Appendix K-1: Preliminary Drainage Report

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PRELIMINARY DRAINAGE REPORT

Green River Ranch Business Park
City of Corona, County of Riverside, California





PREPARED FOR:

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December, 2022

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Section

1

INTRODUCTION

1.1 PURPOSE OF STUDY

Green River Ranch Business Park development is situated along Green River Road in the City of Corona. to the northwest of the City of Corona in unincorporated area of Western Riverside County, California. The site is located south of the 91 Freeway at Green River Road. The purpose of this study is to hydrologically model the project site's onsite and offsite tributary watersheds and determine the existing and proposed peak runoffs. The hydrologic analysis was prepared using the Rational Method as specified in the Riverside County Hydrology Manual. This report also calculates the peak storage required to mitigate any increased runoff due to development for the most critical storm and duration event using the Synthetic Unit Hydrograph Method. The flows are used to estimate the above and below ground drainage facilities to support the proposed project development.

1.2 PROJECT DESCRIPTION

The Green River Ranch Business Park project is comprised of 153.61 acres of vacant land situated in the hills to the northeast of the City of Corona in Riverside County, California adjacent to Green River Road. The site is located roughly 2 miles east from the 91 and 71 freeway intersection, and approximately 5 miles east of Interstate 15 (I-15). **Figure 1-2** shows a vicinity map of the area illustrating the location of the project and the surrounding land uses in the area

The Green River Ranch Business Park project is generally bounded to the north and east by the vacant land and 91 freeway. Bounded on the south by hillside, and to the west by vacant land/commercial. The project is within the 159.1 acres Green River Ranch Specific Plan.

The project site consists of sparsely vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by flat topography with hillside on the south which introduces offsite flow into the site. Small ravines are present which convey the natural drainage across the project site.

As proposed by the Green River Ranch Business Park project, the site consist of five industrial buildings that are 80,320 (SF), 93,868(SF), 124,693 (SF), 125,521 (SF), and 284,698 (SF) within the business industrial designation. The proposed site is comprised of approximately 153.61 acres of undeveloped vacant land, and it is proposed that portion of the 153.61 acres will be graded based on the conceptual grading plan. In addition, this study includes the analysis for the future 5.5 acres general commercial parcel north of Green River Road and the 101.1 acres Estate Residential situated on the southern portion of the property.

1.3 FLOODPLAIN MAPPING

The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for floodplain management and is designed to minimize flood

damage within Special Flood Hazard Areas. The Federal Emergency Management Agency (FEMA) is the agency which administrates the National Flood Insurance Program. Special Flood Hazard Areas (SFHA) are defined as areas that have a 1% chance of flooding within a given year. This is also referred to as the 100-year flood. Flood Insurance Rate Maps (FIRMs) were developed to identify areas of flood hazards within a community.

According to the Flood Insurance Rate Map (FIRM) catalog, there are FIRMs produced by FEMA for the project site:

MAP Number: 06065C0669G, 06065C1335G

MAP Effective Date: August 28, 2008

The site is located within Zone X, which is an area outside the 0.2% annual chance of flood (500-year). Refer to **Appendix A**.

1.4 DESIGN CRITERIA

The following are design criteria for this project, based on the Riverside County Hydrology Manual.

Protection Levels

1. The 100-year flood shall be contained with the street right-of-way limits.

2. The 10-year flood shall be contained within the top of curbs.

3. Initiate a storm drain or channel when either condition is exceeded.

Onsite detention facilities were found to be effective in mitigating the impacts of frequent events (i.e., 2-year to 10-year storm events); however, they have little impacts on low frequency events (i.e., 100-year storm event). For this reason, RCFC&WCD released in 1995 the following guidelines for sizing increased runoff detention facilities:

1) Storms to be studied are 1-hour, 3-hour, 6-hour, and 24-hour duration events for the 2-year, 5-year, and 10-year return frequencies. Detention basin(s) and outlet sizing(s) will ensure that none of these storm events have higher peak discharge in the "after" condition than in the "before" condition.

2) Loss rates are to be determined for the 2- and 5-year events using an AMC I condition, while an AMC II should be used for the 10-year event and AMC III should be used for the 100-year event for the detention basin. All durations should incorporate constant loss rates, except for the 24-hour where a variable loss rate is used.

3) A single plot showing the pre-development and post-development for each storm event considered shall be included with the submittal of the hydrology study.

4) The detention structure must be capable of passing the 100-year storm without damage to the facility.

Section

2

HYDROLOGIC DATA AND MODEL DEVELOPMENT

2.1 EXISTING CONDITION MODEL

The project site consists of highly vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by steep topography, generally increasing in elevation from the south to the north. Several ravines are present which will convey natural drainage across the project site. The existing dirt access roads within the project site are used by the City of Corona Fire Department for emergency fire protection for the area.

The project site can be divided into two (2) major drainage areas to further describe the existing drainage condition. Refer to the **Figure 3 - Existing Condition Hydrology Key Map** in **Appendix D** for locations of the drainage sub-areas and the corresponding peak flows. Hydrologic calculations to evaluate surface water runoff associated with the 100-year and 10-year storm frequency were performed for the on-site and off-site drainage areas.

There are four major flowlines convey towards Green River Road. Two of the four major flowlines converge into single stream towards a headwall inlet structure then convey across Green River Road via a 5'x4' RCB in drainage area A. This runoff combines with the offsite drainage area from Green River Road, the runoff ultimately convey towards BNSF railroad and to an existing 72-inch CMP underneath 91 Freeway. Drainage areas B and C flow northerly towards Green River Road and then convey across the street via existing storm drain facilities. Along with small offsite area D, these runoff will continue flow via natural streambed towards BNSF railroad and eventually discharge under existing 54-inch CMP underneath 91 Freeway.

In order to proceed with analysis of the proposed developed condition, it is necessary to first establish the pre-developed peak runoff rates. **Table 1** summarizes the data and results for the 10-year and 100-year storm event for on-site and off-site flows. All calculations can be found in **Appendix C** of the report.

Table 1. Existing Condition Runoff Summary

Drainage Area	Area (AC)	Q100 (CFS)	Q10 (CFS)	Q5 (CFS)	Q2 (CFS)
A	153.88	420.23	247.15	172.82	116.23
B	86.12	223.73	129.60	87.51	58.03

2.2 PROPOSED CONDITION MODEL

In the proposed condition, approximately 38 acres of tributary from existing drainage area B has been diverted to drain towards drainage area A on the east side of the property. This allows the project to mitigate for the development flows, as required by RCFC&WCD's increase runoff mitigation criteria, in a single detention basin proposed for drainage area A identified as Basin #2 on the Hydrology Key Map. A system of catch basin inlets and storm drain pipes are proposed to convey the runoff across the site to the designated discharge points.

Table 2 summarized comparison between the Existing Condition and Proposed Condition Hydrology results. Detailed calculations of the proposed condition hydrologic analysis are in **Appendix E** along with **Figure 4 - Proposed Condition Hydrology Key Map** in **Appendix F** for an illustration of the proposed drainage pattern.

Table 2 Existing vs. Proposed Condition Peak Flow Runoff Comparison

	Existing Condition			Proposed Condition			
Drainage Area	**Area (Acres)**	**Q100 (CFS)**	**Q10 (CFS)**	**Area (Acres)**	**Q100 (CFS)**	**Q10 (CFS)**	**Note**
A+E	153.88	420.23	247.15	191.91	539.11	321.96	$Q_{Proposed} > Q_{Existing}$ (See Note 1)
B+C+D	86.12	223.73	129.60	48.40	138.08	83.16	$Q_{Proposed} < Q_{Existing}$

Notes:

1. *Subarea A1 through A8 discharge to a proposed detention basin as shown on hydrology key map as Basin #2. Refer to Section 3 for increased runoff mitigation. In the proposed condition, subarea A17 through A20 drains to drainage area A instead of drainage area B in the existing condition.*

2.3 ONSITE STORM DRAIN SYSTEM

Preliminary onsite drainage facilities for the project were calculated utilizing the rational method hydrology program and are presented on the Proposed Condition Hydrology Key Maps. The estimated sizes of these facilities and their approximate locations are intended for conceptual purposes only and will be refined in the design review and final engineering process. Pipe sizes are based on the design criteria presented in Section 1.4. Pipes were designed as reinforced concrete pipe/HDPE, with a roughness coefficient of 0.013. Final hydraulic calculations using the computer program WSPG (Water Surface and Pressure Gradient) will be performed in the Final Engineering phase.

Catch basins and storm drain laterals were placed at locations to keep the 10-year flow below the top of curb and the 100-year flow below the right of way. Catch basins will also be sized in Final Engineering.

There are several existing drainage pipelines/culverts crossing Interstate 91 Freeway and Green Riverside Widening. As-built drawings of these drainage facilities are attached to this report for reference.

- Appendix J - Green River Road Widening Rough Grading and Drainage Plan
- Appendix K - Interstate 91 Freeway Drainage Plans
- Appendix L - Tract No. 20872 Storm Drain Improvement Plans

2.4 STREET CAPACITY ANALYSIS

Preliminary onsite street capacities for the proposed project were calculated by the rational method software. By reviewing street capacity analysis within the rational method, it's concluded that the street sections are sufficient to provide the level of protection required by Riverside County as previously discussed. Since, the storm drain mainline pipes were sized for the 100-year storm event, the street will only contain local flows until catch basins intercept the 100-year flow.

2.5 OUTLET ANALYSIS

The proposed development will outlet at four (4) locations: Drainage Area A will outlet into an existing 5'x4' RCB on Green River Road, Drainage Area B will outlet into an existing 48-inch CMP, portion of Drainage Area C from the offsite Fresno Road will outlet into an existing 30-inch CMP, and the remaining portion of Drainage Area C will outlet into an existing 36-inch CMP. The outlet velocity shall be at or below the existing condition or to a non-erosive velocity.

Section

3

DETENTION ANALYSIS

The developed tributary areas at the most downstream point for each stream within the proposed project were analyzed for both the existing and proposed conditions. KWC Engineers has performed a synthetic unit hydrograph analysis for the Green River Ranch project in order to provide preliminary detention basin sizing calculation. The CivilDesign Unit Hydrograph Analysis computer program was used to perform the calculations.

3.1 APPROACH AND METHODOLOGY

Unit hydrograph calculations were performed to determine the 2-year, 5-year, and 10-year for the 1-hour, 3-hour, 6-hour and 24-hour duration storms and the 100-year for the 1-hour duration storms in accordance with the procedures of the Riverside County Flood Control and Water Conservation District Hydrology Manual (RCHM).

The RCHM has four S-Graphs (Plates E-4.1 through E-4.4) titled Valley, Foothill, Mountain, and Desert, respectively, to represent the specific runoff characteristics of watersheds. The foothill s-graph was selected as the most appropriate S-Graph for this study area. The CivilDesign Unit Hydrograph computer program performs the transformation of S-Graphs and lag time to unit hydrograph ordinances. Point precipitations were taken from the Isohyetal maps shown on Plates E-5.1 through E-5.6 and Plate D-4.3 and D-4.4 of the RCHM (see **Appendix B**). The centroid of the watershed was used as the location on the Isohyetal maps to determine the point precipitation values. **Table 3** summarizes the point precipitations used in this study. The CivilDesign software performs an interpolation using the 2-year and 100-year values to determine the intermediate frequencies (5-year and 10-year values).

Table 3 Precipitation Depth-Duration-Frequency Summary

Frequency	Duration			
	1-Hour	3-Hour	6-Hour	24-Hour
	(in)	(in)	(in)	(in)
2-Year	0.62	1.06	1.52	2.85
100-Year	145	2.63	3.75	8.85

Infiltration rates (loss rates) were based on Plate E-6.2 in the RCHM using the runoff index (RI) determined for each soil and land use condition according to Plate E-6.1. Per the recommendations in the RCHM, Antecedent Soil Moisture Conditions AMC I was used for the 2-year and 5-year storms, AMC II were used for the 10-year storms, AMC III were used for the 100-year storms. The same land use and hydrologic soil type (Soil Type D & B) used in the rational method calculations were used in development of the unit hydrograph calculations.

The 1-hour duration storms were adjusted to match with the rational method peak flow rates by adjusting the lag times until peak flows matched. This adjusted lag time was then used for the other

durations (3-hr, 6-hr and 24-hr). This process was repeated for each storm event (2-yr, 5-yr, 10-yr, and 100-yr). As a result of this process, the 1-hour duration storm, matched with the rational method results.

Table 4 present a comparison between the existing and proposed runoff peak flow rates and volumes at the outlet point for Drainage Area A. The total tributary acreage for Drainage Area A in the existing condition is 153.9 acres compared to 191.9 acres in the proposed condition. Results are presented in **Appendix G** for existing conditions unit hydrograph calculations and **Appendix H** for proposed conditions unit hydrograph calculations.

Table 4 Unit Hydrograph Results for Drainage Area A

		Existing Condition		Proposed Condition		Peak Differential (Proposed vs Existing)	
STORM FREQUENCY	DURATION (HOURS)	PEAK FLOW (CFS)	TOTAL VOL, AC-FT	PEAK FLOW (CFS)	TOTAL VOL, AC-FT	PEAK FLOW (CFS)	TOTAL VOL, AC-FT
2	1	116.1	3.6	159.2	4.7	43.1	1.1
	3	80.4	3.8	106.	5.6	25.7	1.8
	6	74.2	4.5	97.2	7.2	23.0	2.7
	24	12.3	4.1	18.0	9.0	5.7	4.9
5	1	172.4	5.9	231.4	7.6	59.0	1.7
	3	128.0	6.9	166.0	9.4	38.0	2.5
	6	118.6	8.1	153.5	11.8	34.9	3.7
	24	41.8	11.2	54.7	18.7	13.0	7.5
10	1	247.2	10.0	322.8	12.5	75.5	2.5
	3	193.0	15.0	243.3	18.7	50.3	3.7
	6	180.1	17.8	227.5	22.4	47.4	4.6
	24	87.4	32.6	108.9	43.2	21.4	**10.6**
100	-	-	-	-	-	-	-
	1	420.5	17.6	539.9	21.8	**119.4**	4.2

Comparison:

- Per RCFC&WD's design guideline, preliminary detention basin sizing can be based on the difference in volume between the "developed" condition and "pre-developed" condition for the 24-hour duration event for the 10-year return frequency. This would yield the most volume difference. The result translate to 10.6 ac-ft of volume needs to be detained.

- The required debris volume for Basin #2 is 1.24 ac-ft based on the debris basin volume determination worksheet in **Appendix I**.

- The volume required for the proposed Basin #2 is approximately 12.0 ac-ft, which is the combined volume of difference between developed and pre-developed condition for the 10-year 24-hour duration event plus the debris volume. The spillway elevation should be set at 606 feet. Refer to the **Figure 7** and Stage Storage Table in **Appendix I** for details.

- The detention basin will be sized also to detain a minimum peak flow of 119.4 cfs in the 100-year storm event so that the peak runoff does not exceed the existing pre-project condition peak flows.

The estimated sizes of these facilities and their approximate locations are intended for conceptual purposes only and will be refined in the design review and final engineering process.

Section

4

DEBRIS BASIN ANALYSIS

4.1 DESIGN CRITERIA

This section determines the debris yield for the undeveloped tributary watershed areas upstream of the development. The corresponding calculated debris yield is then used to determine the size of the debris basin required upstream of the drainage watersheds. Sediment yield must be accounted for when designing drainage facilities to convey runoff from undeveloped (natural) areas. Soil erosion caused by runoff in undeveloped areas increases the amount of sediment yield or load in storm water discharge. In order to accommodate for the increase in discharge volume a debris factor must be accounted for when considering design flows.

The procedures described in the US Army Corps of Engineers Los Angeles District Method for Prediction of Debris Yield were used to calculate the debris yield as shown below.

4.2 DEBRIS YIELD

LOS ANGELES DISTIRCT METHOD FOR PREDICTION OF DEBRIS YIELD
February 1992, updated February 2000

For Watershed areas from 0.1 square mile to 3.0 square miles, use equation 1 as shown on page 15:

LOG Dy = 0.65(LOG (P*100)) + 0.62(LOG RR) + 0.18(LOG A) + 0.12(FF)

Where:

Dy = Unit Debris Yield (yd^3/mi^2)
P = Maximum 1-Hour Precipitation (inches, taken to two decimal places after the decimal points, times 100)
RR = Relief Ratio (ft/mi) (Highest Watershed Elev-Basin Elev)/Maximum Length in mile
A = Drainage Area (ac)
FF = Non-Dimensional Fire factor

Per the recommendations in the RCHM, typical designs assume 3- to 5-year recovery from a total burn for making estimates of design storm debris production since the probability of a design storm following a 100 percent burn of the entire watershed is extremely remote. Therefore, the fire factor used in the calculations is based on a 4-year recovery period from 100 percent burn.

4.3 DEBRIS BULKING

The debris factor was calculated by applying the Peak Rate Bulking Factor equation per Section F of the RCFC&WCD Hydrology Manual.

Peak Rate Debris Factor, Fb = 1+(D/120,000)

Where D = Design storm debris production rate for the study watershed in cubic feet per square mile which was estimated based on Tatum regression equation. Per the RCFC&WCD Hydrology Manual debris production rates in Riverside County are generally believed to be lower than those experienced in the western San Gabriel Mountains. Evaluation of the existing condition in the project watershed indicated that the Tatum method is the best suited method for estimating debris production within the project watershed area.

The following **Table 5** summarizes the bulked flow at each flow-by basin.

Table 5. Proposed Condition Bulked Peak Flows (100-Year Storm)

Basin	Node	Dy (CY/mi^2)	Fb (Debris Factor)	Clear Water Flow (cfs)	Bulked Flow (cfs)
1	415	15,117.5	1.13	114.9	129.8
2	225	18,396.6	1.15	203.5	234.0
3	130	13,692.5	1.11	54.4	60.4
4	115	12,432.4	1.10	63.0	69.3

Section

5

CONCLUSIONS

This preliminary drainage study has evaluated the potential effects of runoff on the proposed project. In addition, the report has addressed the methodology used to analyze the existing and proposed conditions, which was based on the Riverside County Hydrology Manual. This section provides a summary discussion that evaluates the potential effects of the proposed project.

- The project will add approximately 36-acre of impervious area, which is about 19% of the total tributary area, in the form of rooftops, driveways, sidewalks, and streets.
- Preliminary locations of detention and flow-by basins were presented.
- Preliminary alignment and pipe sizes of storm drain lines were presented.
- A Final Hydrology & Hydraulics Report must be conducted to determine the proposed hydraulic grade lines throughout the storm drain system and final detention basin sizing.

All storm water runoff will be carried via typical street sections and an onsite storm drain system. The computed 10-year storm event is contained below the top of curb and the computed 100-year storm event is protected from the building pads.

Potential Hydrologic Impacts

Without properly designed and constructed stormwater mitigation measures the following items could be impacted due to the development of this project:

1. Runoff – increase in runoff peak flow and volume will be mitigated by the detention basin.
2. Erosion – of existing natural downstream canyons and hillsides will be mitigated by properly designed grading, detention basins, energy dissipators and erosion protection rip-rap pads at the outlet of storm drain system.
3. Flooding – of structures due to the 100-year storm event will be mitigated with properly designed grading and sized storm drain system.
4. Debris – from existing upstream canyons into the development will be mitigated by flow-by debris basins and debris from the project site into downstream properties will be mitigated by WQMP basins, trash racks and properly maintained storm drain facilities.

Section

6

REFERENCES

Riverside County Flood Control and Water Conservation District. Hydrology Manual. April 1978

Riverside County Flood Control and Water Conservation District. Increased Runoff Mitigation Workshop. August 24, 1995

City of Corona Public Works, Green River Road Widening Rough Grading & Drainage Plans, Armstrong & Brooks Consulting Engineers, September 9, 2013

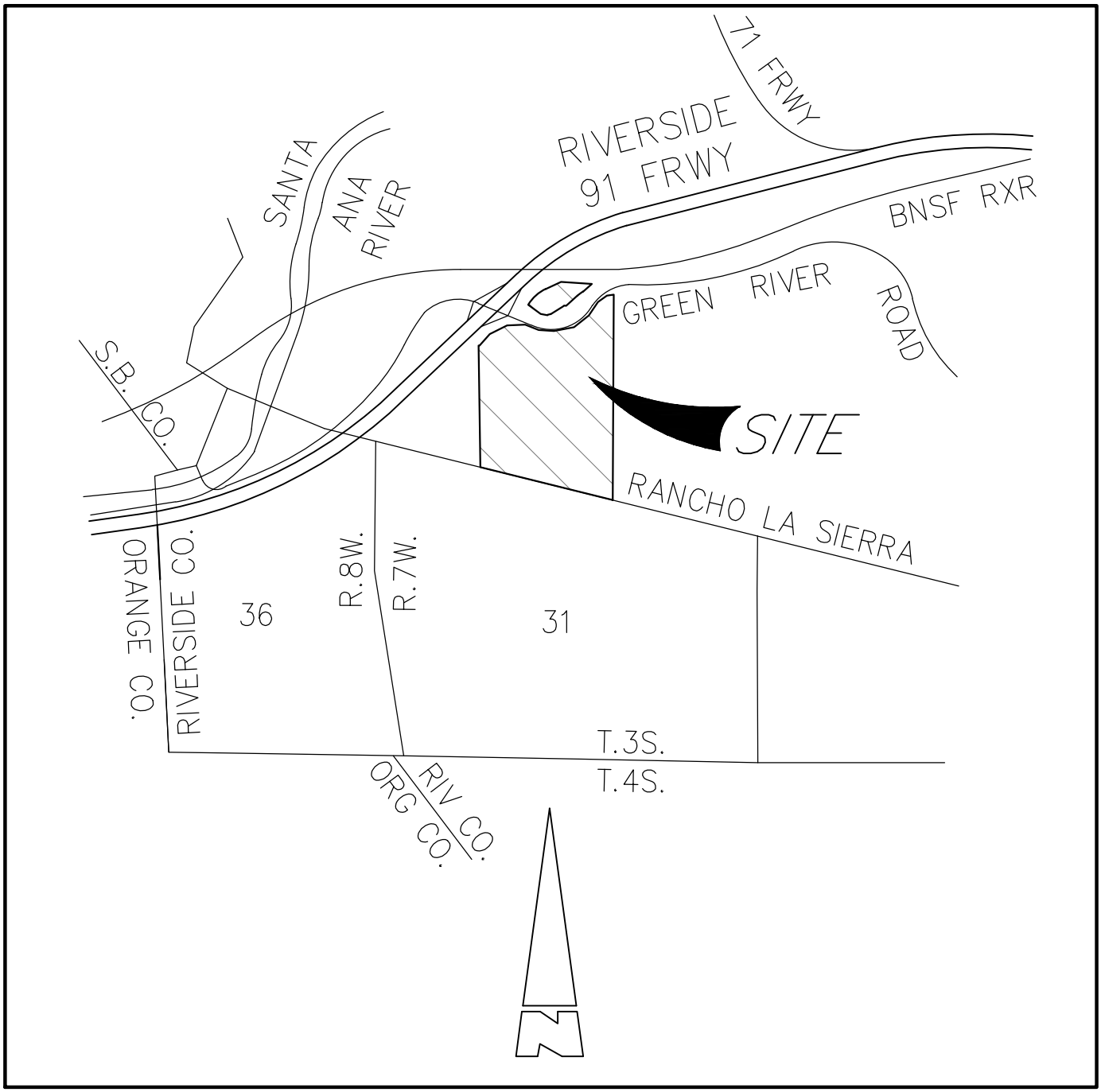
Tract No. 20872, Plan and Profile for the Improvement of Storm Drain, Church Engineering Inc, As Built Dated October 30, 1989

State of California – Department of Transportation, Interstate 91 Drainage Plans, December 1, 2008

Appendix

A

VICINITY MAP & FEMA MAPS



LOCATION MAP

NOT TO SCALE

KWC ENGINEERS
CIVIL ENGINEERS ● PLANNERS ● SURVEYORS
1880 COMPTON AVENUE, SUITE 100 ● CORONA, CA. 92881-3370 ● 951-734-2130

FIGURE 1

J.N. 2013.1394-2.15 R:\19\1886\PRELIM\REPORTS\HYDRO\1886 Location Map.dwg 01/10/2020 12:18

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 2°76'000"N — 1000-meter Universal Transverse Mercator grid values, zone 11N
- 600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ● M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0669G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 669 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CORONA, CITY OF	060250	0669	G
RIVERSIDE COUNTY	060245	0669	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C0669G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

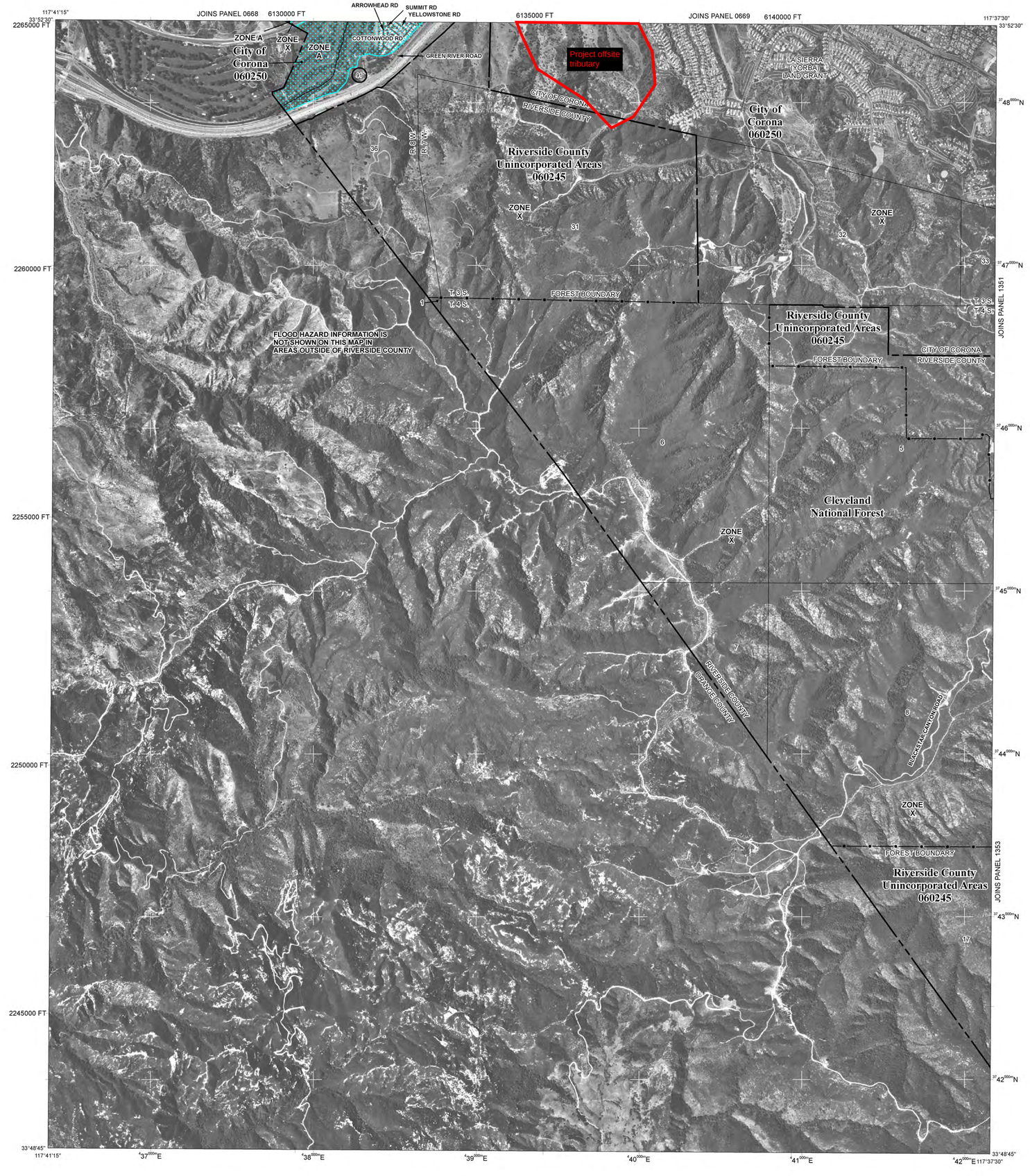
This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 2776000mN — 1000-meter Universal Transverse Mercator grid values, zone 11N
- 600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ●M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1335G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 1335 OF 3805
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CORONA, CITY OF	060250	1335	G
RIVERSIDE COUNTY	060245	1335	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C1335G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

Appendix

B

RCFC&WCD HYDROLOGIC DATA

PROJECT NAME: Green River Ranch Business Park
PROJECT LOCATION: Corona, Riverside County

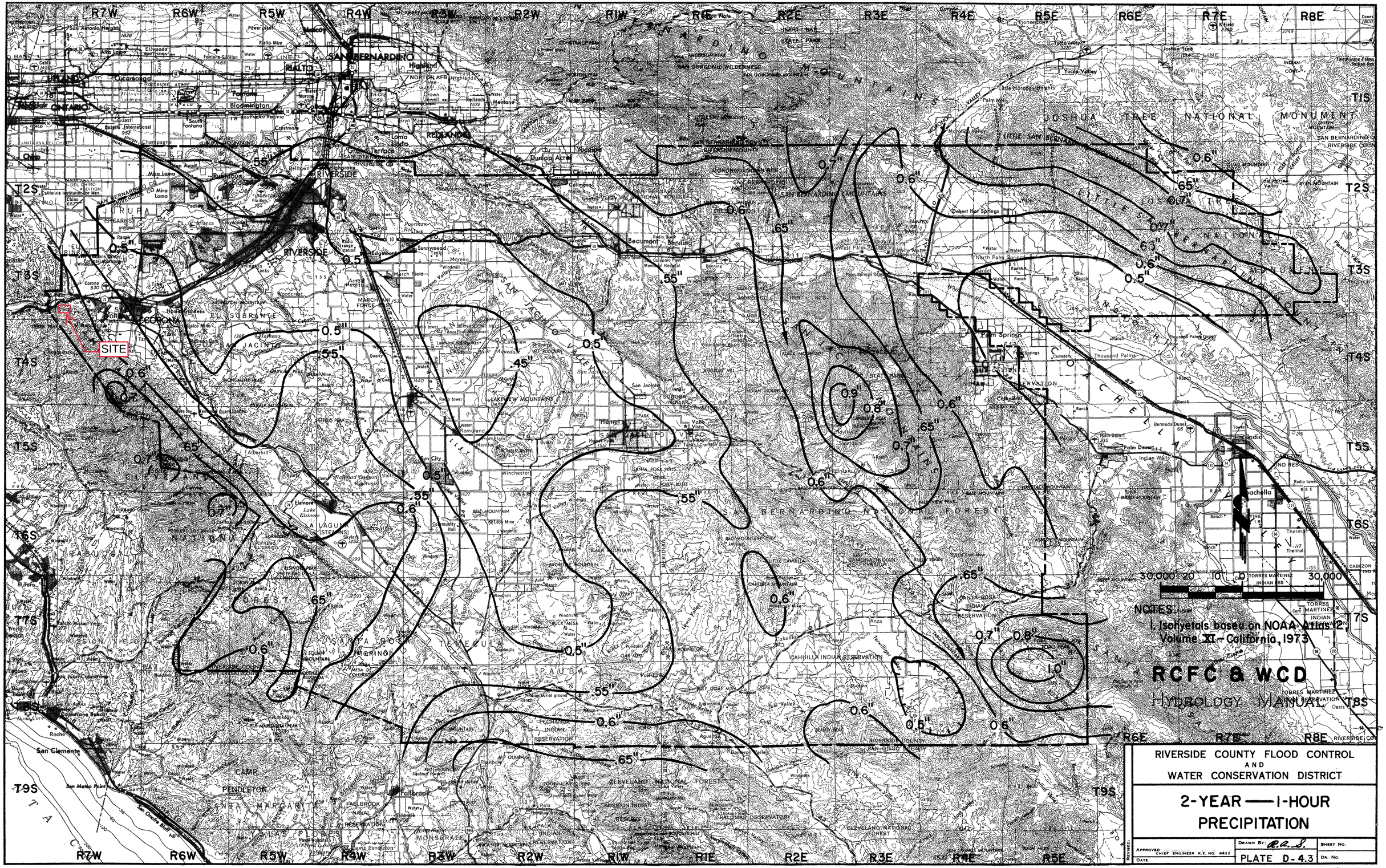
RIVERSIDE COUNTY HYDROLOGIC DATA SUMMARY

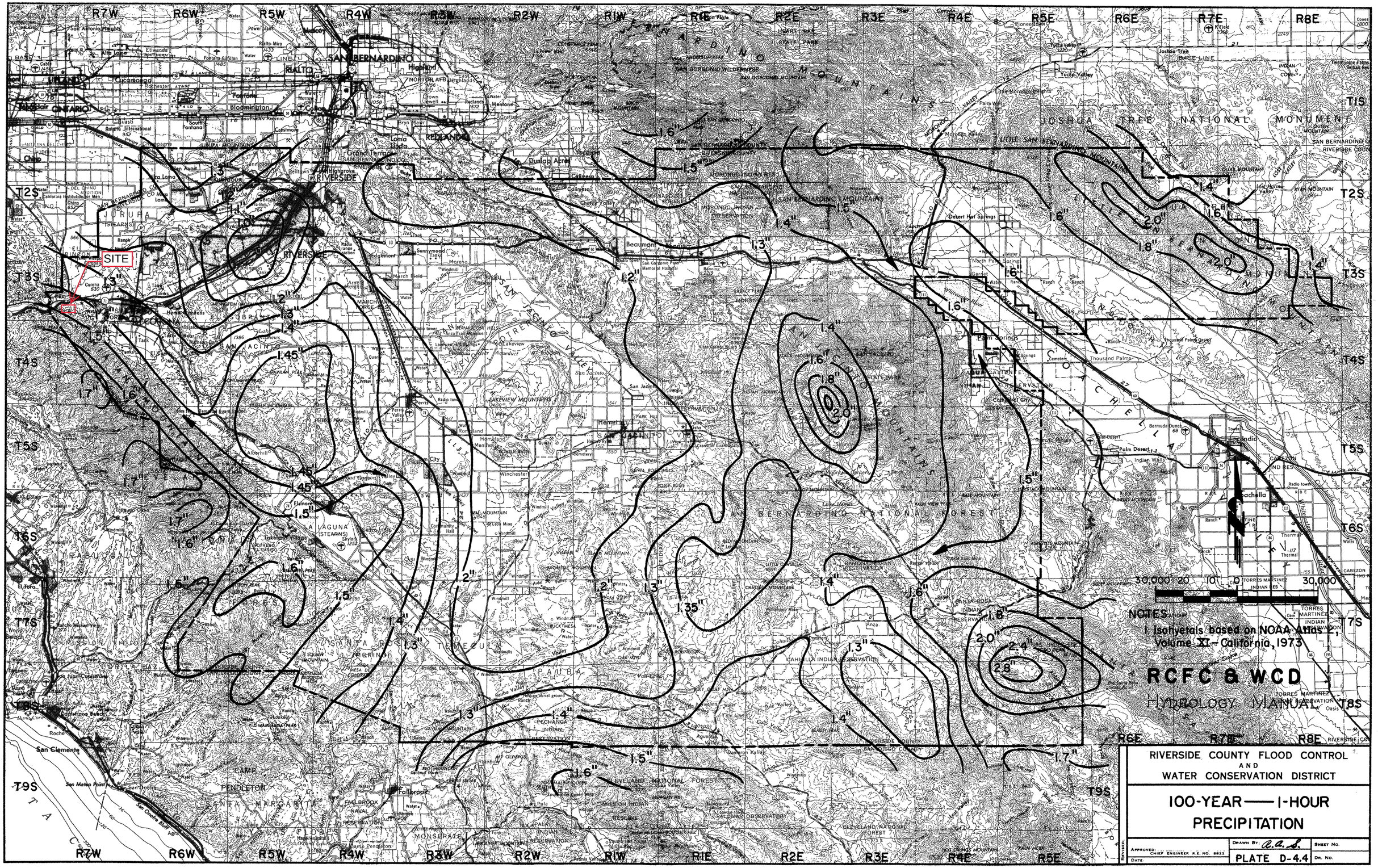
RAINFALL DEPTH

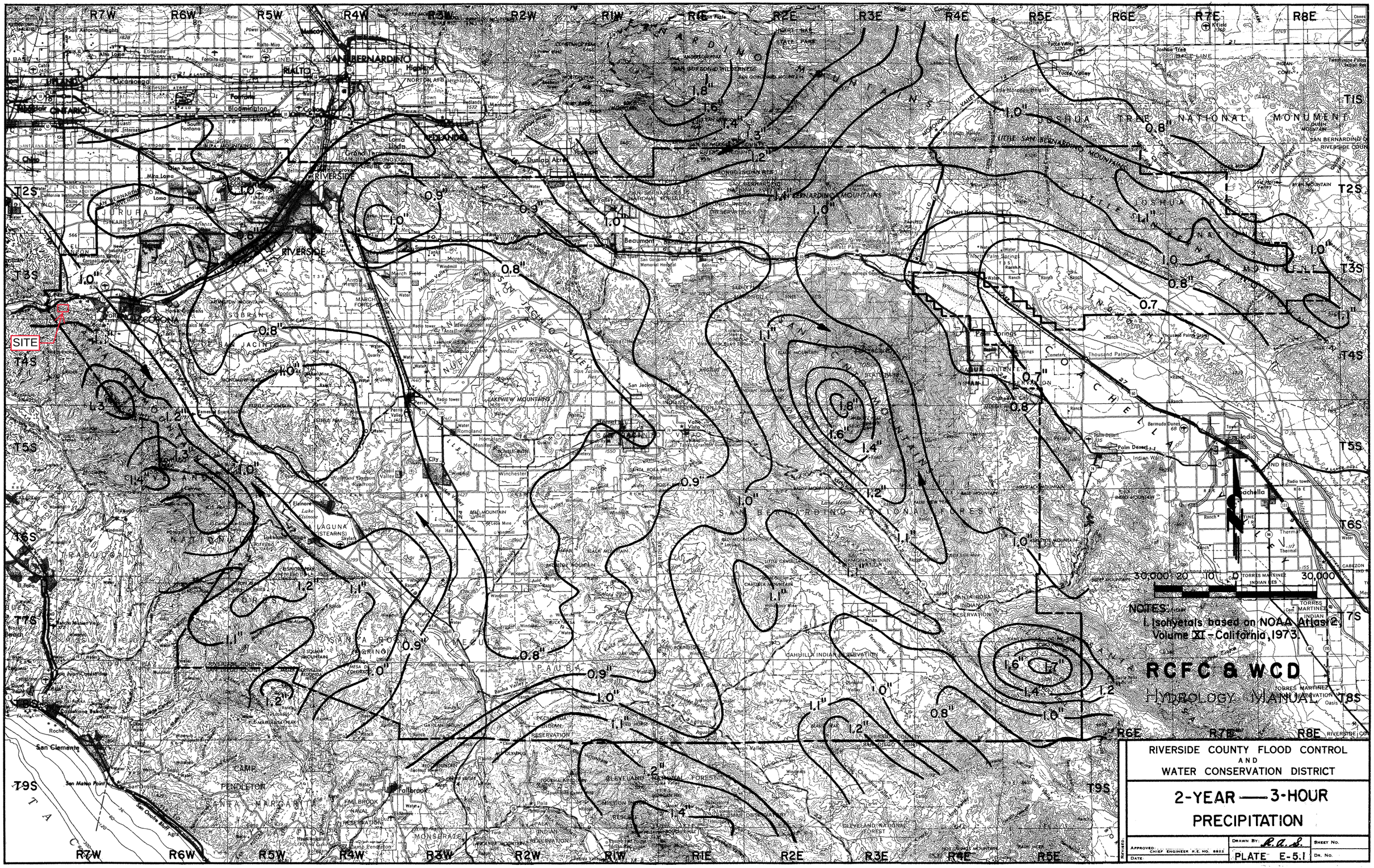
Storm Frenquency (Hr)	2 Year Storm Event Rainfall Depth (inches)	100 Year Storm Event Rainfall Depth (inches)
1	0.62	1.45
3	1.06	2.63
6	1.52	3.75
24	2.85	8.85

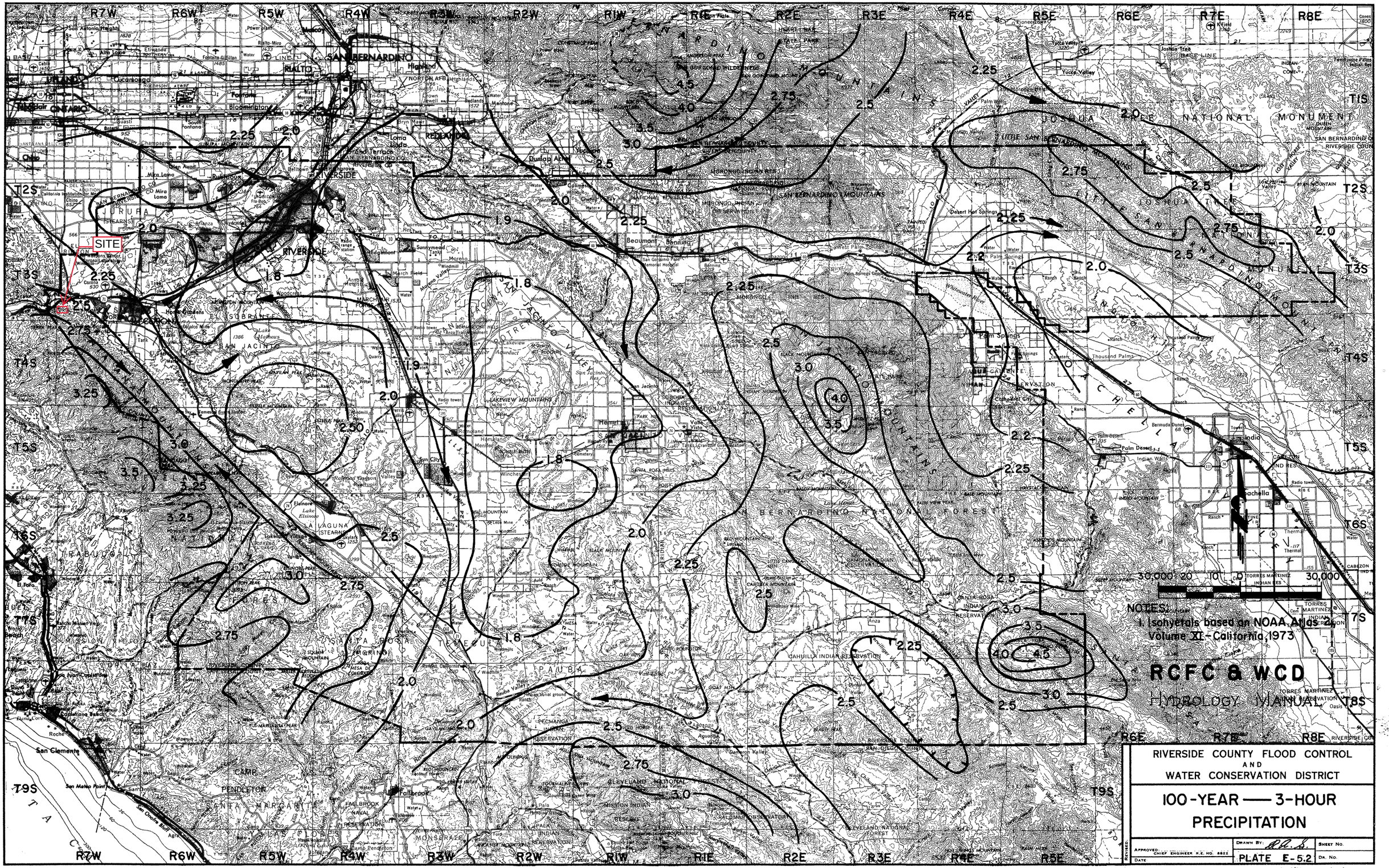
Slope of Intensity Duration Curve:
Slope of Intensity Duration Curve: 0.48

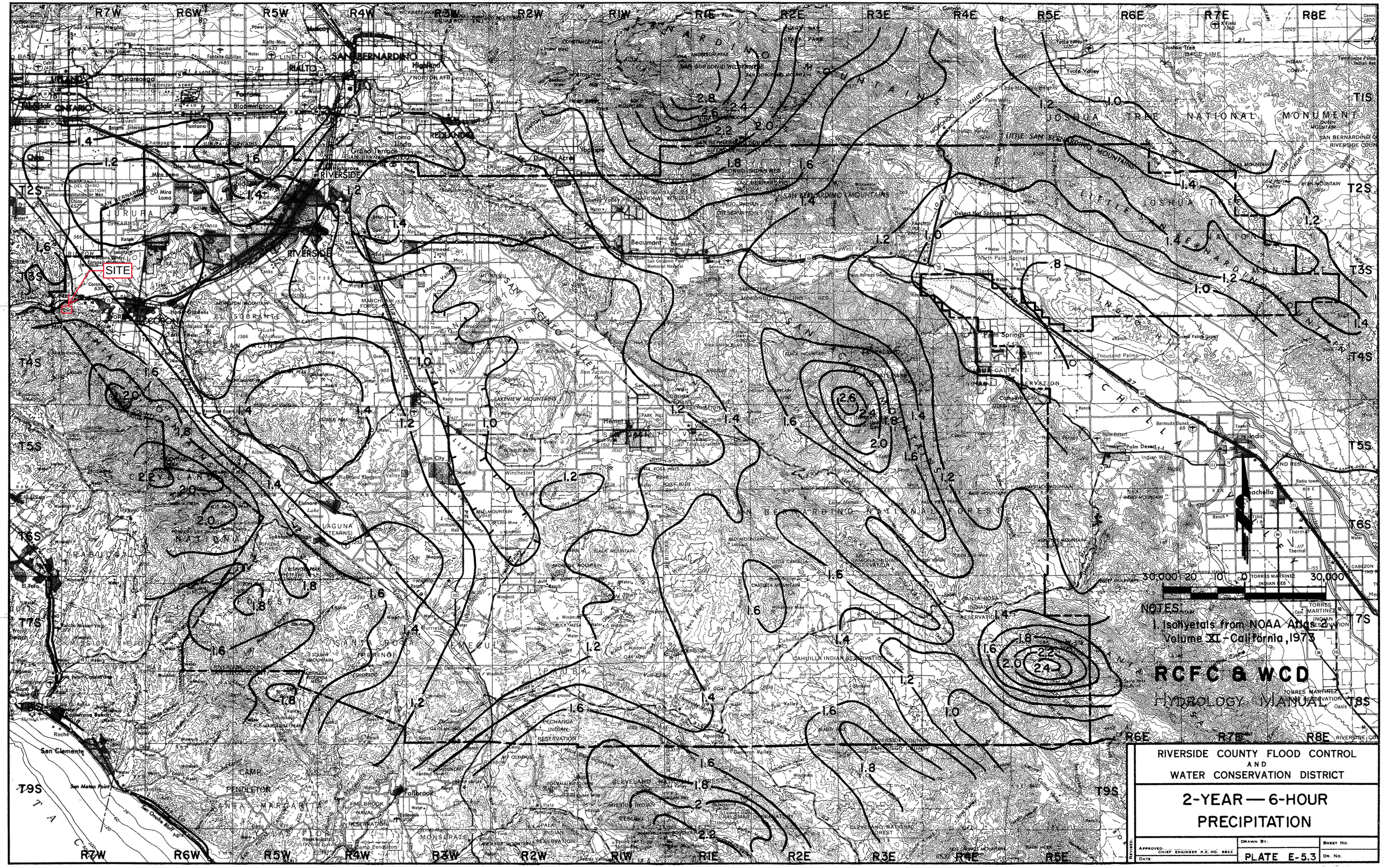
HYDROLOGIC SOIL TYPE:
Soil Type (entire site): B, C & D

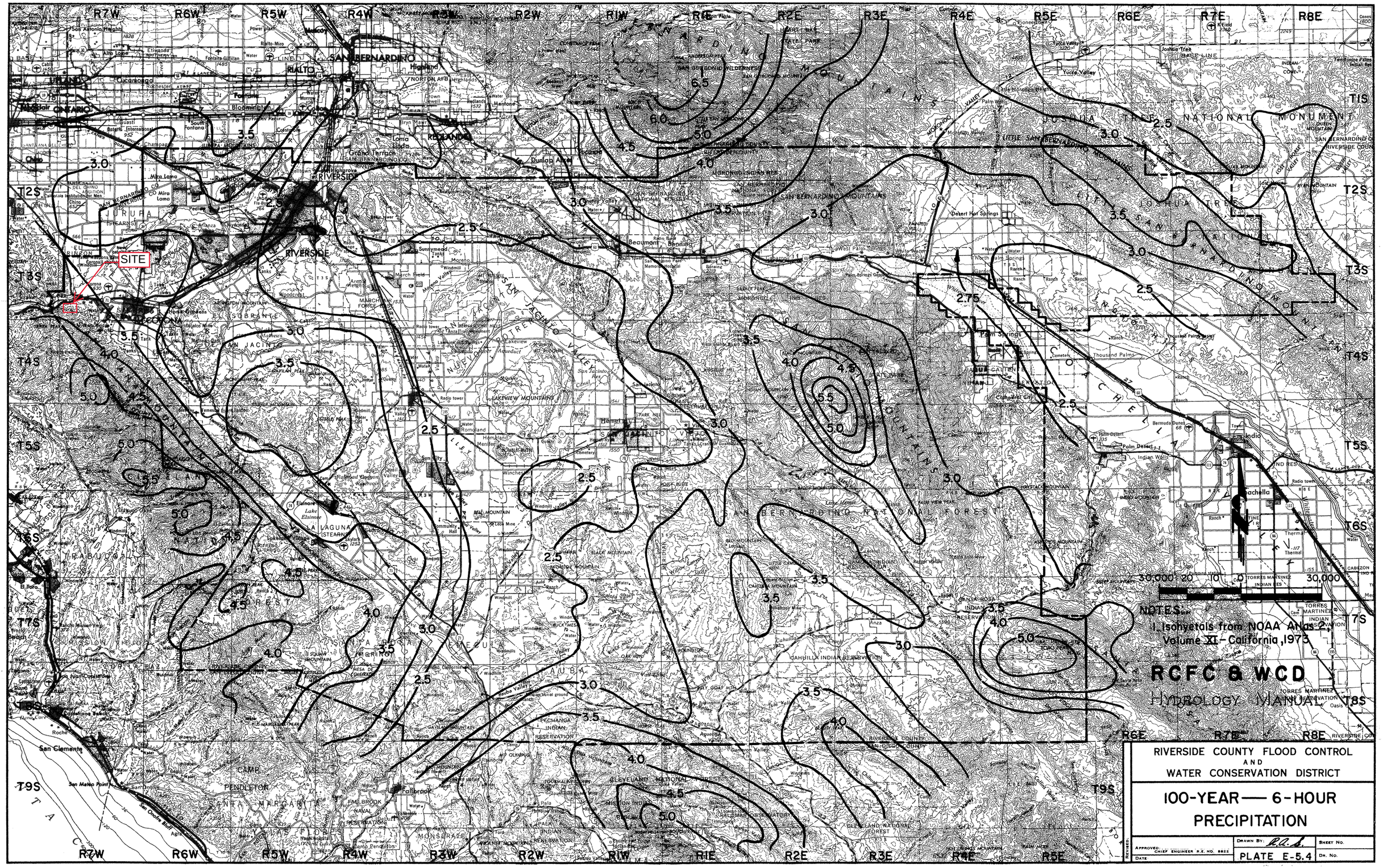

SITE
0.5"
0.55"
0.6"
0.65"
0.7"
0.8"
0.9"
1.0"
.45"
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
DRAWN BY: R.A.S.
PLATE D-4.3
APPROVED CHIEF ENGINEER R.E. NO. 8822
DATE
REVISED:
SHEET No.
DR. No.


SITE
1.0"
1.1"
1.2"
1.3"
1.4"
1.45"
1.5"
1.6"
1.7"
1.8"
2.0"
2.4"
2.8"
1.35"
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
APPROVED: CHIEF ENGINEER R.E. NO. 6822
DATE
DRAWN BY: A.A.S.
SHEET NO.
PLATE D-4.4
DR. NO.
REVISED


SITE
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 3-HOUR PRECIPITATION
DRAWN BY: R.A.S.
SHEET NO.
APPROVED: CHIEF ENGINEER R.E. NO. 6822
PLATE E-5.1
DR. No.
DATE
REVISED


SITE
SAN BERNARDINO
RIVERSIDE
RIALTO
COLTON
CORONA
NORCO
JURUPA
MORENO VALLEY
PERRIS
HEMET
SAN JACINTO
TEMECULA
MURRIETA
LAKE ELSINORE
CANYON LAKE
LAKE MATHEWS
LAKE PERRIS
LAKE ELSINORE
SAN JACINTO MOUNTAINS
SAN BERNARDINO MOUNTAINS
SANTA ROSA MOUNTAINS
LAKEVIEW MOUNTAINS
SANTA ANA MOUNTAINS
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
CAHUILLA INDIAN RESERVATION
AGUA CALIENTE INDIAN RESERVATION
MORONGO INDIAN RESERVATION
SOBOBA INDIAN RESERVATION
PECHANGA INDIAN RESERVATION
SAN MANUEL INDIAN RESERVATION
TORRES MARTINEZ INDIAN RESERVATION
CAMP PENDLETON
MARCH AFB
NORTON AFB
Palm Springs
Desert Hot Springs
Cathedral City
Rancho Mirage
Palm Desert
Indian Wells
Indio
La Quinta
Coachella
Thousand Palms
Yucca Valley
Twentynine Palms
Joshua Tree
Banning
Beaumont
Redlands
Loma Linda
Riverside
Corona
Norco
Moreno Valley
Perris
Hemet
San Jacinto
Temecula
Murrieta
Lake Elsinore
Canyon Lake
Fallbrook
Oceanside
San Clemente
San Mateo Point
San Onofre Bluff
Dana Point
Laguna Beach
Huntington Beach
Long Beach
Santa Ana
Anaheim
Ontario
Chino
Pomona
Claremont
Upland
Rialto
Fontana
Colton
Highland
Yucaipa
Calimesa
Banning
Beaumont
Cabazon
Mecca
Oasis
Salton Sea
R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E
T2S T3S T4S T5S T6S T7S T8S T9S
2.0 2.25 2.5 2.75 3.0 3.25 3.5 4.0 4.5
1.8 1.9 2.2 2.50
30,000 20 10 0 30,000
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR PRECIPITATION
APPROVED CHIEF ENGINEER R.E. NO. 8822
DATE
REVISED
DRAWN BY: R.A.S.
SHEET No.
PLATE E-5.2
DR. No.


SITE
SAN BERNARDINO
RIVERSIDE
RIALTO
REDLANDS
NORCO
CORONA
MORENO VALLEY
PERRIS
HEMET
SAN JACINTO
BEAUMONT
BANNING
CALIMESA
LAKE ELSINORE
MURRIETA
TEMECULA
WILDOMAR
LAKE MATHEWS
LAKE PERRIS
LAKE SKINNER
SAN JACINTO MOUNTAINS
SAN BERNARDINO MOUNTAINS
SAN JACINTO WILDERNESS
SAN GORGONIO WILDERNESS
JOSHUA TREE NATIONAL MONUMENT
LITTLE SAN BERNARDINO MOUNTAINS
PALM SPRINGS
CATHEDRAL CITY
RANCHO MIRAGE
PALM DESERT
INDIO
COACHELLA
DESERT HOT SPRINGS
MORONGO INDIAN RESERVATION
SOBOBA INDIAN RESERVATION
AGUA CALIENTE INDIAN RESERVATION
SANTA ROSA INDIAN RESERVATION
TORRES MARTINEZ INDIAN RESERVATION
CAHUILLA INDIAN RESERVATION
SANTA ROSA MOUNTAINS
SAN JACINTO FAULT
SAN ANDREAS FAULT
CHINO CREEK
SANTA ANA RIVER
TEMECULA CREEK
SAN LUIS REY RIVER
SAN MATEO POINT
SAN ONOFRE BLUFF
CAMP PENDLETON
MARINE CORPS BASE
TWENTYNINE PALMS
R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E
T2S T1S T3S T4S T5S T6S T7S T8S T9S
1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8
30,000 20 10 0 30,000
NOTES
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 6-HOUR PRECIPITATION
APPROVED CHIEF ENGINEER R.E. NO. 6822
DATE
DRAWN BY:
PLATE E-5.3
SHEET NO.
DR. NO.
REVISED



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

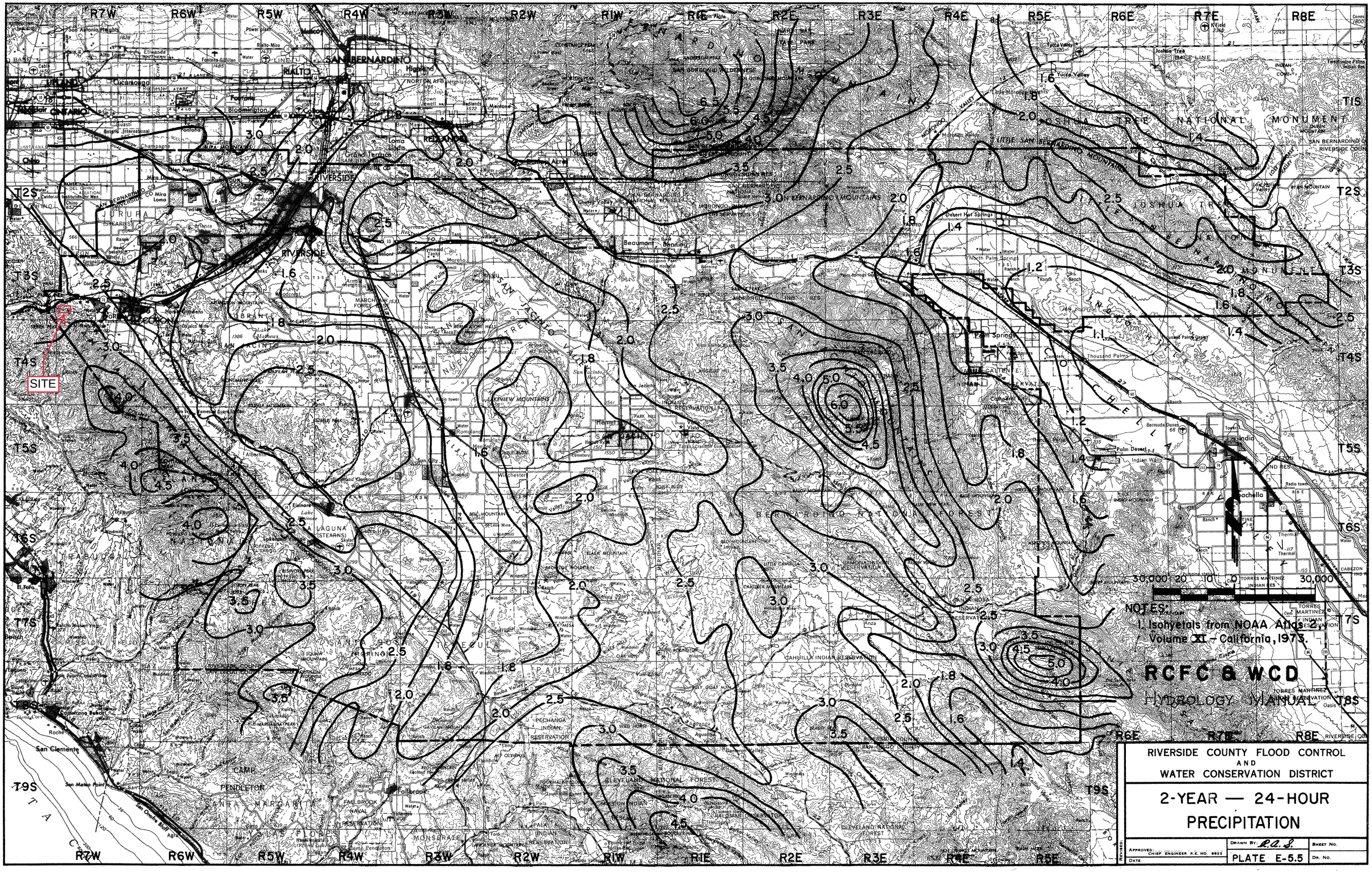
RCFC & WCD

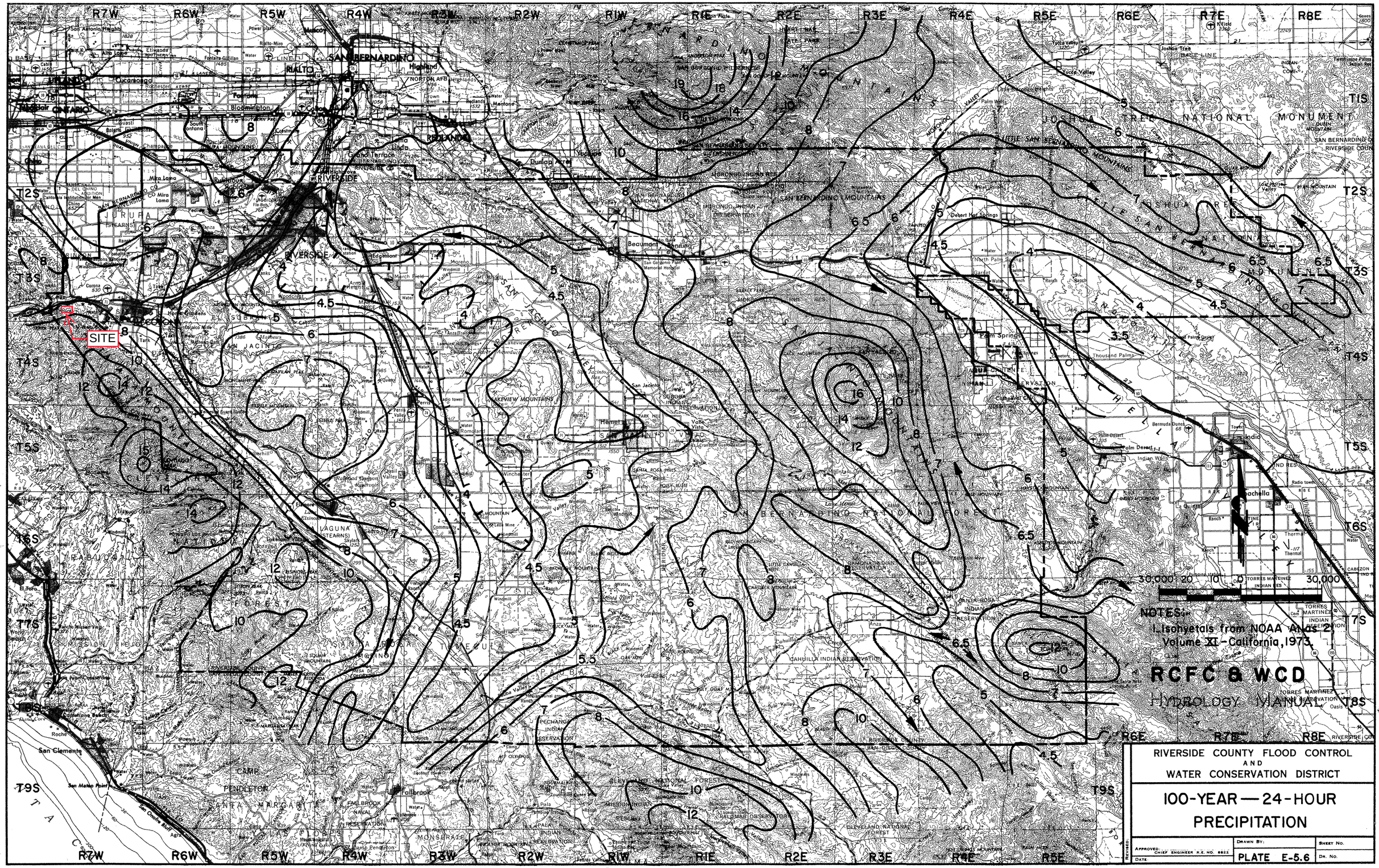
HYDROLOGY MANUAL

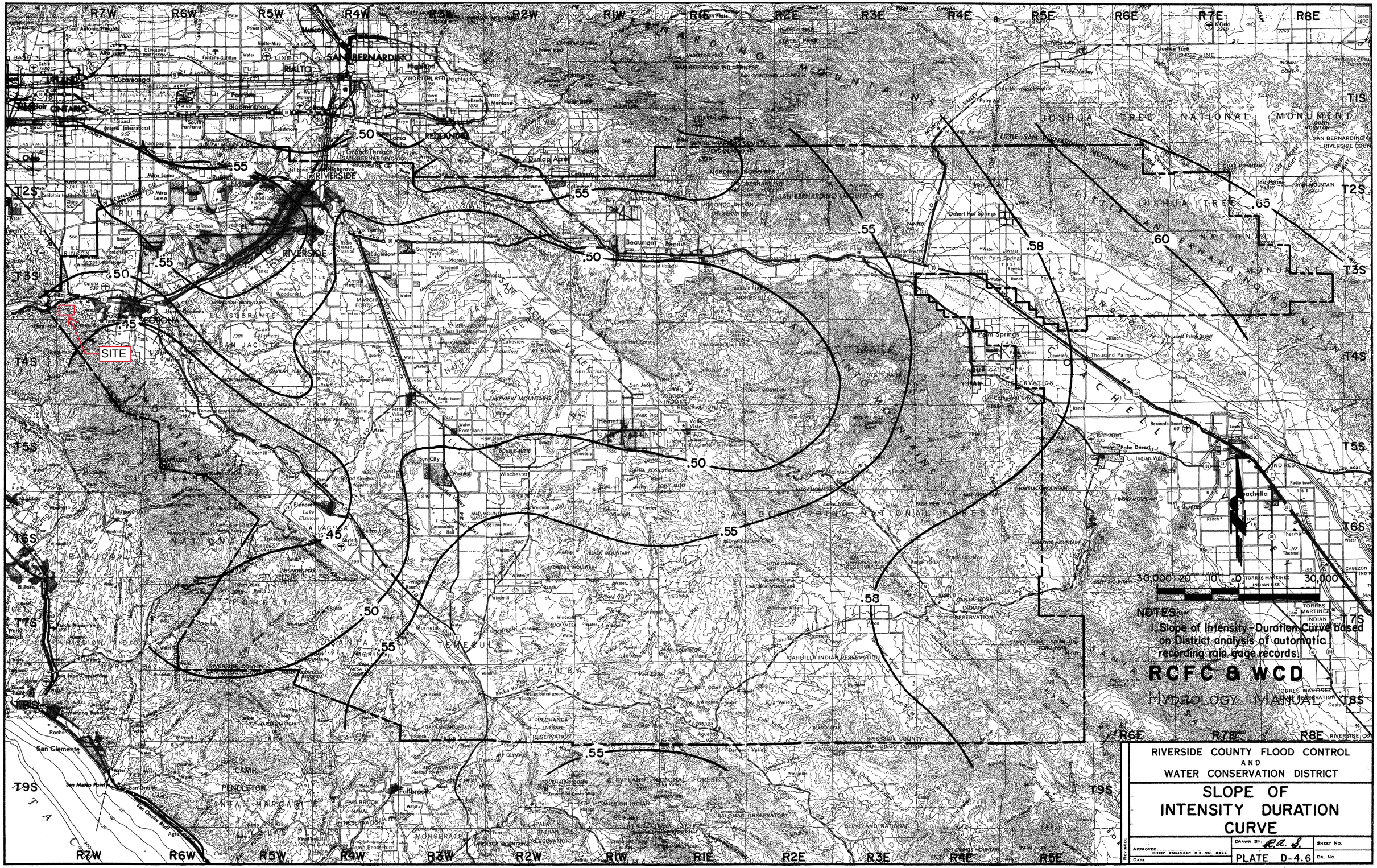
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

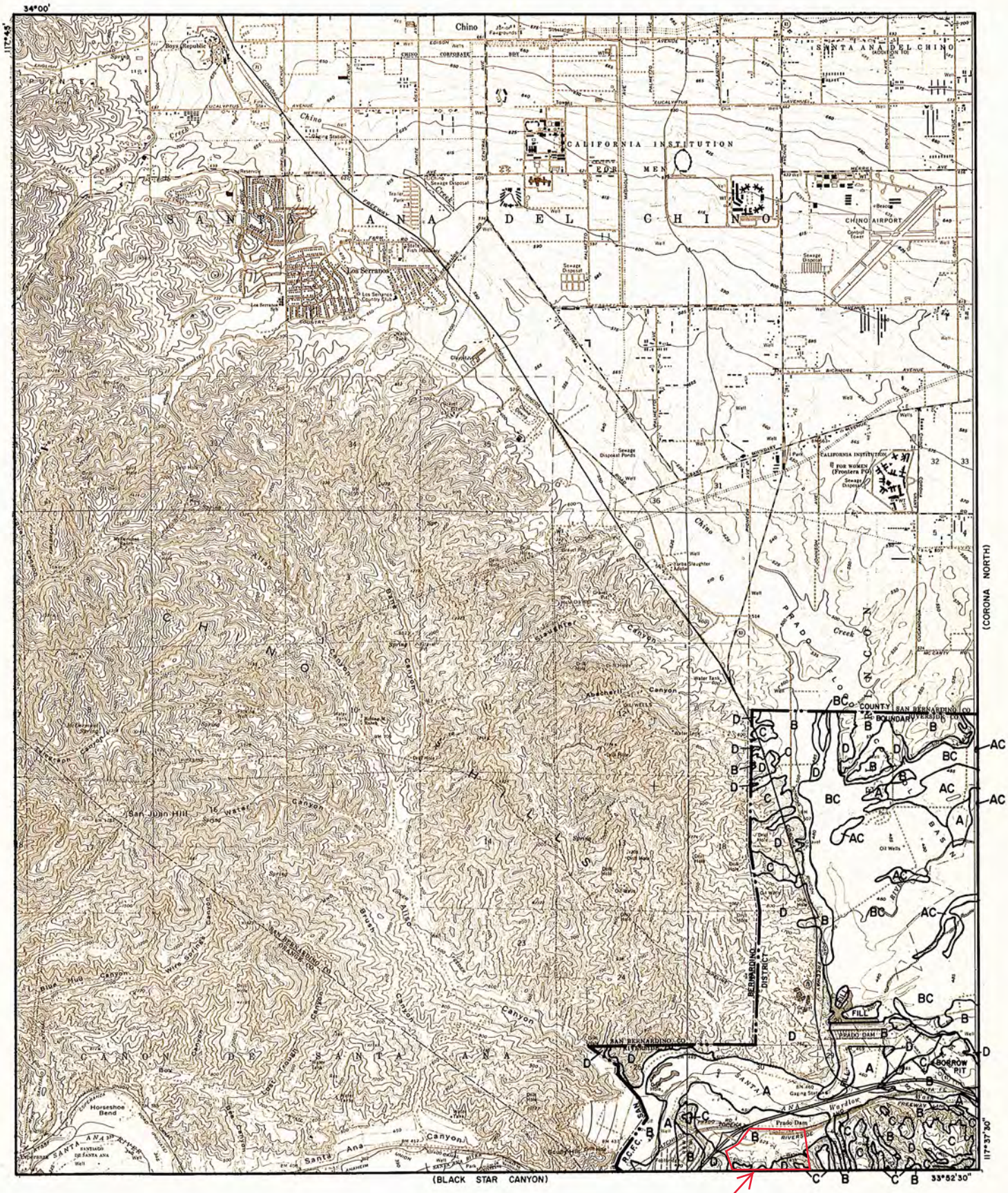
100-YEAR — 6-HOUR PRECIPITATION

REVISED:	DRAWN BY: R.A.S.	SHEET NO.
APPROVED CHIEF ENGINEER R.E. NO. 8822	PLATE E-5.4	DR. NO.
DATE		


SITE
SAN BERNARDINO
RIVERSIDE
RIALTO
COLTON
LOMA LINDA
REDLANDS
HIGHGROVE
BEAUMONT
BANNING
CALIMESA
NORTON AFB
MARCH AIR FORCE BASE
MORENO VALLEY
PERRIS
HEMET
SAN JACINTO
CORONA
NORCO
JURUPA MOUNTAINS
SAN JACINTO MOUNTAINS
SAN BERNARDINO MOUNTAINS
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
JOSHUA TREE NATIONAL MONUMENT
PALM SPRINGS
CATHEDRAL CITY
RANCHO MIRAGE
PALM DESERT
INDIO
COACHELLA
LAKE ELSINORE
LAGUNA (STEARNS)
SAN JUAN CAPISTRANO
SAN CLEMENTE
FALLBROOK
CAMP PENDLETON
SANTA MARGARITA
SAN ONOFRE BLUFF
SAN MATEO POINT
PECHANGA INDIAN RESERVATION
CAHUILLA INDIAN RESERVATION
SANTA ROSA PLATEAU
SAN JACINTO FAULT
SAN ANDREAS FAULT
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
DRAWN BY: R.A.S.
PLATE E-5.5
SHEET NO.
DR. NO.
APPROVED: CHIEF ENGINEER R.E. NO. 8822
DATE
REVISED


SITE
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.6
SHEET NO.
DRAWN BY:
APPROVED CHIEF ENGINEER R.E. NO. 8822
DATE
REVISED


.45
.50
.55
.58
.60
.63
SITE
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T1S
SAN BERNARDINO MOUNTAINS
SAN JACINTO MOUNTAINS
SAN JACINTO FAULT
SAN ANDREAS FAULT
JOSHUA TREE NATIONAL MONUMENT
CLEVELAND NATIONAL FOREST
SAN BERNARDINO NATIONAL FOREST
SANTA ANA RIVER
SANTA MARGARITA
TEMECULA
PAUBA
LAGUNA
TEMESCAL
SAN JACINTO VALLEY
SAN GORGONIO WILDERNESS
SAN GORGONIO MOUNTAIN
LITTLE SAN BERNARDINO MOUNTAINS
SAN JACINTO PEAK
SAN JACINTO STATE PARK
SAN JACINTO WILDERNESS
SAN JACINT



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

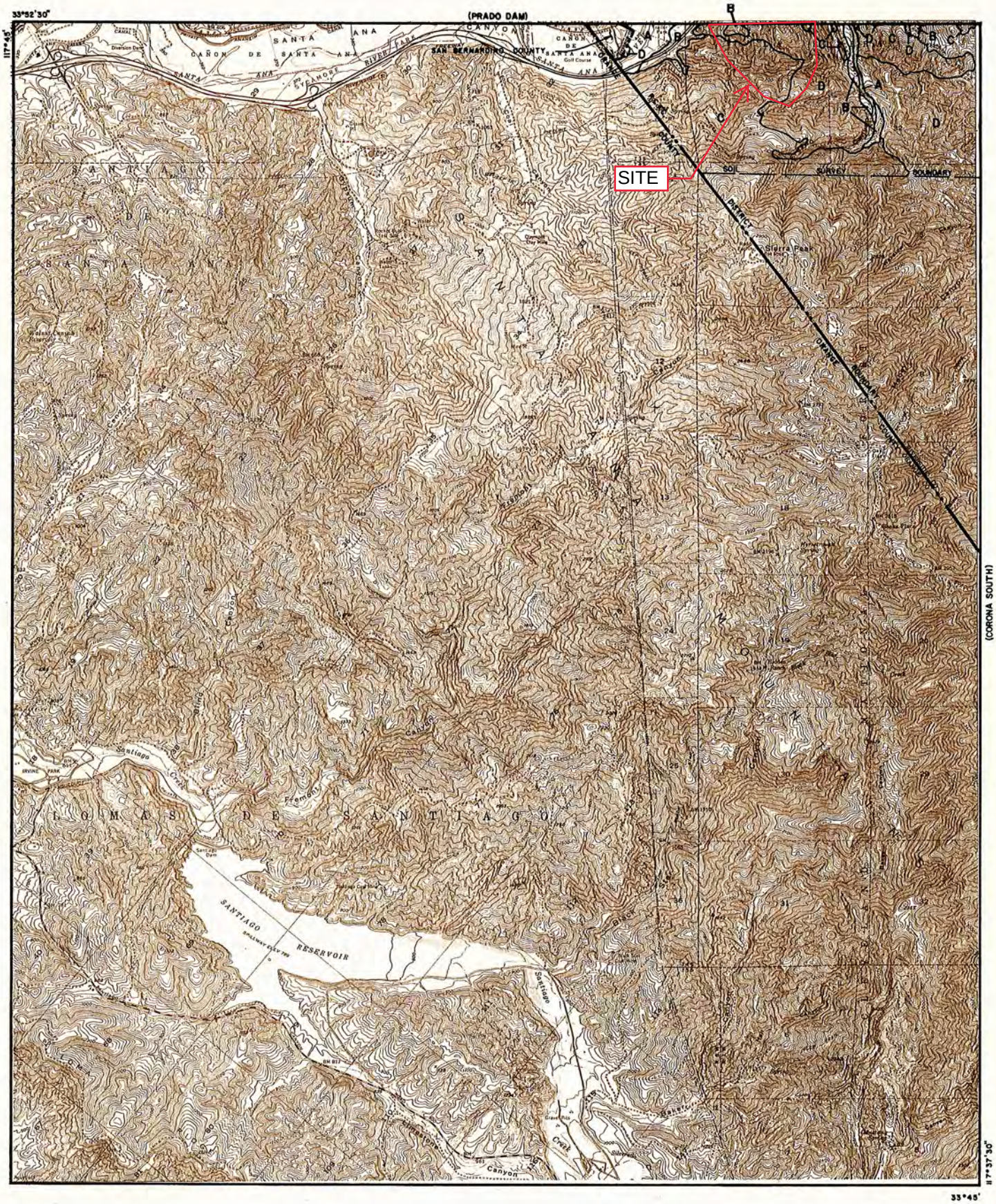
RCFC&WCD

HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR PRADO DAM

PLATE C-1.13



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR BLACK STAR CANYON

PLATE C-1.26

STATE OF CALIFORNIA
The Resources Agency
Department of Water Resources
Division of Safety of Dams

STATUTES AND REGULATIONS PERTAINING TO SUPERVISION OF DAMS AND RESERVOIRS 1970*

CALIFORNIA ADMINISTRATIVE CODE

Title 23. Waters

Chapter 2. Department of Water Resources

Subchapter 1. Dams and Reservoirs

Article 1. General Provisions

301. Definitions. As used in these regulations, the terms listed below shall have the meanings noted:

(a) Department. "Department" means the Department of Water Resources of the State of California.

(b) Dam. "Dam" means any artificial barrier, together with appurtenant works, which does or may impound or divert water, and which either (a) is or will be 25 feet or more in height from the natural bed of the stream or watercourse at the downstream toe of the barrier, as determined by the department, or from the lowest elevation of the outside limit of the barrier, as determined by the department, if it is not across a stream channel or watercourse, to the maximum possible water storage elevation or (b) has or will have an impounding capacity of 50 acre-feet or more.

Any such barrier which is or will not be in excess of 6 feet in height, regardless of storage capacity, or which has or will have a storage capacity not in excess of 15 acre-feet, regardless of height, shall not be considered a dam.

No obstruction in a canal used to raise or lower water therein or divert water therefrom, no levee, including but not limited to a levee on the bed of a natural lake the primary purpose of which levee is to control floodwaters, no railroad fill or structure, and no road or highway fill or structure, no circular tank constructed of steel or concrete or of a combination thereof, no tank elevated above the ground, and no barrier which is not across a stream channel, watercourse, or natural drainage area and which has the principal purpose of impounding water for agricultural use shall be considered a dam. In addition, no obstruction in the channel of a stream or watercourse which is 15 feet or less in height from the lowest elevation of the obstruction and which has the single purpose of spreading water within the bed of the stream or watercourse upstream from the obstruction for percolation underground shall be considered a dam.

(c) Reservoir. "Reservoir" means any reservoir which contains or will contain the water impounded by a dam.

(d) Owner. "Owner" includes any of the following who own, control, operate, maintain, manage, or propose to construct a dam or reservoir:

(1) The State and its departments, institutions, agencies, and political subdivisions.

(2) Every municipal or quasi-municipal corporation.

(3) Every public utility.

(4) Every district.

(5) Every person.

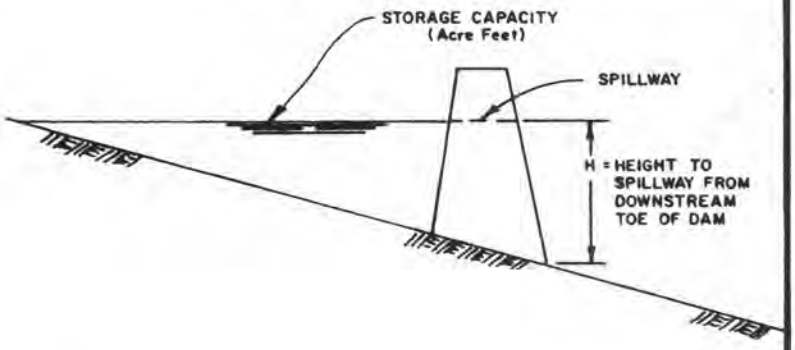
(6) The duly authorized agents, lessees, or trustees of any of the foregoing.

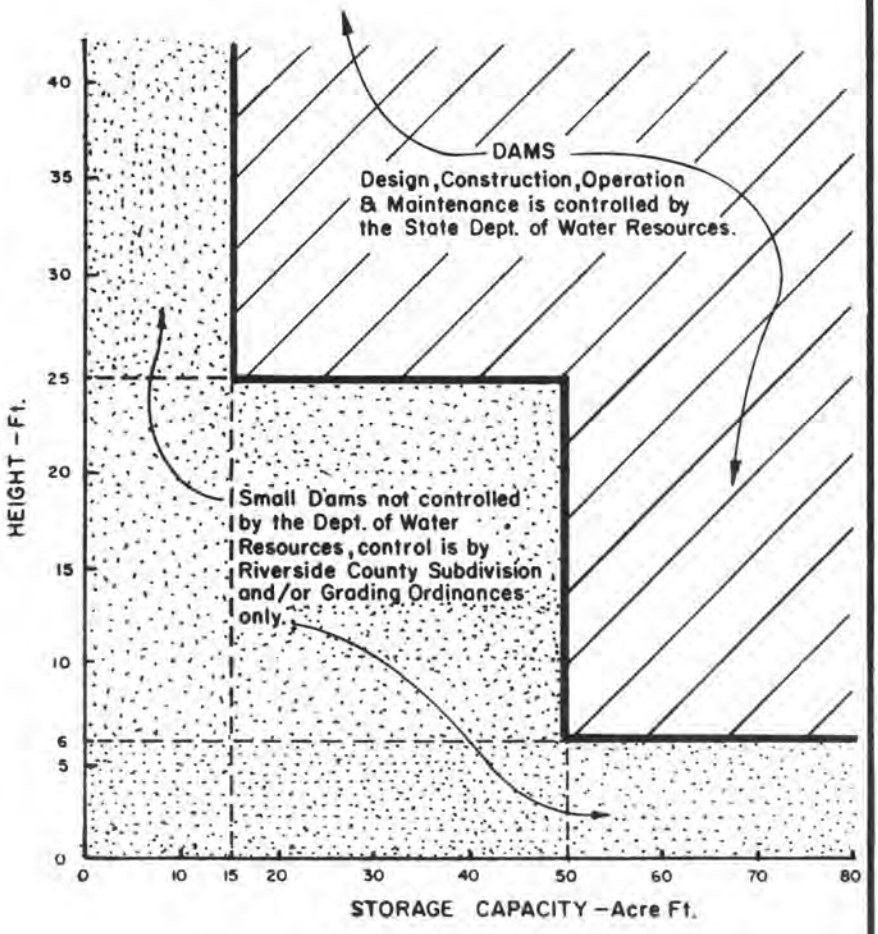
(7) Receivers or trustees appointed by any court for any of the foregoing.

"Owner" does not include the United States. (Sections 6002-6005, Water Code)

302. Purpose and Effect of Regulations. These regulations are adopted for the purpose of carrying out the provisions of Part 1 of Division 3 of the Water Code. Under no circumstances, and in no particular case, shall these regulations, or any of them, be construed as a limitation or restriction upon the exercise of any proper discretion that is vested in the department, nor shall they in any event be construed to deprive the department of any exercise of powers, duties and jurisdiction conferred by law, nor to limit or restrict the amount or character of data or information which may be required for the proper administration of the law. (Section 6078, Water Code)

* USERS SHOULD ASCERTAIN IF STATUTES HAVE BEEN REVISED.





