

IDI Logistics– Indian & Ramona Distribution Center
DPR 18-00002
City of Perris, Riverside County, California

Preliminary Drainage Study

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PERRIS VALLEY MDP LINE E-3 PLANS

SECTION 1 - SUMMARY

PURPOSE

The purpose of this report is to document the hydrologic and hydraulic analyses performed in support of the IDI Gazeley – Indian and Ramona Distribution Center project located in the City of Perris, County of Riverside, California. The project site is located at the northwestern corner of Indian Avenue and Ramona Expressway. The project is bounded by Perry Street to the north, Indian Avenue to the east, Ramona Expressway to the south, and the Perris Valley Logistics Center (DPR NO. 07-07-0029) to the west. The project proposes to build a distribution warehouse on approximately 24 acres. This report will summarize the hydrologic and hydraulic analyses that were conducted in order to determine the necessary drainage improvements required to provide flood protection for the proposed building and safely convey storm runoff through the site.

The scope of this report will include the following:

- Determine the peak 100-year and 10-year flow rates for the developed condition using the Riverside County Flood Control and Water Conservation District (RCFC&WCD) Rational Method.
- Determine the peak 100-year flood volumes for the developed condition using the Riverside County Flood Control and Water Conservation District (RCFC&WCD) Unit Hydrograph Method.
- Determine the required storm drain facilities, alignment, and sizes required to flood protect the project site.
- Determine the necessary basin area and volume required for water quality treatment and to mitigate for increases in runoff.
- Preparation of a preliminary report summarizing the hydrology and hydraulic results.

DESCRIPTION OF WATERSHED

As previously described, the project is proposing a warehouse facility (approximately 428,730 square feet) on approximately 24 acres of vacant land. Existing elevations across the site vary from 1465 at the northwest corner to 1457 at the southeast corner (NAVD88 datum). The site currently slopes toward the east side of the project site at approximately 0.6% grade. The existing drainage pattern for the site and the general area is characterized by sheet flow that follows the slope towards Indian Avenue and Ramona Expressway. The existing flows are then conveyed by a graded earthen flowline that drains towards an existing reinforce concrete box (RCB) located at the Indian Avenue and Ramona Expressway intersection. The RCB is 7-foot high by 14-foot wide located at the southeast end of the project site. The project is located within the Perris Valley Commerce Center (PVCC) specific plan and is also within the Perris Valley Master Drainage Plan (PVMDP) watershed area. The existing Line E-3 storm drain channel is part of the PVCC MDP.

This project proposes to connect the two reaches of Line E that exist on either side of the project site. The project plans to connect the existing concrete trapezoidal channel located west of the site to the existing 7-foot high by 14-foot wide RCB located east of the site, using two 5-foot high by 10-foot wide RCB. Currently, the existing RCB does not have an adequate outlet point. The box spans across Indian Avenue but is capped on both ends with small openings matching current grades allowing limited conveyance. The flow slowly draws down through weep holes along the bottom of the bulkhead but also includes a larger opening along the top for higher flows to escape into an earthen swale that continues east within the northerly parkway of Ramona Expressway. Flow will ultimately reach and discharge into the Perris Valley Storm Drain (PVSD) which drains into the San Jacinto River before finally reaching Canyon Lake and Lake Elsinore. Due to the lack of downstream conveyance of the proposed project, mitigation for

increased runoff will be required for this project. The City of Perris typically requires mitigation of the differential volume between the existing and developed condition associated with the 100-year storm event. Water quality treatment will also need to be provided onsite to be compliant with NPDES MS4 Permit and local regulations.

PROPOSED CONDITIONS

The project site is impacted by minor off-site flows that will be collected and conveyed using a combination of drop inlets and a storm drain system. There are two areas that will directly impact the project site. The flow will be collected and discharged into Line E-3. Refer to Rational Method Hydrology Map in Appendix A for area break down.

On-site flows generated by the proposed project will surface flow through the site utilizing ribbon gutters, curb and gutters, drop inlets and a storm drain system. The storm drain system will be used to convey flows into the proposed bio-retention basin; Basin A. Basin A is located along the north side of the site and will drain into a proposed pump station that will control the total outflow from the site. The project proposes to discharge into the existing Lateral E-3.2, which then discharges into the Line E-3 storm drain. The pump station will discharge a maximum outflow of 5 cfs to mitigate the increase in runoff.

Basin A will accept the complete runoff from the project site. The bio-retention basin will utilize a 4-foot media filter (3' of amended soil media over a 1' layer of gravel) to detain and treat the first flush runoff for water quality treatment. An outlet structure will ensure the water quality volume is retained by only allowing higher flows to bypass once a half-foot of ponding is achieved in the basin. Once the volume exceeds the required half-foot of ponding, flows will begin to spill into the outlet structure. In addition, the basin underdrain system will discharge treated flows to the outlet structure. The high flows and treated flows from the proposed basin underdrain systems will be conveyed by the outlet structure into the pump station.

As previously mentioned, the lack of downstream facilities will require mitigation of increased flow. In order to mitigate the increase in runoff and not adversely affect the downstream facilities and properties, the pump station is proposed to discharge a constant rate of 5 cfs. An emergency spillway will be provided in the basin in case of a failure or improper operation of the pump station. The emergency spillway will allow flow to discharge into the surrounding street, Perry Street, where flow will enter the proposed catch basins and continue to drain south towards Ramona Expressway as has been the case historically.

METHODOLOGY

HYDROLOGY

Hydrologic calculations were performed in accordance with the RCFC&WCD Hydrology Manual, dated April 1978. The Rational Method was utilized in determining peak flow rates.

The hydrological parameters, including rainfall values and soil types were derived from the RCFC&WCD Hydrology Manual. The isohyetal maps and soil map have been included in Section 2.

Rational Method calculations were performed using a computer program developed by CivilDesign Corporation and Joseph E. Bonadiman and Associates Inc. The computer program is commonly referred to as CivilD which incorporates the hydrological parameters outlined in the RCFC&WCD Hydrology Manual.

The Rational Method was used to determine the peak flow rates to size and design the drainage facilities need to convey onsite flows through the site to the proposed basin. The flow rates were computed by generating a hydrologic "link-node" model in which the overall area is divided into separate drainage sub-areas, each tributary to a concentration point (node) determined by the proposed layout and grading.

The Unit Hydrograph Method was used to determine the peak flow rates and volumes associated with the 100-year storm events for the site. Calculations were performed for both the existing condition and developed condition to be used in the analysis of the proposed basin. See Section 2 for additional information and results regarding the hydrologic analyses performed for this project.

HYDRAULICS

Water quality basin calculations were performed using spreadsheets that were created by RCFC&WCD. Preliminary calculations and additional details can be found in the Preliminary-WQMP.

Basin routing calculations were performed using the CivilD computer program. The CivilD program utilizes the Modified-Puls methodology to routes unit hydrographs through a basin using the stage-storage and stage-discharge curves determined from the proposed basin design. See Section 3 for additional discussion and results.

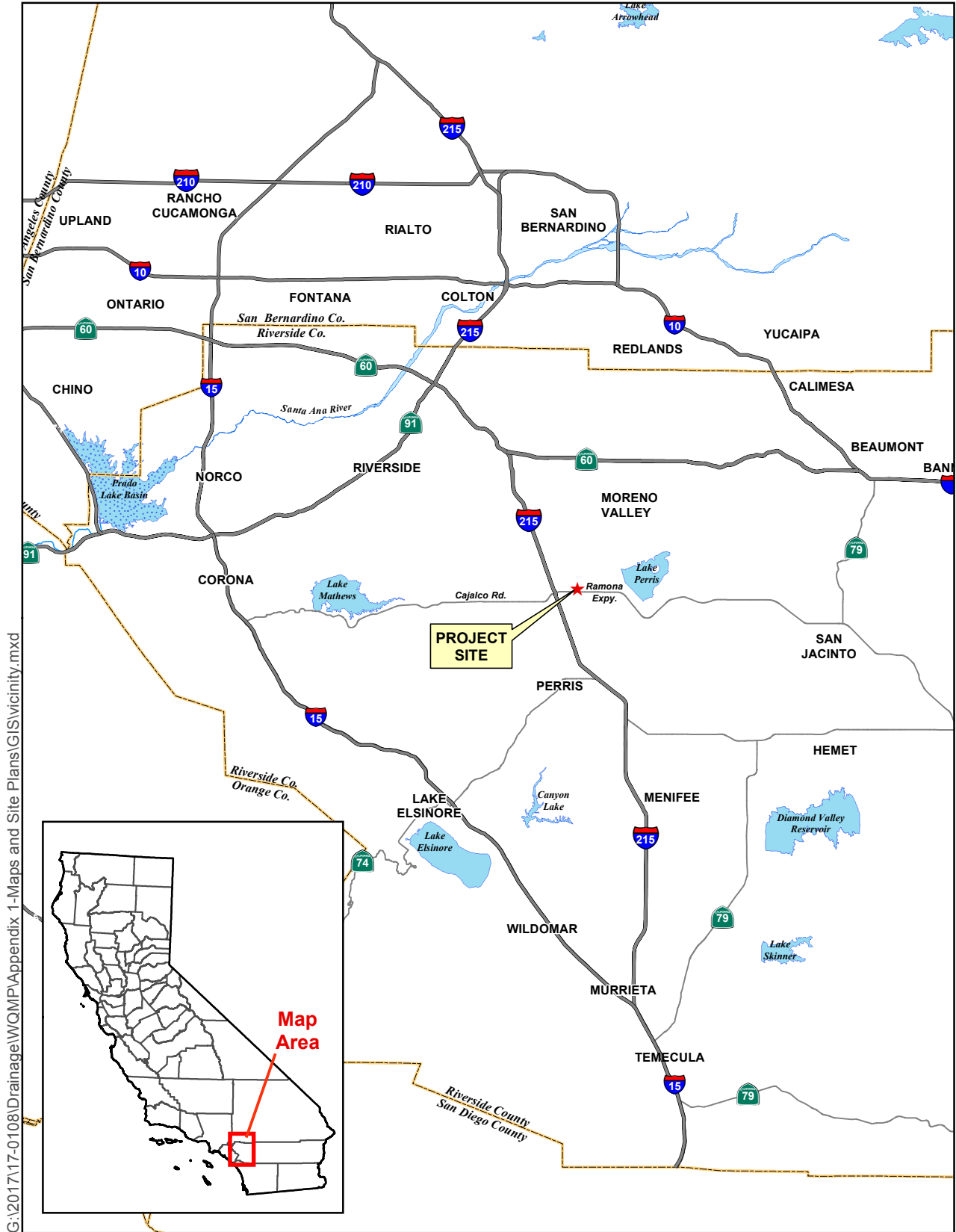
FIG. 1 VICINITY MAP

FIG. 2 USGS TOPOGRAPHY MAP

FIG. 3 AERIAL PHOTOGRAPH

FIG. 4 RECEIVING WATERBODIES

FIG. 5 SOILS MAP



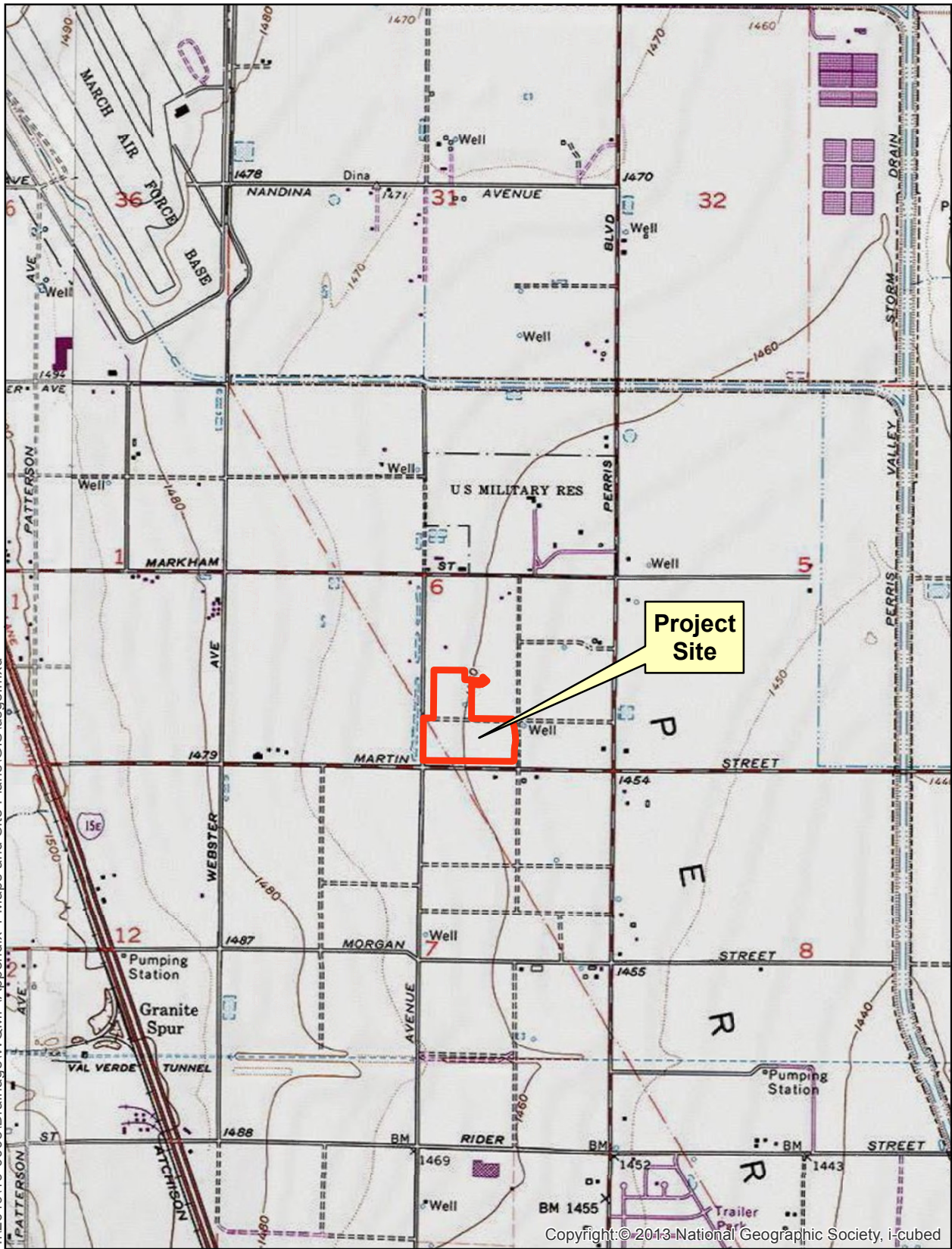
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Figure 1. Vicinity Map

0 2.5 5
Miles



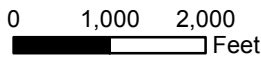
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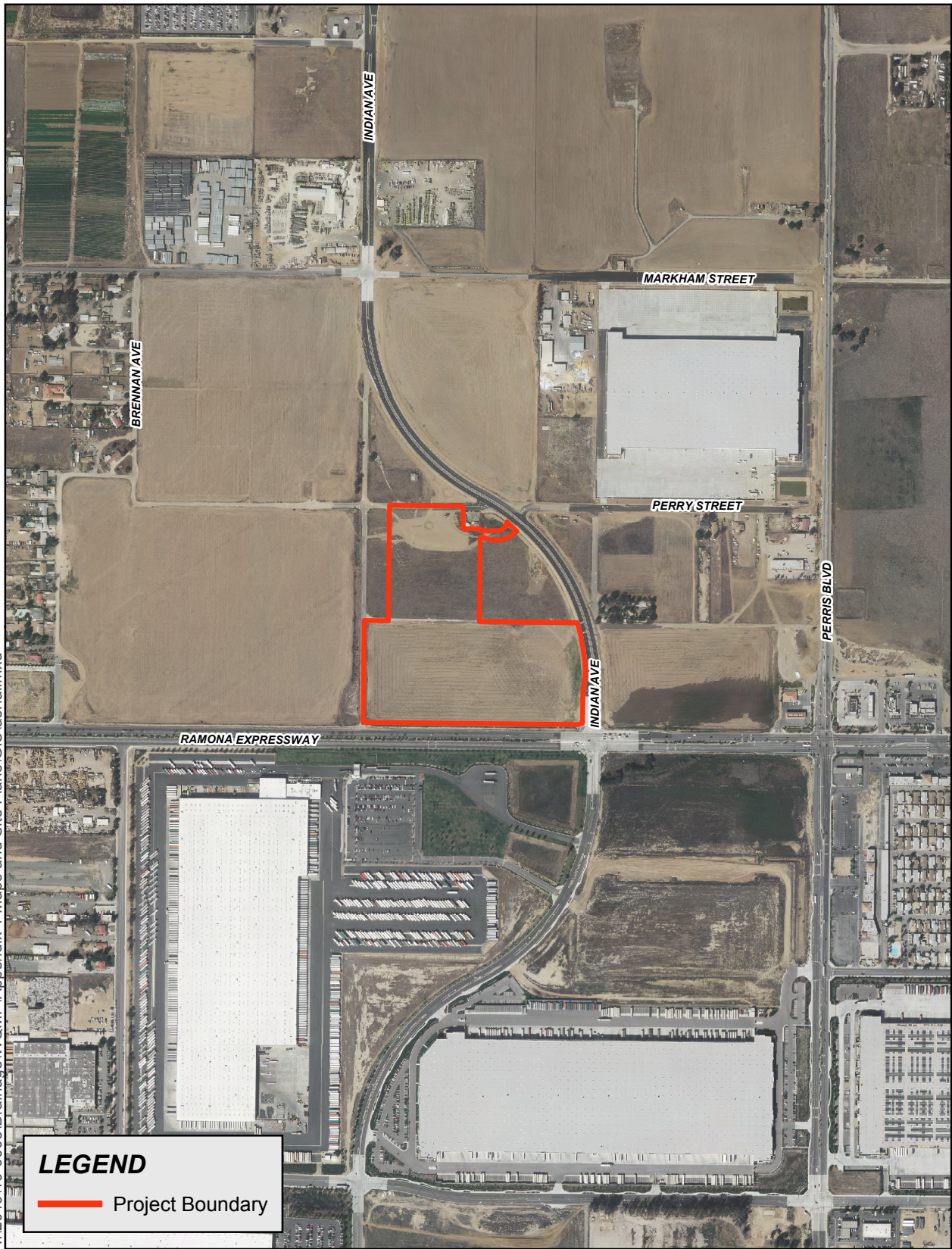
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Sources: ESRI / USGS 7.5min Quad
DRGs: PERRIS

Figure 2. USGS Topography Map



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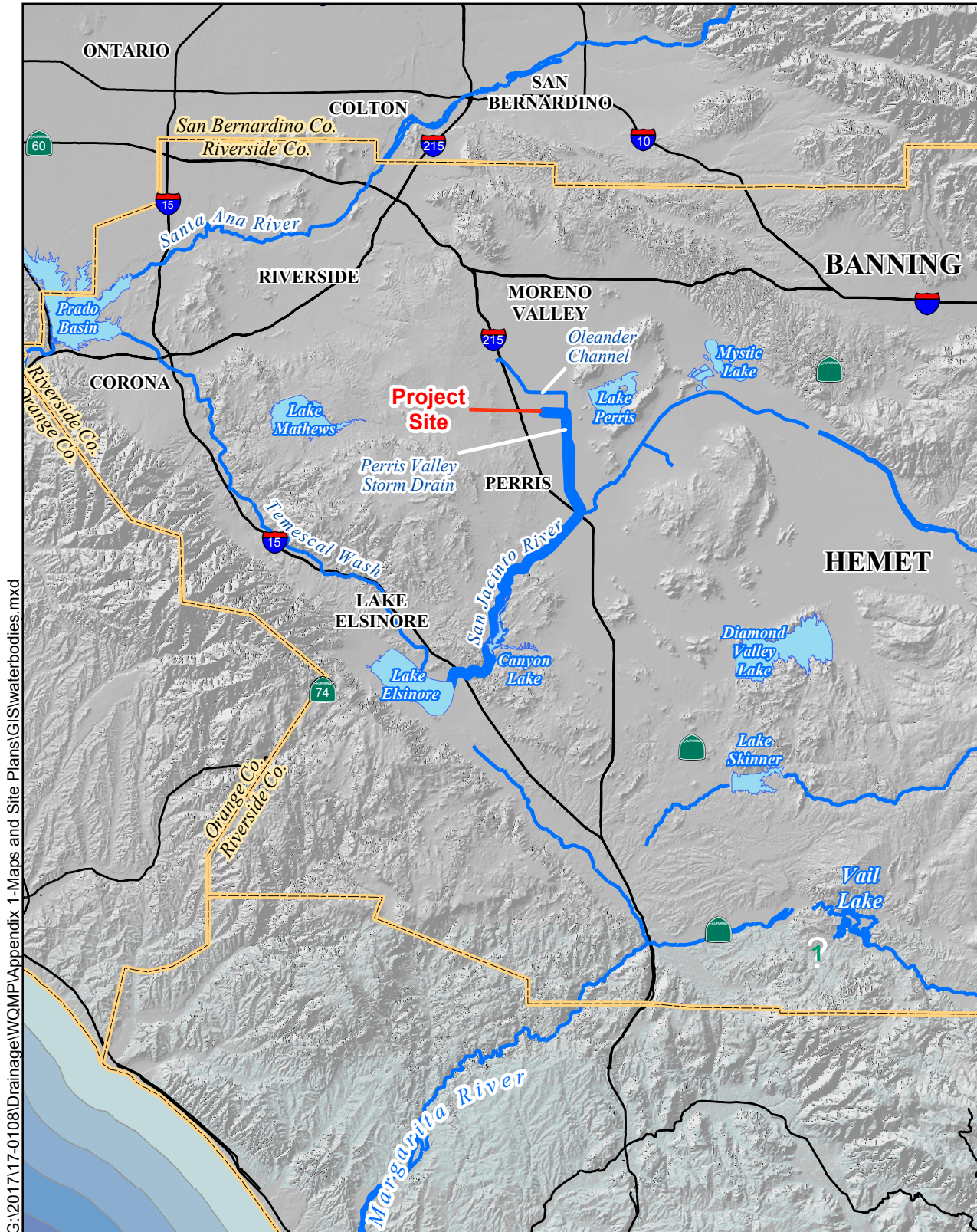


Sources: County of Riverside GIS, 2013; Eagle Aerial, April 2012.

Figure 3. Aerial Photograph

0 400 800
Feet





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Sources: USGS 30 Meter DEM;
USGS Digital Line Graph

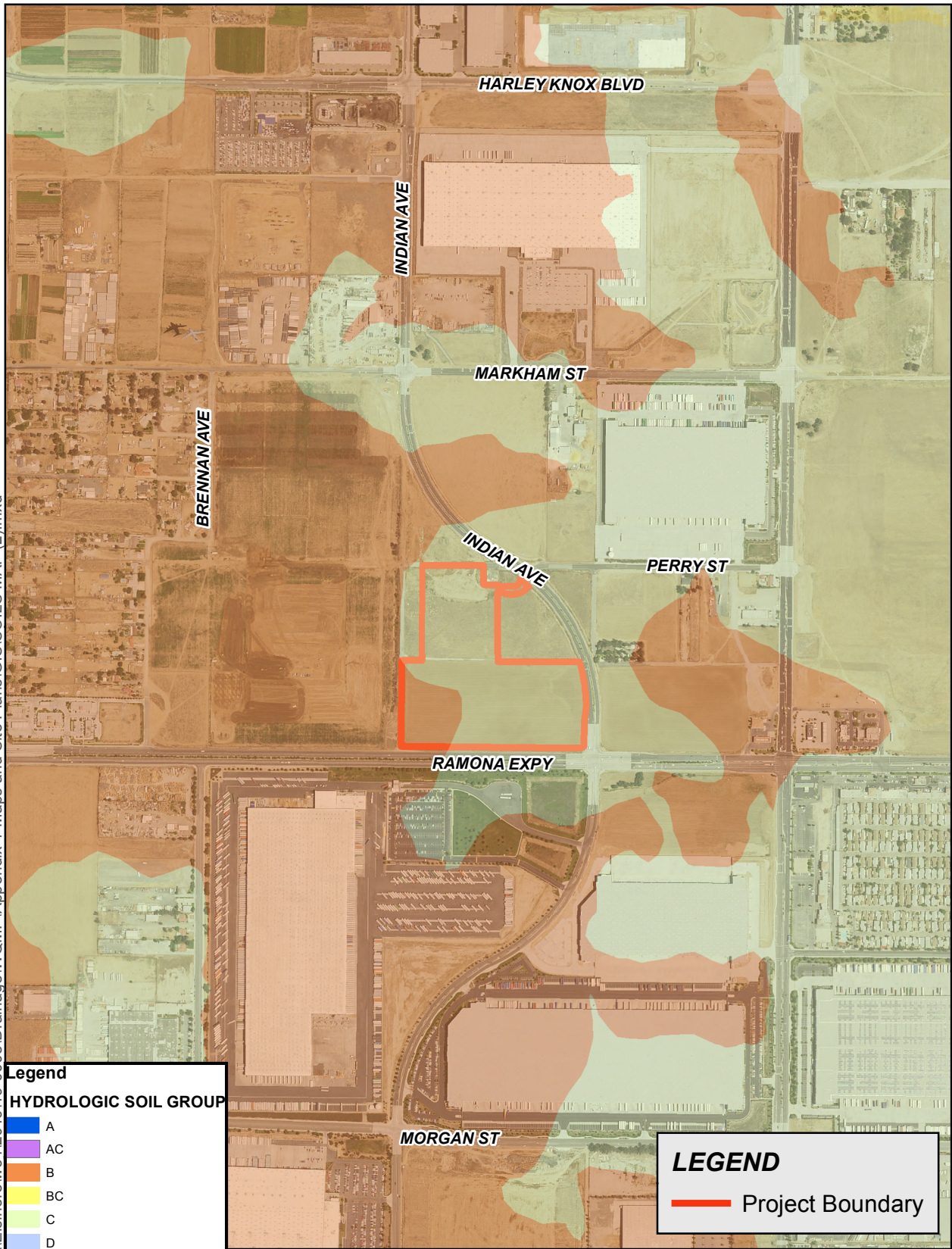
Figure 4. Receiving Waterbodies

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Miles

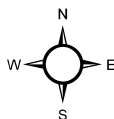


Flowpath

\\Eisnore\wo4\2019\19-0008\Drainage\WCMP\Appendix 1-Maps and Site Plans\GIS\SOILS MAP (2).mxd



Eagle Aerial, April 2010;
Riverside County GIS, 2012
RCFC&WCD Hydology Manual Plate C-1.30



0 500 1,000
Feet

Figure 5. Soils Map

SECTION 2 - HYDROLOGY ANALYSIS

HYDROLOGY PARAMETERS

The RCFC&WCD Hydrology Manual was used to determine several of the hydrological parameters. The following rainfall depths were utilized in the hydrology analyses, which were obtained from the isohyetal maps provided in the RCFC&WCD Hydrology Manual:

Table 1 – Precipitation Values

	Duration
Storm Event	1-Hour (inches)
2-Year	0.50
100-Year	1.25

The value for slope of intensity was determined to be 0.50. The isohyetal maps have been included in Appendix A. Based on the Plate C-1.30 (Perris) in the RCFC&WCD Hydrology Manual, the project site is classified as soil type B & C. The soils map is included in Appendix A.

The cover type was determined based on the existing land cover and proposed land use of the site. Hydrological computations for the existing condition were done using ‘Undeveloped – Poor Cover’. The residential\commercial landscaping cover type was used to represent the developed condition. The table below summarizes the runoff index values and the recommended values for percentage of impervious cover for each category:

Table 2 – Cover Type

Cover Type	Soil Group A	Soil Group B	Soil Group C	Soil Group D	Percentage of Impervious Cover
Undeveloped Poor Cover	67	78	86	89	0%
Commercial Landscaping	32	56	69	75	90%

ON-SITE RATIONAL METHOD HYDROLOGY

The rational method was used to determine peak flow rates in order to adequately size the proposed subsurface storm drains and associated inlets used to convey on-site flows to the proposed basin. The project site behaved as one watershed and was broken down further into six smaller subareas.

The project conveys the runoff through the use of ribbon gutter and curb and gutter. The runoff is then carried into inlets which drain into Basin A, a bio-retention basin.

As previously described, the basins will utilize an outlet structure to dewater the basin and discharge flows into a wet well where outflow will be pumped out at a constant flow rate of 5 cfs into the Line E-3 storm drain within Indian Avenue.

The following table summarizes the rational method results at key points:

Table 3 – Rational Method Results

Point of Interest	10-Year Peak Flow Rate (cfs)	100-Year Peak Flow Rate (cfs)
Node 102 – Flow tributary to proposed inlet and Line A	5.6	8.0
Node 103 – Total Flow tributary to Line A	12.0	17.4
Node 202 – Total Flow tributary to Line A	4.7	6.8
Node 203 – Total Flow tributary to Line A	10.6	15.4
Node 104 – Total Flow tributary to Line A	22.1	32.3
Node 105 – Total Flow tributary to Line A	30.0	43.7
Node 106- Total Flow tributary to Basin A	31.1	45.4

The rational method output files and hydrology map have been included in Appendix A.

ON-SITE UNIT HYDROGRAPH METHOD HYDROLOGY

The unit hydrograph method was used to determine the peak flow rates and volumes in order to adequately size the proposed basins to address increased runoff mitigation. A unit hydrograph was performed for the entire project site (24.2 acres) connected to a single discharge point, the pump station. Unit hydrographs were performed for both the existing condition and developed condition. The existing condition is used to establish a baseline for comparative purposes. The developed condition is used for design purposes, it was utilized in the basin routing analysis in order to size and analyze the proposed basin. The following table summarizes the results of the unit hydrograph analysis:

Table 4 – Unit Hydrograph Results

Storm Event	Existing Condition		Proposed Condition	
	Volume (Ac-ft)	Peak Flow (cfs)	Volume (Ac-ft)	Peak Flow (cfs)
100-Year, 1-Hour	2.136	57.6	2.369	65.1
100-Year, 3-Hour	2.691	33.5	3.410	38.0
100-Year, 6-Hour	2.822	28.1	4.381	33.3
100-Year, 24-Hour	3.720	10.7	7.609	13.4

The unit hydrograph output files and hydrology map have been included in Appendix A.

OFF-SITE RATIONAL METHOD HYDROLOGY

The rational method was used to determine peak flow rates in order to adequately size the offsite lateral that discharges into Lateral E-3.2, as well as an additional lateral that will discharge into Line E-3.

The proposed realignment of Perry Street caused the existing drainage pattern to be disturbed of subarea, OFFSITE-1. Currently, there is a flow line that originates from the south side of an existing driveway (north of Perry Street) and flows south towards an existing 18 inch drop inlet. The proposed realignment of Perry Street disrupts the current drainage pattern because it interferes with the existing flowline entering the drop inlet. The existing Lateral E-3.2 will be relocated to the north side of the new Perry Street alignment. The project assumes the land use will be commercial. OFFSITE-1 produced a peak flowrate of 9.6 cfs.

The realignment of Perry Street also establishes a need for a low point, a catch basin. The project proposes to extend the existing Lateral E-3.2 to the proposed low point on Perry Street. OFFSITE-2 will produce a peak flow rate of 1.2 cfs.

The project is proposing a driveway entrance on Indian Street. This produced an interference with the current drainage pattern for OFFSITE-3. Presently, there is a flow line that originates near the exiting pump house facility and flows southerly towards the low point at the intersection of Indian Street and Ramona Expressway. The project is proposing a lateral that will collect the runoff from OFFSITE-3 and discharge into Line E-3.

The project proposes to only discharge 5 cfs, the existing Lateral E-3.2 must be able to convey a total of 15.5 cfs. Further analysis on all the offsite laterals will be completed during final engineering.

Table 5 – Offsite Rational Method Results

Point of Interest	10-Year Peak Flow Rate (cfs)	100-Year Peak Flow Rate (cfs)
Node 302 – Flow tributary to proposed inlet and Lateral E-3.2	6.7	9.6
Node 305 – Total Flow tributary to proposed catch basin and Lateral E-3.2	0.8	1.2
Node 303 – Total Flow tributary to Lateral E-3.2	10.5	7.3
Node 303-Total Flow with project site discharge	15.5	12.3
Node 402– Total Flow tributary to Proposed Lateral..	6.3	9.1

The offsite rational method output files and hydrology map have been included in Appendix A.

SECTION 3 - HYDRAULIC ANALYSIS

ON-SITE STORM DRAIN FACILITIES

The project proposes a subsurface storm drain system and will utilize curb and gutter, curb cuts, and catch basins to convey onsite flows to the proposed bioretention basin. Basin A will receive the runoff generated by the total site of 24.2 acres for water quality treatment and mitigation for increased runoff. Basin A will utilize a 4' biofilter. The filter is comprised of three-feet of engineered soil media over a foot of gravel. An underdrain system is proposed within the gravel layer to convey treated flows that have filtered through the biofilter and will discharge the flow into a grate inlet where a 24" HDPE pipe will convey basin outflow into a proposed pump station.

A brief summary of each system has been provided and the results of the hydraulic analysis are included at the end of the section. The peak flow rates determined during the 100-year rational method on-site hydrology analysis were utilized to evaluate the proposed storm drain system.

LINE-A

A private storm drain, Line-A, extends from the south side Basin A to the parking area east of the building. Line-A conveys flows toward the bioretention basin, Basin A. Line-A will vary in sizes. Line-A starts at Node 102 at 24 inches, then expand from Node 103 to 203 to 30 inches, then expand from Node 203 to 104 to 36 inches, and then from Node 104 to 105 to 42 inches.

Line-A was preliminary sized using normal depth calculations. Line-A will be further analyzed using the WSPGE software during final engineering and be more accurately sized.

INLET CAPACITIES

The project proposes a total of 4 low points at Node 102, 103, 203, and 104 where grate inlets will be placed. The capacity of each grate will be analyzed using the 100-year peak flow rates from the rational method results. Further analysis shall be provided during final engineering.

OUTLET STRUCTURE

A grated inlet is proposed in Basin-A as an outlet structure to facilitate onsite flow within the basin. The top of grate will be set at half a foot to ensure the required water quality volume is forced through the soil media filter for water quality treatment. Once the water quality volume is exceeded stormwater will begin to spill into the grate inlet. Outflow from the basin will be discharged into a proposed pump station that will restrict outflow from the site to mitigate the increases in runoff associated with the project. The 100-year peak flow will pond at 1452.75 causing a 0.75 foot of head.

In case of pump failure, the basin will implement an emergency spillway that will allow flow to spill into the adjacent street, Perry Street, where flow will enter the proposed catch basin and drain south towards Ramona Expressway as has been the case historically. Further details shall be provided during final engineering.

BASIN ROUTING ANALYSIS

A routing analysis was completed to demonstrate that the basin contains substantial volume needed to mitigate and regulate outflow to a maximum of 5 cfs for the all events up to the 100-year storm event.

Basin routing calculations were conducted for the project site. A stage-storage-discharge table was determined for the project site. In addition, it was assumed that there would positive outflow provided by the bioretention media filter. The following table presents the result of routing analysis for the 1-, 3-, 6-, and 24-hour 100-year storm events to demonstrate that the basins provide the necessary storage volume needed to restrict the outflow to maximum flow rate of 5 cfs. The maximum water surface elevation will be at 1455.4' during the 100-year 3-hour.

Table 6 – Basin Routing Results

Storm Event	Existing Condition		Proposed Condition		Basin Routing Results		
	Volume (AC-ft)	Peak Flow (cfs)	Volume (AC-ft)	Peak Flow (cfs)	Peak Flow (cfs)	Maximum Basin Depth (feet)	Water Surface Elevation
100-Year, 1-Hour	2.136	57.6	2.369	65.1	5.0	3.27	1454.77
100-Year, 3-Hour	2.691	33.5	3.410	38.0	5.0	3.90	1455.40
100-Year, 6-Hour	2.822	28.1	4.381	33.3	5.0	3.87	1455.37
100-Year, 24-Hour	3.720	10.7	7.609	13.4	5.0	3.87	1455.37

The basin routing calculations and other hydraulic calculations have been provided in Appendix B.

OFF-SITE STORM DRAIN FACILITIES

As part of this project, Perry Street will be realigned and improved, which includes adding curb and gutter along the project frontage. There is a proposed low point, which will require the extension of the existing 36-inch storm drain, Lateral E-3.2 (per City of Perris File No. P8-1164), within Perry Street. A 24-inch storm drain will be extended from Lateral E-3.2 to collect the local street flow. A peak flow rate of 1.2 cfs is expected per the rational method analysis (See Section 2 and Appendix A for more detail). A four-foot catch basin is proposed to collect the flow. The project will outlet into Lateral E-3.2, which produces a 100-year peak flow rate of 15.5 cfs. Detailed calculations will be provided during final engineering.

The project also proposes to collect the runoff from OFFSITE-3 and convey it into a proposed storm drain lateral. The lateral will carry 9.1 cfs during the 100-year storm event. The lateral hydraulics and alignment will be finalized during final engineering. Refer to the hydrology maps at the end of Appendix A.

On the south side of the project, the project also proposes to connect Line E, an existing open trapezoidal channel to the existing RCB at the intersection of Indian Avenue and Ramona Expressway. The project proposes two 5'H x 10'W reinforced RCBs that will connect the existing open channel to the existing 7'H x 14'W RCB. The project does not propose to discharge any of the on-site flows into the proposed Line-E RCBs. Further details and calculations will be provided during final engineering.

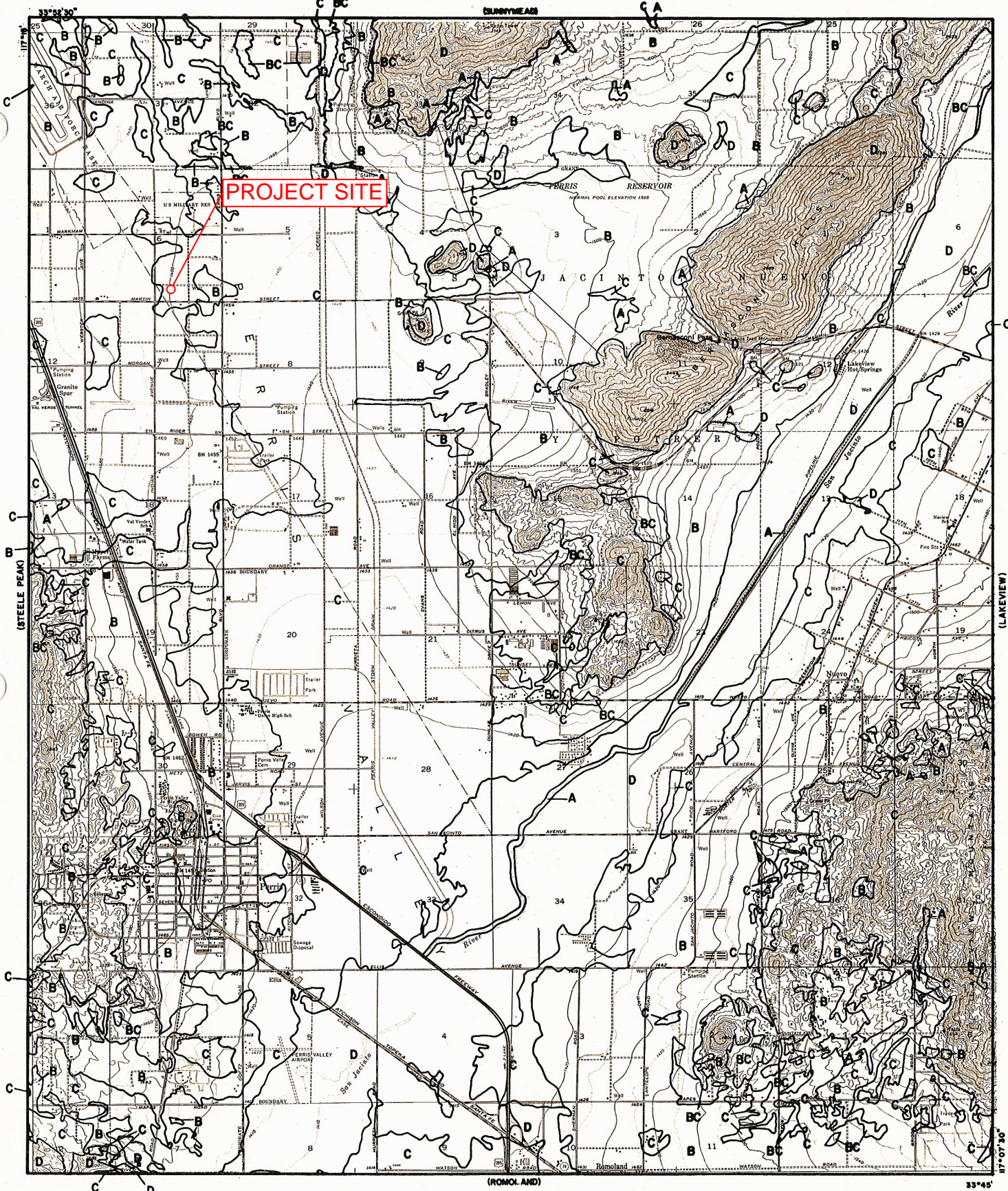
SECTION 4 - CONCLUSION

Based on the analyses and results of this report, the following conclusions were derived from the hydrology and hydraulic results:

- The proposed drainage improvements will adequately convey flows to the basin and provide flood protection for the 100-year storm event.
- The proposed basins will provide adequate water quality treatment.
- The proposed project will not impact flooding condition to upstream or downstream properties.

APPENDIX A – HYDROLOGY

HYDROLOGIC SOILS GROUP MAP (PLATE C-1.30)

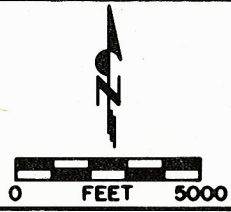


PROJECT SITE

LEGEND

- SOILS GROUP BOUNDARY
- A SOILS GROUP DESIGNATION

RCFC & WCD
HYDROLOGY MANUAL



**HYDROLOGIC SOILS GROUP MAP
FOR
PERRIS**

ISOHYETAL MAPS

RAINFALL INTENSITY - INCHES PER HOUR

MIRA LOMA			MURRIETA - TEMECULA & RANCHO CALIFORNIA			NORCO			PALM SPRINGS			PERRIS VALLEY		
DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 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

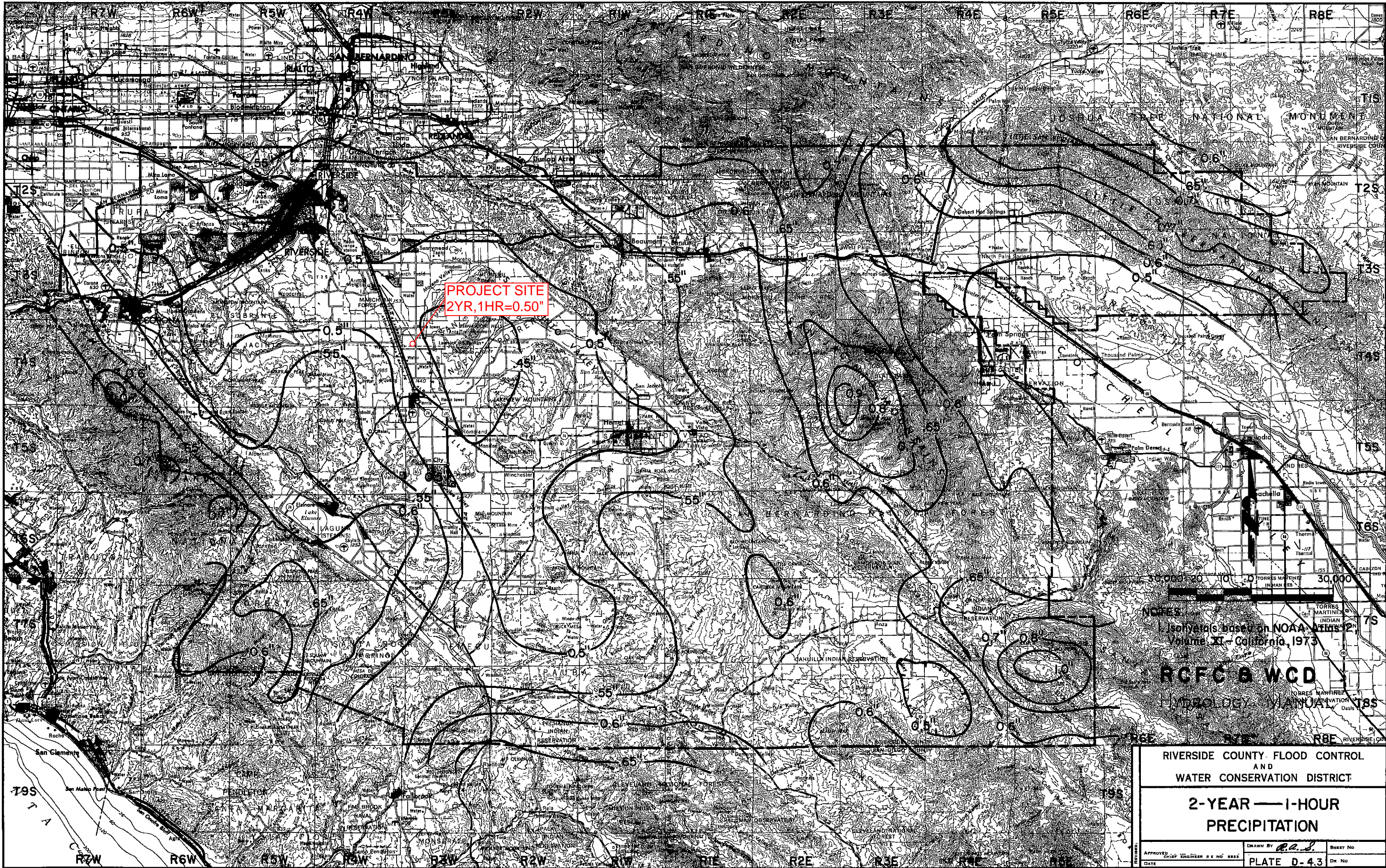
SLOPE = .530

SLOPE = .550

SLOPE = .500

SLOPE = .580

SLOPE = .490



PROJECT SITE
2YR, 1HR = 0.50"



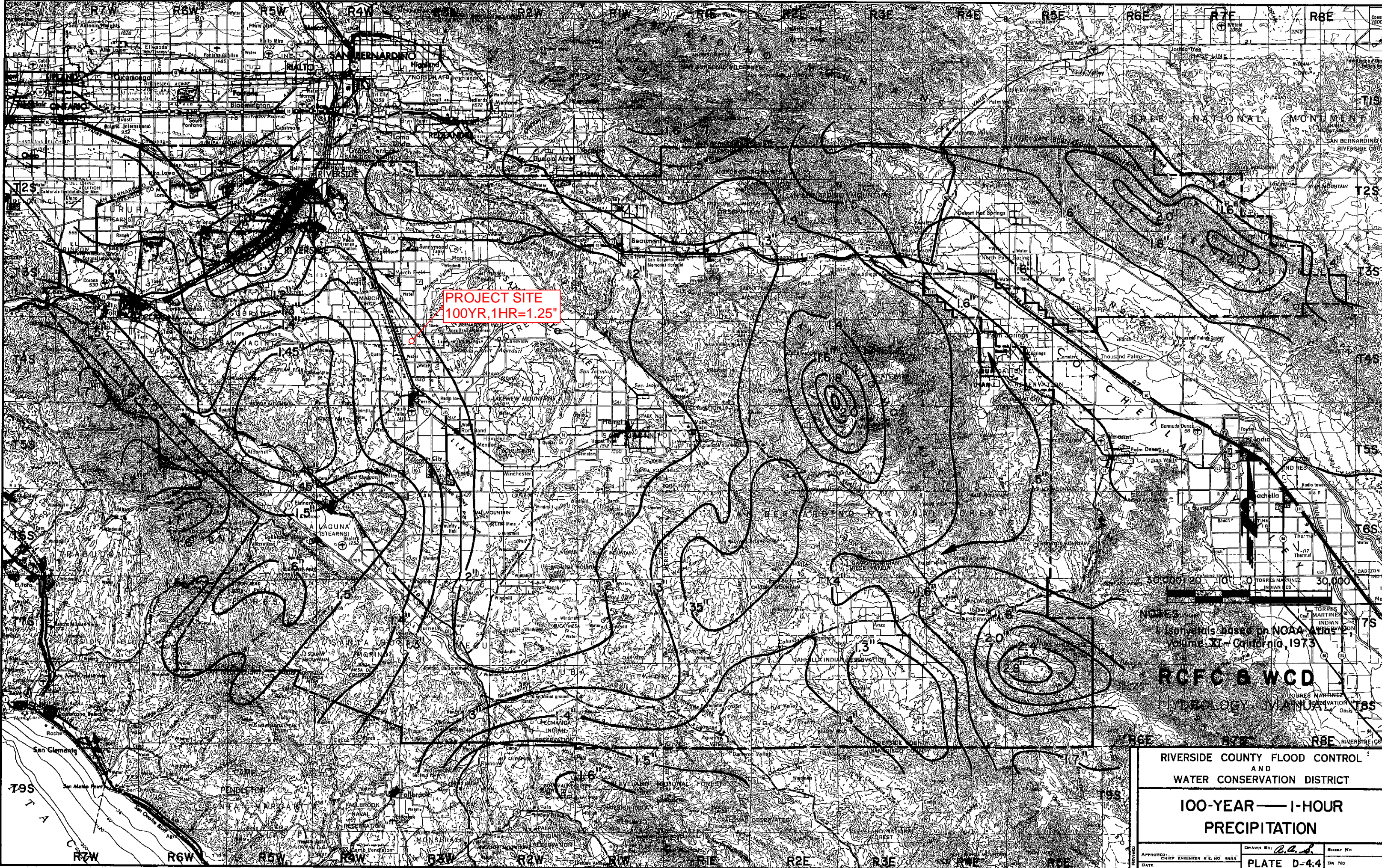
Isohyets based on NOAA Atlas 14,
Volume XI - California, 1973

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR
PRECIPITATION

APPROVED	CHIEF ENGINEER R.E. NO. 8822	DRAWN BY	R.E.S.	SHEET NO.
DATE		PLATE	D-4.3	DR. NO.



PROJECT SITE
100YR, 1HR=1.25"



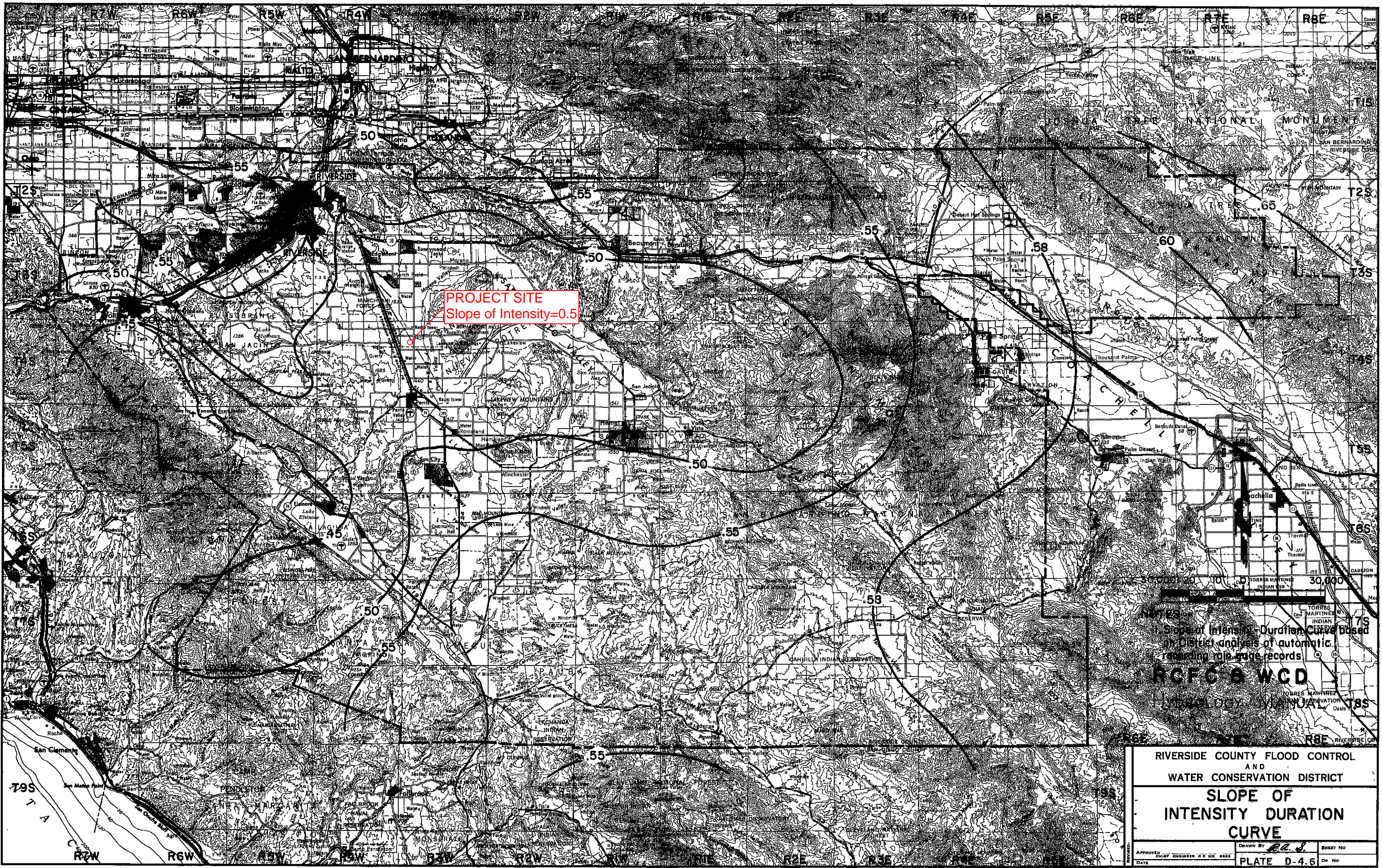
NOTES:
Contours based on NOAA Atlas,
Volume XI - California, 1973

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

100-YEAR — 1-HOUR
PRECIPITATION

APPROVED: CHIEF ENGINEER R.E. NO. 8886
DATE: _____
DRAWN BY: *R.L.S.* SHEET NO. _____
PLATE D-4.4 DN NO. _____



PROJECT SITE
Slope of Intensity=0.5

Slope of Intensity Duration Curve based on District analysis of automatic recording rain gage records

RCFC & WCD

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
SLOPE OF
INTENSITY DURATION
CURVE

APPROVED	DATE	CHIEF ENGINEER R.E. NO. 8888	DRAWN BY	DATE	SHEET NO.
			PLATE D-4.6		OF NO.

10-YEAR ONSITE HYDROLOGY (RATIONAL METHOD)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2004 Version 7.0
Rational Hydrology Study Date: 09/10/18 File:PROP10.out

17-0108 RAMONA & INDIAN
RATIONAL METHOD HYDROLOGY
10 YEAR STORM EVENT
PROPOSED ONSITE CONDITION

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

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

Program License Serial Number 4010

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.780(In/Hr)
Slope of intensity duration curve = 0.4900

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 925.000(Ft.)
Top (of initial area) elevation = 1465.500(Ft.)
Bottom (of initial area) elevation = 1460.300(Ft.)
Difference in elevation = 5.200(Ft.)
Slope = 0.00562 s(percent)= 0.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.990 min.
Rainfall intensity = 1.651(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.876
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 = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 5.568(CFS)
Total initial stream area = 3.850(Ac.)
Pervious area fraction = 0.100

Process from Point/Station 102.000 to Point/Station 103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1456.300(Ft.)
Downstream point/station elevation = 1454.200(Ft.)
Pipe length = 707.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 5.568(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 5.568(CFS)
Normal flow depth in pipe = 13.31(In.)
Flow top width inside pipe = 15.80(In.)
Critical depth = 10.93(In.)
Pipe flow velocity = 3.97(Ft/s)
Travel time through pipe = 2.97 min.
Time of concentration (TC) = 15.96 min.

Process from Point/Station 103.000 to Point/Station 103.000
 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
 Runoff Coefficient = 0.874
 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 = 0.100; Impervious fraction = 0.900
 Time of concentration = 15.96 min.
 Rainfall intensity = 1.493(In/Hr) for a 10.0 year storm
 Subarea runoff = 6.433(CFS) for 4.930(Ac.)
 Total runoff = 12.001(CFS) Total area = 8.780(Ac.)

Process from Point/Station 103.000 to Point/Station 104.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1454.200(Ft.)
 Downstream point/station elevation = 1453.000(Ft.)
 Pipe length = 407.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 12.001(CFS)
 Nearest computed pipe diameter = 24.00(In.)
 Calculated individual pipe flow = 12.001(CFS)
 Normal flow depth in pipe = 17.84(In.)
 Flow top width inside pipe = 20.97(In.)
 Critical Depth = 14.94(In.)
 Pipe flow velocity = 4.80(Ft/s)
 Travel time through pipe = 1.41 min.
 Time of concentration (TC) = 17.37 min.

Process from Point/Station 103.000 to Point/Station 104.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 1
 Stream flow area = 8.780(Ac.)
 Runoff from this stream = 12.001(CFS)
 Time of concentration = 17.37 min.
 Rainfall intensity = 1.432(In/Hr)
 Program is now starting with Main Stream No. 2

Process from Point/Station 101.000 to Point/Station 202.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 1000.000(Ft.)
 Top (of initial area) elevation = 1465.500(Ft.)
 Bottom (of initial area) elevation = 1459.500(Ft.)
 Difference in elevation = 6.000(Ft.)
 Slope = 0.00600 s(percent)= 0.60
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 13.228 min.
 Rainfall intensity = 1.636(In/Hr) for a 10.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.869
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.625
 Decimal fraction soil group C = 0.375
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 2) = 60.88
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 4.707(CFS)
 Total initial stream area = 3.310(Ac.)
 Pervious area fraction = 0.100

Process from Point/Station 202.000 to Point/Station 203.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1459.500(Ft.)
 Downstream point elevation = 1457.600(Ft.)
 Channel length thru subarea = 457.000(Ft.)
 Channel base width = 6.000(Ft.)

Slope or 'z' of left channel bank = 50.000
 Slope or 'z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 7.676(CFS)
 Manning's 'N' = 0.015
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 7.676(CFS)
 Depth of flow = 0.241(Ft.), Average velocity = 1.760(Ft/s)
 Channel flow top width = 30.135(Ft.)
 Flow Velocity = 1.76(Ft/s)
 Travel time = 4.33 min.
 Time of concentration = 17.55 min.

Sub-Channel No. 1 Critical depth = 0.219(Ft.)
 ' ' ' Critical flow top width = 27.875(Ft.)
 ' ' ' Critical flow velocity = 2.072(Ft/s)
 ' ' ' Critical flow area = 3.705(Sq.Ft)

Adding area flow to channel
 COMMERCIAL subarea type
 Runoff Coefficient = 0.869
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.346
 Decimal fraction soil group C = 0.654
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 2) = 64.50
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Rainfall intensity = 1.424(In/Hr) for a 10.0 year storm
 Subarea runoff = 5.882(CFS) for 4.750(Ac.)
 Total runoff = 10.589(CFS) Total area = 8.060(Ac.)
 Depth of flow = 0.278(Ft.), Average velocity = 1.912(Ft/s)

Sub-Channel No. 1 Critical depth = 0.256(Ft.)
 ' ' ' Critical flow top width = 31.586(Ft.)
 ' ' ' Critical flow velocity = 2.202(Ft/s)
 ' ' ' Critical flow area = 4.808(Sq.Ft)

 Process from Point/Station 203.000 to Point/Station 104.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1453.500(Ft.)
 Downstream point/station elevation = 1453.000(Ft.)
 Pipe length = 157.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 10.589(CFS)
 Nearest computed pipe diameter = 24.00(In.)
 Calculated individual pipe flow = 10.589(CFS)
 Normal flow depth in pipe = 15.73(In.)
 Flow top width inside pipe = 22.81(In.)
 Critical Depth = 13.99(In.)
 Pipe flow velocity = 4.85(Ft/s)
 Travel time through pipe = 0.54 min.
 Time of concentration (TC) = 18.09 min.

 Process from Point/Station 203.000 to Point/Station 104.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 8.060(Ac.)
 Runoff from this stream = 10.589(CFS)
 Time of concentration = 18.09 min.
 Rainfall intensity = 1.403(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	12.001	17.37	1.432
2	10.589	18.09	1.403
Largest stream flow has longer or shorter time of concentration			
Qp =	12.001 + sum of		
	Qa	Tb/Ta	
	10.589 *	0.960 =	10.167
Qp =	22.168		

Total of 2 main streams to confluence:
 Flow rates before confluence point:
 12.001 10.589
 Area of streams before confluence:

8.780 8.060

Results of confluence:

Total flow rate = 22.168(CFS)
 Time of concentration = 17.373 min.
 Effective stream area after confluence = 16.840(Ac.)

 Process from Point/Station 104.000 to Point/Station 105.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1453.000(Ft.)
 Downstream point/station elevation = 1452.500(Ft.)
 Pipe length = 162.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 22.168(CFS)
 Nearest computed pipe diameter = 30.00(In.)
 Calculated individual pipe flow = 22.168(CFS)
 Normal flow depth in pipe = 22.22(In.)
 Flow top width inside pipe = 26.30(In.)
 Critical Depth = 19.22(In.)
 Pipe flow velocity = 5.69(Ft/s)
 Travel time through pipe = 0.47 min.
 Time of concentration (TC) = 17.85 min.

 Process from Point/Station 105.000 to Point/Station 105.000
 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
 Runoff Coefficient = 0.873
 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 = 0.100; Impervious fraction = 0.900
 Time of concentration = 17.85 min.
 Rainfall intensity = 1.413(In/Hr) for a 10.0 year storm
 Subarea runoff = 7.810(CFS) for 6.330(Ac.)
 Total runoff = 29.978(CFS) Total area = 23.170(Ac.)

 Process from Point/Station 105.000 to Point/Station 106.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1452.500(Ft.)
 Downstream point/station elevation = 1451.500(Ft.)
 Pipe length = 300.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 29.978(CFS)
 Nearest computed pipe diameter = 33.00(In.)
 Calculated individual pipe flow = 29.978(CFS)
 Normal flow depth in pipe = 24.61(In.)
 Flow top width inside pipe = 28.74(In.)
 Critical Depth = 21.84(In.)
 Pipe flow velocity = 6.31(Ft/s)
 Travel time through pipe = 0.79 min.
 Time of concentration (TC) = 18.64 min.

 Process from Point/Station 106.000 to Point/Station 106.000
 **** SUBAREA FLOW ADDITION ****

UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.778
 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) = 86.00
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Time of concentration = 18.64 min.
 Rainfall intensity = 1.383(In/Hr) for a 10.0 year storm
 Subarea runoff = 1.098(CFS) for 1.020(Ac.)
 Total runoff = 31.075(CFS) Total area = 24.190(Ac.)
 End of computations, total study area = 24.19 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.138

Area averaged RI index number = 67.7

PROP10.out

100-YEAR ONSITE HYDROLOGY (RATIONAL METHOD)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2004 Version 7.0
Rational Hydrology Study Date: 08/20/18 File:PROP100.out

17-0108 INDIAN & RAMONA
RATIONAL METHOD HYDROLOGY
100-YEAR STORM EVENT
PROPOSED ONSITE CONDITION

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

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

Program License Serial Number 4010

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 925.000(Ft.)
Top (of initial area) elevation = 1465.500(Ft.)
Bottom (of initial area) elevation = 1460.300(Ft.)
Difference in elevation = 5.200(Ft.)
Slope = 0.00562 s(percent)= 0.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.990 min.
Rainfall intensity = 2.371(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.882
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 = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 8.048(CFS)
Total initial stream area = 3.850(Ac.)
Pervious area fraction = 0.100

Process from Point/Station 102.000 to Point/Station 103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1456.300(Ft.)
Downstream point/station elevation = 1454.200(Ft.)
Pipe length = 707.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 8.048(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 8.048(CFS)
Normal flow depth in pipe = 15.02(In.)
Flow top width inside pipe = 18.95(In.)
Critical depth = 12.62(In.)
Pipe flow velocity = 4.37(Ft/s)
Travel time through pipe = 2.69 min.
Time of concentration (TC) = 15.68 min.

Process from Point/Station 103.000 to Point/Station 103.000
 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
 Runoff Coefficient = 0.880
 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 = 0.100; Impervious fraction = 0.900
 Time of concentration = 15.68 min.
 Rainfall intensity = 2.161(In/Hr) for a 100.0 year storm
 Subarea runoff = 9.382(CFS) for 4.930(Ac.)
 Total runoff = 17.430(CFS) Total area = 8.780(Ac.)

