Michael Baker
INTERNATIONAL

PRELIMINARY
HYDROLOGY REPORT

FOR
SARES-REGIS INDUSTRIAL DEVELOPMENT
(SARES-REGIS GROUP)

COUNTY OF RIVERSIDE
CALIFORNIA

July, 2019
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JN 152480

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SECTION 1 - SUMMARY

INTRODUCTION

The purpose of this report is to provide hydrologic analysis for Sares-Regis Group's development of 47.1 acres in the Perris Valley area into a two-building industrial "Site". The Site is bounded by Nandina Avenue to the north, Oleander Avenue to the south, and Decker Road to the east, and grading limits approximately 1800' east of Day Street to the east in a portion of unincorporated Riverside County. The Site is in the center of the larger 136.7 acre hydrologic boundary this report will study. The hydrologic boundaries extend westerly to Day St and 1000' further easterly of Decker Rd. This drainage study is intended to provide:

- Schematically map out the major storm drain infrastructure for the project area
- The County of Riverside has informed us that the storm drain system this site is tributary to is sized to convey 100-year ultimate buildout runoff from the area, but that further down-stream Caltrans has constructed storm drain infrastructure designed to convey only the 10-year runoff rates. Calculations of the 10-year and 100-year existing and proposed runoff rates will be provided. Per County of Riverside comments until Caltrans up-sizes their infrastructure (which we were told is planned for in the future) peak runoff rates for these storm events shall not increase due to development of the site.
- Calculations of the 10-year existing and proposed volume of storm runoff. The County of Riverside has told us that on-site extended detention will be required to prevent an increase in peak runoff rates due to development and the preliminary sizing of detention basins should be equivalent to the difference in runoff volume between the existing and proposed 10-year storm events.
- Show where off-site runoff from natural terrain is intercepted up-stream of the site and released back into natural terrain down-stream of the site
- Show that the Site is adequately protected in the event that all inlets are clogged and where runoff overland relief occurs.
- Show hydraulically that the immediate down-stream infrastructure is sufficiently sized to accept 100-year storm event runoff rates.

EXISTING CONDITIONS
(INFRASTRUCTURE, PEAK RUNOFF RATES, AND TOTAL VOLUME OF STORM RUNOFF)

The project site is currently vacant land with seasonal weeds and rock outcroppings. The project site is located within the San Jacinto River watershed. The site has a natural fall from west to east with three well defined watersheds for analysis. There are no identified USGS "blue lines" crossing the site. The local high point from which off-site flows originate is nearby, approximately 2000' to the west of the site.

Currently the three watersheds are broken up and named based on the storm drain lateral that the watershed is tributary to as follows (see also Preliminary Hydrology Map):

- Watershed B-9AA is 34.7 acres north-west of the intersection of Decker Rd and Harley Knox Blvd. Historically runoff from Watershed B-9AA flowed easterly and per Master Drainage Plan for Perris Valley Area June 1991 was intended to be tributary to storm drain Lateral B-9. Now upon construction of 30" RCP storm drain Lateral B-9AA per Riverside County File No. 964B runoff is picked up in a Decker Rd adjacent 48" riser tributary to storm drain Lateral B-9AA and ultimately Lateral B-9. The existing runoff rates are: Q10=33.67 CFS and Q100=53.35 CFS. Additionally, runoff from Lateral B-9AA2 located on the east side of Decker Rd (Not-A-Part) near Nandina Ave constructed per Riverside County File No. 964B adds 1.90 CFS to the Q100 totaling Q100=55.25 CFS.
  Hydrograph analysis of the 10-year/24-hour storm event shows that the total storm volume is 4.03 acre-feet of runoff.

  Note: Included in the 34.7 acres is 5.6 acres (Sub-areas T and U) of partially offsite area to the north-west of the Site. Historically runoff from this area flowed north of Nandina Ave at the now Decker Rd intersection. Upon construction of Nandina Ave and Decker Rd circa 2017 an 18" culvert was installed per Riverside County As-Built File No. 964B directing runoff north of Nandina Ave to be picked up easterly in 36" RCP storm drain Lateral B-9A (see reference plan in appendix). To be able to compare existing flow rates to proposed flow rates from equal areas it has assumed that the runoff from Sub-areas T and U joins other on-site runoff at the Decker Rd-Nandina Ave intersection. The amount of culvert runoff crossing Nandina Ave is: Q10=6.24 CFS and Q100=9.59 CFS.

  Watershed B-8 is 71.0 acres beginning near the intersection of existing Day St and future Oleander Ave and ends at the future Decker Rd and is tributary to existing 48" RCP storm drain Lateral B-8. Historically runoff from Watershed B-8 flowed easterly and per Master Drainage Plan for Perris Valley Area June 1991 was intended to be tributary to storm drain Lateral B-8. Now upon construction of Harley Knox Blvd to Decker Rd and construction of the extension of Lateral B-8 per Riverside County Drawing No. 4-1060 it is (see appendix for reference plan). The existing runoff rates are: Q10=63.66 CFS and Q100=98.73 CFS.

  Hydrograph analysis of the 10-year/24-hour storm event shows that the total storm volume is 8.25 acre-feet of runoff.

- Watershed B-8A is 31.9 acres zoned for future industrial facility and is tributary to Lateral B-8 as historically intended per Master Drainage Plan for Perris Valley Area June 1991 by way of existing 48" RCP Lateral B-8A. This watershed is outside the area of the development but is analyzed because the project site is tributary to it and because it must be shown that Lateral B-8 is sufficiently sized. The existing runoff rates are: Q10=27.19 CFS and Q100=42.17 CFS.

Note that the runoff rate in the existing Nandina Ave 30" RCP storm drain Lateral B-9AA per the Riverside County File No. 964B plan is by our calculations under-reported at Q100=42.3 CFS; our calculations suggest the actual flow rate is Q100=44.52 CFS.

Note that the runoff rate in the existing 48" RCP storm drain Lateral B-8 per Riverside County Drawing No. 4-1060 is by our calculations over-stated at Q100=182.0 CFS; our calculations suggest the actual flow rate is Q100=140.90 CFS

Summation of Existing Condition Hydrology for the 105.7 acre hydrologic boundary (Watersheds B-9AA and B-8):
10-year runoff volume=12.28 acre-feet
Q10=27.19 CFS
Q100=42.17 CFS.

PROPOSED CONDITIONS
(INFRASTRUCTURE, PEAK RUNOFF RATES, AND TOTAL VOLUME OF STORM RUNOFF

The proposed storm drain system will be made of HDPE or RCP pipe. Off-site flows will not be mixed with on-site flows prior to on-site flows being treated for water quality (see Proposed Condition Hydrology Map). Storm drain pipes will convey runoff to the existing down-stream storm drain systems. Proposed drainage patterns have the intent to respect the tributary drainage areas depicted on the Master Drainage Plan for Perris Valley Area June 1991. Proposed storm drain infrastructure and routing will ensure runoff rates are within the criteria imposed by the County of Riverside.

Street-side catch basins:

The two catch basins proposed on Harley Knox Blvd and the two catch basins on Decker Road southerly of Harley Knox Blvd will convey runoff to Lateral B-8 in Harley Knox Blvd. The three catch basins proposed near the intersection of Nandina Ave and Decker Rd will convey runoff to Lateral B-9AA in Nandina Ave.

Runoff from undeveloped areas tributary to the site:

The 2.8 acre Sub-area HH up-stream and north-west of the Site will be intercepted at an inlet structure near Nandina Ave and conveyed by storm drain pipe in Nandina Ave to Lateral B-9AA.

Runoff from the up-stream 56.2 acres of undeveloped (Portion of Watershed B-8) barren natural land up-stream of the Site will be intercepted by brow-ditches at the western edge grading limit. The runoff will be reintroduced into the existing 48" RCP storm drain Lateral B-8 at the intersection of Harley Knox Blvd.

Most runoff from the undeveloped areas is conveyed within obvious earthen gulleys as concentrated flow. Inlet structures are positioned where concentrated runoff flow occurs. Where runoff from undeveloped areas is conveyed by sheet-flow brow-ditches are proposed to capture runoff. Brow-ditches along the westerly grading limit shall not convey more than 10 CFS of runoff. Hydrologic calculations have shown that the maximum flow-rate expected in any brow-ditch is Q100=3.9 CFS (see Sub-area D on the Proposed Hydrology Map). An access road for maintenance of the drainage inlets and brow-ditches runs the entire westerly edge of the site.

Runoff from undeveloped areas west of the Site flowing northerly across Nandina Ave:

With the extension of Nandina Ave northerly to future Day St runoff is disrupted. Culverts will be constructed under the proposed Nandina Ave roadway to intercept runoff at points of concentration on the southerly side and convey that runoff to the northerly side of Nandina Ave to maintain existing drainage patterns.

2:1 slope at the westerly edge of the Site:

A 2:1 slope is to be cut in the existing bedrock. Geotechnical investigation suggests that the slope will be solid rock. The slope will be treated as Commercial/Industrial cover type for hydologic calculations. Though shown to have terrace drainage, in final engineering it is not expected to exist, because erosion is not expected to occur on the solid rock face. At the bottom of the slope there will be a v-ditch intercepting all runoff that will be conveyed to the on-site storm drain system.

Watershed B-9AA:

Runoff from the 21.3 acre Watershed B-9AA is conveyed to the 30" RCP Lateral B-9AA at the intersection of Nandina Ave and Decker Rd. The proposed runoff rates to that location are Q10=31.35 CFS and Q100=45.25 CFS. Hydrograph analysis of the 10-year/24-hour storm event shows that the total storm volume is 2.63 acre-feet of runoff. Analysis of peak runoff rate and storm volume shows a reduction in both, peak runoff rate and volume, as compared to the existing condition. Underground detention to mitigate for increased flow is not expected to be necessary, but in the event that in final engineering analysis determines differently it will be provided. The proposed hydrology map shows a place holder for underground retention if necessary.

Comparison of existing vs proposed runoff for Watershed B-9AA:
Existing 10-year runoff volume=4.03 acre-feet, Q10=33.67 CFS, Q100=53.35 CFS
Proposed 10-year runoff volume=2.63 acre-feet, Q10=31.35 CFS, Q100=45.25 CFS

Watershed B-8:

Runoff from the 84.8 acre Watershed B-8 is conveyed to the 48" RCP Lateral B-8 that currently terminates easterly of Decker Rd in Harley Knox Blvd. The proposed runoff rates to that location are Q10=90.53 CFS and Q100=135.68 CFS. Hydrograph analysis of the 10-year/24-hour storm event shows that the total storm volume is 10.30 acre-feet of runoff. Analysis of peak runoff rate and storm volume shows an increase in both, peak runoff rate and volume, as compared to the existing condition. Underground detention to mitigate for increased flow will be required. Preliminary sizing of underground detention is based on the difference between the existing 10-year runoff volume and the proposed runoff volume. The proposed hydrology map shows a place holder for preliminarily sized underground retention.

Comparison of existing vs proposed runoff for Watershed B-8:
Existing 10-year runoff volume=8.25 acre-feet, Q10=63.66 CFS, Q100=98.73 CFS
Proposed 10-year runoff volume=10.30 acre-feet, Q10=90.53 CFS, Q100=135.68 CFS

The increased flow rates will be mitigated down to exiting condition flow rates by utilizing underground detention. The required volume of detention to reduce flow rates is equal to the increase in 10-year runoff volume=2.05 acre-feet=89,300 CF. Three locations on-site have been designated for underground storage: 17,000 CF at the south-east corner of the northern building, 47,000 CF at the north-east corner of the southern building, and 26,000 CF at the south-east corner of the southern building; 90,000 CF total.

Through routing of on-site runoff though underground storage the peak runoff rates for Watershed B-8 will be that of the existing condition Q10=63.66 CFS, Q100=98.73 CFS.

Watershed B-8A:

The 31.9 acre undeveloped parcel south-easterly of the Site and east of Decker Rd makes up Watershed B-8A. Flow rates attributed to this watershed are addressed in the existing condition section of this report. Off-site runoff from 71.0 acres of natural terrain will no longer be tributary to Watershed B-8A. The existing infrastructure on that parcel was designed to convey all of its runoff and the runoff from the 71.0 off-site acres. The existing infrastructure is assumed to be sufficiently sized to convey the lower proposed runoff flow rates.

Comparison of existing vs proposed runoff to the existing Watershed B-8A infrastructure:
Existing Q10=90.85 CFS, Q100=140.90 CFS
Proposed Q10=27.19 CFS, Q100=42.17 CFS

Lateral B-8 Runoff Rates:

The total flow tributary to Lateral B-8 is the summation of runoff from Watersheds B-8 (Q10=63.66 CFS, Q100=98.73 CFS) and B-8A (Q10=27.19 CFS, Q100=42.17 CFS) = Q10=90.85 CFS, Q100=140.90 CFS.

HYDRAULICS

Lateral B-9AA, 30" RCP, constructed per Riverside County File No. 964B was designed with a stated Q100=42.3 CFS. The existing plan does not state whether this is its capacity, but appears oversized based on HGL, so normal depth calculations have been performed. The existing and proposed flow rates were used in the analysis. Normal depth calculations show that in the existing condition with Q100=55.25 CFS the 2.50' pipe runs at 2.36' deep when using the minimum pipe slope of 1.5%. Normal depth calculations show that in the proposed condition with Q100=47.15 CFS the 2.50' pipe runs at 1.92' deep when using the minimum pipe slope of 1.5%. The pipe is sufficiently sized to convey the proposed runoff.

Lateral B-8, 48" RCP, constructed per Riverside County Drawing No. 4-1060 was designed to convey Q100=182.0 CFS (see reference plans in appendix). The proposed runoff rate to Lateral B-8 is Q100=140.90 CFS. This is a reduction to 77% of its approved conveyance rate and is therefore considered sufficiently sized.

OVERLAND PROTECTION

Infrastructure and private properties are protected in the event that all catch basin inlets are clogged. An "Overland Relief Map" showing the runoff flow-path in such an event is included in the appendix.

WATER QUALITY

The water treatment and runoff mitigation are not a part of this report; they are outlined in the Preliminary WQMP for this project. For reference though, the Treatment Control BMP for this project is volume-based under-ground retention followed by bio-filtration utilizing Modular Wetlands System.

The routing of runoff through underground retention basins is described below:

- There are 4 areas on-site in which runoff is collected and routed through underground retention basins. The areas are in the same location as the underground storm storage shown on the proposed hydrology map.
- Diversion structures route all first flush/low flow runoff into underground retention basins to capture the required volume of runoff.
- Runoff beyond the required capture volume by-passes the water quality basins and must enter the proposed underground storm detention storage basins as shown on the proposed hydrology map before leaving the site.
- Runoff that enters the water quality basins is metered out into Modular Wetlands System bio-filtration devices.
- The now cleaned runoff is reintroduced to the main storm drain system up-stream of the storm detention basins to be metered out for hydro-modification reasons.

METHODOLOGY

The Rational Method was used to calculate 100-year and 10-year peak storm runoff rates. The Advanced Engineering System (AES) computer program approved for the County of Riverside was utilized for the calculations. Input values/criteria came from the Riverside County Flood Control Hydrology Manual. Rainfall intensity values were obtained from Intensity-Duration Table plate D4.1 located in the Riverside County Flood Control Hydrology Manual for the Perris Valley Area (see appendix). This site is comprised primarily of type BC soils so Type C Soils was used for analysis (see Hydrologic Soils Group Map for Steele Peak Plate C-1.29 in the appendix).

Unit Hydrographs were developed to calculate the total volume of runoff for the 10-year/24 hour storm event. These calculations will be performed in the existing and proposed condition. The difference in total storm runoff volume between existing and proposed condition is a good approximation of the volume of runoff that will be required to be retained on-site to mitigate for an increase in runoff rates due to development.

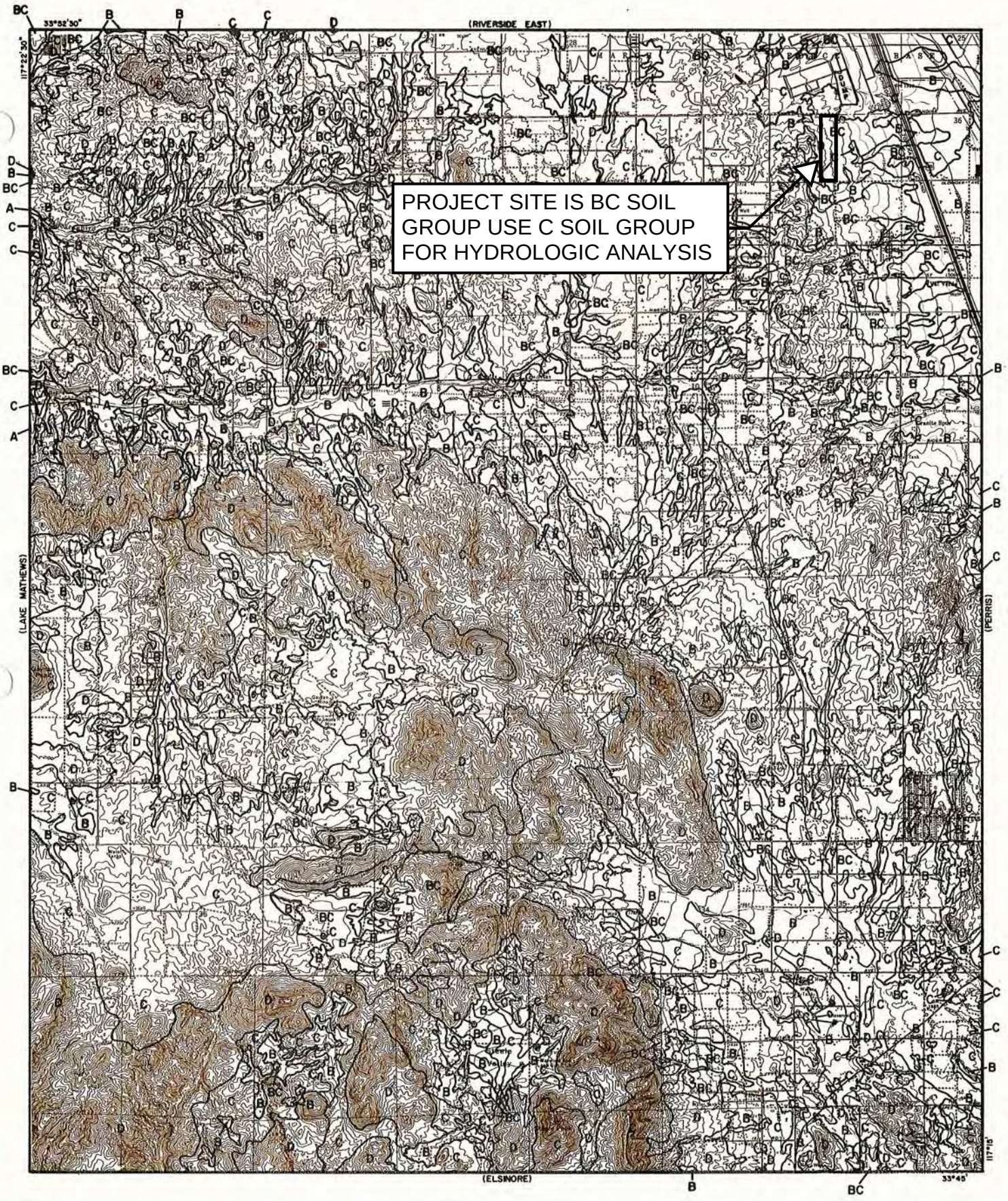
Hydrographs were developed utilizing the Advanced Engineering System (AES) computer program approved for the County of Riverside. Input values/criteria came from the Riverside County Flood Control Hydrology Manual. Precipitation values for the 2-year and 100-year storms came from Isohyetal Maps (Plates E-5.5 and E-5.6 respectively). The 10-year precipitation was derived from the 2-year and 100-year values plotted on Plate E-5.7. Loss rates were determined by Plates E-6.1, E-6.2, and E2.1.

CONCLUSION

This report and associated calculations are based on preliminary engineering. Final engineering of the site will be completed and will incorporate a finalized hydrologic and hydraulic analysis, to be submitted in the future for final approval. Based on the findings in this report, it is concluded that the proposed development can be adequately protected according to the District's requirements in conjunction with the ultimate development and maintenance of the proposed facilities.

This drainage study provided:

- A schematic map of the major storm drain infrastructure for the project area (see the Existing and Proposed Hydrology Maps in the appendix.
- Calculations of the 10-year and 100 year existing and proposed runoff rates reflect an increase in runoff rates that will be mitigated by routing runoff through underground detention facilities sized per the County of Riverside criteria.
- Calculations of the 10-year runoff volume were used to determine preliminary sizing of underground detention facilities to reduce peak runoff rates down to existing condition.
- The plan shows where off-site runoff from natural terrain (westerly portion of the proposed Nandina Ave roadway) is intercepted up-stream of the site and released back into the natural terrain down-stream of the site where it previously flowed.
- Runoff rates are reduced or limited to the existing runoff rates to the tributary storm drain system. Hydraulic calculations show that the existing down-stream storm drain system is sufficiently sized to convey proposed runoff.
- In the unlikely event that every inlet is 100% clogged the Site is protected by overland relief.



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR STEELE PEAK

PLATE C-1.29

RAINFALL INTENSITY—INCHES PER HOUR

MIRA LOMA			MURRIETA - TEMECULA & RANCHO CALIFORNIA			NORCO			PALM SPRINGS			PERRIS VALLEY		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.48	5	3.45	5.10	5	2.77	4.16	5	4.23	6.76	5	2.64	3.78
6	2.58	4.07	6	3.12	4.61	6	2.53	3.79	6	3.80	6.08	6	2.41	3.46
7	2.37	3.75	7	2.87	4.24	7	2.34	3.51	7	3.48	5.56	7	2.24	3.21
8	2.21	3.49	8	2.67	3.94	8	2.19	3.29	8	3.22	5.15	8	2.09	3.01
9	2.08	3.28	9	2.50	3.69	9	2.07	3.10	9	3.01	4.81	9	1.98	2.84
10	1.96	3.10	10	2.36	3.48	10	1.96	2.94	10	2.83	4.52	10	1.88	2.69
11	1.87	2.95	11	2.24	3.30	11	1.87	2.80	11	2.67	4.28	11	1.79	2.57
12	1.78	2.82	12	2.13	3.15	12	1.79	2.68	12	2.54	4.07	12	1.72	2.46
13	1.71	2.70	13	2.04	3.01	13	1.72	2.58	13	2.43	3.88	13	1.65	2.37
14	1.64	2.60	14	1.96	2.89	14	1.66	2.48	14	2.33	3.72	14	1.59	2.29
15	1.58	2.50	15	1.89	2.79	15	1.60	2.40	15	2.23		15	1.54	2.21
16	1.53	2.42	16	1.82	2.69	16	1.55	2.32	16	2.15		16	1.49	2.14
17	1.48	2.34	17	1.76	2.60	17	1.50	2.25	17	2.08		17	1.45	2.08
18	1.44	2.27	18	1.71	2.52	18	1.46	2.19	18	2.01		18	1.41	2.02
19	1.40	2.21	19	1.66	2.45	19	1.42	2.13	19	1.95		19	1.37	1.97
20	1.36	2.15	20	1.61	2.38	20	1.39	2.08	20	1.89		20	1.34	1.92
22	1.29	2.04	22	1.53	2.26	22	1.32	1.98	22	1.79		22	1.28	1.83
24	1.24	1.95	24	1.46	2.15	24	1.26	1.90	24	1.70		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 = .58			SLOPE = .490		

10-MIN VALUES USED

60-MIN VALUES USED

RCFC & WCD

HYDROLOGY MANUAL

STANDARD INTENSITY-DURATION CURVES DATA

PLATE D-4.1 (4 of 6)

MEAD VALLEY INDUSTRIAL PARK
Sub-Areas - Soil Type and Land Use
Parameters for Loss Rate and Hydrograph Development
Proposed Condition

Watershed Number	Area (acres)	Local Subarea		Soil Type	Land Use	Curve Number (CN) AMC II	AMC I	AMC III
B-8	10.8	A		C	Barren	91	80	98
B-8	9.6	B		C	Barren	91	80	98
B-8	10.3	C		C	Barren	91	80	98
B-8	11.0	D		C	Barren	91	80	98
B-8	1.9	E		C	Barren	91	80	98
B-8	2.3	F		C	Barren	91	80	98
B-8	4.0	G		C	Barren	91	80	98
B-8	2.4	H		C	Barren	91	80	98
B-8	0.4	I		C	Barren	91	80	98
B-8	3.5	J		C	Barren	91	80	98
B-8	1.7	K		C	Commercial, Industrial	69	50	86
B-8	2.0	L		C	Commercial, Industrial	69	50	86
B-8	1.4	M		C	Commercial, Industrial	69	50	86
B-8	1.6	N		C	Commercial, Industrial	69	50	86
B-8	3.2	O		C	Commercial, Industrial	69	50	86
B-8	0.9	P		C	Commercial, Industrial	69	50	86
B-8	1.8	Q		C	Commercial, Industrial	69	50	86
B-8	0.9	R		C	Commercial, Industrial	69	50	86
B-8	3.8	S		C	Commercial, Industrial	69	50	86
B-8	1.1	T		C	Commercial, Industrial	69	50	86
B-8	0.6	U		C	Commercial, Industrial	69	50	86
B-8	2.2	V		C	Commercial, Industrial	69	50	86
B-8	3.7	W		C	Commercial, Industrial	69	50	86
B-8	2.2	X		C	Turf, Good	72	53	89
B-8	1.5	Y		C	Commercial, Industrial	69	50	86
B-8A	31.9	Z		C	Barren	91	80	98
B-9AA	2.0	AA		C	Commercial, Industrial	69	50	86
B-9AA	1.7	BB		C	Turf, Good	72	53	89
B-9AA	1.7	CC		C	Commercial, Industrial	69	50	86
B-9AA	2.9	DD		C	Commercial, Industrial	69	50	86
B-9AA	1.4	EE		C	Commercial, Industrial	69	50	86
B-9AA	2.0	FF		C	Commercial, Industrial	69	50	86
B-9AA	4.2	GG		C	Commercial, Industrial	69	50	86
B-9AA	2.8	HH		C	Barren	91	80	98
B-9AA	1.3	II		C	Commercial, Industrial	69	50	86
B-9AA	0.5	JJ		C	Turf, Good	72	53	89
B-9AA	0.8	KK		C	Commercial, Industrial	69	50	86
Total Area	138.0							

WATERSHED B-8 SUMMATION OF DIFFERENT COVER TYPES

Cover Type No.	Area (acres)	Percent of Pervious (%)	Loss Rate Fp (in/hr)	Soil Type	Land Use	Curve Number (CN) AMC II	AMC I	AMC III
1	56.2	100	0.25	C	Barren	91	80	98
2	26.4	10	0.25	C	Commercial, Industrial	69	50	86
3	2.2	85	0.25	C	Turf, Good	72	53	89
Total	84.8							

WATERSHED B-9AA SUMMATION OF DIFFERENT COVER TYPES

Cover Type No.	Area (acres)	Percent of Pervious (%)	Loss Rate Fp (in/hr)	Soil Type	Land Use	Curve Number (CN) AMC II	AMC I	AMC III
1	2.8	100	0.25	C	Barren	91	80	98
2	16.3	10	0.25	C	Commercial, Industrial	69	50	86
3	2.2	85	0.25	C	Turf, Good	72	53	89
Total	21.3							

WATERSHED B-8A SUMMATION OF DIFFERENT COVER TYPES

Cover Type No.	Area (acres)	Percent of Pervious (%)	Loss Rate Fp (in/hr)	Soil Type	Land Use	Curve Number (CN) AMC II	AMC I	AMC III
1	31.9	10	0.25	C	Barren	91	80	98
Total	31.9							

RCFC & WCD SYNTHETIC UNIT HYDROGRAPH METHOD
HYDROLOGY MANUAL
Basic Data Calculation Form
Project WATERSHED B8 EXISTING
By RICK HOWE Date 6/18/19
Checked Date
Sheet

LOSS RATE DATA

AVERAGE ADJUSTED LOSS RATE

[1] SOIL GROUP (PLATE C-1)	[2] COVER TYPE	[3] RI NUMBER (PLATE E-6.1)	[4] PERVIOUS AREA INFILTRATION RATE-IN/HR (PLATE E-6.2)	[5] LAND USE	[6] DECIMAL PERCENT OF AREA IMPERVIOUS (PLATE E-6.3)	[7] ADJUSTED INFILTRATION RATE-IN/HR [4](1-.9[6])	[8] AREA SQ INCHES	[9] [8]/Σ[8]	[10] AVERAGE ADJUSTED INFILTRATION RATE-IN/HR [7]*[9]
C	BARREN	91	0.115	NATURAL	0	0.115	71.0 AC	1	0.115

Σ[8]- 71.0 AC Σ[10]- 0.115

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

F_m = Minimum Loss Rate ≅ F/2 = Σ[10]/2 = 0.0575 IN./HR.

$C = (F - F_m)/54 = (\Sigma[10] - F_m)/54 =$ _____

$F_T = C(24-(T/60))^{1.55} + F_m =$ _____ $(24-(T/60))^{1.55}$ + _____ IN./HR.

Where:

T = Time in minutes. To get an average value for each unit time period, Use T = ½ the unit time for the first time period, T = 1½ unit time for the second period, etc.

10 YEAR/24 HOUR STORM

LAG TIME CALCULATION
(0.8) Tc = (0.8)22.22 min (1 HR / 60 MIN)
= 0.2963 HRS

PLATE E-2.1 (2 of 2)

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD
Basic Data Calculation Form

Project: WATERSHED B9AA EXISTING
By: RICK HOWE Date: 7/1/19
Checked: ________ Date: ________

Sheet

LOSS RATE DATA

AVERAGE ADJUSTED LOSS RATE

[1] SOIL GROUP (PLATE C-1)	[2] COVER TYPE	[3] RI NUMBER (PLATE E-6.1)	[4] PERVIOUS AREA INFILTRATION RATE-IN/HR (PLATE E-6.2)	[5] LAND USE	[6] DECIMAL PERCENT OF AREA IMPERVIOUS (PLATE E-6.3)	[7] ADJUSTED INFILTRATION RATE-IN/HR [4](1-.9[6])	[8] AREA SQ INCHES	[9] [8]/Σ[8]	[10] AVERAGE ADJUSTED INFILTRATION RATE-IN/HR [7]•[9]
C	BARREN	91	0.115	NATURAL	0	0.115	34.7 AC	1	0.115

Σ[8] = 34.7 AC   Σ[10] = 0.115

10 YEAR/24 HOUR STORM

LAG TIME CALCULATION
$(0.8)T_c = (0.8)(17.68\ MIN)\left(\frac{1\ HR}{60\ MIN}\right)$
$= 0.2357$ HRS

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

F_m = Minimum Loss Rate ≅ $F/2 = \Sigma[10]/2 =$ 0.0575 IN./HR.

$C = (F-F_m)/54 = (\Sigma[10]-F_m)/54 =$ ________

$F_T = C(24-(T/60))^{1.55} + F_m =$ ________ $(24-(T/60))^{1.55} +$ ________ IN./HR.

Where:

T = Time in minutes. To get an average value for each unit time period, Use $T=\frac{1}{2}$ the unit time for the first time period, $T=1\frac{1}{2}$ unit time for the second period, etc.

RCFC & WCD HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD

Basic Data Calculation Form

Project: WATERSHED B8 PROPOSED

By: RICK HOWE Date: 7/1/19

Checked: ______ Date: ______

Sheet

LOSS RATE DATA

AVERAGE ADJUSTED LOSS RATE

[1] SOIL GROUP (PLATE C-1)	[2] COVER TYPE	[3] RI NUMBER (PLATE E-6.1)	[4] PERVIOUS AREA INFILTRATION RATE-IN/HR (PLATE E-6.2)	[5] LAND USE	[6] DECIMAL PERCENT OF AREA IMPERVIOUS (PLATE E-6.3)	[7] ADJUSTED INFILTRATION RATE-IN/HR [4](1-.9[6])	[8] AREA SQ INCHES	[9] [8]/Σ[8]	[10] AVERAGE ADJUSTED INFILTRATION RATE-IN/HR [7]•[9]
C	BARREN	91	0.115	NATURAL	0	0.115	56.2 AC	0.663	0.0759
C	URBAN	69	0.372	COMM/IND	0.90	0.0707	26.4 AC	0.311	0.0220
C	URBAN	72	0.340	LANDSCAPE	0	0.340	2.2 AC	0.026	0.0088

Σ[8]- 84.8 AC Σ[10]- 0.1067

USE 0.107

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

F_m = Minimum Loss Rate $\cong F/2 = \Sigma[10]/2 =$ 0.0535 IN./HR.

$C = (F-F_m)/54 = (\Sigma[10]-F_m)/54 =$ ______

$F_T = C(24-(T/60))^{1.55} + F_m =$ ______ $(24-(T/60))^{1.55} +$ ______ IN./HR.

Where:

T = Time in minutes. To get an average value for each unit time period, Use $T = \frac{1}{2}$ the unit time for the first time period, $T = 1\frac{1}{2}$ unit time for the second period, etc.

10 YR/24 HR STORM

LAG TIME CALC

$LT = 0.8\ T_c$

$= (0.8)(19.38)\left(\frac{1\ HR}{60\ m}\right)$

$= 0.2584$ HRS

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HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD
Basic Data Calculation Form

Project: WATERSHED B9AA PROPOSED
Sheet
By: RICK HOWG Date: 7/1/19
Checked: ____ Date: ____

LOSS RATE DATA

AVERAGE ADJUSTED LOSS RATE

[1] SOIL GROUP (PLATE C-1)	[2] COVER TYPE	[3] RI NUMBER (PLATE E-6.1)	[4] PERVIOUS AREA INFILTRATION RATE-IN/HR (PLATE E-6.2)	[5] LAND USE	[6] DECIMAL PERCENT OF AREA IMPERVIOUS (PLATE E-6.3)	[7] ADJUSTED INFILTRATION RATE-IN/HR [4][1-.9[6]]	[8] AREA SQ INCHES	[9] [8]/Σ[8]	[10] AVERAGE ADJUSTED INFILTRATION RATE-IN/HR [7]•[9]
C	BARREN	91	0.115	NATURAL	0	0.115	2.8 AC	0.131	0.0151
C	URBAN	69	0.372	COMM/IND	0.90	0.0707	16.3 AC	0.765	0.0541
C	URBAN	72	0.340	LANDSCAPE	0	0.340	2.2 AC	0.103	0.0350
							Σ[8]- 21.3 AC		Σ[10]- 0.1042

USE 0.104

10 YEAR/24 HR STORM

LAG TIME CALC

$LT = 0.8\,T_c$

$= (0.8)(13.03\,min)\left(\frac{1\,HR}{60\,m}\right)$

$= 0.1737$ HRS

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

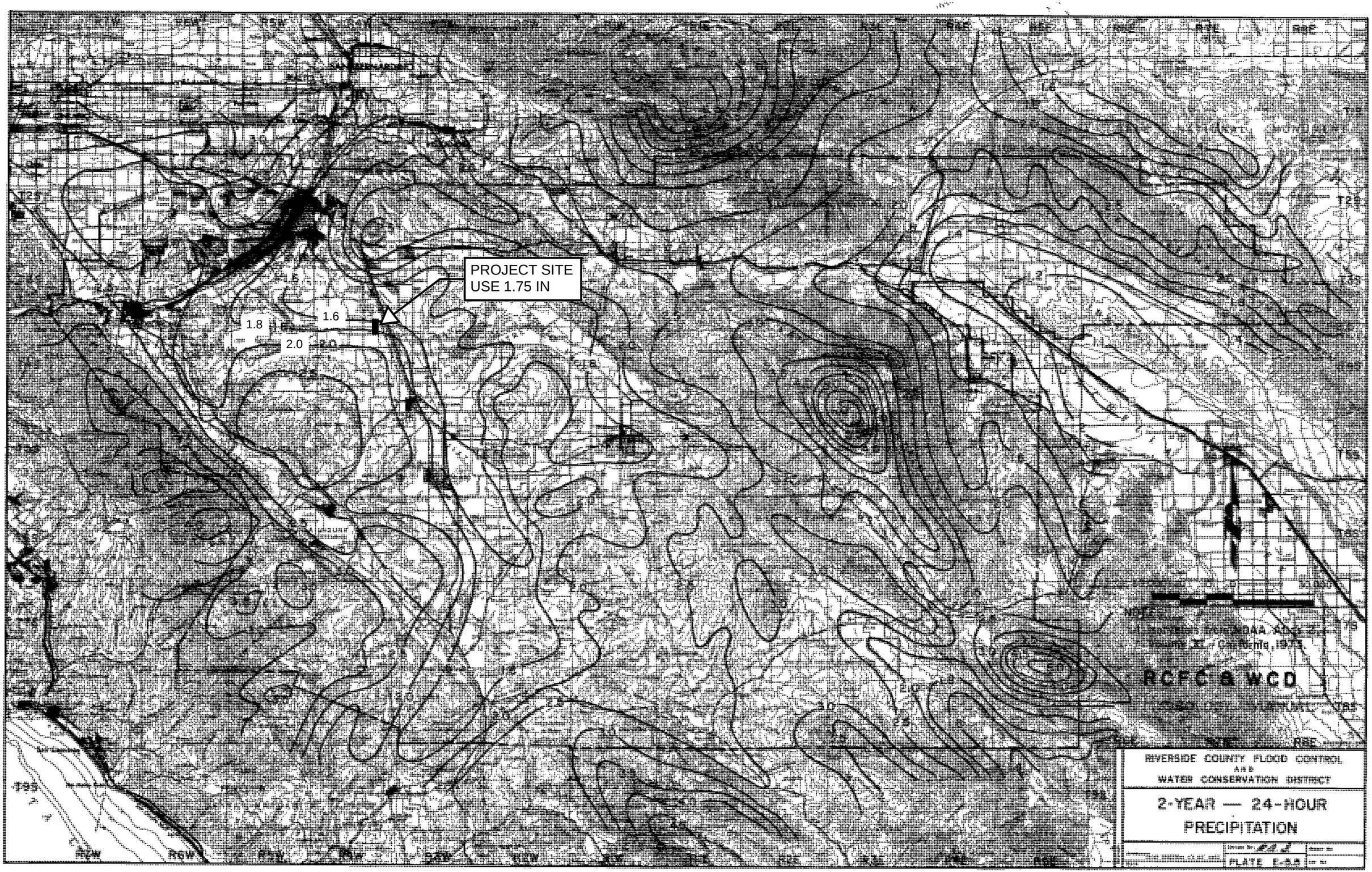
F_m = Minimum Loss Rate $\cong F/2 = \Sigma[10]/2 =$ 0.052 IN./HR.

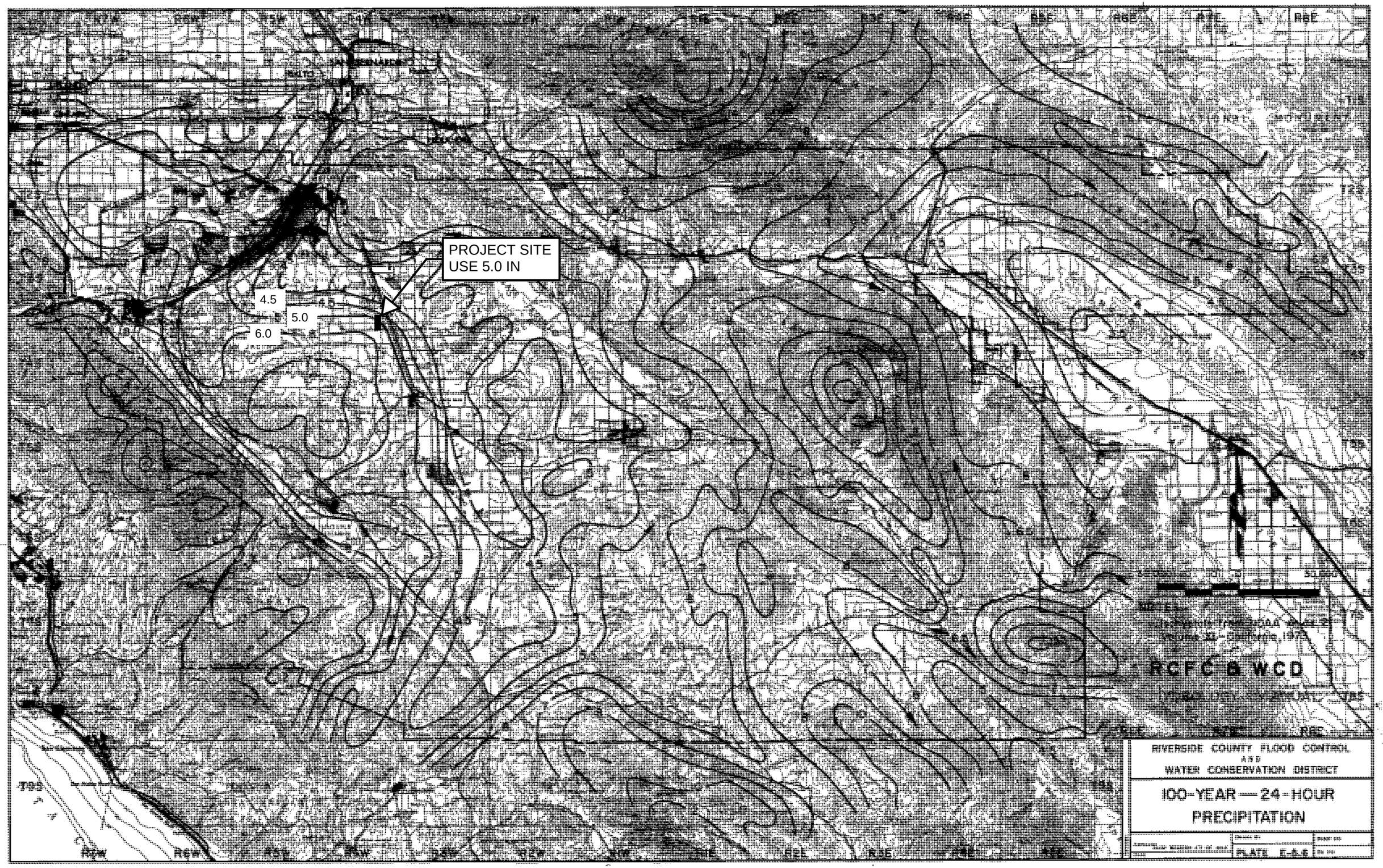
$C = (F-F_m)/54 = (\Sigma[10] - F_m)/54 =$ ____

$F_T = C(24-(T/60))^{1.55} + F_m =$ ____ $(24-(T/60))^{1.55} +$ ____ IN./HR.

Where:

T = Time in minutes. To get an average value for each unit time period, Use $T=\frac{1}{2}$ the unit time for the first time period, $T=1\frac{1}{2}$ unit time for the second period, etc.


PROJECT SITE
USE 1.75 IN
1.6
1.8
2.0
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume X, California, 1973.
RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
PLATE E-6.8


PROJECT SITE
USE 5.0 IN
4.5
5.0
6.0
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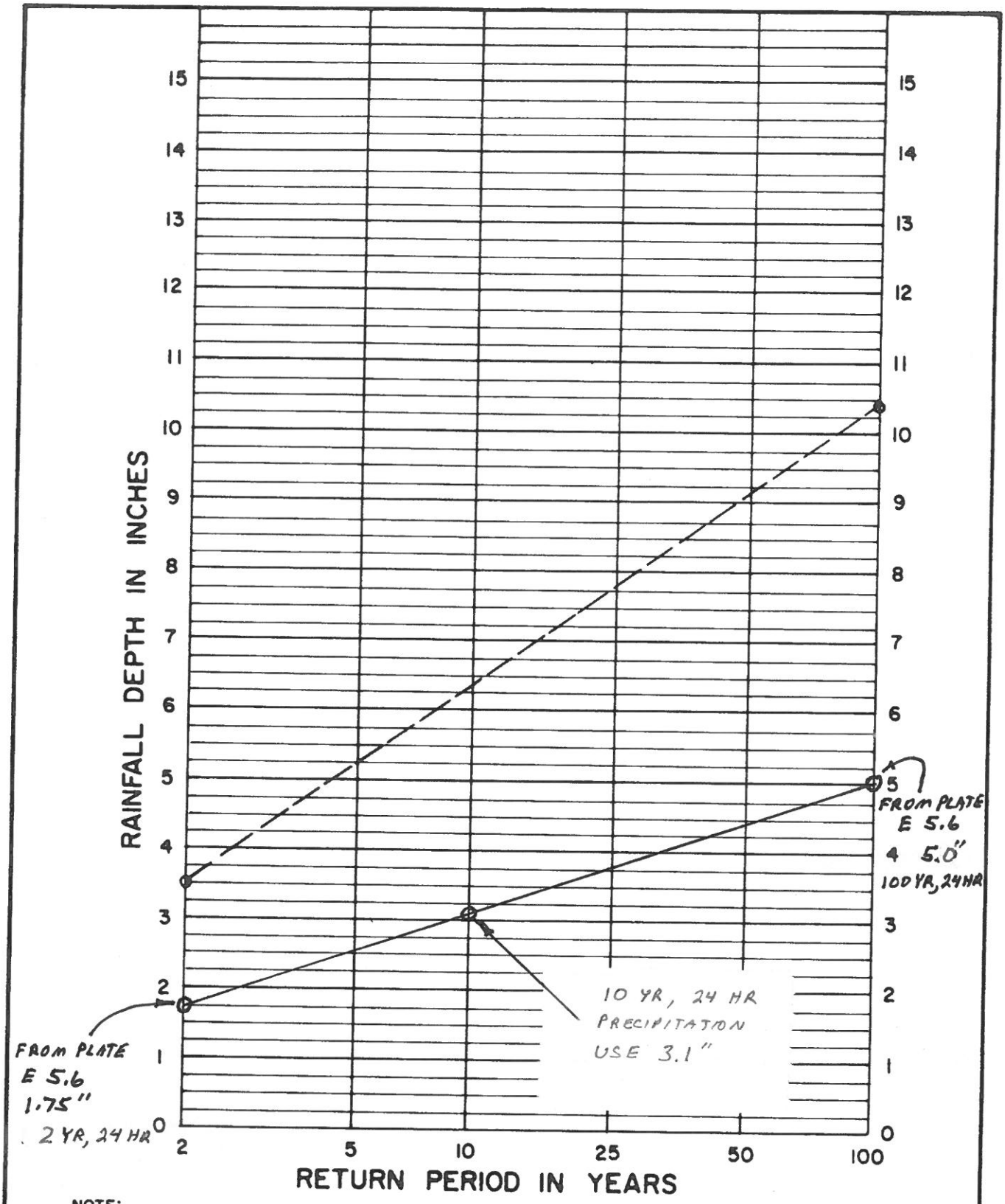
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION
PLATE E-6.6



NOTE:

1. For intermediate return periods plot 2-year and 100-year values from maps for a specific duration, then connect points and read value for desired return period. For example given 2-year 24-hour = 3.50" and 100-year 24-hour = 10.40", 25-year 24-hour = 7.80"

Reference: NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD

HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

PLATE E-5.7

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (LARGE LANDSCAPED AREAS) (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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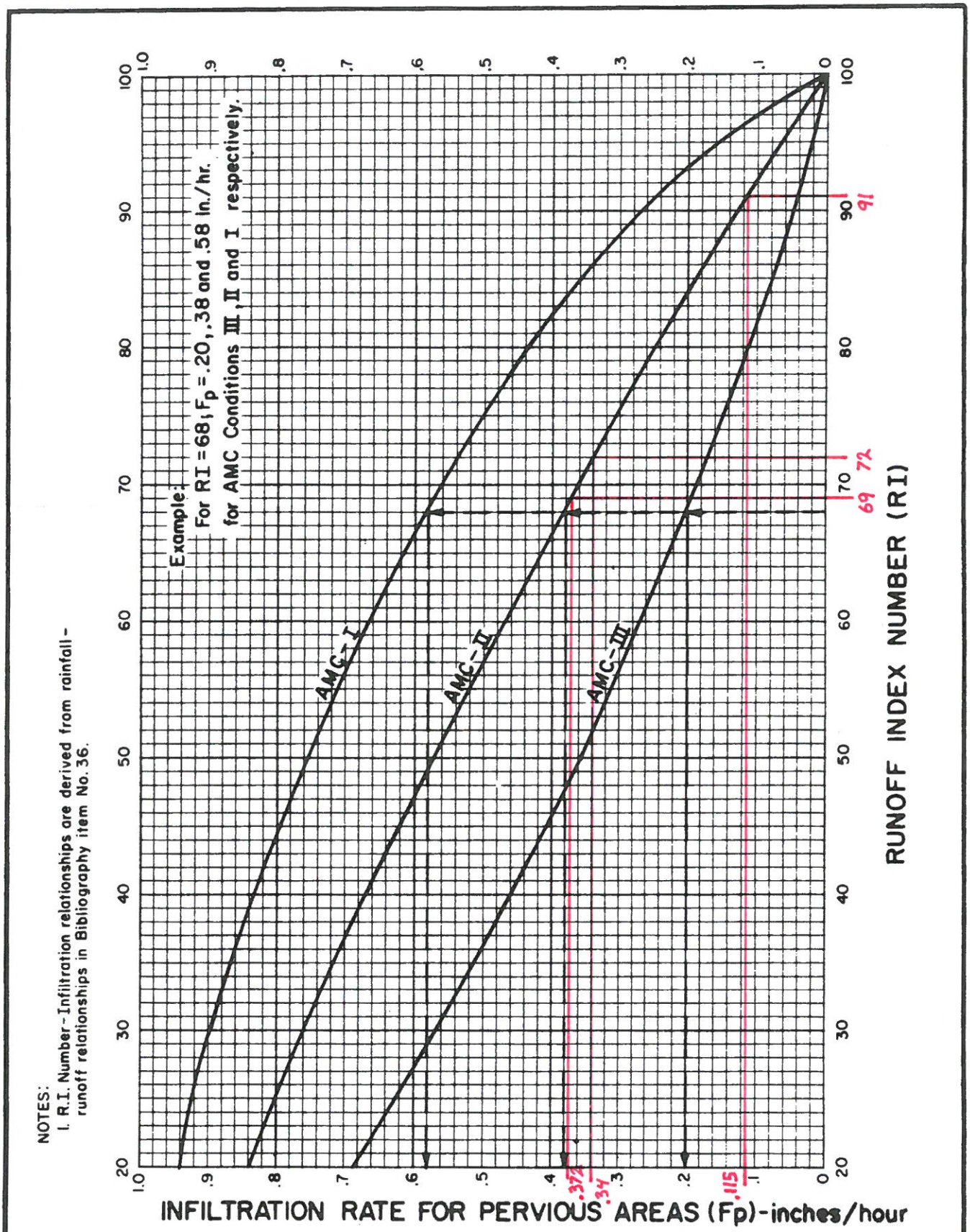
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

PLATE E-6.1 (1 of 2)



NOTES:
1. R.I. Number - Infiltration relationships are derived from rainfall - runoff relationships in Bibliography item No. 36.

RCFC & WCD

HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2

```
******************************************************************************
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:



------------------------------------------------------------------------------
  TIME/DATE OF STUDY: 14:20 07/05/2019
==============================================================================
 Problem Descriptions:
  Existing Condition Lateral B-9AA


******************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
------------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =   2.500
    PIPE SLOPE(FEET/FEET) =  0.0150
    PIPEFLOW(CFS) =        55.25
    MANNINGS FRICTION FACTOR = 0.013000
==============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------------
    CRITICAL DEPTH(FEET) =      2.36
    CRITICAL FLOW AREA(SQUARE FEET) =     4.796
    CRITICAL FLOW TOP-WIDTH(FEET) =   1.164
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =         1573.53
    CRITICAL FLOW VELOCITY(FEET/SEC.) =    11.520
    CRITICAL FLOW VELOCITY HEAD(FEET) =            2.06
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      4.12
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =            4.42
    ==>NORMAL PIPEFLOW IS PRESSURE FLOW
==============================================================================
```

```
******************************************************************************
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:



------------------------------------------------------------------------------
  TIME/DATE OF STUDY: 14:22 07/05/2019
==============================================================================
 Problem Descriptions:
  Proposed Lateral B-9AA


******************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
------------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =   2.500
    PIPE SLOPE(FEET/FEET) =  0.0150
    PIPEFLOW(CFS) =        47.15
    MANNINGS FRICTION FACTOR = 0.013000
==============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------------
    CRITICAL DEPTH(FEET) =      2.26
    CRITICAL FLOW AREA(SQUARE FEET) =     4.668
    CRITICAL FLOW TOP-WIDTH(FEET) =   1.473
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =         1234.36
    CRITICAL FLOW VELOCITY(FEET/SEC.) =    10.101
    CRITICAL FLOW VELOCITY HEAD(FEET) =            1.58
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      3.17
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =             3.84
==============================================================================
    NORMAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =      1.92
    FLOW AREA(SQUARE FEET) =      4.05
    FLOW TOP-WIDTH(FEET) =     2.106
    FLOW PRESSURE + MOMENTUM(POUNDS) =         1282.31
    FLOW VELOCITY(FEET/SEC.) =          11.634
    FLOW VELOCITY HEAD(FEET) =           2.102
    HYDRAULIC DEPTH(FEET) =      1.92
    FROUDE NUMBER =     1.478
    SPECIFIC ENERGY(FEET) =            4.03
==============================================================================
```

```
******************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                              *
* PRELIMINARY EXISTING CONDITION RATIONAL METHOD HYDROLOGY                *
* 10 YEAR STORM EVENT FOR WATERSHED B-8                                  *
 ************************************************************************

  FILE NAME: E10_B8.DAT
  TIME/DATE OF STUDY: 11:46 06/18/2019
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.788
  SLOPE OF INTENSITY DURATION CURVE = 0.4910
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

******************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
```



```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   980.00
  UPSTREAM ELEVATION(FEET) =   1715.00
  DOWNSTREAM ELEVATION(FEET) =   1670.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.533*[(  980.00**3)/(    45.00)]**.2 =   15.506
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.531
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6469
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     10.70
  TOTAL AREA(ACRES) =     10.80   TOTAL RUNOFF(CFS) =     10.70

******************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  91
------------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0350
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.428
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6340
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.03
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   17.88
  SUBAREA AREA(ACRES) =    8.50       SUBAREA RUNOFF(CFS) =    7.69
  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      18.39

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
        DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   7.03   DEPTH*VELOCITY(FT*FT/SEC) =   8.44
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =    1980.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  91
------------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0360
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1070.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.339
```

```
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6218
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     21.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.13
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.50   Tc(MIN.) =   20.38
  SUBAREA AREA(ACRES) =    7.70       SUBAREA RUNOFF(CFS) =    6.41
  TOTAL AREA(ACRES) =       27.0         PEAK FLOW RATE(CFS) =      24.80

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   7.13   DEPTH*VELOCITY(FT*FT/SEC) =   8.56
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    803.00 =    3050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    804.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0090
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.80
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   21.07
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    804.00 =    3380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    804.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.07
  RAINFALL INTENSITY(INCH/HR) =   1.32
  TOTAL STREAM AREA(ACRES) =    27.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.80

****************************************************************************
  FLOW PROCESS FROM NODE    805.00 TO NODE    806.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1733.00
  DOWNSTREAM ELEVATION(FEET) =   1663.00
  ELEVATION DIFFERENCE(FEET) =     70.00
  TC = 0.533*[( 1000.00**3)/(    70.00)]**.2 =   14.368
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.589
```



```
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6536
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     10.70
  TOTAL AREA(ACRES) =     10.30   TOTAL RUNOFF(CFS) =     10.70

****************************************************************************
  FLOW PROCESS FROM NODE    806.00 TO NODE    807.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0400
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.481
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6408
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.52
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   16.58
  SUBAREA AREA(ACRES) =   10.10       SUBAREA RUNOFF(CFS) =    9.59
  TOTAL AREA(ACRES) =       20.4         PEAK FLOW RATE(CFS) =      20.29

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   7.52   DEPTH*VELOCITY(FT*FT/SEC) =   9.02
  LONGEST FLOWPATH FROM NODE    805.00 TO NODE    807.00 =    2000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    807.00 TO NODE    804.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0410
  CHANNEL LENGTH THRU SUBAREA(FEET) =   740.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.415
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6323
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     25.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.61
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =   18.20
  SUBAREA AREA(ACRES) =   10.60       SUBAREA RUNOFF(CFS) =    9.48
  TOTAL AREA(ACRES) =       31.0         PEAK FLOW RATE(CFS) =      29.77

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]
```

```
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   7.61   DEPTH*VELOCITY(FT*FT/SEC) =   9.13
  LONGEST FLOWPATH FROM NODE    805.00 TO NODE    804.00 =    2740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    804.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.20
  RAINFALL INTENSITY(INCH/HR) =   1.41
  TOTAL STREAM AREA(ACRES) =    31.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.77

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.80    21.07        1.317         27.00
      2       29.77    18.20        1.415         31.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       51.20    18.20       1.415
      2       52.51    21.07       1.317

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.51   Tc(MIN.) =   21.07
  TOTAL AREA(ACRES) =       58.0
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    804.00 =    3380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0090
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.57
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.51
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   22.22
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    4040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```



```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.22
  RAINFALL INTENSITY(INCH/HR) =   1.28
  TOTAL STREAM AREA(ACRES) =    58.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     52.51

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    810.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1718.00
  DOWNSTREAM ELEVATION(FEET) =   1610.00
  ELEVATION DIFFERENCE(FEET) =    108.00
  TC = 0.533*[( 1000.00**3)/(   108.00)]**.2 =   13.174
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.658
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6612
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.13
  TOTAL AREA(ACRES) =      6.50   TOTAL RUNOFF(CFS) =      7.13

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    808.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0680
  CHANNEL LENGTH THRU SUBAREA(FEET) =   340.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.609
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6558
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.79
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =   14.01
  SUBAREA AREA(ACRES) =    6.50       SUBAREA RUNOFF(CFS) =    6.86
  TOTAL AREA(ACRES) =       13.0         PEAK FLOW RATE(CFS) =      13.99

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   9.80   DEPTH*VELOCITY(FT*FT/SEC) =  11.76
  LONGEST FLOWPATH FROM NODE    809.00 TO NODE    808.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.01
  RAINFALL INTENSITY(INCH/HR) =   1.61
  TOTAL STREAM AREA(ACRES) =    13.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.99

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       51.20    19.36        1.373         58.00
      1       52.51    22.22        1.283         58.00
      2       13.99    14.01        1.609         13.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       51.04    14.01       1.609
      2       63.13    19.36       1.373
      3       63.66    22.22       1.283

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.66   Tc(MIN.) =   22.22
  TOTAL AREA(ACRES) =       71.0
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    4040.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       71.0  TC(MIN.) =     22.22
  PEAK FLOW RATE(CFS)   =      63.66
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       51.04      14.01
  2       63.13      19.36
  3       63.66      22.22
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* OLEANDER BUSINESS PARK                                                 *
* PRELIMINARY EXISTING CONDITION RATIONAL METHOD HYDROLOGY               *
* 10 YEAR STORM EVENT FOR WATERSHED B-8A                                 *
 ************************************************************************

  FILE NAME: E10_B8A.DAT
  TIME/DATE OF STUDY: 07:16 03/01/2019
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.788
  SLOPE OF INTENSITY DURATION CURVE = 0.4910
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

******************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    813.00 IS CODE =  21
```



```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1640.00
  UPSTREAM ELEVATION(FEET) =   1595.00
  DOWNSTREAM ELEVATION(FEET) =   1556.00
  ELEVATION DIFFERENCE(FEET) =     39.00
  TC = 0.533*[( 1640.00**3)/(    39.00)]**.2 =   21.732
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.297
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6157
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.03
  TOTAL AREA(ACRES) =      3.80   TOTAL RUNOFF(CFS) =      3.03

******************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    814.00 IS CODE =  91
------------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0120
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.255
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6092
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.85
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   23.25
  SUBAREA AREA(ACRES) =    5.00       SUBAREA RUNOFF(CFS) =    3.82
  TOTAL AREA(ACRES) =        8.8         PEAK FLOW RATE(CFS) =       6.86

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
        DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   4.12   DEPTH*VELOCITY(FT*FT/SEC) =   4.94
  LONGEST FLOWPATH FROM NODE    812.00 TO NODE    814.00 =    1900.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    815.00 TO NODE    815.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   23.25
  RAINFALL INTENSITY(INCH/HR) =   1.25
  TOTAL STREAM AREA(ACRES) =     8.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.86
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    816.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   530.00
  UPSTREAM ELEVATION(FEET) =   1596.00
  DOWNSTREAM ELEVATION(FEET) =   1575.00
  ELEVATION DIFFERENCE(FEET) =     21.00
  TC = 0.533*[(  530.00**3)/(    21.00)]**.2 =   12.489
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.703
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6658
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.78
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      5.78

****************************************************************************
  FLOW PROCESS FROM NODE    816.00 TO NODE    815.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0340
  CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.599
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6547
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.93
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =   14.20
  SUBAREA AREA(ACRES) =   10.10       SUBAREA RUNOFF(CFS) =   10.57
  TOTAL AREA(ACRES) =       15.2         PEAK FLOW RATE(CFS) =      16.35

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   6.93   DEPTH*VELOCITY(FT*FT/SEC) =   8.32
  LONGEST FLOWPATH FROM NODE    803.00 TO NODE    815.00 =    1240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    815.00 TO NODE    815.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.20
  RAINFALL INTENSITY(INCH/HR) =   1.60
```



```
  TOTAL STREAM AREA(ACRES) =    15.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.35

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.86    23.25        1.255          8.80
      2       16.35    14.20        1.599         15.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       20.54    14.20       1.599
      2       19.69    23.25       1.255

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.54   Tc(MIN.) =   14.20
  TOTAL AREA(ACRES) =       24.0
  LONGEST FLOWPATH FROM NODE    812.00 TO NODE    815.00 =    1900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    815.00 TO NODE    811.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0066
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.54
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   15.43
  LONGEST FLOWPATH FROM NODE    812.00 TO NODE    811.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    811.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.43
  RAINFALL INTENSITY(INCH/HR) =   1.53
  TOTAL STREAM AREA(ACRES) =    24.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.54

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    817.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   730.00
  UPSTREAM ELEVATION(FEET) =   1593.00
  DOWNSTREAM ELEVATION(FEET) =   1572.00
  ELEVATION DIFFERENCE(FEET) =     21.00
  TC = 0.533*[(  730.00**3)/(    21.00)]**.2 =   15.134
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.549
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6490
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.02
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =      3.02

****************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    818.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0260
  CHANNEL LENGTH THRU SUBAREA(FEET) =   410.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.473
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6399
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.20
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =   16.76
  SUBAREA AREA(ACRES) =    4.90       SUBAREA RUNOFF(CFS) =    4.62
  TOTAL AREA(ACRES) =        7.9         PEAK FLOW RATE(CFS) =       7.64

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
         IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   4.20   DEPTH*VELOCITY(FT*FT/SEC) =   3.36
  LONGEST FLOWPATH FROM NODE    804.00 TO NODE    818.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    811.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0240
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.61
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.64
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   17.71
  LONGEST FLOWPATH FROM NODE    804.00 TO NODE    811.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    811.00 IS CODE =   1
```



```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.71
  RAINFALL INTENSITY(INCH/HR) =   1.43
  TOTAL STREAM AREA(ACRES) =     7.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       20.54    15.43        1.535         24.00
      1       19.69    24.49        1.223         24.00
      2        7.64    17.71        1.434          7.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       27.19    15.43       1.535
      2       26.83    17.71       1.434
      3       26.20    24.49       1.223

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.19   Tc(MIN.) =   15.43
  TOTAL AREA(ACRES) =       31.9
  LONGEST FLOWPATH FROM NODE    812.00 TO NODE    811.00 =    2400.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       31.9  TC(MIN.) =     15.43
  PEAK FLOW RATE(CFS)   =      27.19
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       27.19      15.43
  2       26.83      17.71
  3       26.20      24.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY EXISTING CONDITION RATIONAL METHOD HYDROLOGY              *
* 10 YEAR STORM EVENT FOR AREA TRIBUTARY TO LATERAL B-9AA               *
 ************************************************************************

  FILE NAME: E10_B9AA.DAT
  TIME/DATE OF STUDY: 14:27 07/03/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.788
  SLOPE OF INTENSITY DURATION CURVE = 0.4910
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====== =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
```



```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1691.00
  DOWNSTREAM ELEVATION(FEET) =   1602.00
  ELEVATION DIFFERENCE(FEET) =     89.00
  TC = 0.533*[( 1000.00**3)/(    89.00)]**.2 =   13.694
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.627
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6578
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.14
  TOTAL AREA(ACRES) =      4.80   TOTAL RUNOFF(CFS) =      5.14

************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  91
------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0370
  CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.477
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6403
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.01
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.00   Tc(MIN.) =   16.69
  SUBAREA AREA(ACRES) =    5.10       SUBAREA RUNOFF(CFS) =    4.82
  TOTAL AREA(ACRES) =        9.9         PEAK FLOW RATE(CFS) =       9.96

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
        IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   5.01   DEPTH*VELOCITY(FT*FT/SEC) =   4.01
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1900.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  91
------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0150
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.446
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6364
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.02
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.60
 AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =   17.41
 SUBAREA AREA(ACRES) =   11.00       SUBAREA RUNOFF(CFS) =   10.12
 TOTAL AREA(ACRES) =       20.9         PEAK FLOW RATE(CFS) =      20.08

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  1.24   FLOOD WIDTH(FEET) =    9.14
 FLOW VELOCITY(FEET/SEC.) =   4.68   DEPTH*VELOCITY(FT*FT/SEC) =   5.81
 LONGEST FLOWPATH FROM NODE    900.00 TO NODE    903.00 =    2100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   17.41
 RAINFALL INTENSITY(INCH/HR) =   1.45
 TOTAL STREAM AREA(ACRES) =    20.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.08

****************************************************************************
 FLOW PROCESS FROM NODE    900.00 TO NODE    904.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   860.00
 UPSTREAM ELEVATION(FEET) =   1691.00
 DOWNSTREAM ELEVATION(FEET) =   1618.00
 ELEVATION DIFFERENCE(FEET) =     73.00
 TC = 0.533*[(  860.00**3)/(    73.00)]**.2 =   13.015
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.668
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6622
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      3.31
 TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =      3.31

****************************************************************************
 FLOW PROCESS FROM NODE    904.00 TO NODE    903.00 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0580
 CHANNEL LENGTH THRU SUBAREA(FEET) =   890.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
 PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   2.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.537
```



```
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6476
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.90
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.27
 AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   15.38
 SUBAREA AREA(ACRES) =    5.20       SUBAREA RUNOFF(CFS) =    5.18
 TOTAL AREA(ACRES) =        8.2         PEAK FLOW RATE(CFS) =       8.49

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
        IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    5.00
 FLOW VELOCITY(FEET/SEC.) =   6.27   DEPTH*VELOCITY(FT*FT/SEC) =   5.02
 LONGEST FLOWPATH FROM NODE    900.00 TO NODE    903.00 =    1750.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   15.38
 RAINFALL INTENSITY(INCH/HR) =   1.54
 TOTAL STREAM AREA(ACRES) =     8.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.49

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       20.08    17.41        1.446         20.90
     2        8.49    15.38        1.537          8.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       26.23    15.38       1.537
     2       28.07    17.41       1.446

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      28.07   Tc(MIN.) =   17.41
 TOTAL AREA(ACRES) =       29.1
 LONGEST FLOWPATH FROM NODE    900.00 TO NODE    903.00 =    2100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    903.00 TO NODE    908.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
```

```
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.07
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   17.68
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    908.00 =    2260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    908.00 TO NODE    908.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.68
  RAINFALL INTENSITY(INCH/HR) =   1.44
  TOTAL STREAM AREA(ACRES) =    29.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.07

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    906.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   640.00
  UPSTREAM ELEVATION(FEET) =   1653.00
  DOWNSTREAM ELEVATION(FEET) =   1603.00
  ELEVATION DIFFERENCE(FEET) =     50.00
  TC = 0.533*[(  640.00**3)/(    50.00)]**.2 =   11.758
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.754
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6708
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      2.90   TOTAL RUNOFF(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    907.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0460
  CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.600
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6548
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.58
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   14.18
  SUBAREA AREA(ACRES) =    2.70       SUBAREA RUNOFF(CFS) =    2.83
```



```
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =       6.24

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
        IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   5.58   DEPTH*VELOCITY(FT*FT/SEC) =   4.47
  LONGEST FLOWPATH FROM NODE    905.00 TO NODE    907.00 =    1450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    907.00 TO NODE    908.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.18
  RAINFALL INTENSITY(INCH/HR) =   1.60
  TOTAL STREAM AREA(ACRES) =     5.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.24

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       26.23    15.66        1.523         29.10
      1       28.07    17.68        1.435         29.10
      2        6.24    14.18        1.600          5.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       29.98    14.18       1.600
      2       32.17    15.66       1.523
      3       33.67    17.68       1.435

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      33.67   Tc(MIN.) =   17.68
  TOTAL AREA(ACRES) =       34.7
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    908.00 =    2260.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       34.7  TC(MIN.) =     17.68
  PEAK FLOW RATE(CFS)   =      33.67
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)
  1       29.98      14.18
  2       32.17      15.66
  3       33.67      17.68
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* OLEANDER BUSINESS PARK                                                *
* PRELIMINARY EXISTING CONDITION RATIONAL METHOD HYDROLOGY               *
* 100 YEAR STORM EVENT FOR WATERSHED B-8                                *
 ************************************************************************

  FILE NAME: E100_B8.DAT
  TIME/DATE OF STUDY: 16:43 02/28/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.120
  SLOPE OF INTENSITY DURATION CURVE = 0.4890
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
```



```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   980.00
  UPSTREAM ELEVATION(FEET) =   1715.00
  DOWNSTREAM ELEVATION(FEET) =   1670.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.533*[(  980.00**3)/(    45.00)]**.2 =   15.506
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.171
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7053
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     16.54
  TOTAL AREA(ACRES) =     10.80   TOTAL RUNOFF(CFS) =     16.54

************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  91
------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0350
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.025
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6945
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     22.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.03
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   17.88
  SUBAREA AREA(ACRES) =    8.50       SUBAREA RUNOFF(CFS) =   11.95
  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      28.49

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.21   FLOOD WIDTH(FEET) =    5.55
  FLOW VELOCITY(FEET/SEC.) =   7.07   DEPTH*VELOCITY(FT*FT/SEC) =   8.52
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =    1980.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  91
------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0360
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1070.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.900
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6843
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     33.49
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.18
  AVERAGE FLOW DEPTH(FEET) =   1.28   FLOOD WIDTH(FEET) =   12.58
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.48   Tc(MIN.) =   20.36
  SUBAREA AREA(ACRES) =    7.70       SUBAREA RUNOFF(CFS) =   10.01
  TOTAL AREA(ACRES) =       27.0         PEAK FLOW RATE(CFS) =      38.50

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.34   FLOOD WIDTH(FEET) =   18.52
  FLOW VELOCITY(FEET/SEC.) =   6.89   DEPTH*VELOCITY(FT*FT/SEC) =   9.20
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    803.00 =    3050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    804.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0090
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.50
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   20.98
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    804.00 =    3380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    804.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   20.98
  RAINFALL INTENSITY(INCH/HR) =   1.87
  TOTAL STREAM AREA(ACRES) =    27.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.50

****************************************************************************
  FLOW PROCESS FROM NODE    805.00 TO NODE    806.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1733.00
  DOWNSTREAM ELEVATION(FEET) =   1663.00
  ELEVATION DIFFERENCE(FEET) =     70.00
  TC = 0.533*[( 1000.00**3)/(    70.00)]**.2 =   14.368
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.253
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7110
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     16.50
  TOTAL AREA(ACRES) =     10.30   TOTAL RUNOFF(CFS) =     16.50

****************************************************************************
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```
  FLOW PROCESS FROM NODE    806.00 TO NODE    807.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0400
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.100
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7003
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     23.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.52
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   16.58
  SUBAREA AREA(ACRES) =   10.10       SUBAREA RUNOFF(CFS) =   14.86
  TOTAL AREA(ACRES) =       20.4         PEAK FLOW RATE(CFS) =      31.36

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.22   FLOOD WIDTH(FEET) =    6.95
  FLOW VELOCITY(FEET/SEC.) =   7.62   DEPTH*VELOCITY(FT*FT/SEC) =   9.29
  LONGEST FLOWPATH FROM NODE    805.00 TO NODE    807.00 =    2000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    807.00 TO NODE    804.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0410
  CHANNEL LENGTH THRU SUBAREA(FEET) =   740.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.005
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6930
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     38.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.47
  AVERAGE FLOW DEPTH(FEET) =   1.31   FLOOD WIDTH(FEET) =   16.17
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =   18.24
  SUBAREA AREA(ACRES) =   10.60       SUBAREA RUNOFF(CFS) =   14.73
  TOTAL AREA(ACRES) =       31.0         PEAK FLOW RATE(CFS) =      46.09

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.38   FLOOD WIDTH(FEET) =   23.05
  FLOW VELOCITY(FEET/SEC.) =   7.06   DEPTH*VELOCITY(FT*FT/SEC) =   9.74
  LONGEST FLOWPATH FROM NODE    805.00 TO NODE    804.00 =    2740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    804.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.24
  RAINFALL INTENSITY(INCH/HR) =   2.01
  TOTAL STREAM AREA(ACRES) =    31.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     46.09

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       38.50    20.98        1.872         27.00
      2       46.09    18.24        2.005         31.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       79.55    18.24       2.005
      2       81.54    20.98       1.872

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      81.54   Tc(MIN.) =   20.98
  TOTAL AREA(ACRES) =       58.0
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    804.00 =    3380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0090
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.65
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      81.54
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   22.01
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    4040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.01
  RAINFALL INTENSITY(INCH/HR) =   1.83
  TOTAL STREAM AREA(ACRES) =    58.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     81.54

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    810.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```



```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1718.00
  DOWNSTREAM ELEVATION(FEET) =   1610.00
  ELEVATION DIFFERENCE(FEET) =    108.00
  TC = 0.533*[( 1000.00**3)/(   108.00)]**.2 =   13.174
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.351
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7172
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     10.96
  TOTAL AREA(ACRES) =      6.50   TOTAL RUNOFF(CFS) =     10.96

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    808.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0680
  CHANNEL LENGTH THRU SUBAREA(FEET) =   340.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.302
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7142
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     16.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.80
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =   13.75
  SUBAREA AREA(ACRES) =    6.50       SUBAREA RUNOFF(CFS) =   10.69
  TOTAL AREA(ACRES) =       13.0         PEAK FLOW RATE(CFS) =      21.64

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
        DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   9.80   DEPTH*VELOCITY(FT*FT/SEC) =  11.76
  LONGEST FLOWPATH FROM NODE    809.00 TO NODE    808.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.75
  RAINFALL INTENSITY(INCH/HR) =   2.30
  TOTAL STREAM AREA(ACRES) =    13.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1       79.55     19.27         1.952          58.00
      1       81.54     22.01         1.829          58.00
      2       21.64     13.75         2.302          13.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       78.41     13.75        2.302
      2       97.91     19.27        1.952
      3       98.73     22.01        1.829

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      98.73   Tc(MIN.) =   22.01
  TOTAL AREA(ACRES) =       71.0
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    4040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    818.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0360
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.96
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.73
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   22.62
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    818.00 =    4740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    811.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0240
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.30
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.73
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   23.13
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    811.00 =    5230.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       71.0  TC(MIN.) =     23.13
  PEAK FLOW RATE(CFS)   =      98.73
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       78.41      14.93
  2       97.91      20.40
  3       98.73      23.13
```