RCFC & WCD
HYDROLOGY MANUAL

DAMS & IMPOUNDMENT RESERVOIRS UNDER STATE CONTROL

PLATE A-3

Appendix

C

EXISTING CONDITION HYDROLOGIC ANALYSIS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/15/20 File:1886EXA2.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "A" EXISTING CONDITION 2-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.584(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 200.000 to Point/Station 205.000
**** INITIAL AREA EVALUATION ****

```
Initial area flow distance =   778.000(Ft.)
Top (of initial area) elevation =  1520.000(Ft.)
Bottom (of initial area) elevation =  1060.000(Ft.)
Difference in elevation =   460.000(Ft.)
Slope =    0.59126  s(percent)=      59.13
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.439 min.
Rainfall intensity =      1.496(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.665
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.665(CFS)
Total initial stream area =        4.690(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      210.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   1060.000(Ft.)
End of natural channel elevation =    779.000(Ft.)
Length of natural channel  =   626.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.644(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.4489
Corrected/adjusted channel slope =  0.2174
Travel time =    1.85 min.     TC =   10.29  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.360(In/Hr) for a     2.0 year storm
Subarea runoff =     10.597(CFS) for     12.020(Ac.)
Total runoff =     15.262(CFS)  Total area =      16.710(Ac.)


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Process from Point/Station      210.000 to Point/Station      210.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.29 min.
Rainfall intensity =      1.360(In/Hr) for a     2.0 year storm
Subarea runoff =      3.729(CFS) for      4.230(Ac.)
Total runoff =     18.991(CFS)  Total area =      20.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      215.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    779.000(Ft.)
End of natural channel elevation =    663.000(Ft.)
Length of natural channel  =   505.000(Ft.)
Estimated mean flow rate at midpoint of channel =     26.528(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2297
Corrected/adjusted channel slope =  0.1719
Travel time =    1.24 min.     TC =   11.53  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.638
Decimal fraction soil group A = 0.000
```

```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.288(In/Hr) for a     2.0 year storm
Subarea runoff =     13.660(CFS) for     16.620(Ac.)
Total runoff =     32.651(CFS)  Total area =      37.560(Ac.)


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Process from Point/Station      215.000 to Point/Station      215.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.656
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 1)  =  73.52
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.53 min.
Rainfall intensity =      1.288(In/Hr) for a     2.0 year storm
Subarea runoff =     10.632(CFS) for     12.590(Ac.)
Total runoff =     43.284(CFS)  Total area =      50.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      220.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    663.000(Ft.)
End of natural channel elevation =    588.000(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =     47.262(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.10(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0938
Corrected/adjusted channel slope =  0.0938
Travel time =    2.18 min.     TC =   13.71  min.


 Adding area flow to channel
```

```
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.659
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
RI index for soil(AMC 1)  =  75.44
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.185(In/Hr) for a     2.0 year storm
Subarea runoff =      7.198(CFS) for      9.220(Ac.)
Total runoff =     50.482(CFS)  Total area =      59.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      220.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.645
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    13.71 min.
Rainfall intensity =      1.185(In/Hr) for a     2.0 year storm
Subarea runoff =      4.556(CFS) for      5.960(Ac.)
Total runoff =     55.038(CFS)  Total area =      65.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      225.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    588.000(Ft.)
End of natural channel elevation =    563.000(Ft.)
Length of natural channel  =   503.000(Ft.)
Estimated mean flow rate at midpoint of channel =     57.477(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.76(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0497
Corrected/adjusted channel slope =  0.0497
Travel time =    1.76 min.     TC =   15.47  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.658
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.118(In/Hr) for a     2.0 year storm
Subarea runoff =      4.260(CFS) for      5.790(Ac.)
Total runoff =     59.298(CFS)  Total area =      71.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      225.000 to Point/Station      230.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    563.000(Ft.)
End of natural channel elevation =    532.000(Ft.)
Length of natural channel  =   643.000(Ft.)
Estimated mean flow rate at midpoint of channel =     61.924(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.04(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0482
Corrected/adjusted channel slope =  0.0482
Travel time =    1.19 min.     TC =   16.66  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.482
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  58.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.080(In/Hr) for a     2.0 year storm
Subarea runoff =      3.281(CFS) for      6.300(Ac.)
Total runoff =     62.579(CFS)  Total area =      77.420(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     77.420(Ac.)
Runoff from this stream =     62.579(CFS)
Time of concentration =   16.66 min.
Rainfall intensity =     1.080(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   763.000(Ft.)
Top (of initial area) elevation =  1180.000(Ft.)
Bottom (of initial area) elevation =   800.000(Ft.)
Difference in elevation =   380.000(Ft.)
Slope =    0.49803  s(percent)=      49.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.666 min.
Rainfall intensity =      1.477(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 1)  =  75.92
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.255(CFS)
Total initial stream area =        7.020(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    645.000(Ft.)
Length of natural channel  =  1171.000(Ft.)
Estimated mean flow rate at midpoint of channel =     11.761(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
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```
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.40(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1324
Corrected/adjusted channel slope =  0.1227
Travel time =    4.43 min.     TC =   13.10  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.672
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.211(In/Hr) for a     2.0 year storm
Subarea runoff =      7.095(CFS) for      8.720(Ac.)
Total runoff =     14.350(CFS)  Total area =      15.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      140.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    645.000(Ft.)
End of natural channel elevation =    564.000(Ft.)
Length of natural channel  =   932.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.764(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.26(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0869
Corrected/adjusted channel slope =  0.0869
Travel time =    3.65 min.     TC =   16.75  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.651
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
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```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.077(In/Hr) for a     2.0 year storm
Subarea runoff =      5.249(CFS) for      7.490(Ac.)
Total runoff =     19.599(CFS)  Total area =      23.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     23.230(Ac.)
Runoff from this stream =     19.599(CFS)
Time of concentration =   16.75 min.
Rainfall intensity =     1.077(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      125.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   810.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =   700.000(Ft.)
Difference in elevation =   360.000(Ft.)
Slope =    0.44444  s(percent)=      44.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.080 min.
Rainfall intensity =      1.444(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.542(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      130.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    700.000(Ft.)
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```
End of natural channel elevation =    595.000(Ft.)
Length of natural channel  =   570.000(Ft.)
Estimated mean flow rate at midpoint of channel =      6.292(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1842
Corrected/adjusted channel slope =  0.1521
Travel time =    2.39 min.     TC =   11.47  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.682
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.291(In/Hr) for a     2.0 year storm
Subarea runoff =      3.049(CFS) for      3.460(Ac.)
Total runoff =      7.590(CFS)  Total area =       7.950(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.682
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.47 min.
Rainfall intensity =      1.291(In/Hr) for a     2.0 year storm
Subarea runoff =      8.829(CFS) for     10.020(Ac.)
Total runoff =     16.420(CFS)  Total area =      17.970(Ac.)


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Process from Point/Station      130.000 to Point/Station      140.000
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**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    595.000(Ft.)
End of natural channel elevation =    564.000(Ft.)
Length of natural channel  =   350.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.772(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.30(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0886
Corrected/adjusted channel slope =  0.0886
Travel time =    1.36 min.     TC =   12.82  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.673
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.224(In/Hr) for a     2.0 year storm
Subarea runoff =      2.439(CFS) for      2.960(Ac.)
Total runoff =     18.859(CFS)  Total area =      20.930(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     20.930(Ac.)
Runoff from this stream =     18.859(CFS)
Time of concentration =   12.82 min.
Rainfall intensity =     1.224(In/Hr)
Summary of stream data:

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


1       19.599     16.75                1.077
2       18.859     12.82                1.224
```

```
Largest stream flow has longer time of concentration
Qp =     19.599 + sum of
          Qb         Ia/Ib
          18.859 *    0.880 =     16.591
Qp =     36.190

Total of 2 streams to confluence:
Flow rates before confluence point:
      19.599      18.859
Area of streams before confluence:
       23.230       20.930
Results of confluence:
Total flow rate =     36.190(CFS)
Time of concentration =    16.748 min.
Effective stream area after confluence =     44.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      230.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    564.000(Ft.)
End of natural channel elevation =    532.000(Ft.)
Length of natural channel  =   500.000(Ft.)
Estimated mean flow rate at midpoint of channel =     37.596(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.03(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0640
Corrected/adjusted channel slope =  0.0640
Travel time =    0.92 min.     TC =   17.67  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.493
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.049(In/Hr) for a     2.0 year storm
Subarea runoff =      1.774(CFS) for      3.430(Ac.)
Total runoff =     37.964(CFS)  Total area =      47.590(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     47.590(Ac.)
Runoff from this stream =     37.964(CFS)
Time of concentration =   17.67 min.
Rainfall intensity =     1.049(In/Hr)
Summary of stream data:

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


1       62.579     16.66                 1.080
2       37.964     17.67                 1.049
Largest stream flow has longer or shorter time of concentration
Qp =     62.579 + sum of
          Qa          Tb/Ta
          37.964 *    0.942 =     35.780
Qp =     98.360

Total of 2 main streams to confluence:
Flow rates before confluence point:
      62.579      37.964
Area of streams before confluence:
       77.420       47.590


Results of confluence:
Total flow rate =     98.360(CFS)
Time of concentration =    16.655 min.
Effective stream area after confluence  =    125.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      240.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    503.000(Ft.)
Length of natural channel  =   550.000(Ft.)
Estimated mean flow rate at midpoint of channel =    101.542(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
```

```
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.95(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0527
Corrected/adjusted channel slope =  0.0527
Travel time =    0.84 min.     TC =   17.49  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.494
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.054(In/Hr) for a     2.0 year storm
Subarea runoff =      4.213(CFS) for      8.090(Ac.)
Total runoff =    102.573(CFS)  Total area =     133.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.49 min.
Rainfall intensity =      1.054(In/Hr) for a     2.0 year storm
Subarea runoff =      1.007(CFS) for      1.140(Ac.)
Total runoff =    103.580(CFS)  Total area =     134.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.49 min.
Rainfall intensity =      1.054(In/Hr) for a     2.0 year storm
Subarea runoff =      0.883(CFS) for      1.000(Ac.)
Total runoff =    104.463(CFS)  Total area =     135.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.563
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  67.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    17.49 min.
Rainfall intensity =      1.054(In/Hr) for a     2.0 year storm
Subarea runoff =      6.064(CFS) for     10.210(Ac.)
Total runoff =    110.527(CFS)  Total area =     145.450(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      245.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Covered channel
Upstream point elevation =   503.000(Ft.)
Downstream point elevation =   493.000(Ft.)
Channel length thru subarea  =   144.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =    110.527(CFS)
Depth of flow =   1.040(Ft.), Average velocity =  21.253(Ft/s)
Channel flow top width =    5.000(Ft.)
Flow Velocity =   21.25(Ft/s)
Travel time  =    0.11 min.
Time of concentration =   17.61 min.

Sub-Channel No. 1 Critical depth =      2.469(Ft.)
  '     '       '     Critical flow top width =      5.000(Ft.)
```

```
  '     '       '     Critical flow velocity=    8.954(Ft/s)
  '     '       '     Critical flow area =     12.344(Sq.Ft)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.61 min.
Rainfall intensity =      1.051(In/Hr) for a     2.0 year storm
Subarea runoff =      0.414(CFS) for      0.470(Ac.)
Total runoff =    110.941(CFS)  Total area =     145.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      246.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    493.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =    50.000(Ft.)
Estimated mean flow rate at midpoint of channel =    111.001(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0800
Corrected/adjusted channel slope =  0.0800
Travel time =    0.11 min.     TC =   17.72  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.493
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
```

```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.048(In/Hr) for a     2.0 year storm
Subarea runoff =      0.083(CFS) for      0.160(Ac.)
Total runoff =    111.023(CFS)  Total area =     146.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    146.080(Ac.)
Runoff from this stream =    111.023(CFS)
Time of concentration =   17.72 min.
Rainfall intensity =     1.048(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      605.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   506.000(Ft.)
Top (of initial area) elevation =   700.000(Ft.)
Bottom (of initial area) elevation =   510.800(Ft.)
Difference in elevation =   189.200(Ft.)
Slope =    0.37391  s(percent)=      37.39
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      1.923(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.869
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.605(CFS)
Total initial stream area =        0.960(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      610.000
```

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   506.000(Ft.)
Downstream point/station elevation =   505.000(Ft.)
Pipe length  =    19.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     1.605(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.605(CFS)
Normal flow depth in pipe =    4.44(In.)
Flow top width inside pipe =    9.00(In.)
Critical Depth =    7.00(In.)
Pipe flow velocity =      7.40(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     5.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      610.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     5.04 min.
Rainfall intensity =      1.916(In/Hr) for a     2.0 year storm
Subarea runoff =      0.293(CFS) for      0.180(Ac.)
Total runoff =      1.898(CFS)  Total area =       1.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      615.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________
Upstream point/station elevation =   505.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    16.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     1.898(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     1.898(CFS)
Normal flow depth in pipe =    3.99(In.)
Flow top width inside pipe =    5.66(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.70(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     5.06 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      615.000 to Point/Station      246.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =   457.000(Ft.)
Estimated mean flow rate at midpoint of channel =      2.239(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   1.19(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    6.39 min.     TC =   11.45  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.539
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.292(In/Hr) for a     2.0 year storm
Subarea runoff =      0.285(CFS) for      0.410(Ac.)
Total runoff =      2.183(CFS)  Total area =       1.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      246.000 to Point/Station      246.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      2.183(CFS)
Time of concentration =   11.45 min.
Rainfall intensity =     1.292(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

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


1      111.023     17.72                 1.048
2        2.183     11.45                 1.292
Largest stream flow has longer time of concentration
Qp =    111.023 + sum of
          Qb         Ia/Ib
           2.183 *    0.811 =      1.770
Qp =    112.794

Total of 2 main streams to confluence:
Flow rates before confluence point:
     111.023       2.183
Area of streams before confluence:
      146.080        1.550


Results of confluence:
Total flow rate =    112.794(CFS)
Time of concentration =    17.717 min.
Effective stream area after confluence  =    147.630(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      246.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   489.000(Ft.)
Downstream point/station elevation =   484.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   112.794(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   112.794(CFS)
Normal flow depth in pipe =   25.83(In.)
Flow top width inside pipe =   32.42(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.79(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    17.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.492
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    17.80 min.
Rainfall intensity =      1.046(In/Hr) for a     2.0 year storm
Subarea runoff =      2.789(CFS) for      5.420(Ac.)
Total runoff =    115.583(CFS)  Total area =     153.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.80 min.
Rainfall intensity =      1.046(In/Hr) for a     2.0 year storm
Subarea runoff =      0.526(CFS) for      0.600(Ac.)
Total runoff =    116.108(CFS)  Total area =     153.650(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      255.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    484.000(Ft.)
End of natural channel elevation =    483.000(Ft.)
Length of natural channel  =    32.000(Ft.)
Estimated mean flow rate at midpoint of channel =    116.195(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.78(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0313
Corrected/adjusted channel slope =  0.0313
Travel time =    0.11 min.     TC =   17.91  min.


 Adding area flow to channel
```

```
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.491
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.043(In/Hr) for a     2.0 year storm
Subarea runoff =      0.118(CFS) for      0.230(Ac.)
Total runoff =    116.226(CFS)  Total area =     153.880(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      255.000 to Point/Station      255.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    153.880(Ac.)
Runoff from this stream =    116.226(CFS)
Time of concentration =   17.91 min.
Rainfall intensity =     1.043(In/Hr)
Summary of stream data:

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


1      116.226     17.91                  1.043
Largest stream flow has longer time of concentration
Qp =    116.226 + sum of
Qp =    116.226

Total of 1 main streams to confluence:
Flow rates before confluence point:
     116.226
Area of streams before confluence:
      153.880


Results of confluence:
Total flow rate =    116.226(CFS)
Time of concentration =    17.907 min.
Effective stream area after confluence  =    153.880(Ac.)
End of computations, total study area =          153.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.975
```

Area averaged RI index number = 85.1

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/15/20 File:1886EXA5.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "A" EXISTING CONDITION 5-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 5.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.786(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 200.000 to Point/Station 205.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 778.000(Ft.)

```
Top (of initial area) elevation =  1520.000(Ft.)
Bottom (of initial area) elevation =  1060.000(Ft.)
Difference in elevation =   460.000(Ft.)
Slope =    0.59126  s(percent)=      59.13
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.439 min.
Rainfall intensity =      2.016(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.713
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.743(CFS)
Total initial stream area =        4.690(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      205.000 to Point/Station      210.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1060.000(Ft.)
End of natural channel elevation =    779.000(Ft.)
Length of natural channel  =   626.000(Ft.)
Estimated mean flow rate at midpoint of channel =     15.383(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.37(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.4489
Corrected/adjusted channel slope =  0.2174
Travel time =    1.64 min.     TC =   10.08  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
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Rainfall intensity =      1.852(In/Hr) for a     5.0 year storm
Subarea runoff =     15.583(CFS) for     12.020(Ac.)
Total runoff =     22.326(CFS)  Total area =      16.710(Ac.)


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Process from Point/Station      210.000 to Point/Station      210.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.08 min.
Rainfall intensity =      1.852(In/Hr) for a     5.0 year storm
Subarea runoff =      5.484(CFS) for      4.230(Ac.)
Total runoff =     27.810(CFS)  Total area =      20.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      215.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    779.000(Ft.)
End of natural channel elevation =    663.000(Ft.)
Length of natural channel  =   505.000(Ft.)
Estimated mean flow rate at midpoint of channel =     38.846(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.71(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2297
Corrected/adjusted channel slope =  0.1719
Travel time =    1.09 min.     TC =   11.17  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.692
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
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Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.763(In/Hr) for a     5.0 year storm
Subarea runoff =     20.281(CFS) for     16.620(Ac.)
Total runoff =     48.091(CFS)  Total area =      37.560(Ac.)


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Process from Point/Station      215.000 to Point/Station      215.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.707
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 1)  =  73.52
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.17 min.
Rainfall intensity =      1.763(In/Hr) for a     5.0 year storm
Subarea runoff =     15.696(CFS) for     12.590(Ac.)
Total runoff =     63.787(CFS)  Total area =      50.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      220.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    663.000(Ft.)
End of natural channel elevation =    588.000(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =     69.651(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.94(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0938
Corrected/adjusted channel slope =  0.0938
Travel time =    1.92 min.     TC =   13.09  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.711
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```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
RI index for soil(AMC 1)  =  75.44
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.633(In/Hr) for a     5.0 year storm
Subarea runoff =     10.707(CFS) for      9.220(Ac.)
Total runoff =     74.494(CFS)  Total area =      59.370(Ac.)


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Process from Point/Station      220.000 to Point/Station      220.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.699
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    13.09 min.
Rainfall intensity =      1.633(In/Hr) for a     5.0 year storm
Subarea runoff =      6.808(CFS) for      5.960(Ac.)
Total runoff =     81.303(CFS)  Total area =      65.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      225.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    588.000(Ft.)
End of natural channel elevation =    563.000(Ft.)
Length of natural channel  =   503.000(Ft.)
Estimated mean flow rate at midpoint of channel =     84.905(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.42(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0497
Corrected/adjusted channel slope =  0.0497
Travel time =    1.55 min.     TC =   14.64  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.711
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.548(In/Hr) for a     5.0 year storm
Subarea runoff =      6.372(CFS) for      5.790(Ac.)
Total runoff =     87.674(CFS)  Total area =      71.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      225.000 to Point/Station      230.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    563.000(Ft.)
End of natural channel elevation =    532.000(Ft.)
Length of natural channel  =   643.000(Ft.)
Estimated mean flow rate at midpoint of channel =     91.557(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.15(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0482
Corrected/adjusted channel slope =  0.0482
Travel time =    1.06 min.     TC =   15.69  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.554
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  58.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.497(In/Hr) for a     5.0 year storm
Subarea runoff =      5.227(CFS) for      6.300(Ac.)
Total runoff =     92.901(CFS)  Total area =      77.420(Ac.)


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Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     77.420(Ac.)
Runoff from this stream =     92.901(CFS)
Time of concentration =   15.69 min.
Rainfall intensity =     1.497(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =   763.000(Ft.)
Top (of initial area) elevation =  1180.000(Ft.)
Bottom (of initial area) elevation =   800.000(Ft.)
Difference in elevation =   380.000(Ft.)
Slope =    0.49803  s(percent)=      49.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.666 min.
Rainfall intensity =      1.991(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.742
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 1)  =  75.92
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.374(CFS)
Total initial stream area =        7.020(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    645.000(Ft.)
Length of natural channel  =  1171.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.818(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.95(Ft/s)
```

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Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1324
Corrected/adjusted channel slope =  0.1227
Travel time =    3.94 min.     TC =   12.61  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.721
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.663(In/Hr) for a     5.0 year storm
Subarea runoff =     10.461(CFS) for      8.720(Ac.)
Total runoff =     20.836(CFS)  Total area =      15.740(Ac.)


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Process from Point/Station      110.000 to Point/Station      140.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    645.000(Ft.)
End of natural channel elevation =    564.000(Ft.)
Length of natural channel  =   932.000(Ft.)
Estimated mean flow rate at midpoint of channel =     25.793(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.82(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0869
Corrected/adjusted channel slope =  0.0869
Travel time =    3.23 min.     TC =   15.83  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.705
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
```

```
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.491(In/Hr) for a     5.0 year storm
Subarea runoff =      7.874(CFS) for      7.490(Ac.)
Total runoff =     28.710(CFS)  Total area =      23.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     23.230(Ac.)
Runoff from this stream =     28.710(CFS)
Time of concentration =   15.83 min.
Rainfall intensity =     1.491(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      125.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   810.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =   700.000(Ft.)
Difference in elevation =   360.000(Ft.)
Slope =    0.44444  s(percent)=      44.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.080 min.
Rainfall intensity =      1.947(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.493(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      130.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    700.000(Ft.)
End of natural channel elevation =    595.000(Ft.)
Length of natural channel  =   570.000(Ft.)
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Estimated mean flow rate at midpoint of channel =      8.995(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1842
Corrected/adjusted channel slope =  0.1521
Travel time =    2.12 min.     TC =   11.20  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.729
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.760(In/Hr) for a     5.0 year storm
Subarea runoff =      4.442(CFS) for      3.460(Ac.)
Total runoff =     10.935(CFS)  Total area =       7.950(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.729
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.20 min.
Rainfall intensity =      1.760(In/Hr) for a     5.0 year storm
Subarea runoff =     12.863(CFS) for     10.020(Ac.)
Total runoff =     23.798(CFS)  Total area =      17.970(Ac.)


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Process from Point/Station      130.000 to Point/Station      140.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
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Top of natural channel elevation =    595.000(Ft.)
End of natural channel elevation =    564.000(Ft.)
Length of natural channel  =   350.000(Ft.)
Estimated mean flow rate at midpoint of channel =     25.758(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.86(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0886
Corrected/adjusted channel slope =  0.0886
Travel time =    1.20 min.     TC =   12.40  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.722
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.676(In/Hr) for a     5.0 year storm
Subarea runoff =      3.585(CFS) for      2.960(Ac.)
Total runoff =     27.382(CFS)  Total area =      20.930(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     20.930(Ac.)
Runoff from this stream =     27.382(CFS)
Time of concentration =   12.40 min.
Rainfall intensity =     1.676(In/Hr)
Summary of stream data:

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


1       28.710     15.83                 1.491
2       27.382     12.40                 1.676
Largest stream flow has longer time of concentration
Qp =     28.710 + sum of
```

```
          Qb         Ia/Ib
          27.382 *    0.889 =     24.354
Qp =     53.064

Total of 2 streams to confluence:
Flow rates before confluence point:
      28.710      27.382
Area of streams before confluence:
       23.230       20.930
Results of confluence:
Total flow rate =     53.064(CFS)
Time of concentration =    15.832 min.
Effective stream area after confluence =     44.160(Ac.)


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Process from Point/Station      140.000 to Point/Station      230.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    564.000(Ft.)
End of natural channel elevation =    532.000(Ft.)
Length of natural channel  =   500.000(Ft.)
Estimated mean flow rate at midpoint of channel =     55.124(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.07(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0640
Corrected/adjusted channel slope =  0.0640
Travel time =    0.83 min.     TC =   16.66  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.564
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.455(In/Hr) for a     5.0 year storm
Subarea runoff =      2.814(CFS) for      3.430(Ac.)
Total runoff =     55.878(CFS)  Total area =      47.590(Ac.)
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Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     47.590(Ac.)
Runoff from this stream =     55.878(CFS)
Time of concentration =   16.66 min.
Rainfall intensity =     1.455(In/Hr)
Summary of stream data:

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


1       92.901     15.69                1.497
2       55.878     16.66                1.455
Largest stream flow has longer or shorter time of concentration
Qp =     92.901 + sum of
          Qa          Tb/Ta
          55.878 *    0.942 =     52.635
Qp =    145.536

Total of 2 main streams to confluence:
Flow rates before confluence point:
      92.901      55.878
Area of streams before confluence:
       77.420       47.590


Results of confluence:
Total flow rate =    145.536(CFS)
Time of concentration =    15.693 min.
Effective stream area after confluence  =    125.010(Ac.)


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Process from Point/Station      230.000 to Point/Station      240.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    503.000(Ft.)
Length of natural channel  =   550.000(Ft.)
Estimated mean flow rate at midpoint of channel =    150.245(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.33(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0527
Corrected/adjusted channel slope =  0.0527
Travel time =    0.74 min.     TC =   16.44  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.565
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.464(In/Hr) for a     5.0 year storm
Subarea runoff =      6.697(CFS) for      8.090(Ac.)
Total runoff =    152.233(CFS)  Total area =     133.100(Ac.)


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Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.44 min.
Rainfall intensity =      1.464(In/Hr) for a     5.0 year storm
Subarea runoff =      1.409(CFS) for      1.140(Ac.)
Total runoff =    153.642(CFS)  Total area =     134.240(Ac.)


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Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.44 min.
Rainfall intensity =      1.464(In/Hr) for a     5.0 year storm
Subarea runoff =      1.236(CFS) for      1.000(Ac.)
Total runoff =    154.879(CFS)  Total area =     135.240(Ac.)


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Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.629
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  67.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.44 min.
Rainfall intensity =      1.464(In/Hr) for a     5.0 year storm
Subarea runoff =      9.406(CFS) for     10.210(Ac.)
Total runoff =    164.284(CFS)  Total area =     145.450(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      245.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Covered channel
Upstream point elevation =   503.000(Ft.)
Downstream point elevation =   493.000(Ft.)
Channel length thru subarea  =   144.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =    164.284(CFS)
Depth of flow =   1.367(Ft.), Average velocity =  24.040(Ft/s)
Channel flow top width =    5.000(Ft.)
Flow Velocity =   24.04(Ft/s)
Travel time  =    0.10 min.
Time of concentration =   16.54 min.

Sub-Channel No. 1 Critical depth =      3.219(Ft.)
  '     '       '     Critical flow top width =      5.000(Ft.)
  '     '       '     Critical flow velocity=   10.208(Ft/s)
  '     '       '     Critical flow area =     16.094(Sq.Ft)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.54 min.
Rainfall intensity =      1.460(In/Hr) for a     5.0 year storm
Subarea runoff =      0.579(CFS) for      0.470(Ac.)
Total runoff =    164.864(CFS)  Total area =     145.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      246.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    493.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =    50.000(Ft.)
Estimated mean flow rate at midpoint of channel =    164.954(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   8.53(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0800
Corrected/adjusted channel slope =  0.0800
Travel time =    0.10 min.     TC =   16.63  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.564
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.456(In/Hr) for a     5.0 year storm
Subarea runoff =      0.131(CFS) for      0.160(Ac.)
Total runoff =    164.995(CFS)  Total area =     146.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    146.080(Ac.)
Runoff from this stream =    164.995(CFS)
Time of concentration =   16.63 min.
Rainfall intensity =     1.456(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      605.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   506.000(Ft.)
Top (of initial area) elevation =   700.000(Ft.)
Bottom (of initial area) elevation =   510.800(Ft.)
Difference in elevation =   189.200(Ft.)
Slope =    0.37391  s(percent)=      37.39
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      2.592(In/Hr) for a     5.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.177(CFS)
Total initial stream area =        0.960(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
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```
Upstream point/station elevation =   506.000(Ft.)
Downstream point/station elevation =   505.000(Ft.)
Pipe length  =    19.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     2.177(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.177(CFS)
Normal flow depth in pipe =    5.35(In.)
Flow top width inside pipe =    8.84(In.)
Critical Depth =    7.96(In.)
Pipe flow velocity =      7.96(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     5.04 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      610.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     5.04 min.
Rainfall intensity =      2.582(In/Hr) for a     5.0 year storm
Subarea runoff =      0.398(CFS) for      0.180(Ac.)
Total runoff =      2.576(CFS)  Total area =       1.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      615.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =   505.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    16.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     2.576(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.576(CFS)
Normal flow depth in pipe =    3.73(In.)
Flow top width inside pipe =    8.87(In.)
Critical Depth =    8.37(In.)
Pipe flow velocity =     14.89(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     5.06 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      615.000 to Point/Station      246.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =   457.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.039(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   1.32(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    5.77 min.     TC =   10.83  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.606
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.789(In/Hr) for a     5.0 year storm
Subarea runoff =      0.445(CFS) for      0.410(Ac.)
Total runoff =      3.020(CFS)  Total area =       1.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      246.000 to Point/Station      246.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      3.020(CFS)
Time of concentration =   10.83 min.
Rainfall intensity =     1.789(In/Hr)
Summary of stream data:

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

```
1      164.995     16.63                 1.456
2        3.020     10.83                 1.789
Largest stream flow has longer time of concentration
Qp =    164.995 + sum of
          Qb         Ia/Ib
           3.020 *    0.814 =      2.458
Qp =    167.453

Total of 2 main streams to confluence:
Flow rates before confluence point:
     164.995       3.020
Area of streams before confluence:
      146.080        1.550


Results of confluence:
Total flow rate =    167.453(CFS)
Time of concentration =    16.634 min.
Effective stream area after confluence  =    147.630(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      246.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   489.000(Ft.)
Downstream point/station elevation =   484.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   167.453(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =   167.453(CFS)
Normal flow depth in pipe =   33.38(In.)
Flow top width inside pipe =   27.40(In.)
Critical depth could not be calculated.
Pipe flow velocity =     22.14(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    16.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.564
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.71 min.
Rainfall intensity =      1.453(In/Hr) for a     5.0 year storm
Subarea runoff =      4.438(CFS) for      5.420(Ac.)
Total runoff =    171.891(CFS)  Total area =     153.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.71 min.
Rainfall intensity =      1.453(In/Hr) for a     5.0 year storm
Subarea runoff =      0.736(CFS) for      0.600(Ac.)
Total runoff =    172.627(CFS)  Total area =     153.650(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      255.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    484.000(Ft.)
End of natural channel elevation =    483.000(Ft.)
Length of natural channel  =    32.000(Ft.)
Estimated mean flow rate at midpoint of channel =    172.756(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.45(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0313
Corrected/adjusted channel slope =  0.0313
Travel time =    0.10 min.     TC =   16.81  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.563
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.449(In/Hr) for a     5.0 year storm
Subarea runoff =      0.188(CFS) for      0.230(Ac.)
Total runoff =    172.815(CFS)  Total area =     153.880(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      255.000 to Point/Station      255.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    153.880(Ac.)
Runoff from this stream =    172.815(CFS)
Time of concentration =   16.81 min.
Rainfall intensity =     1.449(In/Hr)
Summary of stream data:

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


1      172.815     16.81                 1.449
Largest stream flow has longer time of concentration
Qp =    172.815 + sum of
Qp =    172.815

Total of 1 main streams to confluence:
Flow rates before confluence point:
     172.815
Area of streams before confluence:
      153.880


Results of confluence:
Total flow rate =    172.815(CFS)
Time of concentration =    16.805 min.
Effective stream area after confluence  =    153.880(Ac.)
End of computations, total study area =          153.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.975
Area averaged RI index number =  85.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/15/20 File:1886EXA10.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "A" EXISTING CONDITION 10-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.940(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 200.000 to Point/Station 205.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 778.000(Ft.)
Top (of initial area) elevation = 1520.000(Ft.)
Bottom (of initial area) elevation = 1060.000(Ft.)

```
Difference in elevation =   460.000(Ft.)
Slope =    0.59126  s(percent)=      59.13
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.439 min.
Rainfall intensity =      2.410(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      9.332(CFS)
Total initial stream area =        4.690(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      210.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1060.000(Ft.)
End of natural channel elevation =    779.000(Ft.)
Length of natural channel  =   626.000(Ft.)
Estimated mean flow rate at midpoint of channel =     21.290(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.10(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.4489
Corrected/adjusted channel slope =  0.2174
Travel time =    1.47 min.     TC =    9.91  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.231(In/Hr) for a    10.0 year storm
Subarea runoff =     21.997(CFS) for     12.020(Ac.)
```

```
Total runoff =     31.329(CFS)  Total area =      16.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      210.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.91 min.
Rainfall intensity =      2.231(In/Hr) for a    10.0 year storm
Subarea runoff =      7.741(CFS) for      4.230(Ac.)
Total runoff =     39.070(CFS)  Total area =      20.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      215.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    779.000(Ft.)
End of natural channel elevation =    663.000(Ft.)
Length of natural channel  =   505.000(Ft.)
Estimated mean flow rate at midpoint of channel =     54.574(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   8.62(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2297
Corrected/adjusted channel slope =  0.1719
Travel time =    0.98 min.     TC =   10.89  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.133(In/Hr) for a    10.0 year storm
Subarea runoff =     28.956(CFS) for     16.620(Ac.)
Total runoff =     68.025(CFS)  Total area =      37.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      215.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.824
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 2)  =  87.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.89 min.
Rainfall intensity =      2.133(In/Hr) for a    10.0 year storm
Subarea runoff =     22.135(CFS) for     12.590(Ac.)
Total runoff =     90.161(CFS)  Total area =      50.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      220.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    663.000(Ft.)
End of natural channel elevation =    588.000(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =     98.448(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.78(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0938
Corrected/adjusted channel slope =  0.0938
Travel time =    1.71 min.     TC =   12.60  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
```

```
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
RI index for soil(AMC 2)  =  88.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.988(In/Hr) for a    10.0 year storm
Subarea runoff =     15.163(CFS) for      9.220(Ac.)
Total runoff =    105.324(CFS)  Total area =      59.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      220.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  87.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.60 min.
Rainfall intensity =      1.988(In/Hr) for a    10.0 year storm
Subarea runoff =      9.732(CFS) for      5.960(Ac.)
Total runoff =    115.056(CFS)  Total area =      65.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      225.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    588.000(Ft.)
End of natural channel elevation =    563.000(Ft.)
Length of natural channel  =   503.000(Ft.)
Estimated mean flow rate at midpoint of channel =    120.155(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.08(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0497
Corrected/adjusted channel slope =  0.0497
Travel time =    1.38 min.     TC =   13.98  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.828
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.891(In/Hr) for a    10.0 year storm
Subarea runoff =      9.067(CFS) for      5.790(Ac.)
Total runoff =    124.123(CFS)  Total area =      71.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      225.000 to Point/Station      230.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    563.000(Ft.)
End of natural channel elevation =    532.000(Ft.)
Length of natural channel  =   643.000(Ft.)
Estimated mean flow rate at midpoint of channel =    129.620(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.27(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0482
Corrected/adjusted channel slope =  0.0482
Travel time =    0.95 min.     TC =   14.93  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.736
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  76.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.833(In/Hr) for a    10.0 year storm
Subarea runoff =      8.493(CFS) for      6.300(Ac.)
Total runoff =    132.616(CFS)  Total area =      77.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
```

```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     77.420(Ac.)
Runoff from this stream =    132.616(CFS)
Time of concentration =   14.93 min.
Rainfall intensity =     1.833(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   763.000(Ft.)
Top (of initial area) elevation =  1180.000(Ft.)
Bottom (of initial area) elevation =   800.000(Ft.)
Difference in elevation =   380.000(Ft.)
Slope =    0.49803  s(percent)=      49.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.666 min.
Rainfall intensity =      2.379(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  88.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     14.032(CFS)
Total initial stream area =        7.020(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    645.000(Ft.)
Length of natural channel  =  1171.000(Ft.)
Estimated mean flow rate at midpoint of channel =     22.747(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.47(Ft/s)

Correction to map slope used on extremely rugged channels with
```

```
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1324
Corrected/adjusted channel slope =  0.1227
Travel time =    3.57 min.     TC =   12.23  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.832
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.017(In/Hr) for a    10.0 year storm
Subarea runoff =     14.631(CFS) for      8.720(Ac.)
Total runoff =     28.663(CFS)  Total area =      15.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      140.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    645.000(Ft.)
End of natural channel elevation =    564.000(Ft.)
Length of natural channel  =   932.000(Ft.)
Estimated mean flow rate at midpoint of channel =     35.483(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.35(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0869
Corrected/adjusted channel slope =  0.0869
Travel time =    2.90 min.     TC =   15.14  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Rainfall intensity =      1.821(In/Hr) for a    10.0 year storm
Subarea runoff =     11.254(CFS) for      7.490(Ac.)
Total runoff =     39.917(CFS)  Total area =      23.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     23.230(Ac.)
Runoff from this stream =     39.917(CFS)
Time of concentration =   15.14 min.
Rainfall intensity =     1.821(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      125.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   810.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =   700.000(Ft.)
Difference in elevation =   360.000(Ft.)
Slope =    0.44444  s(percent)=      44.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.080 min.
Rainfall intensity =      2.327(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.781(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      130.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    700.000(Ft.)
End of natural channel elevation =    595.000(Ft.)
Length of natural channel  =   570.000(Ft.)
Estimated mean flow rate at midpoint of channel =     12.164(CFS)
```

```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.95(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1842
Corrected/adjusted channel slope =  0.1521
Travel time =    1.92 min.     TC =   11.00  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.122(In/Hr) for a    10.0 year storm
Subarea runoff =      6.132(CFS) for      3.460(Ac.)
Total runoff =     14.913(CFS)  Total area =       7.950(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.835
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.00 min.
Rainfall intensity =      2.122(In/Hr) for a    10.0 year storm
Subarea runoff =     17.758(CFS) for     10.020(Ac.)
Total runoff =     32.671(CFS)  Total area =      17.970(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      140.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    595.000(Ft.)
End of natural channel elevation =    564.000(Ft.)
```

```
Length of natural channel  =   350.000(Ft.)
Estimated mean flow rate at midpoint of channel =     35.361(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.39(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0886
Corrected/adjusted channel slope =  0.0886
Travel time =    1.08 min.     TC =   12.08  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.832
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.029(In/Hr) for a    10.0 year storm
Subarea runoff =      4.998(CFS) for      2.960(Ac.)
Total runoff =     37.669(CFS)  Total area =      20.930(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     20.930(Ac.)
Runoff from this stream =     37.669(CFS)
Time of concentration =   12.08 min.
Rainfall intensity =     2.029(In/Hr)
Summary of stream data:

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


1       39.917     15.14                1.821
2       37.669     12.08                2.029
Largest stream flow has longer time of concentration
Qp =     39.917 + sum of
          Qb         Ia/Ib
          37.669 *    0.897 =     33.806
```

```
Qp =     73.724

Total of 2 streams to confluence:
Flow rates before confluence point:
      39.917      37.669
Area of streams before confluence:
       23.230       20.930
Results of confluence:
Total flow rate =     73.724(CFS)
Time of concentration =    15.136 min.
Effective stream area after confluence =     44.160(Ac.)


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Process from Point/Station      140.000 to Point/Station      230.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    564.000(Ft.)
End of natural channel elevation =    532.000(Ft.)
Length of natural channel  =   500.000(Ft.)
Estimated mean flow rate at midpoint of channel =     76.587(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.09(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0640
Corrected/adjusted channel slope =  0.0640
Travel time =    0.75 min.     TC =   15.89  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.779(In/Hr) for a    10.0 year storm
Subarea runoff =      4.533(CFS) for      3.430(Ac.)
Total runoff =     78.257(CFS)  Total area =      47.590(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
```

**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 47.590(Ac.)
Runoff from this stream = 78.257(CFS)
Time of concentration = 15.89 min.
Rainfall intensity = 1.779(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	132.616	14.93	1.833
2	78.257	15.89	1.779

Largest stream flow has longer or shorter time of concentration
Qp = 132.616 + sum of

Qa		Tb/Ta	
78.257	*	0.940	= 73.543

Qp = 206.159

Total of 2 main streams to confluence:
Flow rates before confluence point:
132.616 78.257
Area of streams before confluence:
77.420 47.590

Results of confluence:
Total flow rate = 206.159(CFS)
Time of concentration = 14.931 min.
Effective stream area after confluence = 125.010(Ac.)

++
Process from Point/Station 230.000 to Point/Station 240.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 532.000(Ft.)
End of natural channel elevation = 503.000(Ft.)
Length of natural channel = 550.000(Ft.)
Estimated mean flow rate at midpoint of channel = 212.830(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 13.73(Ft/s)

Correction to map slope used on extremely rugged channels with

```
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0527
Corrected/adjusted channel slope =  0.0527
Travel time =    0.67 min.     TC =   15.60  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.744
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.795(In/Hr) for a    10.0 year storm
Subarea runoff =     10.803(CFS) for      8.090(Ac.)
Total runoff =    216.961(CFS)  Total area =     133.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.60 min.
Rainfall intensity =      1.795(In/Hr) for a    10.0 year storm
Subarea runoff =      1.773(CFS) for      1.140(Ac.)
Total runoff =    218.735(CFS)  Total area =     134.240(Ac.)


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Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Time of concentration =    15.60 min.
Rainfall intensity =      1.795(In/Hr) for a    10.0 year storm
Subarea runoff =      1.556(CFS) for      1.000(Ac.)
Total runoff =    220.290(CFS)  Total area =     135.240(Ac.)


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Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  83.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.60 min.
Rainfall intensity =      1.795(In/Hr) for a    10.0 year storm
Subarea runoff =     14.379(CFS) for     10.210(Ac.)
Total runoff =    234.670(CFS)  Total area =     145.450(Ac.)


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Process from Point/Station      240.000 to Point/Station      245.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Covered channel
Upstream point elevation =   503.000(Ft.)
Downstream point elevation =   493.000(Ft.)
Channel length thru subarea  =   144.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =    234.670(CFS)
Depth of flow =   1.760(Ft.), Average velocity =  26.673(Ft/s)
Channel flow top width =    5.000(Ft.)
Flow Velocity =   26.67(Ft/s)
Travel time  =    0.09 min.
Time of concentration =   15.69 min.

Sub-Channel No. 1 Critical depth =      4.094(Ft.)
  '     '       '     Critical flow top width =      5.000(Ft.)
  '     '       '     Critical flow velocity=   11.465(Ft/s)
  '     '       '     Critical flow area =     20.469(Sq.Ft)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.69 min.
Rainfall intensity =      1.790(In/Hr) for a    10.0 year storm
Subarea runoff =      0.729(CFS) for      0.470(Ac.)
Total runoff =    235.399(CFS)  Total area =     145.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      246.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    493.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =    50.000(Ft.)
Estimated mean flow rate at midpoint of channel =    235.528(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   9.59(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0800
Corrected/adjusted channel slope =  0.0800
Travel time =    0.09 min.     TC =   15.78  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.785(In/Hr) for a    10.0 year storm
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Subarea runoff =      0.212(CFS) for      0.160(Ac.)
Total runoff =    235.611(CFS)  Total area =     146.080(Ac.)


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Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    146.080(Ac.)
Runoff from this stream =    235.611(CFS)
Time of concentration =   15.78 min.
Rainfall intensity =     1.785(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      605.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   506.000(Ft.)
Top (of initial area) elevation =   700.000(Ft.)
Bottom (of initial area) elevation =   510.800(Ft.)
Difference in elevation =   189.200(Ft.)
Slope =    0.37391  s(percent)=      37.39
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      3.098(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.643(CFS)
Total initial stream area =        0.960(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   506.000(Ft.)
Downstream point/station elevation =   505.000(Ft.)
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```
Pipe length  =    19.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     2.643(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.643(CFS)
Normal flow depth in pipe =    6.11(In.)
Flow top width inside pipe =    8.41(In.)
Critical Depth =    8.43(In.)
Pipe flow velocity =      8.28(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     5.04 min.


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Process from Point/Station      610.000 to Point/Station      610.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     5.04 min.
Rainfall intensity =      3.087(In/Hr) for a    10.0 year storm
Subarea runoff =      0.487(CFS) for      0.180(Ac.)
Total runoff =      3.131(CFS)  Total area =       1.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      615.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =   505.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    16.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.131(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.131(CFS)
Normal flow depth in pipe =    4.16(In.)
Flow top width inside pipe =    8.97(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.68(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     5.06 min.


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Process from Point/Station      615.000 to Point/Station      246.000
```

**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 501.000(Ft.)
End of natural channel elevation = 489.000(Ft.)
Length of natural channel = 457.000(Ft.)
Estimated mean flow rate at midpoint of channel = 3.694(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow = 1.41(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0263
Corrected/adjusted channel slope = 0.0263
Travel time = 5.41 min. TC = 10.47 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.767
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 78.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.173(In/Hr) for a 10.0 year storm
Subarea runoff = 0.684(CFS) for 0.410(Ac.)
Total runoff = 3.814(CFS) Total area = 1.550(Ac.)

++
Process from Point/Station 246.000 to Point/Station 246.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 1.550(Ac.)
Runoff from this stream = 3.814(CFS)
Time of concentration = 10.47 min.
Rainfall intensity = 2.173(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	235.611	15.78	1.785

```
2        3.814     10.47                 2.173
Largest stream flow has longer time of concentration
Qp =    235.611 + sum of
          Qb         Ia/Ib
           3.814 *    0.821 =      3.133
Qp =    238.744

Total of 2 main streams to confluence:
Flow rates before confluence point:
     235.611       3.814
Area of streams before confluence:
      146.080        1.550


Results of confluence:
Total flow rate =    238.744(CFS)
Time of concentration =    15.775 min.
Effective stream area after confluence  =    147.630(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      246.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   489.000(Ft.)
Downstream point/station elevation =   484.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   238.744(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   238.744(CFS)
Normal flow depth in pipe =   37.22(In.)
Flow top width inside pipe =   34.04(In.)
Critical depth could not be calculated.
Pipe flow velocity =     24.43(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    15.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
```

```
Time of concentration =    15.84 min.
Rainfall intensity =      1.781(In/Hr) for a    10.0 year storm
Subarea runoff =      7.174(CFS) for      5.420(Ac.)
Total runoff =    245.918(CFS)  Total area =     153.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.84 min.
Rainfall intensity =      1.781(In/Hr) for a    10.0 year storm
Subarea runoff =      0.926(CFS) for      0.600(Ac.)
Total runoff =    246.845(CFS)  Total area =     153.650(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      255.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    484.000(Ft.)
End of natural channel elevation =    483.000(Ft.)
Length of natural channel  =    32.000(Ft.)
Estimated mean flow rate at midpoint of channel =    247.029(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.14(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0313
Corrected/adjusted channel slope =  0.0313
Travel time =    0.09 min.     TC =   15.93  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.777(In/Hr) for a    10.0 year storm
Subarea runoff =      0.304(CFS) for      0.230(Ac.)
Total runoff =    247.148(CFS)  Total area =     153.880(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      255.000 to Point/Station      255.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    153.880(Ac.)
Runoff from this stream =    247.148(CFS)
Time of concentration =   15.93 min.
Rainfall intensity =     1.777(In/Hr)
Summary of stream data:

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


1      247.148     15.93                 1.777
Largest stream flow has longer time of concentration
Qp =    247.148 + sum of
Qp =    247.148

Total of 1 main streams to confluence:
Flow rates before confluence point:
     247.148
Area of streams before confluence:
      153.880


Results of confluence:
Total flow rate =    247.148(CFS)
Time of concentration =    15.929 min.
Effective stream area after confluence  =    153.880(Ac.)
End of computations, total study area =          153.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.975
Area averaged RI index number =  85.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 01/15/20 File:1886EXA100.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "A" EXISTING CONDITION 100-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 200.000 to Point/Station 205.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 778.000(Ft.)
Top (of initial area) elevation = 1520.000(Ft.)
Bottom (of initial area) elevation = 1060.000(Ft.)
Difference in elevation = 460.000(Ft.)
Slope = 0.59126 s(percent)= 59.13

```
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.439 min.
Rainfall intensity =      3.717(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     15.365(CFS)
Total initial stream area =        4.690(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      210.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1060.000(Ft.)
End of natural channel elevation =    779.000(Ft.)
Length of natural channel  =   626.000(Ft.)
Estimated mean flow rate at midpoint of channel =     35.054(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   8.36(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.4489
Corrected/adjusted channel slope =  0.2174
Travel time =    1.25 min.     TC =    9.69  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.479(In/Hr) for a   100.0 year storm
Subarea runoff =     36.805(CFS) for     12.020(Ac.)
Total runoff =     52.169(CFS)  Total area =      16.710(Ac.)
```

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Process from Point/Station      210.000 to Point/Station      210.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.69 min.
Rainfall intensity =      3.479(In/Hr) for a   100.0 year storm
Subarea runoff =     12.952(CFS) for      4.230(Ac.)
Total runoff =     65.121(CFS)  Total area =      20.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      215.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    779.000(Ft.)
End of natural channel elevation =    663.000(Ft.)
Length of natural channel  =   505.000(Ft.)
Estimated mean flow rate at midpoint of channel =     90.964(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =  10.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2297
Corrected/adjusted channel slope =  0.1719
Travel time =    0.82 min.     TC =   10.51  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.346(In/Hr) for a   100.0 year storm
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Subarea runoff =     48.889(CFS) for     16.620(Ac.)
Total runoff =    114.010(CFS)  Total area =      37.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      215.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 3)  =  94.88
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.51 min.
Rainfall intensity =      3.346(In/Hr) for a   100.0 year storm
Subarea runoff =     37.112(CFS) for     12.590(Ac.)
Total runoff =    151.122(CFS)  Total area =      50.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      220.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    663.000(Ft.)
End of natural channel elevation =    588.000(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =    165.014(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   9.22(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0938
Corrected/adjusted channel slope =  0.0938
Travel time =    1.45 min.     TC =   11.96  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
```

```
RI index for soil(AMC 3)  =  95.36
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.145(In/Hr) for a   100.0 year storm
Subarea runoff =     25.570(CFS) for      9.220(Ac.)
Total runoff =    176.692(CFS)  Total area =      59.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      220.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  95.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.96 min.
Rainfall intensity =      3.145(In/Hr) for a   100.0 year storm
Subarea runoff =     16.501(CFS) for      5.960(Ac.)
Total runoff =    193.193(CFS)  Total area =      65.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      225.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    588.000(Ft.)
End of natural channel elevation =    563.000(Ft.)
Length of natural channel  =   503.000(Ft.)
Estimated mean flow rate at midpoint of channel =    201.755(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0497
Corrected/adjusted channel slope =  0.0497
Travel time =    1.16 min.     TC =   13.12  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
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```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.008(In/Hr) for a   100.0 year storm
Subarea runoff =     15.361(CFS) for      5.790(Ac.)
Total runoff =    208.555(CFS)  Total area =      71.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      225.000 to Point/Station      230.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    563.000(Ft.)
End of natural channel elevation =    532.000(Ft.)
Length of natural channel  =   643.000(Ft.)
Estimated mean flow rate at midpoint of channel =    217.792(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  13.22(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0482
Corrected/adjusted channel slope =  0.0482
Travel time =    0.81 min.     TC =   13.93  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  88.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.923(In/Hr) for a   100.0 year storm
Subarea runoff =     15.678(CFS) for      6.300(Ac.)
Total runoff =    224.233(CFS)  Total area =      77.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
```

```
In Main Stream number: 1
Stream flow area =     77.420(Ac.)
Runoff from this stream =    224.233(CFS)
Time of concentration =   13.93 min.
Rainfall intensity =     2.923(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   763.000(Ft.)
Top (of initial area) elevation =  1180.000(Ft.)
Bottom (of initial area) elevation =   800.000(Ft.)
Difference in elevation =   380.000(Ft.)
Slope =    0.49803  s(percent)=      49.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.666 min.
Rainfall intensity =      3.670(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 3)  =  95.48
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     22.798(CFS)
Total initial stream area =        7.020(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    645.000(Ft.)
Length of natural channel  =  1171.000(Ft.)
Estimated mean flow rate at midpoint of channel =     36.957(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.42(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1324
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```
Corrected/adjusted channel slope =  0.1227
Travel time =    3.04 min.     TC =   11.70  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.177(In/Hr) for a   100.0 year storm
Subarea runoff =     24.463(CFS) for      8.720(Ac.)
Total runoff =     47.261(CFS)  Total area =      15.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      140.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    645.000(Ft.)
End of natural channel elevation =    564.000(Ft.)
Length of natural channel  =   932.000(Ft.)
Estimated mean flow rate at midpoint of channel =     58.506(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.31(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0869
Corrected/adjusted channel slope =  0.0869
Travel time =    2.46 min.     TC =   14.17  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.899(In/Hr) for a   100.0 year storm
Subarea runoff =     19.138(CFS) for      7.490(Ac.)
```

```
Total runoff =     66.399(CFS)  Total area =      23.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     23.230(Ac.)
Runoff from this stream =     66.399(CFS)
Time of concentration =   14.17 min.
Rainfall intensity =     2.899(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      125.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   810.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =   700.000(Ft.)
Difference in elevation =   360.000(Ft.)
Slope =    0.44444  s(percent)=      44.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.080 min.
Rainfall intensity =      3.589(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     14.260(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      130.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    700.000(Ft.)
End of natural channel elevation =    595.000(Ft.)
Length of natural channel  =   570.000(Ft.)
Estimated mean flow rate at midpoint of channel =     19.754(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
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```
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.81(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1842
Corrected/adjusted channel slope =  0.1521
Travel time =    1.64 min.     TC =   10.72  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.315(In/Hr) for a   100.0 year storm
Subarea runoff =     10.135(CFS) for      3.460(Ac.)
Total runoff =     24.395(CFS)  Total area =       7.950(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.72 min.
Rainfall intensity =      3.315(In/Hr) for a   100.0 year storm
Subarea runoff =     29.350(CFS) for     10.020(Ac.)
Total runoff =     53.744(CFS)  Total area =      17.970(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      140.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    595.000(Ft.)
End of natural channel elevation =    564.000(Ft.)
Length of natural channel  =   350.000(Ft.)
Estimated mean flow rate at midpoint of channel =     58.170(CFS)
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```
Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.36(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0886
Corrected/adjusted channel slope =  0.0886
Travel time =    0.92 min.     TC =   11.63  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.187(In/Hr) for a   100.0 year storm
Subarea runoff =      8.329(CFS) for      2.960(Ac.)
Total runoff =     62.073(CFS)  Total area =      20.930(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     20.930(Ac.)
Runoff from this stream =     62.073(CFS)
Time of concentration =   11.63 min.
Rainfall intensity =     3.187(In/Hr)
Summary of stream data:

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


1       66.399     14.17                2.899
2       62.073     11.63                3.187
Largest stream flow has longer time of concentration
Qp =     66.399 + sum of
          Qb         Ia/Ib
          62.073 *    0.910 =     56.473
Qp =    122.873
```

```
Total of 2 streams to confluence:
Flow rates before confluence point:
      66.399      62.073
Area of streams before confluence:
       23.230       20.930
Results of confluence:
Total flow rate =    122.873(CFS)
Time of concentration =    14.167 min.
Effective stream area after confluence =     44.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      230.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    564.000(Ft.)
End of natural channel elevation =    532.000(Ft.)
Length of natural channel  =   500.000(Ft.)
Estimated mean flow rate at midpoint of channel =    127.645(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0640
Corrected/adjusted channel slope =  0.0640
Travel time =    0.64 min.     TC =   14.81  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.838(In/Hr) for a   100.0 year storm
Subarea runoff =      8.317(CFS) for      3.430(Ac.)
Total runoff =    131.190(CFS)  Total area =      47.590(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     47.590(Ac.)
Runoff from this stream =    131.190(CFS)
Time of concentration =   14.81 min.
Rainfall intensity =     2.838(In/Hr)
Summary of stream data:

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


1      224.233     13.93                 2.923
2      131.190     14.81                 2.838
Largest stream flow has longer or shorter time of concentration
Qp =    224.233 + sum of
          Qa          Tb/Ta
         131.190 *    0.941 =    123.385
Qp =    347.619

Total of 2 main streams to confluence:
Flow rates before confluence point:
     224.233     131.190
Area of streams before confluence:
       77.420       47.590


Results of confluence:
Total flow rate =    347.619(CFS)
Time of concentration =    13.930 min.
Effective stream area after confluence  =    125.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      240.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    503.000(Ft.)
Length of natural channel  =   550.000(Ft.)
Estimated mean flow rate at midpoint of channel =    358.867(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  16.18(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0527
```

```
Corrected/adjusted channel slope =  0.0527
Travel time =    0.57 min.     TC =   14.50  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.867(In/Hr) for a   100.0 year storm
Subarea runoff =     19.829(CFS) for      8.090(Ac.)
Total runoff =    367.448(CFS)  Total area =     133.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.50 min.
Rainfall intensity =      2.867(In/Hr) for a   100.0 year storm
Subarea runoff =      2.902(CFS) for      1.140(Ac.)
Total runoff =    370.350(CFS)  Total area =     134.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.50 min.
Rainfall intensity =      2.867(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =      2.546(CFS) for      1.000(Ac.)
Total runoff =    372.895(CFS)  Total area =     135.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  93.10
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    14.50 min.
Rainfall intensity =      2.867(In/Hr) for a   100.0 year storm
Subarea runoff =     25.470(CFS) for     10.210(Ac.)
Total runoff =    398.365(CFS)  Total area =     145.450(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      245.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Covered channel
Upstream point elevation =   503.000(Ft.)
Downstream point elevation =   493.000(Ft.)
Channel length thru subarea  =   144.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =    398.365(CFS)
Depth of flow =   2.597(Ft.), Average velocity =  30.677(Ft/s)
Channel flow top width =    5.000(Ft.)
Flow Velocity =   30.68(Ft/s)
Travel time  =    0.08 min.
Time of concentration =   14.58 min.

Sub-Channel No. 1 Critical depth =      5.813(Ft.)
  '     '       '     Critical flow top width =      5.000(Ft.)
  '     '       '     Critical flow velocity=   13.707(Ft/s)
  '     '       '     Critical flow area =     29.063(Sq.Ft)



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```
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.58 min.
Rainfall intensity =      2.860(In/Hr) for a   100.0 year storm
Subarea runoff =      1.193(CFS) for      0.470(Ac.)
Total runoff =    399.558(CFS)  Total area =     145.920(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      246.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of natural channel elevation =    493.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =    50.000(Ft.)
Estimated mean flow rate at midpoint of channel =    399.777(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =  11.42(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0800
Corrected/adjusted channel slope =  0.0800
Travel time =    0.07 min.     TC =   14.65  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.853(In/Hr) for a   100.0 year storm
Subarea runoff =      0.390(CFS) for      0.160(Ac.)
Total runoff =    399.948(CFS)  Total area =     146.080(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    146.080(Ac.)
Runoff from this stream =    399.948(CFS)
Time of concentration =   14.65 min.
Rainfall intensity =     2.853(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      605.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   506.000(Ft.)
Top (of initial area) elevation =   700.000(Ft.)
Bottom (of initial area) elevation =   510.800(Ft.)
Difference in elevation =   189.200(Ft.)
Slope =    0.37391  s(percent)=      37.39
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      4.779(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.114(CFS)
Total initial stream area =        0.960(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      605.000 to Point/Station      610.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =   506.000(Ft.)
Downstream point/station elevation =   505.000(Ft.)
Pipe length  =    19.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     4.114(CFS)
```

```
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.114(CFS)
Normal flow depth in pipe =    6.56(In.)
Flow top width inside pipe =   11.95(In.)
Critical Depth =   10.28(In.)
Pipe flow velocity =      9.35(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     5.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      610.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     5.03 min.
Rainfall intensity =      4.764(In/Hr) for a   100.0 year storm
Subarea runoff =      0.765(CFS) for      0.180(Ac.)
Total runoff =      4.879(CFS)  Total area =       1.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      615.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   505.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    16.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     4.879(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.879(CFS)
Normal flow depth in pipe =    5.45(In.)
Flow top width inside pipe =    8.80(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.45(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     5.05 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      615.000 to Point/Station      246.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
```

```
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =   457.000(Ft.)
Estimated mean flow rate at midpoint of channel =      5.757(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   1.63(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    4.68 min.     TC =    9.72  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.473(In/Hr) for a   100.0 year storm
Subarea runoff =      1.228(CFS) for      0.410(Ac.)
Total runoff =      6.107(CFS)  Total area =       1.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      246.000 to Point/Station      246.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      6.107(CFS)
Time of concentration =    9.72 min.
Rainfall intensity =     3.473(In/Hr)
Summary of stream data:

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


1      399.948     14.65                2.853
2        6.107      9.72                3.473
Largest stream flow has longer time of concentration
```

```
Qp =    399.948 + sum of
          Qb         Ia/Ib
           6.107 *    0.821 =      5.017
Qp =    404.965

Total of 2 main streams to confluence:
Flow rates before confluence point:
     399.948       6.107
Area of streams before confluence:
      146.080        1.550


Results of confluence:
Total flow rate =    404.965(CFS)
Time of concentration =    14.648 min.
Effective stream area after confluence  =    147.630(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      246.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   489.000(Ft.)
Downstream point/station elevation =   484.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   404.965(CFS)
Nearest computed pipe diameter  =     54.00(In.)
Calculated individual pipe flow  =   404.965(CFS)
Normal flow depth in pipe =   47.34(In.)
Flow top width inside pipe =   35.50(In.)
Critical depth could not be calculated.
Pipe flow velocity =     27.40(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    14.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    14.71 min.
Rainfall intensity =      2.847(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =     13.188(CFS) for      5.420(Ac.)
Total runoff =    418.154(CFS)  Total area =     153.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.71 min.
Rainfall intensity =      2.847(In/Hr) for a   100.0 year storm
Subarea runoff =      1.517(CFS) for      0.600(Ac.)
Total runoff =    419.671(CFS)  Total area =     153.650(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      255.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    484.000(Ft.)
End of natural channel elevation =    483.000(Ft.)
Length of natural channel  =    32.000(Ft.)
Estimated mean flow rate at midpoint of channel =    419.985(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.31(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0313
Corrected/adjusted channel slope =  0.0313
Travel time =    0.07 min.     TC =   14.78  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
```

```
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.841(In/Hr) for a   100.0 year storm
Subarea runoff =      0.558(CFS) for      0.230(Ac.)
Total runoff =    420.229(CFS)  Total area =     153.880(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      255.000 to Point/Station      255.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    153.880(Ac.)
Runoff from this stream =    420.229(CFS)
Time of concentration =   14.78 min.
Rainfall intensity =     2.841(In/Hr)
Summary of stream data:

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


1      420.229     14.78                 2.841
Largest stream flow has longer time of concentration
Qp =    420.229 + sum of
Qp =    420.229

Total of 1 main streams to confluence:
Flow rates before confluence point:
     420.229
Area of streams before confluence:
      153.880


Results of confluence:
Total flow rate =    420.229(CFS)
Time of concentration =    14.781 min.
Effective stream area after confluence  =    153.880(Ac.)
End of computations, total study area =          153.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.975
Area averaged RI index number =  85.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886EXB2.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "B" EXISTING CONDITION 2-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.584(In/Hr)
Slope of intensity duration curve = 0.4800

++

Process from Point/Station 300.000 to Point/Station 305.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 690.000(Ft.)
Top (of initial area) elevation = 1254.000(Ft.)
Bottom (of initial area) elevation = 825.000(Ft.)

```
Difference in elevation =   429.000(Ft.)
Slope =    0.62174  s(percent)=      62.17
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.963 min.
Rainfall intensity =      1.538(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.670
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.965(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      310.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    825.000(Ft.)
End of natural channel elevation =    662.000(Ft.)
Length of natural channel  =   758.000(Ft.)
Estimated mean flow rate at midpoint of channel =     13.311(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.32(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2150
Corrected/adjusted channel slope =  0.1660
Travel time =    2.37 min.     TC =   10.34  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.357(In/Hr) for a     2.0 year storm
Subarea runoff =     10.829(CFS) for     12.320(Ac.)
```

```
Total runoff =     17.794(CFS)  Total area =      19.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      310.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.34 min.
Rainfall intensity =      1.357(In/Hr) for a     2.0 year storm
Subarea runoff =      4.193(CFS) for      4.770(Ac.)
Total runoff =     21.987(CFS)  Total area =      23.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      315.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    662.000(Ft.)
End of natural channel elevation =    611.000(Ft.)
Length of natural channel  =   926.000(Ft.)
Estimated mean flow rate at midpoint of channel =     27.403(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.92(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0551
Corrected/adjusted channel slope =  0.0551
Travel time =    3.93 min.     TC =   14.27  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.605
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  70.16
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.163(In/Hr) for a     2.0 year storm
Subarea runoff =      8.264(CFS) for     11.750(Ac.)
Total runoff =     30.251(CFS)  Total area =      35.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      315.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.665
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    14.27 min.
Rainfall intensity =      1.163(In/Hr) for a     2.0 year storm
Subarea runoff =      3.199(CFS) for      4.140(Ac.)
Total runoff =     33.450(CFS)  Total area =      39.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      320.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    611.000(Ft.)
End of natural channel elevation =    533.000(Ft.)
Length of natural channel  =   908.000(Ft.)
Estimated mean flow rate at midpoint of channel =     37.705(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.47(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0859
Corrected/adjusted channel slope =  0.0859
Travel time =    1.45 min.     TC =   15.72  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.456
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.300
RI index for soil(AMC 1)  =  55.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.110(In/Hr) for a     2.0 year storm
Subarea runoff =      5.114(CFS) for     10.110(Ac.)
Total runoff =     38.565(CFS)  Total area =      49.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      325.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   533.000(Ft.)
Downstream point/station elevation =   525.000(Ft.)
Pipe length  =   120.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    38.565(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    38.565(CFS)
Normal flow depth in pipe =   15.68(In.)
Flow top width inside pipe =   22.84(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.74(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    15.83 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.83 min.
Rainfall intensity =      1.106(In/Hr) for a     2.0 year storm
Subarea runoff =      0.343(CFS) for      0.370(Ac.)
Total runoff =     38.908(CFS)  Total area =      50.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
```

```
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.83 min.
Rainfall intensity =      1.106(In/Hr) for a     2.0 year storm
Subarea runoff =      1.234(CFS) for      1.330(Ac.)
Total runoff =     40.142(CFS)  Total area =      51.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    525.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   547.000(Ft.)
Estimated mean flow rate at midpoint of channel =     41.018(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.83(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0640
Corrected/adjusted channel slope =  0.0640
Travel time =    1.89 min.     TC =   17.72  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.493
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.048(In/Hr) for a     2.0 year storm
Subarea runoff =      1.161(CFS) for      2.250(Ac.)
Total runoff =     41.303(CFS)  Total area =      53.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      330.000
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**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     53.800(Ac.)
Runoff from this stream =     41.303(CFS)
Time of concentration =   17.72 min.
Rainfall intensity =     1.048(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      405.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =  1050.000(Ft.)
Top (of initial area) elevation =   965.000(Ft.)
Bottom (of initial area) elevation =   631.000(Ft.)
Difference in elevation =   334.000(Ft.)
Slope =    0.31810  s(percent)=      31.81
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.771 min.
Rainfall intensity =      1.331(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.579
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.200
RI index for soil(AMC 1)  =  64.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.025(CFS)
Total initial stream area =        6.520(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      410.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________
Top of natural channel elevation =    631.000(Ft.)
End of natural channel elevation =    544.300(Ft.)
Length of natural channel  =  1330.000(Ft.)
Estimated mean flow rate at midpoint of channel =      7.141(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.87(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0652
Corrected/adjusted channel slope =  0.0652
Travel time =    3.78 min.     TC =   14.55  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.526
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  61.92
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.152(In/Hr) for a     2.0 year storm
Subarea runoff =      3.325(CFS) for      5.490(Ac.)
Total runoff =      8.350(CFS)  Total area =      12.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    631.000(Ft.)
End of natural channel elevation =    542.000(Ft.)
Length of natural channel  =   100.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.729(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  13.07(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.8900
Corrected/adjusted channel slope =  0.2928
Travel time =    0.13 min.     TC =   14.68  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.525
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  61.92
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.147(In/Hr) for a     2.0 year storm
Subarea runoff =      0.656(CFS) for      1.090(Ac.)
Total runoff =      9.006(CFS)  Total area =      13.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      415.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     13.100(Ac.)
Runoff from this stream =      9.006(CFS)
Time of concentration =   14.68 min.
Rainfall intensity =     1.147(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      505.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   525.000(Ft.)
Top (of initial area) elevation =   740.000(Ft.)
Bottom (of initial area) elevation =   581.000(Ft.)
Difference in elevation =   159.000(Ft.)
Slope =    0.30286  s(percent)=      30.29
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.243 min.
Rainfall intensity =      1.513(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.707
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.736(CFS)
Total initial stream area =        3.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    581.000(Ft.)
End of natural channel elevation =    542.000(Ft.)
Length of natural channel  =   450.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.381(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.04(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0867
Corrected/adjusted channel slope =  0.0867
Travel time =    1.07 min.     TC =    9.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.560
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.427(In/Hr) for a     2.0 year storm
Subarea runoff =      6.937(CFS) for      8.680(Ac.)
Total runoff =     10.672(CFS)  Total area =      12.170(Ac.)


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Process from Point/Station      415.000 to Point/Station      415.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     12.170(Ac.)
Runoff from this stream =     10.672(CFS)
Time of concentration =    9.31 min.
Rainfall intensity =     1.427(In/Hr)
Summary of stream data:

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


1        9.006     14.68                1.147
2       10.672      9.31                1.427
Largest stream flow has longer or shorter time of concentration
Qp =     10.672 + sum of
          Qa          Tb/Ta
           9.006 *    0.634 =      5.713
Qp =     16.385
```

```
Total of 2 streams to confluence:
Flow rates before confluence point:
       9.006      10.672
Area of streams before confluence:
       13.100       12.170
Results of confluence:
Total flow rate =     16.385(CFS)
Time of concentration =     9.309 min.
Effective stream area after confluence =     25.270(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      420.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   542.000(Ft.)
Downstream point/station elevation =   532.000(Ft.)
Pipe length  =   170.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    16.385(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    16.385(CFS)
Normal flow depth in pipe =   11.54(In.)
Flow top width inside pipe =   17.27(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.68(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =     9.52 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      420.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   500.000(Ft.)
Estimated mean flow rate at midpoint of channel =     18.350(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.49(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0840
Corrected/adjusted channel slope =  0.0840
Travel time =    0.98 min.     TC =   10.50  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.548
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.347(In/Hr) for a     2.0 year storm
Subarea runoff =      4.471(CFS) for      6.060(Ac.)
Total runoff =     20.856(CFS)  Total area =      31.330(Ac.)


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Process from Point/Station      330.000 to Point/Station      330.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     31.330(Ac.)
Runoff from this stream =     20.856(CFS)
Time of concentration =   10.50 min.
Rainfall intensity =     1.347(In/Hr)
Summary of stream data:

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


1       41.303     17.72                 1.048
2       20.856     10.50                 1.347
Largest stream flow has longer time of concentration
Qp =     41.303 + sum of
          Qb         Ia/Ib
          20.856 *    0.778 =     16.223
Qp =     57.526

Total of 2 main streams to confluence:
Flow rates before confluence point:
      41.303      20.856
Area of streams before confluence:
       53.800       31.330


Results of confluence:
Total flow rate =     57.526(CFS)
Time of concentration =    17.717 min.
Effective stream area after confluence  =     85.130(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      335.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    490.000(Ft.)
End of natural channel elevation =    486.000(Ft.)
Length of natural channel  =   133.000(Ft.)
Estimated mean flow rate at midpoint of channel =     57.861(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0301
Corrected/adjusted channel slope =  0.0301
Travel time =    0.32 min.     TC =   18.03  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.491
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.039(In/Hr) for a     2.0 year storm
Subarea runoff =      0.505(CFS) for      0.990(Ac.)
Total runoff =     58.031(CFS)  Total area =      86.120(Ac.)


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Process from Point/Station      335.000 to Point/Station      335.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     86.120(Ac.)
Runoff from this stream =     58.031(CFS)
Time of concentration =   18.03 min.
Rainfall intensity =     1.039(In/Hr)
Summary of stream data:

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

```
1       58.031     18.03                  1.039
Largest stream flow has longer time of concentration
Qp =     58.031 + sum of
Qp =     58.031

Total of 1 main streams to confluence:
Flow rates before confluence point:
      58.031
Area of streams before confluence:
       86.120


Results of confluence:
Total flow rate =     58.031(CFS)
Time of concentration =    18.034 min.
Effective stream area after confluence  =     86.120(Ac.)
End of computations, total study area =           86.12 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.982
Area averaged RI index number =  81.5
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886EXB5.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "B" EXISTING CONDITION 5-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 5.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.786(In/Hr)
Slope of intensity duration curve = 0.4800

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Process from Point/Station 300.000 to Point/Station 305.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 690.000(Ft.)
Top (of initial area) elevation = 1254.000(Ft.)
Bottom (of initial area) elevation = 825.000(Ft.)

```
Difference in elevation =   429.000(Ft.)
Slope =    0.62174  s(percent)=      62.17
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.963 min.
Rainfall intensity =      2.073(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.717
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.051(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      305.000 to Point/Station      310.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    825.000(Ft.)
End of natural channel elevation =    662.000(Ft.)
Length of natural channel  =   758.000(Ft.)
Estimated mean flow rate at midpoint of channel =     19.209(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.01(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2150
Corrected/adjusted channel slope =  0.1660
Travel time =    2.10 min.     TC =   10.07  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.853(In/Hr) for a     5.0 year storm
Subarea runoff =     15.981(CFS) for     12.320(Ac.)
```

```
Total runoff =     26.032(CFS)  Total area =      19.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      310.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.07 min.
Rainfall intensity =      1.853(In/Hr) for a     5.0 year storm
Subarea runoff =      6.188(CFS) for      4.770(Ac.)
Total runoff =     32.220(CFS)  Total area =      23.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      315.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    662.000(Ft.)
End of natural channel elevation =    611.000(Ft.)
Length of natural channel  =   926.000(Ft.)
Estimated mean flow rate at midpoint of channel =     40.156(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.45(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0551
Corrected/adjusted channel slope =  0.0551
Travel time =    3.47 min.     TC =   13.53  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.665
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  70.16
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.607(In/Hr) for a     5.0 year storm
Subarea runoff =     12.565(CFS) for     11.750(Ac.)
Total runoff =     44.785(CFS)  Total area =      35.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      315.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.716
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    13.53 min.
Rainfall intensity =      1.607(In/Hr) for a     5.0 year storm
Subarea runoff =      4.768(CFS) for      4.140(Ac.)
Total runoff =     49.553(CFS)  Total area =      39.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      320.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    611.000(Ft.)
End of natural channel elevation =    533.000(Ft.)
Length of natural channel  =   908.000(Ft.)
Estimated mean flow rate at midpoint of channel =     55.856(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.71(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0859
Corrected/adjusted channel slope =  0.0859
Travel time =    1.29 min.     TC =   14.82  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.528
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.300
RI index for soil(AMC 1)  =  55.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.539(In/Hr) for a     5.0 year storm
Subarea runoff =      8.219(CFS) for     10.110(Ac.)
Total runoff =     57.772(CFS)  Total area =      49.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      325.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   533.000(Ft.)
Downstream point/station elevation =   525.000(Ft.)
Pipe length  =   120.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    57.772(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    57.772(CFS)
Normal flow depth in pipe =   18.84(In.)
Flow top width inside pipe =   24.79(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.51(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    14.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.93 min.
Rainfall intensity =      1.534(In/Hr) for a     5.0 year storm
Subarea runoff =      0.480(CFS) for      0.370(Ac.)
Total runoff =     58.251(CFS)  Total area =      50.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
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```
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.93 min.
Rainfall intensity =      1.534(In/Hr) for a     5.0 year storm
Subarea runoff =      1.724(CFS) for      1.330(Ac.)
Total runoff =     59.975(CFS)  Total area =      51.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    525.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   547.000(Ft.)
Estimated mean flow rate at midpoint of channel =     61.284(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.51(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0640
Corrected/adjusted channel slope =  0.0640
Travel time =    1.65 min.     TC =   16.58  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.564
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.458(In/Hr) for a     5.0 year storm
Subarea runoff =      1.852(CFS) for      2.250(Ac.)
Total runoff =     61.827(CFS)  Total area =      53.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      330.000
```

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**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     53.800(Ac.)
Runoff from this stream =     61.827(CFS)
Time of concentration =   16.58 min.
Rainfall intensity =     1.458(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      405.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________
Initial area flow distance =  1050.000(Ft.)
Top (of initial area) elevation =   965.000(Ft.)
Bottom (of initial area) elevation =   631.000(Ft.)
Difference in elevation =   334.000(Ft.)
Slope =    0.31810  s(percent)=      31.81
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.771 min.
Rainfall intensity =      1.794(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.638
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.200
RI index for soil(AMC 1)  =  64.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.459(CFS)
Total initial stream area =        6.520(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      410.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________
Top of natural channel elevation =    631.000(Ft.)
End of natural channel elevation =    544.300(Ft.)
Length of natural channel  =  1330.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.600(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.48(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0652
Corrected/adjusted channel slope =  0.0652
Travel time =    3.42 min.     TC =   14.19  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.591
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  61.92
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.571(In/Hr) for a     5.0 year storm
Subarea runoff =      5.101(CFS) for      5.490(Ac.)
Total runoff =     12.560(CFS)  Total area =      12.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    631.000(Ft.)
End of natural channel elevation =    542.000(Ft.)
Length of natural channel  =   100.000(Ft.)
Estimated mean flow rate at midpoint of channel =     13.130(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  14.50(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.8900
Corrected/adjusted channel slope =  0.2928
Travel time =    0.11 min.     TC =   14.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.591
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  61.92
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.565(In/Hr) for a     5.0 year storm
Subarea runoff =      1.007(CFS) for      1.090(Ac.)
Total runoff =     13.567(CFS)  Total area =      13.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      415.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     13.100(Ac.)
Runoff from this stream =     13.567(CFS)
Time of concentration =   14.31 min.
Rainfall intensity =     1.565(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      505.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   525.000(Ft.)
Top (of initial area) elevation =   740.000(Ft.)
Bottom (of initial area) elevation =   581.000(Ft.)
Difference in elevation =   159.000(Ft.)
Slope =    0.30286  s(percent)=      30.29
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.243 min.
Rainfall intensity =      2.039(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.749
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      5.329(CFS)
Total initial stream area =        3.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    581.000(Ft.)
End of natural channel elevation =    542.000(Ft.)
Length of natural channel  =   450.000(Ft.)
Estimated mean flow rate at midpoint of channel =     11.956(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.70(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0867
Corrected/adjusted channel slope =  0.0867
Travel time =    0.97 min.     TC =    9.22  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.621
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.933(In/Hr) for a     5.0 year storm
Subarea runoff =     10.424(CFS) for      8.680(Ac.)
Total runoff =     15.753(CFS)  Total area =      12.170(Ac.)


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Process from Point/Station      415.000 to Point/Station      415.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     12.170(Ac.)
Runoff from this stream =     15.753(CFS)
Time of concentration =    9.22 min.
Rainfall intensity =     1.933(In/Hr)
Summary of stream data:

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


1       13.567     14.31                1.565
2       15.753      9.22                1.933
Largest stream flow has longer or shorter time of concentration
Qp =     15.753 + sum of
          Qa          Tb/Ta
          13.567 *    0.644 =      8.740
Qp =     24.493
```

```
Total of 2 streams to confluence:
Flow rates before confluence point:
      13.567      15.753
Area of streams before confluence:
       13.100       12.170
Results of confluence:
Total flow rate =     24.493(CFS)
Time of concentration =     9.217 min.
Effective stream area after confluence =     25.270(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      420.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   542.000(Ft.)
Downstream point/station elevation =   532.000(Ft.)
Pipe length  =   170.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    24.493(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    24.493(CFS)
Normal flow depth in pipe =   13.38(In.)
Flow top width inside pipe =   20.19(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.14(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =     9.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      420.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   500.000(Ft.)
Estimated mean flow rate at midpoint of channel =     27.430(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.47(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0840
Corrected/adjusted channel slope =  0.0840
Travel time =    0.88 min.     TC =   10.28  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.611
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.834(In/Hr) for a     5.0 year storm
Subarea runoff =      6.791(CFS) for      6.060(Ac.)
Total runoff =     31.284(CFS)  Total area =      31.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      330.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     31.330(Ac.)
Runoff from this stream =     31.284(CFS)
Time of concentration =   10.28 min.
Rainfall intensity =     1.834(In/Hr)
Summary of stream data:

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


1       61.827     16.58                 1.458
2       31.284     10.28                 1.834
Largest stream flow has longer time of concentration
Qp =     61.827 + sum of
          Qb         Ia/Ib
          31.284 *    0.795 =     24.874
Qp =     86.701

Total of 2 main streams to confluence:
Flow rates before confluence point:
      61.827      31.284
Area of streams before confluence:
       53.800       31.330


Results of confluence:
Total flow rate =     86.701(CFS)
Time of concentration =    16.582 min.
Effective stream area after confluence  =     85.130(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      335.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    490.000(Ft.)
End of natural channel elevation =    486.000(Ft.)
Length of natural channel  =   133.000(Ft.)
Estimated mean flow rate at midpoint of channel =     87.205(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.90(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0301
Corrected/adjusted channel slope =  0.0301
Travel time =    0.28 min.     TC =   16.86  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.563
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.446(In/Hr) for a     5.0 year storm
Subarea runoff =      0.806(CFS) for      0.990(Ac.)
Total runoff =     87.507(CFS)  Total area =      86.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      335.000 to Point/Station      335.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     86.120(Ac.)
Runoff from this stream =     87.507(CFS)
Time of concentration =   16.86 min.
Rainfall intensity =     1.446(In/Hr)
Summary of stream data:

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

```
1       87.507     16.86                  1.446
Largest stream flow has longer time of concentration
Qp =     87.507 + sum of
Qp =     87.507

Total of 1 main streams to confluence:
Flow rates before confluence point:
      87.507
Area of streams before confluence:
       86.120


Results of confluence:
Total flow rate =     87.507(CFS)
Time of concentration =    16.862 min.
Effective stream area after confluence  =     86.120(Ac.)
End of computations, total study area =           86.12 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.982
Area averaged RI index number =  81.5
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886EXB10.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "B" EXISTING CONDITION 10-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.940(In/Hr)
Slope of intensity duration curve = 0.4800

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Process from Point/Station 300.000 to Point/Station 305.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 690.000(Ft.)
Top (of initial area) elevation = 1254.000(Ft.)
Bottom (of initial area) elevation = 825.000(Ft.)

```
Difference in elevation =   429.000(Ft.)
Slope =    0.62174  s(percent)=      62.17
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.963 min.
Rainfall intensity =      2.478(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.828
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.862(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      305.000 to Point/Station      310.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    825.000(Ft.)
End of natural channel elevation =    662.000(Ft.)
Length of natural channel  =   758.000(Ft.)
Estimated mean flow rate at midpoint of channel =     26.494(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2150
Corrected/adjusted channel slope =  0.1660
Travel time =    1.89 min.     TC =    9.85  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.237(In/Hr) for a    10.0 year storm
Subarea runoff =     22.611(CFS) for     12.320(Ac.)
```

```
Total runoff =     36.474(CFS)  Total area =      19.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      310.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.85 min.
Rainfall intensity =      2.237(In/Hr) for a    10.0 year storm
Subarea runoff =      8.755(CFS) for      4.770(Ac.)
Total runoff =     45.228(CFS)  Total area =      23.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      315.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    662.000(Ft.)
End of natural channel elevation =    611.000(Ft.)
Length of natural channel  =   926.000(Ft.)
Estimated mean flow rate at midpoint of channel =     56.370(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0551
Corrected/adjusted channel slope =  0.0551
Travel time =    3.10 min.     TC =   12.95  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  85.10
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.962(In/Hr) for a    10.0 year storm
Subarea runoff =     18.541(CFS) for     11.750(Ac.)
Total runoff =     63.770(CFS)  Total area =      35.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      315.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.830
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.95 min.
Rainfall intensity =      1.962(In/Hr) for a    10.0 year storm
Subarea runoff =      6.744(CFS) for      4.140(Ac.)
Total runoff =     70.513(CFS)  Total area =      39.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      320.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    611.000(Ft.)
End of natural channel elevation =    533.000(Ft.)
Length of natural channel  =   908.000(Ft.)
Estimated mean flow rate at midpoint of channel =     79.483(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.99(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0859
Corrected/adjusted channel slope =  0.0859
Travel time =    1.16 min.     TC =   14.12  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.717
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.300
RI index for soil(AMC 2)  =  73.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.882(In/Hr) for a    10.0 year storm
Subarea runoff =     13.644(CFS) for     10.110(Ac.)
Total runoff =     84.158(CFS)  Total area =      49.850(Ac.)


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Process from Point/Station      320.000 to Point/Station      325.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   533.000(Ft.)
Downstream point/station elevation =   525.000(Ft.)
Pipe length  =   120.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    84.158(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    84.158(CFS)
Normal flow depth in pipe =   22.59(In.)
Flow top width inside pipe =   25.87(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.21(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    14.21 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.21 min.
Rainfall intensity =      1.876(In/Hr) for a    10.0 year storm
Subarea runoff =      0.602(CFS) for      0.370(Ac.)
Total runoff =     84.760(CFS)  Total area =      50.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
```

```
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.21 min.
Rainfall intensity =      1.876(In/Hr) for a    10.0 year storm
Subarea runoff =      2.166(CFS) for      1.330(Ac.)
Total runoff =     86.926(CFS)  Total area =      51.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    525.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   547.000(Ft.)
Estimated mean flow rate at midpoint of channel =     88.823(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.23(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0640
Corrected/adjusted channel slope =  0.0640
Travel time =    1.46 min.     TC =   15.68  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.744
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.790(In/Hr) for a    10.0 year storm
Subarea runoff =      2.996(CFS) for      2.250(Ac.)
Total runoff =     89.922(CFS)  Total area =      53.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      330.000
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**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     53.800(Ac.)
Runoff from this stream =     89.922(CFS)
Time of concentration =   15.68 min.
Rainfall intensity =     1.790(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      405.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =  1050.000(Ft.)
Top (of initial area) elevation =   965.000(Ft.)
Bottom (of initial area) elevation =   631.000(Ft.)
Difference in elevation =   334.000(Ft.)
Slope =    0.31810  s(percent)=      31.81
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.771 min.
Rainfall intensity =      2.144(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.200
RI index for soil(AMC 2)  =  81.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.978(CFS)
Total initial stream area =        6.520(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      410.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    631.000(Ft.)
End of natural channel elevation =    544.300(Ft.)
Length of natural channel  =  1330.000(Ft.)
Estimated mean flow rate at midpoint of channel =     15.599(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.16(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0652
Corrected/adjusted channel slope =  0.0652
Travel time =    3.10 min.     TC =   13.87  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.759
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  79.10
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.899(In/Hr) for a    10.0 year storm
Subarea runoff =      7.914(CFS) for      5.490(Ac.)
Total runoff =     18.892(CFS)  Total area =      12.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      410.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.87 min.
Rainfall intensity =      1.899(In/Hr) for a    10.0 year storm
Subarea runoff =      0.972(CFS) for      0.590(Ac.)
Total runoff =     19.864(CFS)  Total area =      12.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      410.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
```

```
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.87 min.
Rainfall intensity =      1.899(In/Hr) for a    10.0 year storm
Subarea runoff =      0.577(CFS) for      0.350(Ac.)
Total runoff =     20.441(CFS)  Total area =      12.950(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    631.000(Ft.)
End of natural channel elevation =    542.000(Ft.)
Length of natural channel  =   100.000(Ft.)
Estimated mean flow rate at midpoint of channel =     20.559(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  16.34(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.8900
Corrected/adjusted channel slope =  0.2928
Travel time =    0.10 min.     TC =   13.97  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.759
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  79.10
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.892(In/Hr) for a    10.0 year storm
Subarea runoff =      0.215(CFS) for      0.150(Ac.)
Total runoff =     20.656(CFS)  Total area =      13.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      415.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     13.100(Ac.)
Runoff from this stream =     20.656(CFS)
Time of concentration =   13.97 min.
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```
Rainfall intensity =     1.892(In/Hr)


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Process from Point/Station      500.000 to Point/Station      505.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   525.000(Ft.)
Top (of initial area) elevation =   740.000(Ft.)
Bottom (of initial area) elevation =   581.000(Ft.)
Difference in elevation =   159.000(Ft.)
Slope =    0.30286  s(percent)=      30.29
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.243 min.
Rainfall intensity =      2.437(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.843
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.171(CFS)
Total initial stream area =        3.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    581.000(Ft.)
End of natural channel elevation =    542.000(Ft.)
Length of natural channel  =   450.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.088(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.32(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0867
Corrected/adjusted channel slope =  0.0867
Travel time =    0.90 min.     TC =    9.14  min.


 Adding area flow to channel
```

```
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.774
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.319(In/Hr) for a    10.0 year storm
Subarea runoff =     15.588(CFS) for      8.680(Ac.)
Total runoff =     22.758(CFS)  Total area =      12.170(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      415.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     12.170(Ac.)
Runoff from this stream =     22.758(CFS)
Time of concentration =    9.14 min.
Rainfall intensity =     2.319(In/Hr)
Summary of stream data:

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


1       20.656     13.97                 1.892
2       22.758      9.14                 2.319
Largest stream flow has longer or shorter time of concentration
Qp =     22.758 + sum of
          Qa          Tb/Ta
          20.656 *    0.655 =     13.522
Qp =     36.281

Total of 2 streams to confluence:
Flow rates before confluence point:
      20.656      22.758
Area of streams before confluence:
       13.100       12.170
Results of confluence:
Total flow rate =     36.281(CFS)
Time of concentration =     9.144 min.
Effective stream area after confluence =     25.270(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      420.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =   542.000(Ft.)
Downstream point/station elevation =   532.000(Ft.)
Pipe length  =   170.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    36.281(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    36.281(CFS)
Normal flow depth in pipe =   15.70(In.)
Flow top width inside pipe =   22.83(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.67(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =     9.31 min.


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Process from Point/Station      420.000 to Point/Station      420.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.872
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     9.31 min.
Rainfall intensity =      2.299(In/Hr) for a    10.0 year storm
Subarea runoff =      3.527(CFS) for      1.760(Ac.)
Total runoff =     39.807(CFS)  Total area =      27.030(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      420.000 to Point/Station      420.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.872
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     9.31 min.
Rainfall intensity =      2.299(In/Hr) for a    10.0 year storm
Subarea runoff =      2.004(CFS) for      1.000(Ac.)
Total runoff =     41.811(CFS)  Total area =      28.030(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      420.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   500.000(Ft.)
Estimated mean flow rate at midpoint of channel =     44.273(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.83(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0840
Corrected/adjusted channel slope =  0.0840
Travel time =    0.77 min.     TC =   10.08  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.769
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.213(In/Hr) for a    10.0 year storm
Subarea runoff =      5.617(CFS) for      3.300(Ac.)
Total runoff =     47.428(CFS)  Total area =      31.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      330.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     31.330(Ac.)
Runoff from this stream =     47.428(CFS)
Time of concentration =   10.08 min.
Rainfall intensity =     2.213(In/Hr)
Summary of stream data:

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

```
1       89.922     15.68                 1.790
2       47.428     10.08                 2.213
Largest stream flow has longer time of concentration
Qp =     89.922 + sum of
          Qb         Ia/Ib
          47.428 *    0.809 =     38.375
Qp =    128.297

Total of 2 main streams to confluence:
Flow rates before confluence point:
      89.922      47.428
Area of streams before confluence:
       53.800       31.330


Results of confluence:
Total flow rate =    128.297(CFS)
Time of concentration =    15.677 min.
Effective stream area after confluence  =     85.130(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      335.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    490.000(Ft.)
End of natural channel elevation =    486.000(Ft.)
Length of natural channel  =   133.000(Ft.)
Estimated mean flow rate at midpoint of channel =    129.043(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.89(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0301
Corrected/adjusted channel slope =  0.0301
Travel time =    0.25 min.     TC =   15.93  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.743
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
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```
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.777(In/Hr) for a    10.0 year storm
Subarea runoff =      1.307(CFS) for      0.990(Ac.)
Total runoff =    129.603(CFS)  Total area =      86.120(Ac.)