Process from Point/Station 103.000 to Point/Station 104.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1454.200(Ft.)
 Downstream point/station elevation = 1453.000(Ft.)
 Pipe length = 407.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 17.430(CFS)
 Nearest computed pipe diameter = 27.00(In.)
 Calculated individual pipe flow = 17.430(CFS)
 Normal flow depth in pipe = 21.14(In.)
 Flow top width inside pipe = 22.26(In.)
 Critical Depth = 17.49(In.)
 Pipe flow velocity = 5.22(Ft/s)
 Travel time through pipe = 1.30 min.
 Time of concentration (TC) = 16.98 min.

Process from Point/Station 103.000 to Point/Station 104.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 1
 Stream flow area = 8.780(Ac.)
 Runoff from this stream = 17.430(CFS)
 Time of concentration = 16.98 min.
 Rainfall intensity = 2.079(In/Hr)
 Program is now starting with Main Stream No. 2

Process from Point/Station 101.000 to Point/Station 202.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 1000.000(Ft.)
 Top (of initial area) elevation = 1465.500(Ft.)
 Bottom (of initial area) elevation = 1459.500(Ft.)
 Difference in elevation = 6.000(Ft.)
 Slope = 0.00600 s(percent)= 0.60
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 13.228 min.
 Rainfall intensity = 2.350(In/Hr) for a 100.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.876
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.625
 Decimal fraction soil group C = 0.375
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 2) = 60.88
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 6.812(CFS)
 Total initial stream area = 3.310(Ac.)
 Pervious area fraction = 0.100

Process from Point/Station 202.000 to Point/Station 203.000
 **** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1459.500(Ft.)
 Downstream point elevation = 1457.600(Ft.)
 Channel length thru subarea = 457.000(Ft.)
 Channel base width = 6.000(Ft.)

Slope or 'z' of left channel bank = 50.000
 Slope or 'z' of right channel bank = 50.000
 Estimated mean flow rate at midpoint of channel = 11.155(CFS)
 Manning's 'N' = 0.015
 Maximum depth of channel = 1.000(Ft.)
 Flow(q) thru subarea = 11.155(CFS)
 Depth of flow = 0.285(Ft.), Average velocity = 1.937(Ft/s)
 Channel flow top width = 34.460(Ft.)
 Flow Velocity = 1.94(Ft/s)
 Travel time = 3.93 min.
 Time of concentration = 17.16 min.

Sub-Channel No. 1 Critical depth = 0.262(Ft.)
 ' ' ' Critical flow top width = 32.172(Ft.)
 ' ' ' Critical flow velocity = 2.233(Ft/s)
 ' ' ' Critical flow area = 4.995(Sq.Ft)

Adding area flow to channel
 COMMERCIAL subarea type
 Runoff Coefficient = 0.876
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.346
 Decimal fraction soil group C = 0.654
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 2) = 64.50
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Rainfall intensity = 2.068(In/Hr) for a 100.0 year storm
 Subarea runoff = 8.610(CFS) for 4.750(Ac.)
 Total runoff = 15.423(CFS) Total area = 8.060(Ac.)
 Depth of flow = 0.328(Ft.), Average velocity = 2.104(Ft/s)

Sub-Channel No. 1 Critical depth = 0.305(Ft.)
 ' ' ' Critical flow top width = 36.469(Ft.)
 ' ' ' Critical flow velocity = 2.384(Ft/s)
 ' ' ' Critical flow area = 6.470(Sq.Ft)

 Process from Point/Station 203.000 to Point/Station 104.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1453.500(Ft.)
 Downstream point/station elevation = 1453.000(Ft.)
 Pipe length = 157.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 15.423(CFS)
 Nearest computed pipe diameter = 27.00(In.)
 Calculated individual pipe flow = 15.423(CFS)
 Normal flow depth in pipe = 18.52(In.)
 Flow top width inside pipe = 25.07(In.)
 Critical Depth = 16.43(In.)
 Pipe flow velocity = 5.31(Ft/s)
 Travel time through pipe = 0.49 min.
 Time of concentration (TC) = 17.65 min.

 Process from Point/Station 203.000 to Point/Station 104.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 8.060(Ac.)
 Runoff from this stream = 15.423(CFS)
 Time of concentration = 17.65 min.
 Rainfall intensity = 2.040(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	17.430	16.98	2.079
2	15.423	17.65	2.040
Largest stream flow has longer or shorter time of concentration			
Qp =	17.430 + sum of		
	Qa	Tb/Ta	
	15.423 *	0.962 =	14.839
Qp =	32.269		

Total of 2 main streams to confluence:
 Flow rates before confluence point:
 17.430 15.423
 Area of streams before confluence:

8.780 8.060

Results of confluence:

Total flow rate = 32.269(CFS)
 Time of concentration = 16.984 min.
 Effective stream area after confluence = 16.840(Ac.)

 Process from Point/Station 104.000 to Point/Station 105.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1453.000(Ft.)
 Downstream point/station elevation = 1452.500(Ft.)
 Pipe length = 162.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 32.269(CFS)
 Nearest computed pipe diameter = 33.00(In.)
 Calculated individual pipe flow = 32.269(CFS)
 Normal flow depth in pipe = 27.47(In.)
 Flow top width inside pipe = 24.65(In.)
 Critical Depth = 22.66(In.)
 Pipe flow velocity = 6.11(Ft/s)
 Travel time through pipe = 0.44 min.
 Time of concentration (TC) = 17.43 min.

 Process from Point/Station 105.000 to Point/Station 105.000
 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
 Runoff Coefficient = 0.880
 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 = 0.100; Impervious fraction = 0.900
 Time of concentration = 17.43 min.
 Rainfall intensity = 2.053(In/Hr) for a 100.0 year storm
 Subarea runoff = 11.430(CFS) for 6.330(Ac.)
 Total runoff = 43.699(CFS) Total area = 23.170(Ac.)

 Process from Point/Station 105.000 to Point/Station 106.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1452.500(Ft.)
 Downstream point/station elevation = 1451.500(Ft.)
 Pipe length = 300.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 43.699(CFS)
 Nearest computed pipe diameter = 36.00(In.)
 Calculated individual pipe flow = 43.699(CFS)
 Normal flow depth in pipe = 31.31(In.)
 Flow top width inside pipe = 24.23(In.)
 Critical Depth = 25.85(In.)
 Pipe flow velocity = 6.69(Ft/s)
 Travel time through pipe = 0.75 min.
 Time of concentration (TC) = 18.17 min.

 Process from Point/Station 106.000 to Point/Station 106.000
 **** SUBAREA FLOW ADDITION ****

UNDEVELOPED (poor cover) subarea
 Runoff Coefficient = 0.812
 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) = 86.00
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Time of concentration = 18.17 min.
 Rainfall intensity = 2.011(In/Hr) for a 100.0 year storm
 Subarea runoff = 1.666(CFS) for 1.020(Ac.)
 Total runoff = 45.365(CFS) Total area = 24.190(Ac.)
 End of computations, total study area = 24.19 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.138

Area averaged RI index number = 67.7

PROP100.out

10-YEAR OFFSITE HYDROLOGY (RATIONAL METHOD)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2004 Version 7.0
Rational Hydrology Study Date: 12/04/17 File:OFFSITEPART110.out

17-0108 INDIAN & RAMONA
OFFSITE RATIONAL METHOD HYDROLOGY
10-YEAR STORM EVENT
PART 1

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

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

Program License Serial Number 4010

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.780(In/Hr)
Slope of intensity duration curve = 0.4900

+++++
Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 807.000(Ft.)
Top (of initial area) elevation = 1467.000(Ft.)
Bottom (of initial area) elevation = 1462.300(Ft.)
Difference in elevation = 4.700(Ft.)
Slope = 0.00582 s(percent)= 0.58
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.213 min.
Rainfall intensity = 1.702(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.877
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 = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 6.652(CFS)
Total initial stream area = 4.460(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 302.000 to Point/Station 303.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1455.700(Ft.)
Downstream point/station elevation = 1454.900(Ft.)
Pipe length = 52.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 6.652(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 6.652(CFS)
Normal flow depth in pipe = 9.84(In.)
Flow top width inside pipe = 14.25(In.)
Critical depth = 12.46(In.)
Pipe flow velocity = 7.80(Ft/s)
Travel time through pipe = 0.11 min.
Time of concentration (TC) = 12.32 min.

 Process from Point/Station 303.000 to Point/Station 303.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
 Stream flow area = 4.460(Ac.)
 Runoff from this stream = 6.652(CFS)
 Time of concentration = 12.32 min.
 Rainfall intensity = 1.694(In/Hr)
 Program is now starting with Main Stream No. 2

 Process from Point/Station 304.000 to Point/Station 305.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 291.000(Ft.)
 Top (of initial area) elevation = 1464.100(Ft.)
 Bottom (of initial area) elevation = 1460.500(Ft.)
 Difference in elevation = 3.600(Ft.)
 Slope = 0.01237 s(percent)= 1.24
 TC = k(0.300)*[(length^3)/(elevation change)]^0.2
 Initial area time of concentration = 6.985 min.
 Rainfall intensity = 2.237(In/Hr) for a 10.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.881
 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 = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 0.808(CFS)
 Total initial stream area = 0.410(Ac.)
 Pervious area fraction = 0.100

 Process from Point/Station 305.000 to Point/Station 303.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1455.700(Ft.)
 Downstream point/station elevation = 1454.900(Ft.)
 Pipe length = 159.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 0.808(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 0.808(CFS)
 Normal flow depth in pipe = 5.21(In.)
 Flow top width inside pipe = 8.89(In.)
 Critical Depth = 4.93(In.)
 Pipe flow velocity = 3.05(Ft/s)
 Travel time through pipe = 0.87 min.
 Time of concentration (TC) = 7.85 min.

 Process from Point/Station 303.000 to Point/Station 303.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 0.410(Ac.)
 Runoff from this stream = 0.808(CFS)
 Time of concentration = 7.85 min.
 Rainfall intensity = 2.112(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	6.652	12.32	1.694
2	0.808	7.85	2.112

Largest stream flow has longer time of concentration
 $Q_p = 6.652 + \text{sum of } Q_b$
 $Q_p = 0.808 * \frac{I_a/I_b}{0.802} = 0.648$
 $Q_p = 7.300$

Total of 2 main streams to confluence:
 Flow rates before confluence point:

6.652 0.808
Area of streams before confluence:
4.460 0.410

Results of confluence:
Total flow rate = 7.300(CFS)
Time of concentration = 12.324 min.
Effective stream area after confluence = 4.870(AC.)
End of computations, total study area = 4.87 (AC.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 69.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2004 Version 7.0
Rational Hydrology Study Date: 11/30/17 File:OFFSITEPART210.out

17-0108 INDIAN & RAMONA
OFFSITE RATIONAL METHOD HYDROLOGY
10-YEAR STORM EVENT
OFFSITE PART 2

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

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

Program License Serial Number 4010

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.780(In/Hr)
Slope of intensity duration curve = 0.4900

+++++
Process from Point/Station 401.000 to Point/Station 402.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 854.000(Ft.)
Top (of initial area) elevation = 1462.200(Ft.)
Bottom (of initial area) elevation = 1458.900(Ft.)
Difference in elevation = 3.300(Ft.)
Slope = 0.00386 s(percent)= 0.39
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.561 min.
Rainfall intensity = 1.616(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.876
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 = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 6.313(CFS)
Total initial stream area = 4.460(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 4.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 69.0

100-YEAR OFFSITE HYDROLOGY (RATIONAL METHOD)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2004 Version 7.0
Rational Hydrology Study Date: 11/30/17 File:OFFSITEPART1100.out

17-0108 INDIAN & RAMONA
OFFSITE RATIONAL METHOD HYDROLOGY
100-YEAR STORM EVENT
PART 1

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

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

Program License Serial Number 4010

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 807.000(Ft.)
Top (of initial area) elevation = 1467.000(Ft.)
Bottom (of initial area) elevation = 1462.300(Ft.)
Difference in elevation = 4.700(Ft.)
Slope = 0.00582 s(percent)= 0.58
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.213 min.
Rainfall intensity = 2.443(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.882
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 = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 9.614(CFS)
Total initial stream area = 4.460(Ac.)
Pervious area fraction = 0.100

Process from Point/Station 302.000 to Point/Station 303.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1455.700(Ft.)
Downstream point/station elevation = 1454.900(Ft.)
Pipe length = 52.00(Ft.) Manning's N = 0.012
No. of pipes = 1 Required pipe flow = 9.614(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 9.614(CFS)
Normal flow depth in pipe = 10.90(In.)
Flow top width inside pipe = 17.59(In.)
Critical depth = 14.36(In.)
Pipe flow velocity = 8.59(Ft/s)
Travel time through pipe = 0.10 min.
Time of concentration (TC) = 12.31 min.

 Process from Point/Station 303.000 to Point/Station 303.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
 Stream flow area = 4.460(Ac.)
 Runoff from this stream = 9.614(CFS)
 Time of concentration = 12.31 min.
 Rainfall intensity = 2.433(In/Hr)
 Program is now starting with Main Stream No. 2

 Process from Point/Station 304.000 to Point/Station 305.000
 **** INITIAL AREA EVALUATION ****

Initial area flow distance = 291.000(Ft.)
 Top (of initial area) elevation = 1464.100(Ft.)
 Bottom (of initial area) elevation = 1460.500(Ft.)
 Difference in elevation = 3.600(Ft.)
 Slope = 0.01237 s(percent)= 1.24
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 6.985 min.
 Rainfall intensity = 3.213(In/Hr) for a 100.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.886
 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 = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 1.167(CFS)
 Total initial stream area = 0.410(Ac.)
 Pervious area fraction = 0.100

 Process from Point/Station 305.000 to Point/Station 303.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1455.700(Ft.)
 Downstream point/station elevation = 1454.900(Ft.)
 Pipe length = 159.00(Ft.) Manning's N = 0.012
 No. of pipes = 1 Required pipe flow = 1.167(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 1.167(CFS)
 Normal flow depth in pipe = 6.79(In.)
 Flow top width inside pipe = 7.75(In.)
 Critical Depth = 5.96(In.)
 Pipe flow velocity = 3.26(Ft/s)
 Travel time through pipe = 0.81 min.
 Time of concentration (TC) = 7.80 min.

 Process from Point/Station 303.000 to Point/Station 303.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 0.410(Ac.)
 Runoff from this stream = 1.167(CFS)
 Time of concentration = 7.80 min.
 Rainfall intensity = 3.044(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	9.614	12.31	2.433
2	1.167	7.80	3.044

Largest stream flow has longer time of concentration
 $Q_p = \frac{Q_b + \sum I_a/I_b}{1.167 * 0.799} = 0.933$
 $Q_p = 10.547$

Total of 2 main streams to confluence:
 Flow rates before confluence point:

9.614 1.167
Area of streams before confluence:
4.460 0.410

Results of confluence:
Total flow rate = 10.547(CFS)
Time of concentration = 12.314 min.
Effective stream area after confluence = 4.870(AC.)
End of computations, total study area = 4.87 (AC.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 69.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2004 Version 7.0
Rational Hydrology Study Date: 11/30/17 File:OFFSITEPART2100.out

17-0108 INDIAN & RAMONA
OFFSITE RATIONAL METHOD HYDROLOGY
100-YEAR STORM EVENT
OFFSITE PART 2

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

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

Program License Serial Number 4010

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 [Perris Valley] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.780(In/Hr)
100 year storm 10 minute intensity = 2.690(In/Hr)
100 year storm 60 minute intensity = 1.120(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.120(In/Hr)
Slope of intensity duration curve = 0.4900

+++++
Process from Point/Station 401.000 to Point/Station 402.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 854.000(Ft.)
Top (of initial area) elevation = 1462.200(Ft.)
Bottom (of initial area) elevation = 1458.900(Ft.)
Difference in elevation = 3.300(Ft.)
Slope = 0.00386 s(percent)= 0.39
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.561 min.
Rainfall intensity = 2.321(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.882
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 = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 9.126(CFS)
Total initial stream area = 4.460(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 4.46 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 69.0

EXISTING CONDITION UNIT HYDROGRAPHS

Project Name: Indian & Ramona
WO: 17-0108
Date: 11/28/2017

UNIT HYDROGRAPH INPUT DATA - Area A

	<u>EXISTING</u>	<u>DEVELOPED</u>
TOTAL AREA	24.20	24.20
L (ft)	1278.00	2359.00
Lc (ft)	711.00	639.00
DIFFERENCE IN ELEV. (ft)	7.30	14.00
AVERAGE "N"	0.035	0.015
LOW LOSS RATE	0.9	0.18
Soil Type	0.16,B 0.84 C	0.16,B 0.84 C
AMC Factor	1	1
AREA (ac)	24.20	24.20
% IMPERVIOUS	0.00	0.90
RI	84.70	66.90
Assumptions	undeveloped & poor	commercial landscape
Period Interval	5-min	5-min

2-yr 1-hr	0.50 in
2-yr 3-hr	0.80 in
2-yr 6-hr	1.00 in
2-yr 24-hr	1.80 in
100-yr 1-hr	1.25 in
100-yr 3-hr	1.90 in
100-yr 6-hr	2.50 in
100-yr 24-hr	4.50 in

EXISTING CONDITION
100-YEAR, 1-HOUR UNIT HYDROGRAPH

Unit Hydrograph Analysis

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Study date 12/04/17 File: EXIST1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-0108 INDIAN & RAMONA
UNIT HYDROGRAPH HYDROLOGY
EXISTING CONDITION
12/4/17 MJS

Drainage Area = 24.20(Ac.) = 0.038 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 24.20(Ac.) = 0.038 Sq. Mi.
Length along longest watercourse = 1278.00(Ft.)
Length along longest watercourse measured to centroid = 711.00(Ft.)
Length along longest watercourse = 0.242 Mi.
Length along longest watercourse measured to centroid = 0.135 Mi.
Difference in elevation = 7.30(Ft.)
Slope along watercourse = 30.1596 Ft./Mi.
Average Manning's 'N' = 0.035
Lag time = 0.120 Hr.
Lag time = 7.18 Min.
25% of lag time = 1.80 Min.
40% of lag time = 2.87 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 0.50 12.10

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 1.25 30.25

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.250(In)

Point rain (area averaged) = 1.250(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.250(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
24.200 84.70 0.000
Total Area Entered = 24.20(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
AMC2 AMC-2 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
84.7 84.7 0.190 0.000 0.190 1.000 0.190
Sum (F) = 0.190

Area averaged mean soil loss (F) (In/Hr) = 0.190
Minimum soil loss rate ((In/Hr)) = 0.095
(for 24 hour storm duration)
Soil loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	69.605	10.524
2	0.167	139.210	39.896
3	0.250	208.815	23.287
4	0.333	278.420	9.046
5	0.417	348.025	5.500
6	0.500	417.630	3.664
7	0.583	487.235	2.441
8	0.667	556.839	1.916
9	0.750	626.444	1.355
10	0.833	696.049	0.967
11	0.917	765.654	0.712
12	1.000	835.259	0.691
Sum = 100.000			Sum= 24.389

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1	0.08	4.20	0.630	(0.567)	0.439
2	0.17	4.30	0.645	(0.580)	0.454
3	0.25	5.00	0.750	(0.675)	0.559
4	0.33	5.00	0.750	(0.675)	0.559
5	0.42	5.80	0.870	(0.783)	0.679
6	0.50	6.50	0.975	(0.877)	0.784
7	0.58	7.40	1.110	(0.999)	0.919
8	0.67	8.60	1.290	(1.161)	1.099
9	0.75	12.30	1.845	(1.660)	1.654
10	0.83	29.10	4.364	(3.928)	4.174
11	0.92	6.80	1.020	(0.918)	0.829
12	1.00	5.00	0.750	(0.675)	0.559

Sum = 100.0 (Loss Rate Not Used) Sum = 12.7

Flood volume = Effective rainfall 1.06(In)
times area 24.2(Ac.)/[(In)/(Ft.)] = 2.1(Ac.Ft)
Total soil loss = 0.19(In)
Total soil loss = 0.384(Ac.Ft)
Total rainfall = 1.25(In)
Flood volume = 93055.8 Cubic Feet
Total soil loss = 16727.6 Cubic Feet

Peak flow rate of this hydrograph = 57.558(CFS)

1 - HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0078	1.13	Q				
0+10	0.0453	5.45	V Q				
0+15	0.1028	8.36	V Q				
0+20	0.1747	10.44	V Q				
0+25	0.2571	11.96	V Q				
0+30	0.3538	14.04	V Q				
0+35	0.4675	16.51	V Q				
0+40	0.6015	19.46	V Q				
0+45	0.7669	24.01	V Q				
0+50	1.0259	37.61	V Q				
0+55	1.4223	57.56	V Q				
1+ 0	1.7007	40.43	V Q				
1+ 5	1.8661	24.02	V Q				
1+10	1.9611	13.79	V Q				
1+15	2.0181	8.28	V Q				
1+20	2.0566	5.58	V Q				
1+25	2.0844	4.04	V Q				
1+30	2.1040	2.84	V Q				
1+35	2.1177	1.99	V Q				
1+40	2.1272	1.38	V Q				
1+45	2.1340	0.98	V Q				

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1+50
1+55

2.1356
2.1363

0.24 Q
0.09 Q

|

|

|

v|
v

**EXISTING CONDITION
100-YEAR, 3-HOUR UNIT HYDROGRAPH**

Unit Hydrograph Analysis

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Study date 12/04/17 File: EXIST3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-0108 INDIAN & RAMONA
UNIT HYDROGRAPH HYDROLOGY
EXISTING CONDITION
12/4/17 MJS

Drainage Area = 24.20(Ac.) = 0.038 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 24.20(Ac.) = 0.038 Sq. Mi.
Length along longest watercourse = 1278.00(Ft.)
Length along longest watercourse measured to centroid = 711.00(Ft.)
Length along longest watercourse = 0.242 Mi.
Length along longest watercourse measured to centroid = 0.135 Mi.
Difference in elevation = 7.30(Ft.)
Slope along watercourse = 30.1596 Ft./Mi.
Average Manning's 'N' = 0.035
Lag time = 0.120 Hr.
Lag time = 7.18 Min.
25% of lag time = 1.80 Min.
40% of lag time = 2.87 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 0.80 19.36

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 1.90 45.98

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
24.200 84.70 0.000
Total Area Entered = 24.20(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
AMC2 AMC-2 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
84.7 84.7 0.190 0.000 0.190 1.000 0.190
Sum (F) = 0.190

Area averaged mean soil loss (F) (In/Hr) = 0.190
Minimum soil loss rate ((In/Hr)) = 0.095
(for 24 hour storm duration)
Soil loss rate (decimal) = 0.900

VALLEY S-Curve

Unit Hydrograph Data				
Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)	
1	0.083	69.605	10.524	2.567
2	0.167	139.210	39.896	9.730
3	0.250	208.815	23.287	5.679
4	0.333	278.420	9.046	2.206
5	0.417	348.025	5.500	1.341
6	0.500	417.630	3.664	0.894
7	0.583	487.235	2.441	0.595
8	0.667	556.839	1.916	0.467
9	0.750	626.444	1.355	0.331
10	0.833	696.049	0.967	0.236
11	0.917	765.654	0.712	0.174
12	1.000	835.259	0.691	0.169
Sum = 100.000			Sum=	24.389

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1	0.08	1.30	0.190	(0.267)	0.106
2	0.17	1.30	0.190	(0.267)	0.106
3	0.25	1.10	0.190	(0.226)	0.060
4	0.33	1.50	0.190	(0.308)	0.152
5	0.42	1.50	0.190	(0.308)	0.152
6	0.50	1.80	0.190	(0.369)	0.220
7	0.58	1.50	0.190	(0.308)	0.152
8	0.67	1.80	0.190	(0.369)	0.220
9	0.75	1.80	0.190	(0.369)	0.220
10	0.83	1.50	0.190	(0.308)	0.152
11	0.92	1.60	0.190	(0.328)	0.174
12	1.00	1.80	0.190	(0.369)	0.220
13	1.08	2.20	0.190	(0.451)	0.311
14	1.17	2.20	0.190	(0.451)	0.311
15	1.25	2.20	0.190	(0.451)	0.311
16	1.33	2.00	0.190	(0.410)	0.266
17	1.42	2.60	0.190	(0.533)	0.402
18	1.50	2.70	0.190	(0.554)	0.425
19	1.58	2.40	0.190	(0.492)	0.357
20	1.67	2.70	0.190	(0.554)	0.425
21	1.75	3.30	0.190	(0.677)	0.562
22	1.83	3.10	0.190	(0.636)	0.516
23	1.92	2.90	0.190	(0.595)	0.471
24	2.00	3.00	0.190	(0.616)	0.494
25	2.08	3.10	0.190	(0.636)	0.516
26	2.17	4.20	0.190	(0.862)	0.767
27	2.25	5.00	0.190	(1.026)	0.949
28	2.33	3.50	0.190	(0.718)	0.607
29	2.42	6.80	0.190	(1.395)	1.360
30	2.50	7.30	0.190	(1.498)	1.474
31	2.58	8.20	0.190	(1.682)	1.679
32	2.67	5.90	0.190	(1.211)	1.155
33	2.75	2.00	0.190	(0.410)	0.266
34	2.83	1.80	0.190	(0.369)	0.220
35	2.92	1.80	0.190	(0.369)	0.220
36	3.00	0.60	0.137	(0.190)	0.014

Sum = 100.0 (Loss Rate Not Used) Sum = 16.0

Flood volume = Effective rainfall 1.33(In)
 times area 24.2(Ac.)/[(In)/(Ft.)] = 2.7(Ac.Ft)
 Total soil loss = 0.57(In)
 Total soil loss = 1.141(Ac.Ft)
 Total rainfall = 1.90(In)
 Flood volume = 117199.6 Cubic Feet
 Total soil loss = 49690.1 Cubic Feet

Peak flow rate of this hydrograph = 33.508(CFS)

3 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m) Volume Ac.Ft Q(CFS) 0 10.0 20.0 30.0 40.0

0+ 5	0.0019	0.27	Q				
0+10	0.0109	1.30	VQ				
0+15	0.0232	1.79	VQ				
0+20	0.0357	1.81	VQ				
0+25	0.0534	2.58	V Q				
0+30	0.0760	3.27	V Q Q				
0+35	0.1033	3.96	V Q Q				
0+40	0.1308	3.99	V Q Q				
0+45	0.1619	4.51	V Q Q				
0+50	0.1944	4.72	V Q Q				
0+55	0.2239	4.28	V Q Q				
1+ 0	0.2538	4.34	VQ				
1+ 5	0.2887	5.06	VQ				
1+10	0.3314	6.21	V Q Q				
1+15	0.3785	6.84	V Q Q				
1+20	0.4266	6.98	V Q Q				
1+25	0.4752	7.05	V Q Q				
1+30	0.5322	8.28	VQ				
1+35	0.5947	9.08	VQ				
1+40	0.6568	9.01	Q				
1+45	0.7247	9.87	Q				
1+50	0.8038	11.48	Q				
1+55	0.8854	11.86	Q Q	V			
2+ 0	0.9655	11.62	Q Q	V V			
2+ 5	1.0467	11.79	Q Q	V V			
2+10	1.1348	12.79	Q	Q	V		
2+15	1.2442	15.89		Q	V		
2+20	1.3704	18.32		Q Q	V		
2+25	1.4983	18.57		Q	V		
2+30	1.6705	25.01			VQ	V	
2+35	1.8818	30.67			V	Q	
2+40	2.1126	33.51				V	Q
2+45	2.3086	28.46				Q	V
2+50	2.4323	17.96					V
2+55	2.5156	12.10		Q			V
3+ 0	2.5791	9.22		Q			V
3+ 5	2.6193	5.83					V
3+10	2.6444	3.64		Q			V
3+15	2.6613	2.46		Q			V
3+20	2.6733	1.73		Q			V
3+25	2.6812	1.15		Q			V
3+30	2.6862	0.73		Q			V
3+35	2.6887	0.37		Q			V
3+40	2.6897	0.14		Q			V
3+45	2.6902	0.08		Q			V
3+50	2.6905	0.04		Q			V
3+55	2.6905	0.00		Q			V

**EXISTING CONDITION
100-YEAR, 6-HOUR UNIT HYDROGRAPH**

Unit Hydrograph Analysis

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Study date 12/04/17 File: EXIST6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-0108 INDIAN & RAMONA
UNIT HYDROGRAPH HYDROLOGY
EXISTING CONDITION
12/4/17 MJS

Drainage Area = 24.20(Ac.) = 0.038 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 24.20(Ac.) = 0.038 Sq. Mi.
Length along longest watercourse = 1278.00(Ft.)
Length along longest watercourse measured to centroid = 711.00(Ft.)
Length along longest watercourse = 0.242 Mi.
Length along longest watercourse measured to centroid = 0.135 Mi.
Difference in elevation = 7.30(Ft.)
Slope along watercourse = 30.1596 Ft./Mi.
Average Manning's 'N' = 0.035
Lag time = 0.120 Hr.
Lag time = 7.18 Min.
25% of lag time = 1.80 Min.
40% of lag time = 2.87 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 1.00 24.20

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 2.50 60.50

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
24.200 84.70 0.000
Total Area Entered = 24.20(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
AMC2 AMC-2 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
84.7 84.7 0.190 0.000 0.190 1.000 0.190
Sum (F) = 0.190

Area averaged mean soil loss (F) (In/Hr) = 0.190
Minimum soil loss rate ((In/Hr)) = 0.095
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

VALLEY S-Curve

Unit Hydrograph Data				
Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)	
1	0.083	69.605	10.524	2.567
2	0.167	139.210	39.896	9.730
3	0.250	208.815	23.287	5.679
4	0.333	278.420	9.046	2.206
5	0.417	348.025	5.500	1.341
6	0.500	417.630	3.664	0.894
7	0.583	487.235	2.441	0.595
8	0.667	556.839	1.916	0.467
9	0.750	626.444	1.355	0.331
10	0.833	696.049	0.967	0.236
11	0.917	765.654	0.712	0.174
12	1.000	835.259	0.691	0.169
Sum = 100.000			Sum=	24.389

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1	0.08	0.150	(0.190)	0.135	0.015
2	0.17	0.180	(0.190)	0.162	0.018
3	0.25	0.180	(0.190)	0.162	0.018
4	0.33	0.180	(0.190)	0.162	0.018
5	0.42	0.180	(0.190)	0.162	0.018
6	0.50	0.210	(0.190)	0.189	0.021
7	0.58	0.210	(0.190)	0.189	0.021
8	0.67	0.210	(0.190)	0.189	0.021
9	0.75	0.210	(0.190)	0.189	0.021
10	0.83	0.210	(0.190)	0.189	0.021
11	0.92	0.210	(0.190)	0.189	0.021
12	1.00	0.240	0.190	(0.216)	0.050
13	1.08	0.240	0.190	(0.216)	0.050
14	1.17	0.240	0.190	(0.216)	0.050
15	1.25	0.240	0.190	(0.216)	0.050
16	1.33	0.240	0.190	(0.216)	0.050
17	1.42	0.240	0.190	(0.216)	0.050
18	1.50	0.240	0.190	(0.216)	0.050
19	1.58	0.240	0.190	(0.216)	0.050
20	1.67	0.240	0.190	(0.216)	0.050
21	1.75	0.240	0.190	(0.216)	0.050
22	1.83	0.240	0.190	(0.216)	0.050
23	1.92	0.240	0.190	(0.216)	0.050
24	2.00	0.270	0.190	(0.243)	0.080
25	2.08	0.240	0.190	(0.216)	0.050
26	2.17	0.270	0.190	(0.243)	0.080
27	2.25	0.270	0.190	(0.243)	0.080
28	2.33	0.270	0.190	(0.243)	0.080
29	2.42	0.270	0.190	(0.243)	0.080
30	2.50	0.270	0.190	(0.243)	0.080
31	2.58	0.270	0.190	(0.243)	0.080
32	2.67	0.270	0.190	(0.243)	0.080
33	2.75	0.300	0.190	(0.270)	0.110
34	2.83	0.300	0.190	(0.270)	0.110
35	2.92	0.300	0.190	(0.270)	0.110
36	3.00	0.300	0.190	(0.270)	0.110
37	3.08	0.300	0.190	(0.270)	0.110
38	3.17	0.330	0.190	(0.297)	0.140
39	3.25	0.330	0.190	(0.297)	0.140
40	3.33	0.330	0.190	(0.297)	0.140
41	3.42	0.360	0.190	(0.324)	0.170
42	3.50	0.390	0.190	(0.351)	0.200
43	3.58	0.420	0.190	(0.378)	0.230
44	3.67	0.420	0.190	(0.378)	0.230
45	3.75	0.450	0.190	(0.405)	0.260
46	3.83	0.450	0.190	(0.405)	0.260
47	3.92	0.480	0.190	(0.432)	0.290
48	4.00	0.480	0.190	(0.432)	0.290
49	4.08	0.510	0.190	(0.459)	0.320
50	4.17	0.540	0.190	(0.486)	0.350
51	4.25	0.570	0.190	(0.513)	0.380
52	4.33	0.600	0.190	(0.540)	0.410
53	4.42	0.630	0.190	(0.567)	0.440
54	4.50	0.630	0.190	(0.567)	0.440
55	4.58	0.660	0.190	(0.594)	0.470
56	4.67	0.690	0.190	(0.621)	0.500

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57	4.75	2.40	0.720	0.190	(0.648)	0.530
58	4.83	2.40	0.720	0.190	(0.648)	0.530
59	4.92	2.50	0.750	0.190	(0.675)	0.560
60	5.00	2.60	0.780	0.190	(0.702)	0.590
61	5.08	3.10	0.930	0.190	(0.837)	0.740
62	5.17	3.60	1.080	0.190	(0.972)	0.889
63	5.25	3.90	1.170	0.190	(1.053)	0.979
64	5.33	4.20	1.260	0.190	(1.134)	1.069
65	5.42	4.70	1.410	0.190	(1.269)	1.219
66	5.50	5.60	1.680	0.190	(1.512)	1.489
67	5.58	1.90	0.570	0.190	(0.513)	0.380
68	5.67	0.90	0.270	0.190	(0.243)	0.080
69	5.75	0.60	0.180	(0.190)	0.162	0.018
70	5.83	0.50	0.150	(0.190)	0.135	0.015
71	5.92	0.30	0.090	(0.190)	0.081	0.009
72	6.00	0.20	0.060	(0.190)	0.054	0.006

(Loss Rate Not Used)

Sum = 100.0 Sum = 16.8

Flood volume = Effective rainfall 1.40(In)
times area 24.2(Ac.)/[(In)/(Ft.)] = 2.8(Ac.Ft)
Total soil loss = 1.10(In)
Total soil loss = 2.219(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 122946.0 Cubic Feet
Total soil loss = 96650.7 Cubic Feet

Peak flow rate of this hydrograph = 28.077(CFS)

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6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0003	0.04	Q				
0+10	0.0016	0.19	Q				
0+15	0.0037	0.31	Q				
0+20	0.0062	0.36	Q				
0+25	0.0088	0.38	Q				
0+30	0.0116	0.41	Q				
0+35	0.0147	0.45	Q				
0+40	0.0180	0.48	Q				
0+45	0.0213	0.49	Q				
0+50	0.0248	0.50	Q				
0+55	0.0282	0.50	Q				
1+ 0	0.0322	0.58	Q				
1+ 5	0.0382	0.86	VQ				
1+10	0.0452	1.02	VQ				
1+15	0.0527	1.09	VQ				
1+20	0.0605	1.13	VQ				
1+25	0.0684	1.15	VQ				
1+30	0.0765	1.17	Q				
1+35	0.0846	1.18	Q				
1+40	0.0928	1.19	Q				
1+45	0.1011	1.20	Q				
1+50	0.1094	1.20	Q				
1+55	0.1177	1.21	Q				
2+ 0	0.1266	1.29	Q				
2+ 5	0.1369	1.50	VQ				
2+10	0.1470	1.46	VQ				
2+15	0.1583	1.64	Q				
2+20	0.1706	1.79	Q				
2+25	0.1833	1.84	Q				
2+30	0.1962	1.87	Q				
2+35	0.2093	1.90	Q				
2+40	0.2224	1.91	VQ				
2+45	0.2362	2.00	VQ				
2+50	0.2520	2.30	Q				
2+55	0.2690	2.48	Q				
3+ 0	0.2866	2.54	VQ				
3+ 5	0.3044	2.59	VQ				
3+10	0.3229	2.69	VQ				
3+15	0.3436	3.00	Q				
3+20	0.3655	3.19	Q				
3+25	0.3885	3.34	Q				
3+30	0.4144	3.76	Q				
3+35	0.4442	4.33	Q				
3+40	0.4778	4.88	Q				
3+45	0.5139	5.25	Q				
3+50	0.5530	5.68	Q				
3+55	0.5945	6.02	Q				

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4+ 0	0.6389	6.44	QV				
4+ 5	0.6856	6.78	Q				
4+10	0.7356	7.27	QV				
4+15	0.7900	7.89	QV				
4+20	0.8489	8.55	Q				
4+25	0.9125	9.24	Q				
4+30	0.9804	9.86	Q				
4+35	1.0512	10.27	Q				
4+40	1.1257	10.82	Q				
4+45	1.2047	11.47	Q				
4+50	1.2880	12.08	Q				
4+55	1.3740	12.49	Q				
5+ 0	1.4638	13.04	Q				
5+ 5	1.5602	14.00	Q				
5+10	1.6714	16.15	Q				
5+15	1.8013	18.86	Q				
5+20	1.9476	21.25	Q				
5+25	2.1103	23.62	Q				
5+30	2.2954	26.87	Q				
5+35	2.4887	28.08	Q				
5+40	2.6179	18.75	Q				
5+45	2.6897	10.43	Q				
5+50	2.7334	6.35	Q				
5+55	2.7629	4.28	Q				
6+ 0	2.7835	3.00	Q				
6+ 5	2.7982	2.14	Q				
6+10	2.8082	1.45	Q				
6+15	2.8148	0.96	Q				
6+20	2.8190	0.61	Q				
6+25	2.8215	0.36	Q				
6+30	2.8221	0.09	Q				
6+35	2.8223	0.03	Q				
6+40	2.8224	0.01	Q				
6+45	2.8224	0.01	Q				
6+50	2.8224	0.00	Q				
6+55	2.8225	0.00	Q				

**EXISTING CONDITION
100-YEAR, 24-HOUR UNIT HYDROGRAPH**

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
 Study date 11/29/17 File: EXIST24100.out

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Riverside County Synthetic Unit Hydrology Method
 RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

English Units used in output format

 17-0108 INDIAN & RAMONA
 UNIT HYDROGRAPH HYDROLOGY
 EXISTING CONDITION
 11/29/17 MJS

 Drainage Area = 24.20(Ac.) = 0.038 Sq. Mi.
 Drainage Area for Depth-Area Areal Adjustment = 24.20(Ac.) = 0.038 Sq. Mi.
 Length along longest watercourse = 1278.00(Ft.)
 Length along longest watercourse measured to centroid = 711.00(Ft.)
 Length along longest watercourse = 0.242 Mi.
 Length along longest watercourse measured to centroid = 0.135 Mi.
 Difference in elevation = 7.30(Ft.)
 Slope along watercourse = 30.1596 Ft./Mi.
 Average Manning's 'N' = 0.030
 Lag time = 0.103 Hr.
 Lag time = 6.16 Min.
 25% of lag time = 1.54 Min.
 40% of lag time = 2.46 Min.
 Unit time = 5.00 Min.
 Duration of storm = 24 Hour(s)
 User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	weighting[1*2]
24.20	1.80	43.56

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	weighting[1*2]
24.20	2.50	60.50

STORM EVENT (YEAR) = 100.00
 Area Averaged 2-Year Rainfall = 1.800(In)
 Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 2.500(In)

Sub-Area Data:
 Area(Ac.) Runoff Index Impervious %
 24.200 84.70 0.000
 Total Area Entered = 24.20(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
84.7	84.7	0.190	0.000	0.190	1.000	0.190
						Sum (F) =
						0.190

Area averaged mean soil loss (F) (In/Hr) = 0.190
 Minimum soil loss rate ((In/Hr)) = 0.095
 (for 24 hour storm duration)
 Soil loss rate (decimal) = 0.900

VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	81.206	13.638
2	0.167	162.412	44.823
3	0.250	243.617	19.592
4	0.333	324.823	8.166
5	0.417	406.029	4.895
6	0.500	487.235	3.062
7	0.583	568.440	2.221
8	0.667	649.646	1.506
9	0.750	730.852	1.000
10	0.833	812.058	1.098
		Sum = 100.000	Sum= 24.389

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	0.07	0.020	(0.338)	0.018	0.002
2	0.17	0.07	0.020	(0.336)	0.018	0.002
3	0.25	0.07	0.020	(0.335)	0.018	0.002
4	0.33	0.10	0.030	(0.334)	0.027	0.003
5	0.42	0.10	0.030	(0.332)	0.027	0.003
6	0.50	0.10	0.030	(0.331)	0.027	0.003
7	0.58	0.10	0.030	(0.330)	0.027	0.003
8	0.67	0.10	0.030	(0.328)	0.027	0.003
9	0.75	0.10	0.030	(0.327)	0.027	0.003
10	0.83	0.13	0.040	(0.326)	0.036	0.004
11	0.92	0.13	0.040	(0.325)	0.036	0.004
12	1.00	0.13	0.040	(0.323)	0.036	0.004
13	1.08	0.10	0.030	(0.322)	0.027	0.003
14	1.17	0.10	0.030	(0.321)	0.027	0.003
15	1.25	0.10	0.030	(0.320)	0.027	0.003
16	1.33	0.10	0.030	(0.318)	0.027	0.003
17	1.42	0.10	0.030	(0.317)	0.027	0.003
18	1.50	0.10	0.030	(0.316)	0.027	0.003
19	1.58	0.10	0.030	(0.314)	0.027	0.003
20	1.67	0.10	0.030	(0.313)	0.027	0.003
21	1.75	0.10	0.030	(0.312)	0.027	0.003
22	1.83	0.13	0.040	(0.311)	0.036	0.004
23	1.92	0.13	0.040	(0.309)	0.036	0.004
24	2.00	0.13	0.040	(0.308)	0.036	0.004
25	2.08	0.13	0.040	(0.307)	0.036	0.004
26	2.17	0.13	0.040	(0.306)	0.036	0.004
27	2.25	0.13	0.040	(0.304)	0.036	0.004
28	2.33	0.13	0.040	(0.303)	0.036	0.004
29	2.42	0.13	0.040	(0.302)	0.036	0.004
30	2.50	0.13	0.040	(0.301)	0.036	0.004
31	2.58	0.17	0.050	(0.300)	0.045	0.005
32	2.67	0.17	0.050	(0.298)	0.045	0.005
33	2.75	0.17	0.050	(0.297)	0.045	0.005
34	2.83	0.17	0.050	(0.296)	0.045	0.005
35	2.92	0.17	0.050	(0.295)	0.045	0.005
36	3.00	0.17	0.050	(0.293)	0.045	0.005
37	3.08	0.17	0.050	(0.292)	0.045	0.005
38	3.17	0.17	0.050	(0.291)	0.045	0.005
39	3.25	0.17	0.050	(0.290)	0.045	0.005
40	3.33	0.17	0.050	(0.289)	0.045	0.005
41	3.42	0.17	0.050	(0.287)	0.045	0.005
42	3.50	0.17	0.050	(0.286)	0.045	0.005
43	3.58	0.17	0.050	(0.285)	0.045	0.005
44	3.67	0.17	0.050	(0.284)	0.045	0.005
45	3.75	0.17	0.050	(0.283)	0.045	0.005
46	3.83	0.20	0.060	(0.281)	0.054	0.006
47	3.92	0.20	0.060	(0.280)	0.054	0.006
48	4.00	0.20	0.060	(0.279)	0.054	0.006
49	4.08	0.20	0.060	(0.278)	0.054	0.006
50	4.17	0.20	0.060	(0.277)	0.054	0.006
51	4.25	0.20	0.060	(0.275)	0.054	0.006
52	4.33	0.23	0.070	(0.274)	0.063	0.007
53	4.42	0.23	0.070	(0.273)	0.063	0.007
54	4.50	0.23	0.070	(0.272)	0.063	0.007
55	4.58	0.23	0.070	(0.271)	0.063	0.007
56	4.67	0.23	0.070	(0.270)	0.063	0.007
57	4.75	0.23	0.070	(0.268)	0.063	0.007
58	4.83	0.27	0.080	(0.267)	0.072	0.008

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59	4.92	0.27	0.080	(0.266)	0.072	0.008
60	5.00	0.27	0.080	(0.265)	0.072	0.008
61	5.08	0.20	0.060	(0.264)	0.054	0.006
62	5.17	0.20	0.060	(	0.263)	0.054	0.006
63	5.25	0.20	0.060	(	0.262)	0.054	0.006
64	5.33	0.23	0.070	(	0.260)	0.063	0.007
65	5.42	0.23	0.070	(	0.259)	0.063	0.007
66	5.50	0.23	0.070	(	0.258)	0.063	0.007
67	5.58	0.27	0.080	(	0.257)	0.072	0.008
68	5.67	0.27	0.080	(	0.256)	0.072	0.008
69	5.75	0.27	0.080	(	0.255)	0.072	0.008
70	5.83	0.27	0.080	(	0.254)	0.072	0.008
71	5.92	0.27	0.080	(	0.252)	0.072	0.008
72	6.00	0.27	0.080	(	0.251)	0.072	0.008
73	6.08	0.30	0.090	(	0.250)	0.081	0.009
74	6.17	0.30	0.090	(	0.249)	0.081	0.009
75	6.25	0.30	0.090	(	0.248)	0.081	0.009
76	6.33	0.30	0.090	(	0.247)	0.081	0.009
77	6.42	0.30	0.090	(	0.246)	0.081	0.009
78	6.50	0.30	0.090	(	0.245)	0.081	0.009
79	6.58	0.33	0.100	(	0.244)	0.090	0.010
80	6.67	0.33	0.100	(	0.242)	0.090	0.010
81	6.75	0.33	0.100	(	0.241)	0.090	0.010
82	6.83	0.33	0.100	(	0.240)	0.090	0.010
83	6.92	0.33	0.100	(	0.239)	0.090	0.010
84	7.00	0.33	0.100	(	0.238)	0.090	0.010
85	7.08	0.33	0.100	(	0.237)	0.090	0.010
86	7.17	0.33	0.100	(	0.236)	0.090	0.010
87	7.25	0.33	0.100	(	0.235)	0.090	0.010
88	7.33	0.37	0.110	(	0.234)	0.099	0.011
89	7.42	0.37	0.110	(	0.233)	0.099	0.011
90	7.50	0.37	0.110	(	0.232)	0.099	0.011
91	7.58	0.40	0.120	(	0.231)	0.108	0.012
92	7.67	0.40	0.120	(	0.230)	0.108	0.012
93	7.75	0.40	0.120	(	0.229)	0.108	0.012
94	7.83	0.43	0.130	(	0.227)	0.117	0.013
95	7.92	0.43	0.130	(	0.226)	0.117	0.013
96	8.00	0.43	0.130	(	0.225)	0.117	0.013
97	8.08	0.50	0.150	(	0.224)	0.135	0.015
98	8.17	0.50	0.150	(	0.223)	0.135	0.015
99	8.25	0.50	0.150	(	0.222)	0.135	0.015
100	8.33	0.50	0.150	(	0.221)	0.135	0.015
101	8.42	0.50	0.150	(	0.220)	0.135	0.015
102	8.50	0.50	0.150	(	0.219)	0.135	0.015
103	8.58	0.53	0.160	(	0.218)	0.144	0.016
104	8.67	0.53	0.160	(	0.217)	0.144	0.016
105	8.75	0.53	0.160	(	0.216)	0.144	0.016
106	8.83	0.57	0.170	(	0.215)	0.153	0.017
107	8.92	0.57	0.170	(	0.214)	0.153	0.017
108	9.00	0.57	0.170	(	0.213)	0.153	0.017
109	9.08	0.63	0.190	(	0.212)	0.171	0.019
110	9.17	0.63	0.190	(	0.211)	0.171	0.019
111	9.25	0.63	0.190	(	0.210)	0.171	0.019
112	9.33	0.67	0.200	(	0.209)	0.180	0.020
113	9.42	0.67	0.200	(	0.208)	0.180	0.020
114	9.50	0.67	0.200	(	0.207)	0.180	0.020
115	9.58	0.70	0.210	(	0.206)	0.189	0.021
116	9.67	0.70	0.210	(	0.205)	0.189	0.021
117	9.75	0.70	0.210	(	0.204)	0.189	0.021
118	9.83	0.73	0.220	(	0.203)	0.198	0.022
119	9.92	0.73	0.220	(	0.202)	0.198	0.022
120	10.00	0.73	0.220	(	0.201)	0.198	0.022
121	10.08	0.50	0.150	(	0.200)	0.135	0.015
122	10.17	0.50	0.150	(	0.199)	0.135	0.015
123	10.25	0.50	0.150	(	0.198)	0.135	0.015
124	10.33	0.50	0.150	(	0.197)	0.135	0.015
125	10.42	0.50	0.150	(	0.196)	0.135	0.015
126	10.50	0.50	0.150	(	0.195)	0.135	0.015
127	10.58	0.67	0.200	(	0.194)	0.180	0.020
128	10.67	0.67	0.200	(	0.193)	0.180	0.020
129	10.75	0.67	0.200	(	0.192)	0.180	0.020
130	10.83	0.67	0.200	(	0.192)	0.180	0.020
131	10.92	0.67	0.200	(	0.191)	0.180	0.020
132	11.00	0.67	0.200	(	0.190)	0.180	0.020
133	11.08	0.63	0.190	(	0.189)	0.171	0.019
134	11.17	0.63	0.190	(	0.188)	0.171	0.019
135	11.25	0.63	0.190	(	0.187)	0.171	0.019
136	11.33	0.63	0.190	(	0.186)	0.171	0.019
137	11.42	0.63	0.190	(	0.185)	0.171	0.019
138	11.50	0.63	0.190	(	0.184)	0.171	0.019
139	11.58	0.57	0.170	(	0.183)	0.153	0.017
140	11.67	0.57	0.170	(0.182)	0.153	0.017
141	11.75	0.57	0.170	(0.181)	0.153	0.017
142	11.83	0.60	0.180	(0.180)	0.162	0.018

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143	11.92	0.60	0.180	(0.180)	0.162	0.018
144	12.00	0.60	0.180	(0.179)	0.162	0.018
145	12.08	0.83	0.250	(0.178	(0.225)	0.072
146	12.17	0.83	0.250	0.177	(0.225)	0.073
147	12.25	0.83	0.250	0.176	(0.225)	0.074
148	12.33	0.87	0.260	0.175	(0.234)	0.085
149	12.42	0.87	0.260	0.174	(0.234)	0.086
150	12.50	0.87	0.260	0.173	(0.234)	0.087
151	12.58	0.93	0.280	0.172	(0.252)	0.108
152	12.67	0.93	0.280	0.172	(0.252)	0.108
153	12.75	0.93	0.280	0.171	(0.252)	0.109
154	12.83	0.97	0.290	0.170	(0.261)	0.120
155	12.92	0.97	0.290	0.169	(0.261)	0.121
156	13.00	0.97	0.290	0.168	(0.261)	0.122
157	13.08	1.13	0.340	0.167	(0.306)	0.173
158	13.17	1.13	0.340	0.166	(0.306)	0.174
159	13.25	1.13	0.340	0.166	(0.306)	0.174
160	13.33	1.13	0.340	0.165	(0.306)	0.175
161	13.42	1.13	0.340	0.164	(0.306)	0.176
162	13.50	1.13	0.340	0.163	(0.306)	0.177
163	13.58	0.77	0.230	0.162	(0.207)	0.068
164	13.67	0.77	0.230	0.161	(0.207)	0.069
165	13.75	0.77	0.230	0.161	(0.207)	0.069
166	13.83	0.77	0.230	0.160	(0.207)	0.070
167	13.92	0.77	0.230	0.159	(0.207)	0.071
168	14.00	0.77	0.230	0.158	(0.207)	0.072
169	14.08	0.90	0.270	0.157	(0.243)	0.113
170	14.17	0.90	0.270	0.157	(0.243)	0.113
171	14.25	0.90	0.270	0.156	(0.243)	0.114
172	14.33	0.87	0.260	0.155	(0.234)	0.105
173	14.42	0.87	0.260	0.154	(0.234)	0.106
174	14.50	0.87	0.260	0.153	(0.234)	0.107
175	14.58	0.87	0.260	0.153	(0.234)	0.107
176	14.67	0.87	0.260	0.152	(0.234)	0.108
177	14.75	0.87	0.260	0.151	(0.234)	0.109
178	14.83	0.83	0.250	0.150	(0.225)	0.100
179	14.92	0.83	0.250	0.149	(0.225)	0.100
180	15.00	0.83	0.250	0.149	(0.225)	0.101
181	15.08	0.80	0.240	0.148	(0.216)	0.092
182	15.17	0.80	0.240	0.147	(0.216)	0.093
183	15.25	0.80	0.240	0.146	(0.216)	0.094
184	15.33	0.77	0.230	0.146	(0.207)	0.084
185	15.42	0.77	0.230	0.145	(0.207)	0.085
186	15.50	0.77	0.230	0.144	(0.207)	0.086
187	15.58	0.63	0.190	0.143	(0.171)	0.047
188	15.67	0.63	0.190	0.143	(0.171)	0.047
189	15.75	0.63	0.190	0.142	(0.171)	0.048
190	15.83	0.63	0.190	0.141	(0.171)	0.049
191	15.92	0.63	0.190	0.141	(0.171)	0.049
192	16.00	0.63	0.190	0.140	(0.171)	0.050
193	16.08	0.13	0.040	(0.139)	0.036	0.004
194	16.17	0.13	0.040	(0.138)	0.036	0.004
195	16.25	0.13	0.040	(0.138)	0.036	0.004
196	16.33	0.13	0.040	(0.137)	0.036	0.004
197	16.42	0.13	0.040	(0.136)	0.036	0.004
198	16.50	0.13	0.040	(0.136)	0.036	0.004
199	16.58	0.10	0.030	(0.135)	0.027	0.003
200	16.67	0.10	0.030	(0.134)	0.027	0.003
201	16.75	0.10	0.030	(0.134)	0.027	0.003
202	16.83	0.10	0.030	(0.133)	0.027	0.003
203	16.92	0.10	0.030	(0.132)	0.027	0.003
204	17.00	0.10	0.030	(0.132)	0.027	0.003
205	17.08	0.17	0.050	(0.131)	0.045	0.005
206	17.17	0.17	0.050	(0.130)	0.045	0.005
207	17.25	0.17	0.050	(0.130)	0.045	0.005
208	17.33	0.17	0.050	(0.129)	0.045	0.005
209	17.42	0.17	0.050	(0.128)	0.045	0.005
210	17.50	0.17	0.050	(0.128)	0.045	0.005
211	17.58	0.17	0.050	(0.127)	0.045	0.005
212	17.67	0.17	0.050	(0.126)	0.045	0.005
213	17.75	0.17	0.050	(0.126)	0.045	0.005
214	17.83	0.13	0.040	(0.125)	0.036	0.004
215	17.92	0.13	0.040	(0.124)	0.036	0.004
216	18.00	0.13	0.040	(0.124)	0.036	0.004
217	18.08	0.13	0.040	(0.123)	0.036	0.004
218	18.17	0.13	0.040	(0.123)	0.036	0.004
219	18.25	0.13	0.040	(0.122)	0.036	0.004
220	18.33	0.13	0.040	(0.121)	0.036	0.004
221	18.42	0.13	0.040	(0.121)	0.036	0.004
222	18.50	0.13	0.040	(0.120)	0.036	0.004
223	18.58	0.10	0.030	(0.120)	0.027	0.003
224	18.67	0.10	0.030	(0.119)	0.027	0.003
225	18.75	0.10	0.030	(0.119)	0.027	0.003
226	18.83	0.07	0.020	(0.118)	0.018	0.002

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227	18.92	0.07	0.020	(0.117)	0.018	0.002
228	19.00	0.07	0.020	(0.117)	0.018	0.002
229	19.08	0.10	0.030	(0.116)	0.027	0.003
230	19.17	0.10	0.030	(0.116)	0.027	0.003
231	19.25	0.10	0.030	(0.115)	0.027	0.003
232	19.33	0.13	0.040	(0.115)	0.036	0.004
233	19.42	0.13	0.040	(0.114)	0.036	0.004
234	19.50	0.13	0.040	(0.114)	0.036	0.004
235	19.58	0.10	0.030	(0.113)	0.027	0.003
236	19.67	0.10	0.030	(0.113)	0.027	0.003
237	19.75	0.10	0.030	(0.112)	0.027	0.003
238	19.83	0.07	0.020	(0.112)	0.018	0.002
239	19.92	0.07	0.020	(0.111)	0.018	0.002
240	20.00	0.07	0.020	(0.111)	0.018	0.002
241	20.08	0.10	0.030	(0.110)	0.027	0.003
242	20.17	0.10	0.030	(0.110)	0.027	0.003
243	20.25	0.10	0.030	(0.109)	0.027	0.003
244	20.33	0.10	0.030	(0.109)	0.027	0.003
245	20.42	0.10	0.030	(0.108)	0.027	0.003
246	20.50	0.10	0.030	(0.108)	0.027	0.003
247	20.58	0.10	0.030	(0.107)	0.027	0.003
248	20.67	0.10	0.030	(0.107)	0.027	0.003
249	20.75	0.10	0.030	(0.106)	0.027	0.003
250	20.83	0.07	0.020	(0.106)	0.018	0.002
251	20.92	0.07	0.020	(0.106)	0.018	0.002
252	21.00	0.07	0.020	(0.105)	0.018	0.002
253	21.08	0.10	0.030	(0.105)	0.027	0.003
254	21.17	0.10	0.030	(0.104)	0.027	0.003
255	21.25	0.10	0.030	(0.104)	0.027	0.003
256	21.33	0.07	0.020	(0.103)	0.018	0.002
257	21.42	0.07	0.020	(0.103)	0.018	0.002
258	21.50	0.07	0.020	(0.103)	0.018	0.002
259	21.58	0.10	0.030	(0.102)	0.027	0.003
260	21.67	0.10	0.030	(0.102)	0.027	0.003
261	21.75	0.10	0.030	(0.102)	0.027	0.003
262	21.83	0.07	0.020	(0.101)	0.018	0.002
263	21.92	0.07	0.020	(0.101)	0.018	0.002
264	22.00	0.07	0.020	(0.101)	0.018	0.002
265	22.08	0.10	0.030	(0.100)	0.027	0.003
266	22.17	0.10	0.030	(0.100)	0.027	0.003
267	22.25	0.10	0.030	(0.100)	0.027	0.003
268	22.33	0.07	0.020	(0.099)	0.018	0.002
269	22.42	0.07	0.020	(0.099)	0.018	0.002
270	22.50	0.07	0.020	(0.099)	0.018	0.002
271	22.58	0.07	0.020	(0.098)	0.018	0.002
272	22.67	0.07	0.020	(0.098)	0.018	0.002
273	22.75	0.07	0.020	(0.098)	0.018	0.002
274	22.83	0.07	0.020	(0.098)	0.018	0.002
275	22.92	0.07	0.020	(0.097)	0.018	0.002
276	23.00	0.07	0.020	(0.097)	0.018	0.002
277	23.08	0.07	0.020	(0.097)	0.018	0.002
278	23.17	0.07	0.020	(0.097)	0.018	0.002
279	23.25	0.07	0.020	(0.096)	0.018	0.002
280	23.33	0.07	0.020	(0.096)	0.018	0.002
281	23.42	0.07	0.020	(0.096)	0.018	0.002
282	23.50	0.07	0.020	(0.096)	0.018	0.002
283	23.58	0.07	0.020	(0.096)	0.018	0.002
284	23.67	0.07	0.020	(0.096)	0.018	0.002
285	23.75	0.07	0.020	(0.095)	0.018	0.002
286	23.83	0.07	0.020	(0.095)	0.018	0.002
287	23.92	0.07	0.020	(0.095)	0.018	0.002
288	24.00	0.07	0.020	(0.095)	0.018	0.002

(Loss Rate Not Used)

Sum = 100.0 Sum = 6.5

Flood volume = Effective rainfall 0.54(In)
 times area 24.2(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
 Total soil loss = 1.96(In)
 Total soil loss = 3.948(Ac.Ft)
 Total rainfall = 2.50(In)
 Flood volume = 47629.7 Cubic Feet
 Total soil loss = 171974.9 Cubic Feet

 Peak flow rate of this hydrograph = 4.205(CFS)

+++++
 24 - HOUR STORM
 Runoff Hydrograph

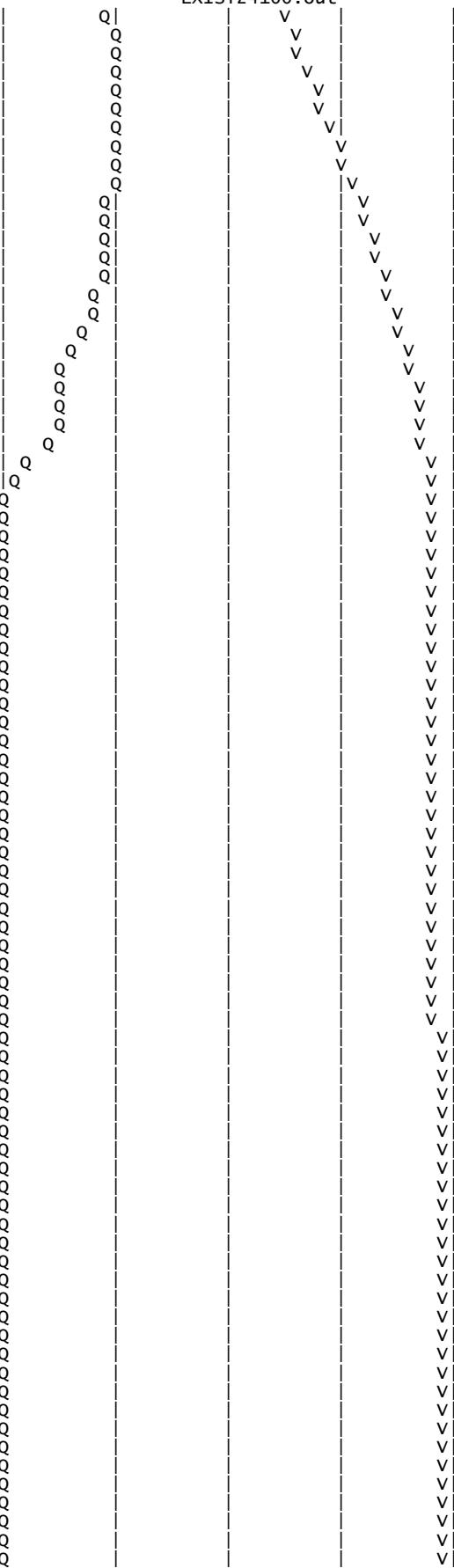
 Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01	Q	|	|	|	|

0+10	0.0002	0.03	Q
0+15	0.0005	0.04	Q
0+20	0.0008	0.05	Q
0+25	0.0012	0.06	Q
0+30	0.0017	0.07	Q
0+35	0.0021	0.07	Q
0+40	0.0026	0.07	Q
0+45	0.0031	0.07	Q
0+50	0.0036	0.08	Q
0+55	0.0042	0.09	Q
1+ 0	0.0049	0.09	Q
1+ 5	0.0055	0.09	Q
1+10	0.0060	0.08	Q
1+15	0.0066	0.08	Q
1+20	0.0071	0.08	Q
1+25	0.0076	0.07	Q
1+30	0.0081	0.07	Q
1+35	0.0086	0.07	Q
1+40	0.0091	0.07	Q
1+45	0.0097	0.07	Q
1+50	0.0102	0.08	Q
1+55	0.0108	0.09	Q
2+ 0	0.0114	0.09	Q
2+ 5	0.0121	0.09	Q
2+10	0.0127	0.10	Q
2+15	0.0134	0.10	Q
2+20	0.0141	0.10	Q
2+25	0.0147	0.10	Q
2+30	0.0154	0.10	Q
2+35	0.0161	0.10	Q
2+40	0.0169	0.11	Q
2+45	0.0177	0.12	Q
2+50	0.0185	0.12	Q
2+55	0.0193	0.12	Q
3+ 0	0.0201	0.12	Q
3+ 5	0.0210	0.12	Q
3+10	0.0218	0.12	Q
3+15	0.0226	0.12	Q
3+20	0.0235	0.12	Q
3+25	0.0243	0.12	Q
3+30	0.0252	0.12	Q
3+35	0.0260	0.12	Q
3+40	0.0268	0.12	Q
3+45	0.0277	0.12	QV
3+50	0.0285	0.13	QV
3+55	0.0295	0.14	QV
4+ 0	0.0305	0.14	QV
4+ 5	0.0314	0.14	QV
4+10	0.0324	0.14	QV
4+15	0.0334	0.14	QV
4+20	0.0345	0.15	QV
4+25	0.0356	0.16	QV
4+30	0.0367	0.17	QV
4+35	0.0379	0.17	QV
4+40	0.0390	0.17	QV
4+45	0.0402	0.17	QV
4+50	0.0414	0.17	QV
4+55	0.0426	0.18	QV
5+ 0	0.0440	0.19	QV
5+ 5	0.0452	0.19	QV
5+10	0.0464	0.16	QV
5+15	0.0474	0.16	QV
5+20	0.0485	0.16	QV
5+25	0.0496	0.16	QV
5+30	0.0508	0.17	QV
5+35	0.0520	0.17	QV
5+40	0.0532	0.18	QV
5+45	0.0545	0.19	QV
5+50	0.0559	0.19	Q V
5+55	0.0572	0.19	Q V
6+ 0	0.0585	0.19	Q V
6+ 5	0.0599	0.20	Q V
6+10	0.0613	0.21	Q V
6+15	0.0628	0.21	Q V
6+20	0.0643	0.22	Q V
6+25	0.0658	0.22	Q V
6+30	0.0673	0.22	Q V
6+35	0.0688	0.22	Q V
6+40	0.0704	0.23	Q V
6+45	0.0721	0.24	Q V
6+50	0.0737	0.24	Q V
6+55	0.0754	0.24	Q V
7+ 0	0.0771	0.24	Q V
7+ 5	0.0787	0.24	Q V

