (W = 7', V = 4'') W/ LD 201, SEE SHEET NO. 4 FOR PROFILE
4. CATCH BASIN NO. 1 PER RCFCD STD. CB 100 (W = 16', V = 4'') W/ L.D. 201, SEE SHEET NO. 4 FOR PROFILE
5. CATCH BASIN NO. 1 PER RCFCD STD. CB 100 (W = 21', V = 4'') W / L.D. 201, SEE SHEET NO. 4 FOR PROFILE
8. INSTALL CHAINLINK FENCE PER RCFCD STD. M801.
10. MANHOLE NO. 2 PER RCFCD STD. MH 252
11. JUNCTION STRUCTURE NO. 4 PER RCFCD STD. JS 229, CASE I.
29. 1/4 TON ROCK SLOPE PROTECTION METHOD B PLACEMENT PER CAL TRANS STANDARD SPECIFICATION SECTION 72-1 (2.9" THICK)
96. 4 STRAND BARB WIRE PER RCFCD STD. M818.

CURVE DATA:

⬡	Δ	R	L	T	B.C.	E.C.
4	90° 00' 00"	22.5'	35.34'	22.50'	15+84.59	16+19.93
5	90° 00' 00"	45'	70.69'	45.00'	14+49.90	15+20.59
6	20° 23' 00"	90'	32.02'	16.18'	12+63.88	12+95.90
7	44° 03' 34"	45'	34.60'	18.21'	11+17.16	11+51.76

AS BUILT
APPROVED BY: [signature]
DATE 6/8/90

ADKAN ENGINEERS
CIVIL ENGINEERING, PLANNING, LAND SURVEYING
6830 AIRPORT DRIVE
RIVERSIDE, CA 92504
WILLIAM E SNELL R.C.E. 19432 DATE 6/1/89

BENCH MARK
SEE SHT. 1 OF 5 SHTS.

REVISIONS

REF.	DESCRIPTION	APPR.	DATE
1	REVISED F.S. ELEVS., ALT. C.I.P.P.	E.E.	9-7-89

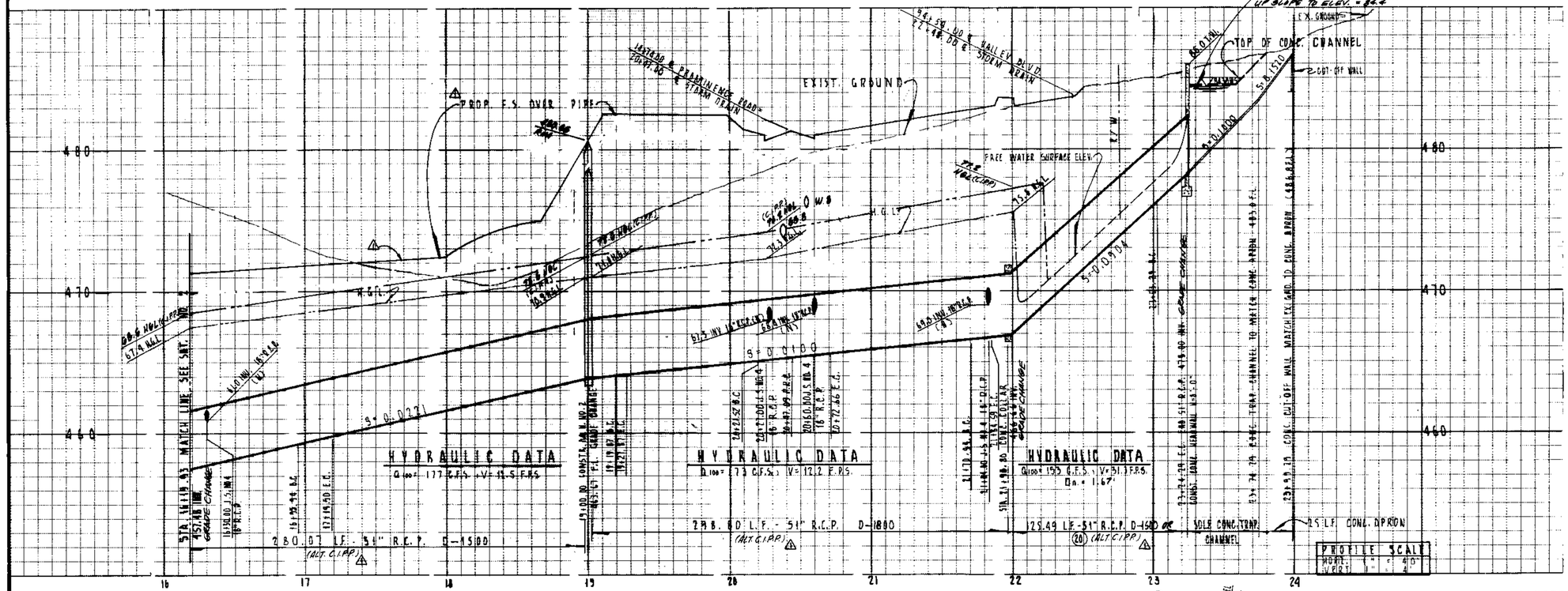
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGR. R.E. NO. 21809 DATE: 8-4-89
APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE: 8-8-89

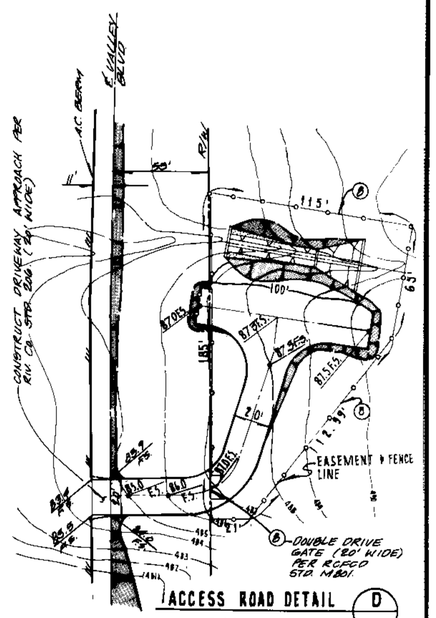
County of Riverside
APPROVED BY:
FOR ROAD COMMISSIONER RIVERSIDE COUNTY, CALIF. DATE:

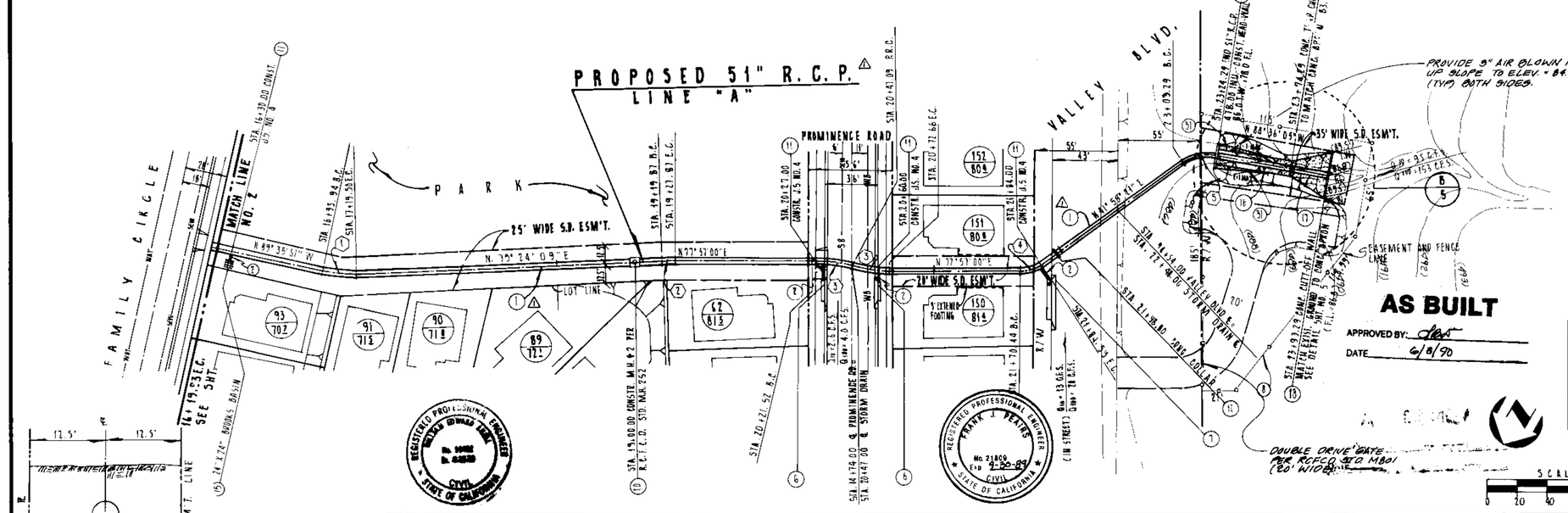
SUN CITY AREA
HILLMAN STREET
STORM DRAIN PLANS
STA. 11+17.16 TO STA. 16+19.93
TRACT NO. 22483

PROJECT NO. 4-0-304
DRAWING NO. 4-539
SHEET NO. 2 OF 5

3399







CONSTRUCTION NOTES:

1. CONSTRUCT 51" RCP (D-1500) (ALT C.I.P.P.) SEE SPECIAL C.I.P.P. NOTE ON SHT. 1.
2. CONSTRUCT 18" RCP (CLASS IV)
6. CATCH BASIN NO. 1 PER RCFCD STD. CB 100 (W = 14', V = 6') W/ L.D. NO. 201, SEE SHT. NO. 4 FOR PROFILE
7. CATCH BASIN NO. 1 PER RCFCD STD. CB 100 (W = 28', V = 7') W/ L.D. NO. 201, SEE SHT. NO. 4 FOR PROFILE
8. INSTALL CHAIN LINK FENCE PER R.C.F.C.D. STD. ENVG. M-801
10. MANHOLE NO. 2 PER RCFCD STD. MH 252
11. JUNCTION STRUCTURE NO. 4 PER RCFCD STD. JS 229, CASE I
12. CONCRETE COLLAR PER RCFCD STD. M 803
14. CONCRETE SINGLE HEAD WALL PER CAL-TRANS STD. D-89 (L = 16.0', H = 8'-0")
15. BROOKS BASIN PER BROOKS STD. 2424 (V = 4.0') SEE SHT. NO. 4 OF 5
16. CONCRETE TRAP. CHANNEL PER RCFCD STD. CH 326 (D = 3.0', W = 4.0')
17. CONCRETE APRON PER DETAIL "B" SHT. NO. 5
18. CONCRETE CUT-OFF WALL PER DETAIL "B" SHT. NO. 5
20. CONCRETE COVER ON INSIDE OF RCP SHALL BE INCREASED TO PROVIDE A MINIMUM OF 1 1/2" OVER THE REINFORCING FOR VELOCITIES EXCEEDING 30 fps CONCRETE DESIGN STRENGTH SHALL BE fc = 5000 PSI
31. 3" AIR BLOWN MORTAR W/ 6"X6" W1.4 X W1.4 WELDED WIRE FABRIC

CURVE DATA

NO.	Δ	R	L	T	B.C.	E.C.
(1)	15° 00' 00"	90.00'	23.56'	11.85'	16+95.94	17+19.50
(2)	2° 32' 51"	180.00'	8.00'	4.00'	19+19.87	19+27.87
(3)	16° 14' 37"	90.00'	25.57'	12.87'	20+21.52	20+72.66
(4)	36° 01' 39"	22.90'	14.15'	7.32'	21+70.44	21+84.59
(5)	53° 28' 34"	22.90'	21.00'	11.34'	23+03.29	23+24.29

SECTION @ STA 17+50
SCALE: 1" = 10
0 5 10 20 30

ADKAN ENGINEERS
CIVIL ENGINEERING PLANNING LAND SURVEYING
9880 AIRPORT DRIVE
RIVERSIDE, CA 92503
WILLIAM E. SNELL R.C.E. 19452 6/6/90 DATE

BENCH MARK
SEE SHT. 1 OF 5 SHTS.

REVISIONS		
REF.	DESCRIPTION	APPR. DATE
1	REVISE A.C. BERM, ALT. C.I.P.P.	C.C. 9-7-89

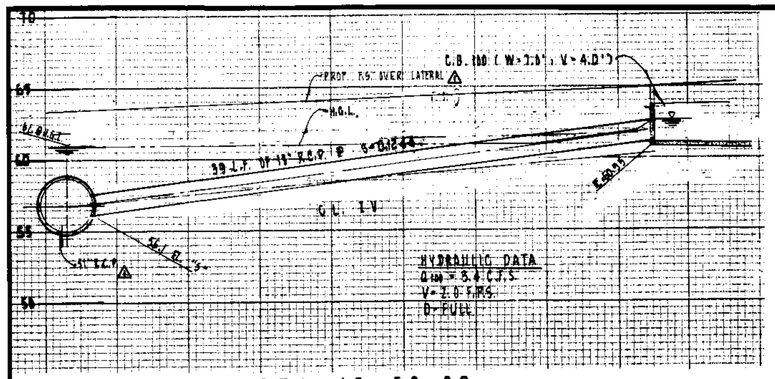
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: Frank J. Peaks, PLANNING ENGR. R.E. NO. 21809, DATE:
APPROVED BY: Kenneth L. Edwards, CHIEF ENGINEER R.E. NO. 12400, DATE: 9-28-89

County of Riverside
APPROVED BY:
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE:

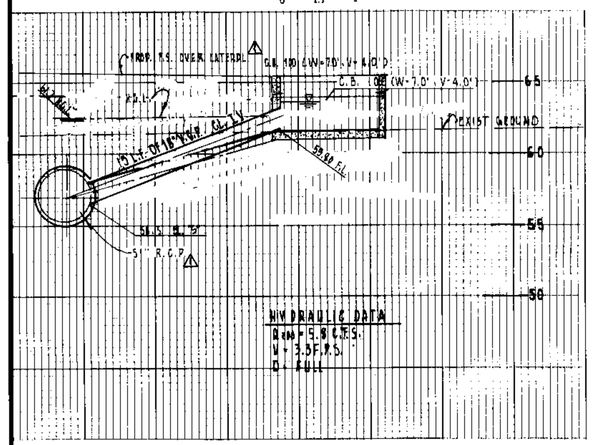
SUN CITY AREA
HILLMAN STREET
STORM DRAIN PLANS
STA. 16+19.93 TO STA. 23+24.29
TRACT NO. 22483

PROJECT NO. 4-0-304
DRAWING NO. 4-539
SHEET NO. 3 OF 5

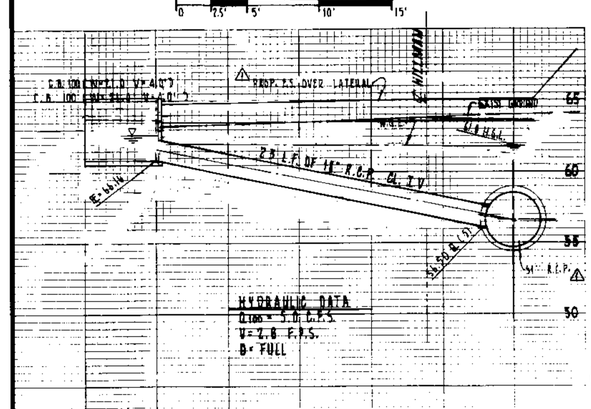
35-309



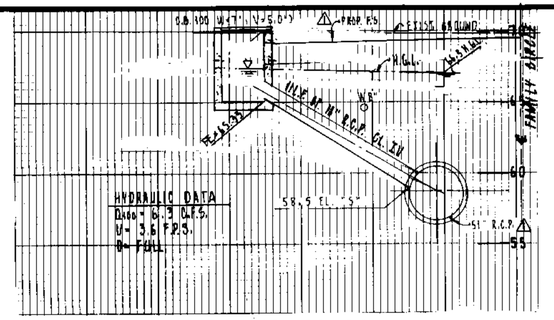
STA. 12+50.00
SEE SHEET NO. 2 FOR PLAN VIEW
SCALE: 1" = 5'



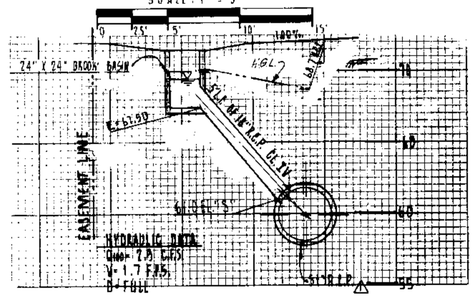
STA. 12+86.00
PLAN VIEW SEE SHT. NO. 2
SCALE: 1" = 5'



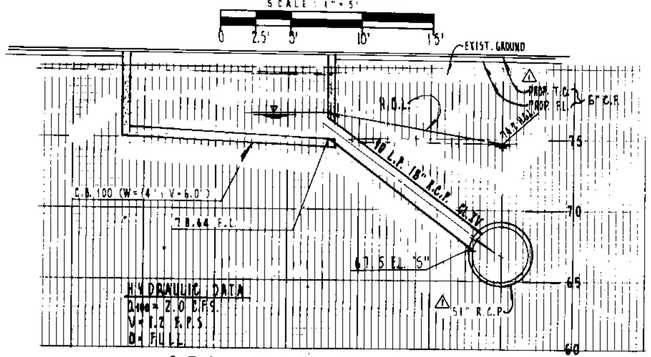
STA. 12+96.00
PLAN VIEW SEE SHT. NO. 2
SCALE: 1" = 5'



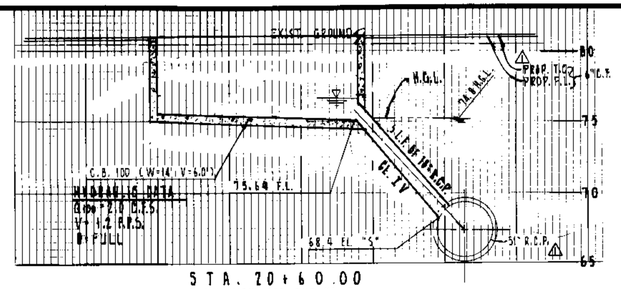
STA. 15+22.00
PLAN VIEW SEE SHT. NO. 2
SCALE: 1" = 5'



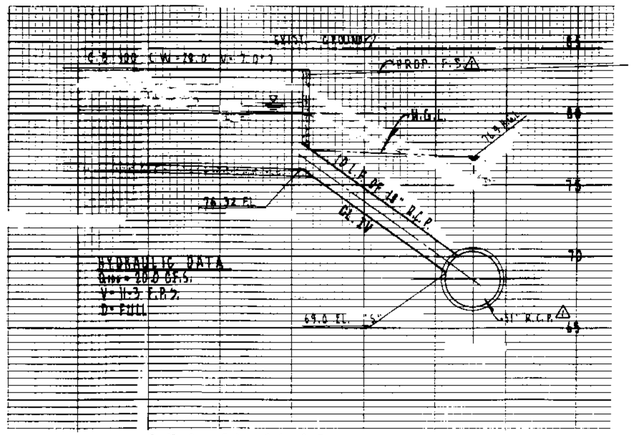
STA. 16+30.00
PLAN VIEW SEE SHT. NO. 3
SCALE: 1" = 5'



STA. 20+27.00
PLAN VIEW SEE SHT. NO. 3
SCALE: 1" = 5'



STA. 20+60.00
PLAN VIEW SEE SHT. NO. 3
SCALE: 1" = 5'



STA. 21+84.00
PLAN VIEW SEE SHT. NO. 3
SCALE: 1" = 5'

⚠ NOTE: STARTING H.G.L. FOR THE CONNECTOR PIPE WAS TAKEN FROM THE C.I.P.P. H.G.L. CALCULATION.

AS BUILT
APPROVED BY: [illegible]
DATE 6/8/90

REGISTERED PROFESSIONAL ENGINEER — WILLIAM E. SNELL — No. 19452 — CIVIL — CALIFORNIA

ADKAN ENGINEERS
CIVIL ENGINEERING/PLANNING/LAND SURVEYING
5930 AIRPORT DRIVE
RIVERSIDE, CA 92504 (714) 688-0241
WILLIAM E. SNELL R.C.E. No. 19452 DATE

BENCH MARK
SEE SHT. 1 OF 5 SHTS.

REVISIONS			
⚠	REVISED F.S. ELEVS., ALT. C.I.P.P.	C.C.	9-7-89
REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL: PLANNING ENGR. R.E. NO. 21505 DATE:
APPROVED BY: CHIEF ENGINEER R.E. NO. 12400 DATE:

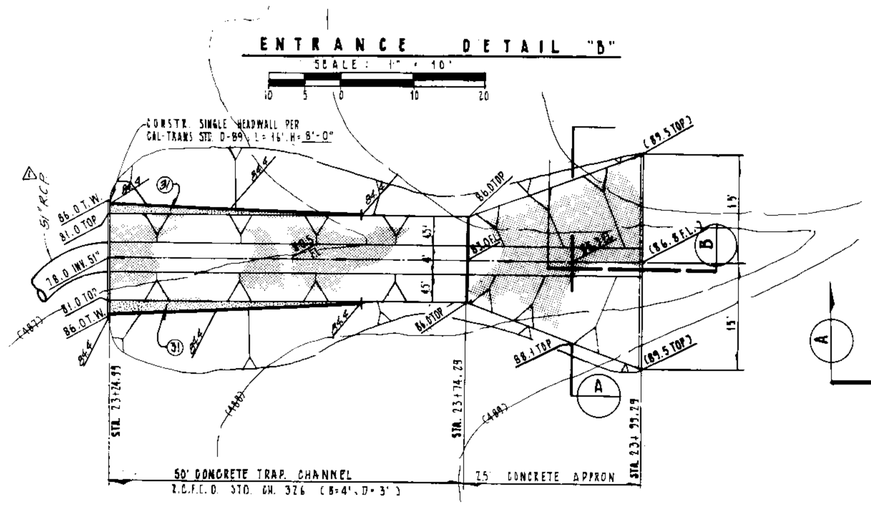
County of Riverside
APPROVED BY:
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE:

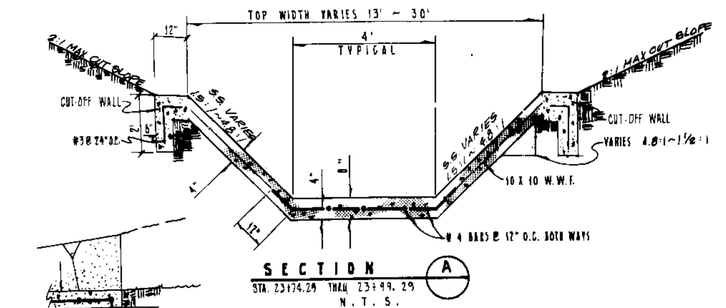
SUN CITY AREA
HILLMAN STREET
STORM DRAIN PLANS
CONNECTOR PIPES PROFILES
TRACT NO. 22483

PROJECT NO. 4-0-304
DRAWING NO. 4-539
SHEET NO. 4 OF 5

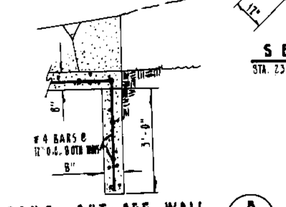
ENTRANCE DETAIL "B"

SCALE: 1" = 10'

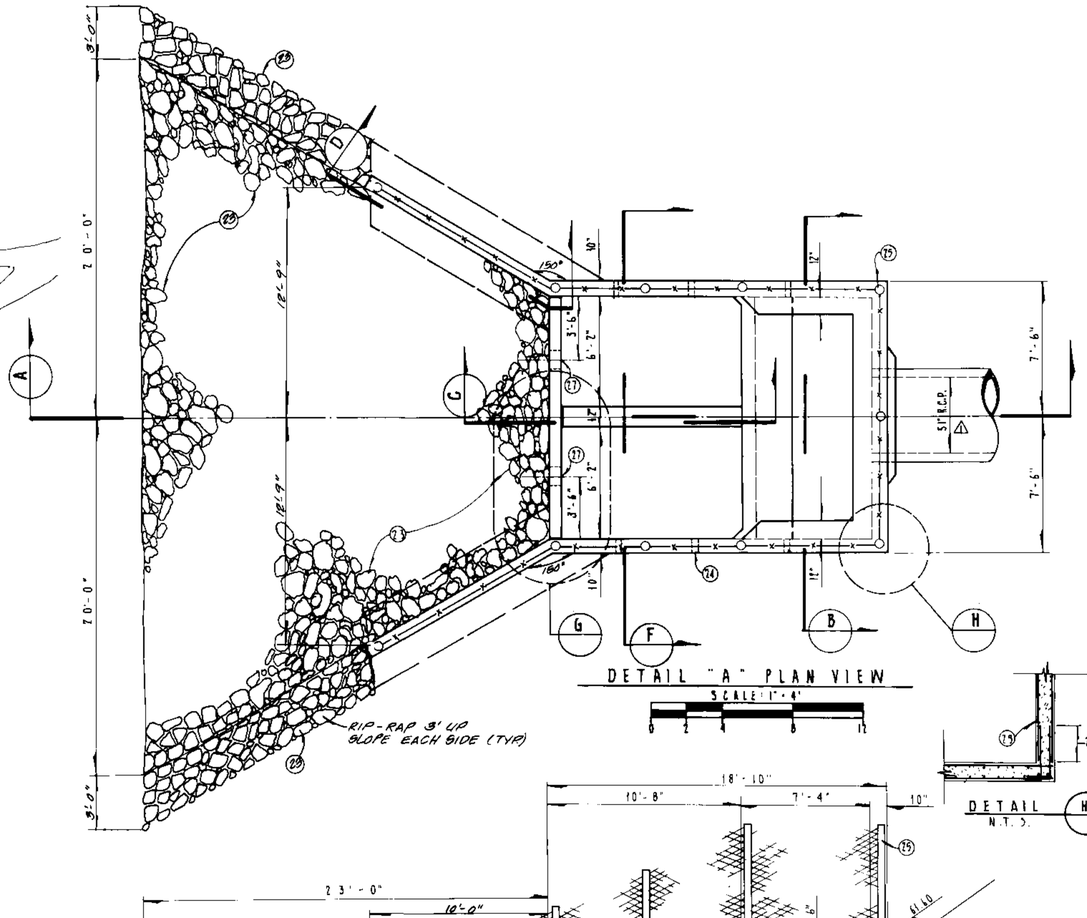




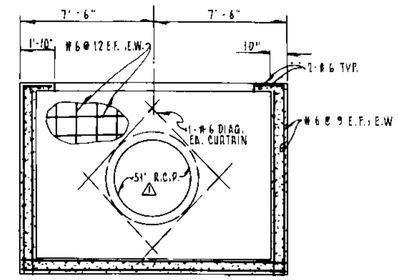
SECTION A
STA. 23+74.29 THRU 23+99.29
N.T.S.