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============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* OLEANDER BUSINESS PARK                                                *
* PRELIMINARY EXISTING CONDITION RATIONAL METHOD HYDROLOGY               *
* 100 YEAR STORM EVENT FOR WATERSHED B-8A                               *
 ************************************************************************

  FILE NAME: E100_B8A.DAT
  TIME/DATE OF STUDY: 06:57 03/01/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.120
  SLOPE OF INTENSITY DURATION CURVE = 0.4890
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    813.00 IS CODE =  21
```



```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1640.00
  UPSTREAM ELEVATION(FEET) =   1595.00
  DOWNSTREAM ELEVATION(FEET) =   1556.00
  ELEVATION DIFFERENCE(FEET) =     39.00
  TC = 0.533*[( 1640.00**3)/(    39.00)]**.2 =   21.732
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.840
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6790
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.75
  TOTAL AREA(ACRES) =      3.80   TOTAL RUNOFF(CFS) =      4.75

************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    814.00 IS CODE =  91
------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0120
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.798
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6751
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.12
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =   22.78
  SUBAREA AREA(ACRES) =    5.00       SUBAREA RUNOFF(CFS) =    6.07
  TOTAL AREA(ACRES) =        8.8         PEAK FLOW RATE(CFS) =      10.82

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
        DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   4.12   DEPTH*VELOCITY(FT*FT/SEC) =   4.94
  LONGEST FLOWPATH FROM NODE    812.00 TO NODE    814.00 =    1900.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    815.00 TO NODE    815.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.78
  RAINFALL INTENSITY(INCH/HR) =   1.80
  TOTAL STREAM AREA(ACRES) =     8.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    816.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   530.00
  UPSTREAM ELEVATION(FEET) =   1596.00
  DOWNSTREAM ELEVATION(FEET) =   1575.00
  ELEVATION DIFFERENCE(FEET) =     21.00
  TC = 0.533*[(  530.00**3)/(    21.00)]**.2 =   12.489
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.413
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7210
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      8.87
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      8.87

****************************************************************************
  FLOW PROCESS FROM NODE    816.00 TO NODE    815.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0340
  CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.266
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7119
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.93
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =   14.20
  SUBAREA AREA(ACRES) =   10.10       SUBAREA RUNOFF(CFS) =   16.29
  TOTAL AREA(ACRES) =       15.2         PEAK FLOW RATE(CFS) =      25.17

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   6.93   DEPTH*VELOCITY(FT*FT/SEC) =   8.32
  LONGEST FLOWPATH FROM NODE    803.00 TO NODE    815.00 =    1240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    815.00 TO NODE    815.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.20
  RAINFALL INTENSITY(INCH/HR) =   2.27
```



```
  TOTAL STREAM AREA(ACRES) =    15.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.82    22.78        1.798          8.80
      2       25.17    14.20        2.266         15.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       31.91    14.20       2.266
      2       30.79    22.78       1.798

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.91   Tc(MIN.) =   14.20
  TOTAL AREA(ACRES) =       24.0
  LONGEST FLOWPATH FROM NODE    812.00 TO NODE    815.00 =    1900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    815.00 TO NODE    811.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0066
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.91
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =   15.29
  LONGEST FLOWPATH FROM NODE    812.00 TO NODE    811.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    811.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.29
  RAINFALL INTENSITY(INCH/HR) =   2.19
  TOTAL STREAM AREA(ACRES) =    24.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.91

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    817.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   730.00
  UPSTREAM ELEVATION(FEET) =   1593.00
  DOWNSTREAM ELEVATION(FEET) =   1572.00
  ELEVATION DIFFERENCE(FEET) =     21.00
  TC = 0.533*[(  730.00**3)/(    21.00)]**.2 =   15.134
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.197
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7072
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.66
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =      4.66

****************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    818.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0260
  CHANNEL LENGTH THRU SUBAREA(FEET) =   410.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.090
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6995
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.20
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =   16.76
  SUBAREA AREA(ACRES) =    4.90       SUBAREA RUNOFF(CFS) =    7.16
  TOTAL AREA(ACRES) =        7.9         PEAK FLOW RATE(CFS) =      11.82

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   6.06   DEPTH*VELOCITY(FT*FT/SEC) =   7.27
  LONGEST FLOWPATH FROM NODE    804.00 TO NODE    818.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    811.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0240
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.82
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   17.61
  LONGEST FLOWPATH FROM NODE    804.00 TO NODE    811.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    811.00 IS CODE =   1
----------------------------------------------------------------------------
```



```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.61
  RAINFALL INTENSITY(INCH/HR) =   2.04
  TOTAL STREAM AREA(ACRES) =     7.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.82

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       31.91    15.29        2.185         24.00
      1       30.79    23.92        1.756         24.00
      2       11.82    17.61        2.040          7.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       42.17    15.29       2.185
      2       41.60    17.61       2.040
      3       40.97    23.92       1.756

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      42.17   Tc(MIN.) =   15.29
  TOTAL AREA(ACRES) =       31.9
  LONGEST FLOWPATH FROM NODE    812.00 TO NODE    811.00 =    2400.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       31.9  TC(MIN.) =     15.29
  PEAK FLOW RATE(CFS)   =      42.17
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       42.17      15.29
  2       41.60      17.61
  3       40.97      23.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY EXISTING CONDITION RATIONAL METHOD HYDROLOGY              *
* 100 YEAR STORM EVENT FOR AREA TRIBUTARY TO LATERAL B-9AA              *
 ************************************************************************

  FILE NAME: E100B9AA.DAT
  TIME/DATE OF STUDY: 14:29 07/03/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.120
  SLOPE OF INTENSITY DURATION CURVE = 0.4890
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
```



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------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1691.00
  DOWNSTREAM ELEVATION(FEET) =   1602.00
  ELEVATION DIFFERENCE(FEET) =     89.00
  TC = 0.533*[( 1000.00**3)/(    89.00)]**.2 =   13.694
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.307
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7145
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.91
  TOTAL AREA(ACRES) =      4.80   TOTAL RUNOFF(CFS) =      7.91

************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  91
------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0370
  CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.153
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7041
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.23
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   15.77
  SUBAREA AREA(ACRES) =    5.10       SUBAREA RUNOFF(CFS) =    7.73
  TOTAL AREA(ACRES) =        9.9         PEAK FLOW RATE(CFS) =      15.64

        NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
        DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   7.23   DEPTH*VELOCITY(FT*FT/SEC) =   8.68
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1900.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  91
------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0150
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.105
```

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  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7006
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     23.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.52
  AVERAGE FLOW DEPTH(FEET) =   1.32   FLOOD WIDTH(FEET) =   16.64
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.74   Tc(MIN.) =   16.51
  SUBAREA AREA(ACRES) =   11.00       SUBAREA RUNOFF(CFS) =   16.23
  TOTAL AREA(ACRES) =       20.9          PEAK FLOW RATE(CFS) =      31.87

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.43   FLOOD WIDTH(FEET) =   28.05
  FLOW VELOCITY(FEET/SEC.) =   4.08   DEPTH*VELOCITY(FT*FT/SEC) =   5.84
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    903.00 =    2100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.51
  RAINFALL INTENSITY(INCH/HR) =   2.11
  TOTAL STREAM AREA(ACRES) =    20.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.87

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    904.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   860.00
  UPSTREAM ELEVATION(FEET) =   1691.00
  DOWNSTREAM ELEVATION(FEET) =   1618.00
  ELEVATION DIFFERENCE(FEET) =     73.00
  TC = 0.533*[(  860.00**3)/(    73.00)]**.2 =   13.015
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.365
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7181
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.09
  TOTAL AREA(ACRES) =      3.00   TOTAL RUNOFF(CFS) =      5.09

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    903.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0580
  CHANNEL LENGTH THRU SUBAREA(FEET) =   890.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.179
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7060
```



```
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      9.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.27
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =   15.38
  SUBAREA AREA(ACRES) =    5.20       SUBAREA RUNOFF(CFS) =    8.00
  TOTAL AREA(ACRES) =        8.2         PEAK FLOW RATE(CFS) =      13.09

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   9.05   DEPTH*VELOCITY(FT*FT/SEC) =  10.86
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    903.00 =    1750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.38
  RAINFALL INTENSITY(INCH/HR) =   2.18
  TOTAL STREAM AREA(ACRES) =     8.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.09

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       31.87    16.51        2.105         20.90
      2       13.09    15.38        2.179          8.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       42.79    15.38       2.179
      2       44.52    16.51       2.105

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.52   Tc(MIN.) =   16.51
  TOTAL AREA(ACRES) =       29.1
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    903.00 =    2100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    908.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.03
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.52
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   16.75
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    908.00 =    2260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    908.00 TO NODE    908.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.75
  RAINFALL INTENSITY(INCH/HR) =   2.09
  TOTAL STREAM AREA(ACRES) =    29.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     44.52

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    906.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   640.00
  UPSTREAM ELEVATION(FEET) =   1653.00
  DOWNSTREAM ELEVATION(FEET) =   1603.00
  ELEVATION DIFFERENCE(FEET) =     50.00
  TC = 0.533*[(  640.00**3)/(    50.00)]**.2 =   11.758
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.485
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7252
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.23
  TOTAL AREA(ACRES) =      2.90   TOTAL RUNOFF(CFS) =      5.23

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    907.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0460
  CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.268
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7120
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.58
  AVERAGE FLOW DEPTH(FEET) =   0.80   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =   14.18
  SUBAREA AREA(ACRES) =    2.70       SUBAREA RUNOFF(CFS) =    4.36
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =       9.59
```



```
         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL DEPTH
         IN A FLOWING-FULL GUTTER(NORMAL DEPTH = GUTTER HIKE)


  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   5.58   DEPTH*VELOCITY(FT*FT/SEC) =   4.47
  LONGEST FLOWPATH FROM NODE    905.00 TO NODE    907.00 =    1450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    907.00 TO NODE    908.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.18
  RAINFALL INTENSITY(INCH/HR) =   2.27
  TOTAL STREAM AREA(ACRES) =     5.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.59

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       42.79    15.62        2.163         29.10
      1       44.52    16.75        2.090         29.10
      2        9.59    14.18        2.268          5.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       48.41    14.18       2.268
      2       51.93    15.62       2.163
      3       53.35    16.75       2.090

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      53.35   Tc(MIN.) =   16.75
  TOTAL AREA(ACRES) =       34.7
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    908.00 =    2260.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       34.7  TC(MIN.) =     16.75
  PEAK FLOW RATE(CFS)   =      53.35
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       48.41      14.18
  2       51.93      15.62
  3       53.35      16.75
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY PROPOSED CONDITION RATIONAL METHOD HYDROLOGY              *
* 10 YEAR STORM EVENT FOR AREA TRIBUTARY TO LATERAL B-8                 *
 ************************************************************************

  FILE NAME: P10_B8.DAT
  TIME/DATE OF STUDY: 11:18 07/03/2019
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.788
  SLOPE OF INTENSITY DURATION CURVE = 0.4910
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====== =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
```



```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   980.00
  UPSTREAM ELEVATION(FEET) =   1715.00
  DOWNSTREAM ELEVATION(FEET) =   1670.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.533*[(  980.00**3)/(    45.00)]**.2 =   15.506
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.531
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6469
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     10.70
  TOTAL AREA(ACRES) =     10.80   TOTAL RUNOFF(CFS) =     10.70

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0390
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1230.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.413
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6320
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.42
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.76   Tc(MIN.) =   18.27
  SUBAREA AREA(ACRES) =    9.60       SUBAREA RUNOFF(CFS) =    8.57
  TOTAL AREA(ACRES) =       20.4         PEAK FLOW RATE(CFS) =      19.27

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   7.42   DEPTH*VELOCITY(FT*FT/SEC) =   8.91
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =    2210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.27
```

```
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   18.77
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    803.00 =    2510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    803.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.77
  RAINFALL INTENSITY(INCH/HR) =   1.39
  TOTAL STREAM AREA(ACRES) =    20.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.27

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    805.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1733.00
  DOWNSTREAM ELEVATION(FEET) =   1663.00
  ELEVATION DIFFERENCE(FEET) =     70.00
  TC = 0.533*[( 1000.00**3)/(    70.00)]**.2 =   14.368
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.589
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6536
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     10.70
  TOTAL AREA(ACRES) =     10.30   TOTAL RUNOFF(CFS) =     10.70

****************************************************************************
  FLOW PROCESS FROM NODE    805.00 TO NODE    806.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0400
  CHANNEL LENGTH THRU SUBAREA(FEET) =   850.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.496
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6427
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.99
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.52
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.88   Tc(MIN.) =   16.25
  SUBAREA AREA(ACRES) =   11.00       SUBAREA RUNOFF(CFS) =   10.58
  TOTAL AREA(ACRES) =       21.3         PEAK FLOW RATE(CFS) =      21.28

         NOTE:TRAVEL TIME ESTIMATES BASED ON NORMAL
         DEPTH EQUAL TO [GUTTER-HIKE + PAVEMENT LIP]
```



```
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.00
  FLOW VELOCITY(FEET/SEC.) =   7.52   DEPTH*VELOCITY(FT*FT/SEC) =   9.02
  LONGEST FLOWPATH FROM NODE    804.00 TO NODE    806.00 =    1850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    806.00 TO NODE    803.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.28
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   16.44
  LONGEST FLOWPATH FROM NODE    804.00 TO NODE    803.00 =    1970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    803.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.44
  RAINFALL INTENSITY(INCH/HR) =   1.49
  TOTAL STREAM AREA(ACRES) =    21.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       19.27    18.77        1.394         20.40
      2       21.28    16.44        1.487         21.30

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       38.16    16.44       1.487
      2       39.20    18.77       1.394

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.20   Tc(MIN.) =   18.77
  TOTAL AREA(ACRES) =       41.7
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    803.00 =    2510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    807.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.88
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.20
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   19.45
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    807.00 =    3000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    807.00 TO NODE    807.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.45
  RAINFALL INTENSITY(INCH/HR) =   1.37
  TOTAL STREAM AREA(ACRES) =    41.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     39.20

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    809.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   570.00
  UPSTREAM ELEVATION(FEET) =   1704.00
  DOWNSTREAM ELEVATION(FEET) =   1648.00
  ELEVATION DIFFERENCE(FEET) =     56.00
  TC = 0.533*[(  570.00**3)/(    56.00)]**.2 =   10.722
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.835
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6785
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.37
  TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =      2.37

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    807.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.06
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.37
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   11.13
  LONGEST FLOWPATH FROM NODE    808.00 TO NODE    807.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    807.00 TO NODE    807.00 IS CODE =   1
```



```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.13
  RAINFALL INTENSITY(INCH/HR) =   1.80
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.37

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       38.16    17.13        1.458         41.70
      1       39.20    19.45        1.370         41.70
      2        2.37    11.13        1.801          1.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       27.16    11.13       1.801
      2       40.07    17.13       1.458
      3       41.00    19.45       1.370

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.00   Tc(MIN.) =   19.45
  TOTAL AREA(ACRES) =       43.6
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    807.00 =    3000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    807.00 TO NODE    810.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.00
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   19.88
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    810.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    810.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.88
  RAINFALL INTENSITY(INCH/HR) =   1.36
  TOTAL STREAM AREA(ACRES) =    43.60
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     41.00

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
  UPSTREAM ELEVATION(FEET) =   1718.00
  DOWNSTREAM ELEVATION(FEET) =   1649.00
  ELEVATION DIFFERENCE(FEET) =     69.00
  TC = 0.533*[(  720.00**3)/(    69.00)]**.2 =   11.831
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.748
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6703
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.70
  TOTAL AREA(ACRES) =      2.30   TOTAL RUNOFF(CFS) =      2.70

****************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    810.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.70
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   12.23
  LONGEST FLOWPATH FROM NODE    811.00 TO NODE    810.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    810.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.23
  RAINFALL INTENSITY(INCH/HR) =   1.72
  TOTAL STREAM AREA(ACRES) =     2.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.70

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       27.16    11.61        1.764         43.60
      1       40.07    17.56        1.440         43.60
      1       41.00    19.88        1.355         43.60
      2        2.70    12.23        1.720          2.30

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```



```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       29.72    11.61        1.764
      2       30.61    12.23        1.720
      3       42.33    17.56        1.440
      4       43.13    19.88        1.355

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.13   Tc(MIN.) =   19.88
  TOTAL AREA(ACRES) =       45.9
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    810.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    813.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.13
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   20.44
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    813.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    814.00 TO NODE    815.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1190.00
  UPSTREAM ELEVATION(FEET) =   1691.00
  DOWNSTREAM ELEVATION(FEET) =   1605.00
  ELEVATION DIFFERENCE(FEET) =     86.00
  TC = 0.533*[( 1190.00**3)/(    86.00)]**.2 =   15.305
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.541
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6480
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.99
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =      3.99

****************************************************************************
  FLOW PROCESS FROM NODE    815.00 TO NODE    816.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   670.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.99
  PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =   16.95
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    816.00 =    1860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    816.00 TO NODE    816.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.95
  RAINFALL INTENSITY(INCH/HR) =   1.47
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.99

****************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    818.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   460.00
  UPSTREAM ELEVATION(FEET) =   1702.00
  DOWNSTREAM ELEVATION(FEET) =   1620.00
  ELEVATION DIFFERENCE(FEET) =     82.00
  TC = 0.533*[(  460.00**3)/(    82.00)]**.2 =    8.736
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.029
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6949
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.38
  TOTAL AREA(ACRES) =      2.40   TOTAL RUNOFF(CFS) =      3.38

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    816.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.60
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.38
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.09
  LONGEST FLOWPATH FROM NODE    817.00 TO NODE    816.00 =     600.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    816.00 TO NODE    816.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.09
  RAINFALL INTENSITY(INCH/HR) =   1.99
  TOTAL STREAM AREA(ACRES) =     2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.38

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        3.99    16.95        1.466          4.00
      2        3.38     9.09        1.990          2.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1        5.53     9.09        1.990
      2        6.49    16.95        1.466

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.49   Tc(MIN.) =   16.95
  TOTAL AREA(ACRES) =        6.4
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    816.00 =    1860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    816.00 TO NODE    819.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.75
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.49
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   17.76
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    819.00 =    2240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    819.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.76
  RAINFALL INTENSITY(INCH/HR) =   1.43
  TOTAL STREAM AREA(ACRES) =     6.40
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.49

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    821.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1690.00
  DOWNSTREAM ELEVATION(FEET) =   1644.00
  ELEVATION DIFFERENCE(FEET) =     46.00
  TC = 0.533*[(  100.00**3)/(    46.00)]**.2 =    3.925
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.669
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7350
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE    821.00 TO NODE    819.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.78
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    5.54
  LONGEST FLOWPATH FROM NODE    820.00 TO NODE    819.00 =     250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    819.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.54
  RAINFALL INTENSITY(INCH/HR) =   2.54
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.53     9.93        1.905          6.40
      1        6.49    17.76        1.432          6.40
      2        0.78     5.54        2.537          0.40

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```



```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        3.87     5.54        2.537
      2        6.12     9.93        1.905
      3        6.93    17.76        1.432

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.93   Tc(MIN.) =   17.76
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    819.00 =    2240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    822.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.85
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.93
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   18.08
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    822.00 =    2390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    822.00 TO NODE    822.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.08
  RAINFALL INTENSITY(INCH/HR) =   1.42
  TOTAL STREAM AREA(ACRES) =     6.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.93

****************************************************************************
  FLOW PROCESS FROM NODE    814.00 TO NODE    823.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   410.00
  UPSTREAM ELEVATION(FEET) =   1691.00
  DOWNSTREAM ELEVATION(FEET) =   1644.00
  ELEVATION DIFFERENCE(FEET) =     47.00
  TC = 0.533*[(  410.00**3)/(    47.00)]**.2 =    9.113
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.987
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6916
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.81
```

```
  TOTAL AREA(ACRES) =      3.50   TOTAL RUNOFF(CFS) =      4.81

****************************************************************************
  FLOW PROCESS FROM NODE    823.00 TO NODE    822.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.25
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.81
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    822.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    822.00 TO NODE    822.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   1.95
  TOTAL STREAM AREA(ACRES) =     3.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.81

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.87     5.91        2.458          6.80
      1        6.12    10.26        1.875          6.80
      1        6.93    18.08        1.420          6.80
      2        4.81     9.50        1.947          3.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        6.86     5.91       2.458
      2       10.47     9.50       1.947
      3       10.75    10.26       1.875
      4       10.44    18.08       1.420

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.75   Tc(MIN.) =   10.26
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    822.00 =    2390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    822.00 TO NODE    813.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.75
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    813.00 =    2490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.86     6.12        2.416         10.30
      2       10.47     9.69        1.928         10.30
      3       10.75    10.45        1.858         10.30
      4       10.44    18.27        1.412         10.30
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    813.00 =    2490.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       29.72    12.22        1.721         45.90
      2       30.61    12.84        1.680         45.90
      3       42.33    18.12        1.418         45.90
      4       43.13    20.44        1.337         45.90
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    813.00 =    3560.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      21.75       6.12        2.416
      2      34.05       9.69        1.928
      3      36.16      10.45        1.858
      4      39.68      12.22        1.721
      5      40.32      12.84        1.680
      6      52.68      18.12        1.418
      7      52.59      18.27        1.412
      8      53.00      20.44        1.337

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      53.00   Tc(MIN.) =   20.44
  TOTAL AREA(ACRES) =       56.2

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

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

```
 FLOW PROCESS FROM NODE    813.00 TO NODE    824.00 IS CODE =  31
--------------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 REPRESENTATIVE SLOPE =  0.0400
 FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.73
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      53.00
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   20.95
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    824.00 =    4070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =  10
--------------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
================================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    825.00 TO NODE    826.00 IS CODE =  21
--------------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
 UPSTREAM ELEVATION(FEET) =   1622.00
 DOWNSTREAM ELEVATION(FEET) =   1598.00
 ELEVATION DIFFERENCE(FEET) =     24.00
 TC = 0.303*[(  290.00**3)/(    24.00)]**.2 =    4.819
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.669
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8835
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      4.01
 TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      4.01

****************************************************************************
 FLOW PROCESS FROM NODE    826.00 TO NODE    827.00 IS CODE =  31
--------------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.01
 PIPE TRAVEL TIME(MIN.) =   2.07    Tc(MIN.) =    7.07
 LONGEST FLOWPATH FROM NODE    825.00 TO NODE    827.00 =     950.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    827.00 TO NODE    827.00 IS CODE =   1
--------------------------------------------------------------------------------
```



```
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.07
 RAINFALL INTENSITY(INCH/HR) =   2.25
 TOTAL STREAM AREA(ACRES) =     1.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.01

****************************************************************************
 FLOW PROCESS FROM NODE    828.00 TO NODE    827.00 IS CODE =  21
--------------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   480.00
 UPSTREAM ELEVATION(FEET) =   1605.00
 DOWNSTREAM ELEVATION(FEET) =   1587.00
 ELEVATION DIFFERENCE(FEET) =     18.00
 TC = 0.303*[(  480.00**3)/(    18.00)]**.2 =    6.907
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.277
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8813
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      4.01
 TOTAL AREA(ACRES) =      2.00   TOTAL RUNOFF(CFS) =      4.01

****************************************************************************
 FLOW PROCESS FROM NODE    827.00 TO NODE    827.00 IS CODE =   1
--------------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.91
 RAINFALL INTENSITY(INCH/HR) =   2.28
 TOTAL STREAM AREA(ACRES) =     2.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.01

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.01     7.07        2.252          1.70
     2        4.01     6.91        2.277          2.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        7.93     6.91       2.277
     2        7.98     7.07       2.252

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.98   Tc(MIN.) =    7.07
```

```
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    827.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    827.00 TO NODE    829.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.01
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.98
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.27
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    829.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    829.00 TO NODE    829.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.27
  RAINFALL INTENSITY(INCH/HR) =   2.22
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.98

****************************************************************************
  FLOW PROCESS FROM NODE    830.00 TO NODE    829.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   640.00
  UPSTREAM ELEVATION(FEET) =   1614.00
  DOWNSTREAM ELEVATION(FEET) =   1592.00
  ELEVATION DIFFERENCE(FEET) =     22.00
  TC = 0.303*[(  640.00**3)/(    22.00)]**.2 =    7.885
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.134
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8803
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.63
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =      2.63

****************************************************************************
  FLOW PROCESS FROM NODE    829.00 TO NODE    829.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.89
```



```
  RAINFALL INTENSITY(INCH/HR) =   2.13
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.93     7.11        2.244          3.70
      1        7.98     7.27        2.220          3.70
      2        2.63     7.89        2.134          1.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       10.30     7.11       2.244
      2       10.40     7.27       2.220
      3       10.30     7.89       2.134

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.40   Tc(MIN.) =    7.27
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    829.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    829.00 TO NODE    824.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.40
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.35
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    824.00 =    1090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.35
  RAINFALL INTENSITY(INCH/HR) =   2.21
  TOTAL STREAM AREA(ACRES) =     5.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.40

****************************************************************************
  FLOW PROCESS FROM NODE    830.00 TO NODE    831.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
       ASSUMED INITIAL SUBAREA UNIFORM
       DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   640.00
  UPSTREAM ELEVATION(FEET) =   1614.00
  DOWNSTREAM ELEVATION(FEET) =   1592.00
  ELEVATION DIFFERENCE(FEET) =     22.00
  TC = 0.303*[(  640.00**3)/(    22.00)]**.2 =    7.885
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.134
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8803
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.01
  TOTAL AREA(ACRES) =      1.60   TOTAL RUNOFF(CFS) =      3.01

****************************************************************************
  FLOW PROCESS FROM NODE    831.00 TO NODE    824.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.44
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.01
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE    830.00 TO NODE    824.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.99
  RAINFALL INTENSITY(INCH/HR) =   2.12
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.30     7.19        2.232          5.10
      1       10.40     7.35        2.208          5.10
      1       10.30     7.96        2.124          5.10
      2        3.01     7.99        2.120          1.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       13.01     7.19       2.232
      2       13.17     7.35       2.208
```



```
      3       13.29     7.96       2.124
      4       13.29     7.99       2.120

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.29   Tc(MIN.) =    7.96
  TOTAL AREA(ACRES) =        6.7
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    824.00 =    1090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       13.01     7.19       2.232        6.70
      2       13.17     7.35       2.208        6.70
      3       13.29     7.96       2.124        6.70
      4       13.29     7.99       2.120        6.70
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    824.00 =    1090.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       21.75     6.75       2.303       56.20
      2       34.05    10.26       1.875       56.20
      3       36.16    11.01       1.811       56.20
      4       39.68    12.77       1.684       56.20
      5       40.32    13.38       1.646       56.20
      6       52.68    18.63       1.399       56.20
      7       52.59    18.78       1.393       56.20
      8       53.00    20.95       1.321       56.20
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    824.00 =    4070.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      33.96       6.75       2.303
      2      36.89       7.19       2.232
      3      37.58       7.35       2.208
      4      39.73       7.96       2.124
      5      39.81       7.99       2.120
      6      45.80      10.26       1.875
      7      47.52      11.01       1.811
      8      50.23      12.77       1.684
      9      50.63      13.38       1.646
     10      61.44      18.63       1.399
     11      61.32      18.78       1.393
     12      61.28      20.95       1.321

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.44   Tc(MIN.) =   18.63
  TOTAL AREA(ACRES) =       62.9

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =  12
```

```
------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    832.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.45
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.44
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   18.74
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    832.00 =    4160.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    832.00 TO NODE    832.00 IS CODE =  10
------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    833.00 TO NODE    834.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   440.00
  UPSTREAM ELEVATION(FEET) =   1622.00
  DOWNSTREAM ELEVATION(FEET) =   1617.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  440.00**3)/(     5.00)]**.2 =    8.470
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.060
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8797
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.80
  TOTAL AREA(ACRES) =      3.20   TOTAL RUNOFF(CFS) =      5.80

******************************************************************************
  FLOW PROCESS FROM NODE    834.00 TO NODE    835.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   830.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.80
  PIPE TRAVEL TIME(MIN.) =   2.44    Tc(MIN.) =   10.90
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    835.00 =    1270.00 FEET.
```



```
******************************************************************************
  FLOW PROCESS FROM NODE    835.00 TO NODE    835.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.90
  RAINFALL INTENSITY(INCH/HR) =   1.82
  TOTAL STREAM AREA(ACRES) =     3.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.80

******************************************************************************
  FLOW PROCESS FROM NODE    833.00 TO NODE    835.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   470.00
  UPSTREAM ELEVATION(FEET) =   1622.00
  DOWNSTREAM ELEVATION(FEET) =   1617.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  470.00**3)/(     5.00)]**.2 =    8.812
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.020
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8794
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.60
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      1.60

******************************************************************************
  FLOW PROCESS FROM NODE    835.00 TO NODE    835.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   2.02
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.60

******************************************************************************
  FLOW PROCESS FROM NODE    836.00 TO NODE    837.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  UPSTREAM ELEVATION(FEET) =   1620.00
  DOWNSTREAM ELEVATION(FEET) =   1615.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  350.00**3)/(     5.00)]**.2 =    7.383
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.204
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8808
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.49
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =      3.49

****************************************************************************
  FLOW PROCESS FROM NODE    837.00 TO NODE    835.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.49
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE    836.00 TO NODE    835.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    835.00 TO NODE    835.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   2.04
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.49

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.80    10.90        1.820          3.20
      2        1.60     8.81        2.020          0.90
      3        3.49     8.68        2.036          1.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        9.68     8.68       2.036
      2        9.75     8.81       2.020
      3       10.36    10.90       1.820

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.36   Tc(MIN.) =   10.90
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    835.00 =    1270.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    835.00 TO NODE    838.00 IS CODE =  31
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.36
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.04
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    838.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    838.00 TO NODE    838.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.04
  RAINFALL INTENSITY(INCH/HR) =   1.81
  TOTAL STREAM AREA(ACRES) =     5.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.36

****************************************************************************
  FLOW PROCESS FROM NODE    839.00 TO NODE    838.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   710.00
  UPSTREAM ELEVATION(FEET) =   1628.00
  DOWNSTREAM ELEVATION(FEET) =   1597.00
  ELEVATION DIFFERENCE(FEET) =     31.00
  TC = 0.303*[(  710.00**3)/(    31.00)]**.2 =    7.836
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.140
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8803
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      1.70

****************************************************************************
  FLOW PROCESS FROM NODE    838.00 TO NODE    838.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.84
  RAINFALL INTENSITY(INCH/HR) =   2.14
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.70

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.68     8.81        2.020          5.90
      1        9.75     8.95        2.005          5.90
      1       10.36    11.04        1.809          5.90
      2        1.70     7.84        2.140          0.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       10.31     7.84       2.140
      2       11.28     8.81       2.020
      3       11.34     8.95       2.005
      4       11.80    11.04       1.809

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.80   Tc(MIN.) =   11.04
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    838.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    838.00 TO NODE    840.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =  1100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.80
  PIPE TRAVEL TIME(MIN.) =   2.65    Tc(MIN.) =   13.69
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    840.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    840.00 TO NODE    840.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    834.00 TO NODE    841.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
  UPSTREAM ELEVATION(FEET) =   1617.00
  DOWNSTREAM ELEVATION(FEET) =   1615.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.303*[(  400.00**3)/(     2.00)]**.2 =    9.608
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.936
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8787
```



```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.47
  TOTAL AREA(ACRES) =      3.80   TOTAL RUNOFF(CFS) =      6.47

****************************************************************************
  FLOW PROCESS FROM NODE    841.00 TO NODE    842.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.47
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   10.05
  LONGEST FLOWPATH FROM NODE    834.00 TO NODE    842.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    842.00 TO NODE    842.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.05
  RAINFALL INTENSITY(INCH/HR) =   1.89
  TOTAL STREAM AREA(ACRES) =     3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.47

****************************************************************************
  FLOW PROCESS FROM NODE    843.00 TO NODE    844.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   730.00
  UPSTREAM ELEVATION(FEET) =   1635.00
  DOWNSTREAM ELEVATION(FEET) =   1618.00
  ELEVATION DIFFERENCE(FEET) =     17.00
  TC = 0.303*[(  730.00**3)/(    17.00)]**.2 =    8.984
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.001
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8793
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      1.94

****************************************************************************
  FLOW PROCESS FROM NODE    844.00 TO NODE    842.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.94
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.34
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    842.00 =     850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    842.00 TO NODE    842.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   1.96
  TOTAL STREAM AREA(ACRES) =     1.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.47    10.05        1.894          3.80
      2        1.94     9.34        1.964          1.10

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        7.94     9.34       1.964
      2        8.33    10.05       1.894

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.33   Tc(MIN.) =   10.05
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    842.00 =     850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    842.00 TO NODE    845.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.33
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   10.63
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    845.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    845.00 TO NODE    845.00 IS CODE =   1
----------------------------------------------------------------------------
```



```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.63
  RAINFALL INTENSITY(INCH/HR) =   1.84
  TOTAL STREAM AREA(ACRES) =     4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.33

****************************************************************************
  FLOW PROCESS FROM NODE    846.00 TO NODE    847.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  UPSTREAM ELEVATION(FEET) =   1650.00
  DOWNSTREAM ELEVATION(FEET) =   1615.00
  ELEVATION DIFFERENCE(FEET) =     35.00
  TC = 0.303*[(  240.00**3)/(    35.00)]**.2 =    3.989
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.669
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8835
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.41
  TOTAL AREA(ACRES) =      0.60   TOTAL RUNOFF(CFS) =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE    847.00 TO NODE    845.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.41
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    5.82
  LONGEST FLOWPATH FROM NODE    846.00 TO NODE    845.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    845.00 TO NODE    845.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.82
  RAINFALL INTENSITY(INCH/HR) =   2.48
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.41

  ** CONFLUENCE DATA **
```

```
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        7.94     9.92        1.906          4.90
     1        8.33    10.63        1.842          4.90
     2        1.41     5.82        2.478          0.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        6.07     5.82       2.478
     2        9.03     9.92       1.906
     3        9.39    10.63       1.842

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.39   Tc(MIN.) =   10.63
 TOTAL AREA(ACRES) =        5.5
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    845.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    845.00 TO NODE    848.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.39
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   10.84
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    848.00 =    1150.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    848.00 TO NODE    848.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.84
 RAINFALL INTENSITY(INCH/HR) =   1.83
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.39

****************************************************************************
 FLOW PROCESS FROM NODE    849.00 TO NODE    848.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
 UPSTREAM ELEVATION(FEET) =   1615.00
```



```
 DOWNSTREAM ELEVATION(FEET) =   1609.00
 ELEVATION DIFFERENCE(FEET) =      6.00
 TC = 0.303*[(  400.00**3)/(     6.00)]**.2 =    7.712
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.157
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8804
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      4.18
 TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =      4.18

****************************************************************************
 FLOW PROCESS FROM NODE    848.00 TO NODE    848.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.71
 RAINFALL INTENSITY(INCH/HR) =   2.16
 TOTAL STREAM AREA(ACRES) =     2.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.18

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        6.07     6.05        2.430          5.50
     1        9.03    10.13        1.887          5.50
     1        9.39    10.84        1.825          5.50
     2        4.18     7.71        2.157          2.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        9.35     6.05       2.430
     2       11.05     7.71       2.157
     3       12.69    10.13       1.887
     4       12.92    10.84       1.825

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.92   Tc(MIN.) =   10.84
 TOTAL AREA(ACRES) =        7.7
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    848.00 =    1150.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    848.00 TO NODE    850.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.92
```

```
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   11.62
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    850.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    850.00 TO NODE    850.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.62
  RAINFALL INTENSITY(INCH/HR) =   1.76
  TOTAL STREAM AREA(ACRES) =     7.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.92

****************************************************************************
  FLOW PROCESS FROM NODE    837.00 TO NODE    850.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  UPSTREAM ELEVATION(FEET) =   1615.00
  DOWNSTREAM ELEVATION(FEET) =   1611.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[(  670.00**3)/(     4.00)]**.2 =   11.398
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.781
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8773
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.78
  TOTAL AREA(ACRES) =      3.70   TOTAL RUNOFF(CFS) =      5.78

****************************************************************************
  FLOW PROCESS FROM NODE    850.00 TO NODE    850.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.40
  RAINFALL INTENSITY(INCH/HR) =   1.78
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.35     6.91        2.277          7.70
      1       11.05     8.52        2.054          7.70
      1       12.69    10.92        1.819          7.70
      1       12.92    11.62        1.764          7.70
      2        5.78    11.40        1.781          3.70

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



```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       12.85     6.91        2.277
      2       15.37     8.52        2.054
      3       18.22    10.92        1.819
      4       18.45    11.40        1.781
      5       18.65    11.62        1.764

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.65   Tc(MIN.) =   11.62
  TOTAL AREA(ACRES) =       11.4
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    850.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    850.00 TO NODE    851.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.65
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   11.74
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    851.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    851.00 TO NODE    851.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.755
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6710
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    2.20   SUBAREA RUNOFF(CFS) =    2.59
  TOTAL AREA(ACRES) =       13.6   TOTAL RUNOFF(CFS) =      21.24
  TC(MIN.) =   11.74

****************************************************************************
  FLOW PROCESS FROM NODE    851.00 TO NODE    851.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.74
  RAINFALL INTENSITY(INCH/HR) =   1.75
  TOTAL STREAM AREA(ACRES) =    13.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.24

****************************************************************************
  FLOW PROCESS FROM NODE    838.00 TO NODE    851.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1070.00
  UPSTREAM ELEVATION(FEET) =   1597.00
  DOWNSTREAM ELEVATION(FEET) =   1587.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  TC = 0.303*[( 1070.00**3)/(    10.00)]**.2 =   12.567
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.697
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8765
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.23
  TOTAL AREA(ACRES) =      1.50   TOTAL RUNOFF(CFS) =      2.23

****************************************************************************
  FLOW PROCESS FROM NODE    851.00 TO NODE    851.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.57
  RAINFALL INTENSITY(INCH/HR) =   1.70
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.23

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       16.38     7.04        2.256         13.60
      1       18.49     8.64        2.040         13.60
      1       20.91    11.03        1.809         13.60
      1       21.07    11.51        1.772         13.60
      1       21.24    11.74        1.755         13.60
      2        2.23    12.57        1.697          1.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       17.63     7.04       2.256
      2       20.03     8.64       2.040
      3       22.87    11.03       1.809
      4       23.12    11.51       1.772
      5       23.32    11.74       1.755
      6       22.77    12.57       1.697

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.32   Tc(MIN.) =   11.74
  TOTAL AREA(ACRES) =       15.1
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    851.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    851.00 TO NODE    840.00 IS CODE =  31
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.65
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.32
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.82
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    840.00 =    1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    840.00 TO NODE    840.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.63     7.12        2.243         15.10
      2       20.03     8.72        2.031         15.10
      3       22.87    11.11        1.803         15.10
      4       23.12    11.59        1.766         15.10
      5       23.32    11.82        1.749         15.10
      6       22.77    12.65        1.692         15.10
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    840.00 =    1600.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.31    10.56        1.849         6.80
      2       11.28    11.49        1.774         6.80
      3       11.34    11.62        1.764         6.80
      4       11.80    13.69        1.628         6.80
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    840.00 =    2440.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       24.63     7.12        2.243
      2       28.60     8.72        2.031
      3       32.04    10.56        1.849
      4       33.79    11.11        1.803
      5       34.18    11.49        1.774
      6       34.43    11.59        1.766
      7       34.43    11.62        1.764
      8       34.57    11.82        1.749
      9       33.67    12.65        1.692
     10       33.70    13.69        1.628

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.57   Tc(MIN.) =   11.82
  TOTAL AREA(ACRES) =       21.9

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

```
 FLOW PROCESS FROM NODE    840.00 TO NODE    840.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    840.00 TO NODE    832.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.69
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.57
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   12.02
 LONGEST FLOWPATH FROM NODE    833.00 TO NODE    832.00 =    2580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    832.00 TO NODE    832.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       24.63     7.34       2.210       21.90
     2       28.60     8.93       2.007       21.90
     3       32.04    10.76       1.832       21.90
     4       33.79    11.31       1.787       21.90
     5       34.18    11.69       1.759       21.90
     6       34.43    11.79       1.751       21.90
     7       34.43    11.82       1.749       21.90
     8       34.57    12.02       1.735       21.90
     9       33.67    12.85       1.679       21.90
    10       33.70    13.89       1.616       21.90
 LONGEST FLOWPATH FROM NODE    833.00 TO NODE    832.00 =    2580.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       33.96     6.88       2.282       62.90
     2       36.89     7.32       2.213       62.90
     3       37.58     7.48       2.190       62.90
     4       39.73     8.09       2.107       62.90
     5       39.81     8.11       2.104       62.90
     6       45.80    10.38       1.865       62.90
     7       47.52    11.13       1.802       62.90
     8       50.23    12.89       1.676       62.90
     9       50.63    13.50       1.638       62.90
    10       61.44    18.74       1.395       62.90
    11       61.32    18.89       1.389       62.90
    12       61.28    21.06       1.317       62.90
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    832.00 =    4160.00 FEET.
```



```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       57.04      6.88        2.282
     2       61.45      7.32        2.213
     3       61.50      7.34        2.210
     4       61.97      7.48        2.190
     5       65.61      8.09        2.107
     6       65.78      8.11        2.104
     7       68.04      8.93        2.007
     8       76.79     10.38        1.865
     9       78.00     10.76        1.832
    10       80.74     11.13        1.802
    11       80.92     11.31        1.787
    12       80.57     11.69        1.759
    13       80.61     11.79        1.751
    14       80.57     11.82        1.749
    15       81.40     12.02        1.735
    16       83.73     12.85        1.679
    17       83.84     12.89        1.676
    18       83.49     13.50        1.638
    19       83.63     13.89        1.616
    20       90.53     18.74        1.395
    21       90.30     18.89        1.389
    22       88.75     21.06        1.317

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      90.53   Tc(MIN.) =   18.74
 TOTAL AREA(ACRES) =       84.8

****************************************************************************
 FLOW PROCESS FROM NODE    832.00 TO NODE    832.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    832.00 TO NODE    852.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0360
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.24
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.53
 PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   19.38
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    852.00 =    4860.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       84.8  TC(MIN.) =     19.38
 PEAK FLOW RATE(CFS)   =      90.53
 *** PEAK FLOW RATE TABLE ***
        Q(CFS)   Tc(MIN.)
 1       57.04       7.58
 2       61.45       8.01
```

3	61.50	8.03
4	61.97	8.17
5	65.61	8.77
6	65.78	8.80
7	68.04	9.62
8	76.79	11.03
9	78.00	11.41
10	80.74	11.77
11	80.92	11.96
12	80.57	12.33
13	80.61	12.44
14	80.57	12.47
15	81.40	12.67
16	83.73	13.49
17	83.84	13.53
18	83.49	14.15
19	83.63	14.53
20	90.53	19.38
21	90.30	19.53
22	88.75	21.70

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY PROPOSED CONDITION RATIONAL METHOD HYDROLOGY              *
* 10 YEAR STORM EVENT FOR AREA TRIBUTARY TO LATERAL B-9AA               *
 ************************************************************************

  FILE NAME: P10_B9AA.DAT
  TIME/DATE OF STUDY: 13:32 07/03/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.788
  SLOPE OF INTENSITY DURATION CURVE = 0.4910
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====== =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
```



```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1140.00
  UPSTREAM ELEVATION(FEET) =   1592.00
  DOWNSTREAM ELEVATION(FEET) =   1567.00
  ELEVATION DIFFERENCE(FEET) =     25.00
  TC = 0.303*[( 1140.00**3)/(    25.00)]**.2 =   10.868
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.823
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8777
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.20
  TOTAL AREA(ACRES) =      2.00   TOTAL RUNOFF(CFS) =      3.20

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    901.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.823
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6774
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    1.70   SUBAREA RUNOFF(CFS) =    2.10
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =       5.30
  TC(MIN.) =   10.87

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.30
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   11.12
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1240.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  10
------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  UPSTREAM ELEVATION(FEET) =   1598.00
  DOWNSTREAM ELEVATION(FEET) =   1597.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  TC = 0.303*[(  190.00**3)/(     1.00)]**.2 =    7.061
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.253
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8811
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.37
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      3.37

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    905.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0060
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.37
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =    8.53
  LONGEST FLOWPATH FROM NODE    903.00 TO NODE    905.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   2.05
  TOTAL STREAM AREA(ACRES) =     1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.37

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    905.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  UPSTREAM ELEVATION(FEET) =   1597.00
  DOWNSTREAM ELEVATION(FEET) =   1595.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.303*[(  370.00**3)/(     2.00)]**.2 =    9.169
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.981
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8791
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.05
  TOTAL AREA(ACRES) =      2.90   TOTAL RUNOFF(CFS) =      5.05

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



```
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.17
  RAINFALL INTENSITY(INCH/HR) =   1.98
  TOTAL STREAM AREA(ACRES) =     2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.05

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.37     8.53        2.053          1.70
      2        5.05     9.17        1.981          2.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.07     8.53       2.053
      2        8.31     9.17       1.981

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.31   Tc(MIN.) =    9.17
  TOTAL AREA(ACRES) =        4.6
  LONGEST FLOWPATH FROM NODE    903.00 TO NODE    905.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    906.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.31
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.59
  LONGEST FLOWPATH FROM NODE    903.00 TO NODE    906.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    906.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.59
  RAINFALL INTENSITY(INCH/HR) =   1.94
  TOTAL STREAM AREA(ACRES) =     4.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.31
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    907.00 TO NODE    908.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1030.00
  UPSTREAM ELEVATION(FEET) =   1646.00
  DOWNSTREAM ELEVATION(FEET) =   1596.00
  ELEVATION DIFFERENCE(FEET) =     50.00
  TC = 0.303*[( 1030.00**3)/(    50.00)]**.2 =    8.902
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.010
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8793
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.47
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =      2.47

****************************************************************************
  FLOW PROCESS FROM NODE    908.00 TO NODE    906.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.47
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    906.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    906.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.17
  RAINFALL INTENSITY(INCH/HR) =   1.98
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.47

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.07     8.96        2.005          4.60
      1        8.31     9.59        1.938          4.60
      2        2.47     9.17        1.981          1.40

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



```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       10.49     8.96        2.005
      2       10.45     9.17        1.981
      3       10.73     9.59        1.938

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.73   Tc(MIN.) =    9.59
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    906.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    909.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.79
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.73
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    9.71
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    909.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.71
  RAINFALL INTENSITY(INCH/HR) =   1.93
  TOTAL STREAM AREA(ACRES) =     6.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.73

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    909.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =   1597.00
  DOWNSTREAM ELEVATION(FEET) =   1591.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  TC = 0.303*[(  250.00**3)/(     6.00)]**.2 =    5.817
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.477
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8825
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.37
  TOTAL AREA(ACRES) =      2.00   TOTAL RUNOFF(CFS) =      4.37
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.82
 RAINFALL INTENSITY(INCH/HR) =   2.48
 TOTAL STREAM AREA(ACRES) =     2.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.37

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       10.49     9.08        1.991          6.00
     1       10.45     9.30        1.968          6.00
     1       10.73     9.71        1.926          6.00
     2        4.37     5.82        2.477          2.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       11.09     5.82       2.477
     2       14.00     9.08       1.991
     3       13.93     9.30       1.968
     4       14.13     9.71       1.926

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      14.13   Tc(MIN.) =    9.71
 TOTAL AREA(ACRES) =        8.0
 LONGEST FLOWPATH FROM NODE    907.00 TO NODE    909.00 =    1180.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    911.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.13
 PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   10.72
 LONGEST FLOWPATH FROM NODE    907.00 TO NODE    911.00 =    1610.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    911.00 TO NODE    911.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
```



```
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.72
 RAINFALL INTENSITY(INCH/HR) =   1.83
 TOTAL STREAM AREA(ACRES) =     8.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.13

****************************************************************************
 FLOW PROCESS FROM NODE    912.00 TO NODE    911.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   820.00
 UPSTREAM ELEVATION(FEET) =   1597.00
 DOWNSTREAM ELEVATION(FEET) =   1592.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 TC = 0.303*[(  820.00**3)/(     5.00)]**.2 =   12.305
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.715
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8767
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      6.31
 TOTAL AREA(ACRES) =      4.20   TOTAL RUNOFF(CFS) =      6.31

****************************************************************************
 FLOW PROCESS FROM NODE    911.00 TO NODE    911.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.30
 RAINFALL INTENSITY(INCH/HR) =   1.71
 TOTAL STREAM AREA(ACRES) =     4.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.31

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       11.09     6.87        2.284          8.00
     1       14.00    10.09        1.891          8.00
     1       13.93    10.31        1.871          8.00
     1       14.13    10.72        1.835          8.00
     2        6.31    12.30        1.715          4.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       14.62     6.87       2.284
     2       19.18    10.09       1.891
     3       19.22    10.31       1.871
     4       19.63    10.72       1.835
     5       19.52    12.30       1.715
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.63   Tc(MIN.) =   10.72
  TOTAL AREA(ACRES) =       12.2
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    911.00 =    1610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.63
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    902.00 =    1740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.62     7.09       2.248       12.20
      2       19.18    10.30       1.871       12.20
      3       19.22    10.52       1.852       12.20
      4       19.63    10.94       1.817       12.20
      5       19.52    12.52       1.700       12.20
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    902.00 =    1740.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.30    11.12       1.802        3.70
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1240.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      18.00       7.09       2.248
      2      24.09      10.30       1.871
      3      24.23      10.52       1.852
      4      24.84      10.94       1.817
      5      24.77      11.12       1.802
      6      24.52      12.52       1.700

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.84   Tc(MIN.) =   10.94
  TOTAL AREA(ACRES) =       15.9

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



```
  FLOW PROCESS FROM NODE    902.00 TO NODE    913.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.84
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.17
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    913.00 =    1870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    915.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   640.00
  UPSTREAM ELEVATION(FEET) =   1654.00
  DOWNSTREAM ELEVATION(FEET) =   1603.00
  ELEVATION DIFFERENCE(FEET) =     51.00
  TC = 0.533*[(  640.00**3)/(    51.00)]**.2 =   11.711
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.757
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6712
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.30
  TOTAL AREA(ACRES) =      2.80   TOTAL RUNOFF(CFS) =      3.30

****************************************************************************
  FLOW PROCESS FROM NODE    915.00 TO NODE    916.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =   640.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.30
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =   12.89
  LONGEST FLOWPATH FROM NODE    914.00 TO NODE    916.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.89
  RAINFALL INTENSITY(INCH/HR) =   1.68
  TOTAL STREAM AREA(ACRES) =     2.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.30

****************************************************************************
  FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   840.00
  UPSTREAM ELEVATION(FEET) =   1606.00
  DOWNSTREAM ELEVATION(FEET) =   1567.00
  ELEVATION DIFFERENCE(FEET) =     39.00
  TC = 0.303*[(  840.00**3)/(    39.00)]**.2 =    8.278
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.083
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8799
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.38
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =      2.38

****************************************************************************
  FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.083
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6990
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.73
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       3.11
  TC(MIN.) =    8.28

****************************************************************************
  FLOW PROCESS FROM NODE    918.00 TO NODE    916.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.11
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    8.61
  LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =     970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```



```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.61
  RAINFALL INTENSITY(INCH/HR) =   2.04
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.11

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.30    12.89        1.676          2.80
      2        3.11     8.61        2.043          1.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        5.32     8.61        2.043
      2        5.85    12.89        1.676

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.85   Tc(MIN.) =   12.89
  TOTAL AREA(ACRES) =        4.6
  LONGEST FLOWPATH FROM NODE    914.00 TO NODE    916.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    916.00 TO NODE    913.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.85
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   13.21
  LONGEST FLOWPATH FROM NODE    914.00 TO NODE    913.00 =    1410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.32     8.94        2.006        4.60
      2        5.85    13.21        1.656        4.60
  LONGEST FLOWPATH FROM NODE    914.00 TO NODE    913.00 =    1410.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
```

```
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       18.00      7.34       2.210       15.90
      2       24.09     10.53       1.851       15.90
      3       24.23     10.75       1.832       15.90
      4       24.84     11.17       1.799       15.90
      5       24.77     11.35       1.785       15.90
      6       24.52     12.75       1.685       15.90
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    913.00 =    1870.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      22.36       7.34       2.210
      2      25.76       8.94       2.006
      3      29.00      10.53       1.851
      4      29.09      10.75       1.832
      5      29.79      11.17       1.799
      6      29.80      11.35       1.785
      7      30.17      12.75       1.685
      8      29.95      13.21       1.656

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.17   Tc(MIN.) =   12.75
  TOTAL AREA(ACRES) =       20.5

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    919.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.13
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.17
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   13.03
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    919.00 =    2040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.03
  RAINFALL INTENSITY(INCH/HR) =   1.67
  TOTAL STREAM AREA(ACRES) =    20.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.17

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```



```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   900.00
  UPSTREAM ELEVATION(FEET) =   1595.00
  DOWNSTREAM ELEVATION(FEET) =   1562.00
  ELEVATION DIFFERENCE(FEET) =     33.00
  TC = 0.303*[(  900.00**3)/(    33.00)]**.2 =    8.921
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.008
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8793
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.41
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    919.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.41
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    919.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    919.00 TO NODE    919.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   1.99
  TOTAL STREAM AREA(ACRES) =     0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.41

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.36      7.64       2.167         20.50
      1       25.76      9.24       1.974         20.50
      1       29.00     10.81       1.827         20.50
      1       29.09     11.03       1.809         20.50
      1       29.79     11.45       1.777         20.50
      1       29.80     11.63       1.763         20.50
      1       30.17     13.03       1.668         20.50
      1       29.95     13.49       1.639         20.50
      2        1.41      9.08       1.991          0.80

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       23.55     7.64       2.167
     2       26.73     9.08       1.991
     3       27.16     9.24       1.974
     4       30.29    10.81       1.827
     5       30.37    11.03       1.809
     6       31.05    11.45       1.777
     7       31.05    11.63       1.763
     8       31.35    13.03       1.668
     9       31.11    13.49       1.639

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      31.35   Tc(MIN.) =   13.03
 TOTAL AREA(ACRES) =       21.3
 LONGEST FLOWPATH FROM NODE    907.00 TO NODE    919.00 =    2040.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       21.3  TC(MIN.) =     13.03
 PEAK FLOW RATE(CFS)   =      31.35
 *** PEAK FLOW RATE TABLE ***
        Q(CFS)   Tc(MIN.)
 1       23.55       7.64
 2       26.73       9.08
 3       27.16       9.24
 4       30.29      10.81
 5       30.37      11.03
 6       31.05      11.45
 7       31.05      11.63
 8       31.35      13.03
 9       31.11      13.49
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY PROPOSED CONDITION RATIONAL METHOD HYDROLOGY              *
* 100 YEAR STORM EVENT FOR AREA TRIBUTARY TO LATERAL B-8                *
 ************************************************************************

  FILE NAME: P100_B8.DAT
  TIME/DATE OF STUDY: 11:33 07/03/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.120
  SLOPE OF INTENSITY DURATION CURVE = 0.4890
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
```



```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   980.00
  UPSTREAM ELEVATION(FEET) =   1715.00
  DOWNSTREAM ELEVATION(FEET) =   1670.00
  ELEVATION DIFFERENCE(FEET) =     45.00
  TC = 0.533*[(  980.00**3)/(    45.00)]**.2 =   15.506
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.171
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7053
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     16.54
  TOTAL AREA(ACRES) =     10.80   TOTAL RUNOFF(CFS) =     16.54

************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  91
------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0390
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1230.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.004
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6928
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     23.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.42
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.76   Tc(MIN.) =   18.27
  SUBAREA AREA(ACRES) =    9.60       SUBAREA RUNOFF(CFS) =   13.33
  TOTAL AREA(ACRES) =       20.4         PEAK FLOW RATE(CFS) =      29.86

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.20   FLOOD WIDTH(FEET) =    5.23
  FLOW VELOCITY(FEET/SEC.) =   7.44   DEPTH*VELOCITY(FT*FT/SEC) =   8.95
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =    2210.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.86
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   18.72
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    803.00 =    2510.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    803.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.72
  RAINFALL INTENSITY(INCH/HR) =   1.98
  TOTAL STREAM AREA(ACRES) =    20.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.86

****************************************************************************
  FLOW PROCESS FROM NODE    804.00 TO NODE    805.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1733.00
  DOWNSTREAM ELEVATION(FEET) =   1663.00
  ELEVATION DIFFERENCE(FEET) =     70.00
  TC = 0.533*[( 1000.00**3)/(    70.00)]**.2 =   14.368
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.253
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7110
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     16.50
  TOTAL AREA(ACRES) =     10.30   TOTAL RUNOFF(CFS) =     16.50

****************************************************************************
  FLOW PROCESS FROM NODE    805.00 TO NODE    806.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0400
  CHANNEL LENGTH THRU SUBAREA(FEET) =   850.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.800
  PAVEMENT LIP(FEET) =  0.400   MANNING'S N = .0300
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.121
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7018
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     24.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.52
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =    5.00
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.88   Tc(MIN.) =   16.25
  SUBAREA AREA(ACRES) =   11.00       SUBAREA RUNOFF(CFS) =   16.38
  TOTAL AREA(ACRES) =       21.3         PEAK FLOW RATE(CFS) =      32.88

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.24   FLOOD WIDTH(FEET) =    9.30
  FLOW VELOCITY(FEET/SEC.) =   7.63   DEPTH*VELOCITY(FT*FT/SEC) =   9.49
  LONGEST FLOWPATH FROM NODE    804.00 TO NODE    806.00 =    1850.00 FEET.

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



```
  FLOW PROCESS FROM NODE    806.00 TO NODE    803.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.59
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.88
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   16.42
  LONGEST FLOWPATH FROM NODE    804.00 TO NODE    803.00 =    1970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    803.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.42
  RAINFALL INTENSITY(INCH/HR) =   2.11
  TOTAL STREAM AREA(ACRES) =    21.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.88

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       29.86    18.72        1.980         20.40
      2       32.88    16.42        2.110         21.30

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       59.08    16.42       2.110
      2       60.70    18.72       1.980

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      60.70   Tc(MIN.) =   18.72
  TOTAL AREA(ACRES) =       41.7
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    803.00 =    2510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    803.00 TO NODE    807.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.42
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      60.70
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   19.33
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    807.00 =    3000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    807.00 TO NODE    807.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.33
  RAINFALL INTENSITY(INCH/HR) =   1.95
  TOTAL STREAM AREA(ACRES) =    41.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     60.70

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    809.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   570.00
  UPSTREAM ELEVATION(FEET) =   1704.00
  DOWNSTREAM ELEVATION(FEET) =   1648.00
  ELEVATION DIFFERENCE(FEET) =     56.00
  TC = 0.533*[(  570.00**3)/(    56.00)]**.2 =   10.722
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.600
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7315
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.61
  TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =      3.61

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    807.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.61
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE    808.00 TO NODE    807.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    807.00 TO NODE    807.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```



```
  TIME OF CONCENTRATION(MIN.) =   11.10
  RAINFALL INTENSITY(INCH/HR) =   2.56
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.61

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       59.08    17.04        2.073         41.70
      1       60.70    19.33        1.949         41.70
      2        3.61    11.10        2.557          1.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       42.09    11.10       2.557
      2       62.00    17.04       2.073
      3       63.45    19.33       1.949

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.45   Tc(MIN.) =   19.33
  TOTAL AREA(ACRES) =       43.6
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    807.00 =    3000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    807.00 TO NODE    810.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.51
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.45
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   19.71
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    810.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    810.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.71
  RAINFALL INTENSITY(INCH/HR) =   1.93
  TOTAL STREAM AREA(ACRES) =    43.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     63.45

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
  UPSTREAM ELEVATION(FEET) =   1718.00
  DOWNSTREAM ELEVATION(FEET) =   1649.00
  ELEVATION DIFFERENCE(FEET) =     69.00
  TC = 0.533*[(  720.00**3)/(    69.00)]**.2 =   11.831
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.478
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7248
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.13
  TOTAL AREA(ACRES) =      2.30   TOTAL RUNOFF(CFS) =      4.13

****************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    810.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.13
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   12.20
  LONGEST FLOWPATH FROM NODE    811.00 TO NODE    810.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    810.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.20
  RAINFALL INTENSITY(INCH/HR) =   2.44
  TOTAL STREAM AREA(ACRES) =     2.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.13

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       42.09    11.52        2.510         43.60
      1       62.00    17.43        2.050         43.60
      1       63.45    19.71        1.930         43.60
      2        4.13    12.20        2.441          2.30

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       45.99    11.52       2.510
```



```
      2       47.52    12.20       2.441
      3       65.47    17.43       2.050
      4       66.72    19.71       1.930

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      66.72   Tc(MIN.) =   19.71
  TOTAL AREA(ACRES) =       45.9
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    810.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    813.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.60
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.72
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   20.21
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    813.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    814.00 TO NODE    815.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1190.00
  UPSTREAM ELEVATION(FEET) =   1691.00
  DOWNSTREAM ELEVATION(FEET) =   1605.00
  ELEVATION DIFFERENCE(FEET) =     86.00
  TC = 0.533*[( 1190.00**3)/(    86.00)]**.2 =   15.305
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.185
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7063
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.17
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =      6.17

****************************************************************************
  FLOW PROCESS FROM NODE    815.00 TO NODE    816.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   670.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.4 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.17
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   16.76
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    816.00 =    1860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    816.00 TO NODE    816.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.76
  RAINFALL INTENSITY(INCH/HR) =   2.09
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.17

****************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    818.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   460.00
  UPSTREAM ELEVATION(FEET) =   1702.00
  DOWNSTREAM ELEVATION(FEET) =   1620.00
  ELEVATION DIFFERENCE(FEET) =     82.00
  TC = 0.533*[(  460.00**3)/(    82.00)]**.2 =    8.736
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.874
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7448
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.14
  TOTAL AREA(ACRES) =      2.40   TOTAL RUNOFF(CFS) =      5.14

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    816.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.14
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.05
  LONGEST FLOWPATH FROM NODE    817.00 TO NODE    816.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    816.00 TO NODE    816.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```



```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.05
  RAINFALL INTENSITY(INCH/HR) =   2.82
  TOTAL STREAM AREA(ACRES) =     2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.14

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.17    16.76        2.090          4.00
      2        5.14     9.05        2.824          2.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.47     9.05       2.824
      2        9.97    16.76       2.090

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.97   Tc(MIN.) =   16.76
  TOTAL AREA(ACRES) =        6.4
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    816.00 =    1860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    816.00 TO NODE    819.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.97
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   17.49
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    819.00 =    2240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    819.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.49
  RAINFALL INTENSITY(INCH/HR) =   2.05
  TOTAL STREAM AREA(ACRES) =     6.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.97

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    821.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1690.00
  DOWNSTREAM ELEVATION(FEET) =   1644.00
  ELEVATION DIFFERENCE(FEET) =     46.00
  TC = 0.533*[(  100.00**3)/(    46.00)]**.2 =    3.925
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.775
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7768
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE    821.00 TO NODE    819.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.09
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE    820.00 TO NODE    819.00 =     250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    819.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.49
  RAINFALL INTENSITY(INCH/HR) =   3.61
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.47     9.84        2.711          6.40
      1        9.97    17.49        2.046          6.40
      2        1.17     5.49        3.606          0.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.90     5.49       3.606
```



```
      2        9.35     9.84       2.711
      3       10.64    17.49       2.046

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.64   Tc(MIN.) =   17.49
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    819.00 =    2240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    822.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.64
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   17.78
  LONGEST FLOWPATH FROM NODE    814.00 TO NODE    822.00 =    2390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    822.00 TO NODE    822.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.78
  RAINFALL INTENSITY(INCH/HR) =   2.03
  TOTAL STREAM AREA(ACRES) =     6.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.64

****************************************************************************
  FLOW PROCESS FROM NODE    814.00 TO NODE    823.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   410.00
  UPSTREAM ELEVATION(FEET) =   1691.00
  DOWNSTREAM ELEVATION(FEET) =   1644.00
  ELEVATION DIFFERENCE(FEET) =     47.00
  TC = 0.533*[(  410.00**3)/(    47.00)]**.2 =    9.113
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.815
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7421
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.31
  TOTAL AREA(ACRES) =      3.50   TOTAL RUNOFF(CFS) =      7.31

****************************************************************************
  FLOW PROCESS FROM NODE    823.00 TO NODE    822.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.31
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    9.47
 LONGEST FLOWPATH FROM NODE    814.00 TO NODE    822.00 =     580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    822.00 TO NODE    822.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.47
 RAINFALL INTENSITY(INCH/HR) =   2.76
 TOTAL STREAM AREA(ACRES) =     3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.31

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        5.90     5.82        3.505          6.80
     1        9.35    10.13        2.673          6.80
     1       10.64    17.78        2.030          6.80
     2        7.31     9.47        2.763          3.50

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       10.39     5.82       3.505
     2       16.05     9.47       2.763
     3       16.43    10.13       2.673
     4       16.01    17.78       2.030

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      16.43   Tc(MIN.) =   10.13
 TOTAL AREA(ACRES) =       10.3
 LONGEST FLOWPATH FROM NODE    814.00 TO NODE    822.00 =    2390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    822.00 TO NODE    813.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.76
```



```
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.43
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.30
 LONGEST FLOWPATH FROM NODE    814.00 TO NODE    813.00 =    2490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       10.39     6.01       3.450       10.30
     2       16.05     9.64       2.738       10.30
     3       16.43    10.30       2.651       10.30
     4       16.01    17.95       2.021       10.30
 LONGEST FLOWPATH FROM NODE    814.00 TO NODE    813.00 =    2490.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       45.99    12.08       2.453       45.90
     2       47.52    12.75       2.389       45.90
     3       65.47    17.93       2.022       45.90
     4       66.72    20.21       1.907       45.90
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    813.00 =    3560.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF      Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      33.29      6.01       3.450
     2      52.78      9.64       2.738
     3      55.67     10.30       2.651
     4      61.19     12.08       2.453
     5      62.32     12.75       2.389
     6      81.47     17.93       2.022
     7      81.45     17.95       2.021
     8      81.83     20.21       1.907

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      81.83   Tc(MIN.) =   20.21
 TOTAL AREA(ACRES) =       56.2

****************************************************************************
 FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    813.00 TO NODE    824.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0400
```

```
  FLOW LENGTH(FEET) =   510.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.83
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      81.83
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   20.66
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    824.00 =    4070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    825.00 TO NODE    826.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  UPSTREAM ELEVATION(FEET) =   1622.00
  DOWNSTREAM ELEVATION(FEET) =   1598.00
  ELEVATION DIFFERENCE(FEET) =     24.00
  TC = 0.303*[(  290.00**3)/(    24.00)]**.2 =    4.819
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.775
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.70
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      5.70

****************************************************************************
  FLOW PROCESS FROM NODE    826.00 TO NODE    827.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.67
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.70
  PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =    6.94
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    827.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    827.00 TO NODE    827.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.94
  RAINFALL INTENSITY(INCH/HR) =   3.22
```



```
  TOTAL STREAM AREA(ACRES) =     1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.70

****************************************************************************
  FLOW PROCESS FROM NODE    828.00 TO NODE    827.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   480.00
  UPSTREAM ELEVATION(FEET) =   1605.00
  DOWNSTREAM ELEVATION(FEET) =   1587.00
  ELEVATION DIFFERENCE(FEET) =     18.00
  TC = 0.303*[(  480.00**3)/(    18.00)]**.2 =    6.907
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.224
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8859
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.71
  TOTAL AREA(ACRES) =      2.00   TOTAL RUNOFF(CFS) =      5.71

****************************************************************************
  FLOW PROCESS FROM NODE    827.00 TO NODE    827.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.91
  RAINFALL INTENSITY(INCH/HR) =   3.22
  TOTAL STREAM AREA(ACRES) =     2.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.71

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.70     6.94        3.216          1.70
      2        5.71     6.91        3.224          2.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       11.38     6.91        3.224
      2       11.40     6.94        3.216

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.40   Tc(MIN.) =    6.94
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    827.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    827.00 TO NODE    829.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.40
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.13
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    829.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    829.00 TO NODE    829.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.13
  RAINFALL INTENSITY(INCH/HR) =   3.17
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.40

****************************************************************************
  FLOW PROCESS FROM NODE    830.00 TO NODE    829.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   640.00
  UPSTREAM ELEVATION(FEET) =   1614.00
  DOWNSTREAM ELEVATION(FEET) =   1592.00
  ELEVATION DIFFERENCE(FEET) =     22.00
  TC = 0.303*[(  640.00**3)/(    22.00)]**.2 =    7.885
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.021
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.74
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =      3.74

****************************************************************************
  FLOW PROCESS FROM NODE    829.00 TO NODE    829.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.89
  RAINFALL INTENSITY(INCH/HR) =   3.02
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.74

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```



```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.38     7.09        3.182          3.70
      1       11.40     7.13        3.174          3.70
      2        3.74     7.89        3.021          1.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       14.75     7.09       3.182
      2       14.78     7.13       3.174
      3       14.59     7.89       3.021

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.78   Tc(MIN.) =    7.13
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    829.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    829.00 TO NODE    824.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.20
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    824.00 =    1090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.20
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     5.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.78

****************************************************************************
  FLOW PROCESS FROM NODE    830.00 TO NODE    831.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   640.00
  UPSTREAM ELEVATION(FEET) =   1614.00
  DOWNSTREAM ELEVATION(FEET) =   1592.00
```

```
  ELEVATION DIFFERENCE(FEET) =     22.00
  TC = 0.303*[(  640.00**3)/(    22.00)]**.2 =    7.885
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.021
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.28
  TOTAL AREA(ACRES) =      1.60   TOTAL RUNOFF(CFS) =      4.28

****************************************************************************
  FLOW PROCESS FROM NODE    831.00 TO NODE    824.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.88
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.28
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    830.00 TO NODE    824.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.98
  RAINFALL INTENSITY(INCH/HR) =   3.00
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       14.75     7.16        3.166          5.10
      1       14.78     7.20        3.159          5.10
      1       14.59     7.96        3.008          5.10
      2        4.28     7.98        3.003          1.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       18.59     7.16       3.166
      2       18.64     7.20       3.159
      3       18.86     7.96       3.008
      4       18.85     7.98       3.003

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.86   Tc(MIN.) =    7.96
  TOTAL AREA(ACRES) =        6.7
```



```
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    824.00 =    1090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       18.59     7.16        3.166        6.70
      2       18.64     7.20        3.159        6.70
      3       18.86     7.96        3.008        6.70
      4       18.85     7.98        3.003        6.70
  LONGEST FLOWPATH FROM NODE    825.00 TO NODE    824.00 =    1090.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       33.29     6.57        3.302       56.20
      2       52.78    10.15        2.670       56.20
      3       55.67    10.81        2.590       56.20
      4       61.19    12.56        2.406       56.20
      5       62.32    13.23        2.346       56.20
      6       81.47    18.38        1.997       56.20
      7       81.45    18.40        1.996       56.20
      8       81.83    20.66        1.886       56.20
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    824.00 =    4070.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      50.35       6.57        3.302
      2      55.84       7.16        3.166
      3      56.06       7.20        3.159
      4      60.22       7.96        3.008
      5      60.35       7.98        3.003
      6      69.53      10.15        2.670
      7      71.92      10.81        2.590
      8      76.29      12.56        2.406
      9      77.04      13.23        2.346
     10      94.00      18.38        1.997
     11      93.98      18.40        1.996
     12      93.66      20.66        1.886

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      94.00   Tc(MIN.) =   18.38
  TOTAL AREA(ACRES) =       62.9

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    824.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    824.00 TO NODE    832.00 IS CODE =  31
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.98
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.00
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   18.48
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    832.00 =    4160.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    832.00 TO NODE    832.00 IS CODE =  10
------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
========================================================================

************************************************************************
  FLOW PROCESS FROM NODE    833.00 TO NODE    834.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   440.00
  UPSTREAM ELEVATION(FEET) =   1622.00
  DOWNSTREAM ELEVATION(FEET) =   1617.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  440.00**3)/(     5.00)]**.2 =    8.470
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.918
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8847
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      8.26
  TOTAL AREA(ACRES) =      3.20   TOTAL RUNOFF(CFS) =      8.26

************************************************************************
  FLOW PROCESS FROM NODE    834.00 TO NODE    835.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   830.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.26
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    835.00 =    1270.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    835.00 TO NODE    835.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
```



```
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   2.61
  TOTAL STREAM AREA(ACRES) =     3.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.26

************************************************************************
  FLOW PROCESS FROM NODE    833.00 TO NODE    835.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   470.00
  UPSTREAM ELEVATION(FEET) =   1622.00
  DOWNSTREAM ELEVATION(FEET) =   1617.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  470.00**3)/(     5.00)]**.2 =    8.812
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.862
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8844
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.28
  TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      2.28

************************************************************************
  FLOW PROCESS FROM NODE    835.00 TO NODE    835.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   2.86
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.28

************************************************************************
  FLOW PROCESS FROM NODE    836.00 TO NODE    837.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  UPSTREAM ELEVATION(FEET) =   1620.00
  DOWNSTREAM ELEVATION(FEET) =   1615.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  TC = 0.303*[(  350.00**3)/(     5.00)]**.2 =    7.383
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.120
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8855
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.97
  TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =      4.97

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

```
 FLOW PROCESS FROM NODE    837.00 TO NODE    835.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.97
 PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    8.58
 LONGEST FLOWPATH FROM NODE    836.00 TO NODE    835.00 =     750.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    835.00 TO NODE    835.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.58
 RAINFALL INTENSITY(INCH/HR) =   2.90
 TOTAL STREAM AREA(ACRES) =     1.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.97

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.26    10.66        2.607          3.20
     2        2.28     8.81        2.862          0.90
     3        4.97     8.58        2.899          1.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       13.84     8.58       2.899
     2       14.01     8.81       2.862
     3       14.81    10.66       2.607

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      14.81   Tc(MIN.) =   10.66
 TOTAL AREA(ACRES) =        5.9
 LONGEST FLOWPATH FROM NODE    833.00 TO NODE    835.00 =    1270.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    835.00 TO NODE    838.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
```



```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.81
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.79
 LONGEST FLOWPATH FROM NODE    833.00 TO NODE    838.00 =    1340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    838.00 TO NODE    838.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.79
 RAINFALL INTENSITY(INCH/HR) =   2.59
 TOTAL STREAM AREA(ACRES) =     5.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.81

****************************************************************************
 FLOW PROCESS FROM NODE    839.00 TO NODE    838.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   710.00
 UPSTREAM ELEVATION(FEET) =   1628.00
 DOWNSTREAM ELEVATION(FEET) =   1597.00
 ELEVATION DIFFERENCE(FEET) =     31.00
 TC = 0.303*[(  710.00**3)/(    31.00)]**.2 =    7.836
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.031
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      2.41
 TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      2.41

****************************************************************************
 FLOW PROCESS FROM NODE    838.00 TO NODE    838.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.84
 RAINFALL INTENSITY(INCH/HR) =   3.03
 TOTAL STREAM AREA(ACRES) =     0.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.41