7+10	0.0804	0.24	Q V
7+15	0.0821	0.24	Q V
7+20	0.0838	0.25	Q V
7+25	0.0856	0.26	Q V
7+30	0.0874	0.26	Q V
7+35	0.0892	0.27	Q V
7+40	0.0912	0.28	Q V
7+45	0.0931	0.29	Q V
7+50	0.0951	0.29	Q V
7+55	0.0972	0.30	Q V
8+ 0	0.0994	0.31	Q V
8+ 5	0.1016	0.32	Q V
8+10	0.1039	0.34	Q V
8+15	0.1064	0.35	Q V
8+20	0.1088	0.36	Q V
8+25	0.1113	0.36	Q V
8+30	0.1138	0.36	Q V
8+35	0.1164	0.37	Q V
8+40	0.1190	0.38	Q V
8+45	0.1216	0.38	Q V
8+50	0.1243	0.39	Q V
8+55	0.1271	0.40	Q V
9+ 0	0.1299	0.41	Q V
9+ 5	0.1328	0.42	Q V
9+10	0.1358	0.44	Q V
9+15	0.1389	0.45	Q V
9+20	0.1421	0.46	Q V
9+25	0.1453	0.47	Q V
9+30	0.1486	0.48	Q V
9+35	0.1520	0.49	Q V
9+40	0.1554	0.50	Q V
9+45	0.1589	0.51	Q V
9+50	0.1624	0.51	Q V
9+55	0.1660	0.52	Q V
10+ 0	0.1697	0.53	Q V
10+ 5	0.1732	0.51	Q V
10+10	0.1762	0.43	Q V
10+15	0.1789	0.40	Q V
10+20	0.1816	0.39	Q V
10+25	0.1842	0.38	Q V
10+30	0.1868	0.38	Q V
10+35	0.1895	0.39	Q V
10+40	0.1925	0.44	Q V
10+45	0.1957	0.46	Q V
10+50	0.1990	0.47	Q V
10+55	0.2023	0.48	Q V
11+ 0	0.2056	0.48	Q V
11+ 5	0.2089	0.48	Q V
11+10	0.2121	0.47	Q V
11+15	0.2153	0.47	Q V
11+20	0.2186	0.47	Q V
11+25	0.2218	0.47	Q V
11+30	0.2250	0.47	Q V
11+35	0.2281	0.46	Q V
11+40	0.2311	0.44	Q V
11+45	0.2341	0.43	Q V
11+50	0.2370	0.42	Q V
11+55	0.2400	0.43	Q V
12+ 0	0.2430	0.44	Q V
12+ 5	0.2472	0.62	Q V
12+10	0.2556	1.21	Q V
12+15	0.2658	1.49	Q V
12+20	0.2772	1.65	Q V
12+25	0.2898	1.84	Q V
12+30	0.3032	1.95	Q V
12+35	0.3176	2.08	Q V
12+40	0.3338	2.35	Q V
12+45	0.3510	2.49	Q V
12+50	0.3689	2.61	Q V
12+55	0.3879	2.76	Q V
13+ 0	0.4075	2.85	Q V
13+ 5	0.4287	3.07	Q V
13+10	0.4539	3.66	Q V
13+15	0.4809	3.93	Q V
13+20	0.5089	4.06	Q V
13+25	0.5374	4.14	Q V
13+30	0.5664	4.20	Q V
13+35	0.5932	3.89	Q V
13+40	0.6120	2.72	Q V
13+45	0.6273	2.23	Q V
13+50	0.6414	2.05	Q V
13+55	0.6547	1.93	Q V
14+ 0	0.6676	1.87	Q V
14+ 5	0.6812	1.97	Q V

14+10	0.6976	2.38
14+15	0.7152	2.57
14+20	0.7332	2.60
14+25	0.7508	2.56
14+30	0.7684	2.56
14+35	0.7862	2.58
14+40	0.8042	2.61
14+45	0.8223	2.63
14+50	0.8403	2.62
14+55	0.8577	2.52
15+ 0	0.8748	2.49
15+ 5	0.8917	2.46
15+10	0.9079	2.35
15+15	0.9239	2.32
15+20	0.9396	2.28
15+25	0.9545	2.17
15+30	0.9692	2.13
15+35	0.9829	1.99
15+40	0.9936	1.55
15+45	1.0030	1.37
15+50	1.0119	1.30
15+55	1.0206	1.27
16+ 0	1.0293	1.25
16+ 5	1.0367	1.09
16+10	1.0407	0.58
16+15	1.0431	0.35
16+20	1.0448	0.25
16+25	1.0462	0.20
16+30	1.0473	0.16
16+35	1.0482	0.13
16+40	1.0490	0.11
16+45	1.0496	0.09
16+50	1.0501	0.08
16+55	1.0506	0.08
17+ 0	1.0511	0.07
17+ 5	1.0517	0.08
17+10	1.0524	0.10
17+15	1.0532	0.11
17+20	1.0540	0.12
17+25	1.0548	0.12
17+30	1.0556	0.12
17+35	1.0564	0.12
17+40	1.0573	0.12
17+45	1.0581	0.12
17+50	1.0589	0.12
17+55	1.0597	0.11
18+ 0	1.0604	0.10
18+ 5	1.0611	0.10
18+10	1.0617	0.10
18+15	1.0624	0.10
18+20	1.0631	0.10
18+25	1.0638	0.10
18+30	1.0645	0.10
18+35	1.0651	0.09
18+40	1.0657	0.08
18+45	1.0662	0.08
18+50	1.0667	0.07
18+55	1.0671	0.06
19+ 0	1.0675	0.06
19+ 5	1.0679	0.06
19+10	1.0684	0.07
19+15	1.0688	0.07
19+20	1.0694	0.07
19+25	1.0699	0.09
19+30	1.0706	0.09
19+35	1.0712	0.09
19+40	1.0718	0.08
19+45	1.0723	0.08
19+50	1.0728	0.07
19+55	1.0732	0.06
20+ 0	1.0736	0.06
20+ 5	1.0740	0.06
20+10	1.0744	0.07
20+15	1.0749	0.07
20+20	1.0754	0.07
20+25	1.0759	0.07
20+30	1.0764	0.07
20+35	1.0769	0.07
20+40	1.0774	0.07
20+45	1.0779	0.07
20+50	1.0784	0.07
20+55	1.0788	0.06
21+ 0	1.0791	0.05
21+ 5	1.0795	0.06



EXIST24100.out

21+10	1.0800	0.07	Q		V
21+15	1.0804	0.07	Q		V
21+20	1.0809	0.07	Q		V
21+25	1.0813	0.06	Q		V
21+30	1.0817	0.05	Q		V
21+35	1.0820	0.05	Q		V
21+40	1.0825	0.06	Q		V
21+45	1.0830	0.07	Q		V
21+50	1.0834	0.07	Q		V
21+55	1.0838	0.06	Q		V
22+ 0	1.0842	0.05	Q		V
22+ 5	1.0846	0.05	Q		V
22+10	1.0850	0.06	Q		V
22+15	1.0855	0.07	Q		V
22+20	1.0859	0.07	Q		V
22+25	1.0863	0.06	Q		V
22+30	1.0867	0.05	Q		V
22+35	1.0871	0.05	Q		V
22+40	1.0874	0.05	Q		V
22+45	1.0878	0.05	Q		V
22+50	1.0881	0.05	Q		V
22+55	1.0884	0.05	Q		V
23+ 0	1.0888	0.05	Q		V
23+ 5	1.0891	0.05	Q		V
23+10	1.0894	0.05	Q		V
23+15	1.0898	0.05	Q		V
23+20	1.0901	0.05	Q		V
23+25	1.0905	0.05	Q		V
23+30	1.0908	0.05	Q		V
23+35	1.0911	0.05	Q		V
23+40	1.0915	0.05	Q		V
23+45	1.0918	0.05	Q		V
23+50	1.0921	0.05	Q		V
23+55	1.0925	0.05	Q		V
24+ 0	1.0928	0.05	Q		V
24+ 5	1.0931	0.04	Q		V
24+10	1.0932	0.02	Q		V
24+15	1.0933	0.01	Q		V
24+20	1.0934	0.01	Q		V
24+25	1.0934	0.00	Q		V
24+30	1.0934	0.00	Q		V
24+35	1.0934	0.00	Q		V
24+40	1.0934	0.00	Q		V
24+45	1.0934	0.00	Q		V

PROPOSED CONDITION UNIT HYDROGRAPHS

PROPOSED CONDITION
100-YEAR, 1-HOUR UNIT HYDROGRAPH

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
Study date 12/04/17 File: PROP1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-0108 INDIAN & RAMONA
UNIT HYDROGRAPH HYDROLOGY
PROPOSED CONDITION
12/4/17 MJS

Drainage Area = 24.20(Ac.) = 0.038 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 24.20(Ac.) = 0.038 Sq. Mi.
Length along longest watercourse = 2359.00(Ft.)
Length along longest watercourse measured to centroid = 639.00(Ft.)
Length along longest watercourse = 0.447 Mi.
Length along longest watercourse measured to centroid = 0.121 Mi.
Difference in elevation = 14.00(Ft.)
Slope along watercourse = 31.3353 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.062 Hr.
Lag time = 3.70 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 0.50 12.10

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 1.25 30.25

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.500(In)
Area Averaged 100-Year Rainfall = 1.250(In)

Point rain (area averaged) = 1.250(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.250(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
24.200 66.90 0.900
Total Area Entered = 24.20(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
AMC2 AMC-2 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
66.9 66.9 0.395 0.900 0.075 1.000 0.075
Sum (F) = 0.075

Area averaged mean soil loss (F) (In/Hr) = 0.075
Minimum soil loss rate ((In/Hr)) = 0.038
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	134.970	29.361
2	0.167	269.940	48.017
3	0.250	404.910	12.146
4	0.333	539.880	5.386
5	0.417	674.850	2.929
6	0.500	809.821	2.161
Sum = 100.000			Sum= 24.389

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.630	0.075 (0.113)	0.555
2	0.17	4.30	0.645	0.075 (0.116)	0.570
3	0.25	5.00	0.750	0.075 (0.135)	0.675
4	0.33	5.00	0.750	0.075 (0.135)	0.675
5	0.42	5.80	0.870	0.075 (0.157)	0.795
6	0.50	6.50	0.975	0.075 (0.175)	0.900
7	0.58	7.40	1.110	0.075 (0.200)	1.035
8	0.67	8.60	1.290	0.075 (0.232)	1.215
9	0.75	12.30	1.845	0.075 (0.332)	1.769
10	0.83	29.10	4.364	0.075 (0.786)	4.289
11	0.92	6.80	1.020	0.075 (0.184)	0.945
12	1.00	5.00	0.750	0.075 (0.135)	0.675

(Loss Rate Not Used)

Sum = 100.0 Sum = 14.1

Flood volume = Effective rainfall 1.17(In)
times area 24.2(Ac.)/[(In)/(Ft.)] = 2.4(Ac.Ft)

Total soil loss = 0.08(In)
Total soil loss = 0.152(Ac.Ft)
Total rainfall = 1.25(In)
Flood volume = 103182.6 Cubic Feet
Total soil loss = 6600.9 Cubic Feet

Peak flow rate of this hydrograph = 65.076(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0274	3.97	V	Q			
0+10	0.1002	10.58	V	Q			
0+15	0.1908	13.15	V	Q			
0+20	0.2952	15.16	V	Q			
0+25	0.4105	16.74	V	Q			
0+30	0.5437	19.34	V	Q			
0+35	0.6951	21.98	V	Q			
0+40	0.8699	25.37		Q			
0+45	1.0908	32.08			Q		
0+50	1.4867	57.48				V	
0+55	1.9349	65.08				Q	V
1+ 0	2.1577	32.35			Q		
1+ 5	2.2833	18.25		Q			
1+10	2.3332	7.24		Q			V
1+15	2.3595	3.82	Q				V
1+20	2.3663	0.98	Q				V
1+25	2.3687	0.36	Q				V

**PROPOSED CONDITION
100-YEAR, 3-HOUR UNIT HYDROGRAPH**

Unit Hydrograph Analysis

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Study date 12/04/17 File: PROP3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-0108 INDIAN & RAMONA
UNIT HYDROGRAPH HYDROLOGY
PROPOSED CONDITION
12/4/17 MJS

Drainage Area = 24.20(Ac.) = 0.038 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 24.20(Ac.) = 0.038 Sq. Mi.
Length along longest watercourse = 2359.00(Ft.)
Length along longest watercourse measured to centroid = 639.00(Ft.)
Length along longest watercourse = 0.447 Mi.
Length along longest watercourse measured to centroid = 0.121 Mi.
Difference in elevation = 14.00(Ft.)
Slope along watercourse = 31.3353 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.062 Hr.
Lag time = 3.70 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 0.80 19.36

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 1.90 45.98

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
24.200 66.90 0.900
Total Area Entered = 24.20(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
AMC2 AMC-2 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
66.9 66.9 0.395 0.900 0.075 1.000 0.075
Sum (F) = 0.075

Area averaged mean soil loss (F) (In/Hr) = 0.075
Minimum soil loss rate ((In/Hr)) = 0.038
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

VALLEY S-Curve

Unit Hydrograph Data				
Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)	
1	0.083	134.970	29.361	7.161
2	0.167	269.940	48.017	11.711
3	0.250	404.910	12.146	2.962
4	0.333	539.880	5.386	1.314
5	0.417	674.850	2.929	0.714
6	0.500	809.821	2.161	0.527
Sum = 100.000			Sum=	24.389

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1	0.08	1.30	(0.075)	0.053	0.243
2	0.17	1.30	(0.075)	0.053	0.243
3	0.25	1.10	(0.075)	0.045	0.206
4	0.33	1.50	(0.075)	0.062	0.280
5	0.42	1.50	(0.075)	0.062	0.280
6	0.50	1.80	(0.075)	0.074	0.336
7	0.58	1.50	(0.075)	0.062	0.280
8	0.67	1.80	(0.075)	0.074	0.336
9	0.75	1.80	(0.075)	0.074	0.336
10	0.83	1.50	(0.075)	0.062	0.280
11	0.92	1.60	(0.075)	0.066	0.299
12	1.00	1.80	(0.075)	0.074	0.336
13	1.08	2.20	0.075	(0.090)	0.426
14	1.17	2.20	0.075	(0.090)	0.426
15	1.25	2.20	0.075	(0.090)	0.426
16	1.33	2.00	0.075	(0.082)	0.381
17	1.42	2.60	0.075	(0.107)	0.518
18	1.50	2.70	0.075	(0.111)	0.540
19	1.58	2.40	0.075	(0.098)	0.472
20	1.67	2.70	0.075	(0.111)	0.540
21	1.75	3.30	0.075	(0.135)	0.677
22	1.83	3.10	0.075	(0.127)	0.632
23	1.92	2.90	0.075	(0.119)	0.586
24	2.00	3.00	0.075	(0.123)	0.609
25	2.08	3.10	0.075	(0.127)	0.632
26	2.17	4.20	0.075	(0.172)	0.882
27	2.25	5.00	0.075	(0.205)	1.065
28	2.33	3.50	0.075	(0.144)	0.723
29	2.42	6.80	0.075	(0.279)	1.475
30	2.50	7.30	0.075	(0.300)	1.589
31	2.58	8.20	0.075	(0.336)	1.794
32	2.67	5.90	0.075	(0.242)	1.270
33	2.75	2.00	0.075	(0.082)	0.381
34	2.83	1.80	(0.075)	0.074	0.336
35	2.92	1.80	(0.075)	0.074	0.336
36	3.00	0.60	(0.075)	0.025	0.112

Sum = 100.0 (Loss Rate Not Used) Sum = 20.3

Flood volume = Effective rainfall 1.69(In)
 times area 24.2(Ac.)/[(In)/(Ft.)] = 3.4(Ac.Ft)
 Total soil loss = 0.21(In)
 Total soil loss = 0.422(Ac.Ft)
 Total rainfall = 1.90(In)
 Flood volume = 148519.1 Cubic Feet
 Total soil loss = 18370.6 Cubic Feet

Peak flow rate of this hydrograph = 38.022(CFS)

3 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0120	1.74	VQ				
0+10	0.0436	4.59	V	Q			
0+15	0.0783	5.04	V	Q			
0+20	0.1159	5.46	|V	Q			
0+25	0.1600	6.40	|V	Q			

0+30	0.2089	7.10	v	Q				
0+35	0.2600	7.43	v	Q				
0+40	0.3108	7.37	v	Q				
0+45	0.3657	7.98	v	Q				
0+50	0.4188	7.71	v	Q				
0+55	0.4687	7.25	v	Q				
1+ 0	0.5208	7.58	v	Q				
1+ 5	0.5806	8.67	v	Q				
1+10	0.6482	9.82	v	Q				
1+15	0.7179	10.12	v	Q				
1+20	0.7864	9.95		Q				
1+25	0.8585	10.48		Q				
1+30	0.9422	12.16		Q				
1+35	1.0268	12.28		Q				
1+40	1.1107	12.18		Q				
1+45	1.2062	13.86		Q				
1+50	1.3118	15.34		Q				
1+55	1.4147	14.94		Q				
2+ 0	1.5154	14.62		Q				
2+ 5	1.6187	14.99		Q				
2+10	1.7365	17.10		Q				
2+15	1.8838	21.39		Q				
2+20	2.0342	21.84		Q				
2+25	2.2004	24.12		Q				
2+30	2.4289	33.17		Q				
2+35	2.6907	38.02		Q				
2+40	2.9514	37.85		Q				
2+45	3.1336	26.45		Q				
2+50	3.2362	14.91		Q				
2+55	3.3139	11.27		Q				
3+ 0	3.3696	8.10		Q				
3+ 5	3.3951	3.70	Q	Q				
3+10	3.4035	1.22	Q	Q				
3+15	3.4073	0.57	Q	Q				
3+20	3.4091	0.26	Q	Q				
3+25	3.4095	0.06	Q	Q				

**PROPOSED CONDITION
100-YEAR, 6-HOUR UNIT HYDROGRAPH**

Unit Hydrograph Analysis

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Study date 12/04/17 File: PROP6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used
English Units used in output format

17-0108 INDIAN & RAMONA
UNIT HYDROGRAPH HYDROLOGY
PROPOSED CONDITION
12/4/17 MJS

Drainage Area = 24.20(Ac.) = 0.038 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 24.20(Ac.) = 0.038 Sq. Mi.
Length along longest watercourse = 2359.00(Ft.)
Length along longest watercourse measured to centroid = 639.00(Ft.)
Length along longest watercourse = 0.447 Mi.
Length along longest watercourse measured to centroid = 0.121 Mi.
Difference in elevation = 14.00(Ft.)
Slope along watercourse = 31.3353 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.062 Hr.
Lag time = 3.70 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 1.00 24.20

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 2.50 60.50

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
24.200 66.90 0.900
Total Area Entered = 24.20(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
AMC2 AMC-2 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
66.9 66.9 0.395 0.900 0.075 1.000 0.075
Sum (F) = 0.075

Area averaged mean soil loss (F) (In/Hr) = 0.075
Minimum soil loss rate ((In/Hr)) = 0.038
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

VALLEY S-Curve

Unit Hydrograph Data				
Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)	
1	0.083	134.970	29.361	7.161
2	0.167	269.940	48.017	11.711
3	0.250	404.910	12.146	2.962
4	0.333	539.880	5.386	1.314
5	0.417	674.850	2.929	0.714
6	0.500	809.821	2.161	0.527
			Sum = 100.000	Sum= 24.389

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1	0.08	0.150	(0.075)	0.027	0.123
2	0.17	0.180	(0.075)	0.032	0.148
3	0.25	0.180	(0.075)	0.032	0.148
4	0.33	0.180	(0.075)	0.032	0.148
5	0.42	0.180	(0.075)	0.032	0.148
6	0.50	0.210	(0.075)	0.038	0.172
7	0.58	0.210	(0.075)	0.038	0.172
8	0.67	0.210	(0.075)	0.038	0.172
9	0.75	0.210	(0.075)	0.038	0.172
10	0.83	0.210	(0.075)	0.038	0.172
11	0.92	0.210	(0.075)	0.038	0.172
12	1.00	0.240	(0.075)	0.043	0.197
13	1.08	0.240	(0.075)	0.043	0.197
14	1.17	0.240	(0.075)	0.043	0.197
15	1.25	0.240	(0.075)	0.043	0.197
16	1.33	0.240	(0.075)	0.043	0.197
17	1.42	0.240	(0.075)	0.043	0.197
18	1.50	0.240	(0.075)	0.043	0.197
19	1.58	0.240	(0.075)	0.043	0.197
20	1.67	0.240	(0.075)	0.043	0.197
21	1.75	0.240	(0.075)	0.043	0.197
22	1.83	0.240	(0.075)	0.043	0.197
23	1.92	0.240	(0.075)	0.043	0.197
24	2.00	0.270	(0.075)	0.049	0.221
25	2.08	0.240	(0.075)	0.043	0.197
26	2.17	0.270	(0.075)	0.049	0.221
27	2.25	0.270	(0.075)	0.049	0.221
28	2.33	0.270	(0.075)	0.049	0.221
29	2.42	0.270	(0.075)	0.049	0.221
30	2.50	0.270	(0.075)	0.049	0.221
31	2.58	0.270	(0.075)	0.049	0.221
32	2.67	0.270	(0.075)	0.049	0.221
33	2.75	0.300	(0.075)	0.054	0.246
34	2.83	0.300	(0.075)	0.054	0.246
35	2.92	0.300	(0.075)	0.054	0.246
36	3.00	0.300	(0.075)	0.054	0.246
37	3.08	0.300	(0.075)	0.054	0.246
38	3.17	0.330	(0.075)	0.059	0.271
39	3.25	0.330	(0.075)	0.059	0.271
40	3.33	0.330	(0.075)	0.059	0.271
41	3.42	0.360	(0.075)	0.065	0.295
42	3.50	0.390	(0.075)	0.070	0.320
43	3.58	0.420	0.075	(0.076)	0.345
44	3.67	0.420	0.075	(0.076)	0.345
45	3.75	0.450	0.075	(0.081)	0.375
46	3.83	0.450	0.075	(0.081)	0.375
47	3.92	0.480	0.075	(0.086)	0.405
48	4.00	0.480	0.075	(0.086)	0.405
49	4.08	0.510	0.075	(0.092)	0.435
50	4.17	0.540	0.075	(0.097)	0.465
51	4.25	0.570	0.075	(0.103)	0.495
52	4.33	0.600	0.075	(0.108)	0.525
53	4.42	0.630	0.075	(0.113)	0.555
54	4.50	0.630	0.075	(0.113)	0.555
55	4.58	0.660	0.075	(0.119)	0.585
56	4.67	0.690	0.075	(0.124)	0.615
57	4.75	0.720	0.075	(0.130)	0.645
58	4.83	0.720	0.075	(0.130)	0.645
59	4.92	0.750	0.075	(0.135)	0.675
60	5.00	0.780	0.075	(0.140)	0.705
61	5.08	0.930	0.075	(0.167)	0.855
62	5.17	1.080	0.075	(0.194)	1.005

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63	5.25	3.90	1.170	0.075	(0.211)	1.095
64	5.33	4.20	1.260	0.075	(0.227)	1.185
65	5.42	4.70	1.410	0.075	(0.254)	1.335
66	5.50	5.60	1.680	0.075	(0.302)	1.605
67	5.58	1.90	0.570	0.075	(0.103)	0.495
68	5.67	0.90	0.270	(0.075)	0.049	0.221
69	5.75	0.60	0.180	(0.075)	0.032	0.148
70	5.83	0.50	0.150	(0.075)	0.027	0.123
71	5.92	0.30	0.090	(0.075)	0.016	0.074
72	6.00	0.20	0.060	(0.075)	0.011	0.049

(Loss Rate Not Used)

Sum = 100.0 Sum = 26.1

Flood volume = Effective rainfall 2.17(In)
times area 24.2(Ac.)/[(In)/(Ft.)] = 4.4(Ac.Ft)
Total soil loss = 0.33(In)
Total soil loss = 0.661(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 190824.5 Cubic Feet
Total soil loss = 28772.2 Cubic Feet

Peak flow rate of this hydrograph = 33.255(CFS)

6 - H O U R S T O R M

R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0061	0.88	Q				
0+10	0.0233	2.50	V Q				
0+15	0.0450	3.15	V Q				
0+20	0.0683	3.39	V Q				
0+25	0.0924	3.51	V Q				
0+30	0.1184	3.76	V Q				
0+35	0.1464	4.07	V Q				
0+40	0.1749	4.14	V Q				
0+45	0.2036	4.17	V Q				
0+50	0.2324	4.19	V Q				
0+55	0.2614	4.20	V Q				
1+ 0	0.2915	4.38	V Q				
1+ 5	0.3237	4.67	V Q				
1+10	0.3563	4.74	V Q				
1+15	0.3892	4.77	V Q				
1+20	0.4221	4.79	V Q				
1+25	0.4552	4.80	Q				
1+30	0.4883	4.80	Q				
1+35	0.5214	4.80	Q				
1+40	0.5544	4.80	Q V				
1+45	0.5875	4.80	Q V				
1+50	0.6206	4.80	Q V				
1+55	0.6536	4.80	Q V				
2+ 0	0.6879	4.98	Q V				
2+ 5	0.7230	5.09	Q V				
2+10	0.7578	5.05	Q V				
2+15	0.7943	5.30	Q V				
2+20	0.8312	5.36	Q V				
2+25	0.8682	5.38	Q V				
2+30	0.9054	5.39	Q V				
2+35	0.9426	5.40	Q V				
2+40	0.9798	5.40	Q V				
2+45	1.0182	5.58	Q V				
2+50	1.0586	5.87	Q V				
2+55	1.0995	5.94	Q V				
3+ 0	1.1406	5.97	Q V				
3+ 5	1.1819	5.99	Q V				
3+10	1.2244	6.18	Q V				
3+15	1.2690	6.47	Q V				
3+20	1.3140	6.54	Q V				
3+25	1.3605	6.75	Q V				
3+30	1.4103	7.23	Q V				
3+35	1.4639	7.78	Q V				
3+40	1.5202	8.18	Q V				
3+45	1.5789	8.52	Q V				
3+50	1.6405	8.94	Q V				
3+55	1.7043	9.27	Q V				
4+ 0	1.7709	9.68	Q V				
4+ 5	1.8398	10.00	Q V				
4+10	1.9130	10.62	Q V				
4+15	1.9908	11.30	Q V				
4+20	2.0735	12.01	Q V				
4+25	2.1611	12.73	Q V				

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4+30	2.2524	13.24			Q	V				
4+35	2.3462	13.62			Q	V				
4+40	2.4444	14.27			Q	V				
4+45	2.5475	14.96			Q	V				
4+50	2.6539	15.45			Q	V				
4+55	2.7628	15.82			Q	V				
5+ 0	2.8762	16.46			Q	V				
5+ 5	3.0003	18.01			Q	V				
5+10	3.1449	20.99			Q	V				
5+15	3.3094	23.90			Q	V				
5+20	3.4904	26.28			Q	V				
5+25	3.6901	28.99			Q	V				
5+30	3.9191	33.26			Q	V				
5+35	4.1200	29.17			Q	V				
5+40	4.2255	15.32			Q	V				
5+45	4.2862	8.81		Q						V
5+50	4.3259	5.77		Q						V
5+55	4.3527	3.90	Q	Q						V
6+ 0	4.3679	2.19	Q	Q						V
6+ 5	4.3760	1.18	Q	Q						V
6+10	4.3788	0.41	Q	Q						V
6+15	4.3800	0.18	Q	Q						V
6+20	4.3805	0.07	Q	Q						V
6+25	4.3807	0.03	Q	Q						V

PROPOSED CONDITION
100-YEAR, 24-HOUR UNIT HYDROGRAPH

Unit Hydrograph Analysis

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Study date 12/04/17 File: PROP24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 4010

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-0108 INDIAN & RAMONA
UNIT HYDROGRAPH HYDROLOGY
PROPOSED CONDITION
12/4/17 MJS

Drainage Area = 24.20(Ac.) = 0.038 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 24.20(Ac.) = 0.038 Sq. Mi.
Length along longest watercourse = 2359.00(Ft.)
Length along longest watercourse measured to centroid = 639.00(Ft.)
Length along longest watercourse = 0.447 Mi.
Length along longest watercourse measured to centroid = 0.121 Mi.
Difference in elevation = 14.00(Ft.)
Slope along watercourse = 31.3353 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.062 Hr.
Lag time = 3.70 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 1.80 43.56

100 YEAR Area rainfall data:

Area(Ac.)[1] Rainfall(In)[2] weighting[1*2]
24.20 4.50 108.90

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.800(In)
Area Averaged 100-Year Rainfall = 4.500(In)

Point rain (area averaged) = 4.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.500(In)

Sub-Area Data:
Area(Ac.) Runoff Index Impervious %
24.200 66.90 0.900
Total Area Entered = 24.20(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
AMC2 AMC-2 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
66.9 66.9 0.395 0.900 0.075 1.000 0.075
Sum (F) = 0.075

Area averaged mean soil loss (F) (In/Hr) = 0.075
Minimum soil loss rate ((In/Hr)) = 0.038
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

VALLEY S-Curve

Unit Hydrograph Data				
Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)	
1	0.083	134.970	29.361	7.161
2	0.167	269.940	48.017	11.711
3	0.250	404.910	12.146	2.962
4	0.333	539.880	5.386	1.314
5	0.417	674.850	2.929	0.714
6	0.500	809.821	2.161	0.527
			Sum = 100.000	Sum= 24.389

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
			Max	Low	
1	0.08	0.036	(0.133)	0.006	0.030
2	0.17	0.036	(0.133)	0.006	0.030
3	0.25	0.036	(0.132)	0.006	0.030
4	0.33	0.054	(0.132)	0.010	0.044
5	0.42	0.054	(0.131)	0.010	0.044
6	0.50	0.054	(0.131)	0.010	0.044
7	0.58	0.054	(0.130)	0.010	0.044
8	0.67	0.054	(0.130)	0.010	0.044
9	0.75	0.054	(0.129)	0.010	0.044
10	0.83	0.072	(0.129)	0.013	0.059
11	0.92	0.072	(0.128)	0.013	0.059
12	1.00	0.072	(0.128)	0.013	0.059
13	1.08	0.054	(0.127)	0.010	0.044
14	1.17	0.054	(0.127)	0.010	0.044
15	1.25	0.054	(0.126)	0.010	0.044
16	1.33	0.054	(0.126)	0.010	0.044
17	1.42	0.054	(0.125)	0.010	0.044
18	1.50	0.054	(0.125)	0.010	0.044
19	1.58	0.054	(0.124)	0.010	0.044
20	1.67	0.054	(0.124)	0.010	0.044
21	1.75	0.054	(0.123)	0.010	0.044
22	1.83	0.072	(0.123)	0.013	0.059
23	1.92	0.072	(0.122)	0.013	0.059
24	2.00	0.072	(0.122)	0.013	0.059
25	2.08	0.072	(0.121)	0.013	0.059
26	2.17	0.072	(0.121)	0.013	0.059
27	2.25	0.072	(0.120)	0.013	0.059
28	2.33	0.072	(0.120)	0.013	0.059
29	2.42	0.072	(0.119)	0.013	0.059
30	2.50	0.072	(0.119)	0.013	0.059
31	2.58	0.090	(0.118)	0.016	0.074
32	2.67	0.090	(0.118)	0.016	0.074
33	2.75	0.090	(0.117)	0.016	0.074
34	2.83	0.090	(0.117)	0.016	0.074
35	2.92	0.090	(0.116)	0.016	0.074
36	3.00	0.090	(0.116)	0.016	0.074
37	3.08	0.090	(0.115)	0.016	0.074
38	3.17	0.090	(0.115)	0.016	0.074
39	3.25	0.090	(0.114)	0.016	0.074
40	3.33	0.090	(0.114)	0.016	0.074
41	3.42	0.090	(0.113)	0.016	0.074
42	3.50	0.090	(0.113)	0.016	0.074
43	3.58	0.090	(0.112)	0.016	0.074
44	3.67	0.090	(0.112)	0.016	0.074
45	3.75	0.090	(0.111)	0.016	0.074
46	3.83	0.108	(0.111)	0.019	0.089
47	3.92	0.108	(0.111)	0.019	0.089
48	4.00	0.108	(0.110)	0.019	0.089
49	4.08	0.108	(0.110)	0.019	0.089
50	4.17	0.108	(0.109)	0.019	0.089
51	4.25	0.108	(0.109)	0.019	0.089
52	4.33	0.126	(0.108)	0.023	0.103
53	4.42	0.126	(0.108)	0.023	0.103
54	4.50	0.126	(0.107)	0.023	0.103
55	4.58	0.126	(0.107)	0.023	0.103
56	4.67	0.126	(0.106)	0.023	0.103
57	4.75	0.126	(0.106)	0.023	0.103
58	4.83	0.144	(0.105)	0.026	0.118
59	4.92	0.144	(0.105)	0.026	0.118
60	5.00	0.144	(0.105)	0.026	0.118
61	5.08	0.108	(0.104)	0.019	0.089
62	5.17	0.108	(0.104)	0.019	0.089

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63	5.25	0.20	0.108	(0.103)	0.019	0.089
64	5.33	0.23	0.126	(0.103)	0.023	0.103
65	5.42	0.23	0.126	(0.102)	0.023	0.103
66	5.50	0.23	0.126	(0.102)	0.023	0.103
67	5.58	0.27	0.144	(0.101)	0.026	0.118
68	5.67	0.27	0.144	(0.101)	0.026	0.118
69	5.75	0.27	0.144	(0.101)	0.026	0.118
70	5.83	0.27	0.144	(0.100)	0.026	0.118
71	5.92	0.27	0.144	(0.100)	0.026	0.118
72	6.00	0.27	0.144	(0.099)	0.026	0.118
73	6.08	0.30	0.162	(0.099)	0.029	0.133
74	6.17	0.30	0.162	(0.098)	0.029	0.133
75	6.25	0.30	0.162	(0.098)	0.029	0.133
76	6.33	0.30	0.162	(0.097)	0.029	0.133
77	6.42	0.30	0.162	(0.097)	0.029	0.133
78	6.50	0.30	0.162	(0.097)	0.029	0.133
79	6.58	0.33	0.180	(0.096)	0.032	0.148
80	6.67	0.33	0.180	(0.096)	0.032	0.148
81	6.75	0.33	0.180	(0.095)	0.032	0.148
82	6.83	0.33	0.180	(0.095)	0.032	0.148
83	6.92	0.33	0.180	(0.094)	0.032	0.148
84	7.00	0.33	0.180	(0.094)	0.032	0.148
85	7.08	0.33	0.180	(0.094)	0.032	0.148
86	7.17	0.33	0.180	(0.093)	0.032	0.148
87	7.25	0.33	0.180	(0.093)	0.032	0.148
88	7.33	0.37	0.198	(0.092)	0.036	0.162
89	7.42	0.37	0.198	(0.092)	0.036	0.162
90	7.50	0.37	0.198	(0.091)	0.036	0.162
91	7.58	0.40	0.216	(0.091)	0.039	0.177
92	7.67	0.40	0.216	(0.091)	0.039	0.177
93	7.75	0.40	0.216	(0.090)	0.039	0.177
94	7.83	0.43	0.234	(0.090)	0.042	0.192
95	7.92	0.43	0.234	(0.089)	0.042	0.192
96	8.00	0.43	0.234	(0.089)	0.042	0.192
97	8.08	0.50	0.270	(0.089)	0.049	0.221
98	8.17	0.50	0.270	(0.088)	0.049	0.221
99	8.25	0.50	0.270	(0.088)	0.049	0.221
100	8.33	0.50	0.270	(0.087)	0.049	0.221
101	8.42	0.50	0.270	(0.087)	0.049	0.221
102	8.50	0.50	0.270	(0.086)	0.049	0.221
103	8.58	0.53	0.288	(0.086)	0.052	0.236
104	8.67	0.53	0.288	(0.086)	0.052	0.236
105	8.75	0.53	0.288	(0.085)	0.052	0.236
106	8.83	0.57	0.306	(0.085)	0.055	0.251
107	8.92	0.57	0.306	(0.084)	0.055	0.251
108	9.00	0.57	0.306	(0.084)	0.055	0.251
109	9.08	0.63	0.342	(0.084)	0.062	0.280
110	9.17	0.63	0.342	(0.083)	0.062	0.280
111	9.25	0.63	0.342	(0.083)	0.062	0.280
112	9.33	0.67	0.360	(0.082)	0.065	0.295
113	9.42	0.67	0.360	(0.082)	0.065	0.295
114	9.50	0.67	0.360	(0.082)	0.065	0.295
115	9.58	0.70	0.378	(0.081)	0.068	0.310
116	9.67	0.70	0.378	(0.081)	0.068	0.310
117	9.75	0.70	0.378	(0.081)	0.068	0.310
118	9.83	0.73	0.396	(0.080)	0.071	0.325
119	9.92	0.73	0.396	(0.080)	0.071	0.325
120	10.00	0.73	0.396	(0.079)	0.071	0.325
121	10.08	0.50	0.270	(0.079)	0.049	0.221
122	10.17	0.50	0.270	(0.079)	0.049	0.221
123	10.25	0.50	0.270	(0.078)	0.049	0.221
124	10.33	0.50	0.270	(0.078)	0.049	0.221
125	10.42	0.50	0.270	(0.077)	0.049	0.221
126	10.50	0.50	0.270	(0.077)	0.049	0.221
127	10.58	0.67	0.360	(0.077)	0.065	0.295
128	10.67	0.67	0.360	(0.076)	0.065	0.295
129	10.75	0.67	0.360	(0.076)	0.065	0.295
130	10.83	0.67	0.360	(0.076)	0.065	0.295
131	10.92	0.67	0.360	(0.075)	0.065	0.295
132	11.00	0.67	0.360	(0.075)	0.065	0.295
133	11.08	0.63	0.342	(0.074)	0.062	0.280
134	11.17	0.63	0.342	(0.074)	0.062	0.280
135	11.25	0.63	0.342	(0.074)	0.062	0.280
136	11.33	0.63	0.342	(0.073)	0.062	0.280
137	11.42	0.63	0.342	(0.073)	0.062	0.280
138	11.50	0.63	0.342	(0.073)	0.062	0.280
139	11.58	0.57	0.306	(0.072)	0.055	0.251
140	11.67	0.57	0.306	(0.072)	0.055	0.251
141	11.75	0.57	0.306	(0.072)	0.055	0.251
142	11.83	0.60	0.324	(0.071)	0.058	0.266
143	11.92	0.60	0.324	(0.071)	0.058	0.266
144	12.00	0.60	0.324	(0.070)	0.058	0.266
145	12.08	0.83	0.450	0.070	(0.081)	0.380
146	12.17	0.83	0.450	0.070	(0.081)	0.380

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147	12.25	0.83	0.450	0.069	(0.081)	0.381
148	12.33	0.87	0.468	0.069	(0.084)	0.399
149	12.42	0.87	0.468	0.069	(0.084)	0.399
150	12.50	0.87	0.468	0.068	(0.084)	0.400
151	12.58	0.93	0.504	0.068	(0.091)	0.436
152	12.67	0.93	0.504	0.068	(0.091)	0.436
153	12.75	0.93	0.504	0.067	(0.091)	0.437
154	12.83	0.97	0.522	0.067	(0.094)	0.455
155	12.92	0.97	0.522	0.067	(0.094)	0.455
156	13.00	0.97	0.522	0.066	(0.094)	0.456
157	13.08	1.13	0.612	0.066	(0.110)	0.546
158	13.17	1.13	0.612	0.066	(0.110)	0.546
159	13.25	1.13	0.612	0.065	(0.110)	0.547
160	13.33	1.13	0.612	0.065	(0.110)	0.547
161	13.42	1.13	0.612	0.065	(0.110)	0.547
162	13.50	1.13	0.612	0.064	(0.110)	0.548
163	13.58	0.77	0.414	0.064	(0.075)	0.350
164	13.67	0.77	0.414	0.064	(0.075)	0.350
165	13.75	0.77	0.414	0.063	(0.075)	0.351
166	13.83	0.77	0.414	0.063	(0.075)	0.351
167	13.92	0.77	0.414	0.063	(0.075)	0.351
168	14.00	0.77	0.414	0.062	(0.075)	0.352
169	14.08	0.90	0.486	0.062	(0.087)	0.424
170	14.17	0.90	0.486	0.062	(0.087)	0.424
171	14.25	0.90	0.486	0.061	(0.087)	0.425
172	14.33	0.87	0.468	0.061	(0.084)	0.407
173	14.42	0.87	0.468	0.061	(0.084)	0.407
174	14.50	0.87	0.468	0.061	(0.084)	0.407
175	14.58	0.87	0.468	0.060	(0.084)	0.408
176	14.67	0.87	0.468	0.060	(0.084)	0.408
177	14.75	0.87	0.468	0.060	(0.084)	0.408
178	14.83	0.83	0.450	0.059	(0.081)	0.391
179	14.92	0.83	0.450	0.059	(0.081)	0.391
180	15.00	0.83	0.450	0.059	(0.081)	0.391
181	15.08	0.80	0.432	0.058	(0.078)	0.374
182	15.17	0.80	0.432	0.058	(0.078)	0.374
183	15.25	0.80	0.432	0.058	(0.078)	0.374
184	15.33	0.77	0.414	0.057	(0.075)	0.356
185	15.42	0.77	0.414	0.057	(0.075)	0.357
186	15.50	0.77	0.414	0.057	(0.075)	0.357
187	15.58	0.63	0.342	0.057	(0.062)	0.285
188	15.67	0.63	0.342	0.056	(0.062)	0.286
189	15.75	0.63	0.342	0.056	(0.062)	0.286
190	15.83	0.63	0.342	0.056	(0.062)	0.286
191	15.92	0.63	0.342	0.055	(0.062)	0.287
192	16.00	0.63	0.342	0.055	(0.062)	0.287
193	16.08	0.13	0.072	(0.055)	0.013	0.059
194	16.17	0.13	0.072	(0.055)	0.013	0.059
195	16.25	0.13	0.072	(0.054)	0.013	0.059
196	16.33	0.13	0.072	(0.054)	0.013	0.059
197	16.42	0.13	0.072	(0.054)	0.013	0.059
198	16.50	0.13	0.072	(0.054)	0.013	0.059
199	16.58	0.10	0.054	(0.053)	0.010	0.044
200	16.67	0.10	0.054	(0.053)	0.010	0.044
201	16.75	0.10	0.054	(0.053)	0.010	0.044
202	16.83	0.10	0.054	(0.052)	0.010	0.044
203	16.92	0.10	0.054	(0.052)	0.010	0.044
204	17.00	0.10	0.054	(0.052)	0.010	0.044
205	17.08	0.17	0.090	(0.052)	0.016	0.074
206	17.17	0.17	0.090	(0.051)	0.016	0.074
207	17.25	0.17	0.090	(0.051)	0.016	0.074
208	17.33	0.17	0.090	(0.051)	0.016	0.074
209	17.42	0.17	0.090	(0.051)	0.016	0.074
210	17.50	0.17	0.090	(0.050)	0.016	0.074
211	17.58	0.17	0.090	(0.050)	0.016	0.074
212	17.67	0.17	0.090	(0.050)	0.016	0.074
213	17.75	0.17	0.090	(0.050)	0.016	0.074
214	17.83	0.13	0.072	(0.049)	0.013	0.059
215	17.92	0.13	0.072	(0.049)	0.013	0.059
216	18.00	0.13	0.072	(0.049)	0.013	0.059
217	18.08	0.13	0.072	(0.049)	0.013	0.059
218	18.17	0.13	0.072	(0.048)	0.013	0.059
219	18.25	0.13	0.072	(0.048)	0.013	0.059
220	18.33	0.13	0.072	(0.048)	0.013	0.059
221	18.42	0.13	0.072	(0.048)	0.013	0.059
222	18.50	0.13	0.072	(0.047)	0.013	0.059
223	18.58	0.10	0.054	(0.047)	0.010	0.044
224	18.67	0.10	0.054	(0.047)	0.010	0.044
225	18.75	0.10	0.054	(0.047)	0.010	0.044
226	18.83	0.07	0.036	(0.047)	0.006	0.030
227	18.92	0.07	0.036	(0.046)	0.006	0.030
228	19.00	0.07	0.036	(0.046)	0.006	0.030
229	19.08	0.10	0.054	(0.046)	0.010	0.044
230	19.17	0.10	0.054	(0.046)	0.010	0.044

231	19.25	0.10	0.054	(0.045)	0.010	0.044
232	19.33	0.13	0.072	(0.045)	0.013	0.059
233	19.42	0.13	0.072	(0.045)	0.013	0.059
234	19.50	0.13	0.072	(0.045)	0.013	0.059
235	19.58	0.10	0.054	(0.045)	0.010	0.044
236	19.67	0.10	0.054	(0.044)	0.010	0.044
237	19.75	0.10	0.054	(0.044)	0.010	0.044
238	19.83	0.07	0.036	(0.044)	0.006	0.030
239	19.92	0.07	0.036	(0.044)	0.006	0.030
240	20.00	0.07	0.036	(0.044)	0.006	0.030
241	20.08	0.10	0.054	(0.043)	0.010	0.044
242	20.17	0.10	0.054	(0.043)	0.010	0.044
243	20.25	0.10	0.054	(0.043)	0.010	0.044
244	20.33	0.10	0.054	(0.043)	0.010	0.044
245	20.42	0.10	0.054	(0.043)	0.010	0.044
246	20.50	0.10	0.054	(0.043)	0.010	0.044
247	20.58	0.10	0.054	(0.042)	0.010	0.044
248	20.67	0.10	0.054	(0.042)	0.010	0.044
249	20.75	0.10	0.054	(0.042)	0.010	0.044
250	20.83	0.07	0.036	(0.042)	0.006	0.030
251	20.92	0.07	0.036	(0.042)	0.006	0.030
252	21.00	0.07	0.036	(0.041)	0.006	0.030
253	21.08	0.10	0.054	(0.041)	0.010	0.044
254	21.17	0.10	0.054	(0.041)	0.010	0.044
255	21.25	0.10	0.054	(0.041)	0.010	0.044
256	21.33	0.07	0.036	(0.041)	0.006	0.030
257	21.42	0.07	0.036	(0.041)	0.006	0.030
258	21.50	0.07	0.036	(0.041)	0.006	0.030
259	21.58	0.10	0.054	(0.040)	0.010	0.044
260	21.67	0.10	0.054	(0.040)	0.010	0.044
261	21.75	0.10	0.054	(0.040)	0.010	0.044
262	21.83	0.07	0.036	(0.040)	0.006	0.030
263	21.92	0.07	0.036	(0.040)	0.006	0.030
264	22.00	0.07	0.036	(0.040)	0.006	0.030
265	22.08	0.10	0.054	(0.040)	0.010	0.044
266	22.17	0.10	0.054	(0.039)	0.010	0.044
267	22.25	0.10	0.054	(0.039)	0.010	0.044
268	22.33	0.07	0.036	(0.039)	0.006	0.030
269	22.42	0.07	0.036	(0.039)	0.006	0.030
270	22.50	0.07	0.036	(0.039)	0.006	0.030
271	22.58	0.07	0.036	(0.039)	0.006	0.030
272	22.67	0.07	0.036	(0.039)	0.006	0.030
273	22.75	0.07	0.036	(0.039)	0.006	0.030
274	22.83	0.07	0.036	(0.039)	0.006	0.030
275	22.92	0.07	0.036	(0.038)	0.006	0.030
276	23.00	0.07	0.036	(0.038)	0.006	0.030
277	23.08	0.07	0.036	(0.038)	0.006	0.030
278	23.17	0.07	0.036	(0.038)	0.006	0.030
279	23.25	0.07	0.036	(0.038)	0.006	0.030
280	23.33	0.07	0.036	(0.038)	0.006	0.030
281	23.42	0.07	0.036	(0.038)	0.006	0.030
282	23.50	0.07	0.036	(0.038)	0.006	0.030
283	23.58	0.07	0.036	(0.038)	0.006	0.030
284	23.67	0.07	0.036	(0.038)	0.006	0.030
285	23.75	0.07	0.036	(0.038)	0.006	0.030
286	23.83	0.07	0.036	(0.038)	0.006	0.030
287	23.92	0.07	0.036	(0.038)	0.006	0.030
288	24.00	0.07	0.036	(0.038)	0.006	0.030

(Loss Rate Not Used)

Sum = 100.0 Sum = 45.3

Flood volume = Effective rainfall 3.77(In)
 times area 24.2(Ac.)/[(In)/(Ft.)] = 7.6(Ac.Ft)
 Total soil loss = 0.73(In)
 Total soil loss = 1.465(Ac.Ft)
 Total rainfall = 4.50(In)
 Flood volume = 331454.5 Cubic Feet
 Total soil loss = 63833.9 Cubic Feet

 Peak flow rate of this hydrograph = 13.354(CFS)

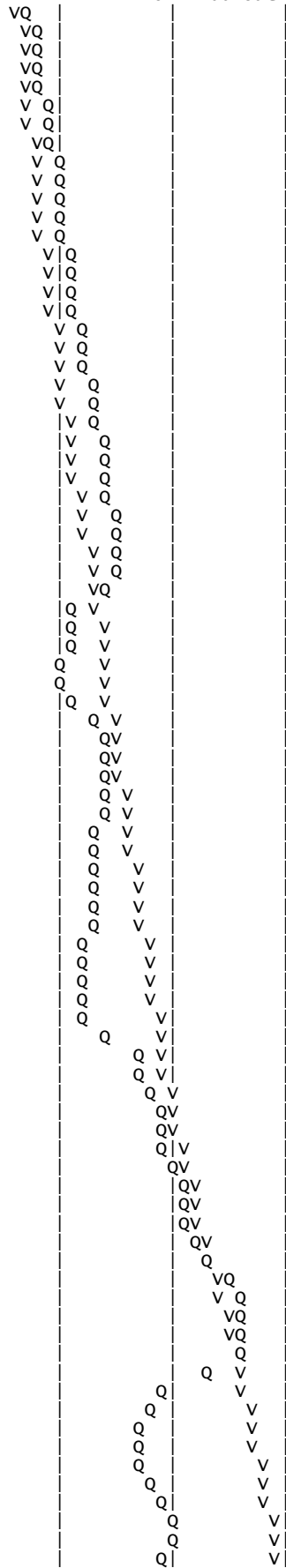
+++++
 24 - H O U R S T O R M
 R u n o f f H y d r o g r a p h

 Hydrograph in 5 Minute intervals ((CFS))

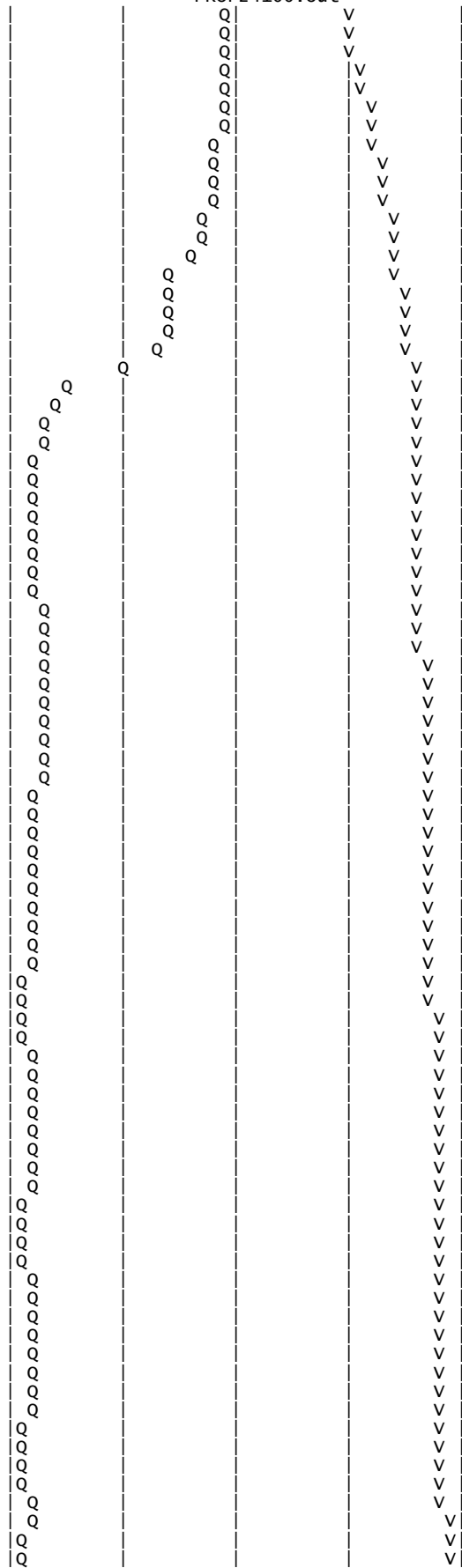
Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0015	0.21	Q				
0+10	0.0053	0.56	VQ				
0+15	0.0097	0.64	VQ				
0+20	0.0152	0.79	VQ				
0+25	0.0219	0.98	VQ				

0+30	0.0291	1.04	V Q
0+35	0.0364	1.06	V Q
0+40	0.0438	1.07	V Q
0+45	0.0513	1.08	V Q
0+50	0.0594	1.19	V Q
0+55	0.0688	1.36	V Q
1+ 0	0.0785	1.40	V Q
1+ 5	0.0875	1.32	V Q
1+10	0.0955	1.15	V Q
1+15	0.1032	1.12	V Q
1+20	0.1107	1.10	V Q
1+25	0.1182	1.09	V Q
1+30	0.1257	1.08	V Q
1+35	0.1331	1.08	V Q
1+40	0.1406	1.08	V Q
1+45	0.1480	1.08	V Q
1+50	0.1562	1.19	V Q
1+55	0.1655	1.36	V Q
2+ 0	0.1752	1.40	V Q
2+ 5	0.1850	1.42	V Q
2+10	0.1949	1.43	VQ
2+15	0.2048	1.44	VQ
2+20	0.2147	1.44	VQ
2+25	0.2246	1.44	VQ
2+30	0.2345	1.44	VQ
2+35	0.2452	1.55	V Q
2+40	0.2570	1.72	V Q
2+45	0.2692	1.76	V Q
2+50	0.2815	1.78	V Q
2+55	0.2938	1.79	V Q
3+ 0	0.3062	1.80	V Q
3+ 5	0.3186	1.80	V Q
3+10	0.3310	1.80	V Q
3+15	0.3434	1.80	V Q
3+20	0.3558	1.80	V Q
3+25	0.3682	1.80	V Q
3+30	0.3806	1.80	VQ
3+35	0.3930	1.80	VQ
3+40	0.4054	1.80	VQ
3+45	0.4178	1.80	VQ
3+50	0.4310	1.91	VQ
3+55	0.4453	2.08	V Q
4+ 0	0.4599	2.12	V Q
4+ 5	0.4747	2.14	V Q
4+10	0.4895	2.15	V Q
4+15	0.5044	2.16	V Q
4+20	0.5200	2.27	V Q
4+25	0.5368	2.44	V Q
4+30	0.5539	2.48	V Q
4+35	0.5711	2.50	V Q
4+40	0.5884	2.51	V Q
4+45	0.6058	2.52	V Q
4+50	0.6239	2.63	V Q
4+55	0.6432	2.80	V Q
5+ 0	0.6627	2.84	V Q
5+ 5	0.6810	2.65	V Q
5+10	0.6970	2.32	VQ
5+15	0.7124	2.24	VQ
5+20	0.7282	2.30	VQ
5+25	0.7451	2.46	VQ
5+30	0.7622	2.48	Q
5+35	0.7802	2.61	VQ
5+40	0.7994	2.79	VQ
5+45	0.8190	2.84	VQ
5+50	0.8387	2.86	VQ
5+55	0.8585	2.87	VQ
6+ 0	0.8784	2.88	VQ
6+ 5	0.8989	2.99	VQ
6+10	0.9207	3.16	V Q
6+15	0.9428	3.20	V Q
6+20	0.9649	3.22	VQ
6+25	0.9872	3.23	VQ
6+30	1.0095	3.24	VQ
6+35	1.0326	3.35	VQ
6+40	1.0568	3.52	V Q
6+45	1.0814	3.56	V Q
6+50	1.1061	3.58	V Q
6+55	1.1308	3.59	V Q
7+ 0	1.1556	3.60	VQ
7+ 5	1.1804	3.60	VQ
7+10	1.2052	3.60	VQ
7+15	1.2300	3.60	VQ
7+20	1.2556	3.71	VQ
7+25	1.2823	3.88	VQ

7+30	1.3093	3.92
7+35	1.3372	4.05
7+40	1.3663	4.23
7+45	1.3958	4.28
7+50	1.4262	4.41
7+55	1.4578	4.59
8+ 0	1.4898	4.64
8+ 5	1.5234	4.88
8+10	1.5594	5.23
8+15	1.5961	5.33
8+20	1.6331	5.37
8+25	1.6702	5.39
8+30	1.7074	5.40
8+35	1.7453	5.51
8+40	1.7844	5.68
8+45	1.8239	5.72
8+50	1.8641	5.85
8+55	1.9057	6.03
9+ 0	1.9476	6.08
9+ 5	1.9911	6.32
9+10	2.0371	6.67
9+15	2.0837	6.77
9+20	2.1313	6.91
9+25	2.1802	7.11
9+30	2.2296	7.17
9+35	2.2798	7.29
9+40	2.3312	7.47
9+45	2.3831	7.53
9+50	2.4358	7.65
9+55	2.4897	7.83
10+ 0	2.5440	7.89
10+ 5	2.5934	7.16
10+10	2.6344	5.96
10+15	2.6735	5.67
10+20	2.7116	5.53
10+25	2.7491	5.46
10+30	2.7863	5.40
10+35	2.8272	5.93
10+40	2.8740	6.80
10+45	2.9223	7.01
10+50	2.9713	7.11
10+55	3.0206	7.16
11+ 0	3.0702	7.20
11+ 5	3.1191	7.10
11+10	3.1668	6.92
11+15	3.2142	6.88
11+20	3.2614	6.86
11+25	3.3086	6.85
11+30	3.3557	6.84
11+35	3.4014	6.63
11+40	3.4447	6.29
11+45	3.4874	6.20
11+50	3.5305	6.26
11+55	3.5747	6.42
12+ 0	3.6191	6.44
12+ 5	3.6693	7.28
12+10	3.7287	8.63
12+15	3.7906	8.99
12+20	3.8545	9.27
12+25	3.9204	9.57
12+30	3.9872	9.69
12+35	4.0559	9.98
12+40	4.1278	10.43
12+45	4.2004	10.55
12+50	4.2744	10.74
12+55	4.3500	10.98
13+ 0	4.4262	11.06
13+ 5	4.5071	11.74
13+10	4.5953	12.81
13+15	4.6855	13.10
13+20	4.7766	13.23
13+25	4.8682	13.30
13+30	4.9602	13.35
13+35	5.0424	11.94
13+40	5.1088	9.63
13+45	5.1711	9.05
13+50	5.2317	8.80
13+55	5.2914	8.67
14+ 0	5.3504	8.57
14+ 5	5.4130	9.09
14+10	5.4815	9.95
14+15	5.5515	10.17
14+20	5.6214	10.14
14+25	5.6902	9.99