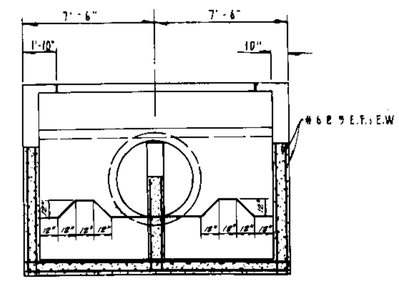
CONC. CUT-OFF WALL SECTION
NOT TO SCALE



DETAIL "A" PLAN VIEW
SCALE: 1" = 4'

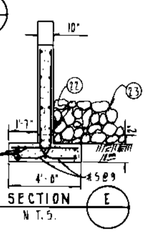


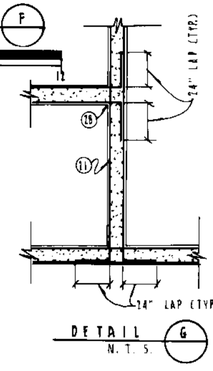
SECTION B
SCALE: 1" = 4'



SECTION F
SCALE: 1" = 4'

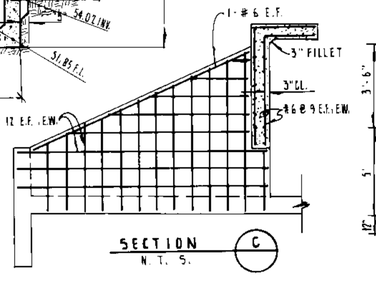
DETAIL H
N.T.S.



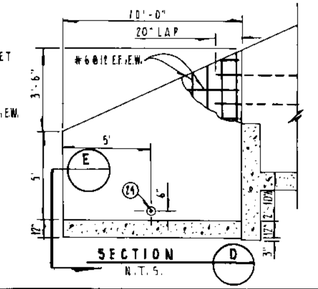


DETAIL G
N.T.S.

SECTION A
SCALE: 1" = 4'



SECTION C
N.T.S.



SECTION D
N.T.S.

NOTES

(11) — ALL STEEL SHALL HAVE 2" COVER UNLESS OTHERWISE NOTED

(22) — 6" STARTER WALL WITH CONST. JOINT TO BE USED IN ALL CASES

(23) — 1/4 TON ROCK SLOPE PROTECTION *METHOD & PLACEMENT PER CAL TRANS STANDARD SPECIFICATION SECTION 72-1 (3'-9" THICK).*

(24) — CONST. 1 1/2 DIAM. WEEPHOOLES WITH RODENT SCREENS AND 1 CUBIC FOOT OF FILTER MATERIAL AT EACH HOLE

(25) — CONST. CHAIN LINK FENCE 6' HIGH PER R.C.F.C.D. M 801.

(26) — ALL EXPOSED CONC. EDGES SHALL HAVE A 3/4" CHAMFER

(27) — 12" SQUARE OPENING

(28) — INTERSECTING WALL & CORNER DETAILS TYP. ALL CORNERS & INTERSECTIONS, 24" LAP, SEE DETAIL G.

(29) — REINFORCING STEEL SHALL CONFORM TO ASTM A615/40

(30) — USE MINIMUM 3000 PSI CONCRETE

(31) — 3" AIR BLOWN MORTAR W/ 6X6-W1.4 WELDED WIRE FABRIC.

AS BUILT
APPROVED BY: [illegible]
DATE: 6/8/90

REGISTERED PROFESSIONAL ENGINEER — WILLIAM R. SNELL — No. 21809 Exp. 6-30-90 — CIVIL — STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — FRANK J. PERINI — No. 21809 Exp. 6-30-90 — CIVIL — STATE OF CALIFORNIA

ADKAN ENGINEERS
CIVIL ENGINEERING, PLANNING, LAND SURVEYING
8630 AIRPORT DRIVE
RIVERSIDE, CA 92504 (714) 688-0241
William R. Snell R.C.E. 14628 6/14/89
WILLIAM R. SNELL, R.C.E. 14628 DATE

BENCH MARK
SEE SHT. 1 OF 5 SHEETS.

REVISIONS			
	REVISED R.B. ELEVS., ALT. C.I.P.P.	C.P.	9-7-89
REF.	DESCRIPTION	APPR.	DATE

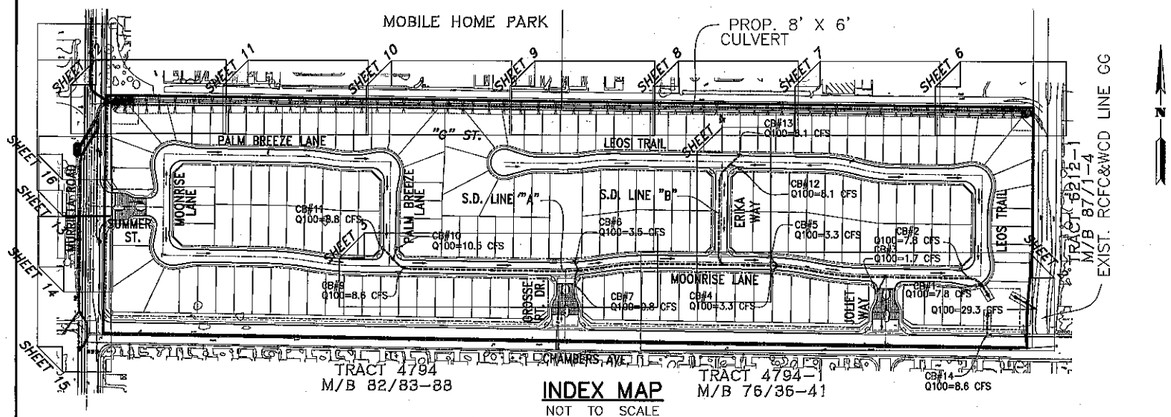
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: Frank J. Perini
PLANNING & DESIGN, R.E. NO. 21809
DATE: 8-4-89
APPROVED BY: Kenneth L. Brunet
CHIEF ENGINEER R.E. NO. 12400
DATE: 8-8-89

County of Riverside
APPROVED BY:
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE:

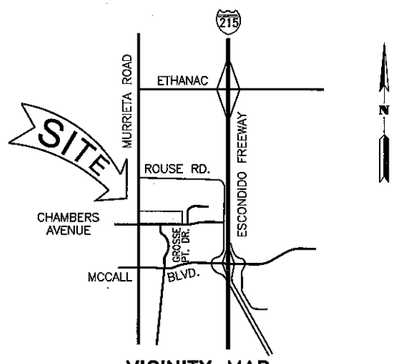
SUN CITY AREA
HILLMAN STREET
STORM DRAIN PLANS
DETAIL SHEET
TRACT NO. 22483

PROJECT NO. 4-0-304
DRAWING NO. 4-539
SHEET NO. 5 OF 5

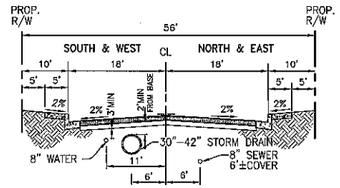
COUNTY OF RIVERSIDE FLOOD CONTROL AND WATER CONSERVATION DISTRICT



INDEX MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE
T 5 SOUTH, R 3 WEST, S 21



TYPICAL UTILITY LAYOUT ON LOCAL STREETS
NOT TO SCALE

INDEX

R.C.F.C. & W.C.D. STANDARD DRAWINGS

STD. JS 227 & JS231 JUNCTION STRUCTURE
STD. MH 254 MANHOLE
STD. MH 251 MANHOLE
STD. TS 301 TRANSITION STRUCTURE

GENERAL NOTES:

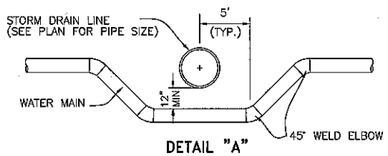
1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S MEMORANDUM OF UNDERSTANDING STANDARD SPECIFICATIONS, DATED SEPTEMBER 1984, AND DESIGN MANUAL STANDARD DRAWINGS, DATED APRIL 2004.
2. THE CONTRACTOR IS REQUIRED TO CONTACT ALL UTILITY AGENCIES REGARDING TEMPORARY SUPPORT AND SHORING REQUIREMENTS FOR THE VARIOUS UTILITIES SHOWN ON THE PLAN.
3. CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. CONTACT DALE ANDERSON AT (909) 275-1288. THE DISTRICT MUST BE NOTIFIED 20 DAYS PRIOR TO CONSTRUCTION.
4. ALL STATIONING REFERS TO THE CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE– CENTERLINE INTERSECTION STATION.
6. FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-227-2600.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON U.S.C. & G.S. DATUM.
8. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
9. ELEVATIONS AND LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE UNLESS OTHERWISE NOTED. ALL UTILITIES ARE TO BE PROTECTED IN PLACE UNLESS OTHERWISE NOTED.
10. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6 INCHES OF CLASS "B" CONCRETE.
11. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO. 4 (JS 229) UNLESS OTHERWISE NOTED.
12. BEDDING PIPE SHALL CONFORM TO RCFC&WCD STD. M815, EXCEPT FOR COVER <2 FEET. FOR COVER < 2 FEET, CONCRETE SLURRY (2000 PSI– 2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF PIPE.
13. "V" IS THE DEPTH OF INLET AND CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
14. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
15. HYDRAULIC GRADE LINES SHOWN IN PROFILES ARE FOR 100 YEAR FREQUENCY FLOWS, UNLESS OTHERWISE NOTED.
16. THE CONTRACTOR SHALL COMPLY WITH THE STATE AND LOCAL SAFETY CODES DURING THE PROGRESS OF WORK.
17. THE DEVELOPER SHALL MAINTAIN ADJACENT STREETS IN A NEAT, SAFE, CLEAN AND SANITARY CONDITION AT ALL TIMES AND TO THE SATISFACTION OF THE COUNTY'S OR DISTRICT'S INSPECTOR. THE ADJACENT STREETS SHALL BE KEPT CLEAN OF DEBRIS, WITH DUST AND OTHER NUISANCE BEING CONTROLLED AT AL TIMES. THE DEVELOPER SHALL BE RESPONSIBLE FOR ANY CLEAN-UP ON ADJACENT STREETS AFFECTED BY HIS CONSTRUCTION. METHOD OF STREET CLEANING SHALL BE DRY SWEEPING ALL PAVED AREAS.
18. THE CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, R.C.F.C.D. COUNTY ROAD DEPARTMENT, AND THE DEVELOPER'S ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY RISING FROM THE SOLE NEGLIGENCE OF THE OWNERS, OR THE DEVELOPERS ENGINEER.
19. ADJUST ALL STORM DRAIN AND SEWER MANHOLES, AND WATER VALVES TO GRADE.
20. ALL PIPE LENGTHS ARE HORIZONTAL PROJECTIONS (NOT TRUE LENGTHS OF PIPE) AND ARE THE BASIS OF THE ESTIMATES OF QUANTITIES. THE CONTRACTOR SHALL DETERMINE THE TRUE QUANTITY OF PIPE REQUIRED FOR THIS PROJECT PRIOR TO PLACING THE ORDER.
21. ALL ELEVATIONS SHOWN ARE TO THE INVERT OF PIPE, EXCEPT WHERE OTHERWISE NOTED.
22. AT THE DISCRETION OF THE ENGINEER, THE CONTRACTOR MAY BE REQUIRED TO VERIFY BY POTHOLING THE LOCATION OF POTENTIALLY AFFECTED UTILITIES.
23. CONTRACTOR SHALL DISPOSE OF ALL EXCESS EXCAVATED MATERIAL AT MANDATORY DISPOSAL SITE. MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
24. ALL BACKFILL AND BEDDING AROUND STRUCTURES AND PIPES SHALL BE COMPACTED TO NOT LESS THAN 90 PERCENT RELATIVE COMPACTION EXCEPT WHERE SUCH MATERIAL IS PLACED UNDER EXISTING PAVED ROADWAYS, THE TOP 3 FEET, MEASURED FROM THE FINISHED PAVING, SHALL BE COMPACTED TO 95 PERCENT RELATIVE COMPACTION.
25. CATCH BASIN SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
26. INDICATES APPROX. SOIL BORING LOCATION PER SOILS REPORT DATED 9/17/2002 BY PETRA GEOTECHNICAL, INC.

NOTICE TO CONTRACTOR:

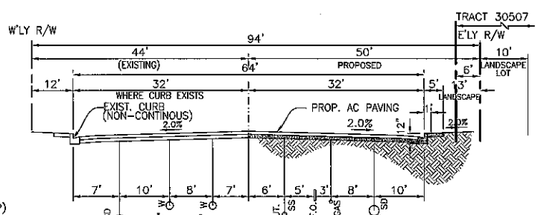
THE EXISTENCE AND LOCATIONS OF ALL UNDERGROUND UTILITIES (UTILITY PIPES, STRUCTURES, ETC.) SHOWN ON THESE PLANS (MAIN LINES ONLY– NO SERVICE LATERALS) WERE ASCERTAINED BY A REVIEW OF RECORDS PROVIDED BY THESE MEMBER AGENCIES AND ARE APPROXIMATE. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN.
THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. LOCATIONS OF UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION.
CALL UNDERGROUND SERVICE ALERT (U.S.A.) 1-800-227-2600 AT LEAST 2 WORKING DAYS PRIOR TO EXCAVATION.
THE QUANTITY ESTIMATE SHOWN HEREON IS FOR THE USE OF GOVERNING AGENCIES IN DETERMINING BOND AMOUNTS AND/OR FEES AND IS NOT TO BE USED FOR BID

LEGEND

A.C.	ASPHALTIC CONCRETE	(R)	RIDGE LINE
B.C.	BEGIN CURVE	RCP	REINFORCED CONCRETE PIPE
B.V.C.	BEG. VERTICAL CURVE	R/W	RIGHT OF WAY
B.W.	BACK SIDEWALK	ST.LT.	STREET LIGHT
C.B.	CATCH BASIN	TAN.	TANGENT
C.L.	CENTERLINE	T.C.	TOP OF CURB
E.C.	END CURVE	W	WIDTH
E.P.	EDGE PAVEMENT	V	VERTICAL DEPTH
E.G.	EDGE GRADE	V.C.	VERTICAL CURVE
E.V.C.	END VERTICAL CURVE	///	EDGE OF PAVEMENT
F.L.	FLOW LINE	(590.69)	INDICATES EXISTING ELEVATION
F.S.	FINISH SURFACE	310.00	INDICATES PROPOSED ELEVATION
G.B.	GRADE BREAK	O	INDICATES ST.LT.
H.P.	HIGH POINT	+	INDICATES TREES
INV.	INVERT		
L.E.	LANDSCAPE EASEMENT		
O.C.	ON CENTER		
P.C.C.	PORTLAND CEMENT CONCRETE		



DETAIL "A" (TYPICAL WATER/STORM DRAIN UNDERCROSSING DETAIL)
NOT TO SCALE



TYPICAL UTILITY LAYOUT ON MURRIETA ROAD
NOT TO SCALE

QUANTITIES

CONSTRUCTION NOTES

		TRANSPORTATION MADOLE	TRANSPORTATION RBF	RCFCD MADOLE	RCFCD RBF
1	CONSTRUCT 42" RCP, D-LOAD PER PROFILE.	742 LF			
2	CONSTRUCT 36" RCP, D-LOAD PER PROFILE.	873 LF	36 LF		
3	CONSTRUCT 30" RCP, D-LOAD PER PROFILE	459 LF		28 LF	
4	CONSTRUCT 24" RCP, (CLASS IV)	271 LF	25 LF		
5	CONSTRUCT 18" RCP, (CLASS IV)	90 LF	312 LF		
6	~~CONST. 6'x1' CONCRETE BOX PER DETAIL ON SHEET 5~~	~~1 EA~~			
7	~~CONSTRUCT TRANSITION STRUCTURE PER DETAIL ON SHEET 5~~	~~6 EA~~			
8	CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFCD STD. JS227	4 EA			
9	CONSTRUCT JUNCTION STRUCTURE PER RCFCD STD. NO. JS231	1 EA			
10	CONSTRUCT MANHOLE NO. 1 PER RCFCD STD. MH251	1 EA	1 EA	1 EA	
11	CONSTRUCT 6" MIN. DIA. GROUTED RIP RAP PER DETAIL ON SHEET 5	4 CY			
12	INSTALL DROP INLET PER DETAIL ON SHEET 5	1 EA			
13	CONSTRUCT HEADWALL PER CALTRANS DETAIL D90 TYPE A	2 EA			
14	CONSTRUCT 78" RCP, D-LOAD PER PROFILE.				45 LF
15	CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC & WCD STD. PLAN TS301, (MODIFIED TO INCLUDE PIPE JUNCTION AND MANHOLE PER RCFC & WCD STD. PLAN MH254 AT LINE C).	6 EA			5 EA
16	CONSTRUCT MANHOLE NO. 4 PER RCFC & WCD STD PLAN MH254.				2 EA
17	CONSTRUCT CONCRETE CONNECTOR PIPE COLLAR PER APWA STD. PLAN 380-2. SEE SHEET 12.				2 EA
18	CONSTRUCT JUNCTION STRUCTURE NO. 4, CASE 2, PER RCFC & WCD STD. PLAN JS229.				2 EA
19	CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STD PLAN MH252.				1 EA
20	CONSTRUCT CURB INLET CATCH BASIN PER RCTD STD. NO. 300. WIDTH PER PLANVIEW.		2 EA		
23	CONSTRUCT MODIFIED CONCRETE DROP INLET PER RCFC & WCD STD. PLAN CB110, WITH 12" HIGH SLOTS FOR 20.0' ON BOTH SIDES, T=12", W=36", AND LENGTH = 21.0'.				1 EA
24	CONSTRUCT 48" RCP, D-LOAD PER PROFILE.				441 LF
26	CONSTRUCT 66" RCP, D-LOAD PER PROFILE.				84 LF
27	CONSTRUCT MODIFIED 84" W X 42" H CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD. D80 (USE 7'W X 4'H STANDARDS) SHEET 18				16 LF
28	CONSTRUCT MODIFIED 60" W X 42" H CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80. (USE 5'W X 4'H STANDARDS) SHEET 18				18 LF
29	CONSTRUCT MANHOLE NO. 3 PER RCFC & WCD STD. PLAN MH253.				2 EA
30	CONSTRUCT CONCRETE APRON AROUND CONCRETE DROP INLET PER DETAIL ON SHEET 12.		320 SF		660 SF
31	INSTALL TRAFFIC BARRICADE PER CALTRANS STD DWG A77.-		50 LF		
32	CONSTRUCT GRATED CATCH BASIN PER APWA STD. PLAN 305-2, 309, 635 & 311-2, USING 5 GRATES, t=12", A=45° W=10'-10"", AND V PER PROFILE. SHEET 17.		2 EA		
34	CONSTRUCT 60" RCP, D-LOAD PER PROFILE.				19 LF
41	CONSTRUCT 8' W X 6' H CAST IN PLACE REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80 (SEE SHEET 18)				2,543 LF
42	CONSTRUCT 6' HIGH CHAIN LINK FENCE GATE PER RCFC & WCD STD. DWG. M801.				2 EA
43	CONSTRUCT 24" DIA. RCB CULVERT MANHOLE PER RCFC & WCD DWGS. MH253 & MH257. CONSTRUCT 6" THICK 6'X6' CONCRETE APRON AROUND MH AT FINISH GRADE.				5 EA
44	INSTALL 6" PVC.				75 LF
45	CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 3, PER RCFC & WCD STD. DWG. JS 228.				13 EA
46	INSTALL 18" X 18" CONCRETE BOX INLET W/ TRAFFIC RATED STEEL GRATE (BROOKS PRODUCTS # 1818 OR APPROVED ALTERNATIVE) " TO BE MAINTAINED BY HOA"				13 EA
47	INSTALL 12" X 12" BOX INLET W/GRATE (NDS #1213 OR APPROVED ALTERNATIVE). TO BE MAINTAINED BY HOA.				6 EA
48	CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 1, PER RCFC & WCD STD. DWG. JS 228				6 EA

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

PLAN PREPARED BY:
RBF PLANNING ■ DESIGN ■ CONSTRUCTION
CONSULTING
27555 YNEZ ROAD, SUITE 400 TEMECULA, CALIFORNIA 92591-4679 951.676.8042 • FAX 951.676.7240 • www.RBF.com
Victor Ella 6-7-2005
Victor A. Ella, RCE 64803 Exp. DATE: 6-30-07
FOR SHEETS 6 THROUGH 18 INCLUSIVE

BENCH MARK: BM# T-600-29-68
AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1637312-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REF.	REVISIONS	APPR.	DATE

DESIGNED BY: MJG
DRAWN BY: CC
DATE DRAWN: FEB. 2004

Prepared Under The Supervision Of:
PREPARED IN THE OFFICE OF MADOLE AND ASSOCIATES, INC.
760-A S. ROCHESTER AVENUE
ROCHESTER AVENUE
PHONE (909) 937-9151
AARON THOMAS SKEERS, RCE 62183 DATE: 9-30-05
FOR SHEETS 1 THROUGH 5 INCLUSIVE