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Process from Point/Station      335.000 to Point/Station      335.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     86.120(Ac.)
Runoff from this stream =    129.603(CFS)
Time of concentration =   15.93 min.
Rainfall intensity =     1.777(In/Hr)
Summary of stream data:

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


1      129.603     15.93                  1.777
Largest stream flow has longer time of concentration
Qp =    129.603 + sum of
Qp =    129.603

Total of 1 main streams to confluence:
Flow rates before confluence point:
     129.603
Area of streams before confluence:
       86.120


Results of confluence:
Total flow rate =    129.603(CFS)
Time of concentration =    15.926 min.
Effective stream area after confluence  =     86.120(Ac.)
End of computations, total study area =           86.12 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.944
Area averaged RI index number =  80.6
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886EXB100.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "B" EXISTING CONDITION 100-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4800

++

Process from Point/Station 300.000 to Point/Station 305.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 690.000(Ft.)
Top (of initial area) elevation = 1254.000(Ft.)
Bottom (of initial area) elevation = 825.000(Ft.)

```
Difference in elevation =   429.000(Ft.)
Slope =    0.62174  s(percent)=      62.17
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.963 min.
Rainfall intensity =      3.823(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     22.785(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      310.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    825.000(Ft.)
End of natural channel elevation =    662.000(Ft.)
Length of natural channel  =   758.000(Ft.)
Estimated mean flow rate at midpoint of channel =     43.548(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.87(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2150
Corrected/adjusted channel slope =  0.1660
Travel time =    1.61 min.     TC =    9.57  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.500(In/Hr) for a   100.0 year storm
Subarea runoff =     37.951(CFS) for     12.320(Ac.)
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```
Total runoff =     60.736(CFS)  Total area =      19.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      310.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.57 min.
Rainfall intensity =      3.500(In/Hr) for a   100.0 year storm
Subarea runoff =     14.694(CFS) for      4.770(Ac.)
Total runoff =     75.429(CFS)  Total area =      23.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      315.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    662.000(Ft.)
End of natural channel elevation =    611.000(Ft.)
Length of natural channel  =   926.000(Ft.)
Estimated mean flow rate at midpoint of channel =     94.010(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.89(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0551
Corrected/adjusted channel slope =  0.0551
Travel time =    2.62 min.     TC =   12.19  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  94.04
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.116(In/Hr) for a   100.0 year storm
Subarea runoff =     32.086(CFS) for     11.750(Ac.)
Total runoff =    107.515(CFS)  Total area =      35.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      315.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.19 min.
Rainfall intensity =      3.116(In/Hr) for a   100.0 year storm
Subarea runoff =     11.388(CFS) for      4.140(Ac.)
Total runoff =    118.903(CFS)  Total area =      39.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      320.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    611.000(Ft.)
End of natural channel elevation =    533.000(Ft.)
Length of natural channel  =   908.000(Ft.)
Estimated mean flow rate at midpoint of channel =    134.028(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  15.20(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0859
Corrected/adjusted channel slope =  0.0859
Travel time =    1.00 min.     TC =   13.18  min.


 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.300
RI index for soil(AMC 3)  =  87.10
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.001(In/Hr) for a   100.0 year storm
Subarea runoff =     25.621(CFS) for     10.110(Ac.)
Total runoff =    144.524(CFS)  Total area =      49.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      325.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   533.000(Ft.)
Downstream point/station elevation =   525.000(Ft.)
Pipe length  =   120.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   144.524(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   144.524(CFS)
Normal flow depth in pipe =   28.55(In.)
Flow top width inside pipe =   29.17(In.)
Critical depth could not be calculated.
Pipe flow velocity =     24.06(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    13.27 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.27 min.
Rainfall intensity =      2.992(In/Hr) for a   100.0 year storm
Subarea runoff =      0.983(CFS) for      0.370(Ac.)
Total runoff =    145.508(CFS)  Total area =      50.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
```

```
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.27 min.
Rainfall intensity =      2.992(In/Hr) for a   100.0 year storm
Subarea runoff =      3.535(CFS) for      1.330(Ac.)
Total runoff =    149.042(CFS)  Total area =      51.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    525.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   547.000(Ft.)
Estimated mean flow rate at midpoint of channel =    152.295(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.44(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0640
Corrected/adjusted channel slope =  0.0640
Travel time =    1.23 min.     TC =   14.49  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.868(In/Hr) for a   100.0 year storm
Subarea runoff =      5.516(CFS) for      2.250(Ac.)
Total runoff =    154.559(CFS)  Total area =      53.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      330.000
```

```
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     53.800(Ac.)
Runoff from this stream =    154.559(CFS)
Time of concentration =   14.49 min.
Rainfall intensity =     2.868(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      405.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =  1050.000(Ft.)
Top (of initial area) elevation =   965.000(Ft.)
Bottom (of initial area) elevation =   631.000(Ft.)
Difference in elevation =   334.000(Ft.)
Slope =    0.31810  s(percent)=      31.81
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.771 min.
Rainfall intensity =      3.307(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.200
RI index for soil(AMC 3)  =  91.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     18.712(CFS)
Total initial stream area =        6.520(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      410.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of natural channel elevation =    631.000(Ft.)
End of natural channel elevation =    544.300(Ft.)
Length of natural channel  =  1330.000(Ft.)
Estimated mean flow rate at midpoint of channel =     26.590(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.27(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0652
Corrected/adjusted channel slope =  0.0652
Travel time =    2.68 min.     TC =   13.45  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  90.46
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.972(In/Hr) for a   100.0 year storm
Subarea runoff =     14.022(CFS) for      5.490(Ac.)
Total runoff =     32.734(CFS)  Total area =      12.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    631.000(Ft.)
End of natural channel elevation =    542.000(Ft.)
Length of natural channel  =   100.000(Ft.)
Estimated mean flow rate at midpoint of channel =     34.220(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  18.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.8900
Corrected/adjusted channel slope =  0.2928
Travel time =    0.09 min.     TC =   13.54  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  90.46
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.963(In/Hr) for a   100.0 year storm
Subarea runoff =      2.775(CFS) for      1.090(Ac.)
Total runoff =     35.509(CFS)  Total area =      13.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      415.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     13.100(Ac.)
Runoff from this stream =     35.509(CFS)
Time of concentration =   13.54 min.
Rainfall intensity =     2.963(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      505.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   525.000(Ft.)
Top (of initial area) elevation =   740.000(Ft.)
Bottom (of initial area) elevation =   581.000(Ft.)
Difference in elevation =   159.000(Ft.)
Slope =    0.30286  s(percent)=      30.29
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.243 min.
Rainfall intensity =      3.760(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     11.620(CFS)
Total initial stream area =        3.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      505.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    581.000(Ft.)
End of natural channel elevation =    542.000(Ft.)
Length of natural channel  =   450.000(Ft.)
Estimated mean flow rate at midpoint of channel =     26.069(CFS)
```

```
Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0867
Corrected/adjusted channel slope =  0.0867
Travel time =    0.79 min.     TC =    9.03  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.864
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.598(In/Hr) for a   100.0 year storm
Subarea runoff =     26.972(CFS) for      8.680(Ac.)
Total runoff =     38.592(CFS)  Total area =      12.170(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      415.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     12.170(Ac.)
Runoff from this stream =     38.592(CFS)
Time of concentration =    9.03 min.
Rainfall intensity =     3.598(In/Hr)
Summary of stream data:

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


1       35.509     13.54                2.963
2       38.592      9.03                3.598
Largest stream flow has longer or shorter time of concentration
Qp =     38.592 + sum of
          Qa          Tb/Ta
          35.509 *    0.667 =     23.692
Qp =     62.284
```

```
Total of 2 streams to confluence:
Flow rates before confluence point:
      35.509      38.592
Area of streams before confluence:
       13.100       12.170
Results of confluence:
Total flow rate =     62.284(CFS)
Time of concentration =     9.034 min.
Effective stream area after confluence =     25.270(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      420.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   542.000(Ft.)
Downstream point/station elevation =   532.000(Ft.)
Pipe length  =   170.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    62.284(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    62.284(CFS)
Normal flow depth in pipe =   21.14(In.)
Flow top width inside pipe =   22.26(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.64(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     9.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      420.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   500.000(Ft.)
Estimated mean flow rate at midpoint of channel =     69.752(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.36(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0840
Corrected/adjusted channel slope =  0.0840
Travel time =    0.67 min.     TC =    9.86  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.450(In/Hr) for a   100.0 year storm
Subarea runoff =     18.025(CFS) for      6.060(Ac.)
Total runoff =     80.309(CFS)  Total area =      31.330(Ac.)


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Process from Point/Station      330.000 to Point/Station      330.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     31.330(Ac.)
Runoff from this stream =     80.309(CFS)
Time of concentration =    9.86 min.
Rainfall intensity =     3.450(In/Hr)
Summary of stream data:

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


1      154.559     14.49                 2.868
2       80.309      9.86                 3.450
Largest stream flow has longer time of concentration
Qp =    154.559 + sum of
          Qb         Ia/Ib
          80.309 *    0.831 =     66.759
Qp =    221.317

Total of 2 main streams to confluence:
Flow rates before confluence point:
     154.559      80.309
Area of streams before confluence:
       53.800       31.330


Results of confluence:
Total flow rate =    221.317(CFS)
Time of concentration =    14.491 min.
Effective stream area after confluence  =     85.130(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      335.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    490.000(Ft.)
End of natural channel elevation =    486.000(Ft.)
Length of natural channel  =   133.000(Ft.)
Estimated mean flow rate at midpoint of channel =    222.604(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.51(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0301
Corrected/adjusted channel slope =  0.0301
Travel time =    0.21 min.     TC =   14.70  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.848(In/Hr) for a   100.0 year storm
Subarea runoff =      2.409(CFS) for      0.990(Ac.)
Total runoff =    223.727(CFS)  Total area =      86.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      335.000 to Point/Station      335.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     86.120(Ac.)
Runoff from this stream =    223.727(CFS)
Time of concentration =   14.70 min.
Rainfall intensity =     2.848(In/Hr)
Summary of stream data:

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

```
1      223.727     14.70                  2.848
Largest stream flow has longer time of concentration
Qp =    223.727 + sum of
Qp =    223.727

Total of 1 main streams to confluence:
Flow rates before confluence point:
     223.727
Area of streams before confluence:
       86.120

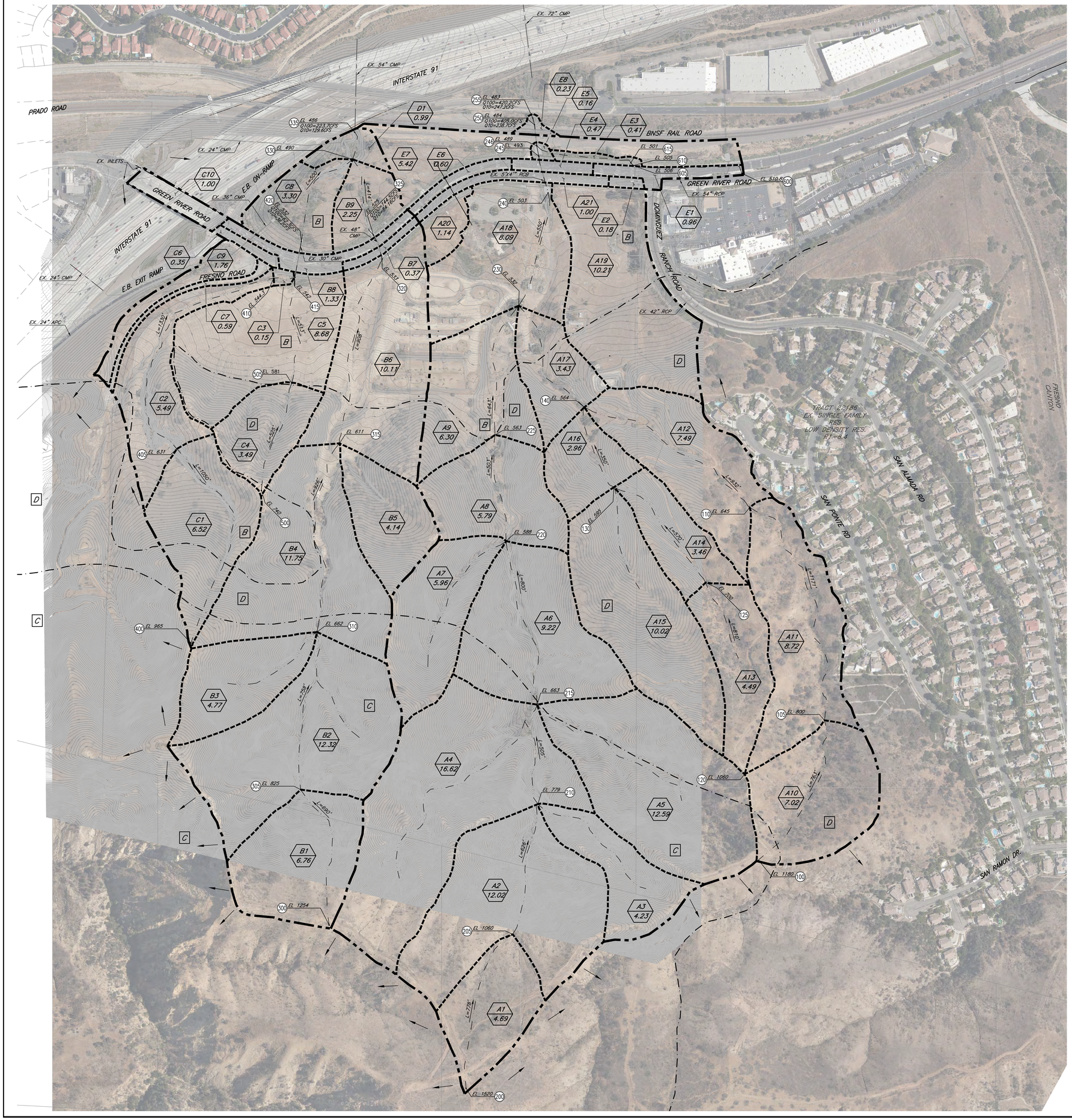

Results of confluence:
Total flow rate =    223.727(CFS)
Time of concentration =    14.701 min.
Effective stream area after confluence  =     86.120(Ac.)
End of computations, total study area =           86.12 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.982
Area averaged RI index number =  81.5
```

Appendix

D

EXISTING CONDITION HYDROLOGIC KEY MAP



EXIST. SUBAREA "A" RUNOFFS TO SD INLET						
NODE	TC (MIN)	100-YR STORM RUNOFF	TC (MIN)	10-YR STORM RUNOFF	TOTAL TRIB. AREA (AC)	STREAM DESCRIPTION OR REMARKS
205	8.44	15.37	8.44	9.33	4.69	INITIAL AREA A1
210	9.69	65.12	9.91	39.07	20.94	A2 AND A3
215	10.51	151.12	10.89	90.16	50.15	A4 AND A5
220	11.96	193.19	12.60	115.06	65.33	A6 AND A7
225	13.12	208.56	13.98	124.12	71.12	A8
230	13.93	224.23	14.93	132.62	77.42	A9, MAIN CONFLUENCE 1
105	8.67	22.80	8.67	14.03	7.02	INITIAL AREA A10
110	11.70	47.26	12.23	28.66	15.74	A11
140	14.17	66.40	15.14	39.92	23.23	A12, MINOR CONFLUENCE 1
125	9.08	14.26	9.08	8.78	4.49	INITIAL AREA A13
130	10.72	53.74	11.00	32.67	17.97	A14, A15
140	14.17	122.87	15.14	73.72	44.16	A16, MINOR CONFLUENCE 1&2
230	13.93	347.62	14.93	206.16	125.01	A17, MAIN CONFLUENCE 1&2
240	14.50	397.40	15.60	234.67	145.45	A18, A19, A20, A21
245	14.57	399.56	15.69	235.40	145.92	E4
246	14.65	399.95	15.78	235.61	146.08	E5, MAIN CONFLUENCE 1
605	5.00	4.11	5.00	2.64	0.96	INITIAL AREA E1
610	5.03	4.88	5.04	3.13	1.14	E2
615	5.05	4.88	5.06	3.13	1.14	PIPEFLOW
246	14.65	404.97	15.77	238.74	147.63	E3, MAIN CONFLUENCE 1&2
250	14.71	404.97	15.84	238.74	147.63	PIPEFLOW
255	14.78	420.23	15.93	247.15	153.88	E6, E7, E8

EXIST. SUBAREA "B" RUNOFFS TO SD INLET						
NODE	TC (MIN)	100-YR STORM RUNOFF	TC (MIN)	10-YR STORM RUNOFF	TOTAL TRIB. AREA (AC)	STREAM DESCRIPTION OR REMARKS
305	7.96	22.79	7.96	13.86	6.76	INITIAL AREA B1
310	9.57	75.43	9.85	45.23	23.85	B2 AND B3
315	12.19	118.90	12.95	70.51	39.74	B4 AND B5
320	13.18	144.52	14.12	84.16	49.85	B6
325	13.27	144.52	14.21	84.16	49.85	PIPEFLOW
330	14.50	154.21	15.68	89.42	53.80	B7, B8, B9, MAIN CONFLUENCE 1
405	10.77	18.71	10.77	10.98	6.52	INITIAL AREA C1
410	13.45	32.73	13.87	18.89	12.02	C2
415	13.54	35.51	13.97	20.46	13.10	C3, C6, C7, MINOR CONFLUENCE 1
505	8.24	11.62	8.24	7.17	3.49	INITIAL AREA C4
415	9.03	62.28	9.14	36.28	25.27	C5, MINOR CONFLUENCE 1&2
420	9.19	62.28	9.31	36.28	25.27	PIPEFLOW
330	14.50	221.32	15.68	128.30	85.13	C8, C9, C10, MAIN CONFLUENCE 1&2
335	14.71	223.73	15.93	129.60	86.12	D1, TO EX. INLET

LEGEND

- MAJOR WATERSHED BOUNDARY
- MINOR WATERSHED BOUNDARY
- FLOW PATH
- SOIL BOUNDARY
- DIRECTION OF FLOW
- A10 / 7.02 — DRAINAGE AREA DESIGNATION / ACRES
- 340 — NODE DESIGNATION
- L=300' — LENGTH OF EXISTING FLOW PATH
- Q_{100} — CALCULATED 100-YEAR STORM RUNOFF
- Q_{10} — CALCULATED 10-YEAR STORM RUNOFF
- C — SOIL GROUP

N

150' 0 150' 300' 450'
SCALE IN FEET

EXISTING CONDITION HYDROLOGY KEY MAP
FOR
GREEN RIVER RANCH
COUNTY RIVERSIDE

HYD: --
DRAFT: --
CHECK: --

KWC ENGINEERS
CIVIL ENGINEERS ★ SURVEYORS ★ CONSTRUCTION MANAGEMENT
1880 COMPTON AVENUE, SUITE 100 ★ CORONA, CA 92881-3370 ★ 909-734-2130

SHEET 1 OF 1

© KWC ENGINEERS
P:\21\1268\PRELIM\REPORTS\HYDRO\1268 HYDRO EX.dwg | 11/17/2022 7:34 AM | Plotted by: Andrew Bunce

Appendix

E

PROPOSED CONDITION HYDROLOGIC ANALYSIS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886PRA2.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "A" AND "E" PROPOSED CONDITION 2-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.584(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 200.000 to Point/Station 205.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 778.000(Ft.)
Top (of initial area) elevation = 1520.000(Ft.)
Bottom (of initial area) elevation = 1060.000(Ft.)

```
Difference in elevation =   460.000(Ft.)
Slope =    0.59126  s(percent)=      59.13
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.439 min.
Rainfall intensity =      1.496(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.665
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.665(CFS)
Total initial stream area =        4.690(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      210.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1060.000(Ft.)
End of natural channel elevation =    779.000(Ft.)
Length of natural channel  =   626.000(Ft.)
Estimated mean flow rate at midpoint of channel =     10.644(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.4489
Corrected/adjusted channel slope =  0.2174
Travel time =    1.85 min.     TC =   10.29  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.360(In/Hr) for a     2.0 year storm
Subarea runoff =     10.597(CFS) for     12.020(Ac.)
```

```
Total runoff =     15.262(CFS)  Total area =      16.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      210.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.29 min.
Rainfall intensity =      1.360(In/Hr) for a     2.0 year storm
Subarea runoff =      3.729(CFS) for      4.230(Ac.)
Total runoff =     18.991(CFS)  Total area =      20.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      215.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    779.000(Ft.)
End of natural channel elevation =    663.000(Ft.)
Length of natural channel  =   505.000(Ft.)
Estimated mean flow rate at midpoint of channel =     26.528(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2297
Corrected/adjusted channel slope =  0.1719
Travel time =    1.24 min.     TC =   11.53  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.638
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.288(In/Hr) for a     2.0 year storm
Subarea runoff =     13.660(CFS) for     16.620(Ac.)
Total runoff =     32.651(CFS)  Total area =      37.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      215.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.656
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 1)  =  73.52
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.53 min.
Rainfall intensity =      1.288(In/Hr) for a     2.0 year storm
Subarea runoff =     10.632(CFS) for     12.590(Ac.)
Total runoff =     43.284(CFS)  Total area =      50.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      220.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    663.000(Ft.)
End of natural channel elevation =    587.500(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =     47.262(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.12(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0944
Corrected/adjusted channel slope =  0.0944
Travel time =    2.18 min.     TC =   13.70  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.659
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
```

```
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
RI index for soil(AMC 1)  =  75.44
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.185(In/Hr) for a     2.0 year storm
Subarea runoff =      7.201(CFS) for      9.220(Ac.)
Total runoff =     50.484(CFS)  Total area =      59.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      220.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.645
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    13.70 min.
Rainfall intensity =      1.185(In/Hr) for a     2.0 year storm
Subarea runoff =      4.558(CFS) for      5.960(Ac.)
Total runoff =     55.042(CFS)  Total area =      65.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      225.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    587.500(Ft.)
End of natural channel elevation =    585.000(Ft.)
Length of natural channel  =   355.000(Ft.)
Estimated mean flow rate at midpoint of channel =     56.744(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   1.81(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0070
Corrected/adjusted channel slope =  0.0070
Travel time =    3.26 min.     TC =   16.96  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.650
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.070(In/Hr) for a     2.0 year storm
Subarea runoff =      2.809(CFS) for      4.040(Ac.)
Total runoff =     57.851(CFS)  Total area =      69.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      225.000 to Point/Station      230.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   585.000(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =   166.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    57.851(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    57.851(CFS)
Normal flow depth in pipe =   19.97(In.)
Flow top width inside pipe =   17.94(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.72(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    17.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     69.370(Ac.)
Runoff from this stream =     57.851(CFS)
Time of concentration =   17.10 min.
Rainfall intensity =     1.066(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      405.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   690.000(Ft.)
Top (of initial area) elevation =  1254.000(Ft.)
Bottom (of initial area) elevation =   825.000(Ft.)
```

```
Difference in elevation =   429.000(Ft.)
Slope =    0.62174  s(percent)=      62.17
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.963 min.
Rainfall intensity =      1.538(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.670
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.965(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      410.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    825.000(Ft.)
End of natural channel elevation =    662.000(Ft.)
Length of natural channel  =   758.000(Ft.)
Estimated mean flow rate at midpoint of channel =     13.311(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.32(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2150
Corrected/adjusted channel slope =  0.1660
Travel time =    2.37 min.     TC =   10.34  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.357(In/Hr) for a     2.0 year storm
Subarea runoff =     10.829(CFS) for     12.320(Ac.)
```

```
Total runoff =     17.794(CFS)  Total area =      19.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      410.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.648
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.34 min.
Rainfall intensity =      1.357(In/Hr) for a     2.0 year storm
Subarea runoff =      4.193(CFS) for      4.770(Ac.)
Total runoff =     21.987(CFS)  Total area =      23.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    662.000(Ft.)
End of natural channel elevation =    630.400(Ft.)
Length of natural channel  =   922.000(Ft.)
Estimated mean flow rate at midpoint of channel =     28.791(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.16(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0343
Corrected/adjusted channel slope =  0.0343
Travel time =    4.86 min.     TC =   15.20  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.623
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.170
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.680
RI index for soil(AMC 1)  =  72.69
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.128(In/Hr) for a     2.0 year storm
Subarea runoff =     10.375(CFS) for     14.760(Ac.)
Total runoff =     32.362(CFS)  Total area =      38.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      230.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   630.400(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =   845.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    32.362(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    32.362(CFS)
Normal flow depth in pipe =   15.40(In.)
Flow top width inside pipe =   18.57(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.11(Ft/s)
Travel time through pipe =    0.82 min.
Time of concentration (TC) =    16.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     38.610(Ac.)
Runoff from this stream =     32.362(CFS)
Time of concentration =   16.02 min.
Rainfall intensity =     1.100(In/Hr)
Summary of stream data:

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


1       57.851     17.10                1.066
2       32.362     16.02                1.100
Largest stream flow has longer time of concentration
Qp =     57.851 + sum of
          Qb         Ia/Ib
          32.362 *    0.969 =     31.370
Qp =     89.221

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

```
      57.851      32.362
Area of streams before confluence:
       69.370       38.610


Results of confluence:
Total flow rate =     89.221(CFS)
Time of concentration =    17.099 min.
Effective stream area after confluence  =    107.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      235.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   570.900(Ft.)
Downstream point/station elevation =   569.800(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    89.221(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    89.221(CFS)
Normal flow depth in pipe =   29.72(In.)
Flow top width inside pipe =   33.22(In.)
Critical Depth =   35.07(In.)
Pipe flow velocity =     13.16(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    17.18 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      235.000 to Point/Station      235.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
RI index for soil(AMC 1)  =  54.72
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.18 min.
Rainfall intensity =      1.064(In/Hr) for a     2.0 year storm
Subarea runoff =      5.515(CFS) for      6.070(Ac.)
Total runoff =     94.736(CFS)  Total area =     114.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      235.000 to Point/Station      240.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =   569.800(Ft.)
Downstream point/station elevation =   569.200(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    94.736(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    94.736(CFS)
Normal flow depth in pipe =   31.31(In.)
Flow top width inside pipe =   31.03(In.)
Critical Depth =   35.68(In.)
Pipe flow velocity =     13.26(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    17.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    114.050(Ac.)
Runoff from this stream =     94.736(CFS)
Time of concentration =   17.22 min.
Rainfall intensity =     1.062(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   763.000(Ft.)
Top (of initial area) elevation =  1180.000(Ft.)
Bottom (of initial area) elevation =   800.000(Ft.)
Difference in elevation =   380.000(Ft.)
Slope =    0.49803  s(percent)=      49.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.666 min.
Rainfall intensity =      1.477(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 1)  =  75.92
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      7.255(CFS)
Total initial stream area =        7.020(Ac.)
```

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Pervious area fraction = 1.000


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Process from Point/Station      105.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    645.000(Ft.)
Length of natural channel  =  1171.000(Ft.)
Estimated mean flow rate at midpoint of channel =     11.761(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.40(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1324
Corrected/adjusted channel slope =  0.1227
Travel time =    4.43 min.     TC =   13.10  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.672
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.211(In/Hr) for a     2.0 year storm
Subarea runoff =      7.095(CFS) for      8.720(Ac.)
Total runoff =     14.350(CFS)  Total area =      15.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      115.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    645.000(Ft.)
End of natural channel elevation =    585.000(Ft.)
Length of natural channel  =   685.000(Ft.)
Estimated mean flow rate at midpoint of channel =     17.094(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
```

```
Velocity using mean channel flow =   4.22(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0876
Corrected/adjusted channel slope =  0.0876
Travel time =    2.71 min.     TC =   15.81  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.656
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.107(In/Hr) for a     2.0 year storm
Subarea runoff =      4.371(CFS) for      6.020(Ac.)
Total runoff =     18.721(CFS)  Total area =      21.760(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      140.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   585.000(Ft.)
Downstream point/station elevation =   577.300(Ft.)
Pipe length  =   218.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    18.721(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    18.721(CFS)
Normal flow depth in pipe =   13.27(In.)
Flow top width inside pipe =   20.26(In.)
Critical Depth =   18.79(In.)
Pipe flow velocity =     11.70(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    16.12 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.760(Ac.)
Runoff from this stream =     18.721(CFS)
Time of concentration =   16.12 min.
Rainfall intensity =     1.097(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      125.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   922.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =   700.000(Ft.)
Difference in elevation =   360.000(Ft.)
Slope =    0.39046  s(percent)=      39.05
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.814 min.
Rainfall intensity =      1.391(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.694
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.339(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      130.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    700.000(Ft.)
End of natural channel elevation =    595.000(Ft.)
Length of natural channel  =   570.000(Ft.)
Estimated mean flow rate at midpoint of channel =      6.025(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.92(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1842
Corrected/adjusted channel slope =  0.1521
Travel time =    2.42 min.     TC =   12.23  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.677
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.252(In/Hr) for a     2.0 year storm
Subarea runoff =      2.958(CFS) for      3.490(Ac.)
Total runoff =      7.297(CFS)  Total area =       7.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.677
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.23 min.
Rainfall intensity =      1.252(In/Hr) for a     2.0 year storm
Subarea runoff =      8.528(CFS) for     10.060(Ac.)
Total runoff =     15.825(CFS)  Total area =      18.040(Ac.)


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Process from Point/Station      130.000 to Point/Station      135.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    595.000(Ft.)
End of natural channel elevation =    580.000(Ft.)
Length of natural channel  =   175.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.180(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.10(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0857
Corrected/adjusted channel slope =  0.0857
Travel time =    0.71 min.     TC =   12.95  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.673
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.218(In/Hr) for a     2.0 year storm
Subarea runoff =      0.664(CFS) for      0.810(Ac.)
Total runoff =     16.489(CFS)  Total area =      18.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      135.000 to Point/Station      140.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   580.000(Ft.)
Downstream point/station elevation =   577.300(Ft.)
Pipe length  =   175.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    16.489(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.489(CFS)
Normal flow depth in pipe =   16.62(In.)
Flow top width inside pipe =   17.07(In.)
Critical Depth =   17.93(In.)
Pipe flow velocity =      8.08(Ft/s)
Travel time through pipe =    0.36 min.
Time of concentration (TC) =    13.31 min.


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Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     18.850(Ac.)
Runoff from this stream =     16.489(CFS)
Time of concentration =   13.31 min.
Rainfall intensity =     1.202(In/Hr)
Summary of stream data:

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


1       18.721     16.12                1.097
2       16.489     13.31                1.202
```

```
Largest stream flow has longer time of concentration
Qp =     18.721 + sum of
          Qb         Ia/Ib
          16.489 *    0.912 =     15.041
Qp =     33.762

Total of 2 streams to confluence:
Flow rates before confluence point:
      18.721      16.489
Area of streams before confluence:
       21.760       18.850
Results of confluence:
Total flow rate =     33.762(CFS)
Time of concentration =    16.116 min.
Effective stream area after confluence =     40.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      240.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   577.300(Ft.)
Downstream point/station elevation =   569.300(Ft.)
Pipe length  =   324.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    33.762(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    33.762(CFS)
Normal flow depth in pipe =   18.28(In.)
Flow top width inside pipe =   25.25(In.)
Critical Depth =   23.84(In.)
Pipe flow velocity =     11.79(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    16.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     40.610(Ac.)
Runoff from this stream =     33.762(CFS)
Time of concentration =   16.57 min.
Rainfall intensity =     1.082(In/Hr)
Summary of stream data:

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

```
1       94.736     17.22                 1.062
2       33.762     16.57                 1.082
Largest stream flow has longer time of concentration
Qp =     94.736 + sum of
          Qb         Ia/Ib
          33.762 *    0.982 =     33.150
Qp =    127.886

Total of 2 main streams to confluence:
Flow rates before confluence point:
      94.736      33.762
Area of streams before confluence:
      114.050       40.610


Results of confluence:
Total flow rate =    127.886(CFS)
Time of concentration =    17.217 min.
Effective stream area after confluence  =    154.660(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      245.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   569.200(Ft.)
Downstream point/station elevation =   562.900(Ft.)
Pipe length  =   352.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   127.886(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   127.886(CFS)
Normal flow depth in pipe =   33.75(In.)
Flow top width inside pipe =   38.97(In.)
Critical Depth =   40.46(In.)
Pipe flow velocity =     14.39(Ft/s)
Travel time through pipe =    0.41 min.
Time of concentration (TC) =    17.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
```

```
RI index for soil(AMC 1)  =  54.72
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.62 min.
Rainfall intensity =      1.051(In/Hr) for a     2.0 year storm
Subarea runoff =      2.476(CFS) for      2.760(Ac.)
Total runoff =    130.362(CFS)  Total area =     157.420(Ac.)


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Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.820
RI index for soil(AMC 1)  =  52.90
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.62 min.
Rainfall intensity =      1.051(In/Hr) for a     2.0 year storm
Subarea runoff =      2.749(CFS) for      3.070(Ac.)
Total runoff =    133.111(CFS)  Total area =     160.490(Ac.)


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Process from Point/Station      245.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   562.900(Ft.)
Downstream point/station elevation =   561.900(Ft.)
Pipe length  =    57.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   133.111(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   133.111(CFS)
Normal flow depth in pipe =   35.34(In.)
Flow top width inside pipe =   36.95(In.)
Critical Depth =   40.96(In.)
Pipe flow velocity =     14.31(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    17.69 min.


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Process from Point/Station      250.000 to Point/Station      250.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
```

```
Stream flow area =    160.490(Ac.)
Runoff from this stream =    133.111(CFS)
Time of concentration =   17.69 min.
Rainfall intensity =     1.049(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   681.000(Ft.)
Top (of initial area) elevation =   700.000(Ft.)
Bottom (of initial area) elevation =   569.000(Ft.)
Difference in elevation =   131.000(Ft.)
Slope =    0.19236  s(percent)=      19.24
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.371 min.
Rainfall intensity =      1.597(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.726
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.982(CFS)
Total initial stream area =        1.710(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   567.000(Ft.)
Downstream point/station elevation =   566.000(Ft.)
Pipe length  =    43.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     1.982(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.982(CFS)
Normal flow depth in pipe =    6.71(In.)
Flow top width inside pipe =    7.83(In.)
Critical Depth =    7.69(In.)
Pipe flow velocity =      5.61(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =     7.50 min.
```

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Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.50 min.
Rainfall intensity =      1.583(In/Hr) for a     2.0 year storm
Subarea runoff =      0.411(CFS) for      0.300(Ac.)
Total runoff =      2.393(CFS)  Total area =       2.010(Ac.)


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Process from Point/Station      604.000 to Point/Station      606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =   566.000(Ft.)
Downstream point/station elevation =   562.800(Ft.)
Pipe length  =   306.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     2.393(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.393(CFS)
Normal flow depth in pipe =    7.81(In.)
Flow top width inside pipe =   11.44(In.)
Critical Depth =    7.94(In.)
Pipe flow velocity =      4.42(Ft/s)
Travel time through pipe =    1.15 min.
Time of concentration (TC) =     8.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      606.000 to Point/Station      606.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  45.60
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.65 min.
Rainfall intensity =      1.478(In/Hr) for a     2.0 year storm
```

```
Subarea runoff =      0.997(CFS) for      0.790(Ac.)
Total runoff =      3.390(CFS)  Total area =       2.800(Ac.)


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Process from Point/Station      606.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   562.800(Ft.)
Downstream point/station elevation =   561.900(Ft.)
Pipe length  =    47.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.390(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.390(CFS)
Normal flow depth in pipe =    8.07(In.)
Flow top width inside pipe =   11.26(In.)
Critical Depth =    9.45(In.)
Pipe flow velocity =      6.04(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =     8.78 min.


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Process from Point/Station      250.000 to Point/Station      250.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.800(Ac.)
Runoff from this stream =      3.390(CFS)
Time of concentration =    8.78 min.
Rainfall intensity =     1.468(In/Hr)
Summary of stream data:

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


1      133.111     17.69                1.049
2        3.390      8.78                1.468
Largest stream flow has longer time of concentration
Qp =    133.111 + sum of
          Qb         Ia/Ib
           3.390 *    0.714 =      2.422
Qp =    135.533

Total of 2 main streams to confluence:
Flow rates before confluence point:
     133.111       3.390
Area of streams before confluence:
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      160.490        2.800


Results of confluence:
Total flow rate =    135.533(CFS)
Time of concentration =    17.691 min.
Effective stream area after confluence  =    163.290(Ac.)


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Process from Point/Station      250.000 to Point/Station      255.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   561.900(Ft.)
Downstream point/station elevation =   554.500(Ft.)
Pipe length  =   408.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   135.533(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   135.533(CFS)
Normal flow depth in pipe =   35.34(In.)
Flow top width inside pipe =   36.95(In.)
Critical Depth =   41.20(In.)
Pipe flow velocity =     14.55(Ft/s)
Travel time through pipe =    0.47 min.
Time of concentration (TC) =    18.16 min.


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Process from Point/Station      255.000 to Point/Station      255.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.16 min.
Rainfall intensity =      1.036(In/Hr) for a     2.0 year storm
Subarea runoff =      3.660(CFS) for      4.220(Ac.)
Total runoff =    139.193(CFS)  Total area =     167.510(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      255.000 to Point/Station      255.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
```

```
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.940
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.060
RI index for soil(AMC 1)  =  37.14
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.16 min.
Rainfall intensity =      1.036(In/Hr) for a     2.0 year storm
Subarea runoff =      3.638(CFS) for      4.190(Ac.)
Total runoff =    142.830(CFS)  Total area =     171.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      255.000 to Point/Station      260.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   554.500(Ft.)
Downstream point/station elevation =   551.300(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   142.830(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   142.830(CFS)
Normal flow depth in pipe =   37.69(In.)
Flow top width inside pipe =   33.20(In.)
Critical Depth =   41.80(In.)
Pipe flow velocity =     14.45(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    18.37 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      260.000 to Point/Station      260.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  37.90
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.37 min.
Rainfall intensity =      1.030(In/Hr) for a     2.0 year storm
Subarea runoff =      2.704(CFS) for      3.130(Ac.)
Total runoff =    145.535(CFS)  Total area =     174.830(Ac.)


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```
Process from Point/Station      260.000 to Point/Station      265.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   551.300(Ft.)
Downstream point/station elevation =   503.000(Ft.)
Pipe length  =   138.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   145.535(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =   145.535(CFS)
Normal flow depth in pipe =   20.34(In.)
Flow top width inside pipe =   23.27(In.)
Critical depth could not be calculated.
Pipe flow velocity =     45.29(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    18.42 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    174.830(Ac.)
Runoff from this stream =    145.535(CFS)
Time of concentration =   18.42 min.
Rainfall intensity =     1.029(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      612.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   270.000(Ft.)
Top (of initial area) elevation =   565.000(Ft.)
Bottom (of initial area) elevation =   550.000(Ft.)
Difference in elevation =    15.000(Ft.)
Slope =    0.05556  s(percent)=       5.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.020 min.
Rainfall intensity =      1.920(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.869
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Initial subarea runoff =      0.467(CFS)
Total initial stream area =        0.280(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      612.000 to Point/Station      614.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   545.000(Ft.)
Downstream point/station elevation =   540.000(Ft.)
Pipe length  =    72.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     0.467(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.467(CFS)
Normal flow depth in pipe =    2.51(In.)
Flow top width inside pipe =    5.92(In.)
Critical Depth =    4.18(In.)
Pipe flow velocity =      6.01(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =     5.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      614.000 to Point/Station      265.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   540.000(Ft.)
Downstream point elevation =   503.000(Ft.)
Channel length thru subarea  =   789.000(Ft.)
Channel base width      =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      2.044(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      2.044(CFS)
Depth of flow =   0.107(Ft.), Average velocity =   4.674(Ft/s)
Channel flow top width =    4.213(Ft.)
Flow Velocity =    4.67(Ft/s)
Travel time  =    2.81 min.
Time of concentration =    8.03 min.

Sub-Channel No. 1 Critical depth =      0.197(Ft.)
  '     '       '     Critical flow top width =      4.395(Ft.)
  '     '       '     Critical flow velocity=    2.469(Ft/s)
  '     '       '     Critical flow area =      0.828(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
```

```
Runoff Coefficient = 0.417
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  42.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.532(In/Hr) for a     2.0 year storm
Subarea runoff =      3.098(CFS) for      4.850(Ac.)
Total runoff =      3.565(CFS)  Total area =       5.130(Ac.)
Depth of flow =   0.149(Ft.), Average velocity =   5.774(Ft/s)

Sub-Channel No. 1 Critical depth =      0.285(Ft.)
  '     '       '     Critical flow top width =      4.570(Ft.)
  '     '       '     Critical flow velocity=    2.917(Ft/s)
  '     '       '     Critical flow area =      1.222(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.03 min.
Rainfall intensity =      1.532(In/Hr) for a     2.0 year storm
Subarea runoff =      1.373(CFS) for      1.060(Ac.)
Total runoff =      4.938(CFS)  Total area =       6.190(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.190(Ac.)
Runoff from this stream =      4.938(CFS)
Time of concentration =    8.03 min.
Rainfall intensity =     1.532(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

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


1      145.535     18.42                 1.029
2        4.938      8.03                 1.532
Largest stream flow has longer time of concentration
Qp =    145.535 + sum of
          Qb         Ia/Ib
           4.938 *    0.672 =      3.316
Qp =    148.850

Total of 2 main streams to confluence:
Flow rates before confluence point:
     145.535       4.938
Area of streams before confluence:
      174.830        6.190


Results of confluence:
Total flow rate =    148.850(CFS)
Time of concentration =    18.416 min.
Effective stream area after confluence  =    181.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      275.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   493.000(Ft.)
Pipe length  =   144.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   148.850(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   148.850(CFS)
Normal flow depth in pipe =   28.78(In.)
Flow top width inside pipe =   28.83(In.)
Critical depth could not be calculated.
Pipe flow velocity =     24.56(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    18.51 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.51 min.
Rainfall intensity =      1.026(In/Hr) for a     2.0 year storm
Subarea runoff =      0.404(CFS) for      0.470(Ac.)
Total runoff =    149.254(CFS)  Total area =     181.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    181.490(Ac.)
Runoff from this stream =    149.254(CFS)
Time of concentration =   18.51 min.
Rainfall intensity =     1.026(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      625.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   523.000(Ft.)
Top (of initial area) elevation =   510.000(Ft.)
Bottom (of initial area) elevation =   503.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01338  s(percent)=       1.34
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.694 min.
Rainfall intensity =      1.475(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.158(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      625.000 to Point/Station      630.000
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```
**** PIPEFLOW TRAVEL TIME (User specified size) ****
_____________________________________________________________________
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    15.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     1.158(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.158(CFS)
Normal flow depth in pipe =    2.30(In.)
Flow top width inside pipe =   12.02(In.)
Critical Depth =    4.82(In.)
Pipe flow velocity =      8.80(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     8.72 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      275.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    493.000(Ft.)
Length of natural channel  =   265.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.414(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.79(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0302
Corrected/adjusted channel slope =  0.0302
Travel time =    1.59 min.     TC =   10.31  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.550
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.359(In/Hr) for a     2.0 year storm
Subarea runoff =      0.306(CFS) for      0.410(Ac.)
Total runoff =      1.465(CFS)  Total area =       1.340(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.340(Ac.)
Runoff from this stream =      1.465(CFS)
Time of concentration =   10.31 min.
Rainfall intensity =     1.359(In/Hr)
Summary of stream data:

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


1      149.254     18.51                 1.026
2        1.465     10.31                 1.359
Largest stream flow has longer time of concentration
Qp =    149.254 + sum of
          Qb         Ia/Ib
           1.465 *    0.755 =      1.106
Qp =    150.360

Total of 2 main streams to confluence:
Flow rates before confluence point:
     149.254       1.465
Area of streams before confluence:
      181.490        1.340


Results of confluence:
Total flow rate =    150.360(CFS)
Time of concentration =    18.514 min.
Effective stream area after confluence  =    182.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      280.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    493.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =    50.000(Ft.)
Estimated mean flow rate at midpoint of channel =    150.426(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
```

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Velocity using mean channel flow =  15.19(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0800
Corrected/adjusted channel slope =  0.0800
Travel time =    0.05 min.     TC =   18.57  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.488
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.025(In/Hr) for a     2.0 year storm
Subarea runoff =      0.080(CFS) for      0.160(Ac.)
Total runoff =    150.440(CFS)  Total area =     182.990(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    182.990(Ac.)
Runoff from this stream =    150.440(CFS)
Time of concentration =   18.57 min.
Rainfall intensity =     1.025(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      619.000 to Point/Station      620.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =    50.000(Ft.)
Top (of initial area) elevation =   511.000(Ft.)
Bottom (of initial area) elevation =   510.000(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.02000  s(percent)=       2.00
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      1.923(In/Hr) for a     2.0 year storm
```

```
COMMERCIAL subarea type
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.294(CFS)
Total initial stream area =        0.180(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      625.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   510.000(Ft.)
Downstream point/station elevation =   503.000(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     0.294(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.294(CFS)
Normal flow depth in pipe =    1.83(In.)
Flow top width inside pipe =    5.52(In.)
Critical Depth =    3.29(In.)
Pipe flow velocity =      5.81(Ft/s)
Travel time through pipe =    0.22 min.
Time of concentration (TC) =     5.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      625.000 to Point/Station      625.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     5.22 min.
Rainfall intensity =      1.883(In/Hr) for a     2.0 year storm
Subarea runoff =      1.537(CFS) for      0.960(Ac.)
Total runoff =      1.831(CFS)  Total area =       1.140(Ac.)


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Process from Point/Station      625.000 to Point/Station      630.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     1.831(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.831(CFS)
Normal flow depth in pipe =    6.08(In.)
Flow top width inside pipe =    8.43(In.)
Critical Depth =    7.43(In.)
Pipe flow velocity =      5.77(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =     5.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      280.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =   457.000(Ft.)
Estimated mean flow rate at midpoint of channel =      2.160(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.83(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    2.69 min.     TC =    8.14  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.573
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.523(In/Hr) for a     2.0 year storm
Subarea runoff =      0.358(CFS) for      0.410(Ac.)
Total runoff =      2.189(CFS)  Total area =       1.550(Ac.)
```

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Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      2.189(CFS)
Time of concentration =    8.14 min.
Rainfall intensity =     1.523(In/Hr)
Summary of stream data:

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


1      150.440     18.57                 1.025
2        2.189      8.14                 1.523
Largest stream flow has longer time of concentration
Qp =    150.440 + sum of
          Qb         Ia/Ib
            2.189 *    0.673 =      1.473
Qp =    151.913

Total of 2 main streams to confluence:
Flow rates before confluence point:
     150.440       2.189
Area of streams before confluence:
      182.990        1.550


Results of confluence:
Total flow rate =    151.913(CFS)
Time of concentration =    18.568 min.
Effective stream area after confluence  =    184.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      285.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   489.000(Ft.)
Downstream point/station elevation =   483.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   151.913(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   151.913(CFS)
Normal flow depth in pipe =   32.16(In.)
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Flow top width inside pipe =   22.24(In.)
Critical depth could not be calculated.
Pipe flow velocity =     22.80(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    18.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      285.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.837
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.64 min.
Rainfall intensity =      1.023(In/Hr) for a     2.0 year storm
Subarea runoff =      0.514(CFS) for      0.600(Ac.)
Total runoff =    152.426(CFS)  Total area =     185.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      285.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.487
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    18.64 min.
Rainfall intensity =      1.023(In/Hr) for a     2.0 year storm
Subarea runoff =      2.700(CFS) for      5.420(Ac.)
Total runoff =    155.127(CFS)  Total area =     190.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      286.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    484.000(Ft.)
End of natural channel elevation =    483.000(Ft.)
Length of natural channel  =    32.000(Ft.)
```

```
Estimated mean flow rate at midpoint of channel =    155.220(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.59(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0313
Corrected/adjusted channel slope =  0.0313
Travel time =    0.06 min.     TC =   18.70  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.487
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.021(In/Hr) for a     2.0 year storm
Subarea runoff =      0.114(CFS) for      0.230(Ac.)
Total runoff =    155.241(CFS)  Total area =     190.790(Ac.)
End of computations, total study area =          190.79 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.859
Area averaged RI index number =  82.7
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886PRA5.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "A" AND "E" PROPOSED CONDITION 5-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 5.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 5.0
Calculated rainfall intensity data:
1 hour intensity = 0.786(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 200.000 to Point/Station 205.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 778.000(Ft.)
Top (of initial area) elevation = 1520.000(Ft.)
Bottom (of initial area) elevation = 1060.000(Ft.)

```
Difference in elevation =   460.000(Ft.)
Slope =    0.59126  s(percent)=      59.13
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.439 min.
Rainfall intensity =      2.016(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.713
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.743(CFS)
Total initial stream area =        4.690(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      210.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1060.000(Ft.)
End of natural channel elevation =    779.000(Ft.)
Length of natural channel  =   626.000(Ft.)
Estimated mean flow rate at midpoint of channel =     15.383(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.37(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.4489
Corrected/adjusted channel slope =  0.2174
Travel time =    1.64 min.     TC =   10.08  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.852(In/Hr) for a     5.0 year storm
Subarea runoff =     15.583(CFS) for     12.020(Ac.)
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Total runoff =     22.326(CFS)  Total area =      16.710(Ac.)


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Process from Point/Station      210.000 to Point/Station      210.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.08 min.
Rainfall intensity =      1.852(In/Hr) for a     5.0 year storm
Subarea runoff =      5.484(CFS) for      4.230(Ac.)
Total runoff =     27.810(CFS)  Total area =      20.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      215.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    779.000(Ft.)
End of natural channel elevation =    663.000(Ft.)
Length of natural channel  =   505.000(Ft.)
Estimated mean flow rate at midpoint of channel =     38.846(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.71(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2297
Corrected/adjusted channel slope =  0.1719
Travel time =    1.09 min.     TC =   11.17  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.692
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
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Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.763(In/Hr) for a     5.0 year storm
Subarea runoff =     20.281(CFS) for     16.620(Ac.)
Total runoff =     48.091(CFS)  Total area =      37.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      215.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.707
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 1)  =  73.52
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.17 min.
Rainfall intensity =      1.763(In/Hr) for a     5.0 year storm
Subarea runoff =     15.696(CFS) for     12.590(Ac.)
Total runoff =     63.787(CFS)  Total area =      50.150(Ac.)


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Process from Point/Station      215.000 to Point/Station      220.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    663.000(Ft.)
End of natural channel elevation =    587.500(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =     69.651(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.96(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0944
Corrected/adjusted channel slope =  0.0944
Travel time =    1.92 min.     TC =   13.08  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.711
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
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Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
RI index for soil(AMC 1)  =  75.44
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.634(In/Hr) for a     5.0 year storm
Subarea runoff =     10.710(CFS) for      9.220(Ac.)
Total runoff =     74.497(CFS)  Total area =      59.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      220.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.699
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    13.08 min.
Rainfall intensity =      1.634(In/Hr) for a     5.0 year storm
Subarea runoff =      6.810(CFS) for      5.960(Ac.)
Total runoff =     81.307(CFS)  Total area =      65.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      225.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    587.500(Ft.)
End of natural channel elevation =    585.000(Ft.)
Length of natural channel  =   355.000(Ft.)
Estimated mean flow rate at midpoint of channel =     83.821(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   2.06(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0070
Corrected/adjusted channel slope =  0.0070
Travel time =    2.87 min.     TC =   15.95  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
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```
Runoff Coefficient = 0.705
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.485(In/Hr) for a     5.0 year storm
Subarea runoff =      4.229(CFS) for      4.040(Ac.)
Total runoff =     85.536(CFS)  Total area =      69.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      225.000 to Point/Station      230.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   585.000(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =   166.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    85.536(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    85.536(CFS)
Normal flow depth in pipe =   20.77(In.)
Flow top width inside pipe =   27.70(In.)
Critical depth could not be calculated.
Pipe flow velocity =     23.58(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    16.07 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     69.370(Ac.)
Runoff from this stream =     85.536(CFS)
Time of concentration =   16.07 min.
Rainfall intensity =     1.480(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      405.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   690.000(Ft.)
Top (of initial area) elevation =  1254.000(Ft.)
Bottom (of initial area) elevation =   825.000(Ft.)
```

```
Difference in elevation =   429.000(Ft.)
Slope =    0.62174  s(percent)=      62.17
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.963 min.
Rainfall intensity =      2.073(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.717
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.051(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      410.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    825.000(Ft.)
End of natural channel elevation =    662.000(Ft.)
Length of natural channel  =   758.000(Ft.)
Estimated mean flow rate at midpoint of channel =     19.209(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.01(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2150
Corrected/adjusted channel slope =  0.1660
Travel time =    2.10 min.     TC =   10.07  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.853(In/Hr) for a     5.0 year storm
Subarea runoff =     15.981(CFS) for     12.320(Ac.)
```

```
Total runoff =     26.032(CFS)  Total area =      19.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      410.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.700
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.07 min.
Rainfall intensity =      1.853(In/Hr) for a     5.0 year storm
Subarea runoff =      6.188(CFS) for      4.770(Ac.)
Total runoff =     32.220(CFS)  Total area =      23.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    662.000(Ft.)
End of natural channel elevation =    630.400(Ft.)
Length of natural channel  =   922.000(Ft.)
Estimated mean flow rate at midpoint of channel =     42.189(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   3.58(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0343
Corrected/adjusted channel slope =  0.0343
Travel time =    4.29 min.     TC =   14.35  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.681
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.170
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.680
RI index for soil(AMC 1)  =  72.69
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.563(In/Hr) for a     5.0 year storm
Subarea runoff =     15.718(CFS) for     14.760(Ac.)
Total runoff =     47.937(CFS)  Total area =      38.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      415.000 to Point/Station      230.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   630.400(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =   845.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    47.937(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    47.937(CFS)
Normal flow depth in pipe =   18.16(In.)
Flow top width inside pipe =   20.59(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.79(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =    15.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     38.610(Ac.)
Runoff from this stream =     47.937(CFS)
Time of concentration =   15.10 min.
Rainfall intensity =     1.525(In/Hr)
Summary of stream data:

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


1       85.536     16.07                1.480
2       47.937     15.10                1.525
Largest stream flow has longer time of concentration
Qp =     85.536 + sum of
          Qb         Ia/Ib
          47.937 *    0.971 =     46.534
Qp =    132.070

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

```
      85.536      47.937
Area of streams before confluence:
       69.370       38.610


Results of confluence:
Total flow rate =    132.070(CFS)
Time of concentration =    16.069 min.
Effective stream area after confluence  =    107.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      235.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   570.900(Ft.)
Downstream point/station elevation =   569.800(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   132.070(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   132.070(CFS)
Normal flow depth in pipe =   34.59(In.)
Flow top width inside pipe =   37.95(In.)
Critical Depth =   40.89(In.)
Pipe flow velocity =     14.49(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    16.14 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      235.000 to Point/Station      235.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
RI index for soil(AMC 1)  =  54.72
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.14 min.
Rainfall intensity =      1.477(In/Hr) for a     5.0 year storm
Subarea runoff =      7.724(CFS) for      6.070(Ac.)
Total runoff =    139.794(CFS)  Total area =     114.050(Ac.)


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Process from Point/Station      235.000 to Point/Station      240.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =   569.800(Ft.)
Downstream point/station elevation =   569.200(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   139.794(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   139.794(CFS)
Normal flow depth in pipe =   36.47(In.)
Flow top width inside pipe =   35.28(In.)
Critical Depth =   41.55(In.)
Pipe flow velocity =     14.59(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    16.18 min.


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Process from Point/Station      240.000 to Point/Station      240.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    114.050(Ac.)
Runoff from this stream =    139.794(CFS)
Time of concentration =   16.18 min.
Rainfall intensity =     1.475(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   763.000(Ft.)
Top (of initial area) elevation =  1180.000(Ft.)
Bottom (of initial area) elevation =   800.000(Ft.)
Difference in elevation =   380.000(Ft.)
Slope =    0.49803  s(percent)=      49.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.666 min.
Rainfall intensity =      1.991(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.742
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 1)  =  75.92
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     10.374(CFS)
Total initial stream area =        7.020(Ac.)
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Pervious area fraction = 1.000


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Process from Point/Station      105.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    645.000(Ft.)
Length of natural channel  =  1171.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.818(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.95(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1324
Corrected/adjusted channel slope =  0.1227
Travel time =    3.94 min.     TC =   12.61  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.721
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.663(In/Hr) for a     5.0 year storm
Subarea runoff =     10.461(CFS) for      8.720(Ac.)
Total runoff =     20.836(CFS)  Total area =      15.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      115.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    645.000(Ft.)
End of natural channel elevation =    585.000(Ft.)
Length of natural channel  =   685.000(Ft.)
Estimated mean flow rate at midpoint of channel =     24.820(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
```

```
Velocity using mean channel flow =   4.77(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0876
Corrected/adjusted channel slope =  0.0876
Travel time =    2.39 min.     TC =   15.00  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.709
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.530(In/Hr) for a     5.0 year storm
Subarea runoff =      6.531(CFS) for      6.020(Ac.)
Total runoff =     27.367(CFS)  Total area =      21.760(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      140.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   585.000(Ft.)
Downstream point/station elevation =   577.300(Ft.)
Pipe length  =   218.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    27.367(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    27.367(CFS)
Normal flow depth in pipe =   15.40(In.)
Flow top width inside pipe =   23.02(In.)
Critical Depth =   21.79(In.)
Pipe flow velocity =     12.85(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    15.28 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.760(Ac.)
Runoff from this stream =     27.367(CFS)
Time of concentration =   15.28 min.
Rainfall intensity =     1.516(In/Hr)
```

```
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Process from Point/Station      120.000 to Point/Station      125.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   922.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =   700.000(Ft.)
Difference in elevation =   360.000(Ft.)
Slope =    0.39046  s(percent)=      39.05
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.814 min.
Rainfall intensity =      1.875(In/Hr) for a     5.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.738
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      6.214(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      130.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    700.000(Ft.)
End of natural channel elevation =    595.000(Ft.)
Length of natural channel  =   570.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.629(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.42(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1842
Corrected/adjusted channel slope =  0.1521
Travel time =    2.15 min.     TC =   11.96  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.725
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.705(In/Hr) for a     5.0 year storm
Subarea runoff =      4.314(CFS) for      3.490(Ac.)
Total runoff =     10.529(CFS)  Total area =       7.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.725
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.96 min.
Rainfall intensity =      1.705(In/Hr) for a     5.0 year storm
Subarea runoff =     12.437(CFS) for     10.060(Ac.)
Total runoff =     22.965(CFS)  Total area =      18.040(Ac.)


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Process from Point/Station      130.000 to Point/Station      135.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    595.000(Ft.)
End of natural channel elevation =    580.000(Ft.)
Length of natural channel  =   175.000(Ft.)
Estimated mean flow rate at midpoint of channel =     23.481(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.64(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0857
Corrected/adjusted channel slope =  0.0857
Travel time =    0.63 min.     TC =   12.59  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.721
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  76.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.664(In/Hr) for a     5.0 year storm
Subarea runoff =      0.972(CFS) for      0.810(Ac.)
Total runoff =     23.937(CFS)  Total area =      18.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      135.000 to Point/Station      140.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   580.000(Ft.)
Downstream point/station elevation =   577.300(Ft.)
Pipe length  =   175.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    23.937(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    23.937(CFS)
Normal flow depth in pipe =   19.31(In.)
Flow top width inside pipe =   19.03(In.)
Critical Depth =   20.79(In.)
Pipe flow velocity =      8.84(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =    12.92 min.


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Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     18.850(Ac.)
Runoff from this stream =     23.937(CFS)
Time of concentration =   12.92 min.
Rainfall intensity =     1.643(In/Hr)
Summary of stream data:

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


1       27.367     15.28                1.516
2       23.937     12.92                1.643
```

```
Largest stream flow has longer time of concentration
Qp =     27.367 + sum of
          Qb         Ia/Ib
          23.937 *    0.923 =     22.087
Qp =     49.454

Total of 2 streams to confluence:
Flow rates before confluence point:
      27.367      23.937
Area of streams before confluence:
       21.760       18.850
Results of confluence:
Total flow rate =     49.454(CFS)
Time of concentration =    15.281 min.
Effective stream area after confluence =     40.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      240.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   577.300(Ft.)
Downstream point/station elevation =   569.300(Ft.)
Pipe length  =   324.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    49.454(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    49.454(CFS)
Normal flow depth in pipe =   21.94(In.)
Flow top width inside pipe =   26.60(In.)
Critical Depth =   27.49(In.)
Pipe flow velocity =     12.85(Ft/s)
Travel time through pipe =    0.42 min.
Time of concentration (TC) =    15.70 min.


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Process from Point/Station      240.000 to Point/Station      240.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     40.610(Ac.)
Runoff from this stream =     49.454(CFS)
Time of concentration =   15.70 min.
Rainfall intensity =     1.497(In/Hr)
Summary of stream data:

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

```
1      139.794     16.18                 1.475
2       49.454     15.70                 1.497
Largest stream flow has longer time of concentration
Qp =    139.794 + sum of
          Qb         Ia/Ib
          49.454 *    0.986 =     48.751
Qp =    188.546

Total of 2 main streams to confluence:
Flow rates before confluence point:
     139.794      49.454
Area of streams before confluence:
      114.050       40.610


Results of confluence:
Total flow rate =    188.546(CFS)
Time of concentration =    16.177 min.
Effective stream area after confluence  =    154.660(Ac.)


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Process from Point/Station      240.000 to Point/Station      245.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   569.200(Ft.)
Downstream point/station elevation =   562.900(Ft.)
Pipe length  =   352.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   188.546(CFS)
Nearest computed pipe diameter  =     51.00(In.)
Calculated individual pipe flow  =   188.546(CFS)
Normal flow depth in pipe =   40.22(In.)
Flow top width inside pipe =   41.65(In.)
Critical Depth =   46.90(In.)
Pipe flow velocity =     15.72(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =    16.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
```

```
RI index for soil(AMC 1)  =  54.72
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.55 min.
Rainfall intensity =      1.459(In/Hr) for a     5.0 year storm
Subarea runoff =      3.469(CFS) for      2.760(Ac.)
Total runoff =    192.015(CFS)  Total area =     157.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.820
RI index for soil(AMC 1)  =  52.90
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.55 min.
Rainfall intensity =      1.459(In/Hr) for a     5.0 year storm
Subarea runoff =      3.851(CFS) for      3.070(Ac.)
Total runoff =    195.866(CFS)  Total area =     160.490(Ac.)


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Process from Point/Station      245.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   562.900(Ft.)
Downstream point/station elevation =   561.900(Ft.)
Pipe length  =    57.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   195.866(CFS)
Nearest computed pipe diameter  =     51.00(In.)
Calculated individual pipe flow  =   195.866(CFS)
Normal flow depth in pipe =   42.28(In.)
Flow top width inside pipe =   38.40(In.)
Critical Depth =   47.37(In.)
Pipe flow velocity =     15.57(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    16.61 min.


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Process from Point/Station      250.000 to Point/Station      250.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
```

```
Stream flow area =    160.490(Ac.)
Runoff from this stream =    195.866(CFS)
Time of concentration =   16.61 min.
Rainfall intensity =     1.457(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   681.000(Ft.)
Top (of initial area) elevation =   700.000(Ft.)
Bottom (of initial area) elevation =   569.000(Ft.)
Difference in elevation =   131.000(Ft.)
Slope =    0.19236  s(percent)=      19.24
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.371 min.
Rainfall intensity =      2.152(In/Hr) for a     5.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.757
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      2.784(CFS)
Total initial stream area =        1.710(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      602.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   567.000(Ft.)
Downstream point/station elevation =   566.000(Ft.)
Pipe length  =    43.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     2.784(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.784(CFS)
Normal flow depth in pipe =    6.64(In.)
Flow top width inside pipe =   11.93(In.)
Critical Depth =    8.58(In.)
Pipe flow velocity =      6.25(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =     7.49 min.
```

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Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.871
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.49 min.
Rainfall intensity =      2.136(In/Hr) for a     5.0 year storm
Subarea runoff =      0.558(CFS) for      0.300(Ac.)
Total runoff =      3.342(CFS)  Total area =       2.010(Ac.)


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Process from Point/Station      604.000 to Point/Station      606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   566.000(Ft.)
Downstream point/station elevation =   562.800(Ft.)
Pipe length  =   306.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.342(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     3.342(CFS)
Normal flow depth in pipe =    8.24(In.)
Flow top width inside pipe =   14.93(In.)
Critical Depth =    8.85(In.)
Pipe flow velocity =      4.85(Ft/s)
Travel time through pipe =    1.05 min.
Time of concentration (TC) =     8.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      606.000 to Point/Station      606.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  45.60
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.54 min.
Rainfall intensity =      2.005(In/Hr) for a     5.0 year storm
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Subarea runoff =      1.363(CFS) for      0.790(Ac.)
Total runoff =      4.705(CFS)  Total area =       2.800(Ac.)


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Process from Point/Station      606.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   562.800(Ft.)
Downstream point/station elevation =   561.900(Ft.)
Pipe length  =    47.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     4.705(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.705(CFS)
Normal flow depth in pipe =    8.44(In.)
Flow top width inside pipe =   14.88(In.)
Critical Depth =   10.56(In.)
Pipe flow velocity =      6.62(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =     8.66 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.800(Ac.)
Runoff from this stream =      4.705(CFS)
Time of concentration =    8.66 min.
Rainfall intensity =     1.992(In/Hr)
Summary of stream data:

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


1      195.866     16.61                1.457
2        4.705      8.66                1.992
Largest stream flow has longer time of concentration
Qp =    195.866 + sum of
          Qb         Ia/Ib
           4.705 *    0.731 =      3.441
Qp =    199.307

Total of 2 main streams to confluence:
Flow rates before confluence point:
     195.866       4.705
Area of streams before confluence:
```

```
      160.490        2.800


Results of confluence:
Total flow rate =    199.307(CFS)
Time of concentration =    16.611 min.
Effective stream area after confluence  =    163.290(Ac.)


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Process from Point/Station      250.000 to Point/Station      255.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   561.900(Ft.)
Downstream point/station elevation =   554.500(Ft.)
Pipe length  =   408.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   199.307(CFS)
Nearest computed pipe diameter  =     51.00(In.)
Calculated individual pipe flow  =   199.307(CFS)
Normal flow depth in pipe =   42.38(In.)
Flow top width inside pipe =   38.24(In.)
Critical Depth =   47.61(In.)
Pipe flow velocity =     15.83(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    17.04 min.


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Process from Point/Station      255.000 to Point/Station      255.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.04 min.
Rainfall intensity =      1.439(In/Hr) for a     5.0 year storm
Subarea runoff =      5.126(CFS) for      4.220(Ac.)
Total runoff =    204.433(CFS)  Total area =     167.510(Ac.)


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Process from Point/Station      255.000 to Point/Station      255.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
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```
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.940
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.060
RI index for soil(AMC 1)  =  37.14
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.04 min.
Rainfall intensity =      1.439(In/Hr) for a     5.0 year storm
Subarea runoff =      5.095(CFS) for      4.190(Ac.)
Total runoff =    209.528(CFS)  Total area =     171.700(Ac.)


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Process from Point/Station      255.000 to Point/Station      260.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   554.500(Ft.)
Downstream point/station elevation =   551.300(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   209.528(CFS)
Nearest computed pipe diameter  =     54.00(In.)
Calculated individual pipe flow  =   209.528(CFS)
Normal flow depth in pipe =   40.78(In.)
Flow top width inside pipe =   46.44(In.)
Critical Depth =   49.15(In.)
Pipe flow velocity =     16.25(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    17.22 min.


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Process from Point/Station      260.000 to Point/Station      260.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  37.90
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.22 min.
Rainfall intensity =      1.432(In/Hr) for a     5.0 year storm
Subarea runoff =      3.789(CFS) for      3.130(Ac.)
Total runoff =    213.318(CFS)  Total area =     174.830(Ac.)


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Process from Point/Station      260.000 to Point/Station      265.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   551.300(Ft.)
Downstream point/station elevation =   503.000(Ft.)
Pipe length  =   138.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   213.318(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =   213.318(CFS)
Normal flow depth in pipe =   24.98(In.)
Flow top width inside pipe =   22.39(In.)
Critical depth could not be calculated.
Pipe flow velocity =     48.81(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    17.27 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    174.830(Ac.)
Runoff from this stream =    213.318(CFS)
Time of concentration =   17.27 min.
Rainfall intensity =     1.430(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      612.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   270.000(Ft.)
Top (of initial area) elevation =   565.000(Ft.)
Bottom (of initial area) elevation =   550.000(Ft.)
Difference in elevation =    15.000(Ft.)
Slope =    0.05556  s(percent)=       5.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.020 min.
Rainfall intensity =      2.587(In/Hr) for a     5.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1)  =  57.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Initial subarea runoff =      0.634(CFS)
Total initial stream area =        0.280(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      612.000 to Point/Station      614.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   545.000(Ft.)
Downstream point/station elevation =   540.000(Ft.)
Pipe length  =    72.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     0.634(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.634(CFS)
Normal flow depth in pipe =    2.98(In.)
Flow top width inside pipe =    6.00(In.)
Critical Depth =    4.85(In.)
Pipe flow velocity =      6.51(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =     5.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      614.000 to Point/Station      265.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   540.000(Ft.)
Downstream point elevation =   503.000(Ft.)
Channel length thru subarea  =   789.000(Ft.)
Channel base width      =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      3.190(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      3.190(CFS)
Depth of flow =   0.139(Ft.), Average velocity =   5.537(Ft/s)
Channel flow top width =    4.278(Ft.)
Flow Velocity =    5.54(Ft/s)
Travel time  =    2.37 min.
Time of concentration =    7.58 min.

Sub-Channel No. 1 Critical depth =      0.266(Ft.)
  '     '       '     Critical flow top width =      4.531(Ft.)
  '     '       '     Critical flow velocity=    2.815(Ft/s)
  '     '       '     Critical flow area =      1.133(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
```

```
Runoff Coefficient = 0.490
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 1)  =  42.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.123(In/Hr) for a     5.0 year storm
Subarea runoff =      5.048(CFS) for      4.850(Ac.)
Total runoff =      5.682(CFS)  Total area =       5.130(Ac.)
Depth of flow =   0.197(Ft.), Average velocity =   6.874(Ft/s)

Sub-Channel No. 1 Critical depth =      0.383(Ft.)
  '     '       '     Critical flow top width =      4.766(Ft.)
  '     '       '     Critical flow velocity=    3.386(Ft/s)
  '     '       '     Critical flow area =      1.678(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.58 min.
Rainfall intensity =      2.123(In/Hr) for a     5.0 year storm
Subarea runoff =      1.919(CFS) for      1.060(Ac.)
Total runoff =      7.600(CFS)  Total area =       6.190(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.190(Ac.)
Runoff from this stream =      7.600(CFS)
Time of concentration =    7.58 min.
Rainfall intensity =     2.123(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

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


1      213.318     17.27                 1.430
2        7.600      7.58                 2.123
Largest stream flow has longer time of concentration
Qp =    213.318 + sum of
          Qb         Ia/Ib
           7.600 *    0.673 =      5.118
Qp =    218.436

Total of 2 main streams to confluence:
Flow rates before confluence point:
     213.318       7.600
Area of streams before confluence:
      174.830        6.190


Results of confluence:
Total flow rate =    218.436(CFS)
Time of concentration =    17.271 min.
Effective stream area after confluence  =    181.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      275.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   493.000(Ft.)
Pipe length  =   144.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   218.436(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   218.436(CFS)
Normal flow depth in pipe =   32.72(In.)
Flow top width inside pipe =   34.85(In.)
Critical depth could not be calculated.
Pipe flow velocity =     27.18(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    17.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.36 min.
Rainfall intensity =      1.426(In/Hr) for a     5.0 year storm
Subarea runoff =      0.566(CFS) for      0.470(Ac.)
Total runoff =    219.002(CFS)  Total area =     181.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    181.490(Ac.)
Runoff from this stream =    219.002(CFS)
Time of concentration =   17.36 min.
Rainfall intensity =     1.426(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      625.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   523.000(Ft.)
Top (of initial area) elevation =   510.000(Ft.)
Bottom (of initial area) elevation =   503.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01338  s(percent)=       1.34
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.694 min.
Rainfall intensity =      1.988(In/Hr) for a     5.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.573(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      625.000 to Point/Station      630.000
```

```
**** PIPEFLOW TRAVEL TIME (User specified size) ****
_____________________________________________________________________
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    15.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     1.573(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.573(CFS)
Normal flow depth in pipe =    2.66(In.)
Flow top width inside pipe =   12.79(In.)
Critical Depth =    5.64(In.)
Pipe flow velocity =      9.64(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     8.72 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      275.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    493.000(Ft.)
Length of natural channel  =   265.000(Ft.)
Estimated mean flow rate at midpoint of channel =      1.920(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.97(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0302
Corrected/adjusted channel slope =  0.0302
Travel time =    1.49 min.     TC =   10.21  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.612
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.840(In/Hr) for a     5.0 year storm
Subarea runoff =      0.462(CFS) for      0.410(Ac.)
Total runoff =      2.035(CFS)  Total area =       1.340(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.340(Ac.)
Runoff from this stream =      2.035(CFS)
Time of concentration =   10.21 min.
Rainfall intensity =     1.840(In/Hr)
Summary of stream data:

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


1      219.002     17.36                 1.426
2        2.035     10.21                 1.840
Largest stream flow has longer time of concentration
Qp =    219.002 + sum of
          Qb         Ia/Ib
           2.035 *    0.775 =      1.577
Qp =    220.579

Total of 2 main streams to confluence:
Flow rates before confluence point:
     219.002       2.035
Area of streams before confluence:
      181.490        1.340


Results of confluence:
Total flow rate =    220.579(CFS)
Time of concentration =    17.360 min.
Effective stream area after confluence  =    182.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      280.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    493.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =    50.000(Ft.)
Estimated mean flow rate at midpoint of channel =    220.675(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
```

```
Velocity using mean channel flow =  17.10(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0800
Corrected/adjusted channel slope =  0.0800
Travel time =    0.05 min.     TC =   17.41  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.559
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.424(In/Hr) for a     5.0 year storm
Subarea runoff =      0.128(CFS) for      0.160(Ac.)
Total runoff =    220.706(CFS)  Total area =     182.990(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    182.990(Ac.)
Runoff from this stream =    220.706(CFS)
Time of concentration =   17.41 min.
Rainfall intensity =     1.424(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      619.000 to Point/Station      620.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =    50.000(Ft.)
Top (of initial area) elevation =   511.000(Ft.)
Bottom (of initial area) elevation =   510.000(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.02000  s(percent)=       2.00
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      2.592(In/Hr) for a     5.0 year storm
```

```
COMMERCIAL subarea type
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.400(CFS)
Total initial stream area =        0.180(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      625.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   510.000(Ft.)
Downstream point/station elevation =   503.000(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     0.400(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.400(CFS)
Normal flow depth in pipe =    2.15(In.)
Flow top width inside pipe =    5.75(In.)
Critical Depth =    3.86(In.)
Pipe flow velocity =      6.33(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =     5.21 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      625.000 to Point/Station      625.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     5.21 min.
Rainfall intensity =      2.543(In/Hr) for a     5.0 year storm
Subarea runoff =      2.091(CFS) for      0.960(Ac.)
Total runoff =      2.491(CFS)  Total area =       1.140(Ac.)


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```

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Process from Point/Station      625.000 to Point/Station      630.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     2.491(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.491(CFS)
Normal flow depth in pipe =    6.02(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    8.11(In.)
Pipe flow velocity =      6.31(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =     5.41 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      280.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =   457.000(Ft.)
Estimated mean flow rate at midpoint of channel =      2.939(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.03(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    2.51 min.     TC =    7.93  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.635
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.078(In/Hr) for a     5.0 year storm
Subarea runoff =      0.541(CFS) for      0.410(Ac.)
Total runoff =      3.032(CFS)  Total area =       1.550(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      3.032(CFS)
Time of concentration =    7.93 min.
Rainfall intensity =     2.078(In/Hr)
Summary of stream data:

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


1      220.706     17.41                 1.424
2        3.032      7.93                 2.078
Largest stream flow has longer time of concentration
Qp =    220.706 + sum of
          Qb         Ia/Ib
           3.032 *    0.685 =      2.078
Qp =    222.785

Total of 2 main streams to confluence:
Flow rates before confluence point:
     220.706       3.032
Area of streams before confluence:
      182.990        1.550


Results of confluence:
Total flow rate =    222.785(CFS)
Time of concentration =    17.408 min.
Effective stream area after confluence  =    184.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      285.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   489.000(Ft.)
Downstream point/station elevation =   483.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   222.785(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   222.785(CFS)
Normal flow depth in pipe =   35.81(In.)
```

```
Flow top width inside pipe =   29.77(In.)
Critical depth could not be calculated.
Pipe flow velocity =     25.50(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    17.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      285.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.47 min.
Rainfall intensity =      1.422(In/Hr) for a     5.0 year storm
Subarea runoff =      0.720(CFS) for      0.600(Ac.)
Total runoff =    223.504(CFS)  Total area =     185.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      285.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.559
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    17.47 min.
Rainfall intensity =      1.422(In/Hr) for a     5.0 year storm
Subarea runoff =      4.309(CFS) for      5.420(Ac.)
Total runoff =    227.813(CFS)  Total area =     190.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      286.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    484.000(Ft.)
End of natural channel elevation =    483.000(Ft.)
Length of natural channel  =    32.000(Ft.)
```

Estimated mean flow rate at midpoint of channel = 227.951(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 10.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope = 0.0313
Corrected/adjusted channel slope = 0.0313
Travel time = 0.05 min. TC = 17.52 min.

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.559
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 60.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.420(In/Hr) for a 5.0 year storm
Subarea runoff = 0.183(CFS) for 0.230(Ac.)
Total runoff = 227.996(CFS) Total area = 190.790(Ac.)
End of computations, total study area = 190.79 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.859
Area averaged RI index number = 82.7

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886PRA10.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "A" AND "E" PROPOSED CONDITION 10-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.940(In/Hr)
Slope of intensity duration curve = 0.4800

++

Process from Point/Station 200.000 to Point/Station 205.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 778.000(Ft.)
Top (of initial area) elevation = 1520.000(Ft.)
Bottom (of initial area) elevation = 1060.000(Ft.)

```
Difference in elevation =   460.000(Ft.)
Slope =    0.59126  s(percent)=      59.13
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.439 min.
Rainfall intensity =      2.410(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.826
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      9.332(CFS)
Total initial stream area =        4.690(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      205.000 to Point/Station      210.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1060.000(Ft.)
End of natural channel elevation =    779.000(Ft.)
Length of natural channel  =   626.000(Ft.)
Estimated mean flow rate at midpoint of channel =     21.290(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.10(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.4489
Corrected/adjusted channel slope =  0.2174
Travel time =    1.47 min.     TC =    9.91  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.231(In/Hr) for a    10.0 year storm
Subarea runoff =     21.997(CFS) for     12.020(Ac.)
```

```
Total runoff =     31.329(CFS)  Total area =      16.710(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      210.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.91 min.
Rainfall intensity =      2.231(In/Hr) for a    10.0 year storm
Subarea runoff =      7.741(CFS) for      4.230(Ac.)
Total runoff =     39.070(CFS)  Total area =      20.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      215.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    779.000(Ft.)
End of natural channel elevation =    663.000(Ft.)
Length of natural channel  =   505.000(Ft.)
Estimated mean flow rate at midpoint of channel =     54.574(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   8.62(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2297
Corrected/adjusted channel slope =  0.1719
Travel time =    0.98 min.     TC =   10.89  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.817
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.133(In/Hr) for a    10.0 year storm
Subarea runoff =     28.956(CFS) for     16.620(Ac.)
Total runoff =     68.025(CFS)  Total area =      37.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      215.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.824
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 2)  =  87.20
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.89 min.
Rainfall intensity =      2.133(In/Hr) for a    10.0 year storm
Subarea runoff =     22.135(CFS) for     12.590(Ac.)
Total runoff =     90.161(CFS)  Total area =      50.150(Ac.)


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Process from Point/Station      215.000 to Point/Station      220.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    663.000(Ft.)
End of natural channel elevation =    587.500(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =     98.448(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0944
Corrected/adjusted channel slope =  0.0944
Travel time =    1.71 min.     TC =   12.59  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
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```
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
RI index for soil(AMC 2)  =  88.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.989(In/Hr) for a    10.0 year storm
Subarea runoff =     15.167(CFS) for      9.220(Ac.)
Total runoff =    105.328(CFS)  Total area =      59.370(Ac.)


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Process from Point/Station      220.000 to Point/Station      220.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.821
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  87.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.59 min.
Rainfall intensity =      1.989(In/Hr) for a    10.0 year storm
Subarea runoff =      9.734(CFS) for      5.960(Ac.)
Total runoff =    115.062(CFS)  Total area =      65.330(Ac.)


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Process from Point/Station      220.000 to Point/Station      225.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    587.500(Ft.)
End of natural channel elevation =    585.000(Ft.)
Length of natural channel  =   355.000(Ft.)
Estimated mean flow rate at midpoint of channel =    118.620(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   2.31(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0070
Corrected/adjusted channel slope =  0.0070
Travel time =    2.56 min.     TC =   15.15  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.825
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.820(In/Hr) for a    10.0 year storm
Subarea runoff =      6.067(CFS) for      4.040(Ac.)
Total runoff =    121.129(CFS)  Total area =      69.370(Ac.)


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Process from Point/Station      225.000 to Point/Station      230.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   585.000(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =   166.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   121.129(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =   121.129(CFS)
Normal flow depth in pipe =   24.63(In.)
Flow top width inside pipe =   28.71(In.)
Critical depth could not be calculated.
Pipe flow velocity =     25.48(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    15.26 min.


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Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     69.370(Ac.)
Runoff from this stream =    121.129(CFS)
Time of concentration =   15.26 min.
Rainfall intensity =     1.814(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      400.000 to Point/Station      405.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   690.000(Ft.)
Top (of initial area) elevation =  1254.000(Ft.)
Bottom (of initial area) elevation =   825.000(Ft.)
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```
Difference in elevation =   429.000(Ft.)
Slope =    0.62174  s(percent)=      62.17
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.963 min.
Rainfall intensity =      2.478(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.828
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.862(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      410.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    825.000(Ft.)
End of natural channel elevation =    662.000(Ft.)
Length of natural channel  =   758.000(Ft.)
Estimated mean flow rate at midpoint of channel =     26.494(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2150
Corrected/adjusted channel slope =  0.1660
Travel time =    1.89 min.     TC =    9.85  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.237(In/Hr) for a    10.0 year storm
Subarea runoff =     22.611(CFS) for     12.320(Ac.)
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Total runoff =     36.474(CFS)  Total area =      19.080(Ac.)


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Process from Point/Station      410.000 to Point/Station      410.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.820
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.85 min.
Rainfall intensity =      2.237(In/Hr) for a    10.0 year storm
Subarea runoff =      8.755(CFS) for      4.770(Ac.)
Total runoff =     45.228(CFS)  Total area =      23.850(Ac.)


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Process from Point/Station      410.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    662.000(Ft.)
End of natural channel elevation =    630.400(Ft.)
Length of natural channel  =   922.000(Ft.)
Estimated mean flow rate at midpoint of channel =     59.224(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.01(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0343
Corrected/adjusted channel slope =  0.0343
Travel time =    3.83 min.     TC =   13.69  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.170
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.680
RI index for soil(AMC 2)  =  86.68
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.911(In/Hr) for a    10.0 year storm
Subarea runoff =     22.923(CFS) for     14.760(Ac.)
Total runoff =     68.152(CFS)  Total area =      38.610(Ac.)


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Process from Point/Station      415.000 to Point/Station      230.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   630.400(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =   845.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    68.152(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    68.152(CFS)
Normal flow depth in pipe =   21.14(In.)
Flow top width inside pipe =   22.26(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.39(Ft/s)
Travel time through pipe =    0.69 min.
Time of concentration (TC) =    14.38 min.