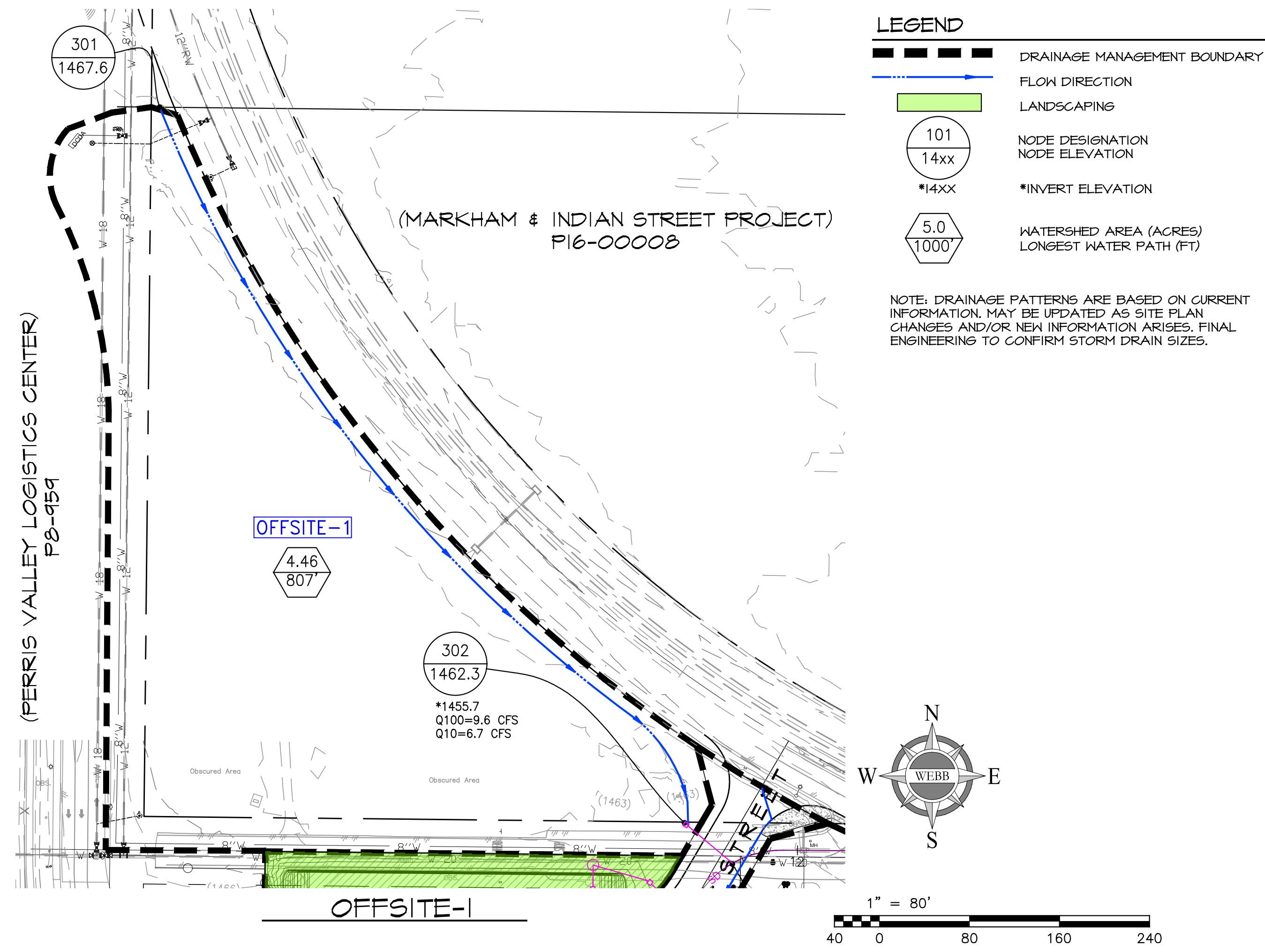
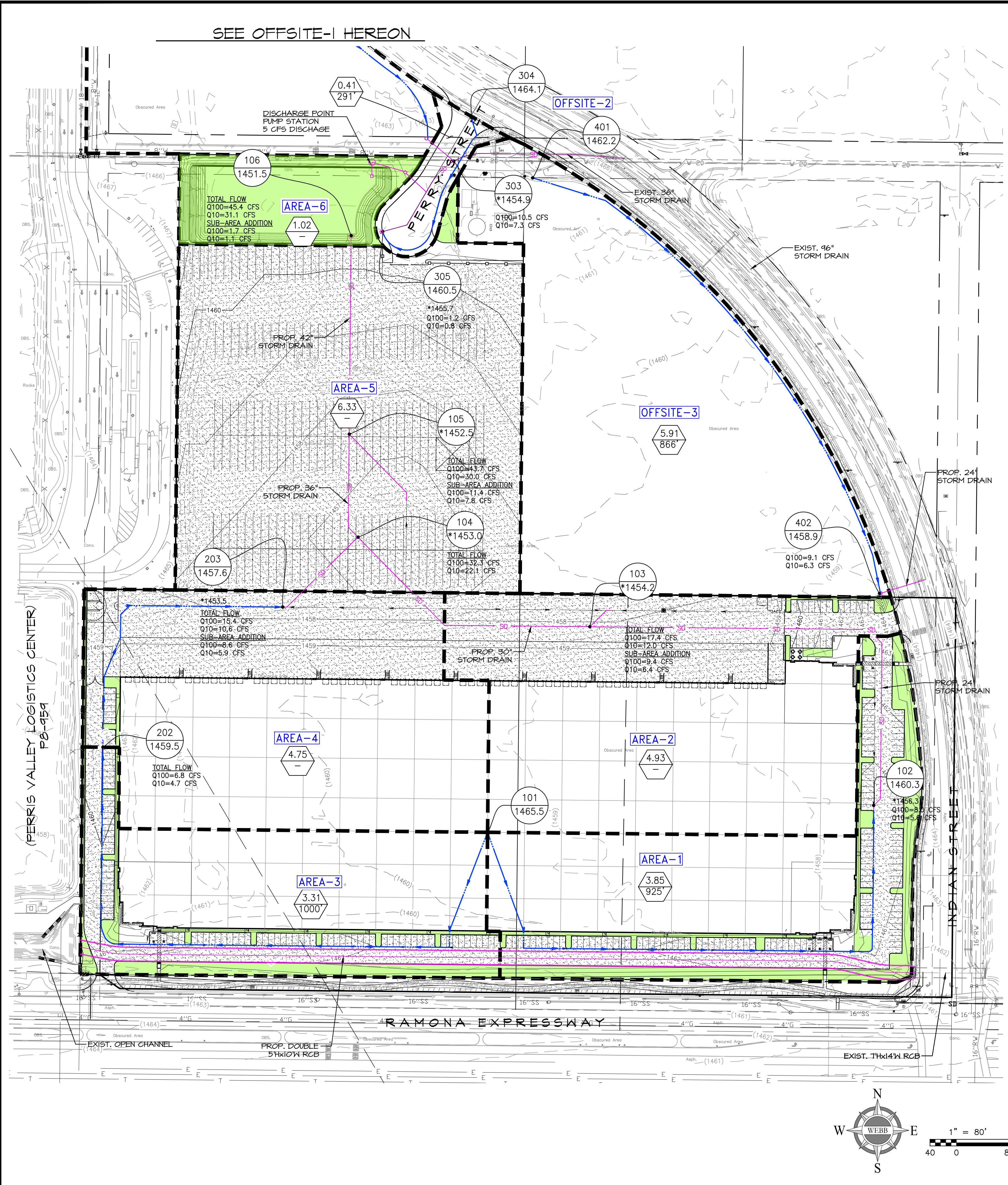
14+30	5.7589	9.98
14+35	5.8275	9.96
14+40	5.8961	9.96
14+45	5.9647	9.96
14+50	6.0324	9.84
14+55	6.0988	9.63
15+ 0	6.1648	9.59
15+ 5	6.2298	9.44
15+10	6.2933	9.22
15+15	6.3565	9.17
15+20	6.4186	9.02
15+25	6.4793	8.81
15+30	6.5395	8.75
15+35	6.5961	8.22
15+40	6.6469	7.37
15+45	6.6962	7.15
15+50	6.7448	7.07
15+55	6.7932	7.02
16+ 0	6.8413	6.99
16+ 5	6.8783	5.36
16+10	6.8968	2.70
16+15	6.9108	2.02
16+20	6.9226	1.72
16+25	6.9334	1.56
16+30	6.9433	1.44
16+35	6.9525	1.33
16+40	6.9605	1.16
16+45	6.9682	1.12
16+50	6.9758	1.10
16+55	6.9833	1.09
17+ 0	6.9907	1.08
17+ 5	6.9996	1.29
17+10	7.0109	1.64
17+15	7.0228	1.73
17+20	7.0349	1.76
17+25	7.0472	1.79
17+30	7.0596	1.80
17+35	7.0720	1.80
17+40	7.0844	1.80
17+45	7.0968	1.80
17+50	7.1085	1.70
17+55	7.1190	1.52
18+ 0	7.1292	1.48
18+ 5	7.1392	1.46
18+10	7.1492	1.45
18+15	7.1591	1.44
18+20	7.1690	1.44
18+25	7.1790	1.44
18+30	7.1889	1.44
18+35	7.1981	1.33
18+40	7.2061	1.16
18+45	7.2138	1.12
18+50	7.2206	0.99
18+55	7.2262	0.81
19+ 0	7.2314	0.76
19+ 5	7.2372	0.84
19+10	7.2442	1.01
19+15	7.2513	1.04
19+20	7.2594	1.17
19+25	7.2687	1.35
19+30	7.2783	1.40
19+35	7.2874	1.32
19+40	7.2954	1.15
19+45	7.3031	1.12
19+50	7.3099	0.99
19+55	7.3155	0.81
20+ 0	7.3207	0.76
20+ 5	7.3265	0.84
20+10	7.3334	1.01
20+15	7.3406	1.04
20+20	7.3479	1.06
20+25	7.3553	1.07
20+30	7.3628	1.08
20+35	7.3702	1.08
20+40	7.3777	1.08
20+45	7.3851	1.08
20+50	7.3918	0.97
20+55	7.3973	0.80
21+ 0	7.4026	0.76
21+ 5	7.4084	0.84
21+10	7.4153	1.01
21+15	7.4225	1.04
21+20	7.4291	0.96
21+25	7.4345	0.79



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21+30	7.4398	0.76	Q			V
21+35	7.4456	0.84	Q			V
21+40	7.4525	1.01	Q			V
21+45	7.4597	1.04	Q			V
21+50	7.4663	0.96	Q			V
21+55	7.4717	0.79	Q			V
22+ 0	7.4770	0.76	Q			V
22+ 5	7.4828	0.84	Q			V
22+10	7.4897	1.01	Q			V
22+15	7.4969	1.04	Q			V
22+20	7.5035	0.96	Q			V
22+25	7.5089	0.79	Q			V
22+30	7.5142	0.76	Q			V
22+35	7.5193	0.74	Q			V
22+40	7.5243	0.73	Q			V
22+45	7.5292	0.72	Q			V
22+50	7.5342	0.72	Q			V
22+55	7.5392	0.72	Q			V
23+ 0	7.5441	0.72	Q			V
23+ 5	7.5491	0.72	Q			V
23+10	7.5540	0.72	Q			V
23+15	7.5590	0.72	Q			V
23+20	7.5640	0.72	Q			V
23+25	7.5689	0.72	Q			V
23+30	7.5739	0.72	Q			V
23+35	7.5788	0.72	Q			V
23+40	7.5838	0.72	Q			V
23+45	7.5888	0.72	Q			V
23+50	7.5937	0.72	Q			V
23+55	7.5987	0.72	Q			V
24+ 0	7.6036	0.72	Q			V
24+ 5	7.6071	0.51	Q			V
24+10	7.6083	0.16	Q			V
24+15	7.6088	0.08	Q			V
24+20	7.6090	0.04	Q			V
24+25	7.6091	0.02	Q			V

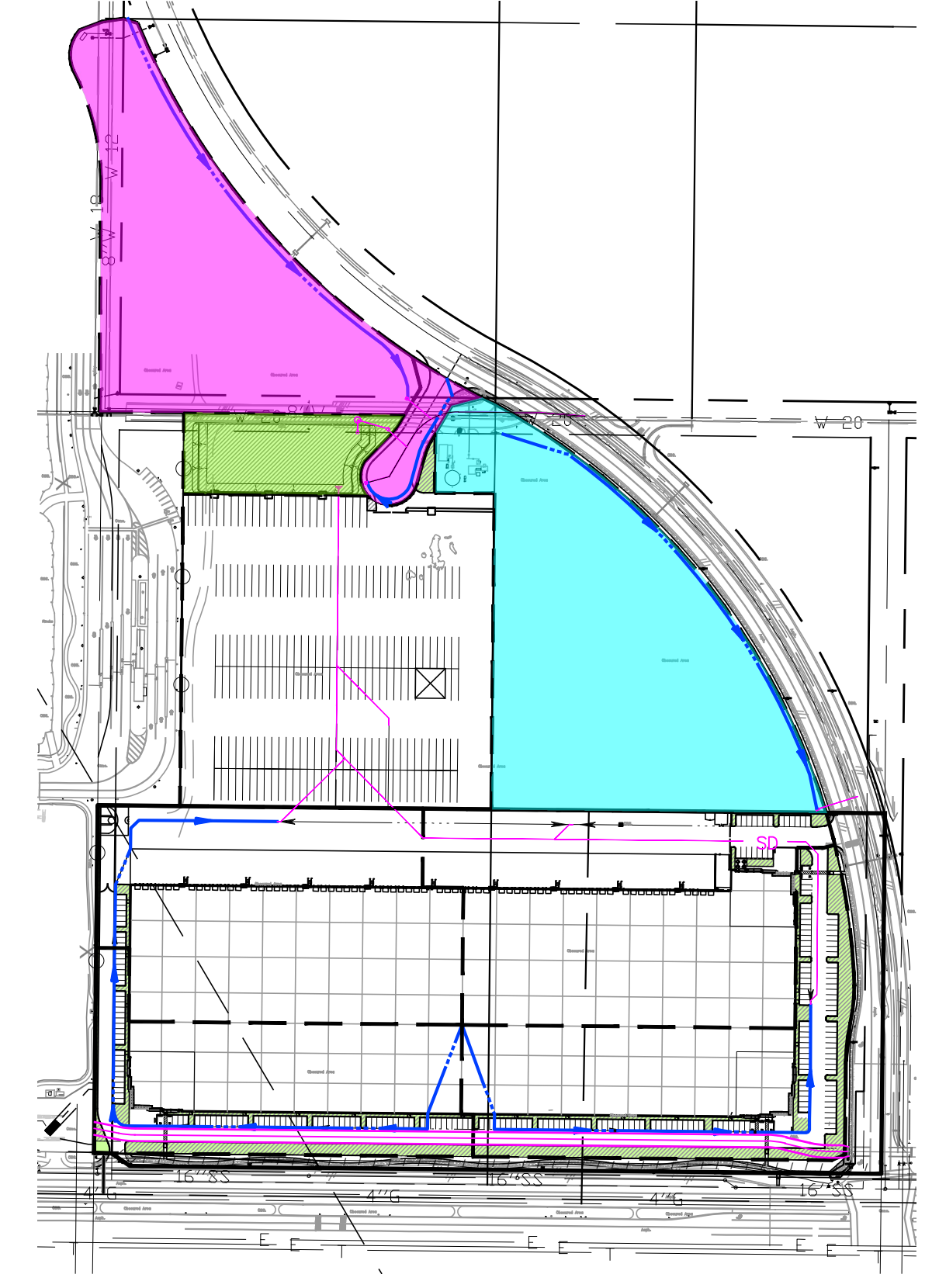
HYDROLOGY MAPS



LEGEND

- DRAINAGE MANAGEMENT BOUNDARY
- FLOW DIRECTION
- LANDSCAPING
- 101 14xx NODE DESIGNATION, 14XX *INVERT ELEVATION
- 5.0 1000 WATERSHED AREA (ACRES), LONGEST WATER PATH (FT)

NOTE: DRAINAGE PATTERNS ARE BASED ON CURRENT INFORMATION. MAY BE UPDATED AS SITE PLAN CHANGES AND/OR NEW INFORMATION ARISES. FINAL ENGINEERING TO CONFIRM STORM DRAIN SIZES.



LEGEND

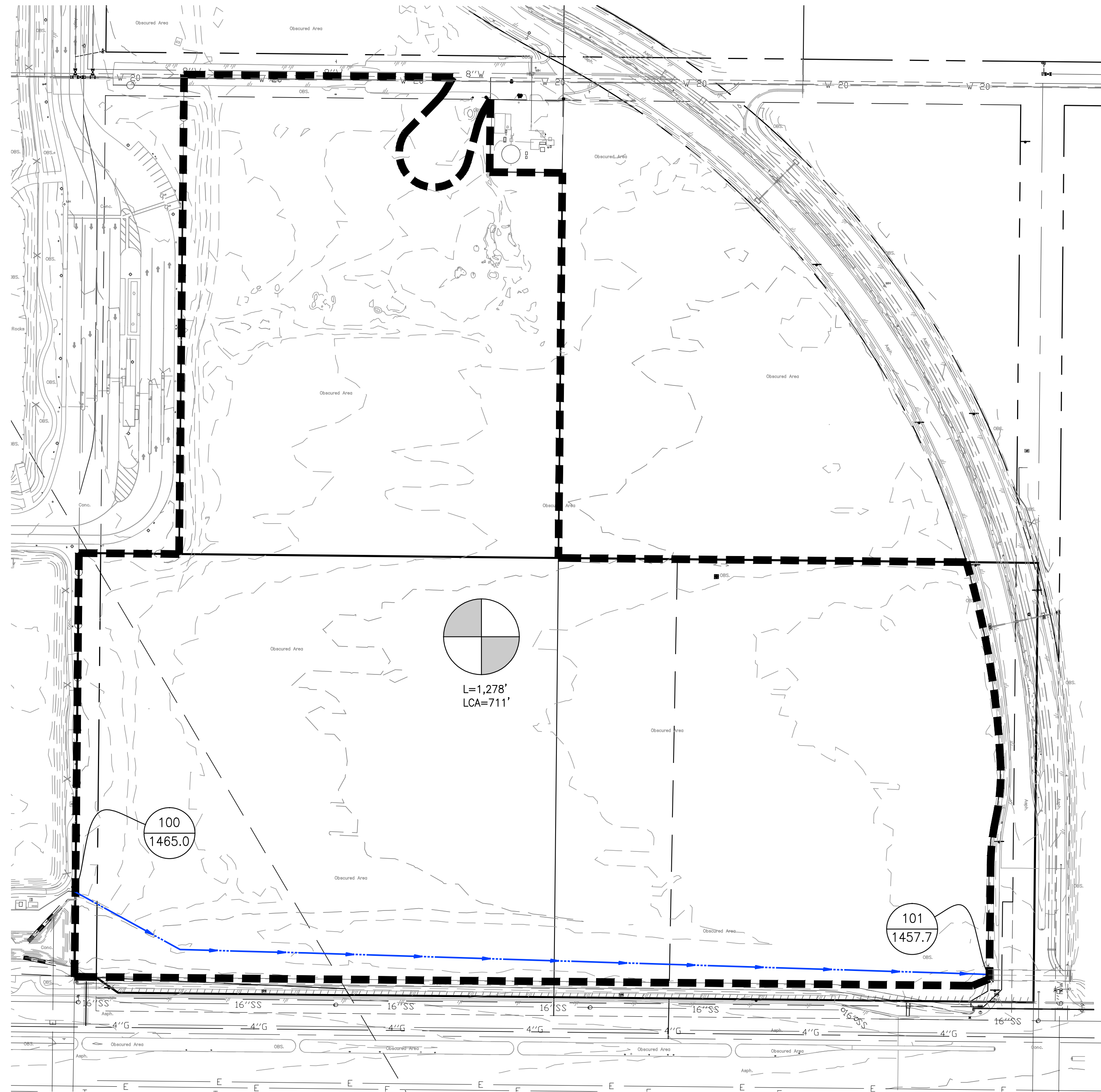
- OFFSITE PART 1
- OFFSITE PART 2

CITY OF PERRIS

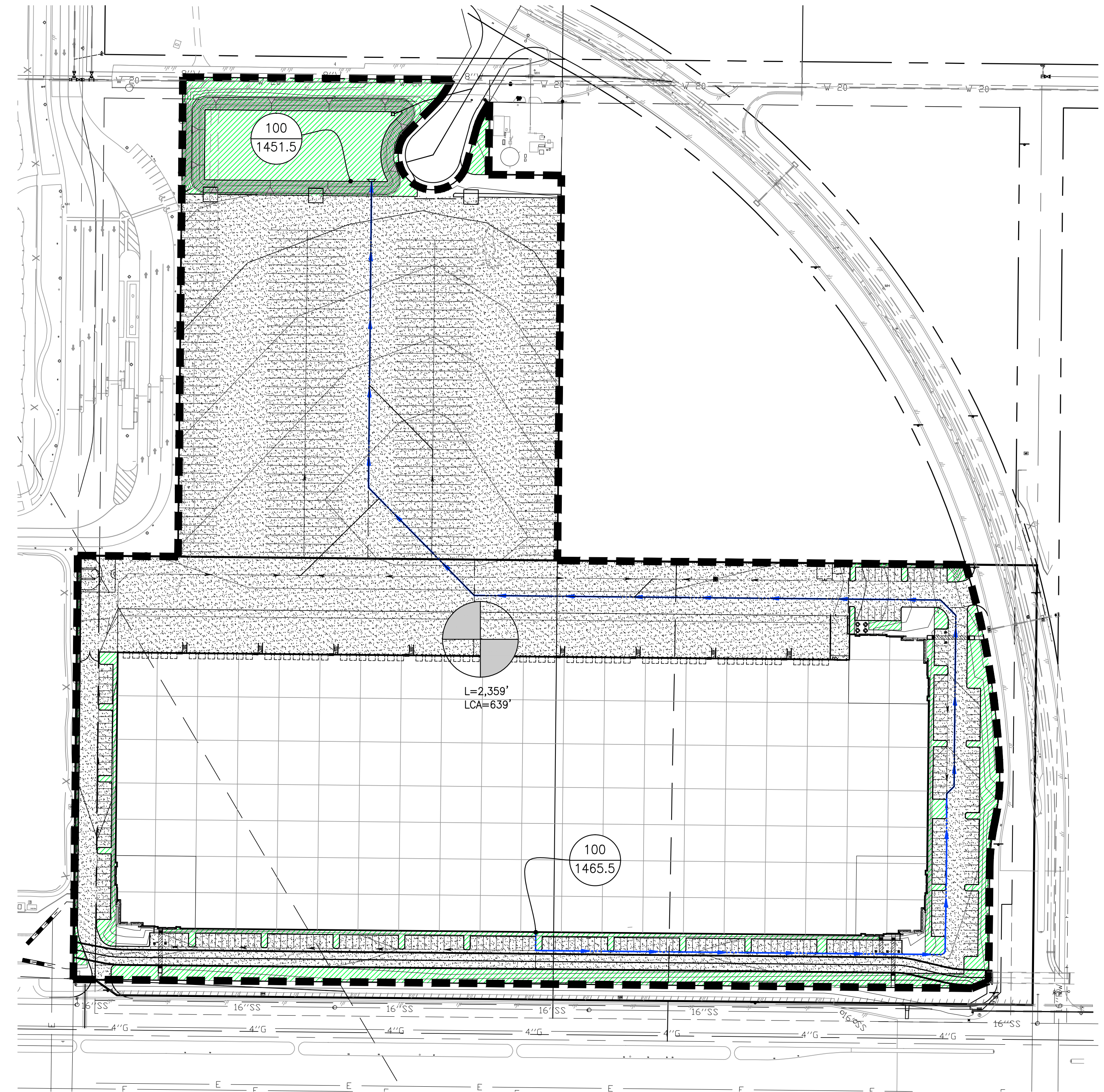
RATIONAL METHOD HYDROLOGY MAP
PROPOSED CONDITION HYDROLOGY MAP
ON-SITE & OFF-SITE PEAK FLOW RATES

SCALE: 1"=80'	ALBERTA ENGINEERING CONSULTANTS	W.O. 17-0108
DATE: 9/10/18	3788 MCCRAY STREET	SHEET 1
DESIGNED: MJS	RIVERSIDE CA 92506	OF 1 SHEETS
CHECKED: CRC	PH. (951) 686-1070	DWG. NO.
PLN CK REF:	FAX (951) 788-1256	
F.B.		

G:\2017\17-0108\DRAINAGE\DWG FOLDER\17-0108-PHYO-RATIONAL.DWG 8/20/2018 7:17:10 PM



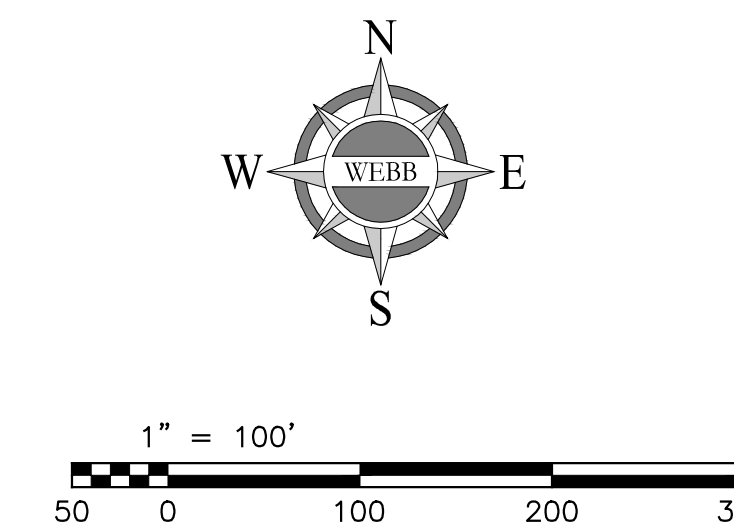
EXISTING CONDITION



PROPOSED CONDITION

LEGEND

- DRAINAGE MANAGEMENT BOUNDARY
- FLOW DIRECTION
- LONGEST FLOW PATH
CENTROIDAL LENGTH
- NODE DESIGNATION
NODE ELEVATION
- *INVERT ELEVATION
- WATERSHED AREA (ACRES)
LONGEST WATER PATH (FT)
- CENTROID



CITY OF PERRIS	
UNIT HYDROGRAPH HYDROLOGY UNIT HYDROGRAPH MAPS INDIAN & RAMONA	
SCALE: 1"=100' DATE: 11/30/17 DESIGNED: MJS CHECKED: CRC PLN CK REF: F.B.	ALBERT A. WEBB & ASSOCIATES ENGINEERING CONSULTANTS 3788 McCRAY STREET RIVERSIDE CA. 92506 PH. (951) 686-1070 FAX (951) 788-1256
W.O. 17-0108 SHEET 1 OF 1 SHEETS DWG. NO.	

APPENDIX B – HYDRAULICS

WSPG CALCULATIONS

***To be provided during final engineering**

INLET CAPACITIES

***To be provided during final engineering**

STAGE-STORAGE/OUTFLOW TABLE

Basin Stage-Storage-Outflow Table
17-0108 Indian & Ramona Distribution Center
Bioretention/Detention Basin

Basin A			Max Pump Rate**		
	Basin Top	1460.5	5 cfs		
	Basin Top of Media	1451.5			
	Basin Bottom	1447.5			
	Basin Bottom Area	24030			

#	Elevation (FT)	Depth (FT)	Total Storage (AC-FT)	Q (CFS)	Qtotal (CFS)
1.00	1,451.50	0.00	0.000	0.00	0.000
2.00	1,452.00	0.50	0.280	0.00	0.000
3.00	1,452.10	0.60	0.337	5.00	5.000
4.00	1,452.50	1.00	0.568	5.00	5.000
5.00	1,453.00	1.50	0.864	5.00	5.000
6.00	1,453.50	2.00	1.169	5.00	5.000
7.00	1,454.00	2.50	1.482	5.00	5.000
8.00	1,454.50	3.00	1.804	5.00	5.000
9.00	1,455.00	3.50	2.134	5.00	5.000
10.00	1,455.50	4.00	2.474	5.00	5.000
11.00	1,456.00	4.50	2.822	5.00	5.000
12.00	1,456.50	5.00	3.184	5.00	5.000
13.00	1,457.50	6.00	3.918	5.00	5.000
14.00	1,458.50	7.00	4.667	5.00	5.000
15.00	1,459.50	8.00	5.429	5.00	5.000
16.00	1,460.50	9.00	6.207	5.00	5.000

*The pump will operate when the volume in the basin exceeds water quality depth of 0.6'. The pump station will discharge a max flow rate of 5 cfs.

**A small amount of flow was assume to leave the basin through the proposed media in the basin and the underdrain system

BASIN ROUTING
100-YEAR, 1-HOUR STORM EVENT

 17-0108 INDIAN & RAMONA DISTRIBUTION CENTER
 ROUTING CALCULATION
 100-YR 1-HR STORM EVENT
 MJS

Program License Serial Number 4010

***** HYDROGRAPH INFORMATION *****

From study/file name: PROP1100.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 17
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 65.076 (CFS)
 Total volume = 2.369 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
 Process from Point/Station 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

 User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 17
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.280	0.000	0.280	0.280
0.600	0.337	5.000	0.320	0.354
1.000	0.568	5.000	0.551	0.585
1.500	0.864	5.000	0.847	0.881
2.000	1.169	5.000	1.152	1.186
2.500	1.482	5.000	1.465	1.499
3.000	1.804	5.000	1.787	1.821
3.500	2.134	5.000	2.117	2.151
4.000	2.474	5.000	2.457	2.491
4.500	2.822	5.000	2.805	2.839
5.000	3.184	5.000	3.167	3.201
6.000	3.918	5.000	3.901	3.935
7.000	4.667	5.000	4.650	4.684
8.000	5.429	5.000	5.412	5.446
9.000	6.207	5.000	6.190	6.224

 Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)						Depth (Ft.)
0.083	3.97	0.00	0.014	OI		16.3	32.54	48.81	65.08
0.167	10.58	0.00	0.064	O	I				
0.250	13.15	0.00	0.146	O	I				
0.333	15.16	0.00	0.243	O	I				
0.417	16.74	4.91	0.336	O	I				
0.500	19.34	5.00	0.426	O	I				
0.583	21.98	5.00	0.534	O	I				
0.667	25.37	5.00	0.663	O	I				

ROUTE1100.out

0.750	32.08	5.00	0.826	O					1.44
0.833	57.48	5.00	1.100	O		I			1.89
0.917	65.08	5.00	1.488	O			I		2.51
1.000	32.35	5.00	1.789	O		I			2.98
1.083	18.25	5.00	1.928	O	I				3.19
1.167	7.24	5.00	1.982	O	IO				3.27
1.250	3.82	5.00	1.985	IO					3.27
1.333	0.98	5.00	1.968	IO					3.25
1.417	0.36	5.00	1.938	IO					3.20
1.500	0.00	5.00	1.904	IO					3.15
1.583	0.00	5.00	1.870	IO					3.10
1.667	0.00	5.00	1.836	IO					3.05
1.750	0.00	5.00	1.801	IO					3.00
1.833	0.00	5.00	1.767	IO					2.94
1.917	0.00	5.00	1.732	IO					2.89
2.000	0.00	5.00	1.698	IO					2.84
2.083	0.00	5.00	1.663	IO					2.78
2.167	0.00	5.00	1.629	IO					2.73
2.250	0.00	5.00	1.595	IO					2.67
2.333	0.00	5.00	1.560	IO					2.62
2.417	0.00	5.00	1.526	IO					2.57
2.500	0.00	5.00	1.491	IO					2.51
2.583	0.00	5.00	1.457	IO					2.46
2.667	0.00	5.00	1.422	IO					2.40
2.750	0.00	5.00	1.388	IO					2.35
2.833	0.00	5.00	1.354	IO					2.29
2.917	0.00	5.00	1.319	IO					2.24
3.000	0.00	5.00	1.285	IO					2.18
3.083	0.00	5.00	1.250	IO					2.13
3.167	0.00	5.00	1.216	IO					2.07
3.250	0.00	5.00	1.181	IO					2.02
3.333	0.00	5.00	1.147	IO					1.96
3.417	0.00	5.00	1.112	IO					1.91
3.500	0.00	5.00	1.078	IO					1.85
3.583	0.00	5.00	1.044	IO					1.79
3.667	0.00	5.00	1.009	IO					1.74
3.750	0.00	5.00	0.975	IO					1.68
3.833	0.00	5.00	0.940	IO					1.63
3.917	0.00	5.00	0.906	IO					1.57
4.000	0.00	5.00	0.871	IO					1.51
4.083	0.00	5.00	0.837	IO					1.45
4.167	0.00	5.00	0.803	IO					1.40
4.250	0.00	5.00	0.768	IO					1.34
4.333	0.00	5.00	0.734	IO					1.28
4.417	0.00	5.00	0.699	IO					1.22
4.500	0.00	5.00	0.665	IO					1.16
4.583	0.00	5.00	0.630	IO					1.11
4.667	0.00	5.00	0.596	IO					1.05
4.750	0.00	5.00	0.562	IO					0.99
4.833	0.00	5.00	0.527	IO					0.93
4.917	0.00	5.00	0.493	IO					0.87
5.000	0.00	5.00	0.458	IO					0.81
5.083	0.00	5.00	0.424	IO					0.75
5.167	0.00	5.00	0.389	IO					0.69
5.250	0.00	5.00	0.355	IO					0.63
5.333	0.00	3.89	0.324	IO					0.58
5.417	0.00	2.08	0.304	IO					0.54
5.500	0.00	1.12	0.293	O					0.52
5.583	0.00	0.60	0.287	O					0.51
5.667	0.00	0.32	0.284	O					0.51
5.750	0.00	0.17	0.282	O					0.50
5.833	0.00	0.09	0.281	O					0.50
5.917	0.00	0.05	0.281	O					0.50
6.000	0.00	0.03	0.280	O					0.50
6.083	0.00	0.01	0.280	O					0.50
6.167	0.00	0.01	0.280	O					0.50
6.250	0.00	0.00	0.280	O					0.50
6.333	0.00	0.00	0.280	O					0.50
6.417	0.00	0.00	0.280	O					0.50
6.500	0.00	0.00	0.280	O					0.50

Remaining water in basin = 0.28 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 78
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 5,000 (CFS)
 Total volume = 2.089 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

BASIN ROUTING
100-YEAR, 3-HOUR STORM EVENT

 17-0108 INDIAN & RAMONA DISTRIBUTION CENTER
 ROUTING CALCULATION
 100-YR 3-HR STORM EVENT
 MJS

Program License Serial Number 4010

***** HYDROGRAPH INFORMATION *****

From study/file name: PROP3100.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 41
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 38.022 (CFS)
 Total volume = 3.410 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
 Process from Point/Station 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

 User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 41
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.280	0.000	0.280	0.280
0.600	0.337	5.000	0.320	0.354
1.000	0.568	5.000	0.551	0.585
1.500	0.864	5.000	0.847	0.881
2.000	1.169	5.000	1.152	1.186
2.500	1.482	5.000	1.465	1.499
3.000	1.804	5.000	1.787	1.821
3.500	2.134	5.000	2.117	2.151
4.000	2.474	5.000	2.457	2.491
4.500	2.822	5.000	2.805	2.839
5.000	3.184	5.000	3.167	3.201
6.000	3.918	5.000	3.901	3.935
7.000	4.667	5.000	4.650	4.684
8.000	5.429	5.000	5.412	5.446
9.000	6.207	5.000	6.190	6.224

 Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)						Depth (Ft.)
0.083	1.74	0.00	0.006	O	I				0.01
0.167	4.59	0.00	0.028	O	I				0.05
0.250	5.04	0.00	0.061	O	I				0.11
0.333	5.46	0.00	0.097	O	I				0.17
0.417	6.40	0.00	0.138	O	I				0.25
0.500	7.10	0.00	0.184	O	I				0.33
0.583	7.43	0.00	0.234	O	I				0.42
0.667	7.37	0.36	0.284	O	I				0.51

ROUTE3100.out

0.750	7.98	3.75	0.323	O	I					0.58
0.833	7.71	5.00	0.347	O	I					0.62
0.917	7.25	5.00	0.364	O	I					0.65
1.000	7.58	5.00	0.380	O	I					0.68
1.083	8.67	5.00	0.402	O	I					0.71
1.167	9.82	5.00	0.431	O	I					0.76
1.250	10.12	5.00	0.465	O	I					0.82
1.333	9.95	5.00	0.500	O	I					0.88
1.417	10.48	5.00	0.536	O	I					0.94
1.500	12.16	5.00	0.579	O		I				1.02
1.583	12.28	5.00	0.629	O		I				1.10
1.667	12.18	5.00	0.679	O		I				1.19
1.750	13.86	5.00	0.734	O		I				1.28
1.833	15.34	5.00	0.800	O			I			1.39
1.917	14.94	5.00	0.870	O			I			1.51
2.000	14.62	5.00	0.937	O			I			1.62
2.083	14.99	5.00	1.005	O			I			1.73
2.167	17.10	5.00	1.081	O				I		1.86
2.250	21.39	5.00	1.179	O					I	2.02
2.333	21.84	5.00	1.294	O					I	2.20
2.417	24.12	5.00	1.417	O					I	2.40
2.500	33.17	5.00	1.580	O						2.65
2.583	38.02	5.00	1.791	O						2.98
2.667	37.85	5.00	2.018	O					I	3.32
2.750	26.45	5.00	2.205	O				I		3.60
2.833	14.91	5.00	2.313	O		I				3.76
2.917	11.27	5.00	2.369	O		I				3.84
3.000	8.10	5.00	2.401	O	I					3.89
3.083	3.70	5.00	2.407	IO						3.90
3.167	1.22	5.00	2.390	I	O					3.88
3.250	0.57	5.00	2.361	I	O					3.83
3.333	0.26	5.00	2.330	I	O					3.79
3.417	0.06	5.00	2.296	I	O					3.74
3.500	0.00	5.00	2.262	I	O					3.69
3.583	0.00	5.00	2.228	I	O					3.64
3.667	0.00	5.00	2.193	I	O					3.59
3.750	0.00	5.00	2.159	I	O					3.54
3.833	0.00	5.00	2.124	I	O					3.49
3.917	0.00	5.00	2.090	I	O					3.43
4.000	0.00	5.00	2.055	I	O					3.38
4.083	0.00	5.00	2.021	I	O					3.33
4.167	0.00	5.00	1.987	I	O					3.28
4.250	0.00	5.00	1.952	I	O					3.22
4.333	0.00	5.00	1.918	I	O					3.17
4.417	0.00	5.00	1.883	I	O					3.12
4.500	0.00	5.00	1.849	I	O					3.07
4.583	0.00	5.00	1.814	I	O					3.02
4.667	0.00	5.00	1.780	I	O					2.96
4.750	0.00	5.00	1.746	I	O					2.91
4.833	0.00	5.00	1.711	I	O					2.86
4.917	0.00	5.00	1.677	I	O					2.80
5.000	0.00	5.00	1.642	I	O					2.75
5.083	0.00	5.00	1.608	I	O					2.70
5.167	0.00	5.00	1.573	I	O					2.64
5.250	0.00	5.00	1.539	I	O					2.59
5.333	0.00	5.00	1.504	I	O					2.53
5.417	0.00	5.00	1.470	I	O					2.48
5.500	0.00	5.00	1.436	I	O					2.43
5.583	0.00	5.00	1.401	I	O					2.37
5.667	0.00	5.00	1.367	I	O					2.32
5.750	0.00	5.00	1.332	I	O					2.26
5.833	0.00	5.00	1.298	I	O					2.21
5.917	0.00	5.00	1.263	I	O					2.15
6.000	0.00	5.00	1.229	I	O					2.10
6.083	0.00	5.00	1.195	I	O					2.04
6.167	0.00	5.00	1.160	I	O					1.99
6.250	0.00	5.00	1.126	I	O					1.93
6.333	0.00	5.00	1.091	I	O					1.87
6.417	0.00	5.00	1.057	I	O					1.82
6.500	0.00	5.00	1.022	I	O					1.76
6.583	0.00	5.00	0.988	I	O					1.70
6.667	0.00	5.00	0.953	I	O					1.65
6.750	0.00	5.00	0.919	I	O					1.59
6.833	0.00	5.00	0.885	I	O					1.53
6.917	0.00	5.00	0.850	I	O					1.48
7.000	0.00	5.00	0.816	I	O					1.42
7.083	0.00	5.00	0.781	I	O					1.36
7.167	0.00	5.00	0.747	I	O					1.30
7.250	0.00	5.00	0.712	I	O					1.24
7.333	0.00	5.00	0.678	I	O					1.19
7.417	0.00	5.00	0.644	I	O					1.13
7.500	0.00	5.00	0.609	I	O					1.07
7.583	0.00	5.00	0.575	I	O					1.01
7.667	0.00	5.00	0.540	I	O					0.95
7.750	0.00	5.00	0.506	I	O					0.89
7.833	0.00	5.00	0.471	I	O					0.83
7.917	0.00	5.00	0.437	I	O					0.77
8.000	0.00	5.00	0.403	I	O					0.71

ROUTE3100.out					
8.083	0.00	5.00	0.368	I 0	0.65
8.167	0.00	4.77	0.334	I 0	0.60
8.250	0.00	2.56	0.309	I 0	0.55
8.333	0.00	1.37	0.296	IO	0.53
8.417	0.00	0.74	0.288	O	0.51
8.500	0.00	0.39	0.284	O	0.51
8.583	0.00	0.21	0.282	O	0.50
8.667	0.00	0.11	0.281	O	0.50
8.750	0.00	0.06	0.281	O	0.50
8.833	0.00	0.03	0.280	O	0.50
8.917	0.00	0.02	0.280	O	0.50
9.000	0.00	0.01	0.280	O	0.50
9.083	0.00	0.01	0.280	O	0.50
9.167	0.00	0.00	0.280	O	0.50
9.250	0.00	0.00	0.280	O	0.50
9.333	0.00	0.00	0.280	O	0.50

Remaining water in basin = 0.28 (Ac.Ft)

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*****HYDROGRAPH DATA*****
      Number of intervals = 112
      Time interval = 5.0 (Min.)
      Maximum/Peak flow rate = 5.000 (CFS)
      Total volume = 3.130 (Ac.Ft)
      Status of hydrographs being held in storage
      Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
      Peak (CFS) 0.000 0.000 0.000 0.000 0.000
      Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000
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BASIN ROUTING
100-YEAR, 6-HOUR STORM EVENT

 17-0108 INDIAN & RAMONA DISTRIBUTION CENTER
 ROUTING CALCULATION
 100-YR 6-HR STORM EVENT
 MJS

Program License Serial Number 4010

***** HYDROGRAPH INFORMATION *****

From study/file name: PROP6100.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 77
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 33.255 (CFS)
 Total volume = 4.381 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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 Process from Point/Station 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

 User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 77
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.280	0.000	0.280	0.280
0.600	0.337	5.000	0.320	0.354
1.000	0.568	5.000	0.551	0.585
1.500	0.864	5.000	0.847	0.881
2.000	1.169	5.000	1.152	1.186
2.500	1.482	5.000	1.465	1.499
3.000	1.804	5.000	1.787	1.821
3.500	2.134	5.000	2.117	2.151
4.000	2.474	5.000	2.457	2.491
4.500	2.822	5.000	2.805	2.839
5.000	3.184	5.000	3.167	3.201
6.000	3.918	5.000	3.901	3.935
7.000	4.667	5.000	4.650	4.684
8.000	5.429	5.000	5.412	5.446
9.000	6.207	5.000	6.190	6.224

 Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'o'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	Depth (Ft.)
0.083	0.88	0.00	0.003	0.01
0.167	2.50	0.00	0.015	0.03
0.250	3.15	0.00	0.034	0.06
0.333	3.39	0.00	0.057	0.10
0.417	3.51	0.00	0.080	0.14
0.500	3.76	0.00	0.105	0.19
0.583	4.07	0.00	0.132	0.24
0.667	4.14	0.00	0.161	0.29

ROUTE6100.out

0.750	4.17	0.00	0.189	O	I							0.34
0.833	4.19	0.00	0.218	O	I							0.39
0.917	4.20	0.00	0.247	O	I							0.44
1.000	4.38	0.00	0.276	O	I							0.49
1.083	4.67	1.86	0.301	O	I							0.54
1.167	4.74	3.18	0.316	O	I							0.56
1.250	4.77	3.91	0.325	O	I							0.58
1.333	4.79	4.31	0.329	O	I							0.59
1.417	4.80	4.54	0.332	O	I							0.59
1.500	4.80	4.66	0.333	O	I							0.59
1.583	4.80	4.73	0.334	O	I							0.59
1.667	4.80	4.76	0.334	O	I							0.60
1.750	4.80	4.78	0.334	O	I							0.60
1.833	4.80	4.79	0.335	O	I							0.60
1.917	4.80	4.80	0.335	O	I							0.60
2.000	4.98	4.84	0.335	O	I							0.60
2.083	5.09	4.93	0.336	O	I							0.60
2.167	5.05	5.00	0.337	O	I							0.60
2.250	5.30	5.00	0.338	O	I							0.60
2.333	5.36	5.00	0.340	O	I							0.61
2.417	5.38	5.00	0.343	O	I							0.61
2.500	5.39	5.00	0.346	O	I							0.61
2.583	5.40	5.00	0.348	O	I							0.62
2.667	5.40	5.00	0.351	O	I							0.62
2.750	5.58	5.00	0.355	O	I							0.63
2.833	5.87	5.00	0.359	O	I							0.64
2.917	5.94	5.00	0.366	O	I							0.65
3.000	5.97	5.00	0.372	O	I							0.66
3.083	5.99	5.00	0.379	O	I							0.67
3.167	6.18	5.00	0.387	O	I							0.69
3.250	6.47	5.00	0.396	O	I							0.70
3.333	6.54	5.00	0.406	O	I							0.72
3.417	6.75	5.00	0.417	O	I							0.74
3.500	7.23	5.00	0.431	O	I							0.76
3.583	7.78	5.00	0.448	O	I							0.79
3.667	8.18	5.00	0.469	O	I							0.83
3.750	8.52	5.00	0.492	O	I							0.87
3.833	8.94	5.00	0.518	O	I							0.91
3.917	9.27	5.00	0.546	O	I							0.96
4.000	9.68	5.00	0.577	O	I							1.01
4.083	10.00	5.00	0.610	O	I							1.07
4.167	10.62	5.00	0.647	O	I							1.13
4.250	11.30	5.00	0.688	O	I							1.20
4.333	12.01	5.00	0.733	O	I							1.28
4.417	12.73	5.00	0.784	O	I							1.37
4.500	13.24	5.00	0.839	O	I							1.46
4.583	13.62	5.00	0.897	O	I							1.55
4.667	14.27	5.00	0.959	O	I							1.66
4.750	14.96	5.00	1.025	O	I							1.76
4.833	15.45	5.00	1.095	O	I							1.88
4.917	15.82	5.00	1.169	O	I							2.00
5.000	16.46	5.00	1.245	O	I							2.12
5.083	18.01	5.00	1.330	O	I							2.26
5.167	20.99	5.00	1.429	O	I							2.42
5.250	23.90	5.00	1.550	O	I							2.61
5.333	26.28	5.00	1.688	O	I							2.82
5.417	28.99	5.00	1.844	O	I							3.06
5.500	33.26	5.00	2.024	O	I							3.33
5.583	29.17	5.00	2.204	O	I							3.60
5.667	15.32	5.00	2.323	O	I							3.78
5.750	8.81	5.00	2.372	O	I							3.85
5.833	5.77	5.00	2.387	O	I							3.87
5.917	3.90	5.00	2.386	O	I							3.87
6.000	2.19	5.00	2.373	O	I							3.85
6.083	1.18	5.00	2.350	O	I							3.82
6.167	0.41	5.00	2.321	O	I							3.78
6.250	0.18	5.00	2.289	O	I							3.73
6.333	0.07	5.00	2.255	O	I							3.68
6.417	0.03	5.00	2.221	O	I							3.63
6.500	0.00	5.00	2.187	O	I							3.58
6.583	0.00	5.00	2.152	O	I							3.53
6.667	0.00	5.00	2.118	O	I							3.48
6.750	0.00	5.00	2.083	O	I							3.42
6.833	0.00	5.00	2.049	O	I							3.37
6.917	0.00	5.00	2.015	O	I							3.32
7.000	0.00	5.00	1.980	O	I							3.27
7.083	0.00	5.00	1.946	O	I							3.21
7.167	0.00	5.00	1.911	O	I							3.16
7.250	0.00	5.00	1.877	O	I							3.11
7.333	0.00	5.00	1.842	O	I							3.06
7.417	0.00	5.00	1.808	O	I							3.01
7.500	0.00	5.00	1.773	O	I							2.95
7.583	0.00	5.00	1.739	O	I							2.90
7.667	0.00	5.00	1.705	O	I							2.85
7.750	0.00	5.00	1.670	O	I							2.79
7.833	0.00	5.00	1.636	O	I							2.74
7.917	0.00	5.00	1.601	O	I							2.69
8.000	0.00	5.00	1.567	O	I							2.63

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8.083	0.00	5.00	1.532	I	0	2.58
8.167	0.00	5.00	1.498	I	0	2.52
8.250	0.00	5.00	1.464	I	0	2.47
8.333	0.00	5.00	1.429	I	0	2.42
8.417	0.00	5.00	1.395	I	0	2.36
8.500	0.00	5.00	1.360	I	0	2.31
8.583	0.00	5.00	1.326	I	0	2.25
8.667	0.00	5.00	1.291	I	0	2.20
8.750	0.00	5.00	1.257	I	0	2.14
8.833	0.00	5.00	1.222	I	0	2.09
8.917	0.00	5.00	1.188	I	0	2.03
9.000	0.00	5.00	1.154	I	0	1.97
9.083	0.00	5.00	1.119	I	0	1.92
9.167	0.00	5.00	1.085	I	0	1.86
9.250	0.00	5.00	1.050	I	0	1.81
9.333	0.00	5.00	1.016	I	0	1.75
9.417	0.00	5.00	0.981	I	0	1.69
9.500	0.00	5.00	0.947	I	0	1.64
9.583	0.00	5.00	0.913	I	0	1.58
9.667	0.00	5.00	0.878	I	0	1.52
9.750	0.00	5.00	0.844	I	0	1.47
9.833	0.00	5.00	0.809	I	0	1.41
9.917	0.00	5.00	0.775	I	0	1.35
10.000	0.00	5.00	0.740	I	0	1.29
10.083	0.00	5.00	0.706	I	0	1.23
10.167	0.00	5.00	0.672	I	0	1.17
10.250	0.00	5.00	0.637	I	0	1.12
10.333	0.00	5.00	0.603	I	0	1.06
10.417	0.00	5.00	0.568	I	0	1.00
10.500	0.00	5.00	0.534	I	0	0.94
10.583	0.00	5.00	0.499	I	0	0.88
10.667	0.00	5.00	0.465	I	0	0.82
10.750	0.00	5.00	0.430	I	0	0.76
10.833	0.00	5.00	0.396	I	0	0.70
10.917	0.00	5.00	0.362	I	0	0.64
11.000	0.00	4.34	0.329	I	0	0.59
11.083	0.00	2.33	0.307	I	0	0.55
11.167	0.00	1.25	0.294	IO		0.52
11.250	0.00	0.67	0.288	O		0.51
11.333	0.00	0.36	0.284	O		0.51
11.417	0.00	0.19	0.282	O		0.50
11.500	0.00	0.10	0.281	O		0.50
11.583	0.00	0.06	0.281	O		0.50
11.667	0.00	0.03	0.280	O		0.50
11.750	0.00	0.02	0.280	O		0.50
11.833	0.00	0.01	0.280	O		0.50
11.917	0.00	0.00	0.280	O		0.50
12.000	0.00	0.00	0.280	O		0.50
12.083	0.00	0.00	0.280	O		0.50
12.167	0.00	0.00	0.280	O		0.50

Remaining water in basin = 0.28 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 146
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 5.000 (CFS)
 Total volume = 4.101 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

BASIN ROUTING
100-YEAR, 24-HOUR STORM EVENT

 17-0108 INDIAN & RAMONA DISTRIBUTION CENTER
 ROUTING CALCULATION
 100-YR 24-HR STORM EVENT
 MJS

Program License Serial Number 4010

***** HYDROGRAPH INFORMATION *****

From study/file name: PROP24100.rte
 *****HYDROGRAPH DATA*****
 Number of intervals = 293
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 13.354 (CFS)
 Total volume = 7.609 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
 Process from Point/Station 100.000 to Point/Station 101.000
 **** RETARDING BASIN ROUTING ****

 User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 293
 Hydrograph time unit = 5.000 (Min.)
 Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
 Initial basin storage = 0.00 (Ac.Ft)
 Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-0*dt/2) (Ac.Ft)	(S+0*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.280	0.000	0.280	0.280
0.600	0.337	5.000	0.320	0.354
1.000	0.568	5.000	0.551	0.585
1.500	0.864	5.000	0.847	0.881
2.000	1.169	5.000	1.152	1.186
2.500	1.482	5.000	1.465	1.499
3.000	1.804	5.000	1.787	1.821
3.500	2.134	5.000	2.117	2.151
4.000	2.474	5.000	2.457	2.491
4.500	2.822	5.000	2.805	2.839
5.000	3.184	5.000	3.167	3.201
6.000	3.918	5.000	3.901	3.935
7.000	4.667	5.000	4.650	4.684
8.000	5.429	5.000	5.412	5.446
9.000	6.207	5.000	6.190	6.224

 Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	0	3.3	6.68	10.02	13.35	Depth (Ft.)
0.083	0.21	0.00	0.001	O					0.00
0.167	0.56	0.00	0.003	O I					0.01
0.250	0.64	0.00	0.008	O I					0.01
0.333	0.79	0.00	0.012	O I					0.02
0.417	0.98	0.00	0.019	O I					0.03
0.500	1.04	0.00	0.026	O I					0.05
0.583	1.06	0.00	0.033	O I					0.06
0.667	1.07	0.00	0.040	O I					0.07

0.750	1.08	0.00	0.048	O I		0.08
0.833	1.19	0.00	0.055	O I		0.10
0.917	1.36	0.00	0.064	O I		0.11
1.000	1.40	0.00	0.074	O I		0.13
1.083	1.32	0.00	0.083	O I		0.15
1.167	1.15	0.00	0.092	O I		0.16
1.250	1.12	0.00	0.099	O I		0.18
1.333	1.10	0.00	0.107	O I		0.19
1.417	1.09	0.00	0.114	O I		0.20
1.500	1.08	0.00	0.122	O I		0.22
1.583	1.08	0.00	0.129	O I		0.23
1.667	1.08	0.00	0.137	O I		0.24
1.750	1.08	0.00	0.144	O I		0.26
1.833	1.19	0.00	0.152	O I		0.27
1.917	1.36	0.00	0.161	O I		0.29
2.000	1.40	0.00	0.170	O I		0.30
2.083	1.42	0.00	0.180	O I		0.32
2.167	1.43	0.00	0.190	O I		0.34
2.250	1.44	0.00	0.200	O I		0.36
2.333	1.44	0.00	0.210	O I		0.37
2.417	1.44	0.00	0.220	O I		0.39
2.500	1.44	0.00	0.230	O I		0.41
2.583	1.55	0.00	0.240	O I		0.43
2.667	1.72	0.00	0.251	O I		0.45
2.750	1.76	0.00	0.263	O I		0.47
2.833	1.78	0.00	0.275	O I		0.49
2.917	1.79	0.51	0.286	O I		0.51
3.000	1.80	1.11	0.293	O I		0.52
3.083	1.80	1.43	0.296	O I		0.53
3.167	1.80	1.60	0.298	O I		0.53
3.250	1.80	1.69	0.299	O		0.53
3.333	1.80	1.74	0.300	O		0.53
3.417	1.80	1.77	0.300	O		0.54
3.500	1.80	1.78	0.300	O		0.54
3.583	1.80	1.79	0.300	O		0.54
3.667	1.80	1.80	0.300	O		0.54
3.750	1.80	1.80	0.300	O		0.54
3.833	1.91	1.82	0.301	O		0.54
3.917	2.08	1.90	0.302	O		0.54
4.000	2.12	1.99	0.303	O I		0.54
4.083	2.14	2.06	0.303	O I		0.54
4.167	2.15	2.10	0.304	O		0.54
4.250	2.16	2.13	0.304	O		0.54
4.333	2.27	2.17	0.305	O		0.54
4.417	2.44	2.25	0.306	O		0.55
4.500	2.48	2.35	0.307	O		0.55
4.583	2.50	2.42	0.308	O		0.55
4.667	2.51	2.46	0.308	O I		0.55
4.750	2.52	2.49	0.308	O I		0.55
4.833	2.63	2.53	0.309	O		0.55
4.917	2.80	2.61	0.310	O		0.55
5.000	2.84	2.71	0.311	O		0.55
5.083	2.65	2.73	0.311	O		0.55
5.167	2.32	2.61	0.310	O I		0.55
5.250	2.24	2.46	0.308	O		0.55
5.333	2.30	2.37	0.307	O		0.55
5.417	2.46	2.37	0.307	O		0.55
5.500	2.48	2.42	0.308	O		0.55
5.583	2.61	2.48	0.308	O I		0.55
5.667	2.79	2.58	0.309	O		0.55
5.750	2.84	2.69	0.311	O		0.55
5.833	2.86	2.77	0.312	O		0.56
5.917	2.87	2.81	0.312	O		0.56
6.000	2.88	2.84	0.312	O		0.56
6.083	2.99	2.89	0.313	O I		0.56
6.167	3.16	2.97	0.314	O		0.56
6.250	3.20	3.07	0.315	O		0.56
6.333	3.22	3.14	0.316	O		0.56
6.417	3.23	3.18	0.316	O		0.56
6.500	3.24	3.21	0.317	O		0.56
6.583	3.35	3.25	0.317	O I		0.56
6.667	3.52	3.33	0.318	O I		0.57
6.750	3.56	3.43	0.319	O		0.57
6.833	3.58	3.50	0.320	O		0.57
6.917	3.59	3.54	0.320	O		0.57
7.000	3.60	3.57	0.321	O		0.57
7.083	3.60	3.58	0.321	O		0.57
7.167	3.60	3.59	0.321	O		0.57
7.250	3.60	3.60	0.321	O		0.57
7.333	3.71	3.62	0.321	O		0.57
7.417	3.88	3.70	0.322	O I		0.57
7.500	3.92	3.79	0.323	O		0.58
7.583	4.05	3.88	0.324	O		0.58
7.667	4.23	4.00	0.326	O I		0.58
7.750	4.28	4.12	0.327	O I		0.58
7.833	4.41	4.23	0.328	O		0.58
7.917	4.59	4.35	0.330	O I		0.59
8.000	4.64	4.48	0.331	O I		0.59

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8.083	4.88	4.61	0.333	O			0.59
8.167	5.23	4.81	0.335	OI			0.60
8.250	5.33	5.00	0.337	OI			0.60
8.333	5.37	5.00	0.340	OI			0.60
8.417	5.39	5.00	0.342	OI			0.61
8.500	5.40	5.00	0.345	OI			0.61
8.583	5.51	5.00	0.348	O I			0.62
8.667	5.68	5.00	0.352	O I			0.63
8.750	5.72	5.00	0.357	O I			0.63
8.833	5.85	5.00	0.363	O I			0.64
8.917	6.03	5.00	0.369	O I			0.66
9.000	6.08	5.00	0.376	O I			0.67
9.083	6.32	5.00	0.385	O I			0.68
9.167	6.67	5.00	0.395	O I			0.70
9.250	6.77	5.00	0.407	O I			0.72
9.333	6.91	5.00	0.419	O I			0.74
9.417	7.11	5.00	0.433	O I			0.77
9.500	7.17	5.00	0.448	O I			0.79
9.583	7.29	5.00	0.463	O I			0.82
9.667	7.47	5.00	0.480	O I			0.85
9.750	7.53	5.00	0.497	O I			0.88
9.833	7.65	5.00	0.515	O I			0.91
9.917	7.83	5.00	0.534	O I			0.94
10.000	7.89	5.00	0.553	O I			0.97
10.083	7.16	5.00	0.571	O I			1.00
10.167	5.96	5.00	0.582	O I			1.02
10.250	5.67	5.00	0.587	O I			1.03
10.333	5.53	5.00	0.591	O I			1.04
10.417	5.46	5.00	0.595	O I			1.05
10.500	5.40	5.00	0.598	OI			1.05
10.583	5.93	5.00	0.602	O I			1.06
10.667	6.80	5.00	0.612	O I			1.07
10.750	7.01	5.00	0.625	O I			1.10
10.833	7.11	5.00	0.639	O I			1.12
10.917	7.16	5.00	0.654	O I			1.14
11.000	7.20	5.00	0.669	O I			1.17
11.083	7.10	5.00	0.684	O I			1.20
11.167	6.92	5.00	0.697	O I			1.22
11.250	6.88	5.00	0.710	O I			1.24
11.333	6.86	5.00	0.723	O I			1.26
11.417	6.85	5.00	0.736	O I			1.28
11.500	6.84	5.00	0.749	O I			1.31
11.583	6.63	5.00	0.761	O I			1.33
11.667	6.29	5.00	0.771	O I			1.34
11.750	6.20	5.00	0.779	O I			1.36
11.833	6.26	5.00	0.788	O I			1.37
11.917	6.42	5.00	0.797	O I			1.39
12.000	6.44	5.00	0.807	O I			1.40
12.083	7.28	5.00	0.820	O I			1.43
12.167	8.63	5.00	0.840	O I	I		1.46
12.250	8.99	5.00	0.866	O I	I		1.50
12.333	9.27	5.00	0.895	O I	I		1.55
12.417	9.57	5.00	0.925	O I	I		1.60
12.500	9.69	5.00	0.957	O I	I		1.65
12.583	9.98	5.00	0.991	O I	I		1.71
12.667	10.43	5.00	1.026	O I	I		1.77
12.750	10.55	5.00	1.064	O I	I		1.83
12.833	10.74	5.00	1.103	O I	I		1.89
12.917	10.98	5.00	1.143	O I	I		1.96
13.000	11.06	5.00	1.185	O I	I		2.03
13.083	11.74	5.00	1.229	O I	I		2.10
13.167	12.81	5.00	1.279	O I	I		2.18
13.250	13.10	5.00	1.334	O I	I		2.26
13.333	13.23	5.00	1.390	O I	I		2.35
13.417	13.30	5.00	1.447	O I	I		2.44
13.500	13.35	5.00	1.504	O I	I		2.53
13.583	11.94	5.00	1.557	O I	I		2.62
13.667	9.63	5.00	1.597	O I	I		2.68
13.750	9.05	5.00	1.627	O I	I		2.72
13.833	8.80	5.00	1.654	O I	I		2.77
13.917	8.67	5.00	1.680	O I	I		2.81
14.000	8.57	5.00	1.705	O I	I		2.85
14.083	9.09	5.00	1.731	O I	I		2.89
14.167	9.95	5.00	1.762	O I	I		2.93
14.250	10.17	5.00	1.797	O I	I		2.99
14.333	10.14	5.00	1.832	O I	I		3.04
14.417	9.99	5.00	1.867	O I	I		3.10
14.500	9.98	5.00	1.902	O I	I		3.15
14.583	9.96	5.00	1.936	O I	I		3.20
14.667	9.96	5.00	1.970	O I	I		3.25
14.750	9.96	5.00	2.004	O I	I		3.30
14.833	9.84	5.00	2.038	O I	I		3.35
14.917	9.63	5.00	2.070	O I	I		3.40
15.000	9.59	5.00	2.102	O I	I		3.45
15.083	9.44	5.00	2.133	O I	I		3.50
15.167	9.22	5.00	2.163	O I	I		3.54
15.250	9.17	5.00	2.192	O I	I		3.59
15.333	9.02	5.00	2.220	O I	I		3.63

ROUTE24100.out

15.417	8.81	5.00	2.247		0			3.67
15.500	8.75	5.00	2.273		0		I	3.70
15.583	8.22	5.00	2.297		0		I	3.74
15.667	7.37	5.00	2.316		0		I	3.77
15.750	7.15	5.00	2.332		0		I	3.79
15.833	7.07	5.00	2.347		0		I	3.81
15.917	7.02	5.00	2.361		0		I	3.83
16.000	6.99	5.00	2.374		0		I	3.85
16.083	5.36	5.00	2.383		0	I		3.87
16.167	2.70	5.00	2.376		0		I	3.86
16.250	2.02	5.00	2.358		0		I	3.83
16.333	1.72	5.00	2.336		0		I	3.80
16.417	1.56	5.00	2.313		0		I	3.76
16.500	1.44	5.00	2.289		0		I	3.73
16.583	1.33	5.00	2.264		0		I	3.69
16.667	1.16	5.00	2.238		0		I	3.65
16.750	1.12	5.00	2.212		0		I	3.61
16.833	1.10	5.00	2.185		0		I	3.57
16.917	1.09	5.00	2.158		0		I	3.54
17.000	1.08	5.00	2.131		0		I	3.50
17.083	1.29	5.00	2.105		0		I	3.46
17.167	1.64	5.00	2.080		0		I	3.42
17.250	1.73	5.00	2.057		0		I	3.38
17.333	1.76	5.00	2.035		0		I	3.35
17.417	1.79	5.00	2.013		0		I	3.32
17.500	1.80	5.00	1.991		0		I	3.28
17.583	1.80	5.00	1.969		0		I	3.25
17.667	1.80	5.00	1.947		0		I	3.22
17.750	1.80	5.00	1.925		0		I	3.18
17.833	1.70	5.00	1.902		0		I	3.15
17.917	1.52	5.00	1.879		0		I	3.11
18.000	1.48	5.00	1.855		0		I	3.08
18.083	1.46	5.00	1.830		0		I	3.04
18.167	1.45	5.00	1.806		0		I	3.00
18.250	1.44	5.00	1.782		0		I	2.97
18.333	1.44	5.00	1.757		0		I	2.93
18.417	1.44	5.00	1.733		0		I	2.89
18.500	1.44	5.00	1.708		0		I	2.85
18.583	1.33	5.00	1.683		0		I	2.81
18.667	1.16	5.00	1.657		0		I	2.77
18.750	1.12	5.00	1.631		0		I	2.73
18.833	0.99	5.00	1.604		0		I	2.69
18.917	0.81	5.00	1.575		0		I	2.64
19.000	0.76	5.00	1.546		0		I	2.60
19.083	0.84	5.00	1.517		0		I	2.55
19.167	1.01	5.00	1.489		0		I	2.51
19.250	1.04	5.00	1.462		0		I	2.47
19.333	1.17	5.00	1.435		0		I	2.43
19.417	1.35	5.00	1.409		0		I	2.38
19.500	1.40	5.00	1.384		0		I	2.34
19.583	1.32	5.00	1.359		0		I	2.30
19.667	1.15	5.00	1.333		0		I	2.26
19.750	1.12	5.00	1.307		0		I	2.22
19.833	0.99	5.00	1.280		0		I	2.18
19.917	0.81	5.00	1.251		0		I	2.13
20.000	0.76	5.00	1.222		0		I	2.09
20.083	0.84	5.00	1.193		0		I	2.04
20.167	1.01	5.00	1.165		0		I	1.99
20.250	1.04	5.00	1.138		0		I	1.95
20.333	1.06	5.00	1.111		0		I	1.90
20.417	1.07	5.00	1.084		0		I	1.86
20.500	1.08	5.00	1.057		0		I	1.82
20.583	1.08	5.00	1.030		0		I	1.77
20.667	1.08	5.00	1.003		0		I	1.73
20.750	1.08	5.00	0.976		0		I	1.68
20.833	0.97	5.00	0.948		0		I	1.64
20.917	0.80	5.00	0.920		0		I	1.59
21.000	0.76	5.00	0.891		0		I	1.54
21.083	0.84	5.00	0.862		0		I	1.50
21.167	1.01	5.00	0.834		0		I	1.45
21.250	1.04	5.00	0.807		0		I	1.40
21.333	0.96	5.00	0.779		0		I	1.36
21.417	0.79	5.00	0.751		0		I	1.31
21.500	0.76	5.00	0.722		0		I	1.26
21.583	0.84	5.00	0.693		0		I	1.21
21.667	1.01	5.00	0.665		0		I	1.16
21.750	1.04	5.00	0.637		0		I	1.12
21.833	0.96	5.00	0.610		0		I	1.07
21.917	0.79	5.00	0.581		0		I	1.02
22.000	0.76	5.00	0.552		0		I	0.97
22.083	0.84	5.00	0.523		0		I	0.92
22.167	1.01	5.00	0.495		0		I	0.87
22.250	1.04	5.00	0.468		0		I	0.83
22.333	0.96	5.00	0.440		0		I	0.78
22.417	0.79	5.00	0.412		0		I	0.73
22.500	0.76	5.00	0.383		0		I	0.68
22.583	0.74	5.00	0.354		0		I	0.63
22.667	0.73	4.13	0.327		0		I	0.58