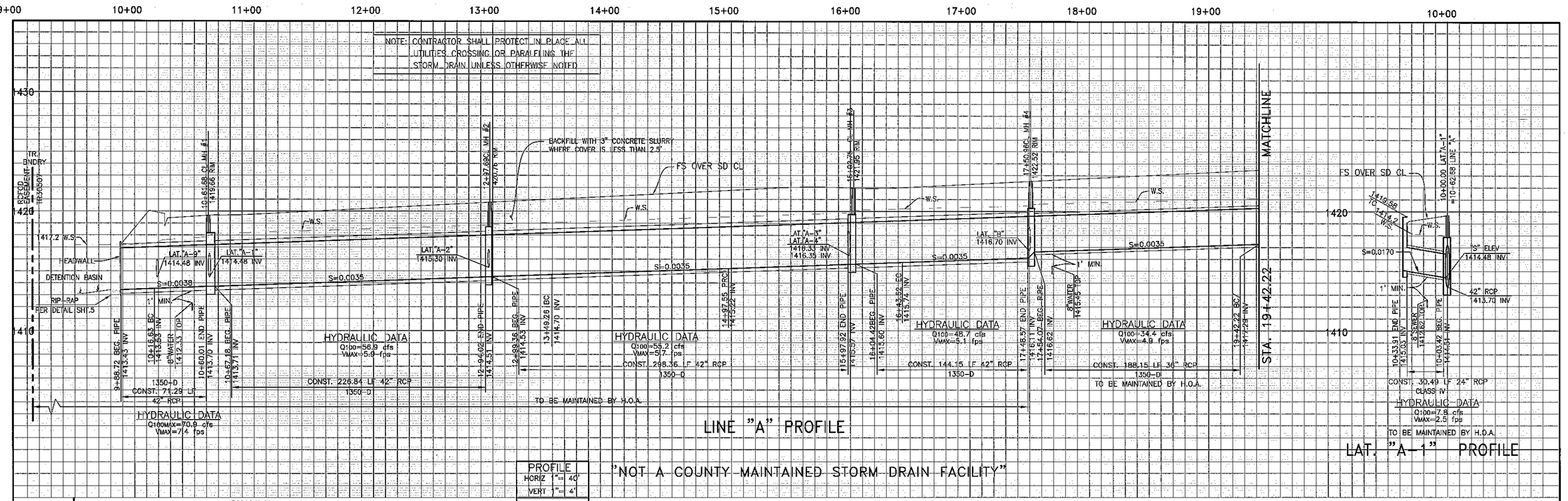
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: Stuart E. McKibbin
PLANNING ENGINEER DATE: 7-7-05
APPROVED BY:
CHIEF ENGINEER DATE: 7/8/05

COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
APPROVED BY:
KHALED A. OTHMAN DATE: 6/29/05
RECOMMENDED BOYLE ENG. DATE: 6-24-05

TRACT 30507– IP 040040
SUN CITY- THORNTON AVENUE
STORM DRAIN PLANS
TITLE SHEET

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 1 OF 18

J:714-1809(TR 30507) STORM DRAIN PLAN



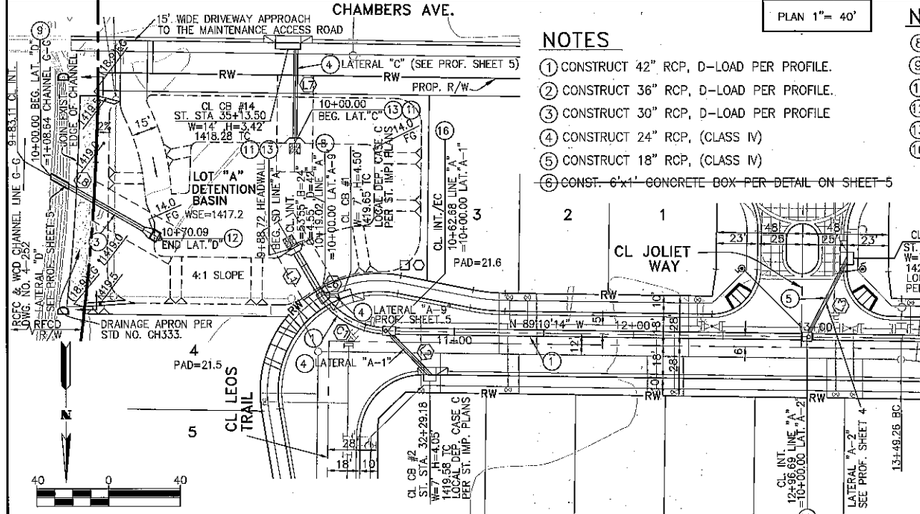
NOTES

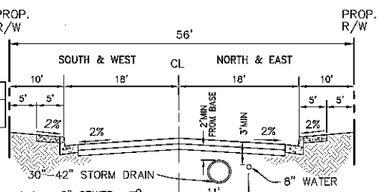
1. CONSTRUCT 42" RCP, D-LOAD PER PROFILE.
2. CONSTRUCT 36" RCP, D-LOAD PER PROFILE.
3. CONSTRUCT 30" RCP, D-LOAD PER PROFILE
4. CONSTRUCT 24" RCP, (CLASS IV)
5. CONSTRUCT 18" RCP, (CLASS IV)
6. ~~CONST. 6'x1' CONCRETE BOX PER DETAIL ON SHEET 5~~

NOTES CONT.

8. CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFCD STD. JS227
9. CONSTRUCT JUNCTION STRUCTURE PER RCFCD STD. NO. JS231
11. CONSTRUCT 6" MIN. DIA. GROUTED RIP RAP PER DETAIL ON SHEET 5
12. INSTALL CONCRETE DROP INLET PER RCFCD STD. CB110.(SEE SHT. 5)
13. CONSTRUCT HEADWALL PER CALTRANS DETAIL D90 TYPE A
16. CONST. MANHOLE NO. 4 PER RCFCD STD. 254.

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	58°37'59"	45.00	46.05	25.27
C2	10°32'27"	806.00	148.28	74.35
C3	7°17'56"	794.00	101.16	50.65
C4	3°14'29"	794.00	44.92	22.46





INFORMATIONAL NOTE: ALL X-SECTIONS TAKEN LOOKING DOWN STREAM

TYPICAL UTILITY LAYOUT
NOT TO SCALE

LINE TABLE		
LINE	BEARING	LENGTH
L1	S30°32'15"E	27.91'
L2	N44°07'07"W	33.91'
L3	N27°29'31"E	48.78'
L4	N48°57'17"E	17.07'
L5	N39°44'28"W	32.82'
L6	N87°29'26"W	9.70'
L7	N00°49'46"E	52.50'
L8	N60°12'23"W	70.09'

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK: BM# T-800-29-68
AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REVISIONS			
REF.	DESCRIPTION	APPR.	DATE

DESIGNED BY: MJG
DRAWN BY: CC
DATE DRAWN: FEB. 2004

Prepared Under The Supervision Of: PREPARED IN THE OFFICE OF MADOLE AND ASSOCIATES, INC.
760-A S. ROCHESTER AVENUE
ROCHESTER AVENUE
PHONE (909) 937-9151
AARON THOMAS SKEERS, RCE 62183 DATE: 9-30-05

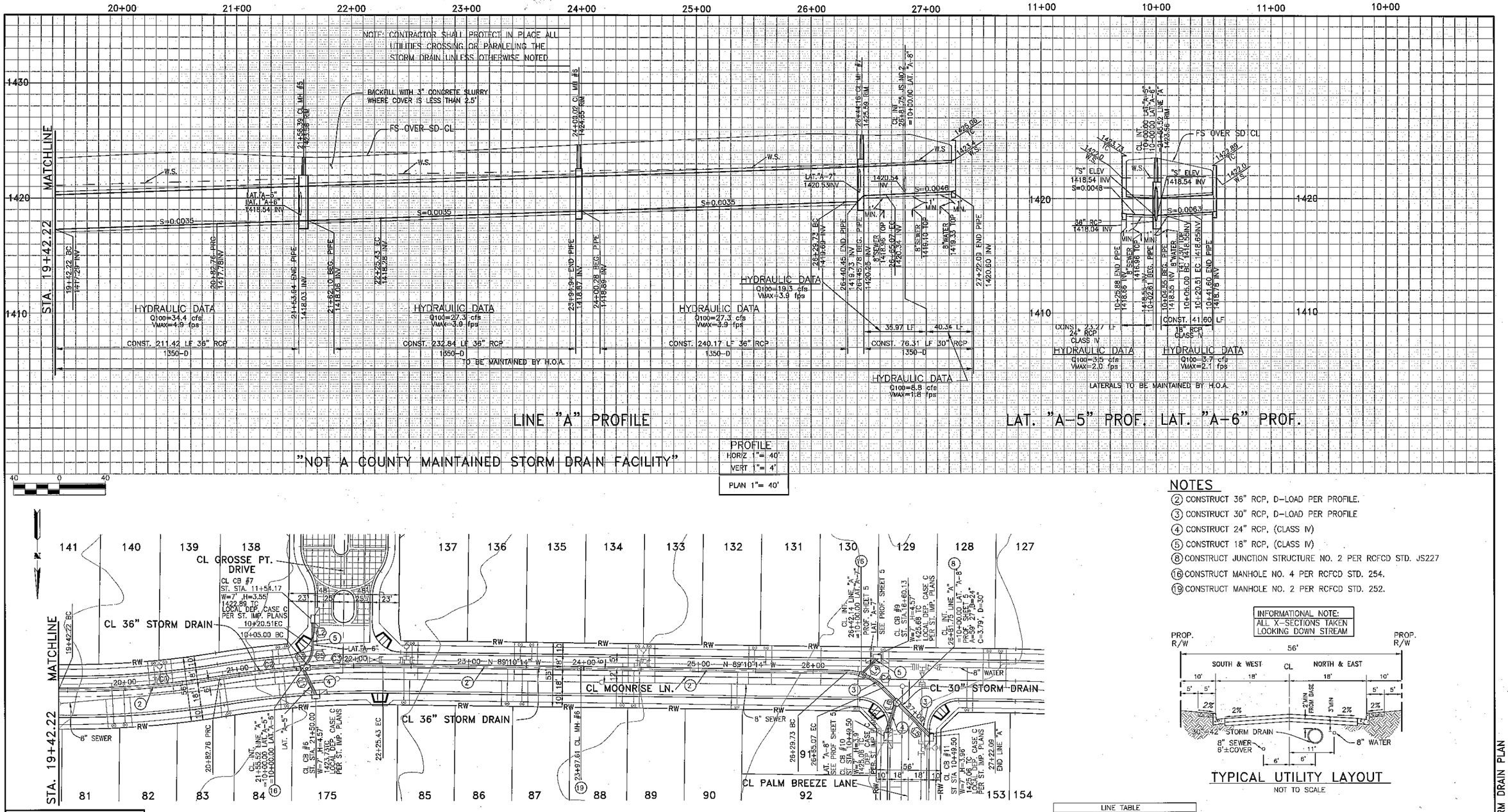
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE: 7/7/05
APPROVED BY: Stuart E. McKibbin DATE: 7-7-05

COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
APPROVED BY: DATE: 6/29/05
RECOMMENDED - BOYLE ENG. DATE: 6-24-05

SUN CITY - THORNTON AVENUE
STORM DRAIN TRACT 30507- IP 040040
LINE "A"
FROM STA. 10+00.00
TO STA. 19+42.22
& LAT. "A-1"

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 2 OF 18

J:714-1809(TR 30507) STORM DRAIN PLAN



LINE "A" PROFILE

LAT. "A-5" PROF. LAT. "A-6" PROF.

"NOT A COUNTY MAINTAINED STORM DRAIN FACILITY"

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

LINE "A" PLAN

"NOT A COUNTY MAINTAINED STORM DRAIN FACILITY"

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	5°10'20"	794.00	140.54	70.46
C2	5°13'44"	806.00	72.76	36.41
C3	4°58'10"	806.00	69.91	34.98
C4	45°00'03"	45.00	35.34	18.64
C5	39°30'19"	22.50	15.51	8.08

LINE TABLE		
LINE	BEARING	LENGTH
L1	N25°47'18"W	25.88'
L2	N0°49'46"E	21.09'
L3	N40°20'05"E	5.00'
L4	N45°49'46"E	19.37'
L5	N44°10'11"W	57.02'
L6	N15°16'33"E	29.95'

NOTES

(2) CONSTRUCT 36" RCP, D-LOAD PER PROFILE.
(3) CONSTRUCT 30" RCP, D-LOAD PER PROFILE
(4) CONSTRUCT 24" RCP, (CLASS IV)
(5) CONSTRUCT 18" RCP, (CLASS IV)
(8) CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFCD STD. JS227
(16) CONSTRUCT MANHOLE NO. 4 PER RCFCD STD. 254.
(19) CONSTRUCT MANHOLE NO. 2 PER RCFCD STD. 252.

INFORMATIONAL NOTE:
ALL X-SECTIONS TAKEN LOOKING DOWN STREAM

TYPICAL UTILITY LAYOUT

NOT TO SCALE

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.
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BENCH MARK BM# T-600-29-68
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ELEVATION: 1429.249'

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DESIGNED BY: MJG
DRAWN BY: CC
DATE DRAWN: FEB. 2004

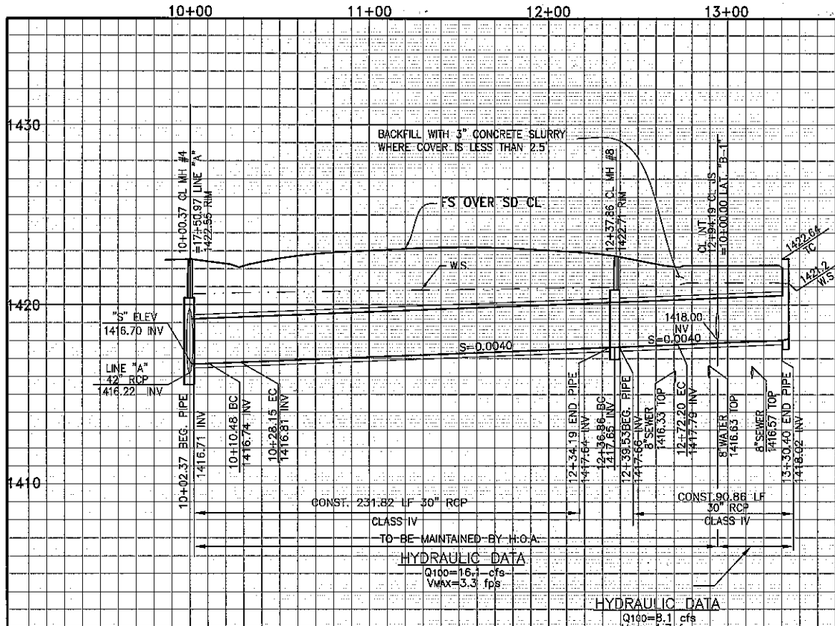
Prepared Under The Supervision Of :
PREPARED IN THE OFFICE OF MADOLE AND ASSOCIATES, INC.
760-A S. ROCHESTER AVENUE
ROCHESTER AVENUE
PHONE (909) 937-9151
6.8.05
AARON THOMAS SKEERS, RCE 62183 DATE: 9-30-05
REGISTERED PROFESSIONAL ENGINEER AARON THOMAS SKEERS No. 62183 Exp: 9-30-06 CIVIL STATE OF CALIFORNIA

COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT
APPROVED BY:
KHALED A. OTHMAN DATE: 6/29/05
RECOMMENDED - BOYLE ENG. DATE: 6-24-05

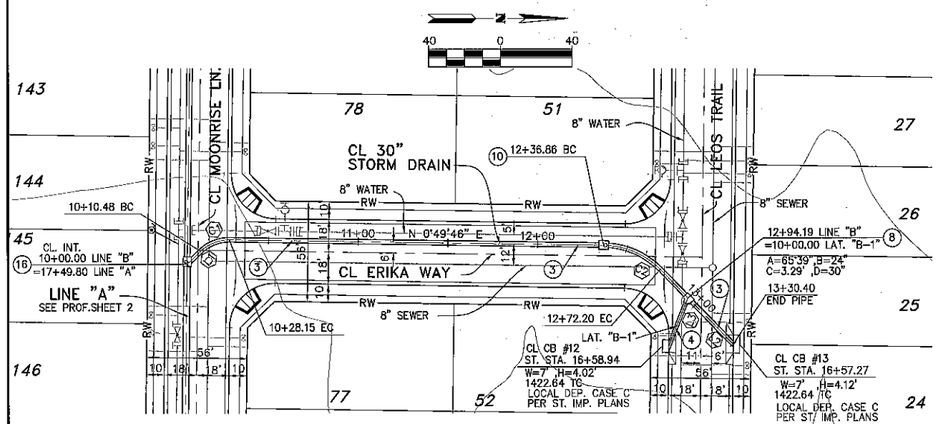
SUN CITY-THORNTON AVENUE
STORM DRAIN TRACT 30507- IP 040040
LINE "A"
FROM STA. 19+42.22
TO STA. 27+24.38
& LAT. "A-5", "A-6", "A-6B"

PROJECT NO.
DRAWING NO. 4-842
SHEET NO. 3 OF 18

J:714-1809(TR 30507) STORM DRAIN PLAN



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



LINE "B" PLAN
"NOT A COUNTY MAINTAINED STORM DRAIN FACILITY"

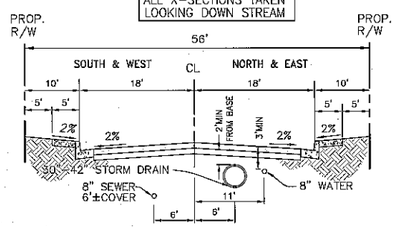
CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	45°00'00"	22.50	17.67	9.32
C2	45°00'00"	45.00	35.34	18.64

LINE TABLE		
LINE	BEARING	LENGTH
L1	S44°10'14"E	10.48'
L2	N45°49'46"E	58.20'
L3	N68°31'14"W	29.48'

NOTES

(3) CONSTRUCT 30" RCP, D-LOAD PER PROFILE
(4) CONSTRUCT 24" RCP, (CLASS IV)
(5) CONSTRUCT 18" RCP, (CLASS IV)
(8) CONSTRUCT JUNCTION STRUCTURE NO. 2 PER RCFCD STD. JS227
(10) CONSTRUCT MANHOLE NO. 1 PER RCFCD STD. MH251
(16) CONSTRUCT MANHOLE NO. 4 PER RCFCD STD. MH254.

INFORMATIONAL NOTE:
ALL X-SECTIONS TAKEN LOOKING DOWN STREAM



TYPICAL UTILITY LAYOUT
NOT TO SCALE

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK BM# T-800-29-68
AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 324 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REF.	REVISIONS	APPR.	DATE

DESIGNED BY: MJG
DRAWN BY: CC
DATE DRAWN: FEB. 2004

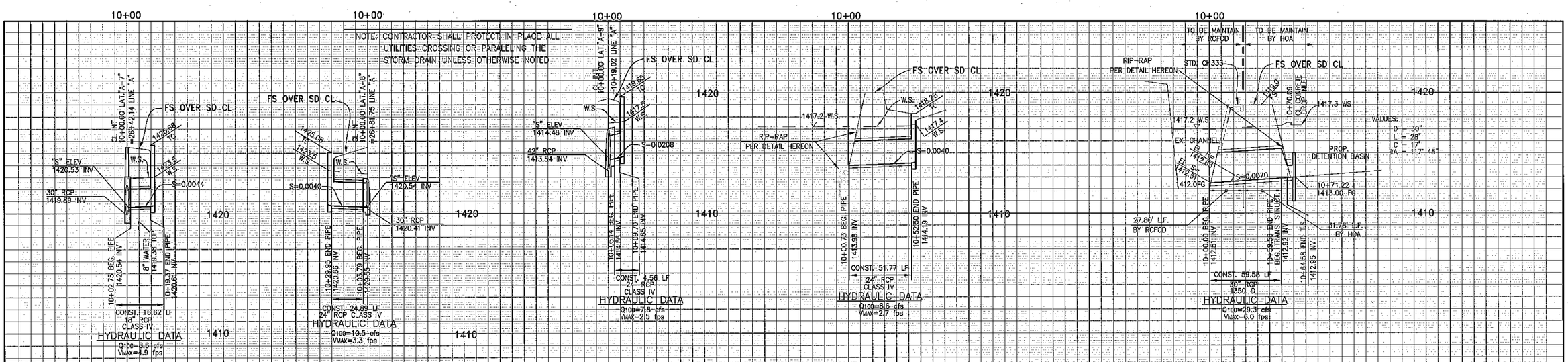
Prepared Under The Supervision Of:
PREPARED IN THE OFFICE OF
MADOLE AND ASSOCIATES, INC.
760-A S. ROCHESTER AVENUE
ROCHESTER AVENUE
PHONE (909) 537-9161
AARON THOMAS SKEERS, RCE 62183 DATE: 9-30-05
REGISTERED PROFESSIONAL ENGINEER AARON THOMAS SKEERS No. 62183 Exp: 9-30-05 CIVIL STATE OF CALIFORNIA

COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT
APPROVED BY:
KHALED A. OTMAN DATE: 6/29/05
RECOMMENDED: BOYLE ENG. DATE: 6-24-05

SUN CITY-THORNTON AVENUE
STORM DRAIN TRACT 30507- IP 040040
LINE "B" & LAT. "A-2", "A-3" "A-4", "B-1"

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 4 OF 18

J:714-1809(TR 30507) STORM DRAIN PLAN



LAT. "A-7" PROFILE
SEE PLAN SHEET 3

LAT. "A-8" PROFILE
SEE PLAN SHEET 3

LAT. "A-9" PROFILE
SEE PLAN SHEET 2

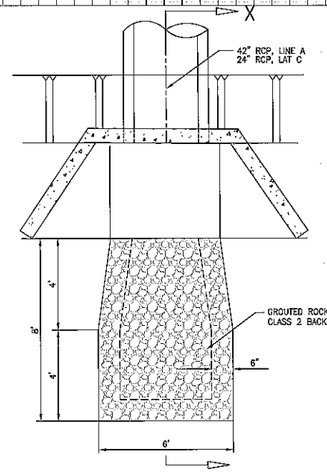
ALL LINES TO BE MAINTAINED BY H.O.A. UNLESS INDICATED OTHERWISE

LAT. "C" PROFILE
SEE PLAN SHEET 2

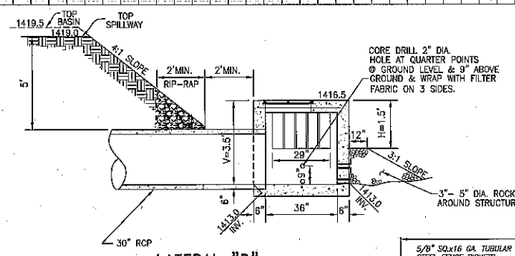
LAT. "D" PROFILE
SEE PLAN SHEET 2

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

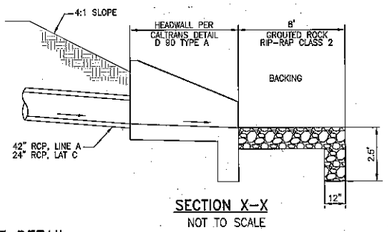
PLAN 1"= 40'



RIP-RAP/PLAN VIEW
V=8 fps max.
NOT TO SCALE

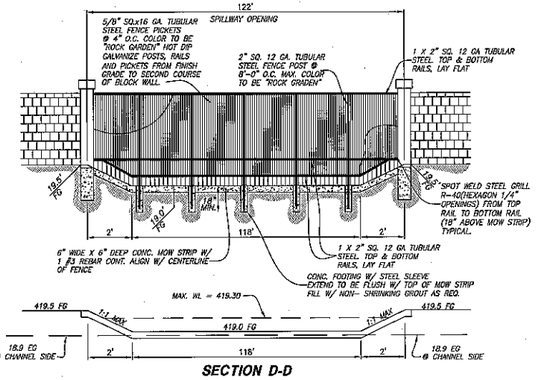


LATERAL "D"
NTS

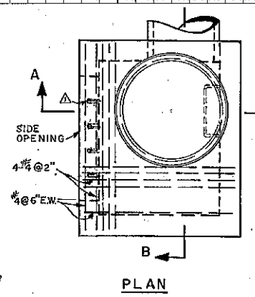


SECTION X-X
NOT TO SCALE

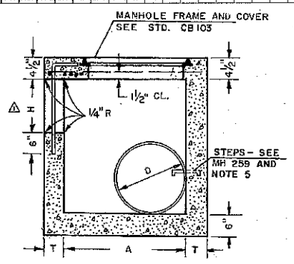
13(1) OUTLET DETAIL
NOT TO SCALE



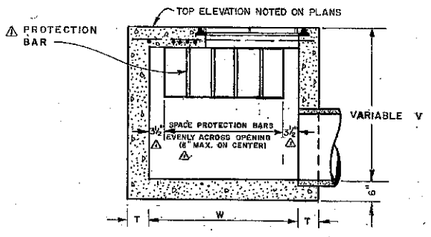
SECTION D-D
FENCE DETAIL AT EMERGENCY SPILLWAY
N.T.S.
ON SHEET 2



PLAN



SECTION A-A



SECTION B-B

CONCRETE DROP INLET DETAIL
RCFCD STD. DWG. NO. CB 110
NOT TO SCALE

1. DIMENSIONS:
   V= SHALL BE SHOWN ON THE PLANS (18 FEET MAX)
   W= SHALL BE 36" OR AS NOTED ON PLANS.
   T= 6 INCHES IF V IS 4 FEET OR LESS.
   T= 8 INCHES IF V IS 8 FEET OR LESS
   D= 18 INCHES UNLESS OTHERWISE SPECIFIED.
   A= 36 INCHES UNLESS OTHERWISE SPECIFIED.
   H= 9" OR AS NOTED ON PLANS.
2. STRUCTURAL CONCRETE SHALL BE CLASS "A".
3. REINFORCING STEEL SHALL BE NO. 4 DEFORMED BARS. CLEARANCE SHALL BE 1 1/2" BOTTOM OF SLAB.
4. THE BASIN FLOOR SHALL BE GIVEN A TIGHT WOOD FLOAT FINISH, CURVATURE OF THE LIP & SIDEWALLS AT THE SIDE OPENING SHALL NOT BE MADE BY PLASTERING. THE OUTLET PIPE SHALL BE TRIM TO FINAL SHAPE & LENGTH BEFORE THE CONCRETE IS POURED.
5. STEPS: 3/4" PLAIN ROUND GALVANIZED STEEL. STEPS SHALL BE INSTALLED 16" APART WHEN V EXCEEDS 4'-8" THE TOP STEP FROM THE WALL ONLY ONE STEP 12" FROM THE BOTTOM SHALL SHALL BE INSTALLED IF V IS 4'-6" OR LESS ALLSTEPS SHALL BE ANCHORED NOT LESS THAN 4" INTO THE WALL OF THE BASIN.
6. PROTECTION BARS ARE PLAIN ROUND STEEL BARS 1" DIAMETER & SHALL BE INSTALLED WITH ENDS EMBEDDED 6".
7. ALL EXPOSED METAL PARTS SHALL BE GALVANIZED.
8. SLOPE BOTTOM TO OUTLET FROM ALL DIRECTIONS.
9. SEE STANDARD DRAWING CB 106 FOR WALL & FLOOR STELL REINFORCING.