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       13.84     8.71       2.878          5.90
     1       14.01     8.94       2.842          5.90
     1       14.81    10.79       2.592          5.90
     2        2.41     7.84       3.031          0.90
```

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       14.86     7.84       3.031
      2       16.13     8.71       2.878
      3       16.28     8.94       2.842
      4       16.87    10.79       2.592

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.87   Tc(MIN.) =   10.79
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    838.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    838.00 TO NODE    840.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =  1100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.56
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.87
  PIPE TRAVEL TIME(MIN.) =   2.42    Tc(MIN.) =   13.21
  LONGEST FLOWPATH FROM NODE    833.00 TO NODE    840.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    840.00 TO NODE    840.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    834.00 TO NODE    841.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
  UPSTREAM ELEVATION(FEET) =   1617.00
  DOWNSTREAM ELEVATION(FEET) =   1615.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.303*[(  400.00**3)/(     2.00)]**.2 =    9.608
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.743
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8839
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      9.21
  TOTAL AREA(ACRES) =      3.80   TOTAL RUNOFF(CFS) =      9.21

****************************************************************************
  FLOW PROCESS FROM NODE    841.00 TO NODE    842.00 IS CODE =  31
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.21
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE    834.00 TO NODE    842.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    842.00 TO NODE    842.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.02
  RAINFALL INTENSITY(INCH/HR) =   2.69
  TOTAL STREAM AREA(ACRES) =     3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.21

****************************************************************************
  FLOW PROCESS FROM NODE    843.00 TO NODE    844.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   730.00
  UPSTREAM ELEVATION(FEET) =   1635.00
  DOWNSTREAM ELEVATION(FEET) =   1618.00
  ELEVATION DIFFERENCE(FEET) =     17.00
  TC = 0.303*[(  730.00**3)/(    17.00)]**.2 =    8.984
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.835
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8843
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.76
  TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      2.76

****************************************************************************
  FLOW PROCESS FROM NODE    844.00 TO NODE    842.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.76
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.30
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    842.00 =     850.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    842.00 TO NODE    842.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.30
  RAINFALL INTENSITY(INCH/HR) =   2.79
  TOTAL STREAM AREA(ACRES) =     1.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.76

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.21    10.02        2.687          3.80
      2        2.76     9.30        2.787          1.10

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       11.31     9.30       2.787
      2       11.87    10.02       2.687

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.87   Tc(MIN.) =   10.02
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    842.00 =     850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    842.00 TO NODE    845.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.93
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.87
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   10.55
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    845.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    845.00 TO NODE    845.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.55
  RAINFALL INTENSITY(INCH/HR) =   2.62
```



```
  TOTAL STREAM AREA(ACRES) =     4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.87

****************************************************************************
  FLOW PROCESS FROM NODE    846.00 TO NODE    847.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  UPSTREAM ELEVATION(FEET) =   1650.00
  DOWNSTREAM ELEVATION(FEET) =   1615.00
  ELEVATION DIFFERENCE(FEET) =     35.00
  TC = 0.303*[(  240.00**3)/(    35.00)]**.2 =    3.989
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.775
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.01
  TOTAL AREA(ACRES) =      0.60   TOTAL RUNOFF(CFS) =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    847.00 TO NODE    845.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.01
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    5.76
  LONGEST FLOWPATH FROM NODE    846.00 TO NODE    845.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    845.00 TO NODE    845.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.76
  RAINFALL INTENSITY(INCH/HR) =   3.52
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.31     9.84        2.712          4.90
      1       11.87    10.55        2.620          4.90
      2        2.01     5.76        3.522          0.60
```

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        8.64     5.76       3.522
     2       12.85     9.84       2.712
     3       13.37    10.55       2.620

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.37   Tc(MIN.) =   10.55
 TOTAL AREA(ACRES) =        5.5
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    845.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    845.00 TO NODE    848.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.06
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.37
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.74
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    848.00 =    1150.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    848.00 TO NODE    848.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.74
 RAINFALL INTENSITY(INCH/HR) =   2.60
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.37

****************************************************************************
 FLOW PROCESS FROM NODE    849.00 TO NODE    848.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
 UPSTREAM ELEVATION(FEET) =   1615.00
 DOWNSTREAM ELEVATION(FEET) =   1609.00
 ELEVATION DIFFERENCE(FEET) =      6.00
 TC = 0.303*[(  400.00**3)/(     6.00)]**.2 =    7.712
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.054
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8852
 SOIL CLASSIFICATION IS "C"
```



```
 SUBAREA RUNOFF(CFS) =      5.95
 TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =      5.95

****************************************************************************
 FLOW PROCESS FROM NODE    848.00 TO NODE    848.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.71
 RAINFALL INTENSITY(INCH/HR) =   3.05
 TOTAL STREAM AREA(ACRES) =     2.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.95

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)      (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.64      5.97        3.461          5.50
     1       12.85     10.03        2.687          5.50
     1       13.37     10.74        2.597          5.50
     2        5.95      7.71        3.054          2.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       13.24      5.97       3.461
     2       15.84      7.71       3.054
     3       18.09     10.03       2.687
     4       18.43     10.74       2.597

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      18.43   Tc(MIN.) =   10.74
 TOTAL AREA(ACRES) =        7.7
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    848.00 =    1150.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    848.00 TO NODE    850.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.43
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   11.46
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    850.00 =    1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    850.00 TO NODE    850.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.46
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =     7.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.43

****************************************************************************
  FLOW PROCESS FROM NODE    837.00 TO NODE    850.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  UPSTREAM ELEVATION(FEET) =   1615.00
  DOWNSTREAM ELEVATION(FEET) =   1611.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[(  670.00**3)/(     4.00)]**.2 =   11.398
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.523
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8827
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      8.24
  TOTAL AREA(ACRES) =      3.70   TOTAL RUNOFF(CFS) =      8.24

****************************************************************************
  FLOW PROCESS FROM NODE    850.00 TO NODE    850.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.40
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.24

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.24     6.75        3.259          7.70
      1       15.84     8.45        2.921          7.70
      1       18.09    10.74        2.597          7.70
      1       18.43    11.46        2.517          7.70
      2        8.24    11.40        2.523          3.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       18.12     6.75       3.259
      2       21.95     8.45       2.921
```



```
      3       25.86    10.74       2.597
      4       26.57    11.40       2.523
      5       26.65    11.46       2.517

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.65   Tc(MIN.) =   11.46
  TOTAL AREA(ACRES) =       11.4
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    850.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    850.00 TO NODE    851.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.90
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.65
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE    843.00 TO NODE    851.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    851.00 TO NODE    851.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.505
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7263
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    2.20   SUBAREA RUNOFF(CFS) =    4.00
  TOTAL AREA(ACRES) =       13.6   TOTAL RUNOFF(CFS) =      30.65
  TC(MIN.) =   11.57

****************************************************************************
  FLOW PROCESS FROM NODE    851.00 TO NODE    851.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.57
  RAINFALL INTENSITY(INCH/HR) =   2.51
  TOTAL STREAM AREA(ACRES) =    13.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.65

****************************************************************************
  FLOW PROCESS FROM NODE    838.00 TO NODE    851.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1070.00
  UPSTREAM ELEVATION(FEET) =   1597.00
```

```
 DOWNSTREAM ELEVATION(FEET) =   1587.00
 ELEVATION DIFFERENCE(FEET) =     10.00
 TC = 0.303*[( 1070.00**3)/(    10.00)]**.2 =   12.567
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.406
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8821
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      3.18
 TOTAL AREA(ACRES) =      1.50   TOTAL RUNOFF(CFS) =      3.18

****************************************************************************
 FLOW PROCESS FROM NODE    851.00 TO NODE    851.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.57
 RAINFALL INTENSITY(INCH/HR) =   2.41
 TOTAL STREAM AREA(ACRES) =     1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.18

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       23.52     6.87        3.232         13.60
     1       26.71     8.56        2.903         13.60
     1       30.01    10.85        2.585         13.60
     1       30.58    11.50        2.512         13.60
     1       30.65    11.57        2.505         13.60
     2        3.18    12.57        2.406          1.50

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       25.26     6.87        3.232
     2       28.88     8.56        2.903
     3       32.76    10.85        2.585
     4       33.50    11.50        2.512
     5       33.58    11.57        2.505
     6       32.61    12.57        2.406

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      33.58   Tc(MIN.) =   11.57
 TOTAL AREA(ACRES) =       15.1
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    851.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    851.00 TO NODE    840.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
```



```
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.63
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      33.58
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.64
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    840.00 =    1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    840.00 TO NODE    840.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       25.26     6.95        3.214         15.10
     2       28.88     8.64        2.890         15.10
     3       32.76    10.92        2.576         15.10
     4       33.50    11.58        2.504         15.10
     5       33.58    11.64        2.498         15.10
     6       32.61    12.64        2.399         15.10
 LONGEST FLOWPATH FROM NODE    843.00 TO NODE    840.00 =    1600.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       14.86    10.41        2.638         6.80
     2       16.13    11.16        2.550         6.80
     3       16.28    11.38        2.525         6.80
     4       16.87    13.21        2.348         6.80
 LONGEST FLOWPATH FROM NODE    833.00 TO NODE    840.00 =    2440.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       35.31     6.95        3.214
     2       41.37     8.64        2.890
     3       46.08    10.41        2.638
     4       48.56    10.92        2.576
     5       48.56    11.16        2.550
     6       49.21    11.38        2.525
     7       49.64    11.58        2.504
     8       49.68    11.64        2.498
     9       48.76    12.64        2.399
    10       48.79    13.21        2.348

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      49.68   Tc(MIN.) =   11.64
 TOTAL AREA(ACRES) =       21.9

****************************************************************************
 FLOW PROCESS FROM NODE    840.00 TO NODE    840.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

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

```
 FLOW PROCESS FROM NODE    840.00 TO NODE    832.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.69
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      49.68
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   11.82
 LONGEST FLOWPATH FROM NODE    833.00 TO NODE    832.00 =    2580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    832.00 TO NODE    832.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       35.31     7.15       3.170       21.90
     2       41.37     8.83       2.859       21.90
     3       46.08    10.60       2.615       21.90
     4       48.56    11.11       2.555       21.90
     5       48.56    11.34       2.530       21.90
     6       49.21    11.56       2.506       21.90
     7       49.64    11.76       2.485       21.90
     8       49.68    11.82       2.479       21.90
     9       48.76    12.82       2.382       21.90
    10       48.79    13.39       2.332       21.90
 LONGEST FLOWPATH FROM NODE    833.00 TO NODE    832.00 =    2580.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       50.35     6.69       3.274       62.90
     2       55.84     7.28       3.142       62.90
     3       56.06     7.31       3.135       62.90
     4       60.22     8.07       2.988       62.90
     5       60.35     8.09       2.983       62.90
     6       69.53    10.26       2.656       62.90
     7       71.92    10.92       2.577       62.90
     8       76.29    12.67       2.396       62.90
     9       77.04    13.34       2.336       62.90
    10       94.00    18.48       1.992       62.90
    11       93.98    18.50       1.991       62.90
    12       93.66    20.76       1.882       62.90
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    832.00 =    4160.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      83.42       6.69       3.274
     2      90.14       7.15       3.170
     3      90.84       7.28       3.142
```



```
     4      90.98       7.31       3.135
     5      98.00       8.07       2.988
     6      98.26       8.09       2.983
     7     101.21       8.83       2.859
     8     114.39      10.26       2.656
     9     115.89      10.60       2.615
    10     119.63      10.92       2.577
    11     119.86      11.11       2.555
    12     119.15      11.34       2.530
    13     119.12      11.56       2.506
    14     120.48      11.76       2.485
    15     120.89      11.82       2.479
    16     124.45      12.67       2.396
    17     124.59      12.82       2.382
    18     125.63      13.34       2.336
    19     125.68      13.39       2.332
    20     135.68      18.48       1.992
    21     135.63      18.50       1.991
    22     133.04      20.76       1.882

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     135.68   Tc(MIN.) =   18.48
 TOTAL AREA(ACRES) =       84.8

****************************************************************************
 FLOW PROCESS FROM NODE    832.00 TO NODE    832.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    832.00 TO NODE    852.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0360
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.31
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     135.68
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   19.06
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    852.00 =    4860.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       84.8  TC(MIN.) =     19.06
 PEAK FLOW RATE(CFS)   =     135.68
 *** PEAK FLOW RATE TABLE ***
        Q(CFS)   Tc(MIN.)
 1       83.42       7.34
 2       90.14       7.79
 3       90.84       7.92
 4       90.98       7.95
 5       98.00       8.68
 6       98.26       8.71
 7      101.21       9.44
 8      114.39      10.86
```

9	115.89	11.20
10	119.63	11.52
11	119.86	11.71
12	119.15	11.94
13	119.12	12.17
14	120.48	12.35
15	120.89	12.41
16	124.45	13.25
17	124.59	13.40
18	125.63	13.92
19	125.68	13.97
20	135.68	19.06
21	135.63	19.08
22	133.04	21.34

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
                    (Rational Tabling Version 20.0)
                Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY PROPOSED CONDITION RATIONAL METHOD HYDROLOGY              *
* 100 YEAR STORM EVENT FOR AREA TRIBUTARY TO LATERAL B-9AA              *
 ************************************************************************

  FILE NAME: P100B9AA.DAT
  TIME/DATE OF STUDY: 13:54 07/03/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.880
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.690
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.120
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4909883
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4890234
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.120
  SLOPE OF INTENSITY DURATION CURVE = 0.4890
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====== =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
```



```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1140.00
  UPSTREAM ELEVATION(FEET) =   1592.00
  DOWNSTREAM ELEVATION(FEET) =   1567.00
  ELEVATION DIFFERENCE(FEET) =     25.00
  TC = 0.303*[( 1140.00**3)/(    25.00)]**.2 =   10.868
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.583
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8831
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.56
  TOTAL AREA(ACRES) =      2.00   TOTAL RUNOFF(CFS) =      4.56

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    901.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.583
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7306
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    1.70   SUBAREA RUNOFF(CFS) =    3.21
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =       7.77
  TC(MIN.) =   10.87

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.77
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1240.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  10
------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
========================================================================


**************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  UPSTREAM ELEVATION(FEET) =   1598.00
  DOWNSTREAM ELEVATION(FEET) =   1597.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  TC = 0.303*[(  190.00**3)/(     1.00)]**.2 =    7.061
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.189
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8858
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.80
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      4.80

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    905.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0060
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.60
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.80
  PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =    8.40
  LONGEST FLOWPATH FROM NODE    903.00 TO NODE    905.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.40
  RAINFALL INTENSITY(INCH/HR) =   2.93
  TOTAL STREAM AREA(ACRES) =     1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.80

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    905.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  UPSTREAM ELEVATION(FEET) =   1597.00
  DOWNSTREAM ELEVATION(FEET) =   1595.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  TC = 0.303*[(  370.00**3)/(     2.00)]**.2 =    9.169
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.807
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8842
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      7.20
  TOTAL AREA(ACRES) =      2.90   TOTAL RUNOFF(CFS) =      7.20

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



```
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.17
  RAINFALL INTENSITY(INCH/HR) =   2.81
  TOTAL STREAM AREA(ACRES) =     2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.80     8.40        2.929          1.70
      2        7.20     9.17        2.807          2.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.40     8.40       2.929
      2       11.80     9.17       2.807

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.80   Tc(MIN.) =    9.17
  TOTAL AREA(ACRES) =        4.6
  LONGEST FLOWPATH FROM NODE    903.00 TO NODE    905.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    906.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.80
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    9.55
  LONGEST FLOWPATH FROM NODE    903.00 TO NODE    906.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    906.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.55
  RAINFALL INTENSITY(INCH/HR) =   2.75
  TOTAL STREAM AREA(ACRES) =     4.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.80
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    907.00 TO NODE    908.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1030.00
  UPSTREAM ELEVATION(FEET) =   1646.00
  DOWNSTREAM ELEVATION(FEET) =   1596.00
  ELEVATION DIFFERENCE(FEET) =     50.00
  TC = 0.303*[( 1030.00**3)/(    50.00)]**.2 =    8.902
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.847
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8844
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.53
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =      3.53

****************************************************************************
  FLOW PROCESS FROM NODE    908.00 TO NODE    906.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.65
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.53
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.15
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    906.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    906.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.15
  RAINFALL INTENSITY(INCH/HR) =   2.81
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.53

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.40     8.79        2.865          4.60
      1       11.80     9.55        2.751          4.60
      2        3.53     9.15        2.809          1.40

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



```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       14.78     8.79        2.865
      2       14.83     9.15        2.809
      3       15.25     9.55        2.751

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.25   Tc(MIN.) =    9.55
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    906.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    909.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.41
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.25
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    9.67
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    909.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.67
  RAINFALL INTENSITY(INCH/HR) =   2.74
  TOTAL STREAM AREA(ACRES) =     6.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.25

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    909.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =   1597.00
  DOWNSTREAM ELEVATION(FEET) =   1591.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  TC = 0.303*[(  250.00**3)/(     6.00)]**.2 =    5.817
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.506
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      6.22
  TOTAL AREA(ACRES) =      2.00   TOTAL RUNOFF(CFS) =      6.22
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.82
 RAINFALL INTENSITY(INCH/HR) =   3.51
 TOTAL STREAM AREA(ACRES) =     2.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.22

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       14.78     8.91        2.847          6.00
     1       14.83     9.27        2.792          6.00
     1       15.25     9.67        2.735          6.00
     2        6.22     5.82        3.506          2.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       15.87     5.82        3.506
     2       19.83     8.91        2.847
     3       19.78     9.27        2.792
     4       20.10     9.67        2.735

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      20.10   Tc(MIN.) =    9.67
 TOTAL AREA(ACRES) =        8.0
 LONGEST FLOWPATH FROM NODE    907.00 TO NODE    909.00 =    1180.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    911.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.77
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      20.10
 PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.59
 LONGEST FLOWPATH FROM NODE    907.00 TO NODE    911.00 =    1610.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    911.00 TO NODE    911.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
```



```
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.59
 RAINFALL INTENSITY(INCH/HR) =   2.62
 TOTAL STREAM AREA(ACRES) =     8.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.10

****************************************************************************
 FLOW PROCESS FROM NODE    912.00 TO NODE    911.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   820.00
 UPSTREAM ELEVATION(FEET) =   1597.00
 DOWNSTREAM ELEVATION(FEET) =   1592.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 TC = 0.303*[(  820.00**3)/(     5.00)]**.2 =   12.305
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.431
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8822
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      9.01
 TOTAL AREA(ACRES) =      4.20   TOTAL RUNOFF(CFS) =      9.01

****************************************************************************
 FLOW PROCESS FROM NODE    911.00 TO NODE    911.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.30
 RAINFALL INTENSITY(INCH/HR) =   2.43
 TOTAL STREAM AREA(ACRES) =     4.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.01

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       15.87     6.78        3.254          8.00
     1       19.83     9.83        2.713          8.00
     1       19.78    10.19        2.665          8.00
     1       20.10    10.59        2.616          8.00
     2        9.01    12.30        2.431          4.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       20.83     6.78        3.254
     2       27.02     9.83        2.713
     3       27.24    10.19        2.665
     4       27.85    10.59        2.616
     5       27.68    12.30        2.431
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.85   Tc(MIN.) =   10.59
  TOTAL AREA(ACRES) =       12.2
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    911.00 =    1610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.96
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.85
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.79
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    902.00 =    1740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       20.83      6.99       3.205       12.20
      2       27.02     10.03       2.686       12.20
      3       27.24     10.39       2.640       12.20
      4       27.85     10.79       2.592       12.20
      5       27.68     12.50       2.412       12.20
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    902.00 =    1740.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.77     11.10       2.557        3.70
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1240.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      25.73       6.99       3.205
      2      34.05      10.03       2.686
      3      34.52      10.39       2.640
      4      35.40      10.79       2.592
      5      35.24      11.10       2.557
      6      35.01      12.50       2.412

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.40   Tc(MIN.) =   10.79
  TOTAL AREA(ACRES) =       15.9

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



```
  FLOW PROCESS FROM NODE    902.00 TO NODE    913.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.32
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.40
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   11.00
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    913.00 =    1870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    915.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   640.00
  UPSTREAM ELEVATION(FEET) =   1654.00
  DOWNSTREAM ELEVATION(FEET) =   1603.00
  ELEVATION DIFFERENCE(FEET) =     51.00
  TC = 0.533*[(  640.00**3)/(    51.00)]**.2 =   11.711
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.490
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7255
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      5.06
  TOTAL AREA(ACRES) =      2.80   TOTAL RUNOFF(CFS) =      5.06

****************************************************************************
  FLOW PROCESS FROM NODE    915.00 TO NODE    916.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  FLOW LENGTH(FEET) =   640.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.31
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.06
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   12.75
  LONGEST FLOWPATH FROM NODE    914.00 TO NODE    916.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.75
  RAINFALL INTENSITY(INCH/HR) =   2.39
  TOTAL STREAM AREA(ACRES) =     2.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.06

****************************************************************************
  FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   840.00
  UPSTREAM ELEVATION(FEET) =   1606.00
  DOWNSTREAM ELEVATION(FEET) =   1567.00
  ELEVATION DIFFERENCE(FEET) =     39.00
  TC = 0.303*[(  840.00**3)/(    39.00)]**.2 =    8.278
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.950
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8848
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.39
  TOTAL AREA(ACRES) =      1.30   TOTAL RUNOFF(CFS) =      3.39

****************************************************************************
  FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.950
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7481
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.10
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       4.50
  TC(MIN.) =    8.28

****************************************************************************
  FLOW PROCESS FROM NODE    918.00 TO NODE    916.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.50
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    8.59
  LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =     970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```



```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.59
  RAINFALL INTENSITY(INCH/HR) =   2.90
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.06    12.75        2.389          2.80
      2        4.50     8.59        2.897          1.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        7.91     8.59       2.897
      2        8.77    12.75       2.389

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.77   Tc(MIN.) =   12.75
  TOTAL AREA(ACRES) =        4.6
  LONGEST FLOWPATH FROM NODE    914.00 TO NODE    916.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    916.00 TO NODE    913.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.77
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   13.03
  LONGEST FLOWPATH FROM NODE    914.00 TO NODE    913.00 =    1410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.91     8.89       2.850        4.60
      2        8.77    13.03       2.363        4.60
  LONGEST FLOWPATH FROM NODE    914.00 TO NODE    913.00 =    1410.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
```

```
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       25.73      7.22       3.155       15.90
      2       34.05     10.24       2.659       15.90
      3       34.52     10.60       2.614       15.90
      4       35.40     11.00       2.568       15.90
      5       35.24     11.31       2.533       15.90
      6       35.01     12.71       2.392       15.90
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    913.00 =    1870.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      32.15       7.22        3.155
      2      37.46       8.89        2.850
      3      41.42      10.24        2.659
      4      41.77      10.60        2.614
      5      42.80      11.00        2.568
      6      42.84      11.31        2.533
      7      43.56      12.71        2.392
      8      43.35      13.03        2.363

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.56   Tc(MIN.) =   12.71
  TOTAL AREA(ACRES) =       20.5

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    919.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.56
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE    907.00 TO NODE    919.00 =    2040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.97
  RAINFALL INTENSITY(INCH/HR) =   2.37
  TOTAL STREAM AREA(ACRES) =    20.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.56

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```



```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   900.00
  UPSTREAM ELEVATION(FEET) =   1595.00
  DOWNSTREAM ELEVATION(FEET) =   1562.00
  ELEVATION DIFFERENCE(FEET) =     33.00
  TC = 0.303*[(  900.00**3)/(    33.00)]**.2 =    8.921
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.844
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8843
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.01
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    919.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.01
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.07
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    919.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    919.00 TO NODE    919.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.07
  RAINFALL INTENSITY(INCH/HR) =   2.82
  TOTAL STREAM AREA(ACRES) =     0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       32.15      7.50        3.097        20.50
      1       37.46      9.15        2.809        20.50
      1       41.42     10.50        2.627        20.50
      1       41.77     10.86        2.583        20.50
      1       42.80     11.25        2.539        20.50
      1       42.84     11.56        2.506        20.50
      1       43.56     12.97        2.369        20.50
      1       43.35     13.29        2.341        20.50
      2        2.01      9.07        2.822         0.80

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       33.81     7.50       3.097
     2       39.13     9.07       2.822
     3       39.46     9.15       2.809
     4       43.30    10.50       2.627
     5       43.61    10.86       2.583
     6       44.61    11.25       2.539
     7       44.63    11.56       2.506
     8       45.25    12.97       2.369
     9       45.02    13.29       2.341

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      45.25   Tc(MIN.) =   12.97
 TOTAL AREA(ACRES) =       21.3
 LONGEST FLOWPATH FROM NODE    907.00 TO NODE    919.00 =    2040.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       21.3  TC(MIN.) =     12.97
 PEAK FLOW RATE(CFS)   =      45.25
 *** PEAK FLOW RATE TABLE ***
        Q(CFS)   Tc(MIN.)
 1       33.81       7.50
 2       39.13       9.07
 3       39.46       9.15
 4       43.30      10.50
 5       43.61      10.86
 6       44.61      11.25
 7       44.63      11.56
 8       45.25      12.97
 9       45.02      13.29
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

             F L O O D    R O U T I N G    A N A L Y S I S

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                 (Synthetic Unit Hydrograph Version 20.0)
                 Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY EXISTING CONDITION HYDROGRAPH DEVELOPMENT                 *
* 10 YEAR - 24 HOUR STORM - 15 MIN INTERVAL AMC II                      *
 ************************************************************************

  FILE NAME: E10_B8.DAT
  TIME/DATE OF STUDY: 13:19 06/18/2019
```



```
**************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    808.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      71.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.296 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.115
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.900
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.058
         USER-ENTERED RAINFALL =  3.10 INCHES
         RCFC&WCD 24-Hour Storm (15-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 0.9999


         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  84.374


==========================================================================
                     UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER         MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------
        1               14.297               40.921
        2               60.254              131.537
        3               79.116               53.988
        4               87.017               22.614
        5               91.632               13.208
        6               94.693                8.761
        7               96.785                5.988
        8               98.126                3.840
        9               98.762                1.819
       10               99.344                1.666
       11               99.738                1.126
       12               99.934                0.563
       13              100.000                0.188


--------------------------------------------------------------------------

         TOTAL STORM RAINFALL(INCHES) =  3.10
         TOTAL SOIL-LOSS(INCHES) =  1.70
         TOTAL EFFECTIVE RAINFALL(INCHES) =  1.39
```

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

              F L O O D    R O U T I N G    A N A L Y S I S

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                  (Synthetic Unit Hydrograph Version 20.0)
                  Release Date: 06/01/2013  License ID 1264

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                              *
* PRELIMINARY PROPOSED CONDITION HYDROGRAPH DEVELOPMENT                  *
* 10 YEAR - 24 HOUR STORM - 15 MIN INTERVAL AMC II                       *
 **************************************************************************

  FILE NAME: P10_B8.DAT
  TIME/DATE OF STUDY: 15:53 07/03/2019
```



```
**************************************************************************
 FLOW PROCESS FROM NODE    800.00 TO NODE    832.00 IS CODE =   1
--------------------------------------------------------------------------
 >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

     (UNIT-HYDROGRAPH ADDED TO STREAM #1)

        WATERSHED AREA =      84.800 ACRES
        BASEFLOW =   0.000 CFS/SQUARE-MILE
        *USER ENTERED "LAG" TIME =    0.258 HOURS
         CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
         THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
         MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
        VALLEY S-GRAPH SELECTED
        UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.107
        LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.900
        MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.054
        USER-ENTERED RAINFALL =  3.10 INCHES
        RCFC&WCD 24-Hour Storm (15-Minute period) SELECTED
        RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 0.9998


        UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
        UNIT INTERVAL PERCENTAGE OF LAG-TIME =  96.749


==========================================================================
                    UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER         MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------
       1               17.999               61.531
       2               66.253              164.954
       3               82.532               55.651
       4               89.617               24.221
       5               93.753               14.138
       6               96.438                9.178
       7               98.069                5.577
       8               98.823                2.575
       9               99.424                2.057
      10               99.770                1.181
      11               99.942                0.590
      12              100.000                0.197


--------------------------------------------------------------------------

        TOTAL STORM RAINFALL(INCHES) =  3.10
        TOTAL SOIL-LOSS(INCHES) =  1.64
        TOTAL EFFECTIVE RAINFALL(INCHES) =  1.46

--------------------------------------------------------------------------
```

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 11.5960
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 10.3020

==========

2 4 - 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 FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
0.083	0.0003	0.04	Q	.	.	.	.
0.167	0.0005	0.04	Q	.	.	.	.
0.250	0.0008	0.04	Q	.	.	.	.
0.333	0.0019	0.16	Q	.	.	.	.
0.417	0.0030	0.16	Q	.	.	.	.
0.500	0.0041	0.16	Q	.	.	.	.
0.583	0.0058	0.25	Q	.	.	.	.
0.667	0.0075	0.25	Q	.	.	.	.
0.750	0.0091	0.25	Q	.	.	.	.
0.833	0.0112	0.30	Q	.	.	.	.
0.917	0.0132	0.30	Q	.	.	.	.
1.000	0.0153	0.30	Q	.	.	.	.
1.083	0.0176	0.34	Q	.	.	.	.
1.167	0.0200	0.34	Q	.	.	.	.
1.250	0.0224	0.34	Q	.	.	.	.
1.333	0.0246	0.32	Q	.	.	.	.
1.417	0.0268	0.32	Q	.	.	.	.
1.500	0.0290	0.32	Q	.	.	.	.
1.583	0.0312	0.32	Q	.	.	.	.
1.667	0.0334	0.32	Q	.	.	.	.
1.750	0.0356	0.32	Q	.	.	.	.
1.833	0.0379	0.34	Q	.	.	.	.
1.917	0.0402	0.34	Q	.	.	.	.
2.000	0.0425	0.34	Q	.	.	.	.
2.083	0.0452	0.39	Q	.	.	.	.
2.167	0.0479	0.39	Q	.	.	.	.
2.250	0.0506	0.39	Q	.	.	.	.
2.333	0.0534	0.41	Q	.	.	.	.
2.417	0.0562	0.41	Q	.	.	.	.
2.500	0.0590	0.41	Q	.	.	.	.
2.583	0.0619	0.43	Q	.	.	.	.
2.667	0.0649	0.43	Q	.	.	.	.
2.750	0.0679	0.43	Q	.	.	.	.
2.833	0.0713	0.49	Q	.	.	.	.
2.917	0.0746	0.49	Q	.	.	.	.
3.000	0.0780	0.49	Q	.	.	.	.
3.083	0.0815	0.51	Q	.	.	.	.
3.167	0.0850	0.51	Q	.	.	.	.
3.250	0.0885	0.51	Q	.	.	.	.
3.333	0.0920	0.52	Q	.	.	.	.
3.417	0.0956	0.52	Q	.	.	.	.
3.500	0.0991	0.52	Q	.	.	.	.
3.583	0.1027	0.52	Q	.	.	.	.
3.667	0.1063	0.52	Q	.	.	.	.
3.750	0.1099	0.52	Q	.	.	.	.
3.833	0.1137	0.54	Q	.	.	.	.
3.917	0.1174	0.54	Q	.	.	.	.

4.000	0.1212	0.54	Q	.	.	.	.
4.083	0.1253	0.60	Q	.	.	.	.
4.167	0.1294	0.60	Q	.	.	.	.
4.250	0.1335	0.60	Q	.	.	.	.
4.333	0.1379	0.63	Q	.	.	.	.
4.417	0.1423	0.63	Q	.	.	.	.
4.500	0.1466	0.63	Q	.	.	.	.
4.583	0.1514	0.69	Q	.	.	.	.
4.667	0.1562	0.69	Q	.	.	.	.
4.750	0.1610	0.69	Q	.	.	.	.
4.833	0.1661	0.74	Q	.	.	.	.
4.917	0.1711	0.74	Q	.	.	.	.
5.000	0.1762	0.74	Q	.	.	.	.
5.083	0.1814	0.76	VQ	.	.	.	.
5.167	0.1866	0.76	VQ	.	.	.	.
5.250	0.1919	0.76	VQ	.	.	.	.
5.333	0.1967	0.70	Q	.	.	.	.
5.417	0.2015	0.70	Q	.	.	.	.
5.500	0.2063	0.70	Q	.	.	.	.
5.583	0.2115	0.75	Q	.	.	.	.
5.667	0.2166	0.75	Q	.	.	.	.
5.750	0.2217	0.75	Q	.	.	.	.
5.833	0.2273	0.81	VQ	.	.	.	.
5.917	0.2328	0.81	VQ	.	.	.	.
6.000	0.2384	0.81	VQ	.	.	.	.
6.083	0.2442	0.85	VQ	.	.	.	.
6.167	0.2500	0.85	VQ	.	.	.	.
6.250	0.2558	0.85	VQ	.	.	.	.
6.333	0.2621	0.91	.Q	.	.	.	.
6.417	0.2683	0.91	.Q	.	.	.	.
6.500	0.2745	0.91	.Q	.	.	.	.
6.583	0.2811	0.95	.Q	.	.	.	.
6.667	0.2876	0.95	.Q	.	.	.	.
6.750	0.2941	0.95	.Q	.	.	.	.
6.833	0.3010	1.01	.Q	.	.	.	.
6.917	0.3080	1.01	.Q	.	.	.	.
7.000	0.3149	1.01	.Q	.	.	.	.
7.083	0.3221	1.03	.Q	.	.	.	.
7.167	0.3292	1.03	.Q	.	.	.	.
7.250	0.3363	1.03	.Q	.	.	.	.
7.333	0.3436	1.06	.Q	.	.	.	.
7.417	0.3509	1.06	.Q	.	.	.	.
7.500	0.3582	1.06	.Q	.	.	.	.
7.583	0.3666	1.21	.Q	.	.	.	.
7.667	0.3750	1.21	.Q	.	.	.	.
7.750	0.3833	1.21	.Q	.	.	.	.
7.833	0.3951	1.71	.VQ	.	.	.	.
7.917	0.4068	1.71	.VQ	.	.	.	.
8.000	0.4186	1.71	.VQ	.	.	.	.
8.083	0.4379	2.80	.V Q	.	.	.	.
8.167	0.4571	2.80	.V Q	.	.	.	.
8.250	0.4764	2.80	.V Q	.	.	.	.
8.333	0.5050	4.16	.V Q	.	.	.	.
8.417	0.5336	4.16	. V Q	.	.	.	.
8.500	0.5623	4.16	. V Q	.	.	.	.
8.583	0.5962	4.93	. V Q	.	.	.	.
8.667	0.6302	4.93	. V Q	.	.	.	.
8.750	0.6641	4.93	. V Q	.	.	.	.

8.833	0.7053	5.98	. V Q	.	.	.	.
8.917	0.7465	5.98	. V Q	.	.	.	.
9.000	0.7877	5.98	. V Q	.	.	.	.
9.083	0.8380	7.31	. V Q.	.	.	.	.
9.167	0.8884	7.31	. V Q.	.	.	.	.
9.250	0.9388	7.31	. V Q.	.	.	.	.
9.333	1.0007	9.00	. V .Q	.	.	.	.
9.417	1.0627	9.00	. V .Q	.	.	.	.
9.500	1.1246	9.00	. V .Q	.	.	.	.
9.583	1.1959	10.35	. V . Q	.	.	.	.
9.667	1.2672	10.35	. V . Q	.	.	.	.
9.750	1.3385	10.35	. V . Q	.	.	.	.
9.833	1.4185	11.61	. V . Q	.	.	.	.
9.917	1.4985	11.61	. V . Q	.	.	.	.
10.000	1.5785	11.61	. V . Q	.	.	.	.
10.083	1.6565	11.33	. V . Q	.	.	.	.
10.167	1.7346	11.33	. V . Q	.	.	.	.
10.250	1.8126	11.33	. V . Q	.	.	.	.
10.333	1.8696	8.28	. V .Q	.	.	.	.
10.417	1.9266	8.28	. V .Q	.	.	.	.
10.500	1.9836	8.28	. V .Q	.	.	.	.
10.583	2.0412	8.36	. V .Q	.	.	.	.
10.667	2.0988	8.36	. V .Q	.	.	.	.
10.750	2.1564	8.36	. V .Q	.	.	.	.
10.833	2.2297	10.65	. V . Q	.	.	.	.
10.917	2.3030	10.65	. V . Q	.	.	.	.
11.000	2.3764	10.65	. V. Q	.	.	.	.
11.083	2.4537	11.22	. V. Q	.	.	.	.
11.167	2.5309	11.22	. V. Q	.	.	.	.
11.250	2.6082	11.22	. V Q	.	.	.	.
11.333	2.6844	11.06	. V Q	.	.	.	.
11.417	2.7606	11.06	. V Q	.	.	.	.
11.500	2.8368	11.06	. V Q	.	.	.	.

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
11.583	2.9109	10.76	.	.V Q	.	.	.
11.667	2.9851	10.76	.	.V Q	.	.	.
11.750	3.0592	10.76	.	.V Q	.	.	.
11.833	3.1287	10.09	.	. VQ	.	.	.
11.917	3.1982	10.09	.	. VQ	.	.	.
12.000	3.2676	10.09	.	. VQ	.	.	.
12.083	3.3484	11.73	.	. V Q	.	.	.
12.167	3.4291	11.73	.	. V Q	.	.	.
12.250	3.5099	11.73	.	. V Q	.	.	.
12.333	3.6176	15.63	.	. V Q	.	.	.
12.417	3.7252	15.63	.	. V Q	.	.	.
12.500	3.8329	15.63	.	. V Q	.	.	.
12.583	3.9559	17.85	.	. V . Q	.	.	.
12.667	4.0788	17.85	.	. V . Q	.	.	.
12.750	4.2018	17.85	.	. V . Q	.	.	.
12.833	4.3387	19.88	.	. V . Q	.	.	.
12.917	4.4757	19.88	.	. V . Q	.	.	.
13.000	4.6126	19.88	.	. V . Q	.	.	.
13.083	4.7655	22.20	.	. V .	Q.	.	.
13.167	4.9184	22.20	.	. V.	Q.	.	.
13.250	5.0712	22.20	.	. V.	Q.	.	.
13.333	5.2465	25.44	.	. V	. Q	.	.
13.417	5.4217	25.44	.	. V	. Q	.	.
13.500	5.5969	25.44	.	. V	. Q	.	.
13.583	5.7666	24.64	.	. . V	. Q	.	.
13.667	5.9362	24.64	.	. . V	. Q	.	.
13.750	6.1059	24.64	.	. . V	. Q	.	.
13.833	6.2414	19.68	.	. . V Q	.	.	.
13.917	6.3770	19.68	.	. . V Q	.	.	.
14.000	6.5125	19.68	.	. . VQ	.	.	.
14.083	6.6434	19.00	.	. . Q	.	.	.
14.167	6.7742	19.00	.	. . QV	.	.	.
14.250	6.9050	19.00	.	. . QV	.	.	.
14.333	7.0452	20.35	.	. . Q	.	.	.
14.417	7.1854	20.35	.	. . Q	.	.	.
14.500	7.3255	20.35	.	. . QV	.	.	.
14.583	7.4653	20.29	.	. . QV	.	.	.
14.667	7.6050	20.29	.	. . Q V.	.	.	.
14.750	7.7447	20.29	.	. . Q V	.	.	.
14.833	7.8831	20.09	.	. . Q V	.	.	.
14.917	8.0214	20.09	.	. . Q V	.	.	.
15.000	8.1598	20.09	.	. . Q V	.	.	.
15.083	8.2937	19.45	.	. . Q . V	.	.	.
15.167	8.4276	19.45	.	. . Q . V	.	.	.
15.250	8.5616	19.45	.	. . Q . V	.	.	.
15.333	8.6903	18.69	.	. . Q . V	.	.	.
15.417	8.8190	18.69	.	. . Q . V	.	.	.
15.500	8.9477	18.69	.	. . Q . V	.	.	.
15.583	9.0665	17.26	.	. . Q . V	.	.	.
15.667	9.1854	17.26	.	. . Q . V	.	.	.
15.750	9.3042	17.26	.	. . Q . V	.	.	.
15.833	9.4075	15.00	.	. Q	.	. V	.
15.917	9.5108	15.00	.	. Q	.	. V	.
16.000	9.6142	15.00	.	. Q	.	. V	.
16.083	9.6963	11.92	.	. Q	.	. V	.

16.167	9.7783	11.92	.	. Q	.	. V	.
16.250	9.8604	11.92	.	. Q	.	. V	.
16.333	9.8970	5.31	. Q	.	.	. V	.
16.417	9.9336	5.31	. Q	.	.	. V	.
16.500	9.9702	5.31	. Q	.	.	. V	.
16.583	9.9907	2.98	. Q	.	.	. V	.
16.667	10.0112	2.98	. Q	.	.	. V	.
16.750	10.0317	2.98	. Q	.	.	. V	.
16.833	10.0446	1.87	. Q	.	.	. V.	
16.917	10.0575	1.87	. Q	.	.	. V.	
17.000	10.0705	1.87	. Q	.	.	. V.	
17.083	10.0793	1.28	.Q	.	.	. V.	
17.167	10.0881	1.28	.Q	.	.	. V.	
17.250	10.0969	1.28	.Q	.	.	. V.	
17.333	10.1037	0.99	.Q	.	.	. V.	
17.417	10.1105	0.99	.Q	.	.	. V.	
17.500	10.1172	0.99	.Q	.	.	. V.	
17.583	10.1226	0.77	.Q	.	.	. V.	
17.667	10.1279	0.77	.Q	.	.	. V.	
17.750	10.1333	0.77	.Q	.	.	. V.	
17.833	10.1378	0.65	Q	.	.	. V.	
17.917	10.1423	0.65	Q	.	.	. V.	
18.000	10.1468	0.65	Q	.	.	. V.	
18.083	10.1504	0.53	Q	.	.	. V.	
18.167	10.1540	0.53	Q	.	.	. V.	
18.250	10.1576	0.53	Q	.	.	. V.	
18.333	10.1608	0.47	Q	.	.	. V.	
18.417	10.1640	0.47	Q	.	.	. V.	
18.500	10.1673	0.47	Q	.	.	. V.	
18.583	10.1701	0.42	Q	.	.	. V.	
18.667	10.1730	0.42	Q	.	.	. V.	
18.750	10.1759	0.42	Q	.	.	. V.	
18.833	10.1783	0.34	Q	.	.	. V.	
18.917	10.1806	0.34	Q	.	.	. V.	
19.000	10.1829	0.34	Q	.	.	. V.	
19.083	10.1849	0.29	Q	.	.	. V.	
19.167	10.1869	0.29	Q	.	.	. V.	
19.250	10.1889	0.29	Q	.	.	. V.	
19.333	10.1912	0.33	Q	.	.	. V.	
19.417	10.1934	0.33	Q	.	.	. V.	
19.500	10.1957	0.33	Q	.	.	. V.	
19.583	10.1983	0.37	Q	.	.	. V.	
19.667	10.2008	0.37	Q	.	.	. V.	
19.750	10.2034	0.37	Q	.	.	. V.	
19.833	10.2055	0.32	Q	.	.	. V.	
19.917	10.2077	0.32	Q	.	.	. V.	
20.000	10.2099	0.32	Q	.	.	. V.	
20.083	10.2118	0.27	Q	.	.	. V.	
20.167	10.2137	0.27	Q	.	.	. V.	
20.250	10.2156	0.27	Q	.	.	. V.	
20.333	10.2176	0.30	Q	.	.	. V.	
20.417	10.2197	0.30	Q	.	.	. V.	
20.500	10.2218	0.30	Q	.	.	. V.	
20.583	10.2240	0.31	Q	.	.	. V.	
20.667	10.2262	0.31	Q	.	.	. V.	
20.750	10.2283	0.31	Q	.	.	. V.	
20.833	10.2304	0.30	Q	.	.	. V.	
20.917	10.2324	0.30	Q	.	.	. V.	

21.000	10.2344	0.30	Q	.	.	.	V.
21.083	10.2362	0.26	Q	.	.	.	V.
21.167	10.2381	0.26	Q	.	.	.	V.
21.250	10.2399	0.26	Q	.	.	.	V.
21.333	10.2418	0.28	Q	.	.	.	V.
21.417	10.2437	0.28	Q	.	.	.	V.
21.500	10.2457	0.28	Q	.	.	.	V.
21.583	10.2475	0.26	Q	.	.	.	V.
21.667	10.2492	0.26	Q	.	.	.	V.
21.750	10.2510	0.26	Q	.	.	.	V.
21.833	10.2529	0.28	Q	.	.	.	V.
21.917	10.2548	0.28	Q	.	.	.	V.
22.000	10.2567	0.28	Q	.	.	.	V.
22.083	10.2585	0.26	Q	.	.	.	V.
22.167	10.2603	0.26	Q	.	.	.	V.
22.250	10.2620	0.26	Q	.	.	.	V.
22.333	10.2639	0.28	Q	.	.	.	V.
22.417	10.2658	0.28	Q	.	.	.	V.
22.500	10.2677	0.28	Q	.	.	.	V.
22.583	10.2693	0.24	Q	.	.	.	V.
22.667	10.2710	0.24	Q	.	.	.	V.
22.750	10.2726	0.24	Q	.	.	.	V.
22.833	10.2741	0.22	Q	.	.	.	V.
22.917	10.2757	0.22	Q	.	.	.	V.
23.000	10.2772	0.22	Q	.	.	.	V.
23.083	10.2787	0.22	Q	.	.	.	V.
23.166	10.2802	0.22	Q	.	.	.	V.
23.250	10.2817	0.22	Q	.	.	.	V.
23.333	10.2832	0.22	Q	.	.	.	V.
23.416	10.2847	0.22	Q	.	.	.	V.
23.500	10.2862	0.22	Q	.	.	.	V.
23.583	10.2877	0.21	Q	.	.	.	V.
23.666	10.2892	0.21	Q	.	.	.	V.
23.750	10.2906	0.21	Q	.	.	.	V.
23.833	10.2921	0.21	Q	.	.	.	V.
23.916	10.2936	0.21	Q	.	.	.	V.
24.000	10.2950	0.21	Q	.	.	.	V.

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
24.083	10.2962	0.17	Q	.	.	.	V.
24.166	10.2975	0.17	Q	.	.	.	V.
24.250	10.2987	0.17	Q	.	.	.	V.
24.333	10.2992	0.07	Q	.	.	.	V.
24.416	10.2996	0.07	Q	.	.	.	V.
24.500	10.3001	0.07	Q	.	.	.	V.
24.583	10.3004	0.04	Q	.	.	.	V.
24.666	10.3007	0.04	Q	.	.	.	V.
24.750	10.3009	0.04	Q	.	.	.	V.
24.833	10.3011	0.02	Q	.	.	.	V.
24.916	10.3012	0.02	Q	.	.	.	V.
25.000	10.3014	0.02	Q	.	.	.	V.
25.083	10.3015	0.01	Q	.	.	.	V.
25.166	10.3015	0.01	Q	.	.	.	V.
25.250	10.3016	0.01	Q	.	.	.	V.
25.333	10.3017	0.01	Q	.	.	.	V.
25.416	10.3017	0.01	Q	.	.	.	V.
25.500	10.3018	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1530.0
10%	525.0
20%	465.0
30%	420.0
40%	360.0
50%	225.0
60%	210.0
70%	180.0
80%	45.0
90%	30.0

END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D    R O U T I N G    A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2013 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 20.0)
                 Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY PROPOSED CONDITION HYDROGRAPH DEVELOPMENT WATERSHED B-9AA *
* 10 YEAR - 24 HOUR STORM - 15 MIN INTERVAL AMC II                      *
 *************************************************************************

  FILE NAME: P10_B9AA.DAT
  TIME/DATE OF STUDY: 15:58 07/03/2019
```



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**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    919.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      21.300 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.174 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.104
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.900
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.052
         USER-ENTERED RAINFALL =  3.10 INCHES
         RCFC&WCD 24-Hour Storm (15-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 143.926



==========================================================================
                     UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER         MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------
       1               31.544                27.086
       2               79.127                40.857
       3               90.580                 9.834
       4               95.714                 4.408
       5               98.210                 2.144
       6               99.250                 0.893
       7               99.700                 0.386
       8               99.925                 0.193
       9              100.000                 0.064


--------------------------------------------------------------------------

         TOTAL STORM RAINFALL(INCHES) =  3.10
         TOTAL SOIL-LOSS(INCHES) =  1.62
         TOTAL EFFECTIVE RAINFALL(INCHES) =  1.48

--------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =       2.8722
    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =       2.6287
--------------------------------------------------------------------------
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2 4 - 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

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	2.5	5.0	7.5	10.0
0.083	0.0001	0.02	Q	.	.	.	.
0.167	0.0002	0.02	Q	.	.	.	.
0.250	0.0003	0.02	Q	.	.	.	.
0.333	0.0007	0.05	Q	.	.	.	.
0.417	0.0010	0.05	Q	.	.	.	.
0.500	0.0014	0.05	Q	.	.	.	.
0.583	0.0019	0.07	Q	.	.	.	.
0.667	0.0023	0.07	Q	.	.	.	.
0.750	0.0028	0.07	Q	.	.	.	.
0.833	0.0034	0.08	Q	.	.	.	.
0.917	0.0040	0.08	Q	.	.	.	.
1.000	0.0045	0.08	Q	.	.	.	.
1.083	0.0052	0.09	Q	.	.	.	.
1.167	0.0058	0.09	Q	.	.	.	.
1.250	0.0064	0.09	Q	.	.	.	.
1.333	0.0070	0.08	Q	.	.	.	.
1.417	0.0075	0.08	Q	.	.	.	.
1.500	0.0081	0.08	Q	.	.	.	.
1.583	0.0087	0.08	Q	.	.	.	.
1.667	0.0092	0.08	Q	.	.	.	.
1.750	0.0098	0.08	Q	.	.	.	.
1.833	0.0104	0.09	Q	.	.	.	.
1.917	0.0110	0.09	Q	.	.	.	.
2.000	0.0116	0.09	Q	.	.	.	.
2.083	0.0123	0.10	Q	.	.	.	.
2.167	0.0130	0.10	Q	.	.	.	.
2.250	0.0137	0.10	Q	.	.	.	.
2.333	0.0144	0.10	Q	.	.	.	.
2.417	0.0151	0.10	Q	.	.	.	.
2.500	0.0159	0.10	Q	.	.	.	.
2.583	0.0166	0.11	Q	.	.	.	.
2.667	0.0174	0.11	Q	.	.	.	.
2.750	0.0182	0.11	Q	.	.	.	.
2.833	0.0191	0.13	Q	.	.	.	.
2.917	0.0200	0.13	Q	.	.	.	.
3.000	0.0208	0.13	Q	.	.	.	.
3.083	0.0217	0.13	Q	.	.	.	.
3.167	0.0226	0.13	Q	.	.	.	.
3.250	0.0235	0.13	Q	.	.	.	.
3.333	0.0244	0.13	Q	.	.	.	.
3.417	0.0253	0.13	Q	.	.	.	.
3.500	0.0263	0.13	Q	.	.	.	.
3.583	0.0272	0.13	Q	.	.	.	.
3.667	0.0281	0.13	Q	.	.	.	.
3.750	0.0290	0.13	Q	.	.	.	.
3.833	0.0300	0.14	Q	.	.	.	.
3.917	0.0309	0.14	Q	.	.	.	.

4.000	0.0319	0.14	Q	.	.	.	.
4.083	0.0330	0.15	Q	.	.	.	.
4.167	0.0340	0.15	Q	.	.	.	.
4.250	0.0351	0.15	Q	.	.	.	.
4.333	0.0362	0.17	Q	.	.	.	.
4.417	0.0374	0.17	Q	.	.	.	.
4.500	0.0385	0.17	Q	.	.	.	.
4.583	0.0397	0.18	Q	.	.	.	.
4.667	0.0410	0.18	Q	.	.	.	.
4.750	0.0422	0.18	Q	.	.	.	.
4.833	0.0435	0.19	Q	.	.	.	.
4.917	0.0449	0.19	Q	.	.	.	.
5.000	0.0462	0.19	Q	.	.	.	.
5.083	0.0475	0.19	Q	.	.	.	.
5.167	0.0488	0.19	Q	.	.	.	.
5.250	0.0501	0.19	Q	.	.	.	.
5.333	0.0513	0.18	Q	.	.	.	.
5.417	0.0525	0.18	Q	.	.	.	.
5.500	0.0537	0.18	Q	.	.	.	.
5.583	0.0551	0.19	Q	.	.	.	.
5.667	0.0564	0.19	Q	.	.	.	.
5.750	0.0577	0.19	Q	.	.	.	.
5.833	0.0591	0.21	Q	.	.	.	.
5.917	0.0606	0.21	Q	.	.	.	.
6.000	0.0620	0.21	Q	.	.	.	.
6.083	0.0635	0.22	Q	.	.	.	.
6.167	0.0650	0.22	Q	.	.	.	.
6.250	0.0665	0.22	QV	.	.	.	.
6.333	0.0681	0.23	QV	.	.	.	.
6.417	0.0697	0.23	QV	.	.	.	.
6.500	0.0713	0.23	QV	.	.	.	.
6.583	0.0730	0.24	QV	.	.	.	.
6.667	0.0747	0.24	QV	.	.	.	.
6.750	0.0764	0.24	QV	.	.	.	.
6.833	0.0782	0.26	.Q	.	.	.	.
6.917	0.0799	0.26	.Q	.	.	.	.
7.000	0.0817	0.26	.Q	.	.	.	.
7.083	0.0835	0.26	.Q	.	.	.	.
7.167	0.0853	0.26	.Q	.	.	.	.
7.250	0.0872	0.26	.Q	.	.	.	.
7.333	0.0890	0.27	.Q	.	.	.	.
7.417	0.0909	0.27	.Q	.	.	.	.
7.500	0.0928	0.27	.Q	.	.	.	.
7.583	0.0952	0.35	.Q	.	.	.	.
7.667	0.0976	0.35	.Q	.	.	.	.
7.750	0.1001	0.35	.Q	.	.	.	.
7.833	0.1038	0.55	.VQ	.	.	.	.
7.917	0.1076	0.55	.VQ	.	.	.	.
8.000	0.1114	0.55	.VQ	.	.	.	.
8.083	0.1175	0.90	.V Q	.	.	.	.
8.167	0.1237	0.90	.V Q	.	.	.	.
8.250	0.1299	0.90	.V Q	.	.	.	.
8.333	0.1383	1.22	. V Q	.	.	.	.
8.417	0.1467	1.22	. V Q	.	.	.	.
8.500	0.1552	1.22	. V Q	.	.	.	.
8.583	0.1650	1.42	. V Q	.	.	.	.
8.667	0.1748	1.42	. V Q	.	.	.	.
8.750	0.1846	1.42	. V Q	.	.	.	.

8.833	0.1963	1.71	. V Q	.	.	.	.
8.917	0.2081	1.71	. V Q	.	.	.	.
9.000	0.2198	1.71	. V Q	.	.	.	.
9.083	0.2342	2.08	. V Q	.	.	.	.
9.167	0.2485	2.08	. V Q	.	.	.	.
9.250	0.2628	2.08	. V Q	.	.	.	.
9.333	0.2801	2.51	. V Q	.	.	.	.
9.417	0.2974	2.51	. V Q	.	.	.	.
9.500	0.3147	2.51	. V Q	.	.	.	.
9.583	0.3342	2.84	. V .Q	.	.	.	.
9.667	0.3538	2.84	. V .Q	.	.	.	.
9.750	0.3733	2.84	. V .Q	.	.	.	.
9.833	0.3950	3.15	. V . Q	.	.	.	.
9.917	0.4167	3.15	. V . Q	.	.	.	.
10.000	0.4384	3.15	. V . Q	.	.	.	.
10.083	0.4576	2.79	. V .Q	.	.	.	.
10.167	0.4768	2.79	. V .Q	.	.	.	.
10.250	0.4960	2.79	. V .Q	.	.	.	.
10.333	0.5098	1.99	. Q .	.	.	.	.
10.417	0.5235	1.99	. Q .	.	.	.	.
10.500	0.5372	1.99	. QV .	.	.	.	.
10.583	0.5528	2.26	. VQ.	.	.	.	.
10.667	0.5683	2.26	. VQ.	.	.	.	.
10.750	0.5839	2.26	. VQ.	.	.	.	.
10.833	0.6035	2.84	. V.Q	.	.	.	.
10.917	0.6231	2.84	. V.Q	.	.	.	.
11.000	0.6427	2.84	. V.Q	.	.	.	.
11.083	0.6627	2.90	. VQ	.	.	.	.
11.167	0.6827	2.90	. VQ	.	.	.	.
11.250	0.7027	2.90	. VQ	.	.	.	.
11.333	0.7224	2.86	. VQ	.	.	.	.
11.417	0.7421	2.86	. Q	.	.	.	.
11.500	0.7618	2.86	. Q	.	.	.	.

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	2.5	5.0	7.5	10.0
11.583	0.7805	2.72	.	QV	.	.	.
11.667	0.7992	2.72	.	Q V	.	.	.
11.750	0.8180	2.72	.	Q V	.	.	.
11.833	0.8358	2.58	.	Q V	.	.	.
11.917	0.8535	2.58	.	Q V	.	.	.
12.000	0.8713	2.58	.	Q V	.	.	.
12.083	0.8938	3.26	.	. Q	.	.	.
12.167	0.9162	3.26	.	. Q	.	.	.
12.250	0.9387	3.26	.	. QV	.	.	.
12.333	0.9681	4.27	.	. V Q	.	.	.
12.417	0.9975	4.27	.	. V Q	.	.	.
12.500	1.0269	4.27	.	. V Q	.	.	.
12.583	1.0600	4.81	.	. V Q.	.	.	.
12.667	1.0931	4.81	.	. V Q.	.	.	.
12.750	1.1263	4.81	.	. V Q.	.	.	.
12.833	1.1628	5.30	.	. V .Q	.	.	.
12.917	1.1993	5.30	.	. V .Q	.	.	.
13.000	1.2358	5.30	.	. V .Q	.	.	.
13.083	1.2772	6.00	.	. V. Q	.	.	.
13.167	1.3185	6.00	.	. V Q	.	.	.
13.250	1.3598	6.00	.	. V Q	.	.	.
13.333	1.4063	6.75	.	. .V Q	.	.	.
13.417	1.4528	6.75	.	. . V Q	.	.	.
13.500	1.4992	6.75	.	. . V Q	.	.	.
13.583	1.5409	6.05	.	. . VQ	.	.	.
13.667	1.5825	6.05	.	. . Q	.	.	.
13.750	1.6241	6.05	.	. . Q	.	.	.
13.833	1.6570	4.77	.	. Q. V	.	.	.
13.917	1.6898	4.77	.	. Q. V	.	.	.
14.000	1.7226	4.77	.	. Q. V	.	.	.
14.083	1.7560	4.84	.	. Q. V	.	.	.
14.167	1.7893	4.84	.	. Q. V	.	.	.
14.250	1.8226	4.84	.	. Q. V	.	.	.
14.333	1.8581	5.15	.	. Q V	.	.	.
14.417	1.8936	5.15	.	. Q V	.	.	.
14.500	1.9291	5.15	.	. Q V.	.	.	.
14.583	1.9643	5.11	.	. Q V.	.	.	.
14.667	1.9995	5.11	.	. Q V	.	.	.
14.750	2.0347	5.11	.	. Q V	.	.	.
14.833	2.0695	5.05	.	. Q .V	.	.	.
14.917	2.1043	5.05	.	. Q . V	.	.	.
15.000	2.1391	5.05	.	. Q . V	.	.	.
15.083	2.1726	4.87	.	. Q. . V	.	.	.
15.167	2.2062	4.87	.	. Q. . V	.	.	.
15.250	2.2397	4.87	.	. Q. . V	.	.	.
15.333	2.2718	4.65	.	. Q . . V	.	.	.
15.417	2.3038	4.65	.	. Q . . V	.	.	.
15.500	2.3359	4.65	.	. Q . . V	.	.	.
15.583	2.3646	4.17	.	. Q . . V	.	.	.
15.667	2.3934	4.17	.	. Q . . V	.	.	.
15.750	2.4221	4.17	.	. Q . . V	.	.	.
15.833	2.4472	3.64	.	. Q . . V	.	.	.
15.917	2.4723	3.64	.	. Q . . V	.	.	.
16.000	2.4974	3.64	.	. Q . . V	.	.	.
16.083	2.5144	2.48	.	Q. . . V	.	.	.

16.167	2.5315	2.48	.	Q.	.	.	V .
16.250	2.5485	2.48	.	Q.	.	.	V .
16.333	2.5543	0.84	. Q	.	.	.	V .
16.417	2.5601	0.84	. Q	.	.	.	V .
16.500	2.5660	0.84	. Q	.	.	.	V.
16.583	2.5689	0.43	.Q	.	.	.	V.
16.667	2.5719	0.43	.Q	.	.	.	V.
16.750	2.5748	0.43	.Q	.	.	.	V.
16.833	2.5764	0.24	Q	.	.	.	V.
16.917	2.5781	0.24	Q	.	.	.	V.
17.000	2.5797	0.24	Q	.	.	.	V.
17.083	2.5808	0.16	Q	.	.	.	V.
17.167	2.5819	0.16	Q	.	.	.	V.
17.250	2.5830	0.16	Q	.	.	.	V.
17.333	2.5840	0.15	Q	.	.	.	V.
17.417	2.5851	0.15	Q	.	.	.	V.
17.500	2.5861	0.15	Q	.	.	.	V.
17.583	2.5870	0.14	Q	.	.	.	V.
17.667	2.5880	0.14	Q	.	.	.	V.
17.750	2.5889	0.14	Q	.	.	.	V.
17.833	2.5898	0.13	Q	.	.	.	V.
17.917	2.5907	0.13	Q	.	.	.	V.
18.000	2.5915	0.13	Q	.	.	.	V.
18.083	2.5923	0.11	Q	.	.	.	V.
18.167	2.5931	0.11	Q	.	.	.	V.
18.250	2.5938	0.11	Q	.	.	.	V.
18.333	2.5946	0.11	Q	.	.	.	V.
18.417	2.5953	0.11	Q	.	.	.	V.
18.500	2.5961	0.11	Q	.	.	.	V.
18.583	2.5968	0.10	Q	.	.	.	V.
18.667	2.5974	0.10	Q	.	.	.	V.
18.750	2.5981	0.10	Q	.	.	.	V.
18.833	2.5986	0.08	Q	.	.	.	V.
18.917	2.5992	0.08	Q	.	.	.	V.
19.000	2.5997	0.08	Q	.	.	.	V.
19.083	2.6002	0.07	Q	.	.	.	V.
19.167	2.6007	0.07	Q	.	.	.	V.
19.250	2.6012	0.07	Q	.	.	.	V.
19.333	2.6018	0.09	Q	.	.	.	V.
19.417	2.6023	0.09	Q	.	.	.	V.
19.500	2.6029	0.09	Q	.	.	.	V.
19.583	2.6036	0.09	Q	.	.	.	V.
19.667	2.6042	0.09	Q	.	.	.	V.
19.750	2.6048	0.09	Q	.	.	.	V.
19.833	2.6053	0.07	Q	.	.	.	V.
19.917	2.6059	0.07	Q	.	.	.	V.
20.000	2.6064	0.07	Q	.	.	.	V.
20.083	2.6068	0.07	Q	.	.	.	V.
20.167	2.6073	0.07	Q	.	.	.	V.
20.250	2.6078	0.07	Q	.	.	.	V.
20.333	2.6083	0.08	Q	.	.	.	V.
20.417	2.6088	0.08	Q	.	.	.	V.
20.500	2.6094	0.08	Q	.	.	.	V.
20.583	2.6099	0.08	Q	.	.	.	V.
20.667	2.6105	0.08	Q	.	.	.	V.
20.750	2.6110	0.08	Q	.	.	.	V.
20.833	2.6115	0.07	Q	.	.	.	V.
20.917	2.6120	0.07	Q	.	.	.	V.

21.000	2.6125	0.07	Q	.	.	.	V.
21.083	2.6129	0.07	Q	.	.	.	V.
21.167	2.6134	0.07	Q	.	.	.	V.
21.250	2.6139	0.07	Q	.	.	.	V.
21.333	2.6143	0.07	Q	.	.	.	V.
21.417	2.6148	0.07	Q	.	.	.	V.
21.500	2.6153	0.07	Q	.	.	.	V.
21.583	2.6157	0.07	Q	.	.	.	V.
21.667	2.6162	0.07	Q	.	.	.	V.
21.750	2.6166	0.07	Q	.	.	.	V.
21.833	2.6171	0.07	Q	.	.	.	V.
21.917	2.6176	0.07	Q	.	.	.	V.
22.000	2.6180	0.07	Q	.	.	.	V.
22.083	2.6185	0.07	Q	.	.	.	V.
22.167	2.6189	0.07	Q	.	.	.	V.
22.250	2.6194	0.07	Q	.	.	.	V.
22.333	2.6198	0.07	Q	.	.	.	V.
22.417	2.6203	0.07	Q	.	.	.	V.
22.500	2.6208	0.07	Q	.	.	.	V.
22.583	2.6212	0.06	Q	.	.	.	V.
22.667	2.6216	0.06	Q	.	.	.	V.
22.750	2.6220	0.06	Q	.	.	.	V.
22.833	2.6223	0.05	Q	.	.	.	V.
22.917	2.6227	0.05	Q	.	.	.	V.
23.000	2.6231	0.05	Q	.	.	.	V.
23.083	2.6235	0.05	Q	.	.	.	V.
23.166	2.6238	0.05	Q	.	.	.	V.
23.250	2.6242	0.05	Q	.	.	.	V.
23.333	2.6246	0.05	Q	.	.	.	V.
23.416	2.6249	0.05	Q	.	.	.	V.
23.500	2.6253	0.05	Q	.	.	.	V.
23.583	2.6257	0.05	Q	.	.	.	V.
23.666	2.6260	0.05	Q	.	.	.	V.
23.750	2.6264	0.05	Q	.	.	.	V.
23.833	2.6268	0.05	Q	.	.	.	V.
23.916	2.6271	0.05	Q	.	.	.	V.
24.000	2.6275	0.05	Q	.	.	.	V.

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	2.5	5.0	7.5	10.0
24.083	2.6278	0.04	Q	.	.	.	V.
24.166	2.6280	0.04	Q	.	.	.	V.
24.250	2.6283	0.04	Q	.	.	.	V.
24.333	2.6283	0.01	Q	.	.	.	V.
24.416	2.6284	0.01	Q	.	.	.	V.
24.500	2.6285	0.01	Q	.	.	.	V.
24.583	2.6285	0.01	Q	.	.	.	V.
24.666	2.6286	0.01	Q	.	.	.	V.
24.750	2.6286	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1485.0
10%	510.0
20%	465.0
30%	420.0
40%	345.0
50%	225.0
60%	210.0
70%	165.0
80%	45.0
90%	15.0

END OF FLOODSCx ROUTING ANALYSIS

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 10.0873
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 8.2477

2 4 - 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 FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
0.083	0.0002	0.03	Q	.	.	.	.
0.167	0.0003	0.03	Q	.	.	.	.
0.250	0.0005	0.03	Q	.	.	.	.
0.333	0.0013	0.12	Q	.	.	.	.
0.417	0.0022	0.12	Q	.	.	.	.
0.500	0.0030	0.12	Q	.	.	.	.
0.583	0.0043	0.19	Q	.	.	.	.
0.667	0.0057	0.19	Q	.	.	.	.
0.750	0.0070	0.19	Q	.	.	.	.
0.833	0.0086	0.24	Q	.	.	.	.
0.917	0.0103	0.24	Q	.	.	.	.
1.000	0.0119	0.24	Q	.	.	.	.
1.083	0.0138	0.28	Q	.	.	.	.
1.167	0.0158	0.28	Q	.	.	.	.
1.250	0.0177	0.28	Q	.	.	.	.
1.333	0.0195	0.27	Q	.	.	.	.
1.417	0.0214	0.27	Q	.	.	.	.
1.500	0.0232	0.27	Q	.	.	.	.
1.583	0.0250	0.26	Q	.	.	.	.
1.667	0.0268	0.26	Q	.	.	.	.
1.750	0.0286	0.26	Q	.	.	.	.
1.833	0.0305	0.28	Q	.	.	.	.
1.917	0.0324	0.28	Q	.	.	.	.
2.000	0.0343	0.28	Q	.	.	.	.
2.083	0.0365	0.32	Q	.	.	.	.
2.167	0.0387	0.32	Q	.	.	.	.
2.250	0.0409	0.32	Q	.	.	.	.
2.333	0.0432	0.34	Q	.	.	.	.
2.417	0.0455	0.34	Q	.	.	.	.
2.500	0.0479	0.34	Q	.	.	.	.
2.583	0.0503	0.36	Q	.	.	.	.
2.667	0.0528	0.36	Q	.	.	.	.
2.750	0.0552	0.36	Q	.	.	.	.
2.833	0.0580	0.40	Q	.	.	.	.
2.917	0.0607	0.40	Q	.	.	.	.
3.000	0.0635	0.40	Q	.	.	.	.
3.083	0.0664	0.42	Q	.	.	.	.
3.167	0.0693	0.42	Q	.	.	.	.
3.250	0.0722	0.42	Q	.	.	.	.
3.333	0.0752	0.43	Q	.	.	.	.
3.417	0.0781	0.43	Q	.	.	.	.
3.500	0.0811	0.43	Q	.	.	.	.
3.583	0.0841	0.43	Q	.	.	.	.
3.667	0.0871	0.43	Q	.	.	.	.
3.750	0.0901	0.43	Q	.	.	.	.
3.833	0.0932	0.45	Q	.	.	.	.
3.917	0.0963	0.45	Q	.	.	.	.

4.000	0.0994	0.45	Q	.	.	.	.
4.083	0.1028	0.49	Q	.	.	.	.
4.167	0.1062	0.49	Q	.	.	.	.
4.250	0.1096	0.49	Q	.	.	.	.
4.333	0.1132	0.52	Q	.	.	.	.
4.417	0.1168	0.52	Q	.	.	.	.
4.500	0.1204	0.52	Q	.	.	.	.
4.583	0.1244	0.57	Q	.	.	.	.
4.667	0.1283	0.57	Q	.	.	.	.
4.750	0.1322	0.57	Q	.	.	.	.
4.833	0.1364	0.61	Q	.	.	.	.
4.917	0.1406	0.61	Q	.	.	.	.
5.000	0.1448	0.61	Q	.	.	.	.
5.083	0.1491	0.63	Q	.	.	.	.
5.167	0.1535	0.63	Q	.	.	.	.
5.250	0.1579	0.63	Q	.	.	.	.
5.333	0.1619	0.59	Q	.	.	.	.
5.417	0.1659	0.59	Q	.	.	.	.
5.500	0.1700	0.59	Q	.	.	.	.
5.583	0.1742	0.62	Q	.	.	.	.
5.667	0.1785	0.62	Q	.	.	.	.
5.750	0.1827	0.62	Q	.	.	.	.
5.833	0.1873	0.67	Q	.	.	.	.
5.917	0.1919	0.67	Q	.	.	.	.
6.000	0.1965	0.67	Q	.	.	.	.
6.083	0.2014	0.70	Q	.	.	.	.
6.167	0.2062	0.70	Q	.	.	.	.
6.250	0.2110	0.70	QV	.	.	.	.
6.333	0.2162	0.75	QV	.	.	.	.
6.417	0.2213	0.75	QV	.	.	.	.
6.500	0.2265	0.75	QV	.	.	.	.
6.583	0.2319	0.78	.Q	.	.	.	.
6.667	0.2373	0.78	.Q	.	.	.	.
6.750	0.2427	0.78	.Q	.	.	.	.
6.833	0.2484	0.83	.Q	.	.	.	.
6.917	0.2542	0.83	.Q	.	.	.	.
7.000	0.2599	0.83	.Q	.	.	.	.
7.083	0.2658	0.86	.Q	.	.	.	.
7.167	0.2718	0.86	.Q	.	.	.	.
7.250	0.2777	0.86	.Q	.	.	.	.
7.333	0.2837	0.88	.Q	.	.	.	.
7.417	0.2898	0.88	.Q	.	.	.	.
7.500	0.2959	0.88	.Q	.	.	.	.
7.583	0.3024	0.94	.Q	.	.	.	.
7.667	0.3089	0.94	.Q	.	.	.	.
7.750	0.3153	0.94	.Q	.	.	.	.
7.833	0.3229	1.10	.Q	.	.	.	.
7.917	0.3305	1.10	.Q	.	.	.	.
8.000	0.3381	1.10	.Q	.	.	.	.
8.083	0.3499	1.72	.VQ	.	.	.	.
8.167	0.3617	1.72	.VQ	.	.	.	.
8.250	0.3736	1.72	.VQ	.	.	.	.
8.333	0.3925	2.76	.V Q	.	.	.	.
8.417	0.4115	2.76	.V Q	.	.	.	.
8.500	0.4305	2.76	. VQ	.	.	.	.
8.583	0.4538	3.39	. V Q	.	.	.	.
8.667	0.4771	3.39	. V Q	.	.	.	.
8.750	0.5004	3.39	. V Q	.	.	.	.

8.833	0.5294	4.21	. V Q	.	.	.	.
8.917	0.5584	4.21	. V Q	.	.	.	.
9.000	0.5875	4.21	. V Q	.	.	.	.
9.083	0.6238	5.27	. V Q	.	.	.	.
9.167	0.6600	5.27	. V Q	.	.	.	.
9.250	0.6963	5.27	. V Q	.	.	.	.
9.333	0.7421	6.64	. V Q	.	.	.	.
9.417	0.7879	6.64	. V Q	.	.	.	.
9.500	0.8336	6.64	. V Q	.	.	.	.
9.583	0.8873	7.80	. V Q	.	.	.	.
9.667	0.9410	7.80	. V Q	.	.	.	.
9.750	0.9947	7.80	. V Q	.	.	.	.
9.833	1.0558	8.86	. V .Q	.	.	.	.
9.917	1.1168	8.86	. V .Q	.	.	.	.
10.000	1.1779	8.86	. V .Q	.	.	.	.
10.083	1.2391	8.89	. V .Q	.	.	.	.
10.167	1.3003	8.89	. V .Q	.	.	.	.
10.250	1.3616	8.89	. V .Q	.	.	.	.
10.333	1.4066	6.54	. V Q .	.	.	.	.
10.417	1.4517	6.54	. VQ .	.	.	.	.
10.500	1.4967	6.54	. VQ .	.	.	.	.
10.583	1.5403	6.33	. VQ .	.	.	.	.
10.667	1.5839	6.33	. VQ .	.	.	.	.
10.750	1.6275	6.33	. VQ .	.	.	.	.
10.833	1.6834	8.13	. V Q	.	.	.	.
10.917	1.7394	8.13	. V Q	.	.	.	.
11.000	1.7954	8.13	. V Q	.	.	.	.
11.083	1.8557	8.75	. V .Q	.	.	.	.
11.167	1.9159	8.75	. V.Q	.	.	.	.
11.250	1.9762	8.75	. V.Q	.	.	.	.
11.333	2.0360	8.68	. V.Q	.	.	.	.
11.417	2.0958	8.68	. VQ	.	.	.	.
11.500	2.1555	8.68	. VQ	.	.	.	.