ROUTE24100.out

22.750	0.72	2.55	0.309	I	0				0.55
22.833	0.72	1.70	0.299	I	0				0.53
22.917	0.72	1.25	0.294	IO					0.52
23.000	0.72	1.00	0.291	IO					0.52
23.083	0.72	0.87	0.290	IO					0.52
23.167	0.72	0.80	0.289	O					0.52
23.250	0.72	0.76	0.289	O					0.52
23.333	0.72	0.74	0.288	O					0.51
23.417	0.72	0.73	0.288	O					0.51
23.500	0.72	0.73	0.288	O					0.51
23.583	0.72	0.72	0.288	O					0.51
23.667	0.72	0.72	0.288	O					0.51
23.750	0.72	0.72	0.288	O					0.51
23.833	0.72	0.72	0.288	O					0.51
23.917	0.72	0.72	0.288	O					0.51
24.000	0.72	0.72	0.288	O					0.51
24.083	0.51	0.67	0.288	O					0.51
24.167	0.16	0.52	0.286	IO					0.51
24.250	0.08	0.33	0.284	O					0.51
24.333	0.04	0.20	0.282	O					0.50
24.417	0.02	0.12	0.281	O					0.50
24.500	0.00	0.07	0.281	O					0.50
24.583	0.00	0.04	0.280	O					0.50
24.667	0.00	0.02	0.280	O					0.50
24.750	0.00	0.01	0.280	O					0.50
24.833	0.00	0.01	0.280	O					0.50
24.917	0.00	0.00	0.280	O					0.50
25.000	0.00	0.00	0.280	O					0.50
25.083	0.00	0.00	0.280	O					0.50

Remaining water in basin = 0.28 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 301
 Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 5.000 (CFS)
 Total volume = 7.329 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

APPENDIX C – REFERENCES

PERRIS VALLEY MDP LINE E-3 PLANS

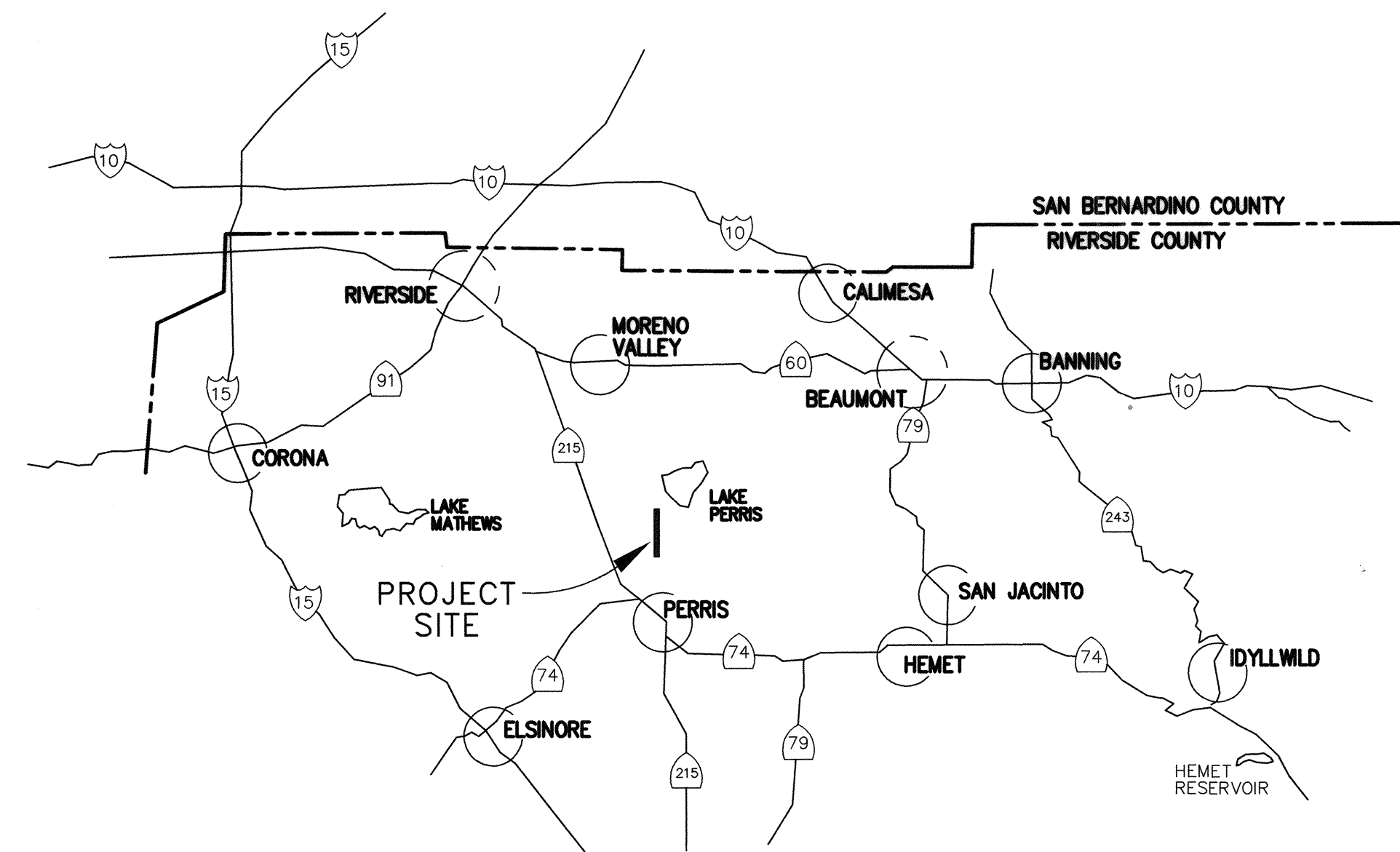
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

PERRIS VALLEY MDP LINE E-3

INDEX

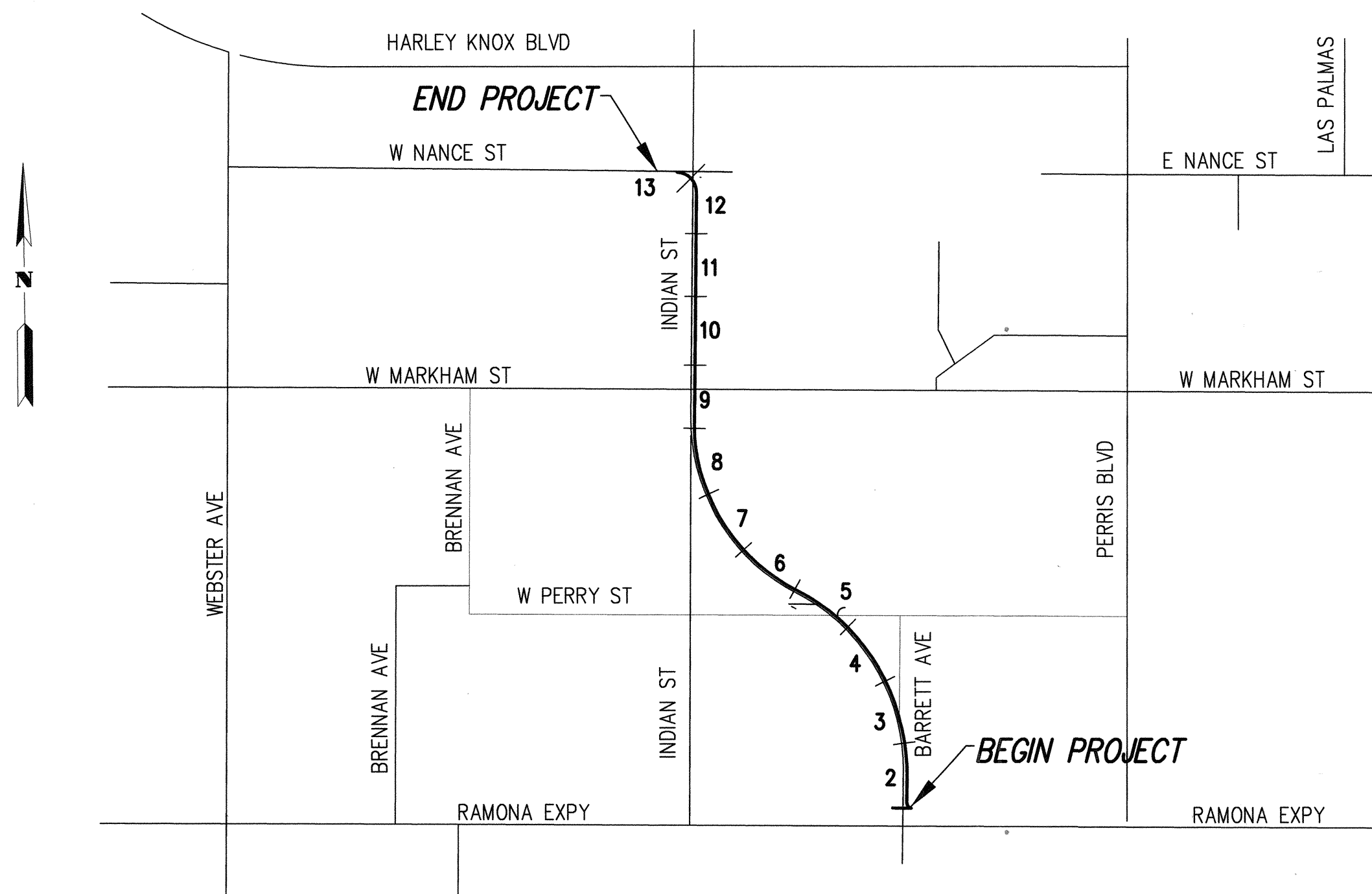
SHEET NO.

TITLE SHEET	1
LINE "E-3" PLAN AND PROFILE	2-14
LATERAL PROFILES	15-18
DETAILS AND SECTIONS	19-20



VICINITY MAP

SECTION 7, TOWNSHIP 4 SOUTH, RANGE 3 WEST
N.T.S.



INDEX MAP

N.T.S.

GENERAL NOTES:

- THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN ACCORDANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S M.O.U. STANDARD SPECIFICATIONS DATED SEPTEMBER 1984, AND DESIGN MANUAL STANDARD DRAWINGS DATED APRIL 2004.
- AN ENCROACHMENT PERMIT IS REQUIRED FROM RIVERSIDE COUNTY FLOOD CONTROL. CONTACT ED LOTZ AT 951-955-1266. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
- CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. CONTACT HENRY OLIVO AT 951-955-1288. THE DISTRICT MUST BE NOTIFIED TWENTY (20) DAYS PRIOR TO CONSTRUCTION.
- ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION (STORM DRAIN) UNLESS OTHERWISE NOTED.
- STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE INTERSECTION STATIONS.
- FORTY-EIGHT HOURS BEFORE EXCAVATION, THE CONTRACTOR IS TO CALL UNDERGROUND SERVICE ALERT AT 811.
- ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON U.S.C. & G.S. DATUM.
- ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
- ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
- OPENINGS 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.
- PIPE BEDDING SHALL CONFORM TO RCFC&WCD STD. DWG. NO M815 EXCEPT FOR COVER LESS THAN 2 FEET. FOR COVER LESS THAN 2 FEET, CONCRETE SLURRY (2000 PSI-2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRIED EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF THE PIPE.
- BH-1 INDICATES SOIL BORING LOCATIONS BASED ON THE SOILS REPORT DATED DECEMBER 27, 2006. LOCATIONS SHOWN ARE APPROXIMATE.
- "V" IS THE DEPTH OF CATCH BASINS MEASURED FROM THE TOP OF THE CURB TO THE INVERT OF THE CONNECTOR PIPE.
- CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSIONS SHALL BEGIN AT EXISTING CURB RETURN JOINT. UNLESS OTHERWISE NOTED.
- 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.
- STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
- THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS.
- DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
- APPROVAL OF THESE PLANS BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEER OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE THE NECESSARY CORRECTIONS.
- THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK.

CONSTRUCTION NOTES:

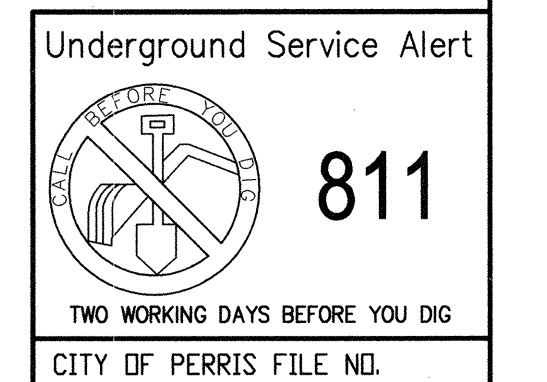
- CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
- CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
- CONSTRUCT 72" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
- CONSTRUCT 18" R.C.P. (D-LOAD SHOWN ON PROFILE).
- CONSTRUCT 36" R.C.P. (D-LOAD SHOWN ON PROFILE).
- CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC STD. DWG. TS301.
- CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC STD. DWG. JS229.
- CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
- CONSTRUCT MANHOLE FOR C.I.P.P. PER DETAIL "D" ON SHEET 20.
- CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
- CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
- CONSTRUCT 24"x24"x24" DEEP GRATED INLET WITH 12" VERTICAL PVC PIPE (SDR35).
- CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
- EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
- EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
- CONSTRUCT CATCH BASIN OPENING AT BACK OF CATCH BASIN (12" WIDE X 6" HIGH). SEE PROFILE FOR CATCH BASIN OPENING ELEVATION.
- CONSTRUCT INLET TYPE X PER RCFC STD. DWG. CB108 (MODIFIED W/ ONE OPENING ONLY).
- CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
- CONSTRUCT METAL FLARED END SECTION PER CALTRANS STD. DWG. D94A (TYPE III).
- CONSTRUCT 18" C.M.P. (14 GA. MINIMUM).
- CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
- REMOVE EXISTING 8" PVC RAW WATER LINE (SEE PLAN FOR LIMITS). VERIFY LOCATION OF WATER LINE NOTIFY ENGINEER IF THERE IS A CONFLICT (MANHOLE TO BE CENTERED AT EXISTING).
- SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.

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

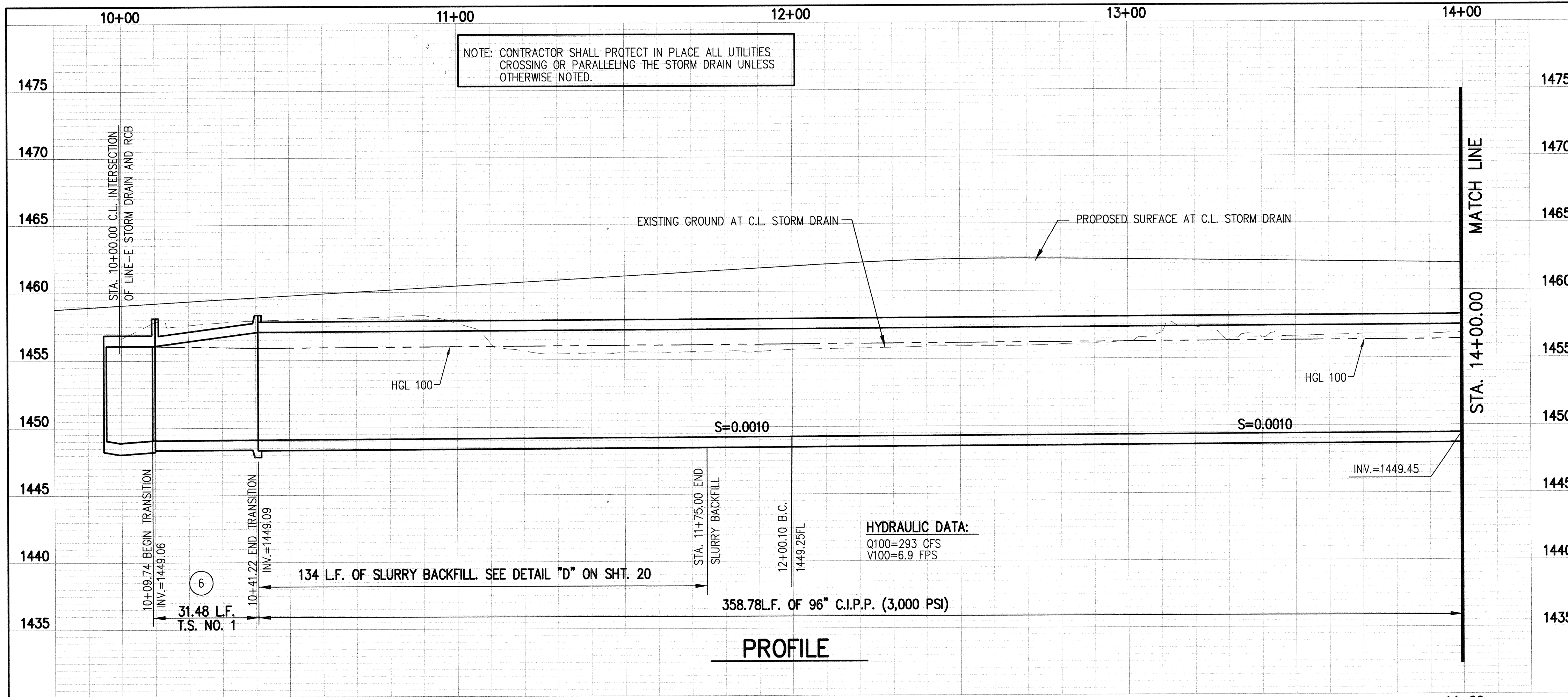
CB100	CATCH BASIN NO. 1
CB108	TYPE X INLET
MH252	MANHOLE NO. 2
MH254	MANHOLE NO. 4
TS301	TRANSITION STRUCTURE NO. 1
M816	CONCRETE BULKHEAD

CALTRANS STANDARD DRAWINGS

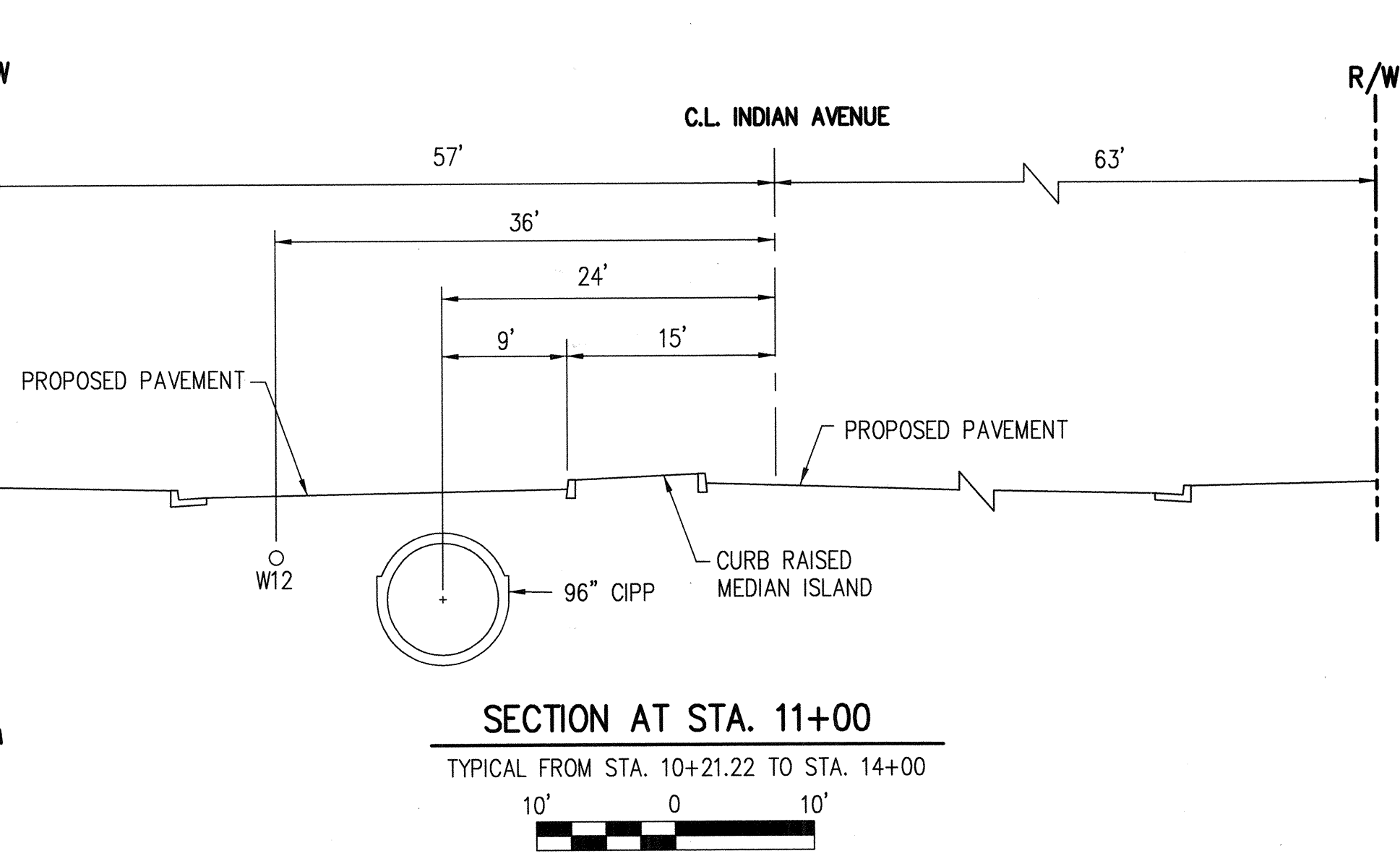
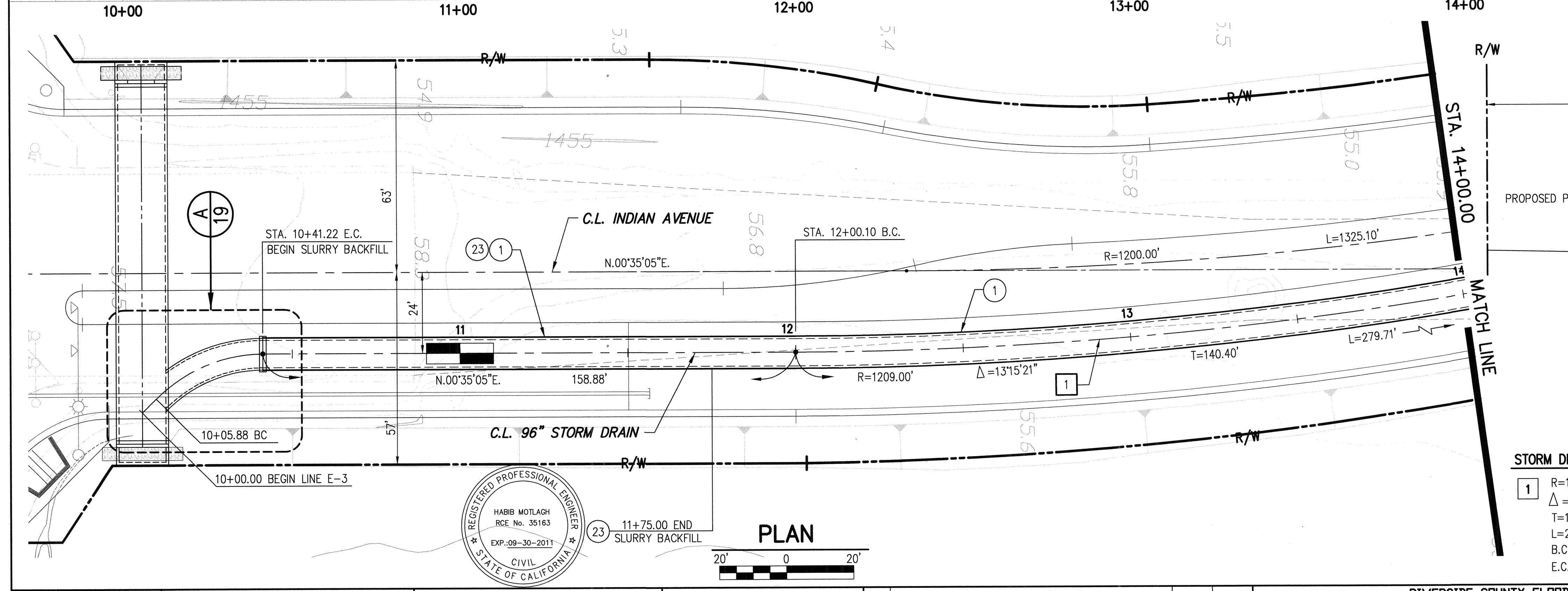
D80	CAST-IN-PLACE REINFORCED CONCRETE SINGLE BOX CULVERT
D94A	METAL AND PLASTIC FLARED END SECTIONS



	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 6705 Riverside, CA 92517-5705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-541-4848 Fax: 951-541-4845 e-mail: kctinc@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: <i>[Signature]</i> CITY ENGINEER DATE: 6/10/11 RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS				RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			PERRIS VALLEY MDP LINE E-3 TITLE SHEET	PROJECT NO.
				DESIGNED BY:	RECOMMENDED FOR APPROVAL BY:	APPROVED BY:	DATE:	RCE NO 30539	DATE:	RCE NO 32336		DRAWING NO.
				REF.	DESCRIPTION	APPR	DATE				SHEET NO. 1 OF 20	



- CONSTRUCTION NOTES:**
- ① CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ② CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ③ CONSTRUCT 72" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
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 - ⑧ CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
 - ⑨ CONSTRUCT MANHOLE FOR C.I.P.P. PER DETAIL "D" ON SHEET 20.
 - ⑩ CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
 - ⑪ CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
 - ⑫ CONSTRUCT 24"x24"x24" DEEP GRATED INLET WITH 12" VERTICAL PVC PIPE (SDR35).
 - ⑬ CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
 - ⑭ EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
 - ⑮ EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
 - ⑯ CONSTRUCT CATCH BASIN OPENING AT BACK OF CATCH BASIN (12" WIDE X 6" HIGH). SEE PROFILE FOR CATCH BASIN OPENING ELEVATION.
 - ⑰ CONSTRUCT INLET TYPE X PER RCFC STD. DWG. CB108 (MODIFIED W/ ONE OPENING ONLY).
 - ⑱ CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
 - ⑲ CONSTRUCT METAL FLARED END SECTION PER CALTRANS STD. DWG. D94A (TYPE III).
 - ⑳ CONSTRUCT 18" C.M.P. (14 GA. MINIMUM).
 - ㉑ CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
 - ㉒ REMOVE EXISTING 8" PVC RAW WATER LINE (SEE PLAN FOR LIMITS). VERIFY LOCATION OF WATER LINE NOTIFY ENGINEER IF THERE IS A CONFLICT (MANHOLE TO BE CENTERED AT EXISTING).
 - ㉓ SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



STORM DRAIN C.L. CURVE DATA:

①	R=1000.00'
	$\Delta=13'15'21''$
	T=140.40'
	L=279.71'
	B.C. STA=12+00.10
	E.C. STA=14+79.81

Underground Service Alert

811

TWO WORKING DAYS BEFORE YOU DIG

CITY OF PERRIS FILE NO. **P8-1164**

SEAL

KCT CONSULTANTS, INC.
Civil Engineers - Surveyors - Planners
P.O. Box 5708 Riverside, CA 92517-6705
4344 Latham St., Suite 200, Riverside, CA 92501
Phone: 951-341-8940 Fax: 951-341-8945
e-mail: kctinfo@kctconsultants.com

PREPARED UNDER THE SUPERVISION OF:
Teresito N. Tabaldo DATE **6-10-11**
TERESITO N. TABALDO, R.C.E. NO. 38826

CITY OF PERRIS ENGINEERING DEPARTMENT

APPROVED BY: *[Signature]*
CITY ENGINEER

DATE: **6/10/11** RCE

BENCH MARK: Z-6843
1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD.
ELEVATION=1454.258

REVISIONS	DESCRIPTION	APPR	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: _____
DRAWN BY: _____
DATE DRAWN: _____

RECOMMENDED FOR APPROVAL BY: _____
CHIEF, DESIGN & CONSTRUCTION
DATE: _____ RCE NO 30539

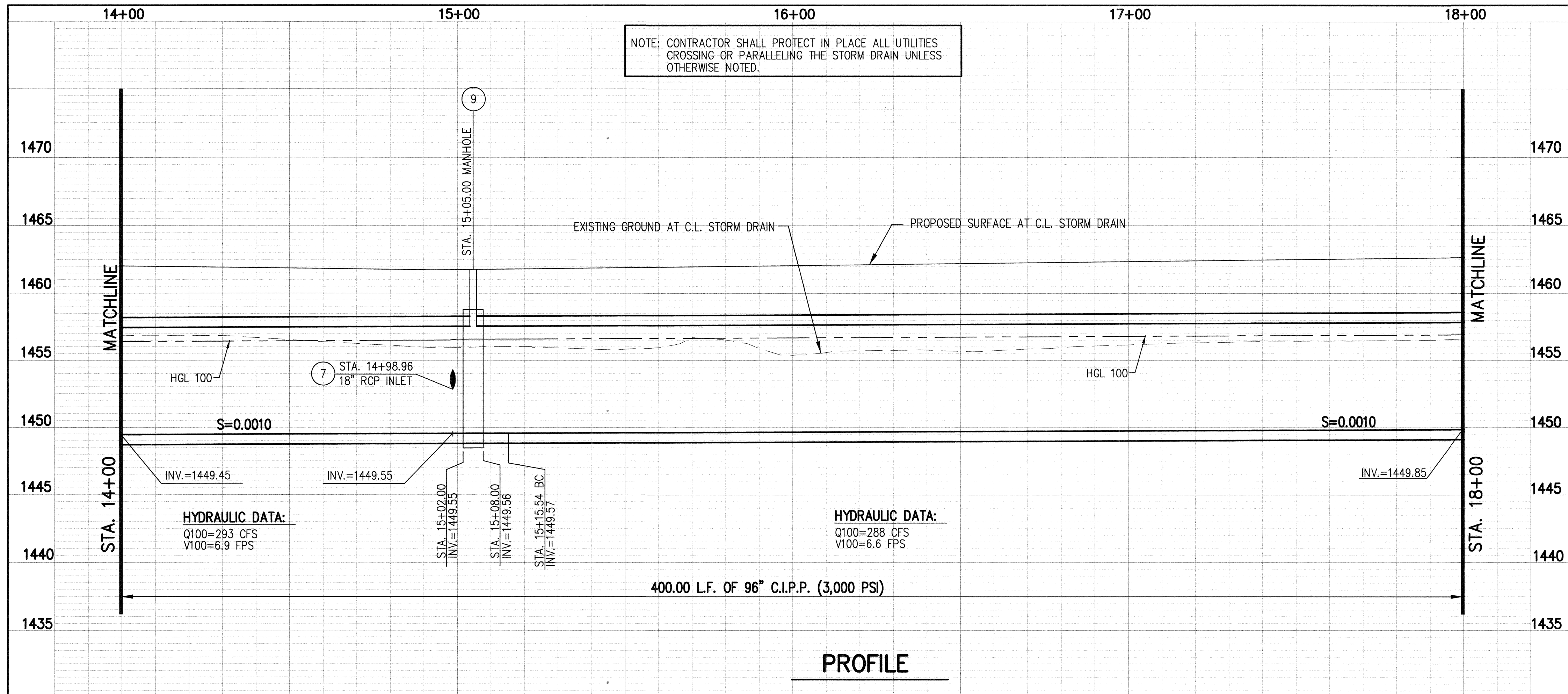
APPROVED BY: _____
CHIEF ENGINEER
DATE: _____ RCE NO 32336

PERRIS VALLEY MDP LINE E-3 STAGE 1

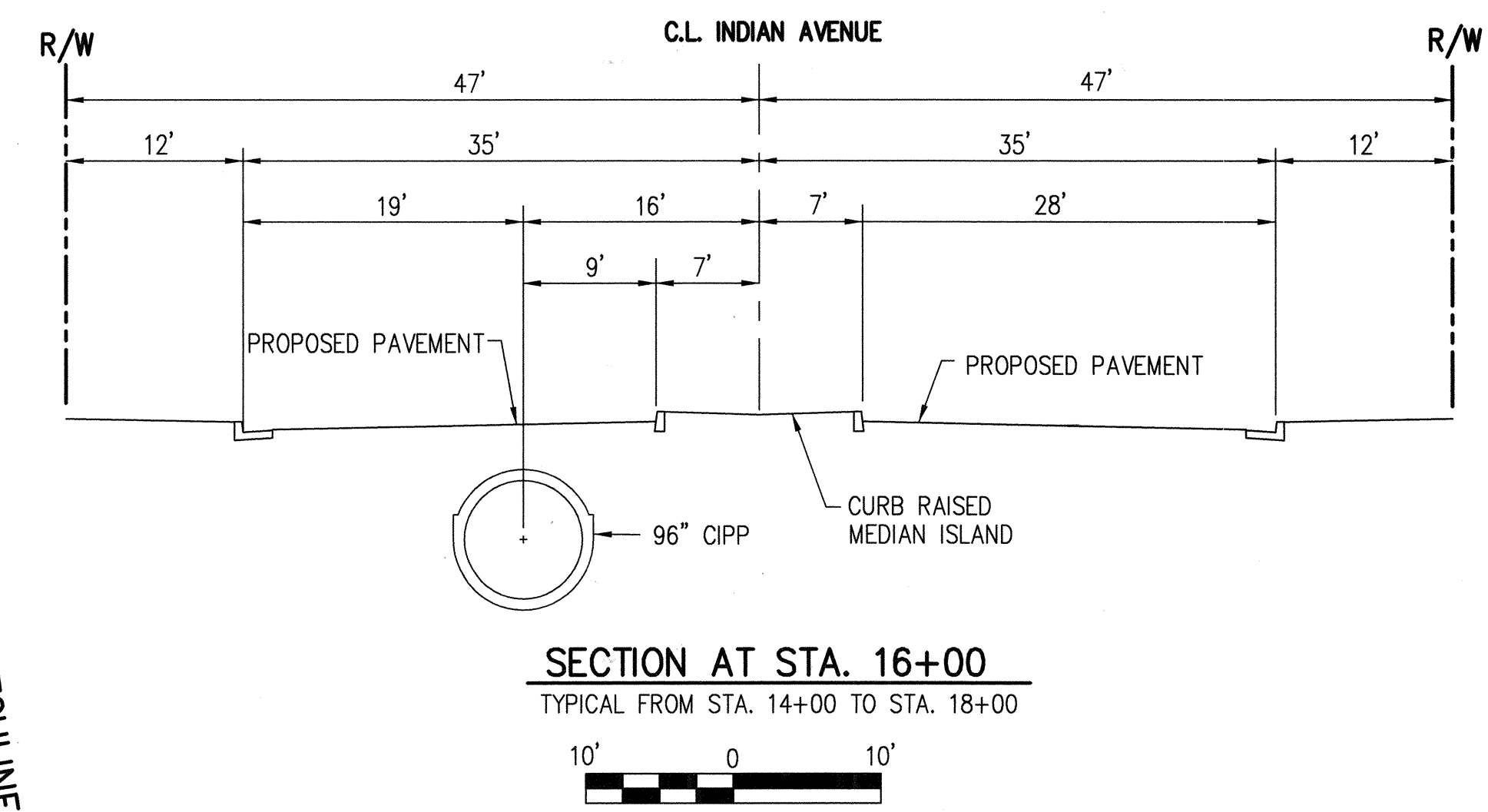
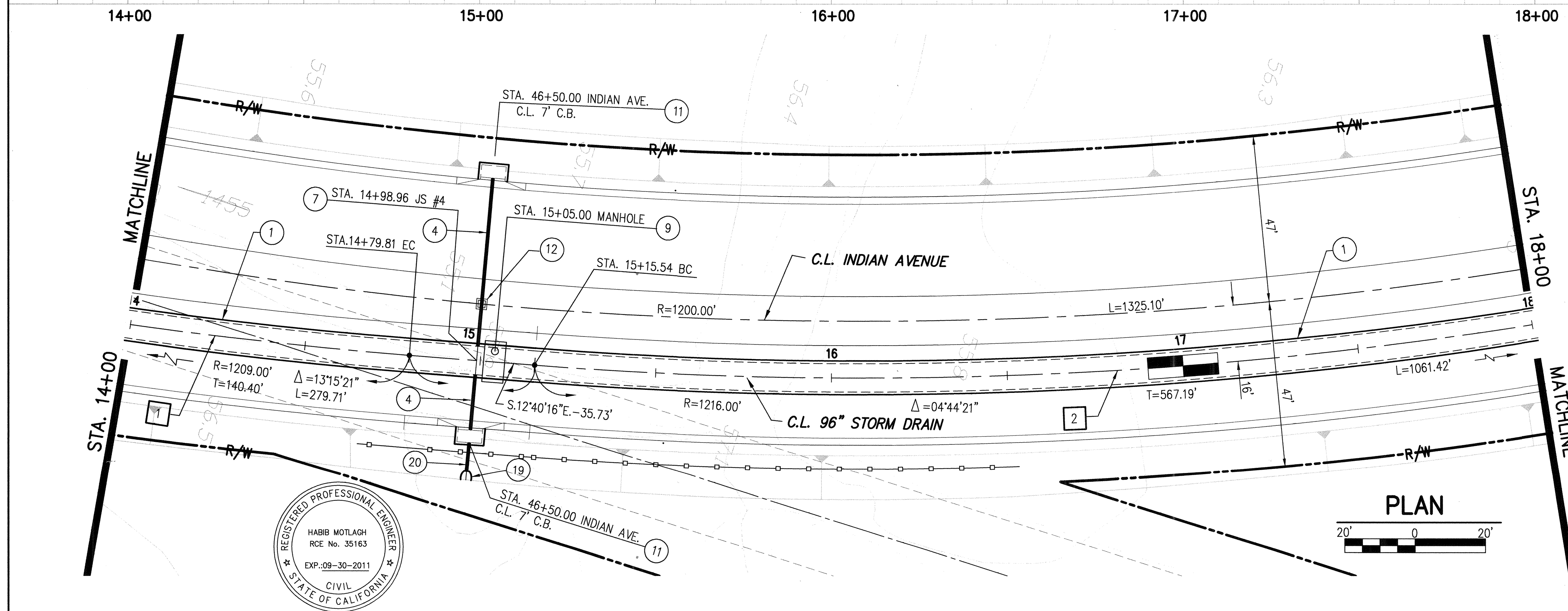
STA. 10+00 TO STA. 14+00

PROJECT NO. _____
DRAWING NO. _____
SHEET NO. **2 OF 20**

P:\1385\03 - Perris Valley MDP - E-3\Eng\Stormdrain\03-46-indian.dwg
 Plot Date: June 10, 2011 10:55am Terry



- CONSTRUCTION NOTES:**
- 1 CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - 2 CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - 3 CONSTRUCT 72" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - 4 CONSTRUCT 18" R.C.P. (D-LOAD SHOWN ON PROFILE).
 - 5 CONSTRUCT 36" R.C.P. (D-LOAD SHOWN ON PROFILE).
 - 6 CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC STD. DWG. TS301.
 - 7 CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC STD. DWG. JS229.
 - 8 CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
 - 9 CONSTRUCT MANHOLE FOR C.I.P.P. PER DETAIL "D" ON SHEET 20.
 - 10 CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
 - 11 CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
 - 12 CONSTRUCT 24"x24"x24" DEEP GRATED INLET WITH 12" VERTICAL PVC PIPE (SDR35).
 - 13 CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
 - 14 EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
 - 15 EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
 - 16 CONSTRUCT CATCH BASIN OPENING AT BACK OF CATCH BASIN (12" WIDE X 6" HIGH). SEE PROFILE FOR CATCH BASIN OPENING ELEVATION.
 - 17 CONSTRUCT INLET TYPE X PER RCFC STD. DWG. CB108 (MODIFIED W/ ONE OPENING ONLY).
 - 18 CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
 - 19 CONSTRUCT METAL FLARED END SECTION PER CALTRANS STD. DWG. D94A (TYPE III).
 - 20 CONSTRUCT 18" C.M.P. (14 GA. MINIMUM).
 - 21 CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
 - 22 REMOVE EXISTING 8" PVC RAW WATER LINE (SEE PLAN FOR LIMITS). VERIFY LOCATION OF WATER LINE NOTIFY ENGINEER IF THERE IS A CONFLICT (MANHOLE TO BE CENTERED AT EXISTING).
 - 23 SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.

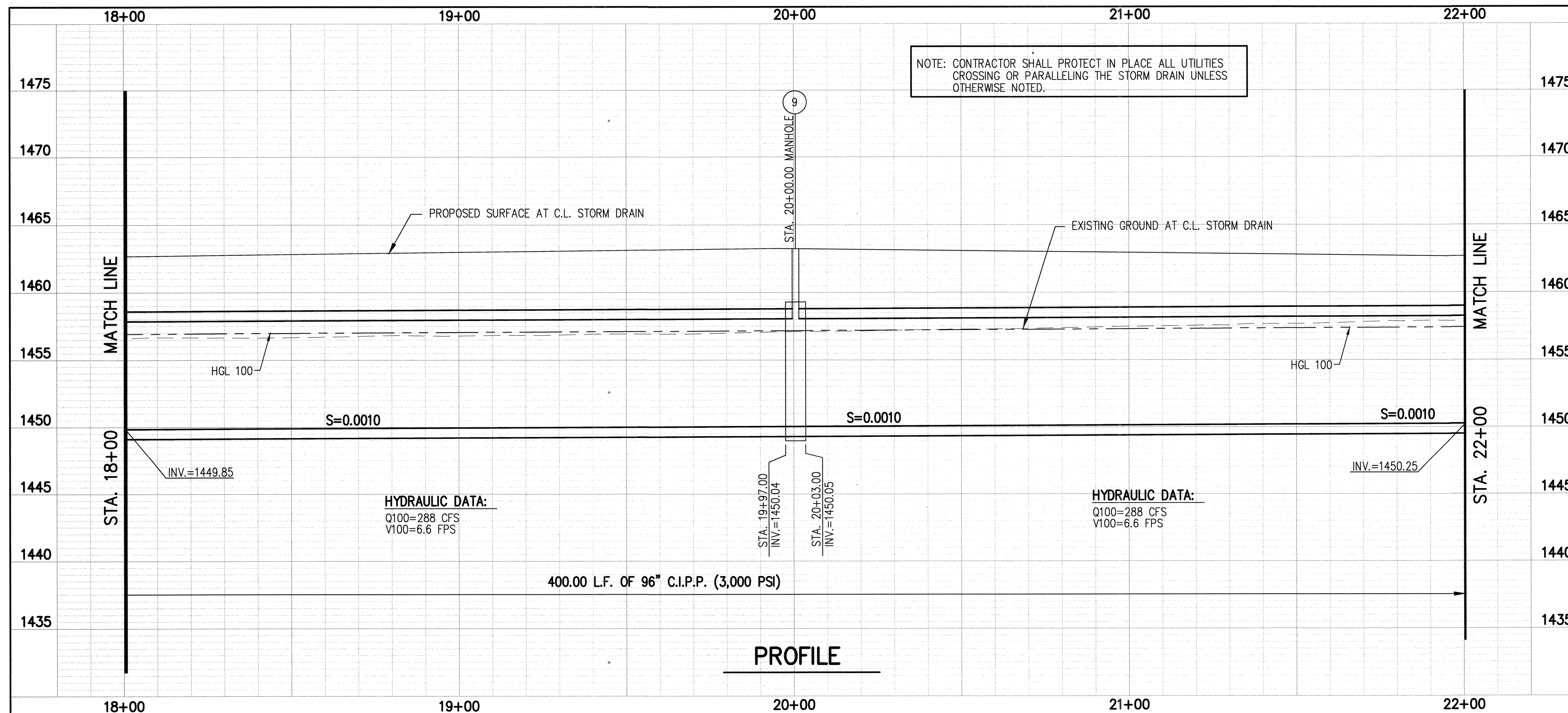


STORM DRAIN C.L. CURVE DATA:

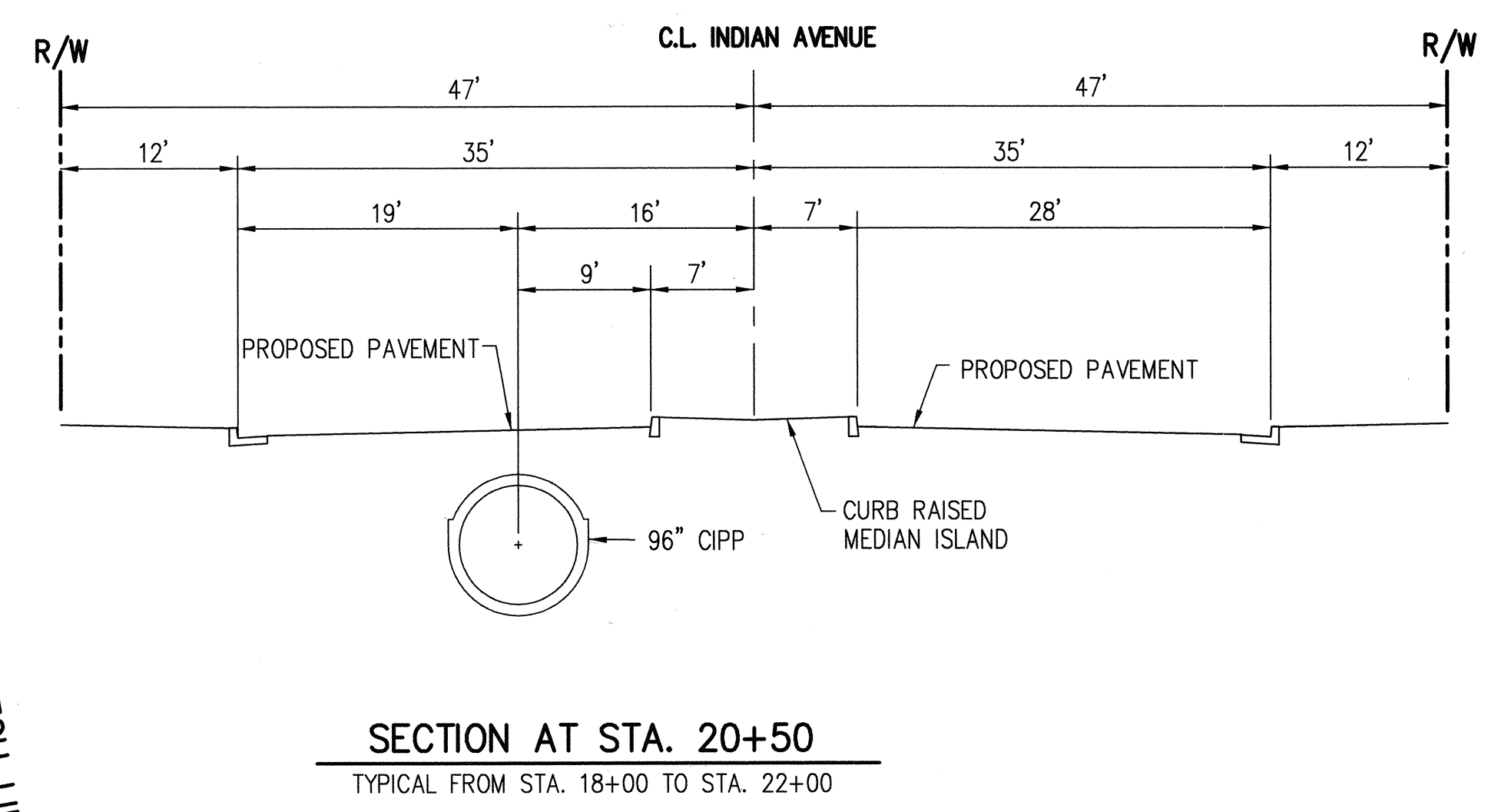
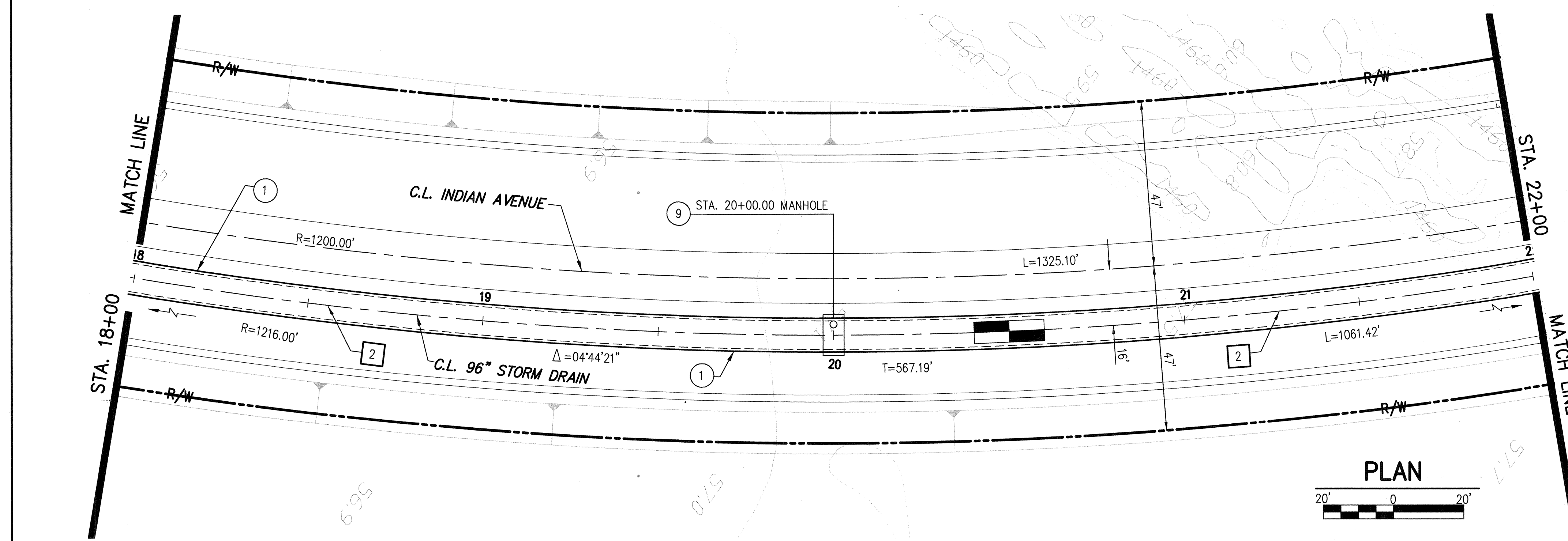
Station	Radius (R)	Delta (Δ)	Tangent (T)	Length (L)	B.C. Station	E.C. Station
1	R=1000.00'	Δ=13°15'21"	T=140.40'	L=279.71'	B.C. STA=12+00.10	E.C. STA=14+79.81
2	R=1216.00'	Δ=04°44'21"	T=567.19'	L=1061.42'	B.C. STA=15+15.54	P.R.C. STA=25+76.96

	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5705 Riverside, CA 92517-5705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-541-6840 Fax: 951-541-6845 e-mail: kct@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: <i>[Signature]</i> CITY ENGINEER DATE: _____ RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS <table border="1"> <thead> <tr> <th>REF.</th> <th>DESCRIPTION</th> <th>APPR.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REF.	DESCRIPTION	APPR.	DATE					RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DESIGNED BY: _____ DRAWN BY: _____ DATE DRAWN: _____ RECOMMENDED FOR APPROVAL BY: _____ CHIEF, DESIGN & CONSTRUCTION DATE: _____ RCE NO 30539 APPROVED BY: _____ CHIEF ENGINEER DATE: _____ RCE NO 32336			PERRIS VALLEY MDP LINE E-3 STAGE 1 STA. 14+00 TO STA. 18+00	UNDERGROUND SERVICE ALERT 811 TWO WORKING DAYS BEFORE YOU DIG CITY OF PERRIS FILE NO. P8-1164	PROJECT NO. DRAWING NO. SHEET NO. 3 OF 20
					REF.	DESCRIPTION	APPR.	DATE										
PREPARED UNDER THE SUPERVISION OF: <i>[Signature]</i> DATE 6.10.11 TERESITO N. TABALDO, R.C.E. NO. 38826	DATE: _____ RCE																	

H:\1386\03 - Indian Avenue\Storm\03 - rd - rd - indian.dwg
 Plot Date: June 10, 2011 10:24am Terry

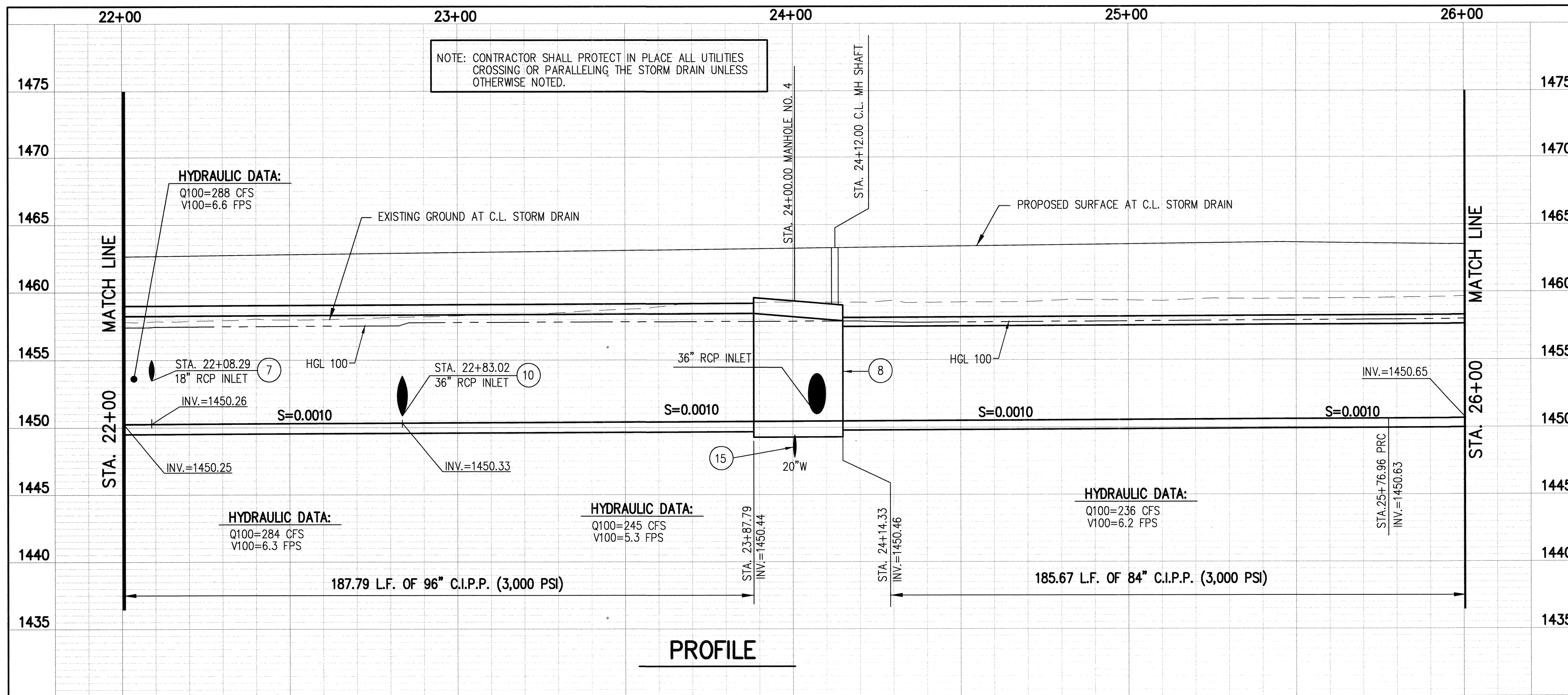


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R=1061.42'
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B.C. STA=15+15.54
P.R.C. STA=25+76.96
- STORM DRAIN C.L. CURVE DATA:**

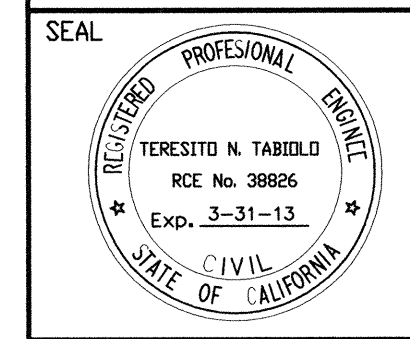
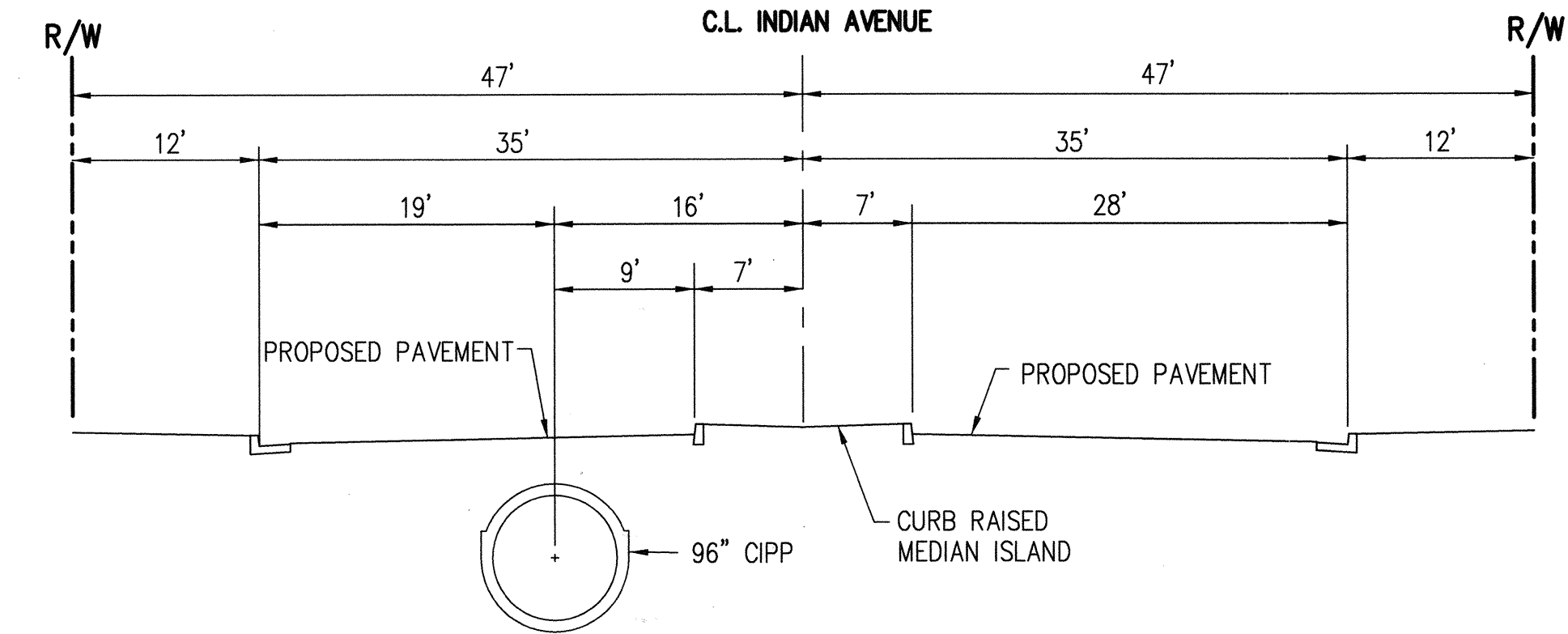
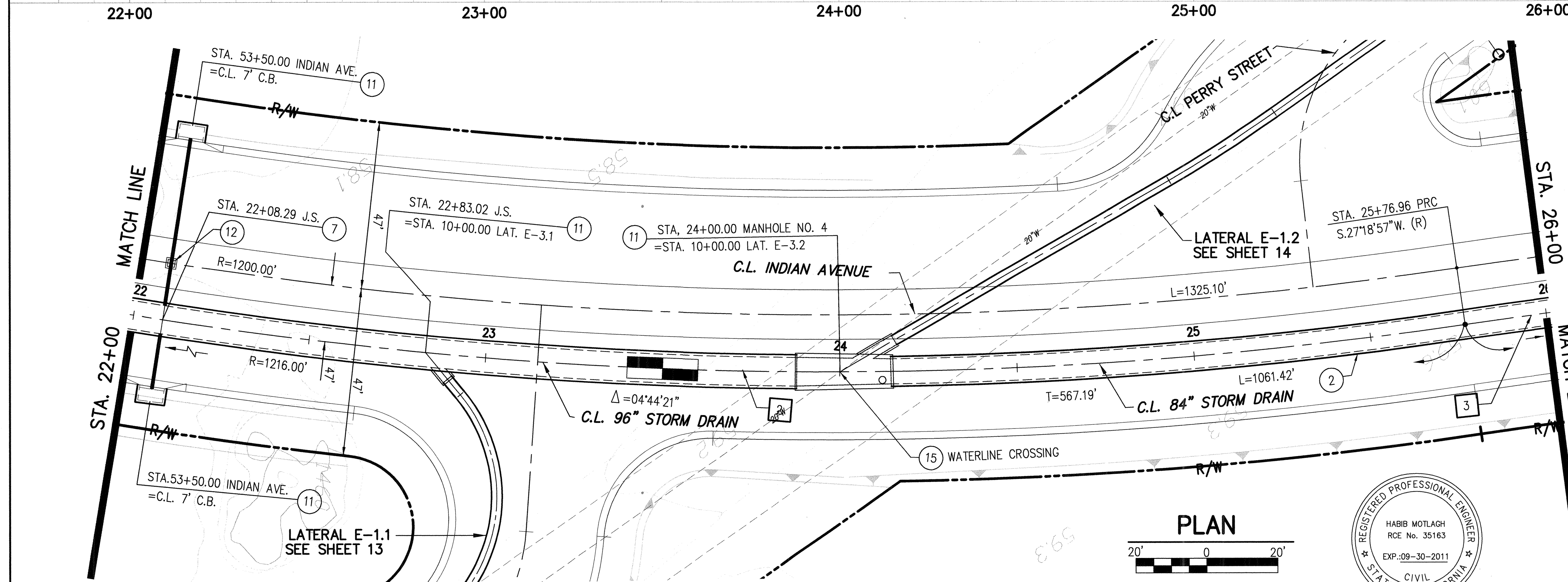


	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5105 Riverside, CA 92517-5105 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-541-0545 Fax: 951-541-0545 e-mail: kctinc@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: <i>[Signature]</i> CITY ENGINEER DATE: 6/10/11 RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS		RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		PERRIS VALLEY MDP LINE E-3 STAGE 1 STA 18+00 TO STA. 22+00	PROJECT NO. DRAWING NO. SHEET NO. 4 OF 20
				DESIGNED BY: DRAWN BY: DATE DRAWN:	RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION DATE: RCE NO 30539	APPROVED BY: CHIEF ENGINEER DATE: RCE NO 32336	Undergroud Service Alert 811 TWO WORKING DAYS BEFORE YOU DIG CITY OF PERRIS FILE NO. P8-1164		

H:\186\03 - Indian Avenue\Perris - SD\Exp\Stormdrain\03-54-Indian.dwg
 Plot Date: June 10, 2011 - 10:34am | Terry



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 - SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



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Civil Engineers - Surveyors - Planners
P.O. Box 5705 Riverside, CA 92517-5705
4344 Latham St., Suite 200, Riverside, CA 92501
Phone: 951-541-0940 Fax: 951-541-0945
e-mail: kctinc@kctconsultants.com

PREPARED UNDER THE SUPERVISION OF:
Teresito N. Tabaldo DATE 6-10-11
TERESITO N. TABALDO, R.C.E. NO. 38826

CITY OF PERRIS ENGINEERING DEPARTMENT

APPROVED BY: *[Signature]*
CITY ENGINEER
DATE: 6/10/11 RCE

BENCH MARK: Z-6843
1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD.
ELEVATION=1454.258

REF.	DESCRIPTION	APPR	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: _____
DRAWN BY: _____
DATE DRAWN: _____