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Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     38.610(Ac.)
Runoff from this stream =     68.152(CFS)
Time of concentration =   14.38 min.
Rainfall intensity =     1.866(In/Hr)
Summary of stream data:

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


1      121.129     15.26                1.814
2       68.152     14.38                1.866
Largest stream flow has longer time of concentration
Qp =    121.129 + sum of
          Qb         Ia/Ib
          68.152 *    0.972 =     66.234
Qp =    187.363

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

```
     121.129      68.152
Area of streams before confluence:
       69.370       38.610


Results of confluence:
Total flow rate =    187.363(CFS)
Time of concentration =    15.261 min.
Effective stream area after confluence  =    107.980(Ac.)


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Process from Point/Station      230.000 to Point/Station      235.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   570.900(Ft.)
Downstream point/station elevation =   569.800(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   187.363(CFS)
Nearest computed pipe diameter  =     51.00(In.)
Calculated individual pipe flow  =   187.363(CFS)
Normal flow depth in pipe =   39.84(In.)
Flow top width inside pipe =   42.17(In.)
Critical Depth =   46.82(In.)
Pipe flow velocity =     15.77(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    15.33 min.


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Process from Point/Station      235.000 to Point/Station      235.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  73.10
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.33 min.
Rainfall intensity =      1.810(In/Hr) for a    10.0 year storm
Subarea runoff =      9.676(CFS) for      6.070(Ac.)
Total runoff =    197.039(CFS)  Total area =     114.050(Ac.)


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Process from Point/Station      235.000 to Point/Station      240.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =   569.800(Ft.)
Downstream point/station elevation =   569.200(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   197.039(CFS)
Nearest computed pipe diameter  =     51.00(In.)
Calculated individual pipe flow  =   197.039(CFS)
Normal flow depth in pipe =   41.72(In.)
Flow top width inside pipe =   39.35(In.)
Critical Depth =   47.45(In.)
Pipe flow velocity =     15.86(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    15.36 min.


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Process from Point/Station      240.000 to Point/Station      240.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    114.050(Ac.)
Runoff from this stream =    197.039(CFS)
Time of concentration =   15.36 min.
Rainfall intensity =     1.808(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      100.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   763.000(Ft.)
Top (of initial area) elevation =  1180.000(Ft.)
Bottom (of initial area) elevation =   800.000(Ft.)
Difference in elevation =   380.000(Ft.)
Slope =    0.49803  s(percent)=      49.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.666 min.
Rainfall intensity =      2.379(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 2)  =  88.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     14.032(CFS)
Total initial stream area =        7.020(Ac.)
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Pervious area fraction = 1.000


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Process from Point/Station      105.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    645.000(Ft.)
Length of natural channel  =  1171.000(Ft.)
Estimated mean flow rate at midpoint of channel =     22.747(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.47(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1324
Corrected/adjusted channel slope =  0.1227
Travel time =    3.57 min.     TC =   12.23  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.832
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.017(In/Hr) for a    10.0 year storm
Subarea runoff =     14.631(CFS) for      8.720(Ac.)
Total runoff =     28.663(CFS)  Total area =      15.740(Ac.)


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Process from Point/Station      110.000 to Point/Station      115.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    645.000(Ft.)
End of natural channel elevation =    585.000(Ft.)
Length of natural channel  =   685.000(Ft.)
Estimated mean flow rate at midpoint of channel =     34.144(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
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Velocity using mean channel flow =   5.30(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0876
Corrected/adjusted channel slope =  0.0876
Travel time =    2.15 min.     TC =   14.39  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.866(In/Hr) for a    10.0 year storm
Subarea runoff =      9.288(CFS) for      6.020(Ac.)
Total runoff =     37.951(CFS)  Total area =      21.760(Ac.)


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Process from Point/Station      115.000 to Point/Station      140.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   585.000(Ft.)
Downstream point/station elevation =   577.300(Ft.)
Pipe length  =   218.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    37.951(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    37.951(CFS)
Normal flow depth in pipe =   20.39(In.)
Flow top width inside pipe =   17.16(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.34(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    14.66 min.


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Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.760(Ac.)
Runoff from this stream =     37.951(CFS)
Time of concentration =   14.66 min.
Rainfall intensity =     1.849(In/Hr)
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Process from Point/Station      120.000 to Point/Station      125.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   922.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =   700.000(Ft.)
Difference in elevation =   360.000(Ft.)
Slope =    0.39046  s(percent)=      39.05
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.814 min.
Rainfall intensity =      2.242(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.838
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      8.438(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      125.000 to Point/Station      130.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    700.000(Ft.)
End of natural channel elevation =    595.000(Ft.)
Length of natural channel  =   570.000(Ft.)
Estimated mean flow rate at midpoint of channel =     11.717(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.89(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1842
Corrected/adjusted channel slope =  0.1521
Travel time =    1.94 min.     TC =   11.76  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.055(In/Hr) for a    10.0 year storm
Subarea runoff =      5.977(CFS) for      3.490(Ac.)
Total runoff =     14.414(CFS)  Total area =       7.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.76 min.
Rainfall intensity =      2.055(In/Hr) for a    10.0 year storm
Subarea runoff =     17.228(CFS) for     10.060(Ac.)
Total runoff =     31.642(CFS)  Total area =      18.040(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      135.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    595.000(Ft.)
End of natural channel elevation =    580.000(Ft.)
Length of natural channel  =   175.000(Ft.)
Estimated mean flow rate at midpoint of channel =     32.353(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.15(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0857
Corrected/adjusted channel slope =  0.0857
Travel time =    0.57 min.     TC =   12.32  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.832
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.009(In/Hr) for a    10.0 year storm
Subarea runoff =      1.354(CFS) for      0.810(Ac.)
Total runoff =     32.996(CFS)  Total area =      18.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      135.000 to Point/Station      140.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   580.000(Ft.)
Downstream point/station elevation =   577.300(Ft.)
Pipe length  =   175.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    32.996(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    32.996(CFS)
Normal flow depth in pipe =   21.89(In.)
Flow top width inside pipe =   21.15(In.)
Critical Depth =   23.65(In.)
Pipe flow velocity =      9.56(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    12.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     18.850(Ac.)
Runoff from this stream =     32.996(CFS)
Time of concentration =   12.63 min.
Rainfall intensity =     1.986(In/Hr)
Summary of stream data:

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


1       37.951     14.66                1.849
2       32.996     12.63                1.986
```

```
Largest stream flow has longer time of concentration
Qp =     37.951 + sum of
          Qb         Ia/Ib
          32.996 *    0.931 =     30.719
Qp =     68.669

Total of 2 streams to confluence:
Flow rates before confluence point:
      37.951      32.996
Area of streams before confluence:
       21.760       18.850
Results of confluence:
Total flow rate =     68.669(CFS)
Time of concentration =    14.658 min.
Effective stream area after confluence =     40.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      240.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   577.300(Ft.)
Downstream point/station elevation =   569.300(Ft.)
Pipe length  =   324.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    68.669(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    68.669(CFS)
Normal flow depth in pipe =   25.78(In.)
Flow top width inside pipe =   27.28(In.)
Critical Depth =   30.96(In.)
Pipe flow velocity =     13.80(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =    15.05 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      240.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     40.610(Ac.)
Runoff from this stream =     68.669(CFS)
Time of concentration =   15.05 min.
Rainfall intensity =     1.826(In/Hr)
Summary of stream data:

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

```
1      197.039     15.36                 1.808
2       68.669     15.05                 1.826
Largest stream flow has longer time of concentration
Qp =    197.039 + sum of
          Qb         Ia/Ib
          68.669 *    0.990 =     67.999
Qp =    265.039

Total of 2 main streams to confluence:
Flow rates before confluence point:
     197.039      68.669
Area of streams before confluence:
      114.050       40.610


Results of confluence:
Total flow rate =    265.039(CFS)
Time of concentration =    15.360 min.
Effective stream area after confluence  =    154.660(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      245.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   569.200(Ft.)
Downstream point/station elevation =   562.900(Ft.)
Pipe length  =   352.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   265.039(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   265.039(CFS)
Normal flow depth in pipe =   47.06(In.)
Flow top width inside pipe =   43.25(In.)
Critical Depth =   53.28(In.)
Pipe flow velocity =     16.94(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =    15.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
```

```
RI index for soil(AMC 2)  =  73.10
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.71 min.
Rainfall intensity =      1.789(In/Hr) for a    10.0 year storm
Subarea runoff =      4.347(CFS) for      2.760(Ac.)
Total runoff =    269.386(CFS)  Total area =     157.420(Ac.)


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Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.820
RI index for soil(AMC 2)  =  71.58
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.71 min.
Rainfall intensity =      1.789(In/Hr) for a    10.0 year storm
Subarea runoff =      4.829(CFS) for      3.070(Ac.)
Total runoff =    274.215(CFS)  Total area =     160.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   562.900(Ft.)
Downstream point/station elevation =   561.900(Ft.)
Pipe length  =    57.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   274.215(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   274.215(CFS)
Normal flow depth in pipe =   49.88(In.)
Flow top width inside pipe =   37.70(In.)
Critical Depth =   53.66(In.)
Pipe flow velocity =     16.66(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    15.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
```

```
Stream flow area =    160.490(Ac.)
Runoff from this stream =    274.215(CFS)
Time of concentration =   15.76 min.
Rainfall intensity =     1.786(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   681.000(Ft.)
Top (of initial area) elevation =   700.000(Ft.)
Bottom (of initial area) elevation =   569.000(Ft.)
Difference in elevation =   131.000(Ft.)
Slope =    0.19236  s(percent)=      19.24
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.371 min.
Rainfall intensity =      2.572(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.666(CFS)
Total initial stream area =        1.710(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   567.000(Ft.)
Downstream point/station elevation =   566.000(Ft.)
Pipe length  =    43.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.666(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.666(CFS)
Normal flow depth in pipe =    7.96(In.)
Flow top width inside pipe =   11.34(In.)
Critical Depth =    9.80(In.)
Pipe flow velocity =      6.63(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =     7.48 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.48 min.
Rainfall intensity =      2.554(In/Hr) for a    10.0 year storm
Subarea runoff =      0.679(CFS) for      0.300(Ac.)
Total runoff =      4.346(CFS)  Total area =       2.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   566.000(Ft.)
Downstream point/station elevation =   562.800(Ft.)
Pipe length  =   306.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     4.346(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.346(CFS)
Normal flow depth in pipe =    9.77(In.)
Flow top width inside pipe =   14.29(In.)
Critical Depth =   10.14(In.)
Pipe flow velocity =      5.13(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =     8.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      606.000 to Point/Station      606.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  65.50
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.47 min.
Rainfall intensity =      2.405(In/Hr) for a    10.0 year storm
```

```
Subarea runoff =      1.672(CFS) for      0.790(Ac.)
Total runoff =      6.017(CFS)  Total area =       2.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      606.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   562.800(Ft.)
Downstream point/station elevation =   561.900(Ft.)
Pipe length  =    47.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     6.017(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     6.017(CFS)
Normal flow depth in pipe =    9.94(In.)
Flow top width inside pipe =   14.19(In.)
Critical Depth =   11.89(In.)
Pipe flow velocity =      6.98(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =     8.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.800(Ac.)
Runoff from this stream =      6.017(CFS)
Time of concentration =    8.58 min.
Rainfall intensity =     2.390(In/Hr)
Summary of stream data:

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


1      274.215     15.76                1.786
2        6.017      8.58                2.390
Largest stream flow has longer time of concentration
Qp =    274.215 + sum of
          Qb         Ia/Ib
           6.017 *    0.747 =      4.495
Qp =    278.710

Total of 2 main streams to confluence:
Flow rates before confluence point:
     274.215       6.017
Area of streams before confluence:
```

```
      160.490        2.800


Results of confluence:
Total flow rate =    278.710(CFS)
Time of concentration =    15.763 min.
Effective stream area after confluence  =    163.290(Ac.)


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Process from Point/Station      250.000 to Point/Station      255.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   561.900(Ft.)
Downstream point/station elevation =   554.500(Ft.)
Pipe length  =   408.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   278.710(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   278.710(CFS)
Normal flow depth in pipe =   49.88(In.)
Flow top width inside pipe =   37.70(In.)
Critical Depth =   53.88(In.)
Pipe flow velocity =     16.94(Ft/s)
Travel time through pipe =    0.40 min.
Time of concentration (TC) =    16.16 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      255.000 to Point/Station      255.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.16 min.
Rainfall intensity =      1.764(In/Hr) for a    10.0 year storm
Subarea runoff =      6.451(CFS) for      4.220(Ac.)
Total runoff =    285.161(CFS)  Total area =     167.510(Ac.)


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Process from Point/Station      255.000 to Point/Station      255.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
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```
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.940
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.060
RI index for soil(AMC 2)  =  57.14
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.16 min.
Rainfall intensity =      1.764(In/Hr) for a    10.0 year storm
Subarea runoff =      6.412(CFS) for      4.190(Ac.)
Total runoff =    291.573(CFS)  Total area =     171.700(Ac.)


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Process from Point/Station      255.000 to Point/Station      260.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   554.500(Ft.)
Downstream point/station elevation =   551.300(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   291.573(CFS)
Nearest computed pipe diameter  =     60.00(In.)
Calculated individual pipe flow  =   291.573(CFS)
Normal flow depth in pipe =   47.44(In.)
Flow top width inside pipe =   48.82(In.)
Critical Depth =   55.64(In.)
Pipe flow velocity =     17.51(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    16.33 min.


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Process from Point/Station      260.000 to Point/Station      260.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  57.90
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.33 min.
Rainfall intensity =      1.755(In/Hr) for a    10.0 year storm
Subarea runoff =      4.769(CFS) for      3.130(Ac.)
Total runoff =    296.341(CFS)  Total area =     174.830(Ac.)


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Process from Point/Station      260.000 to Point/Station      265.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   551.300(Ft.)
Downstream point/station elevation =   503.000(Ft.)
Pipe length  =   138.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   296.341(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   296.341(CFS)
Normal flow depth in pipe =   25.88(In.)
Flow top width inside pipe =   32.37(In.)
Critical depth could not be calculated.
Pipe flow velocity =     54.46(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    16.38 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    174.830(Ac.)
Runoff from this stream =    296.341(CFS)
Time of concentration =   16.38 min.
Rainfall intensity =     1.753(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      612.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   270.000(Ft.)
Top (of initial area) elevation =   565.000(Ft.)
Bottom (of initial area) elevation =   550.000(Ft.)
Difference in elevation =    15.000(Ft.)
Slope =    0.05556  s(percent)=       5.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.020 min.
Rainfall intensity =      3.092(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Initial subarea runoff =      0.769(CFS)
Total initial stream area =        0.280(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      612.000 to Point/Station      614.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   545.000(Ft.)
Downstream point/station elevation =   540.000(Ft.)
Pipe length  =    72.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     0.769(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.769(CFS)
Normal flow depth in pipe =    3.35(In.)
Flow top width inside pipe =    5.96(In.)
Critical Depth =    5.25(In.)
Pipe flow velocity =      6.82(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =     5.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      614.000 to Point/Station      265.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   540.000(Ft.)
Downstream point elevation =   503.000(Ft.)
Channel length thru subarea  =   789.000(Ft.)
Channel base width      =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      5.182(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      5.182(CFS)
Depth of flow =   0.186(Ft.), Average velocity =   6.643(Ft/s)
Channel flow top width =    4.373(Ft.)
Flow Velocity =    6.64(Ft/s)
Travel time  =    1.98 min.
Time of concentration =    7.18 min.

Sub-Channel No. 1 Critical depth =      0.363(Ft.)
  '     '       '     Critical flow top width =      4.727(Ft.)
  '     '       '     Critical flow velocity=    3.269(Ft/s)
  '     '       '     Critical flow area =      1.585(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
```

```
Runoff Coefficient = 0.691
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  62.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.605(In/Hr) for a    10.0 year storm
Subarea runoff =      8.735(CFS) for      4.850(Ac.)
Total runoff =      9.504(CFS)  Total area =       5.130(Ac.)
Depth of flow =   0.268(Ft.), Average velocity =   8.300(Ft/s)

Sub-Channel No. 1 Critical depth =      0.531(Ft.)
  '     '       '     Critical flow top width =      5.063(Ft.)
  '     '       '     Critical flow velocity=    3.948(Ft/s)
  '     '       '     Critical flow area =      2.407(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.874
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.18 min.
Rainfall intensity =      2.605(In/Hr) for a    10.0 year storm
Subarea runoff =      2.414(CFS) for      1.060(Ac.)
Total runoff =     11.918(CFS)  Total area =       6.190(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.190(Ac.)
Runoff from this stream =     11.918(CFS)
Time of concentration =    7.18 min.
Rainfall intensity =     2.605(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

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


1      296.341     16.38                 1.753
2       11.918      7.18                 2.605
Largest stream flow has longer time of concentration
Qp =    296.341 + sum of
          Qb         Ia/Ib
          11.918 *    0.673 =      8.020
Qp =    304.362

Total of 2 main streams to confluence:
Flow rates before confluence point:
     296.341      11.918
Area of streams before confluence:
      174.830        6.190


Results of confluence:
Total flow rate =    304.362(CFS)
Time of concentration =    16.377 min.
Effective stream area after confluence  =    181.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      275.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   493.000(Ft.)
Pipe length  =   144.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   304.362(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   304.362(CFS)
Normal flow depth in pipe =   36.56(In.)
Flow top width inside pipe =   40.90(In.)
Critical depth could not be calculated.
Pipe flow velocity =     29.65(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    16.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.46 min.
Rainfall intensity =      1.749(In/Hr) for a    10.0 year storm
Subarea runoff =      0.712(CFS) for      0.470(Ac.)
Total runoff =    305.074(CFS)  Total area =     181.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    181.490(Ac.)
Runoff from this stream =    305.074(CFS)
Time of concentration =   16.46 min.
Rainfall intensity =     1.749(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      625.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   523.000(Ft.)
Top (of initial area) elevation =   510.000(Ft.)
Bottom (of initial area) elevation =   503.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01338  s(percent)=       1.34
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.694 min.
Rainfall intensity =      2.376(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.872
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.928(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      625.000 to Point/Station      630.000
```

**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 503.000(Ft.)
Downstream point/station elevation = 501.000(Ft.)
Pipe length = 15.00(Ft.) Manning's N = 0.015
No. of pipes = 1 Required pipe flow = 1.928(CFS)
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 1.928(CFS)
Normal flow depth in pipe = 2.94(In.)
Flow top width inside pipe = 13.31(In.)
Critical Depth = 6.27(In.)
Pipe flow velocity = 10.24(Ft/s)
Travel time through pipe = 0.02 min.
Time of concentration (TC) = 8.72 min.

++
Process from Point/Station 630.000 to Point/Station 275.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 501.000(Ft.)
End of natural channel elevation = 493.000(Ft.)
Length of natural channel = 265.000(Ft.)
Estimated mean flow rate at midpoint of channel = 2.353(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 3.09(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0302
Corrected/adjusted channel slope = 0.0302
Travel time = 1.43 min. TC = 10.15 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.769
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 78.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.206(In/Hr) for a 10.0 year storm
Subarea runoff = 0.696(CFS) for 0.410(Ac.)
Total runoff = 2.623(CFS) Total area = 1.340(Ac.)

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.340(Ac.)
Runoff from this stream =      2.623(CFS)
Time of concentration =   10.15 min.
Rainfall intensity =     2.206(In/Hr)
Summary of stream data:

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


1      305.074     16.46                 1.749
2        2.623     10.15                 2.206
Largest stream flow has longer time of concentration
Qp =    305.074 + sum of
          Qb         Ia/Ib
           2.623 *    0.793 =      2.080
Qp =    307.153

Total of 2 main streams to confluence:
Flow rates before confluence point:
     305.074       2.623
Area of streams before confluence:
      181.490        1.340


Results of confluence:
Total flow rate =    307.153(CFS)
Time of concentration =    16.458 min.
Effective stream area after confluence  =    182.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      280.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    493.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =    50.000(Ft.)
Estimated mean flow rate at midpoint of channel =    307.288(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
```

```
Velocity using mean channel flow =  18.97(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0800
Corrected/adjusted channel slope =  0.0800
Travel time =    0.04 min.     TC =   16.50  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.741
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.747(In/Hr) for a    10.0 year storm
Subarea runoff =      0.207(CFS) for      0.160(Ac.)
Total runoff =    307.360(CFS)  Total area =     182.990(Ac.)


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Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    182.990(Ac.)
Runoff from this stream =    307.360(CFS)
Time of concentration =   16.50 min.
Rainfall intensity =     1.747(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      619.000 to Point/Station      620.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =    50.000(Ft.)
Top (of initial area) elevation =   511.000(Ft.)
Bottom (of initial area) elevation =   510.000(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.02000  s(percent)=       2.00
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      3.098(In/Hr) for a    10.0 year storm
```

```
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.489(CFS)
Total initial stream area =        0.180(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      620.000 to Point/Station      625.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   510.000(Ft.)
Downstream point/station elevation =   503.000(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     0.489(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.489(CFS)
Normal flow depth in pipe =    2.40(In.)
Flow top width inside pipe =    5.88(In.)
Critical Depth =    4.28(In.)
Pipe flow velocity =      6.69(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =     5.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      625.000 to Point/Station      625.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     5.19 min.
Rainfall intensity =      3.042(In/Hr) for a    10.0 year storm
Subarea runoff =      2.561(CFS) for      0.960(Ac.)
Total runoff =      3.050(CFS)  Total area =       1.140(Ac.)


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Process from Point/Station      625.000 to Point/Station      630.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.050(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.050(CFS)
Normal flow depth in pipe =    6.82(In.)
Flow top width inside pipe =   11.89(In.)
Critical Depth =    8.98(In.)
Pipe flow velocity =      6.62(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =     5.39 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      280.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =   457.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.599(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.17(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    2.40 min.     TC =    7.79  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.782
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.504(In/Hr) for a    10.0 year storm
Subarea runoff =      0.803(CFS) for      0.410(Ac.)
Total runoff =      3.854(CFS)  Total area =       1.550(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      3.854(CFS)
Time of concentration =    7.79 min.
Rainfall intensity =     2.504(In/Hr)
Summary of stream data:

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


1      307.360     16.50                 1.747
2        3.854      7.79                 2.504
Largest stream flow has longer time of concentration
Qp =    307.360 + sum of
          Qb         Ia/Ib
            3.854 *    0.698 =      2.688
Qp =    310.049

Total of 2 main streams to confluence:
Flow rates before confluence point:
     307.360       3.854
Area of streams before confluence:
      182.990        1.550


Results of confluence:
Total flow rate =    310.049(CFS)
Time of concentration =    16.502 min.
Effective stream area after confluence  =    184.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      285.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   489.000(Ft.)
Downstream point/station elevation =   483.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   310.049(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   310.049(CFS)
Normal flow depth in pipe =   39.66(In.)
```

```
Flow top width inside pipe =   36.38(In.)
Critical depth could not be calculated.
Pipe flow velocity =     27.94(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    16.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      285.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.56 min.
Rainfall intensity =      1.744(In/Hr) for a    10.0 year storm
Subarea runoff =      0.906(CFS) for      0.600(Ac.)
Total runoff =    310.955(CFS)  Total area =     185.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      285.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.740
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    16.56 min.
Rainfall intensity =      1.744(In/Hr) for a    10.0 year storm
Subarea runoff =      6.997(CFS) for      5.420(Ac.)
Total runoff =    317.952(CFS)  Total area =     190.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      286.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    484.000(Ft.)
End of natural channel elevation =    483.000(Ft.)
Length of natural channel  =    32.000(Ft.)
```

```
Estimated mean flow rate at midpoint of channel =    318.144(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.99(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0313
Corrected/adjusted channel slope =  0.0313
Travel time =    0.04 min.     TC =   16.60  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.740
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.742(In/Hr) for a    10.0 year storm
Subarea runoff =      0.296(CFS) for      0.230(Ac.)
Total runoff =    318.249(CFS)  Total area =     190.790(Ac.)
End of computations, total study area =          190.79 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.859
Area averaged RI index number =  82.7
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886PRA100.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "A" AND "E" PROPOSED CONDITION 100-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 200.000 to Point/Station 205.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 778.000(Ft.)
Top (of initial area) elevation = 1520.000(Ft.)
Bottom (of initial area) elevation = 1060.000(Ft.)

```
Difference in elevation =   460.000(Ft.)
Slope =    0.59126  s(percent)=      59.13
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.439 min.
Rainfall intensity =      3.717(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     15.365(CFS)
Total initial stream area =        4.690(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      210.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   1060.000(Ft.)
End of natural channel elevation =    779.000(Ft.)
Length of natural channel  =   626.000(Ft.)
Estimated mean flow rate at midpoint of channel =     35.054(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   8.36(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.4489
Corrected/adjusted channel slope =  0.2174
Travel time =    1.25 min.     TC =    9.69  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.479(In/Hr) for a   100.0 year storm
Subarea runoff =     36.805(CFS) for     12.020(Ac.)
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Total runoff =     52.169(CFS)  Total area =      16.710(Ac.)


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Process from Point/Station      210.000 to Point/Station      210.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.69 min.
Rainfall intensity =      3.479(In/Hr) for a   100.0 year storm
Subarea runoff =     12.952(CFS) for      4.230(Ac.)
Total runoff =     65.121(CFS)  Total area =      20.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      215.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    779.000(Ft.)
End of natural channel elevation =    663.000(Ft.)
Length of natural channel  =   505.000(Ft.)
Estimated mean flow rate at midpoint of channel =     90.964(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =  10.21(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2297
Corrected/adjusted channel slope =  0.1719
Travel time =    0.82 min.     TC =   10.51  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.346(In/Hr) for a   100.0 year storm
Subarea runoff =     48.889(CFS) for     16.620(Ac.)
Total runoff =    114.010(CFS)  Total area =      37.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      215.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.600
Decimal fraction soil group D = 0.400
RI index for soil(AMC 3)  =  94.88
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    10.51 min.
Rainfall intensity =      3.346(In/Hr) for a   100.0 year storm
Subarea runoff =     37.112(CFS) for     12.590(Ac.)
Total runoff =    151.122(CFS)  Total area =      50.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      215.000 to Point/Station      220.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    663.000(Ft.)
End of natural channel elevation =    587.500(Ft.)
Length of natural channel  =   800.000(Ft.)
Estimated mean flow rate at midpoint of channel =    165.014(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   9.25(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0944
Corrected/adjusted channel slope =  0.0944
Travel time =    1.44 min.     TC =   11.95  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
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```
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.800
RI index for soil(AMC 3)  =  95.36
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.146(In/Hr) for a   100.0 year storm
Subarea runoff =     25.575(CFS) for      9.220(Ac.)
Total runoff =    176.697(CFS)  Total area =      59.370(Ac.)


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Process from Point/Station      220.000 to Point/Station      220.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  95.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.95 min.
Rainfall intensity =      3.146(In/Hr) for a   100.0 year storm
Subarea runoff =     16.505(CFS) for      5.960(Ac.)
Total runoff =    193.202(CFS)  Total area =      65.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      220.000 to Point/Station      225.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    587.500(Ft.)
End of natural channel elevation =    585.000(Ft.)
Length of natural channel  =   355.000(Ft.)
Estimated mean flow rate at midpoint of channel =    199.175(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   2.75(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0070
Corrected/adjusted channel slope =  0.0070
Travel time =    2.16 min.     TC =   14.11  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.905(In/Hr) for a   100.0 year storm
Subarea runoff =     10.344(CFS) for      4.040(Ac.)
Total runoff =    203.546(CFS)  Total area =      69.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      225.000 to Point/Station      230.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   585.000(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =   166.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   203.546(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =   203.546(CFS)
Normal flow depth in pipe =   31.13(In.)
Flow top width inside pipe =   31.31(In.)
Critical depth could not be calculated.
Pipe flow velocity =     28.65(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    14.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     69.370(Ac.)
Runoff from this stream =    203.546(CFS)
Time of concentration =   14.20 min.
Rainfall intensity =     2.895(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      400.000 to Point/Station      405.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   690.000(Ft.)
Top (of initial area) elevation =  1254.000(Ft.)
Bottom (of initial area) elevation =   825.000(Ft.)
```

```
Difference in elevation =   429.000(Ft.)
Slope =    0.62174  s(percent)=      62.17
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.963 min.
Rainfall intensity =      3.823(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     22.785(CFS)
Total initial stream area =        6.760(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      410.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    825.000(Ft.)
End of natural channel elevation =    662.000(Ft.)
Length of natural channel  =   758.000(Ft.)
Estimated mean flow rate at midpoint of channel =     43.548(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   7.87(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2150
Corrected/adjusted channel slope =  0.1660
Travel time =    1.61 min.     TC =    9.57  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.500(In/Hr) for a   100.0 year storm
Subarea runoff =     37.951(CFS) for     12.320(Ac.)
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Total runoff =     60.736(CFS)  Total area =      19.080(Ac.)


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Process from Point/Station      410.000 to Point/Station      410.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.57 min.
Rainfall intensity =      3.500(In/Hr) for a   100.0 year storm
Subarea runoff =     14.694(CFS) for      4.770(Ac.)
Total runoff =     75.429(CFS)  Total area =      23.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      410.000 to Point/Station      415.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    662.000(Ft.)
End of natural channel elevation =    630.400(Ft.)
Length of natural channel  =   922.000(Ft.)
Estimated mean flow rate at midpoint of channel =     98.770(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.74(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0343
Corrected/adjusted channel slope =  0.0343
Travel time =    3.24 min.     TC =   12.81  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.170
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.680
RI index for soil(AMC 3)  =  94.67
```

```
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.043(In/Hr) for a   100.0 year storm
Subarea runoff =     39.450(CFS) for     14.760(Ac.)
Total runoff =    114.880(CFS)  Total area =      38.610(Ac.)


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Process from Point/Station      415.000 to Point/Station      230.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   630.400(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =   845.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   114.880(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =   114.880(CFS)
Normal flow depth in pipe =   25.55(In.)
Flow top width inside pipe =   27.60(In.)
Critical depth could not be calculated.
Pipe flow velocity =     23.29(Ft/s)
Travel time through pipe =    0.60 min.
Time of concentration (TC) =    13.41 min.


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Process from Point/Station      230.000 to Point/Station      230.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     38.610(Ac.)
Runoff from this stream =    114.880(CFS)
Time of concentration =   13.41 min.
Rainfall intensity =     2.976(In/Hr)
Summary of stream data:

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


1      203.546     14.20                2.895
2      114.880     13.41                2.976
Largest stream flow has longer time of concentration
Qp =    203.546 + sum of
          Qb         Ia/Ib
         114.880 *    0.973 =    111.758
Qp =    315.304

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

```
     203.546     114.880
Area of streams before confluence:
       69.370       38.610


Results of confluence:
Total flow rate =    315.304(CFS)
Time of concentration =    14.204 min.
Effective stream area after confluence  =    107.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      230.000 to Point/Station      235.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   570.900(Ft.)
Downstream point/station elevation =   569.800(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   315.304(CFS)
Nearest computed pipe diameter  =     60.00(In.)
Calculated individual pipe flow  =   315.304(CFS)
Normal flow depth in pipe =   51.75(In.)
Flow top width inside pipe =   41.32(In.)
Critical Depth =   56.65(In.)
Pipe flow velocity =     17.53(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    14.26 min.


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Process from Point/Station      235.000 to Point/Station      235.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
RI index for soil(AMC 3)  =  86.86
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.26 min.
Rainfall intensity =      2.890(In/Hr) for a   100.0 year storm
Subarea runoff =     15.684(CFS) for      6.070(Ac.)
Total runoff =    330.988(CFS)  Total area =     114.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      235.000 to Point/Station      240.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =   569.800(Ft.)
Downstream point/station elevation =   569.200(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   330.988(CFS)
Nearest computed pipe diameter  =     63.00(In.)
Calculated individual pipe flow  =   330.988(CFS)
Normal flow depth in pipe =   49.22(In.)
Flow top width inside pipe =   52.09(In.)
Critical Depth =   58.50(In.)
Pipe flow velocity =     18.23(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    14.29 min.


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Process from Point/Station      240.000 to Point/Station      240.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    114.050(Ac.)
Runoff from this stream =    330.988(CFS)
Time of concentration =   14.29 min.
Rainfall intensity =     2.887(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   763.000(Ft.)
Top (of initial area) elevation =  1180.000(Ft.)
Bottom (of initial area) elevation =   800.000(Ft.)
Difference in elevation =   380.000(Ft.)
Slope =    0.49803  s(percent)=      49.80
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.666 min.
Rainfall intensity =      3.670(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.900
RI index for soil(AMC 3)  =  95.48
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     22.798(CFS)
Total initial stream area =        7.020(Ac.)
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Pervious area fraction = 1.000


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Process from Point/Station      105.000 to Point/Station      110.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    645.000(Ft.)
Length of natural channel  =  1171.000(Ft.)
Estimated mean flow rate at midpoint of channel =     36.957(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.42(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1324
Corrected/adjusted channel slope =  0.1227
Travel time =    3.04 min.     TC =   11.70  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.177(In/Hr) for a   100.0 year storm
Subarea runoff =     24.463(CFS) for      8.720(Ac.)
Total runoff =     47.261(CFS)  Total area =      15.740(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      115.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    645.000(Ft.)
End of natural channel elevation =    585.000(Ft.)
Length of natural channel  =   685.000(Ft.)
Estimated mean flow rate at midpoint of channel =     56.299(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
```

```
Velocity using mean channel flow =   6.25(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0876
Corrected/adjusted channel slope =  0.0876
Travel time =    1.83 min.     TC =   13.53  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.964(In/Hr) for a   100.0 year storm
Subarea runoff =     15.732(CFS) for      6.020(Ac.)
Total runoff =     62.994(CFS)  Total area =      21.760(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      140.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   585.000(Ft.)
Downstream point/station elevation =   577.300(Ft.)
Pipe length  =   218.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    62.994(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    62.994(CFS)
Normal flow depth in pipe =   23.18(In.)
Flow top width inside pipe =   25.15(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.48(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =    13.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.760(Ac.)
Runoff from this stream =     62.994(CFS)
Time of concentration =   13.77 min.
Rainfall intensity =     2.939(In/Hr)
```

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Process from Point/Station      120.000 to Point/Station      125.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   922.000(Ft.)
Top (of initial area) elevation =  1060.000(Ft.)
Bottom (of initial area) elevation =   700.000(Ft.)
Difference in elevation =   360.000(Ft.)
Slope =    0.39046  s(percent)=      39.05
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.814 min.
Rainfall intensity =      3.458(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     13.729(CFS)
Total initial stream area =        4.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      125.000 to Point/Station      130.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    700.000(Ft.)
End of natural channel elevation =    595.000(Ft.)
Length of natural channel  =   570.000(Ft.)
Estimated mean flow rate at midpoint of channel =     19.065(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   5.74(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1842
Corrected/adjusted channel slope =  0.1521
Travel time =    1.66 min.     TC =   11.47  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
```

```
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.208(In/Hr) for a   100.0 year storm
Subarea runoff =      9.889(CFS) for      3.490(Ac.)
Total runoff =     23.618(CFS)  Total area =       7.980(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      130.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.47 min.
Rainfall intensity =      3.208(In/Hr) for a   100.0 year storm
Subarea runoff =     28.505(CFS) for     10.060(Ac.)
Total runoff =     52.122(CFS)  Total area =      18.040(Ac.)


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Process from Point/Station      130.000 to Point/Station      135.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Top of natural channel elevation =    595.000(Ft.)
End of natural channel elevation =    580.000(Ft.)
Length of natural channel  =   175.000(Ft.)
Estimated mean flow rate at midpoint of channel =     53.292(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   6.08(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0857
Corrected/adjusted channel slope =  0.0857
Travel time =    0.48 min.     TC =   11.95  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.146(In/Hr) for a   100.0 year storm
Subarea runoff =      2.250(CFS) for      0.810(Ac.)
Total runoff =     54.372(CFS)  Total area =      18.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      135.000 to Point/Station      140.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   580.000(Ft.)
Downstream point/station elevation =   577.300(Ft.)
Pipe length  =   175.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    54.372(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    54.372(CFS)
Normal flow depth in pipe =   25.78(In.)
Flow top width inside pipe =   27.28(In.)
Critical Depth =   28.85(In.)
Pipe flow velocity =     10.91(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    12.22 min.


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Process from Point/Station      140.000 to Point/Station      140.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =     18.850(Ac.)
Runoff from this stream =     54.372(CFS)
Time of concentration =   12.22 min.
Rainfall intensity =     3.113(In/Hr)
Summary of stream data:

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


1       62.994     13.77                2.939
2       54.372     12.22                3.113
```

```
Largest stream flow has longer time of concentration
Qp =     62.994 + sum of
          Qb         Ia/Ib
          54.372 *    0.944 =     51.345
Qp =    114.339

Total of 2 streams to confluence:
Flow rates before confluence point:
      62.994      54.372
Area of streams before confluence:
       21.760       18.850
Results of confluence:
Total flow rate =    114.339(CFS)
Time of concentration =    13.765 min.
Effective stream area after confluence =     40.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      140.000 to Point/Station      240.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   577.300(Ft.)
Downstream point/station elevation =   569.300(Ft.)
Pipe length  =   324.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   114.339(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =   114.339(CFS)
Normal flow depth in pipe =   32.63(In.)
Flow top width inside pipe =   28.84(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.44(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =    14.11 min.


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Process from Point/Station      240.000 to Point/Station      240.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     40.610(Ac.)
Runoff from this stream =    114.339(CFS)
Time of concentration =   14.11 min.
Rainfall intensity =     2.904(In/Hr)
Summary of stream data:

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

```
1      330.988     14.29                 2.887
2      114.339     14.11                 2.904
Largest stream flow has longer time of concentration
Qp =    330.988 + sum of
          Qb         Ia/Ib
         114.339 *    0.994 =    113.655
Qp =    444.643

Total of 2 main streams to confluence:
Flow rates before confluence point:
     330.988     114.339
Area of streams before confluence:
      114.050       40.610


Results of confluence:
Total flow rate =    444.643(CFS)
Time of concentration =    14.292 min.
Effective stream area after confluence  =    154.660(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      240.000 to Point/Station      245.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   569.200(Ft.)
Downstream point/station elevation =   562.900(Ft.)
Pipe length  =   352.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   444.643(CFS)
Nearest computed pipe diameter  =     69.00(In.)
Calculated individual pipe flow  =   444.643(CFS)
Normal flow depth in pipe =   57.47(In.)
Flow top width inside pipe =   51.49(In.)
Critical Depth =   65.06(In.)
Pipe flow velocity =     19.23(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    14.60 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
```

```
RI index for soil(AMC 3)  =  86.86
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.60 min.
Rainfall intensity =      2.858(In/Hr) for a   100.0 year storm
Subarea runoff =      7.052(CFS) for      2.760(Ac.)
Total runoff =    451.694(CFS)  Total area =     157.420(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      245.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.820
RI index for soil(AMC 3)  =  85.95
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.60 min.
Rainfall intensity =      2.858(In/Hr) for a   100.0 year storm
Subarea runoff =      7.840(CFS) for      3.070(Ac.)
Total runoff =    459.535(CFS)  Total area =     160.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      245.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   562.900(Ft.)
Downstream point/station elevation =   561.900(Ft.)
Pipe length  =    57.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   459.535(CFS)
Nearest computed pipe diameter  =     69.00(In.)
Calculated individual pipe flow  =   459.535(CFS)
Normal flow depth in pipe =   61.13(In.)
Flow top width inside pipe =   43.88(In.)
Critical Depth =   65.50(In.)
Pipe flow velocity =     18.87(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    14.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
```

```
Stream flow area =    160.490(Ac.)
Runoff from this stream =    459.535(CFS)
Time of concentration =   14.65 min.
Rainfall intensity =     2.853(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   681.000(Ft.)
Top (of initial area) elevation =   700.000(Ft.)
Bottom (of initial area) elevation =   569.000(Ft.)
Difference in elevation =   131.000(Ft.)
Slope =    0.19236  s(percent)=      19.24
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.371 min.
Rainfall intensity =      3.967(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      5.972(CFS)
Total initial stream area =        1.710(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   567.000(Ft.)
Downstream point/station elevation =   566.000(Ft.)
Pipe length  =    43.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     5.972(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.972(CFS)
Normal flow depth in pipe =    9.25(In.)
Flow top width inside pipe =   14.59(In.)
Critical Depth =   11.86(In.)
Pipe flow velocity =      7.53(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     7.47 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.47 min.
Rainfall intensity =      3.943(In/Hr) for a   100.0 year storm
Subarea runoff =      1.060(CFS) for      0.300(Ac.)
Total runoff =      7.032(CFS)  Total area =       2.010(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   566.000(Ft.)
Downstream point/station elevation =   562.800(Ft.)
Pipe length  =   306.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     7.032(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.032(CFS)
Normal flow depth in pipe =   11.70(In.)
Flow top width inside pipe =   17.17(In.)
Critical Depth =   12.32(In.)
Pipe flow velocity =      5.79(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =     8.35 min.


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Process from Point/Station      606.000 to Point/Station      606.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  82.30
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.35 min.
Rainfall intensity =      3.737(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =      2.638(CFS) for      0.790(Ac.)
Total runoff =      9.670(CFS)  Total area =       2.800(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      606.000 to Point/Station      250.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   562.800(Ft.)
Downstream point/station elevation =   561.900(Ft.)
Pipe length  =    47.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     9.670(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.670(CFS)
Normal flow depth in pipe =   11.82(In.)
Flow top width inside pipe =   17.09(In.)
Critical Depth =   14.41(In.)
Pipe flow velocity =      7.86(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     8.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      250.000 to Point/Station      250.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.800(Ac.)
Runoff from this stream =      9.670(CFS)
Time of concentration =    8.45 min.
Rainfall intensity =     3.716(In/Hr)
Summary of stream data:

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


1      459.535     14.65                2.853
2        9.670      8.45                3.716
Largest stream flow has longer time of concentration
Qp =    459.535 + sum of
          Qb         Ia/Ib
           9.670 *    0.768 =      7.424
Qp =    466.959

Total of 2 main streams to confluence:
Flow rates before confluence point:
     459.535       9.670
Area of streams before confluence:
```

```
      160.490        2.800


Results of confluence:
Total flow rate =    466.959(CFS)
Time of concentration =    14.648 min.
Effective stream area after confluence  =    163.290(Ac.)


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Process from Point/Station      250.000 to Point/Station      255.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   561.900(Ft.)
Downstream point/station elevation =   554.500(Ft.)
Pipe length  =   408.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   466.959(CFS)
Nearest computed pipe diameter  =     69.00(In.)
Calculated individual pipe flow  =   466.959(CFS)
Normal flow depth in pipe =   61.13(In.)
Flow top width inside pipe =   43.88(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.19(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =    15.00 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      255.000 to Point/Station      255.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.00 min.
Rainfall intensity =      2.821(In/Hr) for a   100.0 year storm
Subarea runoff =     10.565(CFS) for      4.220(Ac.)
Total runoff =    477.524(CFS)  Total area =     167.510(Ac.)


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Process from Point/Station      255.000 to Point/Station      255.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
```

```
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.940
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.060
RI index for soil(AMC 3)  =  75.71
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.00 min.
Rainfall intensity =      2.821(In/Hr) for a   100.0 year storm
Subarea runoff =     10.496(CFS) for      4.190(Ac.)
Total runoff =    488.020(CFS)  Total area =     171.700(Ac.)


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Process from Point/Station      255.000 to Point/Station      260.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   554.500(Ft.)
Downstream point/station elevation =   551.300(Ft.)
Pipe length  =   179.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   488.020(CFS)
Nearest computed pipe diameter  =     72.00(In.)
Calculated individual pipe flow  =   488.020(CFS)
Normal flow depth in pipe =   58.69(In.)
Flow top width inside pipe =   55.90(In.)
Critical Depth =   67.67(In.)
Pipe flow velocity =     19.79(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    15.15 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      260.000 to Point/Station      260.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  76.32
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.15 min.
Rainfall intensity =      2.807(In/Hr) for a   100.0 year storm
Subarea runoff =      7.806(CFS) for      3.130(Ac.)
Total runoff =    495.826(CFS)  Total area =     174.830(Ac.)


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Process from Point/Station      260.000 to Point/Station      265.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   551.300(Ft.)
Downstream point/station elevation =   503.000(Ft.)
Pipe length  =   138.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   495.826(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   495.826(CFS)
Normal flow depth in pipe =   33.05(In.)
Flow top width inside pipe =   34.40(In.)
Critical depth could not be calculated.
Pipe flow velocity =     61.06(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    15.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    174.830(Ac.)
Runoff from this stream =    495.826(CFS)
Time of concentration =   15.19 min.
Rainfall intensity =     2.804(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      610.000 to Point/Station      612.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   270.000(Ft.)
Top (of initial area) elevation =   565.000(Ft.)
Bottom (of initial area) elevation =   550.000(Ft.)
Difference in elevation =    15.000(Ft.)
Slope =    0.05556  s(percent)=       5.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.020 min.
Rainfall intensity =      4.770(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.897
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Initial subarea runoff =      1.198(CFS)
Total initial stream area =        0.280(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      612.000 to Point/Station      614.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   545.000(Ft.)
Downstream point/station elevation =   540.000(Ft.)
Pipe length  =    72.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     1.198(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     1.198(CFS)
Normal flow depth in pipe =    4.60(In.)
Flow top width inside pipe =    5.08(In.)
Critical depth could not be calculated.
Pipe flow velocity =      7.42(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     5.18 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      614.000 to Point/Station      265.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   540.000(Ft.)
Downstream point elevation =   503.000(Ft.)
Channel length thru subarea  =   789.000(Ft.)
Channel base width      =    4.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      9.599(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =      9.599(CFS)
Depth of flow =   0.270(Ft.), Average velocity =   8.330(Ft/s)
Channel flow top width =    4.540(Ft.)
Flow Velocity =    8.33(Ft/s)
Travel time  =    1.58 min.
Time of concentration =    6.76 min.

Sub-Channel No. 1 Critical depth =      0.539(Ft.)
  '     '       '     Critical flow top width =      5.078(Ft.)
  '     '       '     Critical flow velocity=    3.923(Ft/s)
  '     '       '     Critical flow area =      2.447(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (good cover) subarea
```

```
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  80.32
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      4.135(In/Hr) for a   100.0 year storm
Subarea runoff =     16.728(CFS) for      4.850(Ac.)
Total runoff =     17.926(CFS)  Total area =       5.130(Ac.)
Depth of flow =   0.393(Ft.), Average velocity =  10.397(Ft/s)

Sub-Channel No. 1 Critical depth =      0.797(Ft.)
  '     '       '     Critical flow top width =      5.594(Ft.)
  '     '       '     Critical flow velocity=    4.690(Ft/s)
  '     '       '     Critical flow area =      3.823(Sq.Ft)



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Process from Point/Station      265.000 to Point/Station      265.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     6.76 min.
Rainfall intensity =      4.135(In/Hr) for a   100.0 year storm
Subarea runoff =      3.906(CFS) for      1.060(Ac.)
Total runoff =     21.832(CFS)  Total area =       6.190(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      265.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.190(Ac.)
Runoff from this stream =     21.832(CFS)
Time of concentration =    6.76 min.
Rainfall intensity =     4.135(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

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


1      495.826     15.19                 2.804
2       21.832      6.76                 4.135
Largest stream flow has longer time of concentration
Qp =    495.826 + sum of
          Qb         Ia/Ib
          21.832 *    0.678 =     14.802
Qp =    510.628

Total of 2 main streams to confluence:
Flow rates before confluence point:
     495.826      21.832
Area of streams before confluence:
      174.830        6.190


Results of confluence:
Total flow rate =    510.628(CFS)
Time of concentration =    15.191 min.
Effective stream area after confluence  =    181.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      265.000 to Point/Station      275.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   493.000(Ft.)
Pipe length  =   144.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   510.628(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   510.628(CFS)
Normal flow depth in pipe =   45.94(In.)
Flow top width inside pipe =   45.09(In.)
Critical depth could not be calculated.
Pipe flow velocity =     33.37(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    15.26 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.26 min.
Rainfall intensity =      2.797(In/Hr) for a   100.0 year storm
Subarea runoff =      1.167(CFS) for      0.470(Ac.)
Total runoff =    511.795(CFS)  Total area =     181.490(Ac.)


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Process from Point/Station      275.000 to Point/Station      275.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    181.490(Ac.)
Runoff from this stream =    511.795(CFS)
Time of concentration =   15.26 min.
Rainfall intensity =     2.797(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      625.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   523.000(Ft.)
Top (of initial area) elevation =   510.000(Ft.)
Bottom (of initial area) elevation =   503.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01338  s(percent)=       1.34
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.694 min.
Rainfall intensity =      3.665(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.034(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      625.000 to Point/Station      630.000
```

```
**** PIPEFLOW TRAVEL TIME (User specified size) ****
_____________________________________________________________________
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    15.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.034(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.034(CFS)
Normal flow depth in pipe =    3.67(In.)
Flow top width inside pipe =   14.51(In.)
Critical Depth =    7.95(In.)
Pipe flow velocity =     11.71(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.72 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      275.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____________________________________________________________________
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    493.000(Ft.)
Length of natural channel  =   265.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.703(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.42(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0302
Corrected/adjusted channel slope =  0.0302
Travel time =    1.29 min.     TC =   10.01  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.426(In/Hr) for a   100.0 year storm
Subarea runoff =      1.211(CFS) for      0.410(Ac.)
Total runoff =      4.245(CFS)  Total area =       1.340(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      275.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.340(Ac.)
Runoff from this stream =      4.245(CFS)
Time of concentration =   10.01 min.
Rainfall intensity =     3.426(In/Hr)
Summary of stream data:

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


1      511.795     15.26                 2.797
2        4.245     10.01                 3.426
Largest stream flow has longer time of concentration
Qp =    511.795 + sum of
          Qb         Ia/Ib
           4.245 *    0.817 =      3.466
Qp =    515.261

Total of 2 main streams to confluence:
Flow rates before confluence point:
     511.795       4.245
Area of streams before confluence:
      181.490        1.340


Results of confluence:
Total flow rate =    515.261(CFS)
Time of concentration =    15.262 min.
Effective stream area after confluence  =    182.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      275.000 to Point/Station      280.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    493.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =    50.000(Ft.)
Estimated mean flow rate at midpoint of channel =    515.486(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
```

```
Velocity using mean channel flow =  22.37(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0800
Corrected/adjusted channel slope =  0.0800
Travel time =    0.04 min.     TC =   15.30  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.794(In/Hr) for a   100.0 year storm
Subarea runoff =      0.382(CFS) for      0.160(Ac.)
Total runoff =    515.643(CFS)  Total area =     182.990(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    182.990(Ac.)
Runoff from this stream =    515.643(CFS)
Time of concentration =   15.30 min.
Rainfall intensity =     2.794(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      619.000 to Point/Station      620.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =    50.000(Ft.)
Top (of initial area) elevation =   511.000(Ft.)
Bottom (of initial area) elevation =   510.000(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.02000  s(percent)=       2.00
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      4.779(In/Hr) for a   100.0 year storm
```

```
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.768(CFS)
Total initial stream area =        0.180(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      620.000 to Point/Station      625.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   510.000(Ft.)
Downstream point/station elevation =   503.000(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     0.768(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.768(CFS)
Normal flow depth in pipe =    3.09(In.)
Flow top width inside pipe =    6.00(In.)
Critical Depth =    5.25(In.)
Pipe flow velocity =      7.52(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =     5.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      625.000 to Point/Station      625.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     5.17 min.
Rainfall intensity =      4.702(In/Hr) for a   100.0 year storm
Subarea runoff =      4.027(CFS) for      0.960(Ac.)
Total runoff =      4.795(CFS)  Total area =       1.140(Ac.)


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Process from Point/Station      625.000 to Point/Station      630.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   503.000(Ft.)
Downstream point/station elevation =   501.000(Ft.)
Pipe length  =    78.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     4.795(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.795(CFS)
Normal flow depth in pipe =    9.52(In.)
Flow top width inside pipe =    9.72(In.)
Critical Depth =   10.87(In.)
Pipe flow velocity =      7.17(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =     5.35 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      630.000 to Point/Station      280.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    501.000(Ft.)
End of natural channel elevation =    489.000(Ft.)
Length of natural channel  =   457.000(Ft.)
Estimated mean flow rate at midpoint of channel =      5.657(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.52(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0263
Corrected/adjusted channel slope =  0.0263
Travel time =    2.16 min.     TC =    7.52  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.930(In/Hr) for a   100.0 year storm
Subarea runoff =      1.396(CFS) for      0.410(Ac.)
Total runoff =      6.191(CFS)  Total area =       1.550(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      280.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      6.191(CFS)
Time of concentration =    7.52 min.
Rainfall intensity =     3.930(In/Hr)
Summary of stream data:

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


1      515.643     15.30                 2.794
2        6.191      7.52                 3.930
Largest stream flow has longer time of concentration
Qp =    515.643 + sum of
          Qb         Ia/Ib
           6.191 *    0.711 =      4.402
Qp =    520.045

Total of 2 main streams to confluence:
Flow rates before confluence point:
     515.643       6.191
Area of streams before confluence:
      182.990        1.550


Results of confluence:
Total flow rate =    520.045(CFS)
Time of concentration =    15.300 min.
Effective stream area after confluence  =    184.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      280.000 to Point/Station      285.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   489.000(Ft.)
Downstream point/station elevation =   483.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =   520.045(CFS)
Nearest computed pipe diameter  =     60.00(In.)
Calculated individual pipe flow  =   520.045(CFS)
Normal flow depth in pipe =   45.84(In.)
```

```
Flow top width inside pipe =   50.95(In.)
Critical depth could not be calculated.
Pipe flow velocity =     32.31(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    15.35 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      285.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.35 min.
Rainfall intensity =      2.790(In/Hr) for a   100.0 year storm
Subarea runoff =      1.486(CFS) for      0.600(Ac.)
Total runoff =    521.530(CFS)  Total area =     185.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      285.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    15.35 min.
Rainfall intensity =      2.790(In/Hr) for a   100.0 year storm
Subarea runoff =     12.907(CFS) for      5.420(Ac.)
Total runoff =    534.437(CFS)  Total area =     190.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      285.000 to Point/Station      286.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    484.000(Ft.)
End of natural channel elevation =    483.000(Ft.)
Length of natural channel  =    32.000(Ft.)
```

```
Estimated mean flow rate at midpoint of channel =    534.760(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  14.14(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0313
Corrected/adjusted channel slope =  0.0313
Travel time =    0.04 min.     TC =   15.39  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.786(In/Hr) for a   100.0 year storm
Subarea runoff =      0.547(CFS) for      0.230(Ac.)
Total runoff =    534.984(CFS)  Total area =     190.790(Ac.)
End of computations, total study area =          190.79 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.859
Area averaged RI index number =  82.7
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886PRF10.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "F" PROPOSED CONDITION 10-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.940(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 800.000 to Point/Station 810.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 680.000(Ft.)
Bottom (of initial area) elevation = 553.000(Ft.)

```
Difference in elevation =   127.000(Ft.)
Slope =    0.12700  s(percent)=      12.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.339 min.
Rainfall intensity =      2.296(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.778(CFS)
Total initial stream area =        1.990(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      810.000 to Point/Station      810.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  89.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.34 min.
Rainfall intensity =      2.296(In/Hr) for a    10.0 year storm
Subarea runoff =      4.453(CFS) for      2.310(Ac.)
Total runoff =      8.231(CFS)  Total area =       4.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      810.000 to Point/Station      820.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   553.000(Ft.)
End of street segment elevation =   511.000(Ft.)
Length of street segment  =   467.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  12.000(Ft.)
```

```
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      8.575(CFS)
Depth of flow =   0.281(Ft.), Average velocity =   5.967(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.693(Ft.)
Flow velocity =   5.97(Ft/s)
Travel time =    1.30 min.     TC =   10.64  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.874
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.800
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.200
RI index for soil(AMC 2)  =  59.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.156(In/Hr) for a    10.0 year storm
Subarea runoff =      0.678(CFS) for      0.360(Ac.)
Total runoff =      8.909(CFS)  Total area =       4.660(Ac.)
Street flow at end of street =      8.909(CFS)
Half street flow at end of street =      4.454(CFS)
Depth of flow =   0.283(Ft.), Average velocity =   6.016(Ft/s)
Flow width (from curb towards crown)=   7.834(Ft.)
End of computations, total study area =            4.66 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.717
Area averaged RI index number =  80.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886PRF100.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "F" PROPOSED CONDITION 100-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 800.000 to Point/Station 810.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 680.000(Ft.)
Bottom (of initial area) elevation = 553.000(Ft.)

```
Difference in elevation =   127.000(Ft.)
Slope =    0.12700  s(percent)=      12.70
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.339 min.
Rainfall intensity =      3.541(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.878
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      6.187(CFS)
Total initial stream area =        1.990(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      810.000 to Point/Station      810.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  95.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =     9.34 min.
Rainfall intensity =      3.541(In/Hr) for a   100.0 year storm
Subarea runoff =      7.236(CFS) for      2.310(Ac.)
Total runoff =     13.424(CFS)  Total area =       4.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      810.000 to Point/Station      820.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =   553.000(Ft.)
End of street segment elevation =   511.000(Ft.)
Length of street segment  =   467.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  12.000(Ft.)
```

```
Slope from curb to property line (v/hz) =   0.025
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     13.986(CFS)
Depth of flow =   0.319(Ft.), Average velocity =   6.645(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.621(Ft.)
Flow velocity =   6.64(Ft/s)
Travel time =    1.17 min.     TC =   10.51  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.800
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.200
RI index for soil(AMC 3)  =  77.84
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      3.346(In/Hr) for a   100.0 year storm
Subarea runoff =      1.073(CFS) for      0.360(Ac.)
Total runoff =     14.497(CFS)  Total area =       4.660(Ac.)
Street flow at end of street =     14.497(CFS)
Half street flow at end of street =      7.248(CFS)
Depth of flow =   0.322(Ft.), Average velocity =   6.699(Ft/s)
Flow width (from curb towards crown)=   9.774(Ft.)
End of computations, total study area =            4.66 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.717
Area averaged RI index number =  80.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886PB10.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "B", "C" AND "D" PROPOSED CONDITION 10-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

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

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.940(In/Hr)
Slope of intensity duration curve = 0.4800

++

Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 361.000(Ft.)
Top (of initial area) elevation = 962.000(Ft.)
Bottom (of initial area) elevation = 800.000(Ft.)

```
Difference in elevation =   162.000(Ft.)
Slope =    0.44875  s(percent)=      44.88
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.560 min.
Rainfall intensity =      2.720(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.590
RI index for soil(AMC 2)  =  87.77
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.879(CFS)
Total initial stream area =        0.820(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    631.000(Ft.)
Length of natural channel  =   733.000(Ft.)
Estimated mean flow rate at midpoint of channel =      6.164(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.20(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2306
Corrected/adjusted channel slope =  0.1722
Travel time =    2.91 min.     TC =    9.47  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.787
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.790
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.210
RI index for soil(AMC 2)  =  80.31
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.281(In/Hr) for a    10.0 year storm
Subarea runoff =      6.715(CFS) for      3.740(Ac.)
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Total runoff =      8.593(CFS)  Total area =       4.560(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =   631.000(Ft.)
Downstream point elevation =   577.000(Ft.)
Channel length thru subarea  =   616.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =     11.445(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.500(Ft.)
Flow(q) thru subarea =     11.445(CFS)
Depth of flow =   0.217(Ft.), Average velocity =  10.095(Ft/s)
Channel flow top width =    5.435(Ft.)
Flow Velocity =   10.10(Ft/s)
Travel time  =    1.02 min.
Time of concentration =   10.48 min.

Sub-Channel No. 1 Critical depth =      0.523(Ft.)
  '     '       '     Critical flow top width =      6.047(Ft.)
  '     '       '     Critical flow velocity=    3.959(Ft/s)
  '     '       '     Critical flow area =      2.891(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.774
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  79.10
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.172(In/Hr) for a    10.0 year storm
Subarea runoff =      5.617(CFS) for      3.340(Ac.)
Total runoff =     14.211(CFS)  Total area =       7.900(Ac.)
Depth of flow =   0.247(Ft.), Average velocity =  10.942(Ft/s)

Sub-Channel No. 1 Critical depth =      0.602(Ft.)
  '     '       '     Critical flow top width =      6.203(Ft.)
  '     '       '     Critical flow velocity=    4.217(Ft/s)
  '     '       '     Critical flow area =      3.370(Sq.Ft)



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Process from Point/Station      303.000 to Point/Station      304.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    577.000(Ft.)
End of natural channel elevation =    543.500(Ft.)
Length of natural channel  =   688.000(Ft.)
Estimated mean flow rate at midpoint of channel =     16.810(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.31(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0487
Corrected/adjusted channel slope =  0.0487
Travel time =    1.82 min.     TC =   12.30  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.758
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.011(In/Hr) for a    10.0 year storm
Subarea runoff =      4.407(CFS) for      2.890(Ac.)
Total runoff =     18.618(CFS)  Total area =      10.790(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     10.790(Ac.)
Runoff from this stream =     18.618(CFS)
Time of concentration =   12.30 min.
Rainfall intensity =     2.011(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      309.000 to Point/Station      310.000
**** INITIAL AREA EVALUATION ****
```

```
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =   622.500(Ft.)
Bottom (of initial area) elevation =   554.100(Ft.)
Difference in elevation =    68.400(Ft.)
Slope =    0.06840  s(percent)=       6.84
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.130 min.
Rainfall intensity =      2.454(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.874
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.950
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.050
RI index for soil(AMC 2)  =  56.95
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.808(CFS)
Total initial stream area =        1.310(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   549.100(Ft.)
Downstream point/station elevation =   548.000(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.808(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.808(CFS)
Normal flow depth in pipe =    6.68(In.)
Flow top width inside pipe =    7.87(In.)
Critical Depth =    8.54(In.)
Pipe flow velocity =      7.98(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     8.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      314.000 to Point/Station      314.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.310(Ac.)
Runoff from this stream =      2.808(CFS)
Time of concentration =    8.20 min.
Rainfall intensity =     2.444(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      312.000 to Point/Station      313.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   334.000(Ft.)
Top (of initial area) elevation =   562.000(Ft.)
Bottom (of initial area) elevation =   550.800(Ft.)
Difference in elevation =    11.200(Ft.)
Slope =    0.03353  s(percent)=       3.35
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.047 min.
Rainfall intensity =      2.828(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.892(CFS)
Total initial stream area =        0.360(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      313.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =   548.400(Ft.)
Downstream point/station elevation =   548.000(Ft.)
Pipe length  =    56.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.892(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.892(CFS)
Normal flow depth in pipe =    5.22(In.)
Flow top width inside pipe =    8.88(In.)
Critical Depth =    5.18(In.)
Pipe flow velocity =      3.35(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =     6.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      314.000 to Point/Station      314.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.360(Ac.)
```

```
Runoff from this stream =      0.892(CFS)
Time of concentration =    6.33 min.
Rainfall intensity =     2.768(In/Hr)
Summary of stream data:

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


1        2.808      8.20                2.444
2        0.892      6.33                2.768
Largest stream flow has longer time of concentration
Qp =      2.808 + sum of
          Qb         Ia/Ib
           0.892 *    0.883 =      0.787
Qp =      3.596

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.808       0.892
Area of streams before confluence:
        1.310        0.360
Results of confluence:
Total flow rate =      3.596(CFS)
Time of concentration =     8.195 min.
Effective stream area after confluence =      1.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      314.000 to Point/Station      311.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   548.000(Ft.)
Downstream point/station elevation =   546.700(Ft.)
Pipe length  =    17.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.596(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.596(CFS)
Normal flow depth in pipe =    6.01(In.)
Flow top width inside pipe =    8.48(In.)
Critical depth could not be calculated.
Pipe flow velocity =     11.47(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.22 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      304.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
```

```
Top of natural channel elevation =    546.700(Ft.)
End of natural channel elevation =    543.500(Ft.)
Length of natural channel  =    89.000(Ft.)
Estimated mean flow rate at midpoint of channel =      3.682(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.73(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0360
Corrected/adjusted channel slope =  0.0360
Travel time =    0.40 min.     TC =    8.62  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.777
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.386(In/Hr) for a    10.0 year storm
Subarea runoff =      0.148(CFS) for      0.080(Ac.)
Total runoff =      3.744(CFS)  Total area =       1.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.750(Ac.)
Runoff from this stream =      3.744(CFS)
Time of concentration =    8.62 min.
Rainfall intensity =     2.386(In/Hr)
Summary of stream data:

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


1       18.618     12.30                2.011
2        3.744      8.62                2.386
Largest stream flow has longer time of concentration
```

```
Qp =     18.618 + sum of
          Qb         Ia/Ib
           3.744 *    0.843 =      3.156
Qp =     21.774

Total of 2 main streams to confluence:
Flow rates before confluence point:
      18.618       3.744
Area of streams before confluence:
       10.790        1.750


Results of confluence:
Total flow rate =     21.774(CFS)
Time of concentration =    12.300 min.
Effective stream area after confluence  =     12.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   543.500(Ft.)
Downstream point/station elevation =   532.000(Ft.)
Pipe length  =   158.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.774(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    21.774(CFS)
Normal flow depth in pipe =   11.84(In.)
Flow top width inside pipe =   17.08(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.69(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    12.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      306.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    520.000(Ft.)
Length of natural channel  =   242.000(Ft.)
Estimated mean flow rate at midpoint of channel =     22.590(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.90(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0496
Corrected/adjusted channel slope =  0.0496
Travel time =    0.58 min.     TC =   13.03  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.755
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.956(In/Hr) for a    10.0 year storm
Subarea runoff =      1.388(CFS) for      0.940(Ac.)
Total runoff =     23.162(CFS)  Total area =      13.480(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      306.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     13.480(Ac.)
Runoff from this stream =     23.162(CFS)
Time of concentration =   13.03 min.
Rainfall intensity =     1.956(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      316.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   963.000(Ft.)
Top (of initial area) elevation =   633.000(Ft.)
Bottom (of initial area) elevation =   551.000(Ft.)
Difference in elevation =    82.000(Ft.)
Slope =    0.08515  s(percent)=       8.52
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.542 min.
Rainfall intensity =      1.921(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.753
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.010
```

```
RI index for soil(AMC 2)  =  78.11
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.156(CFS)
Total initial stream area =        1.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      316.000 to Point/Station      317.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   551.000(Ft.)
Downstream point/station elevation =   537.500(Ft.)
Pipe length  =   238.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.156(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.156(CFS)
Normal flow depth in pipe =    4.75(In.)
Flow top width inside pipe =    8.99(In.)
Critical Depth =    7.93(In.)
Pipe flow velocity =      9.12(Ft/s)
Travel time through pipe =    0.44 min.
Time of concentration (TC) =    13.98 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      317.000 to Point/Station      317.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.98 min.
Rainfall intensity =      1.892(In/Hr) for a    10.0 year storm
Subarea runoff =      1.658(CFS) for      1.010(Ac.)
Total runoff =      3.814(CFS)  Total area =       2.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      317.000 to Point/Station      318.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   537.500(Ft.)
Downstream point/station elevation =   528.000(Ft.)
Pipe length  =    99.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =     3.814(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.814(CFS)
Normal flow depth in pipe =    5.78(In.)
Flow top width inside pipe =    8.63(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.71(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    14.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      318.000 to Point/Station      306.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    528.000(Ft.)
End of natural channel elevation =    520.000(Ft.)
Length of natural channel  =   224.000(Ft.)
Estimated mean flow rate at midpoint of channel =      4.829(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   3.95(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0357
Corrected/adjusted channel slope =  0.0357
Travel time =    0.94 min.     TC =   15.05  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.746
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.826(In/Hr) for a    10.0 year storm
Subarea runoff =      1.812(CFS) for      1.330(Ac.)
Total runoff =      5.626(CFS)  Total area =       3.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      306.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
```

```
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.830(Ac.)
Runoff from this stream =      5.626(CFS)
Time of concentration =   15.05 min.
Rainfall intensity =     1.826(In/Hr)
Summary of stream data:

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


1       23.162     13.03                 1.956
2        5.626     15.05                 1.826
Largest stream flow has longer or shorter time of concentration
Qp =     23.162 + sum of
          Qa          Tb/Ta
           5.626 *    0.866 =      4.872
Qp =     28.035

Total of 2 streams to confluence:
Flow rates before confluence point:
      23.162       5.626
Area of streams before confluence:
       13.480        3.830
Results of confluence:
Total flow rate =     28.035(CFS)
Time of concentration =    13.034 min.
Effective stream area after confluence =     17.310(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      307.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    520.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   263.000(Ft.)
Estimated mean flow rate at midpoint of channel =     28.869(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.98(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1141
Corrected/adjusted channel slope =  0.1098
Travel time =    0.40 min.     TC =   13.43  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.753
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.928(In/Hr) for a    10.0 year storm
Subarea runoff =      1.496(CFS) for      1.030(Ac.)
Total runoff =     29.530(CFS)  Total area =      18.340(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      307.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     18.340(Ac.)
Runoff from this stream =     29.530(CFS)
Time of concentration =   13.43 min.
Rainfall intensity =     1.928(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      319.000 to Point/Station      320.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   450.000(Ft.)
Top (of initial area) elevation =   584.700(Ft.)
Bottom (of initial area) elevation =   575.900(Ft.)
Difference in elevation =     8.800(Ft.)
Slope =    0.01956  s(percent)=       1.96
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.588 min.
Rainfall intensity =      2.536(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 2)  =  57.90
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.397(CFS)
Total initial stream area =        1.080(Ac.)
```

```
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   571.100(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =    13.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.397(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.397(CFS)
Normal flow depth in pipe =    6.30(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    7.96(In.)
Pipe flow velocity =      5.74(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     7.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      321.000 to Point/Station      321.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.874
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.980
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.020
RI index for soil(AMC 2)  =  56.38
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.63 min.
Rainfall intensity =      2.530(In/Hr) for a    10.0 year storm
Subarea runoff =      2.852(CFS) for      1.290(Ac.)
Total runoff =      5.249(CFS)  Total area =       2.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      321.000 to Point/Station      322.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   570.900(Ft.)
Downstream point/station elevation =   569.300(Ft.)
Pipe length  =   313.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.249(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.249(CFS)
Normal flow depth in pipe =   11.09(In.)
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```
Flow top width inside pipe =   17.51(In.)
Critical Depth =   10.59(In.)
Pipe flow velocity =      4.60(Ft/s)
Travel time through pipe =    1.13 min.
Time of concentration (TC) =     8.76 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      322.000 to Point/Station      322.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.760
RI index for soil(AMC 2)  =  70.44
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.76 min.
Rainfall intensity =      2.367(In/Hr) for a    10.0 year storm
Subarea runoff =      5.956(CFS) for      2.850(Ac.)
Total runoff =     11.205(CFS)  Total area =       5.220(Ac.)


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Process from Point/Station      322.000 to Point/Station      323.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   569.300(Ft.)
Downstream point/station elevation =   567.600(Ft.)
Pipe length  =   339.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.205(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.205(CFS)
Normal flow depth in pipe =   17.20(In.)
Flow top width inside pipe =   16.16(In.)
Critical Depth =   14.98(In.)
Pipe flow velocity =      5.32(Ft/s)
Travel time through pipe =    1.06 min.
Time of concentration (TC) =     9.82 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      323.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
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Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     9.82 min.
Rainfall intensity =      2.241(In/Hr) for a    10.0 year storm
Subarea runoff =      1.963(CFS) for      0.990(Ac.)
Total runoff =     13.168(CFS)  Total area =       6.210(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   567.600(Ft.)
Downstream point/station elevation =   565.600(Ft.)
Pipe length  =   299.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.168(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    13.168(CFS)
Normal flow depth in pipe =   17.53(In.)
Flow top width inside pipe =   15.60(In.)
Critical Depth =   16.21(In.)
Pipe flow velocity =      6.14(Ft/s)
Travel time through pipe =    0.81 min.
Time of concentration (TC) =    10.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      324.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.150
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.850
RI index for soil(AMC 2)  =  72.15
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.64 min.
Rainfall intensity =      2.157(In/Hr) for a    10.0 year storm
Subarea runoff =      5.140(CFS) for      2.700(Ac.)
Total runoff =     18.308(CFS)  Total area =       8.910(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      324.000
**** CONFLUENCE OF MINOR STREAMS ****
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Along Main Stream number: 2 in normal stream number 1
Stream flow area =      8.910(Ac.)
Runoff from this stream =     18.308(CFS)
Time of concentration =   10.64 min.
Rainfall intensity =     2.157(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      331.000 to Point/Station      332.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   376.000(Ft.)
Top (of initial area) elevation =   576.600(Ft.)
Bottom (of initial area) elevation =   570.400(Ft.)
Difference in elevation =     6.200(Ft.)
Slope =    0.01649  s(percent)=       1.65
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.307 min.
Rainfall intensity =      2.582(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.960
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.040
RI index for soil(AMC 2)  =  56.76
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.604(CFS)
Total initial stream area =        0.710(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      332.000 to Point/Station      332.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.830
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.170
RI index for soil(AMC 2)  =  59.23
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.31 min.
Rainfall intensity =      2.582(In/Hr) for a    10.0 year storm
Subarea runoff =     14.847(CFS) for      6.560(Ac.)
Total runoff =     16.451(CFS)  Total area =       7.270(Ac.)
```

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Process from Point/Station      332.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   566.000(Ft.)
Downstream point/station elevation =   565.600(Ft.)
Pipe length  =    68.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.451(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    16.451(CFS)
Normal flow depth in pipe =   18.66(In.)
Flow top width inside pipe =   19.97(In.)
Critical Depth =   17.55(In.)
Pipe flow velocity =      6.28(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =     7.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      324.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.270(Ac.)
Runoff from this stream =     16.451(CFS)
Time of concentration =    7.49 min.
Rainfall intensity =     2.552(In/Hr)
Summary of stream data:

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


1       18.308     10.64                2.157
2       16.451      7.49                2.552
Largest stream flow has longer time of concentration
Qp =     18.308 + sum of
          Qb         Ia/Ib
          16.451 *    0.845 =     13.901
Qp =     32.208

Total of 2 streams to confluence:
Flow rates before confluence point:
      18.308      16.451
Area of streams before confluence:
        8.910        7.270
Results of confluence:
Total flow rate =     32.208(CFS)
Time of concentration =    10.635 min.
```

```
Effective stream area after confluence =     16.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      325.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   565.600(Ft.)
Downstream point/station elevation =   564.800(Ft.)
Pipe length  =    34.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    32.208(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    32.208(CFS)
Normal flow depth in pipe =   18.28(In.)
Flow top width inside pipe =   20.45(In.)
Critical Depth =   22.71(In.)
Pipe flow velocity =     12.54(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    10.68 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.68 min.
Rainfall intensity =      2.152(In/Hr) for a    10.0 year storm
Subarea runoff =      3.008(CFS) for      1.580(Ac.)
Total runoff =     35.217(CFS)  Total area =      17.760(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      326.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   564.800(Ft.)
Downstream point/station elevation =   555.300(Ft.)
Pipe length  =   262.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    35.217(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    35.217(CFS)
Normal flow depth in pipe =   16.50(In.)
```

```
Flow top width inside pipe =   22.25(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.29(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =    10.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      326.000 to Point/Station      326.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     17.760(Ac.)
Runoff from this stream =     35.217(CFS)
Time of concentration =   10.97 min.
Rainfall intensity =     2.125(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      333.000 to Point/Station      334.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   440.000(Ft.)
Top (of initial area) elevation =   598.000(Ft.)
Bottom (of initial area) elevation =   561.000(Ft.)
Difference in elevation =    37.000(Ft.)
Slope =    0.08409  s(percent)=       8.41
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.618 min.
Rainfall intensity =      2.930(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.550
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.450
RI index for soil(AMC 2)  =  64.55
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.600(CFS)
Total initial stream area =        1.780(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      334.000 to Point/Station      326.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   556.000(Ft.)
Downstream point/station elevation =   555.300(Ft.)
Pipe length  =    27.00(Ft.)   Manning's N = 0.013
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```
No. of pipes = 1  Required pipe flow  =     4.600(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.600(CFS)
Normal flow depth in pipe =    8.13(In.)
Flow top width inside pipe =   11.22(In.)
Critical Depth =   10.72(In.)
Pipe flow velocity =      8.12(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     5.67 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      326.000 to Point/Station      326.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.780(Ac.)
Runoff from this stream =      4.600(CFS)
Time of concentration =    5.67 min.
Rainfall intensity =     2.916(In/Hr)
Summary of stream data:

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


1       35.217     10.97                2.125
2        4.600      5.67                2.916
Largest stream flow has longer time of concentration
Qp =     35.217 + sum of
          Qb         Ia/Ib
           4.600 *    0.729 =      3.352
Qp =     38.569

Total of 2 streams to confluence:
Flow rates before confluence point:
      35.217       4.600
Area of streams before confluence:
       17.760        1.780
Results of confluence:
Total flow rate =     38.569(CFS)
Time of concentration =    10.966 min.
Effective stream area after confluence =     19.540(Ac.)


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Process from Point/Station      326.000 to Point/Station      327.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   555.300(Ft.)
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Downstream point/station elevation =   539.300(Ft.)
Pipe length  =   427.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    38.569(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    38.569(CFS)
Normal flow depth in pipe =   17.48(In.)
Flow top width inside pipe =   21.35(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.73(Ft/s)
Travel time through pipe =    0.45 min.
Time of concentration (TC) =    11.42 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      327.000 to Point/Station      327.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.540(Ac.)
Runoff from this stream =     38.569(CFS)
Time of concentration =   11.42 min.
Rainfall intensity =     2.084(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      335.000 to Point/Station      336.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =   584.300(Ft.)
Bottom (of initial area) elevation =   575.000(Ft.)
Difference in elevation =     9.300(Ft.)
Slope =    0.00930  s(percent)=       0.93
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.118 min.
Rainfall intensity =      2.026(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.869
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.010
RI index for soil(AMC 2)  =  56.19
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.523(CFS)
Total initial stream area =        2.000(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      336.000 to Point/Station      327.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   570.000(Ft.)
Downstream point/station elevation =   539.300(Ft.)
Pipe length  =   172.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.523(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.523(CFS)
Normal flow depth in pipe =    4.52(In.)
Flow top width inside pipe =    9.00(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.86(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    12.30 min.


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Process from Point/Station      327.000 to Point/Station      327.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.000(Ac.)
Runoff from this stream =      3.523(CFS)
Time of concentration =   12.30 min.
Rainfall intensity =     2.011(In/Hr)
Summary of stream data:

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


1       38.569     11.42                 2.084
2        3.523     12.30                 2.011
Largest stream flow has longer or shorter time of concentration
Qp =     38.569 + sum of
          Qa          Tb/Ta
           3.523 *    0.928 =      3.271
Qp =     41.840

Total of 2 streams to confluence:
Flow rates before confluence point:
      38.569       3.523
Area of streams before confluence:
       19.540        2.000
Results of confluence:
Total flow rate =     41.840(CFS)
Time of concentration =    11.419 min.
Effective stream area after confluence =     21.540(Ac.)
```

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Process from Point/Station      327.000 to Point/Station      328.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   539.300(Ft.)
Downstream point/station elevation =   532.500(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    41.840(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    41.840(CFS)
Normal flow depth in pipe =   14.23(In.)
Flow top width inside pipe =   14.65(In.)
Critical depth could not be calculated.
Pipe flow velocity =     27.92(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    11.44 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      328.000 to Point/Station      328.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.540(Ac.)
Runoff from this stream =     41.840(CFS)
Time of concentration =   11.44 min.
Rainfall intensity =     2.082(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      337.000 to Point/Station      338.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   792.000(Ft.)
Top (of initial area) elevation =   564.700(Ft.)
Bottom (of initial area) elevation =   537.500(Ft.)
Difference in elevation =    27.200(Ft.)
Slope =    0.03434  s(percent)=       3.43
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.500 min.
Rainfall intensity =      2.402(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
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Initial subarea runoff =      6.811(CFS)
Total initial stream area =        3.250(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      338.000 to Point/Station      328.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   532.800(Ft.)
Downstream point/station elevation =   532.500(Ft.)
Pipe length  =    54.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.811(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.811(CFS)
Normal flow depth in pipe =   12.98(In.)
Flow top width inside pipe =   16.14(In.)
Critical Depth =   12.12(In.)
Pipe flow velocity =      4.99(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =     8.68 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      328.000 to Point/Station      328.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.250(Ac.)
Runoff from this stream =      6.811(CFS)
Time of concentration =    8.68 min.
Rainfall intensity =     2.378(In/Hr)
Summary of stream data:

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


1       41.840     11.44                 2.082
2        6.811      8.68                 2.378
Largest stream flow has longer time of concentration
Qp =     41.840 + sum of
          Qb         Ia/Ib
           6.811 *    0.876 =      5.966
Qp =     47.805

Total of 2 streams to confluence:
Flow rates before confluence point:
      41.840       6.811
Area of streams before confluence:
```

```
       21.540        3.250
Results of confluence:
Total flow rate =     47.805(CFS)
Time of concentration =    11.442 min.
Effective stream area after confluence =     24.790(Ac.)


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Process from Point/Station      328.000 to Point/Station      329.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   532.500(Ft.)
Downstream point/station elevation =   525.000(Ft.)
Pipe length  =   127.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    47.805(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    47.805(CFS)
Normal flow depth in pipe =   17.30(In.)
Flow top width inside pipe =   21.54(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.71(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    11.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      329.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    525.000(Ft.)
End of natural channel elevation =    511.000(Ft.)
Length of natural channel  =   158.000(Ft.)
Estimated mean flow rate at midpoint of channel =     48.471(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.42(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0886
Corrected/adjusted channel slope =  0.0886
Travel time =    0.23 min.     TC =   11.78  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.761
Decimal fraction soil group A = 0.000
```

```
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.053(In/Hr) for a    10.0 year storm
Subarea runoff =      1.078(CFS) for      0.690(Ac.)
Total runoff =     48.883(CFS)  Total area =      25.480(Ac.)


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Process from Point/Station      330.000 to Point/Station      330.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     25.480(Ac.)
Runoff from this stream =     48.883(CFS)
Time of concentration =   11.78 min.
Rainfall intensity =     2.053(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      339.000 to Point/Station      340.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   928.000(Ft.)
Top (of initial area) elevation =   562.000(Ft.)
Bottom (of initial area) elevation =   525.000(Ft.)
Difference in elevation =    37.000(Ft.)
Slope =    0.03987  s(percent)=       3.99
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.790 min.
Rainfall intensity =      2.363(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.872
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.917(CFS)
Total initial stream area =        1.900(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      340.000 to Point/Station      340.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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COMMERCIAL subarea type
Runoff Coefficient = 0.872
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.79 min.
Rainfall intensity =      2.363(In/Hr) for a    10.0 year storm
Subarea runoff =      0.330(CFS) for      0.160(Ac.)
Total runoff =      4.247(CFS)  Total area =       2.060(Ac.)


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Process from Point/Station      340.000 to Point/Station      341.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   522.500(Ft.)
Downstream point/station elevation =   522.000(Ft.)
Pipe length  =    99.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.247(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.247(CFS)
Normal flow depth in pipe =   11.39(In.)
Flow top width inside pipe =   12.82(In.)
Critical Depth =   10.02(In.)
Pipe flow velocity =      4.25(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =     9.18 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      341.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    522.000(Ft.)
End of natural channel elevation =    511.000(Ft.)
Length of natural channel  =   143.000(Ft.)
Estimated mean flow rate at midpoint of channel =      4.546(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.72(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0769
Corrected/adjusted channel slope =  0.0769
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Travel time =    0.42 min.     TC =    9.60  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.772
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.266(In/Hr) for a    10.0 year storm
Subarea runoff =      0.507(CFS) for      0.290(Ac.)
Total runoff =      4.754(CFS)  Total area =       2.350(Ac.)


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Process from Point/Station      330.000 to Point/Station      330.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.350(Ac.)
Runoff from this stream =      4.754(CFS)
Time of concentration =    9.60 min.
Rainfall intensity =     2.266(In/Hr)
Summary of stream data:

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


1       48.883     11.78                 2.053
2        4.754      9.60                 2.266
Largest stream flow has longer time of concentration
Qp =     48.883 + sum of
          Qb         Ia/Ib
           4.754 *    0.906 =      4.308
Qp =     53.192

Total of 2 streams to confluence:
Flow rates before confluence point:
      48.883       4.754
Area of streams before confluence:
       25.480        2.350
Results of confluence:
Total flow rate =     53.192(CFS)
Time of concentration =    11.780 min.
Effective stream area after confluence =     27.830(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      330.000 to Point/Station      307.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    511.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   219.000(Ft.)
Estimated mean flow rate at midpoint of channel =     54.377(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.28(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0959
Corrected/adjusted channel slope =  0.0959
Travel time =    0.30 min.     TC =   12.08  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.759
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.029(In/Hr) for a    10.0 year storm
Subarea runoff =      1.910(CFS) for      1.240(Ac.)
Total runoff =     55.102(CFS)  Total area =      29.070(Ac.)