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
11.583	2.2140	8.49	.	VQ	.	.	.
11.667	2.2724	8.49	.	Q	.	.	.
11.750	2.3308	8.49	.	Q	.	.	.
11.833	2.3854	7.92	.	QV	.	.	.
11.917	2.4399	7.92	.	QV	.	.	.
12.000	2.4944	7.92	.	Q V	.	.	.
12.083	2.5565	9.02	.	. Q	.	.	.
12.167	2.6186	9.02	.	. Q	.	.	.
12.250	2.6808	9.02	.	. QV	.	.	.
12.333	2.7644	12.15	.	. V Q	.	.	.
12.417	2.8481	12.15	.	. V Q	.	.	.
12.500	2.9317	12.15	.	. V Q	.	.	.
12.583	3.0286	14.07	.	. V Q	.	.	.
12.667	3.1255	14.07	.	. V Q	.	.	.
12.750	3.2224	14.07	.	. V Q	.	.	.
12.833	3.3311	15.77	.	. V .Q	.	.	.
12.917	3.4397	15.77	.	. V .Q	.	.	.
13.000	3.5484	15.77	.	. V .Q	.	.	.
13.083	3.6697	17.62	.	. V . Q	.	.	.
13.167	3.7910	17.62	.	. V . Q	.	.	.
13.250	3.9124	17.62	.	. V . Q	.	.	.
13.333	4.0522	20.30	.	. V. Q	.	.	.
13.417	4.1920	20.30	.	. V Q	.	.	.
13.500	4.3319	20.30	.	. V Q	.	.	.
13.583	4.4708	20.17	.	. .V Q	.	.	.
13.667	4.6096	20.17	.	. . V Q	.	.	.
13.750	4.7485	20.17	.	. . V Q	.	.	.
13.833	4.8610	16.33	.	. .Q V	.	.	.
13.917	4.9735	16.33	.	. .Q V	.	.	.
14.000	5.0859	16.33	.	. .Q V	.	.	.
14.083	5.1921	15.42	.	. Q V	.	.	.
14.167	5.2984	15.42	.	. Q V	.	.	.
14.250	5.4046	15.42	.	. Q V	.	.	.
14.333	5.5181	16.48	.	. .Q V	.	.	.
14.417	5.6316	16.48	.	. .Q V	.	.	.
14.500	5.7451	16.48	.	. .Q V	.	.	.
14.583	5.8590	16.54	.	. . Q V	.	.	.
14.667	5.9730	16.54	.	. . Q V	.	.	.
14.750	6.0869	16.54	.	. . Q V.	.	.	.
14.833	6.2000	16.43	.	. .Q V	.	.	.
14.917	6.3131	16.43	.	. .Q V	.	.	.
15.000	6.4263	16.43	.	. .Q V	.	.	.
15.083	6.5360	15.93	.	. .Q .V	.	.	.
15.167	6.6457	15.93	.	. .Q . V	.	.	.
15.250	6.7554	15.93	.	. .Q . V	.	.	.
15.333	6.8607	15.30	.	. Q . V	.	.	.
15.417	6.9660	15.30	.	. Q . V	.	.	.
15.500	7.0714	15.30	.	. Q . V	.	.	.
15.583	7.1695	14.25	.	. Q . V	.	.	.
15.667	7.2676	14.25	.	. Q . V	.	.	.
15.750	7.3658	14.25	.	. Q . V	.	.	.
15.833	7.4513	12.42	.	. Q . V	.	.	.
15.917	7.5368	12.42	.	. Q . V	.	.	.
16.000	7.6223	12.42	.	. Q . V	.	.	.
16.083	7.6924	10.18	.	. Q . V	.	.	.

16.167	7.7625	10.18	.	. Q	.	.	V .
16.250	7.8326	10.18	.	. Q	.	.	V .
16.333	7.8674	5.05	.	Q .	.	.	V .
16.417	7.9021	5.05	.	Q .	.	.	V .
16.500	7.9369	5.05	.	Q .	.	.	V .
16.583	7.9567	2.87	. Q	.	.	.	V .
16.667	7.9765	2.87	. Q	.	.	.	V .
16.750	7.9963	2.87	. Q	.	.	.	V .
16.833	8.0092	1.88	. Q	.	.	.	V .
16.917	8.0222	1.88	. Q	.	.	.	V .
17.000	8.0351	1.88	. Q	.	.	.	V .
17.083	8.0442	1.32	.Q	.	.	.	V.
17.167	8.0533	1.32	.Q	.	.	.	V.
17.250	8.0624	1.32	.Q	.	.	.	V.
17.333	8.0694	1.02	.Q	.	.	.	V.
17.417	8.0764	1.02	.Q	.	.	.	V.
17.500	8.0834	1.02	.Q	.	.	.	V.
17.583	8.0889	0.80	.Q	.	.	.	V.
17.667	8.0944	0.80	.Q	.	.	.	V.
17.750	8.0998	0.80	.Q	.	.	.	V.
17.833	8.1042	0.63	Q	.	.	.	V.
17.917	8.1086	0.63	Q	.	.	.	V.
18.000	8.1129	0.63	Q	.	.	.	V.
18.083	8.1165	0.52	Q	.	.	.	V.
18.167	8.1200	0.52	Q	.	.	.	V.
18.250	8.1236	0.52	Q	.	.	.	V.
18.333	8.1266	0.44	Q	.	.	.	V.
18.417	8.1296	0.44	Q	.	.	.	V.
18.500	8.1326	0.44	Q	.	.	.	V.
18.583	8.1352	0.38	Q	.	.	.	V.
18.667	8.1378	0.38	Q	.	.	.	V.
18.750	8.1404	0.38	Q	.	.	.	V.
18.833	8.1424	0.30	Q	.	.	.	V.
18.917	8.1445	0.30	Q	.	.	.	V.
19.000	8.1466	0.30	Q	.	.	.	V.
19.083	8.1483	0.25	Q	.	.	.	V.
19.167	8.1500	0.25	Q	.	.	.	V.
19.250	8.1517	0.25	Q	.	.	.	V.
19.333	8.1536	0.28	Q	.	.	.	V.
19.417	8.1554	0.28	Q	.	.	.	V.
19.500	8.1573	0.28	Q	.	.	.	V.
19.583	8.1595	0.31	Q	.	.	.	V.
19.667	8.1616	0.31	Q	.	.	.	V.
19.750	8.1637	0.31	Q	.	.	.	V.
19.833	8.1656	0.27	Q	.	.	.	V.
19.917	8.1675	0.27	Q	.	.	.	V.
20.000	8.1693	0.27	Q	.	.	.	V.
20.083	8.1709	0.23	Q	.	.	.	V.
20.167	8.1725	0.23	Q	.	.	.	V.
20.250	8.1741	0.23	Q	.	.	.	V.
20.333	8.1759	0.25	Q	.	.	.	V.
20.417	8.1776	0.25	Q	.	.	.	V.
20.500	8.1794	0.25	Q	.	.	.	V.
20.583	8.1812	0.26	Q	.	.	.	V.
20.667	8.1830	0.26	Q	.	.	.	V.
20.750	8.1848	0.26	Q	.	.	.	V.
20.833	8.1865	0.25	Q	.	.	.	V.
20.917	8.1883	0.25	Q	.	.	.	V.

21.000	8.1900	0.25	Q	.	.	.	V.
21.083	8.1915	0.22	Q	.	.	.	V.
21.167	8.1931	0.22	Q	.	.	.	V.
21.250	8.1946	0.22	Q	.	.	.	V.
21.333	8.1962	0.24	Q	.	.	.	V.
21.417	8.1978	0.24	Q	.	.	.	V.
21.500	8.1995	0.24	Q	.	.	.	V.
21.583	8.2010	0.22	Q	.	.	.	V.
21.667	8.2025	0.22	Q	.	.	.	V.
21.750	8.2040	0.22	Q	.	.	.	V.
21.833	8.2056	0.23	Q	.	.	.	V.
21.917	8.2072	0.23	Q	.	.	.	V.
22.000	8.2088	0.23	Q	.	.	.	V.
22.083	8.2102	0.22	Q	.	.	.	V.
22.167	8.2117	0.22	Q	.	.	.	V.
22.250	8.2132	0.22	Q	.	.	.	V.
22.333	8.2148	0.23	Q	.	.	.	V.
22.417	8.2164	0.23	Q	.	.	.	V.
22.500	8.2180	0.23	Q	.	.	.	V.
22.583	8.2194	0.20	Q	.	.	.	V.
22.667	8.2208	0.20	Q	.	.	.	V.
22.750	8.2221	0.20	Q	.	.	.	V.
22.833	8.2234	0.19	Q	.	.	.	V.
22.917	8.2247	0.19	Q	.	.	.	V.
23.000	8.2261	0.19	Q	.	.	.	V.
23.083	8.2273	0.18	Q	.	.	.	V.
23.166	8.2286	0.18	Q	.	.	.	V.
23.250	8.2299	0.18	Q	.	.	.	V.
23.333	8.2311	0.18	Q	.	.	.	V.
23.416	8.2324	0.18	Q	.	.	.	V.
23.500	8.2336	0.18	Q	.	.	.	V.
23.583	8.2349	0.18	Q	.	.	.	V.
23.666	8.2361	0.18	Q	.	.	.	V.
23.750	8.2374	0.18	Q	.	.	.	V.
23.833	8.2386	0.18	Q	.	.	.	V.
23.916	8.2398	0.18	Q	.	.	.	V.
24.000	8.2411	0.18	Q	.	.	.	V.

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
24.083	8.2421	0.15	Q	.	.	.	V.
24.166	8.2432	0.15	Q	.	.	.	V.
24.250	8.2442	0.15	Q	.	.	.	V.
24.333	8.2447	0.07	Q	.	.	.	V.
24.416	8.2452	0.07	Q	.	.	.	V.
24.500	8.2457	0.07	Q	.	.	.	V.
24.583	8.2460	0.04	Q	.	.	.	V.
24.666	8.2462	0.04	Q	.	.	.	V.
24.750	8.2465	0.04	Q	.	.	.	V.
24.833	8.2466	0.02	Q	.	.	.	V.
24.916	8.2468	0.02	Q	.	.	.	V.
25.000	8.2469	0.02	Q	.	.	.	V.
25.083	8.2471	0.01	Q	.	.	.	V.
25.166	8.2472	0.01	Q	.	.	.	V.
25.250	8.2473	0.01	Q	.	.	.	V.
25.333	8.2473	0.01	Q	.	.	.	V.
25.416	8.2474	0.01	Q	.	.	.	V.
25.500	8.2475	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1530.0
10%	510.0
20%	465.0
30%	420.0
40%	345.0
50%	240.0
60%	210.0
70%	180.0
80%	105.0
90%	30.0

END OF FLOODSCx ROUTING ANALYSIS

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              F L O O D    R O U T I N G    A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2013 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 20.0)
                 Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* MEAD VALLEY BUSINESS PARK                                             *
* PRELIMINARY EXISTING CONDITION HYDROGRAPH DEVELOPMENT WATERSHED B-9AA  *
* 10 YEAR - 24 HOUR STORM - 15 MIN INTERVAL AMC II                      *
 **************************************************************************

  FILE NAME: E10_B9AA.DAT
  TIME/DATE OF STUDY: 15:44 07/03/2019
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**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    908.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      34.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.236 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.115
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.900
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.058
         USER-ENTERED RAINFALL =  3.10 INCHES
         RCFC&WCD 24-Hour Storm (15-Minute period) SELECTED
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 0.9999


         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 106.067


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER         MEAN VALUES          ORDINATES(CFS)
--------------------------------------------------------------------------
       1               20.886               29.216
       2               69.734               68.331
       3               84.630               20.837
       4               91.212                9.208
       5               95.065                5.389
       6               97.426                3.303
       7               98.563                1.590
       8               99.297                1.027
       9               99.719                0.590
      10               99.930                0.295
      11              100.000                0.098


--------------------------------------------------------------------------

         TOTAL STORM RAINFALL(INCHES) =  3.10
         TOTAL SOIL-LOSS(INCHES) =  1.70
         TOTAL EFFECTIVE RAINFALL(INCHES) =  1.39

--------------------------------------------------------------------------
    TOTAL SOIL-LOSS VOLUME(ACRE-FEET) =       4.9302
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TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 4.0314

24-HOUR STORM RUNOFF HYDROGRAPH

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0001	0.02	Q	.	.	.	.
0.167	0.0002	0.02	Q	.	.	.	.
0.250	0.0004	0.02	Q	.	.	.	.
0.333	0.0009	0.07	Q	.	.	.	.
0.417	0.0013	0.07	Q	.	.	.	.
0.500	0.0018	0.07	Q	.	.	.	.
0.583	0.0025	0.10	Q	.	.	.	.
0.667	0.0032	0.10	Q	.	.	.	.
0.750	0.0040	0.10	Q	.	.	.	.
0.833	0.0048	0.12	Q	.	.	.	.
0.917	0.0057	0.12	Q	.	.	.	.
1.000	0.0065	0.12	Q	.	.	.	.
1.083	0.0075	0.14	Q	.	.	.	.
1.167	0.0085	0.14	Q	.	.	.	.
1.250	0.0095	0.14	Q	.	.	.	.
1.333	0.0104	0.13	Q	.	.	.	.
1.417	0.0113	0.13	Q	.	.	.	.
1.500	0.0122	0.13	Q	.	.	.	.
1.583	0.0131	0.13	Q	.	.	.	.
1.667	0.0140	0.13	Q	.	.	.	.
1.750	0.0149	0.13	Q	.	.	.	.
1.833	0.0159	0.14	Q	.	.	.	.
1.917	0.0168	0.14	Q	.	.	.	.
2.000	0.0178	0.14	Q	.	.	.	.
2.083	0.0189	0.16	Q	.	.	.	.
2.167	0.0200	0.16	Q	.	.	.	.
2.250	0.0211	0.16	Q	.	.	.	.
2.333	0.0223	0.17	Q	.	.	.	.
2.417	0.0234	0.17	Q	.	.	.	.
2.500	0.0246	0.17	Q	.	.	.	.
2.583	0.0258	0.18	Q	.	.	.	.
2.667	0.0270	0.18	Q	.	.	.	.
2.750	0.0283	0.18	Q	.	.	.	.
2.833	0.0297	0.20	Q	.	.	.	.
2.917	0.0311	0.20	Q	.	.	.	.
3.000	0.0324	0.20	Q	.	.	.	.
3.083	0.0339	0.21	Q	.	.	.	.
3.167	0.0353	0.21	Q	.	.	.	.
3.250	0.0368	0.21	Q	.	.	.	.
3.333	0.0382	0.21	Q	.	.	.	.
3.417	0.0397	0.21	Q	.	.	.	.
3.500	0.0412	0.21	Q	.	.	.	.
3.583	0.0426	0.21	Q	.	.	.	.
3.667	0.0441	0.21	Q	.	.	.	.
3.750	0.0456	0.21	Q	.	.	.	.
3.833	0.0471	0.22	Q	.	.	.	.
3.917	0.0487	0.22	Q	.	.	.	.

4.000	0.0502	0.22	Q	.	.	.	.
4.083	0.0519	0.25	Q	.	.	.	.
4.167	0.0536	0.25	Q	.	.	.	.
4.250	0.0553	0.25	Q	.	.	.	.
4.333	0.0571	0.26	Q	.	.	.	.
4.417	0.0589	0.26	Q	.	.	.	.
4.500	0.0607	0.26	Q	.	.	.	.
4.583	0.0627	0.29	Q	.	.	.	.
4.667	0.0647	0.29	Q	.	.	.	.
4.750	0.0666	0.29	Q	.	.	.	.
4.833	0.0687	0.30	Q	.	.	.	.
4.917	0.0708	0.30	Q	.	.	.	.
5.000	0.0729	0.30	Q	.	.	.	.
5.083	0.0751	0.31	Q	.	.	.	.
5.167	0.0772	0.31	Q	.	.	.	.
5.250	0.0793	0.31	Q	.	.	.	.
5.333	0.0813	0.29	Q	.	.	.	.
5.417	0.0833	0.29	Q	.	.	.	.
5.500	0.0853	0.29	Q	.	.	.	.
5.583	0.0874	0.31	Q	.	.	.	.
5.667	0.0895	0.31	Q	.	.	.	.
5.750	0.0916	0.31	Q	.	.	.	.
5.833	0.0939	0.33	Q	.	.	.	.
5.917	0.0962	0.33	Q	.	.	.	.
6.000	0.0985	0.33	Q	.	.	.	.
6.083	0.1009	0.35	QV	.	.	.	.
6.167	0.1033	0.35	QV	.	.	.	.
6.250	0.1057	0.35	QV	.	.	.	.
6.333	0.1082	0.37	QV	.	.	.	.
6.417	0.1108	0.37	QV	.	.	.	.
6.500	0.1134	0.37	QV	.	.	.	.
6.583	0.1161	0.39	QV	.	.	.	.
6.667	0.1187	0.39	QV	.	.	.	.
6.750	0.1214	0.39	QV	.	.	.	.
6.833	0.1243	0.42	QV	.	.	.	.
6.917	0.1271	0.42	QV	.	.	.	.
7.000	0.1300	0.42	QV	.	.	.	.
7.083	0.1329	0.42	QV	.	.	.	.
7.167	0.1359	0.42	QV	.	.	.	.
7.250	0.1388	0.42	QV	.	.	.	.
7.333	0.1418	0.44	QV	.	.	.	.
7.417	0.1448	0.44	QV	.	.	.	.
7.500	0.1478	0.44	QV	.	.	.	.
7.583	0.1510	0.47	QV	.	.	.	.
7.667	0.1543	0.47	QV	.	.	.	.
7.750	0.1575	0.47	QV	.	.	.	.
7.833	0.1614	0.57	.Q	.	.	.	.
7.917	0.1654	0.57	.Q	.	.	.	.
8.000	0.1693	0.57	.Q	.	.	.	.
8.083	0.1757	0.94	.Q	.	.	.	.
8.167	0.1822	0.94	.Q	.	.	.	.
8.250	0.1887	0.94	.Q	.	.	.	.
8.333	0.1987	1.46	.VQ	.	.	.	.
8.417	0.2088	1.46	. Q	.	.	.	.
8.500	0.2189	1.46	. Q	.	.	.	.
8.583	0.2310	1.76	. VQ	.	.	.	.
8.667	0.2431	1.76	. VQ	.	.	.	.
8.750	0.2553	1.76	. VQ	.	.	.	.

8.833	0.2704	2.20	. V Q	.	.	.	.
8.917	0.2855	2.20	. V Q	.	.	.	.
9.000	0.3007	2.20	. V Q	.	.	.	.
9.083	0.3196	2.76	. V Q	.	.	.	.
9.167	0.3386	2.76	. V Q	.	.	.	.
9.250	0.3576	2.76	. V Q	.	.	.	.
9.333	0.3814	3.45	. V Q	.	.	.	.
9.417	0.4052	3.45	. V Q	.	.	.	.
9.500	0.4289	3.45	. V Q	.	.	.	.
9.583	0.4565	4.00	. V Q	.	.	.	.
9.667	0.4841	4.00	. V Q	.	.	.	.
9.750	0.5117	4.00	. V Q	.	.	.	.
9.833	0.5428	4.53	. V Q.	.	.	.	.
9.917	0.5740	4.53	. V Q.	.	.	.	.
10.000	0.6052	4.53	. V Q.	.	.	.	.
10.083	0.6349	4.31	. V Q	.	.	.	.
10.167	0.6645	4.31	. V Q	.	.	.	.
10.250	0.6942	4.31	. V Q	.	.	.	.
10.333	0.7151	3.03	. QV	.	.	.	.
10.417	0.7360	3.03	. QV	.	.	.	.
10.500	0.7569	3.03	. QV	.	.	.	.
10.583	0.7787	3.16	. QV	.	.	.	.
10.667	0.8005	3.16	. QV	.	.	.	.
10.750	0.8222	3.16	. Q V	.	.	.	.
10.833	0.8507	4.13	. Q	.	.	.	.
10.917	0.8791	4.13	. Q	.	.	.	.
11.000	0.9075	4.13	. QV.	.	.	.	.
11.083	0.9373	4.32	. QV.	.	.	.	.
11.167	0.9670	4.32	. QV.	.	.	.	.
11.250	0.9968	4.32	. QV.	.	.	.	.
11.333	1.0261	4.25	. Q V	.	.	.	.
11.417	1.0554	4.25	. Q V	.	.	.	.
11.500	1.0847	4.25	. Q V	.	.	.	.

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 5.0 10.0 15.0 20.0
11.583	1.1131	4.12	. Q .V . . .
11.667	1.1415	4.12	. Q .V . . .
11.750	1.1699	4.12	. Q .V . . .
11.833	1.1964	3.85	. Q .V . . .
11.917	1.2230	3.85	. Q . V . . .
12.000	1.2495	3.85	. Q . V . . .
12.083	1.2813	4.62	. Q. V . . .
12.167	1.3131	4.62	. Q. V . . .
12.250	1.3450	4.62	. Q. V . . .
12.333	1.3881	6.26	. . QV . . .
12.417	1.4312	6.26	. . Q V . . .
12.500	1.4743	6.26	. . Q V . . .
12.583	1.5236	7.16	. . QV . . .
12.667	1.5729	7.16	. . QV . . .
12.750	1.6222	7.16	. . Q V . . .
12.833	1.6772	7.99	. . QV . . .
12.917	1.7322	7.99	. . Q V . . .
13.000	1.7873	7.99	. . Q V . . .
13.083	1.8491	8.98	. . QV . . .
13.167	1.9110	8.98	. . QV . . .
13.250	1.9729	8.98	. . Q V. . . .
13.333	2.0439	10.30	. . Q . . .
13.417	2.1148	10.30	. . Q . . .
13.500	2.1858	10.30	. . QV . . .
13.583	2.2532	9.79	. . Q. V . . .
13.667	2.3207	9.79	. . Q. V . . .
13.750	2.3881	9.79	. . Q. V . . .
13.833	2.4413	7.72	. . Q . V . . .
13.917	2.4944	7.72	. . Q . V . . .
14.000	2.5476	7.72	. . Q . V . . .
14.083	2.5996	7.55	. . Q . V . . .
14.167	2.6515	7.55	. . Q . V . . .
14.250	2.7035	7.55	. . Q . V . . .
14.333	2.7594	8.11	. . Q . V . . .
14.417	2.8152	8.11	. . Q . V . . .
14.500	2.8711	8.11	. . Q . V . . .
14.583	2.9266	8.06	. . Q . V. . . .
14.667	2.9821	8.06	. . Q . V. . . .
14.750	3.0376	8.06	. . Q . V . . .
14.833	3.0925	7.97	. . Q . V . . .
14.917	3.1474	7.97	. . Q . V . . .
15.000	3.2023	7.97	. . Q . V . . .
15.083	3.2555	7.72	. . Q . . V . . .
15.167	3.3086	7.72	. . Q . . V . . .
15.250	3.3618	7.72	. . Q . . V . . .
15.333	3.4127	7.39	. . Q . . V . . .
15.417	3.4636	7.39	. . Q . . V . . .
15.500	3.5145	7.39	. . Q . . V . . .
15.583	3.5611	6.76	. . Q . . V . . .
15.667	3.6077	6.76	. . Q . . V . . .
15.750	3.6542	6.76	. . Q . . V . . .
15.833	3.6945	5.85	. .Q . . V . . .
15.917	3.7348	5.85	. .Q . . V . . .
16.000	3.7751	5.85	. .Q . . V . . .
16.083	3.8062	4.51	. Q. . . V . . .

16.167	3.8373	4.51	. Q. . . V . . .
16.250	3.8683	4.51	. Q. . . V . . .
16.333	3.8814	1.89	. Q . . . V . . .
16.417	3.8944	1.89	. Q . . . V . . .
16.500	3.9074	1.89	. Q . . . V . . .
16.583	3.9146	1.05	. Q . . . V . . .
16.667	3.9218	1.05	. Q . . . V . . .
16.750	3.9290	1.05	. Q . . . V . . .
16.833	3.9334	0.64	.Q . . . V.
16.917	3.9378	0.64	.Q . . . V.
17.000	3.9423	0.64	.Q . . . V.
17.083	3.9453	0.43	Q . . . V.
17.167	3.9482	0.43	Q . . . V.
17.250	3.9512	0.43	Q . . . V.
17.333	3.9536	0.34	Q . . . V.
17.417	3.9559	0.34	Q . . . V.
17.500	3.9582	0.34	Q . . . V.
17.583	3.9602	0.28	Q . . . V.
17.667	3.9621	0.28	Q . . . V.
17.750	3.9641	0.28	Q . . . V.
17.833	3.9657	0.24	Q . . . V.
17.917	3.9673	0.24	Q . . . V.
18.000	3.9690	0.24	Q . . . V.
18.083	3.9703	0.20	Q . . . V.
18.167	3.9717	0.20	Q . . . V.
18.250	3.9731	0.20	Q . . . V.
18.333	3.9743	0.18	Q . . . V.
18.417	3.9756	0.18	Q . . . V.
18.500	3.9768	0.18	Q . . . V.
18.583	3.9780	0.17	Q . . . V.
18.667	3.9791	0.17	Q . . . V.
18.750	3.9803	0.17	Q . . . V.
18.833	3.9812	0.14	Q . . . V.
18.917	3.9821	0.14	Q . . . V.
19.000	3.9831	0.14	Q . . . V.
19.083	3.9839	0.12	Q . . . V.
19.167	3.9847	0.12	Q . . . V.
19.250	3.9855	0.12	Q . . . V.
19.333	3.9864	0.14	Q . . . V.
19.417	3.9874	0.14	Q . . . V.
19.500	3.9883	0.14	Q . . . V.
19.583	3.9893	0.15	Q . . . V.
19.667	3.9904	0.15	Q . . . V.
19.750	3.9914	0.15	Q . . . V.
19.833	3.9923	0.13	Q . . . V.
19.917	3.9932	0.13	Q . . . V.
20.000	3.9941	0.13	Q . . . V.
20.083	3.9948	0.11	Q . . . V.
20.167	3.9956	0.11	Q . . . V.
20.250	3.9964	0.11	Q . . . V.
20.333	3.9972	0.13	Q . . . V.
20.417	3.9981	0.13	Q . . . V.
20.500	3.9989	0.13	Q . . . V.
20.583	3.9998	0.13	Q . . . V.
20.667	4.0007	0.13	Q . . . V.
20.750	4.0016	0.13	Q . . . V.
20.833	4.0024	0.12	Q . . . V.
20.917	4.0032	0.12	Q . . . V.

21.000	4.0041	0.12	Q	.	.	.	V.
21.083	4.0048	0.11	Q	.	.	.	V.
21.167	4.0055	0.11	Q	.	.	.	V.
21.250	4.0063	0.11	Q	.	.	.	V.
21.333	4.0071	0.11	Q	.	.	.	V.
21.417	4.0079	0.11	Q	.	.	.	V.
21.500	4.0087	0.11	Q	.	.	.	V.
21.583	4.0094	0.11	Q	.	.	.	V.
21.667	4.0101	0.11	Q	.	.	.	V.
21.750	4.0108	0.11	Q	.	.	.	V.
21.833	4.0116	0.11	Q	.	.	.	V.
21.917	4.0124	0.11	Q	.	.	.	V.
22.000	4.0132	0.11	Q	.	.	.	V.
22.083	4.0139	0.10	Q	.	.	.	V.
22.167	4.0146	0.10	Q	.	.	.	V.
22.250	4.0153	0.10	Q	.	.	.	V.
22.333	4.0161	0.11	Q	.	.	.	V.
22.417	4.0169	0.11	Q	.	.	.	V.
22.500	4.0177	0.11	Q	.	.	.	V.
22.583	4.0183	0.10	Q	.	.	.	V.
22.667	4.0190	0.10	Q	.	.	.	V.
22.750	4.0196	0.10	Q	.	.	.	V.
22.833	4.0203	0.09	Q	.	.	.	V.
22.917	4.0209	0.09	Q	.	.	.	V.
23.000	4.0215	0.09	Q	.	.	.	V.
23.083	4.0221	0.09	Q	.	.	.	V.
23.166	4.0227	0.09	Q	.	.	.	V.
23.250	4.0234	0.09	Q	.	.	.	V.
23.333	4.0240	0.09	Q	.	.	.	V.
23.416	4.0246	0.09	Q	.	.	.	V.
23.500	4.0252	0.09	Q	.	.	.	V.
23.583	4.0258	0.09	Q	.	.	.	V.
23.666	4.0264	0.09	Q	.	.	.	V.
23.750	4.0270	0.09	Q	.	.	.	V.
23.833	4.0276	0.09	Q	.	.	.	V.
23.916	4.0282	0.09	Q	.	.	.	V.
24.000	4.0288	0.09	Q	.	.	.	V.

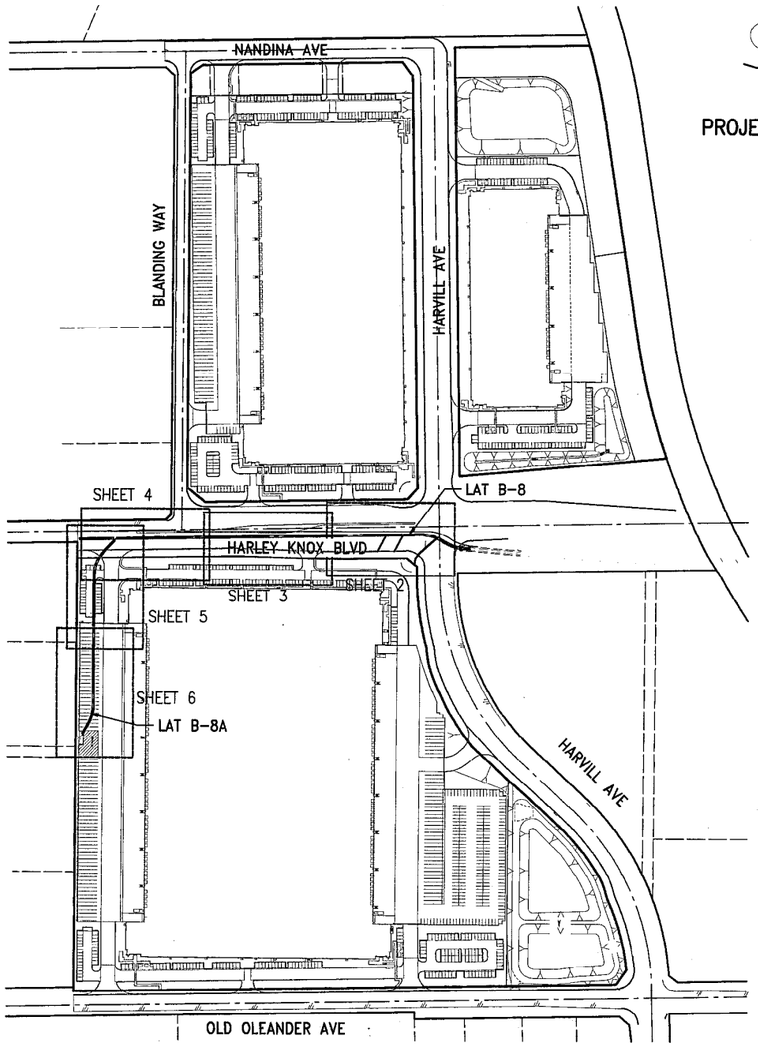
TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
24.083	4.0293	0.07	Q	.	.	.	V.
24.166	4.0297	0.07	Q	.	.	.	V.
24.250	4.0302	0.07	Q	.	.	.	V.
24.333	4.0304	0.03	Q	.	.	.	V.
24.416	4.0306	0.03	Q	.	.	.	V.
24.500	4.0307	0.03	Q	.	.	.	V.
24.583	4.0308	0.01	Q	.	.	.	V.
24.666	4.0309	0.01	Q	.	.	.	V.
24.750	4.0310	0.01	Q	.	.	.	V.
24.833	4.0311	0.01	Q	.	.	.	V.
24.916	4.0311	0.01	Q	.	.	.	V.
25.000	4.0312	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1500.0
10%	510.0
20%	450.0
30%	405.0
40%	345.0
50%	225.0
60%	210.0
70%	165.0
80%	45.0
90%	30.0

END OF FLOODSCx ROUTING ANALYSIS

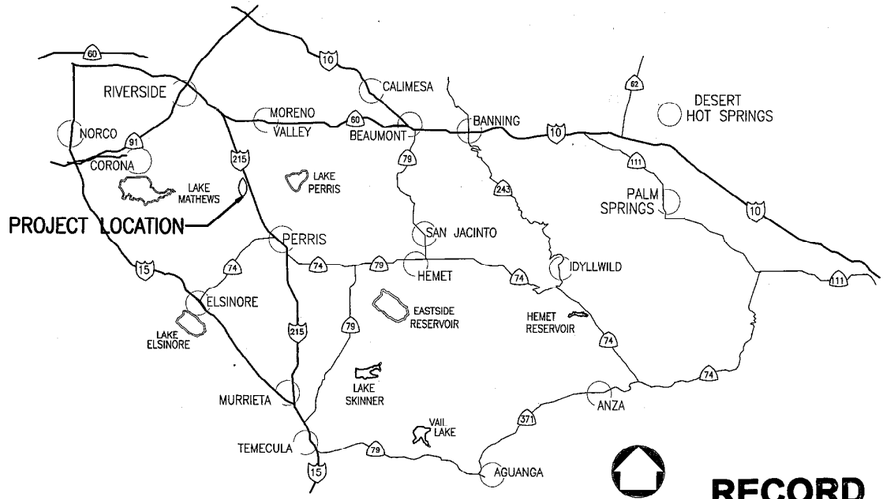
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



INDEX MAP

GRAPHIC SCALE 1"=200'

0 200 400 600



VICINITY MAP

N.T.S.

RECORD DRAWINGS

APPROVED BY: [signature]

DATE: 4/3/14

UNDERGROUND UTILITIES NOTE

ALL UNDERGROUND STRUCTURES OR UTILITIES REPORTED BY THE OWNER OR OTHERS AND THOSE SHOWN ON THE RECORDS EXAMINED ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT.

THE OWNER, BY ACCEPTING THESE PLANS OR PROCEEDING WITH THE IMPROVEMENTS PURSUANT THERETO AGREE TO ASSUME LIABILITY AND TO HOLD THE UNDERSIGNED HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED TO THE UNDERSIGNED, NOT INDICATED ON THE PUBLIC RECORDS EXAMINED, OR LOCATED AT A VARIANCE WITH THAT REPORTED OR SHOWN ON THE RECORDS EXAMINED.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK.

CALL UNDERGROUND SERVICE ALERT (U.S.A.) 1-800-227-2600 AT LEAST 2 WORKING DAYS PRIOR TO EXCAVATION.

NOTICE TO CONTRACTOR

CONTRACTOR AGREES THAT HE SHALL ASSUME COMPLETE AND SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE IN EFFECT CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD COUNTY OF RIVERSIDE, THE OWNER, AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FROM LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR ENGINEER.

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

CB101	CATCH BASIN #4
CB109	CORNER CONNECTION TO CATCH BASIN
MH251	MANHOLE No. 1
MH252	MANHOLE No. 2
MH254	MANHOLE No. 4
M801	CHAIN LINK FENCE
M803	CONCRETE COLLAR
M816	CONCRETE BULKHEAD
M827	VEHICULAR TURN AROUND AREA

CALTRANS STD. DRAWINGS

D86B	HEADWALL AND WINGWALLS
D77A	GRATE DETAILS

SHEET INDEX

STATE PLANE BEARING

STATE PLANE SYSTEM BEARINGS ARE ROTATED 0°51'19" FROM RECORD BEARINGS PER PM 33942. COORDINATES SHOWN ON PLANS HAVE BEEN ADJUSTED TO STATE PLANE SYSTEM.

GENERAL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S M.O.U STANDARD SPECIFICATIONS, DATED JUNE 24, 2008, AND RCFC&WCD STANDARD MANUAL. FOR THE LATEST DRAWINGS OF THE STANDARD MANUAL, PLEASE REFER TO THE "PUBLICATIONS AND RECORDS" PAGE FOUND ON THE DISTRICT'S WEB SITE.
2. CONTACT THE ENCROACHMENT PERMIT ENGINEER AT (951) 955-1266 IF ANENCROACHMENT PERMIT IS REQUIRED FROM RIVERSIDE COUNTY FLOOD CONTROL. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
3. CONTACT CONTRACT ADMINISTRATOR AT (951) 955-1288 IF CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. THE DISTRICT MUST BE NOTIFIED TWENTY DAYS (20) PRIOR TO COSTRUCTION.
4. ALL STATIONING REFERS TO THE CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE INTERSECTION STATION.
6. FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-227-2600.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON NATIONAL GEODETIC VERTICAL DATUM (NGVD 1929).
8. ALL COORDINATES ARE SHOWN IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN DATUM (NAD 83), CALIFORNIA COORDINATE SYSTEM (CCS), ZONE 6. EPOCH 1991.35
9. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
10. ELEVATIONS AND LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE UNLESS OTHERWISE NOTED.
11. UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "B" HOT MIX ASPHALT OVER 6" CLASS 2 AGGREGATE BASE OR AS SPECIFIED BY THE ENGINEER.
12. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6 INCHES OF CLASS "B" CONCRETE.
13. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO. 4 (JS 229) UNLESS OTHERWISE NOTED.
14. PIPE BEDDING SHALL CONFORM TO RCFC&WCD STD. DWG. M815, EXCEPT FOR COVER <2 FEET. FOR COVER <2 FEET, CONCRETE SLURRY (2000 PSI-2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF THE PIPE.
15. BH-1 INDICATES SOIL BORING LOCATIONS BASED ON THE SOILS REPORT DATED JUNE 1, 2011. LOCATIONS SHOWN ARE APPROXIMATE.
16. "V" IS THE DEPTH OF INLET AND CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
17. CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSIONS SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
18. 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.
19. STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS OTHERWISE NOTED.
20. THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS.
21. 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.
22. APPROVAL OF THESE PLANS BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEERS OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE NECESSARY CORRECTIONS.
23. THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO ALL COMMENCEMENT OF ANY WORK.
24. THE CONCRETE COATING ON THE INSIDE OF ALL REINFORCED CONCRETE PIPES MUST BE INCREASED TO PROVIDE A MINIMUM OF 1-1/2 INCHES OVER THE REINFORCING AND INCREASED TO A MINIMUM OF 3-1/2 INCHES OVER THE REINFORCING FOR BOX CULVERT, WHEN DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'c=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND F'c=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.
25. CONSTRUCTION JOINT FOR CALTRANS STANDARD REINFORCED CONCRETE BOX SHALL BE ACCORDING TO RCFC&WCD STD DWG. NO. BX 401.

P.M. NO. 33942/P.P. NO. 20699R1/I.P. NO. 110029

PLAN CHECK OVERSIGHT ENGINEER: Allen Fruend — DATE SIGNED: 2-13-13
REGISTRATION NUMBER: 45702
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

REGISTERED PROFESSIONAL ENGINEER — SCOTT E. WILLIAMSON — NO. C44762 — CIVIL — STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES — CIVIL ENGINEERS
3788 McCRAY ST.
RIVERSIDE CA. 92506
PH: (951) 686-1070
FAX: (951) 788-1256

PREPARED BY: [signature] DATE: 1/31/13 R.C.E. NO. C44762

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

BENCH MARK:
RIVERSIDE COUNTY B.M.
600-40-68
ALUMINUM DISK ON CONCRETE
FROM THIENES ENGINEERING ALTA
ELEV. 1505.08'
DATUM: NGVD 1929 +2.513' FOR NGVD 1988

REVISIONS			
REF.	DESCRIPTION	APPR.	DATE
1	RECORD DRAWINGS	HKT	04/01/14

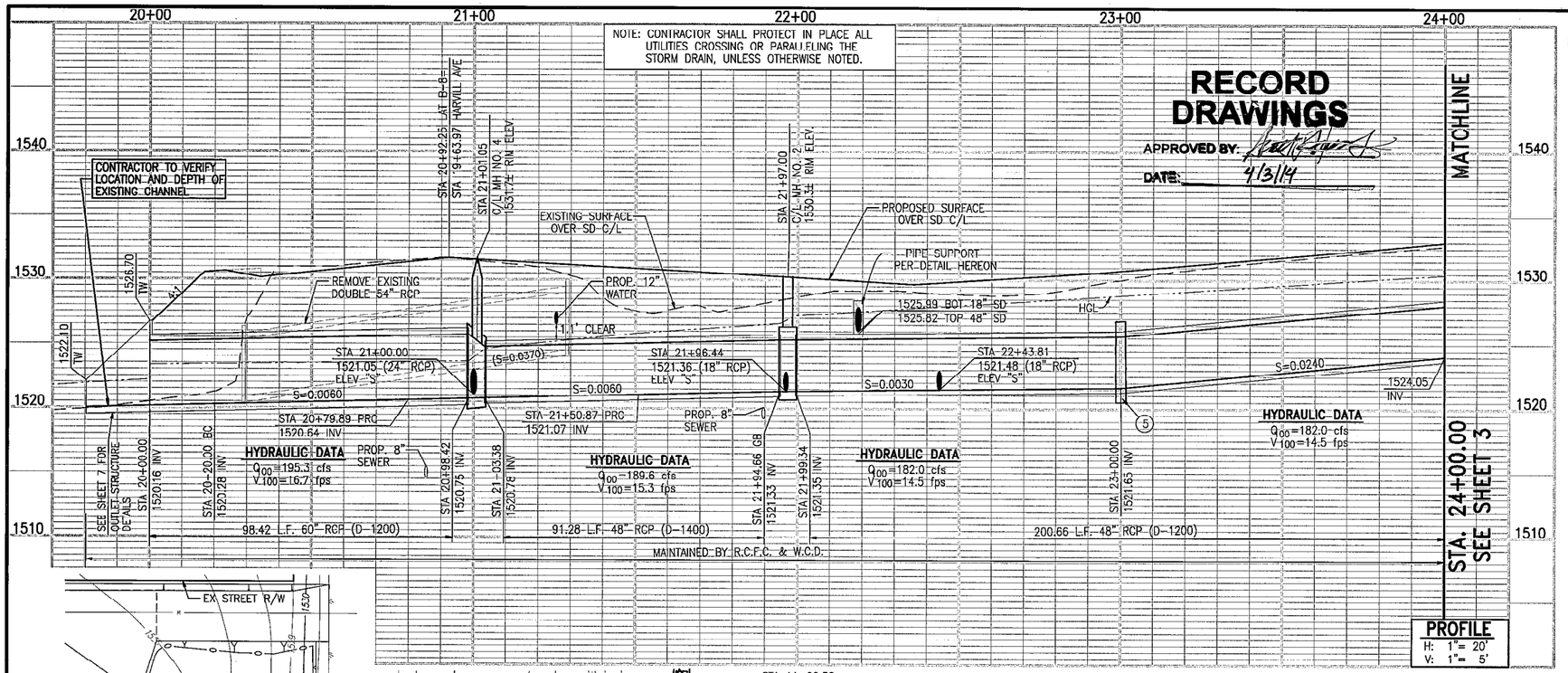
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: Mark W. Wills, PLANNING ENGINEER, DATE: 2/19/2013
APPROVED BY: [signature], CHIEF ENGINEER, DATE: 2/22/13

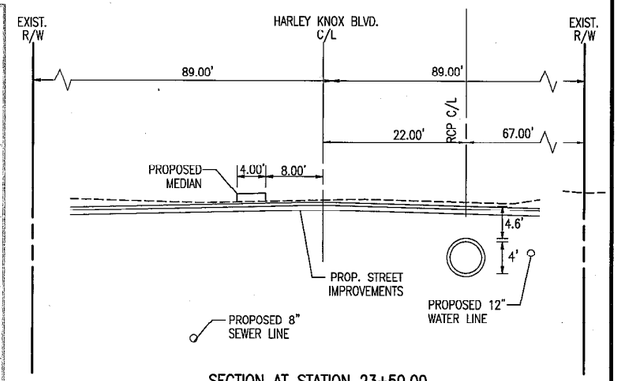
PERRIS VALLEY MDP LATERAL B-8
PERRIS VALLEY LATERAL B-8A

TITLE SHEET

PROJECT NO. 4-0-00457 4-0-00458
DRAWING NO. 4-1060
SHEET NO. 1 OF 7

G:\2011\11-0054\DWG & PRO\design\11-005403.pro 1/30/2013

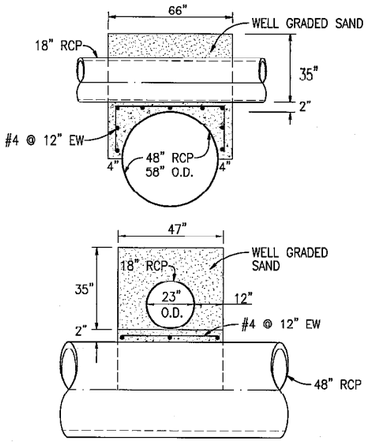




SECTION AT STATION 23+50.00
SCALE 1"=10'

CONSTRUCTION NOTES

1. CONSTRUCT 48" RCP (D-LOAD PER PROFILE)
2. CONSTRUCT 60" RCP (D-LOAD PER PROFILE)
3. CONSTRUCT MANHOLE No.2 PER RCFC&WCD STD. DWG. MH252
4. CONSTRUCT MANHOLE No.4 PER RCFC&WCD STD. DWG. MH254
5. CONSTRUCT CONCRETE COLLAR PER RCFC&WCD STD. DWG. M803
7. CONSTRUCT HEADWALL PER CALTRANS STD. D86B AND DETAILS ON SHEET 7
12. CONSTRUCT 18" RCP (CLASS IV)
13. CONSTRUCT 24" RCP (CLASS IV)
14. CONSTRUCT MANHOLE No.1 PER RCFC&WCD STD. DWG. MH251
15. CONSTRUCT 6'x5.4'x6" CONCRETE PAD W/#4@18" E.W. AROUND MANHOLE FRAME
19. CONSTRUCT JUNCTION STRUCTURE #2 PER RCFC&WCD STD. DWG. JS227



PIPE SUPPORT DETAIL
N.T.S.

(A) ℄ CURVE DATA
Δ=28°35'52"
R=120.00'
L=59.90'
T=30.59'
BC=STA 20+20.00
EC=STA 20+79.89
PI= N 2258914.21
E 6254074.36

(B) ℄ CURVE DATA
Δ=33°53'25"
R=120.00'
L=70.98'
T=36.56'
BC=STA 20+79.89
EC=STA 21+50.87
PI= N 2258951.54
E 6254018.55

(C) ℄ CURVE DATA
Δ=49°43'26"
R=45.00'
L=39.05'
T=20.85'
BC=STA 10+61.78
EC=STA 11+00.83
PI= N 2258887.50
E 6253968.36

P.M. NO. 33942/P.P. NO. 20699R1/I.P. NO. 110029

PLAN CHECK OVERSIGHT ENGINEER: Alan Fund
REGISTRATION NUMBER: 45702
DATE SIGNED: 2-13-13
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES

REGISTERED PROFESSIONAL ENGINEER SCOTT E. HILLERMAN NO. C44782 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
3788 McCRAY ST.
RIVERSIDE CA. 92506
PH: (951) 686-1070
FAX: (951) 788-1256
PREPARED BY:
DATE: 1/29/13
R.C.E. NO. C44762

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

BENCH MARK:
RIV. CO. BM# "600-40-68"
ALUM. DISK ON CONC.
ELEV.=1505.08'
DATUM: 1929
ELEV. 647.374

REF.	REVISIONS	APPR.	DATE

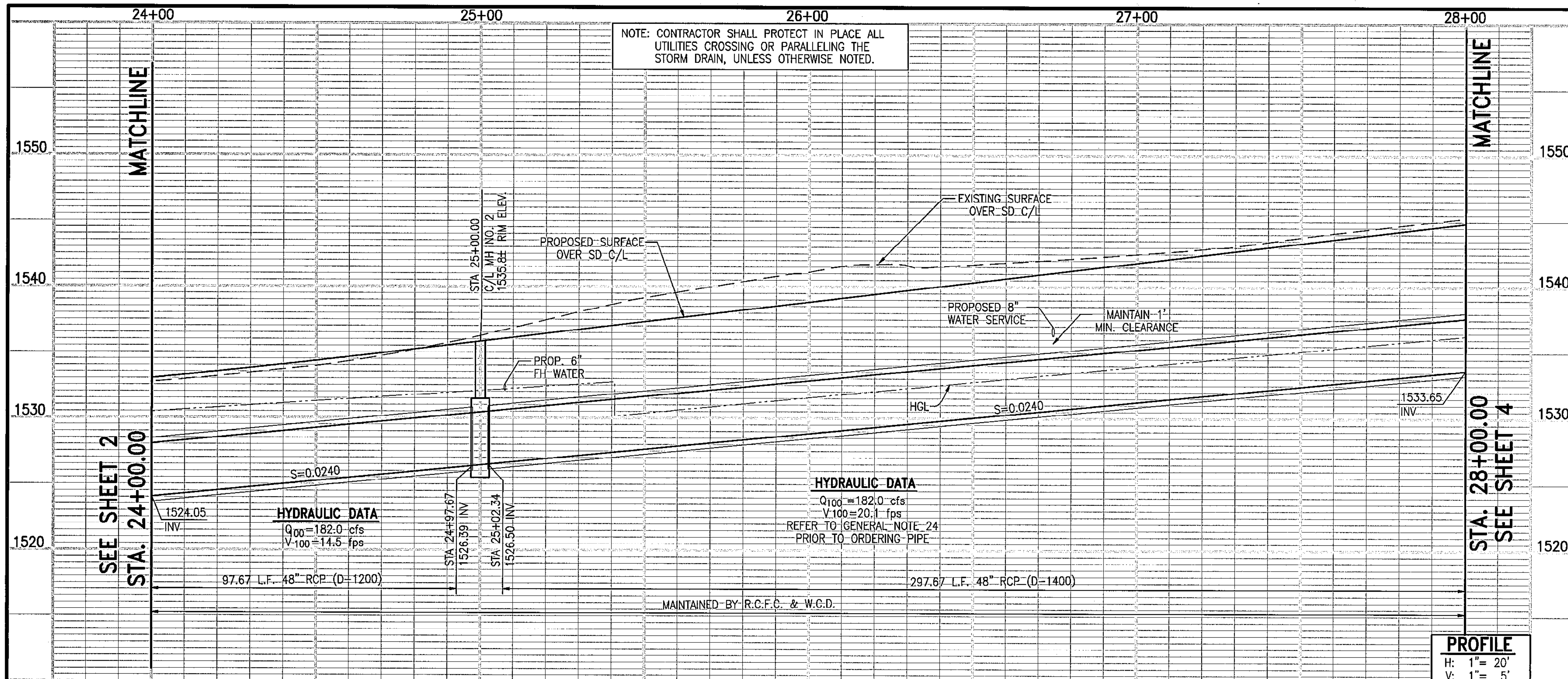
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY:
DATE: 2/19/2013
APPROVED BY:
DATE: 2/19/2013

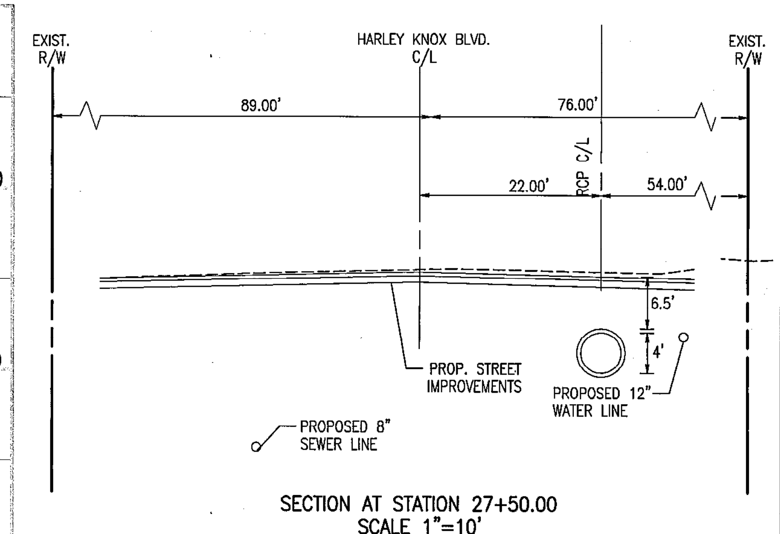
PERRIS VALLEY MDP LATERAL B-8

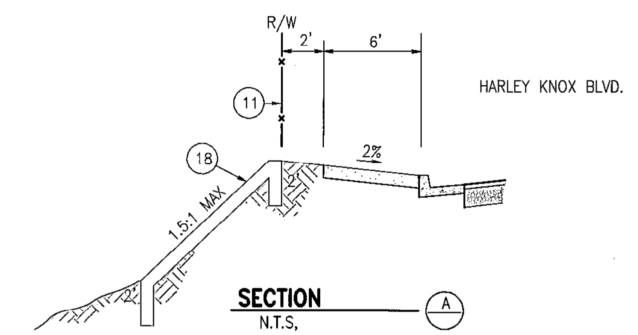
STA 20+00.00 TO STA. 24+00.00

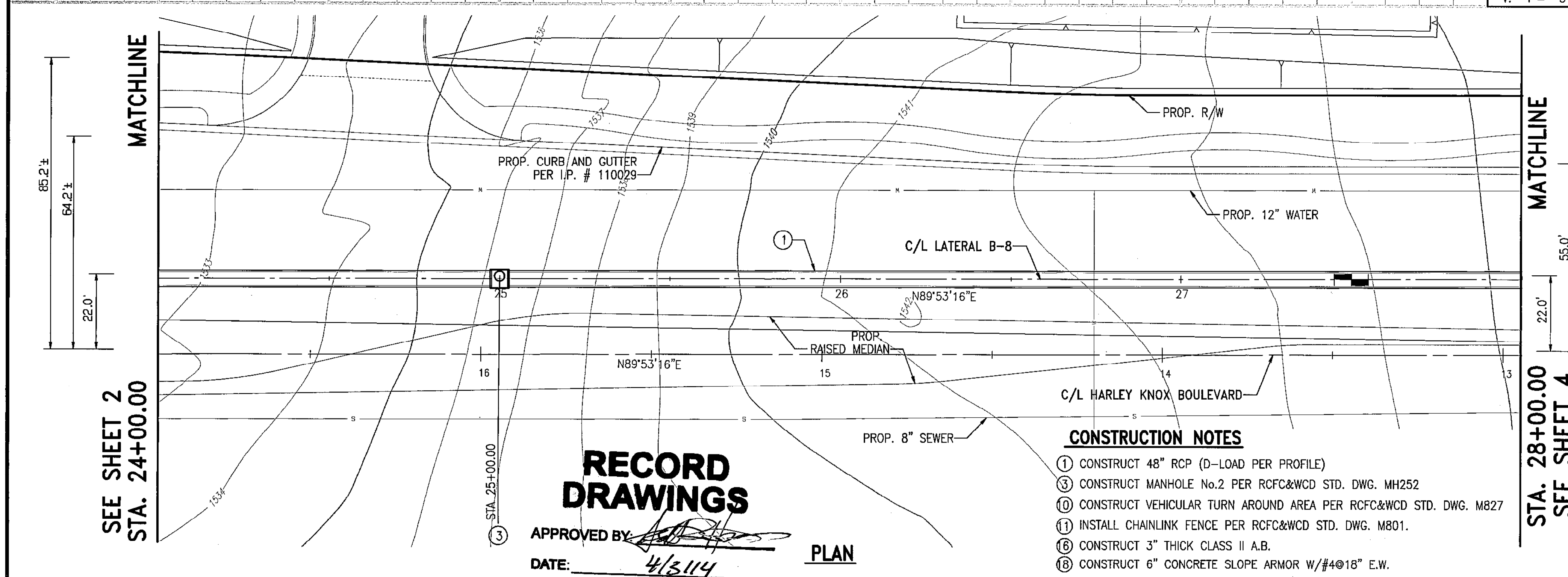
PROJECT NO. 4-0-00457
DRAWING NO. 4-1060
SHEET NO. 2 OF 7

Q:\2013\11-025\LWRC & PROD\design\11-025450.pro 1/29/2013



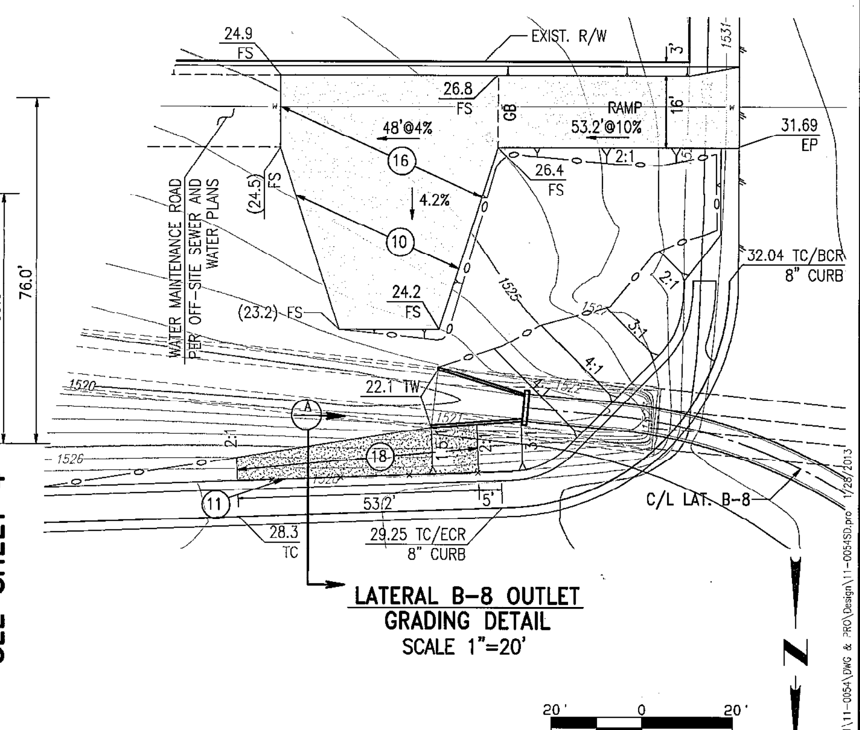






CONSTRUCTION NOTES

1. CONSTRUCT 48" RCP (D-LOAD PER PROFILE)
3. CONSTRUCT MANHOLE No.2 PER RCFC&WCD STD. DWG. MH252
10. CONSTRUCT VEHICULAR TURN AROUND AREA PER RCFC&WCD STD. DWG. M827
11. INSTALL CHAINLINK FENCE PER RCFC&WCD STD. DWG. M801.
16. CONSTRUCT 3" THICK CLASS II A.B.
18. CONSTRUCT 6" CONCRETE SLOPE ARMOR W/#4@18" E.W.



ALBERT A. WEBB ASSOCIATES — CIVIL ENGINEERS, 3788 McCRAY ST., RIVERSIDE CA. 92506, PH: (951) 686-1070, FAX: (951) 788-1256	PREPARED BY: ; DATE: 1/29/13 ; R.C.E. NO. C44762
Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG	BENCH MARK: RIVERSIDE COUNTY B.M. 600-40-68 ALUMINUM DISK ON CONCRETE FROM THIENES ENGINEERING ALTA ELEV. 1505.08' DATUM: NGVD 1929 +2.513' FOR NGVD 1988

REF.	REVISIONS / DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: DATE: 2/19/2013 — APPROVED BY: Mark H. Wills DATE: 2/19/2013

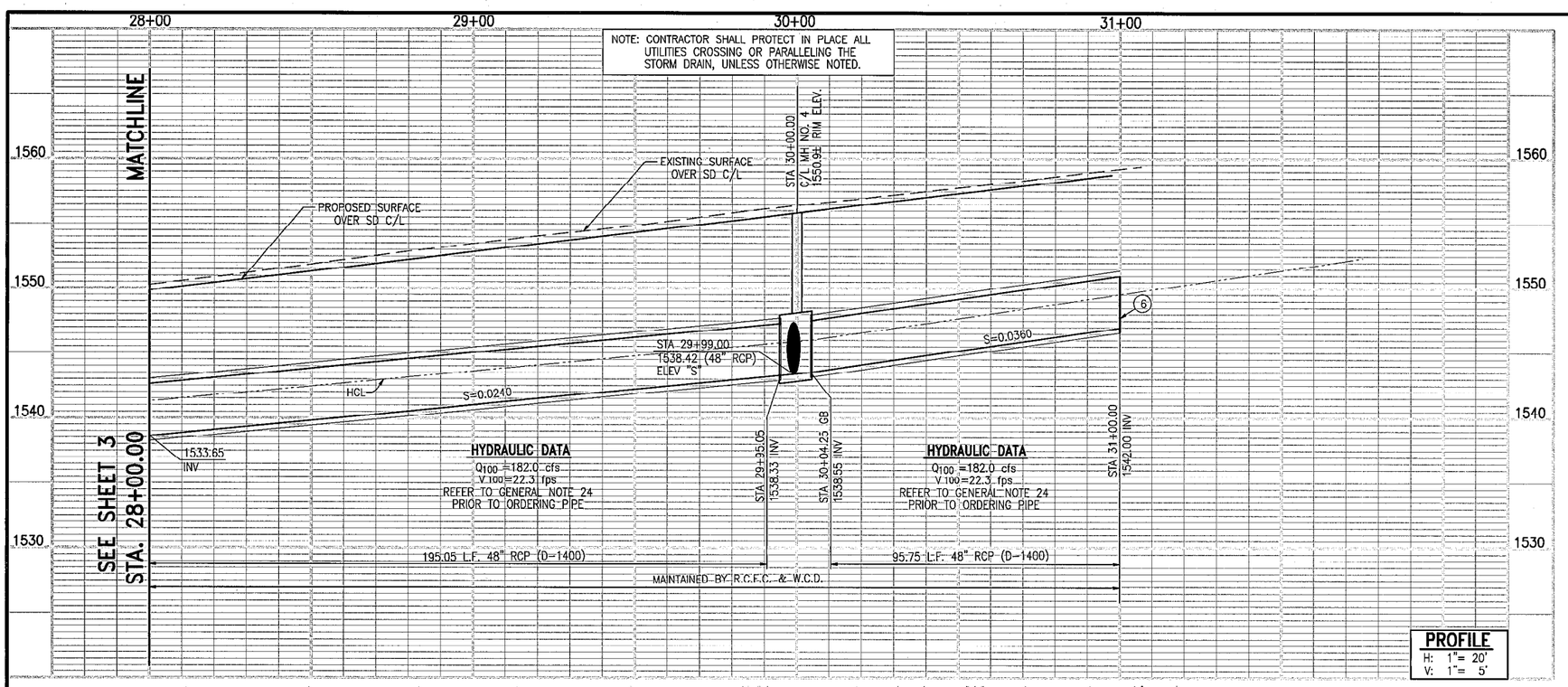
PERRIS VALLEY MDP LATERAL B-8

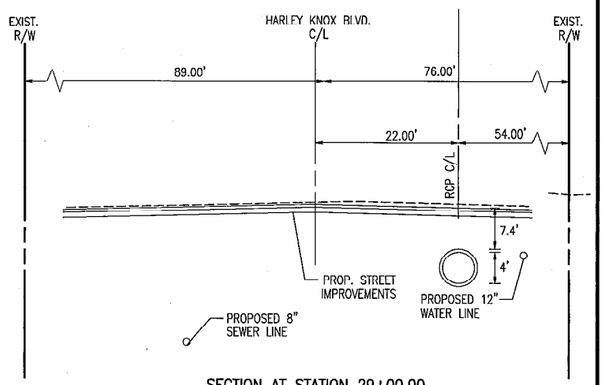
STA 24+00.00 TO STA. 28+00.00

PROJECT NO. 4-0-00457

DRAWING NO. 4-1060

SHEET NO. 3 OF 7

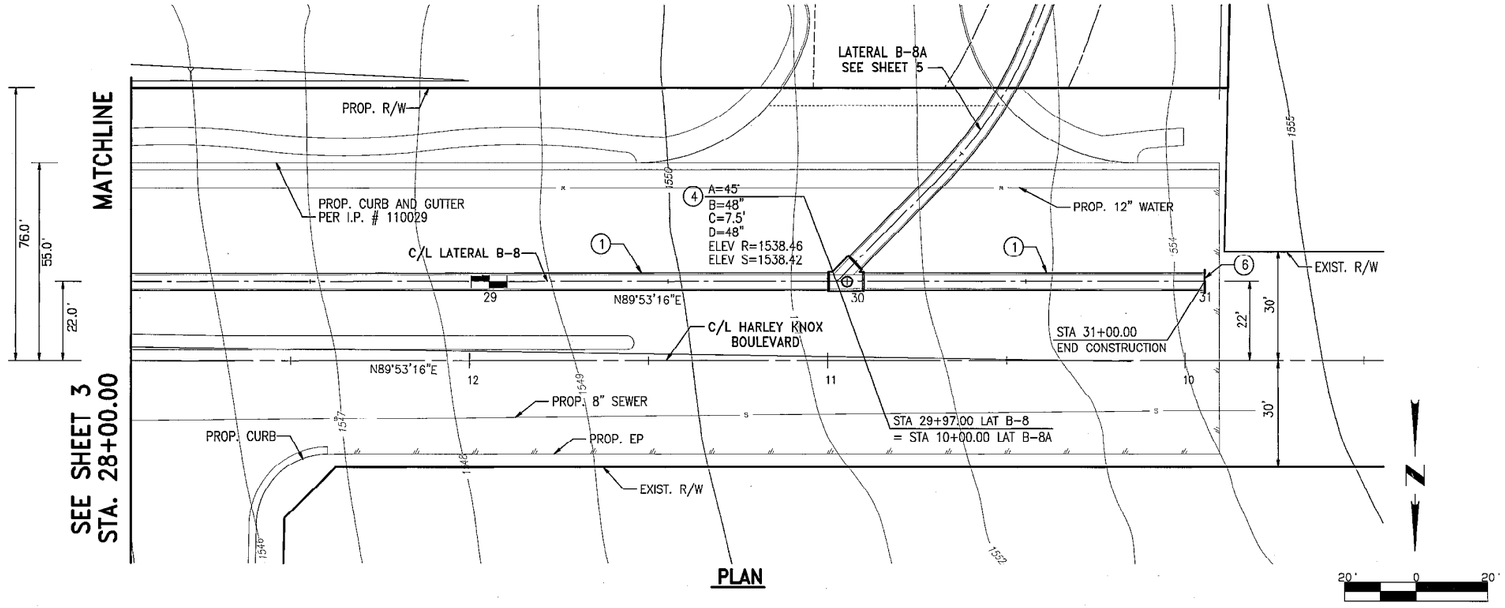




SECTION AT STATION 29+00.00
SCALE 1"=10'

CONSTRUCTION NOTES

1. CONSTRUCT 48" RCP (D-LOAD PER PROFILE)
4. CONSTRUCT MANHOLE No.4 PER RCFC&WCD STD. DWG. MH254
6. CONSTRUCT CONCRETE BULKHEAD PER RCFC&WCD STD. DWG. M816



PLAN

RECORD DRAWINGS
APPROVED BY: Scott A. Webb
DATE: 4/13/14

C:\2013\11-0054\Civil & PRO\Design\11-0054SD.pro 1/28/2013

REGISTERED PROFESSIONAL ENGINEER SCOTT A. WEBB NO. C44762 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
3788 McCRAY ST.
RIVERSIDE CA. 92506
PH: (951) 686-1070
FAX: (951) 788-1256

PREPARED BY: Scott A. Webb
DATE: 1/29/13
R.C.E. NO. C44762

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

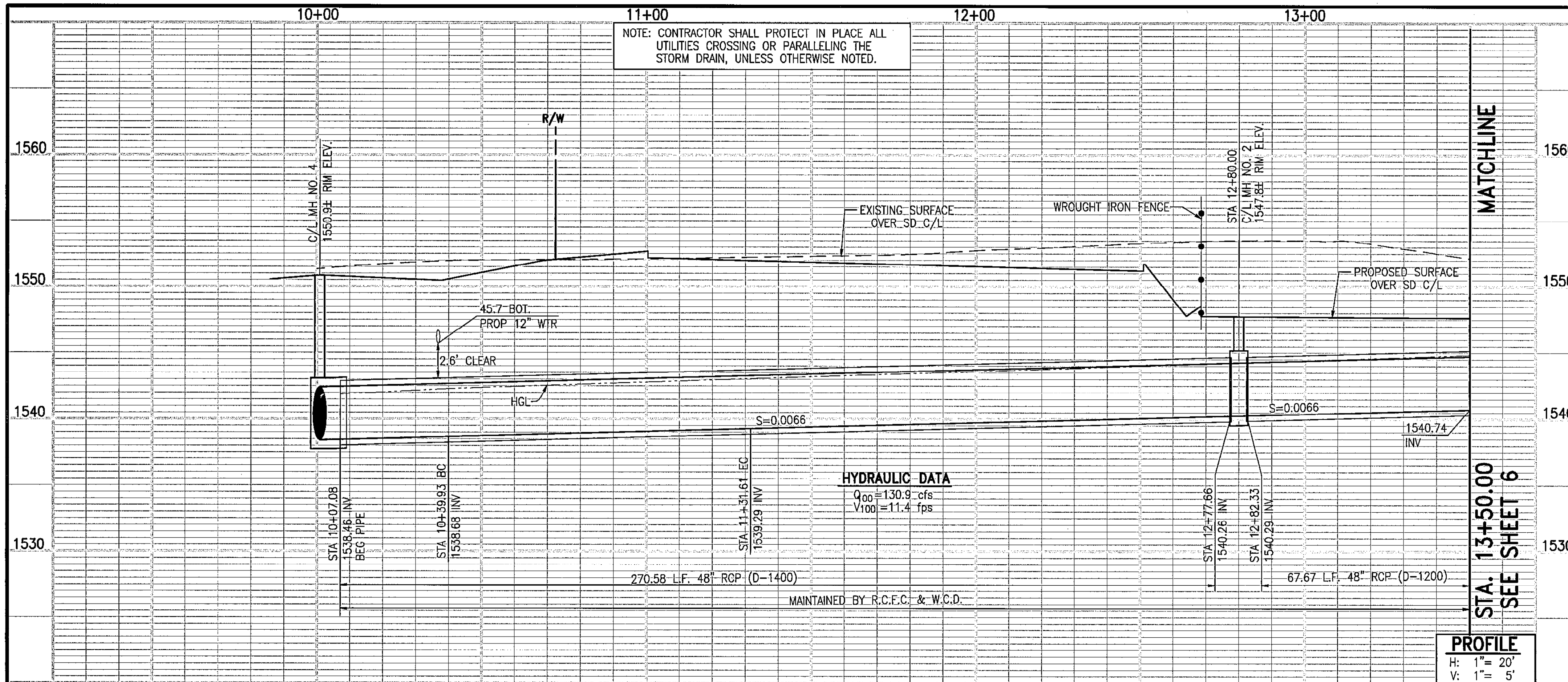
BENCH MARK:
RIVERSIDE COUNTY B.M.
600-40-68
ALUMINUM DISK ON CONCRETE
FROM THIENES ENGINEERING ALTA
ELEV. 1505.08'
DATUM: NGVD 1929 +2.513' FOR NGVD 1988

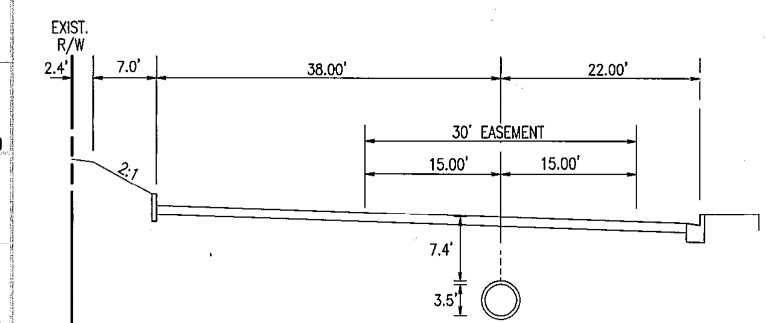
REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 2/15/2013
APPROVED BY: Mark H. Wills DATE: 2/19/2013

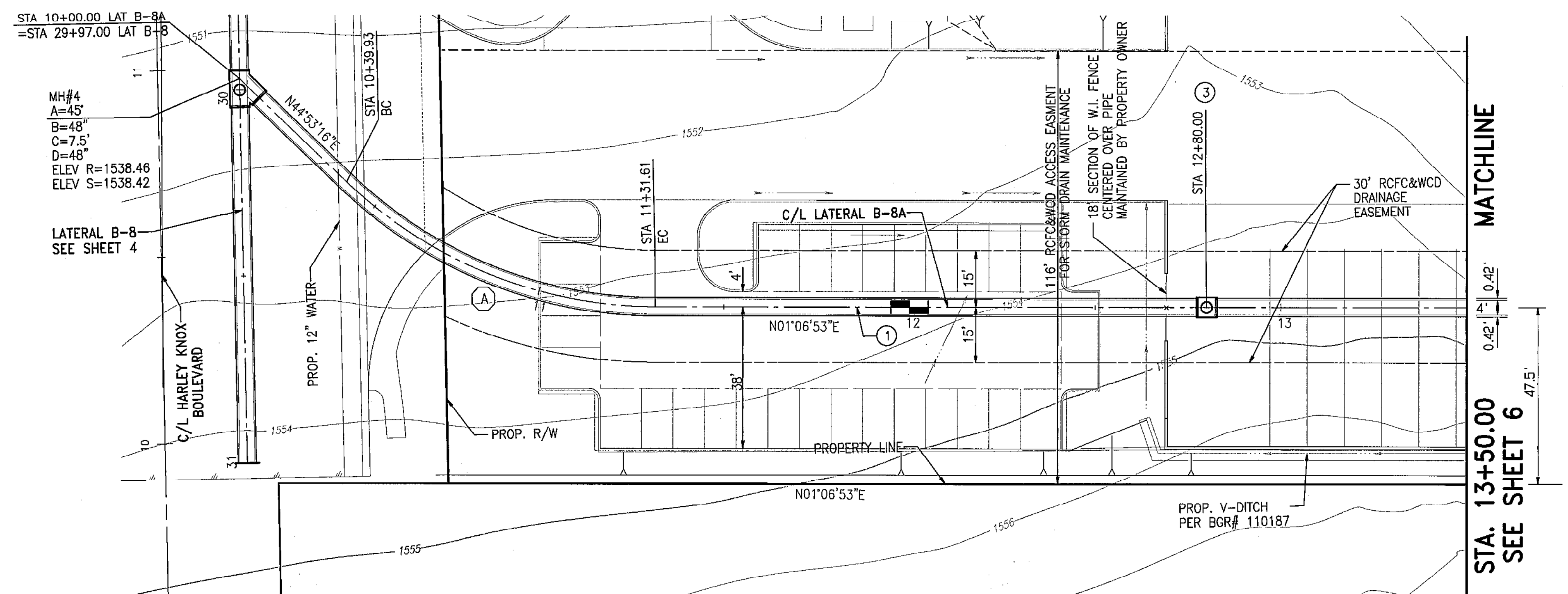
PERRIS VALLEY MDP
LATERAL B-8
STA 28+00.00 TO STA. 31+00.00

PROJECT NO. 4-0-00457
DRAWING NO. 4-1060
SHEET NO. 4 OF 7





SECTION AT STATION 12+00.00
SCALE 1"=10'



PLAN

CONSTRUCTION NOTES

(1) CONSTRUCT 48" RCP (D-LOAD PER PROFILE)
(3) CONSTRUCT MANHOLE No.2 PER RCFC&WCD STD. DWG. MH252

(A) ℄ CURVE DATA
Δ=43°46'23"
R=60.00'
L=45.84'
T=24.10'
BC=STA 10+08.37
EC=STA 10+54.21
PI= N 2258887.37 E 6253073.66

RECORD DRAWINGS
APPROVED BY: [signature]
DATE: 4/3/14

ALBERT A. WEBB ASSOCIATES — CIVIL ENGINEERS
3788 McCRAY ST.
RIVERSIDE CA. 92506
PH: (951) 686-1070
FAX: (951) 788-1256
PREPARED BY: [signature]
R.C.E. NO. C44762
DATE: 1/29/13

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

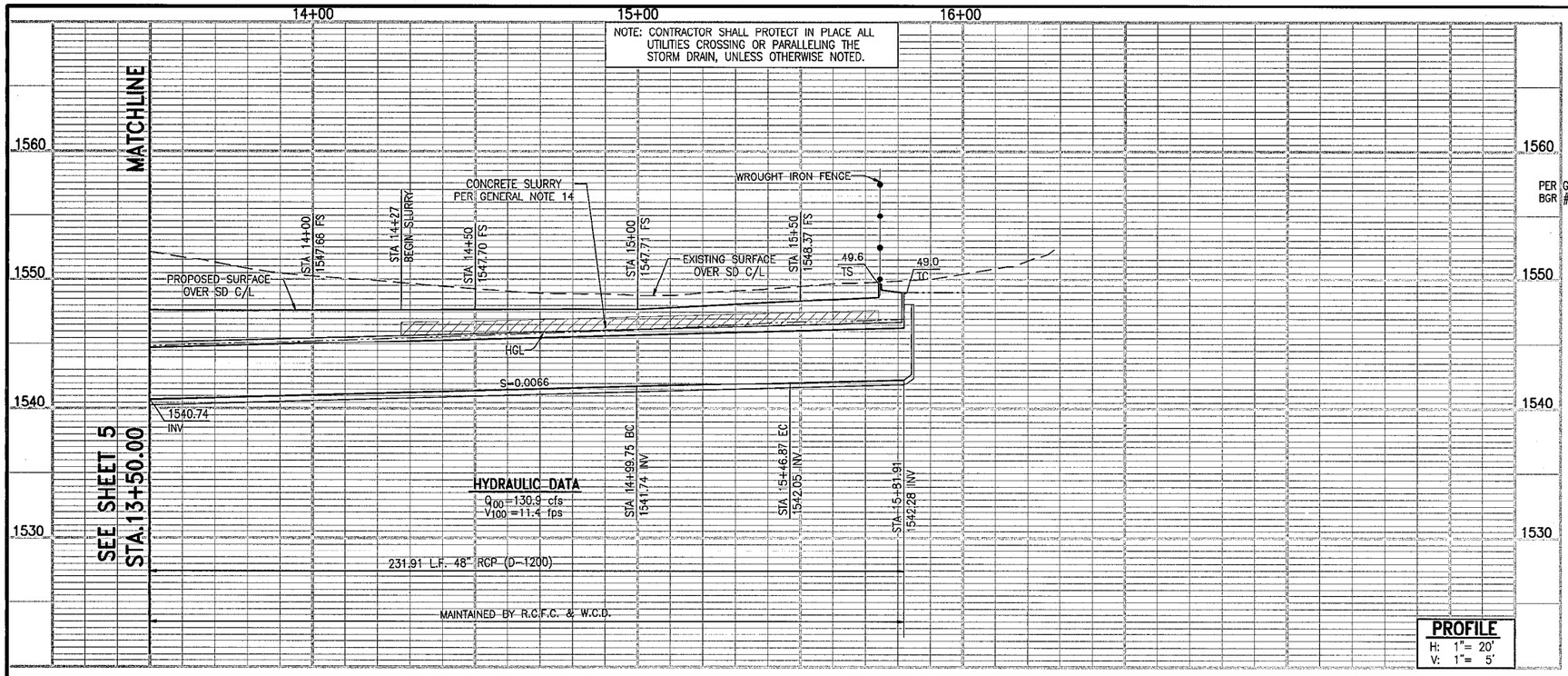
BENCH MARK:
RIVERSIDE COUNTY B.M.
600-40-68
ALUMINUM DISK ON CONCRETE
FROM THIENES ENGINEERING ALTA
ELEV. 1505.08'
DATUM: NGVD 1929 +2.513' FOR NGVD 1988

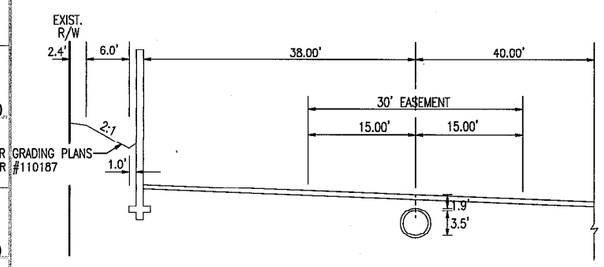
REF.	REVISIONS / DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 2/19/2013
APPROVED BY: Mark H. Wills DATE: 2/19/2013

PERRIS VALLEY
LATERAL B-8A
STA 10+00.00 TO STA. 13+50.00

PROJECT NO. 4-0-00458
DRAWING NO. 4-1060
SHEET NO. 5 OF 7

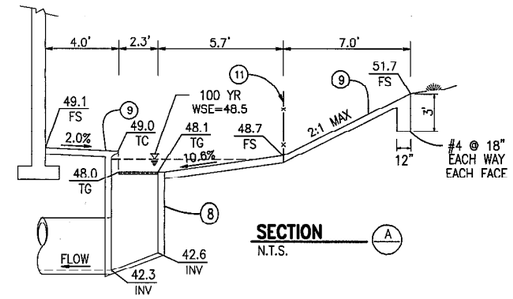




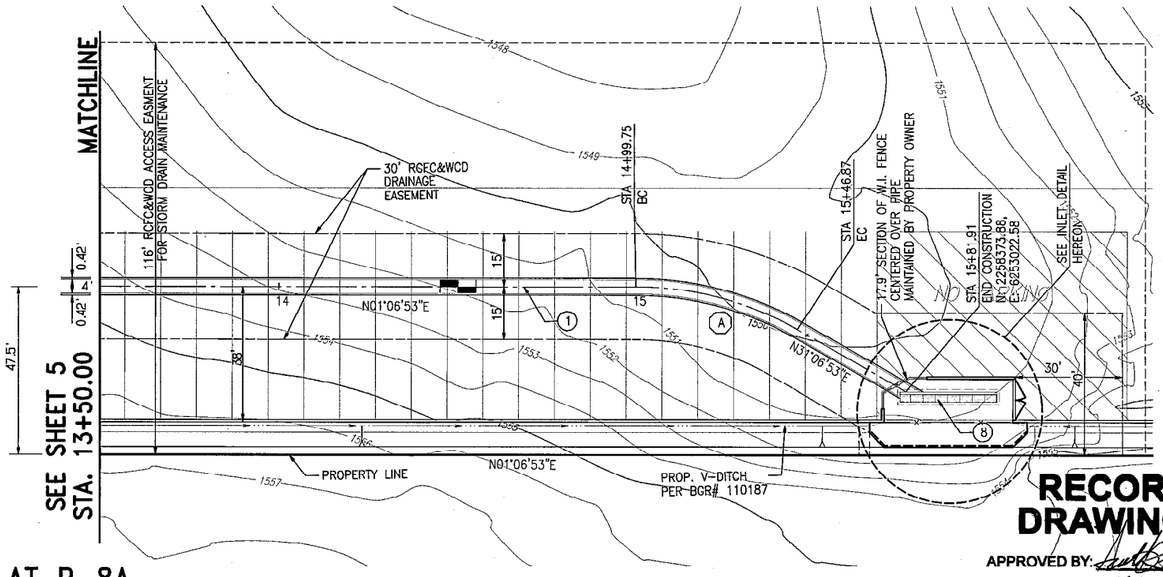
SECTION AT STATION 14+50.00
SCALE 1"=10'

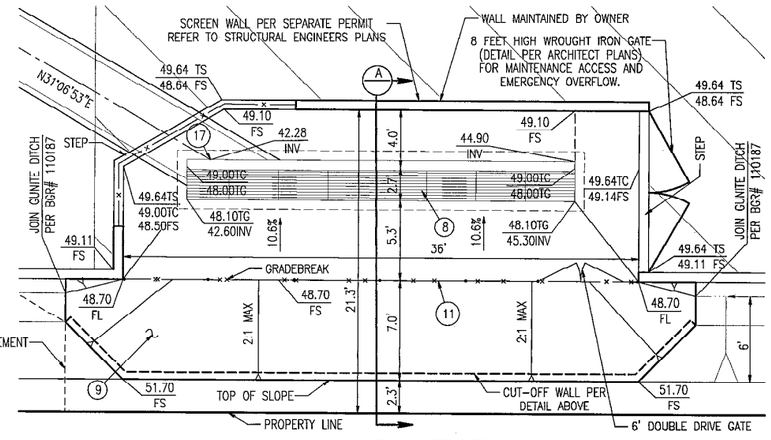
CONSTRUCTION NOTES

(1) CONSTRUCT 48" RCP (D-LOAD PER PROFILE)
(8) CONSTRUCT CATCH BASIN #4 PER RCFC&WCD STD. DWG. CB101 (W=27.08', V=6.72') WITH 8 STEEL BAR GRATES TYPE 24-9 PER CALTRANS STD. D77A OR APPROVED EQUAL
(9) INSTALL 6" CONCRETE WITH #4 @ 18" BOTH WAYS REINFORCEMENT
(11) INSTALL CHAINLINK FENCE PER RCFC&WCD STD. DWG. M801 MODIFIED TO PROVIDE POST 6' O.C.
(17) CONSTRUCT CORNER CONNECTION TO CATCH BASIN PER RCFC&WCD STD. DWG. CB109



SECTION (A) N.T.S.