BENCH MARK BM# T-600-29-05
AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REF.	REVISIONS	APPR.	DATE

DESIGNED BY: MJG
DRAWN BY: CC
DATE DRAWN: FEB. 2004

Prepared Under The Supervision Of :
PREPARED IN THE OFFICE OF
MADOLE AND ASSOCIATES, INC.
760-A S. ROCHESTER AVENUE
ROCHESTER AVENUE
PHONE (909) 937-9151
AARON THOMAS SKEERS, RCE 62183 DATE: 9-30-05
No. 62183 Exp: 9-30-05 REGISTERED PROFESSIONAL ENGINEER AARON THOMAS SKEERS CIVIL STATE OF CALIFORNIA

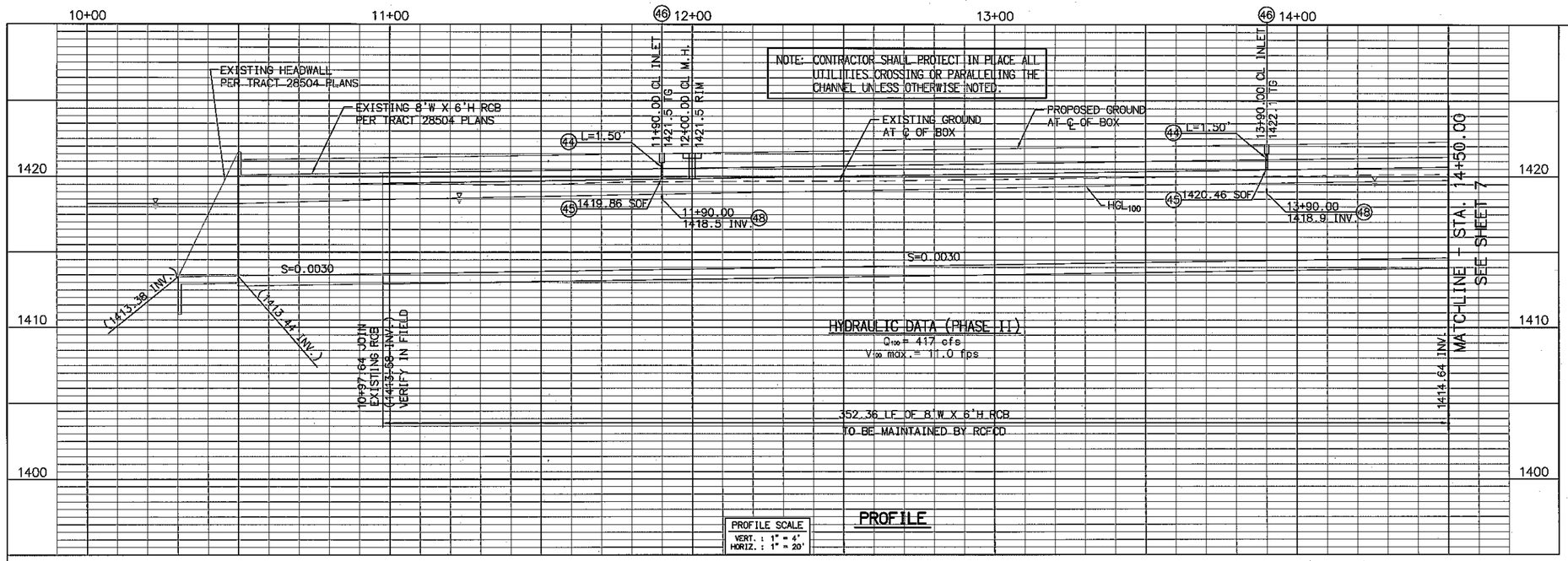
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: APPROVED BY:
DATE: 7/7/05 DATE: 7-7-05

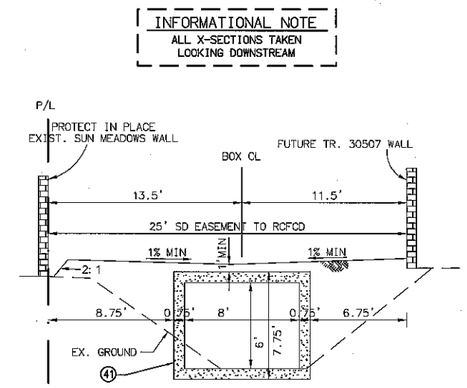
COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
APPROVED BY:
KHALED A. OHMAN DATE: 6/29/05
RECOMMENDED BOYLE ENG. DATE: 6.24.05

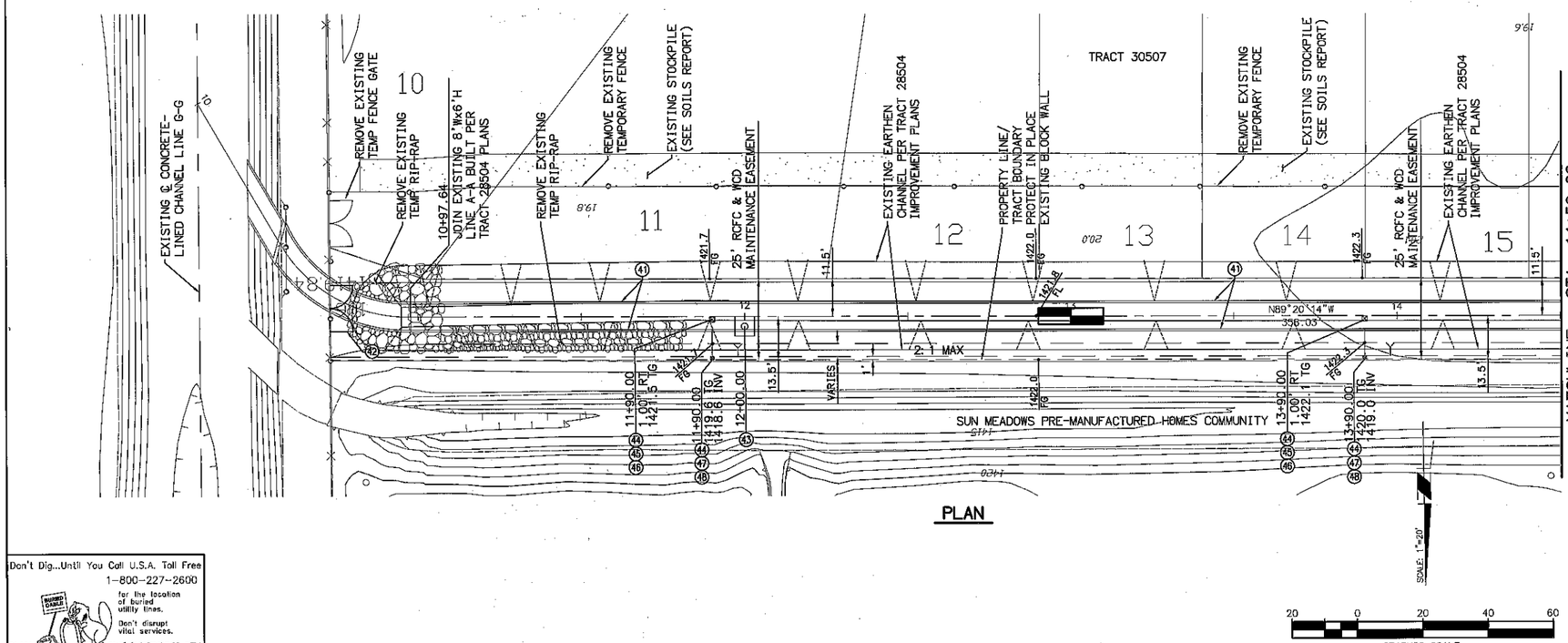
SUN CITY- THORNTON AVENUE
STORM DRAIN TRACT 30507- IP 040040
DETAILS & LAT. "A-7", "A-8", "A-9", LAT. "C", "D"

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 5 OF 18

J:714-1809(TR 30507) STORM DRAIN PLAN







CONSTRUCTION NOTES

(41) CONSTRUCT 8'W X 6'H CAST-IN-PLACE OR PRECAST REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80 (SEE SHEET 18).

(42) CONSTRUCT 6' HIGH CHAIN LINK FENCE GATE PER RCFC & WCD STD. DWG. M801.

(43) CONSTRUCT 24" DIA. RCB CULVERT MANHOLE PER RCFC & WCD STD. DWGS. MH253 & MH257. CONSTRUCT 6" THICK, 6'x6' CONCRETE APRON AROUND MH AT FINISH GRADE.

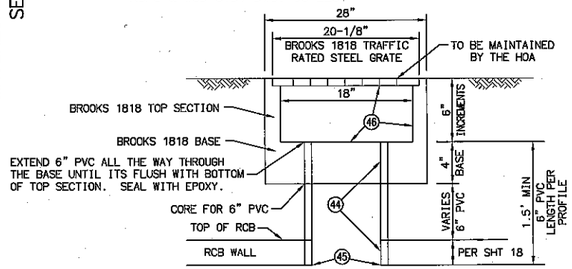
(44) INSTALL 6" P.V.C.

(45) CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 3, PER RCFC & WCD STD. DWG. JS 228

(46) INSTALL 18" X 18" CONCRETE BOX INLET W/ TRAFFIC RATED STEEL GRATE (BROOKS PRODUCTS #1818 OR APPROVED ALTERNATIVE) TO BE MAINTAINED BY HOA.

(47) INSTALL 12" X 12" BOX INLET W/GRATE (NDS #1213 OR APPROVED ALTERNATIVE). TO BE MAINTAINED BY HOA.

(48) CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 1, PER RCFC & WCD STD. DWG. JS 228



(44)(45)(46) INLET OVER RCB DETAIL

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK: BM# T-600-29-65 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
CHECKED BY: M.T.

PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
2755 Time Road, Suite 400, TEMECULA, CALIFORNIA 92591-4679, 9516768042 • FAX 9516767240 • www.RBFcon
REGISTERED PROFESSIONAL ENGINEER VICTOR A. ELIA No. 64803 Exp. 6-30-07 CIVIL STATE OF CALIFORNIA
Victor Elia 6.7.05
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 7/7/05
APPROVED BY: [signature] DATE: 7.7.05

TRACT 30507 – IP 040040
SUN CITY-THORNTON AVENUE STORM DRAIN
FROM STA. 10+97.64 TO 14+50

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 6 OF 18

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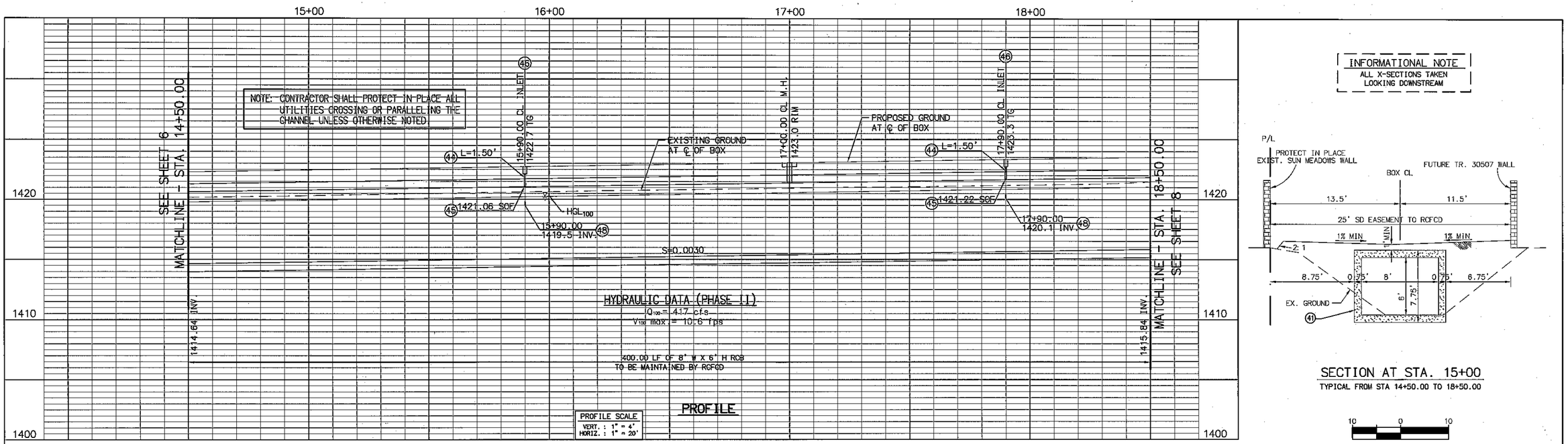
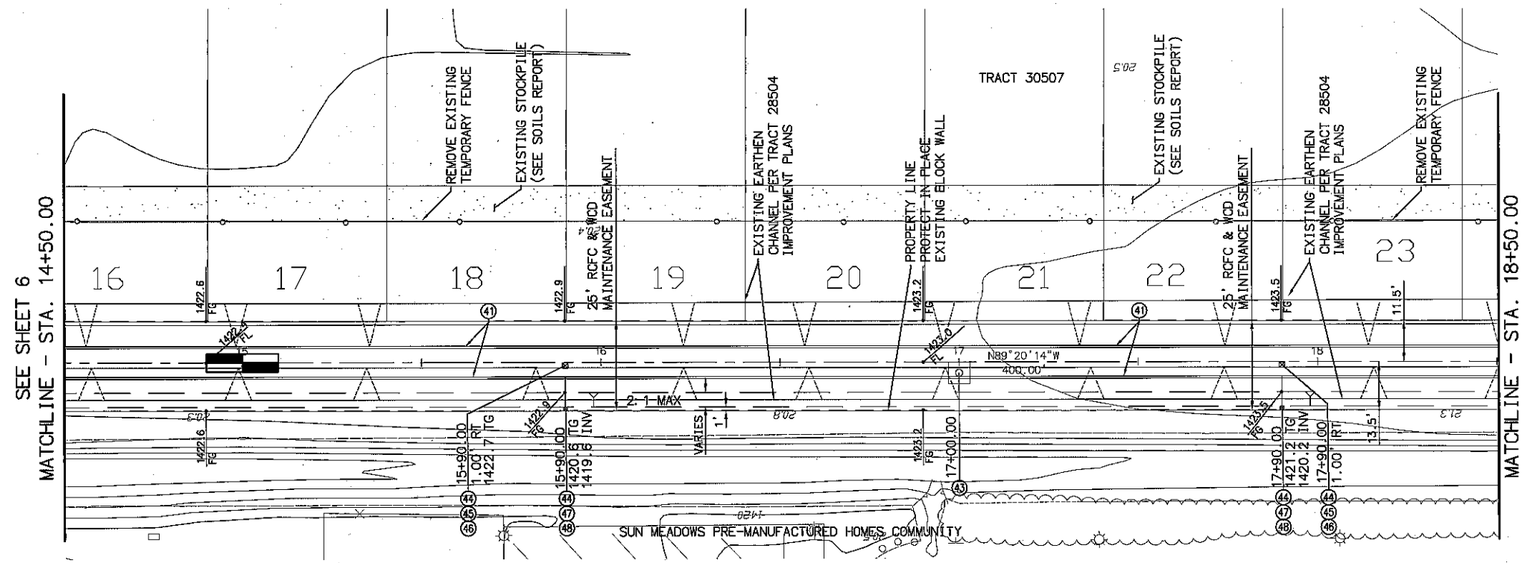


INFORMATIONAL NOTE
ALL X-SECTIONS TAKEN LOOKING DOWNSTREAM

SECTION AT STA. 15+00
TYPICAL FROM STA 14+50.00 TO 18+50.00

10 0 10



PLAN

CONSTRUCTION NOTES

(41) CONSTRUCT 8'W X 6'H CAST-IN-PLACE OR PRECAST REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80 (SEE SHEET 18).

(43) CONSTRUCT 24" DIA. RCB CULVERT MANHOLE PER RCFC & WCD STD. DWGS. MH253 & MH257. CONSTRUCT 6" THICK, 6'x6' CONCRETE APRON AROUND MH AT FINISH GRADE.

(44) INSTALL 6" P.V.C.

(45) CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 3, PER RCFC & WCD STD. DWG. JS 228

(46) INSTALL 18" X 18" CONCRETE BOX INLET W/ TRAFFIC RATED STEEL GRATE (BROOKS PRODUCTS #1818 OR APPROVED ALTERNATIVE) TO BE MAINTAINED BY HOA.

(47) INSTALL 12" X 12" BOX INLET W/GRATE (NDS #1213 OR APPROVED ALTERNATIVE). TO BE MAINTAINED BY HOA.

(48) CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 1, PER RCFC & WCD STD. DWG. JS 228

SCALE: 1"=20'

20 0 20 40 60
GRAPHIC SCALE

BENCHMARK: BM# T-800-29-68 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
CHECKED BY: M.T.

PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
27555 Ynez Road, Suite 400 TEMECULA, CALIFORNIA 92591-4670
951/676.2042 • FAX 951/676.7240 • www.RBF.com
Victor Elia 6-7-05
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE: 7/7/05
APPROVED BY: DATE: 7.7.05

TRACT 30507 – IP 040040
SUN CITY - THORNTON AVENUE STORM DRAIN
FROM STA. 14+50 TO 18+50

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 7 OF 18

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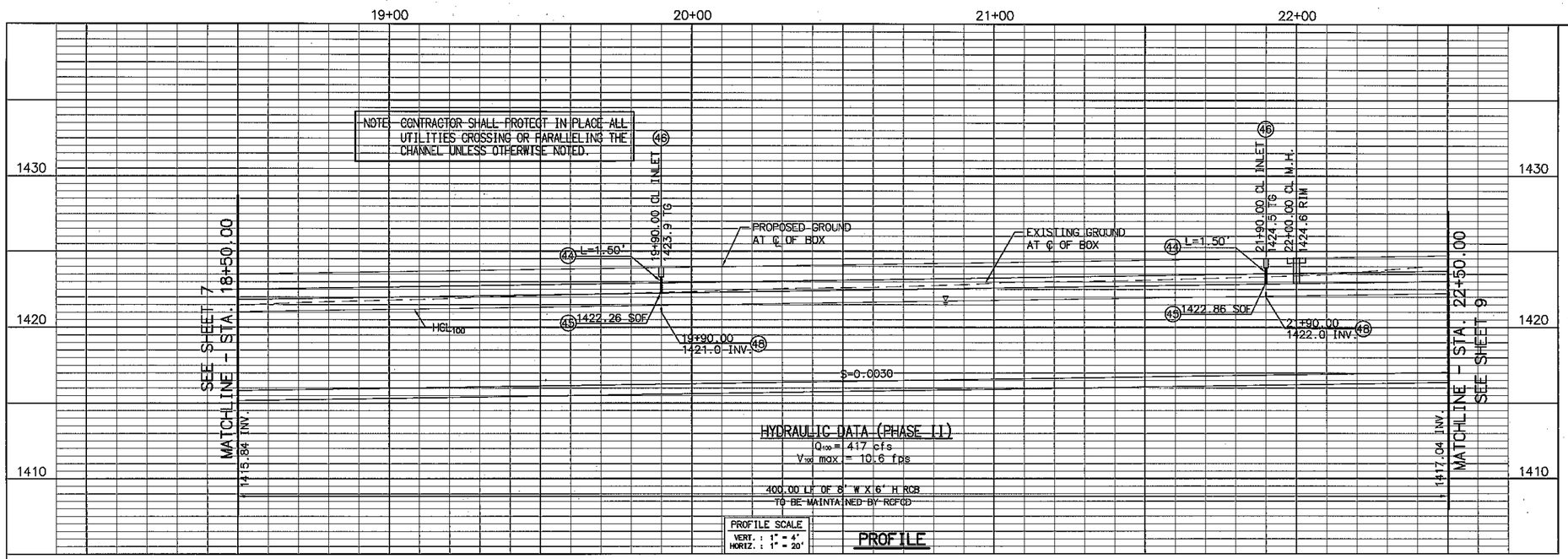

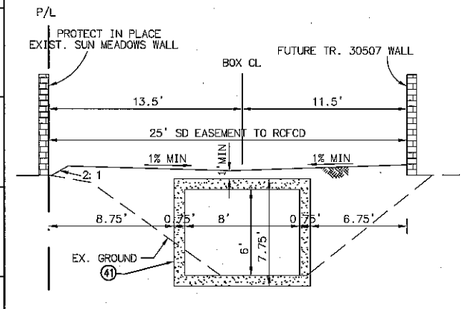

SECTION AT STA. 19+00

TYPICAL FROM STA 18+50.00 TO 22+50.00

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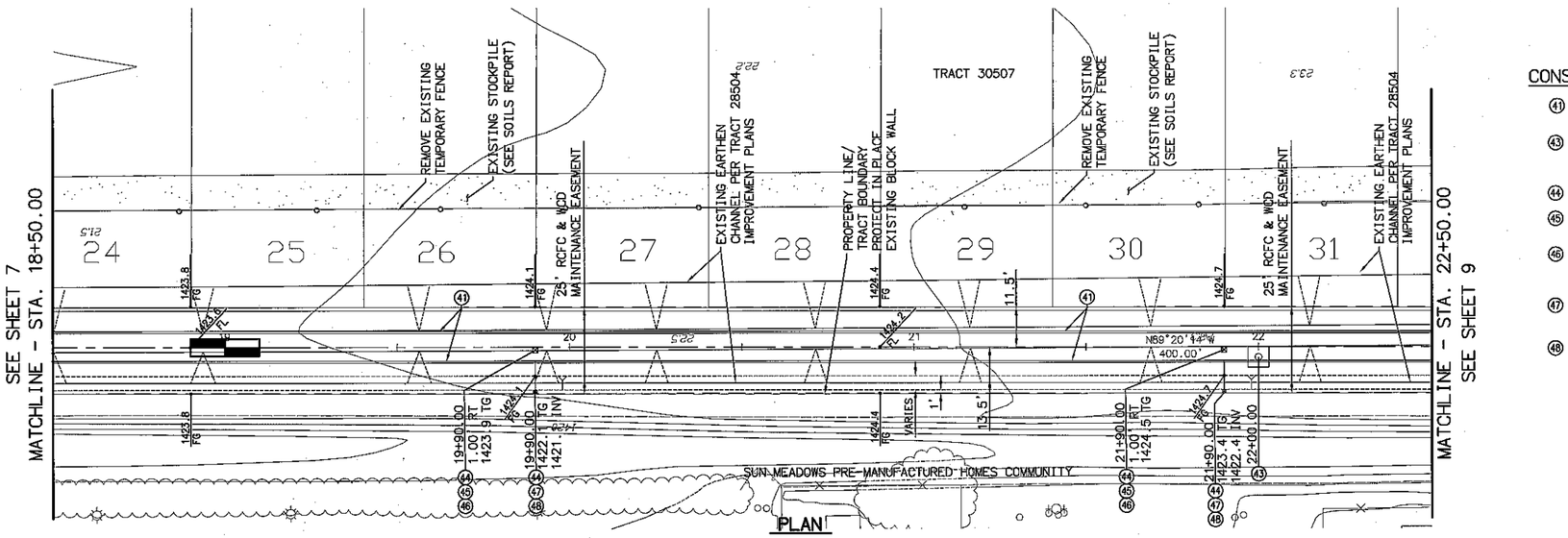

PLAN

CONSTRUCTION NOTES

(41) CONSTRUCT 8'W X 6'H CAST-IN-PLACE OR PRECAST REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80 (SEE SHEET 18).