RECOMMENDED FOR APPROVAL BY: _____
CHIEF, DESIGN & CONSTRUCTION
DATE: _____ RCE NO 30539

APPROVED BY: _____
CHIEF ENGINEER
DATE: _____ RCE NO 32336

PERRIS VALLEY MDP LINE E-3 STAGE 1
STA 22+00 TO STA 26+00

PROJECT NO. _____
DRAWING NO. _____
SHEET NO. 5 OF 20

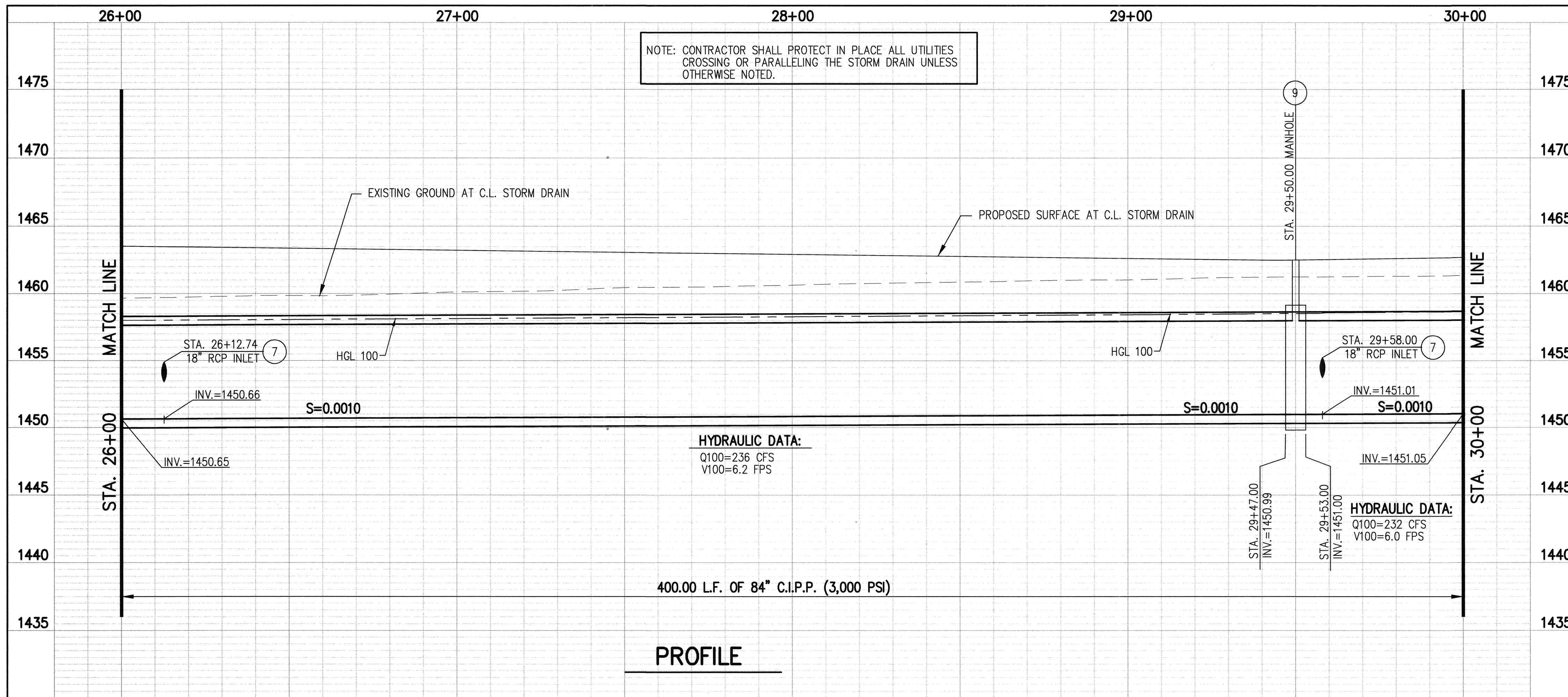
Underground Service Alert

811

TWO WORKING DAYS BEFORE YOU DIG

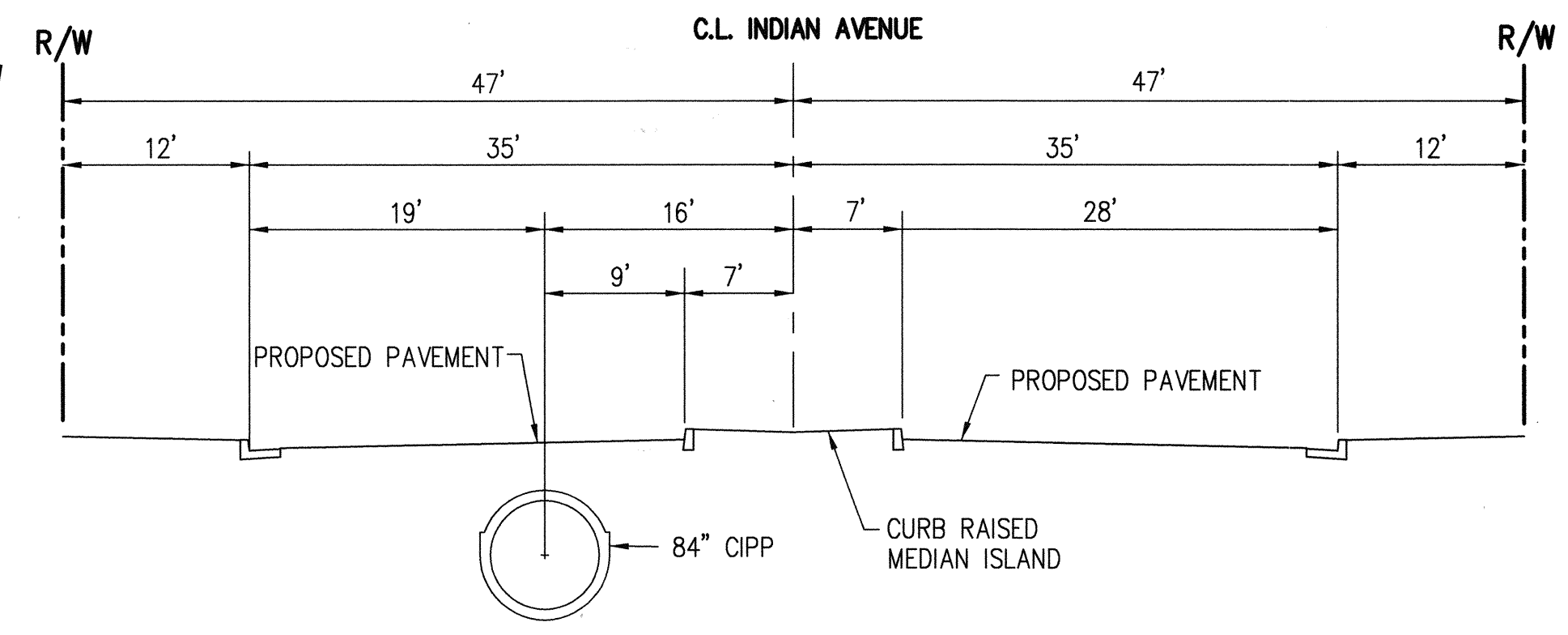
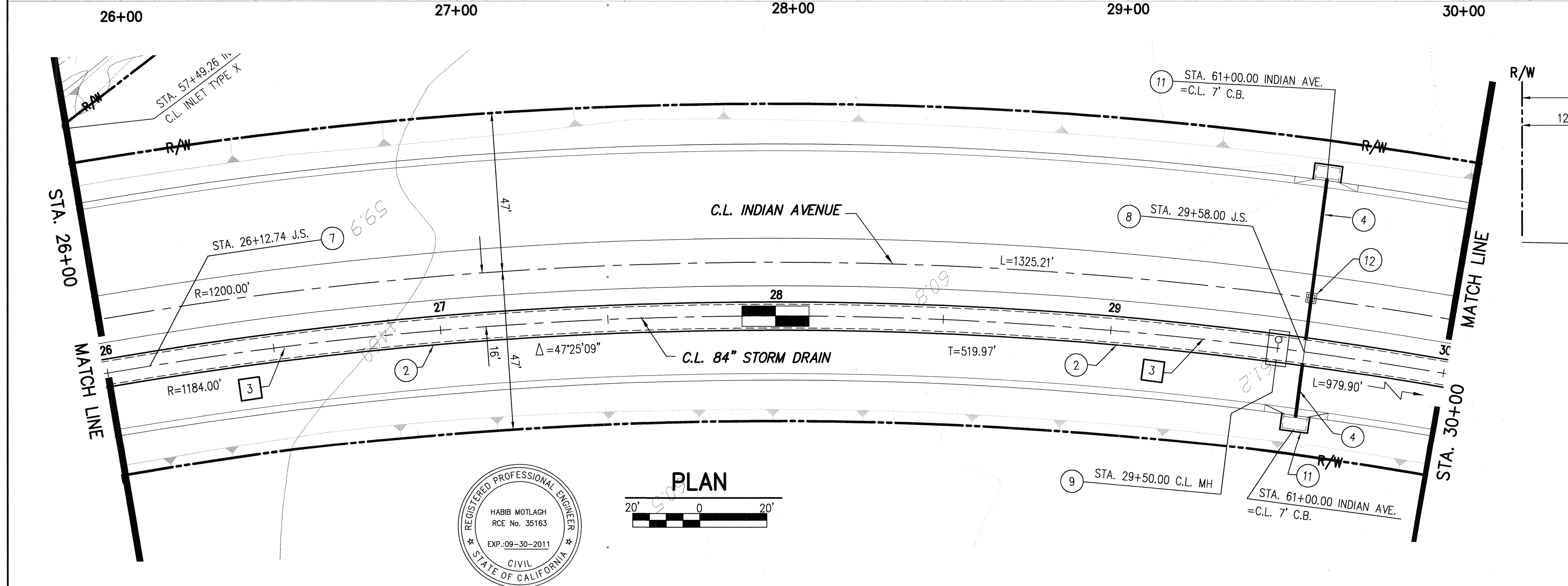
CITY OF PERRIS FILE NO. _____
P8-1164

H:\1866\03 - Indian Avenue\Peris - SD\Exp\Stormdrain\03-std-Indian.dwg
Plot Date: June 10, 2011 - 10:41am Terry



CONSTRUCTION NOTES:

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- ㉓ SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



STORM DRAIN C.L. CURVE DATA:

③	R=1184.00'
	Δ=47°25'09"
	T=519.97'
	L=979.90'
	P.R.C. STA=25+76.96
	P.C.C. STA=35+56.86

Underground Service Alert

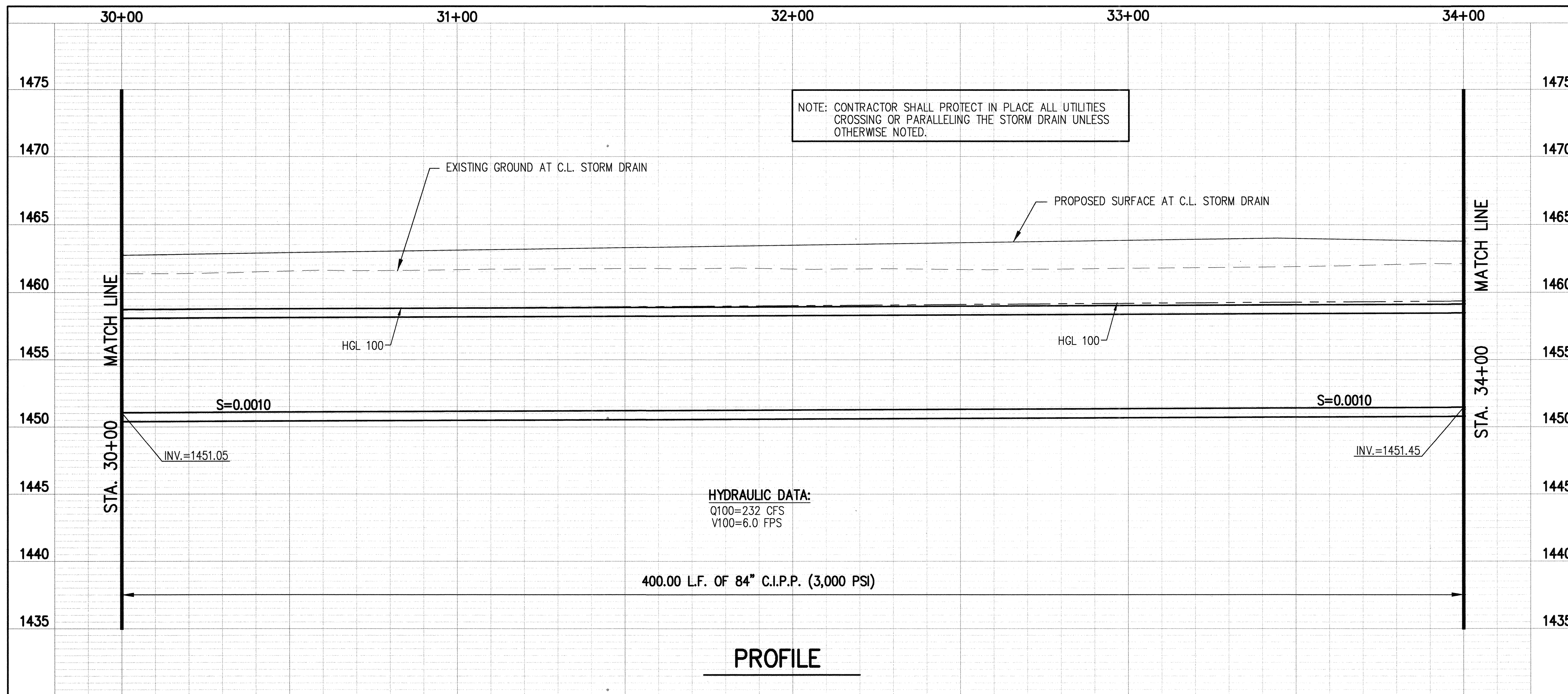
811

TWO WORKING DAYS BEFORE YOU DIG

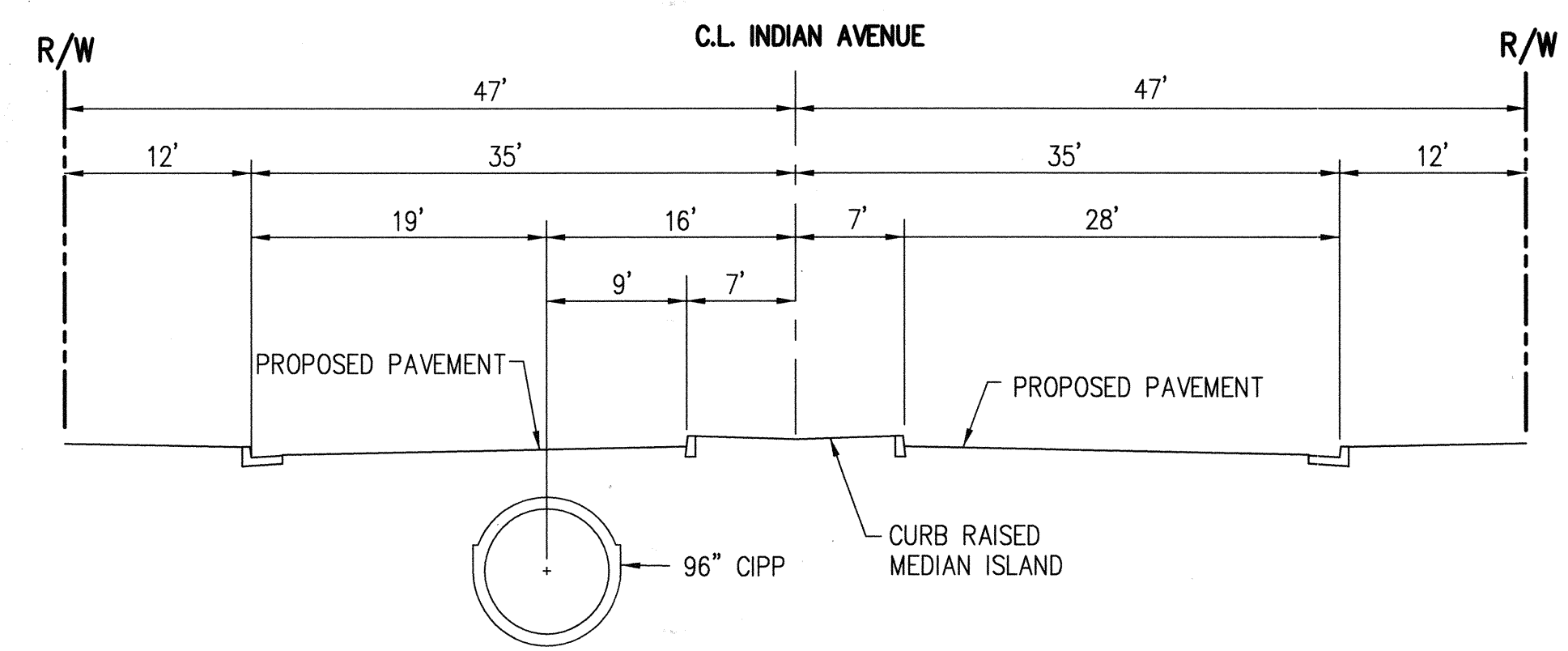
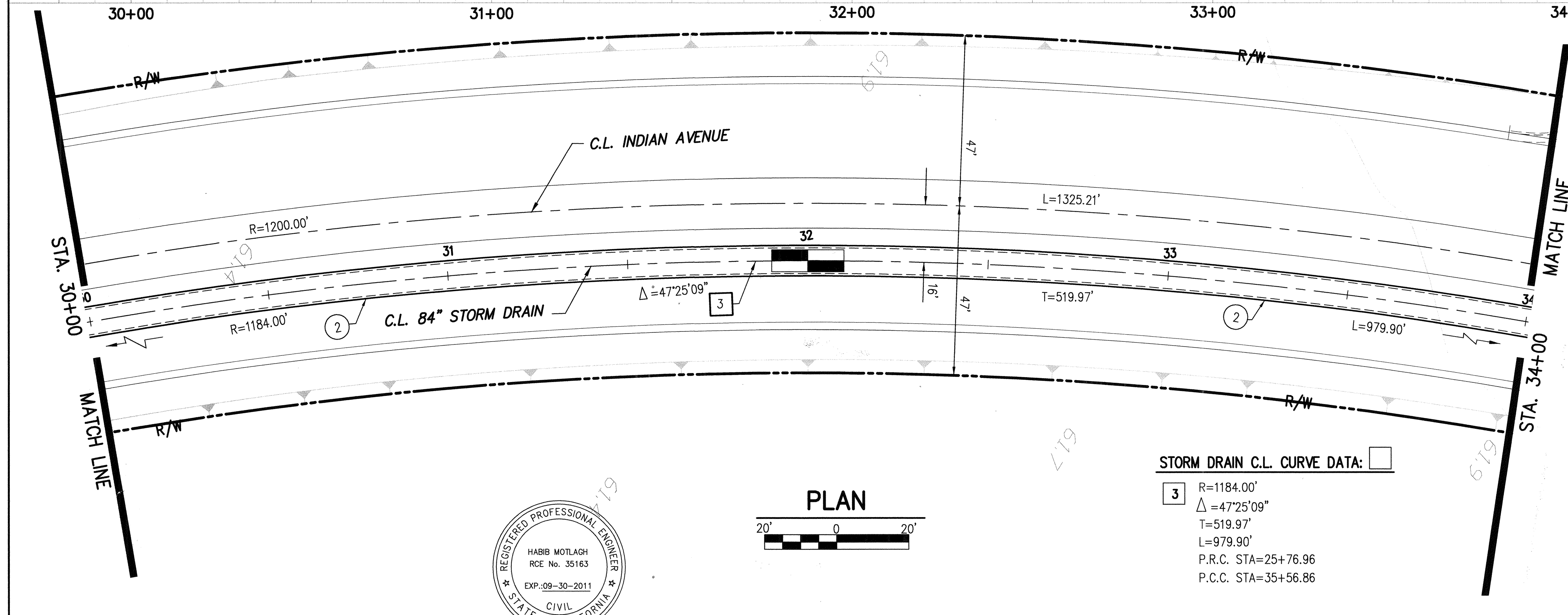
CITY OF PERRIS FILE NO. **P8-1164**

	<p>KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5705 Riverside, CA 92517-4705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-341-6949 Fax: 951-341-6945 e-mail: kctinfo@kctconsultants.com</p>	<p>CITY OF PERRIS ENGINEERING DEPARTMENT</p> <p>APPROVED: <i>[Signature]</i> CITY ENGINEER</p>	<p>BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258</p>	<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>REF.</th> <th>DESCRIPTION</th> <th>APPR.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REF.	DESCRIPTION	APPR.	DATE					<p>RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT</p> <p>DESIGNED BY: _____ DRAWN BY: _____ DATE DRAWN: _____</p> <p>RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION APPROVED BY: CHIEF ENGINEER</p> <p>DATE: _____ RCE NO 30539 DATE: _____ RCE NO 32336</p>	<p>PERRIS VALLEY MDP LINE E-3 STAGE 1</p> <p>STA. 26+00 TO STA 30+00</p>	<p>PROJECT NO. _____ DRAWING NO. _____ SHEET NO. 6 OF 20</p>
REF.	DESCRIPTION	APPR.	DATE												

H:\1386\03 - Indian Avenue\Storm Drain\03-84-Indian.dwg
 Plot Date: June 10, 2011 10:51am Terry

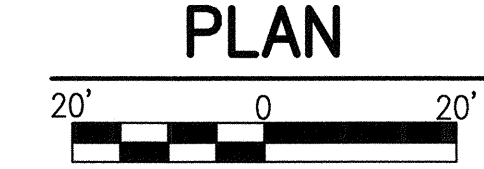
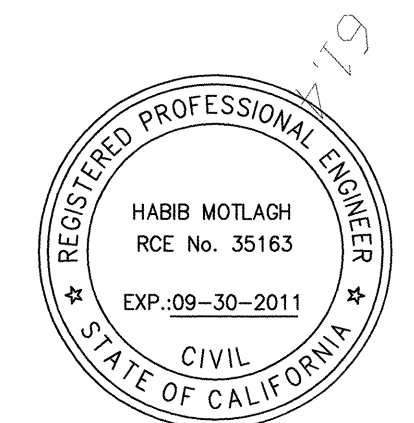


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STORM DRAIN C.L. CURVE DATA:

③	R=1184.00'
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	L=979.90'
	P.R.C. STA=25+76.96
	P.C.C. STA=35+56.86



Underground Service Alert

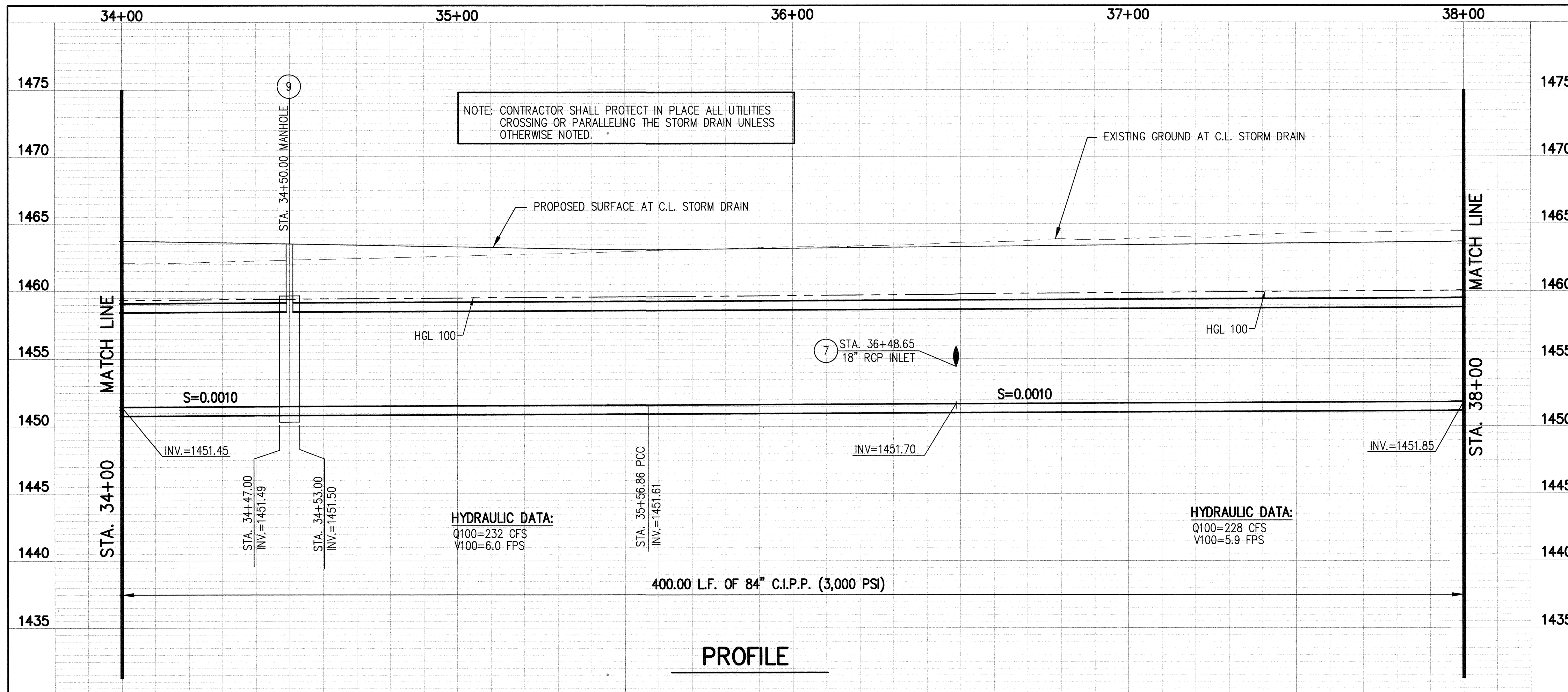
811

TWO WORKING DAYS BEFORE YOU DIG

CITY OF PERRIS FILE NO. **P8-1164**

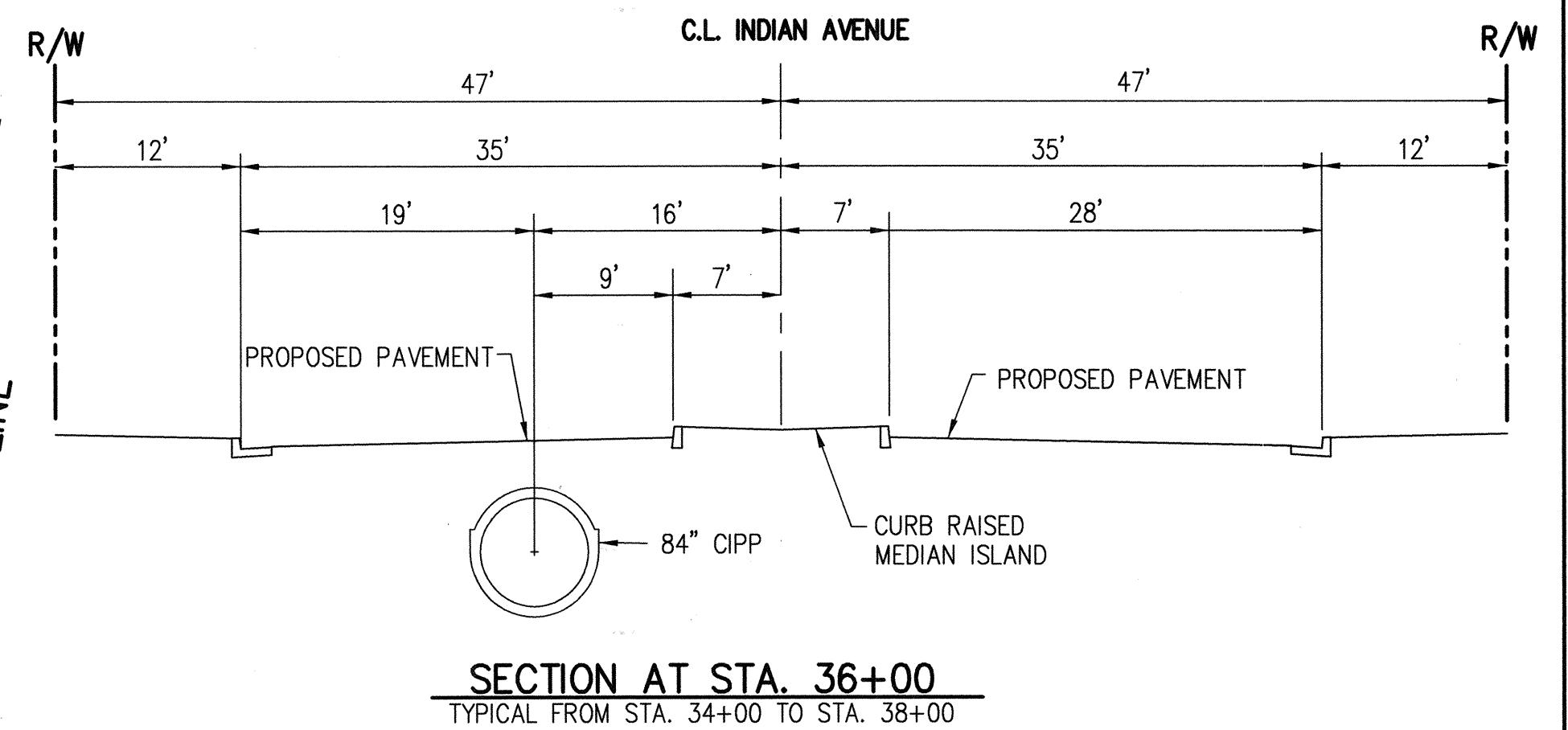
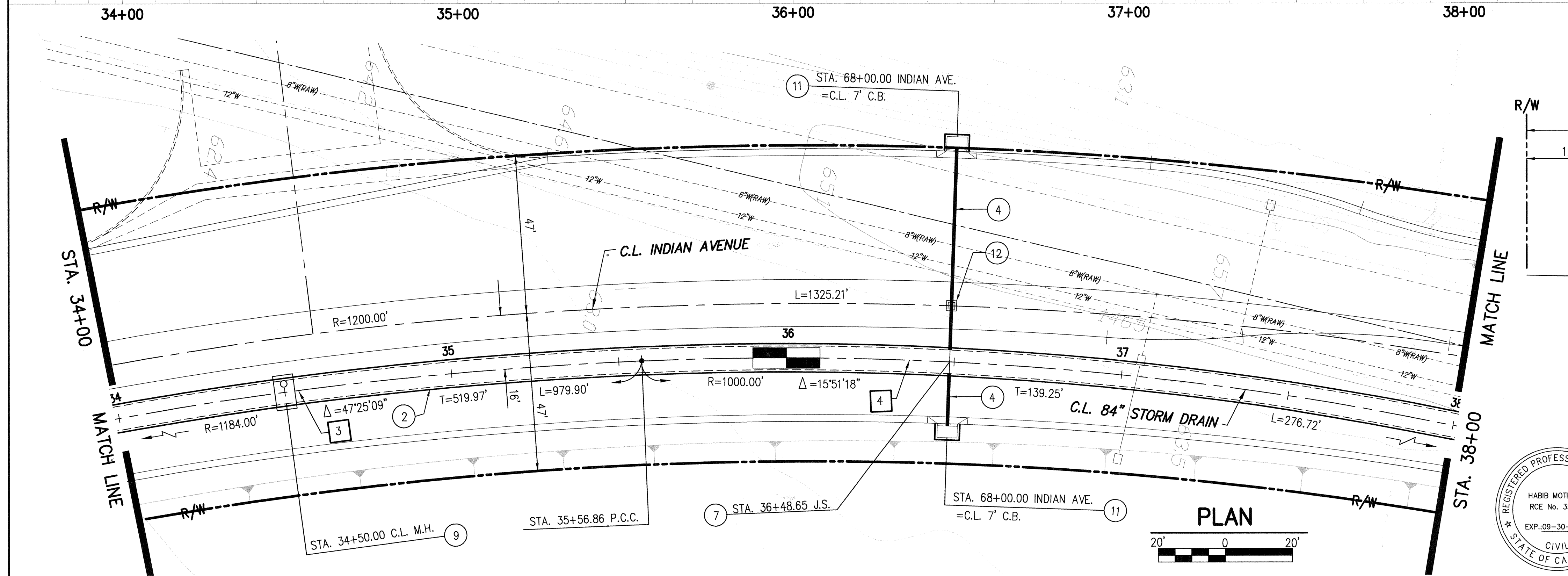
	<p>KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5705 Riverside, CA 92517-5705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-341-8940 Fax: 951-341-8945 e-mail: kctinc@kctconsultants.com</p>	<p>CITY OF PERRIS ENGINEERING DEPARTMENT</p> <p>APPROVED BY: <i>[Signature]</i> CITY ENGINEER</p> <p>DATE: 6/10/11 RCE</p>	<p>BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258</p>	<p>REVISIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REF.</th> <th>DESCRIPTION</th> <th>APPR</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REF.	DESCRIPTION	APPR	DATE					<p>RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT</p> <p>DESIGNED BY: _____ DRAWN BY: _____ DATE DRAWN: _____</p> <p>RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION DATE: _____ RCE NO 30539</p> <p>APPROVED BY: CHIEF ENGINEER DATE: _____ RCE NO 32336</p>	<p>PERRIS VALLEY MDP LINE E-3 STAGE 1</p> <p>STA 30+00 TO STA 34+00</p>	<p>PROJECT NO. _____ DRAWING NO. _____ SHEET NO. 7 OF 20</p>
REF.	DESCRIPTION	APPR	DATE												

H:\1886\03 - Indian Avenue\Storm Drain - SD\Eng\Storm Drain\03-ed-indian.dwg
 Plot Date: June 10, 2011 - 10:52am | Terry



CONSTRUCTION NOTES: ○

- ① CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
- ② CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
- ③ CONSTRUCT 72" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
- ④ CONSTRUCT 18" R.C.P. (D-LOAD SHOWN ON PROFILE).
- ⑤ CONSTRUCT 36" R.C.P. (D-LOAD SHOWN ON PROFILE).
- ⑥ CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC STD. DWG. TS301.
- ⑦ CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC STD. DWG. JS229.
- ⑧ CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
- ⑨ CONSTRUCT MANHOLE FOR C.I.P.P. PER DETAIL "D" ON SHEET 20.
- ⑩ CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
- ⑪ CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
- ⑫ CONSTRUCT 24"x24"x24" DEEP GRATED INLET WITH 12" VERTICAL PVC PIPE (SDR35).
- ⑬ CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
- ⑭ EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
- ⑮ EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
- ⑯ CONSTRUCT CATCH BASIN OPENING AT BACK OF CATCH BASIN (12" WIDE X 6" HIGH). SEE PROFILE FOR CATCH BASIN OPENING ELEVATION.
- ⑰ CONSTRUCT INLET TYPE X PER RCFC STD. DWG. CB108 (MODIFIED W/ ONE OPENING ONLY).
- ⑱ CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
- ⑲ CONSTRUCT METAL FLARED END SECTION PER CALTRANS STD. DWG. D94A (TYPE III).
- ⑳ CONSTRUCT 18" C.M.P. (14 GA. MINIMUM).
- ㉑ CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
- ㉒ REMOVE EXISTING 8" PVC RAW WATER LINE (SEE PLAN FOR LIMITS). VERIFY LOCATION OF WATER LINE NOTIFY ENGINEER IF THERE IS A CONFLICT (MANHOLE TO BE CENTERED AT EXISTING).
- ㉓ SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



STORM DRAIN C.L. CURVE DATA:

③	R=1184.00' Δ=47°25'09" T=519.97' L=979.90' P.R.C. STA=25+76.96 P.C.C. STA=35+56.86	④	R=1000.00' Δ=15°51'18" T=139.25' L=276.72' P.C.C. STA=35+56.86 E.C. STA=38+33.58
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Underground Service Alert

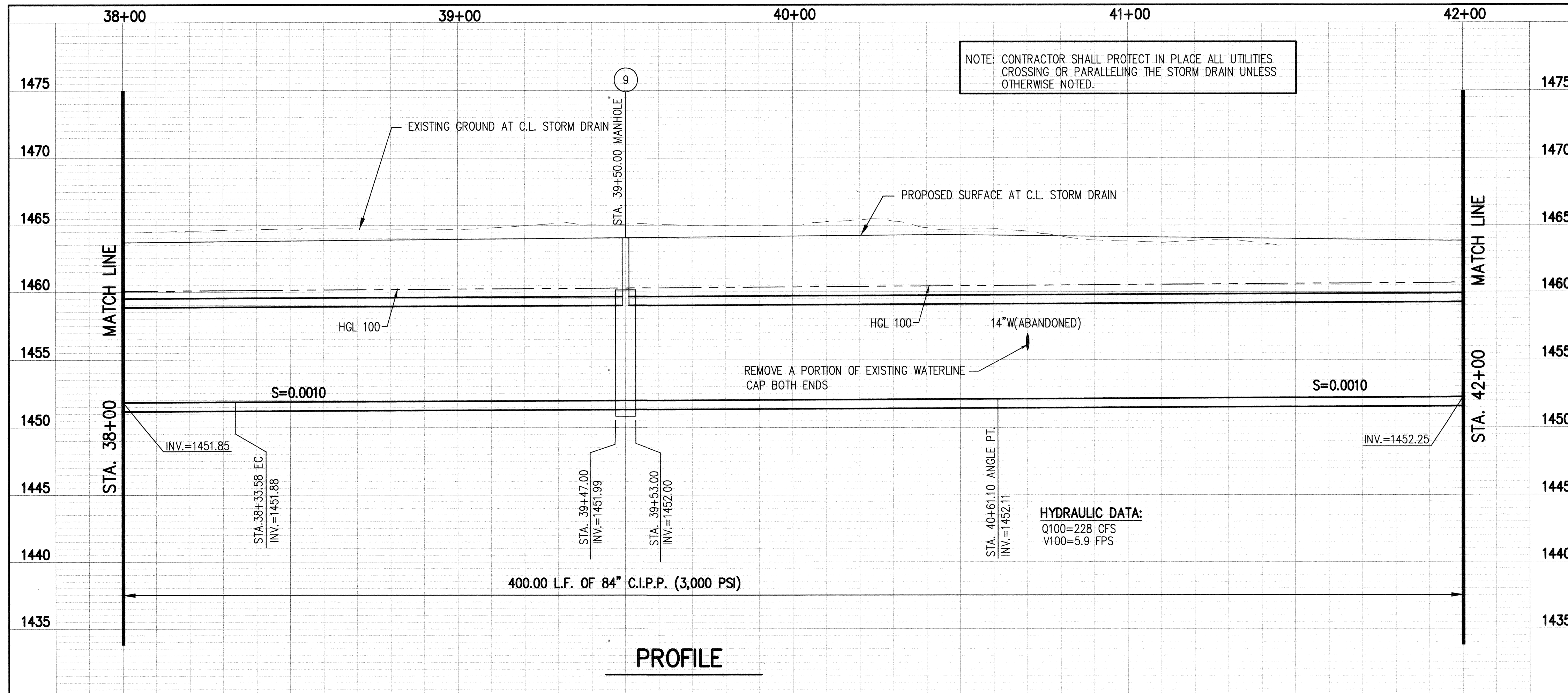
811

TWO WORKING DAYS BEFORE YOU DIG

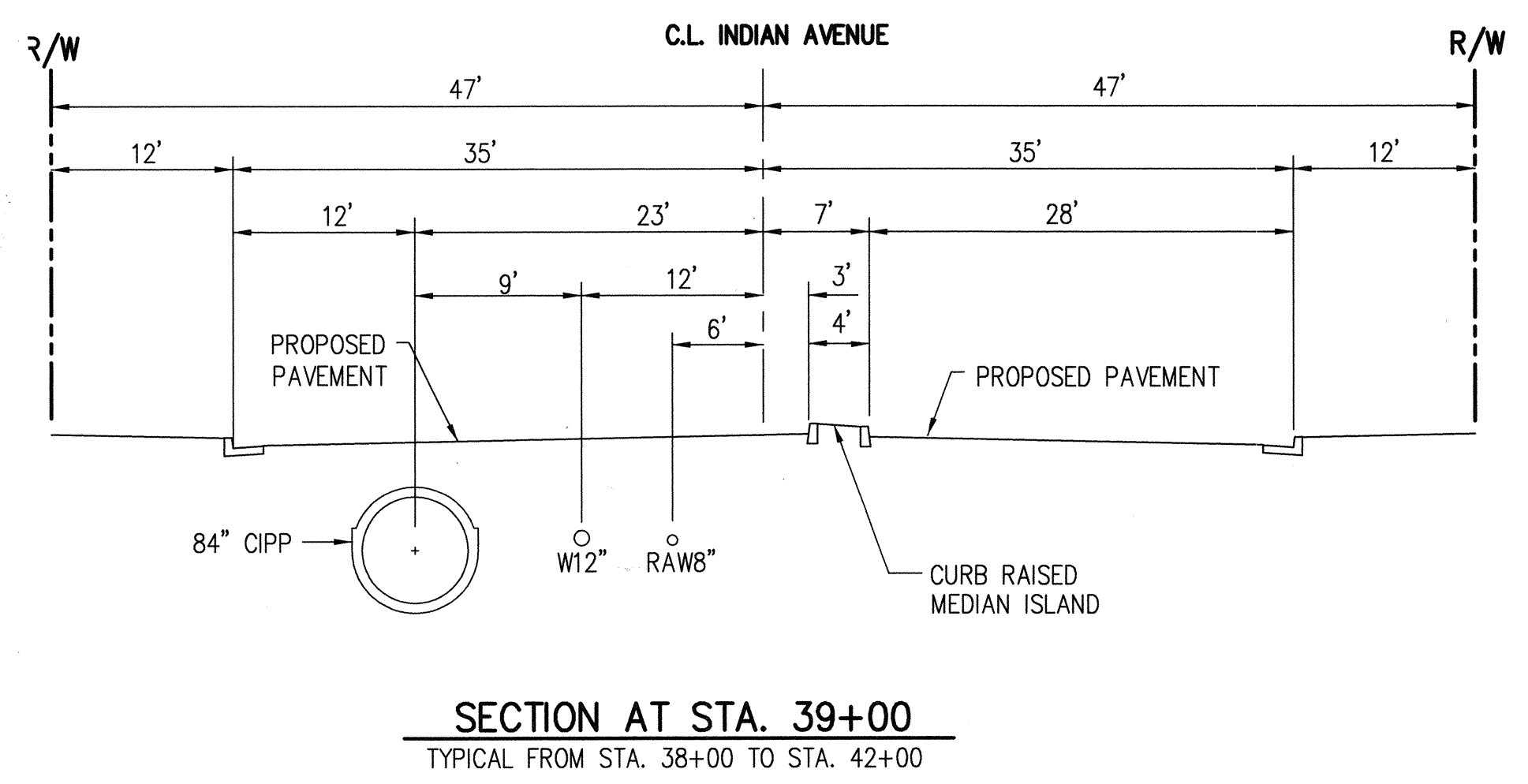
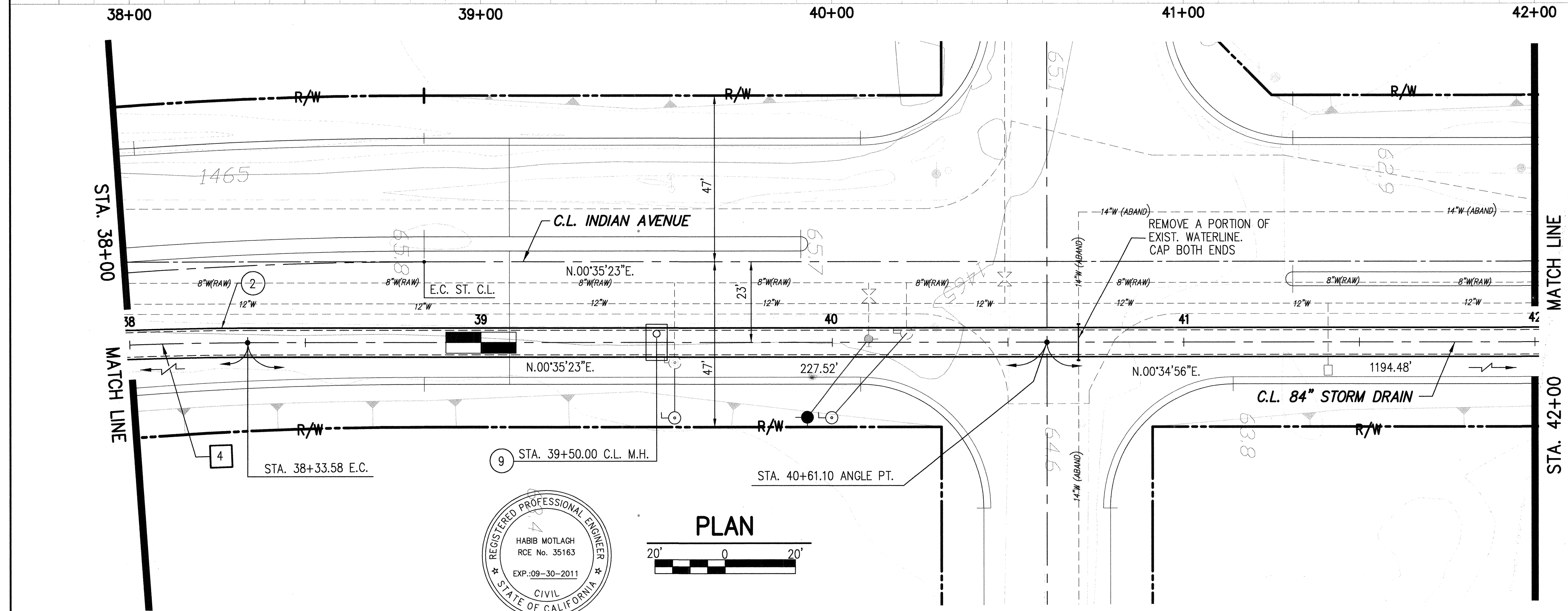
CITY OF PERRIS FILE NO. **P8-1164**

	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 6705 Riverside, CA 92517-6705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-541-6848 Fax: 951-541-6849 e-mail: kctinc@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: <i>[Signature]</i> CITY ENGINEER DATE: 6/10/11 RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS			RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			PERRIS VALLEY MDP LINE E-3 STAGE 1 STA 34+00 TO STA 38+00	PROJECT NO. DRAWING NO. SHEET NO. 8 OF 20
				DESIGNED BY: DRAWN BY: DATE DRAWN:	RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION DATE: RCE NO 30539	APPROVED BY: CHIEF ENGINEER DATE: RCE NO 32936	REF. DESCRIPTION APPR DATE				

H:\1386\03 - Indian Avenue\Storm Drain\03-ed-Indian.dwg
 Plot Date: June 10, 2011 - 10:54am Terry



- CONSTRUCTION NOTES:**
- ① CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ② CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ③ CONSTRUCT 72" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ④ CONSTRUCT 18" R.C.P. (D-LOAD SHOWN ON PROFILE).
 - ⑤ CONSTRUCT 36" R.C.P. (D-LOAD SHOWN ON PROFILE).
 - ⑥ CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC STD. DWG. TS301.
 - ⑦ CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC STD. DWG. JS229.
 - ⑧ CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
 - ⑨ CONSTRUCT MANHOLE FOR C.I.P.P. PER DETAIL "D" ON SHEET 20.
 - ⑩ CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
 - ⑪ CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
 - ⑫ CONSTRUCT 24"x24"x24" DEEP GRATED INLET WITH 12" VERTICAL PVC PIPE (SDR35).
 - ⑬ CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
 - ⑭ EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
 - ⑮ EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
 - ⑯ CONSTRUCT CATCH BASIN OPENING AT BACK OF CATCH BASIN (12" WIDE X 6" HIGH). SEE PROFILE FOR CATCH BASIN OPENING ELEVATION.
 - ⑰ CONSTRUCT INLET TYPE X PER RCFC STD. DWG. CB108 (MODIFIED W/ ONE OPENING ONLY).
 - ⑱ CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
 - ⑲ CONSTRUCT METAL FLARED END SECTION PER CALTRANS STD. DWG. D94A (TYPE III).
 - ⑳ CONSTRUCT 18" C.M.P. (14 GA. MINIMUM).
 - ㉑ CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
 - ㉒ REMOVE EXISTING 8" PVC RAW WATER LINE (SEE PLAN FOR LIMITS). VERIFY LOCATION OF WATER LINE NOTIFY ENGINEER IF THERE IS A CONFLICT (MANHOLE TO BE CENTERED AT EXISTING).
 - ㉓ SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



Underground Service Alert

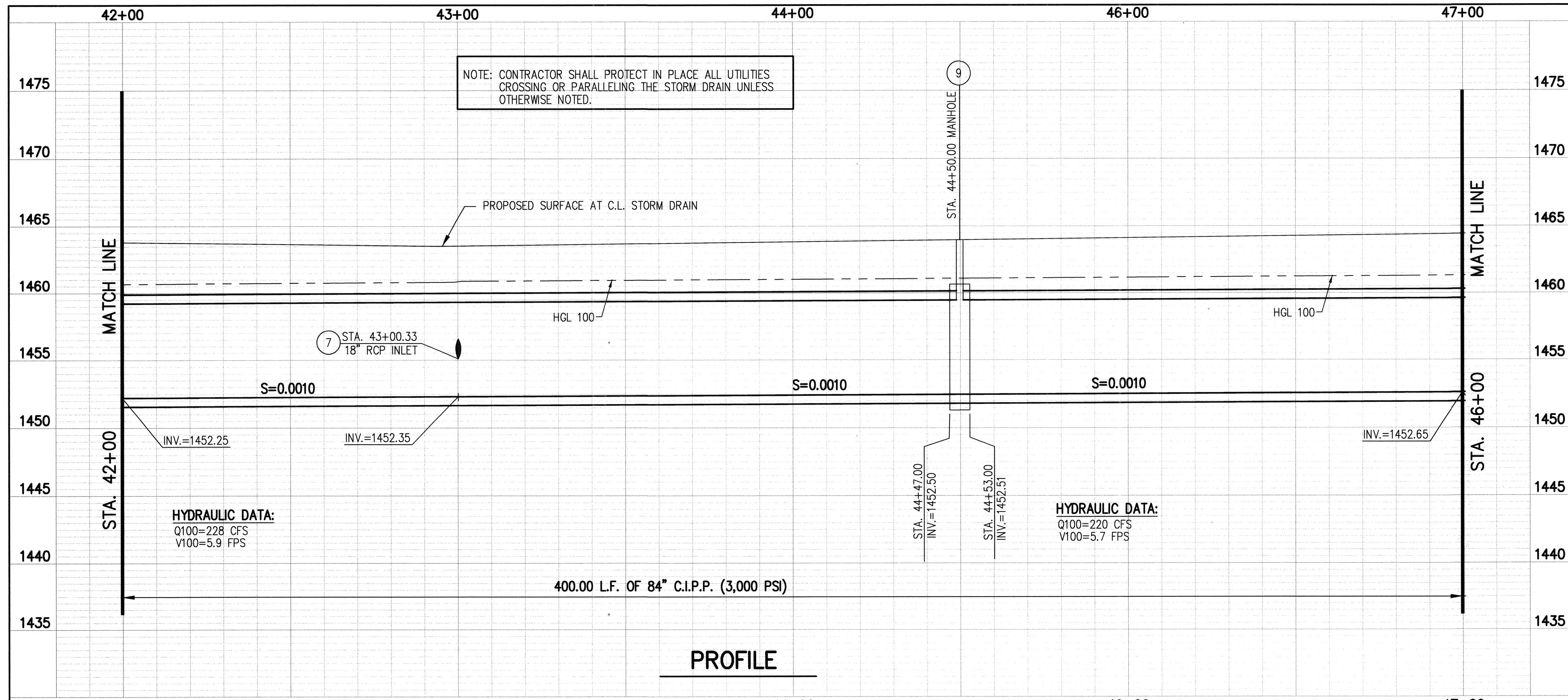
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TWO WORKING DAYS BEFORE YOU DIG

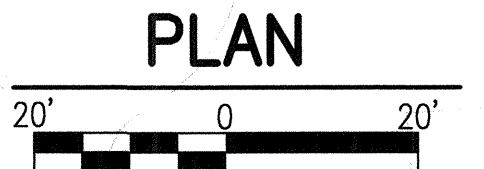
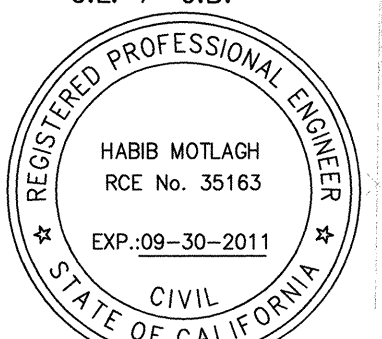
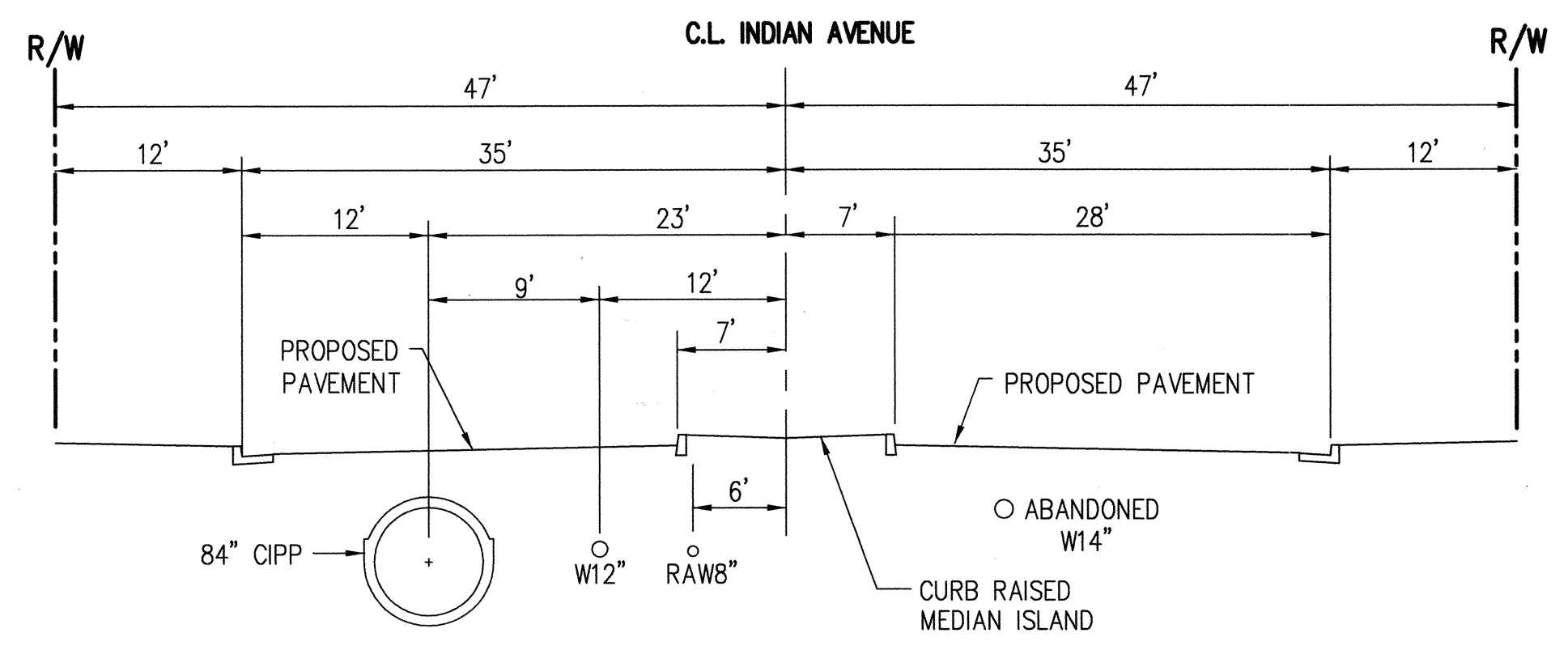
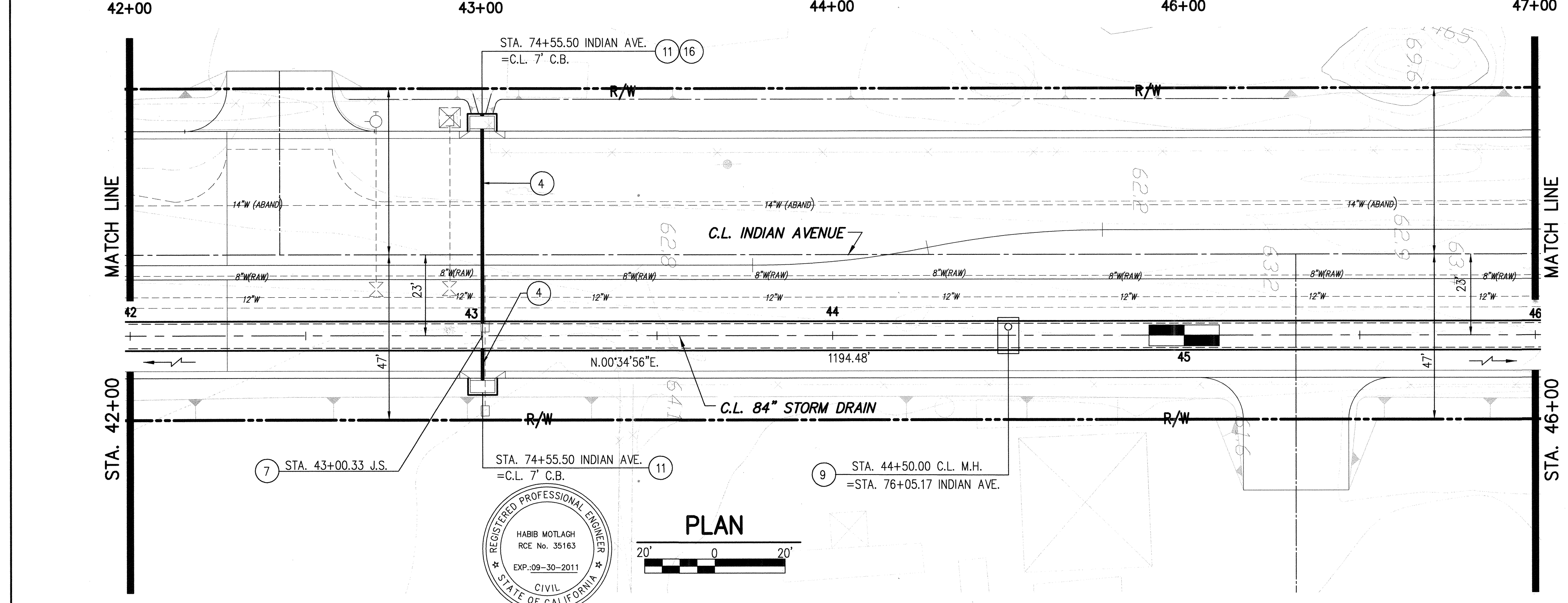
CITY OF PERRIS FILE NO.
P8-1164

	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5705 Riverside, CA 92517-5705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-541-8840 Fax: 951-541-8845 e-mail: kctinc@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: [Signature] CITY ENGINEER DATE: 6/10/11 RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS REF. DESCRIPTION APPR. DATE	RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		PERRIS VALLEY MDP LINE E-3 STAGE 1 STA 38+00 TO STA 42+00	PROJECT NO. DRAWING NO. SHEET NO. 9 OF 20
					DESIGNED BY: [Signature] DRAWN BY: [Signature] DATE DRAWN: [Signature]	RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION DATE: [Signature] RCE NO 30539			APPROVED BY: CHIEF ENGINEER DATE: [Signature] RCE NO 32336

H:\1386\03 - Indian Avenue\Peris - SD\Eng\Stormdrain\03-ss-nd-ndm.dwg
 Plot Date: June 10, 2011 - 11:58am Terry



- CONSTRUCTION NOTES:**
- ① CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ② CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
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 - ⑦ CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC STD. DWG. JS229.
 - ⑧ CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
 - ⑨ CONSTRUCT MANHOLE FOR C.I.P.P. PER DETAIL "D" ON SHEET 20.
 - ⑩ CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
 - ⑪ CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
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 - ⑬ CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
 - ⑭ EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
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 - ⑱ CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
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 - ㉑ CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
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 - ㉓ SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



Underground Service Alert

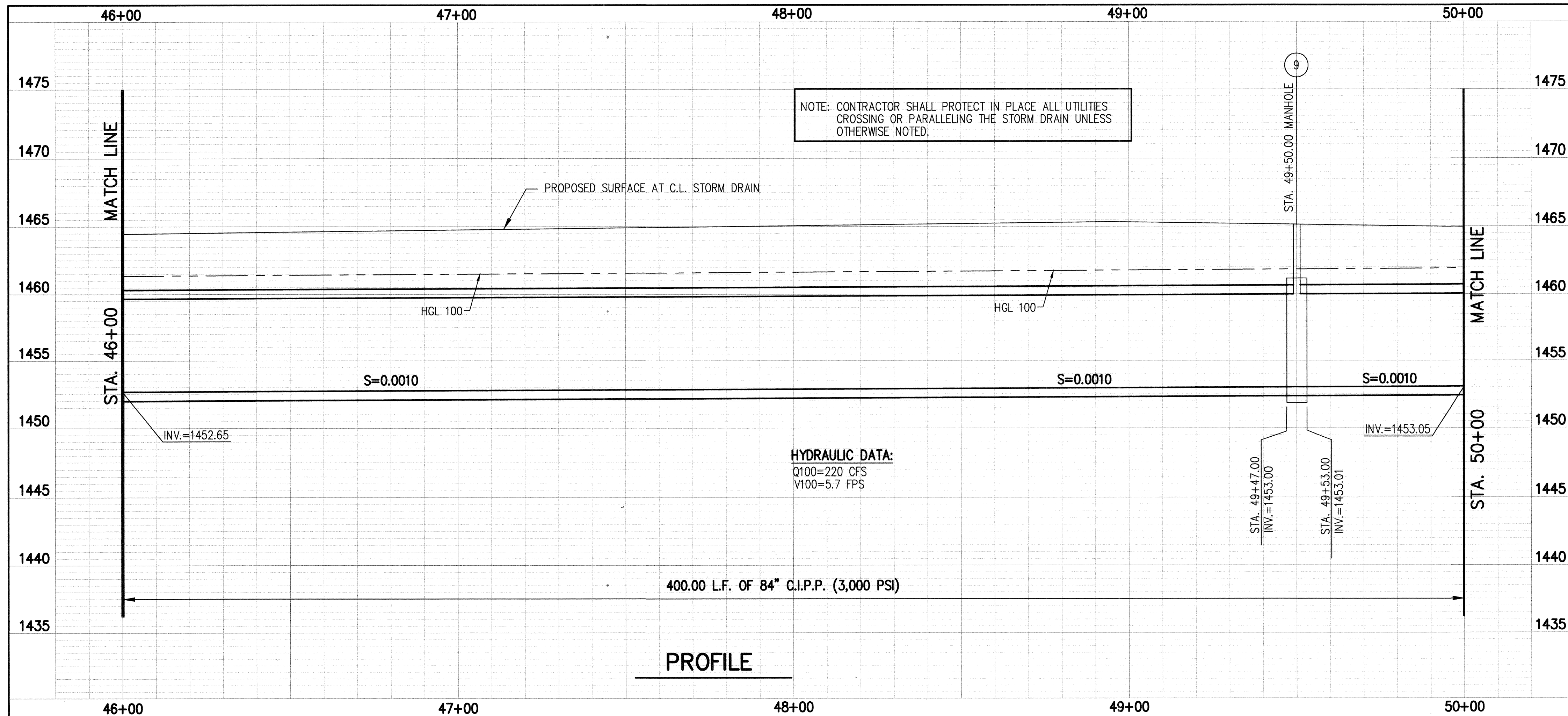
811

TWO WORKING DAYS BEFORE YOU DIG

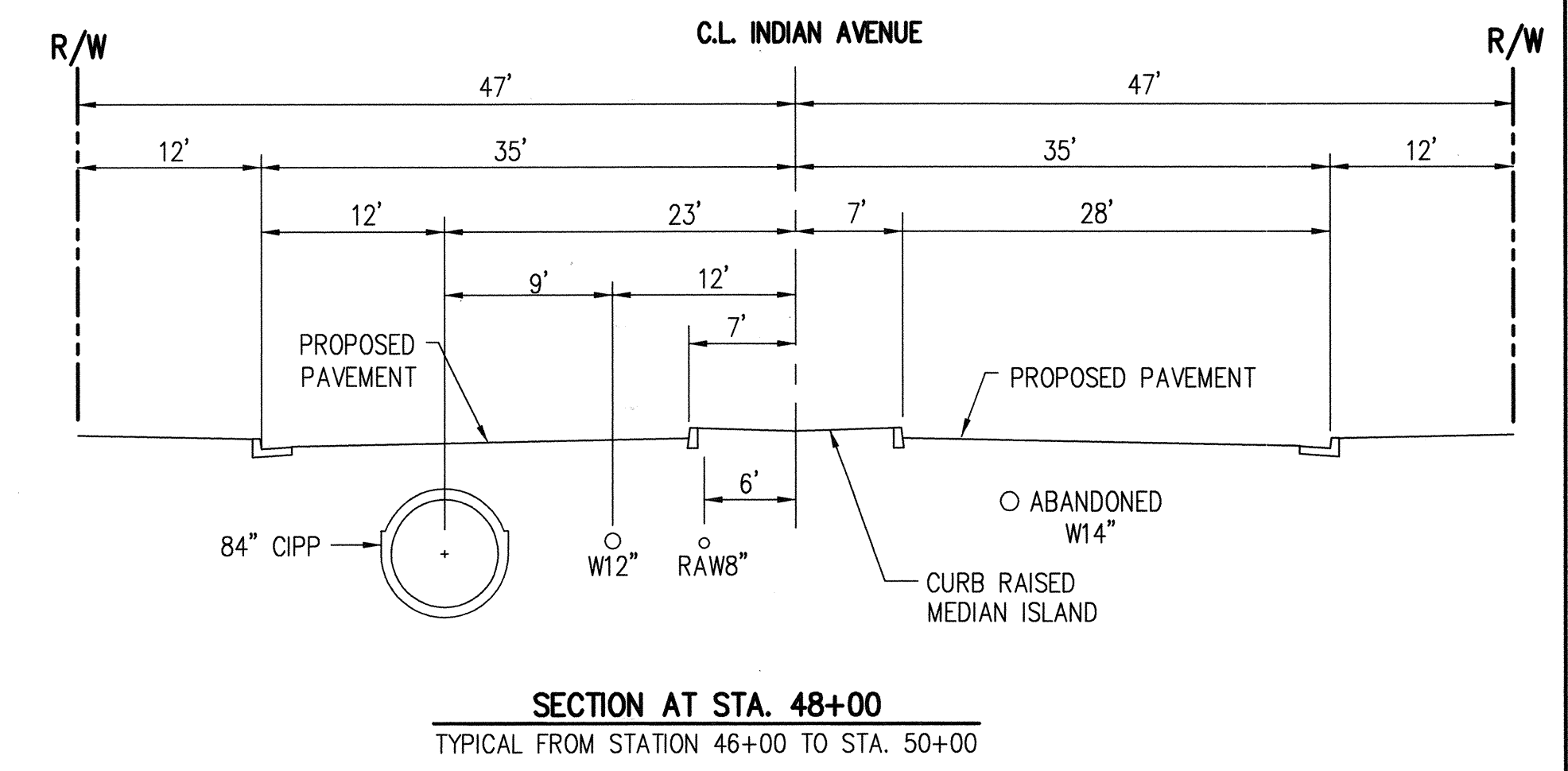
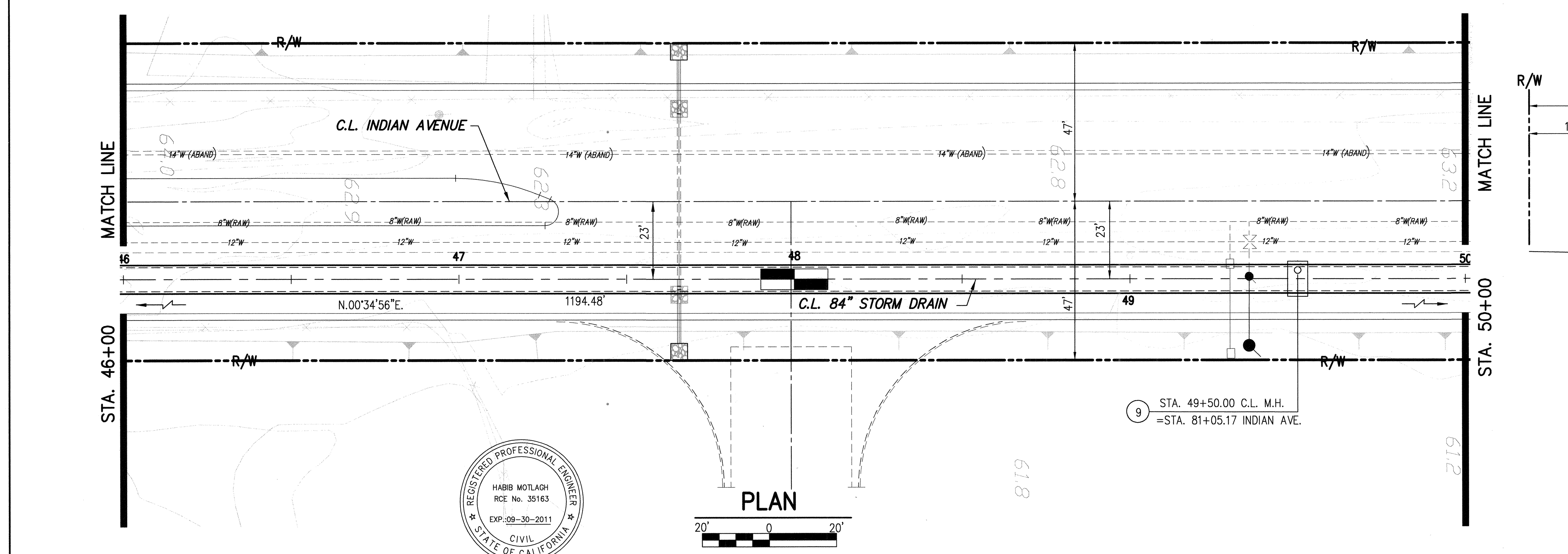
CITY OF PERRIS FILE NO. **P8-1164**