CURB INLET DETAIL

(A) ℄ CURVE DATA
Δ=30°00'00"
R=90.00'
L=47.12'
T=24.12'
BC=STA 14+99.75
EC=STA 15+46.87
PI= N 2258446.99 E 6253065.10

RECORD DRAWINGS
APPROVED BY: Scott Hilderbrandt
DATE: 4/3/14

LAT B-8A

PLAN

REGISTERED PROFESSIONAL ENGINEER SCOTT R. HILDERBRANDT NO. 044762 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
3788 McCRAY ST.
RIVERSIDE, CA. 92506
PH: (951) 686-1070
FAX: (951) 788-1256
PREPARED BY: Scott R. Hilderbrandt
DATE: 1/31/13
R.C.E. NO. C44762

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

BENCH MARK:
RIVERSIDE COUNTY B.M.
600-40-68
ALUMINUM DISK ON CONCRETE
FROM THIENES ENGINEERING ALTA
ELEV. 1505.08'
DATUM: NGVD 1929 +2.513' FOR NGVD 1988

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 2/19/2013
APPROVED BY: Mark W. Wills DATE: 2/19/2013

PERRIS VALLEY LATERAL B-8A
STA 13+50.00 TO STA. 15+83.57

PROJECT NO. 4-0-00458
DRAWING NO. 4-1060
SHEET NO. 6 OF 7

G:\2011\11-0056\DWG & PRO\Design\11-0056D.pro 1/31/2013

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

10+00 10+25 10+50 10+75 11+00 11+25

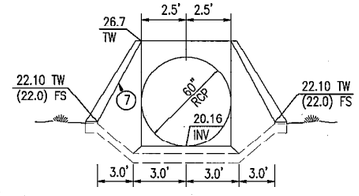
1530 1520 1513 1523 1533

31.74' TRIM MH #4
PROP. FINISHED SURFACE
℄ C/L PIPE
13+32 12" WTR
26.40 FL
30.44 TC
ELEV.S 21.05 INV
MH#4 20.76 INV
10+04.18 BEG. PIPE 21.06 INV ELEV.R
HGL
0.30%
HYDRAULIC DATA
Q_{00}=6.9 cfs
V_{00}=2.2 fps
INSTALL 96.65 LF 24" (CLASS IV D-2000) RCP
MAINTAINED BY R.C.T.D.
10+61.78 BC
21.24 INV
11+02.58 SDMH
31.82± RIM MH #1
P/L
6'x5.4'x6" CONCRETE PAD
11+00.33 EC
21.35 INV END PIPE
11+06.38
21.37 INV
PROP. SD PER BRG # 1.10.87
LAT B-8B
SEE SHEET 2 FOR PLAN
10+00.00 SDMH #2
29.8± RIM MH #2
PROP. FINISHED SURFACE
℄ C/L PIPE
FOR CB OPENING CONFIGURATION SEE STREET IMPR. PLANS
28.57 CB OPENING
29.40 TC
10+30 12" WTR
25.20 INV
28.40 FL
HGL
1.00%
10+00.00 SDMH
29.8± FS
PROP. FINISHED SURFACE
℄ C/L PIPE
48" RCP LAT. B-8
28.87 CB OPENING
29.70 TC REDUNDANT CB
FOR CB OPENING CONFIGURATION SEE STREET IMPR. PLANS
10+30 12" WTR
24.3 INV
28.70 FL
HGL
0.5%
HYDRAULIC DATA
Q_{00}=7.5 cfs
V_{00}=4.2 fps
INSTALL 49.12 LF 18" (CLASS IV D-2000) RCP
MAINTAINED BY R.C.T.D.
ELEV.S 21.48 INV
10+04.58 BEG.PIPE 21.50 INV ELEV.R
10+53.70 21.75 INV END PIPE
ELEV.S 21.36 INV
10+02.51 BEG.PIPE 21.38 INV
HYDRAULIC DATA
Q_{00}=7.5 cfs
V_{00}=4.2 fps
INSTALL 51.58 LF 18" (CLASS IV D-2000) RCP
MAINTAINED BY R.C.T.D.
10+53.89 21.89 INV END PIPE
LAT B-8D
SEE SHEET 2 FOR PLAN
LAT B-8C
SEE SHEET 2 FOR PLAN

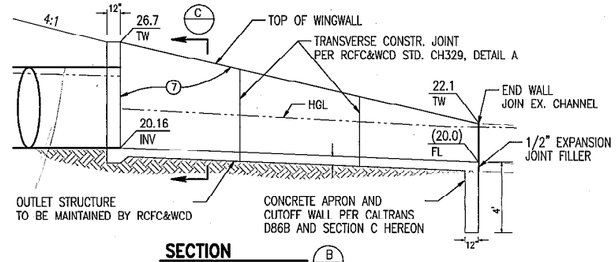
PROFILE
H: 1"= 5'
V: 1"= 5'

CONSTRUCTION NOTES

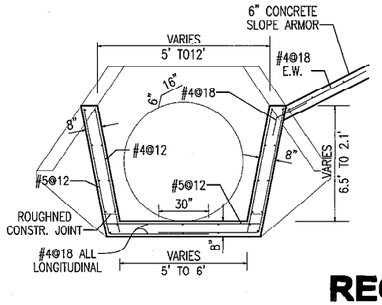
(7) CONSTRUCT HEADWALL AND WARPED WINGWALLS PER CALTRANS STD. D86B AND DETAILS HEREON. WARPED WINGWALL THICKNESS AND REINFORCEMENT PER SECTION "C"



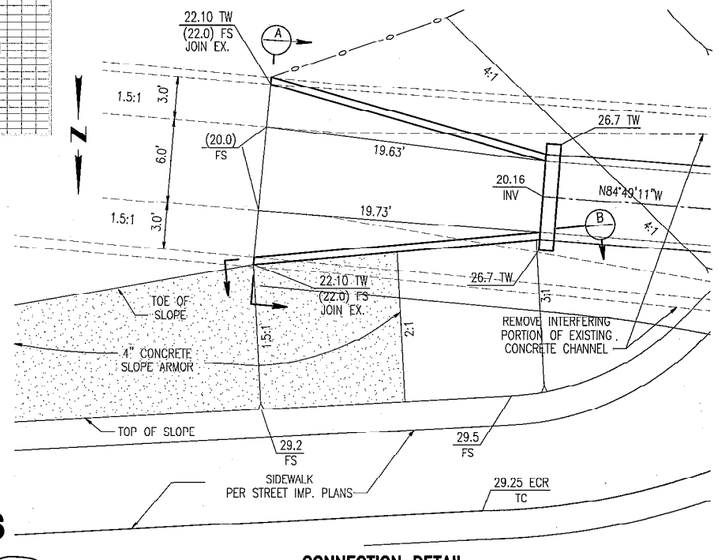
SECTION A
N.T.S,



SECTION B
N.T.S,



SECTION C
N.T.S,



CONNECTION DETAIL

5' 0 5'

RECORD DRAWINGS

APPROVED BY: [signature]

DATE: 4/16/14

PLAN CHECK OVERSIGHT ENGINEER: Alan Franck
REGISTRATION NUMBER: 45702
DATE SIGNED: 2-13-13
APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

REGISTERED PROFESSIONAL ENGINEER SCOTT R. HILDEBRANDT NO. C44762 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
3788 McCRAY ST.
RIVERSIDE, CA. 92506
PH: (951) 686-1070
FAX: (951) 788-1256
PREPARED BY: [signature]
R.C.E. NO. C44762
DATE: 1/21/13

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

BENCH MARK:
RIV. CO. BM# "600-40-68"
ALUM. DISK ON CONC.
ELEV.=1505.08
DATUM: 1929
ELEV. 647.374

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DATE: 2/15/2013
APPROVED BY: Mark W. Wills DATE: 2/19/2013

PERRIS VALLEY MDP LATERAL B-8

LATERAL PROFILES

PROJECT NO. 4-0-00457
DRAWING NO. 4-1060
SHEET NO. 7 OF 7

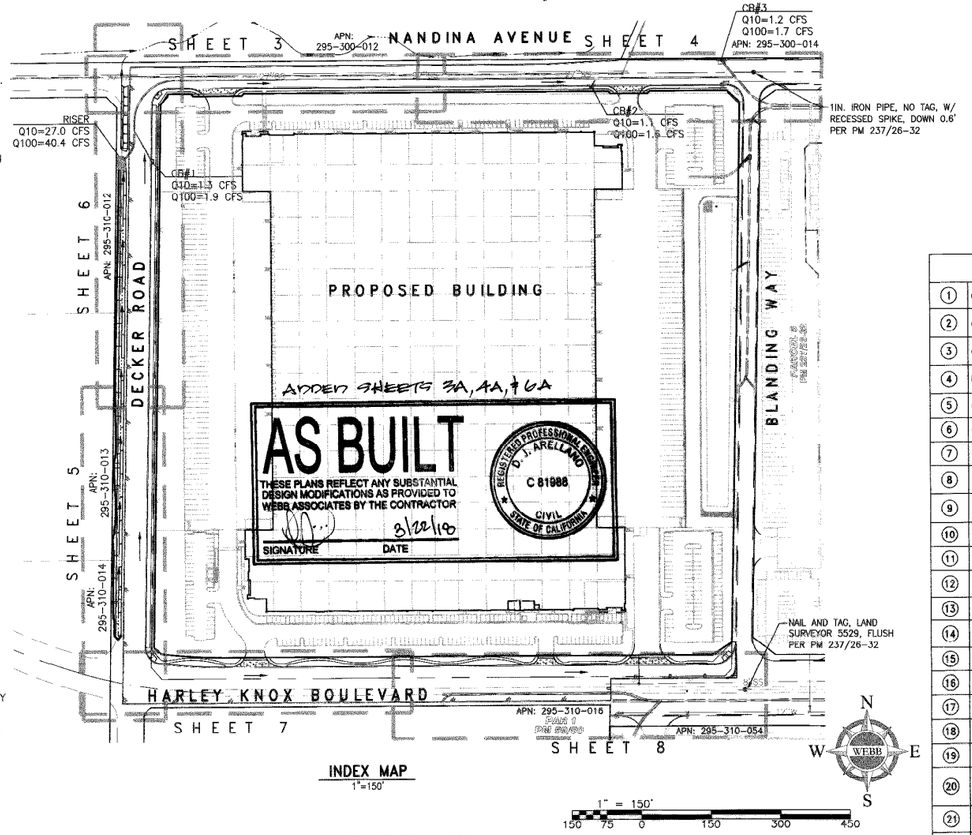
G:\2013\11-0054\PNG & PRO\Design\11-0054SD.pro 1/29/2014

STREET IMPROVEMENT PLANS FOR
TCC NANDINA BUSINESS CENTER
PLOT PLAN NO. 25954
IN THE COUNTY OF RIVERSIDE, CALIFORNIA

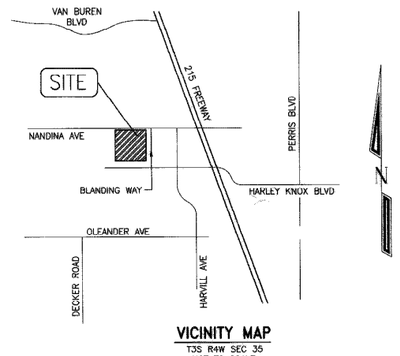
GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER/OWNER CONTRACTOR TO APPLY TO THE RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT, PERMIT SECTION, FOR AN ENCROACHMENT PERMIT FOR ALL WORK PERFORMED WITHIN PUBLIC RIGHT-OF-WAY, DEDICATED AND ACCEPTED FOR PUBLIC USE; AND TO BE RESPONSIBLE FOR SATISFACTORY COMPLIANCE FOR ALL CURRENT ENVIRONMENTAL REGULATIONS DURING THE LIFE OF CONSTRUCTION ACTIVITIES FOR THIS PROJECT, ADDITIONAL STUDIES AND/OR PERMITS MAY BE REQUIRED.
2. THE CONTRACTOR/DEVELOPER SHALL BE RESPONSIBLE FOR THE CLEARING OF THE WORK AREA, AND RELOCATION COSTS OF ALL EXISTING UTILITIES. THIS INCLUDES UNDERGROUNDING OF EXISTING OVERHEAD LINES ALONG THE PROJECT FRONTAGE AS REQUIRED BY THE CONDITIONS OF APPROVAL. PERMITEE MUST INFORM COUNTY OF CONSTRUCTION SCHEDULE AT LEAST 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION. PHONE: (951) 955-6790.
3. THE DEVELOPER WILL INSTALL STREET NAME SIGNS CONFORMING TO COUNTY STANDARD NO. 1220 AND 1221.
4. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT IMPROVEMENT STANDARDS AND SPECIFICATIONS, LATEST EDITION, COUNTY ORDINANCE NO. 461 AND SUBSEQUENT AMENDMENTS.
5. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO NOTIFY THE ENGINEER TO INSTALL STREET CENTERLINE MONUMENTS AS REQUIRED BY RIVERSIDE COUNTY ORDINANCE NO. 461. IF CONSTRUCTION CENTERLINE DIFFERS, PROVIDE A TIE TO EXISTING CENTERLINE OF RIGHT-OF-WAY. PRIOR TO ROAD CONSTRUCTION, SURVEY MONUMENTS INCLUDING CENTERLINE MONUMENTS, TIE POINTS, PROPERTY CORNERS AND BENCH MARKS SHALL BE REFERENCED OUT AND CORNER RECORDS FILED WITH THE COUNTY SURVEYOR PURSUANT TO SECTION 8771 OF THE BUSINESS & PROFESSIONAL CODE. SURVEY POINTS DESTROYED DURING CONSTRUCTION SHALL BE RESET, AND A SECOND CORNER RECORD FILED FOR THOSE POINTS PRIOR TO COMPLETION AND ACCEPTANCE OF THE IMPROVEMENTS.
6. ALL UNDERGROUND FACILITIES, WITH LATERALS, SHALL BE IN PLACE PRIOR TO PAVING THE STREET, INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING: SEWER, WATER, ELECTRIC, GAS, STORM DRAINS.
7. CURB DEPRESSIONS AND DRIVEWAY APPROACHES WILL BE INSTALLED AND CONSTRUCTED ACCORDING TO COUNTY STANDARD NO. 207A, AS DIRECTED IN THE FIELD.
8. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR TO INSTALL AND MAINTAIN ALL CONSTRUCTION, REGULATORY, GUIDE AND WARNING SIGNS WITHIN THE PROJECT LIMITS AND ITS SURROUNDINGS TO PROVIDE SAFE PASSAGE FOR THE TRAVELING PUBLIC AND WORKERS UNTIL THE FINAL COMPLETION AND ACCEPTANCE OF THE PROJECT BY THE COUNTY. A TRAFFIC CONTROL PLAN MUST BE SUBMITTED FOR REVIEW TO THE PERMITS SECTION OR INSPECTION SECTION (FOR MAP CASES) PRIOR TO OBTAINING AN ENCROACHMENT PERMIT.
9. ALL STREET SECTIONS ARE TENTATIVE. ADDITIONAL SOIL TESTS MAY BE TAKEN BY THE COUNTY AFTER ROUGH GRADING TO DETERMINE THE EXACT STREET SECTION REQUIREMENTS. USE STANDARD NO. 401 IF EXPANSIVE SOILS ARE ENCOUNTERED.
10. ASPHALTIC EMULSION (FOG SEAL) SHALL BE APPLIED NOT LESS THAN FOURTEEN DAYS FOLLOWING PLACEMENT OF THE ASPHALT SURFACING. FOG SEAL AND PAINT BINDER SHALL BE APPLIED AT A RATE OF 0.05 AND 0.03 GALLON PER SQUARE YARD RESPECTIVELY. ASPHALTIC EMULSION SHALL CONFORM TO SECTION 37, 39 AND 94 OF THE STATE STANDARD SPECIFICATIONS.
11. PRIME COAT IS REQUIRED PRIOR TO PAVING ON ALL GRADES IN EXCESS OF TEN PERCENT.
12. INSTALL STREET TREES IN ACCORDANCE WITH ORDINANCE NO. 461 AND THE COMPREHENSIVE LANDSCAPING GUIDELINES (SEE SEPARATE LANDSCAPE PLANS).
13. STREET LIGHTS SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROVED STREET LIGHTING PLAN.
14. AS DETERMINED BY THE TRANSPORTATION DIRECTOR, THE DEVELOPER IS RESPONSIBLE AS A MINIMUM FOR ROAD IMPROVEMENTS TO CENTERLINE, AND MAY BE REQUIRED TO RECONSTRUCT EXISTING PAVEMENT, INCLUDING BASE, AND MATCHING OVERLAY REQUIRED TO MEET THE STRUCTURAL STANDARDS FOR THE CURRENT ASSIGNED TRAFFIC INDEX.
15. ONLY LANDSCAPING CONSISTING OF GRASS AND PARKWAY TREES MAY BE INSTALLED WITHIN PARKWAYS ON LOCAL RESIDENTIAL STREETS WITHOUT SEPARATE LANDSCAPE PLANS. ALL OTHER TYPES OF LANDSCAPING IN THESE AREAS, AND ALL LANDSCAPING ON ALL OTHER STREETS, SHALL REQUIRE SEPARATE LANDSCAPE PLANS. ALL LANDSCAPING ENCROACHMENTS SHALL CONFORM TO RIVERSIDE COUNTY COMPREHENSIVE LANDSCAPING GUIDELINES DATED OCTOBER 2009.
16. ANY PRIVATE DRAINAGE FACILITIES SHOWN ON THESE PLANS ARE FOR INFORMATION ONLY. BY SIGNING THESE IMPROVEMENT PLANS, NO REVIEW OR APPROVAL OF THOSE PRIVATE FACILITIES IS IMPLIED OR INTENDED BY THE RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT.
17. a. CONSTRUCTION PROJECTS MUST OBTAIN A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT. OWNERS/DEVELOPERS ARE REQUIRED TO FILE A NOTICE OF INTENT (NOI) WITH THE STATE WATER RESOURCES CONTROL BOARD (SWRCB), PREPARE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND MONITORING PLAN FOR THE SITE.

    b. PRIOR TO ANY CONSTRUCTION, THE DEVELOPER SHALL PROVIDE THE COUNTY A COPY OF THE NOI WITH A VALID WDID NUMBER.
18. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ADDITIONAL SIGNS AND MARKINGS NOT INCLUDED IN THE SIGNING AND STRIPING PLAN WITHIN THE PROJECT AREAS, OR ON ROADWAYS ADJACENT TO THE PROJECT BOUNDARIES, UPON THE REQUEST OF THE DIRECTOR OF TRANSPORTATION OR HIS DESIGNEE TO IMPROVE TRAFFIC SAFETY ON THE ROADS UNDER THE JURISDICTION OF THE DEVELOPER.
19. EXISTING STORM DRAIN PIPES / CULVERTS (WHETHER TO BE CONNECTED TO, EXTENDED, ADJUSTED, DRAINED TO, OR JUST IN THE PROJECT VICINITY) MUST BE REPAIRED, AND/OR CLEANED TO MAKE THEM FUNCTIONAL AND ACCEPTABLE AS DIRECTED BY THE TRANSPORTATION DEPARTMENT.
20. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER/CONTRACTOR TO APPLY TO RIVERSIDE COUNTY FLOOD CONTROL (RCFC) FOR PERMITS WHEN ANY STORM DRAIN PIPE NEEDS TO BE CONNECTED WITH A RCFC FACILITY AND ADD PERMIT #_____ ON THE PLAN.
21. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR TO APPLY TO THE CITY AND OR CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS) FOR AN ENCROACHMENT PERMIT FOR ALL WORK PERFORMED WITHIN THEIR RIGHT-OF-WAY.
22. FOR ALL DRIVEWAY RECONSTRUCTION BEYOND RIGHT-OF-WAY, PROOF OF DRIVEWAY OWNER NOTIFICATION IS REQUIRED PRIOR TO CONSTRUCTION.
23. BEDDING PIPE SHALL CONFORM TO RCFC&WCD STD. DWG. M815, EXCEPT FOR COVER <2 FEET. FOR COVER <2 FEET, CONCRETE SLURRY (2000 PSI-2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF THE PIPE.
24. ALL CATCH BASINS SHALL BE STENCILED WITH "NO DUMPING – ONLY RAIN IN THE DRAIN" PER R.C.F.C. & W.C.D. STANDARDS.



INDEX MAP
1"=150'



VICINITY MAP
T3S R4W SEC 35
NOT TO SCALE

CONSTRUCTION NOTES AND QUANTITY ESTIMATE*

1	CONSTRUCT MINIMUM 0.53' AC OVER 0.5' AB CLASS II	(86,970 SF)	3,320 1,610	TONS CY
2	CONSTRUCT MINIMUM 0.43' AC OVER 0.50' AB CLASS II	(57,850 SF)	1,790 1,070	TONS CY
3	CONSTRUCT MINIMUM 0.39' AC OVER 0.50' AB CLASS II	(59,060 SF)	1,660 1,090	TONS CY
4	LEFT INTEIONALLY BLANK		–	–
5	CONSTRUCT TYPE "A-8" CURB & GUTTER PER RIV. CO. STD. NO. 201		1,300	LF
6	CONSTRUCT TYPE "A-6" CURB & GUTTER PER RIV. CO. STD. NO. 200		3,760	LF
7	CONSTRUCT CONCRETE APRON AND TRANSITION PER DETAIL ON SHEET 10		330	SF
8	CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" RISER PER DETAIL ON SHEET 10		1	EA
9	CONSTRUCT 1.0' CLASS II AB @ EP PER TYP. EDGE OF PAVEMENT DETAIL ON SHEET 2		80	CY
10	SAWCUT & JOIN EX. AC PAVEMENT PER DETAIL ON SHEET 2		450	LF
11	CONSTRUCT CURB RAMP CASE "A" OR "B" (MODIFIED) PER. RIV. CO. STD. NO. 403		3	EA
12	CONSTRUCT 6' SIDEWALK AT CURB PER RIV. CO. STD. NO. 401		132,000	SF
13	CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404		27,500	SF
14	CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A		5 6,000	EA SF
15	REMOVE EX. AC PAVEMENT		50	SY
16	SAWCUT & REMOVE EX. CURB & GUTTER		160	LF
17	ADJUST TO GRADE		1	EA
18	PROTECTECT IN PLACE		1	EA
19	CONSTRUCT CONCRETE COLLAR PER RCFC&WCD STD. NO. M803		1	EA
20	CONSTRUCT CURB INLET CATCH BASIN WITH FOSSIL FILTER AND LOCAL DEPRESSION PER RIV. CO. STD. 300, 300A, & 311. USE SPECIAL CONNECTIONS PER RCFC&WCD STD NO. CB109 FOR CORNER CONNECTIONS		3	EA
21	CONSTRUCT 3" AC PAVEMENT LINED V-DITCH	(12,125 SF)	220 110	TONS CY
40	INSTALL 18" RCP STORM DRAIN (D-LOAD PER PLAN)		65	LF
41	INSTALL 30" RCP STORM DRAIN (D-LOAD PER PLAN)		1,500	LF
42	INSTALL 36" RCP STORM DRAIN (D-LOAD PER PLAN)		15	LF
43	CONSTRUCT MANHOLE NO. 4 PER RCFC&WCD STD. NO. MH254		1	EA
44	CONSTRUCT MANHOLE NO. 1 PER RCFC&WCD STD. NO. MH251		4	EA
45	DEMOLISH EXISITNG CATCH BASIN		1	EA

*THE QUANTITY ESTIMATE SHOWN HEREON IS FOR THE USE OF GOVERNING AGENCIES IN DETERMINING BOND AMOUNT AND/OR FEES AND IS NOT TO BE USED FOR BID PURPOSES.

UNDERGROUND UTILITIES NOTE

ALL UNDERGROUND STRUCTURES OR UTILITIES REPORTED BY THE OWNER OR OTHERS AND THOSE SHOWN ON THE RECORDS EXAMINED ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT.

THE OWNER, BY ACCEPTING THESE PLANS OR PROCEEDING WITH THE IMPROVEMENTS PURSUANT THERETO AGREES TO ASSUME LIABILITY AND TO HOLD THE UNDERSIGNED HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED TO THE UNDERSIGNED, NOT INDICATED ON THE PUBLIC RECORDS EXAMINED, LOCATED AT VARIANCE WITH THAT REPORTED OR SHOWN ON THE RECORDS EXAMINED.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK.

CALL UNDERGROUND SERVICE ALERT (U.S.A.) 1-800-227-2600 AT LEAST 2 WORKING DAYS PRIOR TO EXCAVATION.

UTILITY COMPANIES

WATER:	EASTERN MUNICIPAL WATER DISTRICT
SEWER:	EASTERN MUNICIPAL WATER DISTRICT
ELECTRIC:	SOUTHERN CALIFORNIA EDISON
TELEPHONE:	VERIZON
GAS:	SOUTHERN CALIFORNIA GAS COMPANY

GEOTECHNICAL

GEOTECHNICAL REPORT BY:	MATRIX GEOTECHNICAL CONSULTING INC.
PROJECT NO.:	M103-006
PRELIMINARY R-VALUE:	25
DATED:	01-21-2016

ENGINEER OF RECORD NOTE

WEBB ASSOCIATES WAS RETAINED AS THE ENGINEER OF RECORD FOR THE DEVELOPMENT AND PROCESSING OF THESE PLANS FOR CONSTRUCTION PURPOSES. SAID PLANS HAVE BEEN REVIEWED AND APPROVED BY THE LOCAL GOVERNING AGENCY TO BE CONSTRUCTIBLE BASED ON LOCAL INDUSTRY STANDARDS. THIS DOES NOT MEAN, HOWEVER, THAT EVERY HORIZONTAL DIMENSION OR VERTICAL ELEVATION NECESSARY FOR CONSTRUCTION IS DELINEATED ON SAID DRAWINGS. ANY PART OF THESE DRAWINGS THAT IS TO BE USED IN STAKING THE PROPERTY HAS BEEN PREPARED BY WEBB WITH THE EXPECTATION AND ASSUMPTION THAT ANY STAKING, WHETHER BY WEBB, OWNER OR A THIRD PARTY, WILL BE PERFORMED UNDER THE SUPERVISION AND CONTROL OF A LICENSED LAND SURVEYOR AND WILL INCLUDE ON-SITE INTERPRETATION, VERIFICATION, CROSS-CHECKING AND FIELD CORRECTIONS OF PLANS, DRAWINGS, SURVEY INFORMATION AND ELECTRONIC DATA AT THE TIME OF ACTUAL STAKING OF THE PROPERTY PRIOR TO CONSTRUCTION.

NOTICE TO CONTRACTORS

CONTRACTOR AGREES THAT HE SHALL ASSUME COMPLETE AND SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FROM LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR ENGINEER.

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THESE LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED IN FIELD BY THE CONTRACTOR, SO THAT ANY NECESSARY ADJUSTMENT CAN BE MADE IN ALIGNMENT AND/OR GRADE OF THE PROPOSED IMPROVEMENT. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ANY UTILITY LINES SHOWN AND ANY OTHER LINES NOT SHOWN ON THESE PLANS.

MAJOR ITEMS TO BE REMOVED HAVE BEEN NOTED ON THESE PLANS, HOWEVER THE CONTRACTOR IS TO WALK THE SITE FOR VERIFICATION OF ADDITIONAL SURFACE FEATURES REQUIRING REMOVAL. THE CONTRACTOR IS RESPONSIBLE TO REMOVE ALL OBJECTS AND MATERIALS (AC, CONCRETE, TREES, BUSHES, FENCING, ETC.) THAT ARE IN CONFLICT WITH THE NEW PROPOSED IMPROVEMENTS WHETHER CALLE-OUT OR NOT ON THE PLANS AND DISPOSE OF LEGALLY. CONTRACTOR IS TO BACKFILL ACCORDINGLY AND LEAVE SITE IN A RELATIVELY LEVEL CONDITION.

CASH-IN-LIEU NOTE FOR MEDIAN

AN AMOUNT OF $ 108,657.42 HAS BEEN PLACED INTO ACCOUNT #20000-3130100000-230106 FOR THE FUTURE CONSTRUCTION OF MEDIAN LOCATED ON HARLEY KNOX BLVD. WHICH IS NOT FEASIBLE TO BUILD AT THIS TIME.
RECEIPT NO: 29087-12 , DATE: 1-4-17

BENCHMARK

USC & GS BENCHMARKS:

Z 1143 1961 (PID #DX2103) + ¾" BRASS DISK, SET IN TOP OF A CONCRETE MONUMENT.

STATION IS NEAR THE INTERSECTION OF INTERSTATE 215 AND VAN BUREN BLVD. ABOUT 0.10 MILE N OF AVE. A, ABOUT 0.35 S DIRT PATROL ON THE E SIDE OF ATSF RAILROAD TRACKS, 15 FEET SE OF MILEPOST 11, 183 FEET SE OF A SWITCH STAND, 25 FEET E OF TRACKS, 5.4 FEET W OF 215 FWY RIGHT OF WAY, AND 5 INCHES ABOUT GROUND. MARK IS METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA STANDARD DISK STAMPED Z 1143 1961.

ELEV. = 1535.16, (NAVD 88) NAVD88-2.38=NGVD29

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM, CCS83, ZONE 6, BASED LOCALLY ON CONTROL STATIONS "MLFP", "CNPP" AND "PPBF" NAD 83(NSRS2007) AS SHOWN HEREON. ALL BEARINGS SHOWN ON THIS MAP ARE GRID. QUOTED BEARINGS AND DISTANCES FROM REFERENCE MAPS OR DEEDS ARE AS SHOWN PER THAT RECORD REFERENCE. ALL DISTANCES SHOWN ARE GROUND DISTANCES UNLESS SPECIFIED OTHERWISE. GRID DISTANCES, MAY BE OBTAINED BY MULTIPLYING THE GROUND DISTANCE BY A COMBINATION FACTOR OF 1.00000283. CALCULATIONS ARE MADE AT FOUND MONUMENT LOCATED AT THE CENTERLINE INTERSECTION OF NANDINA AVENUE AND DECKER ROAD WITH COORDINATES OF: N: 2260304.10, E: 6252014.28, USING AN ELEVATION OF 1564.87(NAVD88).

CASH IN-LIEU FOR TRAFFIC SIGNAL

AN AMOUNT OF $16,200 AND $13,600 FOR CUMULATIVE IMPACTS TO HARLEY KNOX BLVD. AT THE I-215 SOUTHBOUND RAMPS AND I-215 NORTHBOUND RAMPS, RESPECTIVELY, HAS BEEN PLACED IN ACCOUNT# 20000-3130100000-230106;
RECEIPT NO: 29087-13, 29087-14 , DATE: 1-4-17

RCFC PERMIT NO:

LEGEND

GRIND AND OVERLAY EXISTING PAVEMENT
COMPACTED NATIVE

BCR	BEGIN CURB RETURN
BC	BEGIN CURVE
CB	CATCH BASIN
CL	CENTER LINE
DWY	DRIVE WAY
EC	END OF CURVE
ECR	END OF CURB RETURN
EG	EXISTING GROUND
EP	EDGE OF PAVEMENT
FG	FINISHED GRADE
FL	FLOW LINE
FS	FINISH SURFACE
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT
LS	LANDSCAPE AREA
LP	LOW POINT
MAX	MAXIMUM
MIN	MINIMUM
PL	PROPERTY LINE
RL	RIDGELINE
R/W	RIGHT OF WAY
SD	STORM DRAIN
STA	STATION
TC	TOP OF CURB
TG	TOP OF GRADE
TWR	TOP OF WEIR
TYP	TYPICAL

NOTE:
THIS PROJECT IS BONDED AND WILL BE INSPECTED BY COUNTY PERMIT DEPARTMENT

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE: [illegible]
4-5-18

SHEET INDEX

PP 25954 IP 160028

RECMD | COUNTY OVERSIGHT ENGINEER | REGISTRATION | DATE SIGNED
APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.
Alan Frost | 45702 | 1-5-18

DIGALERT — DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG — TOLL FREE 1-800-227-2600 — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

MARK	BY	DATE	REVISIONS	APPR.	DATE
1	ENGINEER		Sheet 3A added	mm	4-5-18
				COUNTY	

SEAL – ENGINEER
REGISTERED PROFESSIONAL ENGINEER D.J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: MD CHECKED BY: SL
R.C.E. NO.: 81988
DATE 11/1/18

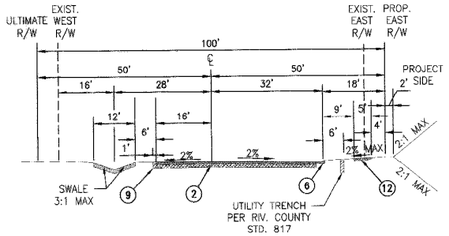
BENCHMARK: SEE SHEET 1
SCALE: H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
TITLE SHEET

FOR: TRAMMELL CROW COMPANY | W.O. 2015-0324 | COUNTY FILE NO. 964B

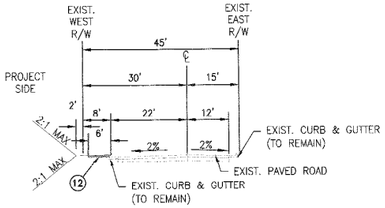
SHEET NO. 1 OF 10 SHEETS

G:\2015\15-0324\DRAWINGS\DESIGN (DJ)\15-0324-C-ST.DWG 10/30/2018 11:10 AM



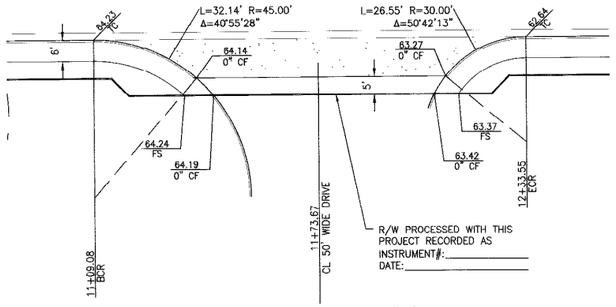
DECKER ROAD

(STA 20+00.00 – STA 33+14.37)
SECONDARY HIGHWAY – STD. NO. 94
T.I.=8.5 R VALUE=60
NOT TO SCALE



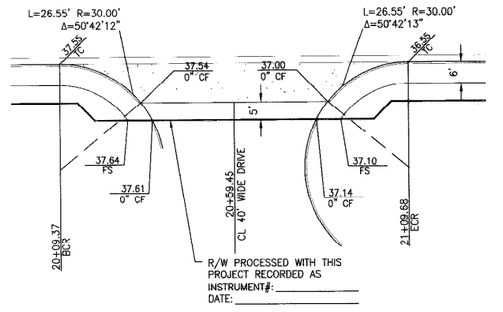
BLANDING WAY

(STA 20+00.00 – STA 33+33.77)
COLLECTOR FRONTAGE ROAD – STD. NO. 107A
T.I.=5.5 R VALUE=60
NOT TO SCALE



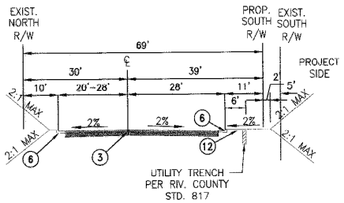
DRIVEWAY DETAIL "A"

NANDINA AVENUE
STA 11+71.39
SCALE 1"=20'



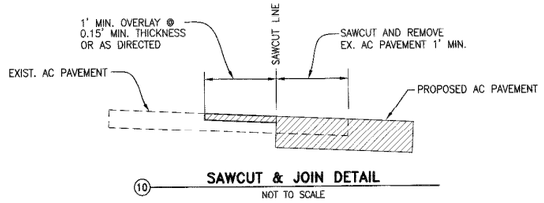
DRIVEWAY DETAIL "B"

NANDINA AVENUE
STA 20+59.45
SCALE 1"=20'



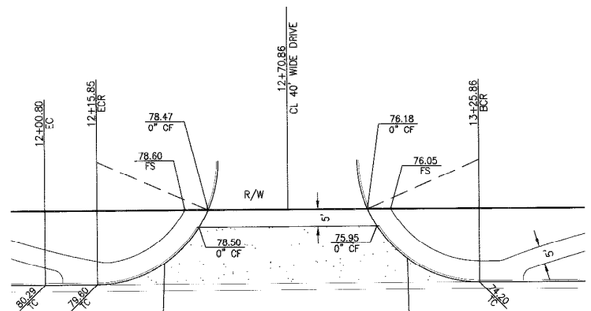
NANDINA AVENUE

(STA 10+00.00 – STA 23+29.37)
INDUSTRIAL COLLECTOR ROAD STD. NO. 111
T.I.=8.0 R VALUE=60
NOT TO SCALE



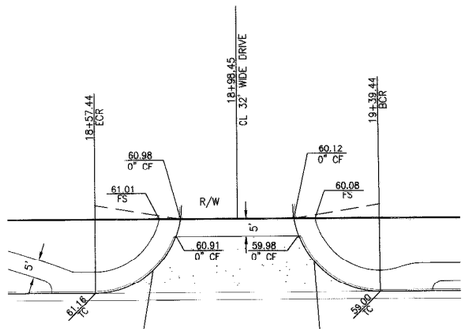
SAWCUT & JOIN DETAIL

NOT TO SCALE



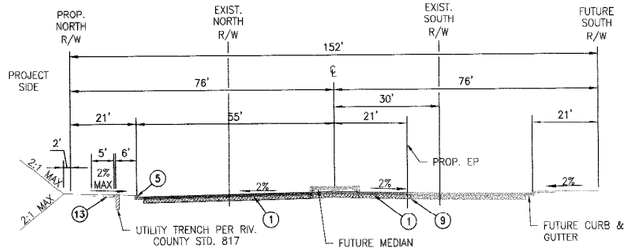
DRIVEWAY DETAIL "C"

HARLEY KNOX BOULEVARD
STA 12+70.86
SCALE 1"=20'



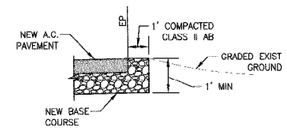
DRIVEWAY DETAIL "D"

HARLEY KNOX BOULEVARD
STA 18+98.45
SCALE 1"=20'



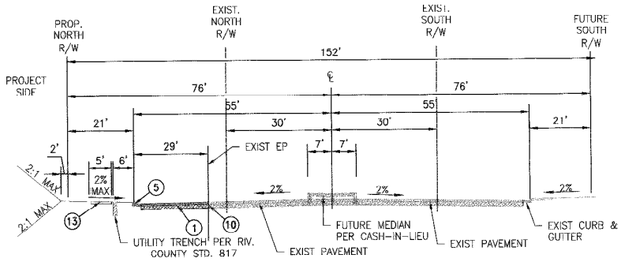
HARLEY KNOX BOULEVARD

(STA 10+00.00 – STA 20+37.21)
URBAN ARTERIAL HIGHWAY – STD. NO. 91
T.I.=10.0 R VALUE=60
NOT TO SCALE



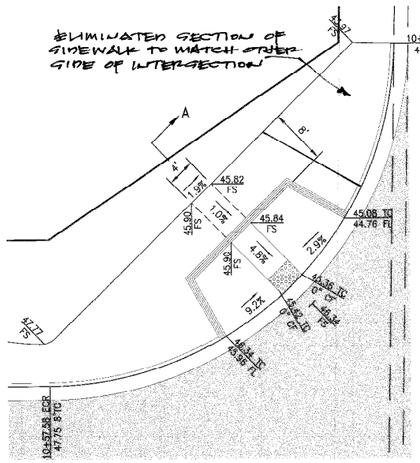
TYP. EDGE OF PAVEMENT DETAIL

9
NOT TO SCALE



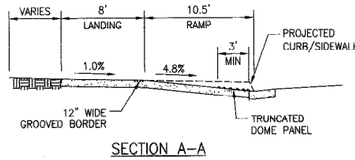
HARLEY KNOX BOULEVARD

(STA 20+37.21 – STA 23+27.46)
URBAN ARTERIAL HIGHWAY – STD. NO. 91
T.I.=10.0 R VALUE=60
NOT TO SCALE



CURB RAMP DETAIL "C"

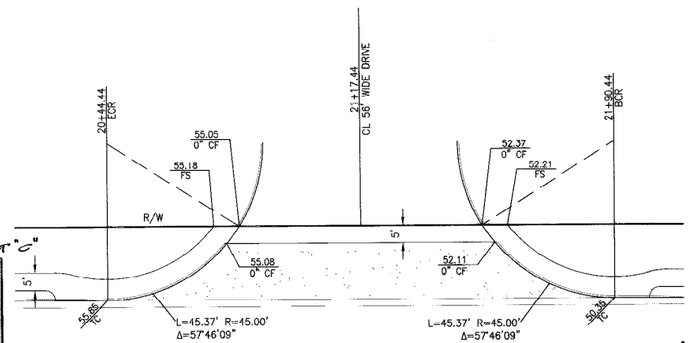
HARLEY KNOX BLVD. & BLANDING WAY
SCALE 1"=10'
REFER TO SHEET 8



SECTION A–A

MODIFIED SIDEWALK PER CURB RAMP DET "C"

AS BUILT
THESE PLANS REFLECT ANY SUBSTANTIAL DESIGN MODIFICATIONS AS PROVIDED TO WEBB ASSOCIATES BY THE CONTRACTOR
SIGNATURE
3/22/18
DATE
REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA



DRIVEWAY DETAIL "E"

HARLEY KNOX BOULEVARD
STA. 21+17.44
SCALE 1"=20'

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE: 4-5-18

PP 25954 IP 160028

RECMD COUNTY OVERSIGHT ENGINEER REGISTRATION DATE SIGNED
Alan Fund 45702 1-5-17
APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIGALERT
DIAL BEFORE YOU DIG TOLL FREE 1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

MARK | BY | DATE — ENGINEER
REVISIONS
APPR. | DATE — COUNTY

SEAL – ENGINEER
REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

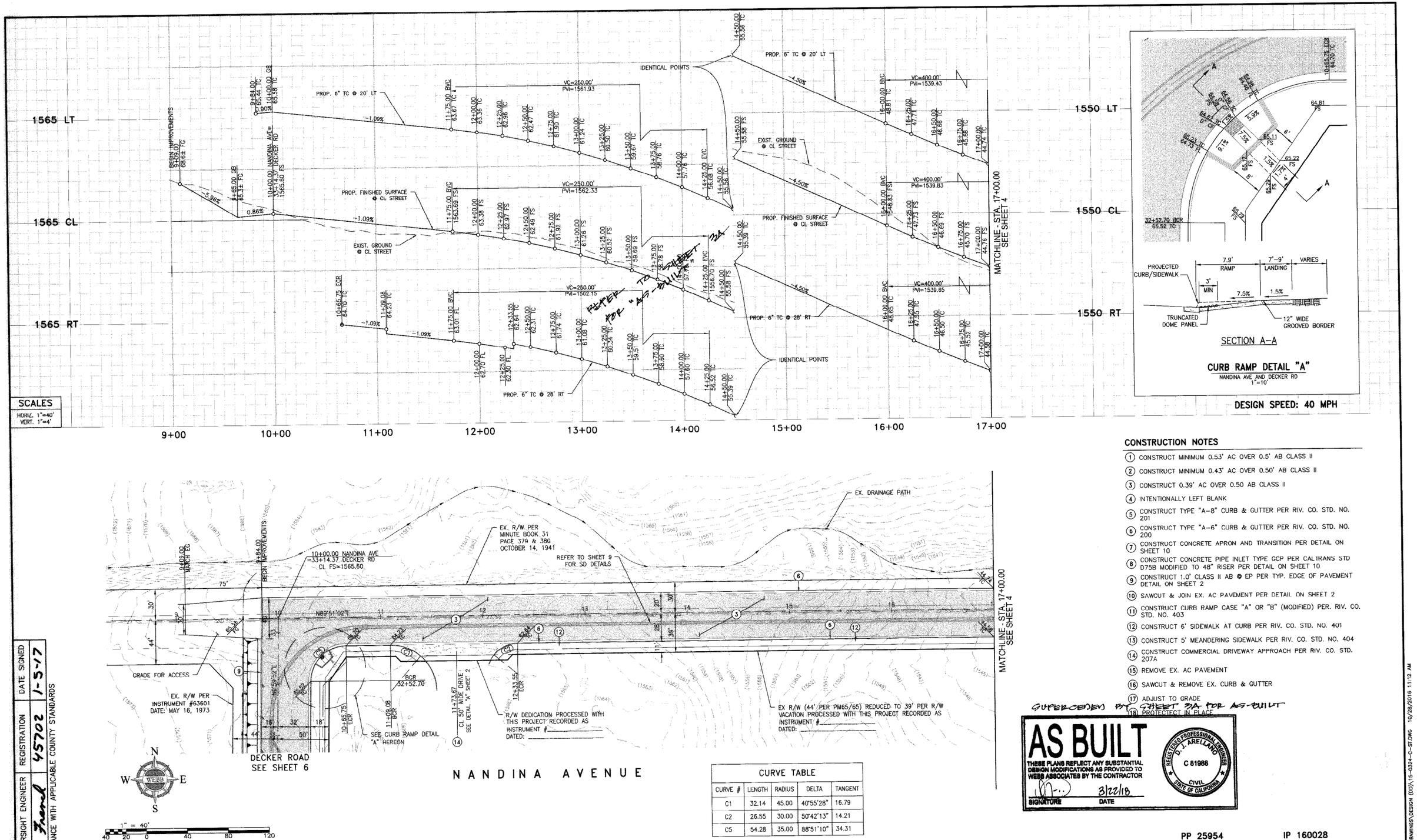
PREPARED UNDER THE SUPERVISION OF:
D.J. ARELLANO
DESIGNED BY: MS CHECKED BY: SA
R.C.E. NO.: 81988
DATE 11/11/17

BENCHMARK: SEE SHEET 1
SCALE: H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
STREET SECTIONS AND DRIVEWAY DETAILS
FOR: TRAMMELL CROW COMPANY
W.O. 2015-0324
COUNTY FILE NO. 964B

SHEET NO. 2 OF 10 SHEETS

G:\2015\15-0324\DRAWINGS\DESIGN (DD)\15-0324-C-ST.DWG 10/28/2016 11:10 AM



SCALES
HORIZ. 1"=40'
VERT. 1"=4'

CURB RAMP DETAIL "A"
NANDINA AVE AND DECKER RD
1"=10'

DESIGN SPEED: 40 MPH

CONSTRUCTION NOTES

1. CONSTRUCT MINIMUM 0.53' AC OVER 0.5' AB CLASS II
2. CONSTRUCT MINIMUM 0.43' AC OVER 0.50' AB CLASS II
3. CONSTRUCT 0.39' AC OVER 0.50 AB CLASS II
4. INTENTIONALLY LEFT BLANK
5. CONSTRUCT TYPE "A-8" CURB & GUTTER PER RIV. CO. STD. NO. 201
6. CONSTRUCT TYPE "A-6" CURB & GUTTER PER RIV. CO. STD. NO. 200
7. CONSTRUCT CONCRETE APRON AND TRANSITION PER DETAIL ON SHEET 10
8. CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" RISER PER DETAIL ON SHEET 10
9. CONSTRUCT 1.0' CLASS II AB @ EP PER TYP. EDGE OF PAVEMENT DETAIL ON SHEET 2
10. SAWCUT & JOIN EX. AC PAVEMENT PER DETAIL ON SHEET 2
11. CONSTRUCT CURB RAMP CASE "A" OR "B" (MODIFIED) PER. RIV. CO. STD. NO. 403
12. CONSTRUCT 6' SIDEWALK AT CURB PER RIV. CO. STD. NO. 401
13. CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404
14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A
15. REMOVE EX. AC PAVEMENT
16. SAWCUT & REMOVE EX. CURB & GUTTER
17. ADJUST TO GRADE
18. PROTECTECT IN PLACE

CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	TANGENT
C1	32.14	45.00	40°55'28"	16.79
C2	26.55	30.00	50°42'13"	14.21
C5	54.28	35.00	88°51'10"	34.31

AS BUILT
THESE PLANS REFLECT ANY SUBSTANTIAL DESIGN MODIFICATIONS AS PROVIDED TO WEBB ASSOCIATES BY THE CONTRACTOR
SIGNATURE 3/22/18 DATE
REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA

PP 25954 IP 160028

DIGALERT
DIAL BEFORE YOU DIG TOLL FREE 1-800-227-2600 TWO WORKING DAYS BEFORE YOU DIG
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
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MARK	BY	DATE	REVISIONS
			See Sheet 3A

ENGINEER: APPR. mm 4-5-18 DATE
COUNTY

SEAL – ENGINEER
REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE, CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: MS CHECKED BY: SA
R.C.E. NO.: 81988 DATE

BENCHMARK: SEE SHEET 1

SCALE: H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

FOR: TRAMMELL CROW COMPANY | W.O. 2015-0324 | COUNTY FILE NO. 964 B

SHEET NO. 3 OF 10 SHEETS

RECMD | COUNTY OVERSIGHT ENGINEER | REGISTRATION | DATE SIGNED
Alan Fund | 45702 | 1-5-17
APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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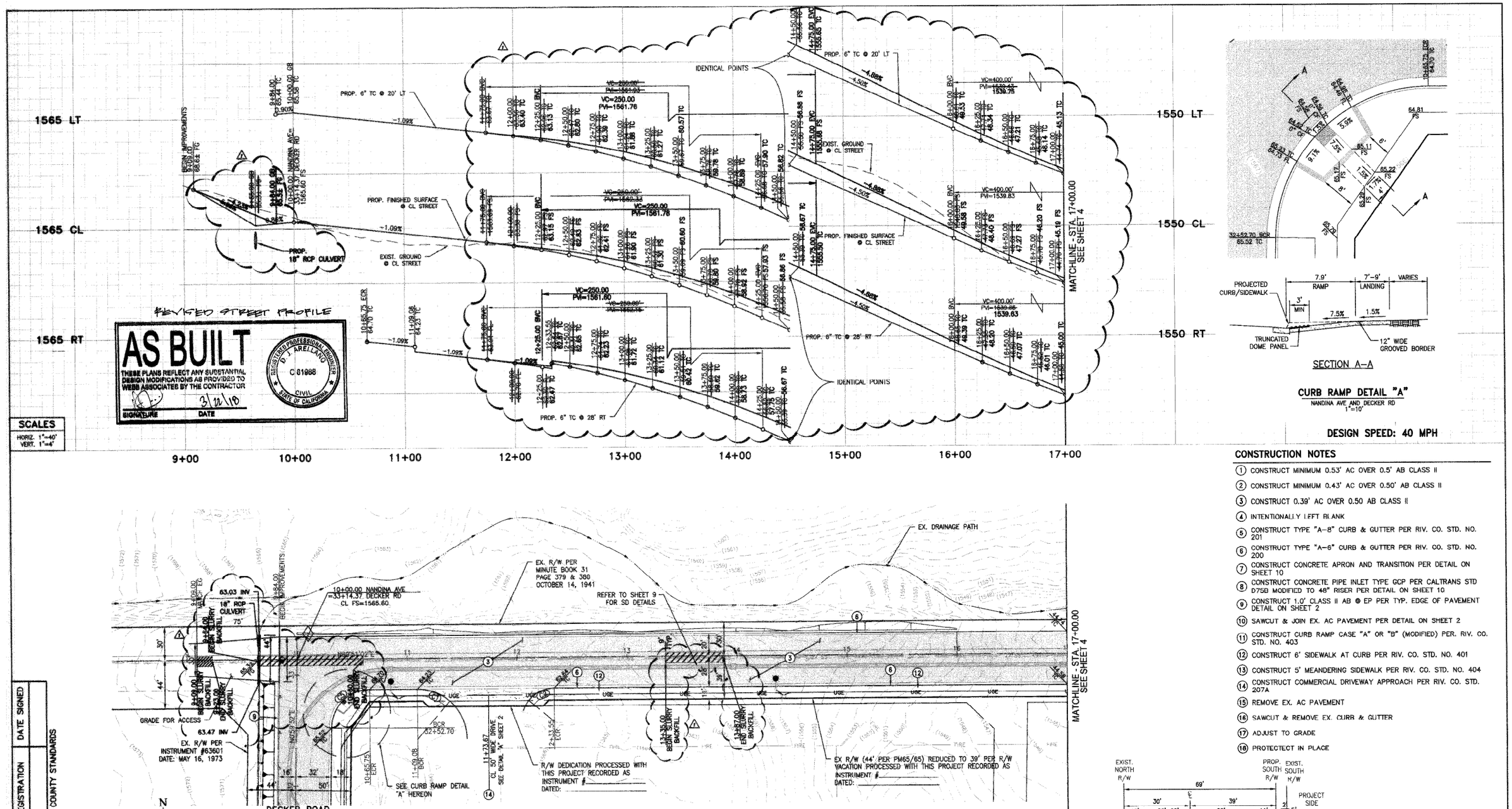

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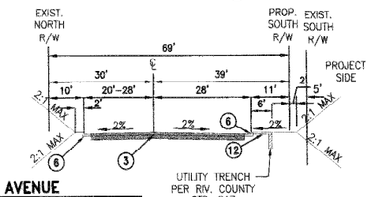

NANDINA AVENUE
(STA 10+00.00 – STA 23+29.37)
INDUSTRIAL COLLECTOR ROAD – STD. NO. 111
T.I.=8.0 R VALUE=60
NOT TO SCALE

CONSTRUCTION NOTES

1. CONSTRUCT MINIMUM 0.53' AC OVER 0.5' AB CLASS II
2. CONSTRUCT MINIMUM 0.43' AC OVER 0.50' AB CLASS II
3. CONSTRUCT 0.39' AC OVER 0.50 AB CLASS II
4. INTENTIONALLY LEFT BLANK
5. CONSTRUCT TYPE "A–8" CURB & GUTTER PER RIV. CO. STD. NO. 201
6. CONSTRUCT TYPE "A–6" CURB & GUTTER PER RIV. CO. STD. NO. 200
7. CONSTRUCT CONCRETE APRON AND TRANSITION PER DETAIL ON SHEET 10
8. CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" RISER PER DETAIL ON SHEET 10
9. CONSTRUCT 1.0' CLASS II AB @ EP PER TYP. EDGE OF PAVEMENT DETAIL ON SHEET 2
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13. CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404
14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A
15. REMOVE EX. AC PAVEMENT
16. SAWCUT & REMOVE EX. CURB & GUTTER
17. ADJUST TO GRADE
18. PROTECTECT IN PLACE

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE: 4-5-18

PP 25954 IP 160028

DIGALERT — DIAL BEFORE YOU DIG TOLL FREE 1-800-227-2600 — TWO WORKING DAYS BEFORE YOU DIG — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

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MARK	BY	DATE	REVISIONS	APPR.	DATE
1	EJA	8/22/17	REVISED CENTERLINE AND CURB PROFILES, ADDED 18" RCP CULVERT, ADDED SLURRY BACKFILL FOR EX SEWER COVER	ENGINEER	COUNTY

SEAL – ENGINEER

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: ____ CHECKED BY: ____
R.C.E. NO.: 81988
DATE

BENCHMARK: SEE SHEET 1

SCALE: H: AS SHOWN V: N/A

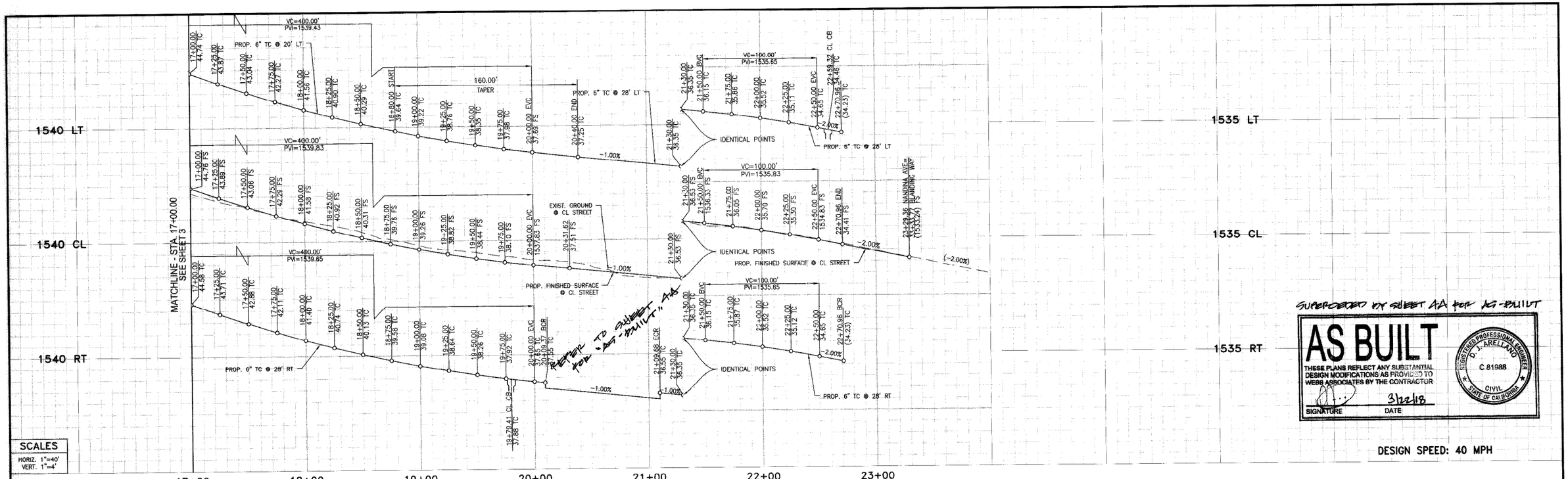
COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

SHEET NO. 3A OF 10 SHEETS

FOR: TRAMMELL CROW COMPANY
W.O. 2015-0324
COUNTY FILE NO. 964 B

RECMD	COUNTY OVERSIGHT ENGINEER	REGISTRATION	DATE SIGNED

APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.