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(44) INSTALL 6" P.V.C.

(45) CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 3, PER RCFC & WCD STD. DWG. JS 228

(46) INSTALL 18" X 18" CONCRETE BOX INLET W/ TRAFFIC RATED STEEL GRATE (BROOKS PRODUCTS #1818 OR APPROVED ALTERNATIVE) TO BE MAINTAINED BY HOA.

(47) INSTALL 12" X 12" BOX INLET W/GRATE (NDS #1213 OR APPROVED ALTERNATIVE). TO BE MAINTAINED BY HOA.

(48) CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 1, PER RCFC & WCD STD. DWG. JS 228

SCALE: 1"=20'

20 0 20 40 60

GRAPHIC SCALE

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK: BM# T-800-29-68 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 5 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E. SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
CHECKED BY: M.T.

PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
27565 Ynez Road, Suite 400, TEMECULA, CALIFORNIA 92591-4679
9516769342 • FAX 9516767240 • www.RBF.com
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Victor Elia 6-7-05
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: C. Telegadillo T. DATE: 7/7/05
APPROVED BY: Stuart C. McKibbin DATE: 7-7-05

TRACT 30507 – IP 040040
SUN CITY-THORNTON AVENUE STORM DRAIN
FROM STA. 18+50 TO 22+50

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 8 OF 18

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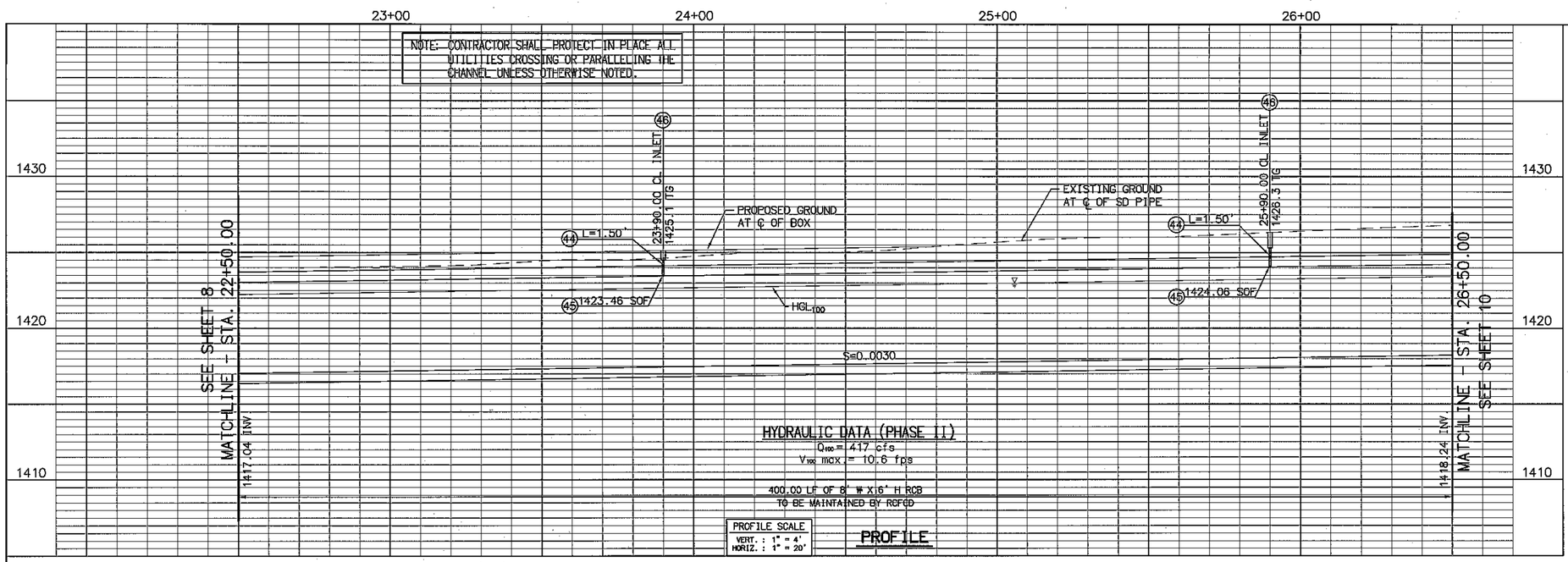
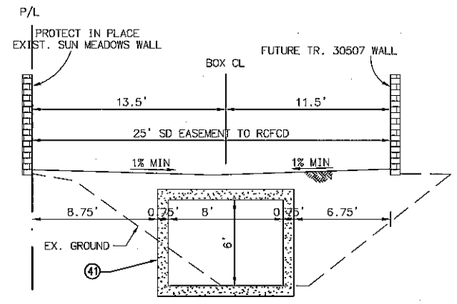


INFORMATIONAL NOTE
ALL X-SECTIONS TAKEN LOOKING DOWNSTREAM



SECTION AT STA. 23+00
TYPICAL FROM STA 22+50.00 TO 26+50.00

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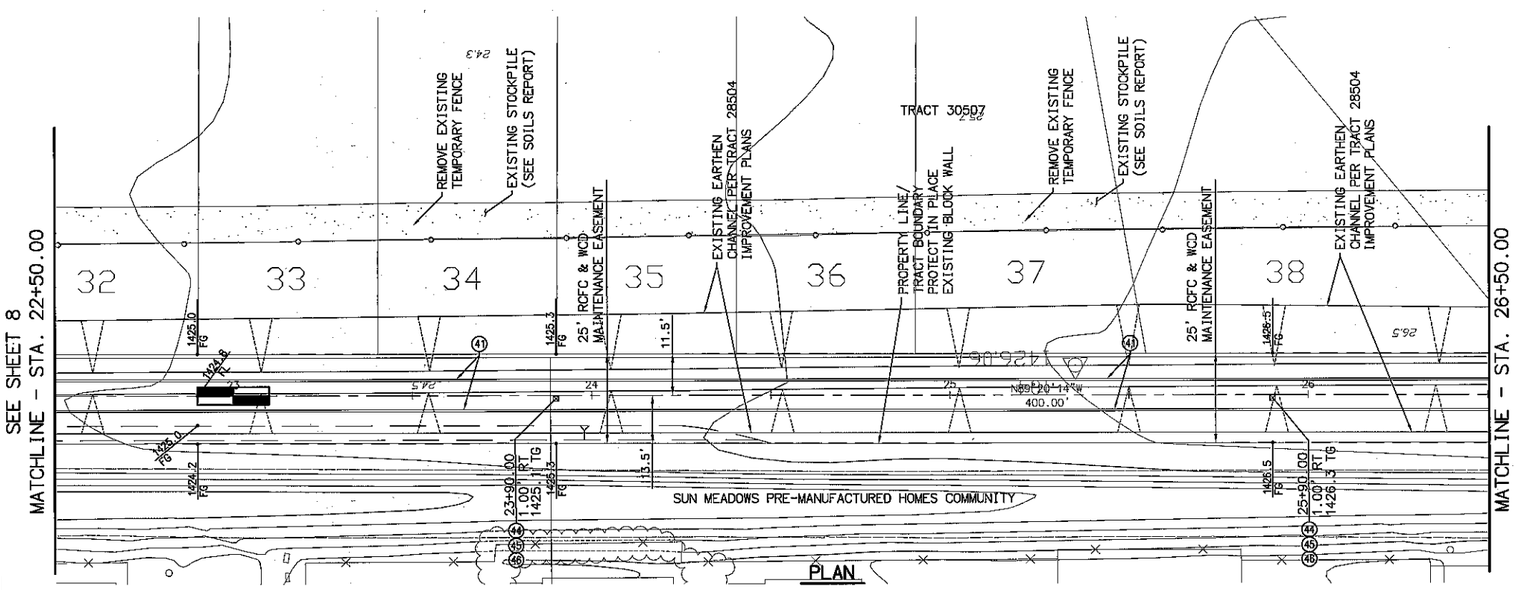


CONSTRUCTION NOTES

(41) CONSTRUCT 8'W X 6'H CAST-IN-PLACE OR PRECAST REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80 (SEE SHEET 18).

(44) INSTALL 6" P.V.C.

(45) CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 3, PER RCFC & WCD STD. DWG. JS 228

(46) INSTALL 18" X 18" CONCRETE BOX INLET W/ TRAFFIC RATED STEEL GRATE (BROOKS PRODUCTS #1818 OR APPROVED ALTERNATIVE) TO BE MAINTAINED BY HOA.

(47) INSTALL 12" X 12" BOX INLET W/GRATE (NDS #1213 OR APPROVED ALTERNATIVE). TO BE MAINTAINED BY HOA.

(48) CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 1, PER RCFC & WCD STD. DWG. JS 228

SCALE: 1"=20'

20 0 20 40 60
GRAPHIC SCALE

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK BM# T-600-28-68
AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
CHECKED BY: M.T.

PREPARED BY:
RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
27555 Ynez Road, Suite 400
TEMECULA, CALIFORNIA 92591-4679
951.676.5042 • FAX 951.676.7240 • www.RBF.com

REGISTERED PROFESSIONAL ENGINEER VICTOR A. ELIA No. 64803 Exp. 6-30-07 CIVIL STATE OF CALIFORNIA

Victor Elia 6-7-05
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

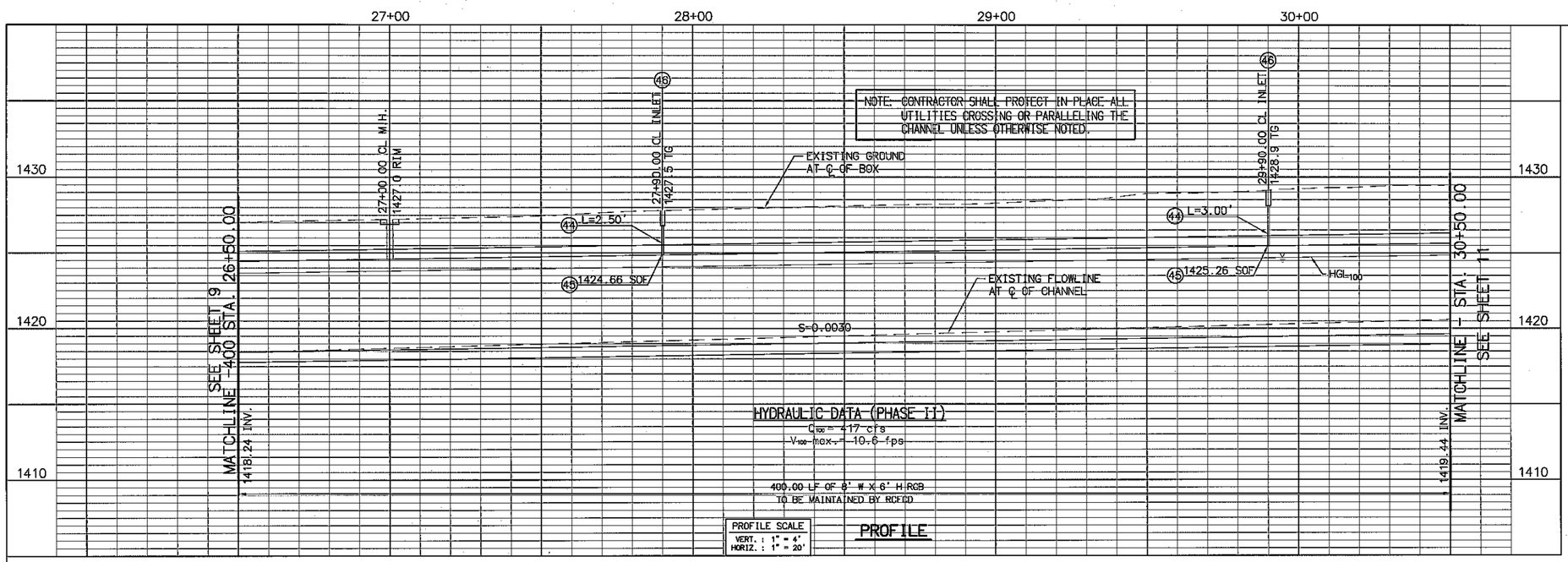
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 7/7/05

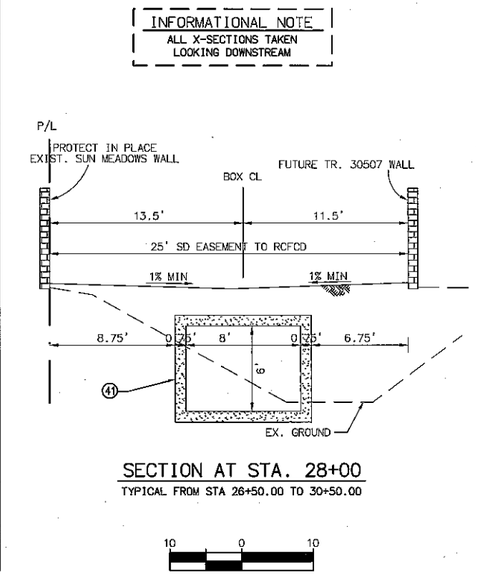
APPROVED BY: [signature] DATE: 7-7-05

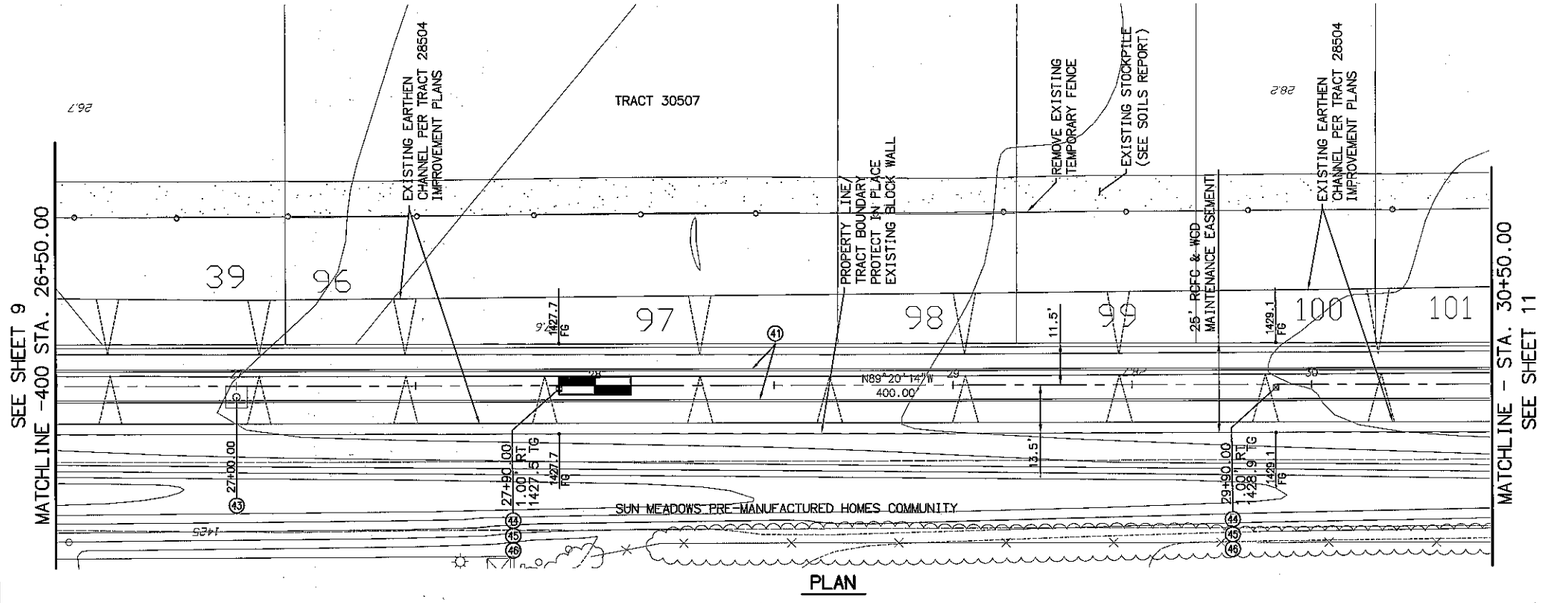
TRACT 30507 - IP 040040
SUN CITY - THORNTON AVENUE STORM DRAIN
FROM STA. 22+50 TO 26+50

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 9 OF 18

H:\PDATA\15100846\CADD\LAND\PLVT\846SD009.DWG VELIA 6/7/05 9:40 am







CONSTRUCTION NOTES

41. CONSTRUCT 8'W X 6'H CAST-IN-PLACE OR PRECAST REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80 (SEE SHEET 18).
43. CONSTRUCT 24" DIA. RCB CULVERT MANHOLE PER RCFC & WCD STD. DWGS. MH253 & MH257. CONSTRUCT 6" THICK, 6'x6' CONCRETE APRON AROUND MH AT FINISH GRADE.
44. INSTALL 6" P.V.C.
45. CONSTRUCT JUNCTION STRUCTURE NO. 3, CASE 3, PER RCFC & WCD STD. DWG. JS 228
46. INSTALL 18" X 18" CONCRETE BOX INLET W/ TRAFFIC RATED STEEL GRATE (BROOKS PRODUCTS #1818 OR APPROVED ALTERNATIVE) TO BE MAINTAINED BY HOA.

SCALE: 1"=20'

20 0 20 40 60
GRAPHIC SCALE

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600
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TWO WORKING DAYS BEFORE YOU DIG

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ELEVATION: 1429.249'

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
CHECKED BY: M.T.

PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
27555 Ynez Road, Suite 400 TEMECULA, CALIFORNIA 92591-4679
951/676-8042 • FAX 951/676-7240 • www.rbfcon
Victor Elia 6-7-05
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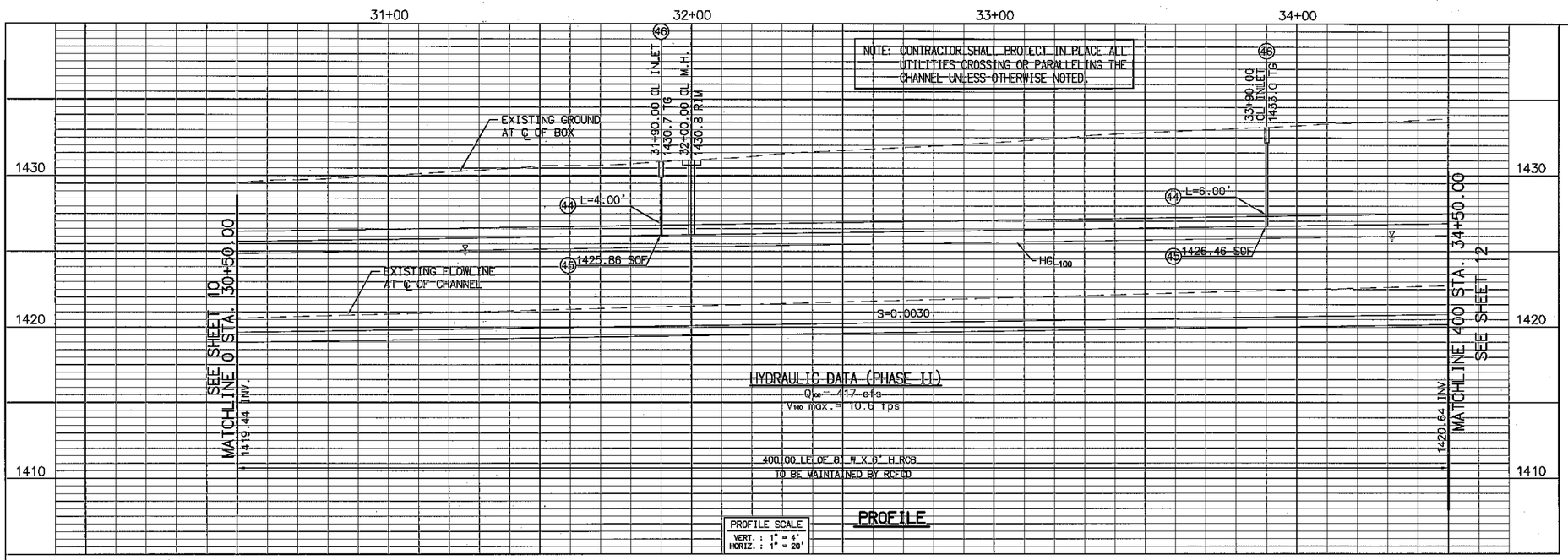
REGISTERED PROFESSIONAL ENGINEER VICTOR A. ELIA No. 64803 Exp. 6-30-07 CIVIL STATE OF CALIFORNIA

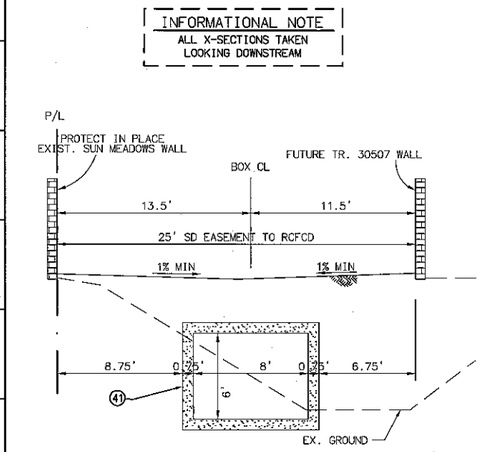
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 7/7/05
APPROVED BY: [signature] DATE: 7-7-2005

TRACT 30507 – IP 040040
SUN CITY-THORNTON AVENUE STORM DRAIN
FROM STA. 26+50 TO 30+50

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 10 OF 18

H:\PDATA\15100846\CADD\LAND\DLV\846SD010.DWG VELIA 6/7/05 9:41 am

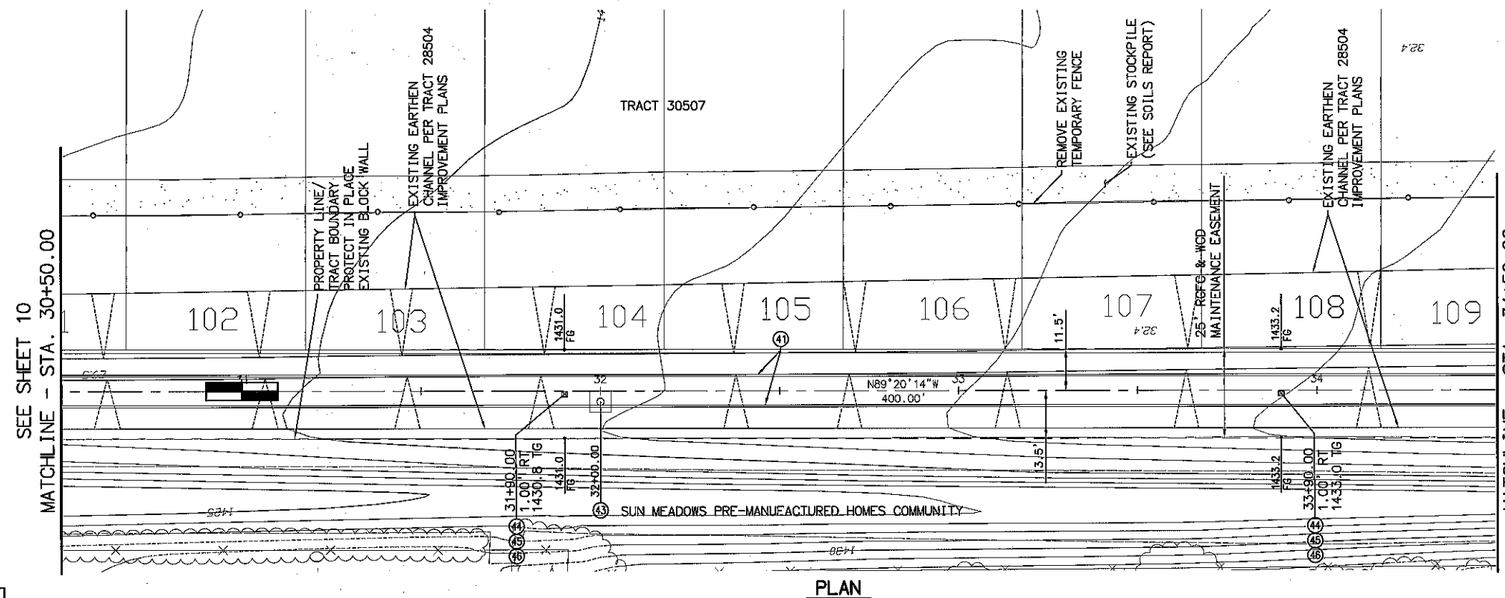




SECTION AT STA. 31+00

TYPICAL FROM STA 30+50.00 TO 34+50.00

10 0 10



PLAN

CONSTRUCTION NOTES

41. CONSTRUCT 8'W X 6'H CAST-IN-PLACE OR PRECAST REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80 (SEE SHEET 18).
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SCALE: 1"=20'