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Process from Point/Station      307.000 to Point/Station      307.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     29.070(Ac.)
Runoff from this stream =     55.102(CFS)
Time of concentration =   12.08 min.
Rainfall intensity =     2.029(In/Hr)
Summary of stream data:

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

```
1       29.530     13.43                 1.928
2       55.102     12.08                 2.029
Largest stream flow has longer or shorter time of concentration
Qp =     55.102 + sum of
          Qa          Tb/Ta
          29.530 *    0.899 =     26.551
Qp =     81.653

Total of 2 main streams to confluence:
Flow rates before confluence point:
      29.530      55.102
Area of streams before confluence:
       18.340       29.070


Results of confluence:
Total flow rate =     81.653(CFS)
Time of concentration =    12.078 min.
Effective stream area after confluence  =     47.410(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      308.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    490.000(Ft.)
End of natural channel elevation =    486.000(Ft.)
Length of natural channel  =   134.000(Ft.)
Estimated mean flow rate at midpoint of channel =     82.505(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.74(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0299
Corrected/adjusted channel slope =  0.0299
Travel time =    0.29 min.     TC =   12.37  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.758
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
```

Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 78.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.006(In/Hr) for a 10.0 year storm
Subarea runoff = 1.505(CFS) for 0.990(Ac.)
Total runoff = 83.158(CFS) Total area = 48.400(Ac.)
End of computations, total study area = 48.40 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.451
Area averaged RI index number = 68.6

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/22/22 File:1886PB100.out

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
SUBAREA "B", "C" AND "D" PROPOSED CONDITION 100-YEAR STORM EVENT
BY KWC ENGINEERS

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

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

Program License Serial Number 6062

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

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Corona] area used.
10 year storm 10 minute intensity = 2.220(In/Hr)
10 year storm 60 minute intensity = 0.940(In/Hr)
100 year storm 10 minute intensity = 3.430(In/Hr)
100 year storm 60 minute intensity = 1.450(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.450(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 361.000(Ft.)
Top (of initial area) elevation = 962.000(Ft.)
Bottom (of initial area) elevation = 800.000(Ft.)

```
Difference in elevation =   162.000(Ft.)
Slope =    0.44875  s(percent)=      44.88
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.560 min.
Rainfall intensity =      4.195(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.590
RI index for soil(AMC 3)  =  95.11
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.046(CFS)
Total initial stream area =        0.820(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      301.000 to Point/Station      302.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    800.000(Ft.)
End of natural channel elevation =    631.000(Ft.)
Length of natural channel  =   733.000(Ft.)
Estimated mean flow rate at midpoint of channel =      9.994(CFS)

Natural mountain channel type used
L.A. County flood control district formula for channel velocity:
 Velocity = 5.48(q^.33)(slope^.492)
Velocity using mean channel flow =   4.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.2306
Corrected/adjusted channel slope =  0.1722
Travel time =    2.48 min.     TC =    9.04  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.869
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.790
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.210
RI index for soil(AMC 3)  =  91.19
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.597(In/Hr) for a   100.0 year storm
Subarea runoff =     11.690(CFS) for      3.740(Ac.)
```

```
Total runoff =     14.736(CFS)  Total area =       4.560(Ac.)


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Process from Point/Station      302.000 to Point/Station      303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =   631.000(Ft.)
Downstream point elevation =   577.000(Ft.)
Channel length thru subarea  =   616.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =     19.742(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.500(Ft.)
Flow(q) thru subarea =     19.742(CFS)
Depth of flow =   0.302(Ft.), Average velocity =  12.348(Ft/s)
Channel flow top width =    5.603(Ft.)
Flow Velocity =   12.35(Ft/s)
Travel time  =    0.83 min.
Time of concentration =    9.87 min.

Sub-Channel No. 1 Critical depth =      0.750(Ft.)
  '     '       '     Critical flow top width =      6.500(Ft.)
  '     '       '     Critical flow velocity=    4.578(Ft/s)
  '     '       '     Critical flow area =      4.313(Sq.Ft)

 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  90.46
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.448(In/Hr) for a   100.0 year storm
Subarea runoff =      9.960(CFS) for      3.340(Ac.)
Total runoff =     24.696(CFS)  Total area =       7.900(Ac.)
Depth of flow =   0.345(Ft.), Average velocity =  13.393(Ft/s)

Sub-Channel No. 1 Critical depth =      0.859(Ft.)
  '     '       '     Critical flow top width =      6.719(Ft.)
  '     '       '     Critical flow velocity=    4.905(Ft/s)
  '     '       '     Critical flow area =      5.035(Sq.Ft)



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Process from Point/Station      303.000 to Point/Station      304.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =    577.000(Ft.)
End of natural channel elevation =    543.500(Ft.)
Length of natural channel  =   688.000(Ft.)
Estimated mean flow rate at midpoint of channel =     29.213(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.33(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0487
Corrected/adjusted channel slope =  0.0487
Travel time =    1.56 min.     TC =   11.43  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.213(In/Hr) for a   100.0 year storm
Subarea runoff =      7.982(CFS) for      2.890(Ac.)
Total runoff =     32.678(CFS)  Total area =      10.790(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     10.790(Ac.)
Runoff from this stream =     32.678(CFS)
Time of concentration =   11.43 min.
Rainfall intensity =     3.213(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      309.000 to Point/Station      310.000
**** INITIAL AREA EVALUATION ****
```

```
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =   622.500(Ft.)
Bottom (of initial area) elevation =   554.100(Ft.)
Difference in elevation =    68.400(Ft.)
Slope =    0.06840  s(percent)=       6.84
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.130 min.
Rainfall intensity =      3.785(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.950
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.050
RI index for soil(AMC 3)  =  75.56
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.416(CFS)
Total initial stream area =        1.310(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      310.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   549.100(Ft.)
Downstream point/station elevation =   548.000(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.416(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.416(CFS)
Normal flow depth in pipe =    7.10(In.)
Flow top width inside pipe =   11.80(In.)
Critical Depth =   10.57(In.)
Pipe flow velocity =      9.12(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     8.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      314.000 to Point/Station      314.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      1.310(Ac.)
Runoff from this stream =      4.416(CFS)
Time of concentration =    8.19 min.
Rainfall intensity =     3.772(In/Hr)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      312.000 to Point/Station      313.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   334.000(Ft.)
Top (of initial area) elevation =   562.000(Ft.)
Bottom (of initial area) elevation =   550.800(Ft.)
Difference in elevation =    11.200(Ft.)
Slope =    0.03353  s(percent)=       3.35
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.047 min.
Rainfall intensity =      4.363(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.400(CFS)
Total initial stream area =        0.360(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      313.000 to Point/Station      314.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =   548.400(Ft.)
Downstream point/station elevation =   548.000(Ft.)
Pipe length  =    56.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.400(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.400(CFS)
Normal flow depth in pipe =    5.75(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    6.01(In.)
Pipe flow velocity =      3.77(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =     6.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      314.000 to Point/Station      314.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.360(Ac.)
```

```
Runoff from this stream =      1.400(CFS)
Time of concentration =    6.29 min.
Rainfall intensity =     4.279(In/Hr)
Summary of stream data:

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


1        4.416      8.19                 3.772
2        1.400      6.29                 4.279
Largest stream flow has longer time of concentration
Qp =      4.416 + sum of
          Qb         Ia/Ib
           1.400 *    0.881 =      1.234
Qp =      5.651

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.416       1.400
Area of streams before confluence:
        1.310        0.360
Results of confluence:
Total flow rate =      5.651(CFS)
Time of concentration =     8.187 min.
Effective stream area after confluence =      1.670(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      314.000 to Point/Station      311.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   548.000(Ft.)
Downstream point/station elevation =   546.700(Ft.)
Pipe length  =    17.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.651(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.651(CFS)
Normal flow depth in pipe =    6.52(In.)
Flow top width inside pipe =   11.96(In.)
Critical Depth =   11.33(In.)
Pipe flow velocity =     12.97(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.21 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      304.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
```

```
Top of natural channel elevation =    546.700(Ft.)
End of natural channel elevation =    543.500(Ft.)
Length of natural channel  =    89.000(Ft.)
Estimated mean flow rate at midpoint of channel =      5.786(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.14(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0360
Corrected/adjusted channel slope =  0.0360
Travel time =    0.36 min.     TC =    8.57  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.691(In/Hr) for a   100.0 year storm
Subarea runoff =      0.255(CFS) for      0.080(Ac.)
Total runoff =      5.906(CFS)  Total area =       1.750(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      304.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.750(Ac.)
Runoff from this stream =      5.906(CFS)
Time of concentration =    8.57 min.
Rainfall intensity =     3.691(In/Hr)
Summary of stream data:

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


1       32.678     11.43                3.213
2        5.906      8.57                3.691
Largest stream flow has longer time of concentration
```

```
Qp =     32.678 + sum of
          Qb         Ia/Ib
           5.906 *    0.871 =      5.142
Qp =     37.820

Total of 2 main streams to confluence:
Flow rates before confluence point:
      32.678       5.906
Area of streams before confluence:
       10.790        1.750


Results of confluence:
Total flow rate =     37.820(CFS)
Time of concentration =    11.432 min.
Effective stream area after confluence  =     12.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   543.500(Ft.)
Downstream point/station elevation =   532.000(Ft.)
Pipe length  =   158.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    37.820(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    37.820(CFS)
Normal flow depth in pipe =   15.35(In.)
Flow top width inside pipe =   18.62(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.07(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    11.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      306.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    532.000(Ft.)
End of natural channel elevation =    520.000(Ft.)
Length of natural channel  =   242.000(Ft.)
Estimated mean flow rate at midpoint of channel =     39.238(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.04(Ft/s)
```

```
Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0496
Corrected/adjusted channel slope =  0.0496
Travel time =    0.50 min.     TC =   12.07  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.131(In/Hr) for a   100.0 year storm
Subarea runoff =      2.527(CFS) for      0.940(Ac.)
Total runoff =     40.347(CFS)  Total area =      13.480(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      306.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     13.480(Ac.)
Runoff from this stream =     40.347(CFS)
Time of concentration =   12.07 min.
Rainfall intensity =     3.131(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      315.000 to Point/Station      316.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   963.000(Ft.)
Top (of initial area) elevation =   633.000(Ft.)
Bottom (of initial area) elevation =   551.000(Ft.)
Difference in elevation =    82.000(Ft.)
Slope =    0.08515  s(percent)=       8.52
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.542 min.
Rainfall intensity =      2.963(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.010
```

```
RI index for soil(AMC 3)  =  89.87
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.781(CFS)
Total initial stream area =        1.490(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      316.000 to Point/Station      317.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   551.000(Ft.)
Downstream point/station elevation =   537.500(Ft.)
Pipe length  =   238.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.781(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.781(CFS)
Normal flow depth in pipe =    7.07(In.)
Flow top width inside pipe =    7.39(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.16(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =    13.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      317.000 to Point/Station      317.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.93 min.
Rainfall intensity =      2.922(In/Hr) for a   100.0 year storm
Subarea runoff =      2.621(CFS) for      1.010(Ac.)
Total runoff =      6.402(CFS)  Total area =       2.500(Ac.)


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Process from Point/Station      317.000 to Point/Station      318.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   537.500(Ft.)
Downstream point/station elevation =   528.000(Ft.)
Pipe length  =    99.00(Ft.)   Manning's N = 0.013
```

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No. of pipes = 1  Required pipe flow  =     6.402(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.402(CFS)
Normal flow depth in pipe =    6.56(In.)
Flow top width inside pipe =   11.95(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.57(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    14.05 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      318.000 to Point/Station      306.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    528.000(Ft.)
End of natural channel elevation =    520.000(Ft.)
Length of natural channel  =   224.000(Ft.)
Estimated mean flow rate at midpoint of channel =      8.105(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   4.48(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0357
Corrected/adjusted channel slope =  0.0357
Travel time =    0.83 min.     TC =   14.88  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.832(In/Hr) for a   100.0 year storm
Subarea runoff =      3.217(CFS) for      1.330(Ac.)
Total runoff =      9.619(CFS)  Total area =       3.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      306.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
```

```
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.830(Ac.)
Runoff from this stream =      9.619(CFS)
Time of concentration =   14.88 min.
Rainfall intensity =     2.832(In/Hr)
Summary of stream data:

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


1       40.347     12.07                 3.131
2        9.619     14.88                 2.832
Largest stream flow has longer or shorter time of concentration
Qp =     40.347 + sum of
          Qa          Tb/Ta
           9.619 *    0.811 =      7.800
Qp =     48.148

Total of 2 streams to confluence:
Flow rates before confluence point:
      40.347       9.619
Area of streams before confluence:
       13.480        3.830
Results of confluence:
Total flow rate =     48.148(CFS)
Time of concentration =    12.065 min.
Effective stream area after confluence =     17.310(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      306.000 to Point/Station      307.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    520.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   263.000(Ft.)
Estimated mean flow rate at midpoint of channel =     49.580(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.80(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.1141
Corrected/adjusted channel slope =  0.1098
Travel time =    0.34 min.     TC =   12.41  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.090(In/Hr) for a   100.0 year storm
Subarea runoff =      2.730(CFS) for      1.030(Ac.)
Total runoff =     50.878(CFS)  Total area =      18.340(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      307.000 to Point/Station      307.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     18.340(Ac.)
Runoff from this stream =     50.878(CFS)
Time of concentration =   12.41 min.
Rainfall intensity =     3.090(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      319.000 to Point/Station      320.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   450.000(Ft.)
Top (of initial area) elevation =   584.700(Ft.)
Bottom (of initial area) elevation =   575.900(Ft.)
Difference in elevation =     8.800(Ft.)
Slope =    0.01956  s(percent)=       1.96
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.588 min.
Rainfall intensity =      3.912(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  76.32
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.766(CFS)
Total initial stream area =        1.080(Ac.)
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Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      320.000 to Point/Station      321.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   571.100(Ft.)
Downstream point/station elevation =   570.900(Ft.)
Pipe length  =    13.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.766(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.766(CFS)
Normal flow depth in pipe =    8.52(In.)
Flow top width inside pipe =   10.89(In.)
Critical Depth =    9.91(In.)
Pipe flow velocity =      6.32(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     7.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      321.000 to Point/Station      321.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.980
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.020
RI index for soil(AMC 3)  =  75.10
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.62 min.
Rainfall intensity =      3.904(In/Hr) for a   100.0 year storm
Subarea runoff =      4.486(CFS) for      1.290(Ac.)
Total runoff =      8.252(CFS)  Total area =       2.370(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      321.000 to Point/Station      322.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   570.900(Ft.)
Downstream point/station elevation =   569.300(Ft.)
Pipe length  =   313.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.252(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.252(CFS)
Normal flow depth in pipe =   13.30(In.)
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```
Flow top width inside pipe =   20.24(In.)
Critical Depth =   12.78(In.)
Pipe flow velocity =      5.14(Ft/s)
Travel time through pipe =    1.02 min.
Time of concentration (TC) =     8.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      322.000 to Point/Station      322.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.240
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.760
RI index for soil(AMC 3)  =  85.26
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.64 min.
Rainfall intensity =      3.676(In/Hr) for a   100.0 year storm
Subarea runoff =      9.374(CFS) for      2.850(Ac.)
Total runoff =     17.626(CFS)  Total area =       5.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      322.000 to Point/Station      323.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   569.300(Ft.)
Downstream point/station elevation =   567.600(Ft.)
Pipe length  =   339.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.626(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    17.626(CFS)
Normal flow depth in pipe =   18.33(In.)
Flow top width inside pipe =   25.21(In.)
Critical Depth =   17.61(In.)
Pipe flow velocity =      6.13(Ft/s)
Travel time through pipe =    0.92 min.
Time of concentration (TC) =     9.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      323.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
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Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     9.56 min.
Rainfall intensity =      3.502(In/Hr) for a   100.0 year storm
Subarea runoff =      3.105(CFS) for      0.990(Ac.)
Total runoff =     20.731(CFS)  Total area =       6.210(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      323.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   567.600(Ft.)
Downstream point/station elevation =   565.600(Ft.)
Pipe length  =   299.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.731(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    20.731(CFS)
Normal flow depth in pipe =   18.59(In.)
Flow top width inside pipe =   25.01(In.)
Critical Depth =   19.13(In.)
Pipe flow velocity =      7.11(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =    10.26 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      324.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.150
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.850
RI index for soil(AMC 3)  =  86.29
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.26 min.
Rainfall intensity =      3.385(In/Hr) for a   100.0 year storm
Subarea runoff =      8.176(CFS) for      2.700(Ac.)
Total runoff =     28.907(CFS)  Total area =       8.910(Ac.)


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Process from Point/Station      324.000 to Point/Station      324.000
**** CONFLUENCE OF MINOR STREAMS ****
```

```
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      8.910(Ac.)
Runoff from this stream =     28.907(CFS)
Time of concentration =   10.26 min.
Rainfall intensity =     3.385(In/Hr)


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Process from Point/Station      331.000 to Point/Station      332.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   376.000(Ft.)
Top (of initial area) elevation =   576.600(Ft.)
Bottom (of initial area) elevation =   570.400(Ft.)
Difference in elevation =     6.200(Ft.)
Slope =    0.01649  s(percent)=       1.65
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.307 min.
Rainfall intensity =      3.984(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.960
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.040
RI index for soil(AMC 3)  =  75.41
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.520(CFS)
Total initial stream area =        0.710(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      332.000 to Point/Station      332.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.830
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.170
RI index for soil(AMC 3)  =  77.38
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     7.31 min.
Rainfall intensity =      3.984(In/Hr) for a   100.0 year storm
Subarea runoff =     23.310(CFS) for      6.560(Ac.)
Total runoff =     25.830(CFS)  Total area =       7.270(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      332.000 to Point/Station      324.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   566.000(Ft.)
Downstream point/station elevation =   565.600(Ft.)
Pipe length  =    68.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.830(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    25.830(CFS)
Normal flow depth in pipe =   20.70(In.)
Flow top width inside pipe =   27.75(In.)
Critical Depth =   20.79(In.)
Pipe flow velocity =      7.15(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     7.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      324.000 to Point/Station      324.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      7.270(Ac.)
Runoff from this stream =     25.830(CFS)
Time of concentration =    7.47 min.
Rainfall intensity =     3.943(In/Hr)
Summary of stream data:

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


1       28.907     10.26                3.385
2       25.830      7.47                3.943
Largest stream flow has longer time of concentration
Qp =     28.907 + sum of
          Qb         Ia/Ib
          25.830 *    0.858 =     22.174
Qp =     51.081

Total of 2 streams to confluence:
Flow rates before confluence point:
      28.907      25.830
Area of streams before confluence:
        8.910        7.270
Results of confluence:
Total flow rate =     51.081(CFS)
Time of concentration =    10.260 min.
```

```
Effective stream area after confluence =     16.180(Ac.)


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Process from Point/Station      324.000 to Point/Station      325.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   565.600(Ft.)
Downstream point/station elevation =   564.800(Ft.)
Pipe length  =    34.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    51.081(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    51.081(CFS)
Normal flow depth in pipe =   20.53(In.)
Flow top width inside pipe =   27.89(In.)
Critical Depth =   27.76(In.)
Pipe flow velocity =     14.28(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    10.30 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      325.000 to Point/Station      325.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.30 min.
Rainfall intensity =      3.378(In/Hr) for a   100.0 year storm
Subarea runoff =      4.780(CFS) for      1.580(Ac.)
Total runoff =     55.861(CFS)  Total area =      17.760(Ac.)


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Process from Point/Station      325.000 to Point/Station      326.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   564.800(Ft.)
Downstream point/station elevation =   555.300(Ft.)
Pipe length  =   262.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    55.861(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    55.861(CFS)
Normal flow depth in pipe =   20.95(In.)
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```
Flow top width inside pipe =   22.51(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.87(Ft/s)
Travel time through pipe =    0.26 min.
Time of concentration (TC) =    10.56 min.


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Process from Point/Station      326.000 to Point/Station      326.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     17.760(Ac.)
Runoff from this stream =     55.861(CFS)
Time of concentration =   10.56 min.
Rainfall intensity =     3.338(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      333.000 to Point/Station      334.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   440.000(Ft.)
Top (of initial area) elevation =   598.000(Ft.)
Bottom (of initial area) elevation =   561.000(Ft.)
Difference in elevation =    37.000(Ft.)
Slope =    0.08409  s(percent)=       8.41
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.618 min.
Rainfall intensity =      4.520(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.894
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.550
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.450
RI index for soil(AMC 3)  =  81.64
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.195(CFS)
Total initial stream area =        1.780(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      334.000 to Point/Station      326.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   556.000(Ft.)
Downstream point/station elevation =   555.300(Ft.)
Pipe length  =    27.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =     7.195(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.195(CFS)
Normal flow depth in pipe =    9.18(In.)
Flow top width inside pipe =   14.62(In.)
Critical Depth =   12.86(In.)
Pipe flow velocity =      9.15(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     5.67 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      326.000 to Point/Station      326.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.780(Ac.)
Runoff from this stream =      7.195(CFS)
Time of concentration =    5.67 min.
Rainfall intensity =     4.501(In/Hr)
Summary of stream data:

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


1       55.861     10.56                 3.338
2        7.195      5.67                 4.501
Largest stream flow has longer time of concentration
Qp =     55.861 + sum of
          Qb         Ia/Ib
           7.195 *    0.742 =      5.337
Qp =     61.198

Total of 2 streams to confluence:
Flow rates before confluence point:
      55.861       7.195
Area of streams before confluence:
       17.760        1.780
Results of confluence:
Total flow rate =     61.198(CFS)
Time of concentration =    10.559 min.
Effective stream area after confluence =     19.540(Ac.)


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Process from Point/Station      326.000 to Point/Station      327.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   555.300(Ft.)
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Downstream point/station elevation =   539.300(Ft.)
Pipe length  =   427.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    61.198(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    61.198(CFS)
Normal flow depth in pipe =   22.69(In.)
Flow top width inside pipe =   19.78(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.17(Ft/s)
Travel time through pipe =    0.41 min.
Time of concentration (TC) =    10.97 min.


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Process from Point/Station      327.000 to Point/Station      327.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     19.540(Ac.)
Runoff from this stream =     61.198(CFS)
Time of concentration =   10.97 min.
Rainfall intensity =     3.277(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      335.000 to Point/Station      336.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1000.000(Ft.)
Top (of initial area) elevation =   584.300(Ft.)
Bottom (of initial area) elevation =   575.000(Ft.)
Difference in elevation =     9.300(Ft.)
Slope =    0.00930  s(percent)=       0.93
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.118 min.
Rainfall intensity =      3.125(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.010
RI index for soil(AMC 3)  =  74.95
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      5.555(CFS)
Total initial stream area =        2.000(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      336.000 to Point/Station      327.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   570.000(Ft.)
Downstream point/station elevation =   539.300(Ft.)
Pipe length  =   172.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.555(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     5.555(CFS)
Normal flow depth in pipe =    6.06(In.)
Flow top width inside pipe =    8.44(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.55(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    12.28 min.


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Process from Point/Station      327.000 to Point/Station      327.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.000(Ac.)
Runoff from this stream =      5.555(CFS)
Time of concentration =   12.28 min.
Rainfall intensity =     3.105(In/Hr)
Summary of stream data:

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


1       61.198     10.97                 3.277
2        5.555     12.28                 3.105
Largest stream flow has longer or shorter time of concentration
Qp =     61.198 + sum of
          Qa          Tb/Ta
           5.555 *    0.894 =      4.963
Qp =     66.161

Total of 2 streams to confluence:
Flow rates before confluence point:
      61.198       5.555
Area of streams before confluence:
       19.540        2.000
Results of confluence:
Total flow rate =     66.161(CFS)
Time of concentration =    10.973 min.
Effective stream area after confluence =     21.540(Ac.)
```

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Process from Point/Station      327.000 to Point/Station      328.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   539.300(Ft.)
Downstream point/station elevation =   532.500(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    66.161(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    66.161(CFS)
Normal flow depth in pipe =   17.48(In.)
Flow top width inside pipe =   15.68(In.)
Critical depth could not be calculated.
Pipe flow velocity =     30.95(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    10.99 min.


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Process from Point/Station      328.000 to Point/Station      328.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.540(Ac.)
Runoff from this stream =     66.161(CFS)
Time of concentration =   10.99 min.
Rainfall intensity =     3.274(In/Hr)


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Process from Point/Station      337.000 to Point/Station      338.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   792.000(Ft.)
Top (of initial area) elevation =   564.700(Ft.)
Bottom (of initial area) elevation =   537.500(Ft.)
Difference in elevation =    27.200(Ft.)
Slope =    0.03434  s(percent)=       3.43
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.500 min.
Rainfall intensity =      3.705(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
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Initial subarea runoff =     10.719(CFS)
Total initial stream area =        3.250(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      338.000 to Point/Station      328.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   532.800(Ft.)
Downstream point/station elevation =   532.500(Ft.)
Pipe length  =    54.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.719(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    10.719(CFS)
Normal flow depth in pipe =   15.68(In.)
Flow top width inside pipe =   18.27(In.)
Critical Depth =   14.65(In.)
Pipe flow velocity =      5.56(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     8.66 min.


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Process from Point/Station      328.000 to Point/Station      328.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.250(Ac.)
Runoff from this stream =     10.719(CFS)
Time of concentration =    8.66 min.
Rainfall intensity =     3.671(In/Hr)
Summary of stream data:

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


1       66.161     10.99                 3.274
2       10.719      8.66                 3.671
Largest stream flow has longer time of concentration
Qp =     66.161 + sum of
          Qb         Ia/Ib
          10.719 *    0.892 =      9.560
Qp =     75.721

Total of 2 streams to confluence:
Flow rates before confluence point:
      66.161      10.719
Area of streams before confluence:
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       21.540        3.250
Results of confluence:
Total flow rate =     75.721(CFS)
Time of concentration =    10.995 min.
Effective stream area after confluence =     24.790(Ac.)


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Process from Point/Station      328.000 to Point/Station      329.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   532.500(Ft.)
Downstream point/station elevation =   525.000(Ft.)
Pipe length  =   127.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    75.721(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    75.721(CFS)
Normal flow depth in pipe =   22.27(In.)
Flow top width inside pipe =   20.53(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.57(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    11.09 min.


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Process from Point/Station      329.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    525.000(Ft.)
End of natural channel elevation =    511.000(Ft.)
Length of natural channel  =   158.000(Ft.)
Estimated mean flow rate at midpoint of channel =     76.775(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  13.06(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0886
Corrected/adjusted channel slope =  0.0886
Travel time =    0.20 min.     TC =   11.29  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.000
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Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.232(In/Hr) for a   100.0 year storm
Subarea runoff =      1.917(CFS) for      0.690(Ac.)
Total runoff =     77.638(CFS)  Total area =      25.480(Ac.)


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Process from Point/Station      330.000 to Point/Station      330.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     25.480(Ac.)
Runoff from this stream =     77.638(CFS)
Time of concentration =   11.29 min.
Rainfall intensity =     3.232(In/Hr)


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Process from Point/Station      339.000 to Point/Station      340.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   928.000(Ft.)
Top (of initial area) elevation =   562.000(Ft.)
Bottom (of initial area) elevation =   525.000(Ft.)
Difference in elevation =    37.000(Ft.)
Slope =    0.03987  s(percent)=       3.99
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.790 min.
Rainfall intensity =      3.645(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      6.165(CFS)
Total initial stream area =        1.900(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      340.000 to Point/Station      340.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
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COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.79 min.
Rainfall intensity =      3.645(In/Hr) for a   100.0 year storm
Subarea runoff =      0.519(CFS) for      0.160(Ac.)
Total runoff =      6.685(CFS)  Total area =       2.060(Ac.)


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Process from Point/Station      340.000 to Point/Station      341.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   522.500(Ft.)
Downstream point/station elevation =   522.000(Ft.)
Pipe length  =    99.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.685(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.685(CFS)
Normal flow depth in pipe =   13.29(In.)
Flow top width inside pipe =   15.82(In.)
Critical Depth =   12.00(In.)
Pipe flow velocity =      4.78(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =     9.14 min.


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Process from Point/Station      341.000 to Point/Station      330.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    522.000(Ft.)
End of natural channel elevation =    511.000(Ft.)
Length of natural channel  =   143.000(Ft.)
Estimated mean flow rate at midpoint of channel =      7.155(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.38(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0769
Corrected/adjusted channel slope =  0.0769
```

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Travel time =    0.37 min.     TC =    9.51  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.510(In/Hr) for a   100.0 year storm
Subarea runoff =      0.878(CFS) for      0.290(Ac.)
Total runoff =      7.563(CFS)  Total area =       2.350(Ac.)


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Process from Point/Station      330.000 to Point/Station      330.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      2.350(Ac.)
Runoff from this stream =      7.563(CFS)
Time of concentration =    9.51 min.
Rainfall intensity =     3.510(In/Hr)
Summary of stream data:

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


1       77.638     11.29                3.232
2        7.563      9.51                3.510
Largest stream flow has longer time of concentration
Qp =     77.638 + sum of
          Qb         Ia/Ib
           7.563 *    0.921 =      6.964
Qp =     84.602

Total of 2 streams to confluence:
Flow rates before confluence point:
      77.638       7.563
Area of streams before confluence:
       25.480        2.350
Results of confluence:
Total flow rate =     84.602(CFS)
Time of concentration =    11.295 min.
Effective stream area after confluence =     27.830(Ac.)
```

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Process from Point/Station      330.000 to Point/Station      307.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =    511.000(Ft.)
End of natural channel elevation =    490.000(Ft.)
Length of natural channel  =   219.000(Ft.)
Estimated mean flow rate at midpoint of channel =     86.487(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  14.07(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0959
Corrected/adjusted channel slope =  0.0959
Travel time =    0.26 min.     TC =   11.55  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.197(In/Hr) for a   100.0 year storm
Subarea runoff =      3.407(CFS) for      1.240(Ac.)
Total runoff =     88.009(CFS)  Total area =      29.070(Ac.)


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Process from Point/Station      307.000 to Point/Station      307.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     29.070(Ac.)
Runoff from this stream =     88.009(CFS)
Time of concentration =   11.55 min.
Rainfall intensity =     3.197(In/Hr)
Summary of stream data:

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

```
1       50.878     12.41                 3.090
2       88.009     11.55                 3.197
Largest stream flow has longer or shorter time of concentration
Qp =     88.009 + sum of
          Qa          Tb/Ta
          50.878 *    0.931 =     47.377
Qp =    135.386

Total of 2 main streams to confluence:
Flow rates before confluence point:
      50.878      88.009
Area of streams before confluence:
       18.340       29.070


Results of confluence:
Total flow rate =    135.386(CFS)
Time of concentration =    11.554 min.
Effective stream area after confluence  =     47.410(Ac.)


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Process from Point/Station      307.000 to Point/Station      308.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =    490.000(Ft.)
End of natural channel elevation =    486.000(Ft.)
Length of natural channel  =   134.000(Ft.)
Estimated mean flow rate at midpoint of channel =    136.799(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.02(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0299
Corrected/adjusted channel slope =  0.0299
Travel time =    0.25 min.     TC =   11.80  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
```

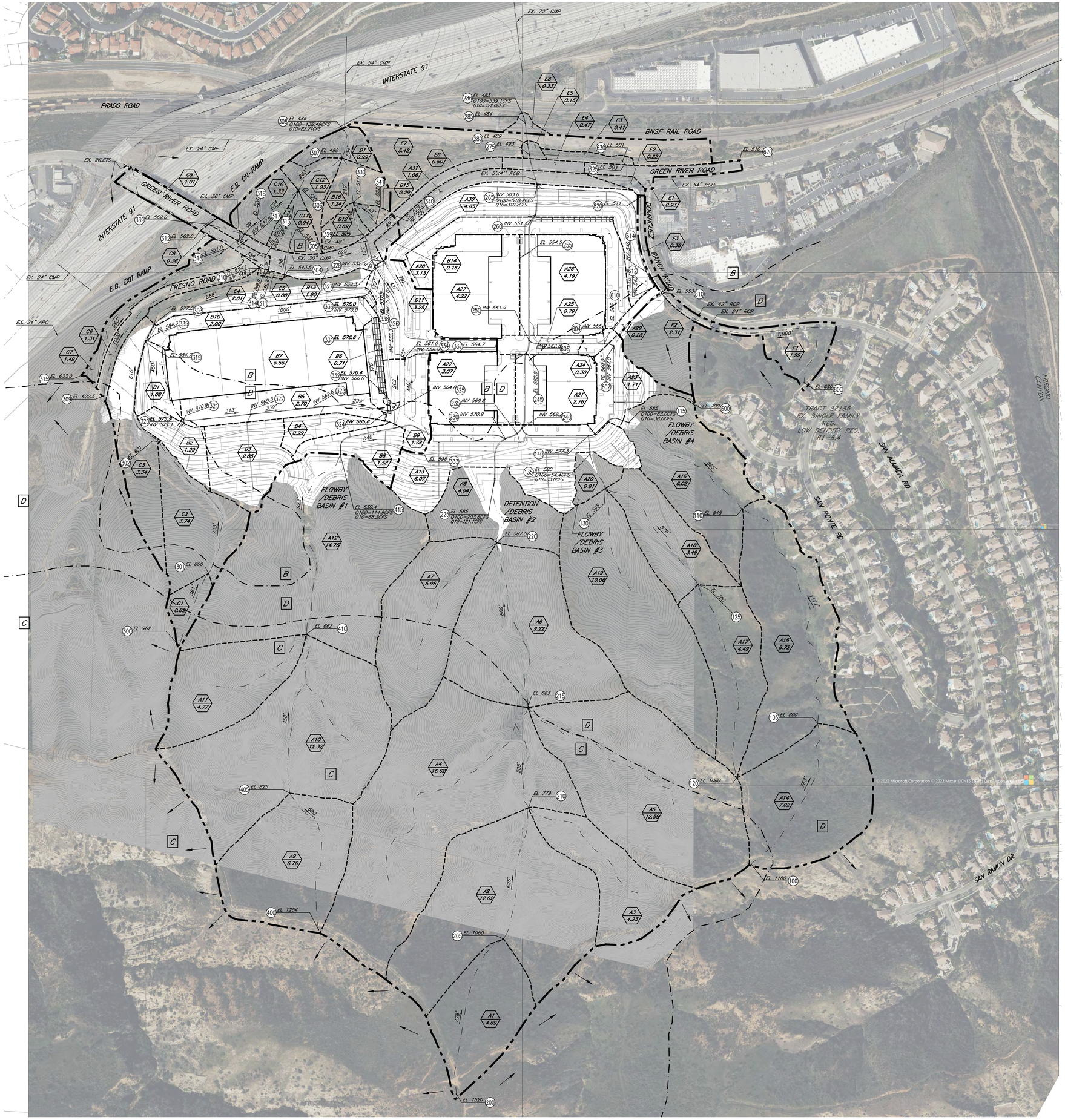
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 89.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.165(In/Hr) for a 100.0 year storm
Subarea runoff = 2.691(CFS) for 0.990(Ac.)
Total runoff = 138.077(CFS) Total area = 48.400(Ac.)
End of computations, total study area = 48.40 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.451
Area averaged RI index number = 68.6

Appendix

F

PROPOSED CONDITION HYDROLOGIC KEY MAP



PROP. SUBAREA "A" RUNOFFS TO SD INLET						
NODE	TC (MIN)	100-YR STORM RUNOFF	TC (MIN)	10-YR STORM RUNOFF	TOTAL TRIB. AREA (AC)	STREAM DESCRIPTION OR REMARKS
205	8.44	15.37	8.44	9.33	4.69	INITIAL AREA A1
210	9.69	65.12	9.91	39.07	20.94	A2 AND A3
215	10.51	151.12	10.89	90.16	50.15	A4 AND A5
220	11.95	193.20	12.59	115.06	65.33	A6 AND A7
225	14.11	203.55	15.15	121.13	69.37	A8: DETENTION BASIN #4
230	14.20	203.55	15.26	121.13	69.37	MAIN CONFLUENCE 1
405	7.96	22.79	7.96	13.86	6.76	INITIAL AREA A17
410	9.57	75.43	9.85	45.23	23.85	A18 AND A19
415	12.81	114.88	13.69	68.15	38.61	A20: FLOWBY BASIN #1
230	14.20	315.30	15.26	187.36	107.98	MAIN CONFLUENCE 1&2
235	14.26	330.99	15.33	197.04	114.05	A9
240	14.29	330.99	15.36	197.04	114.05	MAIN CONFLUENCE 1
105	8.67	22.80	8.67	14.03	7.02	INITIAL AREA A10
110	11.70	47.26	12.23	28.66	15.74	A11
115	13.53	62.99	14.39	37.95	21.76	A12: FLOWBY BASIN #3
140	13.77	62.99	14.66	37.95	21.76	MINOR CONFLUENCE 1
125	9.81	13.73	9.81	8.44	4.49	INITIAL AREA A13
130	11.47	52.12	11.76	31.64	18.04	A14 AND A15
135	11.95	54.37	12.32	33.00	18.85	A16: FLOWBY BASIN #2
140	13.77	114.34	14.66	68.67	40.61	MINOR CONFLUENCE 1&2
240	14.29	444.64	15.36	265.04	154.66	MAIN CONFLUENCE 1&2
245	14.60	459.54	15.71	274.22	160.49	A21 AND A22
250	14.65	459.54	15.76	274.22	160.49	MAIN CONFLUENCE 1
602	5.00	7.33	5.00	4.71	1.71	INITIAL AREA A23
604	5.09	8.60	5.12	5.53	2.01	A24
606	5.94	11.71	6.08	7.49	2.80	A25
250	14.65	467.19	15.76	279.00	163.29	MAIN CONFLUENCE 1&2
255	15.00	488.25	16.16	291.86	171.70	A26 AND A27
260	15.15	496.06	16.34	296.63	174.83	A28
265	15.19	496.06	16.38	296.63	174.83	MAIN CONFLUENCE 1
612	8.10	8.63	8.10	5.33	2.57	INITIAL AREA A29
614	8.20	9.51	8.19	5.89	2.83	A30
616	9.61	27.60	9.86	17.25	8.65	A31 AND A32
265	15.19	518.22	16.38	310.15	183.48	MAIN CONFLUENCE 1&2
275	15.26	519.39	16.46	310.86	183.95	E4
280	15.30	519.77	16.50	311.07	184.11	E5, MAIN CONFLUENCE 1
620	5.00	0.77	5.00	0.49	0.18	INITIAL AREA E2
625	5.17	4.80	5.19	3.05	1.14	E1
630	5.35	4.80	5.39	3.05	1.14	PIPEFLOW
280	15.30	524.17	16.50	313.76	185.66	E3, MAIN CONFLUENCE 1&2
285	15.35	538.56	16.56	321.66	191.68	E6 AND E7
286	15.39	539.11	16.60	321.96	191.91	E8

PROP. SUBAREA "B", "C" & "D" RUNOFFS TO SD INLET						
NODE	TC (MIN)	100-YR STORM RUNOFF	TC (MIN)	10-YR STORM RUNOFF	TOTAL TRIB. AREA (AC)	STREAM DESCRIPTION OR REMARKS
301	6.56	3.05	6.56	1.88	0.82	INITIAL AREA C1
302	9.04	14.74	9.47	8.59	4.56	C2
303	9.87	24.70	10.48	14.21	7.90	C3
304	11.43	32.68	12.30	21.77	10.06	C4, MAIN CONFLUENCE 1
310	4.42	8.13	8.13	2.81	1.31	C6
314	8.19	4.42	8.20	2.81	1.31	MINOR CONFLUENCE 1
313	6.05	1.40	6.05	0.89	0.36	C8
314	8.19	5.65	8.20	3.60	1.67	MINOR CONFLUENCE 2
311	8.21	5.65	8.22	3.60	1.67	PIPEFLOW
304	11.43	37.82	12.30	21.77	12.54	C5, MAJOR CONFLUENCE 2
305	11.56	37.82	12.45	21.77	12.54	PIPEFLOW
306	12.07	40.35	13.03	23.16	13.48	C11, MINOR CONFLUENCE 1
316	13.54	3.78	13.54	2.16	1.49	C7
317	13.93	6.40	13.98	3.81	2.50	C9, PIPEFLOW
318	14.05	6.40	14.11	3.81	2.50	PIPEFLOW
306	12.07	48.15	13.03	28.04	17.31	C10, MINOR CONFLUENCE 2
307	12.41	50.88	13.43	29.53	18.34	C12, MAJOR CONFLUENCE 1
320	7.59	3.77	7.59	2.40	1.08	INITIAL AREA B1
321	7.62	8.25	7.63	5.25	2.37	B2, PIPEFLOW
322	8.64	17.63	8.76	11.21	5.22	B3, PIPEFLOW
323	9.56	20.73	9.82	13.17	6.21	B4, PIPEFLOW
324	10.26	28.91	10.64	18.31	8.91	B4, PIPEFLOW, MINOR CONFLUENCE 1
332	7.31	25.83	7.31	16.45	7.27	B6 AND B7
324	10.26	51.08	10.64	32.21	16.18	MINOR CONFLUENCE 2
325	10.30	55.86	10.68	35.22	17.76	B8, PIPEFLOW
326	10.56	55.86	10.97	35.22	17.76	MINOR CONFLUENCE 1
334	5.62	7.20	5.62	4.60	1.78	B9
326	10.56	61.20	10.97	38.57	19.54	MINOR CONFLUENCE 2
327	10.97	61.20	11.42	38.57	19.54	MINOR CONFLUENCE 1
336	12.12	5.56	12.12	3.52	2.00	B10
327	10.97	66.16	11.42	41.84	21.54	MINOR CONFLUENCE 2
328	10.99	66.16	11.44	41.84	21.54	MINOR CONFLUENCE 1
338	8.50	10.72	8.50	6.81	3.25	B11
328	11.00	75.72	11.44	47.81	24.79	MINOR CONFLUENCE 2
329	11.09	75.72	11.55	47.81	24.79	PIPEFLOW
330	11.29	77.64	11.78	48.88	25.48	B12, MINOR CONFLUENCE 1
340	8.79	6.69	8.79	4.25	2.06	B13 AND B14
341	9.14	6.69	9.18	4.25	2.06	PIPEFLOW
330	11.30	84.60	11.78	53.19	27.83	B15, MINOR CONFLUENCE 2
307	11.55	135.39	12.08	81.65	47.41	B16
308	11.80	138.08	12.37	83.16	48.40	D1

PROP. SUBAREA "F" RUNOFFS TO SD INLET						
NODE	TC (MIN)	100-YR STORM RUNOFF	TC (MIN)	10-YR STORM RUNOFF	TOTAL TRIB. AREA (AC)	STREAM DESCRIPTION OR REMARKS
810	9.34	13.43	9.34	8.23	4.30	INITIAL AREA F1, F2
820	10.51	14.50	9.47	8.91	4.66	F3

LEGEND

- MAJOR WATERSHED BOUNDARY
- MINOR WATERSHED BOUNDARY
- FLOW PATH
- SOIL BOUNDARY
- DIRECTION OF FLOW
- A10 / 7.02 — DRAINAGE AREA DESIGNATION / ACRES
- 340 — NODE DESIGNATION
- L=300' — LENGTH OF EXISTING FLOW PATH
- Q_{100} — CALCULATED 100-YEAR STORM RUNOFF
- Q_{10} — CALCULATED 10-YEAR STORM RUNOFF
- C — SOIL GROUP

150' 0 150' 300' 450'
SCALE IN FEET

PROPOSED CONDITION HYDROLOGY KEY MAP
FOR
GREEN RIVER RANCH
COUNTY RIVERSIDE

HYD: --
DRAFT: --
CHECK: --

KWC ENGINEERS
CIVIL ENGINEERING, PLANNING AND CONSTRUCTION MANAGEMENT
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 909-734-2130

SHEET 1 OF 1

P:\191\1868 PRELIM REPORTS\HYDRO\1868 HYDRO PREP.dwg 1/27/2022 7:53 AM by Andrew Bonar

Appendix

G

EXISTING CONDITION UNIT HYDROGRAPHS

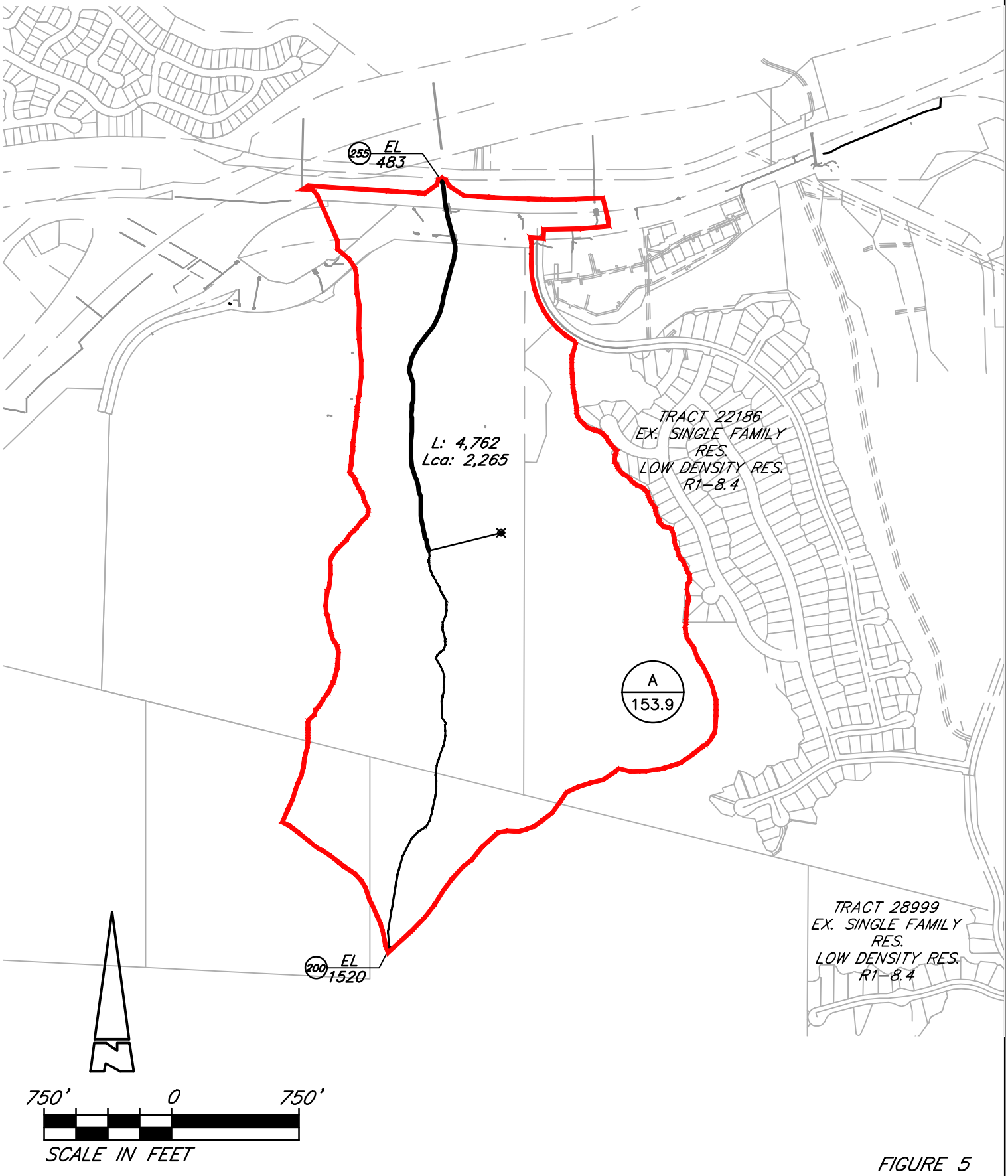


FIGURE 5

KWC ENGINEERS, INC.
CIVIL ENGINEERING, PLANNING AND CONSTRUCTION MANAGEMENT
1269 W. POMONA ROAD, SUITE 104 • CORONA, CA. 92882-7158 • 909-734-2130

DRAINAGE AREA "A"
EXISTING CONDITION UNIT HYDROGRAPH MAP
GREEN RIVER RANCH PROJECT
CORONA, CA

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA12R12.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 2-YEAR AND 1-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.033
Lag time = 0.143 Hr.
Lag time = 8.60 Min.
25% of lag time = 2.15 Min.
40% of lag time = 3.44 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	0.62	95.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.45	223.16

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 0.620(In)
Areal adjustment factor = 99.86 %
Adjusted average point rain = 0.619(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

```
       RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
       AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
       85.1  70.2      0.360     0.025        0.352       1.000      0.352
                                                        Sum (F) =   0.352
       Area averaged mean soil loss (F) (In/Hr) =  0.352
       Minimum soil loss rate ((In/Hr)) =  0.176
       (for 24 hour storm duration)
       Soil low loss rate (decimal) =   0.880
       ------------------------------------------------------------------------
       Slope of intensity-duration curve for a 1 hour storm =0.4800
       ------------------------------------------------------------------------

                     U n i t  H y d r o g r a p h
                             FOOTHILL S-Curve
       ------------------------------------------------------------------
                     Unit Hydrograph Data
       ------------------------------------------------------------------------
       Unit time period   Time % of lag   Distribution   Unit Hydrograph
           (hrs)                          Graph %            (CFS)
       ------------------------------------------------------------------------
           1   0.083         58.116          5.330              8.268
           2   0.167        116.232         29.600             45.910
           3   0.250        174.347         34.978             54.252
           4   0.333        232.463         12.744             19.766
           5   0.417        290.579          7.357             11.411
           6   0.500        348.695          4.558              7.070
           7   0.583        406.810          2.632              4.082
           8   0.667        464.926          1.127              1.749
           9   0.750        523.042          0.595              0.923
          10   0.833        581.158          0.408              0.632
          11   0.917        639.274          0.399              0.619
          12   1.000        697.389          0.206              0.320
          13   1.083        755.505          0.065              0.101
                                     Sum = 100.000   Sum=     155.102
------------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     4.40      0.327         0.352     0.288         0.04
    2   0.17     4.50      0.334         0.352     0.294         0.04
    3   0.25     5.40      0.401         0.352       ---         0.05
    4   0.33     5.40      0.401         0.352       ---         0.05
    5   0.42     5.70      0.423         0.352       ---         0.07
    6   0.50     6.40      0.475         0.352       ---         0.12
    7   0.58     7.90      0.587         0.352       ---         0.23
    8   0.67     9.10      0.676         0.352       ---         0.32
    9   0.75    12.80      0.951         0.352       ---         0.60
   10   0.83    25.60      1.902         0.352       ---         1.55
   11   0.92     7.90      0.587         0.352       ---         0.23
   12   1.00     4.90      0.364         0.352       ---         0.01
      Sum =     100.0                                    Sum =     3.3
       Flood volume = Effective rainfall      0.28(In)
        times area     153.9(Ac.)/[(In)/(Ft.)] =       3.6(Ac.Ft)
       Total soil loss =      0.34(In)
       Total soil loss =     4.384(Ac.Ft)
       Total rainfall =      0.62(In)
       Flood volume =      154917.5 Cubic Feet
       Total soil loss =      190966.8 Cubic Feet
       ------------------------------------------------------------------
        Peak flow rate of this hydrograph =    116.090(CFS)
       ------------------------------------------------------------------
       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          1 - H O U R    S T O R M
                       R u n o f f      H y d r o g r a p h
       ------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

       ------------------------------------------------------------------
```

```
 Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
 ---------------------------------------------------------------------------
   0+ 5       0.0022      0.32  Q         |         |         |         |
   0+10       0.0169      2.13  Q         |         |         |         |
   0+15       0.0471      4.38  Q         |         |         |         |
   0+20       0.0858      5.62  VQ        |         |         |         |
   0+25       0.1324      6.76  |Q        |         |         |         |
   0+30       0.1922      8.68  |QV       |         |         |         |
   0+35       0.2850     13.47  | QV      |         |         |         |
   0+40       0.4415     22.73  |   Q     |         |         |         |
   0+45       0.6929     36.51  |      Q  |         |         |         |
   0+50       1.1395     64.84  |         | Q       |         |         |
   0+55       1.9390    116.09  |         |         |V Q      |         |
   1+ 0       2.7170    112.97  |         |         | Q       V         |
   1+ 5       3.0918     54.41  |         Q         |         |   V     |
   1+10       3.2927     29.18  |    Q    |         |         |      V  |
   1+15       3.4115     17.26  |  Q      |         |         |       V |
   1+20       3.4786      9.73  |Q        |         |         |        V|
   1+25       3.5110      4.71  Q         |         |         |        V|
   1+30       3.5286      2.56  Q         |         |         |        V|
   1+35       3.5404      1.72  Q         |         |         |        V|
   1+40       3.5497      1.34  Q         |         |         |        V|
   1+45       3.5546      0.71  Q         |         |         |        V|
   1+50       3.5562      0.24  Q         |         |         |        V|
   1+55       3.5564      0.03  Q         |         |         |        V|
   2+ 0       3.5564      0.00  Q         |         |         |         V
---------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA32R32.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 2-YEAR AND 3-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.033
Lag time = 0.143 Hr.
Lag time = 8.60 Min.
25% of lag time = 2.15 Min.
40% of lag time = 3.44 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.06	163.13

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	2.63	404.76

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.060(In)
Area Averaged 100-Year Rainfall = 2.630(In)

Point rain (area averaged) = 1.060(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 1.059(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	70.2	0.360	0.025	0.352	1.000	0.352
					Sum (F) =	0.352

Area averaged mean soil loss (F) (In/Hr) = 0.352
Minimum soil loss rate ((In/Hr)) = 0.176
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	58.116	5.330	8.268
2	0.167	116.232	29.600	45.910
3	0.250	174.347	34.978	54.252
4	0.333	232.463	12.744	19.766
5	0.417	290.579	7.357	11.411
6	0.500	348.695	4.558	7.070
7	0.583	406.810	2.632	4.082
8	0.667	464.926	1.127	1.749
9	0.750	523.042	0.595	0.923
10	0.833	581.158	0.408	0.632
11	0.917	639.274	0.399	0.619
12	1.000	697.389	0.206	0.320
13	1.083	755.505	0.065	0.101
			Sum = 100.000	Sum= 155.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.165	0.352	0.145	0.02
2	0.17	1.30	0.165	0.352	0.145	0.02
3	0.25	1.10	0.140	0.352	0.123	0.02
4	0.33	1.50	0.191	0.352	0.168	0.02
5	0.42	1.50	0.191	0.352	0.168	0.02
6	0.50	1.80	0.229	0.352	0.201	0.03
7	0.58	1.50	0.191	0.352	0.168	0.02
8	0.67	1.80	0.229	0.352	0.201	0.03
9	0.75	1.80	0.229	0.352	0.201	0.03
10	0.83	1.50	0.191	0.352	0.168	0.02
11	0.92	1.60	0.203	0.352	0.179	0.02
12	1.00	1.80	0.229	0.352	0.201	0.03
13	1.08	2.20	0.280	0.352	0.246	0.03
14	1.17	2.20	0.280	0.352	0.246	0.03
15	1.25	2.20	0.280	0.352	0.246	0.03
16	1.33	2.00	0.254	0.352	0.224	0.03
17	1.42	2.60	0.330	0.352	0.291	0.04
18	1.50	2.70	0.343	0.352	0.302	0.04
19	1.58	2.40	0.305	0.352	0.268	0.04
20	1.67	2.70	0.343	0.352	0.302	0.04
21	1.75	3.30	0.419	0.352	---	0.07
22	1.83	3.10	0.394	0.352	---	0.04
23	1.92	2.90	0.369	0.352	---	0.02
24	2.00	3.00	0.381	0.352	---	0.03
25	2.08	3.10	0.394	0.352	---	0.04
26	2.17	4.20	0.534	0.352	---	0.18
27	2.25	5.00	0.636	0.352	---	0.28
28	2.33	3.50	0.445	0.352	---	0.09
29	2.42	6.80	0.864	0.352	---	0.51
30	2.50	7.30	0.928	0.352	---	0.58
31	2.58	8.20	1.042	0.352	---	0.69
32	2.67	5.90	0.750	0.352	---	0.40

33	2.75	2.00	0.254	0.352	0.224	0.03
34	2.83	1.80	0.229	0.352	0.201	0.03
35	2.92	1.80	0.229	0.352	0.201	0.03
36	3.00	0.60	0.076	0.352	0.067	0.01
Sum =		100.0			Sum =	3.6

Flood volume = Effective rainfall 0.30(In)
times area 153.9(Ac.)/[(In)/(Ft.)] = 3.8(Ac.Ft)
Total soil loss = 0.76(In)
Total soil loss = 9.739(Ac.Ft)
Total rainfall = 1.06(In)
Flood volume = 167551.1 Cubic Feet
Total soil loss = 424226.6 Cubic Feet

Peak flow rate of this hydrograph = 80.367(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 22.5 45.0 67.5 90.0
0+ 5	0.0011	0.16	Q
0+10	0.0085	1.07	Q
0+15	0.0232	2.13	Q
0+20	0.0399	2.43	VQ
0+25	0.0590	2.77	VQ
0+30	0.0811	3.22	VQ
0+35	0.1056	3.56	|Q
0+40	0.1312	3.72	|Q
0+45	0.1575	3.82	|Q
0+50	0.1852	4.02	|Q
0+55	0.2122	3.92	|QV
1+ 0	0.2384	3.81	|QV
1+ 5	0.2661	4.02	|QV
1+10	0.2969	4.46	|Q V
1+15	0.3302	4.85	| QV
1+20	0.3645	4.97	| QV
1+25	0.3989	5.00	| Q V
1+30	0.4356	5.32	| Q V
1+35	0.4757	5.82	| Q V
1+40	0.5162	5.89	| Q V
1+45	0.5589	6.19	| Q V
1+50	0.6100	7.42	| Q V
1+55	0.6620	7.55	| Q V
2+ 0	0.7010	5.67	| Q V
2+ 5	0.7341	4.80	| Q V
2+10	0.7799	6.64	| Q V
2+15	0.8797	14.49	| Q V
2+20	1.0542	25.34	| VQ
2+25	1.2502	28.45	| QV
2+30	1.5366	41.59	| V Q
2+35	1.9957	66.66	| V Q
2+40	2.5492	80.37	| V Q
2+45	3.0689	75.46	| V Q
2+50	3.4008	48.18	| Q V
2+55	3.5773	25.64	| Q V
3+ 0	3.6910	16.50	| Q V
3+ 5	3.7613	10.21	| Q V
3+10	3.7987	5.42	| Q V
3+15	3.8186	2.89	|Q V
3+20	3.8309	1.80	Q V
3+25	3.8390	1.17	Q V
3+30	3.8435	0.66	Q V
3+35	3.8454	0.27	Q V
3+40	3.8460	0.09	Q V
3+45	3.8463	0.03	Q V
3+50	3.8464	0.02	Q V
3+55	3.8464	0.01	Q V

```
    4+ 0       3.8464      0.00  Q         |         |         |         V
-------------------------------------------------------------------------
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA62R62.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 2-YEAR AND 6-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.033
Lag time = 0.143 Hr.
Lag time = 8.60 Min.
25% of lag time = 2.15 Min.
40% of lag time = 3.44 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.52	233.93

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	3.75	577.13

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.520(In)
Area Averaged 100-Year Rainfall = 3.750(In)

Point rain (area averaged) = 1.520(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 1.519(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	70.2	0.360	0.025	0.352	1.000	0.352
					Sum (F) =	0.352

Area averaged mean soil loss (F) (In/Hr) = 0.352
Minimum soil loss rate ((In/Hr)) = 0.176
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	58.116	5.330	8.268
2	0.167	116.232	29.600	45.910
3	0.250	174.347	34.978	54.252
4	0.333	232.463	12.744	19.766
5	0.417	290.579	7.357	11.411
6	0.500	348.695	4.558	7.070
7	0.583	406.810	2.632	4.082
8	0.667	464.926	1.127	1.749
9	0.750	523.042	0.595	0.923
10	0.833	581.158	0.408	0.632
11	0.917	639.274	0.399	0.619
12	1.000	697.389	0.206	0.320
13	1.083	755.505	0.065	0.101
			Sum = 100.000	Sum= 155.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.091	0.352	0.080	0.01
2	0.17	0.60	0.109	0.352	0.096	0.01
3	0.25	0.60	0.109	0.352	0.096	0.01
4	0.33	0.60	0.109	0.352	0.096	0.01
5	0.42	0.60	0.109	0.352	0.096	0.01
6	0.50	0.70	0.128	0.352	0.112	0.02
7	0.58	0.70	0.128	0.352	0.112	0.02
8	0.67	0.70	0.128	0.352	0.112	0.02
9	0.75	0.70	0.128	0.352	0.112	0.02
10	0.83	0.70	0.128	0.352	0.112	0.02
11	0.92	0.70	0.128	0.352	0.112	0.02
12	1.00	0.80	0.146	0.352	0.128	0.02
13	1.08	0.80	0.146	0.352	0.128	0.02
14	1.17	0.80	0.146	0.352	0.128	0.02
15	1.25	0.80	0.146	0.352	0.128	0.02
16	1.33	0.80	0.146	0.352	0.128	0.02
17	1.42	0.80	0.146	0.352	0.128	0.02
18	1.50	0.80	0.146	0.352	0.128	0.02
19	1.58	0.80	0.146	0.352	0.128	0.02
20	1.67	0.80	0.146	0.352	0.128	0.02
21	1.75	0.80	0.146	0.352	0.128	0.02
22	1.83	0.80	0.146	0.352	0.128	0.02
23	1.92	0.80	0.146	0.352	0.128	0.02
24	2.00	0.90	0.164	0.352	0.144	0.02
25	2.08	0.80	0.146	0.352	0.128	0.02
26	2.17	0.90	0.164	0.352	0.144	0.02
27	2.25	0.90	0.164	0.352	0.144	0.02
28	2.33	0.90	0.164	0.352	0.144	0.02
29	2.42	0.90	0.164	0.352	0.144	0.02
30	2.50	0.90	0.164	0.352	0.144	0.02
31	2.58	0.90	0.164	0.352	0.144	0.02
32	2.67	0.90	0.164	0.352	0.144	0.02
33	2.75	1.00	0.182	0.352	0.160	0.02

34	2.83	1.00	0.182	0.352	0.160	0.02
35	2.92	1.00	0.182	0.352	0.160	0.02
36	3.00	1.00	0.182	0.352	0.160	0.02
37	3.08	1.00	0.182	0.352	0.160	0.02
38	3.17	1.10	0.201	0.352	0.176	0.02
39	3.25	1.10	0.201	0.352	0.176	0.02
40	3.33	1.10	0.201	0.352	0.176	0.02
41	3.42	1.20	0.219	0.352	0.193	0.03
42	3.50	1.30	0.237	0.352	0.209	0.03
43	3.58	1.40	0.255	0.352	0.225	0.03
44	3.67	1.40	0.255	0.352	0.225	0.03
45	3.75	1.50	0.273	0.352	0.241	0.03
46	3.83	1.50	0.273	0.352	0.241	0.03
47	3.92	1.60	0.292	0.352	0.257	0.04
48	4.00	1.60	0.292	0.352	0.257	0.04
49	4.08	1.70	0.310	0.352	0.273	0.04
50	4.17	1.80	0.328	0.352	0.289	0.04
51	4.25	1.90	0.346	0.352	0.305	0.04
52	4.33	2.00	0.365	0.352	---	0.01
53	4.42	2.10	0.383	0.352	---	0.03
54	4.50	2.10	0.383	0.352	---	0.03
55	4.58	2.20	0.401	0.352	---	0.05
56	4.67	2.30	0.419	0.352	---	0.07
57	4.75	2.40	0.438	0.352	---	0.09
58	4.83	2.40	0.438	0.352	---	0.09
59	4.92	2.50	0.456	0.352	---	0.10
60	5.00	2.60	0.474	0.352	---	0.12
61	5.08	3.10	0.565	0.352	---	0.21
62	5.17	3.60	0.656	0.352	---	0.30
63	5.25	3.90	0.711	0.352	---	0.36
64	5.33	4.20	0.766	0.352	---	0.41
65	5.42	4.70	0.857	0.352	---	0.50
66	5.50	5.60	1.021	0.352	---	0.67
67	5.58	1.90	0.346	0.352	0.305	0.04
68	5.67	0.90	0.164	0.352	0.144	0.02
69	5.75	0.60	0.109	0.352	0.096	0.01
70	5.83	0.50	0.091	0.352	0.080	0.01
71	5.92	0.30	0.055	0.352	0.048	0.01
72	6.00	0.20	0.036	0.352	0.032	0.00
Sum =	100.0				Sum =	4.2

Flood volume = Effective rainfall 0.35(In)
times area 153.9(Ac.)/[(In)/(Ft.)] = 4.5(Ac.Ft)
Total soil loss = 1.17(In)
Total soil loss = 14.953(Ac.Ft)
Total rainfall = 1.52(In)
Flood volume = 197346.4 Cubic Feet
Total soil loss = 651363.0 Cubic Feet

Peak flow rate of this hydrograph = 74.214(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	20.0	40.0	60.0	80.0
0+ 5	0.0006	0.09	Q	|	|	|	|
0+10	0.0048	0.61	Q	|	|	|	|
0+15	0.0138	1.31	Q	|	|	|	|
0+20	0.0251	1.64	Q	|	|	|	|
0+25	0.0376	1.81	Q	|	|	|	|
0+30	0.0509	1.93	Q	|	|	|	|
0+35	0.0652	2.09	VQ	|	|	|	|
0+40	0.0806	2.24	VQ	|	|	|	|
0+45	0.0964	2.29	VQ	|	|	|	|
0+50	0.1125	2.33	VQ	|	|	|	|
0+55	0.1287	2.35	|Q	|	|	|	|
1+ 0	0.1451	2.38	|Q	|	|	|	|

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1+ 5       0.1622      2.49  |Q        |         |         |         |
1+10       0.1802      2.61  |Q        |         |         |         |
1+15       0.1985      2.65  |Q        |         |         |         |
1+20       0.2169      2.68  |Q        |         |         |         |
1+25       0.2355      2.70  |QV       |         |         |         |
1+30       0.2542      2.71  |QV       |         |         |         |
1+35       0.2728      2.71  |QV       |         |         |         |
1+40       0.2915      2.71  |QV       |         |         |         |
1+45       0.3102      2.71  |QV       |         |         |         |
1+50       0.3289      2.71  |QV       |         |         |         |
1+55       0.3476      2.72  |Q V      |         |         |         |
2+ 0       0.3664      2.73  |Q V      |         |         |         |
2+ 5       0.3858      2.82  |Q V      |         |         |         |
2+10       0.4055      2.85  |Q V      |         |         |         |
2+15       0.4253      2.88  |Q V      |         |         |         |
2+20       0.4458      2.98  |Q V      |         |         |         |
2+25       0.4665      3.01  |Q  V     |         |         |         |
2+30       0.4874      3.03  |Q  V     |         |         |         |
2+35       0.5083      3.04  |Q  V     |         |         |         |
2+40       0.5293      3.05  |Q  V     |         |         |         |
2+45       0.5505      3.07  |Q  V     |         |         |         |
2+50       0.5723      3.17  |Q   V    |         |         |         |
2+55       0.5950      3.29  |Q   V    |         |         |         |
3+ 0       0.6180      3.34  |Q   V    |         |         |         |
3+ 5       0.6411      3.36  |Q   V    |         |         |         |
3+10       0.6645      3.39  |Q   V    |         |         |         |
3+15       0.6886      3.50  |Q    V   |         |         |         |
3+20       0.7136      3.63  |Q    V   |         |         |         |
3+25       0.7390      3.69  |Q    V   |         |         |         |
3+30       0.7654      3.83  |Q    V   |         |         |         |
3+35       0.7936      4.09  | Q    V  |         |         |         |
3+40       0.8236      4.36  | Q    V  |         |         |         |
3+45       0.8551      4.57  | Q    V  |         |         |         |
3+50       0.8878      4.76  | Q    V  |         |         |         |
3+55       0.9219      4.94  | Q     V |         |         |         |
4+ 0       0.9571      5.12  | Q     V |         |         |         |
4+ 5       0.9936      5.29  | Q     V |         |         |         |
4+10       1.0313      5.48  | Q      V|         |         |         |
4+15       1.0710      5.76  | Q      V|         |         |         |
4+20       1.1109      5.80  | Q      V|         |         |         |
4+25       1.1441      4.82  | Q       V         |         |         |
4+30       1.1729      4.18  | Q       V         |         |         |
4+35       1.2059      4.80  | Q       V         |         |         |
4+40       1.2462      5.85  | Q       |V        |         |         |
4+45       1.3002      7.84  |  Q      |V        |         |         |
4+50       1.3694     10.05  |    Q    | V       |         |         |
4+55       1.4506     11.79  |    Q    | V       |         |         |
5+ 0       1.5434     13.48  |     Q   |  V      |         |         |
5+ 5       1.6569     16.47  |       Q |   V     |         |         |
5+10       1.8152     22.99  |         |Q    V   |         |         |
5+15       2.0444     33.28  |         |     Q V |         |         |
5+20       2.3432     43.39  |         |         VQ        |         |
5+25       2.7063     52.71  |         |         |  V  Q   |         |
5+30       3.1479     64.13  |         |         |      V  | Q       |
5+35       3.6591     74.21  |         |         |         | V    Q  |
5+40       4.0551     57.51  |         |         |       Q |    V    |
5+45       4.2449     27.56  |         |  Q      |         |     V   |
5+50       4.3595     16.64  |       Q |         |         |      V  |
5+55       4.4308     10.36  |    Q    |         |         |       V |
6+ 0       4.4736      6.20  |  Q      |         |         |        V|
6+ 5       4.4975      3.47  |Q        |         |         |        V|
6+10       4.5118      2.08  |Q        |         |         |        V|
6+15       4.5205      1.27  Q         |         |         |        V|
6+20       4.5262      0.83  Q         |         |         |        V|
6+25       4.5289      0.39  Q         |         |         |        V|
6+30       4.5299      0.14  Q         |         |         |        V|
6+35       4.5302      0.04  Q         |         |         |        V|
6+40       4.5303      0.02  Q         |         |         |        V|
6+45       4.5304      0.01  Q         |         |         |        V|
6+50       4.5304      0.01  Q         |         |         |        V|
6+55       4.5304      0.00  Q         |         |         |        V|
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    7+ 0       4.5305      0.00  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA242R242.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 2-YEAR AND 24-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.033
Lag time = 0.143 Hr.
Lag time = 8.60 Min.
25% of lag time = 2.15 Min.
40% of lag time = 3.44 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	2.85	438.62

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	8.85	1362.02

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.850(In)
Area Averaged 100-Year Rainfall = 8.850(In)

Point rain (area averaged) = 2.850(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 2.849(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	70.2	0.360	0.025	0.352	1.000	0.352
					Sum (F) =	0.352

Area averaged mean soil loss (F) (In/Hr) = 0.352
Minimum soil loss rate ((In/Hr)) = 0.176
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	58.116	5.330	8.268
2	0.167	116.232	29.600	45.910
3	0.250	174.347	34.978	54.252
4	0.333	232.463	12.744	19.766
5	0.417	290.579	7.357	11.411
6	0.500	348.695	4.558	7.070
7	0.583	406.810	2.632	4.082
8	0.667	464.926	1.127	1.749
9	0.750	523.042	0.595	0.923
10	0.833	581.158	0.408	0.632
11	0.917	639.274	0.399	0.619
12	1.000	697.389	0.206	0.320
13	1.083	755.505	0.065	0.101
			Sum = 100.000	Sum= 155.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.023	0.624	0.020	0.00
2	0.17	0.07	0.023	0.622	0.020	0.00
3	0.25	0.07	0.023	0.619	0.020	0.00
4	0.33	0.10	0.034	0.617	0.030	0.00
5	0.42	0.10	0.034	0.614	0.030	0.00
6	0.50	0.10	0.034	0.612	0.030	0.00
7	0.58	0.10	0.034	0.610	0.030	0.00
8	0.67	0.10	0.034	0.607	0.030	0.00
9	0.75	0.10	0.034	0.605	0.030	0.00
10	0.83	0.13	0.046	0.602	0.040	0.01
11	0.92	0.13	0.046	0.600	0.040	0.01
12	1.00	0.13	0.046	0.598	0.040	0.01
13	1.08	0.10	0.034	0.595	0.030	0.00
14	1.17	0.10	0.034	0.593	0.030	0.00
15	1.25	0.10	0.034	0.591	0.030	0.00
16	1.33	0.10	0.034	0.588	0.030	0.00
17	1.42	0.10	0.034	0.586	0.030	0.00
18	1.50	0.10	0.034	0.584	0.030	0.00
19	1.58	0.10	0.034	0.581	0.030	0.00
20	1.67	0.10	0.034	0.579	0.030	0.00
21	1.75	0.10	0.034	0.577	0.030	0.00
22	1.83	0.13	0.046	0.574	0.040	0.01
23	1.92	0.13	0.046	0.572	0.040	0.01
24	2.00	0.13	0.046	0.570	0.040	0.01
25	2.08	0.13	0.046	0.567	0.040	0.01
26	2.17	0.13	0.046	0.565	0.040	0.01
27	2.25	0.13	0.046	0.563	0.040	0.01
28	2.33	0.13	0.046	0.561	0.040	0.01
29	2.42	0.13	0.046	0.558	0.040	0.01
30	2.50	0.13	0.046	0.556	0.040	0.01
31	2.58	0.17	0.057	0.554	0.050	0.01
32	2.67	0.17	0.057	0.551	0.050	0.01

33	2.75	0.17	0.057	0.549	0.050	0.01
34	2.83	0.17	0.057	0.547	0.050	0.01
35	2.92	0.17	0.057	0.545	0.050	0.01
36	3.00	0.17	0.057	0.542	0.050	0.01
37	3.08	0.17	0.057	0.540	0.050	0.01
38	3.17	0.17	0.057	0.538	0.050	0.01
39	3.25	0.17	0.057	0.536	0.050	0.01
40	3.33	0.17	0.057	0.533	0.050	0.01
41	3.42	0.17	0.057	0.531	0.050	0.01
42	3.50	0.17	0.057	0.529	0.050	0.01
43	3.58	0.17	0.057	0.527	0.050	0.01
44	3.67	0.17	0.057	0.525	0.050	0.01
45	3.75	0.17	0.057	0.522	0.050	0.01
46	3.83	0.20	0.068	0.520	0.060	0.01
47	3.92	0.20	0.068	0.518	0.060	0.01
48	4.00	0.20	0.068	0.516	0.060	0.01
49	4.08	0.20	0.068	0.514	0.060	0.01
50	4.17	0.20	0.068	0.511	0.060	0.01
51	4.25	0.20	0.068	0.509	0.060	0.01
52	4.33	0.23	0.080	0.507	0.070	0.01
53	4.42	0.23	0.080	0.505	0.070	0.01
54	4.50	0.23	0.080	0.503	0.070	0.01
55	4.58	0.23	0.080	0.501	0.070	0.01
56	4.67	0.23	0.080	0.498	0.070	0.01
57	4.75	0.23	0.080	0.496	0.070	0.01
58	4.83	0.27	0.091	0.494	0.080	0.01
59	4.92	0.27	0.091	0.492	0.080	0.01
60	5.00	0.27	0.091	0.490	0.080	0.01
61	5.08	0.20	0.068	0.488	0.060	0.01
62	5.17	0.20	0.068	0.486	0.060	0.01
63	5.25	0.20	0.068	0.483	0.060	0.01
64	5.33	0.23	0.080	0.481	0.070	0.01
65	5.42	0.23	0.080	0.479	0.070	0.01
66	5.50	0.23	0.080	0.477	0.070	0.01
67	5.58	0.27	0.091	0.475	0.080	0.01
68	5.67	0.27	0.091	0.473	0.080	0.01
69	5.75	0.27	0.091	0.471	0.080	0.01
70	5.83	0.27	0.091	0.469	0.080	0.01
71	5.92	0.27	0.091	0.467	0.080	0.01
72	6.00	0.27	0.091	0.465	0.080	0.01
73	6.08	0.30	0.103	0.463	0.090	0.01
74	6.17	0.30	0.103	0.461	0.090	0.01
75	6.25	0.30	0.103	0.458	0.090	0.01
76	6.33	0.30	0.103	0.456	0.090	0.01
77	6.42	0.30	0.103	0.454	0.090	0.01
78	6.50	0.30	0.103	0.452	0.090	0.01
79	6.58	0.33	0.114	0.450	0.100	0.01
80	6.67	0.33	0.114	0.448	0.100	0.01
81	6.75	0.33	0.114	0.446	0.100	0.01
82	6.83	0.33	0.114	0.444	0.100	0.01
83	6.92	0.33	0.114	0.442	0.100	0.01
84	7.00	0.33	0.114	0.440	0.100	0.01
85	7.08	0.33	0.114	0.438	0.100	0.01
86	7.17	0.33	0.114	0.436	0.100	0.01
87	7.25	0.33	0.114	0.434	0.100	0.01
88	7.33	0.37	0.125	0.432	0.110	0.02
89	7.42	0.37	0.125	0.430	0.110	0.02
90	7.50	0.37	0.125	0.428	0.110	0.02
91	7.58	0.40	0.137	0.426	0.120	0.02
92	7.67	0.40	0.137	0.424	0.120	0.02
93	7.75	0.40	0.137	0.422	0.120	0.02
94	7.83	0.43	0.148	0.420	0.130	0.02
95	7.92	0.43	0.148	0.419	0.130	0.02
96	8.00	0.43	0.148	0.417	0.130	0.02
97	8.08	0.50	0.171	0.415	0.150	0.02
98	8.17	0.50	0.171	0.413	0.150	0.02
99	8.25	0.50	0.171	0.411	0.150	0.02
100	8.33	0.50	0.171	0.409	0.150	0.02
101	8.42	0.50	0.171	0.407	0.150	0.02
102	8.50	0.50	0.171	0.405	0.150	0.02
103	8.58	0.53	0.182	0.403	0.160	0.02

104	8.67	0.53	0.182	0.401	0.160	0.02
105	8.75	0.53	0.182	0.399	0.160	0.02
106	8.83	0.57	0.194	0.397	0.170	0.02
107	8.92	0.57	0.194	0.396	0.170	0.02
108	9.00	0.57	0.194	0.394	0.170	0.02
109	9.08	0.63	0.217	0.392	0.191	0.03
110	9.17	0.63	0.217	0.390	0.191	0.03
111	9.25	0.63	0.217	0.388	0.191	0.03
112	9.33	0.67	0.228	0.386	0.201	0.03
113	9.42	0.67	0.228	0.384	0.201	0.03
114	9.50	0.67	0.228	0.383	0.201	0.03
115	9.58	0.70	0.239	0.381	0.211	0.03
116	9.67	0.70	0.239	0.379	0.211	0.03
117	9.75	0.70	0.239	0.377	0.211	0.03
118	9.83	0.73	0.251	0.375	0.221	0.03
119	9.92	0.73	0.251	0.374	0.221	0.03
120	10.00	0.73	0.251	0.372	0.221	0.03
121	10.08	0.50	0.171	0.370	0.150	0.02
122	10.17	0.50	0.171	0.368	0.150	0.02
123	10.25	0.50	0.171	0.366	0.150	0.02
124	10.33	0.50	0.171	0.365	0.150	0.02
125	10.42	0.50	0.171	0.363	0.150	0.02
126	10.50	0.50	0.171	0.361	0.150	0.02
127	10.58	0.67	0.228	0.359	0.201	0.03
128	10.67	0.67	0.228	0.358	0.201	0.03
129	10.75	0.67	0.228	0.356	0.201	0.03
130	10.83	0.67	0.228	0.354	0.201	0.03
131	10.92	0.67	0.228	0.352	0.201	0.03
132	11.00	0.67	0.228	0.351	0.201	0.03
133	11.08	0.63	0.217	0.349	0.191	0.03
134	11.17	0.63	0.217	0.347	0.191	0.03
135	11.25	0.63	0.217	0.345	0.191	0.03
136	11.33	0.63	0.217	0.344	0.191	0.03
137	11.42	0.63	0.217	0.342	0.191	0.03
138	11.50	0.63	0.217	0.340	0.191	0.03
139	11.58	0.57	0.194	0.339	0.170	0.02
140	11.67	0.57	0.194	0.337	0.170	0.02
141	11.75	0.57	0.194	0.335	0.170	0.02
142	11.83	0.60	0.205	0.334	0.181	0.02
143	11.92	0.60	0.205	0.332	0.181	0.02
144	12.00	0.60	0.205	0.330	0.181	0.02
145	12.08	0.83	0.285	0.329	0.251	0.03
146	12.17	0.83	0.285	0.327	0.251	0.03
147	12.25	0.83	0.285	0.325	0.251	0.03
148	12.33	0.87	0.296	0.324	0.261	0.04
149	12.42	0.87	0.296	0.322	0.261	0.04
150	12.50	0.87	0.296	0.320	0.261	0.04
151	12.58	0.93	0.319	0.319	---	0.00
152	12.67	0.93	0.319	0.317	---	0.00
153	12.75	0.93	0.319	0.316	---	0.00
154	12.83	0.97	0.331	0.314	---	0.02
155	12.92	0.97	0.331	0.312	---	0.02
156	13.00	0.97	0.331	0.311	---	0.02
157	13.08	1.13	0.387	0.309	---	0.08
158	13.17	1.13	0.387	0.308	---	0.08
159	13.25	1.13	0.387	0.306	---	0.08
160	13.33	1.13	0.387	0.305	---	0.08
161	13.42	1.13	0.387	0.303	---	0.08
162	13.50	1.13	0.387	0.302	---	0.09
163	13.58	0.77	0.262	0.300	0.231	0.03
164	13.67	0.77	0.262	0.298	0.231	0.03
165	13.75	0.77	0.262	0.297	0.231	0.03
166	13.83	0.77	0.262	0.295	0.231	0.03
167	13.92	0.77	0.262	0.294	0.231	0.03
168	14.00	0.77	0.262	0.292	0.231	0.03
169	14.08	0.90	0.308	0.291	---	0.02
170	14.17	0.90	0.308	0.289	---	0.02
171	14.25	0.90	0.308	0.288	---	0.02
172	14.33	0.87	0.296	0.286	---	0.01
173	14.42	0.87	0.296	0.285	---	0.01
174	14.50	0.87	0.296	0.284	---	0.01

175	14.58	0.87	0.296	0.282	---	0.01
176	14.67	0.87	0.296	0.281	---	0.02
177	14.75	0.87	0.296	0.279	---	0.02
178	14.83	0.83	0.285	0.278	---	0.01
179	14.92	0.83	0.285	0.276	---	0.01
180	15.00	0.83	0.285	0.275	---	0.01
181	15.08	0.80	0.274	0.274	0.241	0.03
182	15.17	0.80	0.274	0.272	---	0.00
183	15.25	0.80	0.274	0.271	---	0.00
184	15.33	0.77	0.262	0.269	0.231	0.03
185	15.42	0.77	0.262	0.268	0.231	0.03
186	15.50	0.77	0.262	0.267	0.231	0.03
187	15.58	0.63	0.217	0.265	0.191	0.03
188	15.67	0.63	0.217	0.264	0.191	0.03
189	15.75	0.63	0.217	0.263	0.191	0.03
190	15.83	0.63	0.217	0.261	0.191	0.03
191	15.92	0.63	0.217	0.260	0.191	0.03
192	16.00	0.63	0.217	0.258	0.191	0.03
193	16.08	0.13	0.046	0.257	0.040	0.01
194	16.17	0.13	0.046	0.256	0.040	0.01
195	16.25	0.13	0.046	0.255	0.040	0.01
196	16.33	0.13	0.046	0.253	0.040	0.01
197	16.42	0.13	0.046	0.252	0.040	0.01
198	16.50	0.13	0.046	0.251	0.040	0.01
199	16.58	0.10	0.034	0.249	0.030	0.00
200	16.67	0.10	0.034	0.248	0.030	0.00
201	16.75	0.10	0.034	0.247	0.030	0.00
202	16.83	0.10	0.034	0.246	0.030	0.00
203	16.92	0.10	0.034	0.244	0.030	0.00
204	17.00	0.10	0.034	0.243	0.030	0.00
205	17.08	0.17	0.057	0.242	0.050	0.01
206	17.17	0.17	0.057	0.241	0.050	0.01
207	17.25	0.17	0.057	0.239	0.050	0.01
208	17.33	0.17	0.057	0.238	0.050	0.01
209	17.42	0.17	0.057	0.237	0.050	0.01
210	17.50	0.17	0.057	0.236	0.050	0.01
211	17.58	0.17	0.057	0.235	0.050	0.01
212	17.67	0.17	0.057	0.234	0.050	0.01
213	17.75	0.17	0.057	0.232	0.050	0.01
214	17.83	0.13	0.046	0.231	0.040	0.01
215	17.92	0.13	0.046	0.230	0.040	0.01
216	18.00	0.13	0.046	0.229	0.040	0.01
217	18.08	0.13	0.046	0.228	0.040	0.01
218	18.17	0.13	0.046	0.227	0.040	0.01
219	18.25	0.13	0.046	0.226	0.040	0.01
220	18.33	0.13	0.046	0.225	0.040	0.01
221	18.42	0.13	0.046	0.223	0.040	0.01
222	18.50	0.13	0.046	0.222	0.040	0.01
223	18.58	0.10	0.034	0.221	0.030	0.00
224	18.67	0.10	0.034	0.220	0.030	0.00
225	18.75	0.10	0.034	0.219	0.030	0.00
226	18.83	0.07	0.023	0.218	0.020	0.00
227	18.92	0.07	0.023	0.217	0.020	0.00
228	19.00	0.07	0.023	0.216	0.020	0.00
229	19.08	0.10	0.034	0.215	0.030	0.00
230	19.17	0.10	0.034	0.214	0.030	0.00
231	19.25	0.10	0.034	0.213	0.030	0.00
232	19.33	0.13	0.046	0.212	0.040	0.01
233	19.42	0.13	0.046	0.211	0.040	0.01
234	19.50	0.13	0.046	0.210	0.040	0.01
235	19.58	0.10	0.034	0.209	0.030	0.00
236	19.67	0.10	0.034	0.208	0.030	0.00
237	19.75	0.10	0.034	0.207	0.030	0.00
238	19.83	0.07	0.023	0.206	0.020	0.00
239	19.92	0.07	0.023	0.205	0.020	0.00
240	20.00	0.07	0.023	0.204	0.020	0.00
241	20.08	0.10	0.034	0.204	0.030	0.00
242	20.17	0.10	0.034	0.203	0.030	0.00
243	20.25	0.10	0.034	0.202	0.030	0.00
244	20.33	0.10	0.034	0.201	0.030	0.00
245	20.42	0.10	0.034	0.200	0.030	0.00

246	20.50	0.10	0.034	0.199	0.030	0.00
247	20.58	0.10	0.034	0.198	0.030	0.00
248	20.67	0.10	0.034	0.197	0.030	0.00
249	20.75	0.10	0.034	0.197	0.030	0.00
250	20.83	0.07	0.023	0.196	0.020	0.00
251	20.92	0.07	0.023	0.195	0.020	0.00
252	21.00	0.07	0.023	0.194	0.020	0.00
253	21.08	0.10	0.034	0.194	0.030	0.00
254	21.17	0.10	0.034	0.193	0.030	0.00
255	21.25	0.10	0.034	0.192	0.030	0.00
256	21.33	0.07	0.023	0.191	0.020	0.00
257	21.42	0.07	0.023	0.191	0.020	0.00
258	21.50	0.07	0.023	0.190	0.020	0.00
259	21.58	0.10	0.034	0.189	0.030	0.00
260	21.67	0.10	0.034	0.188	0.030	0.00
261	21.75	0.10	0.034	0.188	0.030	0.00
262	21.83	0.07	0.023	0.187	0.020	0.00
263	21.92	0.07	0.023	0.186	0.020	0.00
264	22.00	0.07	0.023	0.186	0.020	0.00
265	22.08	0.10	0.034	0.185	0.030	0.00
266	22.17	0.10	0.034	0.185	0.030	0.00
267	22.25	0.10	0.034	0.184	0.030	0.00
268	22.33	0.07	0.023	0.183	0.020	0.00
269	22.42	0.07	0.023	0.183	0.020	0.00
270	22.50	0.07	0.023	0.182	0.020	0.00
271	22.58	0.07	0.023	0.182	0.020	0.00
272	22.67	0.07	0.023	0.181	0.020	0.00
273	22.75	0.07	0.023	0.181	0.020	0.00
274	22.83	0.07	0.023	0.180	0.020	0.00
275	22.92	0.07	0.023	0.180	0.020	0.00
276	23.00	0.07	0.023	0.179	0.020	0.00
277	23.08	0.07	0.023	0.179	0.020	0.00
278	23.17	0.07	0.023	0.179	0.020	0.00
279	23.25	0.07	0.023	0.178	0.020	0.00
280	23.33	0.07	0.023	0.178	0.020	0.00
281	23.42	0.07	0.023	0.178	0.020	0.00
282	23.50	0.07	0.023	0.177	0.020	0.00
283	23.58	0.07	0.023	0.177	0.020	0.00
284	23.67	0.07	0.023	0.177	0.020	0.00
285	23.75	0.07	0.023	0.176	0.020	0.00
286	23.83	0.07	0.023	0.176	0.020	0.00
287	23.92	0.07	0.023	0.176	0.020	0.00
288	24.00	0.07	0.023	0.176	0.020	0.00
Sum =	100.0				Sum =	3.8

Flood volume = Effective rainfall 0.32(In)
times area 153.9(Ac.)/[(In)/(Ft.)] = 4.1(Ac.Ft)
Total soil loss = 2.53(In)
Total soil loss = 32.462(Ac.Ft)
Total rainfall = 2.85(In)
Flood volume = 177642.1 Cubic Feet
Total soil loss = 1414051.8 Cubic Feet

Peak flow rate of this hydrograph = 12.309(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0002	0.02	Q	|	|	|	|
0+10	0.0012	0.15	Q	|	|	|	|
0+15	0.0032	0.30	Q	|	|	|	|
0+20	0.0057	0.36	Q	|	|	|	|
0+25	0.0089	0.46	Q	|	|	|	|
0+30	0.0126	0.55	VQ	|	|	|	|
0+35	0.0167	0.59	VQ	|	|	|	|
0+40	0.0209	0.61	VQ	|	|	|	|

0+45	0.0252	0.62	VQ	|	|	|	|
0+50	0.0296	0.64	VQ	|	|	|	|
0+55	0.0344	0.71	VQ	|	|	|	|
1+ 0	0.0398	0.78	VQ	|	|	|	|
1+ 5	0.0453	0.80	VQ	|	|	|	|
1+10	0.0505	0.75	VQ	|	|	|	|
1+15	0.0552	0.69	VQ	|	|	|	|
1+20	0.0598	0.67	VQ	|	|	|	|
1+25	0.0643	0.65	VQ	|	|	|	|
1+30	0.0688	0.65	VQ	|	|	|	|
1+35	0.0732	0.64	VQ	|	|	|	|
1+40	0.0776	0.64	VQ	|	|	|	|
1+45	0.0820	0.64	VQ	|	|	|	|
1+50	0.0865	0.65	VQ	|	|	|	|
1+55	0.0914	0.71	VQ	|	|	|	|
2+ 0	0.0968	0.79	VQ	|	|	|	|
2+ 5	0.1024	0.81	|Q	|	|	|	|
2+10	0.1081	0.83	|Q	|	|	|	|
2+15	0.1139	0.84	|Q	|	|	|	|
2+20	0.1197	0.84	|Q	|	|	|	|
2+25	0.1255	0.85	|Q	|	|	|	|
2+30	0.1313	0.85	|Q	|	|	|	|
2+35	0.1372	0.86	|Q	|	|	|	|
2+40	0.1436	0.92	|Q	|	|	|	|
2+45	0.1505	1.00	|Q	|	|	|	|
2+50	0.1575	1.02	|VQ	|	|	|	|
2+55	0.1647	1.04	|VQ	|	|	|	|
3+ 0	0.1719	1.05	|VQ	|	|	|	|
3+ 5	0.1792	1.06	|VQ	|	|	|	|
3+10	0.1864	1.06	|VQ	|	|	|	|
3+15	0.1937	1.06	|VQ	|	|	|	|
3+20	0.2010	1.06	|VQ	|	|	|	|
3+25	0.2083	1.06	| Q	|	|	|	|
3+30	0.2156	1.06	| Q	|	|	|	|
3+35	0.2230	1.06	| Q	|	|	|	|
3+40	0.2303	1.06	| Q	|	|	|	|
3+45	0.2376	1.06	| Q	|	|	|	|
3+50	0.2450	1.07	| Q	|	|	|	|
3+55	0.2528	1.14	| Q	|	|	|	|
4+ 0	0.2611	1.21	| Q	|	|	|	|
4+ 5	0.2696	1.24	| Q	|	|	|	|
4+10	0.2782	1.25	| Q	|	|	|	|
4+15	0.2869	1.26	| Q	|	|	|	|
4+20	0.2957	1.28	| Q	|	|	|	|
4+25	0.3050	1.34	| Q	|	|	|	|
4+30	0.3148	1.42	| QV	|	|	|	|
4+35	0.3247	1.45	| QV	|	|	|	|
4+40	0.3348	1.46	| QV	|	|	|	|
4+45	0.3450	1.47	| QV	|	|	|	|
4+50	0.3552	1.49	| QV	|	|	|	|
4+55	0.3660	1.56	| Q	|	|	|	|
5+ 0	0.3772	1.63	| Q	|	|	|	|
5+ 5	0.3885	1.64	| Q	|	|	|	|
5+10	0.3990	1.53	| Q	|	|	|	|
5+15	0.4086	1.39	| Q V	|	|	|	|
5+20	0.4179	1.35	| Q V	|	|	|	|
5+25	0.4274	1.39	| Q V	|	|	|	|
5+30	0.4374	1.44	| Q V	|	|	|	|
5+35	0.4475	1.47	| Q V	|	|	|	|
5+40	0.4581	1.55	| QV	|	|	|	|
5+45	0.4693	1.63	| QV	|	|	|	|
5+50	0.4807	1.66	| QV	|	|	|	|
5+55	0.4923	1.67	| QV	|	|	|	|
6+ 0	0.5039	1.68	| QV	|	|	|	|
6+ 5	0.5156	1.70	| Q V	|	|	|	|
6+10	0.5278	1.77	| Q V	|	|	|	|
6+15	0.5405	1.84	| Q V	|	|	|	|
6+20	0.5534	1.87	| Q V	|	|	|	|
6+25	0.5664	1.89	| Q V	|	|	|	|
6+30	0.5794	1.90	| Q V	|	|	|	|
6+35	0.5926	1.92	| Q V	|	|	|	|