SUPERCEDED BY SHEET 4A FOR AS-BUILT

AS BUILT

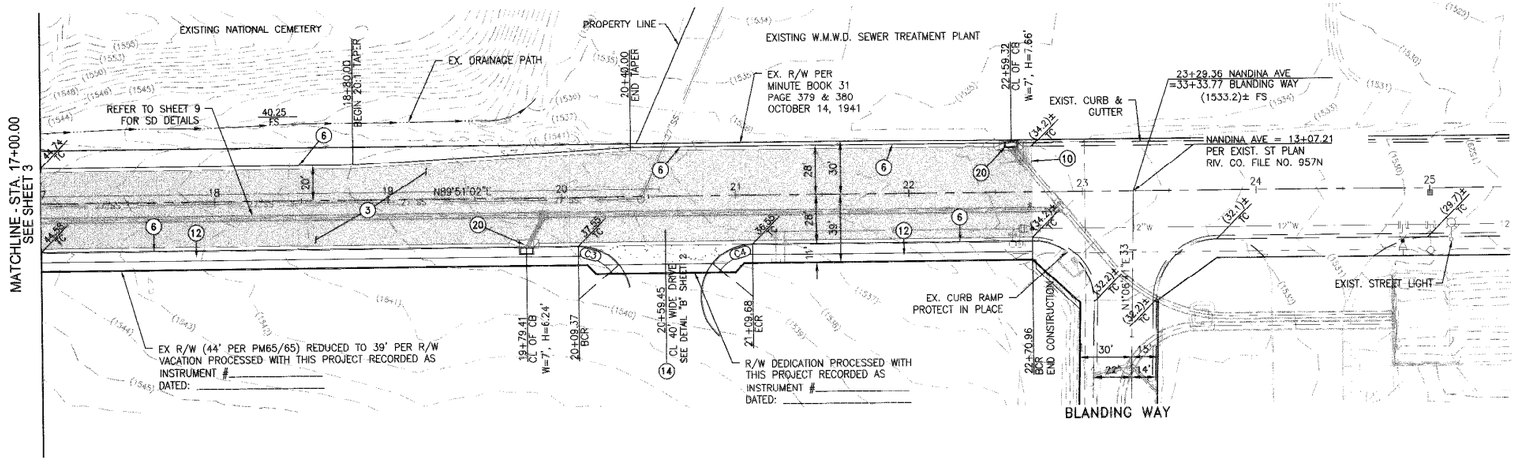
THESE PLANS REFLECT ANY SUBSTANTIAL DESIGN MODIFICATIONS AS PROVIDED TO WEBB ASSOCIATES BY THE CONTRACTOR

SIGNATURE 3/22/18 DATE

REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA

DESIGN SPEED: 40 MPH

SCALES
HORIZ. 1"=40'
VERT. 1"=4'



N A N D I N A A V E N U E

CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	TANGENT
C3	26.55	30.00	50°42'12"	14.21
C4	26.55	30.00	50°42'13"	14.21

CONSTRUCTION NOTES

1. CONSTRUCT MINIMUM 0.53' AC OVER 0.5' AB CLASS II
2. CONSTRUCT MINIMUM 0.43' AC OVER 0.50' AB CLASS II
3. CONSTRUCT 0.39' AC OVER 0.50 AB CLASS II
4. INTENTIONALLY LEFT BLANK
5. CONSTRUCT TYPE "A-8" CURB & GUTTER PER RIV. CO. STD. NO. 201
6. CONSTRUCT TYPF "A-6" CURB & GUTTER PER RIV. CO. STD. NO. 200
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8. CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" RISER PER DETAIL ON SHEET 10
9. CONSTRUCT 1.0' CLASS II AB @ EP PER TYP. EDGE OF PAVEMENT DETAIL ON SHEET 2
10. SAWCUT & JOIN EX. AC PAVEMENT PER DETAIL ON SHEET 2
11. CONSTRUCT CURB RAMP CASE "A" OR "B" (MODIFIED) PER. RIV. CO. STD. NO. 403
12. CONSTRUCT 6' SIDEWALK AT CURB PER RIV. CO. STD. NO. 401
13. CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404
14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A
15. REMOVE EX. AC PAVEMENT
16. SAWCUT & REMOVE EX. CURB & GUTTER
17. ADJUST TO GRADE
18. PROTECTECT IN PLACE
19. CONSTRUCT CONCRETE COLLAR PER RCFC&WCD STD. NO. M803
20. CONSTRUCT CURB INLET CATCH BASIN WITH FOSSIL FILTER AND LOCAL DEPRESSION PER RIV. CO. STD. 300, 300A, & 311. USE SPECIAL CONNECTIONS PER RCFC&WCD STD NO. CB109 FOR CORNER CONNECTIONS

RECMD	COUNTY OVERSIGHT ENGINEER	REGISTRATION	DATE SIGNED
	Allen Franel	45702	1-5-17

APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIGALERT — DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG — TOLL FREE 1-800-227-2600 — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
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MARK	BY	DATE	REVISIONS	APPR.	DATE
A			See Sheet 4A		
	ENGINEER			COUNTY	

SEAL — ENGINEER

REGISTERED PROFESSIONAL ENGINEER D.J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: MS CHECKED BY: SA
R.C.E. NO.: 81988
11/1/16 DATE

BENCHMARK: SEE SHEET 1

SCALE: H: AS SHOWN V: N/A

PP 25954 IP 160028

COUNTY OF RIVERSIDE

PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

FOR: TRAMMELL CROW COMPANY | W.O. 2015-0324 | COUNTY FILE NO. 964B

SHEET NO. 4 OF 10 SHEETS

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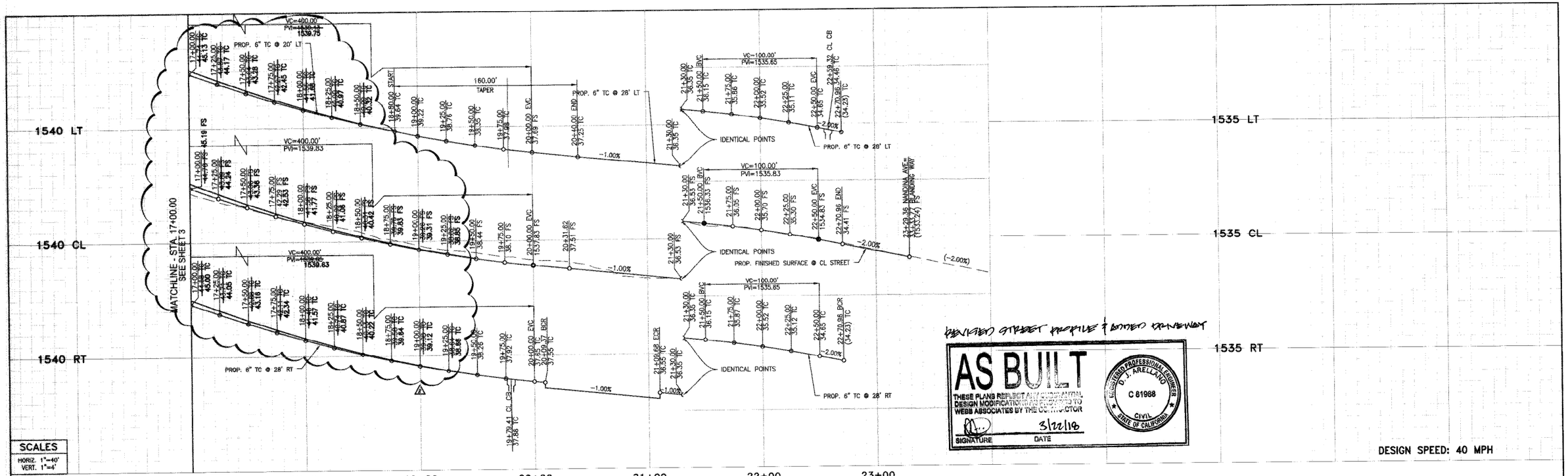


REVISED STREET PROFILE & ADDED DRIVEWAY

AS BUILT

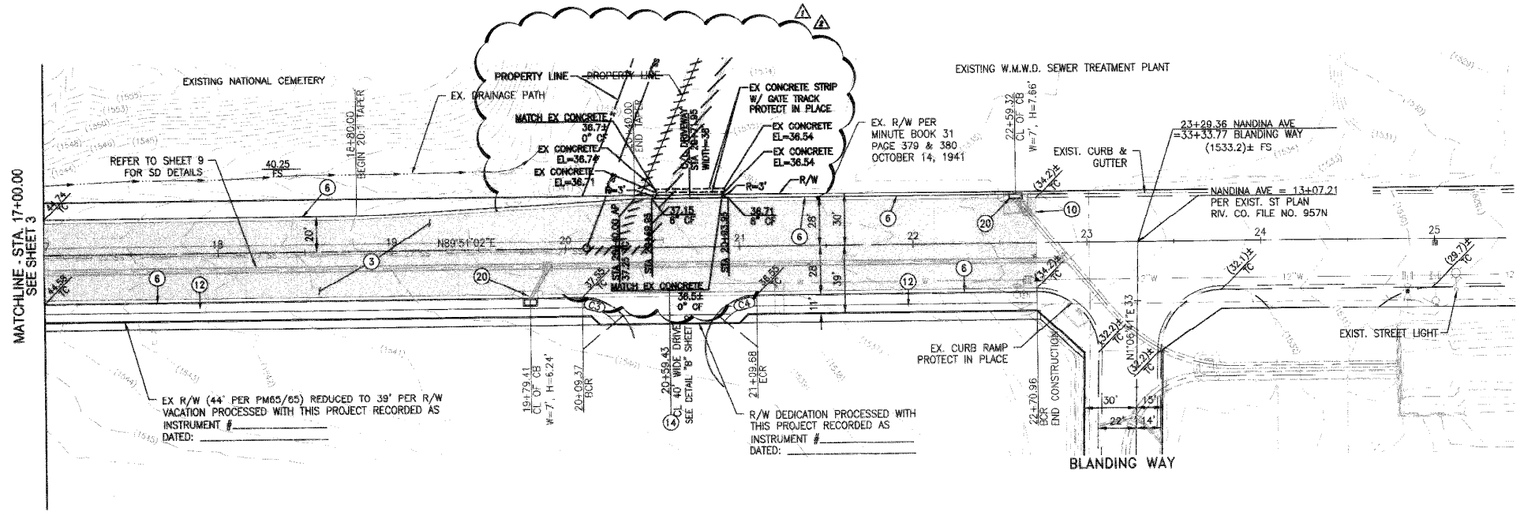
THESE PLANS REFLECT ALL FIELD AND FINAL DESIGN MODIFICATIONS AS NOTED TO WEBB ASSOCIATES BY THE CONTRACTOR

SIGNATURE

3/22/18
DATE

REGISTERED PROFESSIONAL ENGINEER
D. J. ARELLANO
C 81988
CIVIL
STATE OF CALIFORNIA

DESIGN SPEED: 40 MPH



CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	TANGENT
C3	26.55	30.00	50°42'12"	14.21
C4	26.55	30.00	50°42'13"	14.21

CONSTRUCTION NOTES

1. CONSTRUCT MINIMUM 0.53' AC OVER 0.5' AB CLASS II
2. CONSTRUCT MINIMUM 0.43' AC OVER 0.50' AB CLASS II
3. CONSTRUCT 0.39' AC OVER 0.50 AB CLASS II
4. INTENTIONALLY LEFT BLANK
5. CONSTRUCT TYPE "A-6" CURB & GUTTER PER RIV. CO. STD. NO. 201
6. CONSTRUCT TYPE "A-6" CURB & GUTTER PER RIV. CO. STD. NO. 200
7. CONSTRUCT CONCRETE APRON AND TRANSITION PER DETAIL ON SHEET 10
8. CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" RISER PER DETAIL ON SHEET 10
9. CONSTRUCT 1.0' CLASS II AB @ EP PER TYP. EDGE OF PAVEMENT DETAIL ON SHEET 2
10. SAWCUT & JOIN EX. AC PAVEMENT PER DETAIL ON SHEET 2
11. CONSTRUCT CURB RAMP CASE "A" OR "B" (MODIFIED) PER. RIV. CO. STD. NO. 403
12. CONSTRUCT 6' SIDEWALK AT CURB PER RIV. CO. STD. NO. 401
13. CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404
14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A
15. REMOVE EX. AC PAVEMENT
16. SAWCUT & REMOVE EX. CURB & GUTTER
17. ADJUST TO GRADE
18. PROTECTECT IN PLACE
19. CONSTRUCT CONCRETE COLLAR PER RCFC&WCD STD. NO. M803
20. CONSTRUCT CURB INLET CATCH BASIN WITH FOSSIL FILTER AND LOCAL DEPRESSION PER RIV. CO. STD. 300, 300A, & 311. USE SPECIAL CONNECTIONS PER RCFC&WCD STD NO. CB109 FOR CORNER CONNECTIONS

AS-BUILT PLAN
CORRECTIONS NOTED 1 & 2
SIGNATURE: 4-5-18

SCALES
HORIZ. 1"=40'
VERT. 1"=4'

N W E S

1" = 40'
40 20 0 40 80 120

PP 25954 IP 160028

APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD	COUNTY OVERSIGHT ENGINEER	REGISTRATION	DATE SIGNED

DIGALERT
DIAL BEFORE YOU DIG TOLL FREE 1-800-227-2600 TWO WORKING DAYS BEFORE YOU DIG
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

MARK	BY	DATE	REVISIONS	APPR.	DATE
2	EJA	3/22/17	REVISED CENTERLINE AND CURB PROFILES, REVISED LOCATION OF EX. SEWER LINE		
1	EJA	7/11/17	ADDED DRIVEWAY CUT-OUT STATION 20+71.95		

ENGINEER — COUNTY

SEAL — ENGINEER
REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF:
DESIGNED BY: ____ CHECKED BY: ____
R.C.E. NO.: 81988
D.J. ARELLANO — DATE

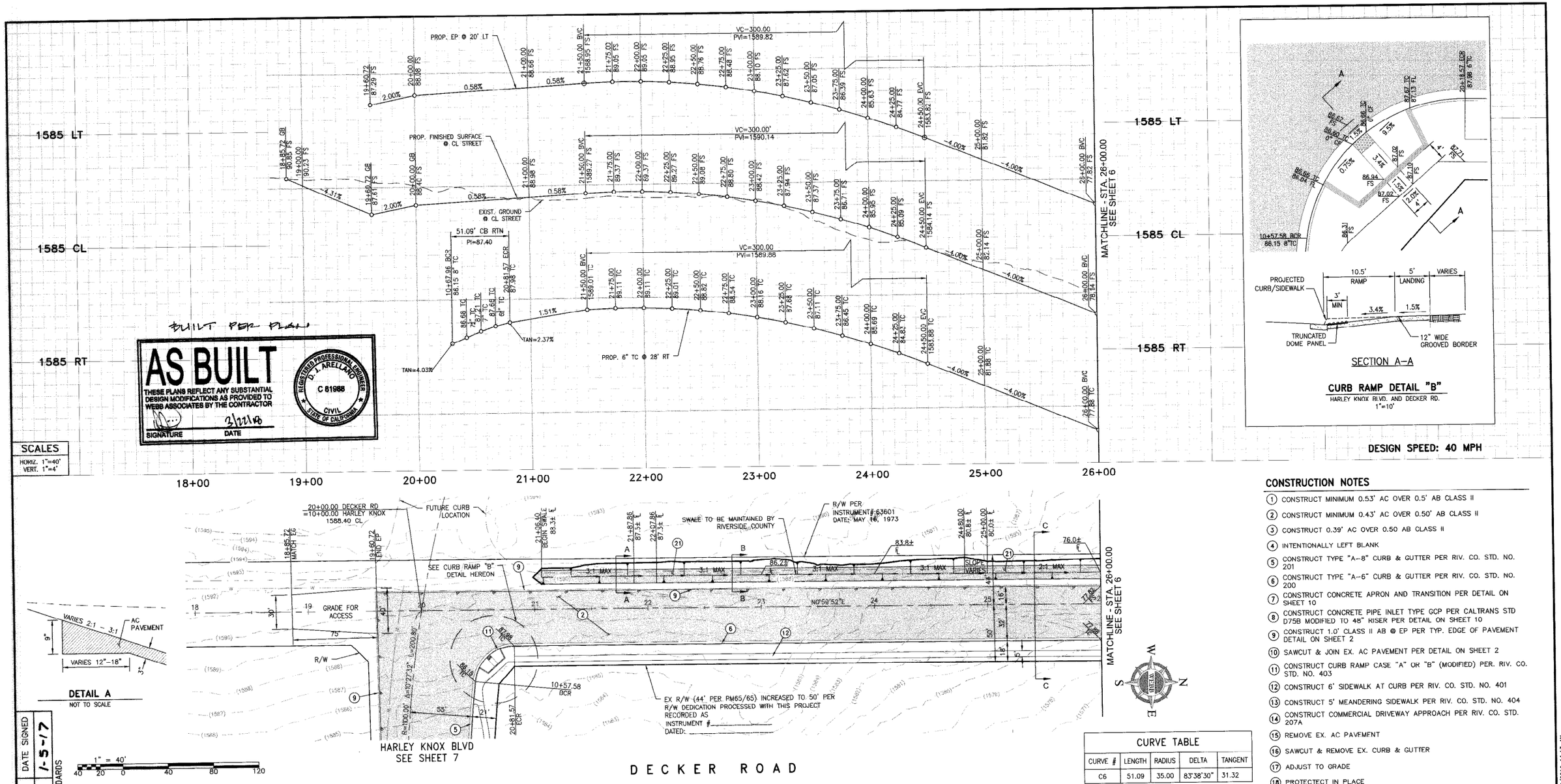
BENCHMARK:
SEE SHEET 1

SCALE:
H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

FOR: TRAMMELL CROW COMPANY | W.O. 2015-0324 | COUNTY FILE NO. 964B

SHEET NO. 4A OF 10 SHEETS



CURB RAMP DETAIL "B"
HARLEY KNOX BLVD. AND DECKER RD.
1"=10'

DESIGN SPEED: 40 MPH

BUILT PER PLAN

AS BUILT
THESE PLANS REFLECT ANY SUBSTANTIAL DESIGN MODIFICATIONS AS PROVIDED TO WEBB ASSOCIATES BY THE CONTRACTOR
SIGNATURE 3/22/18 DATE

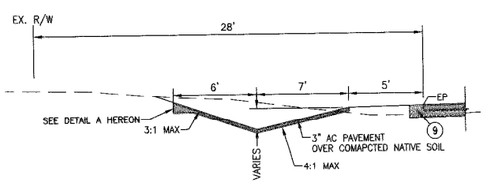
REGISTERED PROFESSIONAL ENGINEER D.J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA

SCALES
HORIZ. 1"=40'
VERT. 1"=4'

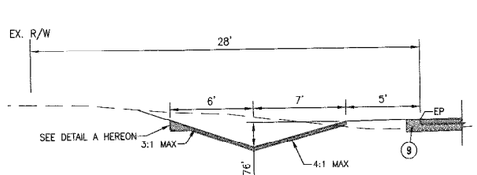
DETAIL A
NOT TO SCALE

1" = 40'
40 20 0 40 80 120

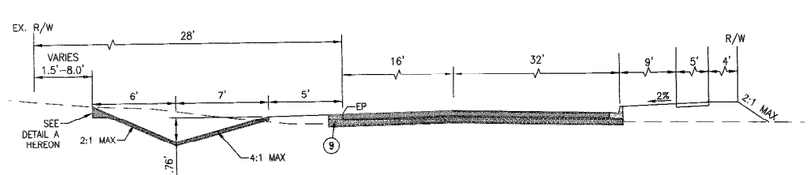
CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	TANGENT
C6	51.09	35.00	83°38'30"	31.32



SECTION A-A
(STA 21+06.40 – STA 21+87.86)



SECTION B-B
(STA 22+07.86 – STA 24+80.00)



SECTION C-C
(STA 25+00.00 – STA 31+12.36)

CONSTRUCTION NOTES

1. CONSTRUCT MINIMUM 0.53' AC OVER 0.5' AB CLASS II
2. CONSTRUCT MINIMUM 0.43' AC OVER 0.50' AB CLASS II
3. CONSTRUCT 0.39' AC OVER 0.50 AB CLASS II
4. INTENTIONALLY LEFT BLANK
5. CONSTRUCT TYPE "A-8" CURB & GUTTER PER RIV. CO. STD. NO. 201
6. CONSTRUCT TYPE "A-6" CURB & GUTTER PER RIV. CO. STD. NO. 200
7. CONSTRUCT CONCRETE APRON AND TRANSITION PER DETAIL ON SHEET 10
8. CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" RISER PER DETAIL ON SHEET 10
9. CONSTRUCT 1.0' CLASS II AB @ EP PER TYP. EDGE OF PAVEMENT DETAIL ON SHEET 2
10. SAWCUT & JOIN EX. AC PAVEMENT PER DETAIL ON SHEET 2
11. CONSTRUCT CURB RAMP CASE "A" OR "B" (MODIFIED) PER. RIV. CO. STD. NO. 403
12. CONSTRUCT 6' SIDEWALK AT CURB PER RIV. CO. STD. NO. 401
13. CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404
14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A
15. REMOVE EX. AC PAVEMENT
16. SAWCUT & REMOVE EX. CURB & GUTTER
17. ADJUST TO GRADE
18. PROTECTECT IN PLACE
19. CONSTRUCT CONCRETE COLLAR PER RCFC&WCD STD. NO. M803
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21. CONSTRUCT 3" AC PAVEMENT LINED V-DITCH

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE: 1-5-18

PP 25954 IP 160028

RECMD
COUNTY OVERSIGHT ENGINEER
REGISTRATION 45702
DATE SIGNED 1-5-17

APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIGALERT
DIAL BEFORE YOU DIG TOLL FREE 1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
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MARK	BY	DATE	REVISIONS	APPR.	DATE
	ENGINEER			COUNTY	

SEAL – ENGINEER

REGISTERED PROFESSIONAL ENGINEER D.J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: MS CHECKED BY: DA
R.C.E. NO.: 81988 DATE

BENCHMARK: SEE SHEET 1

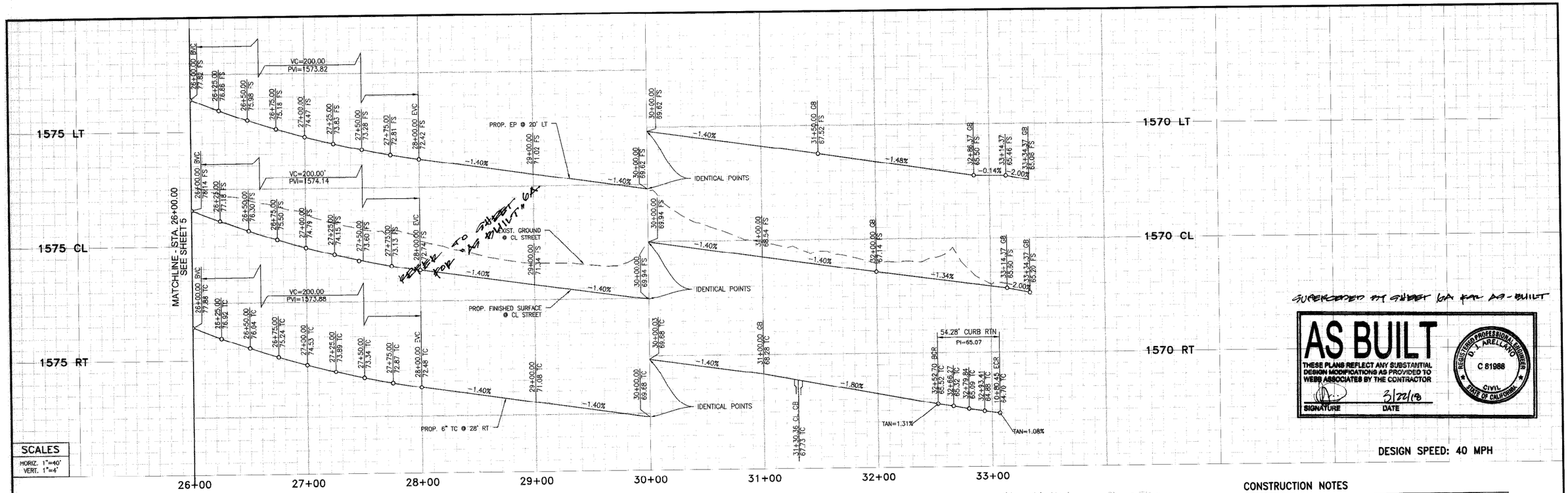
SCALE: H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

SHEET NO. 5 OF 10 SHEETS

FOR: TRAMMELL CROW COMPANY | W.O. 2015-0324 | COUNTY FILE NO. 964TB

G:\2015\15-0324\DRAWINGS\DESIGN (DO)\15-0324-C-ST.DWG 10/28/2016 11:13 AM



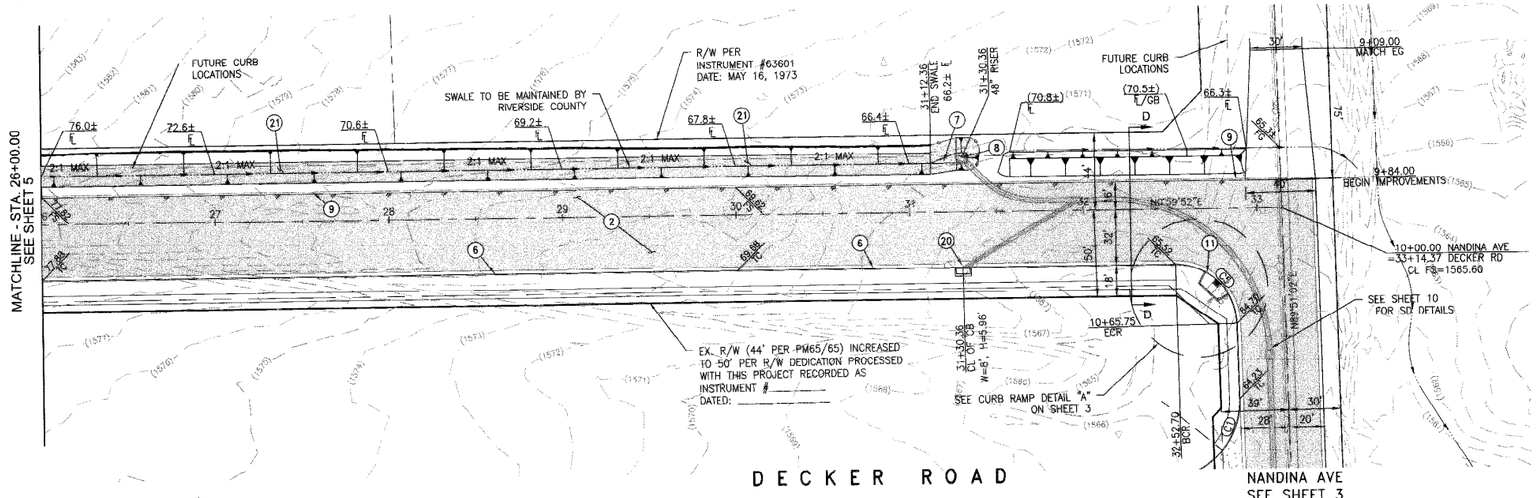
SUPERCEDED BY SHEET 6A FOR AS-BUILT

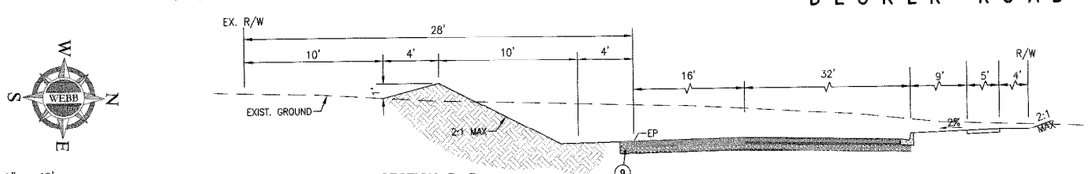
AS BUILT
THESE PLANS REFLECT ANY SUBSTANTIAL DESIGN MODIFICATIONS AS PROVIDED TO WEBB ASSOCIATES BY THE CONTRACTOR
SIGNATURE 3/22/18 DATE

REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA

DESIGN SPEED: 40 MPH

SCALES
HORIZ. 1"=40'
VERT. 1"=4'





SECTION D-D
NTS

1" = 40'
40 20 0 40 80 120

CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	TANGENT
C5	54.28	35.00	88°51'10"	34.31

CONSTRUCTION NOTES

1. CONSTRUCT MINIMUM 0.53' AC OVER 0.5' AB CLASS II
2. CONSTRUCT MINIMUM 0.43' AC OVER 0.50' AB CLASS II
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8. CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" RISER PER DETAIL ON SHEET 10
9. CONSTRUCT 1.0' CLASS II AB @ EP PER TYP. EDGE OF PAVEMENT DETAIL ON SHEET 2
10. SAWCUT & JOIN EX. AC PAVEMENT PER DETAIL ON SHEET 2
11. CONSTRUCT CURB RAMP CASE "A" OR "B" (MODIFIED) PER. RIV. CO. STD. NO. 403
12. CONSTRUCT 6' SIDEWALK AT CURB PER RIV. CO. STD. NO. 401
13. CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404
14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A
15. REMOVE EX. AC PAVEMENT
16. SAWCUT & REMOVE EX. CURB & GUTTER
17. ADJUST TO GRADE
18. PROTECTECT IN PLACE
19. CONSTRUCT CONCRETE COLLAR PER RCFC&WCD STD. NO. M803
20. CONSTRUCT CURB INLET CATCH BASIN WITH FOSSIL FILTER AND LOCAL DEPRESSION PER RIV. CO. STD. 300, 300A, & 311. USE SPECIAL CONNECTIONS PER RCFC&WCD STD NO. CB109 FOR CORNER CONNECTIONS
21. CONSTRUCT 3" AC PAVEMENT LINED V-DITCH

AS-BUILT PLAN
CORRECTIONS NOTED See Sh 6A
SIGNATURE: 1-5-18

PP 25954 IP 160028

RECMD SC
COUNTY OVERSIGHT ENGINEER Alan Fravel
REGISTRATION 45702
DATE SIGNED 1-5-17
APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIGALERT
DIAL BEFORE YOU DIG TOLL FREE 1-800-227-2600 TWO WORKING DAYS BEFORE YOU DIG
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
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MARK	BY	DATE	REVISIONS	APPR.	DATE
1			See Sheet 6A		
ENGINEER				COUNTY	

SEAL - ENGINEER
REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: VS CHECKED BY: SA
R.C.E. NO.: 81988
DATE 1/11/18

BENCHMARK: SEE SHEET 1

SCALE: H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

SHEET NO. 6 OF 10 SHEETS

FOR: TRAMMELL CROW COMPANY | W.O. 2015-0324 | COUNTY FILE NO. 964 B

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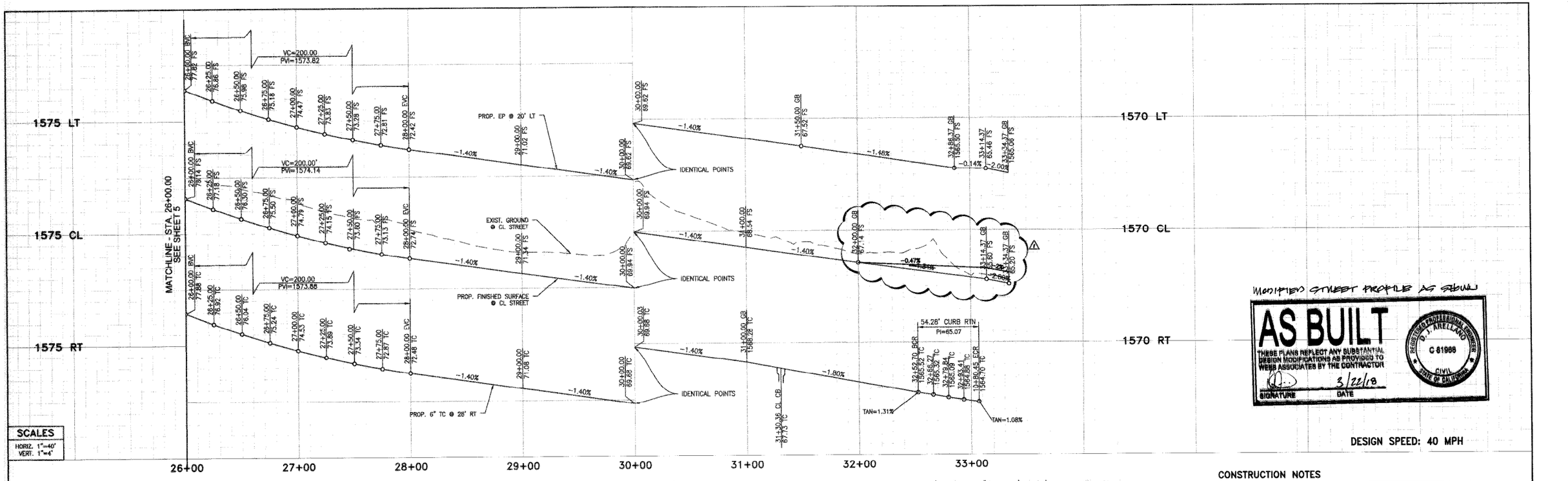


MODIFIED STREET PROFILE AS SHOWN

AS BUILT

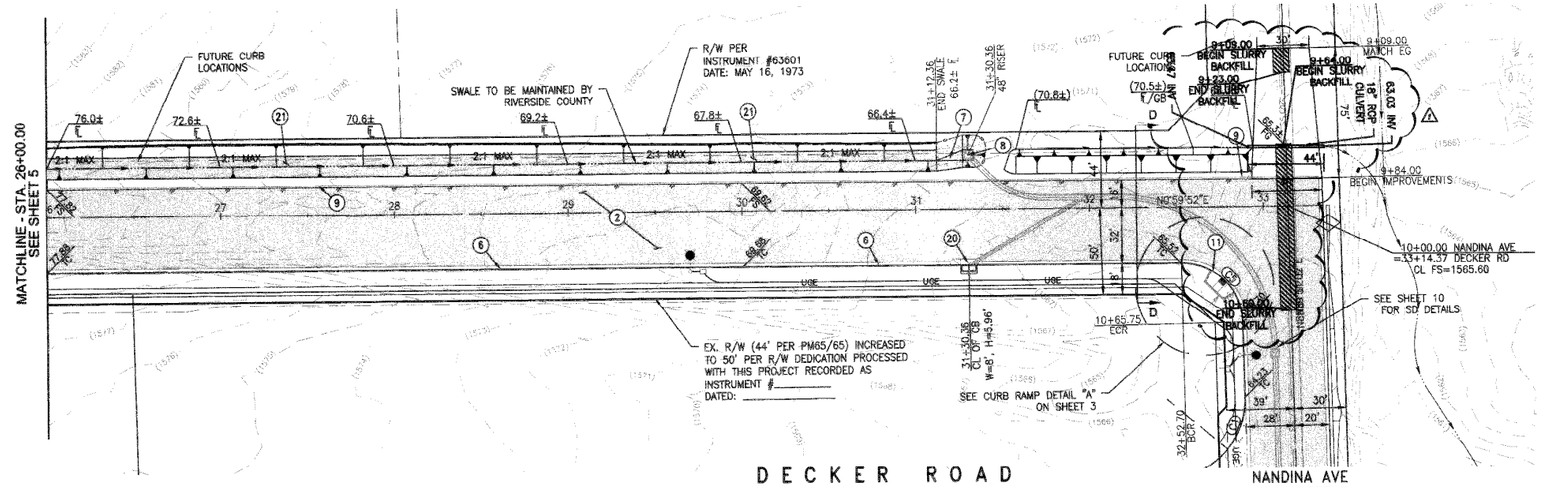
THESE PLANS REFLECT ANY SUBSTANTIAL DESIGN MODIFICATIONS AS PROVIDED TO WEBB ASSOCIATES BY THE CONTRACTOR

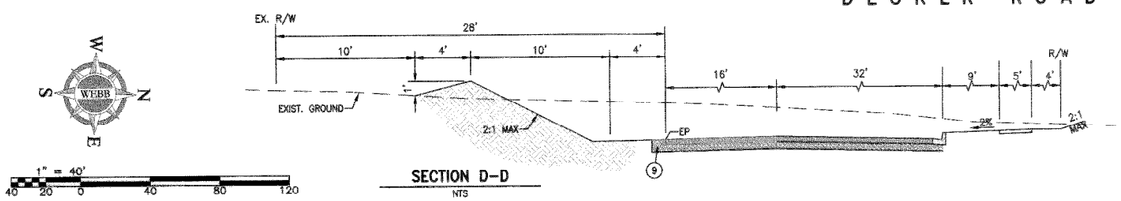
SIGNATURE 3/22/18 DATE

REGISTERED PROFESSIONAL ENGINEER D.J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA

SCALES
HORIZ. 1"=40'
VERT. 1"=4'

DESIGN SPEED: 40 MPH





SECTION D-D
NTS

CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	TANGENT
C5	54.28	35.00	88°51'10"	34.31

CONSTRUCTION NOTES

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13. CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404
14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A
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21. CONSTRUCT 3" AC PAVEMENT LINED V-DITCH

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE: [signature]

PP 25954 IP 160028

RECMD COUNTY OVERSIGHT ENGINEER REGISTRATION DATE SIGNED

APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIGALERT — DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG — TOLL FREE 1-800-227-2600 — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
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MARK	BY	DATE	REVISIONS	APPR.	DATE
1	EJA	9/22/17	REVISED CENTERLINE AND CURB PROFILES, ADDED 18" RCP CULVERT, ADDED SLURRY BACKFILL FOR EX SEWER COVER	ENGINEER	COUNTY

SEAL — ENGINEER

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: ____ CHECKED BY: ____
R.C.E. NO.: 81988 DATE

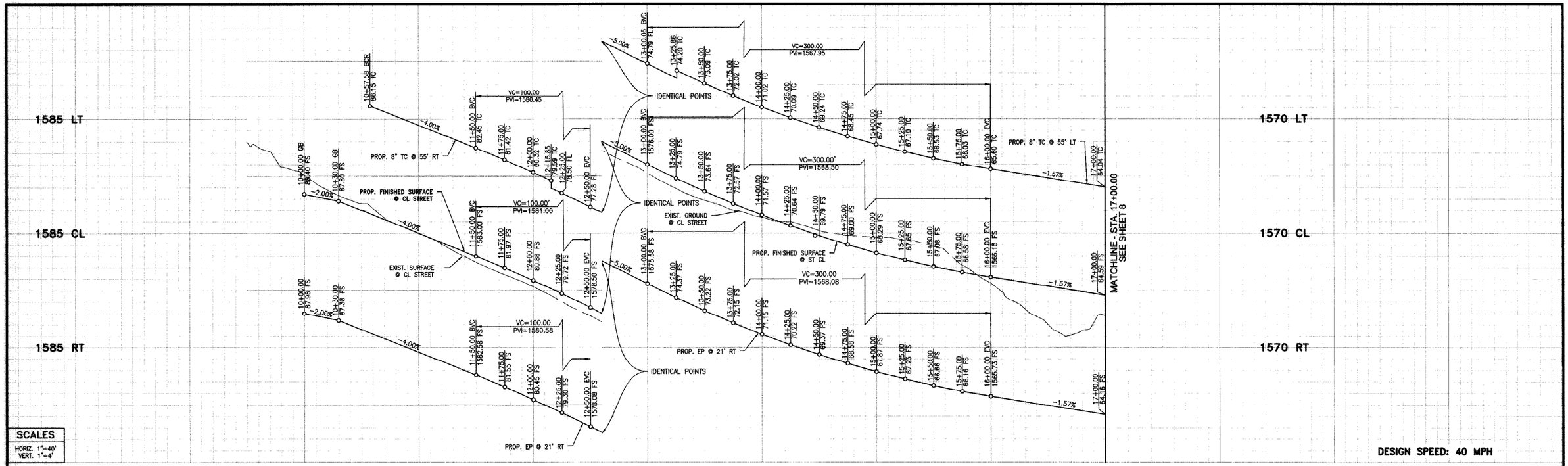
BENCHMARK: SEE SHEET 1

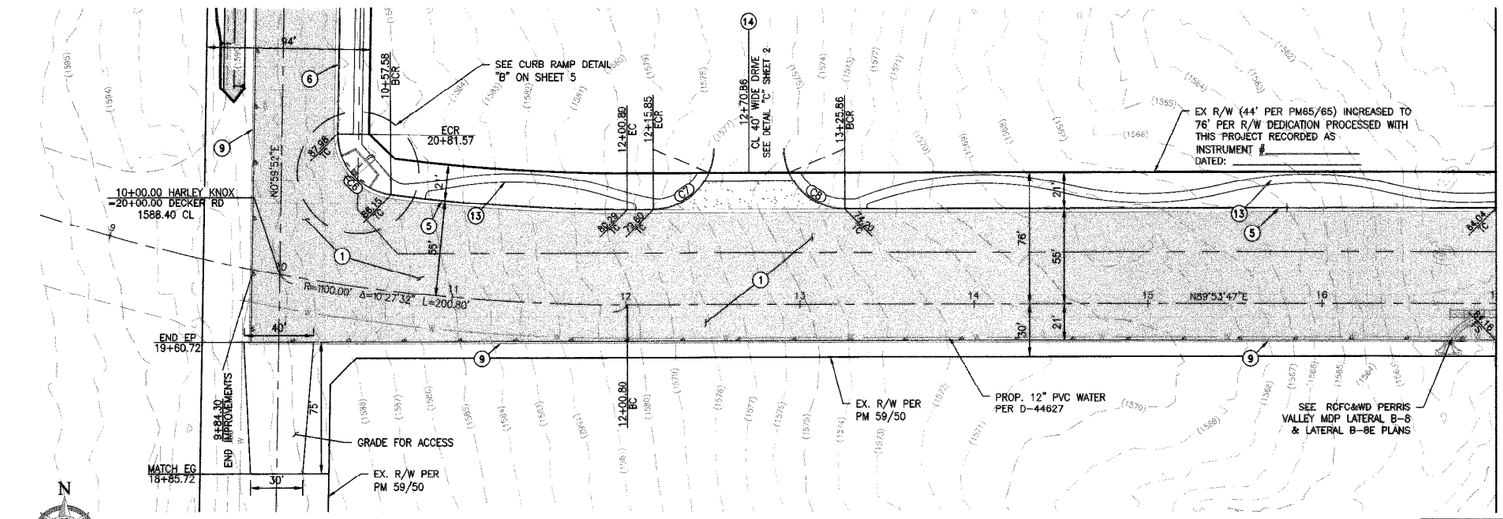
SCALE: H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

SHEET NO. 6A OF 10 SHEETS

FOR: TRAMMELL CROW COMPANY | W.O. 2015-0324 | COUNTY FILE NO. 964B





CONSTRUCTION NOTES

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14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE: 4-5-18

BUILT PER PLAN

AS BUILT
THESE PLANS REFLECT ANY SUBSTANTIAL DESIGN MODIFICATIONS AS PROVIDED TO WEBB ASSOCIATES BY THE CONTRACTOR
SIGNATURE 3/22/18 DATE

REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA

CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	TANGENT
C6	51.09	35.00	83°38'30"	31.32
C7	40.57	35.00	66°25'19"	22.91
C8	40.57	35.00	66°25'19"	22.91

PP 25954 IP 160028

RECMD	COUNTY OVERSIGHT ENGINEER	REGISTRATION	DATE SIGNED
	Allan Frank	45702	1-5-17

APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIGALERT — DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG — TOLL FREE 1-800-227-2600 — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

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MARK	BY	DATE	REVISIONS	APPR.	DATE

ENGINEER — COUNTY

SEAL — ENGINEER

REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: ____ CHECKED BY: ____
R.C.E. NO.: 81988
11/22/16 DATE

BENCHMARK: SEE SHEET 1

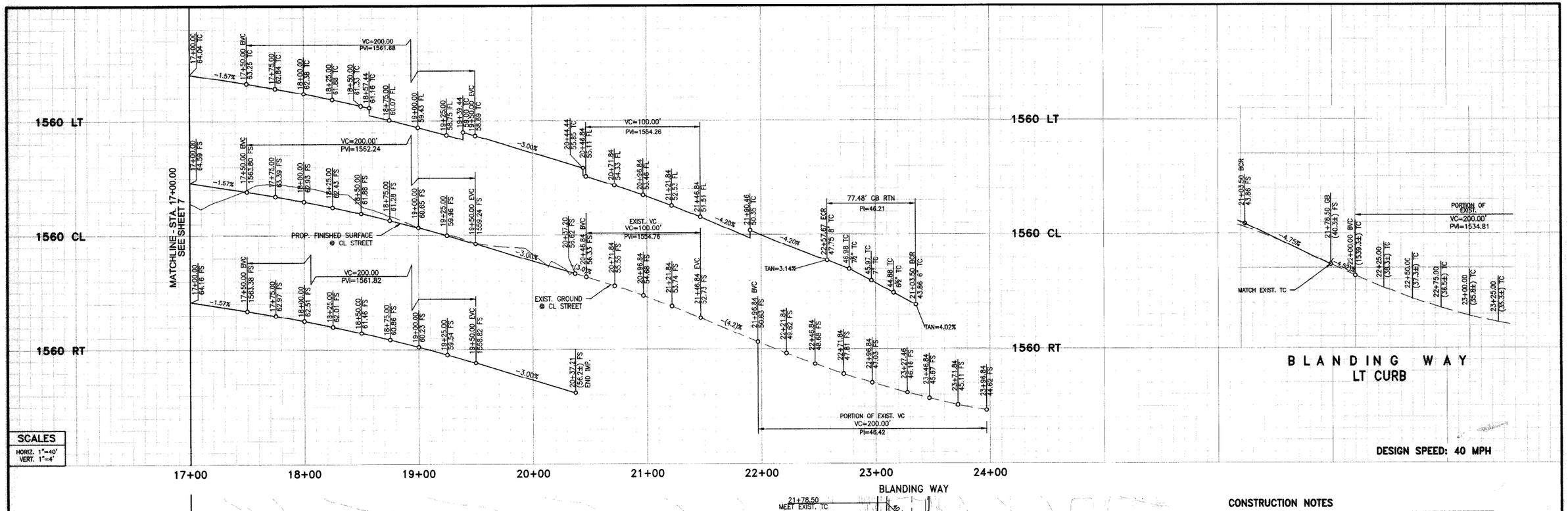
SCALE: H. AS SHOWN V. N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

FOR: TRAMMELL CROW COMPANY | W.O. 2015-0324 | COUNTY FILE NO. 964 B

SHEET NO. 7 OF 10 SHEETS

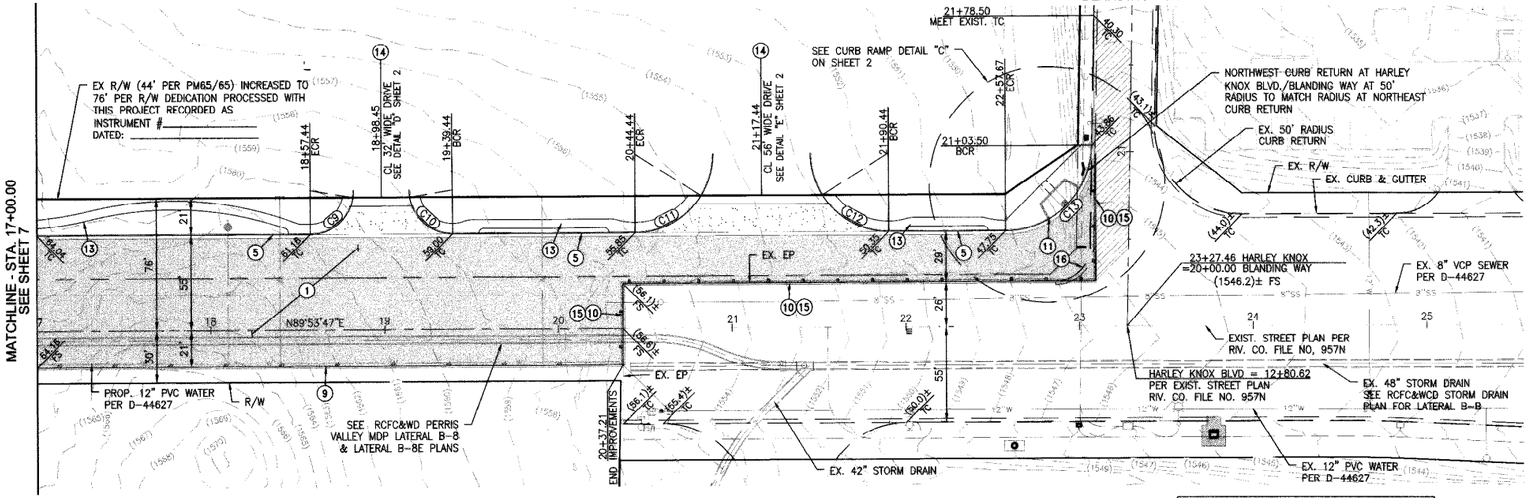
G:\2015\15-0324\DRAWINGS\DESIGN (00)\15-0324-C-ST.DWG 11/22/2016 4:32 PM



BLANDING WAY
LT CURB

DESIGN SPEED: 40 MPH

SCALES
HORIZ. 1"=40'
VERT. 1"=4'



CONSTRUCTION NOTES

1. CONSTRUCT MINIMUM 0.53' AC OVER 0.5' AB CLASS II
2. CONSTRUCT MINIMUM 0.43' AC OVER 0.50' AB CLASS II
3. CONSTRUCT 0.39' AC OVER 0.50 AB CLASS II
4. INTENTIONALLY LEFT BLANK
5. CONSTRUCT TYPE "A-8" CURB & GUTTER PER RIV. CO. STD. NO. 201
6. CONSTRUCT TYPE "A-6" CURB & GUTTER PER RIV. CO. STD. NO. 200
7. CONSTRUCT CONCRETE APRON AND TRANSITION PER DETAIL ON SHEET 10
8. CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" RISER PER DETAIL ON SHEET 10
9. CONSTRUCT 1.0' CLASS II AB @ EP PER TYP. EDGE OF PAVEMENT DETAIL ON SHEET 2
10. SAWCUT & JOIN EX. AC PAVEMENT PER DETAIL ON SHEET 2
11. CONSTRUCT CURB RAMP CASE "A" OR "B" (MODIFIED) PER. RIV. CO. STD. NO. 403
12. CONSTRUCT 6' SIDEWALK AT CURB PER RIV. CO. STD. NO. 401
13. CONSTRUCT 5' MEANDERING SIDEWALK PER RIV. CO. STD. NO. 404
14. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV. CO. STD. 207A
15. REMOVE EX. AC PAVEMENT
16. SAWCUT & REMOVE EX. CURB & GUTTER

BUILT PER PLAN

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE:
4-5-18

AS BUILT
THESE PLANS REFLECT ANY SUBSTANTIAL DESIGN MODIFICATIONS AS PROVIDED TO WEBB ASSOCIATES BY THE CONTRACTOR
SIGNATURE 3/22/18 DATE

REGISTERED PROFESSIONAL ENGINEER D.J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA

CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	TANGENT
C9	35.25	25.00	80°47'35"	21.27
C10	35.25	25.00	80°47'35"	21.27
C11	45.37	45.00	57°46'09"	24.83
C12	45.37	45.00	57°46'09"	24.83
C13	77.48	50.00	88°47'25"	48.95

N
W WEBB E
S
1" = 40'
20 0 40

PP 25954 IP 160028

RECMD COUNTY OVERSIGHT ENGINEER — Glen Trent
REGISTRATION 45702
DATE SIGNED 1-5-17
APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

DIGALERT
DIAL BEFORE YOU DIG TOLL FREE 1-800-227-2600 TWO WORKING DAYS BEFORE YOU DIG
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

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MARK	BY	DATE	REVISIONS	APPR.	DATE
ENGINEER				COUNTY	

SEAL – ENGINEER
REGISTERED PROFESSIONAL ENGINEER D.J. ARELLANO NO. 81988 CIVIL STATE OF CALIFORNIA

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: ____ CHECKED BY: ____
R.C.E. NO.: 81988
DATE 1/22/18

BENCHMARK: SEE SHEET 1
SCALE: H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

FOR: TRAMMELL CROW COMPANY
W.O. 2015-0324
COUNTY FILE NO. 964 T3

SHEET NO. 8 OF 10 SHEETS

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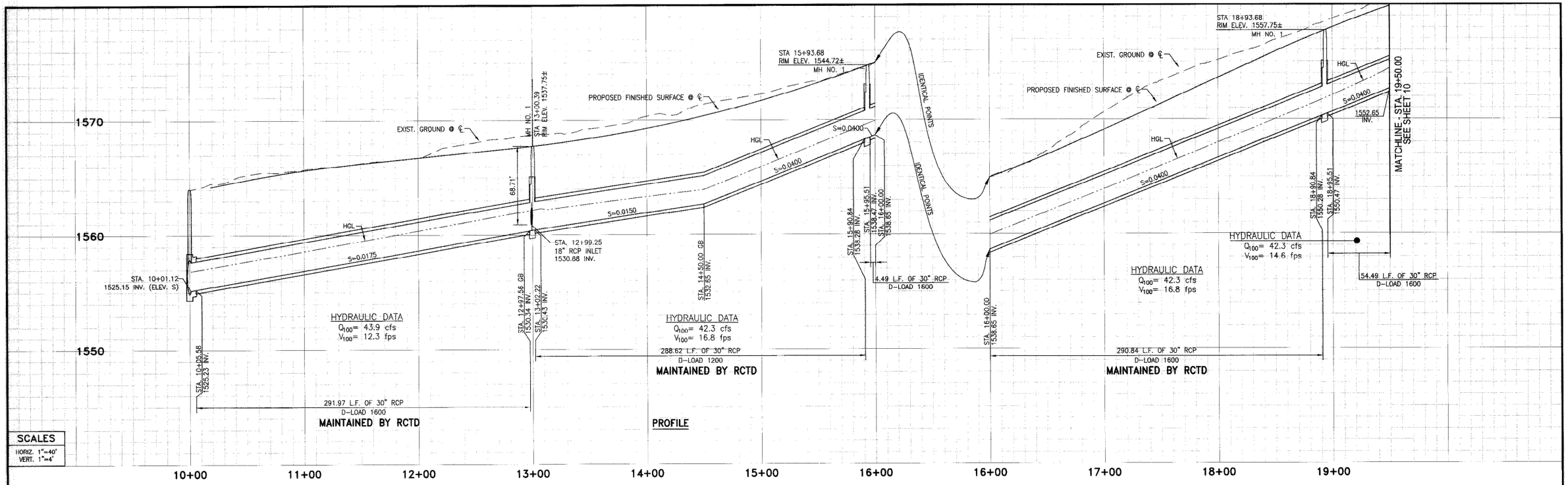
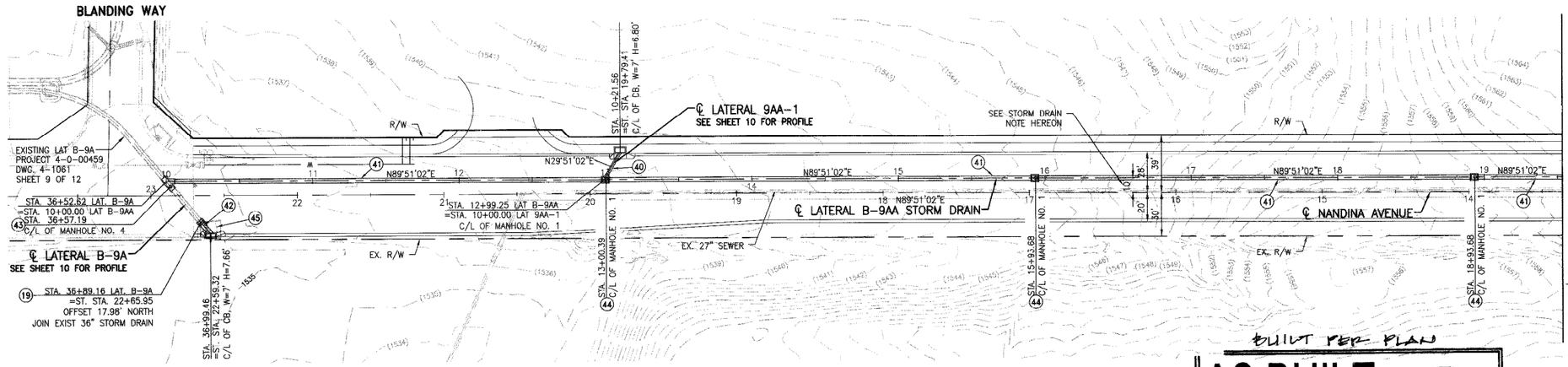
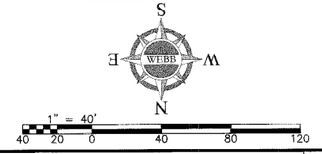


SCALES
HORIZ. 1"=40'
VERT. 1"=4'



MANHOLE #4
LATERAL B-9AA
A = 49°59'07"
B = 30"
C = 6'
D_1 = 36"
D_2 = 36"
ELEV. S = 1525.31
ELEV. R = 1525.38

LATERAL B-9AA PLAN



STORM DRAIN NOTE:
PROPOSED STORM DRAIN ALIGNMENT SET AT 10' SOUTH OF STREET CENTERLINE TO PROVIDE MAINTENANCE ACCESS TO EXISTING 27" SEWER MAIN, LOCATED 1.5' SOUTH OF STREET CENTERLINE.

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE: 1-5-18

CONSTRUCTION NOTES

(40) INSTALL 18" RCP STORM DRAIN (D-LOAD PER PLAN)
(41) INSTALL 30" RCP STORM DRAIN (D-LOAD PER PLAN)
(42) INSTALL 36" RCP STORM DRAIN (D-LOAD PER PLAN)
(43) CONSTRUCT MANHOLE NO. 4 PER RCFC&WCD STD. NO. MH254
(44) CONSTRUCT MANHOLE NO. 1 PER RCFC&WCD STD. NO. MH251
(45) CONSTRUCT JUNCTION NO. 2 PER RCFC&WCD STD. NO. JS227
(7) CONSTRUCT CONCRETE APRON AND TRANSITION PER DETAIL HEREON
(8) CONSTRUCT CONCRETE PIPE INLET TYPE GCP PER CALTRANS STD D75B MODIFIED TO 48" DIAMETER
(19) CONSTRUCT CONCRETE COLLAR PER RCFC&WCD STD. NO. M803
(45) DEMOLISH EXISITNG CATCH BASIN

BUILT PER PLAN

AS BUILT
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SIGNATURE 3/22/18 DATE

REGISTERED PROFESSIONAL ENGINEER D. J. ARELLANO C 81988 CIVIL STATE OF CALIFORNIA

PP 25954 IP 160028

RECMD | COUNTY OVERSIGHT ENGINEER | REGISTRATION | DATE SIGNED
Alan Fund | 45702 | 1-5-17

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RIVERSIDE CA. 92506
PH. (951) 686-1070

PREPARED UNDER THE SUPERVISION OF: D.J. ARELLANO
DESIGNED BY: MS CHECKED BY: SA
R.C.E. NO.: 81988
DATE: 11/11/14

BENCHMARK:
SEE SHEET 1

SCALE:
H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

FOR: TRAMMELL CROW COMPANY
W.O. 2015-0324
COUNTY FILE NO. 964B

SHEET NO. 9 OF 10 SHEETS

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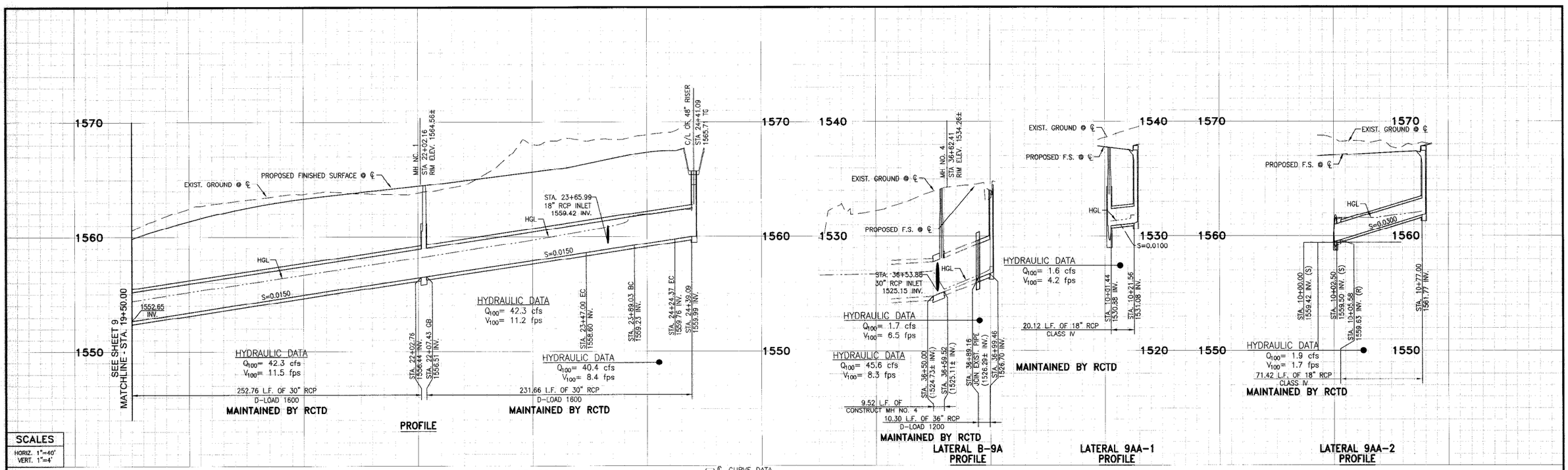

SCALES
HORIZ. 1"=40'
VERT. 1"=4'

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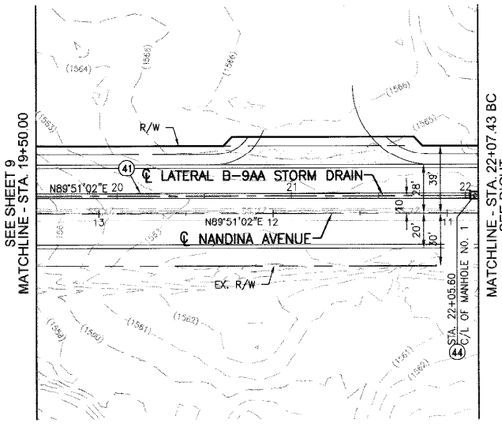
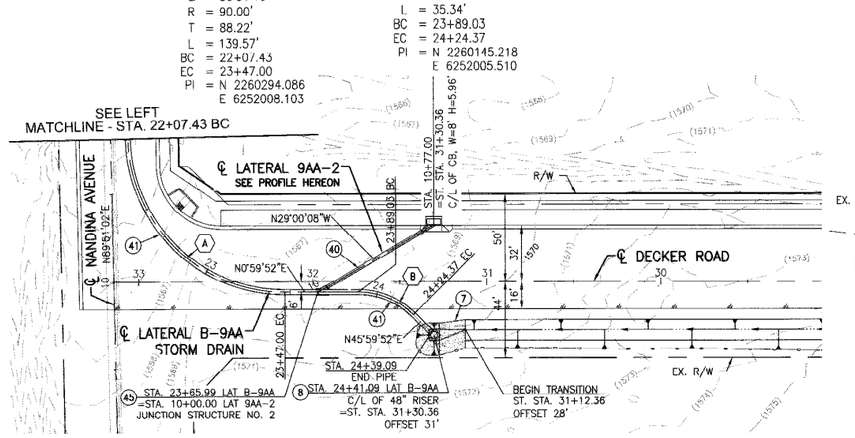
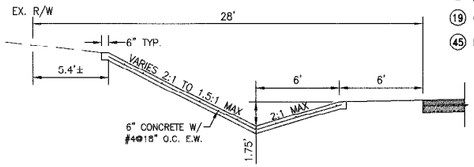
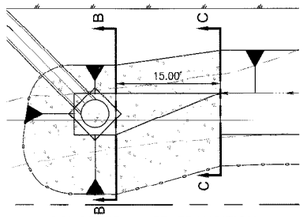


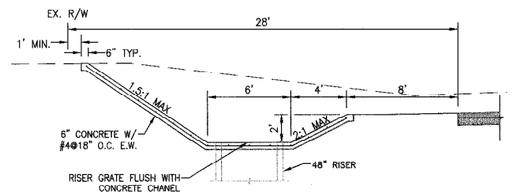




SECTION C-C
NOT TO SCALE



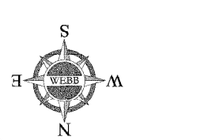
(7) CONCRETE INLET TRANSITION
NOT TO SCALE



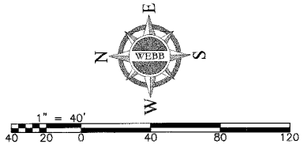
SECTION B-B
NOT TO SCALE

JUNCTION STRUCTURE #2
LATERAL B-9AA
A = 90°00'00"
B = 18"
C = 5'
D = 30"
E = 1.13'
L = 2.25'
ELEV. S = 1559.43
ELEV. R = 1559.54

LATERAL B-9AA



LATERAL B-9AA



(A) ℄ CURVE DATA
Δ = 88°51'10"
R = 90.00'
T = 88.22'
L = 139.57'
BC = 22+07.43
EC = 23+47.00
PI = N 2260294.086
E 6252008.103

(B) ℄ CURVE DATA
Δ = 45°00'00"
R = 45.00'
T = 18.64'
L = 35.34'
BC = 23+89.03
EC = 24+24.37
PI = N 2260145.218
E 6252005.510

AS BUILT
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SIGNATURE
3/22/18
DATE

REGISTERED PROFESSIONAL ENGINEER
D.J. ARELLANO
C 81988
CIVIL
STATE OF CALIFORNIA

AS-BUILT PLAN
CORRECTIONS NOTED
SIGNATURE: 4-5-18

PP 25954 IP 160028

RECMD | COUNTY OVERSIGHT ENGINEER | REGISTRATION | DATE SIGNED
R | Glen Ewell | 45702 | 1-5-17

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				ENGINEER	COUNTY

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PREPARED UNDER THE SUPERVISION OF:
D.J. ARELLANO
DESIGNED BY: MS CHECKED BY: SA
R.C.E. NO.: 81988
11/17
DATE

BENCHMARK:
SEE SHEET 1

SCALE:
H: AS SHOWN V: N/A

COUNTY OF RIVERSIDE
PLOT PLAN NO. 25954
NANDINA BUSINESS CENTER
STREET IMPROVEMENT PLAN
PLAN SHEET

FOR: TRAMMELL CROW COMPANY
W.O. 2015-0324
COUNTY FILE NO. 964B

SHEET NO. 10 OF 10 SHEETS

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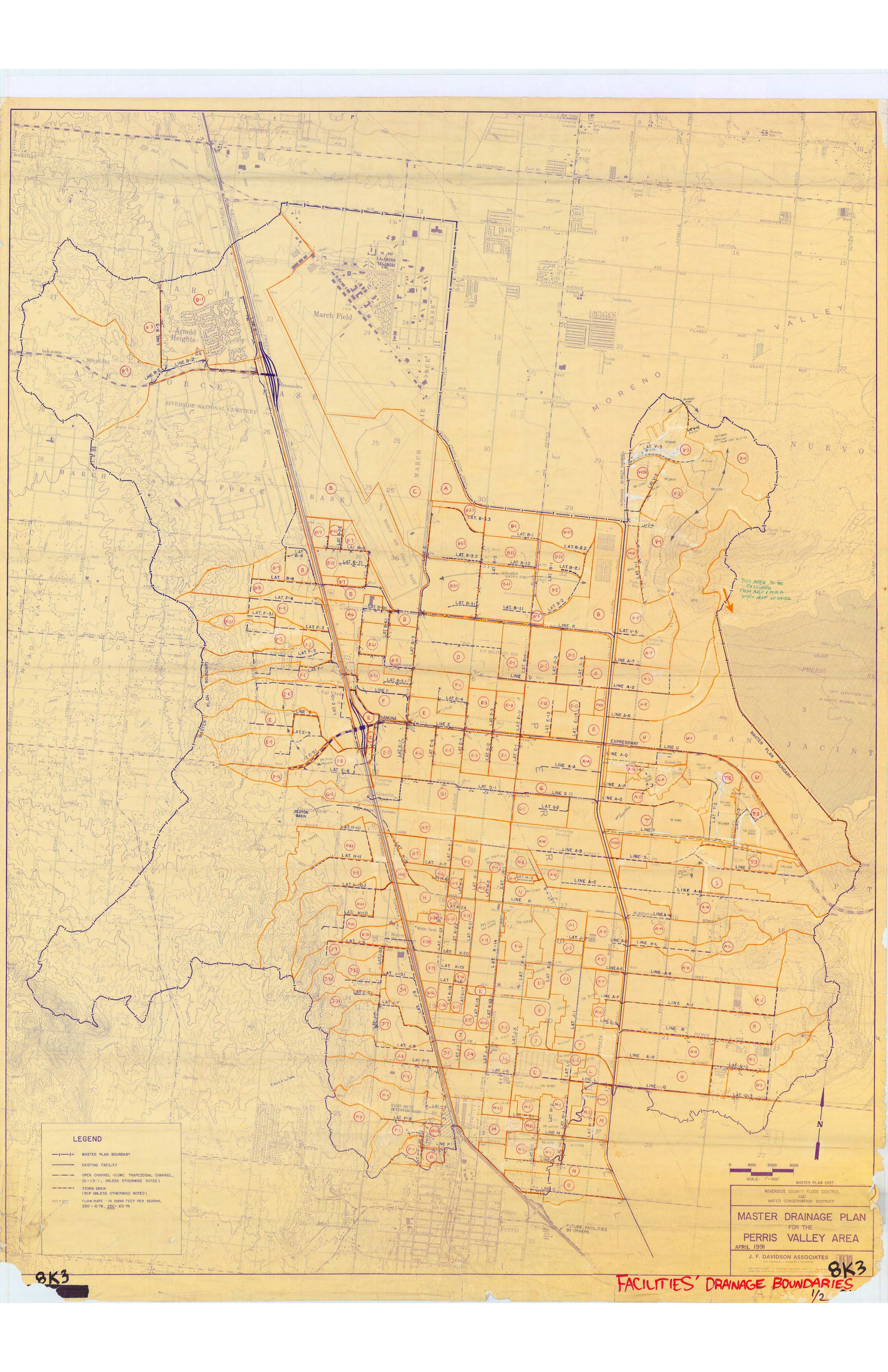
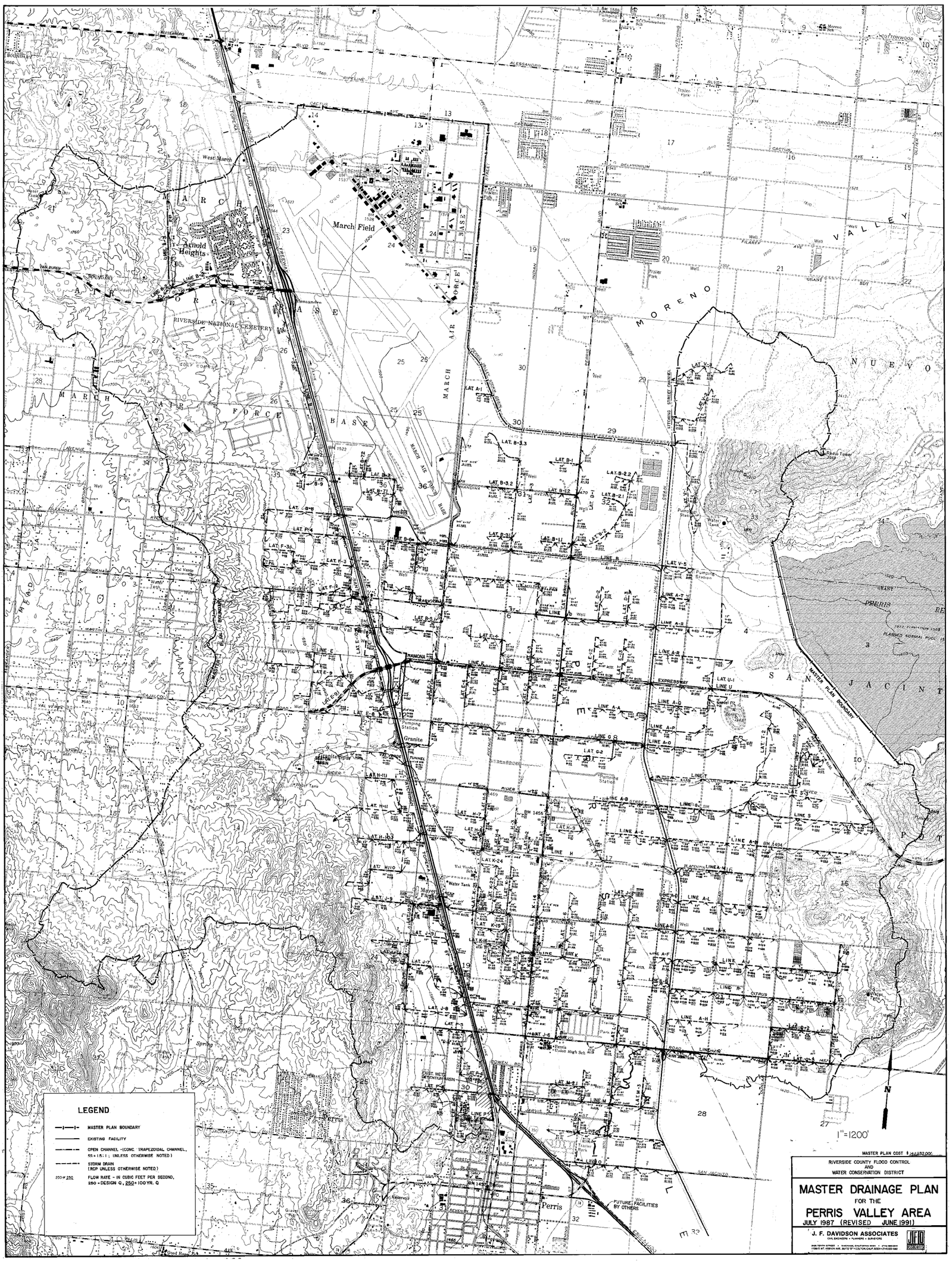
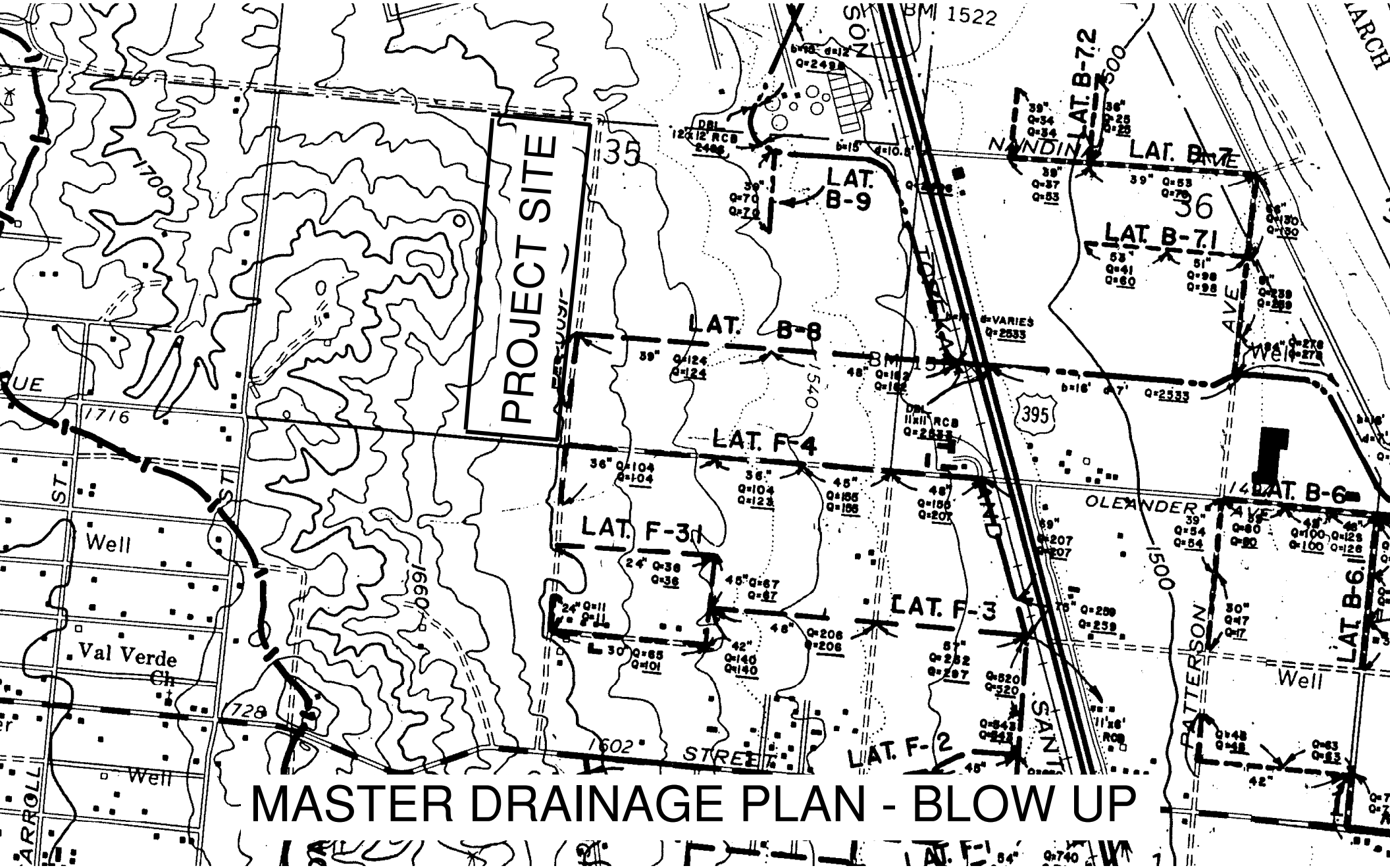


8K3

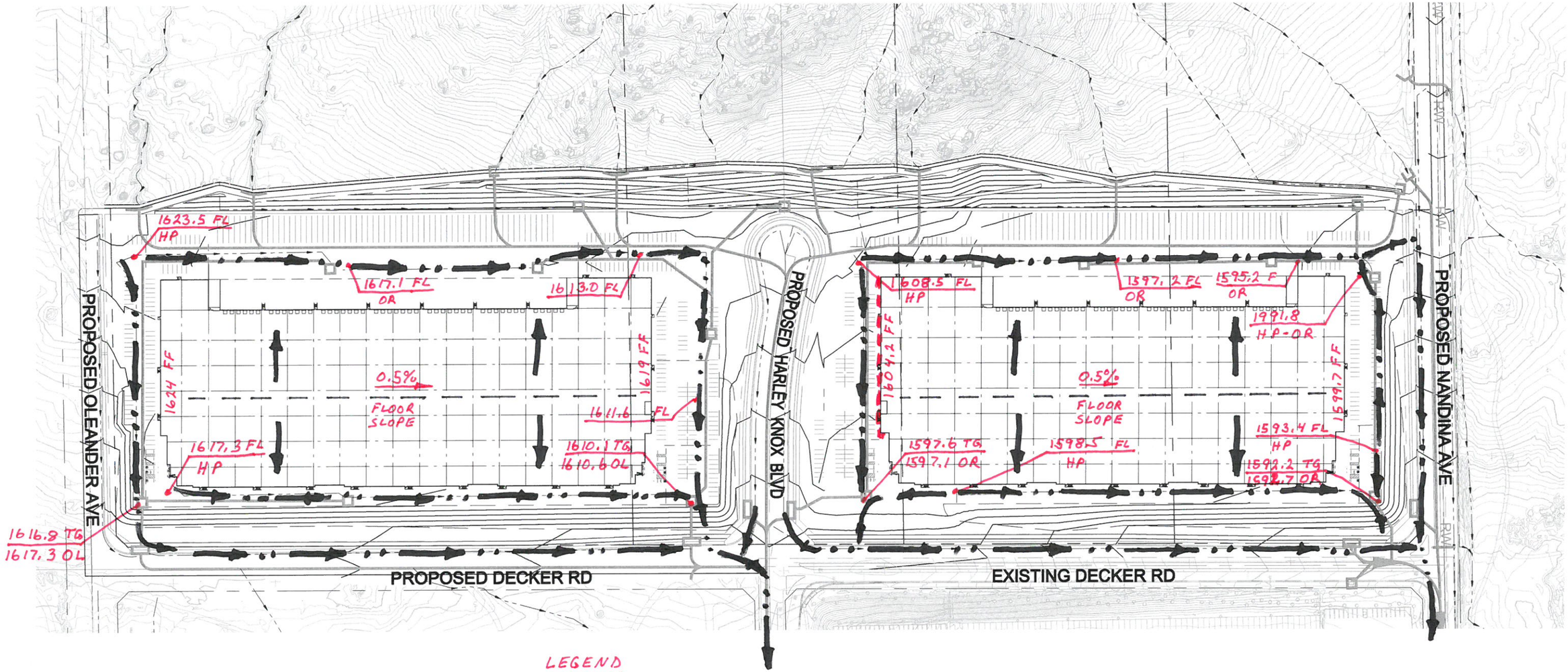
FACILITIES' DRAINAGE BOUNDARIES 1/2

8K3


LEGEND
MASTER PLAN BOUNDARY
EXISTING FACILITY
OPEN CHANNEL -(CONC. TRAPEZOIDAL CHANNEL, 12 x 1.5 ; ; UNLESS OTHERWISE NOTED)
STORM DRAIN (RCP UNLESS OTHERWISE NOTED)
200 or 250 FLOW RATE - IN CUBIC FEET PER SECOND, 250 = DESIGN Q , 250 = 100 YR. Q
MASTER PLAN COST $ 142,200,000
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
MASTER DRAINAGE PLAN
FOR THE
PERRIS VALLEY AREA
JULY 1987 (REVISED JUNE 1991)
J. F. DAVIDSON ASSOCIATES
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1" = 1200'
MARCH AIR FORCE BASE
March Field
Arnold Heights
RIVERSIDE NATIONAL CEMETERY
MORENO VALLEY
NUEVO
PERRIS
SAN JACINTO
Perris
Granite
Spring
MASTER PLAN BOUNDARY
FUTURE FACILITIES BY OTHERS



MASTER DRAINAGE PLAN - BLOW UP



LEGEND

PROPOSED STORM DRAIN SYSTEM

DIRECTION OF OVERLAND RELIEF

EXISTING AND PROPOSED SWALES

200 100 0 200 400 600

SCALE: 1"=200'

LEGEND

OR = OVERLAND RELIEF

FL = FLOW LINE

HP = HIGH POINT

TG = TOP OF GRATE INLET

= STEMWALL ABOVE FS PROTECTING BUILDING

THE ASSUPTION IS THAT EVERY INLET IS TOTALLY CLOGGED AND THE 100-YEAR STORM EVENT MUST FLOW OFF-SITE WITHOUT DAMAGE TO INFRASTRUCTURE.

Prepared By:

Michael Baker INTERNATIONAL

5 Hutton Centre Drive, Suite 500
Santa Ana CA 92707
Phone: (949) 472-3505
MBAKERINTL.COM

MEAD VALLEY BUSINESS PARK
OVERLAND RELIEF MAP
PROPOSED CONDITION
RIVERSIDE COUNTY, CA
JULY 2019

JN:	1" = 200'	DATE:	7/5/2019

H:\PDATA\152480\CADD\LAND\DLV\HYDRO\PRELIMINARY\MAPS\152480-PRELIM-OVERLAND-RELIEF-MAP.DWG RHOWE 7/5/19 3:52 pm

OFF-SITE RUNOFF FROM EXISTING SUBAREAS T AND U ARE CURRENTLY DIVERTED NORTH OF NANDINA THROUGH AN 18" CULVERT INSTALLED CIRCA 2017. THE RUNOFF FLOWS 1300' EASTERLY TO LATERAL B-9A. IN THE PROPOSED CONDITION THE CULVERT WILL BE REMOVED AND OFF-SITE RUNOFF FROM THESE SUBAREAS WILL BE INTERCEPTED, CONVEYED, AND COMBINED WITH ON-SITE RUNOFF (AFTER FILTRATION FOR WQMP PURPOSES) TO LATERAL B-9AA HERE. TO PROPERLY COMPARE EXISTING RUNOFF RATES AND VOLUMES TO PROPOSED RUNOFF RATES AND VOLUMES IT IS ASSUMED THAT ALL RUNOFF COMBINES AT LATERAL B-9AA HERE. RUNOFF VALUES SHOWN IGNORE THE 18" CULVERT AND ASSUME ALL RUNOFF COMBINES AS A SINGLE 34.7 AC WATERSHED.