20 0 20 40 60

GRAPHIC SCALE

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REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE
	DESCRIPTION				

DESIGNED BY: V.E.
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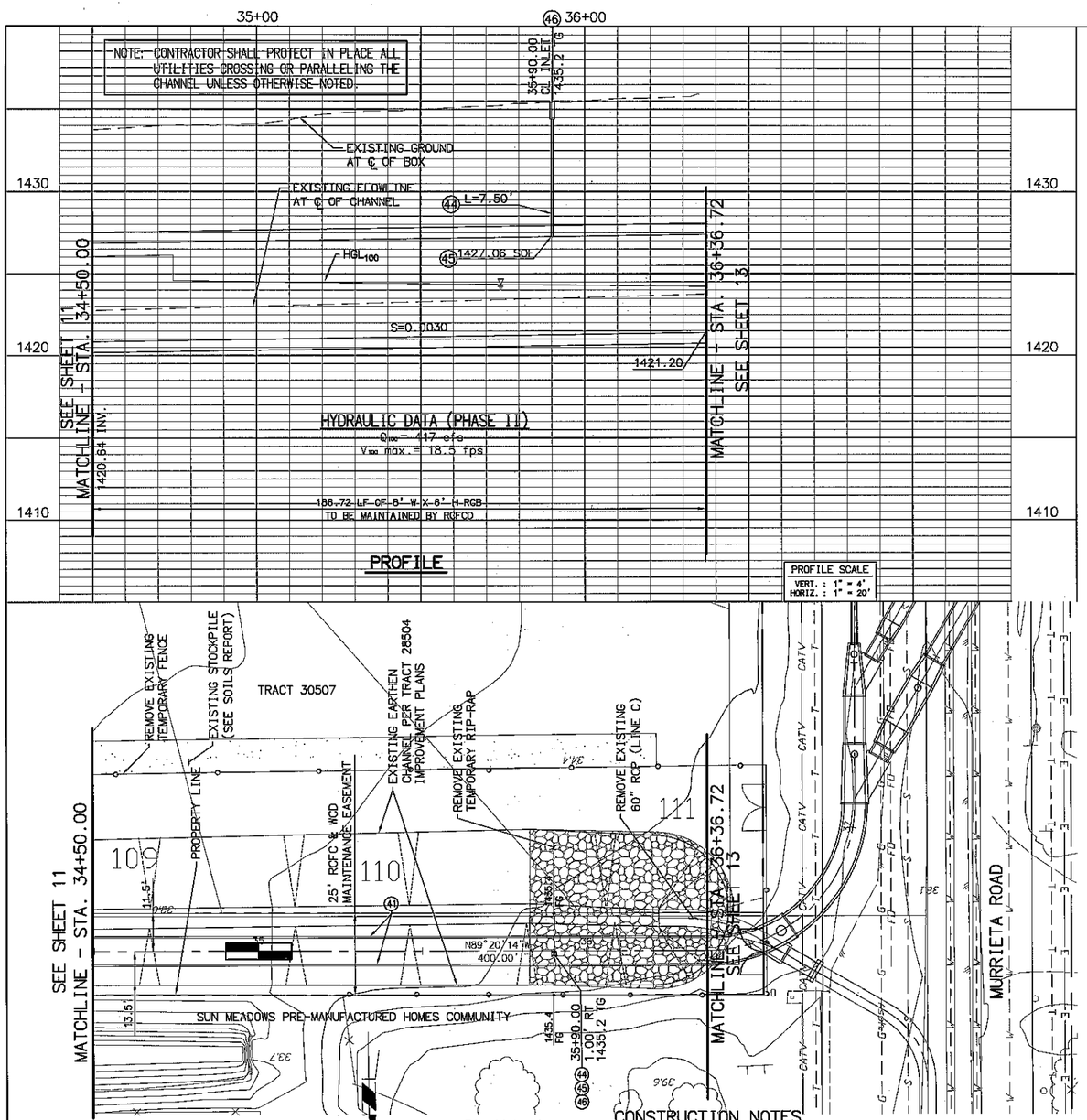
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07
REGISTERED PROFESSIONAL ENGINEER — VICTOR A. ELIA — No. 64803 Exp. 6-30-07 — CIVIL — STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 7/7/05
APPROVED BY: [signature] DATE: 7-7-2005

TRACT 30507 – IP 040040
SUN CITY- THORNTON AVENUE STORM DRAIN
FROM STA. 30+50 TO 34+50

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 11 OF 18

H:\PDATA\15\00846\CADD\LAND\JLV\846SD011.DWG VELIA 6/7/05 9:47 am



CONSTRUCTION NOTES

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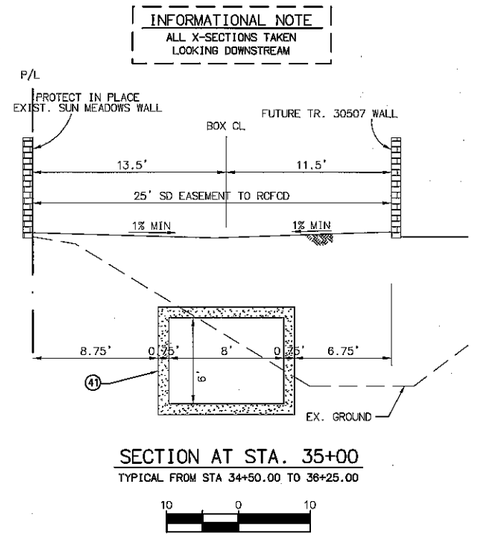
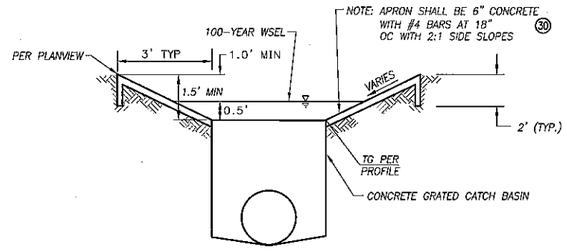


SECTION AT STA. 35+00

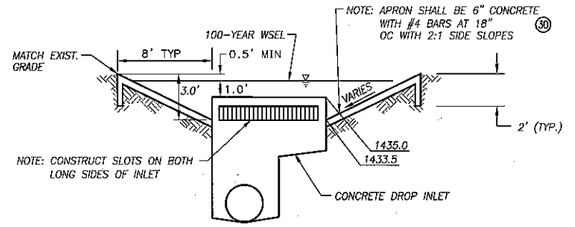
TYPICAL FROM STA 34+50.00 TO 36+25.00

10 0 10



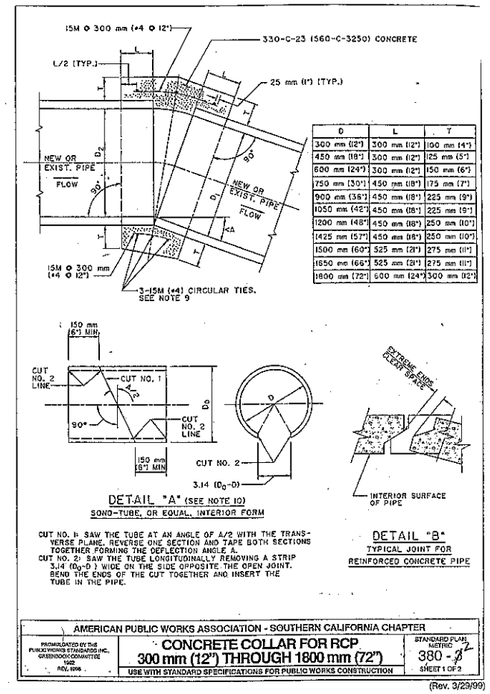
(32) CONCRETE APRON DETAIL

N.T.S.



(23) CONCRETE APRON DETAIL

N.T.S.



D	L	T
300 mm (12")	300 mm (12")	100 mm (4")
450 mm (18")	300 mm (12")	125 mm (5")
600 mm (24")	300 mm (12")	150 mm (6")
750 mm (30")	450 mm (18")	175 mm (7")
900 mm (36")	450 mm (18")	225 mm (9")
1050 mm (42")	450 mm (18")	225 mm (9")
1200 mm (48")	450 mm (18")	250 mm (10")
1425 mm (57")	450 mm (18")	250 mm (10")
1500 mm (60")	525 mm (21")	275 mm (11")
1650 mm (66")	525 mm (21")	275 mm (11")
1800 mm (72")	600 mm (24")	300 mm (12")

DETAIL "A" (SEE NOTE 10)
SONO-TUBE, OR EQUAL, INTERIOR FORM

CUT NO. 1: SAW THE TUBE AT AN ANGLE OF A/2 WITH THE TRANSVERSE PLANE, REVERSE ONE SECTION AND TAPE BOTH SECTIONS TOGETHER FORMING THE DEFLECTION ANGLE A.
CUT NO. 2: SAW THE TUBE LONGITUDINALLY REMOVING A STRIP 3.14 (D0-D) WIDE ON THE SIDE OPPOSITE THE OPEN JOINT. BEND THE ENDS OF THE CUT TOGETHER AND INSERT THE TUBE IN THE PIPE.

DETAIL "B"
TYPICAL JOINT FOR REINFORCED CONCRETE PIPE

AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER		
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE 1968 REVISED 1998	CONCRETE COLLAR FOR RCP 300 mm (12") THROUGH 1800 mm (72") USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 380 - 2 SHEET 1 OF 2

(Rev. 3/29/99)

(17) CONCRETE COLLAR

N.T.S.

NOTES

1. A CONCRETE COLLAR IS REQUIRED WHERE THE CHANGE IN GRADE EXCEEDS 10 PERCENT.
2. FOR CURVE JOINTS (SEE DETAIL B, SHEET 1)
   IF THE EXTREME ENDS OF THE PIPE LEAVE A CLEAR SPACE THAT IS GREATER THAN 25 mm (1"), BUT IS LESS THAN 75 mm (3") A CONCRETE COVER IS REQUIRED IN ACCORDANCE WITH SUBSECTION 306-1.2.4 OF THE SSPWC.
   IF THE EXTREME ENDS OF THE PIPE LEAVE A CLEAR SPACE THAT IS EQUAL TO OR GREATER THAN 75 mm (3"), BUT LESS THAN 150 mm (6"), A CONCRETE COLLAR IS REQUIRED. IF THE CLEAR SPACE IS 150 mm (6") OR GREATER, A TRANSITION STRUCTURE IS REQUIRED.
3. CONCRETE COLLAR SHALL NOT BE USED FOR A SIZE CHANGE ON THE MAIN LINE.
4. CONNECTOR PIPES
   A. WHERE PIPES OF DIFFERENT DIAMETERS ARE JOINED WITH A CONCRETE COLLAR, L AND T SHALL BE THOSE OF THE LARGER PIPE, D1 OR D2, WHICHEVER IS GREATER.
   B. WHEN D1 IS EQUAL TO OR LESS THAN D2, JOIN INVERTS AND WHEN D1 IS GREATER THAN D2, JOIN SOFFITS.
5. FOR PIPE LARGER THAN 1800 mm (72") SPECIAL COLLAR DETAILS ARE REQUIRED.
6. FOR PIPE SIZE NOT LISTED USE NEXT SIZE LARGER.
7. REINFORCEMENT SHALL CONFORM TO ASTM A 615 M (A 615) GRADE 300(40).
8. WHERE REINFORCING IS REQUIRED THE DIAMETER OF THE CIRCULAR TIES SHALL BE D+(2X WALL THICKNESS) +.T.
9. REINFORCING SHALL BE USED WHERE THE PIPE DIAMETER IS GREATER THAN 525 mm (21") AND ON ALL PIPES WHERE THE SPACES BETWEEN THE EXTREME OUTER ENDS IS 75 mm (3") OR LARGER.

CIRCULAR TIES:

PIPE DIAMETER	NO. OF CIRCULAR TIES
525 mm (21") OR LESS	3
600 mm (24") TO 750 mm (30")	3
825 mm (33") TO 1425 mm (57")	4
1500 mm (60") TO 1800 mm (72")	5

WHERE THE SPACE BETWEEN PIPE ENDS EXCEEDS 75 mm (3"), THE NUMBER OF CIRCULAR TIES SHALL BE INCREASED TO MAINTAIN AN APPROXIMATE SPACING OF 150 mm (6") O.C.

10. WHERE THE PIPE IS 525 mm (21") OR LESS IN DIAMETER AN INTERIOR FORM OF UNSEALED SONO-TUBE OR EQUAL SHALL BE USED TO PROVIDE A SMOOTH INTERIOR JOINT. THE PAPER FORM MAY BE LEFT IN PLACE (SEE DETAIL A). WHEN THE PIPE IS 600 mm (24") OR LARGER A REMOVABLE INTERIOR FORM SHALL BE USED OR THE INTERIOR JOINT SHALL BE COMPLETELY FILLED WITH MORTAR AND NEATLY POINTED.
11. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES, EXCEPT REINFORCING BAR SIZES IN ENGLISH UNITS MAY BE SUBSTITUTED FOR METRIC BAR SIZES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER		
	CONCRETE COLLAR FOR RCP 300 mm (12") THROUGH 1800 mm (72")	STANDARD PLAN METRIC 380 - 3 SHEET 2 OF 2

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BENCHMARK: BM# T-800-29-88 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E. SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK. ELEVATION: 1429.249

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
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PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
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Victor Elia 6-7-05
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: [signature] DATE: 7/7/05

APPROVED BY: [signature] DATE: 7.7.2005

TRACT 30507 – IP 040040
SUN CITY - THORNTON AVENUE STORM DRAIN
FROM STA. 34+50 TO 36+36.72

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 12 OF 18

H:\PDATA\15100846\CADD\LAND\DLV\846SD012.DWG VELIA 6/7/05 9:49 am

37+00 38+00 39+00 40+00 10+00 10+50

1440 1435 1430 1425 1420 1415

STA 36+36.72 BC MATCHLINE SEE SHEET 12

STA 36+60.33 CL MH SHAFT (15)

STA 36+73.81 6"ø TELEPHONE 1431.66 S.P.

STA 37+22.23 CL MH SHAFT (16)

STA 37+42.67 CL MH SHAFT (16)

STA 38+05.18 CL MH SHAFT (10)

STA 38+07.02

HYDRAULIC DATA
Q_{100} = 351.0 cfs
V_{100} max. = 10.6 fps

HYDRAULIC DATA
Q_{100} = 1.6 cfs
V_{100} max. = 7.1 fps

STA 38+02.68
18" RCP INLET

EXISTING GROUND AT ℄ OF SD PIPE

HGL100

S=0.0166

1429.40

1429.13

1425.55

FUTURE 10" SEWER

STA 37+08.76
66" RCP INLET

STA 36+53.63
60" RCP INLET
S=0.0030

STA 37+42.14
48" RCP INLET

1421.55

1421.20 1421.41

STA 36+63.23 BEG PIPE

STA 37+07.54 END PIPE

1421.46

STA 37+25.28

STA 37+39.75

1421.51

STA 37+55.67

26.51 LF TRANSITION FROM 8'Wx6'H RCB TO 78" RCP

44.31 LF 78" RCP 1300D

14.47 LF 66" RCP 1400D S=0.0030

46.67 LF 18" RCP 1750D

HYDRAULIC DATA
Q_{100} = 114.0 cfs
V_{100} max. = 4.8 fps

MAINTAINED BY RCFC & WCD

LINE E PROFILE

PROFILE SCALE
HORIZ. : 1" = 20'
VERT. : 1" = 4'

PROPOSED SURFACE AT ℄ OF SD PIPE

C.B. NO. 3 1437.67 TC

W=7.0'H=4.0'

S=0.0150

1433.17

HYDRAULIC DATA
Q_{100} = 0.6 cfs
V_{100} max. = 4.0 fps

STA 40+30.34

253.32 LF 18" RCP

MAINTAINED BY COUNTY OF RIVERSIDE TRANSPORTATION DEPT

INFORMATIONAL NOTE
ALL X-SECTIONS TAKEN LOOKING DOWNSTREAM

W'LY R/W ℄ E'LY R/W

94'

44' 12' 32' (WHERE CURB EXISTS) 50' 32' (PROPOSED) 18'

6" CURB & GUTTER

VARIES 12"-16" TO EP

8"TC-HC=0.17'

6" CURB & GUTTER

5' 13'

2% 2% 2% 2%

10' 8' 7' 6' 5' 3' 5' 10'

48" SD

FUT 10" SSG

4" GSS

EXISTING GROUND AT ℄ OF SD PIPE

C.B. NO. 2 1437.07 TC

W=7.0'H=4.5'

S=-0.2485

1432.07

HGL100

1429.23

STA 10+02.42

STA 10+14.13

11.71 LF 18" RCP

LAT E2 PROFILE

MAINTAINED BY COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT

25' RCFC & WCD MAINTENANCE EASEMENT PER PHASE I PLANS

RCB (8'W x 6'H) PER SHEET 12

36+36.72 BC MATCHLINE SEE SHEET 12

JOIN RCB, BEGIN LINE E. BEGIN TRANSITION STRUCTURE

36+53.63 LINE E ℄ INT =9+86.75 LINE C

A = 50°56'22"
B = 80'
C = 8.79'
D1 = 78"
D2 = 8' W X 6' H
ELEV. R = 1422.85
ELEV. S = 1422.39

A = 30°00'00"
B = 48"
C = 10.90'
D1 = 30"
D2 = 66"
ELEV. R=1421.56
ELEV. S=1421.53

PROPOSED TRACT 30507

SECTION AT STA. 39+25
TYPICAL FROM STA 38+25.00 TO 40+37.85

36+60.33 CL MH

37+42.14 LINE E ℄ INT = 10+00.00 LINE D

37+52.67 ℄ MH

38+02.68 LINE E ℄ INT = 10+00.00 LAT E2

38+05.18 ℄ MH

15+00.00 ST STA. ℄ C.B. #2 W=7.0',H=4.5' LOCAL DEPRESSION CASE C PER ST IMP PLANS

40+37.85 /BC

40+55.52 EC

12+55.00 ST STA. ℄ C.B. #3 W=7.0',H=4.0' LOCAL DEPRESSION CASE C PER ST IMP PLANS

PROPOSED CURB & GUTTER

LINE E

LINE C (60" RCP) PER SUN MEADOWS SD PH I PROJ NO. 4-0-00303 DRAWING NO. 4-792

℄ MURRIETA ROAD

FUTURE CURB & GUTTER

20' 0 20'

37+07.54 EC

37+08.76 LINE E ℄ INT = 10+00.00 LAT E1

37+22.28 ℄ MH

A = 30°00'00"
B = 66"
C = 14.88'
D1 = 66"
D2 = 78"
ELEV. R = 1421.50
ELEV. S = 1421.47

TYP (31)

BEGIN EXISTING CURB & GUTTER

LAT E1, 66" RCP (SEE SHEET 16)

LINE D (SEE SHEET 14)

LINE E PLAN

CONSTRUCTION NOTES

(5) CONSTRUCT 18" RCP, (CLASS IV)

(10) CONSTRUCT MANHOLE NO. 1 PER RCFC STD. MH251

(14) CONSTRUCT 78" RCP, D-LOAD PER PROFILE.

(15) CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC & WCD STD. PLAN TS301, ANGLE OF DIVERGENCE OR CONVERGENCE SHALL NOT EXCEED 5°45', (MODIFIED TO INCLUDE PIPE JUNCTION AND MANHOLE PER RCFC & WCD STD. PLAN MH254 AT LINE C).

(16) CONSTRUCT MANHOLE NO. 4 PER RCFC & WCD STD PLAN MH254.

(20) CONSTRUCT CURB INLET CATCH BASIN PER RCTD STD. NO. 300. WIDTH PER PLANVIEW.

(26) CONSTRUCT 66" RCP, D-LOAD PER PROFILE.

(31) INSTALL REFLECTIVE GUIDE MARKERS EVERY 10' PER CALTRANS TRAFFIC MANUAL, SECTION 6-04.4, FIG. 6-45, TYPE F.

(42) CONSTRUCT 6' HIGH CHAIN LINK FENCE GATE PER RCFC & WCD STD. DWG. M801.

LINE/CURVE DATA

	DELTA/BRG	RADIUS	LENGTH	REMARK
1	Δ= 90°03'45"	45.00'	70.73'	LINE E
2	N00°36'00"E	--	330.40'	LINE E
3	Δ= 45°00'00"	22.50'	17.67'	LINE E
4	N44°24'00"W	---	4.82'	LINE E
5	N59°20'09"W	---	18.78'	LINE C
6	N30°36'00"E	---	110.00'	LAT E1
7	N30°36'00"E	--	94.00'	LINE D
9	N44°24'00"W	--	14.13'	LAT E2

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK: BM# T-600-29-68 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR. 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK. ELEVATION: 1429.249'

REF.	REVISIONS	APPR.	DATE

DESIGNED BY: VE
DRAWN BY: VE
DATE DRAWN: MAR. 2005

PLAN PREPARED BY:
RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
27555 YNEZ ROAD, SUITE 400 TEMECULA, CALIFORNIA 92591-4679
951.676.8042 • FAX 951.676.7240 • www.RBFCA.com
Victor Elia 6-7-05
VICTOR A. ELIA, RCE 64803 DATE: 6-30-07

REGISTERED PROFESSIONAL ENGINEER VICTOR A. ELIA No. 64803 Exp. 6/30/07 CIVIL STATE OF CALIFORNIA

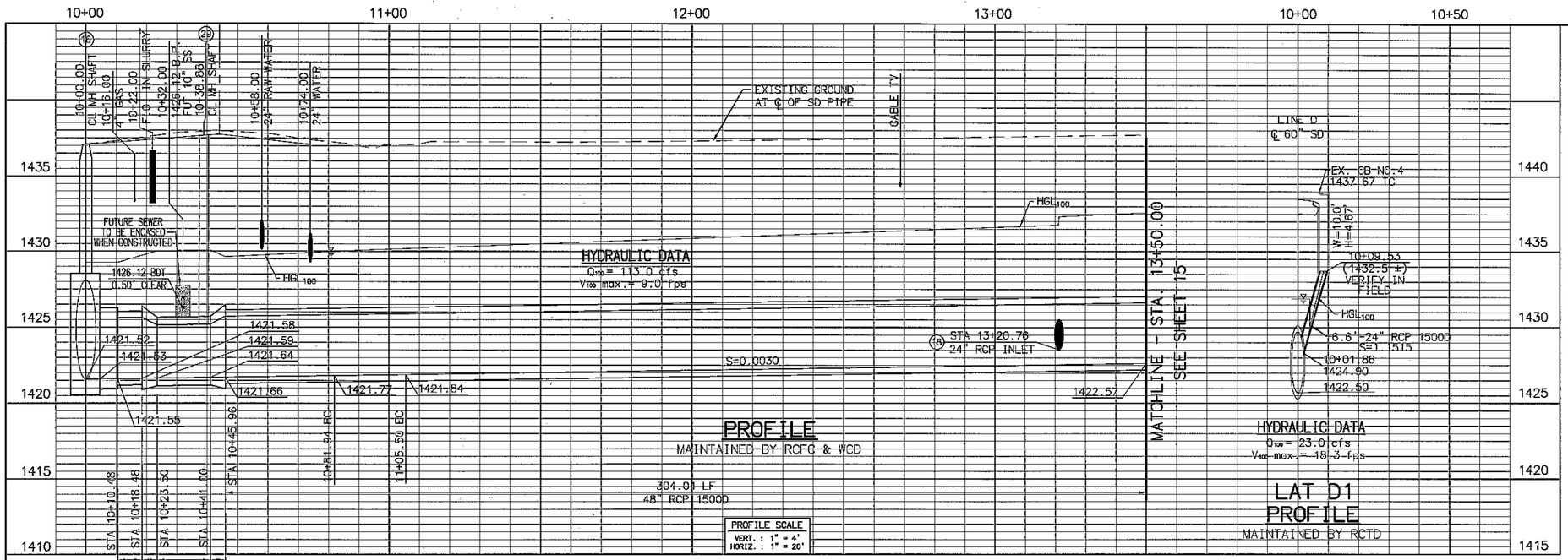
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE: 7/7/05
APPROVED BY: DATE: 7.7.2005

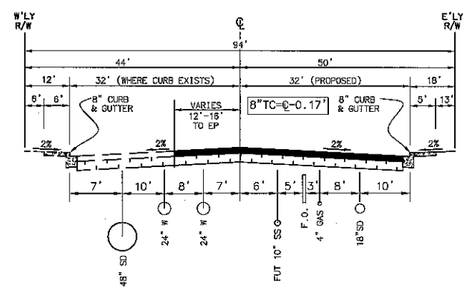
COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
APPROVED BY: KHALED A. OTMAN DATE: 6/29/05
RECOMMENDED BOYLE ENG. DATE: 6-24-05

TRACT 30507- IP 040040
LINE "E"
&
LAT "E-1"

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 13 OF 18

J:714-1809(TR 30507) STORM DRAIN PLAN H:\PDATA\15100846\CADD\LAND\DLV\846SD013.DWG VELIA 6/7/05 11:28 am





INFORMATIONAL NOTE
ALL X-SECTIONS TAKEN LOOKING DOWNSTREAM

SECTION AT STA. 11+50

TYPICAL FROM STA 10+94.00 TO 13+50.00

CONSTRUCTION NOTES

(4) CONSTRUCT 24" RCP, D-LOAD PER PROFILE

(15) CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC & WCD STD. PLAN TS301, ANGLE OF DIVERGENCE OR CONVERGENCE SHALL NOT EXCEED 5°45', (MODIFIED TO INCLUDE PIPE JUNCTION AND MANHOLE PER RCFC & WCD STD. PLAN MH254 AT LINE C).