```
 6+40       0.6063      1.98  |  Q V    |         |         |         |
 6+45       0.6204      2.06  |   Q V   |         |         |         |
 6+50       0.6348      2.08  |   Q V   |         |         |         |
 6+55       0.6493      2.10  |   Q V   |         |         |         |
 7+ 0       0.6638      2.11  |   Q V   |         |         |         |
 7+ 5       0.6784      2.12  |   Q V   |         |         |         |
 7+10       0.6930      2.12  |   Q V   |         |         |         |
 7+15       0.7076      2.12  |   Q V   |         |         |         |
 7+20       0.7222      2.13  |   Q  V  |         |         |         |
 7+25       0.7374      2.20  |   Q  V  |         |         |         |
 7+30       0.7530      2.27  |   Q  V  |         |         |         |
 7+35       0.7689      2.31  |   Q  V  |         |         |         |
 7+40       0.7853      2.39  |   Q  V  |         |         |         |
 7+45       0.8024      2.47  |   Q  V  |         |         |         |
 7+50       0.8197      2.52  |    Q  V |         |         |         |
 7+55       0.8376      2.60  |    Q  V |         |         |         |
 8+ 0       0.8560      2.68  |    Q  V |         |         |         |
 8+ 5       0.8749      2.74  |    Q  V |         |         |         |
 8+10       0.8947      2.88  |    Q  V |         |         |         |
 8+15       0.9157      3.04  |     Q V |         |         |         |
 8+20       0.9370      3.10  |     Q  V|         |         |         |
 8+25       0.9587      3.14  |     Q  V|         |         |         |
 8+30       0.9804      3.16  |     Q  V|         |         |         |
 8+35       1.0023      3.18  |     Q  V|         |         |         |
 8+40       1.0247      3.25  |     Q   V         |         |         |
 8+45       1.0476      3.33  |     Q   V         |         |         |
 8+50       1.0708      3.37  |     Q   V         |         |         |
 8+55       1.0945      3.45  |     Q   V         |         |         |
 9+ 0       1.1189      3.53  |      Q  V         |         |         |
 9+ 5       1.1436      3.59  |      Q  |V        |         |         |
 9+10       1.1693      3.73  |      Q  |V        |         |         |
 9+15       1.1961      3.89  |      Q  |V        |         |         |
 9+20       1.2234      3.96  |      Q  |V        |         |         |
 9+25       1.2513      4.06  |       Q | V       |         |         |
 9+30       1.2799      4.16  |       Q | V       |         |         |
 9+35       1.3089      4.21  |       Q | V       |         |         |
 9+40       1.3384      4.29  |       Q |  V      |         |         |
 9+45       1.3686      4.38  |       Q |  V      |         |         |
 9+50       1.3990      4.42  |       Q |  V      |         |         |
 9+55       1.4301      4.50  |        Q|   V     |         |         |
10+ 0       1.4617      4.59  |        Q|   V     |         |         |
10+ 5       1.4930      4.55  |        Q|   V     |         |         |
10+10       1.5214      4.12  |       Q |   V     |         |         |
10+15       1.5463      3.62  |      Q  |    V    |         |         |
10+20       1.5700      3.43  |     Q   |    V    |         |         |
10+25       1.5929      3.33  |     Q   |    V    |         |         |
10+30       1.6153      3.26  |     Q   |    V    |         |         |
10+35       1.6379      3.28  |     Q   |     V   |         |         |
10+40       1.6626      3.58  |      Q  |     V   |         |         |
10+45       1.6897      3.94  |      Q  |     V   |         |         |
10+50       1.7177      4.07  |       Q |     V   |         |         |
10+55       1.7463      4.14  |       Q |      V  |         |         |
11+ 0       1.7751      4.19  |       Q |      V  |         |         |
11+ 5       1.8041      4.20  |       Q |      V  |         |         |
11+10       1.8327      4.15  |       Q |      V  |         |         |
11+15       1.8608      4.08  |       Q |       V |         |         |
11+20       1.8888      4.06  |       Q |       V |         |         |
11+25       1.9167      4.05  |       Q |       V |         |         |
11+30       1.9445      4.04  |       Q |        V|         |         |
11+35       1.9722      4.02  |       Q |        V|         |         |
11+40       1.9989      3.89  |      Q  |        V|         |         |
11+45       2.0247      3.74  |      Q  |        V|         |         |
11+50       2.0501      3.69  |      Q  |         V         |         |
11+55       2.0758      3.72  |      Q  |         V         |         |
12+ 0       2.1018      3.78  |      Q  |         V         |         |
12+ 5       2.1285      3.87  |      Q  |         V         |         |
12+10       2.1583      4.32  |       Q |         |V        |         |
12+15       2.1917      4.85  |        Q|         |V        |         |
12+20       2.2265      5.06  |         Q         |V        |         |
12+25       2.2625      5.23  |         Q         | V       |         |
12+30       2.2995      5.37  |         Q         | V       |         |
```

12+35	2.3350	5.15	| Q | V | |
12+40	2.3596	3.57	| Q | | V | |
12+45	2.3717	1.76	| Q | | V | |
12+50	2.3810	1.35	| Q | | V | |
12+55	2.3926	1.68	| Q | | V | |
13+ 0	2.4082	2.28	| Q | | V | |
13+ 5	2.4293	3.06	| Q | | V | |
13+10	2.4706	5.99	| Q | V | |
13+15	2.5351	9.37	| Q | V | |
13+20	2.6093	10.76	| Q V | |
13+25	2.6895	11.65	| Q V | |
13+30	2.7742	12.30	| Q V | |
13+35	2.8590	12.31	| Q V | |
13+40	2.9283	10.07	| Q V | |
13+45	2.9781	7.24	| Q V | |
13+50	3.0211	6.24	| Q V | |
13+55	3.0602	5.67	| Q V | |
14+ 0	3.0968	5.32	| Q V | |
14+ 5	3.1312	4.99	| Q | V | |
14+10	3.1603	4.24	| Q | V | |
14+15	3.1842	3.47	| Q | | V |
14+20	3.2064	3.22	| Q | | V |
14+25	3.2249	2.68	| Q | | V |
14+30	3.2397	2.15	| Q | | V |
14+35	3.2540	2.07	| Q | | V |
14+40	3.2687	2.14	| Q | | V |
14+45	3.2843	2.27	| Q | | V |
14+50	3.3004	2.34	| Q | | V |
14+55	3.3142	2.01	| Q | | V |
15+ 0	3.3252	1.59	| Q | | V |
15+ 5	3.3373	1.76	| Q | | V |
15+10	3.3549	2.56	| Q | | V |
15+15	3.3711	2.35	| Q | | V |
15+20	3.3806	1.38	| Q | | V |
15+25	3.3972	2.42	| Q | | V |
15+30	3.4234	3.80	| Q | | V |
15+35	3.4524	4.21	| Q | | V |
15+40	3.4814	4.21	| Q | | V |
15+45	3.5095	4.08	| Q | | V |
15+50	3.5376	4.08	| Q | | V |
15+55	3.5656	4.06	| Q | | V |
16+ 0	3.5934	4.04	| Q | | V |
16+ 5	3.6200	3.86	| Q | | V |
16+10	3.6401	2.92	| Q | | V |
16+15	3.6526	1.81	| Q | | V |
16+20	3.6623	1.41	| Q | | V |
16+25	3.6704	1.17	| Q | | V |
16+30	3.6774	1.02	| Q | | V |
16+35	3.6838	0.93	| Q | | V |
16+40	3.6895	0.83	| Q | | V |
16+45	3.6945	0.73	| Q | | V |
16+50	3.6993	0.69	| Q | | V |
16+55	3.7039	0.67	| Q | | V |
17+ 0	3.7084	0.65	| Q | | V |
17+ 5	3.7130	0.67	| Q | | V |
17+10	3.7184	0.79	| Q | | V |
17+15	3.7249	0.94	| Q | | V |
17+20	3.7317	0.99	| Q | | V |
17+25	3.7387	1.02	| Q | | V |
17+30	3.7458	1.04	| Q | | V |
17+35	3.7531	1.05	| Q | | V |
17+40	3.7603	1.05	| Q | | V |
17+45	3.7676	1.06	| Q | | V |
17+50	3.7748	1.05	| Q | | V |
17+55	3.7816	0.99	| Q | | V |
18+ 0	3.7879	0.91	| Q | | V |
18+ 5	3.7940	0.89	| Q | | V |
18+10	3.8000	0.87	| Q | | V |
18+15	3.8059	0.86	| Q | | V |
18+20	3.8118	0.85	| Q | | V |
18+25	3.8177	0.85	| Q | | V |

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18+30       3.8235      0.85  |Q        |          |          |      V   |
18+35       3.8293      0.84  |Q        |          |          |      V   |
18+40       3.8346      0.78  |Q        |          |          |      V   |
18+45       3.8395      0.70  |Q        |          |          |      V   |
18+50       3.8440      0.66  |Q        |          |          |      V   |
18+55       3.8480      0.58  |Q        |          |          |      V   |
19+ 0       3.8515      0.50  Q         |          |          |      V   |
19+ 5       3.8548      0.48  Q         |          |          |      V   |
19+10       3.8584      0.52  |Q        |          |          |      V   |
19+15       3.8624      0.59  |Q        |          |          |      V   |
19+20       3.8667      0.62  |Q        |          |          |      V   |
19+25       3.8715      0.69  |Q        |          |          |      V   |
19+30       3.8768      0.78  |Q        |          |          |       V  |
19+35       3.8823      0.80  |Q        |          |          |       V  |
19+40       3.8875      0.75  |Q        |          |          |       V  |
19+45       3.8922      0.69  |Q        |          |          |       V  |
19+50       3.8967      0.65  |Q        |          |          |       V  |
19+55       3.9007      0.58  |Q        |          |          |       V  |
20+ 0       3.9041      0.50  Q         |          |          |       V  |
20+ 5       3.9074      0.48  Q         |          |          |       V  |
20+10       3.9110      0.52  |Q        |          |          |       V  |
20+15       3.9150      0.59  |Q        |          |          |       V  |
20+20       3.9192      0.61  |Q        |          |          |       V  |
20+25       3.9235      0.62  |Q        |          |          |       V  |
20+30       3.9278      0.63  |Q        |          |          |       V  |
20+35       3.9322      0.63  |Q        |          |          |       V  |
20+40       3.9365      0.63  |Q        |          |          |       V  |
20+45       3.9409      0.63  |Q        |          |          |       V  |
20+50       3.9452      0.62  |Q        |          |          |       V  |
20+55       3.9491      0.56  |Q        |          |          |       V  |
21+ 0       3.9524      0.49  Q         |          |          |       V  |
21+ 5       3.9557      0.47  Q         |          |          |       V  |
21+10       3.9593      0.52  |Q        |          |          |       V  |
21+15       3.9633      0.58  |Q        |          |          |       V  |
21+20       3.9674      0.59  |Q        |          |          |       V  |
21+25       3.9711      0.54  |Q        |          |          |       V  |
21+30       3.9744      0.48  Q         |          |          |       V  |
21+35       3.9777      0.47  Q         |          |          |        V |
21+40       3.9812      0.52  |Q        |          |          |        V |
21+45       3.9852      0.58  |Q        |          |          |        V |
21+50       3.9893      0.59  |Q        |          |          |        V |
21+55       3.9931      0.54  |Q        |          |          |        V |
22+ 0       3.9964      0.48  Q         |          |          |        V |
22+ 5       3.9996      0.47  Q         |          |          |        V |
22+10       4.0031      0.52  |Q        |          |          |        V |
22+15       4.0072      0.58  |Q        |          |          |        V |
22+20       4.0112      0.59  |Q        |          |          |        V |
22+25       4.0150      0.54  |Q        |          |          |        V |
22+30       4.0183      0.48  Q         |          |          |        V |
22+35       4.0214      0.46  Q         |          |          |        V |
22+40       4.0245      0.44  Q         |          |          |        V |
22+45       4.0275      0.43  Q         |          |          |        V |
22+50       4.0304      0.43  Q         |          |          |        V |
22+55       4.0334      0.43  Q         |          |          |        V |
23+ 0       4.0363      0.43  Q         |          |          |        V |
23+ 5       4.0392      0.43  Q         |          |          |        V |
23+10       4.0422      0.43  Q         |          |          |        V |
23+15       4.0451      0.42  Q         |          |          |        V |
23+20       4.0480      0.42  Q         |          |          |        V |
23+25       4.0509      0.42  Q         |          |          |        V |
23+30       4.0539      0.42  Q         |          |          |        V |
23+35       4.0568      0.42  Q         |          |          |        V |
23+40       4.0597      0.42  Q         |          |          |        V |
23+45       4.0626      0.42  Q         |          |          |        V |
23+50       4.0656      0.42  Q         |          |          |        V |
23+55       4.0685      0.42  Q         |          |          |        V |
24+ 0       4.0714      0.42  Q         |          |          |        V |
24+ 5       4.0742      0.40  Q         |          |          |        V |
24+10       4.0761      0.28  Q         |          |          |        V |
24+15       4.0770      0.13  Q         |          |          |        V |
24+20       4.0775      0.07  Q         |          |          |        V |
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   24+25       4.0778      0.04  Q         |          |          |        V|
   24+30       4.0779      0.02  Q         |          |          |        V|
   24+35       4.0780      0.01  Q         |          |          |        V|
   24+40       4.0780      0.01  Q         |          |          |        V|
   24+45       4.0781      0.00  Q         |          |          |        V|
   24+50       4.0781      0.00  Q         |          |          |        V|
   24+55       4.0781      0.00  Q         |          |          |        V|
   25+ 0       4.0781      0.00  Q         |          |          |         V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA15R15.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 5-YEAR AND 1-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.032
Lag time = 0.141 Hr.
Lag time = 8.45 Min.
25% of lag time = 2.11 Min.
40% of lag time = 3.38 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	0.62	95.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.45	223.16

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 0.814(In)
Areal adjustment factor = 99.86 %
Adjusted average point rain = 0.813(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

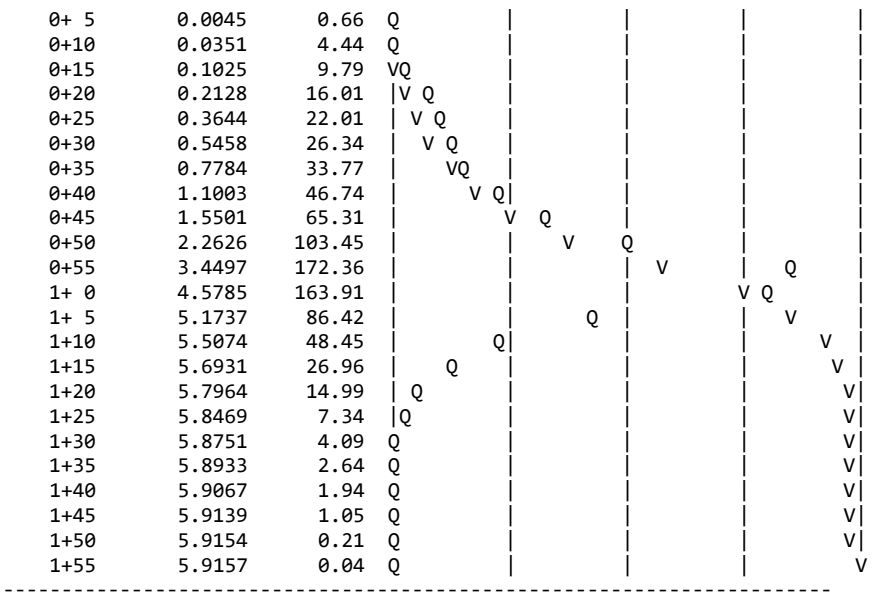
Total Area Entered = 153.90(Ac.)

```
       RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
       AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
       85.1  70.2      0.360     0.025        0.352       1.000      0.352
                                                        Sum (F) =   0.352
       Area averaged mean soil loss (F) (In/Hr) =  0.352
       Minimum soil loss rate ((In/Hr)) =  0.176
       (for 24 hour storm duration)
       Soil low loss rate (decimal) =   0.880
       ------------------------------------------------------------------------
       Slope of intensity-duration curve for a 1 hour storm =0.4800
       ------------------------------------------------------------------------

                     U n i t  H y d r o g r a p h
                             FOOTHILL S-Curve
       ------------------------------------------------------------------
                     Unit Hydrograph Data
       ------------------------------------------------------------------------
       Unit time period   Time % of lag   Distribution   Unit Hydrograph
           (hrs)                          Graph %            (CFS)
       ------------------------------------------------------------------------
           1   0.083         59.202          5.480              8.500
           2   0.167        118.404         30.773             47.729
           3   0.250        177.606         34.453             53.438
           4   0.333        236.808         12.534             19.441
           5   0.417        296.010          7.240             11.230
           6   0.500        355.212          4.431              6.873
           7   0.583        414.414          2.495              3.870
           8   0.667        473.616          1.012              1.569
           9   0.750        532.819          0.577              0.895
          10   0.833        592.021          0.409              0.634
          11   0.917        651.223          0.380              0.589
          12   1.000        710.425          0.216              0.335
                                     Sum = 100.000   Sum=     155.102
------------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     4.40      0.429         0.352      ---          0.08
    2   0.17     4.50      0.439         0.352      ---          0.09
    3   0.25     5.40      0.527         0.352      ---          0.17
    4   0.33     5.40      0.527         0.352      ---          0.17
    5   0.42     5.70      0.556         0.352      ---          0.20
    6   0.50     6.40      0.625         0.352      ---          0.27
    7   0.58     7.90      0.771         0.352      ---          0.42
    8   0.67     9.10      0.888         0.352      ---          0.54
    9   0.75    12.80      1.249         0.352      ---          0.90
   10   0.83    25.60      2.498         0.352      ---          2.15
   11   0.92     7.90      0.771         0.352      ---          0.42
   12   1.00     4.90      0.478         0.352      ---          0.13
      Sum =     100.0                                  Sum =     5.5
         Flood volume = Effective rainfall      0.46(In)
          times area     153.9(Ac.)/[(In)/(Ft.)] =       5.9(Ac.Ft)
         Total soil loss =      0.35(In)
         Total soil loss =     4.515(Ac.Ft)
         Total rainfall =      0.81(In)
         Flood volume =      257686.6 Cubic Feet
         Total soil loss =      196652.6 Cubic Feet
         ------------------------------------------------------------------
          Peak flow rate of this hydrograph =    172.359(CFS)
         ------------------------------------------------------------------
         ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                             1 - H O U R    S T O R M
                        R u n o f f      H y d r o g r a p h
         ------------------------------------------------------------------
                    Hydrograph in   5   Minute intervals ((CFS))

         ------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
```



0+ 5	0.0045	0.66	Q
0+10	0.0351	4.44	Q
0+15	0.1025	9.79	VQ
0+20	0.2128	16.01	V Q
0+25	0.3644	22.01	V Q
0+30	0.5458	26.34	V Q
0+35	0.7784	33.77	VQ
0+40	1.1003	46.74	V Q
0+45	1.5501	65.31	V Q
0+50	2.2626	103.45	V Q
0+55	3.4497	172.36	V Q
1+ 0	4.5785	163.91	V Q
1+ 5	5.1737	86.42	Q V
1+10	5.5074	48.45	Q V
1+15	5.6931	26.96	Q V
1+20	5.7964	14.99	Q V
1+25	5.8469	7.34	Q V
1+30	5.8751	4.09	Q V
1+35	5.8933	2.64	Q V
1+40	5.9067	1.94	Q V
1+45	5.9139	1.05	Q V
1+50	5.9154	0.21	Q V
1+55	5.9157	0.04	Q V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA35R35.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 5-YEAR AND 3-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.032
Lag time = 0.141 Hr.
Lag time = 8.45 Min.
25% of lag time = 2.11 Min.
40% of lag time = 3.38 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.06	163.13

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	2.63	404.76

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.060(In)
Area Averaged 100-Year Rainfall = 2.630(In)

Point rain (area averaged) = 1.428(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 1.427(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	70.2	0.360	0.025	0.352	1.000	0.352
					Sum (F) =	0.352

Area averaged mean soil loss (F) (In/Hr) = 0.352
Minimum soil loss rate ((In/Hr)) = 0.176
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	59.202	5.480	8.500
2	0.167	118.404	30.773	47.729
3	0.250	177.606	34.453	53.438
4	0.333	236.808	12.534	19.441
5	0.417	296.010	7.240	11.230
6	0.500	355.212	4.431	6.873
7	0.583	414.414	2.495	3.870
8	0.667	473.616	1.012	1.569
9	0.750	532.819	0.577	0.895
10	0.833	592.021	0.409	0.634
11	0.917	651.223	0.380	0.589
12	1.000	710.425	0.216	0.335
			Sum = 100.000	Sum= 155.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.223	0.352	0.196	0.03
2	0.17	1.30	0.223	0.352	0.196	0.03
3	0.25	1.10	0.188	0.352	0.166	0.02
4	0.33	1.50	0.257	0.352	0.226	0.03
5	0.42	1.50	0.257	0.352	0.226	0.03
6	0.50	1.80	0.308	0.352	0.271	0.04
7	0.58	1.50	0.257	0.352	0.226	0.03
8	0.67	1.80	0.308	0.352	0.271	0.04
9	0.75	1.80	0.308	0.352	0.271	0.04
10	0.83	1.50	0.257	0.352	0.226	0.03
11	0.92	1.60	0.274	0.352	0.241	0.03
12	1.00	1.80	0.308	0.352	0.271	0.04
13	1.08	2.20	0.377	0.352	---	0.02
14	1.17	2.20	0.377	0.352	---	0.02
15	1.25	2.20	0.377	0.352	---	0.02
16	1.33	2.00	0.342	0.352	0.301	0.04
17	1.42	2.60	0.445	0.352	---	0.09
18	1.50	2.70	0.462	0.352	---	0.11
19	1.58	2.40	0.411	0.352	---	0.06
20	1.67	2.70	0.462	0.352	---	0.11
21	1.75	3.30	0.565	0.352	---	0.21
22	1.83	3.10	0.531	0.352	---	0.18
23	1.92	2.90	0.497	0.352	---	0.14
24	2.00	3.00	0.514	0.352	---	0.16
25	2.08	3.10	0.531	0.352	---	0.18
26	2.17	4.20	0.719	0.352	---	0.37
27	2.25	5.00	0.856	0.352	---	0.50
28	2.33	3.50	0.599	0.352	---	0.25
29	2.42	6.80	1.164	0.352	---	0.81
30	2.50	7.30	1.250	0.352	---	0.90
31	2.58	8.20	1.404	0.352	---	1.05
32	2.67	5.90	1.010	0.352	---	0.66
33	2.75	2.00	0.342	0.352	0.301	0.04

34	2.83	1.80	0.308	0.352	0.271	0.04
35	2.92	1.80	0.308	0.352	0.271	0.04
36	3.00	0.60	0.103	0.352	0.090	0.01
Sum =		100.0			Sum =	6.4

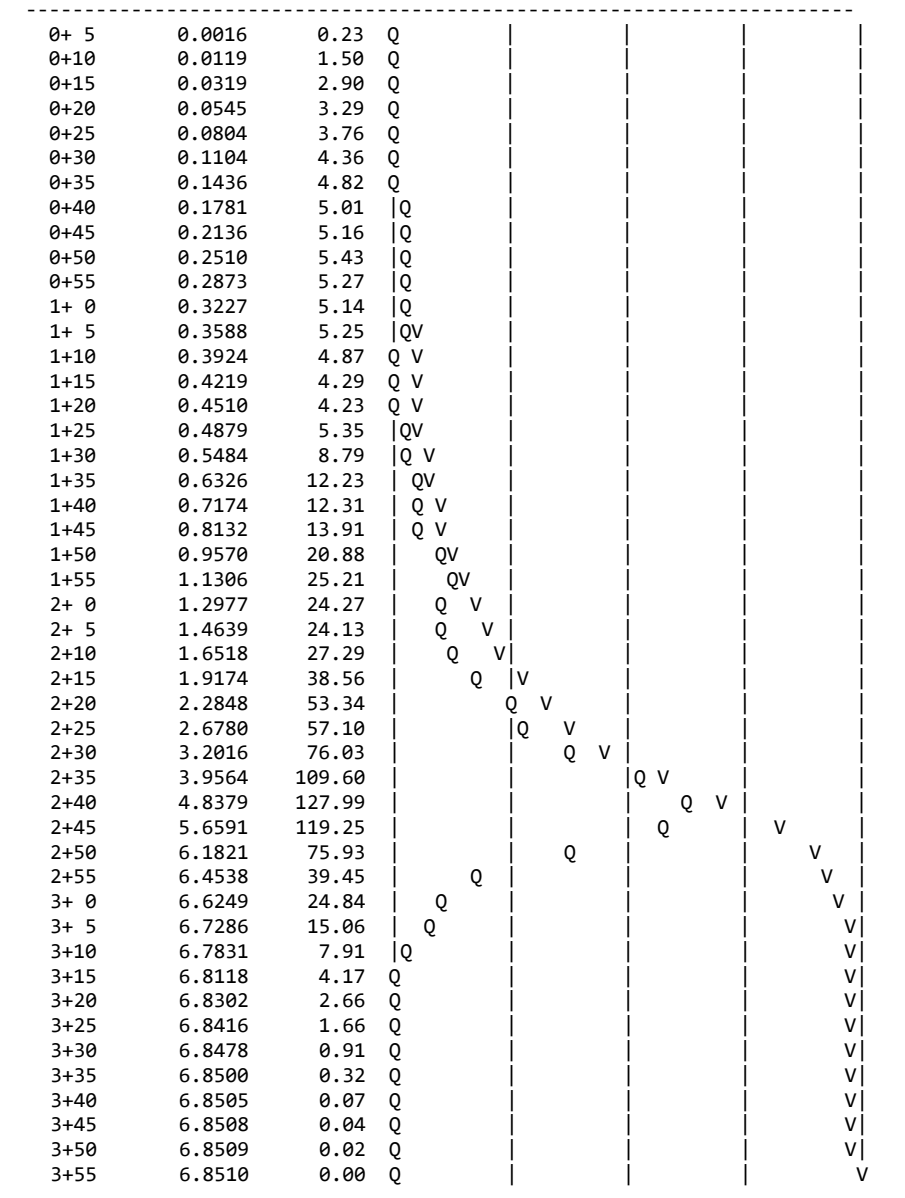
Flood volume = Effective rainfall 0.53(In)
times area 153.9(Ac.)/[(In)/(Ft.)] = 6.9(Ac.Ft)
Total soil loss = 0.89(In)
Total soil loss = 11.447(Ac.Ft)
Total rainfall = 1.43(In)
Flood volume = 298428.1 Cubic Feet
Total soil loss = 498647.4 Cubic Feet

Peak flow rate of this hydrograph = 127.992(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))



U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA65R65.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 5-YEAR AND 6-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.032
Lag time = 0.141 Hr.
Lag time = 8.45 Min.
25% of lag time = 2.11 Min.
40% of lag time = 3.38 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.52	233.93

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	3.75	577.13

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.520(In)
Area Averaged 100-Year Rainfall = 3.750(In)

Point rain (area averaged) = 2.042(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 2.041(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	70.2	0.360	0.025	0.352	1.000	0.352
					Sum (F) =	0.352

Area averaged mean soil loss (F) (In/Hr) = 0.352
Minimum soil loss rate ((In/Hr)) = 0.176
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	59.202	5.480	8.500
2	0.167	118.404	30.773	47.729
3	0.250	177.606	34.453	53.438
4	0.333	236.808	12.534	19.441
5	0.417	296.010	7.240	11.230
6	0.500	355.212	4.431	6.873
7	0.583	414.414	2.495	3.870
8	0.667	473.616	1.012	1.569
9	0.750	532.819	0.577	0.895
10	0.833	592.021	0.409	0.634
11	0.917	651.223	0.380	0.589
12	1.000	710.425	0.216	0.335
			Sum = 100.000	Sum= 155.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.122	0.352	0.108	0.01
2	0.17	0.60	0.147	0.352	0.129	0.02
3	0.25	0.60	0.147	0.352	0.129	0.02
4	0.33	0.60	0.147	0.352	0.129	0.02
5	0.42	0.60	0.147	0.352	0.129	0.02
6	0.50	0.70	0.171	0.352	0.151	0.02
7	0.58	0.70	0.171	0.352	0.151	0.02
8	0.67	0.70	0.171	0.352	0.151	0.02
9	0.75	0.70	0.171	0.352	0.151	0.02
10	0.83	0.70	0.171	0.352	0.151	0.02
11	0.92	0.70	0.171	0.352	0.151	0.02
12	1.00	0.80	0.196	0.352	0.172	0.02
13	1.08	0.80	0.196	0.352	0.172	0.02
14	1.17	0.80	0.196	0.352	0.172	0.02
15	1.25	0.80	0.196	0.352	0.172	0.02
16	1.33	0.80	0.196	0.352	0.172	0.02
17	1.42	0.80	0.196	0.352	0.172	0.02
18	1.50	0.80	0.196	0.352	0.172	0.02
19	1.58	0.80	0.196	0.352	0.172	0.02
20	1.67	0.80	0.196	0.352	0.172	0.02
21	1.75	0.80	0.196	0.352	0.172	0.02
22	1.83	0.80	0.196	0.352	0.172	0.02
23	1.92	0.80	0.196	0.352	0.172	0.02
24	2.00	0.90	0.220	0.352	0.194	0.03
25	2.08	0.80	0.196	0.352	0.172	0.02
26	2.17	0.90	0.220	0.352	0.194	0.03
27	2.25	0.90	0.220	0.352	0.194	0.03
28	2.33	0.90	0.220	0.352	0.194	0.03
29	2.42	0.90	0.220	0.352	0.194	0.03
30	2.50	0.90	0.220	0.352	0.194	0.03
31	2.58	0.90	0.220	0.352	0.194	0.03
32	2.67	0.90	0.220	0.352	0.194	0.03
33	2.75	1.00	0.245	0.352	0.216	0.03

34	2.83	1.00	0.245	0.352	0.216	0.03
35	2.92	1.00	0.245	0.352	0.216	0.03
36	3.00	1.00	0.245	0.352	0.216	0.03
37	3.08	1.00	0.245	0.352	0.216	0.03
38	3.17	1.10	0.269	0.352	0.237	0.03
39	3.25	1.10	0.269	0.352	0.237	0.03
40	3.33	1.10	0.269	0.352	0.237	0.03
41	3.42	1.20	0.294	0.352	0.259	0.04
42	3.50	1.30	0.318	0.352	0.280	0.04
43	3.58	1.40	0.343	0.352	0.302	0.04
44	3.67	1.40	0.343	0.352	0.302	0.04
45	3.75	1.50	0.367	0.352	---	0.02
46	3.83	1.50	0.367	0.352	---	0.02
47	3.92	1.60	0.392	0.352	---	0.04
48	4.00	1.60	0.392	0.352	---	0.04
49	4.08	1.70	0.416	0.352	---	0.06
50	4.17	1.80	0.441	0.352	---	0.09
51	4.25	1.90	0.465	0.352	---	0.11
52	4.33	2.00	0.490	0.352	---	0.14
53	4.42	2.10	0.514	0.352	---	0.16
54	4.50	2.10	0.514	0.352	---	0.16
55	4.58	2.20	0.539	0.352	---	0.19
56	4.67	2.30	0.563	0.352	---	0.21
57	4.75	2.40	0.588	0.352	---	0.24
58	4.83	2.40	0.588	0.352	---	0.24
59	4.92	2.50	0.612	0.352	---	0.26
60	5.00	2.60	0.637	0.352	---	0.28
61	5.08	3.10	0.759	0.352	---	0.41
62	5.17	3.60	0.882	0.352	---	0.53
63	5.25	3.90	0.955	0.352	---	0.60
64	5.33	4.20	1.029	0.352	---	0.68
65	5.42	4.70	1.151	0.352	---	0.80
66	5.50	5.60	1.372	0.352	---	1.02
67	5.58	1.90	0.465	0.352	---	0.11
68	5.67	0.90	0.220	0.352	0.194	0.03
69	5.75	0.60	0.147	0.352	0.129	0.02
70	5.83	0.50	0.122	0.352	0.108	0.01
71	5.92	0.30	0.073	0.352	0.065	0.01
72	6.00	0.20	0.049	0.352	0.043	0.01
Sum =	100.0				Sum =	7.6

Flood volume = Effective rainfall 0.63(In)
times area 153.9(Ac.)/[(In)/(Ft.)] = 8.1(Ac.Ft)
Total soil loss = 1.41(In)
Total soil loss = 18.052(Ac.Ft)
Total rainfall = 2.04(In)
Flood volume = 354003.1 Cubic Feet
Total soil loss = 786349.7 Cubic Feet

Peak flow rate of this hydrograph = 118.593(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0009	0.12	Q	|	|	|	|
0+10	0.0067	0.85	Q	|	|	|	|
0+15	0.0190	1.78	Q	|	|	|	|
0+20	0.0343	2.22	Q	|	|	|	|
0+25	0.0511	2.44	Q	|	|	|	|
0+30	0.0690	2.60	Q	|	|	|	|
0+35	0.0884	2.82	Q	|	|	|	|
0+40	0.1092	3.01	Q	|	|	|	|
0+45	0.1304	3.09	Q	|	|	|	|
0+50	0.1520	3.13	Q	|	|	|	|
0+55	0.1738	3.16	Q	|	|	|	|
1+ 0	0.1959	3.21	Q	|	|	|	|

```
1+ 5       0.2189      3.35  QV        |         |         |         |
1+10       0.2431      3.51  QV        |         |         |         |
1+15       0.2677      3.57  QV        |         |         |         |
1+20       0.2925      3.60  QV        |         |         |         |
1+25       0.3175      3.63  QV        |         |         |         |
1+30       0.3425      3.64  QV        |         |         |         |
1+35       0.3676      3.64  QV        |         |         |         |
1+40       0.3927      3.64  QV        |         |         |         |
1+45       0.4178      3.65  Q V       |         |         |         |
1+50       0.4430      3.65  Q V       |         |         |         |
1+55       0.4681      3.65  Q V       |         |         |         |
2+ 0       0.4934      3.67  Q V       |         |         |         |
2+ 5       0.5195      3.79  Q V       |         |         |         |
2+10       0.5459      3.83  Q V       |         |         |         |
2+15       0.5726      3.87  Q V       |         |         |         |
2+20       0.6001      4.00  Q V       |         |         |         |
2+25       0.6280      4.05  Q  V      |         |         |         |
2+30       0.6561      4.07  Q  V      |         |         |         |
2+35       0.6842      4.09  Q  V      |         |         |         |
2+40       0.7124      4.10  Q  V      |         |         |         |
2+45       0.7408      4.12  Q  V      |         |         |         |
2+50       0.7702      4.27  Q  V      |         |         |         |
2+55       0.8007      4.43  Q  V      |         |         |         |
3+ 0       0.8316      4.48  Q   V     |         |         |         |
3+ 5       0.8627      4.52  Q   V     |         |         |         |
3+10       0.8941      4.56  Q   V     |         |         |         |
3+15       0.9266      4.71  Q   V     |         |         |         |
3+20       0.9602      4.88  Q   V     |         |         |         |
3+25       0.9944      4.96  Q   V     |         |         |         |
3+30       1.0299      5.16  |Q   V     |         |         |         |
3+35       1.0678      5.51  |Q   V     |         |         |         |
3+40       1.1083      5.87  |Q   V     |         |         |         |
3+45       1.1490      5.91  |Q   V     |         |         |         |
3+50       1.1820      4.79  Q    V     |         |         |         |
3+55       1.2074      3.69  Q    V     |         |         |         |
4+ 0       1.2376      4.40  Q     V    |         |         |         |
4+ 5       1.2765      5.64  |Q    V    |         |         |         |
4+10       1.3270      7.33  |Q    V    |         |         |         |
4+15       1.3973     10.20  | Q   V    |         |         |         |
4+20       1.4902     13.50  | Q    V   |         |         |         |
4+25       1.6074     17.01  |  Q   V   |         |         |         |
4+30       1.7481     20.43  |   Q   V  |         |         |         |
4+35       1.9063     22.97  |   Q    V|         |         |         |
4+40       2.0813     25.41  |    Q    V         |         |         |
4+45       2.2791     28.71  |    Q    |V        |         |         |
4+50       2.4996     32.02  |     Q   | V       |         |         |
4+55       2.7370     34.47  |     Q   |  V      |         |         |
5+ 0       2.9909     36.87  |      Q  |   V     |         |         |
5+ 5       3.2732     40.99  |       Q |     V   |         |         |
5+10       3.6175     50.00  |         Q      V  |         |         |
5+15       4.0580     63.95  |         | Q      V|         |         |
5+20       4.5920     77.55  |         |    Q     | V       |         |
5+25       5.2126     90.10  |         |       Q  |    V    |         |
5+30       5.9396    105.57  |         |          |Q       V|         |
5+35       6.7564    118.59  |         |          |  Q      |  V      |
5+40       7.3817     90.79  |         |       Q  |         |    V    |
5+45       7.6908     44.89  |       Q |          |         |     V   |
5+50       7.8705     26.10  |    Q    |          |         |      V  |
5+55       7.9800     15.89  |  Q      |          |         |       V |
6+ 0       8.0441      9.32  |Q        |          |         |       V |
6+ 5       8.0795      5.14  |Q        |          |         |       V |
6+10       8.1007      3.07  Q         |          |         |       V |
6+15       8.1136      1.87  Q         |          |         |       V |
6+20       8.1217      1.18  Q         |          |         |       V |
6+25       8.1254      0.54  Q         |          |         |       V |
6+30       8.1262      0.11  Q         |          |         |       V |
6+35       8.1265      0.05  Q         |          |         |       V |
6+40       8.1266      0.03  Q         |          |         |       V |
6+45       8.1267      0.01  Q         |          |         |       V |
6+50       8.1268      0.01  Q         |          |         |       V |
6+55       8.1268      0.00  Q         |          |         |        V
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA245R245.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 5-YEAR AND 24-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.032
Lag time = 0.141 Hr.
Lag time = 8.45 Min.
25% of lag time = 2.11 Min.
40% of lag time = 3.38 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	2.85	438.62

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	8.85	1362.02

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.850(In)
Area Averaged 100-Year Rainfall = 8.850(In)

Point rain (area averaged) = 4.255(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 4.254(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	70.2	0.360	0.025	0.352	1.000	0.352
					Sum (F) =	0.352

Area averaged mean soil loss (F) (In/Hr) = 0.352
Minimum soil loss rate ((In/Hr)) = 0.176
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	59.202	5.480	8.500
2	0.167	118.404	30.773	47.729
3	0.250	177.606	34.453	53.438
4	0.333	236.808	12.534	19.441
5	0.417	296.010	7.240	11.230
6	0.500	355.212	4.431	6.873
7	0.583	414.414	2.495	3.870
8	0.667	473.616	1.012	1.569
9	0.750	532.819	0.577	0.895
10	0.833	592.021	0.409	0.634
11	0.917	651.223	0.380	0.589
12	1.000	710.425	0.216	0.335
			Sum = 100.000	Sum= 155.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.034	0.624	0.030	0.00
2	0.17	0.07	0.034	0.622	0.030	0.00
3	0.25	0.07	0.034	0.619	0.030	0.00
4	0.33	0.10	0.051	0.617	0.045	0.01
5	0.42	0.10	0.051	0.614	0.045	0.01
6	0.50	0.10	0.051	0.612	0.045	0.01
7	0.58	0.10	0.051	0.610	0.045	0.01
8	0.67	0.10	0.051	0.607	0.045	0.01
9	0.75	0.10	0.051	0.605	0.045	0.01
10	0.83	0.13	0.068	0.602	0.060	0.01
11	0.92	0.13	0.068	0.600	0.060	0.01
12	1.00	0.13	0.068	0.598	0.060	0.01
13	1.08	0.10	0.051	0.595	0.045	0.01
14	1.17	0.10	0.051	0.593	0.045	0.01
15	1.25	0.10	0.051	0.591	0.045	0.01
16	1.33	0.10	0.051	0.588	0.045	0.01
17	1.42	0.10	0.051	0.586	0.045	0.01
18	1.50	0.10	0.051	0.584	0.045	0.01
19	1.58	0.10	0.051	0.581	0.045	0.01
20	1.67	0.10	0.051	0.579	0.045	0.01
21	1.75	0.10	0.051	0.577	0.045	0.01
22	1.83	0.13	0.068	0.574	0.060	0.01
23	1.92	0.13	0.068	0.572	0.060	0.01
24	2.00	0.13	0.068	0.570	0.060	0.01
25	2.08	0.13	0.068	0.567	0.060	0.01
26	2.17	0.13	0.068	0.565	0.060	0.01
27	2.25	0.13	0.068	0.563	0.060	0.01
28	2.33	0.13	0.068	0.561	0.060	0.01
29	2.42	0.13	0.068	0.558	0.060	0.01
30	2.50	0.13	0.068	0.556	0.060	0.01
31	2.58	0.17	0.085	0.554	0.075	0.01
32	2.67	0.17	0.085	0.551	0.075	0.01
33	2.75	0.17	0.085	0.549	0.075	0.01

34	2.83	0.17	0.085	0.547	0.075	0.01
35	2.92	0.17	0.085	0.545	0.075	0.01
36	3.00	0.17	0.085	0.542	0.075	0.01
37	3.08	0.17	0.085	0.540	0.075	0.01
38	3.17	0.17	0.085	0.538	0.075	0.01
39	3.25	0.17	0.085	0.536	0.075	0.01
40	3.33	0.17	0.085	0.533	0.075	0.01
41	3.42	0.17	0.085	0.531	0.075	0.01
42	3.50	0.17	0.085	0.529	0.075	0.01
43	3.58	0.17	0.085	0.527	0.075	0.01
44	3.67	0.17	0.085	0.525	0.075	0.01
45	3.75	0.17	0.085	0.522	0.075	0.01
46	3.83	0.20	0.102	0.520	0.090	0.01
47	3.92	0.20	0.102	0.518	0.090	0.01
48	4.00	0.20	0.102	0.516	0.090	0.01
49	4.08	0.20	0.102	0.514	0.090	0.01
50	4.17	0.20	0.102	0.511	0.090	0.01
51	4.25	0.20	0.102	0.509	0.090	0.01
52	4.33	0.23	0.119	0.507	0.105	0.01
53	4.42	0.23	0.119	0.505	0.105	0.01
54	4.50	0.23	0.119	0.503	0.105	0.01
55	4.58	0.23	0.119	0.501	0.105	0.01
56	4.67	0.23	0.119	0.498	0.105	0.01
57	4.75	0.23	0.119	0.496	0.105	0.01
58	4.83	0.27	0.136	0.494	0.120	0.02
59	4.92	0.27	0.136	0.492	0.120	0.02
60	5.00	0.27	0.136	0.490	0.120	0.02
61	5.08	0.20	0.102	0.488	0.090	0.01
62	5.17	0.20	0.102	0.486	0.090	0.01
63	5.25	0.20	0.102	0.483	0.090	0.01
64	5.33	0.23	0.119	0.481	0.105	0.01
65	5.42	0.23	0.119	0.479	0.105	0.01
66	5.50	0.23	0.119	0.477	0.105	0.01
67	5.58	0.27	0.136	0.475	0.120	0.02
68	5.67	0.27	0.136	0.473	0.120	0.02
69	5.75	0.27	0.136	0.471	0.120	0.02
70	5.83	0.27	0.136	0.469	0.120	0.02
71	5.92	0.27	0.136	0.467	0.120	0.02
72	6.00	0.27	0.136	0.465	0.120	0.02
73	6.08	0.30	0.153	0.463	0.135	0.02
74	6.17	0.30	0.153	0.461	0.135	0.02
75	6.25	0.30	0.153	0.458	0.135	0.02
76	6.33	0.30	0.153	0.456	0.135	0.02
77	6.42	0.30	0.153	0.454	0.135	0.02
78	6.50	0.30	0.153	0.452	0.135	0.02
79	6.58	0.33	0.170	0.450	0.150	0.02
80	6.67	0.33	0.170	0.448	0.150	0.02
81	6.75	0.33	0.170	0.446	0.150	0.02
82	6.83	0.33	0.170	0.444	0.150	0.02
83	6.92	0.33	0.170	0.442	0.150	0.02
84	7.00	0.33	0.170	0.440	0.150	0.02
85	7.08	0.33	0.170	0.438	0.150	0.02
86	7.17	0.33	0.170	0.436	0.150	0.02
87	7.25	0.33	0.170	0.434	0.150	0.02
88	7.33	0.37	0.187	0.432	0.165	0.02
89	7.42	0.37	0.187	0.430	0.165	0.02
90	7.50	0.37	0.187	0.428	0.165	0.02
91	7.58	0.40	0.204	0.426	0.180	0.02
92	7.67	0.40	0.204	0.424	0.180	0.02
93	7.75	0.40	0.204	0.422	0.180	0.02
94	7.83	0.43	0.221	0.420	0.195	0.03
95	7.92	0.43	0.221	0.419	0.195	0.03
96	8.00	0.43	0.221	0.417	0.195	0.03
97	8.08	0.50	0.255	0.415	0.225	0.03
98	8.17	0.50	0.255	0.413	0.225	0.03
99	8.25	0.50	0.255	0.411	0.225	0.03
100	8.33	0.50	0.255	0.409	0.225	0.03
101	8.42	0.50	0.255	0.407	0.225	0.03
102	8.50	0.50	0.255	0.405	0.225	0.03
103	8.58	0.53	0.272	0.403	0.240	0.03
104	8.67	0.53	0.272	0.401	0.240	0.03

105	8.75	0.53	0.272	0.399	0.240	0.03
106	8.83	0.57	0.289	0.397	0.255	0.03
107	8.92	0.57	0.289	0.396	0.255	0.03
108	9.00	0.57	0.289	0.394	0.255	0.03
109	9.08	0.63	0.323	0.392	0.285	0.04
110	9.17	0.63	0.323	0.390	0.285	0.04
111	9.25	0.63	0.323	0.388	0.285	0.04
112	9.33	0.67	0.340	0.386	0.299	0.04
113	9.42	0.67	0.340	0.384	0.299	0.04
114	9.50	0.67	0.340	0.383	0.299	0.04
115	9.58	0.70	0.357	0.381	0.314	0.04
116	9.67	0.70	0.357	0.379	0.314	0.04
117	9.75	0.70	0.357	0.377	0.314	0.04
118	9.83	0.73	0.374	0.375	0.329	0.04
119	9.92	0.73	0.374	0.374	---	0.00
120	10.00	0.73	0.374	0.372	---	0.00
121	10.08	0.50	0.255	0.370	0.225	0.03
122	10.17	0.50	0.255	0.368	0.225	0.03
123	10.25	0.50	0.255	0.366	0.225	0.03
124	10.33	0.50	0.255	0.365	0.225	0.03
125	10.42	0.50	0.255	0.363	0.225	0.03
126	10.50	0.50	0.255	0.361	0.225	0.03
127	10.58	0.67	0.340	0.359	0.299	0.04
128	10.67	0.67	0.340	0.358	0.299	0.04
129	10.75	0.67	0.340	0.356	0.299	0.04
130	10.83	0.67	0.340	0.354	0.299	0.04
131	10.92	0.67	0.340	0.352	0.299	0.04
132	11.00	0.67	0.340	0.351	0.299	0.04
133	11.08	0.63	0.323	0.349	0.285	0.04
134	11.17	0.63	0.323	0.347	0.285	0.04
135	11.25	0.63	0.323	0.345	0.285	0.04
136	11.33	0.63	0.323	0.344	0.285	0.04
137	11.42	0.63	0.323	0.342	0.285	0.04
138	11.50	0.63	0.323	0.340	0.285	0.04
139	11.58	0.57	0.289	0.339	0.255	0.03
140	11.67	0.57	0.289	0.337	0.255	0.03
141	11.75	0.57	0.289	0.335	0.255	0.03
142	11.83	0.60	0.306	0.334	0.270	0.04
143	11.92	0.60	0.306	0.332	0.270	0.04
144	12.00	0.60	0.306	0.330	0.270	0.04
145	12.08	0.83	0.425	0.329	---	0.10
146	12.17	0.83	0.425	0.327	---	0.10
147	12.25	0.83	0.425	0.325	---	0.10
148	12.33	0.87	0.442	0.324	---	0.12
149	12.42	0.87	0.442	0.322	---	0.12
150	12.50	0.87	0.442	0.320	---	0.12
151	12.58	0.93	0.476	0.319	---	0.16
152	12.67	0.93	0.476	0.317	---	0.16
153	12.75	0.93	0.476	0.316	---	0.16
154	12.83	0.97	0.493	0.314	---	0.18
155	12.92	0.97	0.493	0.312	---	0.18
156	13.00	0.97	0.493	0.311	---	0.18
157	13.08	1.13	0.579	0.309	---	0.27
158	13.17	1.13	0.579	0.308	---	0.27
159	13.25	1.13	0.579	0.306	---	0.27
160	13.33	1.13	0.579	0.305	---	0.27
161	13.42	1.13	0.579	0.303	---	0.28
162	13.50	1.13	0.579	0.302	---	0.28
163	13.58	0.77	0.391	0.300	---	0.09
164	13.67	0.77	0.391	0.298	---	0.09
165	13.75	0.77	0.391	0.297	---	0.09
166	13.83	0.77	0.391	0.295	---	0.10
167	13.92	0.77	0.391	0.294	---	0.10
168	14.00	0.77	0.391	0.292	---	0.10
169	14.08	0.90	0.459	0.291	---	0.17
170	14.17	0.90	0.459	0.289	---	0.17
171	14.25	0.90	0.459	0.288	---	0.17
172	14.33	0.87	0.442	0.286	---	0.16
173	14.42	0.87	0.442	0.285	---	0.16
174	14.50	0.87	0.442	0.284	---	0.16
175	14.58	0.87	0.442	0.282	---	0.16

176	14.67	0.87	0.442	0.281	---	0.16
177	14.75	0.87	0.442	0.279	---	0.16
178	14.83	0.83	0.425	0.278	---	0.15
179	14.92	0.83	0.425	0.276	---	0.15
180	15.00	0.83	0.425	0.275	---	0.15
181	15.08	0.80	0.408	0.274	---	0.13
182	15.17	0.80	0.408	0.272	---	0.14
183	15.25	0.80	0.408	0.271	---	0.14
184	15.33	0.77	0.391	0.269	---	0.12
185	15.42	0.77	0.391	0.268	---	0.12
186	15.50	0.77	0.391	0.267	---	0.12
187	15.58	0.63	0.323	0.265	---	0.06
188	15.67	0.63	0.323	0.264	---	0.06
189	15.75	0.63	0.323	0.263	---	0.06
190	15.83	0.63	0.323	0.261	---	0.06
191	15.92	0.63	0.323	0.260	---	0.06
192	16.00	0.63	0.323	0.258	---	0.06
193	16.08	0.13	0.068	0.257	0.060	0.01
194	16.17	0.13	0.068	0.256	0.060	0.01
195	16.25	0.13	0.068	0.255	0.060	0.01
196	16.33	0.13	0.068	0.253	0.060	0.01
197	16.42	0.13	0.068	0.252	0.060	0.01
198	16.50	0.13	0.068	0.251	0.060	0.01
199	16.58	0.10	0.051	0.249	0.045	0.01
200	16.67	0.10	0.051	0.248	0.045	0.01
201	16.75	0.10	0.051	0.247	0.045	0.01
202	16.83	0.10	0.051	0.246	0.045	0.01
203	16.92	0.10	0.051	0.244	0.045	0.01
204	17.00	0.10	0.051	0.243	0.045	0.01
205	17.08	0.17	0.085	0.242	0.075	0.01
206	17.17	0.17	0.085	0.241	0.075	0.01
207	17.25	0.17	0.085	0.239	0.075	0.01
208	17.33	0.17	0.085	0.238	0.075	0.01
209	17.42	0.17	0.085	0.237	0.075	0.01
210	17.50	0.17	0.085	0.236	0.075	0.01
211	17.58	0.17	0.085	0.235	0.075	0.01
212	17.67	0.17	0.085	0.234	0.075	0.01
213	17.75	0.17	0.085	0.232	0.075	0.01
214	17.83	0.13	0.068	0.231	0.060	0.01
215	17.92	0.13	0.068	0.230	0.060	0.01
216	18.00	0.13	0.068	0.229	0.060	0.01
217	18.08	0.13	0.068	0.228	0.060	0.01
218	18.17	0.13	0.068	0.227	0.060	0.01
219	18.25	0.13	0.068	0.226	0.060	0.01
220	18.33	0.13	0.068	0.225	0.060	0.01
221	18.42	0.13	0.068	0.223	0.060	0.01
222	18.50	0.13	0.068	0.222	0.060	0.01
223	18.58	0.10	0.051	0.221	0.045	0.01
224	18.67	0.10	0.051	0.220	0.045	0.01
225	18.75	0.10	0.051	0.219	0.045	0.01
226	18.83	0.07	0.034	0.218	0.030	0.00
227	18.92	0.07	0.034	0.217	0.030	0.00
228	19.00	0.07	0.034	0.216	0.030	0.00
229	19.08	0.10	0.051	0.215	0.045	0.01
230	19.17	0.10	0.051	0.214	0.045	0.01
231	19.25	0.10	0.051	0.213	0.045	0.01
232	19.33	0.13	0.068	0.212	0.060	0.01
233	19.42	0.13	0.068	0.211	0.060	0.01
234	19.50	0.13	0.068	0.210	0.060	0.01
235	19.58	0.10	0.051	0.209	0.045	0.01
236	19.67	0.10	0.051	0.208	0.045	0.01
237	19.75	0.10	0.051	0.207	0.045	0.01
238	19.83	0.07	0.034	0.206	0.030	0.00
239	19.92	0.07	0.034	0.205	0.030	0.00
240	20.00	0.07	0.034	0.204	0.030	0.00
241	20.08	0.10	0.051	0.204	0.045	0.01
242	20.17	0.10	0.051	0.203	0.045	0.01
243	20.25	0.10	0.051	0.202	0.045	0.01
244	20.33	0.10	0.051	0.201	0.045	0.01
245	20.42	0.10	0.051	0.200	0.045	0.01
246	20.50	0.10	0.051	0.199	0.045	0.01

247	20.58	0.10	0.051	0.198	0.045	0.01
248	20.67	0.10	0.051	0.197	0.045	0.01
249	20.75	0.10	0.051	0.197	0.045	0.01
250	20.83	0.07	0.034	0.196	0.030	0.00
251	20.92	0.07	0.034	0.195	0.030	0.00
252	21.00	0.07	0.034	0.194	0.030	0.00
253	21.08	0.10	0.051	0.194	0.045	0.01
254	21.17	0.10	0.051	0.193	0.045	0.01
255	21.25	0.10	0.051	0.192	0.045	0.01
256	21.33	0.07	0.034	0.191	0.030	0.00
257	21.42	0.07	0.034	0.191	0.030	0.00
258	21.50	0.07	0.034	0.190	0.030	0.00
259	21.58	0.10	0.051	0.189	0.045	0.01
260	21.67	0.10	0.051	0.188	0.045	0.01
261	21.75	0.10	0.051	0.188	0.045	0.01
262	21.83	0.07	0.034	0.187	0.030	0.00
263	21.92	0.07	0.034	0.186	0.030	0.00
264	22.00	0.07	0.034	0.186	0.030	0.00
265	22.08	0.10	0.051	0.185	0.045	0.01
266	22.17	0.10	0.051	0.185	0.045	0.01
267	22.25	0.10	0.051	0.184	0.045	0.01
268	22.33	0.07	0.034	0.183	0.030	0.00
269	22.42	0.07	0.034	0.183	0.030	0.00
270	22.50	0.07	0.034	0.182	0.030	0.00
271	22.58	0.07	0.034	0.182	0.030	0.00
272	22.67	0.07	0.034	0.181	0.030	0.00
273	22.75	0.07	0.034	0.181	0.030	0.00
274	22.83	0.07	0.034	0.180	0.030	0.00
275	22.92	0.07	0.034	0.180	0.030	0.00
276	23.00	0.07	0.034	0.179	0.030	0.00
277	23.08	0.07	0.034	0.179	0.030	0.00
278	23.17	0.07	0.034	0.179	0.030	0.00
279	23.25	0.07	0.034	0.178	0.030	0.00
280	23.33	0.07	0.034	0.178	0.030	0.00
281	23.42	0.07	0.034	0.178	0.030	0.00
282	23.50	0.07	0.034	0.177	0.030	0.00
283	23.58	0.07	0.034	0.177	0.030	0.00
284	23.67	0.07	0.034	0.177	0.030	0.00
285	23.75	0.07	0.034	0.176	0.030	0.00
286	23.83	0.07	0.034	0.176	0.030	0.00
287	23.92	0.07	0.034	0.176	0.030	0.00
288	24.00	0.07	0.034	0.176	0.030	0.00
Sum =		100.0			Sum =	10.5

Flood volume = Effective rainfall 0.87(In)
times area 153.9(Ac.)/[(In)/(Ft.)] = 11.2(Ac.Ft)
Total soil loss = 3.38(In)
Total soil loss = 43.366(Ac.Ft)
Total rainfall = 4.25(In)
Flood volume = 487521.2 Cubic Feet
Total soil loss = 1889042.9 Cubic Feet

Peak flow rate of this hydrograph = 41.754(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0002	0.03	Q	|	|	|	|
0+10	0.0018	0.23	Q	|	|	|	|
0+15	0.0049	0.45	Q	|	|	|	|
0+20	0.0087	0.54	Q	|	|	|	|
0+25	0.0134	0.69	Q	|	|	|	|
0+30	0.0191	0.83	Q	|	|	|	|
0+35	0.0252	0.88	Q	|	|	|	|
0+40	0.0314	0.91	Q	|	|	|	|
0+45	0.0378	0.93	Q	|	|	|	|

0+50	0.0444	0.96	Q				
0+55	0.0517	1.06	Q				
1+ 0	0.0598	1.17	Q				
1+ 5	0.0680	1.20	Q				
1+10	0.0757	1.12	Q				
1+15	0.0828	1.03	Q				
1+20	0.0897	1.00	Q				
1+25	0.0964	0.98	Q				
1+30	0.1030	0.96	Q				
1+35	0.1096	0.96	Q				
1+40	0.1162	0.95	Q				
1+45	0.1227	0.95	Q				
1+50	0.1294	0.97	Q				
1+55	0.1368	1.07	Q				
2+ 0	0.1449	1.17	Q				
2+ 5	0.1532	1.21	Q				
2+10	0.1617	1.24	Q				
2+15	0.1704	1.25	VQ				
2+20	0.1790	1.26	VQ				
2+25	0.1877	1.26	VQ				
2+30	0.1964	1.26	VQ				
2+35	0.2053	1.28	VQ				
2+40	0.2148	1.38	VQ				
2+45	0.2251	1.49	VQ				
2+50	0.2356	1.53	VQ				
2+55	0.2463	1.55	VQ				
3+ 0	0.2571	1.57	VQ				
3+ 5	0.2680	1.58	VQ				
3+10	0.2788	1.58	VQ				
3+15	0.2897	1.58	|Q				
3+20	0.3006	1.58	|Q				
3+25	0.3115	1.58	|Q				
3+30	0.3224	1.58	|Q				
3+35	0.3334	1.58	|Q				
3+40	0.3443	1.58	|Q				
3+45	0.3552	1.58	|Q				
3+50	0.3662	1.60	|Q				
3+55	0.3779	1.70	|Q				
4+ 0	0.3904	1.81	|Q				
4+ 5	0.4031	1.85	|Q				
4+10	0.4160	1.87	|Q				
4+15	0.4290	1.89	|Q				
4+20	0.4421	1.91	|Q				
4+25	0.4560	2.01	|Q				
4+30	0.4706	2.12	|Q				
4+35	0.4855	2.16	|Q				
4+40	0.5006	2.19	|Q				
4+45	0.5157	2.20	|Q				
4+50	0.5311	2.23	|Q				
4+55	0.5471	2.33	|Q				
5+ 0	0.5639	2.44	|QV				
5+ 5	0.5807	2.45	|QV				
5+10	0.5964	2.27	|QV				
5+15	0.6107	2.07	|QV				
5+20	0.6245	2.02	|QV				
5+25	0.6388	2.07	|QV				
5+30	0.6536	2.15	|QV				
5+35	0.6688	2.20	|QV				
5+40	0.6847	2.31	|QV				
5+45	0.7015	2.43	|QV				
5+50	0.7185	2.48	|QV				
5+55	0.7357	2.50	| Q				
6+ 0	0.7531	2.52	| Q				
6+ 5	0.7706	2.54	| Q				
6+10	0.7888	2.64	| Q				
6+15	0.8078	2.76	| Q				
6+20	0.8270	2.80	| Q				
6+25	0.8465	2.82	| QV				
6+30	0.8660	2.84	| QV				
6+35	0.8857	2.86	| QV				
6+40	0.9061	2.96	| QV				

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 6+45       0.9273      3.07  | QV      |         |         |         |
 6+50       0.9487      3.11  | QV      |         |         |         |
 6+55       0.9703      3.14  | QV      |         |         |         |
 7+ 0       0.9920      3.15  | QV      |         |         |         |
 7+ 5       1.0138      3.16  | QV      |         |         |         |
 7+10       1.0356      3.16  | QV      |         |         |         |
 7+15       1.0574      3.17  | QV      |         |         |         |
 7+20       1.0793      3.18  | QV      |         |         |         |
 7+25       1.1019      3.28  | QV      |         |         |         |
 7+30       1.1253      3.39  | Q V     |         |         |         |
 7+35       1.1490      3.45  | Q V     |         |         |         |
 7+40       1.1736      3.57  | Q V     |         |         |         |
 7+45       1.1991      3.69  | Q V     |         |         |         |
 7+50       1.2250      3.76  |  QV     |         |         |         |
 7+55       1.2517      3.88  |  QV     |         |         |         |
 8+ 0       1.2793      4.01  |  QV     |         |         |         |
 8+ 5       1.3075      4.09  |  QV     |         |         |         |
 8+10       1.3372      4.31  |  QV     |         |         |         |
 8+15       1.3685      4.55  |  QV     |         |         |         |
 8+20       1.4004      4.64  |  Q V    |         |         |         |
 8+25       1.4327      4.69  |  Q V    |         |         |         |
 8+30       1.4652      4.72  |  Q V    |         |         |         |
 8+35       1.4979      4.75  |  Q V    |         |         |         |
 8+40       1.5314      4.86  |  Q V    |         |         |         |
 8+45       1.5656      4.97  |  Q V    |         |         |         |
 8+50       1.6003      5.03  |   QV    |         |         |         |
 8+55       1.6358      5.15  |   QV    |         |         |         |
 9+ 0       1.6721      5.28  |   QV    |         |         |         |
 9+ 5       1.7090      5.36  |   Q V   |         |         |         |
 9+10       1.7475      5.58  |   Q V   |         |         |         |
 9+15       1.7875      5.82  |   Q V   |         |         |         |
 9+20       1.8283      5.92  |   Q V   |         |         |         |
 9+25       1.8701      6.07  |   Q V   |         |         |         |
 9+30       1.9129      6.21  |   Q V   |         |         |         |
 9+35       1.9561      6.28  |    QV   |         |         |         |
 9+40       2.0003      6.41  |    Q V  |         |         |         |
 9+45       2.0453      6.54  |    Q V  |         |         |         |
 9+50       2.0908      6.61  |    Q V  |         |         |         |
 9+55       2.1346      6.36  |    Q V  |         |         |         |
10+ 0       2.1649      4.39  |  Q   V  |         |         |         |
10+ 5       2.1815      2.41  |Q     V  |         |         |         |
10+10       2.2022      3.01  | Q    V  |         |         |         |
10+15       2.2302      4.07  |  Q   V  |         |         |         |
10+20       2.2601      4.34  |  Q    V |         |         |         |
10+25       2.2911      4.50  |  Q    V |         |         |         |
10+30       2.3229      4.63  |  Q    V |         |         |         |
10+35       2.3559      4.79  |  Q    V |         |         |         |
10+40       2.3924      5.30  |   Q   V |         |         |         |
10+45       2.4326      5.84  |   Q   V |         |         |         |
10+50       2.4743      6.05  |   Q   V |         |         |         |
10+55       2.5168      6.18  |   Q   V |         |         |         |
11+ 0       2.5599      6.26  |    Q   V|         |         |         |
11+ 5       2.6032      6.28  |    Q   V|         |         |         |
11+10       2.6458      6.20  |   Q    V|         |         |         |
11+15       2.6878      6.10  |   Q    V|         |         |         |
11+20       2.7296      6.06  |   Q    V|         |         |         |
11+25       2.7712      6.05  |   Q    V|         |         |         |
11+30       2.8128      6.04  |   Q     V         |         |         |
11+35       2.8541      5.99  |   Q     V         |         |         |
11+40       2.8940      5.80  |   Q     V         |         |         |
11+45       2.9324      5.58  |   Q     V         |         |         |
11+50       2.9704      5.51  |   Q     V         |         |         |
11+55       3.0087      5.56  |   Q     V         |         |         |
12+ 0       3.0476      5.64  |   Q     V         |         |         |
12+ 5       3.0901      6.18  |   Q     |V        |         |         |
12+10       3.1526      9.08  |      Q  |V        |         |         |
12+15       3.2379     12.39  |        Q|V        |         |         |
12+20       3.3336     13.89  |         |Q        |         |         |
12+25       3.4410     15.59  |         | Q       |         |         |
12+30       3.5590     17.14  |         | VQ      |         |         |
12+35       3.6846     18.23  |         |  VQ     |         |         |
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12+40       3.8250     20.39  |          |  V  Q   |          |          |
12+45       3.9809     22.63  |          |   V   Q |          |          |
12+50       4.1447     23.79  |          |   V    Q|          |          |
12+55       4.3189     25.29  |          |    V    Q          |          |
13+ 0       4.5029     26.72  |          |     V   |Q         |          |
13+ 5       4.6968     28.16  |          |     V   | Q        |          |
13+10       4.9222     32.72  |          |      V  |     Q    |          |
13+15       5.1816     37.67  |          |       V |          Q          |
13+20       5.4547     39.66  |          |        V|          |Q         |
13+25       5.7364     40.90  |          |         V          | Q       |
13+30       6.0240     41.75  |          |          |V         |  Q      |
13+35       6.3046     40.74  |          |          | V        | Q       |
13+40       6.5262     32.19  |          |          |  V Q     |         |
13+45       6.6812     22.50  |          |       Q  |  V       |         |
13+50       6.8131     19.15  |          |    Q     |   V      |         |
13+55       6.9325     17.33  |          |  Q       |   V      |         |
14+ 0       7.0448     16.31  |          |  Q       |    V     |         |
14+ 5       7.1577     16.40  |          |  Q       |    V     |         |
14+10       7.2926     19.59  |          |    Q     |     V    |         |
14+15       7.4531     23.29  |          |       Q  |     V    |         |
14+20       7.6224     24.58  |          |        Q |      V   |         |
14+25       7.7922     24.66  |          |        Q |      V   |         |
14+30       7.9601     24.38  |          |        Q |       V  |         |
14+35       8.1291     24.54  |          |        Q |        V |         |
14+40       8.2991     24.68  |          |        Q |        V |         |
14+45       8.4702     24.85  |          |        Q |         V         |
14+50       8.6418     24.91  |          |        Q |         V         |
14+55       8.8094     24.33  |          |        Q |          |V        |
15+ 0       8.9723     23.65  |          |       Q  |          | V       |
15+ 5       9.1333     23.39  |          |       Q  |          | V       |
15+10       9.2890     22.59  |          |       Q  |          |  V      |
15+15       9.4390     21.78  |          |      Q   |          |  V      |
15+20       9.5867     21.46  |          |      Q   |          |   V     |
15+25       9.7289     20.64  |          |     Q    |          |   V     |
15+30       9.8654     19.82  |          |    Q     |          |    V    |
15+35       9.9966     19.05  |          |    Q     |          |    V    |
15+40      10.1052     15.78  |          | Q        |          |     V   |
15+45      10.1894     12.22  |        Q |          |          |     V   |
15+50      10.2653     11.03  |       Q  |          |          |     V   |
15+55      10.3372     10.43  |       Q  |          |          |     V   |
16+ 0      10.4071     10.15  |       Q  |          |          |      V  |
16+ 5      10.4732      9.59  |      Q   |          |          |      V  |
16+10      10.5207      6.91  |    Q     |          |          |      V  |
16+15      10.5474      3.87  |  Q       |          |          |      V  |
16+20      10.5664      2.76  | Q        |          |          |      V  |
16+25      10.5809      2.10  |Q         |          |          |      V  |
16+30      10.5926      1.70  |Q         |          |          |      V  |
16+35      10.6028      1.47  |Q         |          |          |      V  |
16+40      10.6116      1.29  |Q         |          |          |      V  |
16+45      10.6194      1.13  Q          |          |          |      V  |
16+50      10.6267      1.06  Q          |          |          |      V  |
16+55      10.6336      1.00  Q          |          |          |       V |
17+ 0      10.6402      0.97  Q          |          |          |       V |
17+ 5      10.6471      0.99  Q          |          |          |       V |
17+10      10.6552      1.19  Q          |          |          |       V |
17+15      10.6649      1.40  |Q         |          |          |       V |
17+20      10.6751      1.48  |Q         |          |          |       V |
17+25      10.6856      1.52  |Q         |          |          |       V |
17+30      10.6963      1.55  |Q         |          |          |       V |
17+35      10.7071      1.57  |Q         |          |          |       V |
17+40      10.7179      1.57  |Q         |          |          |       V |
17+45      10.7288      1.58  |Q         |          |          |       V |
17+50      10.7396      1.56  |Q         |          |          |       V |
17+55      10.7497      1.47  |Q         |          |          |       V |
18+ 0      10.7590      1.36  |Q         |          |          |       V |
18+ 5      10.7681      1.32  |Q         |          |          |       V |
18+10      10.7771      1.30  |Q         |          |          |       V |
18+15      10.7859      1.28  |Q         |          |          |       V |
18+20      10.7947      1.28  |Q         |          |          |       V |
18+25      10.8035      1.27  |Q         |          |          |       V |
18+30      10.8122      1.27  |Q         |          |          |       V |
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18+35      10.8208      1.25  |Q        |          |          |        V |
18+40      10.8288      1.15  Q        |          |          |        V |
18+45      10.8360      1.04  Q        |          |          |        V |
18+50      10.8428      0.99  Q        |          |          |        V |
18+55      10.8487      0.87  Q        |          |          |        V |
19+ 0      10.8538      0.74  Q        |          |          |        V |
19+ 5      10.8587      0.71  Q        |          |          |        V |
19+10      10.8641      0.78  Q        |          |          |        V |
19+15      10.8702      0.88  Q        |          |          |        V |
19+20      10.8765      0.92  Q        |          |          |        V |
19+25      10.8837      1.04  Q        |          |          |        V |
19+30      10.8917      1.16  Q        |          |          |        V |
19+35      10.8999      1.19  Q        |          |          |        V |
19+40      10.9076      1.12  Q        |          |          |        V |
19+45      10.9147      1.02  Q        |          |          |         V|
19+50      10.9214      0.98  Q        |          |          |         V|
19+55      10.9273      0.86  Q        |          |          |         V|
20+ 0      10.9324      0.74  Q        |          |          |         V|
20+ 5      10.9373      0.71  Q        |          |          |         V|
20+10      10.9427      0.78  Q        |          |          |         V|
20+15      10.9487      0.88  Q        |          |          |         V|
20+20      10.9550      0.91  Q        |          |          |         V|
20+25      10.9614      0.93  Q        |          |          |         V|
20+30      10.9678      0.94  Q        |          |          |         V|
20+35      10.9743      0.94  Q        |          |          |         V|
20+40      10.9808      0.95  Q        |          |          |         V|
20+45      10.9874      0.95  Q        |          |          |         V|
20+50      10.9938      0.93  Q        |          |          |         V|
20+55      10.9995      0.84  Q        |          |          |         V|
21+ 0      11.0045      0.73  Q        |          |          |         V|
21+ 5      11.0094      0.70  Q        |          |          |         V|
21+10      11.0148      0.78  Q        |          |          |         V|
21+15      11.0208      0.87  Q        |          |          |         V|
21+20      11.0269      0.89  Q        |          |          |         V|
21+25      11.0325      0.81  Q        |          |          |         V|
21+30      11.0374      0.71  Q        |          |          |         V|
21+35      11.0422      0.70  Q        |          |          |         V|
21+40      11.0475      0.77  Q        |          |          |         V|
21+45      11.0535      0.87  Q        |          |          |         V|
21+50      11.0596      0.89  Q        |          |          |         V|
21+55      11.0652      0.81  Q        |          |          |         V|
22+ 0      11.0701      0.71  Q        |          |          |         V|
22+ 5      11.0749      0.70  Q        |          |          |         V|
22+10      11.0803      0.77  Q        |          |          |         V|
22+15      11.0863      0.87  Q        |          |          |         V|
22+20      11.0924      0.89  Q        |          |          |         V|
22+25      11.0979      0.81  Q        |          |          |         V|
22+30      11.1029      0.71  Q        |          |          |         V|
22+35      11.1075      0.68  Q        |          |          |         V|
22+40      11.1121      0.66  Q        |          |          |         V|
22+45      11.1165      0.65  Q        |          |          |         V|
22+50      11.1210      0.64  Q        |          |          |         V|
22+55      11.1253      0.64  Q        |          |          |         V|
23+ 0      11.1297      0.64  Q        |          |          |         V|
23+ 5      11.1341      0.64  Q        |          |          |         V|
23+10      11.1385      0.63  Q        |          |          |         V|
23+15      11.1428      0.63  Q        |          |          |         V|
23+20      11.1472      0.63  Q        |          |          |         V|
23+25      11.1516      0.63  Q        |          |          |         V|
23+30      11.1559      0.63  Q        |          |          |         V|
23+35      11.1603      0.63  Q        |          |          |         V|
23+40      11.1647      0.63  Q        |          |          |         V|
23+45      11.1690      0.63  Q        |          |          |         V|
23+50      11.1734      0.63  Q        |          |          |         V|
23+55      11.1778      0.63  Q        |          |          |         V|
24+ 0      11.1821      0.63  Q        |          |          |         V|
24+ 5      11.1863      0.60  Q        |          |          |         V|
24+10      11.1890      0.40  Q        |          |          |         V|
24+15      11.1903      0.19  Q        |          |          |         V|
24+20      11.1910      0.11  Q        |          |          |         V|
24+25      11.1915      0.06  Q        |          |          |         V|
```

```
   24+30      11.1917      0.03  Q         |         |         |        V|
   24+35      11.1918      0.02  Q         |         |         |        V|
   24+40      11.1919      0.01  Q         |         |         |        V|
   24+45      11.1919      0.01  Q         |         |         |        V|
   24+50      11.1919      0.00  Q         |         |         |        V|
   24+55      11.1919      0.00  Q         |         |         |         V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 10-YEAR AND 1-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.031
Lag time = 0.135 Hr.
Lag time = 8.10 Min.
25% of lag time = 2.03 Min.
40% of lag time = 3.24 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	0.62	95.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.45	223.16

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 0.961(In)
Areal adjustment factor = 99.86 %
Adjusted average point rain = 0.960(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

```
       RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
       AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
       85.1  85.1      0.186     0.025        0.182       1.000      0.182
                                                        Sum (F) =   0.182
       Area averaged mean soil loss (F) (In/Hr) =  0.182
       Minimum soil loss rate ((In/Hr)) =  0.091
       (for 24 hour storm duration)
       Soil low loss rate (decimal) =   0.880
       ------------------------------------------------------------------------
       Slope of intensity-duration curve for a 1 hour storm =0.4800
       ------------------------------------------------------------------------

                     U n i t  H y d r o g r a p h
                             FOOTHILL S-Curve
       ------------------------------------------------------------------
                     Unit Hydrograph Data
       ------------------------------------------------------------------------
       Unit time period   Time % of lag   Distribution   Unit Hydrograph
           (hrs)                          Graph %            (CFS)
       ------------------------------------------------------------------------
           1   0.083         61.701          5.835              9.051
           2   0.167        123.402         33.387             51.784
           3   0.250        185.103         33.200             51.493
           4   0.333        246.803         12.111             18.784
           5   0.417        308.504          6.965             10.803
           6   0.500        370.205          4.129              6.405
           7   0.583        431.906          2.168              3.363
           8   0.667        493.607          0.827              1.283
           9   0.750        555.308          0.524              0.812
          10   0.833        617.008          0.434              0.673
          11   0.917        678.709          0.298              0.462
          12   1.000        740.410          0.122              0.189
                                     Sum = 100.000   Sum=     155.102
------------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     4.40      0.507         0.182      ---          0.33
    2   0.17     4.50      0.518         0.182      ---          0.34
    3   0.25     5.40      0.622         0.182      ---          0.44
    4   0.33     5.40      0.622         0.182      ---          0.44
    5   0.42     5.70      0.657         0.182      ---          0.48
    6   0.50     6.40      0.737         0.182      ---          0.56
    7   0.58     7.90      0.910         0.182      ---          0.73
    8   0.67     9.10      1.048         0.182      ---          0.87
    9   0.75    12.80      1.475         0.182      ---          1.29
   10   0.83    25.60      2.950         0.182      ---          2.77
   11   0.92     7.90      0.910         0.182      ---          0.73
   12   1.00     4.90      0.565         0.182      ---          0.38
      Sum =     100.0                                  Sum =     9.3
       Flood volume = Effective rainfall      0.78(In)
        times area     153.9(Ac.)/[(In)/(Ft.)] =      10.0(Ac.Ft)
       Total soil loss =      0.18(In)
       Total soil loss =     2.330(Ac.Ft)
       Total rainfall =      0.96(In)
       Flood volume =      434886.3 Cubic Feet
       Total soil loss =      101495.8 Cubic Feet
       ------------------------------------------------------------------
        Peak flow rate of this hydrograph =    247.244(CFS)
       ------------------------------------------------------------------
       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          1 - H O U R    S T O R M
                       R u n o f f      H y d r o g r a p h
       ------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

       ------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       75.0     150.0     225.0     300.0
```

```
  0+ 5       0.0203      2.95  Q         |         |         |         |
  0+10       0.1574     19.90  V Q       |         |         |         |
  0+15       0.4204     38.20  |V   Q     |         |         |         |
  0+20       0.7667     50.28  |  V  Q    |         |         |         |
  0+25       1.1776     59.66  |   V  Q   |         |         |         |
  0+30       1.6345     66.34  |     V Q  |         |         |         |
  0+35       2.1589     76.15  |       V Q         |         |         |
  0+40       2.7945     92.29  |         |VQ       |         |         |
  0+45       3.5847    114.73  |         |   VQ    |         |         |
  0+50       4.7004    162.00  |         |       V |Q        |         |
  0+55       6.4032    247.24  |         |         |    V    | Q       |
  1+ 0       7.9562    225.50  |         |         |         QV        |
  1+ 5       8.8724    133.03  |         |      Q  |         |    V    |
  1+10       9.3995     76.53  |         Q         |         |      V  |
  1+15       9.6718     39.54  |    Q    |         |         |       V |
  1+20       9.8186     21.32  | Q       |         |         |        V|
  1+25       9.8912     10.53  |Q        |         |         |        V|
  1+30       9.9317      5.88  Q         |         |         |        V|
  1+35       9.9572      3.71  Q         |         |         |        V|
  1+40       9.9732      2.33  Q         |         |         |        V|
  1+45       9.9809      1.12  Q         |         |         |        V|
  1+50       9.9831      0.32  Q         |         |         |        V|
  1+55       9.9836      0.07  Q         |         |         |         V
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA310R310.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 10-YEAR AND 3-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.031
Lag time = 0.135 Hr.
Lag time = 8.10 Min.
25% of lag time = 2.03 Min.
40% of lag time = 3.24 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.06	163.13

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	2.63	404.76

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.060(In)
Area Averaged 100-Year Rainfall = 2.630(In)

Point rain (area averaged) = 1.706(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 1.705(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	85.1	0.186	0.025	0.182	1.000	0.182
					Sum (F) =	0.182

Area averaged mean soil loss (F) (In/Hr) = 0.182
Minimum soil loss rate ((In/Hr)) = 0.091
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	61.701	5.835	9.051
2	0.167	123.402	33.387	51.784
3	0.250	185.103	33.200	51.493
4	0.333	246.803	12.111	18.784
5	0.417	308.504	6.965	10.803
6	0.500	370.205	4.129	6.405
7	0.583	431.906	2.168	3.363
8	0.667	493.607	0.827	1.283
9	0.750	555.308	0.524	0.812
10	0.833	617.008	0.434	0.673
11	0.917	678.709	0.298	0.462
12	1.000	740.410	0.122	0.189
			Sum = 100.000	Sum= 155.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.266	0.182	---	0.08
2	0.17	1.30	0.266	0.182	---	0.08
3	0.25	1.10	0.225	0.182	---	0.04
4	0.33	1.50	0.307	0.182	---	0.13
5	0.42	1.50	0.307	0.182	---	0.13
6	0.50	1.80	0.368	0.182	---	0.19
7	0.58	1.50	0.307	0.182	---	0.13
8	0.67	1.80	0.368	0.182	---	0.19
9	0.75	1.80	0.368	0.182	---	0.19
10	0.83	1.50	0.307	0.182	---	0.13
11	0.92	1.60	0.327	0.182	---	0.15
12	1.00	1.80	0.368	0.182	---	0.19
13	1.08	2.20	0.450	0.182	---	0.27
14	1.17	2.20	0.450	0.182	---	0.27
15	1.25	2.20	0.450	0.182	---	0.27
16	1.33	2.00	0.409	0.182	---	0.23
17	1.42	2.60	0.532	0.182	---	0.35
18	1.50	2.70	0.552	0.182	---	0.37
19	1.58	2.40	0.491	0.182	---	0.31
20	1.67	2.70	0.552	0.182	---	0.37
21	1.75	3.30	0.675	0.182	---	0.49
22	1.83	3.10	0.634	0.182	---	0.45
23	1.92	2.90	0.593	0.182	---	0.41
24	2.00	3.00	0.614	0.182	---	0.43
25	2.08	3.10	0.634	0.182	---	0.45
26	2.17	4.20	0.859	0.182	---	0.68
27	2.25	5.00	1.023	0.182	---	0.84
28	2.33	3.50	0.716	0.182	---	0.53
29	2.42	6.80	1.391	0.182	---	1.21
30	2.50	7.30	1.493	0.182	---	1.31
31	2.58	8.20	1.677	0.182	---	1.50
32	2.67	5.90	1.207	0.182	---	1.03
33	2.75	2.00	0.409	0.182	---	0.23

```
34   2.83     1.80      0.368         0.182      ---          0.19
35   2.92     1.80      0.368         0.182      ---          0.19
36   3.00     0.60      0.123         0.182     0.108         0.01
   Sum =     100.0                                 Sum =    14.0
      Flood volume = Effective rainfall      1.17(In)
       times area     153.9(Ac.)/[(In)/(Ft.)] =      15.0(Ac.Ft)
      Total soil loss =      0.54(In)
      Total soil loss =     6.911(Ac.Ft)
      Total rainfall =      1.70(In)
      Flood volume =      651319.4 Cubic Feet
      Total soil loss =      301057.9 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    192.048(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          3 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
-------------------------------------------------------------------------
  0+ 5       0.0053      0.76  Q         |         |         |         |
  0+10       0.0406      5.13  VQ        |         |         |         |
  0+15       0.1032      9.10  VQ        |         |         |         |
  0+20       0.1673      9.30  VQ        |         |         |         |
  0+25       0.2524     12.35  V Q       |         |         |         |
  0+30       0.3687     16.89  V  Q      |         |         |         |
  0+35       0.5126     20.89  |V  Q     |         |         |         |
  0+40       0.6652     22.16  |V  Q     |         |         |         |
  0+45       0.8290     23.79  | V Q     |         |         |         |
  0+50       1.0093     26.18  | V  Q    |         |         |         |
  0+55       1.1759     24.18  |  VQ     |         |         |         |
  1+ 0       1.3342     22.98  |  VQ     |         |         |         |
  1+ 5       1.5136     26.05  |   VQ    |         |         |         |
  1+10       1.7362     32.32  |   V Q   |         |         |         |
  1+15       1.9925     37.22  |    V Q  |         |         |         |
  1+20       2.2597     38.79  |     VQ  |         |         |         |
  1+25       2.5279     38.94  |     VQ  |         |         |         |
  1+30       2.8312     44.04  |      VQ |         |         |         |
  1+35       3.1783     50.41  |       V Q         |         |         |
  1+40       3.5284     50.83  |        VQ         |         |         |
  1+45       3.8968     53.50  |         Q         |         |         |
  1+50       4.3269     62.44  |         |VQ       |         |         |
  1+55       4.7904     67.30  |         | VQ      |         |         |
  2+ 0       5.2453     66.05  |         |  QV     |         |         |
  2+ 5       5.7000     66.03  |         |  Q V    |         |         |
  2+10       6.1819     69.96  |         |  Q  V   |         |         |
  2+15       6.7627     84.34  |         |     Q V |         |         |
  2+20       7.4655    102.04  |         |        VQ         |         |
  2+25       8.1900    105.19  |         |          |Q       |         |
  2+30       9.0922    131.01  |         |          |   V Q  |         |
  2+35      10.2651    170.30  |         |          |      V  |   Q     |
  2+40      11.5878    192.05  |         |          |         V       Q |
  2+45      12.8139    178.03  |         |          |          |   VQ    |
  2+50      13.6427    120.35  |         |          |   Q      |     V   |
  2+55      14.1462     73.10  |         |   Q      |          |      V  |
  3+ 0      14.5023     51.72  |         Q          |          |       V |
  3+ 5      14.7192     31.48  |     Q    |         |          |        V|
  3+10      14.8252     15.39  |  Q       |         |          |        V|
  3+15      14.8826      8.33  |Q         |         |          |        V|
  3+20      14.9166      4.95  Q          |         |          |        V|
  3+25      14.9358      2.78  Q          |         |          |        V|
  3+30      14.9451      1.35  Q          |         |          |        V|
  3+35      14.9492      0.60  Q          |         |          |        V|
  3+40      14.9510      0.27  Q          |         |          |        V|
  3+45      14.9519      0.13  Q          |         |          |        V|
  3+50      14.9522      0.04  Q          |         |          |        V|
  3+55      14.9522      0.00  Q          |         |          |         V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA610R610.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 10-YEAR AND 6-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.031
Lag time = 0.135 Hr.
Lag time = 8.10 Min.
25% of lag time = 2.03 Min.
40% of lag time = 3.24 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.52	233.93

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	3.75	577.13

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.520(In)
Area Averaged 100-Year Rainfall = 3.750(In)

Point rain (area averaged) = 2.437(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 2.436(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	85.1	0.186	0.025	0.182	1.000	0.182
					Sum (F) =	0.182

Area averaged mean soil loss (F) (In/Hr) = 0.182
Minimum soil loss rate ((In/Hr)) = 0.091
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	61.701	5.835	9.051
2	0.167	123.402	33.387	51.784
3	0.250	185.103	33.200	51.493
4	0.333	246.803	12.111	18.784
5	0.417	308.504	6.965	10.803
6	0.500	370.205	4.129	6.405
7	0.583	431.906	2.168	3.363
8	0.667	493.607	0.827	1.283
9	0.750	555.308	0.524	0.812
10	0.833	617.008	0.434	0.673
11	0.917	678.709	0.298	0.462
12	1.000	740.410	0.122	0.189
			Sum = 100.000	Sum= 155.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.146	0.182	0.129	0.02
2	0.17	0.60	0.175	0.182	0.154	0.02
3	0.25	0.60	0.175	0.182	0.154	0.02
4	0.33	0.60	0.175	0.182	0.154	0.02
5	0.42	0.60	0.175	0.182	0.154	0.02
6	0.50	0.70	0.205	0.182	---	0.02
7	0.58	0.70	0.205	0.182	---	0.02
8	0.67	0.70	0.205	0.182	---	0.02
9	0.75	0.70	0.205	0.182	---	0.02
10	0.83	0.70	0.205	0.182	---	0.02
11	0.92	0.70	0.205	0.182	---	0.02
12	1.00	0.80	0.234	0.182	---	0.05
13	1.08	0.80	0.234	0.182	---	0.05
14	1.17	0.80	0.234	0.182	---	0.05
15	1.25	0.80	0.234	0.182	---	0.05
16	1.33	0.80	0.234	0.182	---	0.05
17	1.42	0.80	0.234	0.182	---	0.05
18	1.50	0.80	0.234	0.182	---	0.05
19	1.58	0.80	0.234	0.182	---	0.05
20	1.67	0.80	0.234	0.182	---	0.05
21	1.75	0.80	0.234	0.182	---	0.05
22	1.83	0.80	0.234	0.182	---	0.05
23	1.92	0.80	0.234	0.182	---	0.05
24	2.00	0.90	0.263	0.182	---	0.08
25	2.08	0.80	0.234	0.182	---	0.05
26	2.17	0.90	0.263	0.182	---	0.08
27	2.25	0.90	0.263	0.182	---	0.08
28	2.33	0.90	0.263	0.182	---	0.08
29	2.42	0.90	0.263	0.182	---	0.08
30	2.50	0.90	0.263	0.182	---	0.08
31	2.58	0.90	0.263	0.182	---	0.08
32	2.67	0.90	0.263	0.182	---	0.08
33	2.75	1.00	0.292	0.182	---	0.11