	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5705 Riverside, CA 92517-5705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-541-6949 Fax: 951-541-8945 e-mail: kctco@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: CITY ENGINEER DATE: 6/10/11 RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS		RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		PERRIS VALLEY MDP LINE E-3 STAGE 1 STA 43+00 TO STA 47+00	PROJECT NO. DRAWING NO. SHEET NO. 10 OF 20
				DESIGNED BY: DRAWN BY: DATE DRAWN:	RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION DATE: _____ RCE NO 30539	APPROVED BY: CHIEF ENGINEER DATE: _____ RCE NO 32336			

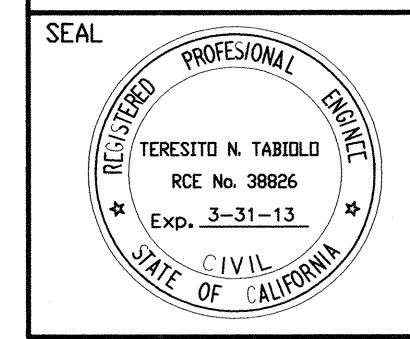
H:\186\03 - Indian Avenue\Storm\03-ss-Indian.dwg
 Plot Date: June 10, 2011 - 10:56am | Terry



- CONSTRUCTION NOTES:**
- ① CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ② CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ③ CONSTRUCT 72" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
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 - ⑥ CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC STD. DWG. TS301.
 - ⑦ CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC STD. DWG. JS229.
 - ⑧ CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
 - ⑨ CONSTRUCT MANHOLE FOR C.I.P.P. PER DETAIL "D" ON SHEET 20.
 - ⑩ CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
 - ⑪ CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
 - ⑫ CONSTRUCT 24"x24"x24" DEEP GRATED INLET WITH 12" VERTICAL PVC PIPE (SDR35).
 - ⑬ CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
 - ⑭ EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
 - ⑮ EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
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 - ⑰ CONSTRUCT INLET TYPE X PER RCFC STD. DWG. CB108 (MODIFIED W/ ONE OPENING ONLY).
 - ⑱ CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
 - ⑲ CONSTRUCT METAL FLARED END SECTION PER CALTRANS STD. DWG. D94A (TYPE III).
 - ⑳ CONSTRUCT 18" C.M.P. (14 GA. MINIMUM).
 - ㉑ CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
 - ㉒ REMOVE EXISTING 8" PVC RAW WATER LINE (SEE PLAN FOR LIMITS). VERIFY LOCATION OF WATER LINE NOTIFY ENGINEER IF THERE IS A CONFLICT (MANHOLE TO BE CENTERED AT EXISTING).
 - ㉓ SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



H:\186\03 - Indian Avenue\Peris - SD\Exp\StmDrain\03-54-Indian.dwg
 Plot Date: June 10, 2011 - 12:38pm Terry



KCT CONSULTANTS, INC.
 Civil Engineers - Surveyors - Planners
 P.O. Box 5705 Riverside, CA 92517-5705
 4344 Latham St., Suite 200, Riverside, CA 92501
 Phone: 951-341-0940 Fax: 951-341-0945
 e-mail: kctinc@kctconsultants.com

PREPARED UNDER THE SUPERVISION OF:
Teresito N. Tabaldo DATE 6-16-11
 TERESITO N. TABALDO, R.C.E. NO. 38826

CITY OF PERRIS ENGINEERING DEPARTMENT

APPROVED BY: *[Signature]*
 CITY ENGINEER

DATE: 6/16/11 RCE

BENCH MARK: Z-6843
 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD.
 ELEVATION=1454.258

REF.	DESCRIPTION	APPR	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: _____
 DRAWN BY: _____
 DATE DRAWN: _____

RECOMMENDED FOR APPROVAL BY: _____
 CHIEF, DESIGN & CONSTRUCTION

APPROVED BY: _____
 CHIEF ENGINEER

DATE: _____ RCE NO 30539 DATE: _____ RCE NO 32336

PERRIS VALLEY MDP LINE E-3 STAGE 1
 STA 46+00 TO STA 50+00

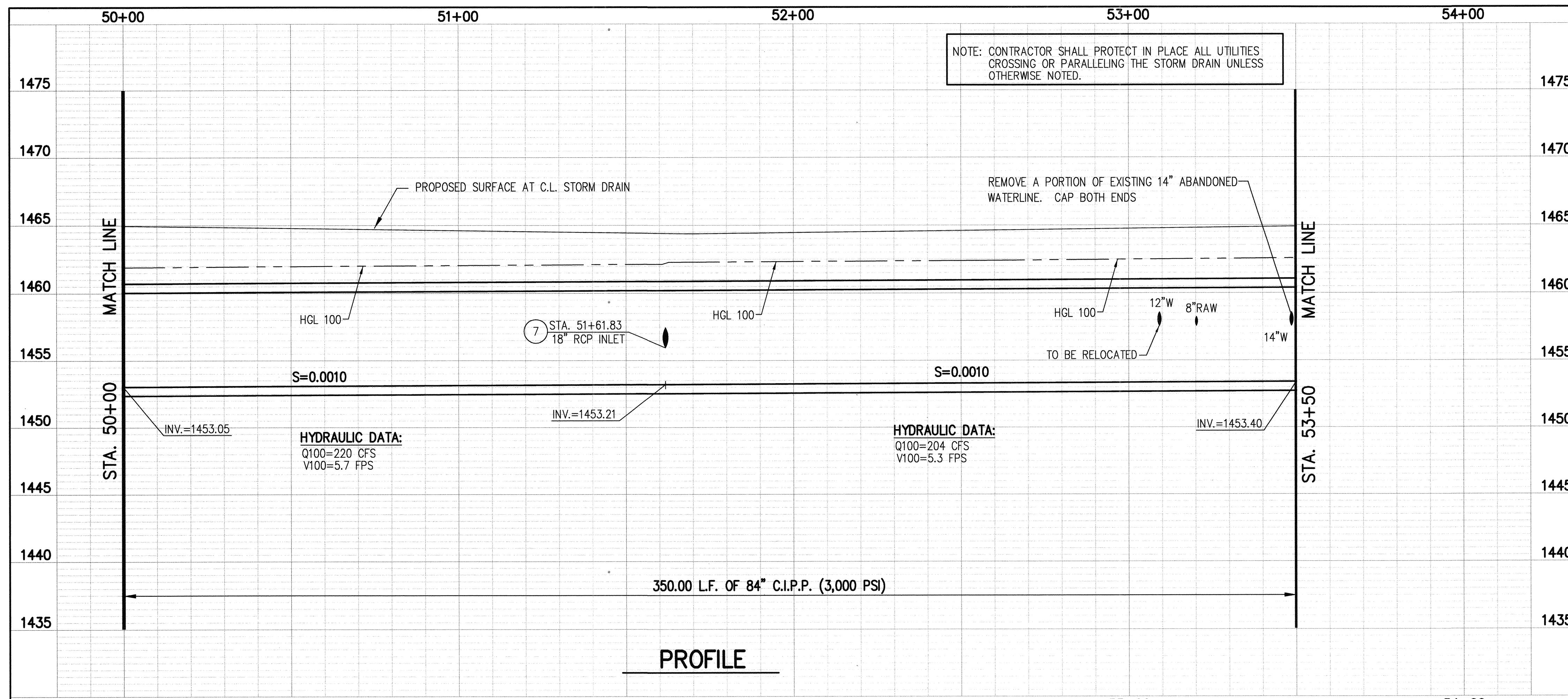
Underground Service Alert

811

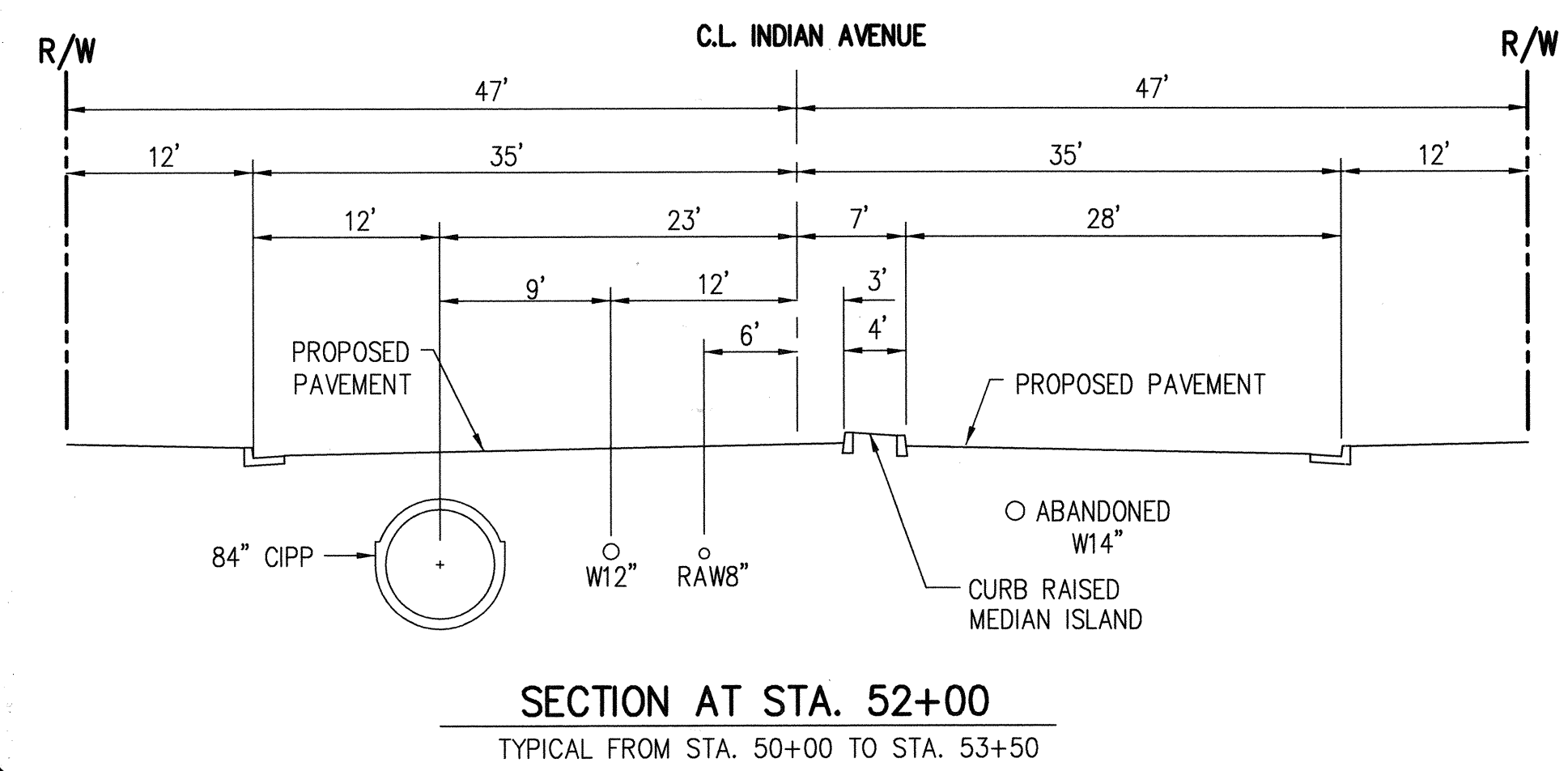
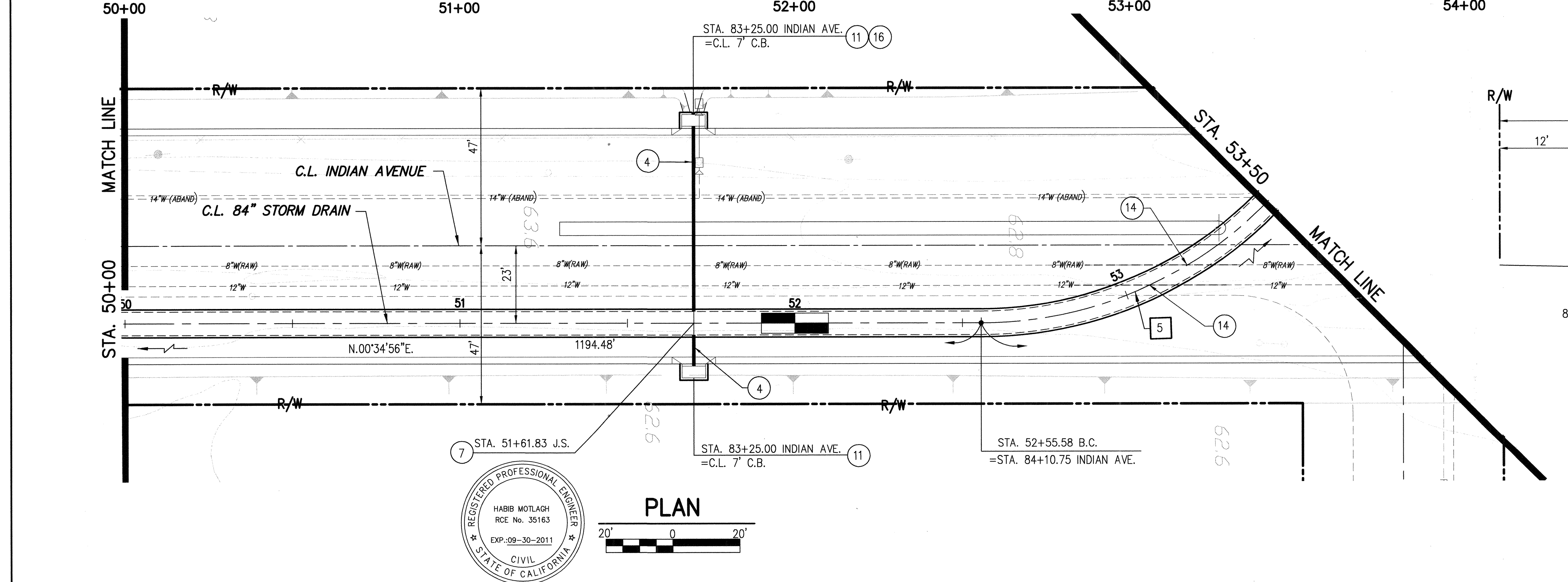
TWO WORKING DAYS BEFORE YOU DIG

CITY OF PERRIS FILE NO. **P8-1164**

PROJECT NO. _____
 DRAWING NO. _____
 SHEET NO. **11** OF **20**



- CONSTRUCTION NOTES:**
- ① CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ② CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
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 - ⑧ CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
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 - ⑩ CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
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 - ⑫ CONSTRUCT 24"X24"X24" DEEP GRATED INLET WITH 12" VERTICAL PVC PIPE (SDR35).
 - ⑬ CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
 - ⑭ EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
 - ⑮ EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
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 - ⑰ CONSTRUCT INLET TYPE X PER RCFC STD. DWG. CB108 (MODIFIED W/ ONE OPENING ONLY).
 - ⑱ CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
 - ⑲ CONSTRUCT METAL FLARED END SECTION PER CALTRANS STD. DWG. D94A (TYPE III).
 - ⑳ CONSTRUCT 14" C.I.P.P. (14" MINIMUM).
 - ㉑ R=120.00'
Δ=89.5831'
 - ㉒ CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
 - ㉓ REMOVE EXISTING 8" PVC RAW WATER LINE (SEE PLAN FOR LIMITS). VERIFY LOCATION OF WATER LINE WITH ENGINEER IF THERE IS A CONFLICT (MANHOLE TO BE CENTERED AT EXISTING).
B.C. STA=52+55.58
S.P. STA=51+40.02
 - ㉔ SEE R/W BACKFILL PER DETAIL "B" ON SHEET 19.
- STORM DRAIN C.L. CURVE DATA:**



Underground Service Alert

811

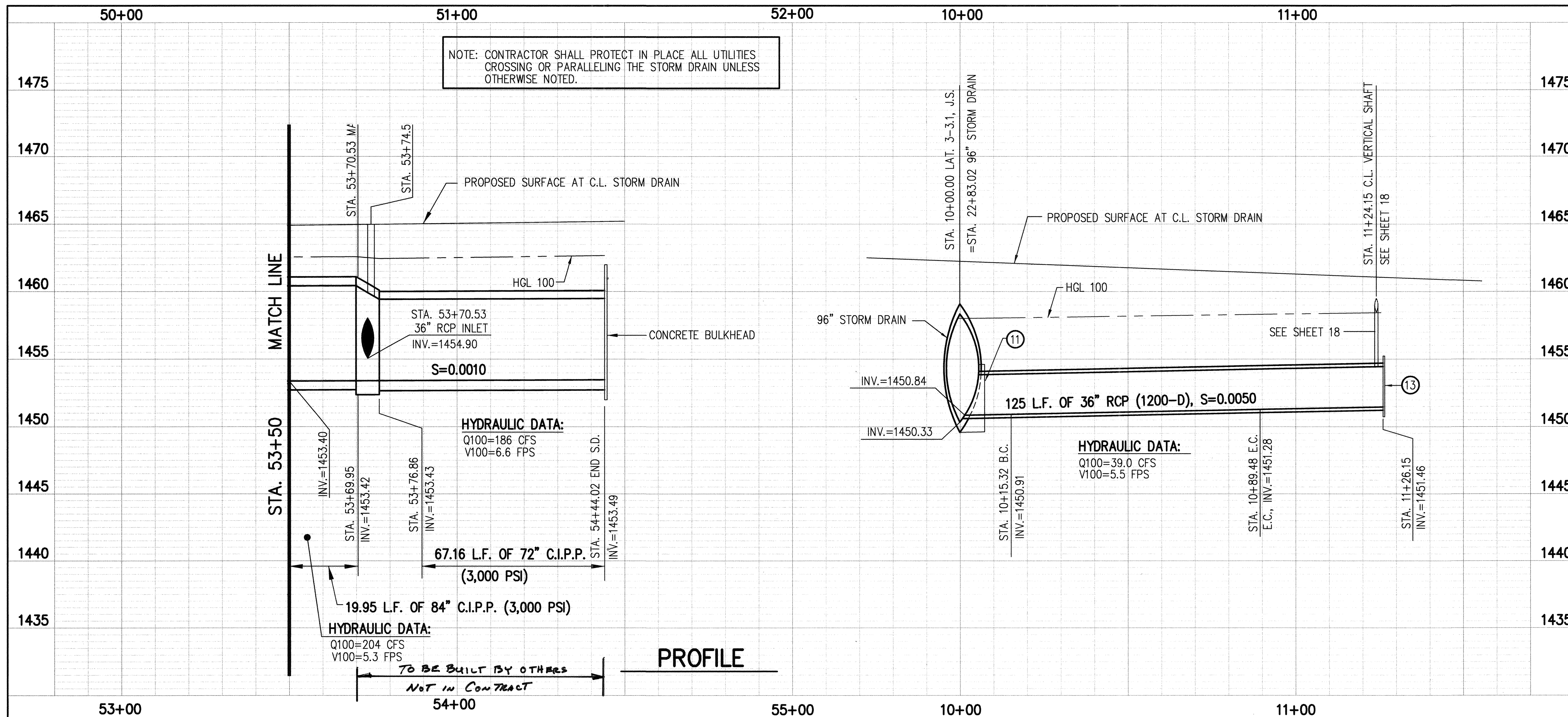
TWO WORKING DAYS BEFORE YOU DIG

CITY OF PERRIS FILE NO.

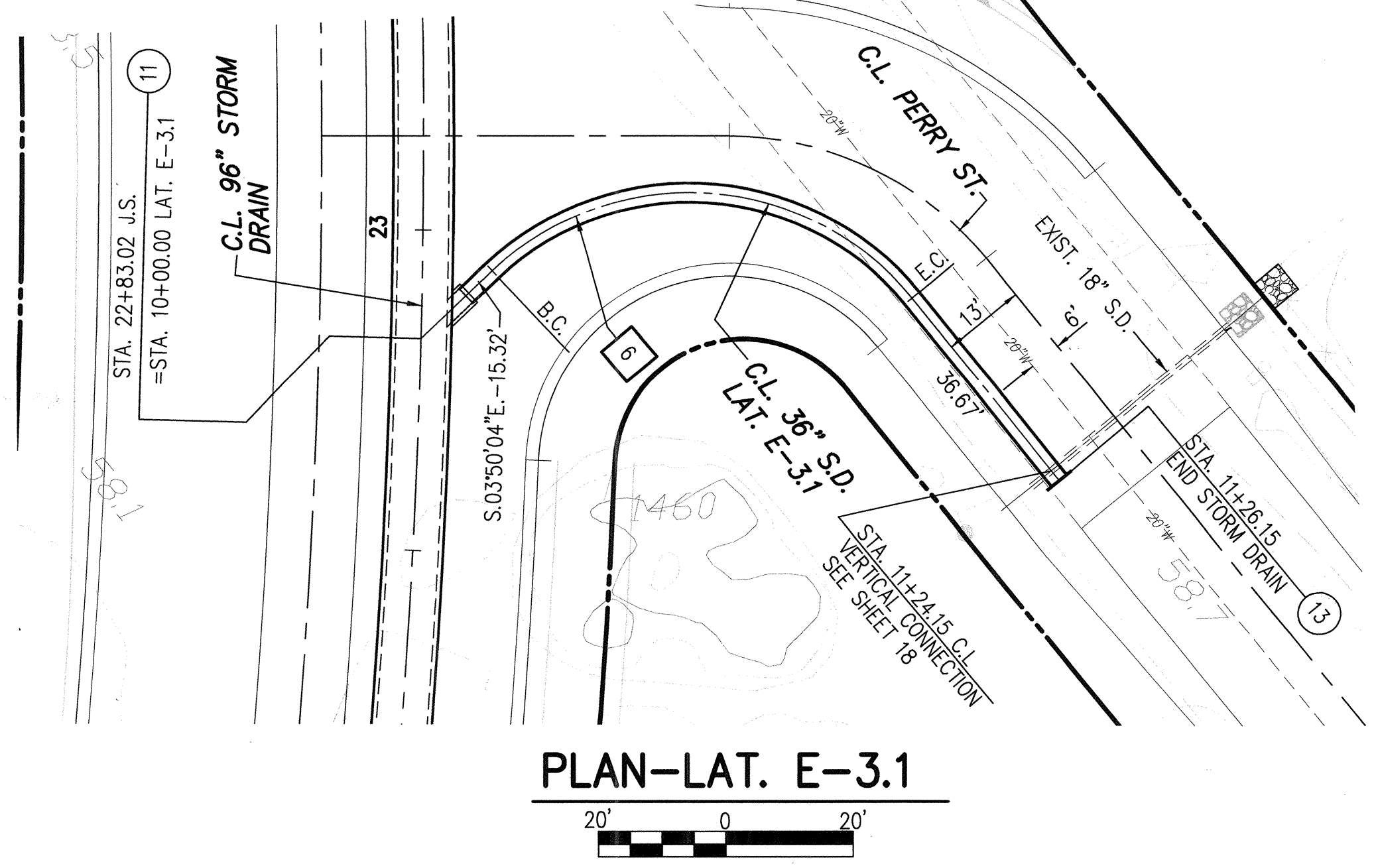
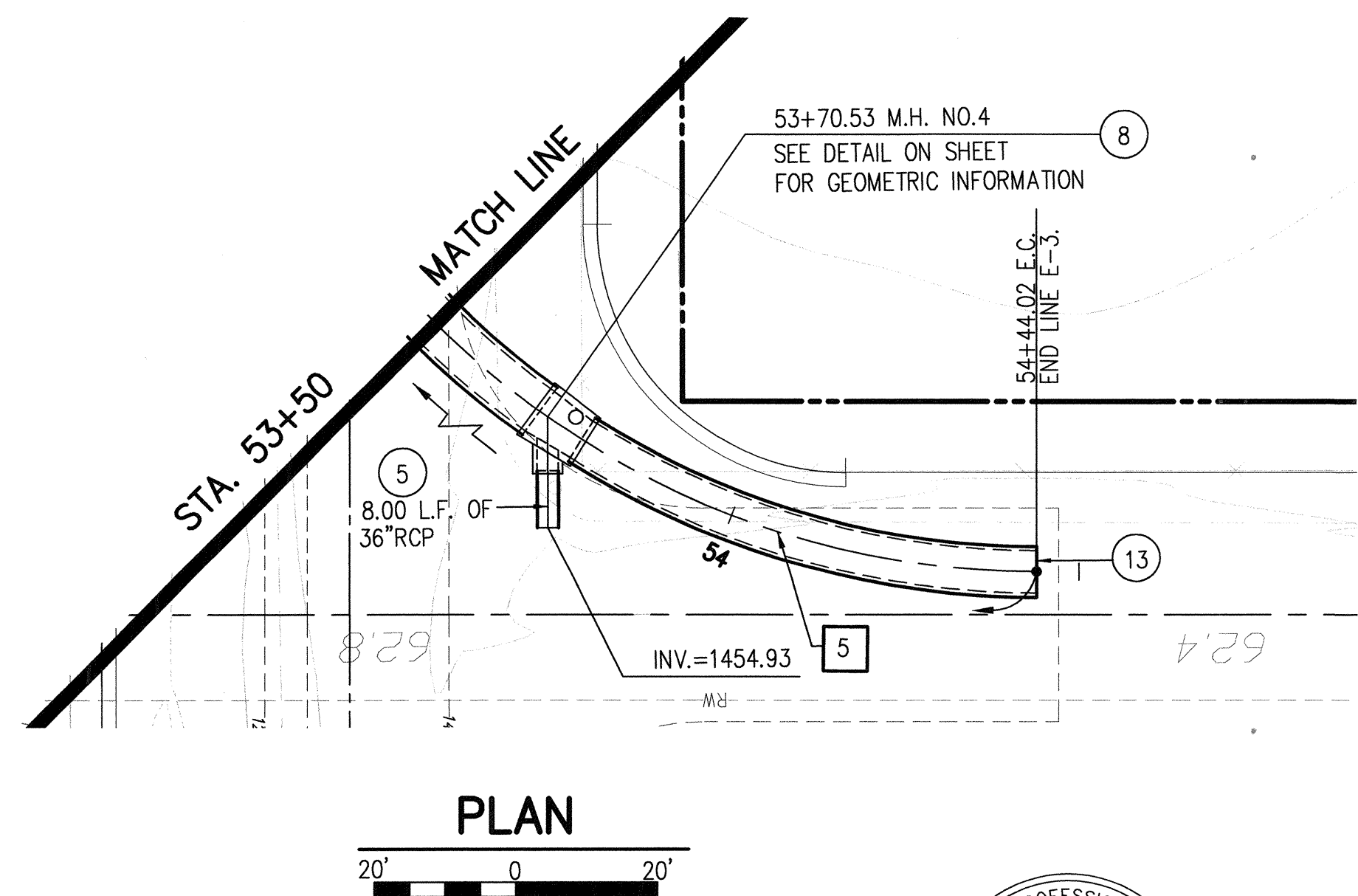
P8-1164

	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5705 Riverside, CA 92517-5705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-541-8983 Fax: 951-541-8945 e-mail: kctinfo@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: <i>[Signature]</i> CITY ENGINEER DATE: 6/10/11 RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS		RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		PERRIS VALLEY MDP LINE E-3 STAGE 1 STA 50+00 TO STA 53+50	PROJECT NO. DRAWING NO. SHEET NO. 12 OF 20
				DESIGNED BY: DRAWN BY: DATE DRAWN:	RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION DATE: _____ RCE NO 30539	APPROVED BY: CHIEF ENGINEER DATE: _____ RCE NO 32336			

H:\186\03 - Indian Avenue\Storm Drain\03-4d-Indian.dwg
 Plot Date: June 10, 2011 - 12:40pm | Terry



- CONSTRUCTION NOTES:**
- ① CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ② CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ③ CONSTRUCT 72" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - ④ CONSTRUCT 18" R.C.P. (D-LOAD SHOWN ON PROFILE).
 - ⑤ CONSTRUCT 36" R.C.P. (D-LOAD SHOWN ON PROFILE).
 - ⑥ CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC STD. DWG. TS301.
 - ⑦ CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC STD. DWG. JS229.
 - ⑧ CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
 - ⑨ CONSTRUCT MANHOLE FOR C.I.P.P. PER DETAIL "D" ON SHEET 20.
 - ⑩ CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
 - ⑪ CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
 - ⑫ CONSTRUCT 24"x24"x24" DEEP GRATED INLET WITH 12" VERTICAL PVC PIPE (SDR35).
 - ⑬ CONSTRUCT CONCRETE BULKHEAD PER RCFC STD. DWG. M816.
 - ⑭ EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
 - ⑮ EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
 - ⑯ CONSTRUCT CATCH BASIN OPENING AT BACK OF CATCH BASIN (12"WIDE X 6"HIGH). SEE PROFILE FOR CATCH BASIN OPENING ELEVATION
 - ⑰ CONSTRUCT INLET TYPE X PER RCFC STD. DWG CB108 (MODIFIED W/ ONE OPENING ONLY).
 - ⑱ CONSTRUCT M.H. NO. 2 PER RCFC STD. DWG. MH252.
 - ⑲ CONSTRUCT METAL FLARED END SECTION PER CALTRANS STD. DWG. D94A (TYPE III).
 - ⑳ CONSTRUCT 18" C.M.P. (14 GA. MINIMUM).
 - ㉑ CAP END OF EXISTING 8" PVC RAW WATER LINE (PVC CAP).
 - ㉒ REMOVE EXISTING 8" PVC RAW WATER LINE (SEE PLAN FOR LIMITS). VERIFY LOCATION OF WATERLINE NOTIFY ENGINEER IF THERE IS A CONFLICT (MANHOLE TO BE CENTERED AT EXISTING).
 - ㉓ SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



STORM DRAIN C.L. CURVE DATA:

5	R=120.00' Δ=89°58'31" T=119.95' L=188.44' B.C. STA=52+55.58 E.C. STA=54+40.02	6	R=45.00' Δ=94°25'43" T=48.62' L=74.16' B.C. STA=10+15.32 E.C. STA=10+89.48
---	--	---	---

MANHOLE NO. 4 DATA:

STATION=53+70.53
D1=72" C.I.P.P.
D2=84" C.I.P.P.
B=36" RCP
ANGLE=54°50'11"
C=8.00'
E'=6.75'
L'=7.75'
ELEV. "S"=1454.90
ELEV. "R"=1454.91

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED.



KCT CONSULTANTS, INC.
Civil Engineers - Surveyors - Planners
P.O. Box 5705 Riverside, CA 92517-5705
4344 Latham St., Suite 200, Riverside, CA 92501
Phone: 951-541-6940 Fax: 951-541-6945
e-mail: kct@kctconsultants.com

PREPARED UNDER THE SUPERVISION OF:
Teresito N. Tabidlo DATE: 6-18-11
TERESITO N. TABIDLO, R.C.E. NO. 38826

CITY OF PERRIS ENGINEERING DEPARTMENT

APPROVED BY: *[Signature]*
CITY ENGINEER

DATE: *6/18/11* RCE

BENCH MARK: Z-6843
1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD.
ELEVATION=1454.258

REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: _____
DRAWN BY: _____
DATE DRAWN: _____

RECOMMENDED FOR APPROVAL BY: _____
CHIEF, DESIGN & CONSTRUCTION

APPROVED BY: _____
CHIEF ENGINEER

DATE: _____ RCE NO 30539 DATE: _____ RCE NO 32336

PERRIS VALLEY MDP LINE E-3 STAGE 1
STA 53+50 TO STA 54+44.02 LATERAL E-3.1

PROJECT NO. _____
DRAWING NO. _____
SHEET NO. 13 OF 20

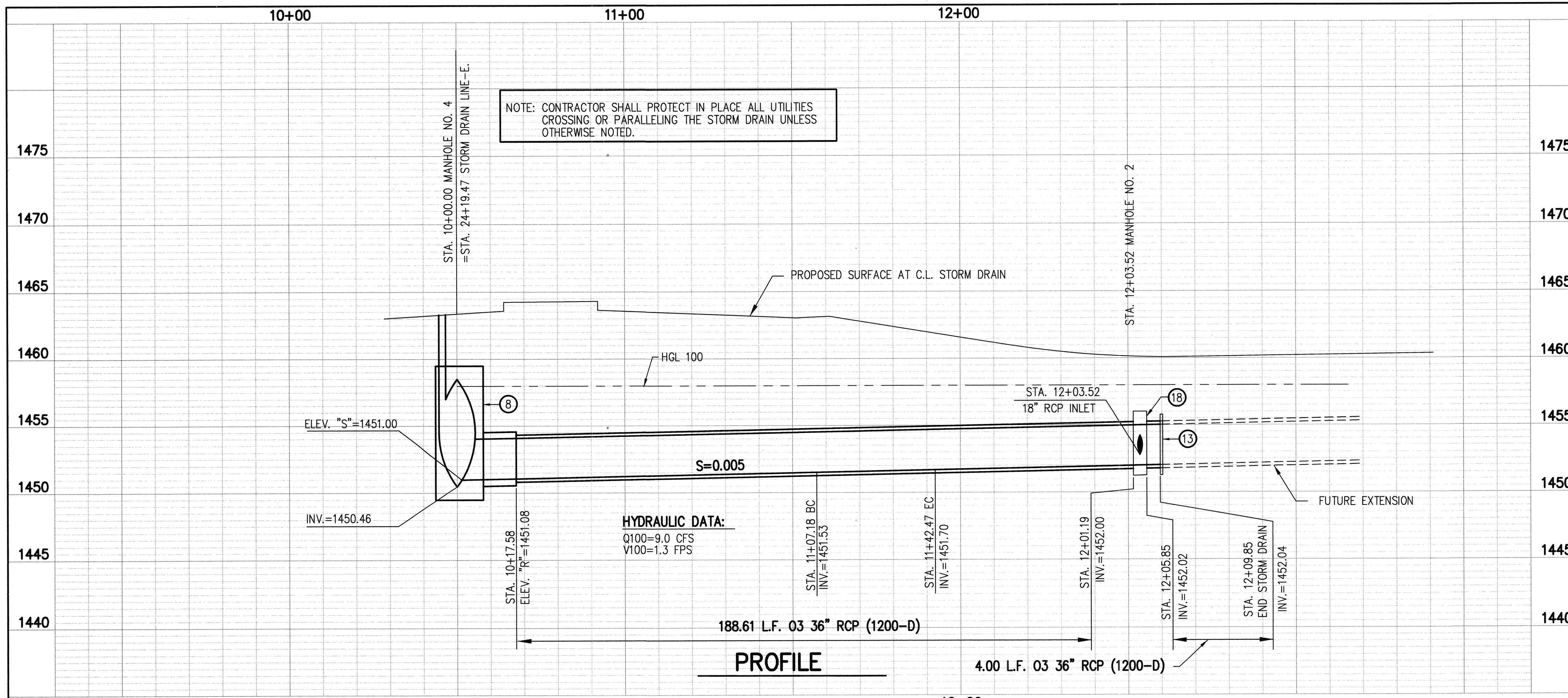
Underground Service Alert

811

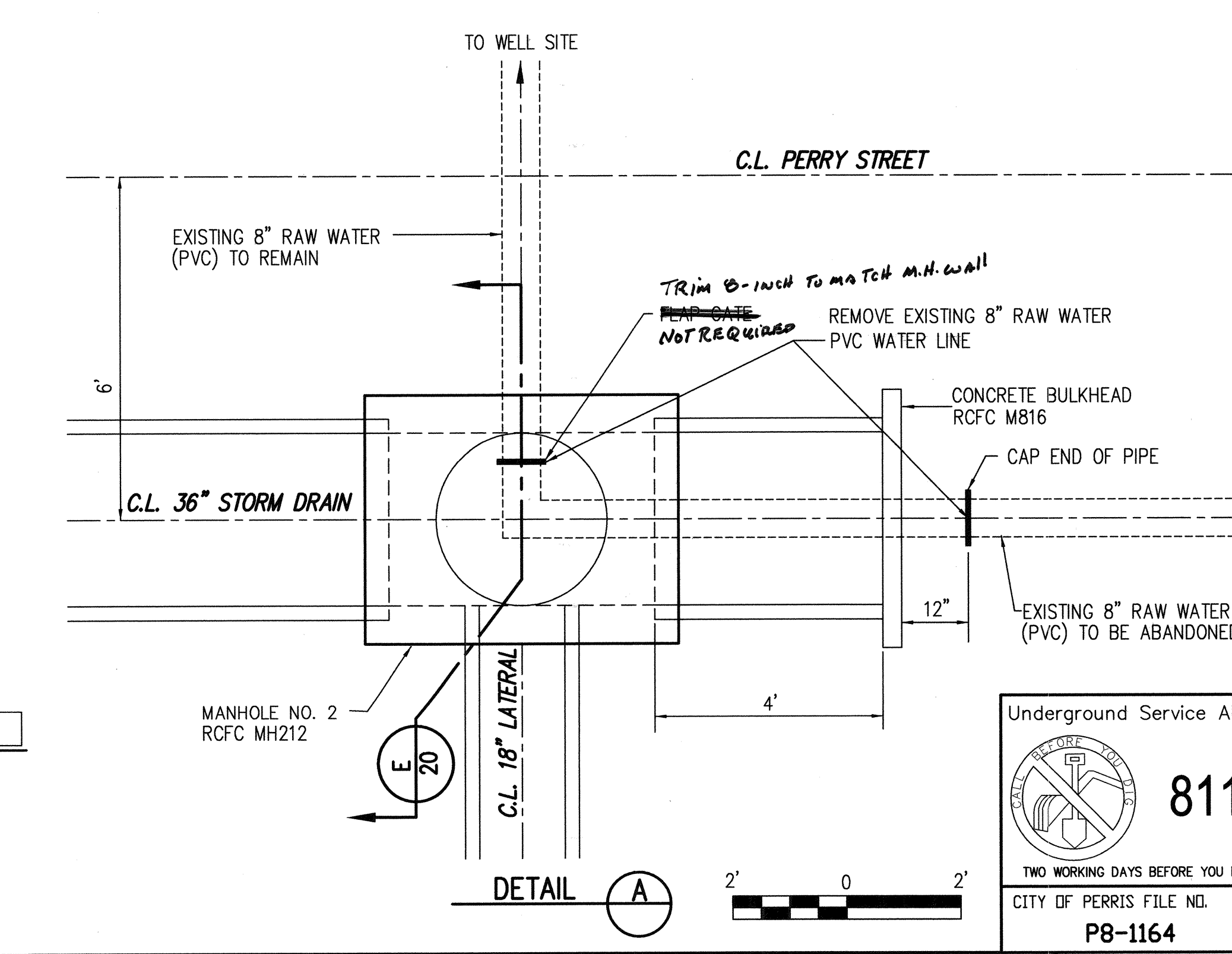
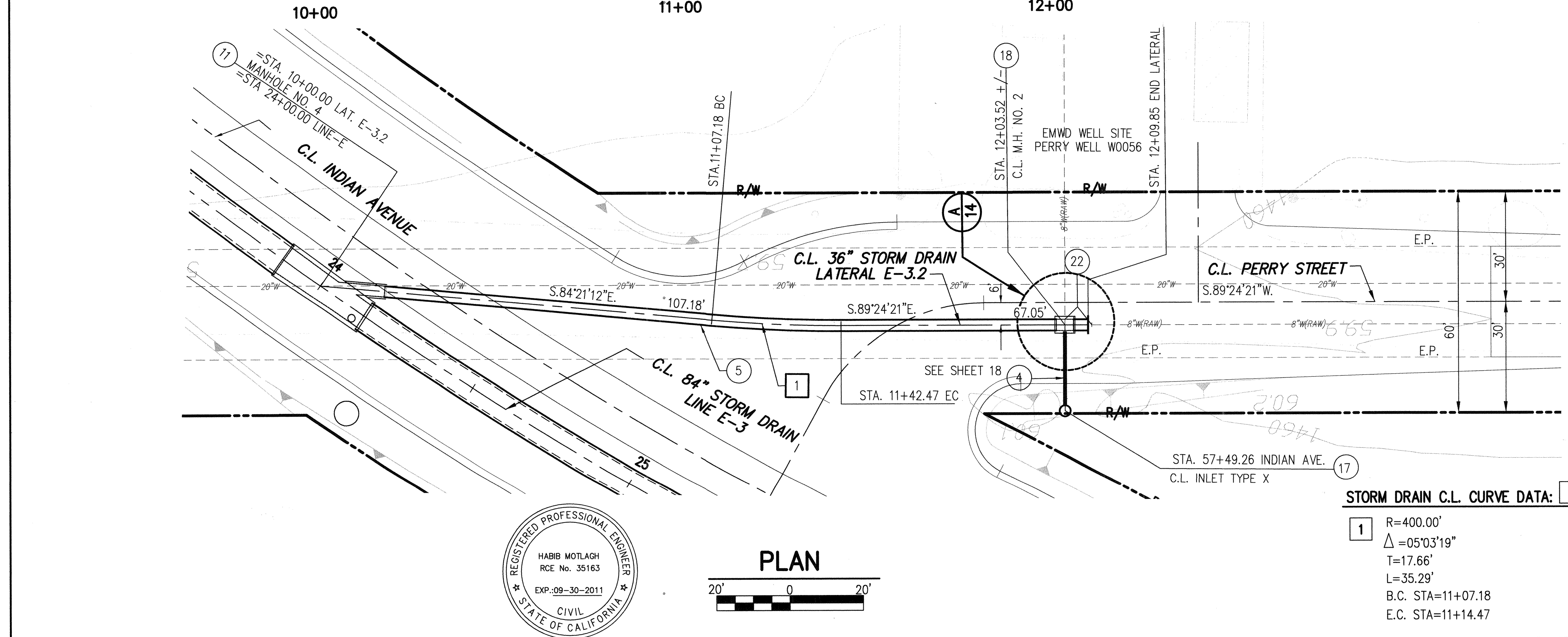
TWO WORKING DAYS BEFORE YOU DIG

CITY OF PERRIS FILE NO. _____
P8-1164

H:\1986\03 - Inland Avenue\Peris - SD\Eng\Stormdrain\03-ss-inland.dwg
Plot Date: June 10, 2011 - 2:10pm | Terry



- CONSTRUCTION NOTES:**
- CONSTRUCT 96" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - CONSTRUCT 84" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - CONSTRUCT 72" CONCRETE CAST-IN-PLACE PIPE (PIPE STRENGTH SHOWN ON PROFILE).
 - CONSTRUCT 18" R.C.P. (D-LOAD SHOWN ON PROFILE).
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 - CONSTRUCT TRANSITION STRUCTURE NO. 1 PER RCFC STD. DWG. TS301.
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 - CONSTRUCT MANHOLE NO. 4 PER RCFC STD. DWG. MH254 (SEE PLAN FOR VALUES).
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 - CONSTRUCT JUNCTION STRUCTURE PER DETAIL "A" ON SHEET 20.
 - CONSTRUCT CATCH BASIN NO. 1 PER RCFC STD. DWG. CB100.
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 - EXISTING WATERLINE (SIZE NOTED ON PLAN) TO BE RELOCATED TO MISS STORM DRAIN.
 - EXISTING WATERLINE ELEVATION AT STORM DRAIN CROSSING TO BE FIELD VERIFIED PRIOR TO START OF STORM DRAIN CONSTRUCTION. RELOCATE WATERLINE IF THERE IS A CONFLICT WITH THE EXISTING WATERLINE AND THE NEW STORM DRAIN.
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 - SLURRY BACKFILL PER DETAIL "B" ON SHEET 19.



Underground Service Alert

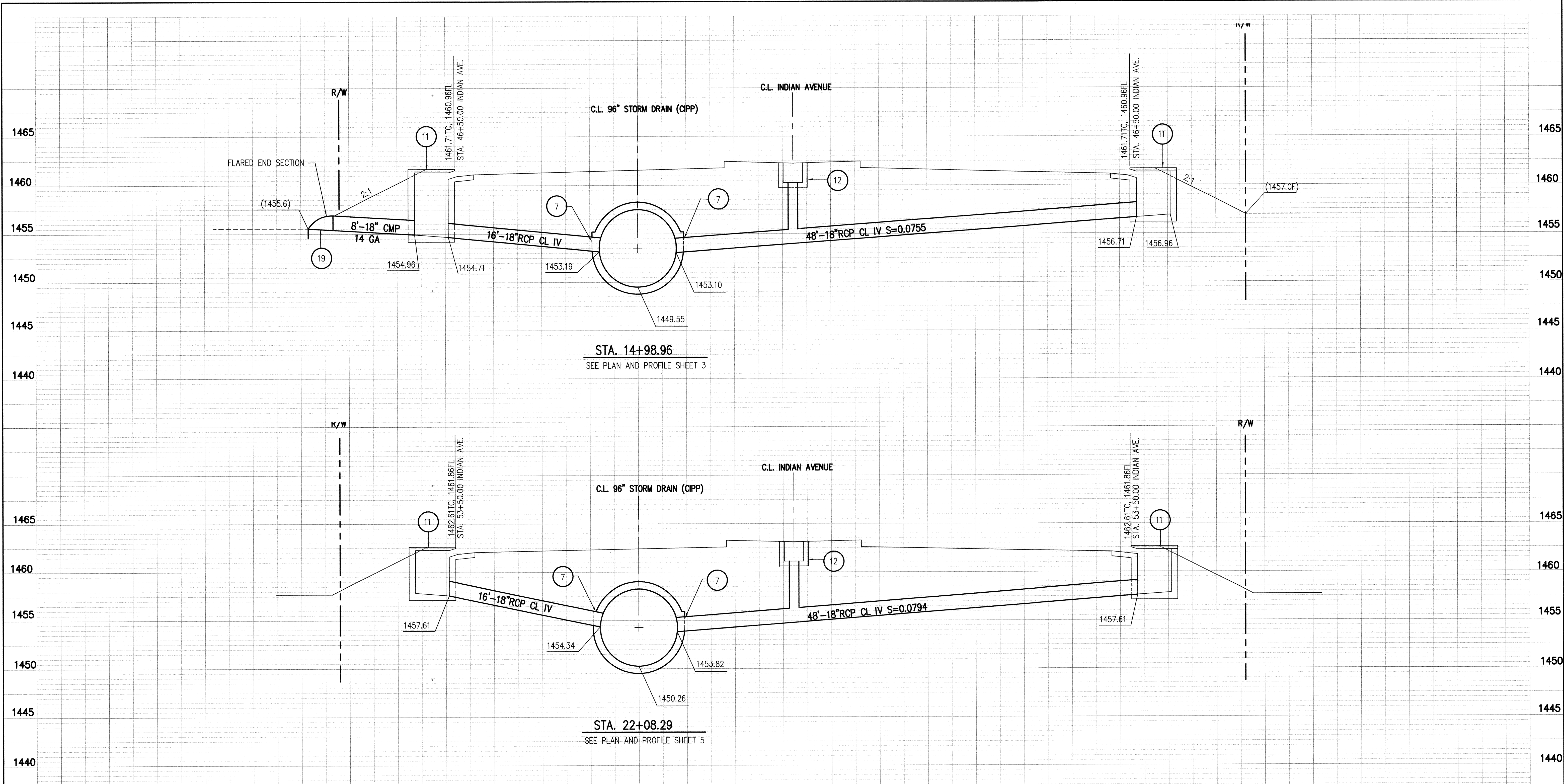
811

TWO WORKING DAYS BEFORE YOU DIG

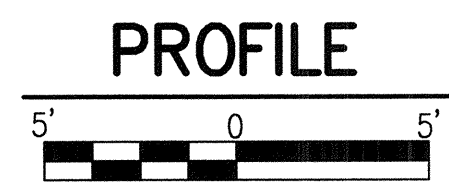
CITY OF PERRIS FILE NO. **P8-1164**

	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5705 Riverside, CA 92517-5705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-341-8860 Fax: 951-341-8945 e-mail: kctinc@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: <i>[Signature]</i> CITY ENGINEER DATE: 6/10/11 RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS		RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		PERRIS VALLEY MDP LINE E-3 STAGE 1 LATERAL E-3.2	PROJECT NO. DRAWING NO. SHEET NO. 14 OF 20
				DESIGNED BY:	RECOMMENDED FOR APPROVAL BY:	APPROVED BY:			
	PREPARED UNDER THE SUPERVISION OF: <i>[Signature]</i> DATE: 6-10-11 TERESITO N. TABALDO, R.C.E. NO. 38826	DATE: 6/10/11 RCE	REF. DESCRIPTION APPR DATE	CHIEF, DESIGN & CONSTRUCTION DATE: _____ RCE NO 30539	CHIEF ENGINEER DATE: _____ RCE NO 32336				

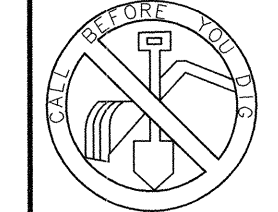
H:\1884\03 - Indian Avenue Perris - SD\Exp\Stormdrain\03-45-Indian.dwg
 Plot Date: June 10, 2011 - 10:20am Terry



NOTE:
SEE SHEET 1 FOR CONSTRUCTION NOTE.



Underground Service Alert



811

TWO WORKING DAYS BEFORE YOU DIG
CITY OF PERRIS FILE NO.
P8-1164



KCT CONSULTANTS, INC.
Civil Engineers - Surveyors - Planners
P.O. Box 5705 Riverside, CA 92517-5705
4344 Latham St., Suite 200, Riverside, CA 92501
Phone: 951-341-8940 Fax: 951-341-8945
e-mail: kctinfo@kctconsultants.com

PREPARED UNDER THE SUPERVISION OF:
Teresito N. Tabaldo DATE: *6/10/11*
TERESITO N. TABALDO, R.C.E. NO. 38826

**CITY OF PERRIS
ENGINEERING DEPARTMENT**

APPROVED BY: *[Signature]*
CITY ENGINEER

DATE: *6/10/11* RCE

BENCH MARK: Z-6843
1 1/2" BRASS DISK AT INT. OF
RAMONA EXPWY. AND PERRIS
BOULEVARD.
ELEVATION=1454.258

REF.	DESCRIPTION	APPR	DATE

**RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT**

DESIGNED BY: _____
DRAWN BY: _____
DATE DRAWN: _____

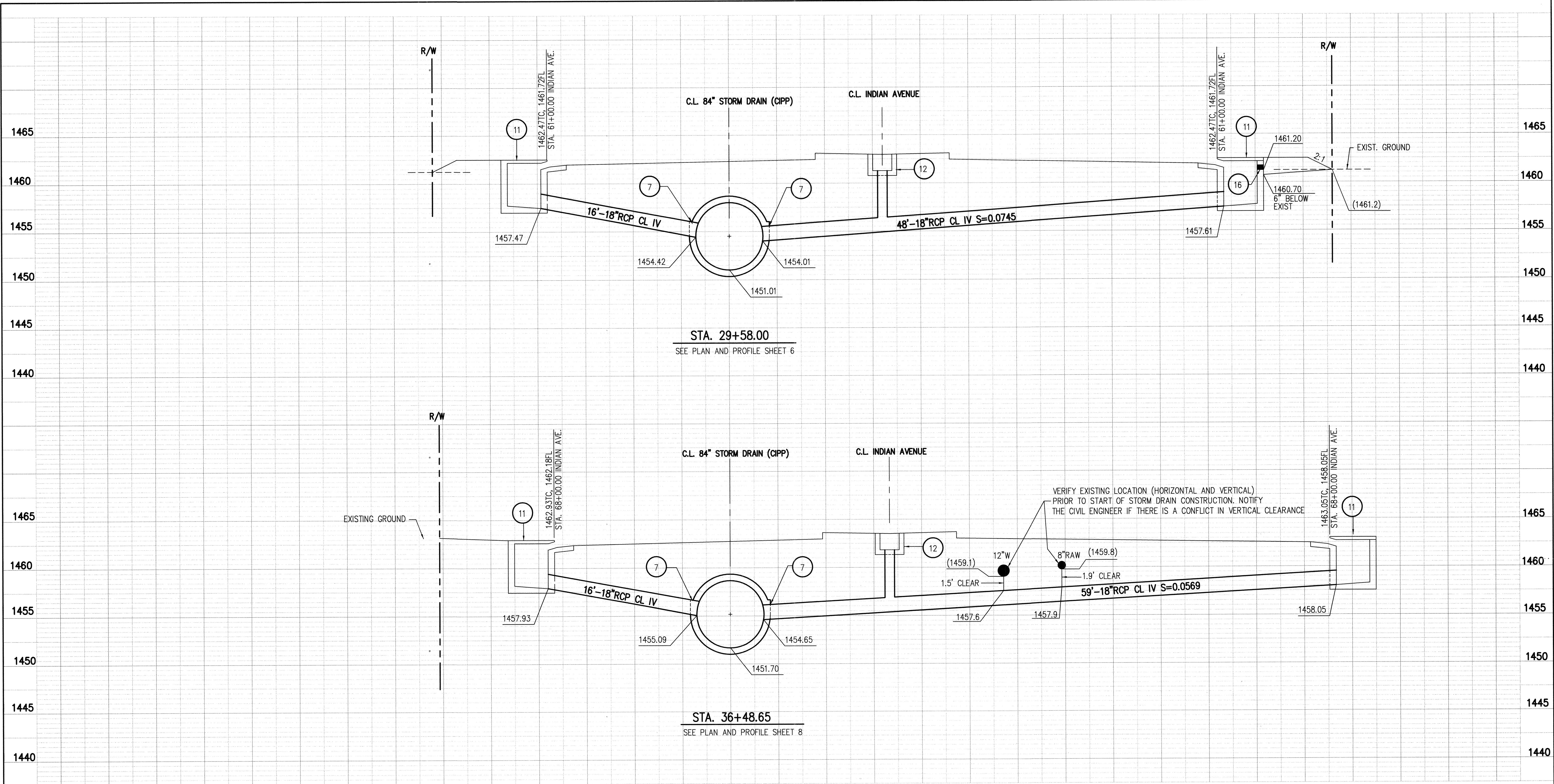
RECOMMENDED FOR APPROVAL BY:
CHIEF, DESIGN & CONSTRUCTION
DATE: _____ RCE NO 30539

APPROVED BY:
CHIEF ENGINEER
DATE: _____ RCE NO 32336

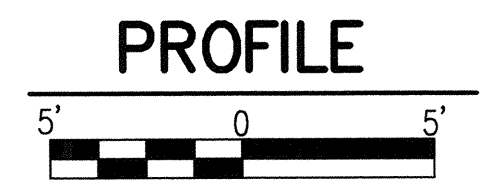
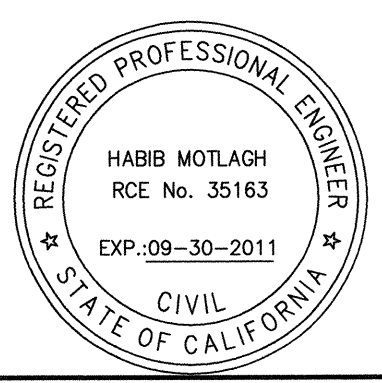
**PERRIS VALLEY MDP
LINE E-3
STAGE 1
LATERALS PROFILE**

PROJECT NO.
DRAWING NO.
SHEET NO.
15 OF 20

N:\1386\03 - Indian Avenue\perris - SD\Exp\Stormwater\03-15-11\1144am Terry
 Plot Date: June 10, 2011 11:44am Terry



NOTE:
SEE SHEET NO. 1 FOR CONSTRUCTION NOTE.

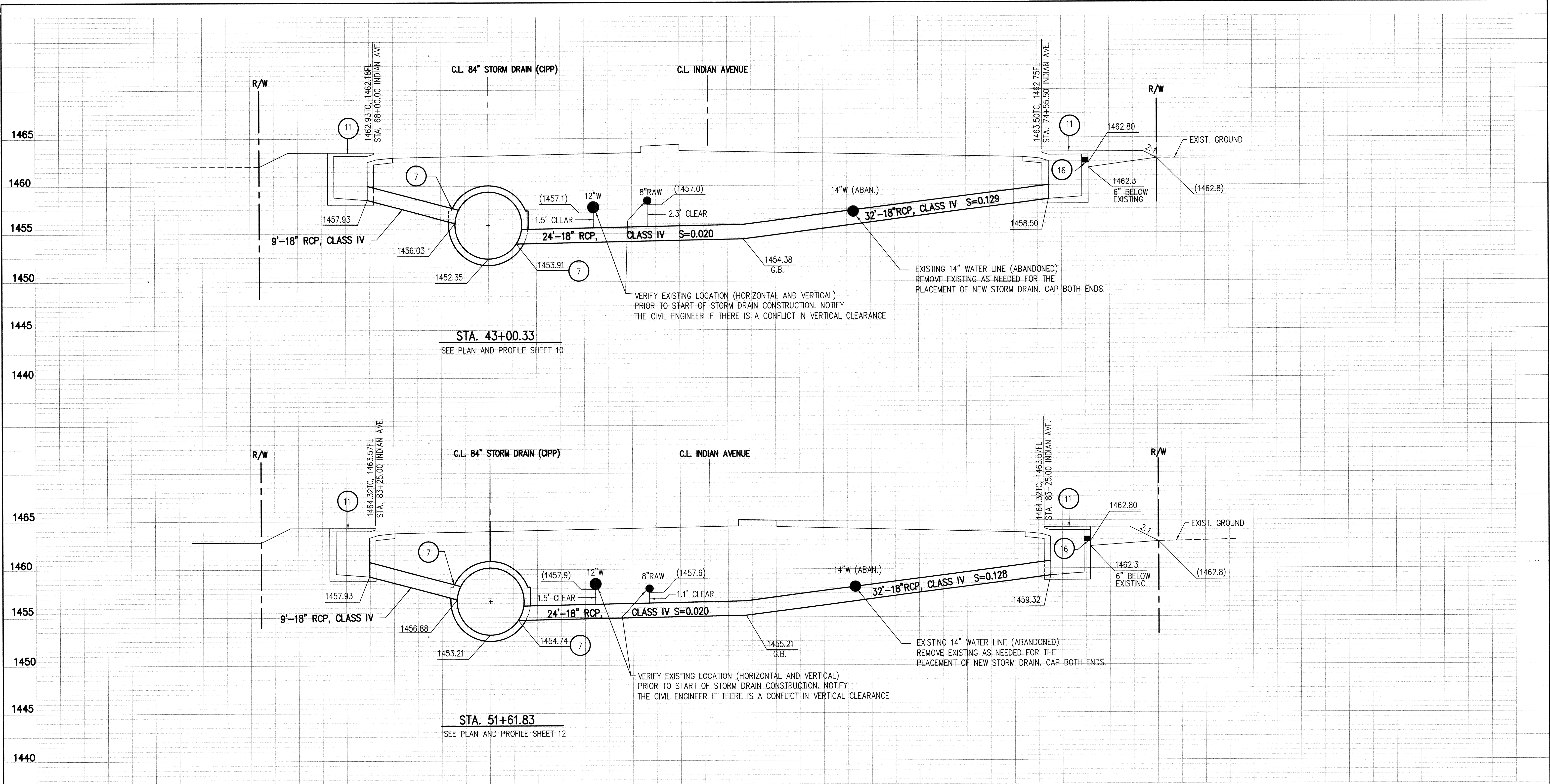


Underground Service Alert

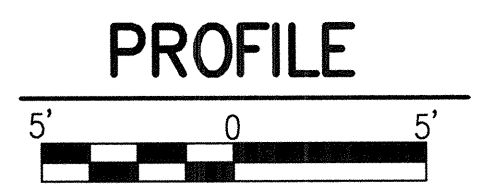
811
 TWO WORKING DAYS BEFORE YOU DIG
 CITY OF PERRIS FILE NO.
P8-1164

 PREPARED UNDER THE SUPERVISION OF: <i>Teresito N. Tabaldo</i> DATE 6-11-11 TERESITO N. TABALDO, R.C.E. NO. 38826	KCT CONSULTANTS, INC. Civil Engineers - Surveyors - Planners P.O. Box 5708 Riverside, CA 92517-5708 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-341-8940 Fax: 951-341-8945 e-mail: kctinc@kctconsultants.com	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: <i>[Signature]</i> CITY ENGINEER DATE: _____ RCE: _____	BENCH MARK: Z-6843 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS			RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			PERRIS VALLEY MDP LINE E-3 STAGE 1 LATERALS PROFILE	PROJECT NO.
				DESIGNED BY: DRAWN BY: DATE DRAWN:	RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION DATE: _____ RCE NO 30539	APPROVED BY: CHIEF ENGINEER DATE: _____ RCE NO 32336	DRAWING NO.	SHEET NO. 16 OF 20			

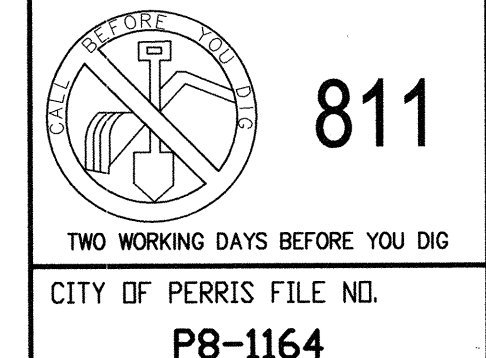
N:\3188\03 - Perris Valley MDP - SDA\Eng\Stormdrain\03-ss-median.dwg
 Plot Date: June 10, 2011 - 11:43am | Terry



NOTE:
SEE SHEET NO. 1 FOR CONSTRUCTION NOTES.