THE PEAK RUNOFF RATE TO LATERAL B-9AA
PER ASBUILT DWG NO. 964B WAS Q_{100}=42.3 CFS CFS.
PER THIS STUDY Q_{100}=55.25 CFS
WHICH IS THE SUMMATION OF (Q_{100}=53.35 CFS) PLUS
N.A.P. LATERAL B-9AA-2 (Q_{100}=1.90 CFS).

EXISTING LATERAL B-9A
36" RCP SD
PER DWG NO. 4-1061
Q_{100}=71.5 CFS IS N.A.P.

FUTURE NANDINA AVE

EXISTING NANDINA AVE
LATERAL B-9AA

EX 30" SD
LATERAL B-9AA

EX 18" CULVERT IGNORED, RUNOFF ASSUMED TO JOIN AT LATERAL 9AA.

FG=1566
1563.47 INV
$Q_{10\text{-SUBAREA}}$=2.83 CFS
$Q_{100\text{-SUBAREA}}$=4.36 CFS
2.7 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=6.24 CFS
$Q_{100\text{-TOTAL}}$=9.59 CFS
5.6 AC_{TOTAL}

FG=1603
$Q_{10\text{-SUBAREA}}$=3.41 CFS
$Q_{100\text{-SUBAREA}}$=5.23 CFS
2.9 $AC_{SUBAREA}$

WATERSHED B-9AA RUNOFF VOLUME AND PEAK RATES.
HISTORICALLY RUNOFF FROM WATERSHED B-9AA FLOWED EASTERLY AND PER MASTER DRAINAGE PLAN FOR PERRIS VALLEY AREA JUNE 1991 WAS INTENDED TO BE TRIBUTARY TO STORM DRAIN LATERAL B-9. HERE EXISTING UPON CONSTRUCTION OF STORM DRAIN LATERAL B-9AA PER RIVERSIDE COUNTY FILE NO. 964B RUNOFF IS PICKED UP IN A DECKER RD ADJACENT 48" RISER TRIBUTARY TO STORM DRAIN LATERAL B-9AA AND ULTIMATELY LATERAL B-9.

34.7 ACRE WATERSHED B-9AA:
TOTAL RUNOFF VOLUME 10 YR/24 HR STORM=4.03 AC-FT
AND RUNOFF RATES Q_{10}=33.67 CFS, Q_{100}=53.35 CFS

SUMMATION OF EXISTING CONDITION 105.7 ACRE HYDROLOGIC BOUNDARY:
TOTAL RUNOFF VOLUME 10 YR/24 HR STORM=12.28 AC-FT
AND RUNOFF RATES Q_{10}=97.33 CFS, Q_{100}=152.08 CFS

EXISTING BLANDING WAY

EXISTING DECKER RD

LATERAL B-9AA-2 (N.A.P.)
$Q_{100\text{-SUBAREA}}$=1.90 CFS
18" RCP SD PER RIVERSIDE COUNTY FILE NO. 964B

FL=1566
$Q_{10\text{-SUBAREA-Q}}$=10.12 CFS
$Q_{100\text{-SUBAREA-Q}}$=16.23 CFS
11.0 $AC_{SUBAREA-Q}$
$Q_{10\text{-SUBAREA-S}}$=5.18 CFS,
$Q_{100\text{-SUBAREA-S}}$=8.00 CFS
5.2 $AC_{SUBAREA-S}$
$Q_{10\text{-TOTAL}}$=28.07 CFS,
$Q_{100\text{-TOTAL}}$=44.52 CFS
29.1 AC_{TOTAL}

FG=1569
$Q_{10\text{-SUBAREA}}$=4.82 CFS
$Q_{100\text{-SUBAREA}}$=7.73 CFS
5.1 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=9.96 CFS
$Q_{100\text{-TOTAL}}$=15.64 CFS
9.9 AC_{TOTAL}

EXISTING INDUSTRIAL WAREHOUSE FACILITY

FG=1618
$Q_{10\text{-SUBAREA}}$=3.31 CFS
$Q_{100\text{-SUBAREA}}$=5.09 CFS
3.0 $AC_{SUBAREA}$

FG=1653

RUNOFF FROM HERE AND WEST OF HERE FLOWS NORTHERLY ACROSS FUTURE NANDINA OFF-SITE BEYOND OUR HYDROLOGIC BOUNDARY

B-9AA
34.7 AC

WATERSHED B-8 RUNOFF VOLUME AND PEAK RATES.
HISTORICALLY RUNOFF FROM WATERSHED B-8 FLOWED EASTERLY AND PER MASTER DRAINAGE PLAN FOR PERRIS VALLEY AREA JUNE 1991 WAS INTENDED TO BE TRIBUTARY TO STORM DRAIN LATERAL B-8. HERE EXISTING UPON CONSTRUCTION OF HARLEY KNOX BLVD TO DECKER RD AND EXTENSION OF STORM DRAIN LATERAL B-8 PER RIVERSIDE COUNTY FLOOD CONTROL DISTRICT DRAWING NO. 4-1060 RUNOFF IS PICKED UP AND IS ULTIMATELY TRIBUTARY TO STORM DRAIN LATERAL B-8.

FROM THE 71.0 ACRE WATERSHED B-8:
TOTAL RUNOFF VOLUME 10 YR/24 HR STORM=8.25 AC-FT
AND RUNOFF RATES Q_{10}=63.66 CFS, Q_{100}=98.73 CFS

THE PEAK RUNOFF RATE TO LATERAL B-8
PER RIVERSIDE COUNTY FLOOD CONTROL DISTRICT ASBUILT DRAWING NO. 4-1060DWG NO. 964B WAS APPROVED FOR Q_{100}=182.00 CFS.
PER THIS STUDY Q_{10}=90.85 CFS, Q_{100}=140.90 CFS
(THE SUMMATION OF WATERSHED B-8 PLUS WATERHSED B-8A).

FG=1561.5
$Q_{10\text{-SUBAREA}}$=4.62 CFS
$Q_{100\text{-SUBAREA}}$=7.16 CFS
4.9 $AC_{SUBAREA}$
$Q_{10\text{-INLET}}$=7.64 CFS
$Q_{100\text{-INLET}}$=11.82 CFS
7.9 AC_{TOTAL}

EX 48" SD
LATERAL B-8

EXISTING HARLEY KNOX BLVD

FROM B-8A ONLY
$Q_{10\text{-TOTAL}}$=27.19 CFS
$Q_{100\text{-TOTAL}}$=42.17 CFS
31.9 AC_{TOTAL}

HISTORICALLY RUNOFF FROM WATERSHED B-8A FLOWED EASTERLY AND PER MASTER DRAINAGE PLAN FOR PERRIS VALLEY AREA JUNE 1991 WAS INTENDED TO BE TRIBUTARY TO STORM DRAIN LATERAL B-8. HERE EXISTING UPON CONSTRUCTION OF STORM DRAIN LATERAL B-8A PER RIVERSIDE COUNTY FLOOD CONTROL DISTRICT DRAWING NO. 4-1060 RUNOFF IS.

EX 48" SD
LATERAL B-8A

EXISTING INDUSTRIAL WAREHOUSE FACILITY

FG=1691

FG=1602
$Q_{10\text{-SUBAREA}}$=5.14 CFS
$Q_{100\text{-SUBAREA}}$=7.91 CFS
5.1 $AC_{SUBAREA}$

FG=1718

FUTURE HARLEY KNOX BLVD

FG=1610
$Q_{10\text{-SUBAREA}}$=7.13 CFS
$Q_{100\text{-SUBAREA}}$=10.96 CFS
6.5 $AC_{SUBAREA}$

FUTURE DECKER RD

FG=1587
$Q_{10\text{-SUBAREA}}$=6.86 CFS
$Q_{100\text{-SUBAREA}}$=10.69 CFS
6.5 $AC_{SUBAREA}$
$Q_{10\text{-INLET}}$=13.99 CFS
$Q_{100\text{-INLET}}$=21.64 CFS
13.0 AC_{INLET}
$Q_{10\text{-TOTAL}}$=63.66 CFS
$Q_{100\text{-TOTAL}}$=98.73 CFS
71.0 AC_{TOTAL}

FG=1572
$Q_{10\text{-SUBAREA}}$=3.02 CFS
$Q_{100\text{-SUBAREA}}$=4.66 CFS
3.0 $AC_{SUBAREA}$

B-8
71.0 AC

B-8A
31.9 AC

NOTE:
TO PREPARE A HYDROLOGY REPORT AND COMPARE THE EXISTING CONDITION TO THE PROPOSED CONDITION RUNOFF FROM WEST OF DECKER RD AND TRIBUTARY TO THE SITE (WATERSHED B-8) IS ANALYZED SEPARATELY FROM RUNOFF EAST OF DECKER RD AND NOT TRIBUTARY TO THE SITE (WATERSHED B-8A).

FG=1593
$Q_{10\text{-SUBAREA}}$=9.48 CFS
$Q_{100\text{-SUBAREA}}$=14.73 CFS
10.6 $AC_{SUBAREA}$
$Q_{10\text{-INLET}}$=29.77 CFS
$Q_{100\text{-INLET}}$=46.09 CFS
31.0 AC_{INLET}
$Q_{10\text{-TOTAL}}$=52.51 CFS
$Q_{100\text{-TOTAL}}$=81.54 CFS
58.0 AC_{TOTAL}

FL=1551.2
$Q_{10\text{-SUBAREA}}$=10.57 CFS
$Q_{100\text{-SUBAREA}}$=16.29 CFS
10.1 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=20.54 CFS
$Q_{100\text{-TOTAL}}$=31.91 CFS
24.0 AC_{TOTAL}

FG=1663
$Q_{10\text{-SUBAREA}}$=10.70 CFS
$Q_{100\text{-SUBAREA}}$=16.50 CFS
10.3 $AC_{SUBAREA}$

FG=1623
$Q_{10\text{-SUBAREA}}$=9.59 CFS
$Q_{100\text{-SUBAREA}}$=14.86 CFS
10.1 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=20.29 CFS
$Q_{100\text{-TOTAL}}$=31.36 CFS
20.4 AC_{TOTAL}

FG=1553
$Q_{10\text{-SUBAREA}}$=3.82 CFS
$Q_{100\text{-SUBAREA}}$=6.07 CFS
5.0 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=6.86 CFS
$Q_{100\text{-TOTAL}}$=10.82 CFS
8.8 AC_{TOTAL}

FG=1575
$Q_{10\text{-SUBAREA}}$=5.78 CFS
$Q_{100\text{-SUBAREA}}$=8.87 CFS
5.1 $AC_{SUBAREA}$

FUTURE INDUSTRIAL WAREHOUSE FACILITY

FG=1556
$Q_{10\text{-SUBAREA}}$=3.03 CFS
$Q_{100\text{-SUBAREA}}$=4.75 CFS
3.8 $AC_{SUBAREA}$

FG=1596
$Q_{10\text{-SUBAREA}}$=6.41 CFS
$Q_{100\text{-SUBAREA}}$=10.1 CFS
7.7 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=24.80 CFS
$Q_{100\text{-TOTAL}}$=38.50 CFS
27.0 AC_{TOTAL}

FG=1635
$Q_{10\text{-SUBAREA}}$=7.69 CFS
$Q_{100\text{-SUBAREA}}$=11.95 CFS
8.5 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=18.39 CFS
$Q_{100\text{-TOTAL}}$=28.49 CFS
19.3 AC_{TOTAL}

FG=1670
$Q_{10\text{-SUBAREA}}$=10.70 CFS
$Q_{100\text{-SUBAREA}}$=16.54 CFS
10.8 $AC_{SUBAREA}$

FG=1733

FG=1715

FG=1595

FUTURE OLEANDER AVE

EXISTING DAY ST

FUTURE DAY ST

FUTURE OLEANDER AVE

LEGEND

- WATERSHED BOUNDARY
- X — WATERSHED NO.
- SUB-AREA BOUNDARY
- EX SD SYSTEM
- XX / X.XX — SUB-AREA NO. / SUB-AREA-ACREAGE
- XX — NODE NO.
- INITIAL AREA FLOW-LINE
- L=270' — LENGTH OF FLOW-LINE OR PIPE
- S=0.8% — SLOPE OF STREET OR PIPE

120 60 0 120 240 360
SCALE: 1"=120'

PREPARED BY:
Michael Baker INTERNATIONAL
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 926707
Phone: (949) 472-3505
MBAKERINTL.COM

REGISTERED PROFESSIONAL ENGINEER JAMES H. BEAUMONT No. 77740 CIVIL STATE OF CALIFORNIA

MEAD VALLEY BUSINESS PARK
PRELIMINARY HYDROLOGY MAP
EXISTING CONDITION
RIVERSIDE COUNTY, CA
JULY 2019

SCALE: 1" = 120'
PROJECT NO. 152480
DATE: 7/8/2019

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PROPOSED NANDINA AVE

EXISTING NANDINA AVE
LATERAL B-9AA

EX 30" RCP SD LATERAL B-9AA
PER DWG NO. 964B: (Q_{100}=42.3 CFS)
PER EX STUDY: (Q_{100}=55.25 CFS)
PROPOSED HERE: Q_{100}=47.15 CFS

EXISTING LATERAL B-9A
36" RCP SD
PER DWG NO. 4-1061
Q_{100}=71.5 CFS

WATERSHED B-9AA CURRENTLY, AS INTENDED PER MASTER DRAINAGE PLAN FOR PERRIS VALLEY AREA JUNE 1991, AND HERE PROPOSED IS ULTIMATELY TRIBUTARY TO STORM DRAIN LATERAL B-9. HERE PROPOSED RUNOFF JOINS STORM DRAIN LATERAL B-9AA CONSTRUCTED PER RIVERSIDE COUNTY FILE NO. 964B CIRCA 2017.

WATERSHED B-9AA YIELD COMPARISON
EX: 34.7 AC, Q_{10}=33.67 CFS, V_{10}=4.03 AC-FT, Q_{100}=53.35 CFS
PR: 21.3 AC, Q_{10}=31.35 CFS, V_{10}=2.63 AC-FT, Q_{100}=45.25 CFS
PLUS N.A.P. LATERAL B-9AA-2; Q_{100}=47.15 CFS

EX BLANDING WAY

SUMMATION OF EXISTING CONDITION 105.7 ACRE HYDROLOGIC BOUNDARY (SEE EX HYDRO MAP):
TOTAL RUNOFF VOLUME 10 YR/24 HR STORM=12.28 AC-FT AND RUNOFF RATES Q_{10}=97.33 CFS, Q_{100}=152.08 CFS

SUMMATION OF PROPOSED CONDITION 106.1 ACRE HYDROLOGIC BOUNDARY:
TOTAL RUNOFF VOLUME 10 YR/24 HR STORM=12.93 AC-FT AND RUNOFF RATES Q_{10}=121.88 CFS, Q_{100}=180.93 CFS

NOTE: UNDERGROUND DETENTION SHALL ENSURE THAT DEVELOPED CONDITION FLOW RATES FOR THE 2, 5, & 10-YEAR STORM EVENTS ARE NOT GREATER THAN THE EXISTING CONDITION 2, 5, & 10-YEAR STORM EVENTS SO THE ACTUAL PEAK FLOW RATES THAT WILL BE RELEASED AT LATERAL B-8 FROM THE SITE ARE EQUAL TO THE EXISTING FLOW RATES.

RUNOFF FROM AREA AND WEST OF HERE FLOWS NORTHERLY TOWARDS THE PROPOSED NANDINA AVE EXTENSION. FOUR NANDINA AVE CULVERTS CONVEY RUNOFF TO THE NORTH TO MAINTAIN EXISTING RUNOFF PATTERNS. ANALYSIS OF THIS OFF-SITE AREA IS BEYOND THE HYDROLOGIC BOUNDARY OF STUDY FOR THIS PROJECT.

B-9AA
21.3 AC

EXISTING DECKER RD

EXISTING INDUSTRIAL WAREHOUSE FACILITY

RUNOFF FROM WATERSHED B-8 AS INTENDED PER MASTER DRAINAGE PLAN FOR PERRIS VALLEY AREA JUNE 1991 IS TRIBUTARY TO STORM DRAIN LATERAL B-8. HERE PROPOSED THE 48" STORM DRAIN LATERAL B-8 CONSTRUCTED PER RIVERSIDE COUNTY FLOOD CONTROL DISTRICT DRAWING NO. 4-1060 IS EXTENDED INTO THE DEVELOPED SITE TO PICK UP RUNOFF.
84.8 ACRE WATERSHED B-8 YIELD:
EX Q_{10}=63.66 CFS, Q_{100}=98.73 CFS, V_{10}=8.25 AC-FT
PR Q_{10}=90.53 CFS, Q_{100}=135.68 CFS, V_{10}=10.30 AC-FT
2.05 AC-FT = 90,000 CF OF UNDER-GROUND STORAGE

LATERAL B-8 PER DWG NO. 4-1060:
Q_{100}=182.0 CFS
PROPOSED HERE:
Q_{100}=140.90 CFS

EX 48" SD
LATERAL B-8

PROPOSED HARLEY KNOX BLVD

EXISTING HARLEY KNOX BLVD

LATERAL B-8

EX 48" SD
LATERAL B-8

FROM B-8A ONLY
SEE EX HYDROLOGY
$Q_{10-TOTAL}$=27.19 CFS
$Q_{100-TOTAL}$=42.17 CFS
31.9 AC_{TOTAL}

CURRENTLY THE SITE EAST OF DECKER RD TRIBUTARY TO LATERAL B-8A CONSTRUCTED PER RIVERSIDE COUNTY FLOOD CONTROL DISTRICT DRAWING NO. 4-1060 IS UNDEVELOPED. PER OUR EXISTING HYDROLOGY ANALYSIS THE 31.9 ACRE WATERSHED B-8A YIELD:
EX Q_{10}=27.19 CFS, Q_{100}=42.17 CFS

EX 48" SD
LATERAL B-8A

NOTE:
TO PREPARE A HYDROLOGY REPORT AND COMPARE THE EXISTING CONDITION TO THE PROPOSED CONDITION RUNOFF FROM WEST OF DECKER RD TRIBUTARY TO THE SITE (WATERSHED B-8) IS SEPARATED FROM RUNOFF EAST OF DECKER RD THAT IS NOT TRIBUTARY TO THE SITE (WATERSHED B-8A).

B-8
84.8 AC

B-8A
31.9 AC

FUTURE INDUSTRIAL WAREHOUSE FACILITY

EXISTING INDUSTRIAL WAREHOUSE FACILITY

PROPOSED DECKER RD

EXISTING DAY ST

FUTURE DAY ST

FUTURE OLEANDER AVE

FUTURE OLEANDER AVE

MAXIMUM RUNOFF FLOW RATE WITHIN ANY BROW-DITCH IS HERE=Q100=3.90 CFS (BASED ON 2.2 AC TRIBUTARY AND $Q_{100-FLOWRATE}$=1.22 CFS/AC)

LEGEND

- WATERSHED BOUNDARY
- LAT # X.X AC — TRIBUTARY LATERAL NO. AND TOTAL ACREAGE
- SUB-AREA BOUNDARY
- EXISTING STORM DRAIN SYSTEM
- PROPOSED STORM DRAIN SYSTEM
- XX / X.XX — SUB-AREA NO. / SUB-AREA-ACREAGE
- XX — NODE NO.
- INITIAL AREA FLOW-LINE
- L=270' — LENGTH OF FLOW-LINE OR PIPE
- S=0.8% — SLOPE OF STREET OR PIPE
- XX,000 CF STORAGE — UNDERGROUND STORAGE TO MITIGATE FOR INCREASED FLOW RATES OR VOLUME OF RUNOFF

120 60 0 120 240 360
SCALE: 1"=120'

PREPARED BY:
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REGISTERED PROFESSIONAL ENGINEER JARROD M. BERGARD No. 77740 CIVIL STATE OF CALIFORNIA

MEAD VALLEY BUSINESS PARK PRELIMINARY HYDROLOGY MAP PROPOSED CONDITION RIVERSIDE COUNTY, CA JULY 2019

SCALE: 1" = 120'
PROJECT NO. 152480
DATE: 7/8/2019

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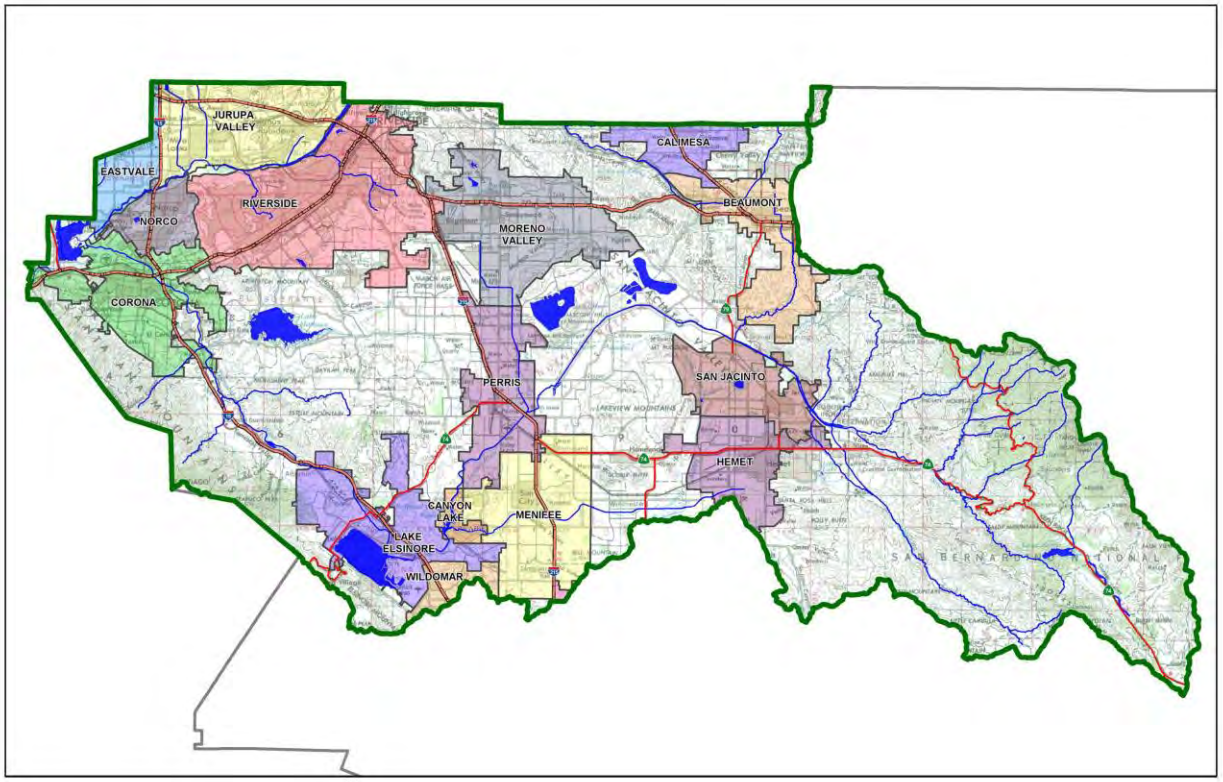
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Oleander Business Park (Mead Valley)

Development No: TBD

Design Review/Case No: TBD



☒ **Preliminary**

☐ **Final**

Original Date Prepared: March 25, 2019

Revision Date(s):

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

Contact Information:

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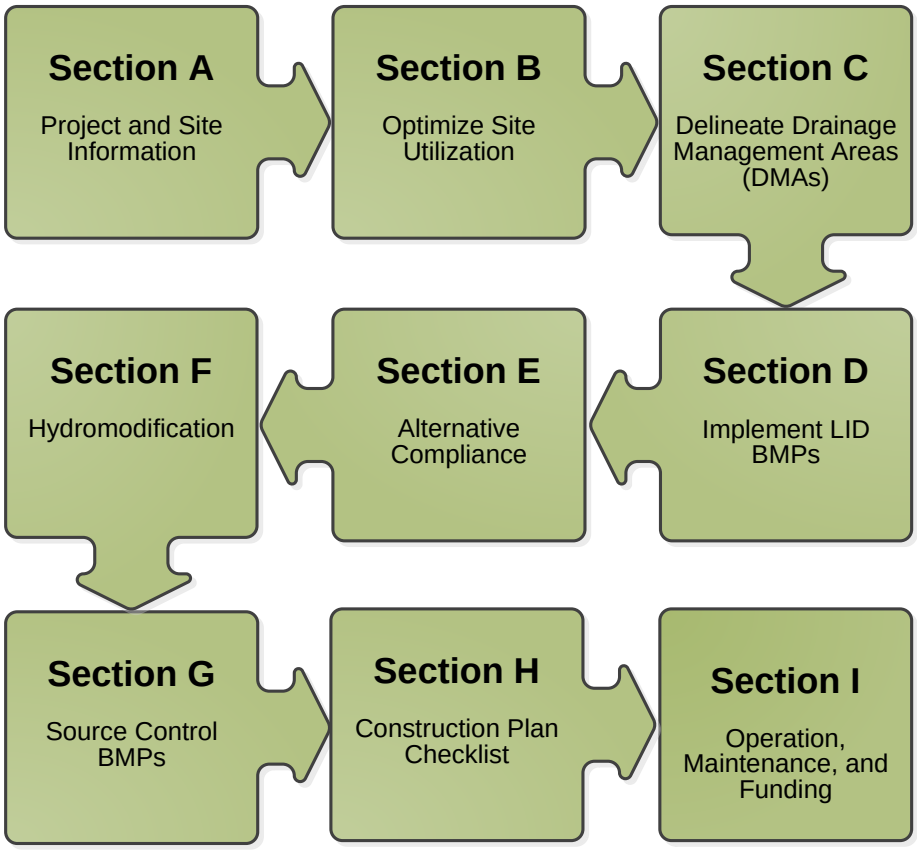
Santa Ana, CA 92707

A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand and will help facilitate a well-prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for SRG Perris, L.P. by Michael Baker International for the Oleander Business Park (Mead Valley) project.

This WQMP is intended to comply with the requirements of The County of Riverside for Water Quality Ordinance (Municipal Code Section 754.1) which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under The County of Riverside Water Quality Ordinance (Municipal Code Section754.1).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Jacqueline Hernandez	
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

Table of Contents

List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Commercial
Planning Area:	
Community Name:	Oleander Business Park (Mead Valley)
Development Name:	Oleander Business Park (Mead Valley)

PROJECT LOCATION
Latitude & Longitude (DMS): 33.862616, -117.271956
Project Watershed and Sub-Watershed: Santa Ana Watershed; San Jacinto Sub-Watershed
Gross Acres: 39.18
APN(s): 295-310-012, 295-310-013, 295-310-014, 295-310-015
Map Book and Page No.: Thomas Bros. Map Page 747

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Commercial
Proposed or Potential SIC Code(s)	To Be Determined
Area of Impervious Project Footprint (SF)	1,738,063
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	1,241,609.34
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N

EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☐ Y ☒ N
If no Geotechnical Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	B, C & D
What is the Water Quality Design Storm Depth for the project?	0.59

The proposed project site is located in unincorporated Riverside County, west of Decker Road between Nandina Avenue and Oleander Avenue. The project proposes to develop two commercial buildings, a parking lot and loading docks on existing barren land. In existing condition, surface runoff flows from west to east. In the proposed condition, surface runoff will flow in the same direction and will enter the storm drain via catch basin inlet and be treated by the proposed BMPs discussed in Section D.5. Off-site runoff will flow onto the site via a terrace drain.

Oleander Avenue, Decker Road and Nandina Avenue are public transportation roadways that are along the perimeter of the project site. These roadways will be built for public use which will be owned and maintained by the County of Riverside. Since these roadways are public roadways, they are considered public transportation projects and are subject to Riverside County's Transportation Project Guidance, and the Transportation Project Template. Transportation project documentation will be prepared and provided with the final WQMP. Drainage Swales that capture runoff from the other half of the public roadway

will be designed for the adjacent future developments. It will be the responsibility of the adjacent future developments to propose water quality BMPs.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Perris Valley MDP Lateral B-9	None*	Perris North (MUN, AGR, IND, PROC) Perris South (MUN, AGR)	No RARE uses identified in receiving waters
Perris Valley MDP Lateral B-8	None*	Perris North (MUN, AGR, IND, PROC) Perris South (MUN, AGR)	No RARE uses identified in receiving waters
Perris Valley Channel Lateral B	None*	Perris North (MUN, AGR, IND, PROC) Perris South (MUN, AGR)	No RARE uses identified in receiving waters
Perris Valley Channel	None*	Perris South (MUN, AGR)	No RARE uses identified in receiving waters
San Jacinto River Reach 3	None	MUN, AGR, IND, PROC	No RARE uses identified in receiving waters
San Jacinto River Reach 2	None	GWR, AGR, WILD, WARM, REC2, REC1, MUN	No RARE uses identified in receiving waters
Canyon Lake	Nutrients	WILD, REC2, WARM, GWR, REC1, AGR	No RARE uses identified in receiving waters
San Jacinto River Reach 1	None	AGR, GWR	No RARE uses identified in receiving waters
Lake Elsinore	DDT, Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs (Polychlorinated biphenyls), Toxicity	MUN, REC1, REC2, WARM, WILD	No RARE uses identified in receiving waters

*Requirement for permit is unknown at this time. Determination shall be made and addressed in the Final WQMP.

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*		
County of Riverside Grading Permit	☒ Y	☐ N
County of Riverside Building Permit	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, constraints might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. Opportunities might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e., no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Yes, the direction of surface runoff will flow from West to East. This drainage pattern will remain the same in the proposed condition. The proposed storm drain system will run from West to East to the proposed underground storage systems to store the design capture volume (DCV) and then treated by the Modular Wetlands Systems (MWS). Offsite surface runoff on the western portion of the project will be collected in the terrace drain and drain onto the project and into the proposed storm drain system. After water quality treatment in the MWS, surface runoff from the project site will leave the site in the easterly direction via Perris Valley MDP Lateral B-8 and B-9.

Did you identify and protect existing vegetation? If so, how? If not, why?

In existing condition, the proposed project site is barren and has minimal effects on local plant life. There are no native trees on-site that need to be relocated. Vegetation proposed on-site will be determined by the Landscape Architect and discussed in the Final WQMP.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

The site has poor infiltration capacity. The soils on-site mainly consist of Hydrologic Soil Types C and D.

Did you identify and minimize impervious area? If so, how? If not, why?

Due to the nature of the project, the majority of new construction will be impervious area. Landscaped parking medians/islands are proposed throughout the project site. Large landscaped areas will be proposed along the perimeter of the project site.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Roof runoff will sheet flow towards landscaped areas surrounding the building. The landscaped areas around the building will be depressed to provide maximum detention before draining onto the parking lot. Runoff will sheet flow throughout the parking lot towards the catch basins and discharge into the proposed storm drain system, eventually being stored in the underground storage systems and treated by the proposed MWS as shown in the BMP Exhibit.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
DMA A-1	Roof, Concrete/Asphalt Landscaping	244,078 26,119 **270,197**	Type D
DMA A-2	Concrete/Asphalt Landscaping	286 7,360 **7,646**	Type A
DMA A-3	Concrete/Asphalt Landscaping	0 44,364 **44,364**	Type A
DMA B-1	Roof, Concrete/Asphalt Landscaping	380,063 86,961 **467,024**	Type D
DMA B-2	Concrete/Asphalt Landscaping	397 75,196 **75,593**	Type A
DMA C-1	Roof, Concrete/Asphalt Landscaping	123,925 62,595 **186,520**	Type D
DMA C-2	Concrete/Asphalt Landscaping	0 8,297 **8,297**	Type A
DMA D-1	Roof, Concrete/Asphalt Landscaping	466,031 82,879 **548,910**	Type D
DMA D-2	Concrete/Asphalt Landscaping	305 97,647 **97,952**	Type A

[1] *Reference Table 2-1 in the WQMP Guidance Document to populate this column*
[2] *If multi-surface provide back-up*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
DMA A-2	7,360.34	Vegetation	To be determined in Final WQMP
DMA A-3	44,363.95	Vegetation	To be determined in Final WQMP
DMA B-2	75,196.59	Vegetation	To be determined in Final WQMP
DMA C-2	8,297.29	Vegetation	To be determined in Final WQMP
DMA D-2	97,647.33	Vegetation	To be determined in Final WQMP

Self-treating areas that have not been fully captured in the soils will runoff into the drainage swales at the toe of slope and discharge into the storm drain system via catch basin inlets.

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name/ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A						

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ID	Area (square feet) [A]	Post-project surface type	Impervious fraction [B]	Product [C] = [A] x [B]	DMA name/ID	Area (square feet) [D]	Ratio [C]/[D]
N/A							

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA A-1	BMP A-1 MWS-L-4-15
DMA B-1	BMP B-1 MWS-L-4-21
DMA C-1	BMP C-1 MWS-L-4-8
DMA D-1	BMP D-1 MWS-L-8-12

Note: More than one drainage management area can drain to a single LID BMP; however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		x
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		x
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		x
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?		x
If Yes, list affected DMAs:		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		x
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		x
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

Based on preliminary information available, the Geotech has indicated that the site contains shallow bedrock encountered between 5-6 feet from existing grades. Additionally, information from the USDA Web oil Survey indicates the depths to the water table are approximately greater than 6.5 feet and the shallowest depth to any soil restrictive layer is approximately 1.2 feet. It is assumed that infiltration is deemed infeasible within the project area. A geotechnical report will be provided along with the Final WQMP submittal.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☒ Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐ The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: Insert Area (Acres)

Type of Landscaping (Conservation Design or Active Turf): List Landscaping Type

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: EIATIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: Insert Area (Acres)

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
Insert Area (Acres)	Insert Area (Acres)

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: Number of daily Toilet Users

Project Type: Enter 'Residential', 'Commercial', 'Industrial' or 'Schools'

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: TUTIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: Required number of toilet users

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
Insert Area (Acres)	Insert Area (Acres)

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g., industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

Insert text here describing how each included Site Design BMP will be implemented.

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: Enter Value

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
BMP A-1	☐	☐	☐	☒	☐
BMP B-1	☐	☐	☐	☒	☐
BMP C-1	☐	☐	☐	☒	☐
BMP D-1	☐	☐	☐	☒	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

All DMAs either drain to a LID BMP (MWS downstream of underground storage systems) or is self-treating.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First, calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second, design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here* **BMP A-1**		
	[A]		[B]	[C]	[A] x [C]			
Impervious (Roof, Parking Lot & Walkway)	*244,078.53*	*Roofs, Concrete, Asphalt*	*1.0*	*0.89*	*217,718*	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Pervious (Landscaping)	*26,118.72*	*Ornamental Landscaping*	*0.1*	*0.11*	*2,885*			
	$A_T = \Sigma[A]$ 270,197.25				Σ= [D] 220,603	[E] 0.59	$[F] = \frac{[D]x[E]}{12}$ 10,846.3	[G] ***11,433***

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here* **BMP B-1**		
	[A]		[B]	[C]	[A] x [C]			
Impervious (Roof, Parking Lot & Walkway)	*380,063.28*	*Roofs, Concrete, Asphalt*	*1.0*	*0.89*	*339,016.4*	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Pervious (Landscaping)	*86,961.35*	*Ornamental Landscaping*	*0.1*	*0.11*	*9,605.6*			
	$A_T = \Sigma[A]$ 467,024.63				Σ= [D] 348,622	[E] 0.59	$[F] = \frac{[D]x[E]}{12}$ 17,140.6	[G] ***17,559***

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here* **BMP C-1**		
	[A]		[B]	[C]	[A] x [C]			
Impervious (Roof, Parking Lot & Walkway)	*123,925.28*	*Roofs, Concrete, Asphalt*	*1.0*	*0.89*	*110,541.3*	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Pervious (Landscaping)	*62,594.75*	*Ornamental Landscaping*	*0.1*	*0.11*	*6,774.1*			
	$A_T = \Sigma[A]$ 186,520.03				Σ= [D] 117,455.4	[E] 0.59	$[F] = \frac{[D]x[E]}{12}$ 5,774.9	[G] ***7554***

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here* **BMP D-1**		
	[A]		[B]	[C]	[A] x [C]			
Impervious (Roof, Parking Lot & Walkway)	*466,030.75*	*Roofs, Concrete, Asphalt*	*1.0*	*0.89*	*415,699.4*	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Pervious (Landscaping)	*82,879.48*	*Ornamental Landscaping*	*0.1*	*0.11*	*9,154.7*			
	$A_T = \Sigma[A]$ 548,910.23				Σ= [D] 424,854.1	[E] 0.59	$[F] = \frac{[D]x[E]}{12}$ 20,888.7	[G] ***22,662***

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

– Or –

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

N/A

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P[(2)]
☒ Commercial/Industrial Development	P[(3)]	P	P[(1)]	P[(1)]	P[(5)]	P[(1)]	P	P
☐ Automotive Repair Shops	N	P	N	N	P[(4, 5)]	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P[(6)]	P	P[(1)]	P[(1)]	P[(4)]	P[(1)]	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☒	☒	☒	☒	☒	☒	☒

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically, petroleum hydrocarbons

(5) Specifically, solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]				
N/A						*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
BMP A-1 MWS	Sediment, Nutrients, Trash, Metals, Bacteria, Oil & Grease, Organic Compounds, Pesticides	Greater than or equal to 80%
BMP B-1 MWS	Sediment, Nutrients, Trash, Metals, Bacteria, Oil & Grease, Organic Compounds, Pesticides	Greater than or equal to 80%
BMP C-1 MWS	Sediment, Nutrients, Trash, Metals, Bacteria, Oil & Grease, Organic Compounds, Pesticides	Greater than or equal to 80%
BMP D-1 MWS	Sediment, Nutrients, Trash, Metals, Bacteria, Oil & Grease, Organic Compounds, Pesticides	Greater than or equal to 80%

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	N/A	N/A	N/A
Volume (Cubic Feet)	N/A	N/A	N/A

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

All downstream receiving waters from the project are engineered and regularly maintained and drains to Canyon Lake and Lake Elsinore.

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	• Maintain and periodically repaint or replace inlet markings. • Provide stormwater pollution prevention information to new site, owners, lessees, or operators. • See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com • Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
		materials so as to create a potential discharge to storm drains."
Need for indoor & structural pest control	Doors will always remain closed.	Provide Integrated Pest Management (IPM) information to owners, lessees, and operators.
Landscape/Outdoor Pesticide Use	State that all final landscape plans will accomplish all of the following: • Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. • Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. • Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. • Consider using pest-resistant plants, especially adjacent to hardscape. • To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	• Maintain landscaping using minimum or no pesticides. • See applicable operational BMPs in "What you should know for…Landscaping and Gardening" at http://rcflood.org/stormwater/ • Provide IPM information to new owners, lessees and operators.
Refuse Areas	• Refuse will be handled with Refuse Areas that will have covered receptacles. These are located on the west side of the project adjacent to truck parking.	There will be adequate number of receptacles for the project site. Receptacles will be inspected regularly. Repair or replacement of leaky receptacles as needed. Receptacles will be covered at all times. Dumping of liquid or hazardous wastes is strictly prohibited. "No hazardous materials" signs will be posted at refuse areas. Litter will be inspected and picked up daily. Spill control materials will be available on-site. See Fact

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
	• Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar	Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Industrial processes	All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.	• See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com • See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/
Loading Docks		• Move loaded and unloaded items indoors as soon as possible. • See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Plazas, sidewalks, and parking lots		Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BMP A-1	MWS downstream of underground storage system	Plot Plan, Precise Grading Plan, Improvement Plan	33.859364, -117.270429
BMP B-1	MWS downstream of underground storage system	Plot Plan, Precise Grading Plan, Improvement Plan	33.862192, -117.27043
BMP C-1	MWS downstream of underground storage system	Plot Plan, Precise Grading Plan, Improvement Plan	33.862611, -117.270873
BMP D-1	MWS downstream of underground storage system	Plot Plan, Precise Grading Plan, Improvement Plan	33.865623, -117.270481

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: All funding will be provided by SRG. If at any time SRG sells the property, then the operation and maintenance responsibilities will be recorded against the property and will be the responsibility of the new property owner.

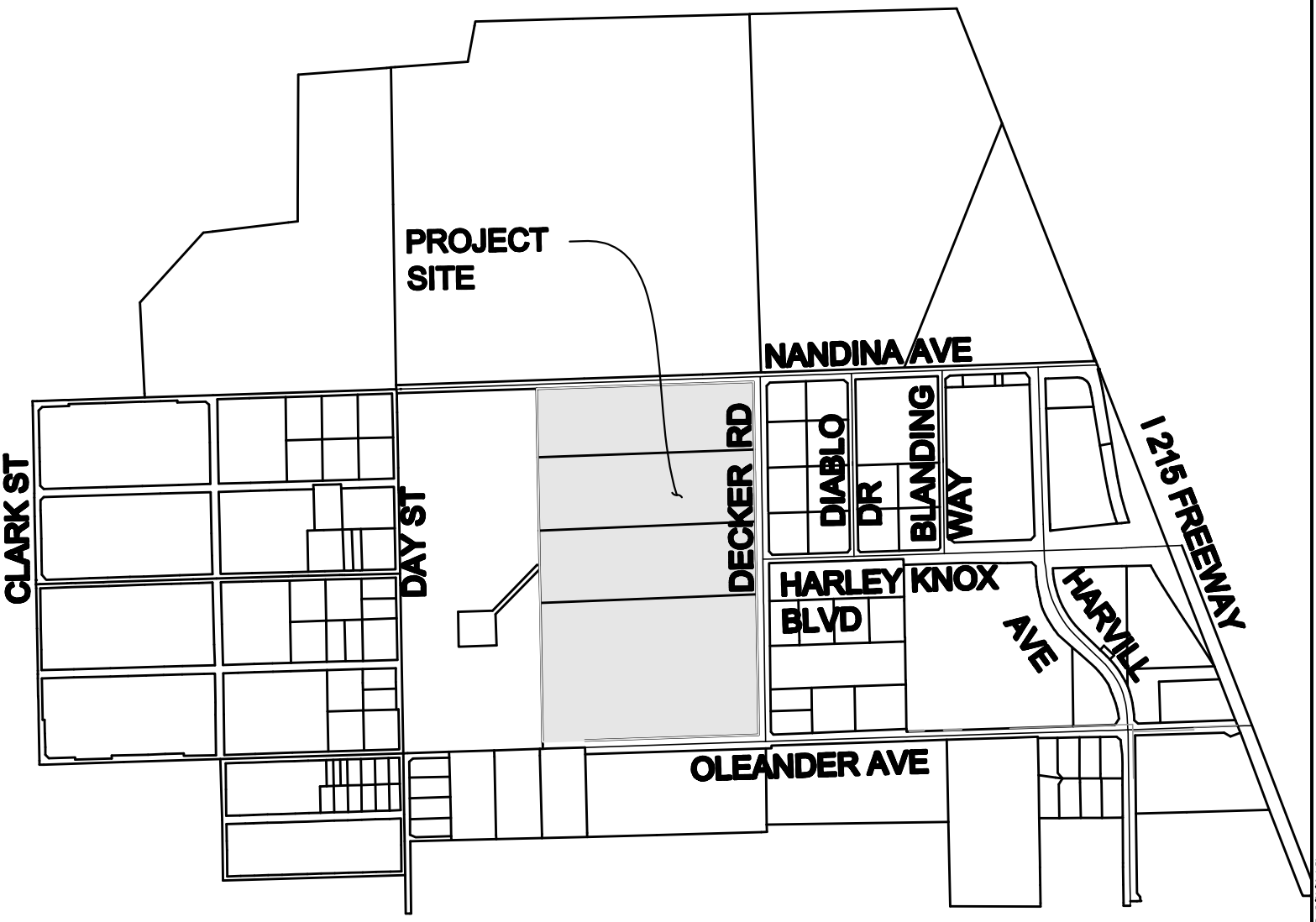
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

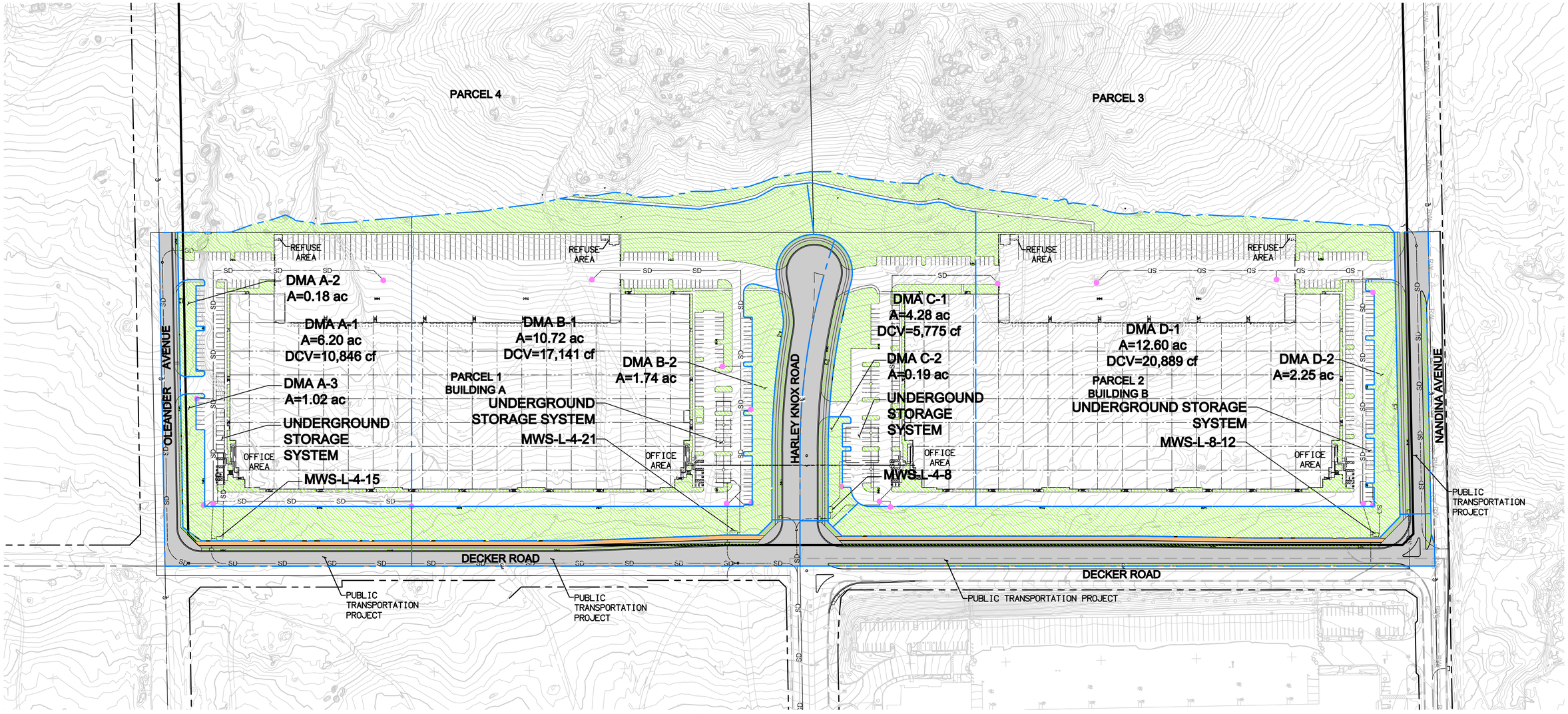
Vicinity Map, WQMP Site Plan and Receiving Waters Map



N.T.S.

Michael Baker
INTERNATIONAL
5 Hutton Centre Drive, Suite 500, Santa Ana, CA 92707
Phone: (949) 472-3505 · MBAKERINTL.COM

VICINITY MAP
OLEANDER BUSINESS PARK (MEAD VALLEY)
WEST OF DECKER RD BETWEEN NANDINA AVE & OLEANDER AVE
UNINCORPORATED RIVERSIDE COUNTY, CALIFORNIA
APN



DMA	PERVIOUS AREA (AC)	IMPERVIOUS AREA (AC)	BMP	BMP LATITUDE/LONGITUDE
A-1	0.60	5.60	BMP A-1	33.859364, -117.270429
A-2	0.17	0.01	SELF-TREATING	-
A-3	1.02	0.00	SELF-TREATING	-
B-1	2.00	8.73	BMP B-1	33.862192, -117.270430
B-2	1.73	0.01	SELF-TREATING	-
C-1	1.44	2.84	BMP C-1	33.862611, -117.2708734
C-2	0.19	0.00	SELF-TREATING	-
D-1	1.90	10.70	BMP D-1	33.865623, -117.2704810
D-2	2.24	0.01	SELF-TREATING	-
	11.28	27.89	TOTAL	39.18

LEGEND

- DMA BOUNDARY
- SD — STORM DRAIN
- PERVIOUS AREA
- TRAIL - DECOMPOSED GRANITE
- STORM DRAIN INLET STENCILNG

SCALE 1"=80'

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BMP EXHIBIT
OLEANDER BUSINESS PARK (MEAD VALLEY)

WEST OF DECKER RD BETWEEN NANDINA AVE & OLEANDER AVE
UNINCORPORATED RIVERSIDE COUNTY, CALIFORNIA
APN: 295-310-012/295-310-013
295-310-014/295-310-015

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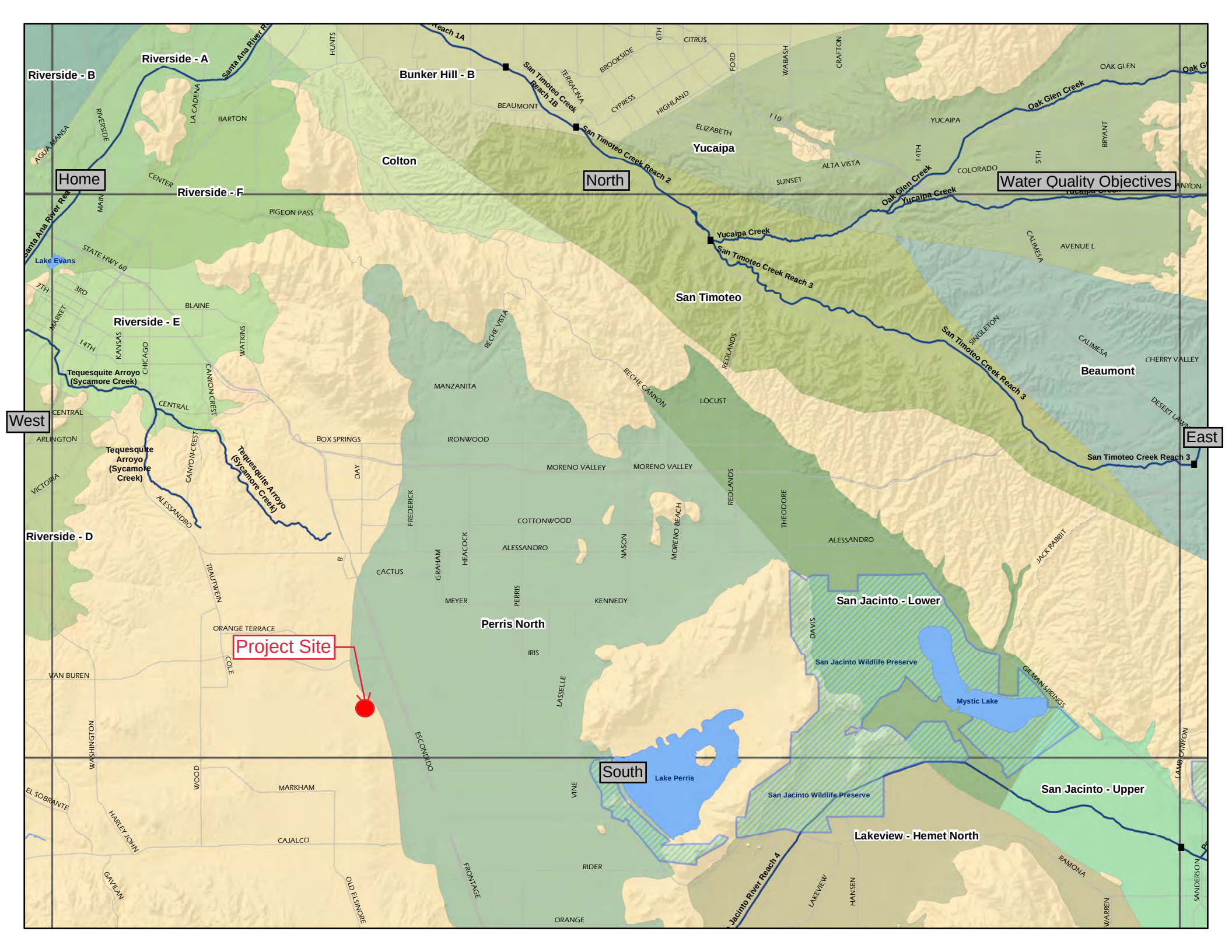
Home
North
Water Quality Objectives
West
East
South
Project Site
Riverside - A
Riverside - B
Riverside - D
Riverside - E
Riverside - F
Bunker Hill - B
Colton
Yucaipa
San Timoteo
Beaumont
Perris North
San Jacinto - Lower
San Jacinto - Upper
Lakeview - Hemet North
Santa Ana River Reach 1A
San Timoteo Creek Reach 1B
San Timoteo Creek Reach 2
San Timoteo Creek Reach 3
San Timoteo Creek Reach 3
San Jacinto River Reach 4
Oak Glen Creek
Oak Glen Creek
Yucaipa Creek
Yucaipa Creek
Tequesquite Arroyo (Sycamore Creek)
Tequesquite Arroyo (Sycamore Creek)
Tequesquite Arroyo (Sycamore Creek)
San Jacinto Wildlife Preserve
San Jacinto Wildlife Preserve
Mystic Lake
Lake Perris
Lake Evans
BARTON
PIGEON PASS
BLAINE
ARLINGTON
CENTRAL
BOX SPRINGS
MANZANITA
IRONWOOD
MORENO VALLEY
MORENO VALLEY
COTTONWOOD
ALESSANDRO
ALESSANDRO
CACTUS
MEYER
KENNEDY
IRIS
ORANGE TERRACE
VAN BUREN
MARKHAM
CAJALCO
RIDER
ORANGE
BEAUMONT
YUCAIPA
ELIZABETH
ALTA VISTA
SUNSET
COLORADO
OAK GLEN
CHERRY VALLEY
LOCUST
AVENUE L
CITRUS
BROOKSIDE
CYPRESS
HIGHLAND
TERRACINA
HUNTS
FORD
WABASH
CRAFTON
BRYANT
5TH
14TH
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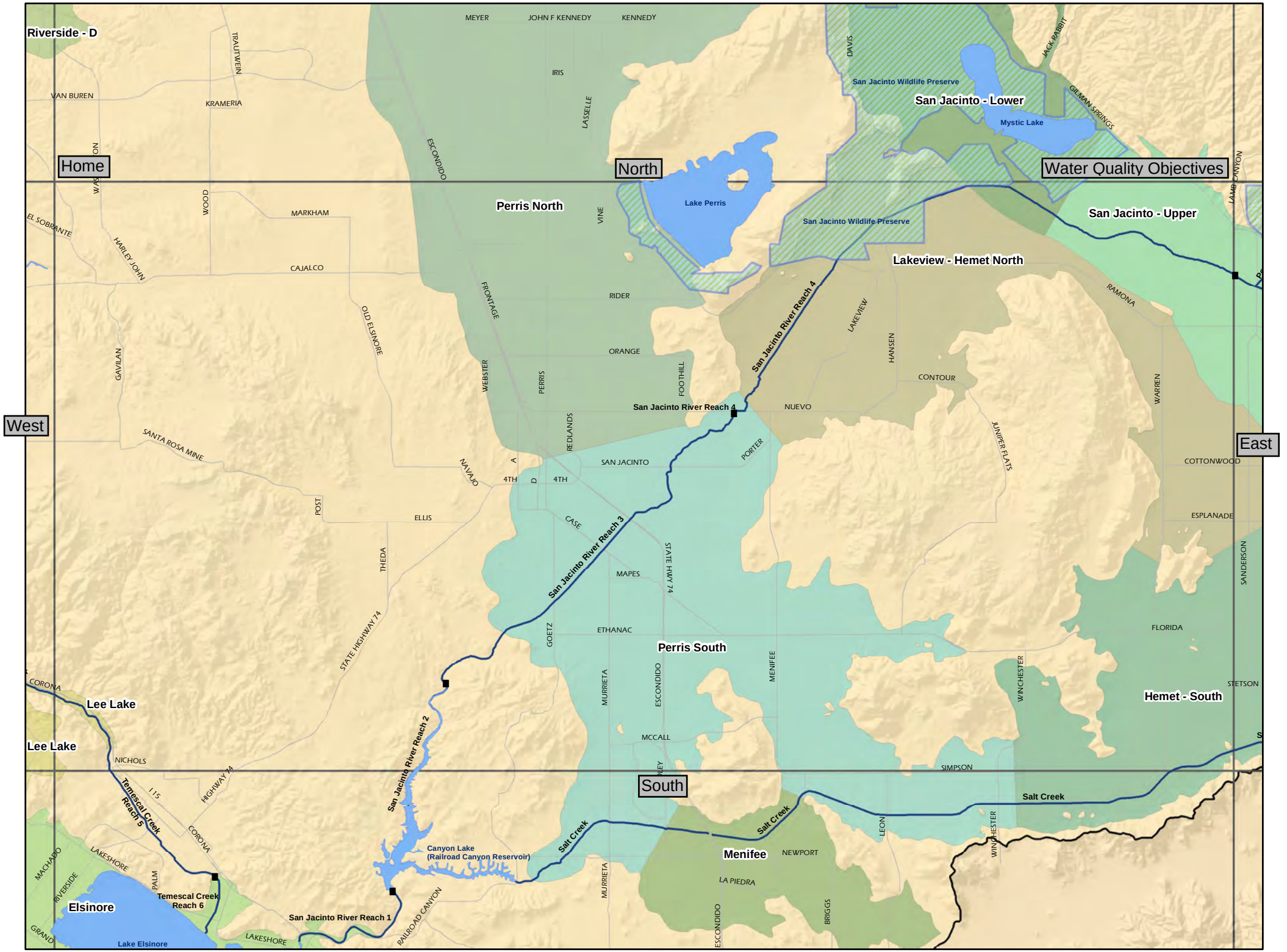
SR 60
STATE HWY 60
CENTER
MAIN
RIVERSIDE
LA CADENA
AGUA MANSA
MARKET
7TH
3RD
14TH
KANSAS
CHICAGO
WATKINS
CANYON CREST
CANYON-CREST
VICTORIA
ALESSANDRO
DAY
FREDERICK
GRAHAM
HEACOCK
NASON
MORENO BEACH
REDLANDS
THEODORE
RECHE VISTA
RECHE CANYON
REDLANDS
SINGLETON
CALIMESA
CALIMESA
DESERT LAWN
JACK RABBIT
TRAUTWEIN
COLE
WASHINGTON
WOOD
EL SOBRANTE
HARLEY JOHN
GAVILAN
OLD ELSINORE
ESCONDIDO
VINE
LASSELLE
FRONTAGE
DAVIS
GILMAN SPRINGS
LAMB CANYON
LAKEVIEW
HANSEN
RAMONA
WARREN
SANDERSON


Riverside - D
Home
North
Water Quality Objectives
West
East
South
Perris North
Perris South
Lakeview - Hemet North
San Jacinto - Upper
San Jacinto - Lower
Hemet - South
Menifee
Elsinore
Lee Lake
Lee Lake
Lake Perris
Mystic Lake
San Jacinto Wildlife Preserve
San Jacinto Wildlife Preserve
Canyon Lake
(Railroad Canyon Reservoir)
Lake Elsinore
San Jacinto River Reach 4
San Jacinto River Reach 4
San Jacinto River Reach 3
San Jacinto River Reach 2
San Jacinto River Reach 1
Temescal Creek
Reach 5
Temescal Creek
Reach 6
Salt Creek
Salt Creek
Salt Creek
MEYER
JOHN F KENNEDY
KENNEDY
IRIS
LASSELLE
DAVIS
JACK RABBIT
GILMAN SPRINGS
VAN BUREN
KRAMERIA
TRAUTWEIN
WASHINGTON
ESCONDIDO
WOOD
MARKHAM
CAJALCO
EL SOBRANTE
HARLEY JOHN
GAVILAN
OLD ELSINORE
SANTA ROSA MINE
POST
THEDA
ELLIS
NAVAJO
4TH
4TH
SAN JACINTO
REDLANDS
FRONTAGE
WEBSTER
PERRIS
VINE
RIDER
ORANGE
FOOTHILL
LAKEVIEW
HANSEN
CONTOUR
NUEVO
RAMONA
WARREN
JUNIPER FLATS
PORTER
COTTONWOOD
ESPLANADE
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MAPES
STATE HWY 74
GOETZ
ETHANAC
MURRIETA
ESCONDIDO
MENIFEE
WINCHESTER
FLORIDA
STETSON
MCCALL
SIMPSON
LEON
NEWPORT
LA PIEDRA
BRIGGS
CORONA
NICHOLS
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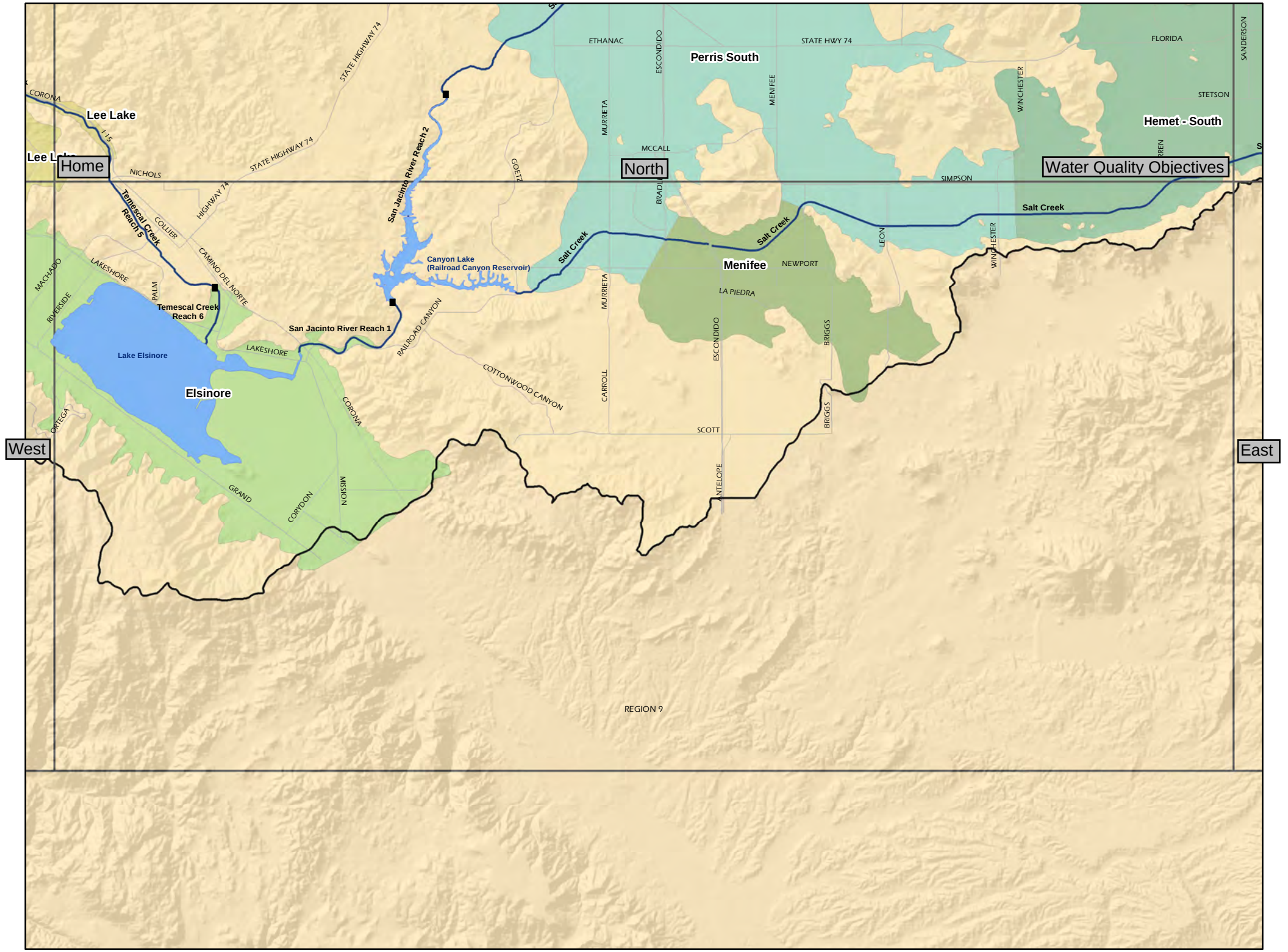
Home
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Water Quality Objectives
West
East
Lee Lake
Temescal Creek Reach 5
Temescal Creek Reach 6
San Jacinto River Reach 2
San Jacinto River Reach 1
Canyon Lake (Railroad Canyon Reservoir)
Salt Creek
Lake Elsinore
Elsinore
Perris South
Menifee
Hemet - South
REGION 9
CORONA
NICHOLS
COLLIER
HIGHWAY 74
STATE HIGHWAY 74
STATE HWY 74
ETHANAC
MCCALL
SIMPSON
FLORIDA
STETSON
SANDERSON
WINCHESTER
MENIFEE
ESCONDIDO
MURRIETA
LEON
NEWPORT
LA PIEDRA
BRIGGS
SCOTT
ANTELOPE
CARROLL
RAILROAD CANYON
COTTONWOOD CANYON
CAMINO DEL NORTE
LAKESHORE
PALM
MACHADO
RIVERSIDE
ORTEGA
GRAND
CORYDON
MISSION
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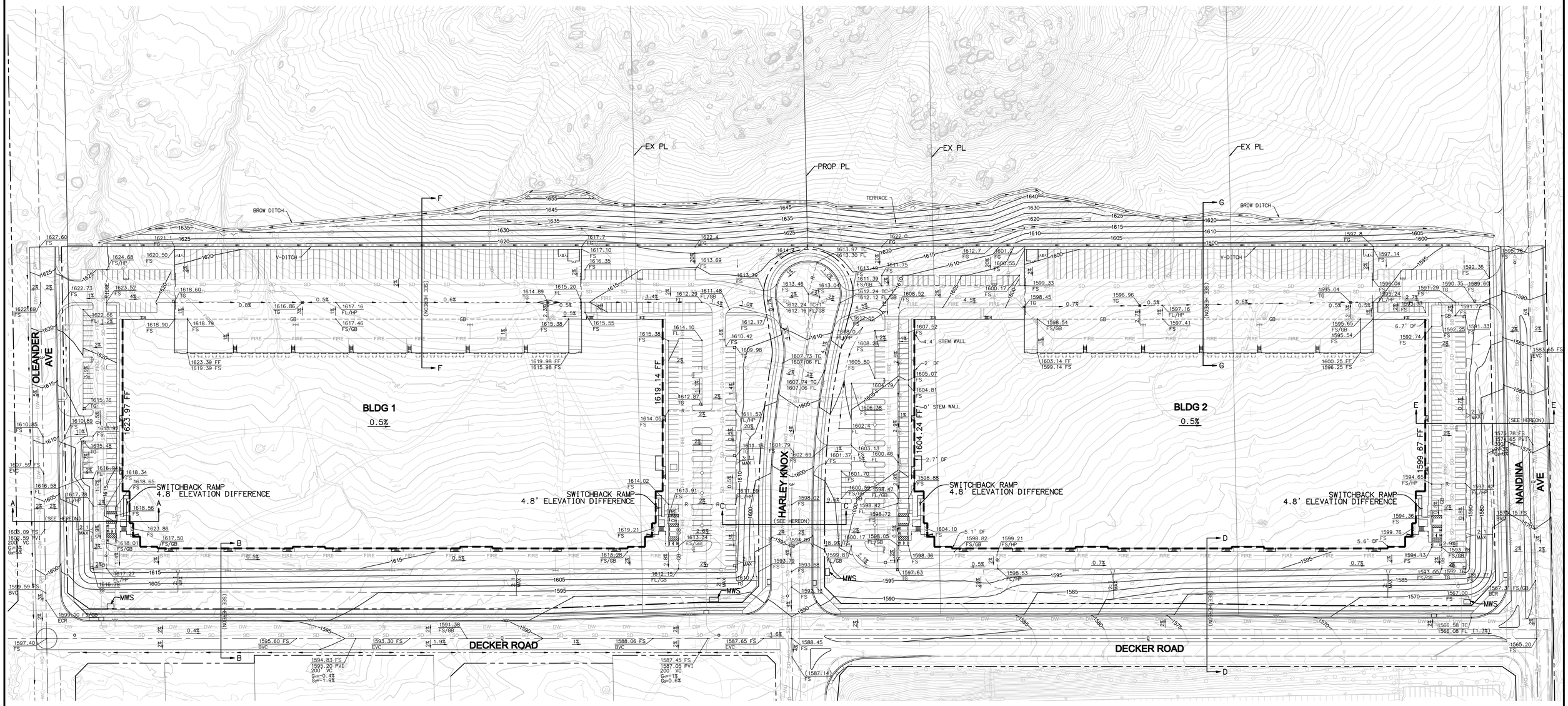
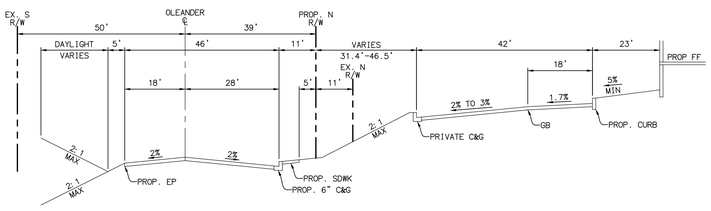
Appendix 2: Construction Plans

Grading and Drainage Plans





SECTION A-A
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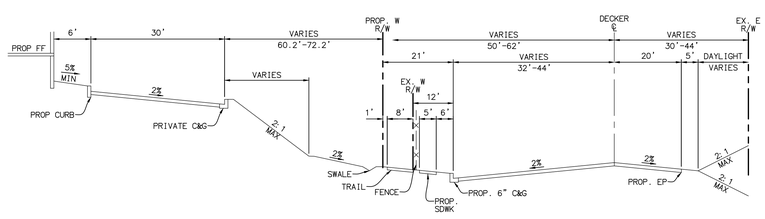
(PER MODIFIED COUNTY STD. 111)



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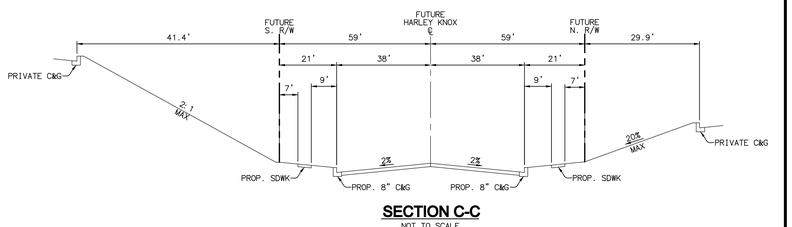

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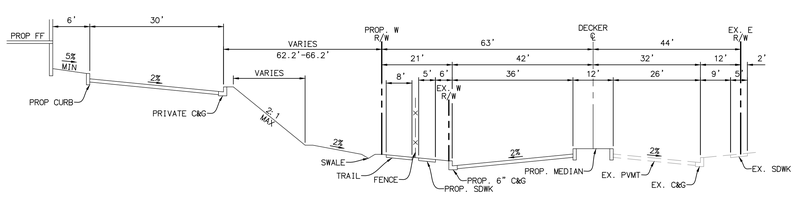

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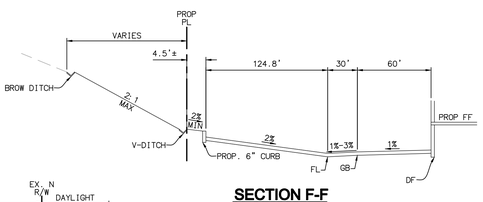

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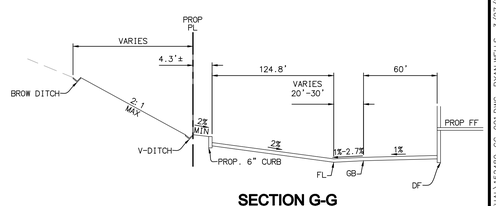

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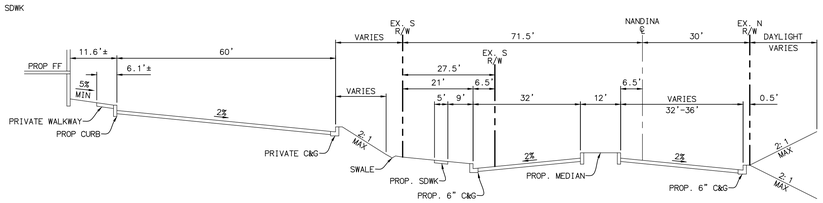

SECTION E-E
NOT TO SCALE
(PER MODIFIED COUNTY STD. 94)

REVISIONS	MADE BY	MADE DATE	APPROVED BY	APPROVED DATE

60 30 0 60 120 180
SCALE: 1"=60'

COUNTY OF RIVERSIDE

MEAD VALLEY BUSINESS PARK
CONCEPTUAL GRADING PLAN

SCALE:	1"=60'
DATE:	03/27/2019
DESIGNED:	RW
CHECKED:	JB
PLN CK REF:	
F.B.	