34	2.83	1.00	0.292	0.182	---	0.11
35	2.92	1.00	0.292	0.182	---	0.11
36	3.00	1.00	0.292	0.182	---	0.11
37	3.08	1.00	0.292	0.182	---	0.11
38	3.17	1.10	0.322	0.182	---	0.14
39	3.25	1.10	0.322	0.182	---	0.14
40	3.33	1.10	0.322	0.182	---	0.14
41	3.42	1.20	0.351	0.182	---	0.17
42	3.50	1.30	0.380	0.182	---	0.20
43	3.58	1.40	0.409	0.182	---	0.23
44	3.67	1.40	0.409	0.182	---	0.23
45	3.75	1.50	0.439	0.182	---	0.26
46	3.83	1.50	0.439	0.182	---	0.26
47	3.92	1.60	0.468	0.182	---	0.29
48	4.00	1.60	0.468	0.182	---	0.29
49	4.08	1.70	0.497	0.182	---	0.32
50	4.17	1.80	0.526	0.182	---	0.34
51	4.25	1.90	0.555	0.182	---	0.37
52	4.33	2.00	0.585	0.182	---	0.40
53	4.42	2.10	0.614	0.182	---	0.43
54	4.50	2.10	0.614	0.182	---	0.43
55	4.58	2.20	0.643	0.182	---	0.46
56	4.67	2.30	0.672	0.182	---	0.49
57	4.75	2.40	0.702	0.182	---	0.52
58	4.83	2.40	0.702	0.182	---	0.52
59	4.92	2.50	0.731	0.182	---	0.55
60	5.00	2.60	0.760	0.182	---	0.58
61	5.08	3.10	0.906	0.182	---	0.72
62	5.17	3.60	1.052	0.182	---	0.87
63	5.25	3.90	1.140	0.182	---	0.96
64	5.33	4.20	1.228	0.182	---	1.05
65	5.42	4.70	1.374	0.182	---	1.19
66	5.50	5.60	1.637	0.182	---	1.46
67	5.58	1.90	0.555	0.182	---	0.37
68	5.67	0.90	0.263	0.182	---	0.08
69	5.75	0.60	0.175	0.182	0.154	0.02
70	5.83	0.50	0.146	0.182	0.129	0.02
71	5.92	0.30	0.088	0.182	0.077	0.01
72	6.00	0.20	0.058	0.182	0.051	0.01
Sum =	100.0				Sum =	16.6

Flood volume = Effective rainfall 1.39(In)
times area 153.9(Ac.)/[(In)/(Ft.)] = 17.8(Ac.Ft)
Total soil loss = 1.05(In)
Total soil loss = 13.470(Ac.Ft)
Total rainfall = 2.44(In)
Flood volume = 774225.3 Cubic Feet
Total soil loss = 586747.3 Cubic Feet

Peak flow rate of this hydrograph = 180.129(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0011	0.16	Q	|	|	|	|
0+10	0.0087	1.10	Q	|	|	|	|
0+15	0.0237	2.18	Q	|	|	|	|
0+20	0.0423	2.70	Q	|	|	|	|
0+25	0.0626	2.95	Q	|	|	|	|
0+30	0.0841	3.12	Q	|	|	|	|
0+35	0.1068	3.30	Q	|	|	|	|
0+40	0.1304	3.43	Q	|	|	|	|
0+45	0.1544	3.49	Q	|	|	|	|
0+50	0.1787	3.52	Q	|	|	|	|
0+55	0.2031	3.54	Q	|	|	|	|
1+ 0	0.2294	3.82	Q	|	|	|	|

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1+ 5       0.2662      5.34  VQ        |         |         |         |
1+10       0.3133      6.85  VQ        |         |         |         |
1+15       0.3643      7.40  VQ        |         |         |         |
1+20       0.4174      7.71  VQ        |         |         |         |
1+25       0.4718      7.90  |Q        |         |         |         |
1+30       0.5269      8.00  |Q        |         |         |         |
1+35       0.5822      8.04  |Q        |         |         |         |
1+40       0.6377      8.06  |Q        |         |         |         |
1+45       0.6934      8.08  |Q        |         |         |         |
1+50       0.7491      8.09  |Q        |         |         |         |
1+55       0.8049      8.10  |Q        |         |         |         |
2+ 0       0.8625      8.36  |Q        |         |         |         |
2+ 5       0.9287      9.61  |QV       |         |         |         |
2+10       0.9967      9.87  |QV       |         |         |         |
2+15       1.0685     10.43  | Q       |         |         |         |
2+20       1.1491     11.70  | Q       |         |         |         |
2+25       1.2326     12.12  | Q       |         |         |         |
2+30       1.3176     12.35  | Q       |         |         |         |
2+35       1.4036     12.48  | QV      |         |         |         |
2+40       1.4901     12.56  | QV      |         |         |         |
2+45       1.5786     12.86  | QV      |         |         |         |
2+50       1.6777     14.39  | QV      |         |         |         |
2+55       1.7873     15.91  |  QV     |         |         |         |
3+ 0       1.9007     16.47  |  QV     |         |         |         |
3+ 5       2.0163     16.79  |  QV     |         |         |         |
3+10       2.1350     17.24  |  QV     |         |         |         |
3+15       2.2648     18.85  |  Q V    |         |         |         |
3+20       2.4053     20.40  |   QV    |         |         |         |
3+25       2.5515     21.23  |   QV    |         |         |         |
3+30       2.7123     23.35  |   Q V   |         |         |         |
3+35       2.8972     26.83  |    QV   |         |         |         |
3+40       3.1073     30.51  |     Q   |         |         |         |
3+45       3.3358     33.18  |     QV  |         |         |         |
3+50       3.5822     35.77  |      QV |         |         |         |
3+55       3.8450     38.17  |      QV |         |         |         |
4+ 0       4.1244     40.57  |       QV|         |         |         |
4+ 5       4.4193     42.82  |       QV|         |         |         |
4+10       4.7321     45.42  |        QV         |         |         |
4+15       5.0707     49.17  |        Q|V        |         |         |
4+20       5.4376     53.27  |         Q V       |         |         |
4+25       5.8341     57.56  |         |Q V      |         |         |
4+30       6.2590     61.70  |         | Q V     |         |         |
4+35       6.7043     64.66  |         | Q  V    |         |         |
4+40       7.1702     67.65  |         |  Q  V   |         |         |
4+45       7.6634     71.61  |         |   Q  V  |         |         |
4+50       8.1838     75.56  |         |    Q  V |         |         |
4+55       8.7236     78.38  |         |    Q   V|         |         |
5+ 0       9.2836     81.32  |         |     Q   V         |         |
5+ 5       9.8782     86.33  |         |      Q  | V       |         |
5+10      10.5506     97.64  |         |        Q|  V      |         |
5+15      11.3398    114.58  |         |         | Q  V    |         |
5+20      12.2405    130.79  |         |         |    QV   |         |
5+25      13.2449    145.84  |         |         |       Q|         |
5+30      14.3789    164.66  |         |         |         | Q       |
5+35      15.6195    180.13  |         |         |         |   VQ    |
5+40      16.5835    139.98  |         |         |      Q  |     V   |
5+45      17.1089     76.28  |         |    Q    |         |       V |
5+50      17.3992     42.16  |       Q |         |         |        V|
5+55      17.5655     24.15  |   Q     |         |         |        V|
6+ 0      17.6595     13.65  | Q       |         |         |        V|
6+ 5      17.7104      7.39  |Q        |         |         |        V|
6+10      17.7400      4.29  Q         |         |         |        V|
6+15      17.7576      2.57  Q         |         |         |        V|
6+20      17.7676      1.45  Q         |         |         |        V|
6+25      17.7719      0.62  Q         |         |         |        V|
6+30      17.7731      0.17  Q         |         |         |        V|
6+35      17.7735      0.05  Q         |         |         |        V|
6+40      17.7736      0.02  Q         |         |         |        V|
6+45      17.7737      0.01  Q         |         |         |        V|
6+50      17.7738      0.01  Q         |         |         |        V|
6+55      17.7738      0.00  Q         |         |         |        V|
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA2410R2410.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 10-YEAR AND 24-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.031
Lag time = 0.135 Hr.
Lag time = 8.10 Min.
25% of lag time = 2.03 Min.
40% of lag time = 3.24 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	2.85	438.62

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	8.85	1362.02

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.850(In)
Area Averaged 100-Year Rainfall = 8.850(In)

Point rain (area averaged) = 5.318(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 5.317(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.1	85.1	0.186	0.025	0.182	1.000	0.182
					Sum (F) =	0.182

Area averaged mean soil loss (F) (In/Hr) = 0.182
Minimum soil loss rate ((In/Hr)) = 0.091
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.880

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	61.701	5.835	9.051
2	0.167	123.402	33.387	51.784
3	0.250	185.103	33.200	51.493
4	0.333	246.803	12.111	18.784
5	0.417	308.504	6.965	10.803
6	0.500	370.205	4.129	6.405
7	0.583	431.906	2.168	3.363
8	0.667	493.607	0.827	1.283
9	0.750	555.308	0.524	0.812
10	0.833	617.008	0.434	0.673
11	0.917	678.709	0.298	0.462
12	1.000	740.410	0.122	0.189
			Sum = 100.000	Sum= 155.102

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.043	0.322	0.037	0.01
2	0.17	0.07	0.043	0.321	0.037	0.01
3	0.25	0.07	0.043	0.320	0.037	0.01
4	0.33	0.10	0.064	0.318	0.056	0.01
5	0.42	0.10	0.064	0.317	0.056	0.01
6	0.50	0.10	0.064	0.316	0.056	0.01
7	0.58	0.10	0.064	0.315	0.056	0.01
8	0.67	0.10	0.064	0.313	0.056	0.01
9	0.75	0.10	0.064	0.312	0.056	0.01
10	0.83	0.13	0.085	0.311	0.075	0.01
11	0.92	0.13	0.085	0.310	0.075	0.01
12	1.00	0.13	0.085	0.308	0.075	0.01
13	1.08	0.10	0.064	0.307	0.056	0.01
14	1.17	0.10	0.064	0.306	0.056	0.01
15	1.25	0.10	0.064	0.305	0.056	0.01
16	1.33	0.10	0.064	0.304	0.056	0.01
17	1.42	0.10	0.064	0.302	0.056	0.01
18	1.50	0.10	0.064	0.301	0.056	0.01
19	1.58	0.10	0.064	0.300	0.056	0.01
20	1.67	0.10	0.064	0.299	0.056	0.01
21	1.75	0.10	0.064	0.298	0.056	0.01
22	1.83	0.13	0.085	0.296	0.075	0.01
23	1.92	0.13	0.085	0.295	0.075	0.01
24	2.00	0.13	0.085	0.294	0.075	0.01
25	2.08	0.13	0.085	0.293	0.075	0.01
26	2.17	0.13	0.085	0.292	0.075	0.01
27	2.25	0.13	0.085	0.290	0.075	0.01
28	2.33	0.13	0.085	0.289	0.075	0.01
29	2.42	0.13	0.085	0.288	0.075	0.01
30	2.50	0.13	0.085	0.287	0.075	0.01
31	2.58	0.17	0.106	0.286	0.094	0.01
32	2.67	0.17	0.106	0.285	0.094	0.01
33	2.75	0.17	0.106	0.283	0.094	0.01

34	2.83	0.17	0.106	0.282	0.094	0.01
35	2.92	0.17	0.106	0.281	0.094	0.01
36	3.00	0.17	0.106	0.280	0.094	0.01
37	3.08	0.17	0.106	0.279	0.094	0.01
38	3.17	0.17	0.106	0.278	0.094	0.01
39	3.25	0.17	0.106	0.276	0.094	0.01
40	3.33	0.17	0.106	0.275	0.094	0.01
41	3.42	0.17	0.106	0.274	0.094	0.01
42	3.50	0.17	0.106	0.273	0.094	0.01
43	3.58	0.17	0.106	0.272	0.094	0.01
44	3.67	0.17	0.106	0.271	0.094	0.01
45	3.75	0.17	0.106	0.270	0.094	0.01
46	3.83	0.20	0.128	0.268	0.112	0.02
47	3.92	0.20	0.128	0.267	0.112	0.02
48	4.00	0.20	0.128	0.266	0.112	0.02
49	4.08	0.20	0.128	0.265	0.112	0.02
50	4.17	0.20	0.128	0.264	0.112	0.02
51	4.25	0.20	0.128	0.263	0.112	0.02
52	4.33	0.23	0.149	0.262	0.131	0.02
53	4.42	0.23	0.149	0.261	0.131	0.02
54	4.50	0.23	0.149	0.259	0.131	0.02
55	4.58	0.23	0.149	0.258	0.131	0.02
56	4.67	0.23	0.149	0.257	0.131	0.02
57	4.75	0.23	0.149	0.256	0.131	0.02
58	4.83	0.27	0.170	0.255	0.150	0.02
59	4.92	0.27	0.170	0.254	0.150	0.02
60	5.00	0.27	0.170	0.253	0.150	0.02
61	5.08	0.20	0.128	0.252	0.112	0.02
62	5.17	0.20	0.128	0.251	0.112	0.02
63	5.25	0.20	0.128	0.250	0.112	0.02
64	5.33	0.23	0.149	0.248	0.131	0.02
65	5.42	0.23	0.149	0.247	0.131	0.02
66	5.50	0.23	0.149	0.246	0.131	0.02
67	5.58	0.27	0.170	0.245	0.150	0.02
68	5.67	0.27	0.170	0.244	0.150	0.02
69	5.75	0.27	0.170	0.243	0.150	0.02
70	5.83	0.27	0.170	0.242	0.150	0.02
71	5.92	0.27	0.170	0.241	0.150	0.02
72	6.00	0.27	0.170	0.240	0.150	0.02
73	6.08	0.30	0.191	0.239	0.168	0.02
74	6.17	0.30	0.191	0.238	0.168	0.02
75	6.25	0.30	0.191	0.237	0.168	0.02
76	6.33	0.30	0.191	0.236	0.168	0.02
77	6.42	0.30	0.191	0.235	0.168	0.02
78	6.50	0.30	0.191	0.233	0.168	0.02
79	6.58	0.33	0.213	0.232	0.187	0.03
80	6.67	0.33	0.213	0.231	0.187	0.03
81	6.75	0.33	0.213	0.230	0.187	0.03
82	6.83	0.33	0.213	0.229	0.187	0.03
83	6.92	0.33	0.213	0.228	0.187	0.03
84	7.00	0.33	0.213	0.227	0.187	0.03
85	7.08	0.33	0.213	0.226	0.187	0.03
86	7.17	0.33	0.213	0.225	0.187	0.03
87	7.25	0.33	0.213	0.224	0.187	0.03
88	7.33	0.37	0.234	0.223	---	0.01
89	7.42	0.37	0.234	0.222	---	0.01
90	7.50	0.37	0.234	0.221	---	0.01
91	7.58	0.40	0.255	0.220	---	0.04
92	7.67	0.40	0.255	0.219	---	0.04
93	7.75	0.40	0.255	0.218	---	0.04
94	7.83	0.43	0.276	0.217	---	0.06
95	7.92	0.43	0.276	0.216	---	0.06
96	8.00	0.43	0.276	0.215	---	0.06
97	8.08	0.50	0.319	0.214	---	0.11
98	8.17	0.50	0.319	0.213	---	0.11
99	8.25	0.50	0.319	0.212	---	0.11
100	8.33	0.50	0.319	0.211	---	0.11
101	8.42	0.50	0.319	0.210	---	0.11
102	8.50	0.50	0.319	0.209	---	0.11
103	8.58	0.53	0.340	0.208	---	0.13
104	8.67	0.53	0.340	0.207	---	0.13

105	8.75	0.53	0.340	0.206	---	0.13
106	8.83	0.57	0.362	0.205	---	0.16
107	8.92	0.57	0.362	0.204	---	0.16
108	9.00	0.57	0.362	0.203	---	0.16
109	9.08	0.63	0.404	0.202	---	0.20
110	9.17	0.63	0.404	0.201	---	0.20
111	9.25	0.63	0.404	0.200	---	0.20
112	9.33	0.67	0.425	0.199	---	0.23
113	9.42	0.67	0.425	0.198	---	0.23
114	9.50	0.67	0.425	0.197	---	0.23
115	9.58	0.70	0.447	0.197	---	0.25
116	9.67	0.70	0.447	0.196	---	0.25
117	9.75	0.70	0.447	0.195	---	0.25
118	9.83	0.73	0.468	0.194	---	0.27
119	9.92	0.73	0.468	0.193	---	0.28
120	10.00	0.73	0.468	0.192	---	0.28
121	10.08	0.50	0.319	0.191	---	0.13
122	10.17	0.50	0.319	0.190	---	0.13
123	10.25	0.50	0.319	0.189	---	0.13
124	10.33	0.50	0.319	0.188	---	0.13
125	10.42	0.50	0.319	0.187	---	0.13
126	10.50	0.50	0.319	0.186	---	0.13
127	10.58	0.67	0.425	0.185	---	0.24
128	10.67	0.67	0.425	0.185	---	0.24
129	10.75	0.67	0.425	0.184	---	0.24
130	10.83	0.67	0.425	0.183	---	0.24
131	10.92	0.67	0.425	0.182	---	0.24
132	11.00	0.67	0.425	0.181	---	0.24
133	11.08	0.63	0.404	0.180	---	0.22
134	11.17	0.63	0.404	0.179	---	0.22
135	11.25	0.63	0.404	0.178	---	0.23
136	11.33	0.63	0.404	0.177	---	0.23
137	11.42	0.63	0.404	0.177	---	0.23
138	11.50	0.63	0.404	0.176	---	0.23
139	11.58	0.57	0.362	0.175	---	0.19
140	11.67	0.57	0.362	0.174	---	0.19
141	11.75	0.57	0.362	0.173	---	0.19
142	11.83	0.60	0.383	0.172	---	0.21
143	11.92	0.60	0.383	0.171	---	0.21
144	12.00	0.60	0.383	0.170	---	0.21
145	12.08	0.83	0.532	0.170	---	0.36
146	12.17	0.83	0.532	0.169	---	0.36
147	12.25	0.83	0.532	0.168	---	0.36
148	12.33	0.87	0.553	0.167	---	0.39
149	12.42	0.87	0.553	0.166	---	0.39
150	12.50	0.87	0.553	0.165	---	0.39
151	12.58	0.93	0.595	0.165	---	0.43
152	12.67	0.93	0.595	0.164	---	0.43
153	12.75	0.93	0.595	0.163	---	0.43
154	12.83	0.97	0.617	0.162	---	0.45
155	12.92	0.97	0.617	0.161	---	0.46
156	13.00	0.97	0.617	0.160	---	0.46
157	13.08	1.13	0.723	0.160	---	0.56
158	13.17	1.13	0.723	0.159	---	0.56
159	13.25	1.13	0.723	0.158	---	0.57
160	13.33	1.13	0.723	0.157	---	0.57
161	13.42	1.13	0.723	0.156	---	0.57
162	13.50	1.13	0.723	0.156	---	0.57
163	13.58	0.77	0.489	0.155	---	0.33
164	13.67	0.77	0.489	0.154	---	0.34
165	13.75	0.77	0.489	0.153	---	0.34
166	13.83	0.77	0.489	0.152	---	0.34
167	13.92	0.77	0.489	0.152	---	0.34
168	14.00	0.77	0.489	0.151	---	0.34
169	14.08	0.90	0.574	0.150	---	0.42
170	14.17	0.90	0.574	0.149	---	0.42
171	14.25	0.90	0.574	0.149	---	0.43
172	14.33	0.87	0.553	0.148	---	0.41
173	14.42	0.87	0.553	0.147	---	0.41
174	14.50	0.87	0.553	0.146	---	0.41
175	14.58	0.87	0.553	0.146	---	0.41

176	14.67	0.87	0.553	0.145	---	0.41
177	14.75	0.87	0.553	0.144	---	0.41
178	14.83	0.83	0.532	0.143	---	0.39
179	14.92	0.83	0.532	0.143	---	0.39
180	15.00	0.83	0.532	0.142	---	0.39
181	15.08	0.80	0.510	0.141	---	0.37
182	15.17	0.80	0.510	0.140	---	0.37
183	15.25	0.80	0.510	0.140	---	0.37
184	15.33	0.77	0.489	0.139	---	0.35
185	15.42	0.77	0.489	0.138	---	0.35
186	15.50	0.77	0.489	0.138	---	0.35
187	15.58	0.63	0.404	0.137	---	0.27
188	15.67	0.63	0.404	0.136	---	0.27
189	15.75	0.63	0.404	0.135	---	0.27
190	15.83	0.63	0.404	0.135	---	0.27
191	15.92	0.63	0.404	0.134	---	0.27
192	16.00	0.63	0.404	0.133	---	0.27
193	16.08	0.13	0.085	0.133	0.075	0.01
194	16.17	0.13	0.085	0.132	0.075	0.01
195	16.25	0.13	0.085	0.131	0.075	0.01
196	16.33	0.13	0.085	0.131	0.075	0.01
197	16.42	0.13	0.085	0.130	0.075	0.01
198	16.50	0.13	0.085	0.129	0.075	0.01
199	16.58	0.10	0.064	0.129	0.056	0.01
200	16.67	0.10	0.064	0.128	0.056	0.01
201	16.75	0.10	0.064	0.127	0.056	0.01
202	16.83	0.10	0.064	0.127	0.056	0.01
203	16.92	0.10	0.064	0.126	0.056	0.01
204	17.00	0.10	0.064	0.125	0.056	0.01
205	17.08	0.17	0.106	0.125	0.094	0.01
206	17.17	0.17	0.106	0.124	0.094	0.01
207	17.25	0.17	0.106	0.124	0.094	0.01
208	17.33	0.17	0.106	0.123	0.094	0.01
209	17.42	0.17	0.106	0.122	0.094	0.01
210	17.50	0.17	0.106	0.122	0.094	0.01
211	17.58	0.17	0.106	0.121	0.094	0.01
212	17.67	0.17	0.106	0.121	0.094	0.01
213	17.75	0.17	0.106	0.120	0.094	0.01
214	17.83	0.13	0.085	0.119	0.075	0.01
215	17.92	0.13	0.085	0.119	0.075	0.01
216	18.00	0.13	0.085	0.118	0.075	0.01
217	18.08	0.13	0.085	0.118	0.075	0.01
218	18.17	0.13	0.085	0.117	0.075	0.01
219	18.25	0.13	0.085	0.116	0.075	0.01
220	18.33	0.13	0.085	0.116	0.075	0.01
221	18.42	0.13	0.085	0.115	0.075	0.01
222	18.50	0.13	0.085	0.115	0.075	0.01
223	18.58	0.10	0.064	0.114	0.056	0.01
224	18.67	0.10	0.064	0.114	0.056	0.01
225	18.75	0.10	0.064	0.113	0.056	0.01
226	18.83	0.07	0.043	0.113	0.037	0.01
227	18.92	0.07	0.043	0.112	0.037	0.01
228	19.00	0.07	0.043	0.111	0.037	0.01
229	19.08	0.10	0.064	0.111	0.056	0.01
230	19.17	0.10	0.064	0.110	0.056	0.01
231	19.25	0.10	0.064	0.110	0.056	0.01
232	19.33	0.13	0.085	0.109	0.075	0.01
233	19.42	0.13	0.085	0.109	0.075	0.01
234	19.50	0.13	0.085	0.108	0.075	0.01
235	19.58	0.10	0.064	0.108	0.056	0.01
236	19.67	0.10	0.064	0.107	0.056	0.01
237	19.75	0.10	0.064	0.107	0.056	0.01
238	19.83	0.07	0.043	0.106	0.037	0.01
239	19.92	0.07	0.043	0.106	0.037	0.01
240	20.00	0.07	0.043	0.105	0.037	0.01
241	20.08	0.10	0.064	0.105	0.056	0.01
242	20.17	0.10	0.064	0.105	0.056	0.01
243	20.25	0.10	0.064	0.104	0.056	0.01
244	20.33	0.10	0.064	0.104	0.056	0.01
245	20.42	0.10	0.064	0.103	0.056	0.01
246	20.50	0.10	0.064	0.103	0.056	0.01

247	20.58	0.10	0.064	0.102	0.056	0.01
248	20.67	0.10	0.064	0.102	0.056	0.01
249	20.75	0.10	0.064	0.102	0.056	0.01
250	20.83	0.07	0.043	0.101	0.037	0.01
251	20.92	0.07	0.043	0.101	0.037	0.01
252	21.00	0.07	0.043	0.100	0.037	0.01
253	21.08	0.10	0.064	0.100	0.056	0.01
254	21.17	0.10	0.064	0.099	0.056	0.01
255	21.25	0.10	0.064	0.099	0.056	0.01
256	21.33	0.07	0.043	0.099	0.037	0.01
257	21.42	0.07	0.043	0.098	0.037	0.01
258	21.50	0.07	0.043	0.098	0.037	0.01
259	21.58	0.10	0.064	0.098	0.056	0.01
260	21.67	0.10	0.064	0.097	0.056	0.01
261	21.75	0.10	0.064	0.097	0.056	0.01
262	21.83	0.07	0.043	0.097	0.037	0.01
263	21.92	0.07	0.043	0.096	0.037	0.01
264	22.00	0.07	0.043	0.096	0.037	0.01
265	22.08	0.10	0.064	0.096	0.056	0.01
266	22.17	0.10	0.064	0.095	0.056	0.01
267	22.25	0.10	0.064	0.095	0.056	0.01
268	22.33	0.07	0.043	0.095	0.037	0.01
269	22.42	0.07	0.043	0.094	0.037	0.01
270	22.50	0.07	0.043	0.094	0.037	0.01
271	22.58	0.07	0.043	0.094	0.037	0.01
272	22.67	0.07	0.043	0.094	0.037	0.01
273	22.75	0.07	0.043	0.093	0.037	0.01
274	22.83	0.07	0.043	0.093	0.037	0.01
275	22.92	0.07	0.043	0.093	0.037	0.01
276	23.00	0.07	0.043	0.093	0.037	0.01
277	23.08	0.07	0.043	0.092	0.037	0.01
278	23.17	0.07	0.043	0.092	0.037	0.01
279	23.25	0.07	0.043	0.092	0.037	0.01
280	23.33	0.07	0.043	0.092	0.037	0.01
281	23.42	0.07	0.043	0.092	0.037	0.01
282	23.50	0.07	0.043	0.091	0.037	0.01
283	23.58	0.07	0.043	0.091	0.037	0.01
284	23.67	0.07	0.043	0.091	0.037	0.01
285	23.75	0.07	0.043	0.091	0.037	0.01
286	23.83	0.07	0.043	0.091	0.037	0.01
287	23.92	0.07	0.043	0.091	0.037	0.01
288	24.00	0.07	0.043	0.091	0.037	0.01
Sum =		100.0			Sum =	30.5

Flood volume = Effective rainfall 2.54(In)
times area 153.9(Ac.)/[(In)/(Ft.)] = 32.6(Ac.Ft)
Total soil loss = 2.77(In)
Total soil loss = 35.581(Ac.Ft)
Total rainfall = 5.32(In)
Flood volume = 1420385.4 Cubic Feet
Total soil loss = 1549910.0 Cubic Feet

Peak flow rate of this hydrograph = 87.046(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	22.5	45.0	67.5	90.0
0+ 5	0.0003	0.05	Q	|	|	|	|
0+10	0.0025	0.31	Q	|	|	|	|
0+15	0.0064	0.57	Q	|	|	|	|
0+20	0.0112	0.69	Q	|	|	|	|
0+25	0.0172	0.88	Q	|	|	|	|
0+30	0.0244	1.04	Q	|	|	|	|
0+35	0.0321	1.11	Q	|	|	|	|
0+40	0.0399	1.14	Q	|	|	|	|
0+45	0.0480	1.16	Q	|	|	|	|

0+50	0.0562	1.20	Q				
0+55	0.0654	1.34	Q				
1+ 0	0.0756	1.47	Q				
1+ 5	0.0859	1.50	Q				
1+10	0.0955	1.39	Q				
1+15	0.1043	1.28	Q				
1+20	0.1128	1.24	Q				
1+25	0.1212	1.22	Q				
1+30	0.1295	1.20	Q				
1+35	0.1377	1.20	Q				
1+40	0.1460	1.19	Q				
1+45	0.1542	1.19	Q				
1+50	0.1625	1.21	Q				
1+55	0.1718	1.34	Q				
2+ 0	0.1819	1.47	Q				
2+ 5	0.1924	1.52	Q				
2+10	0.2031	1.55	Q				
2+15	0.2139	1.57	Q				
2+20	0.2247	1.58	Q				
2+25	0.2356	1.58	Q				
2+30	0.2465	1.58	Q				
2+35	0.2576	1.61	Q				
2+40	0.2695	1.74	Q				
2+45	0.2824	1.87	Q				
2+50	0.2956	1.92	Q				
2+55	0.3090	1.95	Q				
3+ 0	0.3226	1.96	Q				
3+ 5	0.3361	1.97	Q				
3+10	0.3497	1.97	Q				
3+15	0.3633	1.98	Q				
3+20	0.3770	1.98	Q				
3+25	0.3906	1.98	Q				
3+30	0.4042	1.98	Q				
3+35	0.4179	1.98	Q				
3+40	0.4315	1.98	Q				
3+45	0.4452	1.98	Q				
3+50	0.4590	2.00	Q				
3+55	0.4737	2.14	Q				
4+ 0	0.4893	2.27	VQ				
4+ 5	0.5052	2.31	VQ				
4+10	0.5214	2.34	VQ				
4+15	0.5376	2.36	VQ				
4+20	0.5541	2.39	VQ				
4+25	0.5715	2.53	VQ				
4+30	0.5898	2.66	VQ				
4+35	0.6084	2.71	VQ				
4+40	0.6273	2.74	VQ				
4+45	0.6463	2.75	VQ				
4+50	0.6655	2.79	VQ				
4+55	0.6856	2.92	VQ				
5+ 0	0.7066	3.06	VQ				
5+ 5	0.7277	3.06	VQ				
5+10	0.7471	2.82	VQ				
5+15	0.7649	2.58	VQ				
5+20	0.7822	2.51	VQ				
5+25	0.8001	2.59	VQ				
5+30	0.8186	2.69	|Q				
5+35	0.8376	2.75	|Q				
5+40	0.8576	2.90	|Q				
5+45	0.8786	3.05	|Q				
5+50	0.8999	3.10	|Q				
5+55	0.9215	3.13	|Q				
6+ 0	0.9432	3.15	|Q				
6+ 5	0.9651	3.18	|Q				
6+10	0.9879	3.32	|Q				
6+15	1.0117	3.45	|Q				
6+20	1.0358	3.50	|Q				
6+25	1.0601	3.53	|Q				
6+30	1.0845	3.55	|Q				
6+35	1.1092	3.58	|Q				
6+40	1.1348	3.71	|Q				

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 6+45       1.1613      3.85  |Q        |         |         |         |
 6+50       1.1881      3.90  |Q        |         |         |         |
 6+55       1.2151      3.93  |Q        |         |         |         |
 7+ 0       1.2423      3.94  |Q        |         |         |         |
 7+ 5       1.2695      3.95  |Q        |         |         |         |
 7+10       1.2968      3.95  |Q        |         |         |         |
 7+15       1.3240      3.96  |Q        |         |         |         |
 7+20       1.3504      3.83  |Q        |         |         |         |
 7+25       1.3715      3.08  |Q        |         |         |         |
 7+30       1.3879      2.38  |Q        |         |         |         |
 7+35       1.4046      2.41  |Q        |         |         |         |
 7+40       1.4286      3.49  |Q        |         |         |         |
 7+45       1.4605      4.64  |VQ       |         |         |         |
 7+50       1.4972      5.33  |VQ       |         |         |         |
 7+55       1.5440      6.80  |V Q      |         |         |         |
 8+ 0       1.6003      8.17  |V Q      |         |         |         |
 8+ 5       1.6635      9.17  | V Q     |         |         |         |
 8+10       1.7446     11.78  | V  Q    |         |         |         |
 8+15       1.8429     14.28  | V   Q   |         |         |         |
 8+20       1.9484     15.32  | V   Q   |         |         |         |
 8+25       2.0584     15.97  | V    Q  |         |         |         |
 8+30       2.1714     16.41  | V    Q  |         |         |         |
 8+35       2.2879     16.92  | V    Q  |         |         |         |
 8+40       2.4135     18.24  | V     Q |         |         |         |
 8+45       2.5480     19.52  |  V    Q |         |         |         |
 8+50       2.6878     20.30  |  V     Q|         |         |         |
 8+55       2.8379     21.80  |  V     Q|         |         |         |
 9+ 0       2.9976     23.19  |  V      Q         |         |         |
 9+ 5       3.1642     24.20  |  V      Q         |         |         |
 9+10       3.3489     26.81  |   V     |Q        |         |         |
 9+15       3.5507     29.30  |   V     |  Q      |         |         |
 9+20       3.7609     30.53  |   V     |  Q      |         |         |
 9+25       3.9832     32.28  |   V     |   Q     |         |         |
 9+30       4.2161     33.81  |    V    |    Q    |         |         |
 9+35       4.4552     34.71  |    V    |    Q    |         |         |
 9+40       4.7049     36.26  |    V    |     Q   |         |         |
 9+45       4.9643     37.67  |     V   |     Q   |         |         |
 9+50       5.2296     38.51  |     V   |      Q  |         |         |
 9+55       5.5053     40.04  |     V   |      Q  |         |         |
10+ 0       5.7907     41.44  |      V  |       Q |         |         |
10+ 5       6.0712     40.72  |      V  |       Q |         |         |
10+10       6.3013     33.42  |      V  |   Q     |         |         |
10+15       6.4808     26.05  |      V  |Q        |         |         |
10+20       6.6425     23.48  |       V Q         |         |         |
10+25       6.7944     22.05  |       VQ|         |         |         |
10+30       6.9408     21.26  |       VQ|         |         |         |
10+35       7.0915     21.88  |       VQ|         |         |         |
10+40       7.2799     27.35  |       V | Q       |         |         |
10+45       7.5062     32.86  |        V|   Q     |         |         |
10+50       7.7465     34.89  |        V|    Q    |         |         |
10+55       7.9953     36.12  |        V|     Q   |         |         |
11+ 0       8.2494     36.91  |         V     Q   |         |         |
11+ 5       8.5057     37.21  |         V     Q   |         |         |
11+10       8.7563     36.39  |         V     Q   |         |         |
11+15       9.0009     35.52  |         |V   Q    |         |         |
11+20       9.2442     35.32  |         |V   Q    |         |         |
11+25       9.4872     35.28  |         |V   Q    |         |         |
11+30       9.7303     35.30  |         |V   Q    |         |         |
11+35       9.9712     34.98  |         | V  Q    |         |         |
11+40      10.1977     32.89  |         | V Q     |         |         |
11+45      10.4099     30.81  |         | VQ      |         |         |
11+50      10.6188     30.33  |         |  Q      |         |         |
11+55      10.8329     31.09  |         |  Q      |         |         |
12+ 0      11.0537     32.05  |         |  VQ     |         |         |
12+ 5      11.2863     33.78  |         |  V Q    |         |         |
12+10      11.5743     41.81  |         |   V   Q |         |         |
12+15      11.9166     49.71  |         |   V     | Q       |         |
12+20      12.2808     52.88  |         |    V    |  Q      |         |
12+25      12.6645     55.72  |         |    V    |   Q     |         |
12+30      13.0634     57.91  |         |     V   |    Q    |         |
12+35      13.4721     59.35  |         |     V   |     Q   |         |
```

```
12+40      13.8999     62.11  |          |      V  |      Q  |          |
12+45      14.3454     64.69  |          |      V  |       Q |          |
12+50      14.7998     65.98  |          |       V |        Q|          |
12+55      15.2666     67.77  |          |       V |         Q          |
13+ 0      15.7439     69.31  |          |        V|         Q          |
13+ 5      16.2326     70.96  |          |        V|          |Q         |
13+10      16.7621     76.89  |          |         V          |   Q      |
13+15      17.3315     82.67  |          |          |V        |     Q    |
13+20      17.9161     84.89  |          |          |V        |      Q   |
13+25      18.5099     86.21  |          |          | V       |       Q  |
13+30      19.1094     87.05  |          |          |  V      |       Q  |
13+35      19.6977     85.42  |          |          |   V     |      Q   |
13+40      20.2044     73.57  |          |          |   V     | Q        |
13+45      20.6296     61.73  |          |          |    V Q  |          |
13+50      21.0258     57.53  |          |          |    Q    |          |
13+55      21.4058     55.17  |          |          |   Q V   |          |
14+ 0      21.7764     53.82  |          |          |  Q  V   |          |
14+ 5      22.1477     53.92  |          |          |  Q   V  |          |
14+10      22.5482     58.15  |          |          |    Q V  |          |
14+15      22.9784     62.46  |          |          |      QV |          |
14+20      23.4179     63.83  |          |          |       Q |          |
14+25      23.8563     63.66  |          |          |       QV|          |
14+30      24.2914     63.18  |          |          |       QV|          |
14+35      24.7266     63.18  |          |          |       Q V          |
14+40      25.1617     63.18  |          |          |       Q V          |
14+45      25.5972     63.23  |          |          |       Q |V         |
14+50      26.0320     63.14  |          |          |       Q |V         |
14+55      26.4601     62.16  |          |          |      Q  | V        |
15+ 0      26.8815     61.18  |          |          |      Q  | V        |
15+ 5      27.2994     60.69  |          |          |     Q   |  V       |
15+10      27.7089     59.46  |          |          |     Q   |  V       |
15+15      28.1107     58.34  |          |          |    Q    |   V      |
15+20      28.5087     57.79  |          |          |    Q    |   V      |
15+25      28.8980     56.54  |          |          |    Q    |    V     |
15+30      29.2796     55.40  |          |          |   Q     |    V     |
15+35      29.6532     54.25  |          |          |   Q     |     V    |
15+40      29.9955     49.69  |          |          | Q       |     V    |
15+45      30.3072     45.26  |          |         Q          |      V   |
15+50      30.6080     43.68  |          |        Q|          |      V   |
15+55      30.9030     42.84  |          |        Q|          |      V   |
16+ 0      31.1949     42.38  |          |       Q |          |       V  |
16+ 5      31.4691     39.82  |          |      Q  |          |       V  |
16+10      31.6500     26.27  |          |Q        |          |       V  |
16+15      31.7382     12.81  |    Q     |         |          |       V  |
16+20      31.7925      7.87  |  Q       |         |          |        V |
16+25      31.8271      5.03  | Q        |         |          |        V |
16+30      31.8501      3.35  |Q         |         |          |        V |
16+35      31.8670      2.45  |Q         |         |          |        V |
16+40      31.8807      1.98  Q          |         |          |        V |
16+45      31.8920      1.64  Q          |         |          |        V |
16+50      31.9017      1.42  Q          |         |          |        V |
16+55      31.9105      1.27  Q          |         |          |        V |
17+ 0      31.9188      1.21  Q          |         |          |        V |
17+ 5      31.9273      1.24  Q          |         |          |        V |
17+10      31.9377      1.50  Q          |         |          |        V |
17+15      31.9499      1.77  Q          |         |          |        V |
17+20      31.9627      1.86  Q          |         |          |        V |
17+25      31.9758      1.91  Q          |         |          |        V |
17+30      31.9892      1.95  Q          |         |          |        V |
17+35      32.0028      1.96  Q          |         |          |        V |
17+40      32.0163      1.97  Q          |         |          |        V |
17+45      32.0299      1.97  Q          |         |          |        V |
17+50      32.0434      1.95  Q          |         |          |        V |
17+55      32.0559      1.82  Q          |         |          |        V |
18+ 0      32.0676      1.69  Q          |         |          |        V |
18+ 5      32.0789      1.65  Q          |         |          |        V |
18+10      32.0901      1.62  Q          |         |          |        V |
18+15      32.1011      1.60  Q          |         |          |        V |
18+20      32.1121      1.59  Q          |         |          |        V |
18+25      32.1230      1.59  Q          |         |          |        V |
18+30      32.1340      1.59  Q          |         |          |        V |
```

18+35	32.1447	1.56	Q	|	|	|	V|
18+40	32.1546	1.43	Q	|	|	|	V|
18+45	32.1635	1.30	Q	|	|	|	V|
18+50	32.1719	1.23	Q	|	|	|	V|
18+55	32.1793	1.07	Q	|	|	|	V|
19+ 0	32.1856	0.92	Q	|	|	|	V|
19+ 5	32.1917	0.89	Q	|	|	|	V|
19+10	32.1985	0.99	Q	|	|	|	V|
19+15	32.2061	1.10	Q	|	|	|	V|
19+20	32.2141	1.16	Q	|	|	|	V|
19+25	32.2231	1.32	Q	|	|	|	V|
19+30	32.2332	1.46	Q	|	|	|	V|
19+35	32.2435	1.49	Q	|	|	|	V|
19+40	32.2530	1.39	Q	|	|	|	V|
19+45	32.2618	1.28	Q	|	|	|	V|
19+50	32.2702	1.22	Q	|	|	|	V|
19+55	32.2775	1.06	Q	|	|	|	V|
20+ 0	32.2838	0.92	Q	|	|	|	V|
20+ 5	32.2899	0.88	Q	|	|	|	V|
20+10	32.2967	0.99	Q	|	|	|	V|
20+15	32.3043	1.10	Q	|	|	|	V|
20+20	32.3121	1.14	Q	|	|	|	V|
20+25	32.3201	1.16	Q	|	|	|	V|
20+30	32.3282	1.17	Q	|	|	|	V|
20+35	32.3363	1.18	Q	|	|	|	V|
20+40	32.3445	1.18	Q	|	|	|	V|
20+45	32.3526	1.18	Q	|	|	|	V|
20+50	32.3606	1.16	Q	|	|	|	V|
20+55	32.3677	1.03	Q	|	|	|	V|
21+ 0	32.3739	0.90	Q	|	|	|	V|
21+ 5	32.3800	0.88	Q	|	|	|	V|
21+10	32.3867	0.98	Q	|	|	|	V|
21+15	32.3943	1.10	Q	|	|	|	V|
21+20	32.4020	1.11	Q	|	|	|	V|
21+25	32.4089	1.00	Q	|	|	|	V|
21+30	32.4150	0.89	Q	|	|	|	V|
21+35	32.4210	0.87	Q	|	|	|	V|
21+40	32.4277	0.98	Q	|	|	|	V|
21+45	32.4352	1.09	Q	|	|	|	V|
21+50	32.4429	1.11	Q	|	|	|	V|
21+55	32.4498	1.00	Q	|	|	|	V|
22+ 0	32.4559	0.89	Q	|	|	|	V|
22+ 5	32.4619	0.87	Q	|	|	|	V|
22+10	32.4686	0.98	Q	|	|	|	V|
22+15	32.4761	1.09	Q	|	|	|	V|
22+20	32.4838	1.11	Q	|	|	|	V|
22+25	32.4907	1.00	Q	|	|	|	V|
22+30	32.4968	0.89	Q	|	|	|	V|
22+35	32.5026	0.85	Q	|	|	|	V|
22+40	32.5083	0.82	Q	|	|	|	V|
22+45	32.5138	0.81	Q	|	|	|	V|
22+50	32.5193	0.80	Q	|	|	|	V|
22+55	32.5248	0.80	Q	|	|	|	V|
23+ 0	32.5303	0.80	Q	|	|	|	V|
23+ 5	32.5358	0.79	Q	|	|	|	V|
23+10	32.5412	0.79	Q	|	|	|	V|
23+15	32.5467	0.79	Q	|	|	|	V|
23+20	32.5521	0.79	Q	|	|	|	V|
23+25	32.5576	0.79	Q	|	|	|	V|
23+30	32.5631	0.79	Q	|	|	|	V|
23+35	32.5685	0.79	Q	|	|	|	V|
23+40	32.5740	0.79	Q	|	|	|	V|
23+45	32.5794	0.79	Q	|	|	|	V|
23+50	32.5849	0.79	Q	|	|	|	V|
23+55	32.5903	0.79	Q	|	|	|	V|
24+ 0	32.5958	0.79	Q	|	|	|	V|
24+ 5	32.6009	0.75	Q	|	|	|	V|
24+10	32.6042	0.48	Q	|	|	|	V|
24+15	32.6057	0.22	Q	|	|	|	V|
24+20	32.6066	0.12	Q	|	|	|	V|
24+25	32.6071	0.07	Q	|	|	|	V|

```
   24+30      32.6073      0.03  Q         |         |         |        V|
   24+35      32.6074      0.02  Q         |         |         |        V|
   24+40      32.6075      0.01  Q         |         |         |        V|
   24+45      32.6075      0.01  Q         |         |         |        V|
   24+50      32.6076      0.00  Q         |         |         |        V|
   24+55      32.6076      0.00  Q         |         |         |         V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/16/20 File: 1886EXA1100R1100.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" EXISTING CONDITION 100-YEAR AND 1-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 153.90(Ac.) = 0.240 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 153.90(Ac.) = 0.240 Sq. Mi.
Length along longest watercourse = 4762.00(Ft.)
Length along longest watercourse measured to centroid = 2265.00(Ft.)
Length along longest watercourse = 0.902 Mi.
Length along longest watercourse measured to centroid = 0.429 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1149.8026 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.127 Hr.
Lag time = 7.60 Min.
25% of lag time = 1.90 Min.
40% of lag time = 3.04 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	0.62	95.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
153.90	1.45	223.16

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 1.450(In)
Areal adjustment factor = 99.86 %
Adjusted average point rain = 1.448(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
153.900	85.10	0.025

Total Area Entered = 153.90(Ac.)

```
      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
      85.1  94.0      0.077     0.025        0.076       1.000      0.076
                                                       Sum (F) =   0.076
      Area averaged mean soil loss (F) (In/Hr) =  0.076
      Minimum soil loss rate ((In/Hr)) =  0.038
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.880
      ------------------------------------------------------------------------
      Slope of intensity-duration curve for a 1 hour storm =0.4800
      ------------------------------------------------------------------------

                    U n i t  H y d r o g r a p h
                           FOOTHILL S-Curve
      ------------------------------------------------------------------------
                    Unit Hydrograph Data
      ------------------------------------------------------------------------
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                          Graph %            (CFS)
      ------------------------------------------------------------------------
          1   0.083         65.757          6.457             10.015
          2   0.167        131.515         37.338             57.913
          3   0.250        197.272         31.134             48.289
          4   0.333        263.029         11.515             17.860
          5   0.417        328.787          6.508             10.094
          6   0.500        394.544          3.652              5.664
          7   0.583        460.301          1.619              2.512
          8   0.667        526.058          0.687              1.066
          9   0.750        591.816          0.469              0.728
         10   0.833        657.573          0.416              0.645
         11   0.917        723.330          0.204              0.317
                                  Sum = 100.000   Sum=     155.102
------------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     4.40      0.765         0.076      ---          0.69
   2   0.17     4.50      0.782         0.076      ---          0.71
   3   0.25     5.40      0.938         0.076      ---          0.86
   4   0.33     5.40      0.938         0.076      ---          0.86
   5   0.42     5.70      0.990         0.076      ---          0.91
   6   0.50     6.40      1.112         0.076      ---          1.04
   7   0.58     7.90      1.373         0.076      ---          1.30
   8   0.67     9.10      1.581         0.076      ---          1.51
   9   0.75    12.80      2.224         0.076      ---          2.15
  10   0.83    25.60      4.448         0.076      ---          4.37
  11   0.92     7.90      1.373         0.076      ---          1.30
  12   1.00     4.90      0.851         0.076      ---          0.78
     Sum =     100.0                                    Sum =    16.5
        Flood volume = Effective rainfall      1.37(In)
         times area     153.9(Ac.)/[(In)/(Ft.)] =      17.6(Ac.Ft)
        Total soil loss =      0.08(In)
        Total soil loss =     0.971(Ac.Ft)
        Total rainfall =      1.45(In)
        Flood volume =      766612.0 Cubic Feet
        Total soil loss =       42310.8 Cubic Feet
        ------------------------------------------------------------------------
         Peak flow rate of this hydrograph =    420.536(CFS)
        ------------------------------------------------------------------------
        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                           1 - H O U R    S T O R M
                       R u n o f f     H y d r o g r a p h
        ------------------------------------------------------------------------
                    Hydrograph in   5   Minute intervals ((CFS))

        ------------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0      125.0     250.0     375.0     500.0
  ------------------------------------------------------------------------
```

```
    0+ 5       0.0475      6.90  Q         |         |         |         |
    0+10       0.3711     46.99  V  Q      |         |         |         |
    0+15       0.9417     82.84  | V   Q   |         |         |         |
    0+20       1.6651    105.05  |  V    Q |         |         |         |
    0+25       2.4943    120.39  |    V   Q|         |         |         |
    0+30       3.4000    131.51  |      V  Q         |         |         |
    0+35       4.4130    147.09  |         VQ        |         |         |
    0+40       5.6028    172.76  |         | VQ      |         |         |
    0+45       7.0317    207.48  |         |    VQ   |         |         |
    0+50       8.9870    283.90  |         |         V Q       |         |
    0+55      11.8832    420.54  |         |         |      V  |  Q      |
    1+ 0      14.3633    360.10  |         |         |       Q | V       |
    1+ 5      15.8910    221.83  |         |      Q  |         |     V   |
    1+10      16.7434    123.77  |        Q|         |         |       V |
    1+15      17.1611     60.64  |   Q     |         |         |        V|
    1+20      17.3727     30.72  | Q       |         |         |        V|
    1+25      17.4778     15.26  |Q        |         |         |        V|
    1+30      17.5355      8.38  Q         |         |         |        V|
    1+35      17.5718      5.27  Q         |         |         |        V|
    1+40      17.5910      2.79  Q         |         |         |        V|
    1+45      17.5973      0.91  Q         |         |         |        V|
    1+50      17.5990      0.25  Q         |         |         |        V|
-------------------------------------------------------------------------
```

Appendix

H

PROPOSED CONDITION UNIT HYDROGRAPHS

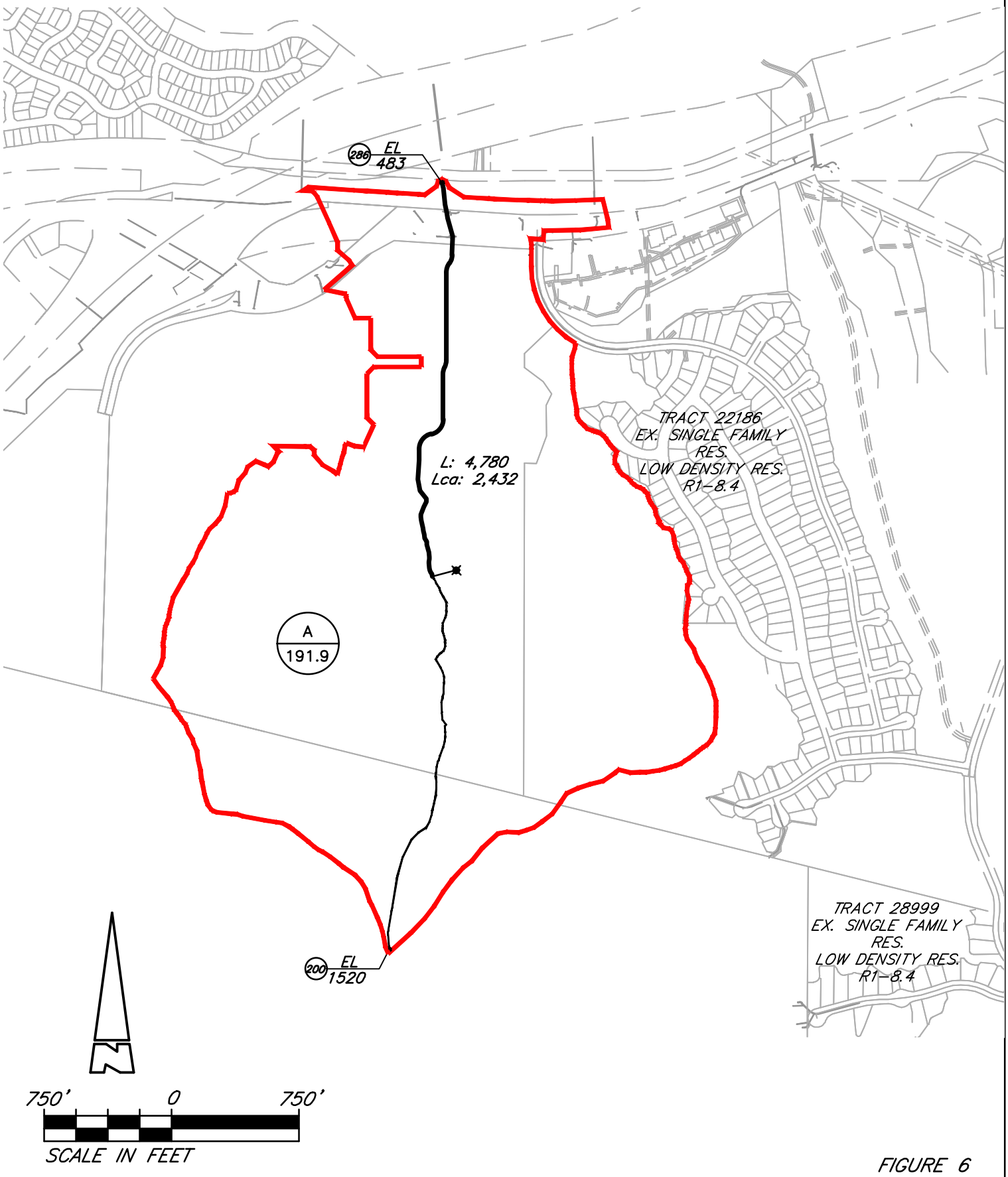


FIGURE 6

KWC ENGINEERS, INC.
CIVIL ENGINEERING, PLANNING AND CONSTRUCTION MANAGEMENT
1269 W. POMONA ROAD, SUITE 104 • CORONA, CA. 92882-7158 • 909-734-2130

DRAINAGE AREA "A"
PROPOSED CONDITION UNIT HYDROGRAPH MAP
GREEN RIVER RANCH PROJECT
CORONA, CA

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA12R12.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 2-YEAR AND 1-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.132 Hr.
Lag time = 7.94 Min.
25% of lag time = 1.98 Min.
40% of lag time = 3.17 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	0.62	118.98

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.45	278.26

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 0.620(In)
Areal adjustment factor = 99.83 %
Adjusted average point rain = 0.619(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

```
       RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
       AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
       82.8  66.9      0.395     0.162        0.338       1.000      0.338
                                                        Sum (F) =   0.338
       Area averaged mean soil loss (F) (In/Hr) =  0.338
       Minimum soil loss rate ((In/Hr)) =  0.169
       (for 24 hour storm duration)
       Soil low loss rate (decimal) =   0.770
       ------------------------------------------------------------------------
       Slope of intensity-duration curve for a 1 hour storm =0.4800
       ------------------------------------------------------------------------

                     U n i t  H y d r o g r a p h
                            FOOTHILL S-Curve
       ------------------------------------------------------------------
                     Unit Hydrograph Data
       ------------------------------------------------------------------------
       Unit time period   Time % of lag   Distribution   Unit Hydrograph
           (hrs)                          Graph %            (CFS)
       ------------------------------------------------------------------------
           1   0.083         62.994          6.028             11.658
           2   0.167        125.988         34.690             67.091
           3   0.250        188.982         32.532             62.917
           4   0.333        251.976         11.921             23.055
           5   0.417        314.971          6.811             13.172
           6   0.500        377.965          3.985              7.707
           7   0.583        440.959          1.985              3.838
           8   0.667        503.953          0.771              1.491
           9   0.750        566.947          0.494              0.956
          10   0.833        629.941          0.442              0.854
          11   0.917        692.935          0.257              0.498
          12   1.000        755.929          0.084              0.162
                                     Sum = 100.000   Sum=     193.399
------------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     4.40      0.327         0.338     0.252         0.08
    2   0.17     4.50      0.334         0.338     0.257         0.08
    3   0.25     5.40      0.401         0.338      ---          0.06
    4   0.33     5.40      0.401         0.338      ---          0.06
    5   0.42     5.70      0.423         0.338      ---          0.09
    6   0.50     6.40      0.475         0.338      ---          0.14
    7   0.58     7.90      0.587         0.338      ---          0.25
    8   0.67     9.10      0.676         0.338      ---          0.34
    9   0.75    12.80      0.951         0.338      ---          0.61
   10   0.83    25.60      1.901         0.338      ---          1.56
   11   0.92     7.90      0.587         0.338      ---          0.25
   12   1.00     4.90      0.364         0.338      ---          0.03
      Sum =     100.0                                  Sum =     3.5
       Flood volume = Effective rainfall      0.30(In)
        times area     191.9(Ac.)/[(In)/(Ft.)] =       4.7(Ac.Ft)
       Total soil loss =      0.32(In)
       Total soil loss =     5.178(Ac.Ft)
       Total rainfall =      0.62(In)
       Flood volume =      205597.1 Cubic Feet
       Total soil loss =      225541.9 Cubic Feet
       ------------------------------------------------------------------
        Peak flow rate of this hydrograph =    159.193(CFS)
       ------------------------------------------------------------------
       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          1 - H O U R    S T O R M
                       R u n o f f      H y d r o g r a p h
       ------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

       ------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
```

```
  0+ 5       0.0060      0.88  Q         |          |          |          |
  0+10       0.0470      5.94  VQ        |          |          |          |
  0+15       0.1202     10.63  |VQ       |          |          |          |
  0+20       0.1999     11.57  |VQ       |          |          |          |
  0+25       0.2826     12.01  | Q       |          |          |          |
  0+30       0.3818     14.41  | QV      |          |          |          |
  0+35       0.5246     20.72  |   Q     |          |          |          |
  0+40       0.7521     33.04  |     Q   |          |          |          |
  0+45       1.1017     50.76  |        VQ          |          |          |
  0+50       1.7173     89.38  |          |   V  Q  |          |          |
  0+55       2.8136    159.19  |          |         |  V       |Q         |
  1+ 0       3.7558    136.80  |          |         |      Q   |V         |
  1+ 5       4.2072     65.54  |          |  Q      |          |    V     |
  1+10       4.4459     34.65  |     Q    |         |          |      V   |
  1+15       4.5782     19.22  |  Q       |         |          |       V  |
  1+20       4.6457      9.81  |Q         |         |          |        V|
  1+25       4.6768      4.51  Q          |         |          |        V|
  1+30       4.6954      2.70  Q          |         |          |        V|
  1+35       4.7090      1.97  Q          |         |          |        V|
  1+40       4.7167      1.12  Q          |         |          |        V|
  1+45       4.7195      0.40  Q          |         |          |        V|
  1+50       4.7198      0.05  Q          |         |          |        V|
  1+55       4.7199      0.00  Q          |         |          |         V
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA32R32.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 2-YEAR AND 3-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.132 Hr.
Lag time = 7.94 Min.
25% of lag time = 1.98 Min.
40% of lag time = 3.17 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.06	203.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	2.63	504.70

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.060(In)
Area Averaged 100-Year Rainfall = 2.630(In)

Point rain (area averaged) = 1.060(In)
Areal adjustment factor = 99.92 %
Adjusted average point rain = 1.059(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	66.9	0.395	0.162	0.338	1.000	0.338
					Sum (F) =	0.338

Area averaged mean soil loss (F) (In/Hr) = 0.338
Minimum soil loss rate ((In/Hr)) = 0.169
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	62.994	6.028	11.658
2	0.167	125.988	34.690	67.091
3	0.250	188.982	32.532	62.917
4	0.333	251.976	11.921	23.055
5	0.417	314.971	6.811	13.172
6	0.500	377.965	3.985	7.707
7	0.583	440.959	1.985	3.838
8	0.667	503.953	0.771	1.491
9	0.750	566.947	0.494	0.956
10	0.833	629.941	0.442	0.854
11	0.917	692.935	0.257	0.498
12	1.000	755.929	0.084	0.162
			Sum = 100.000	Sum= 193.399

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.165	0.338	0.127	0.04
2	0.17	1.30	0.165	0.338	0.127	0.04
3	0.25	1.10	0.140	0.338	0.108	0.03
4	0.33	1.50	0.191	0.338	0.147	0.04
5	0.42	1.50	0.191	0.338	0.147	0.04
6	0.50	1.80	0.229	0.338	0.176	0.05
7	0.58	1.50	0.191	0.338	0.147	0.04
8	0.67	1.80	0.229	0.338	0.176	0.05
9	0.75	1.80	0.229	0.338	0.176	0.05
10	0.83	1.50	0.191	0.338	0.147	0.04
11	0.92	1.60	0.203	0.338	0.157	0.05
12	1.00	1.80	0.229	0.338	0.176	0.05
13	1.08	2.20	0.280	0.338	0.215	0.06
14	1.17	2.20	0.280	0.338	0.215	0.06
15	1.25	2.20	0.280	0.338	0.215	0.06
16	1.33	2.00	0.254	0.338	0.196	0.06
17	1.42	2.60	0.330	0.338	0.254	0.08
18	1.50	2.70	0.343	0.338	---	0.01
19	1.58	2.40	0.305	0.338	0.235	0.07
20	1.67	2.70	0.343	0.338	---	0.01
21	1.75	3.30	0.419	0.338	---	0.08
22	1.83	3.10	0.394	0.338	---	0.06
23	1.92	2.90	0.369	0.338	---	0.03
24	2.00	3.00	0.381	0.338	---	0.04
25	2.08	3.10	0.394	0.338	---	0.06
26	2.17	4.20	0.534	0.338	---	0.20
27	2.25	5.00	0.635	0.338	---	0.30
28	2.33	3.50	0.445	0.338	---	0.11
29	2.42	6.80	0.864	0.338	---	0.53
30	2.50	7.30	0.928	0.338	---	0.59
31	2.58	8.20	1.042	0.338	---	0.70
32	2.67	5.90	0.750	0.338	---	0.41
33	2.75	2.00	0.254	0.338	0.196	0.06

34	2.83	1.80	0.229	0.338	0.176	0.05
35	2.92	1.80	0.229	0.338	0.176	0.05
36	3.00	0.60	0.076	0.338	0.059	0.02
Sum =		100.0			Sum =	4.2

Flood volume = Effective rainfall 0.35(In)
times area 191.9(Ac.)/[(In)/(Ft.)] = 5.6(Ac.Ft)
Total soil loss = 0.71(In)
Total soil loss = 11.294(Ac.Ft)
Total rainfall = 1.06(In)
Flood volume = 245801.9 Cubic Feet
Total soil loss = 491971.0 Cubic Feet

Peak flow rate of this hydrograph = 106.052(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0031	0.44	Q				
0+10	0.0237	2.99	Q				
0+15	0.0603	5.32	VQ				
0+20	0.1012	5.94	VQ				
0+25	0.1484	6.86	|Q				
0+30	0.2025	7.85	|Q				
0+35	0.2623	8.68	|Q				
0+40	0.3236	8.91	|QV				
0+45	0.3873	9.25	|QV				
0+50	0.4540	9.68	|Q V				
0+55	0.5182	9.31	|Q V				
1+ 0	0.5810	9.12	|Q V				
1+ 5	0.6477	9.69	|Q V				
1+10	0.7222	10.82	| Q V				
1+15	0.8027	11.68	| Q V				
1+20	0.8850	11.95	| Q V				
1+25	0.9674	11.97	| Q V				
1+30	1.0505	12.07	| Q V				
1+35	1.1132	9.11	|Q V				
1+40	1.1725	8.60	|Q V				
1+45	1.2262	7.80	|Q V				
1+50	1.2898	9.24	|Q V|				
1+55	1.3651	10.92	| Q V|				
2+ 0	1.4265	8.92	|Q V				
2+ 5	1.4843	8.40	|Q V				
2+10	1.5611	11.14	| Q |V				
2+15	1.7159	22.48	| Q | V				
2+20	1.9647	36.12	| Q | V				
2+25	2.2264	38.01	| Q | V				
2+30	2.6343	59.22	| |Q V				
2+35	3.2492	89.29	| | Q | V				
2+40	3.9796	106.05	| | |Q V				
2+45	4.6383	95.63	| | Q| V				
2+50	5.0494	59.69	| |Q | V				
2+55	5.2824	33.84	| Q | V				
3+ 0	5.4393	22.78	| Q | V				
3+ 5	5.5358	14.01	| Q | V				
3+10	5.5855	7.21	|Q | V				
3+15	5.6117	3.80	Q | V				
3+20	5.6275	2.30	Q | V				
3+25	5.6363	1.27	Q | V				
3+30	5.6402	0.57	Q | V				
3+35	5.6417	0.22	Q | V				
3+40	5.6424	0.10	Q | V				
3+45	5.6427	0.05	Q | V				
3+50	5.6428	0.02	Q | V				
3+55	5.6428	0.00	Q | V				

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA62R62.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 2-YEAR AND 6-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.132 Hr.
Lag time = 7.94 Min.
25% of lag time = 1.98 Min.
40% of lag time = 3.17 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.52	291.69

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	3.75	719.63

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.520(In)
Area Averaged 100-Year Rainfall = 3.750(In)

Point rain (area averaged) = 1.520(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 1.519(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	66.9	0.395	0.162	0.338	1.000	0.338
					Sum (F) =	0.338

Area averaged mean soil loss (F) (In/Hr) = 0.338
Minimum soil loss rate ((In/Hr)) = 0.169
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	62.994	6.028	11.658
2	0.167	125.988	34.690	67.091
3	0.250	188.982	32.532	62.917
4	0.333	251.976	11.921	23.055
5	0.417	314.971	6.811	13.172
6	0.500	377.965	3.985	7.707
7	0.583	440.959	1.985	3.838
8	0.667	503.953	0.771	1.491
9	0.750	566.947	0.494	0.956
10	0.833	629.941	0.442	0.854
11	0.917	692.935	0.257	0.498
12	1.000	755.929	0.084	0.162
			Sum = 100.000	Sum= 193.399

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.091	0.338	0.070	0.02
2	0.17	0.60	0.109	0.338	0.084	0.03
3	0.25	0.60	0.109	0.338	0.084	0.03
4	0.33	0.60	0.109	0.338	0.084	0.03
5	0.42	0.60	0.109	0.338	0.084	0.03
6	0.50	0.70	0.128	0.338	0.098	0.03
7	0.58	0.70	0.128	0.338	0.098	0.03
8	0.67	0.70	0.128	0.338	0.098	0.03
9	0.75	0.70	0.128	0.338	0.098	0.03
10	0.83	0.70	0.128	0.338	0.098	0.03
11	0.92	0.70	0.128	0.338	0.098	0.03
12	1.00	0.80	0.146	0.338	0.112	0.03
13	1.08	0.80	0.146	0.338	0.112	0.03
14	1.17	0.80	0.146	0.338	0.112	0.03
15	1.25	0.80	0.146	0.338	0.112	0.03
16	1.33	0.80	0.146	0.338	0.112	0.03
17	1.42	0.80	0.146	0.338	0.112	0.03
18	1.50	0.80	0.146	0.338	0.112	0.03
19	1.58	0.80	0.146	0.338	0.112	0.03
20	1.67	0.80	0.146	0.338	0.112	0.03
21	1.75	0.80	0.146	0.338	0.112	0.03
22	1.83	0.80	0.146	0.338	0.112	0.03
23	1.92	0.80	0.146	0.338	0.112	0.03
24	2.00	0.90	0.164	0.338	0.126	0.04
25	2.08	0.80	0.146	0.338	0.112	0.03
26	2.17	0.90	0.164	0.338	0.126	0.04
27	2.25	0.90	0.164	0.338	0.126	0.04
28	2.33	0.90	0.164	0.338	0.126	0.04
29	2.42	0.90	0.164	0.338	0.126	0.04
30	2.50	0.90	0.164	0.338	0.126	0.04
31	2.58	0.90	0.164	0.338	0.126	0.04
32	2.67	0.90	0.164	0.338	0.126	0.04
33	2.75	1.00	0.182	0.338	0.140	0.04

34	2.83	1.00	0.182	0.338	0.140	0.04
35	2.92	1.00	0.182	0.338	0.140	0.04
36	3.00	1.00	0.182	0.338	0.140	0.04
37	3.08	1.00	0.182	0.338	0.140	0.04
38	3.17	1.10	0.201	0.338	0.154	0.05
39	3.25	1.10	0.201	0.338	0.154	0.05
40	3.33	1.10	0.201	0.338	0.154	0.05
41	3.42	1.20	0.219	0.338	0.168	0.05
42	3.50	1.30	0.237	0.338	0.182	0.05
43	3.58	1.40	0.255	0.338	0.196	0.06
44	3.67	1.40	0.255	0.338	0.196	0.06
45	3.75	1.50	0.273	0.338	0.211	0.06
46	3.83	1.50	0.273	0.338	0.211	0.06
47	3.92	1.60	0.292	0.338	0.225	0.07
48	4.00	1.60	0.292	0.338	0.225	0.07
49	4.08	1.70	0.310	0.338	0.239	0.07
50	4.17	1.80	0.328	0.338	0.253	0.08
51	4.25	1.90	0.346	0.338	---	0.01
52	4.33	2.00	0.365	0.338	---	0.03
53	4.42	2.10	0.383	0.338	---	0.05
54	4.50	2.10	0.383	0.338	---	0.05
55	4.58	2.20	0.401	0.338	---	0.06
56	4.67	2.30	0.419	0.338	---	0.08
57	4.75	2.40	0.437	0.338	---	0.10
58	4.83	2.40	0.437	0.338	---	0.10
59	4.92	2.50	0.456	0.338	---	0.12
60	5.00	2.60	0.474	0.338	---	0.14
61	5.08	3.10	0.565	0.338	---	0.23
62	5.17	3.60	0.656	0.338	---	0.32
63	5.25	3.90	0.711	0.338	---	0.37
64	5.33	4.20	0.766	0.338	---	0.43
65	5.42	4.70	0.857	0.338	---	0.52
66	5.50	5.60	1.021	0.338	---	0.68
67	5.58	1.90	0.346	0.338	---	0.01
68	5.67	0.90	0.164	0.338	0.126	0.04
69	5.75	0.60	0.109	0.338	0.084	0.03
70	5.83	0.50	0.091	0.338	0.070	0.02
71	5.92	0.30	0.055	0.338	0.042	0.01
72	6.00	0.20	0.036	0.338	0.028	0.01
Sum =	100.0				Sum =	5.4

Flood volume = Effective rainfall 0.45(In)
times area 191.9(Ac.)/[(In)/(Ft.)] = 7.2(Ac.Ft)
Total soil loss = 1.07(In)
Total soil loss = 17.095(Ac.Ft)
Total rainfall = 1.52(In)
Flood volume = 313482.3 Cubic Feet
Total soil loss = 744646.6 Cubic Feet

Peak flow rate of this hydrograph = 97.218(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	25.0	50.0	75.0	100.0
0+ 5	0.0017	0.24	Q	|	|	|	|
0+10	0.0134	1.70	Q	|	|	|	|
0+15	0.0361	3.30	VQ	|	|	|	|
0+20	0.0640	4.05	VQ	|	|	|	|
0+25	0.0945	4.42	VQ	|	|	|	|
0+30	0.1268	4.69	VQ	|	|	|	|
0+35	0.1618	5.08	V Q	|	|	|	|
0+40	0.1989	5.39	|VQ	|	|	|	|
0+45	0.2369	5.52	|VQ	|	|	|	|
0+50	0.2754	5.59	|VQ	|	|	|	|
0+55	0.3143	5.64	|VQ	|	|	|	|
1+ 0	0.3536	5.71	|VQ	|	|	|	|

1+ 5	0.3949	6.00	Q				
1+10	0.4380	6.27	Q				
1+15	0.4819	6.37	Q				
1+20	0.5261	6.42	Q				
1+25	0.5706	6.46	QV				
1+30	0.6152	6.47	QV				
1+35	0.6598	6.48	QV				
1+40	0.7045	6.48	QV				
1+45	0.7491	6.49	Q V				
1+50	0.7938	6.49	Q V				
1+55	0.8385	6.49	Q V				
2+ 0	0.8836	6.54	Q V				
2+ 5	0.9302	6.77	Q V				
2+10	0.9771	6.80	Q V				
2+15	1.0247	6.92	Q V				
2+20	1.0739	7.14	Q V				
2+25	1.1235	7.21	Q V				
2+30	1.1735	7.25	Q V				
2+35	1.2236	7.27	Q V				
2+40	1.2738	7.29	Q V				
2+45	1.3244	7.34	Q V				
2+50	1.3769	7.63	Q V				
2+55	1.4312	7.89	Q V				
3+ 0	1.4863	7.99	Q V				
3+ 5	1.5417	8.05	Q V				
3+10	1.5977	8.13	Q V				
3+15	1.6557	8.43	Q V				
3+20	1.7156	8.70	Q V				
3+25	1.7765	8.85	Q V				
3+30	1.8401	9.23	Q V				
3+35	1.9081	9.86	Q V				
3+40	1.9805	10.52	Q V				
3+45	2.0562	10.99	Q V				
3+50	2.1352	11.46	Q V				
3+55	2.2170	11.88	Q V				
4+ 0	2.3019	12.32	Q V				
4+ 5	2.3894	12.71	Q V				
4+10	2.4802	13.19	Q V				
4+15	2.5700	13.03	Q V				
4+20	2.6332	9.17	Q V				
4+25	2.6785	6.58	Q V				
4+30	2.7302	7.51	Q V				
4+35	2.7885	8.46	Q V				
4+40	2.8578	10.07	Q V				
4+45	2.9459	12.79	Q V				
4+50	3.0541	15.70	Q V				
4+55	3.1764	17.76	Q V				
5+ 0	3.3140	19.99	Q V				
5+ 5	3.4785	23.88	Q V				
5+10	3.7049	32.88	Q V				
5+15	4.0228	46.16	Q V				
5+20	4.4274	58.75	QV				
5+25	4.9128	70.48	VQ				
5+30	5.4998	85.24	V Q				
5+35	6.1694	97.22	V Q				
5+40	6.6265	66.38	Q V				
5+45	6.8441	31.59	Q V				
5+50	6.9839	20.30	Q V				
5+55	7.0720	12.79	Q V				
6+ 0	7.1252	7.73	Q V				
6+ 5	7.1570	4.61	Q V				
6+10	7.1764	2.82	Q V				
6+15	7.1873	1.59	Q V				
6+20	7.1928	0.79	Q V				
6+25	7.1950	0.32	Q V				
6+30	7.1957	0.11	Q V				
6+35	7.1962	0.06	Q V				
6+40	7.1964	0.03	Q V				
6+45	7.1965	0.02	Q V				
6+50	7.1966	0.01	Q V				
6+55	7.1966	0.00	Q V				

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA242R242.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 2-YEAR AND 24-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.132 Hr.
Lag time = 7.94 Min.
25% of lag time = 1.98 Min.
40% of lag time = 3.17 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	2.85	546.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	8.85	1698.32

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.850(In)
Area Averaged 100-Year Rainfall = 8.850(In)

Point rain (area averaged) = 2.850(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 2.849(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	66.9	0.395	0.162	0.338	1.000	0.338
					Sum (F) =	0.338

Area averaged mean soil loss (F) (In/Hr) = 0.338
Minimum soil loss rate ((In/Hr)) = 0.169
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	62.994	6.028	11.658
2	0.167	125.988	34.690	67.091
3	0.250	188.982	32.532	62.917
4	0.333	251.976	11.921	23.055
5	0.417	314.971	6.811	13.172
6	0.500	377.965	3.985	7.707
7	0.583	440.959	1.985	3.838
8	0.667	503.953	0.771	1.491
9	0.750	566.947	0.494	0.956
10	0.833	629.941	0.442	0.854
11	0.917	692.935	0.257	0.498
12	1.000	755.929	0.084	0.162
			Sum = 100.000	Sum= 193.399

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.023	0.599	0.018	0.01
2	0.17	0.07	0.023	0.596	0.018	0.01
3	0.25	0.07	0.023	0.594	0.018	0.01
4	0.33	0.10	0.034	0.592	0.026	0.01
5	0.42	0.10	0.034	0.589	0.026	0.01
6	0.50	0.10	0.034	0.587	0.026	0.01
7	0.58	0.10	0.034	0.585	0.026	0.01
8	0.67	0.10	0.034	0.582	0.026	0.01
9	0.75	0.10	0.034	0.580	0.026	0.01
10	0.83	0.13	0.046	0.578	0.035	0.01
11	0.92	0.13	0.046	0.576	0.035	0.01
12	1.00	0.13	0.046	0.573	0.035	0.01
13	1.08	0.10	0.034	0.571	0.026	0.01
14	1.17	0.10	0.034	0.569	0.026	0.01
15	1.25	0.10	0.034	0.567	0.026	0.01
16	1.33	0.10	0.034	0.564	0.026	0.01
17	1.42	0.10	0.034	0.562	0.026	0.01
18	1.50	0.10	0.034	0.560	0.026	0.01
19	1.58	0.10	0.034	0.558	0.026	0.01
20	1.67	0.10	0.034	0.555	0.026	0.01
21	1.75	0.10	0.034	0.553	0.026	0.01
22	1.83	0.13	0.046	0.551	0.035	0.01
23	1.92	0.13	0.046	0.549	0.035	0.01
24	2.00	0.13	0.046	0.546	0.035	0.01
25	2.08	0.13	0.046	0.544	0.035	0.01
26	2.17	0.13	0.046	0.542	0.035	0.01
27	2.25	0.13	0.046	0.540	0.035	0.01
28	2.33	0.13	0.046	0.538	0.035	0.01
29	2.42	0.13	0.046	0.535	0.035	0.01
30	2.50	0.13	0.046	0.533	0.035	0.01
31	2.58	0.17	0.057	0.531	0.044	0.01
32	2.67	0.17	0.057	0.529	0.044	0.01
33	2.75	0.17	0.057	0.527	0.044	0.01

34	2.83	0.17	0.057	0.525	0.044	0.01
35	2.92	0.17	0.057	0.522	0.044	0.01
36	3.00	0.17	0.057	0.520	0.044	0.01
37	3.08	0.17	0.057	0.518	0.044	0.01
38	3.17	0.17	0.057	0.516	0.044	0.01
39	3.25	0.17	0.057	0.514	0.044	0.01
40	3.33	0.17	0.057	0.512	0.044	0.01
41	3.42	0.17	0.057	0.509	0.044	0.01
42	3.50	0.17	0.057	0.507	0.044	0.01
43	3.58	0.17	0.057	0.505	0.044	0.01
44	3.67	0.17	0.057	0.503	0.044	0.01
45	3.75	0.17	0.057	0.501	0.044	0.01
46	3.83	0.20	0.068	0.499	0.053	0.02
47	3.92	0.20	0.068	0.497	0.053	0.02
48	4.00	0.20	0.068	0.495	0.053	0.02
49	4.08	0.20	0.068	0.493	0.053	0.02
50	4.17	0.20	0.068	0.490	0.053	0.02
51	4.25	0.20	0.068	0.488	0.053	0.02
52	4.33	0.23	0.080	0.486	0.061	0.02
53	4.42	0.23	0.080	0.484	0.061	0.02
54	4.50	0.23	0.080	0.482	0.061	0.02
55	4.58	0.23	0.080	0.480	0.061	0.02
56	4.67	0.23	0.080	0.478	0.061	0.02
57	4.75	0.23	0.080	0.476	0.061	0.02
58	4.83	0.27	0.091	0.474	0.070	0.02
59	4.92	0.27	0.091	0.472	0.070	0.02
60	5.00	0.27	0.091	0.470	0.070	0.02
61	5.08	0.20	0.068	0.468	0.053	0.02
62	5.17	0.20	0.068	0.466	0.053	0.02
63	5.25	0.20	0.068	0.464	0.053	0.02
64	5.33	0.23	0.080	0.462	0.061	0.02
65	5.42	0.23	0.080	0.460	0.061	0.02
66	5.50	0.23	0.080	0.458	0.061	0.02
67	5.58	0.27	0.091	0.456	0.070	0.02
68	5.67	0.27	0.091	0.454	0.070	0.02
69	5.75	0.27	0.091	0.452	0.070	0.02
70	5.83	0.27	0.091	0.450	0.070	0.02
71	5.92	0.27	0.091	0.448	0.070	0.02
72	6.00	0.27	0.091	0.446	0.070	0.02
73	6.08	0.30	0.103	0.444	0.079	0.02
74	6.17	0.30	0.103	0.442	0.079	0.02
75	6.25	0.30	0.103	0.440	0.079	0.02
76	6.33	0.30	0.103	0.438	0.079	0.02
77	6.42	0.30	0.103	0.436	0.079	0.02
78	6.50	0.30	0.103	0.434	0.079	0.02
79	6.58	0.33	0.114	0.432	0.088	0.03
80	6.67	0.33	0.114	0.430	0.088	0.03
81	6.75	0.33	0.114	0.428	0.088	0.03
82	6.83	0.33	0.114	0.426	0.088	0.03
83	6.92	0.33	0.114	0.424	0.088	0.03
84	7.00	0.33	0.114	0.422	0.088	0.03
85	7.08	0.33	0.114	0.420	0.088	0.03
86	7.17	0.33	0.114	0.418	0.088	0.03
87	7.25	0.33	0.114	0.417	0.088	0.03
88	7.33	0.37	0.125	0.415	0.097	0.03
89	7.42	0.37	0.125	0.413	0.097	0.03
90	7.50	0.37	0.125	0.411	0.097	0.03
91	7.58	0.40	0.137	0.409	0.105	0.03
92	7.67	0.40	0.137	0.407	0.105	0.03
93	7.75	0.40	0.137	0.405	0.105	0.03
94	7.83	0.43	0.148	0.403	0.114	0.03
95	7.92	0.43	0.148	0.401	0.114	0.03
96	8.00	0.43	0.148	0.400	0.114	0.03
97	8.08	0.50	0.171	0.398	0.132	0.04
98	8.17	0.50	0.171	0.396	0.132	0.04
99	8.25	0.50	0.171	0.394	0.132	0.04
100	8.33	0.50	0.171	0.392	0.132	0.04
101	8.42	0.50	0.171	0.390	0.132	0.04
102	8.50	0.50	0.171	0.389	0.132	0.04
103	8.58	0.53	0.182	0.387	0.140	0.04
104	8.67	0.53	0.182	0.385	0.140	0.04

105	8.75	0.53	0.182	0.383	0.140	0.04
106	8.83	0.57	0.194	0.381	0.149	0.04
107	8.92	0.57	0.194	0.379	0.149	0.04
108	9.00	0.57	0.194	0.378	0.149	0.04
109	9.08	0.63	0.217	0.376	0.167	0.05
110	9.17	0.63	0.217	0.374	0.167	0.05
111	9.25	0.63	0.217	0.372	0.167	0.05
112	9.33	0.67	0.228	0.371	0.175	0.05
113	9.42	0.67	0.228	0.369	0.175	0.05
114	9.50	0.67	0.228	0.367	0.175	0.05
115	9.58	0.70	0.239	0.365	0.184	0.06
116	9.67	0.70	0.239	0.363	0.184	0.06
117	9.75	0.70	0.239	0.362	0.184	0.06
118	9.83	0.73	0.251	0.360	0.193	0.06
119	9.92	0.73	0.251	0.358	0.193	0.06
120	10.00	0.73	0.251	0.357	0.193	0.06
121	10.08	0.50	0.171	0.355	0.132	0.04
122	10.17	0.50	0.171	0.353	0.132	0.04
123	10.25	0.50	0.171	0.351	0.132	0.04
124	10.33	0.50	0.171	0.350	0.132	0.04
125	10.42	0.50	0.171	0.348	0.132	0.04
126	10.50	0.50	0.171	0.346	0.132	0.04
127	10.58	0.67	0.228	0.345	0.175	0.05
128	10.67	0.67	0.228	0.343	0.175	0.05
129	10.75	0.67	0.228	0.341	0.175	0.05
130	10.83	0.67	0.228	0.340	0.175	0.05
131	10.92	0.67	0.228	0.338	0.175	0.05
132	11.00	0.67	0.228	0.336	0.175	0.05
133	11.08	0.63	0.217	0.335	0.167	0.05
134	11.17	0.63	0.217	0.333	0.167	0.05
135	11.25	0.63	0.217	0.331	0.167	0.05
136	11.33	0.63	0.217	0.330	0.167	0.05
137	11.42	0.63	0.217	0.328	0.167	0.05
138	11.50	0.63	0.217	0.326	0.167	0.05
139	11.58	0.57	0.194	0.325	0.149	0.04
140	11.67	0.57	0.194	0.323	0.149	0.04
141	11.75	0.57	0.194	0.322	0.149	0.04
142	11.83	0.60	0.205	0.320	0.158	0.05
143	11.92	0.60	0.205	0.318	0.158	0.05
144	12.00	0.60	0.205	0.317	0.158	0.05
145	12.08	0.83	0.285	0.315	0.219	0.07
146	12.17	0.83	0.285	0.314	0.219	0.07
147	12.25	0.83	0.285	0.312	0.219	0.07
148	12.33	0.87	0.296	0.310	0.228	0.07
149	12.42	0.87	0.296	0.309	0.228	0.07
150	12.50	0.87	0.296	0.307	0.228	0.07
151	12.58	0.93	0.319	0.306	---	0.01
152	12.67	0.93	0.319	0.304	---	0.01
153	12.75	0.93	0.319	0.303	---	0.02
154	12.83	0.97	0.330	0.301	---	0.03
155	12.92	0.97	0.330	0.300	---	0.03
156	13.00	0.97	0.330	0.298	---	0.03
157	13.08	1.13	0.387	0.297	---	0.09
158	13.17	1.13	0.387	0.295	---	0.09
159	13.25	1.13	0.387	0.294	---	0.09
160	13.33	1.13	0.387	0.292	---	0.10
161	13.42	1.13	0.387	0.291	---	0.10
162	13.50	1.13	0.387	0.289	---	0.10
163	13.58	0.77	0.262	0.288	0.202	0.06
164	13.67	0.77	0.262	0.286	0.202	0.06
165	13.75	0.77	0.262	0.285	0.202	0.06
166	13.83	0.77	0.262	0.283	0.202	0.06
167	13.92	0.77	0.262	0.282	0.202	0.06
168	14.00	0.77	0.262	0.280	0.202	0.06
169	14.08	0.90	0.308	0.279	---	0.03
170	14.17	0.90	0.308	0.278	---	0.03
171	14.25	0.90	0.308	0.276	---	0.03
172	14.33	0.87	0.296	0.275	---	0.02
173	14.42	0.87	0.296	0.273	---	0.02
174	14.50	0.87	0.296	0.272	---	0.02
175	14.58	0.87	0.296	0.271	---	0.03

176	14.67	0.87	0.296	0.269	---	0.03
177	14.75	0.87	0.296	0.268	---	0.03
178	14.83	0.83	0.285	0.266	---	0.02
179	14.92	0.83	0.285	0.265	---	0.02
180	15.00	0.83	0.285	0.264	---	0.02
181	15.08	0.80	0.273	0.262	---	0.01
182	15.17	0.80	0.273	0.261	---	0.01
183	15.25	0.80	0.273	0.260	---	0.01
184	15.33	0.77	0.262	0.258	---	0.00
185	15.42	0.77	0.262	0.257	---	0.01
186	15.50	0.77	0.262	0.256	---	0.01
187	15.58	0.63	0.217	0.254	0.167	0.05
188	15.67	0.63	0.217	0.253	0.167	0.05
189	15.75	0.63	0.217	0.252	0.167	0.05
190	15.83	0.63	0.217	0.250	0.167	0.05
191	15.92	0.63	0.217	0.249	0.167	0.05
192	16.00	0.63	0.217	0.248	0.167	0.05
193	16.08	0.13	0.046	0.247	0.035	0.01
194	16.17	0.13	0.046	0.245	0.035	0.01
195	16.25	0.13	0.046	0.244	0.035	0.01
196	16.33	0.13	0.046	0.243	0.035	0.01
197	16.42	0.13	0.046	0.242	0.035	0.01
198	16.50	0.13	0.046	0.240	0.035	0.01
199	16.58	0.10	0.034	0.239	0.026	0.01
200	16.67	0.10	0.034	0.238	0.026	0.01
201	16.75	0.10	0.034	0.237	0.026	0.01
202	16.83	0.10	0.034	0.236	0.026	0.01
203	16.92	0.10	0.034	0.234	0.026	0.01
204	17.00	0.10	0.034	0.233	0.026	0.01
205	17.08	0.17	0.057	0.232	0.044	0.01
206	17.17	0.17	0.057	0.231	0.044	0.01
207	17.25	0.17	0.057	0.230	0.044	0.01
208	17.33	0.17	0.057	0.229	0.044	0.01
209	17.42	0.17	0.057	0.227	0.044	0.01
210	17.50	0.17	0.057	0.226	0.044	0.01
211	17.58	0.17	0.057	0.225	0.044	0.01
212	17.67	0.17	0.057	0.224	0.044	0.01
213	17.75	0.17	0.057	0.223	0.044	0.01
214	17.83	0.13	0.046	0.222	0.035	0.01
215	17.92	0.13	0.046	0.221	0.035	0.01
216	18.00	0.13	0.046	0.220	0.035	0.01
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219	18.25	0.13	0.046	0.216	0.035	0.01
220	18.33	0.13	0.046	0.215	0.035	0.01
221	18.42	0.13	0.046	0.214	0.035	0.01
222	18.50	0.13	0.046	0.213	0.035	0.01
223	18.58	0.10	0.034	0.212	0.026	0.01
224	18.67	0.10	0.034	0.211	0.026	0.01
225	18.75	0.10	0.034	0.210	0.026	0.01
226	18.83	0.07	0.023	0.209	0.018	0.01
227	18.92	0.07	0.023	0.208	0.018	0.01
228	19.00	0.07	0.023	0.207	0.018	0.01
229	19.08	0.10	0.034	0.206	0.026	0.01
230	19.17	0.10	0.034	0.205	0.026	0.01
231	19.25	0.10	0.034	0.204	0.026	0.01
232	19.33	0.13	0.046	0.203	0.035	0.01
233	19.42	0.13	0.046	0.202	0.035	0.01
234	19.50	0.13	0.046	0.201	0.035	0.01
235	19.58	0.10	0.034	0.201	0.026	0.01
236	19.67	0.10	0.034	0.200	0.026	0.01
237	19.75	0.10	0.034	0.199	0.026	0.01
238	19.83	0.07	0.023	0.198	0.018	0.01
239	19.92	0.07	0.023	0.197	0.018	0.01
240	20.00	0.07	0.023	0.196	0.018	0.01
241	20.08	0.10	0.034	0.195	0.026	0.01
242	20.17	0.10	0.034	0.194	0.026	0.01
243	20.25	0.10	0.034	0.193	0.026	0.01
244	20.33	0.10	0.034	0.193	0.026	0.01
245	20.42	0.10	0.034	0.192	0.026	0.01
246	20.50	0.10	0.034	0.191	0.026	0.01

247	20.58	0.10	0.034	0.190	0.026	0.01
248	20.67	0.10	0.034	0.189	0.026	0.01
249	20.75	0.10	0.034	0.189	0.026	0.01
250	20.83	0.07	0.023	0.188	0.018	0.01
251	20.92	0.07	0.023	0.187	0.018	0.01
252	21.00	0.07	0.023	0.186	0.018	0.01
253	21.08	0.10	0.034	0.186	0.026	0.01
254	21.17	0.10	0.034	0.185	0.026	0.01
255	21.25	0.10	0.034	0.184	0.026	0.01
256	21.33	0.07	0.023	0.183	0.018	0.01
257	21.42	0.07	0.023	0.183	0.018	0.01
258	21.50	0.07	0.023	0.182	0.018	0.01
259	21.58	0.10	0.034	0.181	0.026	0.01
260	21.67	0.10	0.034	0.181	0.026	0.01
261	21.75	0.10	0.034	0.180	0.026	0.01
262	21.83	0.07	0.023	0.179	0.018	0.01
263	21.92	0.07	0.023	0.179	0.018	0.01
264	22.00	0.07	0.023	0.178	0.018	0.01
265	22.08	0.10	0.034	0.178	0.026	0.01
266	22.17	0.10	0.034	0.177	0.026	0.01
267	22.25	0.10	0.034	0.177	0.026	0.01
268	22.33	0.07	0.023	0.176	0.018	0.01
269	22.42	0.07	0.023	0.175	0.018	0.01
270	22.50	0.07	0.023	0.175	0.018	0.01
271	22.58	0.07	0.023	0.174	0.018	0.01
272	22.67	0.07	0.023	0.174	0.018	0.01
273	22.75	0.07	0.023	0.173	0.018	0.01
274	22.83	0.07	0.023	0.173	0.018	0.01
275	22.92	0.07	0.023	0.173	0.018	0.01
276	23.00	0.07	0.023	0.172	0.018	0.01
277	23.08	0.07	0.023	0.172	0.018	0.01
278	23.17	0.07	0.023	0.171	0.018	0.01
279	23.25	0.07	0.023	0.171	0.018	0.01
280	23.33	0.07	0.023	0.171	0.018	0.01
281	23.42	0.07	0.023	0.170	0.018	0.01
282	23.50	0.07	0.023	0.170	0.018	0.01
283	23.58	0.07	0.023	0.170	0.018	0.01
284	23.67	0.07	0.023	0.170	0.018	0.01
285	23.75	0.07	0.023	0.169	0.018	0.01
286	23.83	0.07	0.023	0.169	0.018	0.01
287	23.92	0.07	0.023	0.169	0.018	0.01
288	24.00	0.07	0.023	0.169	0.018	0.01
Sum =		100.0			Sum =	6.7

Flood volume = Effective rainfall 0.56(In)
times area 191.9(Ac.)/[(In)/(Ft.)] = 9.0(Ac.Ft)
Total soil loss = 2.29(In)
Total soil loss = 36.564(Ac.Ft)
Total rainfall = 2.85(In)
Flood volume = 391809.7 Cubic Feet
Total soil loss = 1592747.6 Cubic Feet

Peak flow rate of this hydrograph = 18.000(CFS)

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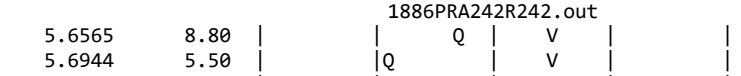
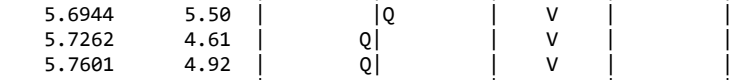
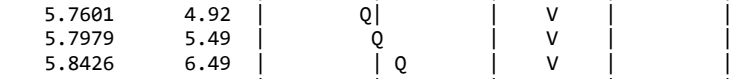
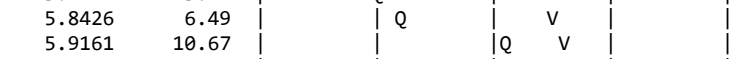
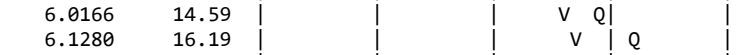
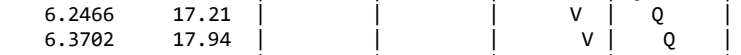
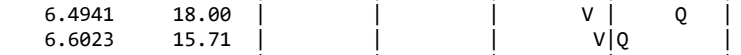
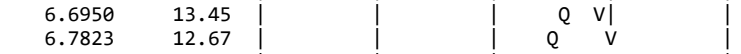
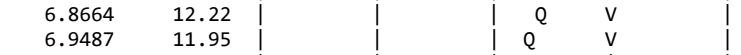
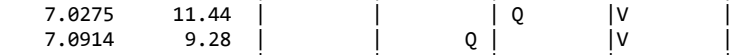
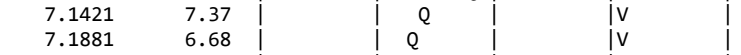
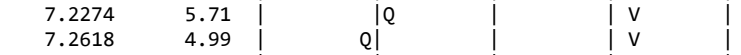
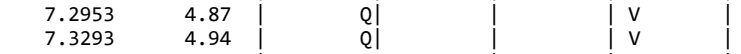
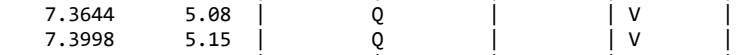
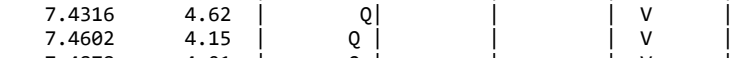
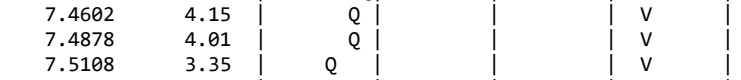
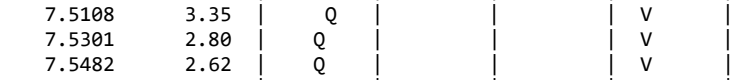
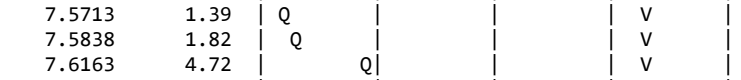
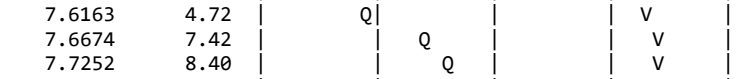
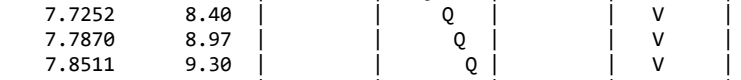
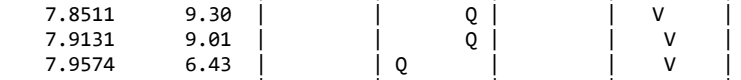
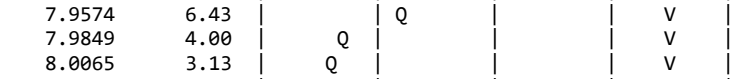
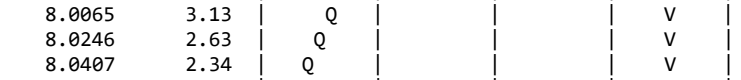
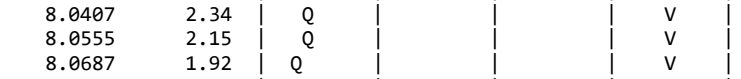
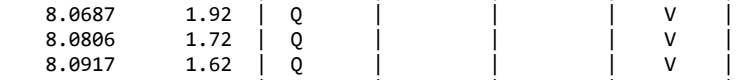
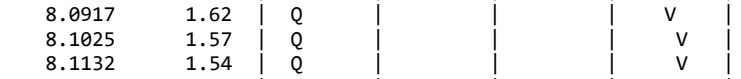
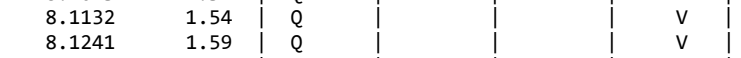
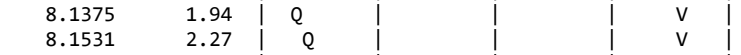
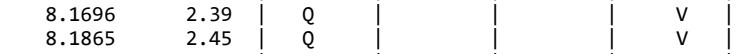
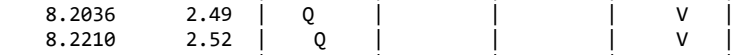
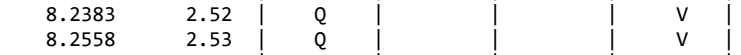
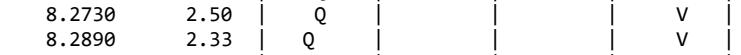
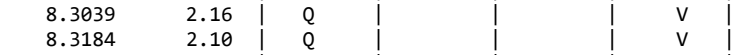
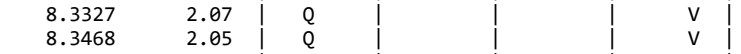
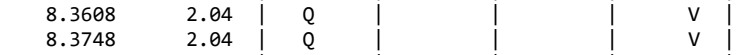
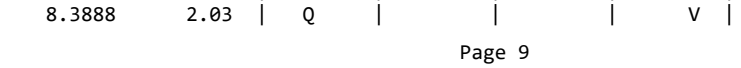
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0004	0.06	Q	|	|	|	|
0+10	0.0033	0.41	Q	|	|	|	|
0+15	0.0084	0.74	VQ	|	|	|	|
0+20	0.0145	0.89	VQ	|	|	|	|
0+25	0.0224	1.14	V Q	|	|	|	|
0+30	0.0317	1.34	V Q	|	|	|	|
0+35	0.0415	1.43	V Q	|	|	|	|
0+40	0.0516	1.47	V Q	|	|	|	|
0+45	0.0619	1.49	V Q	|	|	|	|