Underground Service Alert



KCT CONSULTANTS, INC.
Civil Engineers - Surveyors - Planners
P.O. Box 5705 Riverside, CA 92517-0705
4344 Latham St., Suite 200, Riverside, CA 92501
Phone: 951-541-9980 Fax: 951-541-9945
e-mail: kctinc@kctconsultants.com

PREPARED UNDER THE SUPERVISION OF:
Teresito N. Tabaldo DATE 6-10-11
TERESITO N. TABALDO, R.C.E. NO. 38826

**CITY OF PERRIS
ENGINEERING DEPARTMENT**

APPROVED BY: *[Signature]*
CITY ENGINEER
DATE: 6/10/11 RCE

BENCH MARK: Z-6843
1/2" BRASS DISK AT INT. OF
RAMONA EXPWY. AND PERRIS
BOULEVARD.
ELEVATION=1454.258

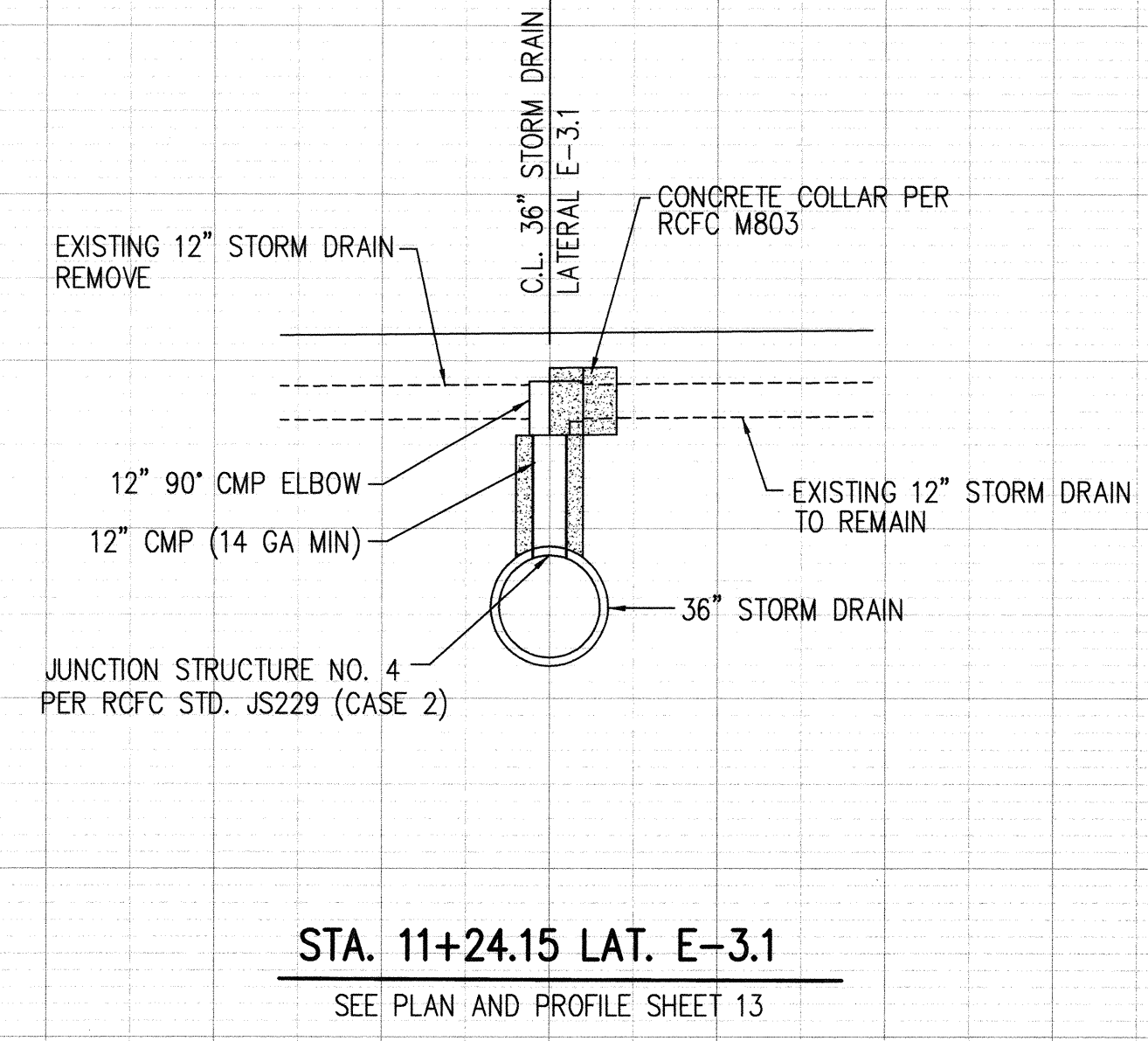
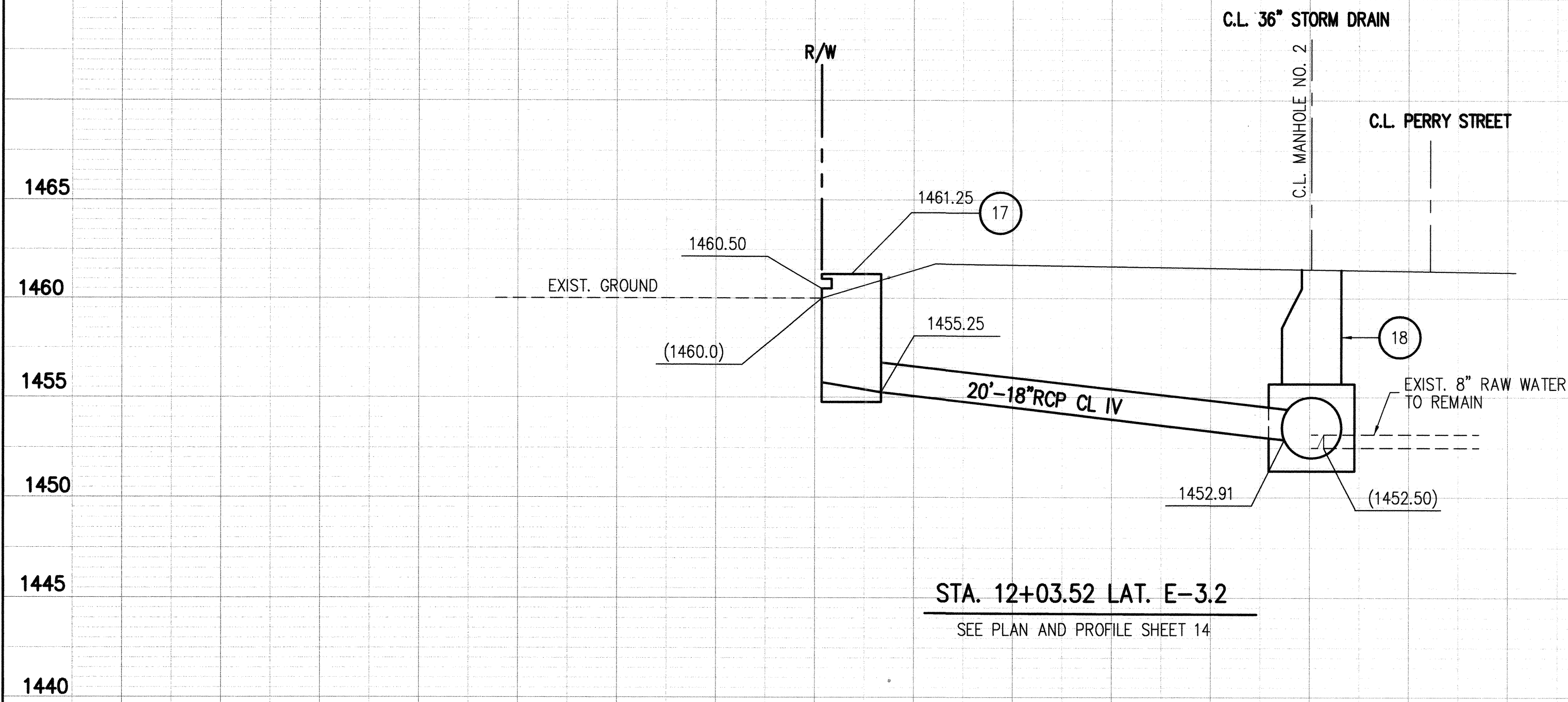
REF.	DESCRIPTION	APPR	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		
DESIGNED BY:	RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
DRAWN BY:	CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER
DATE DRAWN:	DATE: _____ RCE NO 30539	DATE: _____ RCE NO 32336

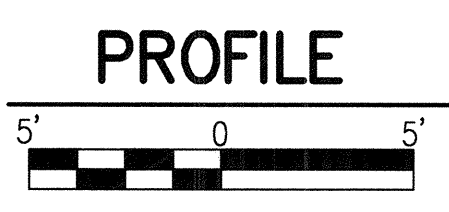
**PERRIS VALLEY MDP
LINE E-3
STAGE 1
LATERALS PROFILE**

PROJECT NO.
DRAWING NO.
SHEET NO.
17 OF 20

H:\1386103 - Indian Avenue (Perris) - SD (Exp) (Stormwater)\03-4d-Indian.dwg
 Plot Date: June 10, 2011 11:42am Terry



NOTE:
SEE SHEET NO. 1 FOR CONSTRUCTION NOTES.



Underground Service Alert

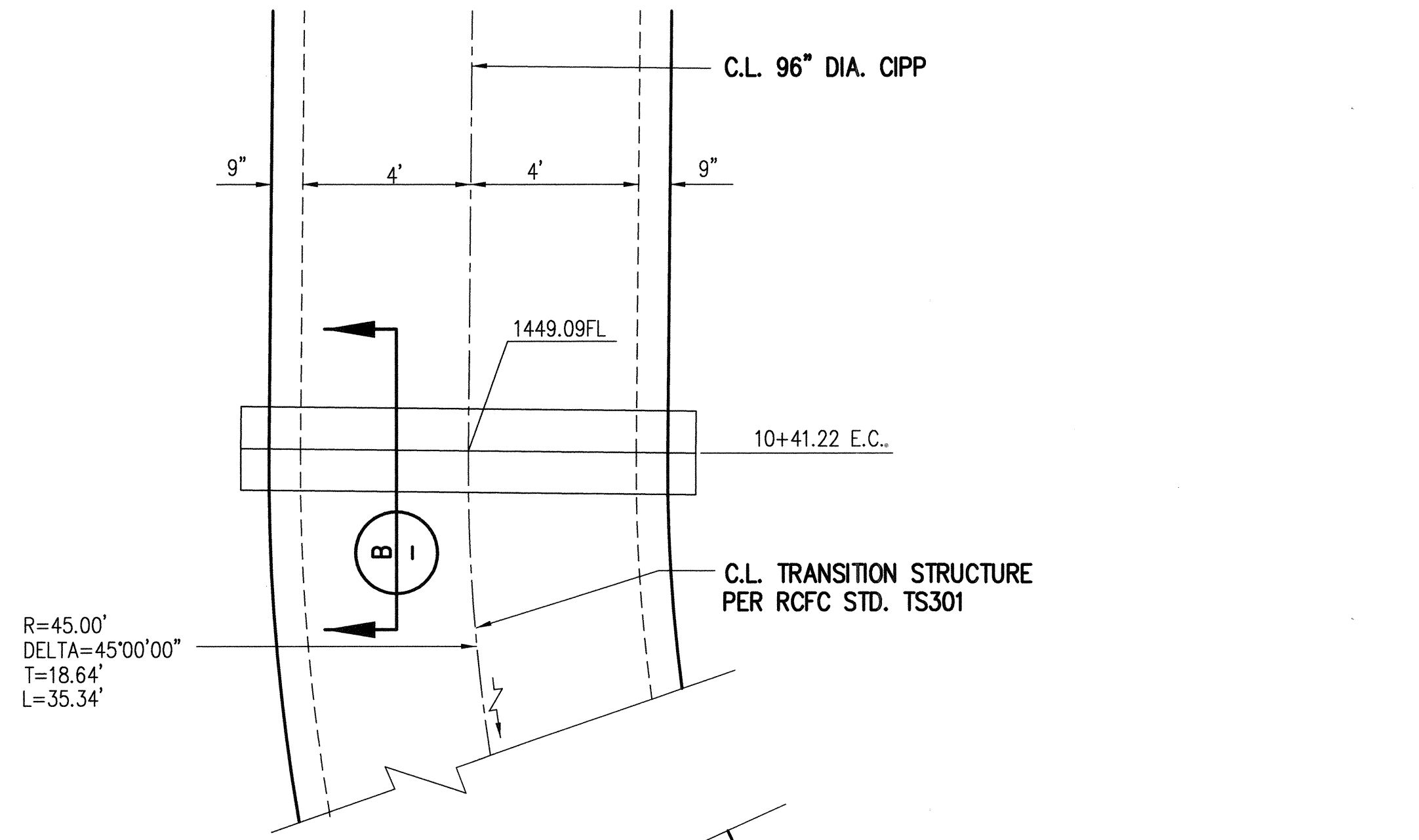
811

TWO WORKING DAYS BEFORE YOU DIG

CITY OF PERRIS FILE NO.
P8-1164

	KCT CONSULTANTS, INC. <small>Civil Engineers - Surveyors - Planners P.O. Box 5705 Riverside, CA 92517-5705 4344 Latham St., Suite 200, Riverside, CA 92501 Phone: 951-541-8940 Fax: 951-541-8945 e-mail: kctco@kctconsultants.com</small>	CITY OF PERRIS ENGINEERING DEPARTMENT APPROVED BY: CITY ENGINEER DATE: 6/10/11 RCE	BENCH MARK: Z-6843 1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD. ELEVATION=1454.258	REVISIONS <table border="1" style="width:100%; border-collapse: collapse;"> <tr><th>REF.</th><th>DESCRIPTION</th><th>APPR</th><th>DATE</th></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	REF.	DESCRIPTION	APPR	DATE													DESIGNED BY: _____ DRAWN BY: _____ DATE DRAWN: _____	RECOMMENDED FOR APPROVAL BY: _____ CHIEF, DESIGN & CONSTRUCTION DATE: _____ RCE NO 30539	APPROVED BY: _____ CHIEF ENGINEER DATE: _____ RCE NO 32336	PERRIS VALLEY MDP LINE E-3 STAGE 1 LATERALS PROFILE	PROJECT NO. DRAWING NO. SHEET NO. 18 OF 20
					REF.	DESCRIPTION	APPR	DATE																	
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		PERRIS VALLEY MDP LINE E-3 STAGE 1 LATERALS PROFILE																							

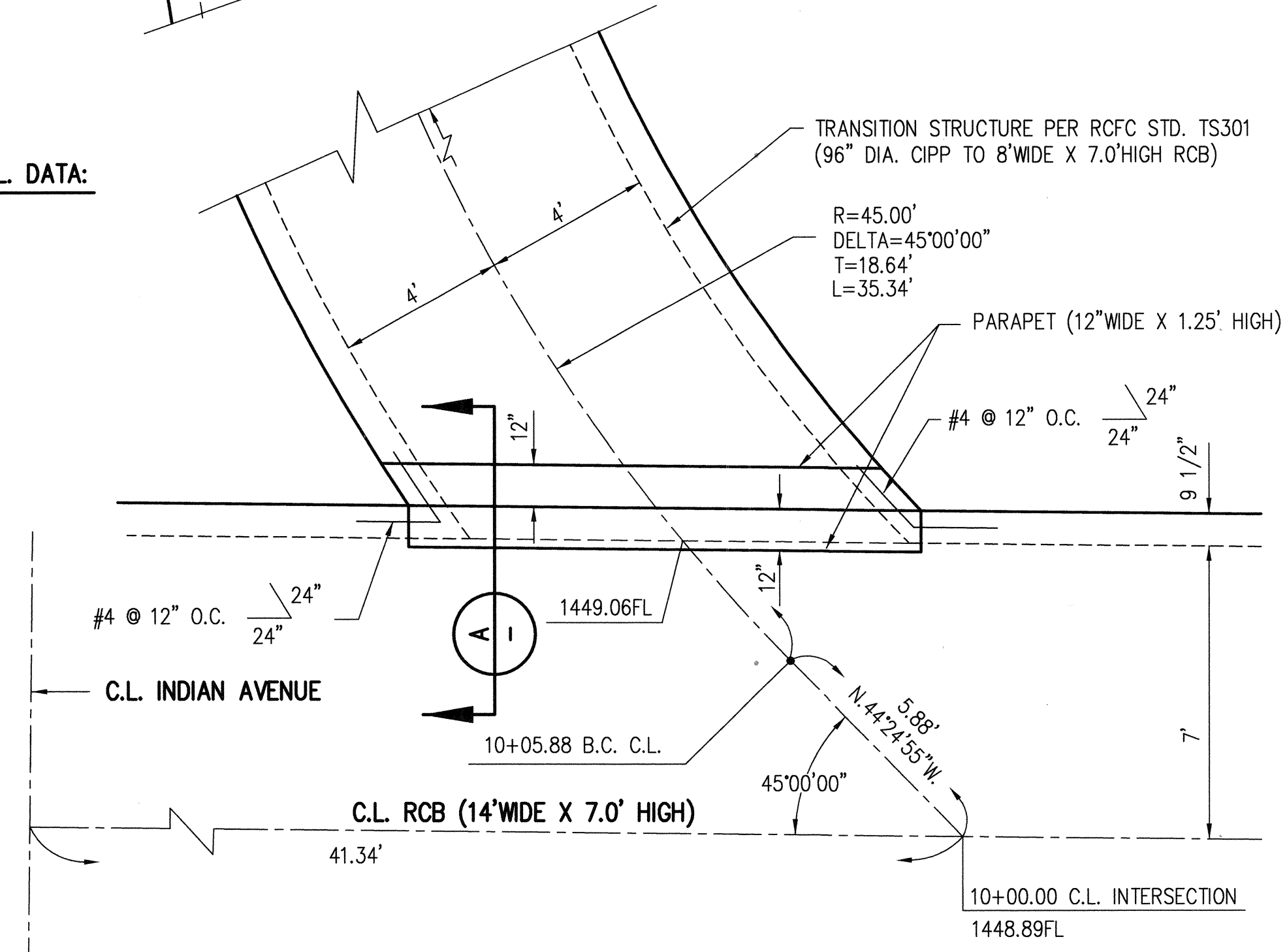
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 Plot Date: June 10, 2011 - 2:11pm | Terry



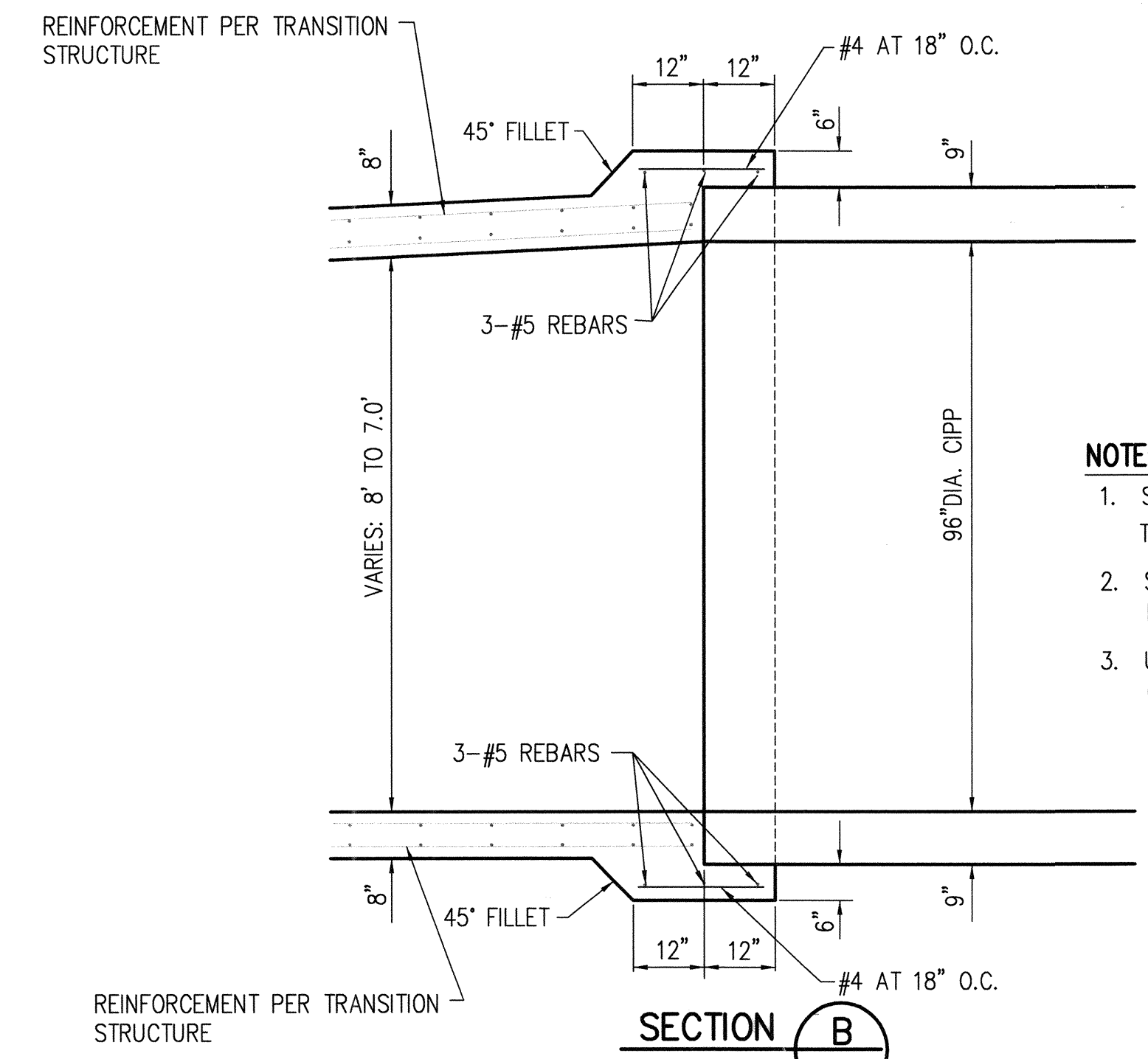
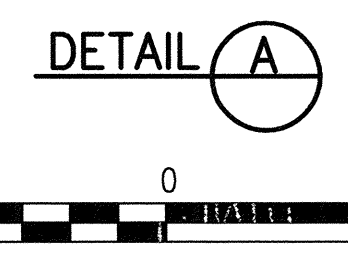
R=45.00'
 DELTA=45°00'00"
 T=18.64'
 L=35.34'

TRANSITION STRUCTURE C.L. DATA:

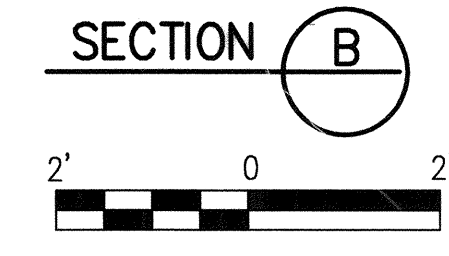
R=45.00'
 DELTA=45°00'00"
 T=18.64'
 L=35.34'
 B.C. STATION=10+05.88
 E.C. STATION=10+41.22



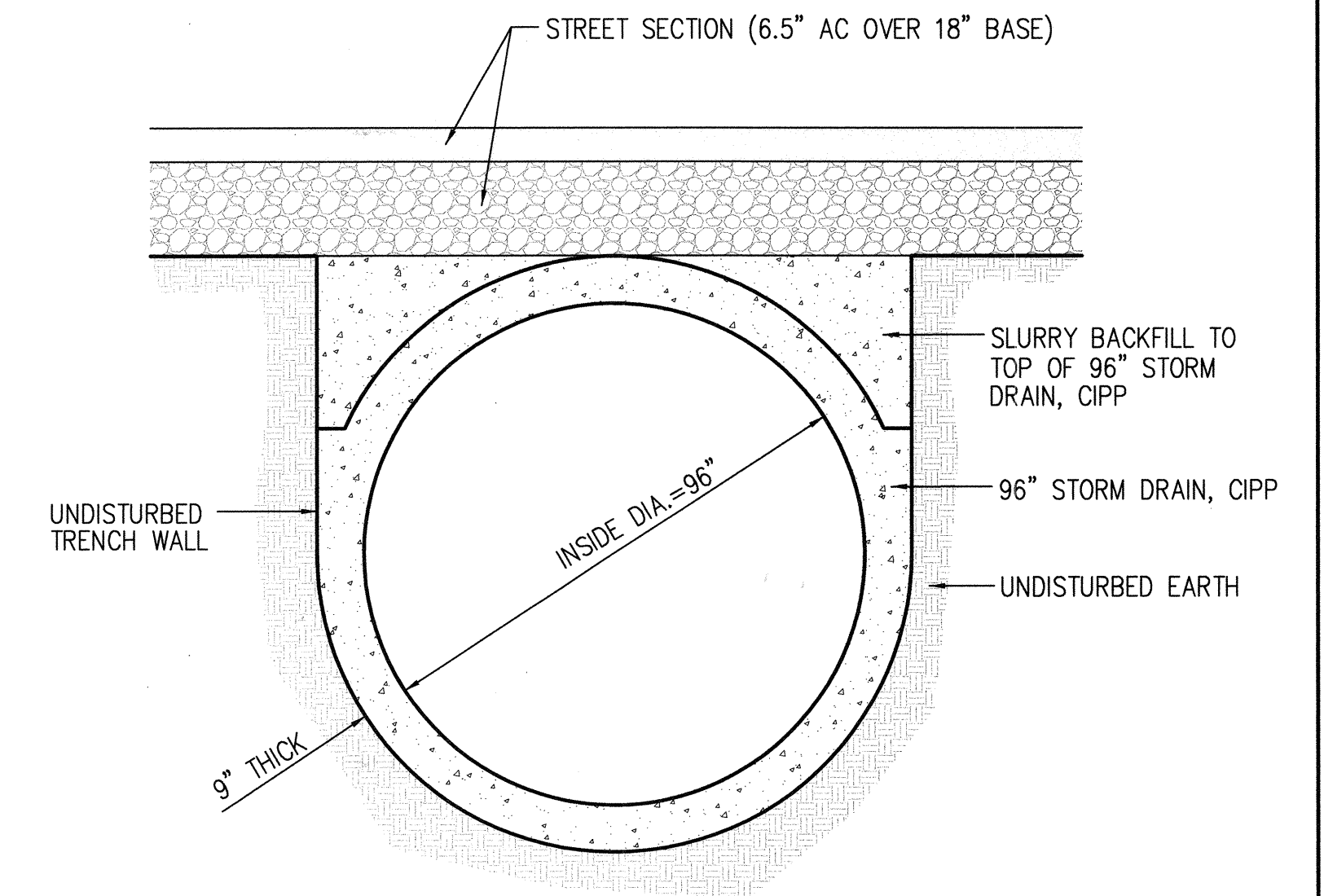
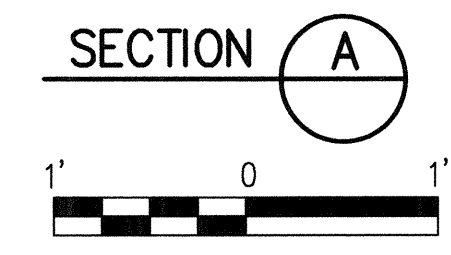
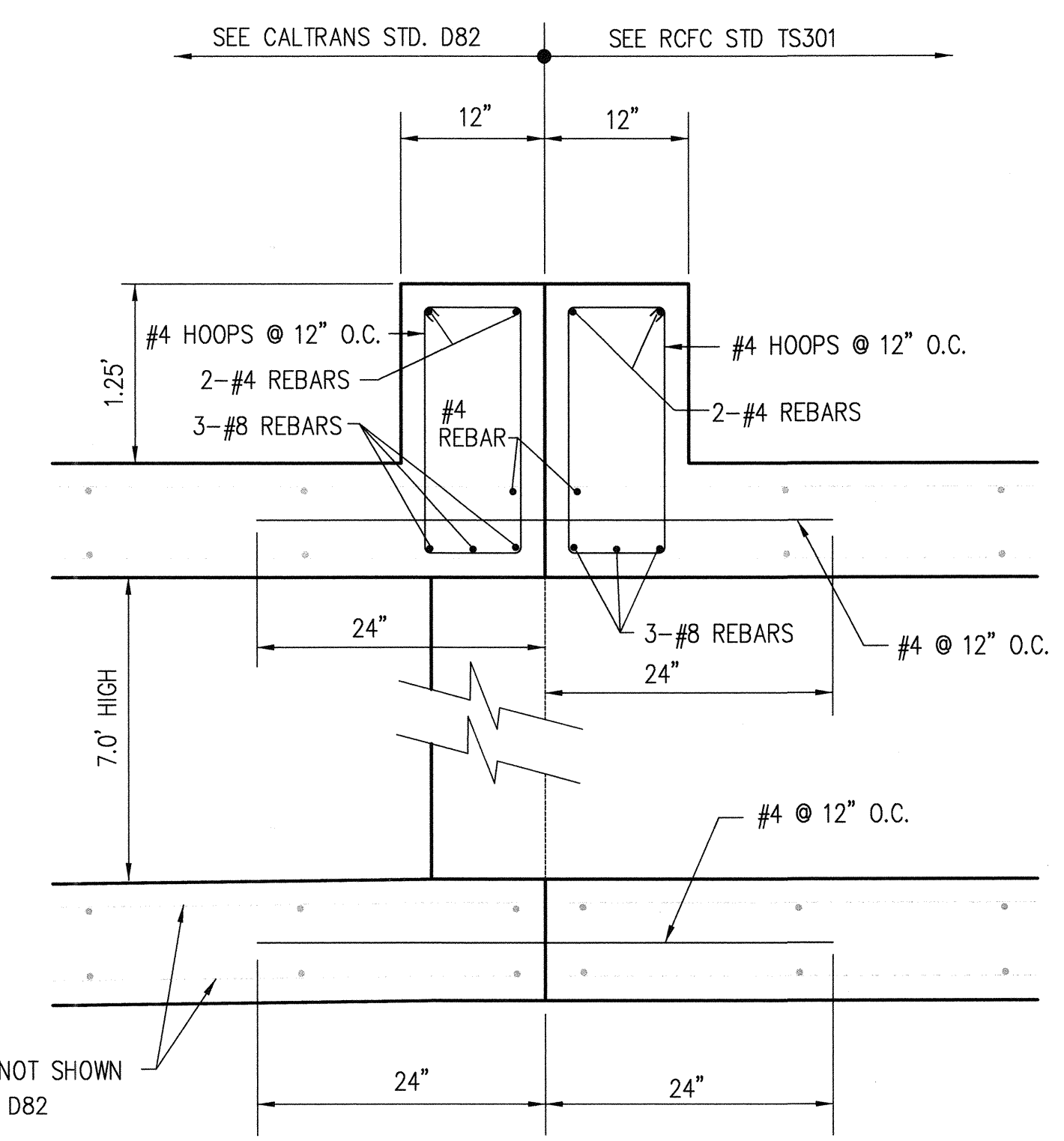
- NOTE:**
1. SEE RIVERSIDE COUNTY FLOOD CONTROL STD DWG. TS301 FOR THE TRANSITION FROM 96" DIA. CIPP TO 8' WIDE X 7' HIGH RCB.
 2. SEE RIVERSIDE COUNTY FLOOD CONTROL STD DWG. TS301 FOR RELATED NOTES FOR THE CONSTRUCTION OF TS301.
 3. USE CALTRANS STD. D82 FOR THE BOX SECTION FOR TS301. (USE VALUES FOR 10' WIDE X 7' HIGH RCB, COVER=10").



- NOTE:**
1. SEE RIVERSIDE COUNTY FLOOD CONTROL STD DWG. TS301 FOR THE TRANSITION FROM 96" DIA. CIPP TO 8' WIDE X 7.0' HIGH RCB.
 2. SEE RIVERSIDE COUNTY FLOOD CONTROL STD DWG. TS301 FOR RELATED NOTES FOR THE CONSTRUCTION OF TS301.
 3. USE CALTRANS STD. D82 FOR THE BOX SECTION FOR TS301. (USE VALUES FOR 10' WIDE X 7' HIGH RCB, COVER=10").



RCB REINFORCING, NOT SHOWN
 SEE CALTRANS STD D82



DETAIL B
 NOT TO SCALE



KCT CONSULTANTS, INC.
 Civil Engineers - Surveyors - Planners
 P.O. Box 5705 Riverside, CA 92517-5705
 4344 Latham St., Suite 200, Riverside, CA 92501
 Phone: 951-341-9949 Fax: 951-341-9945
 e-mail: kctinc@kctconsultants.com

PREPARED UNDER THE SUPERVISION OF:
Teresito N. Tabidlo DATE: 6-10-11
 TERESITO N. TABIDLO, R.C.E. NO. 38826

**CITY OF PERRIS
 ENGINEERING DEPARTMENT**

APPROVED BY: *[Signature]*
 CITY ENGINEER

DATE: 6/10/11 RCE

BENCH MARK: Z-6843
 1 1/2" BRASS DISK AT INT. OF
 RAMONA EXPWY. AND PERRIS
 BOULEVARD.
 ELEVATION=1454.258

REF.	DESCRIPTION	APPR.	DATE

**RIVERSIDE COUNTY FLOOD CONTROL
 AND
 WATER CONSERVATION DISTRICT**

DESIGNED BY: _____
 DRAWN BY: _____
 DATE DRAWN: _____

RECOMMENDED FOR APPROVAL BY:
 CHIEF, DESIGN & CONSTRUCTION
 DATE: _____ RCE NO 30539

APPROVED BY:
 CHIEF ENGINEER
 DATE: _____ RCE NO 32336

**PERRIS VALLEY MDP
 LINE E-3
 STAGE 1**

PROJECT NO.
 DRAWING NO.
 SHEET NO.
 19 OF 20

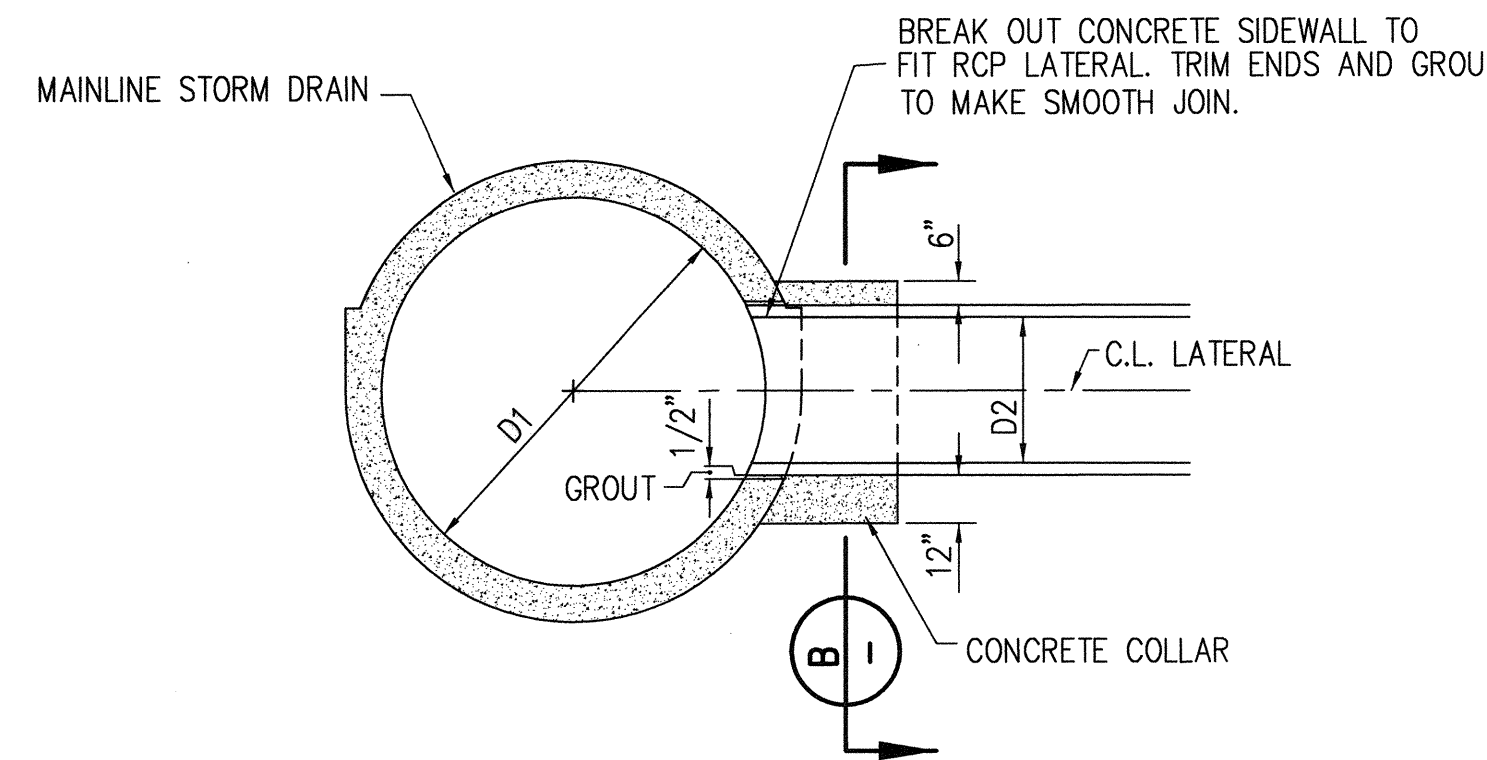
Underground Service Alert

811

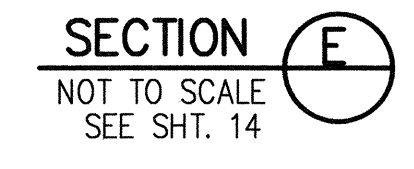
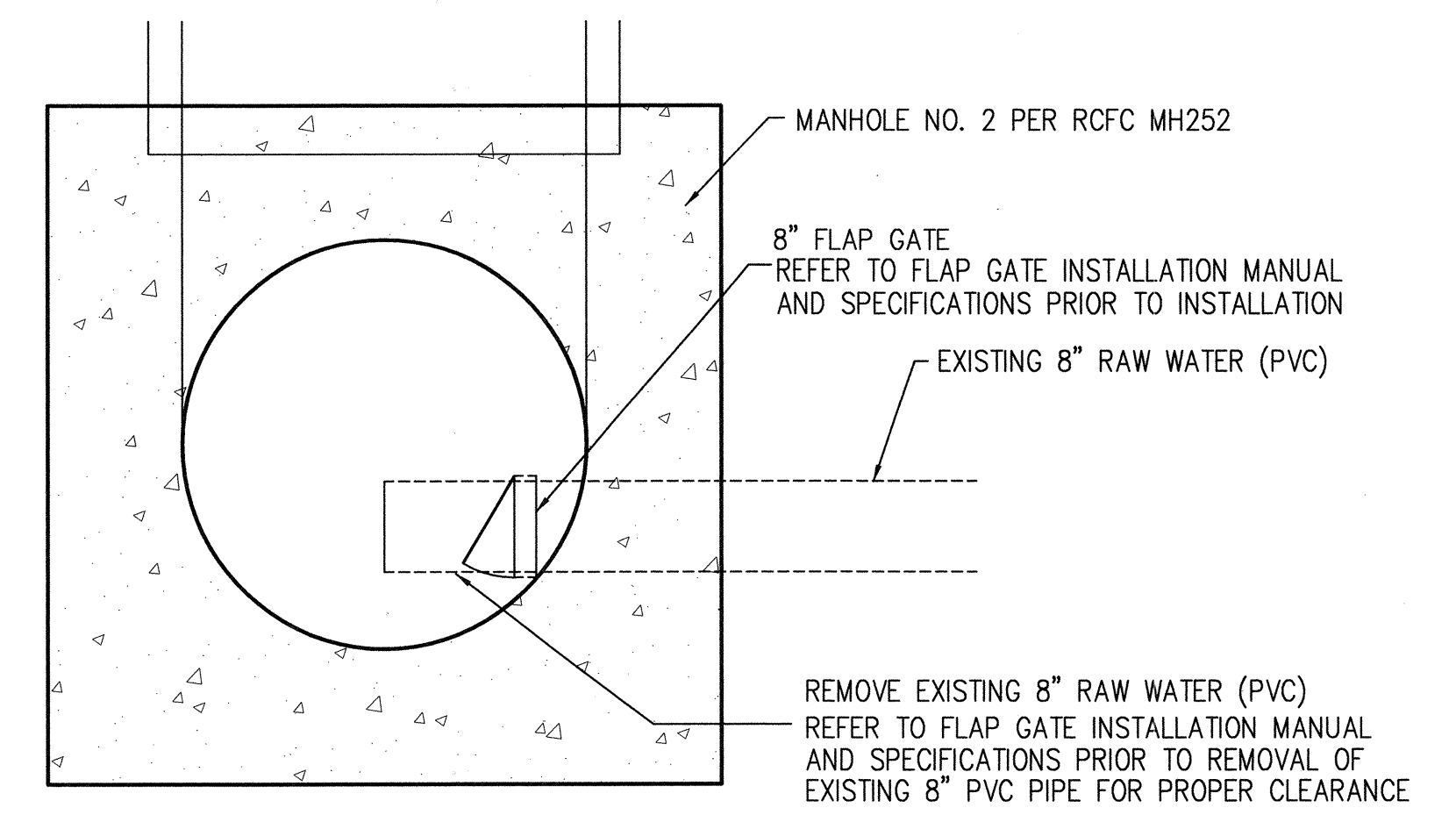
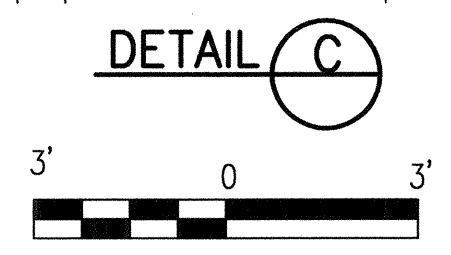
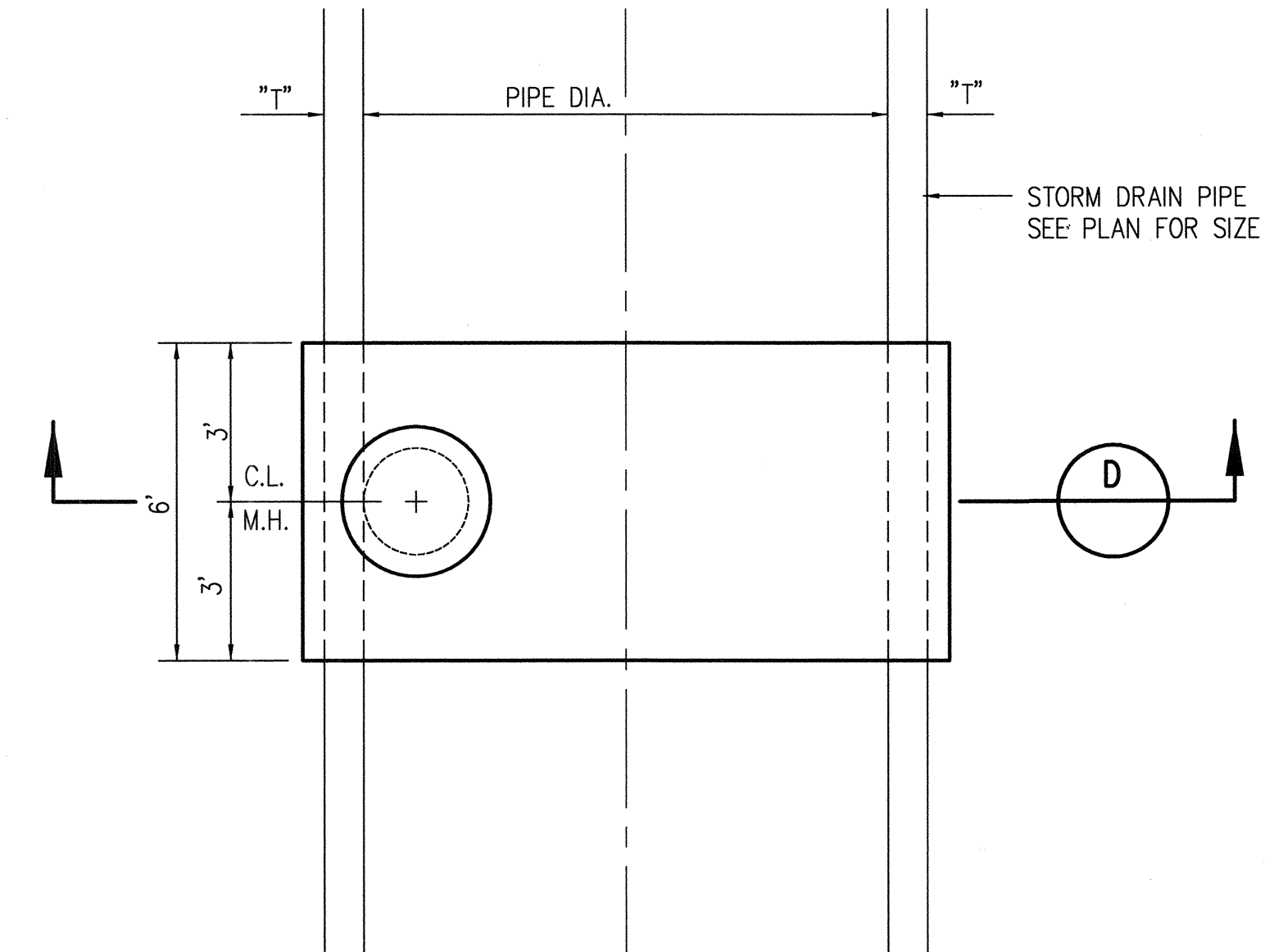
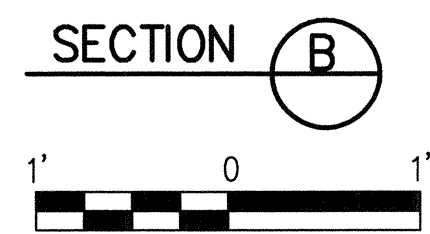
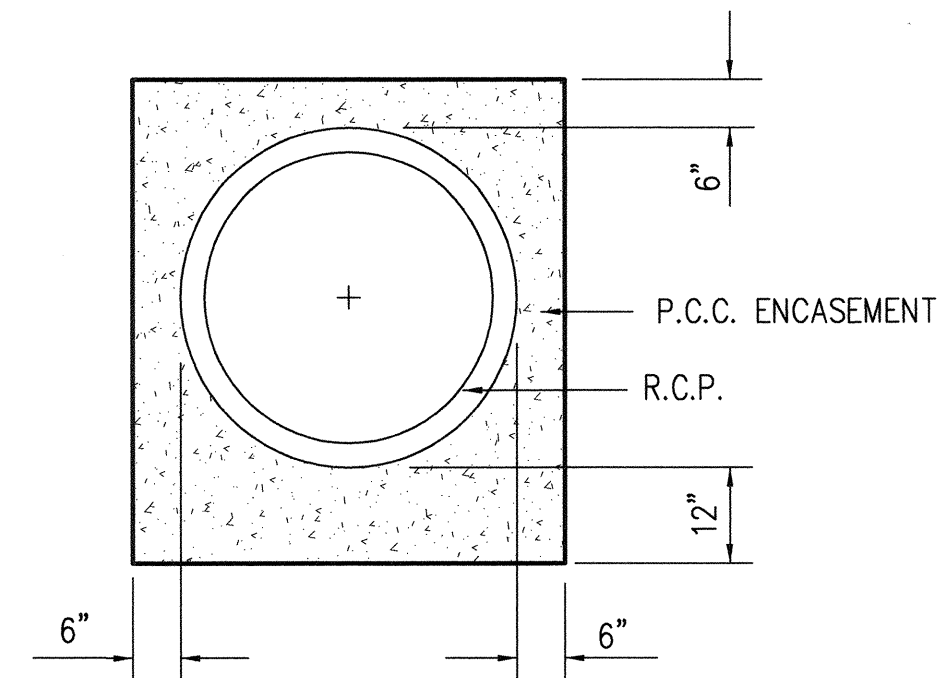
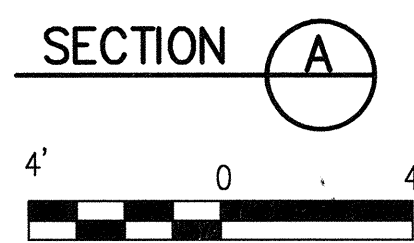
TWO WORKING DAYS BEFORE YOU DIG

CITY OF PERRIS FILE NO.
P8-1164

H:\1886\03 - Indian Avenue\Peris - SD\Eng\Stormdrain\03-ed-indian.dwg
 Plot Date: June 10, 2011 - 11:41am | Terry

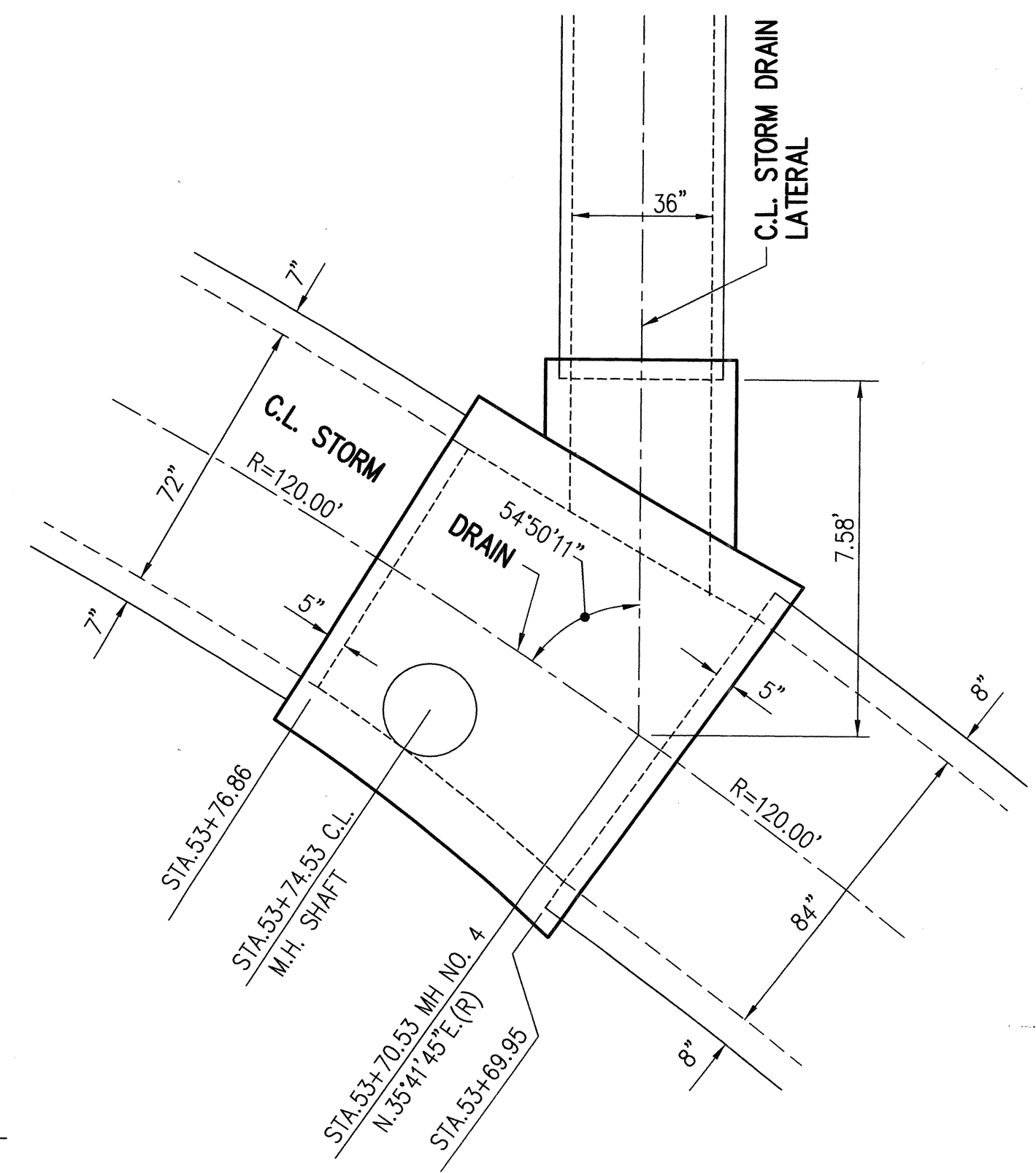
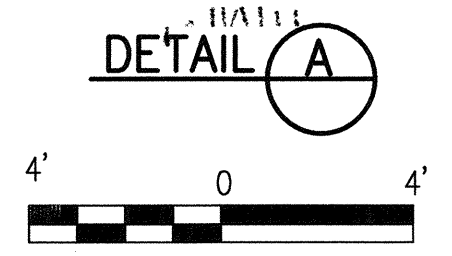
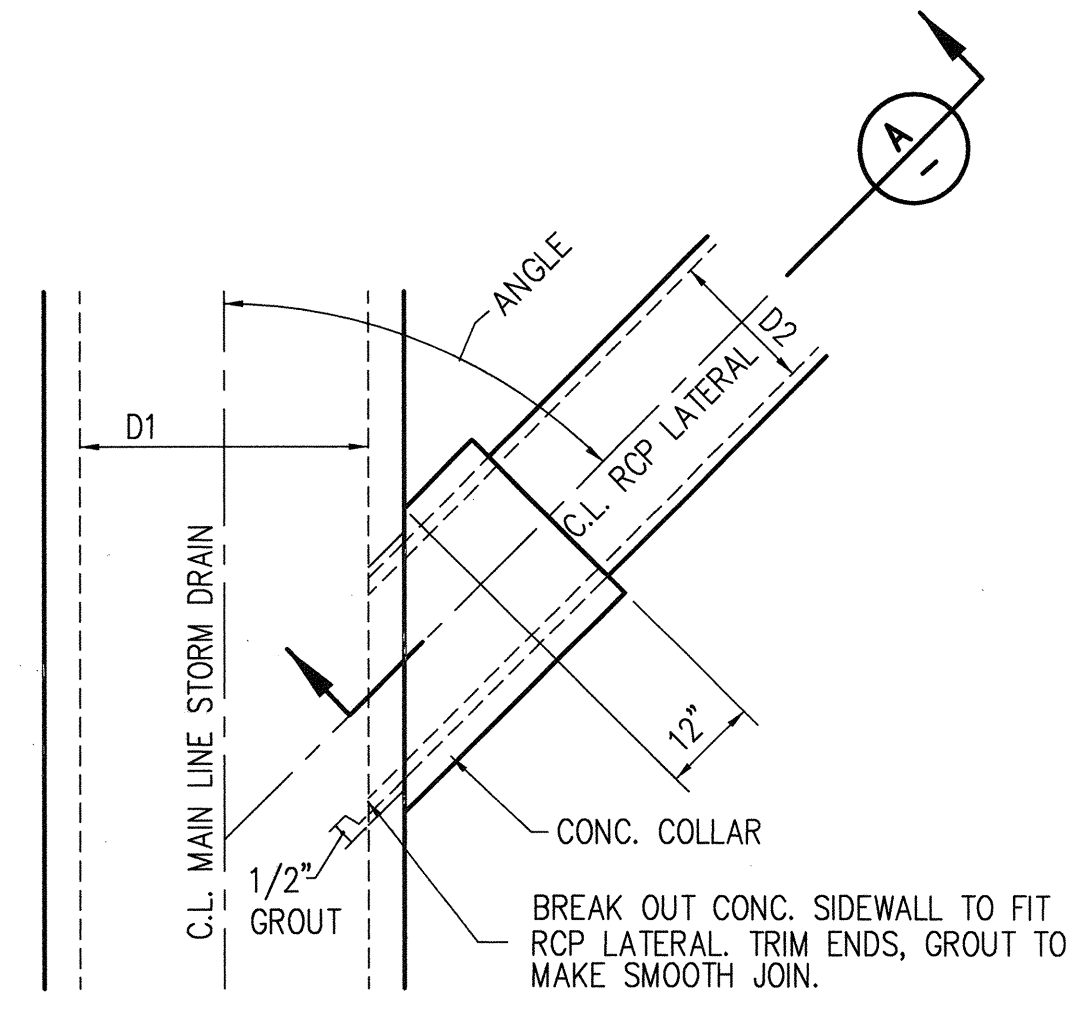


- NOTE:**
- LATERAL SHALL BE JOINED TO CAST-IN-PLACE PIPE WITH AT LEAST 1-8' LONG JOINT OF REINFORCED CONCRETE PIPE.
 - CONCRETE SHALL BE $f'c=4,000$ PSI AT 28 DAYS.
 - LATERAL SIZE SHALL BE LIMITED TO $D2 \leq D1/2$.

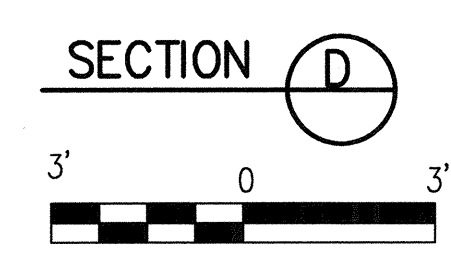
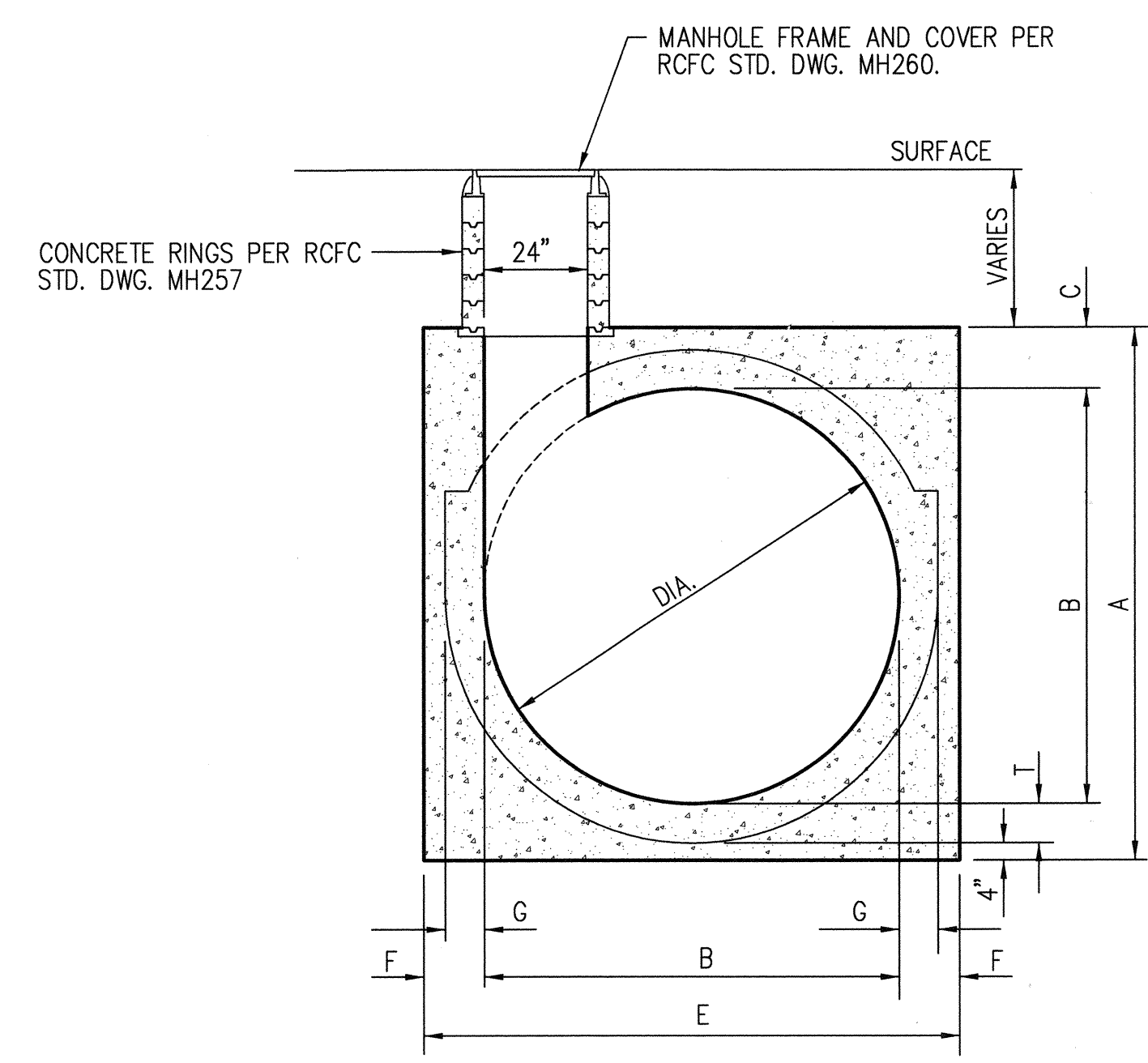
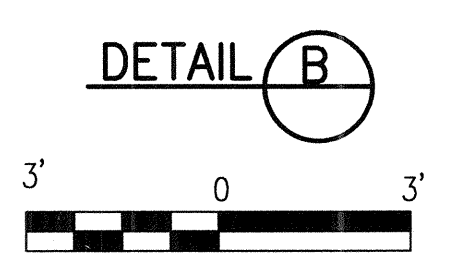


DATA TABLE FOR DETAIL "B" & SECTION "D"

PIPE DIA.	A	B	C	T	E	F	MIN. G
72"	96"	72"	13"	7"	96"	12"	7"
84"	110"	84"	14"	8"	110"	13"	8"
96"	124"	96"	15"	9"	124"	14"	9"



- NOTES FOR DETAIL "B"**
- DETAIL "B" IS FOR GEOMETRICAL INFORMATION ONLY FOR RIVERSIDE COUNTY FLOOD CONTROL MANHOLE NO. 4 STD. MH254.
 - SEE RIVERSIDE COUNTY FLOOD CONTROL MANHOLE NO. 4 STD. MH254 FOR ADDITIONAL DATA, REINFORCEMENT, NOTES, ETC.



KCT CONSULTANTS, INC.
Civil Engineers - Surveyors - Planners
P.O. Box 5705 Riverside, CA 92517-5705
4344 Latham St., Suite 200, Riverside, CA 92501
Phone: 951-541-6940 Fax: 951-541-6945
e-mail: kctinc@kctconsultants.com

PREPARED UNDER THE SUPERVISION OF:
Teresito N. Tabido DATE: 6-18-11
TERESITO N. TABIDO, R.C.E. NO. 38826

CITY OF PERRIS ENGINEERING DEPARTMENT
APPROVED BY: *[Signature]*
CITY ENGINEER
DATE: 6/10/11 RCE

BENCH MARK: Z-6843
1 1/2" BRASS DISK AT INT. OF RAMONA EXPWY. AND PERRIS BOULEVARD.
ELEVATION=1454.258

REF.	DESCRIPTION	APPR	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: _____
DRAWN BY: _____
DATE DRAWN: _____

RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION
DATE: _____ RCE NO 30539

APPROVED BY: CHIEF ENGINEER
DATE: _____ RCE NO 32336

PERRIS VALLEY MDP LINE E-3 STAGE 1

Underground Service Alert
 811
TWO WORKING DAYS BEFORE YOU DIG
CITY OF PERRIS FILE NO. **P8-1164**

PROJECT NO. _____
DRAWING NO. _____
SHEET NO. **20** OF **20**

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Plot Date: June 10, 2011 - 11:38am | Terry