(16) CONSTRUCT MANHOLE NO. 4 PER RCFC & WCD STD PLAN MH254.

(18) CONSTRUCT JUNCTION STRUCTURE NO. 4, CASE 2, PER RCFC & WCD STD. PLAN JS229.

(24) CONSTRUCT 48" RCP, D-LOAD PER PROFILE.

(28) CONSTRUCT MODIFIED 60" W X 42" H CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD D80. (USE 5'Wx4'H STANDARDS)

(29) CONSTRUCT MANHOLE NO. 3 PER RCFC & WCD STD PLAN MH253.

LINE DATA TABLE				
☐	DELTA/BRG	RADIUS	LENGTH	REMARK
7	N30°36'00"E	--	81.94'	LINE D
8	Δ= 30°00'00"	45.00'	23.56'	LINE D
9	N00°36'00"E	--	244.50'	LINE D
11	N89°24'00"W	--	7.33'	LAT D1

20' 0 20'

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK: BM# T-60D-29-68 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK. ELEVATION: 1429.249'

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
CHECKED BY: M.T.

PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
27555 Ynez Road, Suite 400, TEMECULA, CALIFORNIA 92591-4679
951.676.6042 • FAX 951.676.7240 • www.RBF.com
Victor Elia 6-7-05
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07

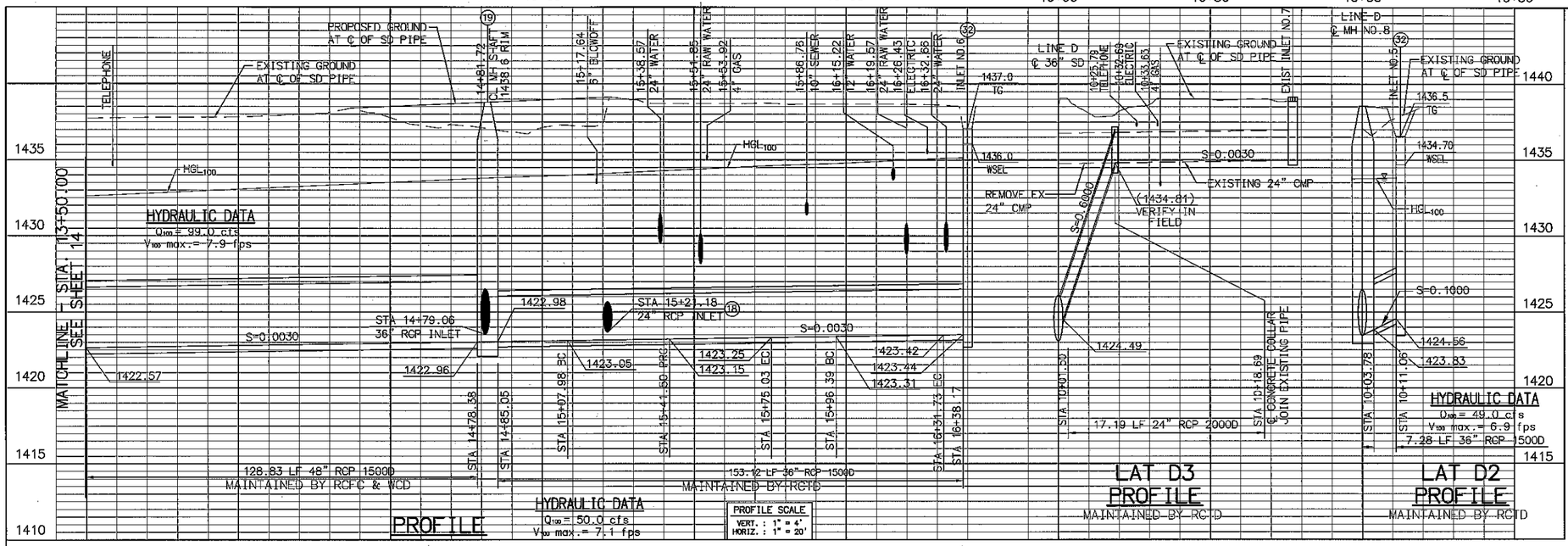
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 7/7/05
APPROVED BY: [signature] DATE: 7-7-2005

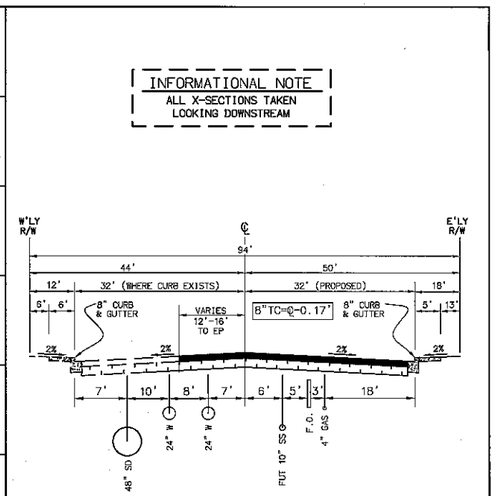
COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
APPROVED BY: KHALED A. OTHMAN [signature] DATE: 6/29/05
RECOMMENDED-BOYLE ENG. [signature] DATE: 6-24-05

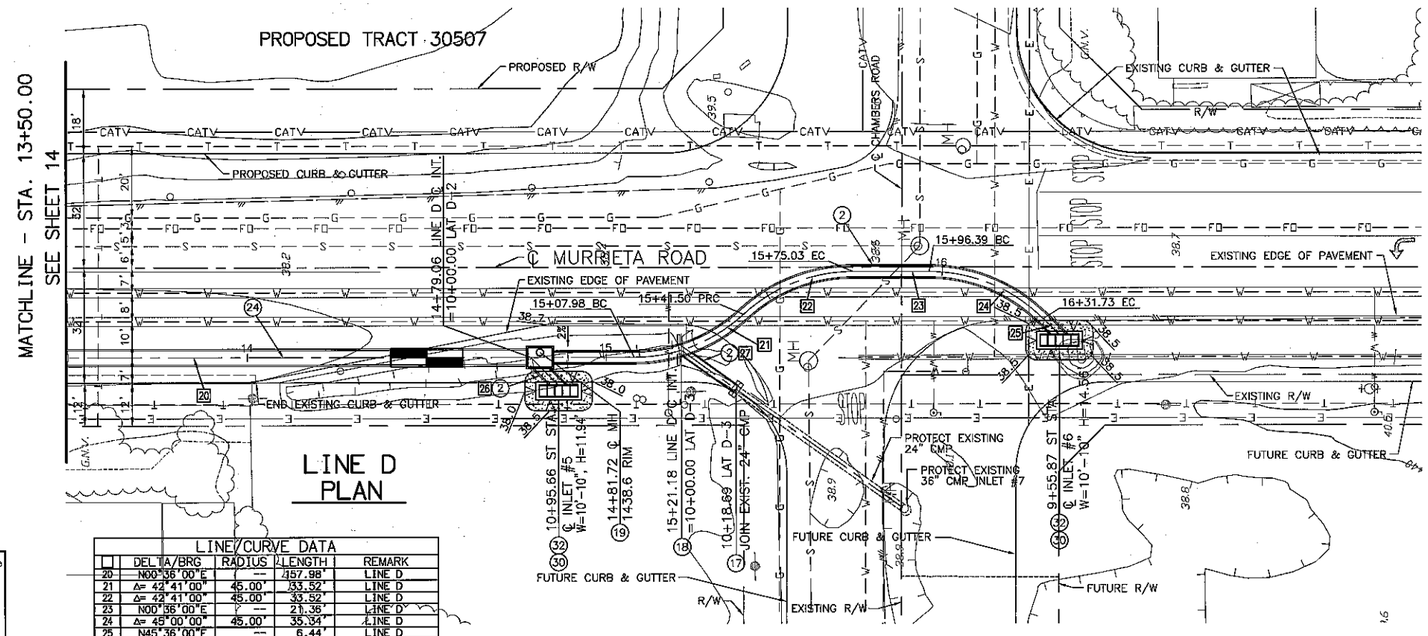
TRACT 30507 – IP 040040
LINE "D" & LAT "D-1"

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 14 OF 18

H:\PDATA\1510046\CADD\LAND\DLV\8465004.DWG VELIA 6/7/05 9:49 am



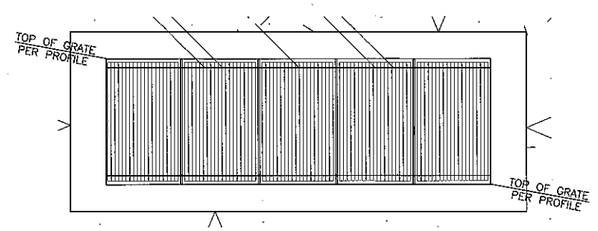




LINE/CURVE DATA				
	DELTA/BRG	RADIUS	LENGTH	REMARK
20	N00°36'00"E	--	457.98'	LINE D
21	Δ= 42°41'00"	45.00'	33.52'	LINE D
22	Δ= 42°41'00"	45.00'	33.52'	LINE D
23	N00°36'00"E	--	21.36'	LINE D
24	Δ= 45°00'00"	45.00'	35.34'	LINE D
25	N45°36'00"E	--	6.44'	LINE D
26	N45°36'00"E	--	11.06'	LAT D-2
27	N36°01'57"E	--	75.61'	LAT D-3

CONSTRUCTION NOTES

(2) CONSTRUCT 36" RCP, D-LOAD PER PROFILE.
(4) CONSTRUCT 24" RCP, D-LOAD PER PROFILE
(17) CONSTRUCT CONCRETE CONNECTOR PIPE COLLAR PER APWA STD. PLAN 380-2. SEE SHEET 12.
(18) CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STD. PLAN MH229.
(19) CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STD. PLAN MH252.
(24) CONSTRUCT 48" RCP, D-LOAD PER PROFILE.
(30) CONSTRUCT CONCRETE APRON AROUND CONCRETE DROP INLET PER DETAIL ON SHEET 12.
(32) CONSTRUCT GRATED CATCH BASIN PER APWA STD. PLAN 305-2, 309, 635 & 311-2, USING 5 GRATES, t=12", A=45°, W=10'-10", AND V PER PROFILE. SEE SHEET 17.



INLET DETAIL (TYPICAL)
SCALE: 1"=2'

20' 0 20'

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK: BM# T-600-23-68 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE
	DESCRIPTION				

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
CHECKED BY: M.T.

PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
27555 Ynez Road, Suite 403, TEMECULA, CALIFORNIA 92591-4679
951/676.6042 • FAX 951/676.7240 • www.RBF.com
REGISTERED PROFESSIONAL ENGINEER VICTOR A. ELIA No. 64803 Exp. 6-30-07 CIVIL STATE OF CALIFORNIA
Victor Elia 6-7-05
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 7/7/05
APPROVED BY: [signature] DATE: 7.7.2005

COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
APPROVED BY: [signature] KHALED A. OTHMAN DATE: 6/29/05
RECOMMENDED - BOYLE ENG. [signature] DATE: 6.29.05

TRACT 30507 – IP 040040
LINE "D" & LATS "D-2" & "D-3"

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 15 OF 18

LDW

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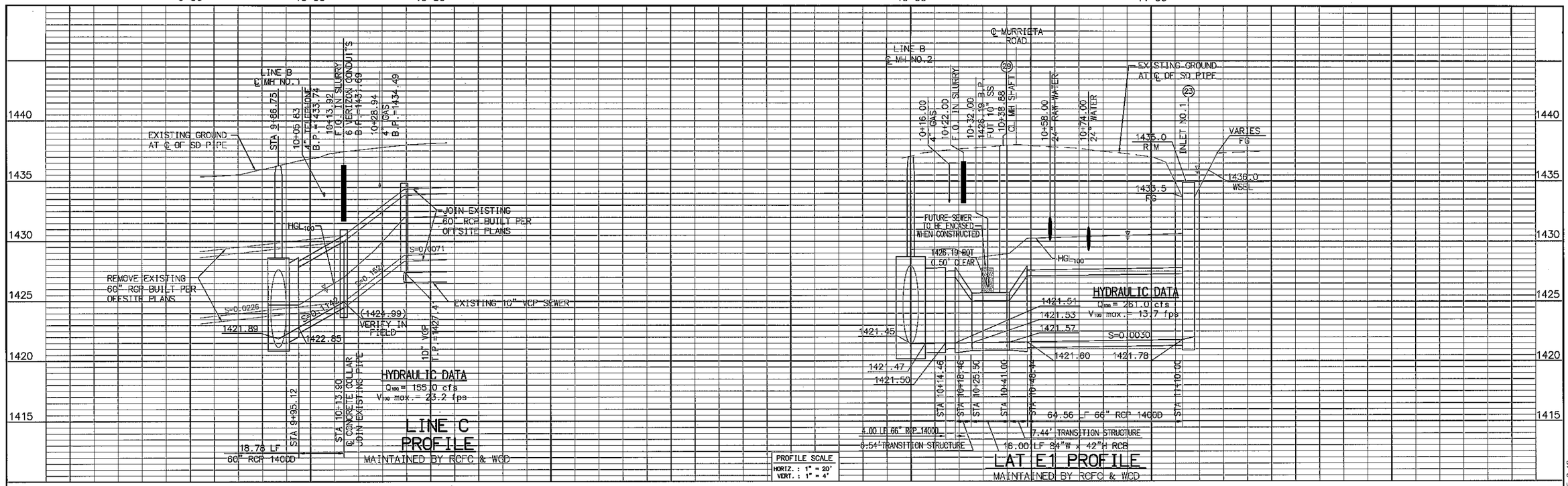
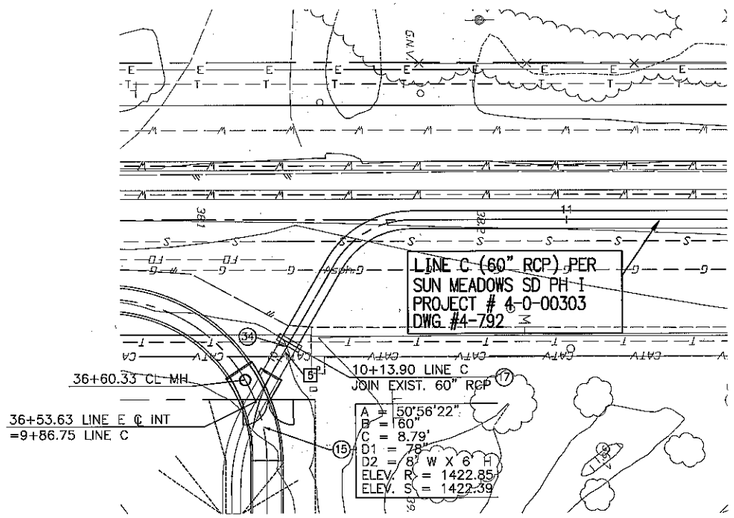
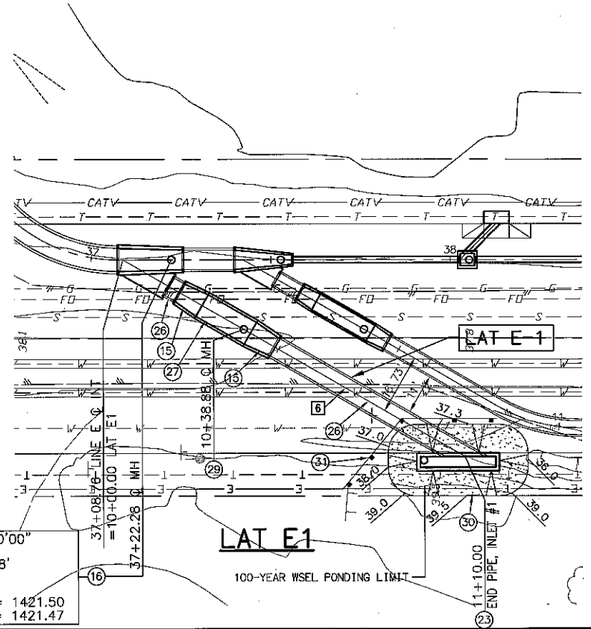






LINE/CURVE DATA				
	DELTA/BRG	RADIUS	LENGTH	REMARK
5	N59°20'09"W	--	18.78'	LINE C
6	N30°36'00"E	--	110.00'	LAT E1

CONSTRUCTION NOTES

(15) CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC & WCD STD. PLAN TS301, ANGLE OF DIVERGENCE OR CONVERGENCE SHALL NOT EXCEED 5°45', (MODIFIED TO INCLUDE PIPE JUNCTION AND MANHOLE PER RCFC & WCD STD. PLAN MH254 AT LINE C).

(16) CONSTRUCT MANHOLE NO. 4 PER RCFC & WCD STD PLAN MH254.

(17) CONSTRUCT CONCRETE CONNECTOR PIPE COLLAR PER APWA STD. PLAN 380-2. SEE SHEET 12.

(23) CONSTRUCT MODIFIED CONCRETE DROP INLET PER RCFC & WCD STD. PLAN CB110, WITH 12" HIGH SLOTS FOR 20.0' ON BOTH SIDES, T=12", W=36", AND LENGTH = 21.0'.

(26) CONSTRUCT 66" RCP, D-LOAD PER PROFILE.

(27) CONSTRUCT MODIFIED 84" W X 42" H CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT PER CALTRANS STD. D80 (USE 7'Wx4'H STANDARDS)

(29) CONSTRUCT MANHOLE NO. 3 PER RCFC & WCD STD PLAN MH253.

(30) CONSTRUCT CONCRETE APRON AROUND CONCRETE DROP INLET PER DETAIL ON SHEET 12.

(31) INSTALL TRAFFIC BARRICADE PER CALTRANS STD DWG A77.

(34) CONSTRUCT 60" RCP, D-LOAD PER PROFILE.

BENCHMARK: BM# T-602-28-68
AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #1623732-E. SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249'

REF.	REVISIONS	APPR.	DATE

DESIGNED BY: VE
DRAWN BY: VE
DATE DRAWN: MAY 2005

PLAN PREPARED BY:
RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
27555 YNEZ ROAD, SUITE 400
TEMECULA, CALIFORNIA 92591-6029
951.676.8042 • FAX 951.676.7249 • www.RBF.com
Victor Elia 6-7-05
VICTOR A. ELIA, RCE 64803 DATE: 6-30-07

REGISTERED PROFESSIONAL ENGINEER VICTOR A. ELIA No. 64803 Exp. 6/30/07 CIVIL STATE OF CALIFORNIA

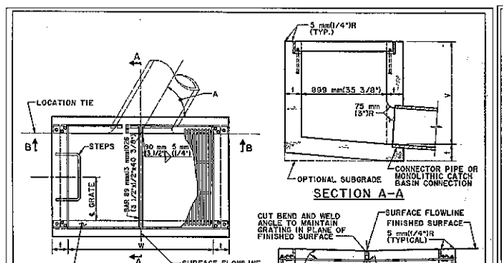
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: C Palgadillo T. DATE: 7/7/05
APPROVED BY: Stuart E. McKibbin DATE: 7.7.2005

COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
APPROVED BY: KHALED A. OTHMAN DATE: 6/29/05
RECOMMENDED: BOYLE ENG. DATE: 6-24-05

TRACT 30507- IP 040040
LINE "C"
&
LAT "E-1"

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 16 OF 18

J:714-1809(TR 30507) STORM DRAIN PLAN H:\PDATA\15\10846\CADD\LAND\DLV\846SD016.DWG VELIA 6/7/05 9:48 am



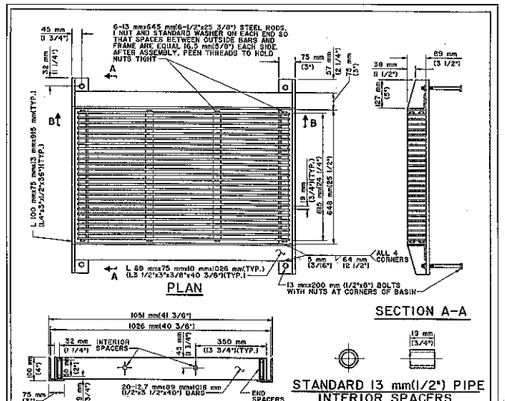
STRUCTURAL DATA			
WALL AND SLAB DIMENSIONS AND REINFORCEMENT REQUIREMENTS			
NO. OF GRATES	MAX V	t	REINFORCEMENT FOR WALLS AND SLABS
2-3	1.2 m(4')	150 mm(6")	NOT REQUIRED
2-3	2.4 m(8')	200 mm(8")	
2-3	3.0 m(10')	250 mm(10")	REQUIRED
2-3	3.5 m(12')	250 mm(10")	
4-6	1.2 m(4')	150 mm(6")	NOT REQUIRED
4-6	2.0 m(7')	200 mm(8")	
4-6	2.4 m(8')	200 mm(8")	REQUIRED
4-6	3.5 m(12')	250 mm(10")	
7-9	1.2 m(4')	150 mm(6")	NOT REQUIRED
7-9	1.8 m(6')	200 mm(8")	
7-9	2.4 m(8')	200 mm(8")	REQUIRED
7-9	3.5 m(12')	250 mm(10")	
>9	1.2 m(4')	150 mm(6")	
>9	2.4 m(8')	200 mm(8")	
>9	3.5 m(12')	250 mm(10")	

AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER		
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC., GREENBOOK COMMITTEE 1964 REV. 1986	GRATING CATCH BASIN — ALLEY (TRANSVERSE) USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 305 - 2 SHEET 1 OF 2

NOTES:

1. ALL CURVED CONCRETE SURFACES SHALL BE FORMED BY CURVED FORMS, AND SHALL NOT BE SHAPED BY PLASTERING.
2. TWO GRATINGS ARE REQUIRED UNLESS OTHERWISE SHOWN ON THE PROJECT PLANS.
3. FLOOR OF BASIN SHALL BE GIVEN A STEEL TROWEL FINISH AND SHALL HAVE A LONGITUDINAL AND LATERAL SLOPE OF 1%2 MINIMUM AND 1%3 MAXIMUM. SLOPE FLOOR FROM ALL DIRECTIONS TO THE OUTLET.
4. DIMENSIONS:
   V = L0 m(3'-6")
   V_1 = THE DEPTH AT THE INVERT OF THE INLET. NOTED ON THE PROJECT PLANS.
   W = 1308 mm(4'-3 1/2") FOR TWO GRATINGS; ADD 660 mm(2'-2") FOR EACH ADDITIONAL GRATING.
   A = THE ANGLE, IN DEGREES, INTERCEPTED BY THE CENTERLINE OF THE CONNECTOR PIPE AND THE CATCH BASIN WALL TO WHICH THE CONNECTOR PIPE IS ATTACHED.
5. PLACE CONNECTOR PIPES AS INDICATED ON THE PROJECT PLANS. UNLESS OTHERWISE SPECIFIED, THE CONNECTOR PIPE SHALL BE LOCATED AT THE DOWNSTREAM END OF THE BASIN. WHERE THE CONNECTOR PIPE IS SHOWN AT A CORNER, THE CENTERLINE OF THE PIPE SHALL INTERSECT THE INSIDE CORNER OF THE BASIN. THE PIPE MAY BE CUT AND TRIMMED AT A SKEW NECESSARY TO INSURE MINIMUM 80 mm(3") PIPE EMBEDMENT, ALL AROUND, WITHIN THE CATCH BASIN WALL, AND 75 mm(3") RADIUS OF ROUNDING OF STRUCTURE CONCRETE, ALL AROUND, ADJACENT TO PIPE ENDS. A MONOLITHIC CATCH BASIN CONNECTION SHALL BE USED TO JOIN THE CONNECTOR PIPE TO THE CATCH BASIN WHENEVER ANGLE "A" IS LESS THAN 70 DEGREES OR GREATER THAN 110 DEGREES, OR WHENEVER THE CONNECTOR PIPE IS LOCATED IN A CORNER. THE OPTIONAL USE OF A MONOLITHIC CATCH BASIN CONNECTION IN ANY CASE IS PERMITTED. MONOLITHIC CATCH BASIN CONNECTIONS MAY BE CONSTRUCTED TO AVOID CUTTING STANDARD LENGTHS OF PIPE.
6. STEPS SHALL BE LOCATED AS SHOWN. IF THE CONNECTOR PIPE INTERFERES WITH THE STEPS, THEY SHALL BE LOCATED ON THE OPPOSITE WALL. STEPS SHALL BE SPACED 300 mm(12") APART. THE TOP STEP SHALL BE 175 mm(7") BELOW THE TOP OF THE GRATING AND PROJECT 65 mm (2-1/2"). ALL OTHER STEPS SHALL PROJECT 130 mm(5").
7. THE FOLLOWING STANDARD PLANS ARE INCORPORATED HEREIN:
   308 MONOLITHIC CATCH BASIN CONNECTION
   309 CATCH BASIN REINFORCEMENT
   311 FRAME AND GRATING FOR CATCH BASINS
   635 STEEL STEP
   636 POLYPROPYLENE PLASTIC STEP
8. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES, EXCEPT REINFORCING BARS SIZES IN ENGLISH UNITS MAY BE SUBSTITUTED FOR METRIC BAR SIZES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER	
GRATING CATCH BASIN — ALLEY (TRANSVERSE)	STANDARD PLAN METRIC 305 - 2 SHEET 2 OF 2

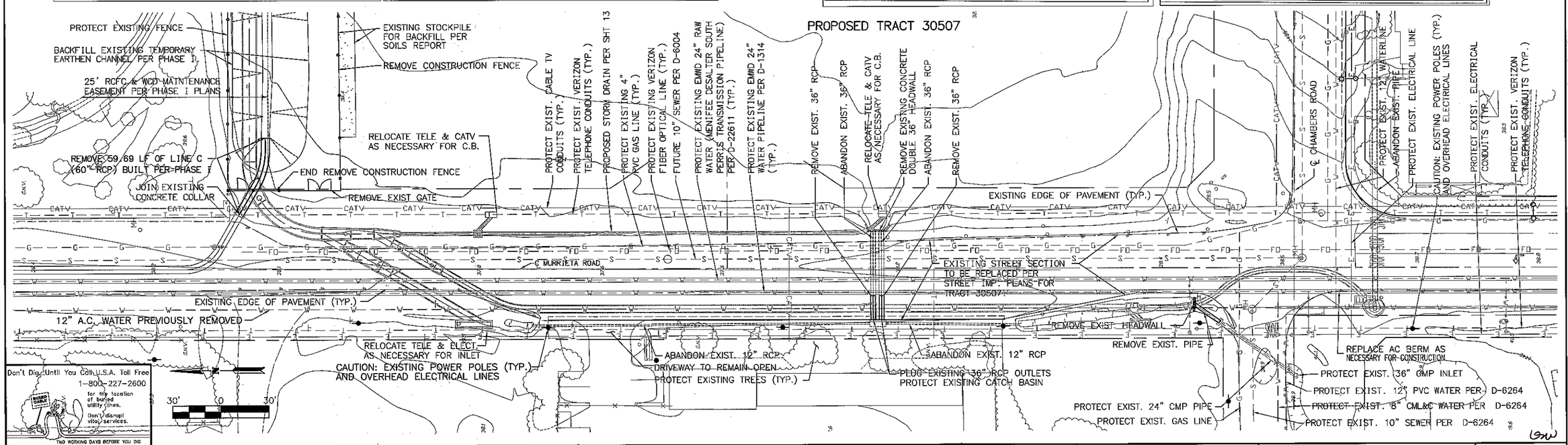


AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER		
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC., GREENBOOK COMMITTEE 1964 REV. 1986	FRAME AND GRATING FOR CATCH BASINS USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN METRIC 311 - 2 SHEET 1 OF 2

NOTES:

1. ALL PARTS SHALL BE STEEL, EXCEPT THAT END SPACERS MAY BE CAST IRON.
2. ALL PARTS SHALL BE GALVANIZED AFTER FABRICATION, EXCEPT THAT GRATINGS SHALL BE ASSEMBLED AFTER COMPONENT PARTS ARE GALVANIZED.
3. ALL DIMENSIONS ARE FINISHED DIMENSIONS AND INCLUDE GALVANIZING.
4. ALL BOLT HOLES SHALL BE 16 mm(5/8") DIAMETER.
5. ALL THREADS SHALL BE NATIONAL COARSE SERIES(NC).
6. CENTER SUPPORT ASSEMBLY REQUIRED WHEN TWO OR MORE GRATINGS ARE SPECIFIED ON PLANS.
   L = 1626 mm(64") FOR CURB OPENING CATCH BASIN WITH GRATING(S) AND DEBRIS SKIMMER(STANDARD PLAN 301).
   L = 1118 mm(44") FOR CURB OPENING CATCH BASIN WITH GRATING(S)(STANDARD PLAN 302).
   L = 914 mm(36") FOR CURBSIDE GRATING CATCH BASIN (STANDARD PLAN 303).
   L = 914 mm(36") FOR GRATING CATCH BASIN-ALLEY(LONGITUDINAL)(STANDARD PLAN 304).
7. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER	
FRAME AND GRATING FOR CATCH BASINS	STANDARD PLAN METRIC 311 - 2 SHEET 2 OF 2



BENCHMARK: BM# T-600-28-68 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #625732-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK. ELEVATION: 1429.249

REVISIONS			DESIGNED BY: VE
REF.	DESCRIPTION	APPR. DATE	DRAWN BY: VE
			DATE DRAWN: MAY 2005

PLAN PREPARED BY:
RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
27555 YNEZ ROAD, SUITE 400 TEMECULA, CALIFORNIA 92591-4679 951.676.8042 • FAX 951.676.7240 • www.RBF.com
Victor Eli 6-7-05
VICTOR A. ELIA, RCE 64803 DATE: 6-30-07

REGISTERED PROFESSIONAL ENGINEER VICTOR A. ELIA No. 64803 Exp. 6/30/07 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT		TRACT 30507- IP 040040	PROJECT NO. 4-0-00307
RECOMMENDED FOR APPROVAL BY:	APPROVED BY:	APPROVED BY:		DETAIL SHEET & DEMOLITION PLAN	DRAWING NO. 4-842
DATE: 7/7/05	DATE: 7-7-2005	KHALED A. OTHMAN RECOMMENDED BOYLE ENG.	DATE: 6/29/05 DATE: 6-24-05	SUN CITY - THORNTON AVENUE	SHEET NO. 17 OF 18

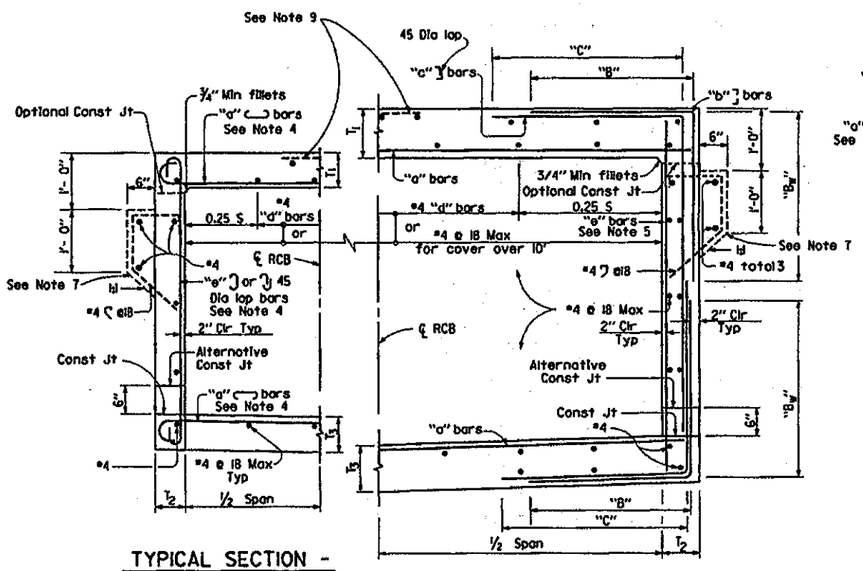
H:\PDATA\15100846\CADD\LAND\DLV\846SD017.DWG VELIA 6/7/05 9:47 am
J:\714-1809(TR 30507) STORM DRAIN PLAN

SPAN (Ft)	4						5						6						7						8					
HEIGHT (Ft)	2		3		4		2		3		4		5		3		4		5		6		3		4		5		6	
Maximum Earth Cover (Ft)	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
Conc — Roof T_1 (inch)	7	7	7	7	7	7	7½	7½	7½	7½	7½	7½	7½	7½	8	8	8	8	8	8	8	8	8	9	8	9	8½	9	8½	9
Conc — Walls T_2 (inch)	6	6	6	6	6	6½	6	6	6	6	6	7	6½	7½	6	6	6	7	6½	7½	7	8½	6	6	6	7	6½	7½	7	8½
Conc — Invert T_3 (inch)	6	6	6	6	6	6½	6½	7	6½	7	6½	7	6½	7	7	7	8	7	8	7	8	8	8	9	8	9	8½	9	8½	9
Reinf — Spacing (inch)	7	7	7	7	7	7	8½	7	8½	5½	8½	5½	8½	5½	7½	5	7½	5	7½	5	7½	4½	6½	5	6½	4½	6½	5½	6½	5½
Reinf — "a" Size Bar *	6	6	6	6	6	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	7	7	7
Reinf — "e" Size Bar *	4	4	4	5	5	6	4	4	4	4	5	5	6	6	4	4	5	5	6	6	6	7	5	5	5	6	6	6	7	7
Quantities — Concrete CF/LF	7.4	7.4	8.4	8.4	9.4	10.1	8.9	9.2	10.0	10.2	11.0	12.0	12.5	13.7	11.7	12.3	12.7	14.2	14.2	15.9	15.9	18.3	13.7	14.9	14.6	16.8	16.1	18.5	18.1	21.0
Quantities — Reinforcement LB/LF	48	48	50	55	58	67	58	60	58	68	67	81	82	105	70	81	82	96	97	120	124	148	94	94	105	118	121	147	130	177

SPAN (Ft)	10										12										14											
HEIGHT (Ft)	5		6		7		8		9		10		6		7		8		9		10		11		12		7		8		9	
Maximum Earth Cover (Ft)	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
Conc — Roof T_1 (inch)	8	10½	8	10½	8	10½	8	10½	8	10½	8½	11	8½	12	8½	12	8½	12	8½	12	8½	12	9½	12	9½	12	9½	14	9½	14	9½	14
Conc — Walls T_2 (inch)	8	8	8	9	8	9	8	10	8½	11½	9½	12½	8	10	8½	10½	8½	10½	8½	11½	9	12½	10½	13½	11½	15	9½	11	9½	11½	9½	11½
Conc — Invert T_3 (inch)	8	11	8	11	8	11	8	11	8	11	8½	11	8½	12½	9	12½	9	12½	9	12½	9	12½	9	13	10	13	10	14½	10	14½	10	14½
Reinf — Spacing (inch)	13	12	12	12	11	11	10	11	11	10	11	10	9	10	9	10	9	10	8	10	8	10	9	9	8	9	10	9	10	9	10	8
Reinf — "a" Size Bar *	6	7	6	7	6	7	6	7	6	6	6	6	6	7	6	7	6	7	6	7	6	7	7	7	7	7	7	7	7	7	7	7
Reinf — "a" Size Bar **	6	7	6	7	6	7	6	7	6	6	7	7	6	7	6	7	6	7	6	7	6	7	7	7	7	7	7	7	7	7	7	7
Reinf — "b" Dimension "B" (Ft-Inch)	2-11	2-11	2-11	3-0	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	3-1	3-2	3-9	3-9	3-9	3-9	3-7	3-9	3-7	4-4	3-7	4-4	4-4	4-4	2-9	4-2	3-4	4-4	3-4	4-6
Reinf — "b" Dimension "B" (Ft-Inch)	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-7	4-7	6-0	5-10	6-2	6-7	6-2	6-7	4-11	4-11	4-11	4-11	4-11	4-11	4-11	4-11	6-5	7-0	7-0	8-4	7-0	8-4
Reinf — "c" Size Bar *	6	7	6	7	6	7	6	7	7	7	7	7	6	7	6	7	6	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7
Reinf — "c" Dimension "C" (Ft-Inch)	3-4	3-4	7-4	4-8	7-7	4-8	8-2	4-8	7-7	4-8	7-7	4-8	4-4	3-7	8-1	5-7	8-1	5-7	8-1	5-7	8-1	5-7	8-1	5-7	8-1	5-7	4-0	4-2	6-9	6-9	5-10	5-10
Reinf — "e" Size Bar *	4	4	4	4	4	4	4	4	4	5	5	5	4	4	4	4	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4
Quantities — Concrete CF/LF	21.6	26.8	23.0	29.5	24.3	31.0	25.6	34.1	27.8	37.7	32.1	42.3	26.8	37.7	29.3	40.1	30.3	41.9	32.2	45.4	34.5	49.8	40.7	54.2	45.4	59.9	36.2	51.0	37.8	53.1	39.5	54.9
Quantities — Reinforcement LB/LF	191	267	233	285	260	325	300	339	314	327	360	373	295	362	353	409	365	420	402	413	415	424	440	471	468	534	374	471	449	522	446	587

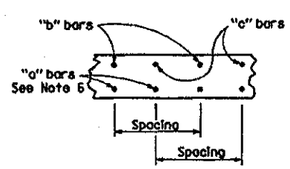
SPAN (Ft)	14															
HEIGHT (Ft)	10		11		12		13		14							
Maximum Earth Cover (Ft)	10	20	10	20	10	20	10	20	10	20						
Conc — Roof T_1 (inch)	9½	14	9½	14	9½	14	10	14	10½	14						
Conc — Walls T_2 (inch)	10	14	10	14	10	14	10½	14	11	14						
Conc — Invert T_3 (inch)	10	14½	10	14½	10½	14½	10½	15	11	15						
Reinf — Spacing (inch)	10	9	10	9	10	8	10	8	10	8						
Reinf — "a" Size Bar *	7	7	7	7	7	7	7	7	7	7						
Reinf — "a" Size Bar **	7	7	7	7	7	7	6	7	6	8						
Reinf — "b" Dimension "B" (Ft-Inch)	4-9	6-0	5-0	6-0	4-6	6-0	4-9	6-0	4-9	6-0						
Reinf — "b" Dimension "B" (Ft-Inch)	6-0	6-0	6-0	6-0	4-6	6-0	5-0	6-0	4-6	6-0						
Reinf — "c" Size Bar *	7	7	7	7	7	7	7	7	7	7						
Reinf — "c" Dimension "C" (Ft-Inch)	4-0	4-2	6-9	6-9	5-10	5-10	6-0	6-4	8-11	6-4	8-11	6-4	8-11	6-4	8-11	6-4
Reinf — "e" Size Bar *	4	4	4	4	4	4	4	5	6	6	6	6	6	6	6	6
Quantities — Concrete CF/LF	41.9	58.7	45.9	64.1	49.9	69.5	55.6	75.8	61.6	81.3						
Quantities — Reinforcement LB/LF	449	580	492	596	537	605	564	634	604	759						

* See Note 5
** See Note 6

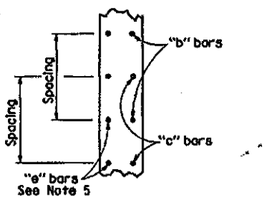


TYPICAL SECTION - SPANS 4' THRU 8'

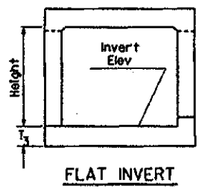
TYPICAL SECTION - SPANS 10' THRU 14'



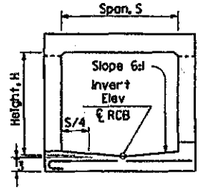
ROOF SECTION SPANS 10' THRU 14'
INVERT SIMILAR



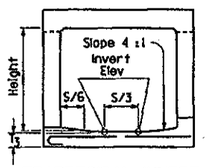
WALL SECTION SPANS 10' THRU 14'



FLAT INVERT

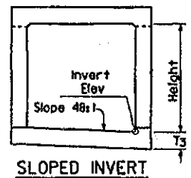


V INVERT



TRAPEZOIDAL INVERT

ALTERNATIVE INVERTS



SLOPED INVERT

"d" bars, for earth covers up to and including 10'

Span	4'	5'	6'	7'	8'	10'	12'	14'
Number	5	6	7	8	9	10	12	16

NOTES

1. For boxes with span or height less than any of those shown in table, use next greater size box concrete dimensions and reinforcement. Make necessary changes in bar lengths and quantities.
2. Quantities are approximate and for design purposes only.
3. For boxes with span or height or cover greater than those shown in tables, a special design is required.
4. It is permissable to eliminate the 180° hooks on every other bar.
5. "e" bars are at half spacing (spans 10'-14' only).
6. "a" bars are at half spacing (spans 10'-14' only).
7. Provide paving notch when top is exposed and when pavement is portland cement concrete, and adjust quantities.
8. For design and details not shown, see Standard Plan D82.
9. For exposed top, provide *4 @ 18 each way (2' lap "c" bars or full span) and adjust.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CAST-IN-PLACE REINFORCED CONCRETE SINGLE BOX CULVERT

NO SCALE

D80

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

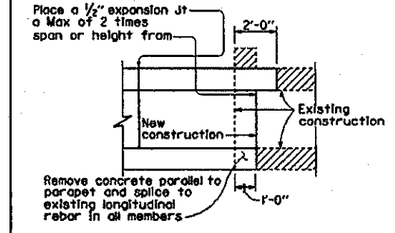
REGISTERED CIVIL ENGINEER — T. Pollock

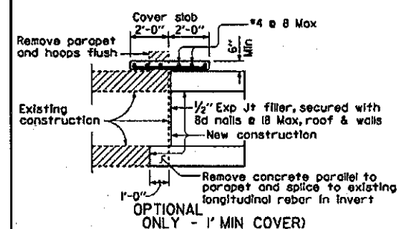
July 1, 1992
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — T. Pollock — No. 13332 — Exp. 3-31-93 — CIVIL — STATE OF CALIFORNIA

GENERAL NOTES

Designations:
Standard: single or multiple box culverts are shown on plans as span times height with maximum cover over roof thus: 8x5 RCB with 10' or DBL 10x5 RCB with 20', followed by: alternatives.
Alternatives:
Single cell: Invert will be sloped unless "trapezoidal invert", "flat invert" or "V invert" is included in designation
Multiple cell: Invert will be vee unless "flat invert" is specified. Ends of culvert will be rounded unless "square ends" are designated. Parapets will be as shown unless designated in plans. Such designations may be different for inlet and outlet ends.
Quantities:
Quantities are for the sloped or vee invert and do not include "d" bars, nor splices in longitudinal bars, nor temperature reinforcement for exposed roof, nor concrete or reinforcement for parapets, cutoff walls or paving notches.
Reinforcement placement:
Main reinforcement is to be placed transverse or, for curved culverts, radial. When radial, reinforcing spacing at the "a", "f" and "g" bars is measured along the centerline. Stagger splices not shown. Hooks Hooks may be rotated or filled, as necessary, for clearance.
Special reinforcement coverage:
Box standard plans are not to be used for culverts in a corrosive environment or where there is a severe abrasive flow condition or in freeze-thaw locations.
Special design:
Required for culverts with conditions, loads, design bearing pressures or sizes greater than those given on this plan or Standard Plans D80 & D81. Also required for multiple cell culverts with unequal spans. For culverts with railroad loading, see the current AREA design specification.
3 or more cells:
For culverts with more than two cells, use dimensions and reinforcement for the standard "double box culvert" and adjust quantities accordingly.





STD. PLAN D80

(41) CALTRANS STANDARD SPECIFICATION D80 FOR CAST-IN-PLACE BOX

(41) CALTRANS STANDARD SPECIFICATION D82 FOR CULVERT EXTENSION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK: BM# T-600-28-68 AT CATHOLIC CHURCH IN SUN CITY 0.4 MILES NORTH OF INT. OF MURRIETA RD AND CHERRY HILLS RD, 204 FT. NORTH OF INT. OF MURRIETA ROAD AND LANCASTER DR, 57 FT. N/E OF THE N/E COR. OF THE RECTORY, 45 FT. WEST OF MURRIETA RD, 7 FT. S/E OF THE EASTERLY COR. OF 6 FT. BLOCK WALL, 2 FT. S/W OF A POWER POLE #16237332-E, SET A BRASS DISK IN THE TOP OF A CONCRETE POST LEVEL WITH THE SIDEWALK.
ELEVATION: 1429.249

REF.	REVISIONS	ENGINEER APPR.	ENGINEER DATE	RCFC/WCD APPR.	RCFC/WCD DATE

DESIGNED BY: V.E.
DRAWN BY: V.E.
DATE DRAWN: MAY 2005
CHECKED BY: M.T.

PREPARED BY: RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
27555 Ynez Road, Suite 400
TEMECULA, CALIFORNIA 92591-4678
951.676.5042 • FAX 951.767.7240 • www.RBF.com

Victor Elia 6-7-05
VICTOR A. ELIA R.E. NO. 64803 EXP: 6-30-07

REGISTERED PROFESSIONAL ENGINEER — VICTOR A. ELIA — No. 64803 — Exp. 6-30-07 — CIVIL — STATE OF CALIFORNIA

TRACT 30507 – IP 040040
SUN CITY - THORNTON AVENUE STORM DRAIN

PROJECT NO. 4-0-00307
DRAWING NO. 4-842
SHEET NO. 18 OF 18

H:\PDATA\1510084\CADD\LAND\DLW\849SD016.DWG VELIA 6/7/05 8:50 am

LEGEND

DRAINAGE BASIN BOUNDARY

SUB-AREA NAME

DRAINAGE BASIN AREA (AC.)

Q100 (CFS)

NODE-ID

ELEV. (FT)

200 0 200 400 600

GRAPHIC SCALE

RBF CONSULTING

PLANNING ■ DESIGN ■ CONSTRUCTION

27555 YNEZ ROAD, SUITE 400
TEMECULA, CALIFORNIA 92591-4679
909.676.8042 ▪ FAX 909.676.7240 ▪ www.RBF.com

FIGURE 2
HYDROLOGY MAP
ULTIMATE CONDITIONS

BASIS OF DESIGN FOR RCB
SUN MEADOWS BOX: PROJ. NO. 4-0-00303
SUN CITY, CA