Michael Baker INTERNATIONAL
5 Hutton Centre Drive Suite 500 Santa Ana, CA 92707 Phone: (949) 472-3505 MBAKERINTL.COM

W.O.
SHEET 1
OF 1 SHEETS
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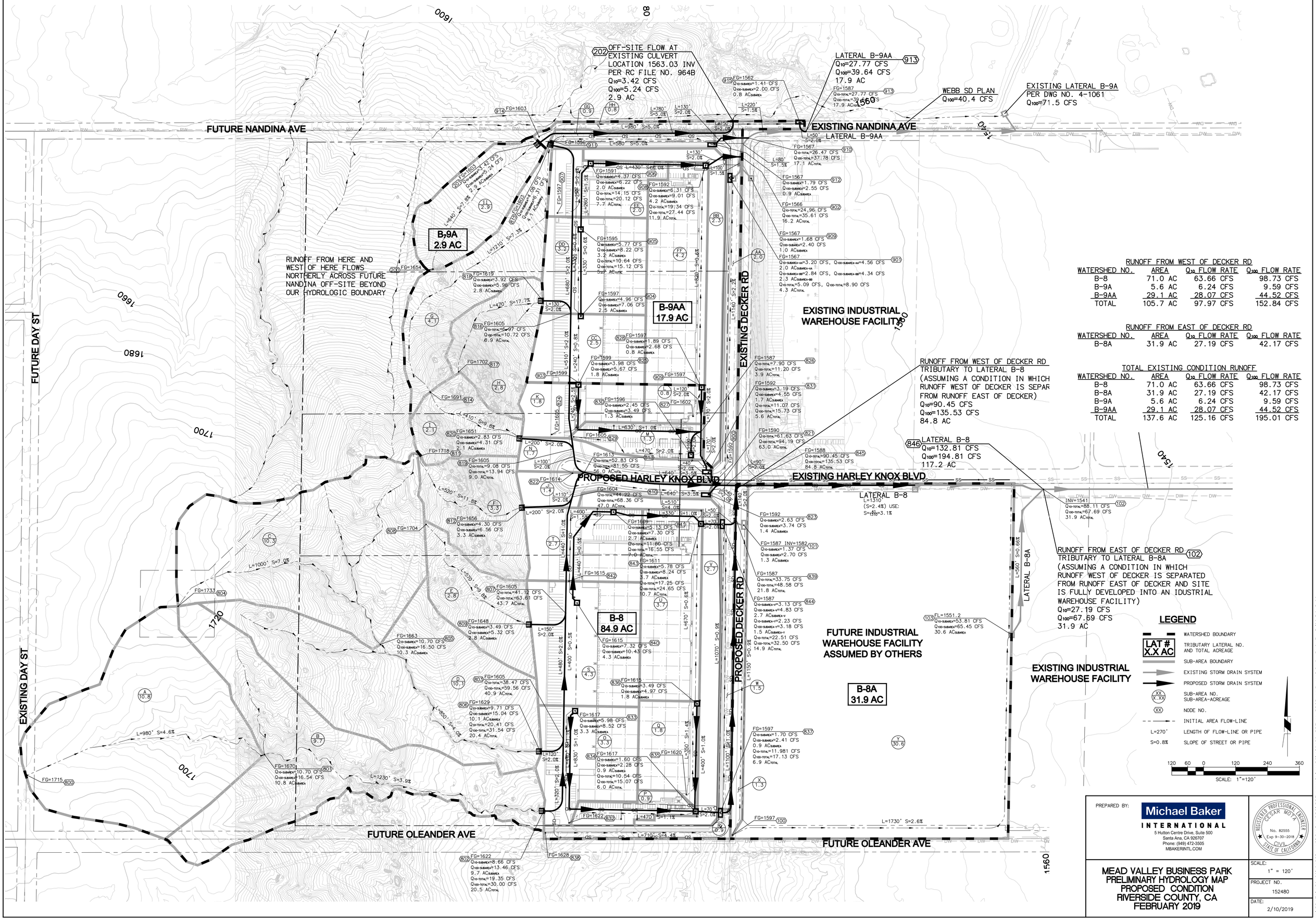


RUNOFF FROM WEST OF DECKER RD

WATERSHED NO.	AREA	Q_{10} FLOW RATE	Q_{100} FLOW RATE
B-8	71.0 AC	63.66 CFS	98.73 CFS
B-9A	5.6 AC	6.24 CFS	9.59 CFS
B-9AA	29.1 AC	28.07 CFS	44.52 CFS
TOTAL	105.7 AC	97.97 CFS	152.84 CFS

RUNOFF FROM EAST OF DECKER RD

WATERSHED NO.	AREA	Q_{10} FLOW RATE	Q_{100} FLOW RATE
B-8A	31.9 AC	27.19 CFS	42.17 CFS

TOTAL EXISTING CONDITION RUNOFF

WATERSHED NO.	AREA	Q_{10} FLOW RATE	Q_{100} FLOW RATE
B-8	71.0 AC	63.66 CFS	98.73 CFS
B-8A	31.9 AC	27.19 CFS	42.17 CFS
B-9A	5.6 AC	6.24 CFS	9.59 CFS
B-9AA	29.1 AC	28.07 CFS	44.52 CFS
TOTAL	137.6 AC	125.16 CFS	195.01 CFS

LEGEND

- WATERSHED BOUNDARY
- LAT # X.X AC — TRIBUTARY LATERAL NO. AND TOTAL ACREAGE
- SUB-AREA BOUNDARY
- EXISTING STORM DRAIN SYSTEM
- PROPOSED STORM DRAIN SYSTEM
- XX X.XX — SUB-AREA NO. SUB-AREA-ACREAGE
- XX — NODE NO.
- L=270' — LENGTH OF FLOW-LINE OR PIPE
- S=0.8% — SLOPE OF STREET OR PIPE

120 60 0 120 240 360
SCALE: 1"=120'

PREPARED BY:
Michael Baker INTERNATIONAL
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 926707
Phone: (949) 472-3505
MBAKERINTL.COM

REGISTERED PROFESSIONAL ENGINEER CESAR MOYA No. 82555 Exp 9-30-2018 CIVIL STATE OF CALIFORNIA

MEAD VALLEY BUSINESS PARK PRELIMINARY HYDROLOGY MAP PROPOSED CONDITION RIVERSIDE COUNTY, CA FEBRUARY 2019

SCALE: 1" = 120'
PROJECT NO. 152480
DATE: 2/10/2019

H:\PDATA\152480\CADD\LAND\DLVHYDRO\PRELIMINARY\MAPS\152480-PRELIM-PROP-HYD-MAP.DWG RHOWE 3/20/19 5:00 pm

HISTORICALLY RUNOFF FROM WATERSHED B-9A FLOWED NORTH OF NANDINA AVE AT THE NOW DECKER RD INTERSECTION. HERE EXISTING UPON CONSTRUCTION OF NANDINA AVE AND DECKER RD CIRCA 2017 IS A CULVERT INSTALLED PER RIVERSIDE COUNTY AS-BUILT FILE NO. 964B DIRECTING RUNOFF NORTH OF NANDINA AVE TO BE PICKED UP EASTERLY IN LATERAL B-9A.
5.6 ACRE WATERSHED B-9A YIELD:
EX Q_{10}=6.24 CFS, Q_{100}=9.59 CFS

EXISTING LATERAL B-9A
PER DWG NO. 4-1061
Q_{100}=71.5 CFS

FUTURE NANDINA AVE

EXISTING NANDINA AVE

LATERAL B-9A

B-9A
5.6 AC

FG=1566
1563.47 INV
$Q_{10\text{-SUBAREA}}$=2.83 CFS
$Q_{100\text{-SUBAREA}}$=4.36 CFS
2.7 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=6.24 CFS
$Q_{100\text{-TOTAL}}$=9.59 CFS
5.6 AC_{TOTAL}
907

FG=1603
$Q_{10\text{-SUBAREA}}$=3.41 CFS
$Q_{100\text{-SUBAREA}}$=5.23 CFS
2.9 $AC_{SUBAREA}$
906

L=44'
S=1.0%

S=1.5%

FL=1566
$Q_{10\text{-SUBAREA-Q}}$=10.12 CFS, $Q_{100\text{-SUBAREA-Q}}$=16.23 CFS
11.0 $AC_{SUBAREA-Q}$
$Q_{10\text{-SUBAREA-S}}$=5.18 CFS, $Q_{100\text{-SUBAREA-S}}$=8.00 CFS
5.2 $AC_{SUBAREA-S}$
$Q_{10\text{-TOTAL}}$=28.07 CFS, $Q_{100\text{-TOTAL}}$=44.52 CFS
29.1 AC_{TOTAL}
903

L=810' S=4.6%
L=890' S=5.8%
L=640' S=7.8%
L=660' S=8.3%
L=200' S=1.5%
L=900' S=3.7%
L=1000' S=8.9%
L=1000' S=10.8%
L=340' S=6.8%
L=1000' S=7.0%
L=980' S=4.6%
L=1000' S=3.5%
L=1070' S=3.6%
L=660' S=20.4%
L=330' S=9.9%
L=740' S=4.1%
L=1000' S=4.0%

HISTORICALLY RUNOFF FROM WATERSHED B-9AA FLOWED EASTERLY AND PER MASTER DRAINAGE PLAN FOR PERRIS VALLEY AREA JUNE 1991 WAS INTENDED TO BE TRIBUTARY TO STORM DRAIN LATERAL B-9. HERE EXISTING UPON CONSTRUCTION OF STORM DRAIN LATERAL B-9AA PER RIVERSIDE COUNTY FILE NO. 964B RUNOFF IS PICKED UP IN A DECKER RD ADJACENT 48" RISER TRIBUTARY TO STORM DRAIN LATERAL B-9AA AND ULTIMATELY LATERAL B-9.
29.1 ACRE WATERSHED B-9AA YIELD:
EX Q_{10}=28.07 CFS, Q_{100}=44.52 CFS

RUNOFF FROM HERE AND WEST OF HERE FLOWS NORTHERLY ACROSS FUTURE NANDINA OFF-SITE BEYOND OUR HYDROLOGIC BOUNDARY

FG=1618
$Q_{10\text{-SUBAREA}}$=3.31 CFS
$Q_{100\text{-SUBAREA}}$=5.09 CFS
3.0 $AC_{SUBAREA}$
904

FG=1653
905

FG=1569
$Q_{10\text{-SUBAREA}}$=4.82 CFS
$Q_{100\text{-SUBAREA}}$=7.73 CFS
5.1 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=9.96 CFS
$Q_{100\text{-TOTAL}}$=15.64 CFS
9.9 AC_{TOTAL}
902

EXISTING DECKER RD

EXISTING INDUSTRIAL WAREHOUSE FACILITY

B-9AA
29.1 AC

HISTORICALLY RUNOFF FROM WATERSHED B-8 FLOWED EASTERLY AND PER MASTER DRAINAGE PLAN FOR PERRIS VALLEY AREA JUNE 1991 WAS INTENDED TO BE TRIBUTARY TO STORM DRAIN LATERAL B-8. HERE EXISTING UPON CONSTRUCTION OF HARLEY KNOX BLVD TO DECKER RD AND EXTENSION OF STORM DRAIN LATERAL B-8 PER RIVERSIDE COUNTY FLOOD CONTROL DISTRICT DRAWING NO. 4-1060 RUNOFF IS PICKED UP AND IS ULTIMATELY TRIBUTARY TO STORM DRAIN LATERAL B-8.
71.0 ACRE WATERSHED B-8 YIELD:
EX Q_{10}=63.66 CFS, Q_{100}=98.73 CFS

NOTE:
TO PREPARE A HYDROLOGY REPORT AND COMPARE THE EXISTING CONDITION TO THE PROPOSED CONDITION RUNOFF FROM WEST OF DECKER RD TRIBUTARY TO THE SITE (WATERSHED B-8) IS SEPARATED FROM RUNOFF EAST OF DECKER RD THAT IS NOT TRIBUTARY TO THE SITE (WATERSHED B-8A).

NOTE:
TOTAL EXISTING CONDITION RUNOFF FROM (WATERSHED B-8 PLUS B-8A) 102.9 ACRES TO LATERAL B-8:
Q_{10}=90.85 CFS, Q_{100}=140.90 CFS
STORM DRAIN LATERAL B-8 PER RIVERSIDE COUNTY FLOOD CONTROL DISTRICT DRAWING NO. 4-1060 HAS A Q_{100}=182 CFS MINIMUM CAPACITY.

FG=1561.5
$Q_{10\text{-SUBAREA}}$=4.62 CFS
$Q_{100\text{-SUBAREA}}$=7.16 CFS
4.9 $AC_{SUBAREA}$
$Q_{10\text{-INLET}}$=7.64 CFS
$Q_{100\text{-INLET}}$=11.82 CFS
7.9 AC_{TOTAL}
818

EXISTING HARLEY KNOX BLVD

LATERAL B-8

FUTURE HARLEY KNOX BLVD

FG=1718
809

FG=1602
$Q_{10\text{-SUBAREA}}$=5.14 CFS
$Q_{100\text{-SUBAREA}}$=7.91 CFS
5.5 $AC_{SUBAREA}$
901

FG=1610
$Q_{10\text{-SUBAREA}}$=7.13 CFS
$Q_{100\text{-SUBAREA}}$=10.96 CFS
6.5 $AC_{SUBAREA}$
810

FG=1587
$Q_{10\text{-SUBAREA}}$=6.86 CFS
$Q_{100\text{-SUBAREA}}$=10.69 CFS
6.5 $AC_{SUBAREA}$
$Q_{10\text{-INLET}}$=13.99 CFS
$Q_{100\text{-INLET}}$=21.64 CFS
13.0 AC_{INLET}
$Q_{10\text{-TOTAL}}$=63.66 CFS
$Q_{100\text{-TOTAL}}$=98.73 CFS
71.0 AC_{TOTAL}
808

L=700' S=3.6%
L=410' S=2.6%
L=490' S=2.4%

FG=1572
$Q_{10\text{-SUBAREA}}$=3.02 CFS
$Q_{100\text{-SUBAREA}}$=4.66 CFS
3.0 $AC_{SUBAREA}$
817

FROM B-8A ONLY
$Q_{10\text{-TOTAL}}$=27.19 CFS
$Q_{100\text{-TOTAL}}$=42.17 CFS
31.9 AC_{TOTAL}
811

HISTORICALLY RUNOFF FROM WATERSHED B-8A FLOWED EASTERLY AND PER MASTER DRAINAGE PLAN FOR PERRIS VALLEY AREA JUNE 1991 WAS INTENDED TO BE TRIBUTARY TO STORM DRAIN LATERAL B-8. HERE EXISTING UPON CONSTRUCTION OF STORM DRAIN LATERAL B-8A PER RIVERSIDE COUNTY FLOOD CONTROL DISTRICT DRAWING NO. 4-1060 RUNOFF IS.
31.9 ACRE WATERSHED B-8A YIELD:
EX Q_{10}=27.19 CFS, Q_{100}=42.17 CFS

L=560' S=0.66%
LATERAL B-8A

FUTURE DECKER RD

B-8
71.0 AC

FG=1593
$Q_{10\text{-SUBAREA}}$=9.48 CFS
$Q_{100\text{-SUBAREA}}$=14.73 CFS
10.6 $AC_{SUBAREA}$
$Q_{10\text{-INLET}}$=29.77 CFS
$Q_{100\text{-INLET}}$=46.09 CFS
31.0 AC_{INLET}
$Q_{10\text{-TOTAL}}$=52.51 CFS
$Q_{100\text{-TOTAL}}$=81.54 CFS
58.0 AC_{TOTAL}
804

FUTURE INDUSTRIAL WAREHOUSE FACILITY

B-8A
31.9 AC

FL=1551.2
$Q_{10\text{-SUBAREA}}$=10.57 CFS
$Q_{100\text{-SUBAREA}}$=16.29 CFS
10.1 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=20.54 CFS
$Q_{100\text{-TOTAL}}$=31.91 CFS
24.0 AC_{TOTAL}
815

EXISTING INDUSTRIAL WAREHOUSE FACILITY

FG=1553
$Q_{10\text{-SUBAREA}}$=3.82 CFS
$Q_{100\text{-SUBAREA}}$=6.07 CFS
5.0 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=6.86 CFS
$Q_{100\text{-TOTAL}}$=10.82 CFS
8.8 AC_{TOTAL}
814

FG=1575
$Q_{10\text{-SUBAREA}}$=5.78 CFS
$Q_{100\text{-SUBAREA}}$=8.87 CFS
5.1 $AC_{SUBAREA}$
816

FG=1556
$Q_{10\text{-SUBAREA}}$=3.03 CFS
$Q_{100\text{-SUBAREA}}$=4.75 CFS
3.8 $AC_{SUBAREA}$
813

L=710' S=3.4%
L=330' S=4.0%
L=260' S=1.2%

FG=1663
$Q_{10\text{-SUBAREA}}$=10.70 CFS
$Q_{100\text{-SUBAREA}}$=16.50 CFS
10.3 $AC_{SUBAREA}$
806

FG=1623
$Q_{10\text{-SUBAREA}}$=9.59 CFS
$Q_{100\text{-SUBAREA}}$=14.86 CFS
10.1 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=20.29 CFS
$Q_{100\text{-TOTAL}}$=31.36 CFS
20.4 AC_{TOTAL}
807

FG=1596
$Q_{10\text{-SUBAREA}}$=6.41 CFS
$Q_{100\text{-SUBAREA}}$=10.1 CFS
7.7 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=24.80 CFS
$Q_{100\text{-TOTAL}}$=38.50 CFS
27.0 AC_{TOTAL}
803

FG=1635
$Q_{10\text{-SUBAREA}}$=7.69 CFS
$Q_{100\text{-SUBAREA}}$=11.95 CFS
8.5 $AC_{SUBAREA}$
$Q_{10\text{-TOTAL}}$=18.39 CFS
$Q_{100\text{-TOTAL}}$=28.49 CFS
19.3 AC_{TOTAL}
802

FG=1670
$Q_{10\text{-SUBAREA}}$=10.70 CFS
$Q_{100\text{-SUBAREA}}$=16.54 CFS
10.8 $AC_{SUBAREA}$
801

FG=1715
800

FG=1733
805

FG=1595
812

FUTURE OLEANDER AVE

EXISTING OLEANDER AVE

FUTURE DAY ST

EXISTING DAY ST

LEGEND

- WATERSHED BOUNDARY
- X — WATERSHED NO.
- SUB-AREA BOUNDARY
- EX SD SYSTEM
- XX / X.XX — SUB-AREA NO. / SUB-AREA-ACREAGE
- XX — NODE NO.
- INITIAL AREA FLOW-LINE
- L=270' — LENGTH OF FLOW-LINE OR PIPE
- S=0.8% — SLOPE OF STREET OR PIPE

120 60 0 120 240 360
SCALE: 1"=120'

PREPARED BY:
Michael Baker INTERNATIONAL
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707
Phone: (949) 472-3505
MBAKERINTL.COM

REGISTERED PROFESSIONAL ENGINEER
CESAR MOYA
No. 82555
Exp 9-30-2018
CIVIL
STATE OF CALIFORNIA

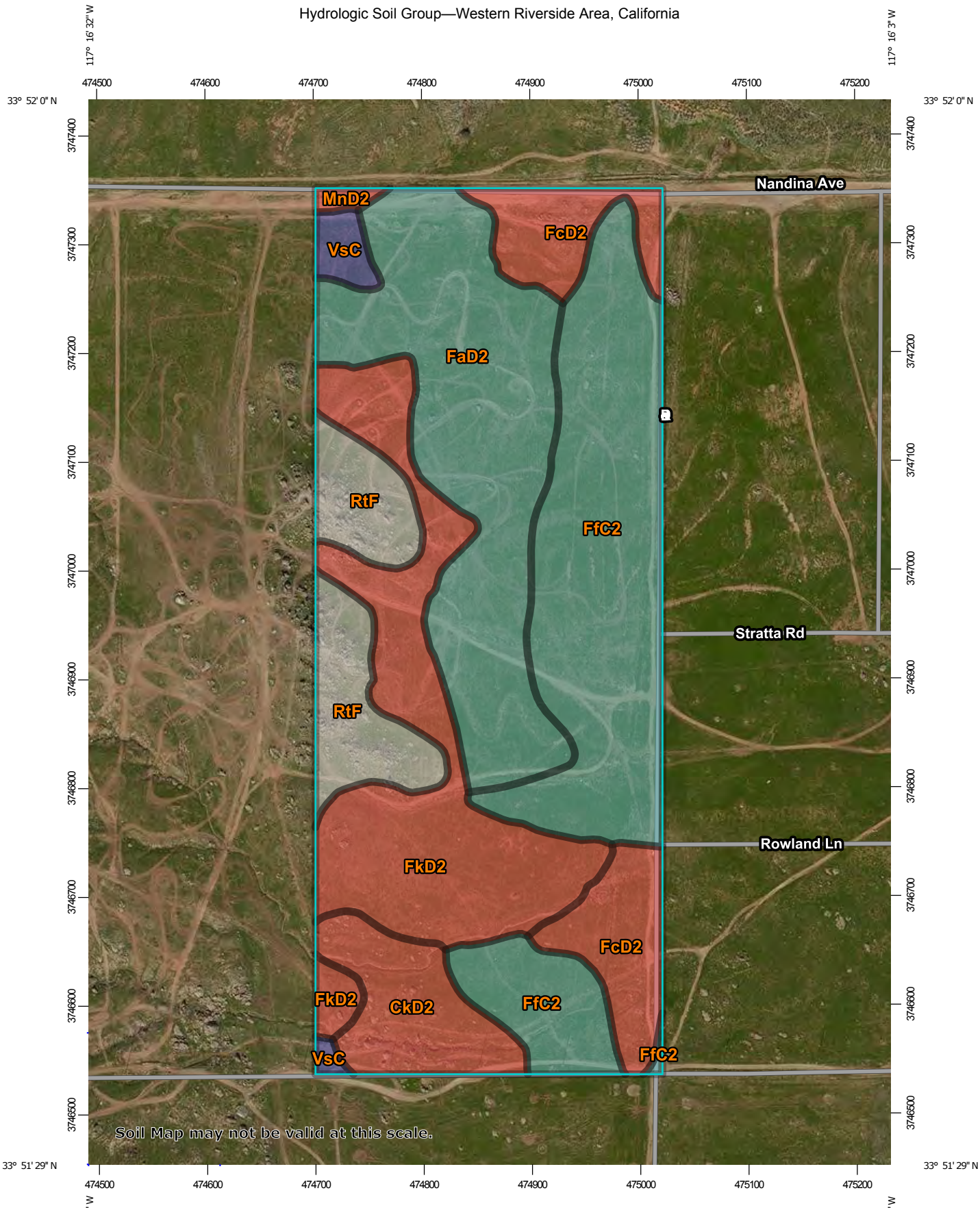
MEAD VALLEY BUSINESS PARK
PRELIMINARY HYDROLOGY MAP
EXISTING CONDITION
RIVERSIDE COUNTY, CA
MARCH 2019

SCALE: 1" = 120'
PROJECT NO. 152480
DATE: 3/21/2019

H:\PDATA\152480\CADD\LAND\DLV\HYDRO\PRELIMINARY\MAPS\152480-PRELIM-EXIST-HYD-MAP.DWG RHOWE 3/21/19 11:39 am

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data


117° 16' 32" W
117° 16' 3" W
33° 52' 0" N
33° 51' 29" N
474500
474600
474700
474800
474900
475000
475100
475200
3747400
3747300
3747200
3747100
3747000
3746900
3746800
3746700
3746600
3746500
MnD2
VsC
FcD2
FaD2
RtF
FfC2
RtF
FkD2
FcD2
FkD2
CkD2
FfC2
VsC
FfC2
Nandina Ave
Stratta Rd
Rowland Ln
Soil Map may not be valid at this scale.
Map Scale: 1:4,780 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 50 100 200 300
Feet
0 200 400 800 1200
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 11, Sep 12, 2018

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

Date(s) aerial images were photographed: Jan 14, 2015—Jan 21, 2015

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CkD2	Cieneba rocky sandy loam, 8 to 15 percent slopes, eroded	D	4.3	6.6%
FaD2	Fallbrook sandy loam, 8 to 15 percent slopes, eroded	C	15.9	24.5%
FcD2	Fallbrook rocky sandy loam, shallow, 8 to 15 percent slopes, eroded	D	6.1	9.5%
FfC2	Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded	C	18.3	28.2%
FkD2	Fallbrook fine sandy loam, shallow, 8 to 15 percent slopes, eroded	D	13.1	20.3%
MnD2	Monserate sandy loam, shallow, 5 to 15 percent slopes, eroded	D	0.3	0.4%
RtF	Rockland		5.8	8.9%
VsC	Vista coarse sandy loam, 2 to 8 percent slopes	B	1.0	1.6%
Totals for Area of Interest			**64.8**	**100.0%**

Description

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

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

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

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

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

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

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

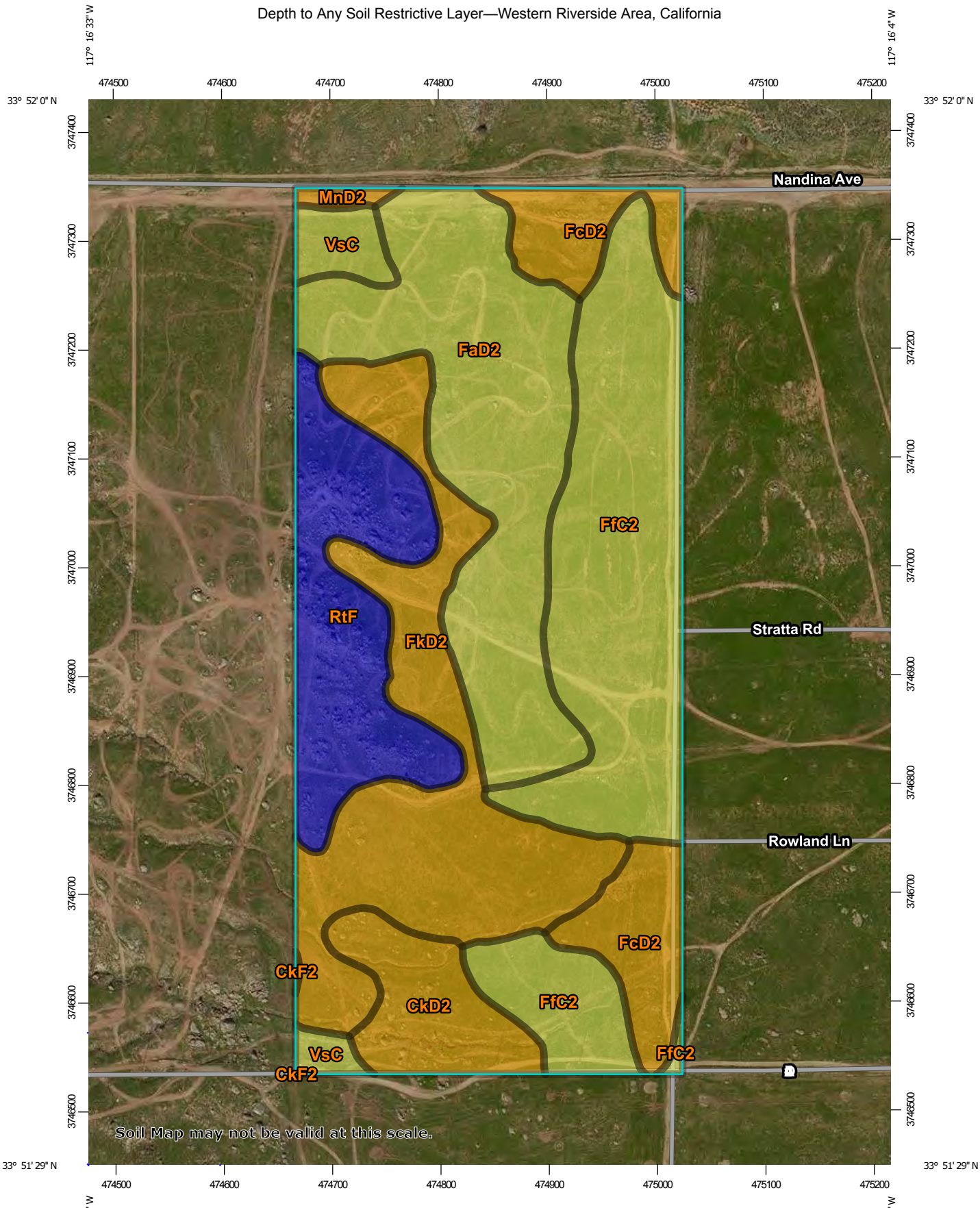
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Depth to Any Soil Restrictive Layer—Western Riverside Area, California



Map Scale: 1:4,780 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 11, Sep 12, 2018

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

Date(s) aerial images were photographed: Jan 14, 2015—Jan 21, 2015

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

Depth to Any Soil Restrictive Layer

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
CkD2	Cieneba rocky sandy loam, 8 to 15 percent slopes, eroded	36	4.4	6.1%
CkF2	Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded	36	0.0	0.0%
FaD2	Fallbrook sandy loam, 8 to 15 percent slopes, eroded	61	16.5	22.8%
FcD2	Fallbrook rocky sandy loam, shallow, 8 to 15 percent slopes, eroded	46	6.2	8.6%
FfC2	Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded	61	18.8	26.0%
FkD2	Fallbrook fine sandy loam, shallow, 8 to 15 percent slopes, eroded	46	14.6	20.3%
MnD2	Monserate sandy loam, shallow, 5 to 15 percent slopes, eroded	46	0.4	0.5%
RtF	Rockland	>200	9.4	13.0%
VsC	Vista coarse sandy loam, 2 to 8 percent slopes	61	1.9	2.7%
Totals for Area of Interest			**72.2**	**100.0%**

Description

A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

This theme presents the depth to any type of restrictive layer that is described for each map unit. If more than one type of restrictive layer is described for an individual soil type, the depth to the shallowest one is presented. If no restrictive layer is described in a map unit, it is represented by the "> 200" depth class.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

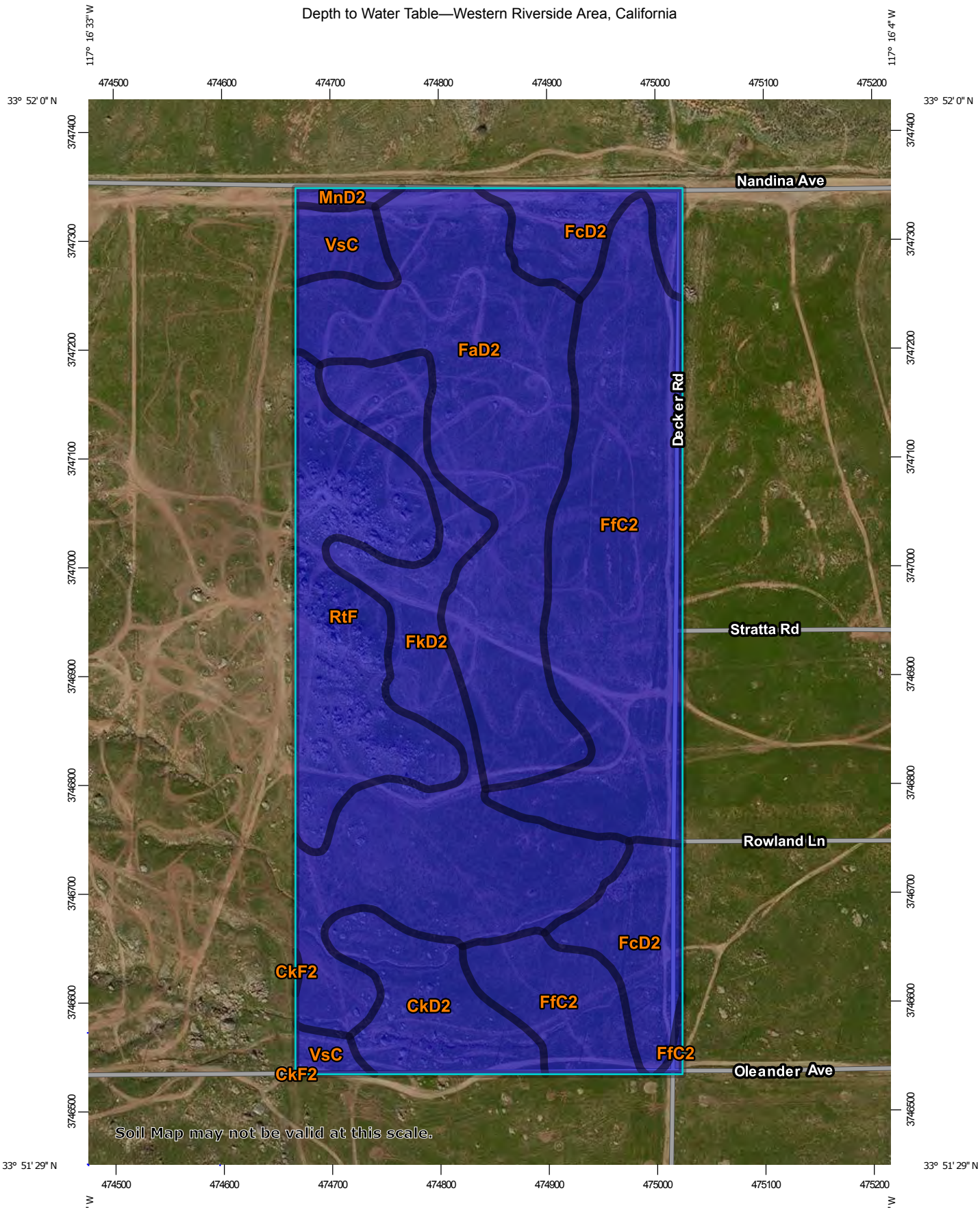
Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Depth to Water Table—Western Riverside Area, California



Map Scale: 1:4,780 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 11, Sep 12, 2018

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

Date(s) aerial images were photographed: Jan 14, 2015—Jan 21, 2015

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

Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
CkD2	Cieneba rocky sandy loam, 8 to 15 percent slopes, eroded	>200	4.4	6.1%
CkF2	Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded	>200	0.0	0.0%
FaD2	Fallbrook sandy loam, 8 to 15 percent slopes, eroded	>200	16.5	22.8%
FcD2	Fallbrook rocky sandy loam, shallow, 8 to 15 percent slopes, eroded	>200	6.2	8.6%
FfC2	Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded	>200	18.8	26.0%
FkD2	Fallbrook fine sandy loam, shallow, 8 to 15 percent slopes, eroded	>200	14.6	20.3%
MnD2	Monserate sandy loam, shallow, 5 to 15 percent slopes, eroded	>200	0.4	0.5%
RtF	Rockland	>200	9.4	13.0%
VsC	Vista coarse sandy loam, 2 to 8 percent slopes	>200	1.9	2.7%
Totals for Area of Interest			**72.2**	**100.0%**

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Appendix 4: Historical Site Conditions

Not Applicable

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Michael Baker International
Date: 3/19/2019
Designed by: Jacqueline Hernandez
Case No:
Company Project Number/Name: 152480 - Oleander Business Park (Mead Valley)

BMP Identification

BMP NAME / ID: BMP A-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.59 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Impervious (Roof, Parking Lot and Walkway)	*244078.53*	*Roofs*	*1*	*0.89*	*217718*			
Pervious (Landscaping)	*26118.72*	*Ornamental Landscaping*	*0.1*	*0.11*	*2885*			
	270197.25	***Total***			**220603**	**0.59**	***10846.3***	***11433***

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Michael Baker International
Date: 3/19/2019
Designed by: Jacqueline Hernandez
Case No:
Company Project Number/Name: 152480 - Oleander Business Park (Mead Valley)

BMP Identification

BMP NAME / ID: BMP B-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.59 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Impervious (Roof, Parking Lot and Walkway)	*380063.28*	*Roofs*	*1*	*0.89*	*339016.4*			
Pervious (Landscaping)	*86961.35*	*Ornamental Landscaping*	*0.1*	*0.11*	*9605.6*			
	467024.63	***Total***			**348622**	**0.59**	***17140.6***	***17559***

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Michael Baker International
Date: 3/19/2019
Designed by: Jacqueline Hernandez
Case No:
Company Project Number/Name: 152480 - Oleander Business Park (Mead Valley)

BMP Identification

BMP NAME / ID: BMP C-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.59 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Impervious (Roof, Parking Lot and Walkway)	*123925.28*	*Roofs*	*1*	*0.89*	*110541.3*			
Pervious (Landscaping)	*62594.75*	*Ornamental Landscaping*	*0.1*	*0.11*	*6914.1*			
	186520.03	**Total**			**117455.4**	**0.59**	**5774.9**	**7554**

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Michael Baker International — Date: 3/19/2019

Designed by: Jacqueline Hernandez — Case No:

Company Project Number/Name: 152480 - Oleander Business Park (Mead Valley)

BMP Identification

BMP NAME / ID: BMP D-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.59 inches

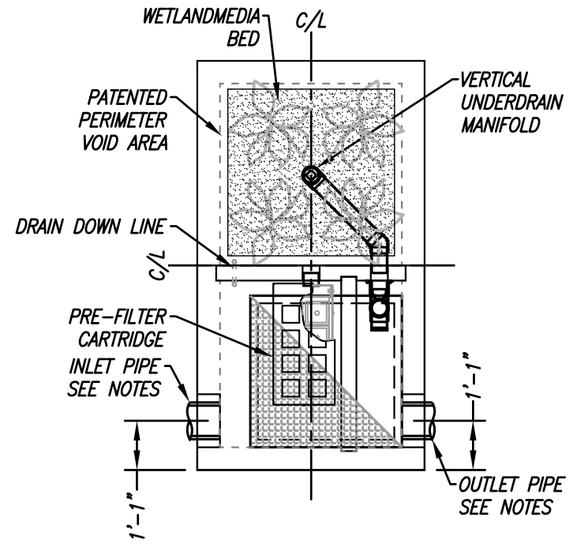
Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imprevious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Impervious (Roof, Parking Lot and Walkway)	*466030.75*	*Roofs*	*1*	*0.89*	*415699.4*			
Pervious (Landscaping)	*82879.48*	*Ornamental Landscaping*	*0.1*	*0.11*	*9154.7*			
	548910.23	***Total***			**424854.1**	**0.59**	***20888.7***	***22662***

Notes:

SITE SPECIFIC DATA			
PROJECT NUMBER			
ORDER NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN	OPEN PLANTER	PEDESTRIAN
FRAME & COVER	36" X 36"	N/A	N/A
WETLANDMEDIA VOLUME (CY)			TBD
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



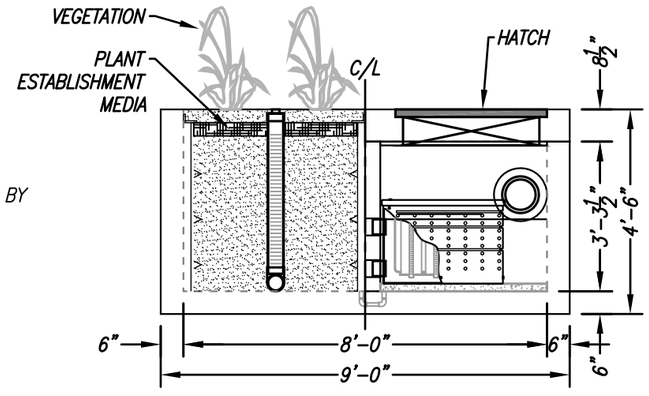
PLAN VIEW

INSTALLATION NOTES

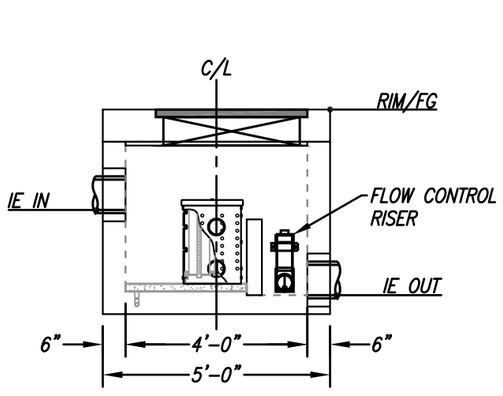
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

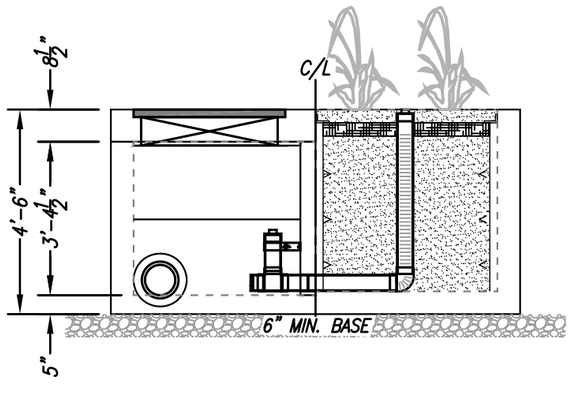
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



LEFT END VIEW



ELEVATION VIEW

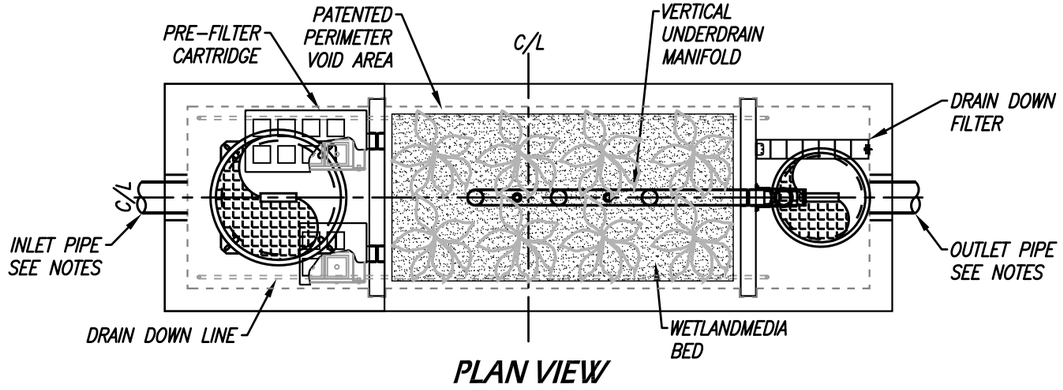


RIGHT END VIEW

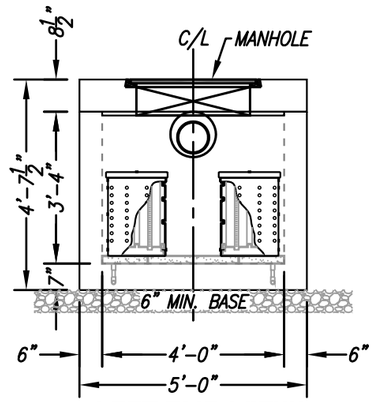
TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MWS-L-4-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

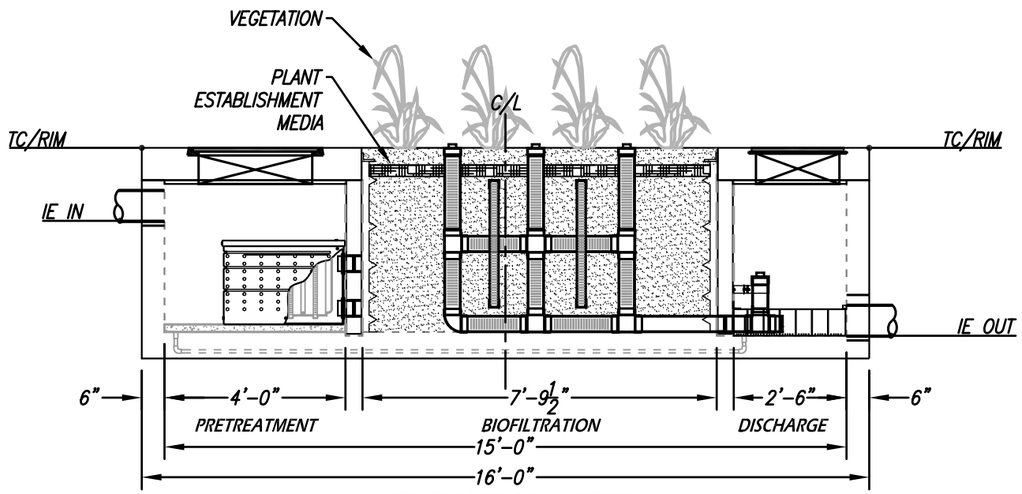
SITE SPECIFIC DATA			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			4.30
WETLANDMEDIA DELIVERY METHOD			TBD
ORIFICE SIZE (DIA. INCHES)			ø1.89"
MAXIMUM PICK WEIGHT (LBS)			31000
NOTES:			



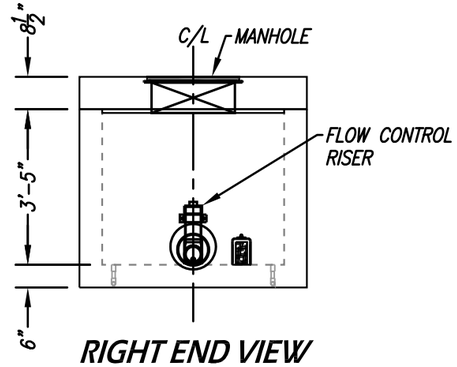
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

INSTALLATION NOTES

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6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

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TREATMENT FLOW (CFS)	0.175
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	TBD
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

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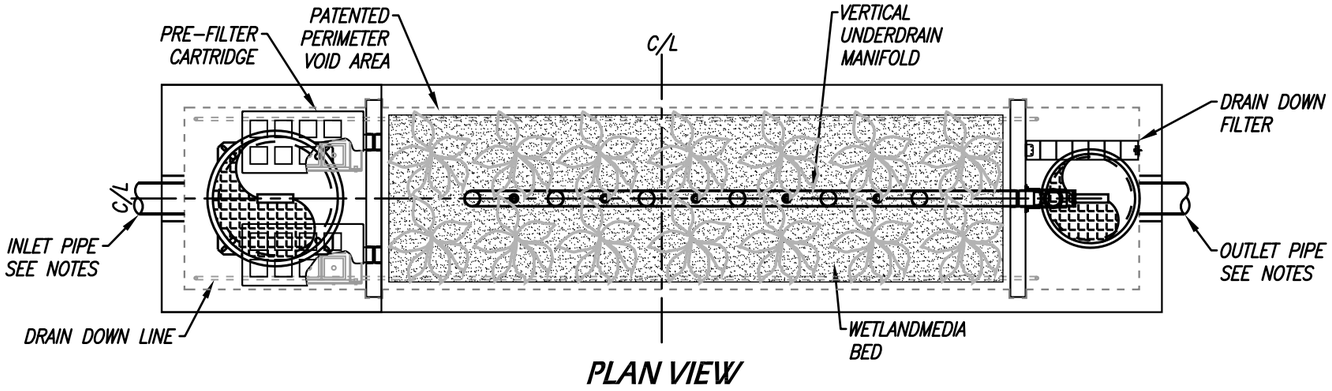
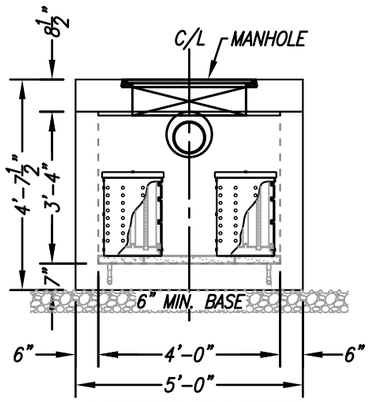
MWS-L-4-15-V
STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

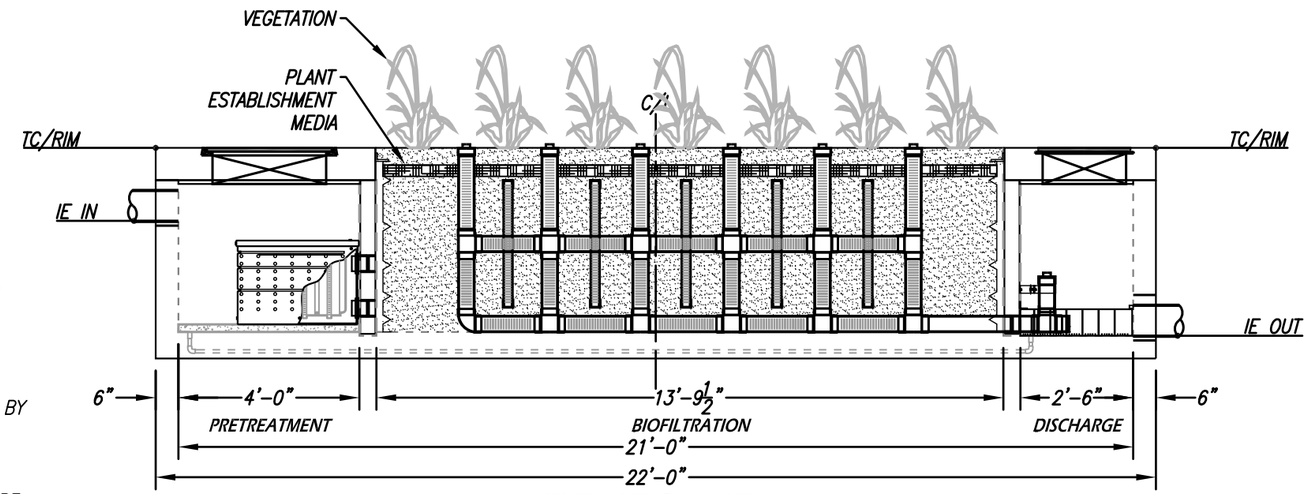
SITE SPECIFIC DATA			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			7.63
WETLANDMEDIA DELIVERY METHOD			TBD
ORIFICE SIZE (DIA. INCHES)			ø2.34"
MAXIMUM PICK WEIGHT (LBS)			43000
NOTES:			



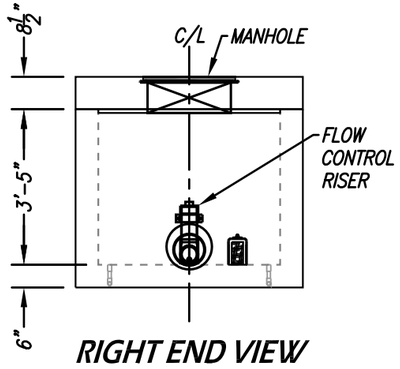
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

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TREATMENT FLOW (CFS)	0.268
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	TBD
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

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MWS-L-4-21-V
STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

SITE SPECIFIC DATA			
PROJECT NUMBER			
ORDER NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN	OPEN PLANTER	PEDESTRIAN
FRAME & COVER	2EA ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			TBD
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			

INSTALLATION NOTES

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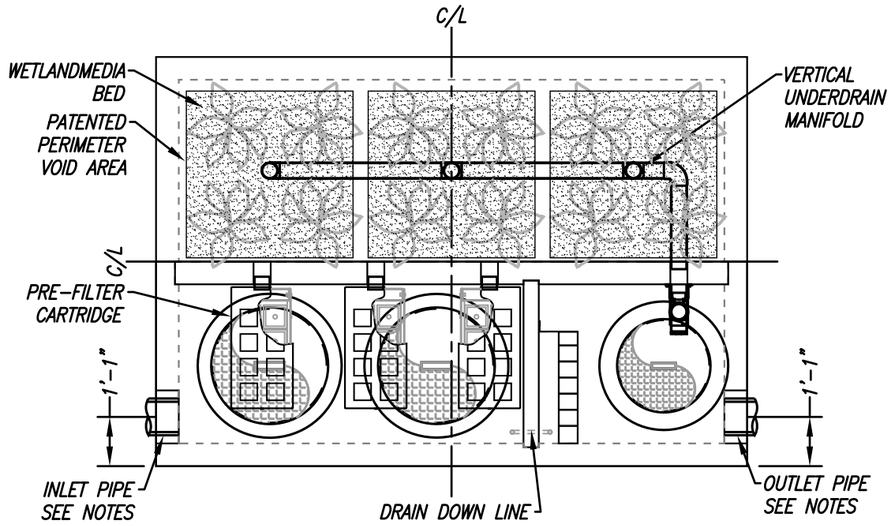
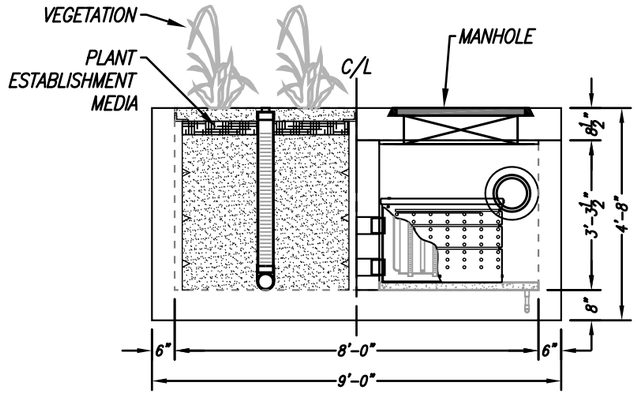
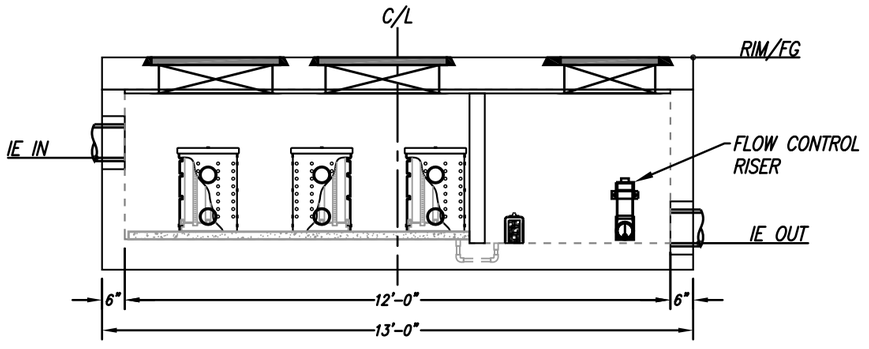


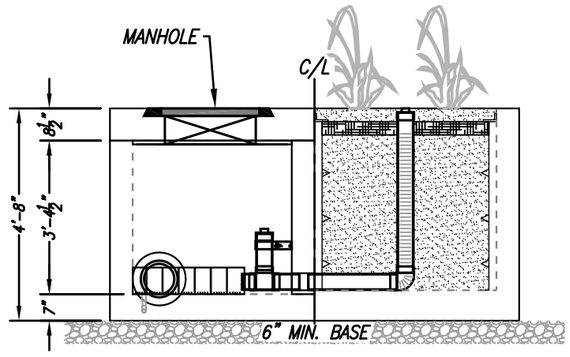
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.346
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

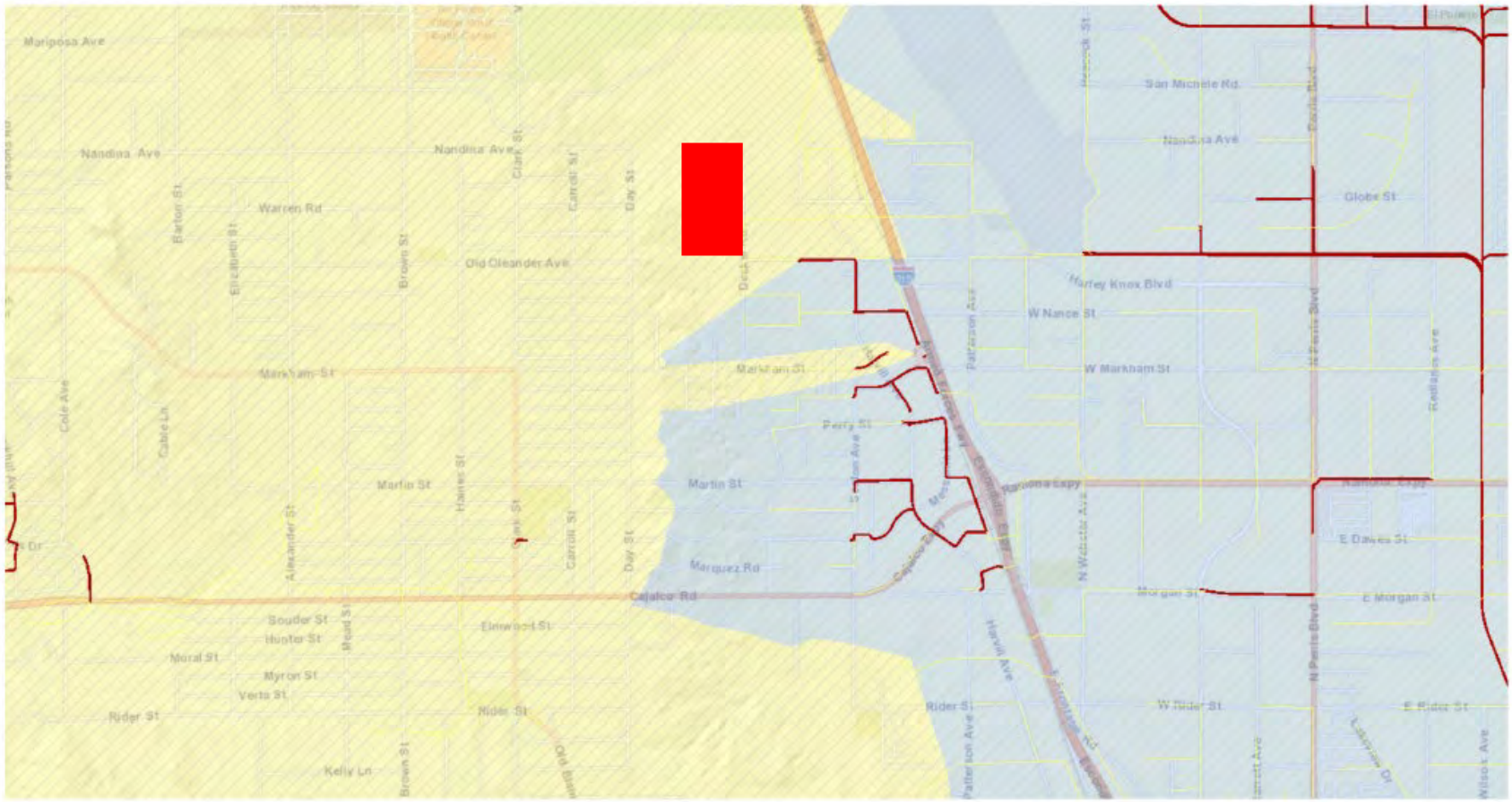
MODULAR WETLANDS

Bio Clean
A Forterra Company

MWS-L-8-12-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



1km

3000ft

Legend

- Hydromodification Exemption Area
- Hydromodification Non-Exemption Area
- Project Location

Site Address: rivco.permitrack.com

Riverside County
SWCTT

Stormwater Map

Receiving Waters and Susceptibility to Hydromodification

Nandina ave

Perris Valley MDP Lateral B-9 → Perris Valley Channel Lateral B (EEM) → Proposed District Facilities (to be engineered) → Perris Valley Channel (EEM) → San Jacinto River Reach 3 (EEM) → **Canyon Lake** → San Jacinto River Reach 1 → Lake Elsinore

Harley Knox Blvd

Perris Valley MDP Lateral B-8 → Perris Valley Channel Lateral B (EEM) → Proposed District Facilities (to be engineered)→ Perris Valley Channel (EEM) → San Jacinto River Reach 3 (EEM) → **Canyon Lake** → San Jacinto River Reach 1 → Lake Elsinore

Oleander Ave

Perris Valley MDP Lines E-10 and F (EFHM) → Proposed District Facilities (to be engineered) → Perris Valley Channel Lateral B (EFHM) → Perris Valley Channel (EEM) → San Jacinto River Reach 3 (EEM) → **Canyon Lake** → San Jacinto River Reach 1 → Lake Elsinore

According to the Hydromodifcation Susceptibility Documentation Report and Mapping: Santa Ana Region, prepared by RBF Consulting, January 2012:

Engineered, Earthen and Maintained (EEM): This group includes constructed facilities that do not contain armoring but have been engineered to be stable systems and are verified by as-builts. The facility must also be maintained. This group is intended to be channel segments constructed for flood conveyance, which generally have a design capacity in excess of a 10-year storm event.

Engineered, Fully Hardened and Maintained (EFHM): This group includes constructed facilities that are fully armored (e.g. concrete, soil cement, rip rap rock, etc.) on three sides and verified by as-builts, aerial photographs and/or a site visit. This group includes piped and boxed stream channel segments. The facility must also, be maintained and designed based on an engineering criteria (e.g. a specific storm event.)

1. Not Susceptible
    a. EFHM – The risk for adverse impacts caused by Hydromodification is insignificant due to the armoring of the stream channel segment and the engineered design which would prevent erosion and degradation of the channel.
    b. EPHM - The risk for adverse impacts caused by Hydromodification is very low due to the partial armoring of the stream channel segment and the engineered design which would significantly lower the risk of erosion and degradation of the channel.
    c. EEM - The risk for adverse impacts caused by Hydromodification is low due to the engineered design of the stream channel segment which would lower the risk of erosion and degradation of the channel.

Therefore, the project site is not susceptible to hydromodification.

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ A. **On-site storm drain inlets**	☑ **Locations of inlets.**	☑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☑ **Maintain and periodically repaint or replace inlet markings.** ☑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☑ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ D1. **Need for future indoor & structural pest control**		☑ **Note building design features that discourage entry of pests.**	☑ **Provide Integrated Pest Management information to owners, lessees, and operators.**
☑ D2. **Landscape/ Outdoor Pesticide Use**	☑ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ☑ **Show self-retaining landscape areas, if any.** ☑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ☑ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ☑ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ☑ **Consider using pest-resistant plants, especially adjacent to hardscape.** **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	☑ **Maintain landscaping using minimum or no pesticides.** ☑ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ☑ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ E. **Pools, spas, ponds, decorative fountains, and other water features.**	☐ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	☐ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
☐ F. **Food service**	☐ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ☐ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	☐ **Describe the location and features of the designated cleaning area.** ☐ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	☐ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
☑ G. **Refuse areas**	☑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ☑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ☐ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	☑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ☑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	☑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ H. **Industrial processes.**	☑ **Show process area.**	☑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	☑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑**Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ M. **Loading Docks**	☑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ☐ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ☐ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		☑ **Move loaded and unloaded items indoors as soon as possible.** ☑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ P. **Plazas, sidewalks, and parking lots.**			☑ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: Operation and Maintenance

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms for Oleander Business Park (Mead Valley)

Riverside County, California

I. Inspection and Maintenance Log

See Appendix A for Inspection and Maintenance Log Records.

II. Updates, Revisions and Errata

See Appendix B for Updates, Revisions and Errata.

III. Introduction

Oleander Business Park (Mead Valley) is a commercial development consisting of two buildings located west of Decker Road between Oleander Avenue and Nandina Avenue in Unincorporated County of Riverside. There are nine drainage management areas (DMAs) for the project site.

DMA A-1 will treat runoff from the southern portion of Building A, parking lot and off-site runoff from the west. The runoff from this DMA will discharge into the storm drain system and be stored in the underground storage system and treated by the volume based Modular Wetlands System (MWS) BMP A-1. DMA A-2 is self-treating landscaped area adjacent to Oleander Avenue. Any runoff not infiltrated will discharge onto Oleander Avenue. DMA A-3 is also a self-treating landscaped area adjacent to Oleander Avenue and Decker Road. Any runoff not infiltrated will discharge into the landscaped swale and enter the storm drain system.

DMA B-1 will treat the remaining northern portion of the Building A, parking lot and off-site runoff from the west. The runoff from this DMA will discharge into the storm drain system and be stored in the underground storage system and treated by the volume based MWS BMP B-1. DMA B-2 is self-treating landscaped area adjacent to Harley Knox Road and Decker Road. Any runoff not infiltrated will discharge into the landscaped swale and enter the storm drain system.

DMA C-1 will treat runoff from the southern portion of the Building B, parking lot and off-site runoff from the west. The runoff from this DMA will discharge into the storm drain system and be stored in the underground storage system and treated by the volume based MWS BMP C-1. DMA C-2 is self-treating landscaped area adjacent to Harley Knox Road. Any runoff not infiltrated will discharge into the landscaped swale and enter the storm drain system.

DMA D-1 will treat runoff from the northern portion of the Building B, parking lot and off-site runoff from the west. The runoff from this DMA will discharge into the storm drain system and be stored in the underground storage system and treated by the volume based MWS BMP D-1. DMA D-2 is self-treating landscaped area adjacent to Decker Road and Nandina Avenue. Any runoff not infiltrated will discharge into the landscaped swale and enter the storm drain system.

IV. Responsibility for Maintenance

a. General

Property Owner:
Contact Info:

The "Storm Water Quality Management Plan and Storm Water BMP Transfer, Access and Maintenance Agreement" executed between the County of Riverside and the property owner requires that the property owner will install, implement and maintain the Modular Wetland Systems and underground storage systems. Any major maintenance to these systems should be performed by a professional contractor.

Operation and Maintenance Agreement will be provided in the O&M Plan in the Final WQMP.

The annual anticipated cost of maintenance for the Modular Wetlands Systems are as follows:

- MWS-L-4-15 - $750
- MWS-L-4-21 - $950
- MWS-L-4-8 - $550
- MWS-L-8-12 - $1,100

Each annual maintenance includes two site visits, one inspection and one full service with clean disposal and media replacement.

b. Staff Training Program

Staff and professional contractors will be trained annually.

c. Records

Maintenance/inspection records should be kept for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

d. Safety

Staff and professional contractors will have safety training annually.

V. Summary of Drainage Management Areas and Stormwater BMPs

a. Drainage Areas

DMAs were explained in Section III. Introduction.

See the WQMP BMP Exhibit in Appendix C for DMAs and pervious and impervious areas.

b. Structural Post-Construction BMPs

BMP A-1 is a volume based MWS (MWS-L-4-15) that treats the stored runoff of DMA A-1 from the underground storage system located in the parking lot adjacent to Building A.

BMP B-1 is a volume based MWS (MWS-L-4-21) that treats the stored runoff of DMA B-1 from the underground storage system located in the parking lot adjacent to Building A.

BMP C-1 is a volume based MWS (MWS-L-4-8) that treats the stored runoff of DMAs C-1 from the underground storage system located in the parking lot adjacent to Building B.

BMP D-1 is a volume based MWS (MWS-L-8-12) that treats the stored runoff of DMAs D-1 from the underground storage system located in the parking lot adjacent to Building D.

See the WQMP BMP Exhibit in Appendix C for where post-construction BMPs are located.

c. Self-Treating Areas

The following DMAs are self-treating and does not require specialized maintenance beyond that of typical landscape maintenance:

- DMA A-2
- DMA A-3
- DMA B-2
- DMA C-2
- DMA D-2

See the WQMP BMP Exhibit in Appendix C for where self-treating areas are located.

VI. Stormwater BMP Design Documentation

See Appendix D for as-built drawings, product brochures and maintenance manuals of the MWS and underground storage systems.

VII. **Maintenance Schedule or Matrix**

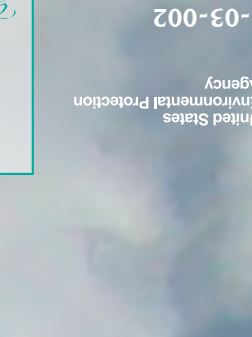
Maintenance Matrix

System	Maintenance Activity	Frequency
Modular Wetlands System	Remove trash from screening device. This can be done manually or with the use of a vacuum truck.	6 to 12 months
	Remove sediment from separation chamber. Spray down pollutants accumulated on walls and cartridge filters with a pressure washer. Vacuum out separation chamber and remove all accumulated pollutants.	12 to 24 months
	Replace cartridge filter media. Remove media cages and spray down the cartridge filter to remove any accumulated pollutants. Reinstall media cages and fill with new media.	12 to 24 months
	Replace drain down filter. Unlock and lift drain down filter housing and remove old media block. Replace with new media block.	12 to 24 months
	Trim vegetation.	6 to 12 months
Underground Storage Systems (ADS StormTech or similar)	Perform inspections annually at a minimum. For the first year of operation, the Isolator Row should be inspected every 6 months. For subsequent years, the inspection should be based upon previous observations of sediment deposition.	6 to 12 months
	If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.	As needed
	Maintain the Isolator Rows by performing the JetVac process and vacuum manhole sump.	6 to 12 months

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

After the Storm



What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

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January 2003

THE YEAR OF CLEAN WATER

Clean Water Environment

EPA United States Environmental Protection Agency

A Citizen's Guide to Understanding Stormwater

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

Stormwater Pollution Solutions

Residential

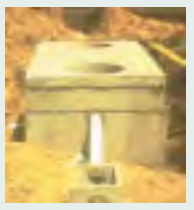
Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

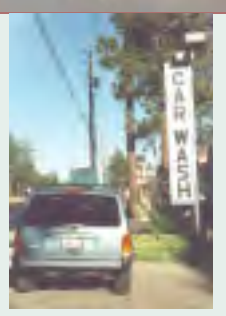
Septic systems



Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

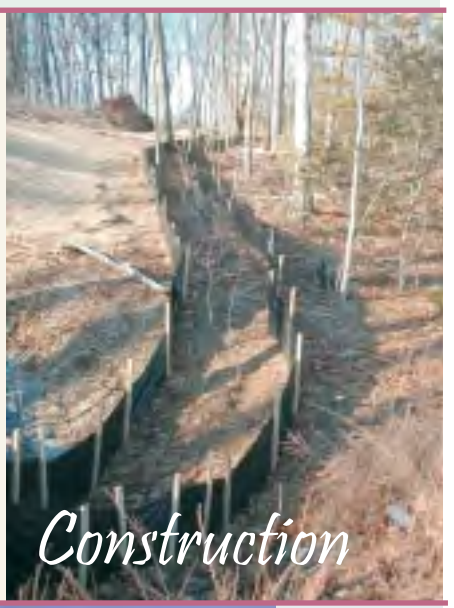
Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

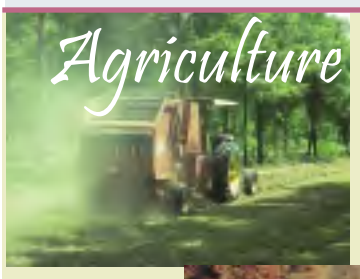
- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.



Construction

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

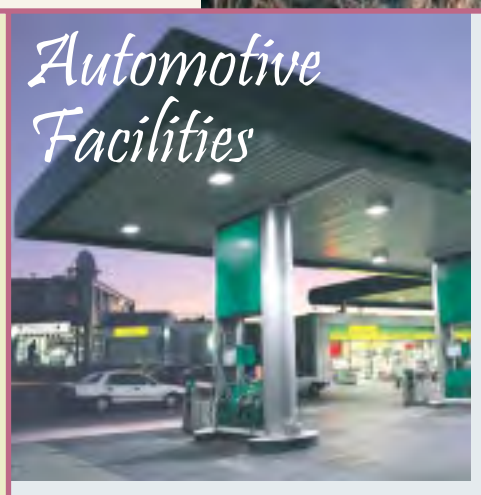
- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.



Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.

Stormwater Pollution

What you should know for...

Industrial & Commercial Facilities

Riverside County Stormwater Program Members

City of Banning
(951) 922-3105

City of Beaumont
(951) 769-8520

City of Calimesa
(909) 795-9801

City of Canyon Lake
(951) 244-2955

City of Cathedral City
(760) 770-0340

City of Coachella
(760) 398-3502

City of Corona
(951) 736-2447

City of Desert Hot Springs
(760) 329-6411

City of Eastvale
(951) 361-0900

City of Hemet
(951) 765-2300

City of Indian Wells
(760) 346-2489

City of Indio
(760) 391-4000

City of Jurupa Valley
(951) 332-6464

City of Lake Elsinore
(951) 674-3124

City of La Quinta
(760) 777-7000

City of Menifee
(951) 672-6777

City of Moreno Valley
(951) 413-3000

City of Murrieta
(951) 304-2489

City of Norco
(951) 270-5607

City of Palm Desert
(760) 346-0611

City of Palm Springs
(760) 323-8299

City of Perris
(951) 943-6100

City of Rancho Mirage
(760) 324-4511

City of Riverside
(951) 826-5311

City of San Jacinto
(951) 487-7330

City of Temecula
(951) 694-6444

City of Wildomar
(951) 677-7751

Coachella Valley Water District
(760) 398-2651

County of Riverside
(951) 955-1000

Riverside County Flood Control District
(951) 955-1200

Best Management Practices (BMPS) for:

- Industrial Facilities
- Commercial Facilities

YOU can prevent Stormwater Pollution following these practices...

Industrial and Commercial Facilities

The Riverside County Stormwater Program has identified a number of Best Management Practices (BMPs) for Industrial and Commercial Facilities. These BMPs control and reduce stormwater pollutants from reaching our storm drain system and ultimately our local water bodies. City and County ordinances require businesses to use these BMPs to protect our water quality. Local cities and the County are required to verify implementation of these BMPs by performing regular facility inspections.

Prohibited Discharges

Discontinue all non-stormwater discharges to the storm drain system. It is *prohibited* to discharge any chemicals, paints, debris, wastes or wastewater into the gutter, street or storm drain.

Outdoor Storage BMPs

- Install covers and secondary containment areas for all hazardous materials and wastes stored outdoors in accordance with County and/or City standards.
- Keep all temporary waste containers covered, at all times when not in use.
- Sweep outdoor areas instead of using a hose or pressure washer.
- Move all process operations including vehicle/equipment maintenance inside of the building or under a covered and contained area.
- Wash equipment and vehicles in a contained and covered wash bay which is closed-loop or connected to a clarifier sized to local standards and discharged to a sanitary sewer or take them to a commercial car wash.

Spills and Clean Up BMPs

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep up the area.
- Clean up spills immediately when they occur, using dry clean up methods such as absorbent materials or sweep followed by proper disposal of materials.
- Always have a spill kit available near chemical loading dock doors and vehicle maintenance and fueling areas.
- Follow your Business Emergency Plan, as filed with the local Fire Department.
- Report all prohibited discharges and non-implementation of BMPs to your local Stormwater Coordinator as listed on the back of this pamphlet.
- Report hazardous materials spills to 951-358-5055 or call after hours to 951-782-2973 or, if an emergency, call the Fire Department's Haz Mat Team at 911.

Plastic Manufacturing Facilities BMPs

AB 258 requires plastic product manufacturers to use BMPs, such as safe storage and clean-up procedures to prevent plastic pellets (nurdles) from entering the waterway. The plastic pellets are released into the environment during transporting, packaging and processing and migrate to waterways through the storm drain system. AB 258 will help protect fish and wildlife from the hazards of plastic pollution.

Training BMPs

As prescribed by your City and County Stormwater Ordinance(s), train employees in spill procedures and prohibit non-stormwater discharges to the storm drain system. Applicable BMP examples can be found at www.cabmphandbooks.com.

Permitting

Stormwater discharges associated with specific categories for industrial facilities are regulated by the State Water Resources Control Board through an Industrial Stormwater General Permit. A copy of this General Permit and application forms are available at: www.waterboards.ca.gov, select stormwater then the industrial quick link.

To report illegal dumping or for more information on stormwater pollution prevention call: 1-800-506-2555 or e-mail us at: fcnpdes@rcflood.org.

IRRIGATION RUNOFF

STORMWATER FACT SHEET

Report Irrigation Runoff or Stormwater Pollution:
800.506.2555

RIVERSIDE COUNTY
WATERSHED PROTECTION

OVERWATERING

Overwatering causes irrigation runoff that may contain pollutants such as pesticides, herbicides, fertilizers, pet waste, yard waste, and sediments which can be hazardous to residents and harmful to our environment. Runoff can also serve as a transport mechanism for other pollutants already on the ground or in the curb gutter. Irrigation runoff entering the storm drain system is an illicit discharge.

BEST PRACTICES

Urban runoff begins when yards and landscaped areas are over-irrigated. Irrigation systems require regular maintenance and visual inspection of the system should be performed to prevent over-spray, leaks, and other problems that result in runoff to storm drains, curbs and gutters.

You can **prevent pollution** by conserving water on your property. Water during cooler times of the day (before 10am and after 6pm).

- Adjust sprinklers to stop overspray and runoff.
- Make needed repairs immediately.
- Use drip irrigation, soaker hoses, or micro-spray systems.
- Use an irrigation timer to pre-set watering times.
- Use a control nozzle or similar mechanism when watering by hand.
- Switch to a water-wise landscape - native plants need less fertilizers, herbicides, pesticides and water.

PROTECT OUR WATERSHED

Many people think that when water flows into a storm drain it is treated, but the storm drain system and the sanitary sewer system are not connected. Everything that enters storm drains flows untreated directly into our creeks, rivers, lakes, beaches and ultimately the ocean. Storm water often contains pollutants, including chemicals, trash, and automobile fluids, all of which pollute our watershed and harm fish and wildlife.

Whether at home or work, you can help reduce pollution and improve water quality by using the above Best Management Practices (BMP's) as part of your daily clean up and maintenance routine.