```
0+50       0.0725      1.54  V  Q      |          |          |          |
0+55       0.0843      1.72  V  Q      |          |          |          |
1+ 0       0.0973      1.89  V  Q      |          |          |          |
1+ 5       0.1105      1.92  V  Q      |          |          |          |
1+10       0.1228      1.78  V  Q      |          |          |          |
1+15       0.1341      1.64  V  Q      |          |          |          |
1+20       0.1450      1.59  V  Q      |          |          |          |
1+25       0.1557      1.56  V  Q      |          |          |          |
1+30       0.1663      1.54  V  Q      |          |          |          |
1+35       0.1769      1.53  V  Q      |          |          |          |
1+40       0.1874      1.53  V  Q      |          |          |          |
1+45       0.1979      1.53  V  Q      |          |          |          |
1+50       0.2086      1.55  V  Q      |          |          |          |
1+55       0.2205      1.73  V  Q      |          |          |          |
2+ 0       0.2335      1.89  |V Q      |          |          |          |
2+ 5       0.2470      1.95  |V Q      |          |          |          |
2+10       0.2607      1.99  |V Q      |          |          |          |
2+15       0.2745      2.01  |V  Q     |          |          |          |
2+20       0.2884      2.02  |V  Q     |          |          |          |
2+25       0.3023      2.02  |V  Q     |          |          |          |
2+30       0.3163      2.02  |V  Q     |          |          |          |
2+35       0.3304      2.06  |V  Q     |          |          |          |
2+40       0.3458      2.23  |V  Q     |          |          |          |
2+45       0.3624      2.40  |V  Q     |          |          |          |
2+50       0.3793      2.46  |V  Q     |          |          |          |
2+55       0.3965      2.50  |V  Q     |          |          |          |
3+ 0       0.4138      2.52  |V   Q    |          |          |          |
3+ 5       0.4312      2.53  |V   Q    |          |          |          |
3+10       0.4486      2.53  |V   Q    |          |          |          |
3+15       0.4661      2.53  | V  Q    |          |          |          |
3+20       0.4835      2.53  | V  Q    |          |          |          |
3+25       0.5010      2.54  | V  Q    |          |          |          |
3+30       0.5184      2.54  | V  Q    |          |          |          |
3+35       0.5359      2.54  | V  Q    |          |          |          |
3+40       0.5534      2.54  | V  Q    |          |          |          |
3+45       0.5708      2.54  | V  Q    |          |          |          |
3+50       0.5885      2.57  | V  Q    |          |          |          |
3+55       0.6074      2.74  | V  Q    |          |          |          |
4+ 0       0.6274      2.91  | V  Q    |          |          |          |
4+ 5       0.6479      2.97  | V  Q    |          |          |          |
4+10       0.6685      3.00  | V   Q   |          |          |          |
4+15       0.6894      3.02  |  V  Q   |          |          |          |
4+20       0.7105      3.06  |  V  Q   |          |          |          |
4+25       0.7328      3.24  |  V  Q   |          |          |          |
4+30       0.7563      3.41  |  V  Q   |          |          |          |
4+35       0.7802      3.47  |  V  Q   |          |          |          |
4+40       0.8044      3.51  |  V   Q  |          |          |          |
4+45       0.8287      3.53  |  V   Q  |          |          |          |
4+50       0.8533      3.57  |  V   Q  |          |          |          |
4+55       0.8791      3.75  |  V   Q  |          |          |          |
5+ 0       0.9061      3.92  |   V  Q  |          |          |          |
5+ 5       0.9331      3.92  |   V  Q  |          |          |          |
5+10       0.9579      3.60  |   V  Q  |          |          |          |
5+15       0.9806      3.29  |   V Q   |          |          |          |
5+20       1.0027      3.21  |   V Q   |          |          |          |
5+25       1.0256      3.32  |   V Q   |          |          |          |
5+30       1.0494      3.45  |   V Q   |          |          |          |
5+35       1.0736      3.52  |   V  Q  |          |          |          |
5+40       1.0993      3.73  |   V  Q  |          |          |          |
5+45       1.1262      3.91  |    V Q  |          |          |          |
5+50       1.1536      3.98  |    V Q  |          |          |          |
5+55       1.1812      4.01  |    V  Q |          |          |          |
6+ 0       1.2090      4.03  |    V  Q |          |          |          |
6+ 5       1.2371      4.08  |    V  Q |          |          |          |
6+10       1.2664      4.26  |    V  Q |          |          |          |
6+15       1.2969      4.42  |    V  Q |          |          |          |
6+20       1.3278      4.49  |    V  Q |          |          |          |
6+25       1.3589      4.52  |     V  Q|          |          |          |
6+30       1.3902      4.54  |     V  Q|          |          |          |
6+35       1.4218      4.58  |     V  Q|          |          |          |
6+40       1.4546      4.76  |     V  Q|          |          |          |
```

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 6+45       1.4886      4.93  |     V  Q|         |         |         |
 6+50       1.5230      4.99  |     V  Q|         |         |         |
 6+55       1.5576      5.03  |     V   Q         |         |         |
 7+ 0       1.5924      5.05  |      V  Q         |         |         |
 7+ 5       1.6273      5.06  |      V  Q         |         |         |
 7+10       1.6622      5.07  |      V  Q         |         |         |
 7+15       1.6971      5.07  |      V  Q         |         |         |
 7+20       1.7322      5.10  |      V  Q         |         |         |
 7+25       1.7685      5.28  |      V  Q         |         |         |
 7+30       1.8060      5.44  |       V Q         |         |         |
 7+35       1.8441      5.53  |       V |Q        |         |         |
 7+40       1.8837      5.74  |       V |Q        |         |         |
 7+45       1.9245      5.93  |       V |Q        |         |         |
 7+50       1.9661      6.03  |       V | Q       |         |         |
 7+55       2.0091      6.25  |       V | Q       |         |         |
 8+ 0       2.0534      6.43  |        V| Q       |         |         |
 8+ 5       2.0986      6.57  |        V|  Q      |         |         |
 8+10       2.1465      6.96  |        V|  Q      |         |         |
 8+15       2.1969      7.31  |        V|   Q     |         |         |
 8+20       2.2482      7.44  |        V|   Q     |         |         |
 8+25       2.3000      7.52  |         V    Q    |         |         |
 8+30       2.3520      7.56  |         V    Q    |         |         |
 8+35       2.4045      7.62  |         V    Q    |         |         |
 8+40       2.4582      7.80  |         V    Q    |         |         |
 8+45       2.5131      7.97  |         |V   Q    |         |         |
 8+50       2.5687      8.07  |         |V    Q   |         |         |
 8+55       2.6257      8.28  |         |V    Q   |         |         |
 9+ 0       2.6840      8.47  |         |V    Q   |         |         |
 9+ 5       2.7432      8.60  |         | V    Q  |         |         |
 9+10       2.8051      8.99  |         | V    Q  |         |         |
 9+15       2.8694      9.34  |         | V     Q |         |         |
 9+20       2.9349      9.50  |         |  V     Q|         |         |
 9+25       3.0021      9.75  |         |  V     Q|         |         |
 9+30       3.0707      9.96  |         |  V     Q|         |         |
 9+35       3.1401     10.08  |         |  V      Q         |         |
 9+40       3.2110     10.30  |         |   V     Q         |         |
 9+45       3.2832     10.49  |         |   V     Q         |         |
 9+50       3.3561     10.59  |         |   V     |Q        |         |
 9+55       3.4306     10.81  |         |    V    |Q        |         |
10+ 0       3.5063     11.00  |         |    V    |Q        |         |
10+ 5       3.5811     10.86  |         |    V    |Q        |         |
10+10       3.6477      9.66  |         |     V  Q|         |         |
10+15       3.7064      8.53  |         |     VQ  |         |         |
10+20       3.7624      8.12  |         |     Q   |         |         |
10+25       3.8167      7.89  |         |    QV   |         |         |
10+30       3.8700      7.75  |         |    Q V  |         |         |
10+35       3.9239      7.83  |         |    Q V  |         |         |
10+40       3.9838      8.68  |         |      Q  |         |         |
10+45       4.0491      9.49  |         |       Q |         |         |
10+50       4.1165      9.78  |         |       VQ|         |         |
10+55       4.1850      9.94  |         |       VQ|         |         |
11+ 0       4.2541     10.04  |         |       V Q         |         |
11+ 5       4.3234     10.06  |         |        VQ         |         |
11+10       4.3916      9.90  |         |        Q|         |         |
11+15       4.4588      9.75  |         |        Q|         |         |
11+20       4.5256      9.70  |         |        QV         |         |
11+25       4.5922      9.67  |         |        QV         |         |
11+30       4.6587      9.66  |         |        QV         |         |
11+35       4.7248      9.59  |         |        Q|V        |         |
11+40       4.7883      9.23  |         |       Q |V        |         |
11+45       4.8496      8.90  |         |      Q  |V        |         |
11+50       4.9102      8.80  |         |      Q  |V        |         |
11+55       4.9716      8.91  |         |      Q  | V       |         |
12+ 0       5.0338      9.03  |         |       Q | V       |         |
12+ 5       5.0978      9.29  |         |       Q | V       |         |
12+10       5.1704     10.55  |         |         |QV       |         |
12+15       5.2511     11.72  |         |         |  Q      |         |
12+20       5.3350     12.18  |         |         |  VQ     |         |
12+25       5.4217     12.60  |         |         |   VQ    |         |
12+30       5.5106     12.90  |         |         |   VQ    |         |
12+35       5.5960     12.40  |         |         |   Q     |         |
```

12+40	5.6565	8.80	
12+45	5.6944	5.50	
12+50	5.7262	4.61	
12+55	5.7601	4.92	
13+ 0	5.7979	5.49	
13+ 5	5.8426	6.49	
13+10	5.9161	10.67	
13+15	6.0166	14.59	
13+20	6.1280	16.19	
13+25	6.2466	17.21	
13+30	6.3702	17.94	
13+35	6.4941	18.00	
13+40	6.6023	15.71	
13+45	6.6950	13.45	
13+50	6.7823	12.67	
13+55	6.8664	12.22	
14+ 0	6.9487	11.95	
14+ 5	7.0275	11.44	
14+10	7.0914	9.28	
14+15	7.1421	7.37	
14+20	7.1881	6.68	
14+25	7.2274	5.71	
14+30	7.2618	4.99	
14+35	7.2953	4.87	
14+40	7.3293	4.94	
14+45	7.3644	5.08	
14+50	7.3998	5.15	
14+55	7.4316	4.62	
15+ 0	7.4602	4.15	
15+ 5	7.4878	4.01	
15+10	7.5108	3.35	
15+15	7.5301	2.80	
15+20	7.5482	2.62	
15+25	7.5617	1.95	
15+30	7.5713	1.39	
15+35	7.5838	1.82	
15+40	7.6163	4.72	
15+45	7.6674	7.42	
15+50	7.7252	8.40	
15+55	7.7870	8.97	
16+ 0	7.8511	9.30	
16+ 5	7.9131	9.01	
16+10	7.9574	6.43	
16+15	7.9849	4.00	
16+20	8.0065	3.13	
16+25	8.0246	2.63	
16+30	8.0407	2.34	
16+35	8.0555	2.15	
16+40	8.0687	1.92	
16+45	8.0806	1.72	
16+50	8.0917	1.62	
16+55	8.1025	1.57	
17+ 0	8.1132	1.54	
17+ 5	8.1241	1.59	
17+10	8.1375	1.94	
17+15	8.1531	2.27	
17+20	8.1696	2.39	
17+25	8.1865	2.45	
17+30	8.2036	2.49	
17+35	8.2210	2.52	
17+40	8.2383	2.52	
17+45	8.2558	2.53	
17+50	8.2730	2.50	
17+55	8.2890	2.33	
18+ 0	8.3039	2.16	
18+ 5	8.3184	2.10	
18+10	8.3327	2.07	
18+15	8.3468	2.05	
18+20	8.3608	2.04	
18+25	8.3748	2.04	
18+30	8.3888	2.03	

18+35	8.4026	2.00	Q			V
18+40	8.4152	1.82	Q			V
18+45	8.4266	1.66	Q			V
18+50	8.4374	1.57	Q			V
18+55	8.4467	1.36	Q			V
19+ 0	8.4548	1.17	Q			V
19+ 5	8.4625	1.13	Q			V
19+10	8.4713	1.27	Q			V
19+15	8.4810	1.41	Q			V
19+20	8.4912	1.49	Q			V
19+25	8.5029	1.69	Q			V
19+30	8.5158	1.88	Q			V
19+35	8.5290	1.91	Q			V
19+40	8.5412	1.78	Q			V
19+45	8.5525	1.63	Q			V
19+50	8.5632	1.55	Q			V
19+55	8.5725	1.35	Q			V
20+ 0	8.5805	1.17	Q			V
20+ 5	8.5883	1.13	Q			V
20+10	8.5970	1.27	Q			V
20+15	8.6067	1.41	Q			V
20+20	8.6168	1.46	Q			V
20+25	8.6270	1.49	Q			V
20+30	8.6374	1.51	Q			V
20+35	8.6478	1.51	Q			V
20+40	8.6582	1.52	Q			V
20+45	8.6687	1.52	Q			V
20+50	8.6790	1.49	Q			V
20+55	8.6880	1.31	Q			V
21+ 0	8.6959	1.15	Q			V
21+ 5	8.7036	1.12	Q			V
21+10	8.7123	1.26	Q			V
21+15	8.7220	1.41	Q			V
21+20	8.7318	1.43	Q			V
21+25	8.7407	1.28	Q			V
21+30	8.7485	1.13	Q			V
21+35	8.7561	1.11	Q			V
21+40	8.7648	1.26	Q			V
21+45	8.7744	1.40	Q			V
21+50	8.7842	1.42	Q			V
21+55	8.7930	1.28	Q			V
22+ 0	8.8009	1.13	Q			V
22+ 5	8.8085	1.11	Q			V
22+10	8.8172	1.26	Q			V
22+15	8.8268	1.40	Q			V
22+20	8.8366	1.42	Q			V
22+25	8.8454	1.28	Q			V
22+30	8.8532	1.13	Q			V
22+35	8.8607	1.08	Q			V
22+40	8.8679	1.05	Q			V
22+45	8.8750	1.03	Q			V
22+50	8.8821	1.02	Q			V
22+55	8.8891	1.02	Q			V
23+ 0	8.8961	1.02	Q			V
23+ 5	8.9031	1.02	Q			V
23+10	8.9101	1.01	Q			V
23+15	8.9171	1.01	Q			V
23+20	8.9241	1.01	Q			V
23+25	8.9310	1.01	Q			V
23+30	8.9380	1.01	Q			V
23+35	8.9450	1.01	Q			V
23+40	8.9520	1.01	Q			V
23+45	8.9590	1.01	Q			V
23+50	8.9660	1.01	Q			V
23+55	8.9730	1.01	Q			V
24+ 0	8.9799	1.01	Q			V
24+ 5	8.9865	0.95	Q			V
24+10	8.9907	0.60	Q			V
24+15	8.9925	0.27	Q			V
24+20	8.9936	0.15	Q			V
24+25	8.9941	0.08	Q			V

24+30	8.9944	0.04	Q	|	|	|	V|
24+35	8.9945	0.02	Q	|	|	|	V|
24+40	8.9946	0.01	Q	|	|	|	V|
24+45	8.9947	0.01	Q	|	|	|	V|
24+50	8.9947	0.00	Q	|	|	|	V|
24+55	8.9947	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA15R15.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 5-YEAR AND 1-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.131 Hr.
Lag time = 7.86 Min.
25% of lag time = 1.96 Min.
40% of lag time = 3.14 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	0.62	118.98

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.45	278.26

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 0.814(In)
Areal adjustment factor = 99.83 %
Adjusted average point rain = 0.813(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

```
       RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
       AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
       82.8  66.9      0.395     0.162        0.338       1.000      0.338
                                                        Sum (F) =   0.338
       Area averaged mean soil loss (F) (In/Hr) =  0.338
       Minimum soil loss rate ((In/Hr)) =  0.169
       (for 24 hour storm duration)
       Soil low loss rate (decimal) =   0.770
       ------------------------------------------------------------------------
       Slope of intensity-duration curve for a 1 hour storm =0.4800
       ------------------------------------------------------------------------

                     U n i t  H y d r o g r a p h
                            FOOTHILL S-Curve
       ------------------------------------------------------------------------
                     Unit Hydrograph Data
       ------------------------------------------------------------------------
       Unit time period   Time % of lag   Distribution   Unit Hydrograph
           (hrs)                          Graph %            (CFS)
       ------------------------------------------------------------------------
           1   0.083         63.646          6.127             11.849
           2   0.167        127.292         35.332             68.331
           3   0.250        190.937         32.198             62.271
           4   0.333        254.583         11.826             22.872
           5   0.417        318.229          6.736             13.027
           6   0.500        381.875          3.910              7.562
           7   0.583        445.520          1.895              3.664
           8   0.667        509.166          0.747              1.445
           9   0.750        572.812          0.484              0.935
          10   0.833        636.458          0.441              0.853
          11   0.917        700.104          0.305              0.589
                                    Sum = 100.000   Sum=     193.399
------------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     4.40      0.429         0.338      ---          0.09
    2   0.17     4.50      0.439         0.338      ---          0.10
    3   0.25     5.40      0.527         0.338      ---          0.19
    4   0.33     5.40      0.527         0.338      ---          0.19
    5   0.42     5.70      0.556         0.338      ---          0.22
    6   0.50     6.40      0.624         0.338      ---          0.29
    7   0.58     7.90      0.771         0.338      ---          0.43
    8   0.67     9.10      0.888         0.338      ---          0.55
    9   0.75    12.80      1.249         0.338      ---          0.91
   10   0.83    25.60      2.498         0.338      ---          2.16
   11   0.92     7.90      0.771         0.338      ---          0.43
   12   1.00     4.90      0.478         0.338      ---          0.14
      Sum =     100.0                                    Sum =     5.7
       Flood volume = Effective rainfall      0.48(In)
        times area     191.9(Ac.)/[(In)/(Ft.)] =       7.6(Ac.Ft)
       Total soil loss =      0.34(In)
       Total soil loss =     5.399(Ac.Ft)
       Total rainfall =      0.81(In)
       Flood volume =      331131.1 Cubic Feet
       Total soil loss =      235195.2 Cubic Feet
       ------------------------------------------------------------------------
        Peak flow rate of this hydrograph =    231.358(CFS)
       ------------------------------------------------------------------------
       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          1 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
       ------------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

       ------------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       75.0     150.0     225.0     300.0
  ------------------------------------------------------------------------
```

```
   0+ 5       0.0075      1.09  Q         |          |          |          |
   0+10       0.0589      7.47  Q         |          |          |          |
   0+15       0.1614     14.88  VQ        |          |          |          |
   0+20       0.3239     23.59  |V Q      |          |          |          |
   0+25       0.5361     30.82  | V Q     |          |          |          |
   0+30       0.7873     36.46  |   Q     |          |          |          |
   0+35       1.1058     46.25  |    VQ   |          |          |          |
   0+40       1.5424     63.40  |       Q |          |          |          |
   0+45       2.1427     87.16  |         |Q         |          |          |
   0+50       3.0973    138.61  |         |     V Q  |          |          |
   0+55       4.6907    231.36  |         |          |   V      Q          |
   1+ 0       6.0605    198.90  |         |          |     Q    |V         |
   1+ 5       6.7804    104.52  |         |  Q       |          |    V     |
   1+10       7.1723     56.91  |       Q |          |          |      V   |
   1+15       7.3797     30.11  |   Q     |          |          |       V  |
   1+20       7.4858     15.40  | Q       |          |          |        V |
   1+25       7.5364      7.35  Q         |          |          |        V |
   1+30       7.5658      4.26  Q         |          |          |        V |
   1+35       7.5863      2.99  Q         |          |          |        V |
   1+40       7.5986      1.77  Q         |          |          |        V |
   1+45       7.6012      0.38  Q         |          |          |        V |
   1+50       7.6017      0.08  Q         |          |          |        V |
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA35R35.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 5-YEAR AND 3-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.131 Hr.
Lag time = 7.86 Min.
25% of lag time = 1.96 Min.
40% of lag time = 3.14 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.06	203.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	2.63	504.70

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.060(In)
Area Averaged 100-Year Rainfall = 2.630(In)

Point rain (area averaged) = 1.428(In)
Areal adjustment factor = 99.92 %
Adjusted average point rain = 1.427(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	66.9	0.395	0.162	0.338	1.000	0.338
					Sum (F) =	0.338

Area averaged mean soil loss (F) (In/Hr) = 0.338
Minimum soil loss rate ((In/Hr)) = 0.169
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	63.646	6.127	11.849
2	0.167	127.292	35.332	68.331
3	0.250	190.937	32.198	62.271
4	0.333	254.583	11.826	22.872
5	0.417	318.229	6.736	13.027
6	0.500	381.875	3.910	7.562
7	0.583	445.520	1.895	3.664
8	0.667	509.166	0.747	1.445
9	0.750	572.812	0.484	0.935
10	0.833	636.458	0.441	0.853
11	0.917	700.104	0.305	0.589
			Sum = 100.000	Sum= 193.399

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.223	0.338	0.171	0.05
2	0.17	1.30	0.223	0.338	0.171	0.05
3	0.25	1.10	0.188	0.338	0.145	0.04
4	0.33	1.50	0.257	0.338	0.198	0.06
5	0.42	1.50	0.257	0.338	0.198	0.06
6	0.50	1.80	0.308	0.338	0.237	0.07
7	0.58	1.50	0.257	0.338	0.198	0.06
8	0.67	1.80	0.308	0.338	0.237	0.07
9	0.75	1.80	0.308	0.338	0.237	0.07
10	0.83	1.50	0.257	0.338	0.198	0.06
11	0.92	1.60	0.274	0.338	0.211	0.06
12	1.00	1.80	0.308	0.338	0.237	0.07
13	1.08	2.20	0.377	0.338	---	0.04
14	1.17	2.20	0.377	0.338	---	0.04
15	1.25	2.20	0.377	0.338	---	0.04
16	1.33	2.00	0.342	0.338	---	0.00
17	1.42	2.60	0.445	0.338	---	0.11
18	1.50	2.70	0.462	0.338	---	0.12
19	1.58	2.40	0.411	0.338	---	0.07
20	1.67	2.70	0.462	0.338	---	0.12
21	1.75	3.30	0.565	0.338	---	0.23
22	1.83	3.10	0.531	0.338	---	0.19
23	1.92	2.90	0.496	0.338	---	0.16
24	2.00	3.00	0.514	0.338	---	0.18
25	2.08	3.10	0.531	0.338	---	0.19
26	2.17	4.20	0.719	0.338	---	0.38
27	2.25	5.00	0.856	0.338	---	0.52
28	2.33	3.50	0.599	0.338	---	0.26
29	2.42	6.80	1.164	0.338	---	0.83
30	2.50	7.30	1.250	0.338	---	0.91
31	2.58	8.20	1.404	0.338	---	1.07
32	2.67	5.90	1.010	0.338	---	0.67
33	2.75	2.00	0.342	0.338	---	0.00
34	2.83	1.80	0.308	0.338	0.237	0.07

```
 35   2.92     1.80      0.308         0.338     0.237         0.07
 36   3.00     0.60      0.103         0.338     0.079         0.02
    Sum =     100.0                                  Sum =     7.0
       Flood volume = Effective rainfall      0.59(In)
        times area     191.9(Ac.)/[(In)/(Ft.)] =       9.4(Ac.Ft)
       Total soil loss =      0.84(In)
       Total soil loss =    13.436(Ac.Ft)
       Total rainfall =      1.43(In)
       Flood volume =      408435.2 Cubic Feet
       Total soil loss =      585283.7 Cubic Feet
       ---------------------------------------------------------------------
        Peak flow rate of this hydrograph =    166.008(CFS)
       ---------------------------------------------------------------------
       +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                           3 - H O U R    S T O R M
                      R u n o f f     H y d r o g r a p h
       ---------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals ((CFS))

       ---------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0     200.0
  ----------------------------------------------------------------------------
    0+ 5       0.0042      0.61  Q         |         |         |         |
    0+10       0.0325      4.11  Q         |         |         |         |
    0+15       0.0821      7.20  VQ        |         |         |         |
    0+20       0.1373      8.02  VQ        |         |         |         |
    0+25       0.2012      9.27  VQ        |         |         |         |
    0+30       0.2742     10.60  |VQ       |         |         |         |
    0+35       0.3549     11.72  |VQ       |         |         |         |
    0+40       0.4376     12.00  |VQ       |         |         |         |
    0+45       0.5235     12.48  | Q       |         |         |         |
    0+50       0.6134     13.05  | Q       |         |         |         |
    0+55       0.6998     12.54  | Q       |         |         |         |
    1+ 0       0.7844     12.29  | QV      |         |         |         |
    1+ 5       0.8705     12.49  | QV      |         |         |         |
    1+10       0.9448     10.79  | Q V     |         |         |         |
    1+15       1.0064      8.96  |Q  V     |         |         |         |
    1+20       1.0610      7.92  |Q  V     |         |         |         |
    1+25       1.1053      6.44  |Q  V     |         |         |         |
    1+30       1.1833     11.32  | Q  V    |         |         |         |
    1+35       1.3030     17.39  |  Q V    |         |         |         |
    1+40       1.4229     17.41  |  Q  V   |         |         |         |
    1+45       1.5634     20.39  |   Q V   |         |         |         |
    1+50       1.7692     29.88  |    Q V  |         |         |         |
    1+55       2.0067     34.48  |     Q V |         |         |         |
    2+ 0       2.2341     33.02  |     Q  V|         |         |         |
    2+ 5       2.4621     33.11  |     Q   V         |         |         |
    2+10       2.7191     37.32  |      Q  |V        |         |         |
    2+15       3.0845     53.05  |         Q  V      |         |         |
    2+20       3.5768     71.49  |         |   QV    |         |         |
    2+25       4.0848     73.76  |         |   Q  V  |         |         |
    2+30       4.7957    103.22  |         |         Q         |         |
    2+35       5.7841    143.51  |         |         |   V   Q |         |
    2+40       6.9274    166.01  |         |         |        V|  Q      |
    2+45       7.9531    148.94  |         |         |        Q|  V      |
    2+50       8.5587     87.92  |         |      Q  |         |    V    |
    2+55       8.8789     46.49  |        Q|         |         |     V   |
    3+ 0       9.0987     31.93  |     Q   |         |         |      V  |
    3+ 5       9.2319     19.33  |  Q      |         |         |       V|
    3+10       9.2992      9.77  |Q        |         |         |        V|
    3+15       9.3354      5.25  |Q        |         |         |        V|
    3+20       9.3573      3.19  Q         |         |         |        V|
    3+25       9.3694      1.75  Q         |         |         |        V|
    3+30       9.3739      0.66  Q         |         |         |        V|
    3+35       9.3750      0.16  Q         |         |         |        V|
    3+40       9.3759      0.12  Q         |         |         |        V|
    3+45       9.3763      0.06  Q         |         |         |        V|
    3+50       9.3764      0.01  Q         |         |         |         V
  ----------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA65R65.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 5-YEAR AND 6-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.131 Hr.
Lag time = 7.86 Min.
25% of lag time = 1.96 Min.
40% of lag time = 3.14 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.52	291.69

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	3.75	719.63

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.520(In)
Area Averaged 100-Year Rainfall = 3.750(In)

Point rain (area averaged) = 2.042(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 2.041(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	66.9	0.395	0.162	0.338	1.000	0.338
					Sum (F) =	0.338

Area averaged mean soil loss (F) (In/Hr) = 0.338
Minimum soil loss rate ((In/Hr)) = 0.169
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	63.646	6.127	11.849
2	0.167	127.292	35.332	68.331
3	0.250	190.937	32.198	62.271
4	0.333	254.583	11.826	22.872
5	0.417	318.229	6.736	13.027
6	0.500	381.875	3.910	7.562
7	0.583	445.520	1.895	3.664
8	0.667	509.166	0.747	1.445
9	0.750	572.812	0.484	0.935
10	0.833	636.458	0.441	0.853
11	0.917	700.104	0.305	0.589
			Sum = 100.000	Sum= 193.399

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.122	0.338	0.094	0.03
2	0.17	0.60	0.147	0.338	0.113	0.03
3	0.25	0.60	0.147	0.338	0.113	0.03
4	0.33	0.60	0.147	0.338	0.113	0.03
5	0.42	0.60	0.147	0.338	0.113	0.03
6	0.50	0.70	0.171	0.338	0.132	0.04
7	0.58	0.70	0.171	0.338	0.132	0.04
8	0.67	0.70	0.171	0.338	0.132	0.04
9	0.75	0.70	0.171	0.338	0.132	0.04
10	0.83	0.70	0.171	0.338	0.132	0.04
11	0.92	0.70	0.171	0.338	0.132	0.04
12	1.00	0.80	0.196	0.338	0.151	0.05
13	1.08	0.80	0.196	0.338	0.151	0.05
14	1.17	0.80	0.196	0.338	0.151	0.05
15	1.25	0.80	0.196	0.338	0.151	0.05
16	1.33	0.80	0.196	0.338	0.151	0.05
17	1.42	0.80	0.196	0.338	0.151	0.05
18	1.50	0.80	0.196	0.338	0.151	0.05
19	1.58	0.80	0.196	0.338	0.151	0.05
20	1.67	0.80	0.196	0.338	0.151	0.05
21	1.75	0.80	0.196	0.338	0.151	0.05
22	1.83	0.80	0.196	0.338	0.151	0.05
23	1.92	0.80	0.196	0.338	0.151	0.05
24	2.00	0.90	0.220	0.338	0.170	0.05
25	2.08	0.80	0.196	0.338	0.151	0.05
26	2.17	0.90	0.220	0.338	0.170	0.05
27	2.25	0.90	0.220	0.338	0.170	0.05
28	2.33	0.90	0.220	0.338	0.170	0.05
29	2.42	0.90	0.220	0.338	0.170	0.05
30	2.50	0.90	0.220	0.338	0.170	0.05
31	2.58	0.90	0.220	0.338	0.170	0.05
32	2.67	0.90	0.220	0.338	0.170	0.05
33	2.75	1.00	0.245	0.338	0.189	0.06
34	2.83	1.00	0.245	0.338	0.189	0.06

35	2.92	1.00	0.245	0.338	0.189	0.06
36	3.00	1.00	0.245	0.338	0.189	0.06
37	3.08	1.00	0.245	0.338	0.189	0.06
38	3.17	1.10	0.269	0.338	0.207	0.06
39	3.25	1.10	0.269	0.338	0.207	0.06
40	3.33	1.10	0.269	0.338	0.207	0.06
41	3.42	1.20	0.294	0.338	0.226	0.07
42	3.50	1.30	0.318	0.338	0.245	0.07
43	3.58	1.40	0.343	0.338	---	0.01
44	3.67	1.40	0.343	0.338	---	0.01
45	3.75	1.50	0.367	0.338	---	0.03
46	3.83	1.50	0.367	0.338	---	0.03
47	3.92	1.60	0.392	0.338	---	0.05
48	4.00	1.60	0.392	0.338	---	0.05
49	4.08	1.70	0.416	0.338	---	0.08
50	4.17	1.80	0.441	0.338	---	0.10
51	4.25	1.90	0.465	0.338	---	0.13
52	4.33	2.00	0.490	0.338	---	0.15
53	4.42	2.10	0.514	0.338	---	0.18
54	4.50	2.10	0.514	0.338	---	0.18
55	4.58	2.20	0.539	0.338	---	0.20
56	4.67	2.30	0.563	0.338	---	0.23
57	4.75	2.40	0.588	0.338	---	0.25
58	4.83	2.40	0.588	0.338	---	0.25
59	4.92	2.50	0.612	0.338	---	0.27
60	5.00	2.60	0.637	0.338	---	0.30
61	5.08	3.10	0.759	0.338	---	0.42
62	5.17	3.60	0.882	0.338	---	0.54
63	5.25	3.90	0.955	0.338	---	0.62
64	5.33	4.20	1.029	0.338	---	0.69
65	5.42	4.70	1.151	0.338	---	0.81
66	5.50	5.60	1.372	0.338	---	1.03
67	5.58	1.90	0.465	0.338	---	0.13
68	5.67	0.90	0.220	0.338	0.170	0.05
69	5.75	0.60	0.147	0.338	0.113	0.03
70	5.83	0.50	0.122	0.338	0.094	0.03
71	5.92	0.30	0.073	0.338	0.057	0.02
72	6.00	0.20	0.049	0.338	0.038	0.01
Sum =	100.0				Sum =	8.9

Flood volume = Effective rainfall 0.74(In)
times area 191.9(Ac.)/[(In)/(Ft.)] = 11.8(Ac.Ft)
Total soil loss = 1.30(In)
Total soil loss = 20.799(Ac.Ft)
Total rainfall = 2.04(In)
Flood volume = 515745.8 Cubic Feet
Total soil loss = 905989.8 Cubic Feet

Peak flow rate of this hydrograph = 153.454(CFS)

++

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0023	0.33	Q	|	|	|	|
0+10	0.0183	2.33	Q	|	|	|	|
0+15	0.0491	4.47	Q	|	|	|	|
0+20	0.0867	5.46	VQ	|	|	|	|
0+25	0.1277	5.96	VQ	|	|	|	|
0+30	0.1712	6.31	VQ	|	|	|	|
0+35	0.2183	6.84	VQ	|	|	|	|
0+40	0.2683	7.25	VQ	|	|	|	|
0+45	0.3194	7.42	|Q	|	|	|	|
0+50	0.3711	7.52	|Q	|	|	|	|
0+55	0.4234	7.58	|Q	|	|	|	|
1+ 0	0.4762	7.68	|Q	|	|	|	|
1+ 5	0.5318	8.07	|Q	|	|	|	|

```
   1+10       0.5898      8.42  |Q        |         |         |         |
   1+15       0.6488      8.56  |QV       |         |         |         |
   1+20       0.7082      8.64  |QV       |         |         |         |
   1+25       0.7680      8.68  |QV       |         |         |         |
   1+30       0.8279      8.70  |QV       |         |         |         |
   1+35       0.8879      8.71  |QV       |         |         |         |
   1+40       0.9479      8.71  |Q V      |         |         |         |
   1+45       1.0079      8.72  |Q V      |         |         |         |
   1+50       1.0680      8.72  |Q V      |         |         |         |
   1+55       1.1280      8.72  |Q V      |         |         |         |
   2+ 0       1.1885      8.79  |Q  V     |         |         |         |
   2+ 5       1.2512      9.11  |Q  V     |         |         |         |
   2+10       1.3142      9.14  |Q  V     |         |         |         |
   2+15       1.3782      9.30  |Q  V     |         |         |         |
   2+20       1.4443      9.60  |Q  V     |         |         |         |
   2+25       1.5111      9.69  |Q   V    |         |         |         |
   2+30       1.5782      9.75  |Q   V    |         |         |         |
   2+35       1.6455      9.78  |Q   V    |         |         |         |
   2+40       1.7130      9.79  |Q   V    |         |         |         |
   2+45       1.7809      9.87  |Q    V   |         |         |         |
   2+50       1.8516     10.26  | Q   V   |         |         |         |
   2+55       1.9247     10.61  | Q   V   |         |         |         |
   3+ 0       1.9986     10.74  | Q   V   |         |         |         |
   3+ 5       2.0731     10.82  | Q    V  |         |         |         |
   3+10       2.1484     10.92  | Q    V  |         |         |         |
   3+15       2.2264     11.33  | Q    V  |         |         |         |
   3+20       2.3069     11.69  | Q    V  |         |         |         |
   3+25       2.3888     11.89  | Q     V |         |         |         |
   3+30       2.4743     12.42  | Q     V |         |         |         |
   3+35       2.5597     12.40  | Q     V |         |         |         |
   3+40       2.6165      8.25  |Q      V |         |         |         |
   3+45       2.6476      4.51  Q       V |         |         |         |
   3+50       2.6804      4.75  Q        V|         |         |         |
   3+55       2.7200      5.75  |Q       V|         |         |         |
   4+ 0       2.7717      7.51  |Q       V|         |         |         |
   4+ 5       2.8364      9.41  |Q       V|         |         |         |
   4+10       2.9193     12.03  | Q      V|         |         |         |
   4+15       3.0286     15.87  |  Q      V         |         |         |
   4+20       3.1670     20.09  |   Q     V         |         |         |
   4+25       3.3359     24.53  |   Q     |V        |         |         |
   4+30       3.5346     28.85  |    Q    |V        |         |         |
   4+35       3.7541     31.86  |     Q   | V       |         |         |
   4+40       3.9954     35.04  |      Q  |  V      |         |         |
   4+45       4.2653     39.20  |      Q  |   V     |         |         |
   4+50       4.5636     43.31  |       Q |    V    |         |         |
   4+55       4.8817     46.19  |        Q|     V   |         |         |
   5+ 0       5.2213     49.31  |        Q|      V  |         |         |
   5+ 5       5.5975     54.62  |         Q       V |         |         |
   5+10       6.0581     66.87  |         |  Q      V         |         |
   5+15       6.6420     84.79  |         |     Q   | V       |         |
   5+20       7.3424    101.70  |         |         Q   V     |         |
   5+25       8.1515    117.48  |         |         |  Q   V  |         |
   5+30       9.0979    137.41  |         |         |      Q  V         |
   5+35      10.1547    153.45  |         |         |         Q   V     |
   5+40      10.9075    109.31  |         |         |Q        |     V   |
   5+45      11.2875     55.18  |         |Q        |         |       V |
   5+50      11.5136     32.83  |     Q   |         |         |       V |
   5+55      11.6524     20.15  |   Q     |         |         |        V|
   6+ 0      11.7344     11.91  | Q       |         |         |        V|
   6+ 5      11.7824      6.97  |Q        |         |         |        V|
   6+10      11.8110      4.15  Q         |         |         |        V|
   6+15      11.8273      2.37  Q         |         |         |        V|
   6+20      11.8355      1.19  Q         |         |         |        V|
   6+25      11.8379      0.34  Q         |         |         |        V|
   6+30      11.8389      0.15  Q         |         |         |        V|
   6+35      11.8394      0.08  Q         |         |         |        V|
   6+40      11.8397      0.04  Q         |         |         |        V|
   6+45      11.8398      0.02  Q         |         |         |        V|
   6+50      11.8399      0.01  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA245R245.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 5-YEAR AND 24-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.029
Lag time = 0.131 Hr.
Lag time = 7.86 Min.
25% of lag time = 1.96 Min.
40% of lag time = 3.14 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	2.85	546.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	8.85	1698.32

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 2.850(In)
Area Averaged 100-Year Rainfall = 8.850(In)

Point rain (area averaged) = 4.255(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 4.254(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	66.9	0.395	0.162	0.338	1.000	0.338
					Sum (F) =	0.338

Area averaged mean soil loss (F) (In/Hr) = 0.338
Minimum soil loss rate ((In/Hr)) = 0.169
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	63.646	6.127	11.849
2	0.167	127.292	35.332	68.331
3	0.250	190.937	32.198	62.271
4	0.333	254.583	11.826	22.872
5	0.417	318.229	6.736	13.027
6	0.500	381.875	3.910	7.562
7	0.583	445.520	1.895	3.664
8	0.667	509.166	0.747	1.445
9	0.750	572.812	0.484	0.935
10	0.833	636.458	0.441	0.853
11	0.917	700.104	0.305	0.589
			Sum = 100.000	Sum= 193.399

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.034	0.599	0.026	0.01
2	0.17	0.07	0.034	0.596	0.026	0.01
3	0.25	0.07	0.034	0.594	0.026	0.01
4	0.33	0.10	0.051	0.592	0.039	0.01
5	0.42	0.10	0.051	0.589	0.039	0.01
6	0.50	0.10	0.051	0.587	0.039	0.01
7	0.58	0.10	0.051	0.585	0.039	0.01
8	0.67	0.10	0.051	0.582	0.039	0.01
9	0.75	0.10	0.051	0.580	0.039	0.01
10	0.83	0.13	0.068	0.578	0.052	0.02
11	0.92	0.13	0.068	0.576	0.052	0.02
12	1.00	0.13	0.068	0.573	0.052	0.02
13	1.08	0.10	0.051	0.571	0.039	0.01
14	1.17	0.10	0.051	0.569	0.039	0.01
15	1.25	0.10	0.051	0.567	0.039	0.01
16	1.33	0.10	0.051	0.564	0.039	0.01
17	1.42	0.10	0.051	0.562	0.039	0.01
18	1.50	0.10	0.051	0.560	0.039	0.01
19	1.58	0.10	0.051	0.558	0.039	0.01
20	1.67	0.10	0.051	0.555	0.039	0.01
21	1.75	0.10	0.051	0.553	0.039	0.01
22	1.83	0.13	0.068	0.551	0.052	0.02
23	1.92	0.13	0.068	0.549	0.052	0.02
24	2.00	0.13	0.068	0.546	0.052	0.02
25	2.08	0.13	0.068	0.544	0.052	0.02
26	2.17	0.13	0.068	0.542	0.052	0.02
27	2.25	0.13	0.068	0.540	0.052	0.02
28	2.33	0.13	0.068	0.538	0.052	0.02
29	2.42	0.13	0.068	0.535	0.052	0.02
30	2.50	0.13	0.068	0.533	0.052	0.02
31	2.58	0.17	0.085	0.531	0.066	0.02
32	2.67	0.17	0.085	0.529	0.066	0.02
33	2.75	0.17	0.085	0.527	0.066	0.02
34	2.83	0.17	0.085	0.525	0.066	0.02

35	2.92	0.17	0.085	0.522	0.066	0.02
36	3.00	0.17	0.085	0.520	0.066	0.02
37	3.08	0.17	0.085	0.518	0.066	0.02
38	3.17	0.17	0.085	0.516	0.066	0.02
39	3.25	0.17	0.085	0.514	0.066	0.02
40	3.33	0.17	0.085	0.512	0.066	0.02
41	3.42	0.17	0.085	0.509	0.066	0.02
42	3.50	0.17	0.085	0.507	0.066	0.02
43	3.58	0.17	0.085	0.505	0.066	0.02
44	3.67	0.17	0.085	0.503	0.066	0.02
45	3.75	0.17	0.085	0.501	0.066	0.02
46	3.83	0.20	0.102	0.499	0.079	0.02
47	3.92	0.20	0.102	0.497	0.079	0.02
48	4.00	0.20	0.102	0.495	0.079	0.02
49	4.08	0.20	0.102	0.493	0.079	0.02
50	4.17	0.20	0.102	0.490	0.079	0.02
51	4.25	0.20	0.102	0.488	0.079	0.02
52	4.33	0.23	0.119	0.486	0.092	0.03
53	4.42	0.23	0.119	0.484	0.092	0.03
54	4.50	0.23	0.119	0.482	0.092	0.03
55	4.58	0.23	0.119	0.480	0.092	0.03
56	4.67	0.23	0.119	0.478	0.092	0.03
57	4.75	0.23	0.119	0.476	0.092	0.03
58	4.83	0.27	0.136	0.474	0.105	0.03
59	4.92	0.27	0.136	0.472	0.105	0.03
60	5.00	0.27	0.136	0.470	0.105	0.03
61	5.08	0.20	0.102	0.468	0.079	0.02
62	5.17	0.20	0.102	0.466	0.079	0.02
63	5.25	0.20	0.102	0.464	0.079	0.02
64	5.33	0.23	0.119	0.462	0.092	0.03
65	5.42	0.23	0.119	0.460	0.092	0.03
66	5.50	0.23	0.119	0.458	0.092	0.03
67	5.58	0.27	0.136	0.456	0.105	0.03
68	5.67	0.27	0.136	0.454	0.105	0.03
69	5.75	0.27	0.136	0.452	0.105	0.03
70	5.83	0.27	0.136	0.450	0.105	0.03
71	5.92	0.27	0.136	0.448	0.105	0.03
72	6.00	0.27	0.136	0.446	0.105	0.03
73	6.08	0.30	0.153	0.444	0.118	0.04
74	6.17	0.30	0.153	0.442	0.118	0.04
75	6.25	0.30	0.153	0.440	0.118	0.04
76	6.33	0.30	0.153	0.438	0.118	0.04
77	6.42	0.30	0.153	0.436	0.118	0.04
78	6.50	0.30	0.153	0.434	0.118	0.04
79	6.58	0.33	0.170	0.432	0.131	0.04
80	6.67	0.33	0.170	0.430	0.131	0.04
81	6.75	0.33	0.170	0.428	0.131	0.04
82	6.83	0.33	0.170	0.426	0.131	0.04
83	6.92	0.33	0.170	0.424	0.131	0.04
84	7.00	0.33	0.170	0.422	0.131	0.04
85	7.08	0.33	0.170	0.420	0.131	0.04
86	7.17	0.33	0.170	0.418	0.131	0.04
87	7.25	0.33	0.170	0.417	0.131	0.04
88	7.33	0.37	0.187	0.415	0.144	0.04
89	7.42	0.37	0.187	0.413	0.144	0.04
90	7.50	0.37	0.187	0.411	0.144	0.04
91	7.58	0.40	0.204	0.409	0.157	0.05
92	7.67	0.40	0.204	0.407	0.157	0.05
93	7.75	0.40	0.204	0.405	0.157	0.05
94	7.83	0.43	0.221	0.403	0.170	0.05
95	7.92	0.43	0.221	0.401	0.170	0.05
96	8.00	0.43	0.221	0.400	0.170	0.05
97	8.08	0.50	0.255	0.398	0.197	0.06
98	8.17	0.50	0.255	0.396	0.197	0.06
99	8.25	0.50	0.255	0.394	0.197	0.06
100	8.33	0.50	0.255	0.392	0.197	0.06
101	8.42	0.50	0.255	0.390	0.197	0.06
102	8.50	0.50	0.255	0.389	0.197	0.06
103	8.58	0.53	0.272	0.387	0.210	0.06
104	8.67	0.53	0.272	0.385	0.210	0.06
105	8.75	0.53	0.272	0.383	0.210	0.06

106	8.83	0.57	0.289	0.381	0.223	0.07
107	8.92	0.57	0.289	0.379	0.223	0.07
108	9.00	0.57	0.289	0.378	0.223	0.07
109	9.08	0.63	0.323	0.376	0.249	0.07
110	9.17	0.63	0.323	0.374	0.249	0.07
111	9.25	0.63	0.323	0.372	0.249	0.07
112	9.33	0.67	0.340	0.371	0.262	0.08
113	9.42	0.67	0.340	0.369	0.262	0.08
114	9.50	0.67	0.340	0.367	0.262	0.08
115	9.58	0.70	0.357	0.365	0.275	0.08
116	9.67	0.70	0.357	0.363	0.275	0.08
117	9.75	0.70	0.357	0.362	0.275	0.08
118	9.83	0.73	0.374	0.360	---	0.01
119	9.92	0.73	0.374	0.358	---	0.02
120	10.00	0.73	0.374	0.357	---	0.02
121	10.08	0.50	0.255	0.355	0.197	0.06
122	10.17	0.50	0.255	0.353	0.197	0.06
123	10.25	0.50	0.255	0.351	0.197	0.06
124	10.33	0.50	0.255	0.350	0.197	0.06
125	10.42	0.50	0.255	0.348	0.197	0.06
126	10.50	0.50	0.255	0.346	0.197	0.06
127	10.58	0.67	0.340	0.345	0.262	0.08
128	10.67	0.67	0.340	0.343	0.262	0.08
129	10.75	0.67	0.340	0.341	0.262	0.08
130	10.83	0.67	0.340	0.340	---	0.00
131	10.92	0.67	0.340	0.338	---	0.00
132	11.00	0.67	0.340	0.336	---	0.00
133	11.08	0.63	0.323	0.335	0.249	0.07
134	11.17	0.63	0.323	0.333	0.249	0.07
135	11.25	0.63	0.323	0.331	0.249	0.07
136	11.33	0.63	0.323	0.330	0.249	0.07
137	11.42	0.63	0.323	0.328	0.249	0.07
138	11.50	0.63	0.323	0.326	0.249	0.07
139	11.58	0.57	0.289	0.325	0.223	0.07
140	11.67	0.57	0.289	0.323	0.223	0.07
141	11.75	0.57	0.289	0.322	0.223	0.07
142	11.83	0.60	0.306	0.320	0.236	0.07
143	11.92	0.60	0.306	0.318	0.236	0.07
144	12.00	0.60	0.306	0.317	0.236	0.07
145	12.08	0.83	0.425	0.315	---	0.11
146	12.17	0.83	0.425	0.314	---	0.11
147	12.25	0.83	0.425	0.312	---	0.11
148	12.33	0.87	0.442	0.310	---	0.13
149	12.42	0.87	0.442	0.309	---	0.13
150	12.50	0.87	0.442	0.307	---	0.14
151	12.58	0.93	0.476	0.306	---	0.17
152	12.67	0.93	0.476	0.304	---	0.17
153	12.75	0.93	0.476	0.303	---	0.17
154	12.83	0.97	0.493	0.301	---	0.19
155	12.92	0.97	0.493	0.300	---	0.19
156	13.00	0.97	0.493	0.298	---	0.20
157	13.08	1.13	0.579	0.297	---	0.28
158	13.17	1.13	0.579	0.295	---	0.28
159	13.25	1.13	0.579	0.294	---	0.28
160	13.33	1.13	0.579	0.292	---	0.29
161	13.42	1.13	0.579	0.291	---	0.29
162	13.50	1.13	0.579	0.289	---	0.29
163	13.58	0.77	0.391	0.288	---	0.10
164	13.67	0.77	0.391	0.286	---	0.11
165	13.75	0.77	0.391	0.285	---	0.11
166	13.83	0.77	0.391	0.283	---	0.11
167	13.92	0.77	0.391	0.282	---	0.11
168	14.00	0.77	0.391	0.280	---	0.11
169	14.08	0.90	0.459	0.279	---	0.18
170	14.17	0.90	0.459	0.278	---	0.18
171	14.25	0.90	0.459	0.276	---	0.18
172	14.33	0.87	0.442	0.275	---	0.17
173	14.42	0.87	0.442	0.273	---	0.17
174	14.50	0.87	0.442	0.272	---	0.17
175	14.58	0.87	0.442	0.271	---	0.17
176	14.67	0.87	0.442	0.269	---	0.17

177	14.75	0.87	0.442	0.268	---	0.17
178	14.83	0.83	0.425	0.266	---	0.16
179	14.92	0.83	0.425	0.265	---	0.16
180	15.00	0.83	0.425	0.264	---	0.16
181	15.08	0.80	0.408	0.262	---	0.15
182	15.17	0.80	0.408	0.261	---	0.15
183	15.25	0.80	0.408	0.260	---	0.15
184	15.33	0.77	0.391	0.258	---	0.13
185	15.42	0.77	0.391	0.257	---	0.13
186	15.50	0.77	0.391	0.256	---	0.14
187	15.58	0.63	0.323	0.254	---	0.07
188	15.67	0.63	0.323	0.253	---	0.07
189	15.75	0.63	0.323	0.252	---	0.07
190	15.83	0.63	0.323	0.250	---	0.07
191	15.92	0.63	0.323	0.249	---	0.07
192	16.00	0.63	0.323	0.248	---	0.08
193	16.08	0.13	0.068	0.247	0.052	0.02
194	16.17	0.13	0.068	0.245	0.052	0.02
195	16.25	0.13	0.068	0.244	0.052	0.02
196	16.33	0.13	0.068	0.243	0.052	0.02
197	16.42	0.13	0.068	0.242	0.052	0.02
198	16.50	0.13	0.068	0.240	0.052	0.02
199	16.58	0.10	0.051	0.239	0.039	0.01
200	16.67	0.10	0.051	0.238	0.039	0.01
201	16.75	0.10	0.051	0.237	0.039	0.01
202	16.83	0.10	0.051	0.236	0.039	0.01
203	16.92	0.10	0.051	0.234	0.039	0.01
204	17.00	0.10	0.051	0.233	0.039	0.01
205	17.08	0.17	0.085	0.232	0.066	0.02
206	17.17	0.17	0.085	0.231	0.066	0.02
207	17.25	0.17	0.085	0.230	0.066	0.02
208	17.33	0.17	0.085	0.229	0.066	0.02
209	17.42	0.17	0.085	0.227	0.066	0.02
210	17.50	0.17	0.085	0.226	0.066	0.02
211	17.58	0.17	0.085	0.225	0.066	0.02
212	17.67	0.17	0.085	0.224	0.066	0.02
213	17.75	0.17	0.085	0.223	0.066	0.02
214	17.83	0.13	0.068	0.222	0.052	0.02
215	17.92	0.13	0.068	0.221	0.052	0.02
216	18.00	0.13	0.068	0.220	0.052	0.02
217	18.08	0.13	0.068	0.219	0.052	0.02
218	18.17	0.13	0.068	0.217	0.052	0.02
219	18.25	0.13	0.068	0.216	0.052	0.02
220	18.33	0.13	0.068	0.215	0.052	0.02
221	18.42	0.13	0.068	0.214	0.052	0.02
222	18.50	0.13	0.068	0.213	0.052	0.02
223	18.58	0.10	0.051	0.212	0.039	0.01
224	18.67	0.10	0.051	0.211	0.039	0.01
225	18.75	0.10	0.051	0.210	0.039	0.01
226	18.83	0.07	0.034	0.209	0.026	0.01
227	18.92	0.07	0.034	0.208	0.026	0.01
228	19.00	0.07	0.034	0.207	0.026	0.01
229	19.08	0.10	0.051	0.206	0.039	0.01
230	19.17	0.10	0.051	0.205	0.039	0.01
231	19.25	0.10	0.051	0.204	0.039	0.01
232	19.33	0.13	0.068	0.203	0.052	0.02
233	19.42	0.13	0.068	0.202	0.052	0.02
234	19.50	0.13	0.068	0.201	0.052	0.02
235	19.58	0.10	0.051	0.201	0.039	0.01
236	19.67	0.10	0.051	0.200	0.039	0.01
237	19.75	0.10	0.051	0.199	0.039	0.01
238	19.83	0.07	0.034	0.198	0.026	0.01
239	19.92	0.07	0.034	0.197	0.026	0.01
240	20.00	0.07	0.034	0.196	0.026	0.01
241	20.08	0.10	0.051	0.195	0.039	0.01
242	20.17	0.10	0.051	0.194	0.039	0.01
243	20.25	0.10	0.051	0.193	0.039	0.01
244	20.33	0.10	0.051	0.193	0.039	0.01
245	20.42	0.10	0.051	0.192	0.039	0.01
246	20.50	0.10	0.051	0.191	0.039	0.01
247	20.58	0.10	0.051	0.190	0.039	0.01

248	20.67	0.10	0.051	0.189	0.039	0.01
249	20.75	0.10	0.051	0.189	0.039	0.01
250	20.83	0.07	0.034	0.188	0.026	0.01
251	20.92	0.07	0.034	0.187	0.026	0.01
252	21.00	0.07	0.034	0.186	0.026	0.01
253	21.08	0.10	0.051	0.186	0.039	0.01
254	21.17	0.10	0.051	0.185	0.039	0.01
255	21.25	0.10	0.051	0.184	0.039	0.01
256	21.33	0.07	0.034	0.183	0.026	0.01
257	21.42	0.07	0.034	0.183	0.026	0.01
258	21.50	0.07	0.034	0.182	0.026	0.01
259	21.58	0.10	0.051	0.181	0.039	0.01
260	21.67	0.10	0.051	0.181	0.039	0.01
261	21.75	0.10	0.051	0.180	0.039	0.01
262	21.83	0.07	0.034	0.179	0.026	0.01
263	21.92	0.07	0.034	0.179	0.026	0.01
264	22.00	0.07	0.034	0.178	0.026	0.01
265	22.08	0.10	0.051	0.178	0.039	0.01
266	22.17	0.10	0.051	0.177	0.039	0.01
267	22.25	0.10	0.051	0.177	0.039	0.01
268	22.33	0.07	0.034	0.176	0.026	0.01
269	22.42	0.07	0.034	0.175	0.026	0.01
270	22.50	0.07	0.034	0.175	0.026	0.01
271	22.58	0.07	0.034	0.174	0.026	0.01
272	22.67	0.07	0.034	0.174	0.026	0.01
273	22.75	0.07	0.034	0.173	0.026	0.01
274	22.83	0.07	0.034	0.173	0.026	0.01
275	22.92	0.07	0.034	0.173	0.026	0.01
276	23.00	0.07	0.034	0.172	0.026	0.01
277	23.08	0.07	0.034	0.172	0.026	0.01
278	23.17	0.07	0.034	0.171	0.026	0.01
279	23.25	0.07	0.034	0.171	0.026	0.01
280	23.33	0.07	0.034	0.171	0.026	0.01
281	23.42	0.07	0.034	0.170	0.026	0.01
282	23.50	0.07	0.034	0.170	0.026	0.01
283	23.58	0.07	0.034	0.170	0.026	0.01
284	23.67	0.07	0.034	0.170	0.026	0.01
285	23.75	0.07	0.034	0.169	0.026	0.01
286	23.83	0.07	0.034	0.169	0.026	0.01
287	23.92	0.07	0.034	0.169	0.026	0.01
288	24.00	0.07	0.034	0.169	0.026	0.01
Sum =		100.0			Sum =	14.0

Flood volume = Effective rainfall 1.17(In)
times area 191.9(Ac.)/[(In)/(Ft.)] = 18.7(Ac.Ft)
Total soil loss = 3.09(In)
Total soil loss = 49.369(Ac.Ft)
Total rainfall = 4.25(In)
Flood volume = 812639.8 Cubic Feet
Total soil loss = 2150510.2 Cubic Feet

Peak flow rate of this hydrograph = 54.720(CFS)

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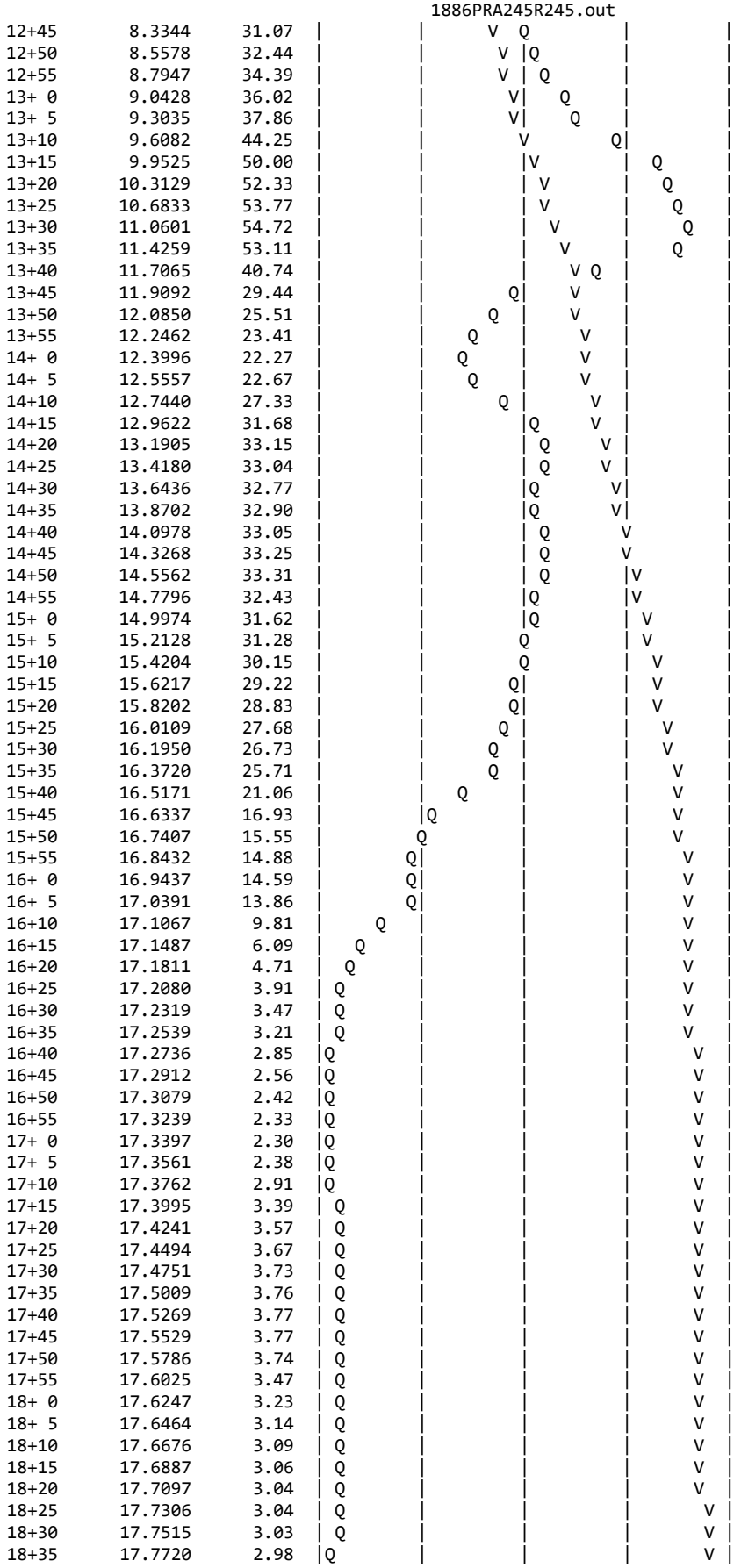
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0006	0.09	Q	|	|	|	|
0+10	0.0050	0.63	Q	|	|	|	|
0+15	0.0126	1.12	Q	|	|	|	|
0+20	0.0219	1.34	Q	|	|	|	|
0+25	0.0337	1.71	VQ	|	|	|	|
0+30	0.0475	2.01	VQ	|	|	|	|
0+35	0.0622	2.13	VQ	|	|	|	|
0+40	0.0773	2.19	VQ	|	|	|	|
0+45	0.0927	2.23	VQ	|	|	|	|
0+50	0.1085	2.30	VQ	|	|	|	|

0+55	0.1263	2.58	VQ	|	|	|	|
1+ 0	0.1457	2.82	VQ	|	|	|	|
1+ 5	0.1655	2.87	VQ	|	|	|	|
1+10	0.1838	2.66	VQ	|	|	|	|
1+15	0.2006	2.44	VQ	|	|	|	|
1+20	0.2169	2.37	VQ	|	|	|	|
1+25	0.2329	2.32	VQ	|	|	|	|
1+30	0.2487	2.30	VQ	|	|	|	|
1+35	0.2644	2.28	VQ	|	|	|	|
1+40	0.2801	2.28	VQ	|	|	|	|
1+45	0.2958	2.28	VQ	|	|	|	|
1+50	0.3118	2.32	VQ	|	|	|	|
1+55	0.3296	2.59	VQ	|	|	|	|
2+ 0	0.3491	2.83	VQ	|	|	|	|
2+ 5	0.3692	2.92	VQ	|	|	|	|
2+10	0.3896	2.97	VQ	|	|	|	|
2+15	0.4103	3.00	VQ	|	|	|	|
2+20	0.4311	3.01	V Q	|	|	|	|
2+25	0.4519	3.02	V Q	|	|	|	|
2+30	0.4727	3.02	|VQ	|	|	|	|
2+35	0.4938	3.07	|VQ	|	|	|	|
2+40	0.5169	3.34	|VQ	|	|	|	|
2+45	0.5416	3.59	|VQ	|	|	|	|
2+50	0.5669	3.68	|VQ	|	|	|	|
2+55	0.5926	3.73	|VQ	|	|	|	|
3+ 0	0.6184	3.76	|VQ	|	|	|	|
3+ 5	0.6444	3.77	|VQ	|	|	|	|
3+10	0.6704	3.78	|VQ	|	|	|	|
3+15	0.6965	3.78	|VQ	|	|	|	|
3+20	0.7225	3.78	|VQ	|	|	|	|
3+25	0.7486	3.79	|VQ	|	|	|	|
3+30	0.7747	3.79	|VQ	|	|	|	|
3+35	0.8007	3.79	|VQ	|	|	|	|
3+40	0.8268	3.79	|VQ	|	|	|	|
3+45	0.8529	3.79	|VQ	|	|	|	|
3+50	0.8793	3.83	|VQ	|	|	|	|
3+55	0.9075	4.10	|VQ	|	|	|	|
4+ 0	0.9375	4.34	| Q	|	|	|	|
4+ 5	0.9680	4.43	| Q	|	|	|	|
4+10	0.9989	4.48	| Q	|	|	|	|
4+15	1.0300	4.51	| VQ	|	|	|	|
4+20	1.0615	4.57	| VQ	|	|	|	|
4+25	1.0949	4.85	| VQ	|	|	|	|
4+30	1.1300	5.10	| VQ	|	|	|	|
4+35	1.1657	5.19	| VQ	|	|	|	|
4+40	1.2018	5.24	| VQ	|	|	|	|
4+45	1.2381	5.27	| VQ	|	|	|	|
4+50	1.2748	5.33	| VQ	|	|	|	|
4+55	1.3134	5.61	| VQ	|	|	|	|
5+ 0	1.3537	5.85	| VQ	|	|	|	|
5+ 5	1.3940	5.85	| VQ	|	|	|	|
5+10	1.4310	5.37	| Q	|	|	|	|
5+15	1.4649	4.91	| Q	|	|	|	|
5+20	1.4979	4.79	| Q	|	|	|	|
5+25	1.5321	4.97	| Q	|	|	|	|
5+30	1.5676	5.15	| Q	|	|	|	|
5+35	1.6038	5.26	| Q	|	|	|	|
5+40	1.6422	5.57	| Q	|	|	|	|
5+45	1.6825	5.84	| Q	|	|	|	|
5+50	1.7234	5.94	| Q	|	|	|	|
5+55	1.7646	5.99	| Q	|	|	|	|
6+ 0	1.8061	6.02	| VQ	|	|	|	|
6+ 5	1.8480	6.09	| VQ	|	|	|	|
6+10	1.8918	6.36	| Q	|	|	|	|
6+15	1.9374	6.61	| Q	|	|	|	|
6+20	1.9835	6.70	| Q	|	|	|	|
6+25	2.0300	6.76	| Q	|	|	|	|
6+30	2.0768	6.79	| Q	|	|	|	|
6+35	2.1239	6.85	| Q	|	|	|	|
6+40	2.1730	7.12	| Q	|	|	|	|
6+45	2.2237	7.37	| Q	|	|	|	|

6+50	2.2751	7.46	Q				
6+55	2.3268	7.51	VQ				
7+ 0	2.3788	7.54	Q				
7+ 5	2.4308	7.56	Q				
7+10	2.4829	7.56	Q				
7+15	2.5350	7.57	Q				
7+20	2.5875	7.62	Q				
7+25	2.6418	7.89	Q				
7+30	2.6978	8.13	Q				
7+35	2.7547	8.27	Q				
7+40	2.8139	8.58	QV				
7+45	2.8749	8.86	QV				
7+50	2.9369	9.01	Q				
7+55	3.0012	9.33	Q				
8+ 0	3.0674	9.61	Q				
8+ 5	3.1349	9.81	Q				
8+10	3.2066	10.40	Q				
8+15	3.2818	10.92	Q				
8+20	3.3584	11.12	Q				
8+25	3.4358	11.23	Q				
8+30	3.5135	11.29	Q				
8+35	3.5919	11.37	Q				
8+40	3.6721	11.65	Q				
8+45	3.7541	11.91	QV				
8+50	3.8371	12.05	Q				
8+55	3.9223	12.37	Q				
9+ 0	4.0094	12.64	Q				
9+ 5	4.0978	12.84	Q				
9+10	4.1903	13.43	Q				
9+15	4.2864	13.95	Q				
9+20	4.3842	14.20	Q				
9+25	4.4846	14.57	Q				
9+30	4.5871	14.88	Q				
9+35	4.6907	15.05	Q				
9+40	4.7966	15.38	Q				
9+45	4.9045	15.66	Q				
9+50	5.0076	14.97	QV				
9+55	5.0793	10.41	Q	V			
10+ 0	5.1231	6.36	Q	V			
10+ 5	5.1612	5.53	Q	V			
10+10	5.2135	7.60	Q	V			
10+15	5.2803	9.70	Q	V			
10+20	5.3521	10.43	Q	V			
10+25	5.4271	10.88	Q	V			
10+30	5.5038	11.14	Q	V			
10+35	5.5828	11.47	Q	V			
10+40	5.6711	12.83	Q	V			
10+45	5.7682	14.09	Q	V			
10+50	5.8622	13.65	Q	V			
10+55	5.9218	8.65	Q	V			
11+ 0	5.9500	4.10	Q	V			
11+ 5	5.9738	3.45	Q	V			
11+10	6.0248	7.42	Q	V			
11+15	6.1026	11.29	Q	V			
11+20	6.1898	12.66	Q	V			
11+25	6.2827	13.50	Q	V			
11+30	6.3789	13.96	Q	V			
11+35	6.4757	14.07	Q	V			
11+40	6.5693	13.59	Q	V			
11+45	6.6600	13.17	Q	V			
11+50	6.7502	13.10	Q	V			
11+55	6.8419	13.31	Q	V			
12+ 0	6.9348	13.49	Q	V			
12+ 5	7.0313	14.02	Q	V			
12+10	7.1470	16.80	Q	V			
12+15	7.2808	19.42	Q	V			
12+20	7.4238	20.77	Q	V			
12+25	7.5802	22.71	QV				
12+30	7.7480	24.35	Q				
12+35	7.9242	25.59	VQ				
12+40	8.1204	28.49	VQ				



12+45	8.3344	31.07	
12+50	8.5578	32.44	
12+55	8.7947	34.39	
13+ 0	9.0428	36.02	
13+ 5	9.3035	37.86	
13+10	9.6082	44.25	
13+15	9.9525	50.00	
13+20	10.3129	52.33	
13+25	10.6833	53.77	
13+30	11.0601	54.72	
13+35	11.4259	53.11	
13+40	11.7065	40.74	
13+45	11.9092	29.44	
13+50	12.0850	25.51	
13+55	12.2462	23.41	
14+ 0	12.3996	22.27	
14+ 5	12.5557	22.67	
14+10	12.7440	27.33	
14+15	12.9622	31.68	
14+20	13.1905	33.15	
14+25	13.4180	33.04	
14+30	13.6436	32.77	
14+35	13.8702	32.90	
14+40	14.0978	33.05	
14+45	14.3268	33.25	
14+50	14.5562	33.31	
14+55	14.7796	32.43	
15+ 0	14.9974	31.62	
15+ 5	15.2128	31.28	
15+10	15.4204	30.15	
15+15	15.6217	29.22	
15+20	15.8202	28.83	
15+25	16.0109	27.68	
15+30	16.1950	26.73	
15+35	16.3720	25.71	
15+40	16.5171	21.06	
15+45	16.6337	16.93	
15+50	16.7407	15.55	
15+55	16.8432	14.88	
16+ 0	16.9437	14.59	
16+ 5	17.0391	13.86	
16+10	17.1067	9.81	
16+15	17.1487	6.09	
16+20	17.1811	4.71	
16+25	17.2080	3.91	
16+30	17.2319	3.47	
16+35	17.2539	3.21	
16+40	17.2736	2.85	
16+45	17.2912	2.56	
16+50	17.3079	2.42	
16+55	17.3239	2.33	
17+ 0	17.3397	2.30	
17+ 5	17.3561	2.38	
17+10	17.3762	2.91	
17+15	17.3995	3.39	
17+20	17.4241	3.57	
17+25	17.4494	3.67	
17+30	17.4751	3.73	
17+35	17.5009	3.76	
17+40	17.5269	3.77	
17+45	17.5529	3.77	
17+50	17.5786	3.74	
17+55	17.6025	3.47	
18+ 0	17.6247	3.23	
18+ 5	17.6464	3.14	
18+10	17.6676	3.09	
18+15	17.6887	3.06	
18+20	17.7097	3.04	
18+25	17.7306	3.04	
18+30	17.7515	3.03	
18+35	17.7720	2.98	

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18+40      17.7907      2.72  |Q        |         |         |       V |
18+45      17.8078      2.47  |Q        |         |         |       V |
18+50      17.8238      2.34  |Q        |         |         |       V |
18+55      17.8377      2.02  |Q        |         |         |       V |
19+ 0      17.8497      1.74  |Q        |         |         |       V |
19+ 5      17.8613      1.69  |Q        |         |         |       V |
19+10      17.8744      1.90  |Q        |         |         |       V |
19+15      17.8889      2.11  |Q        |         |         |       V |
19+20      17.9042      2.23  |Q        |         |         |       V |
19+25      17.9217      2.54  |Q        |         |         |       V |
19+30      17.9410      2.81  |Q        |         |         |       V |
19+35      17.9607      2.86  |Q        |         |         |       V |
19+40      17.9790      2.65  |Q        |         |         |       V |
19+45      17.9957      2.44  |Q        |         |         |       V |
19+50      18.0117      2.32  |Q        |         |         |       V |
19+55      18.0255      2.01  |Q        |         |         |       V |
20+ 0      18.0375      1.74  |Q        |         |         |       V |
20+ 5      18.0491      1.68  |Q        |         |         |       V |
20+10      18.0622      1.90  |Q        |         |         |       V |
20+15      18.0767      2.11  |Q        |         |         |       V |
20+20      18.0917      2.18  |Q        |         |         |       V |
20+25      18.1070      2.22  |Q        |         |         |       V |
20+30      18.1225      2.25  |Q        |         |         |       V |
20+35      18.1380      2.26  |Q        |         |         |       V |
20+40      18.1536      2.26  |Q        |         |         |       V |
20+45      18.1692      2.27  |Q        |         |         |       V |
20+50      18.1845      2.22  |Q        |         |         |       V |
20+55      18.1980      1.96  |Q        |         |         |        V|
21+ 0      18.2098      1.71  |Q        |         |         |        V|
21+ 5      18.2213      1.67  |Q        |         |         |        V|
21+10      18.2343      1.89  |Q        |         |         |        V|
21+15      18.2488      2.10  |Q        |         |         |        V|
21+20      18.2635      2.13  |Q        |         |         |        V|
21+25      18.2766      1.91  |Q        |         |         |        V|
21+30      18.2882      1.69  |Q        |         |         |        V|
21+35      18.2997      1.66  |Q        |         |         |        V|
21+40      18.3126      1.88  |Q        |         |         |        V|
21+45      18.3270      2.10  |Q        |         |         |        V|
21+50      18.3417      2.13  |Q        |         |         |        V|
21+55      18.3548      1.91  |Q        |         |         |        V|
22+ 0      18.3665      1.69  |Q        |         |         |        V|
22+ 5      18.3779      1.66  |Q        |         |         |        V|
22+10      18.3908      1.88  |Q        |         |         |        V|
22+15      18.4053      2.10  |Q        |         |         |        V|
22+20      18.4199      2.13  |Q        |         |         |        V|
22+25      18.4331      1.91  |Q        |         |         |        V|
22+30      18.4447      1.69  |Q        |         |         |        V|
22+35      18.4558      1.61  |Q        |         |         |        V|
22+40      18.4666      1.56  |Q        |         |         |        V|
22+45      18.4772      1.54  |Q        |         |         |        V|
22+50      18.4877      1.53  |Q        |         |         |        V|
22+55      18.4982      1.52  |Q        |         |         |        V|
23+ 0      18.5086      1.52  |Q        |         |         |        V|
23+ 5      18.5191      1.52  |Q        |         |         |        V|
23+10      18.5295      1.51  |Q        |         |         |        V|
23+15      18.5400      1.51  |Q        |         |         |        V|
23+20      18.5504      1.51  |Q        |         |         |        V|
23+25      18.5608      1.51  |Q        |         |         |        V|
23+30      18.5712      1.51  |Q        |         |         |        V|
23+35      18.5817      1.51  |Q        |         |         |        V|
23+40      18.5921      1.51  |Q        |         |         |        V|
23+45      18.6025      1.51  |Q        |         |         |        V|
23+50      18.6130      1.51  |Q        |         |         |        V|
23+55      18.6234      1.51  |Q        |         |         |        V|
24+ 0      18.6338      1.51  |Q        |         |         |        V|
24+ 5      18.6436      1.42  Q        |         |         |        V|
24+10      18.6497      0.89  Q        |         |         |        V|
24+15      18.6525      0.40  Q        |         |         |        V|
24+20      18.6540      0.22  Q        |         |         |        V|
24+25      18.6548      0.12  Q        |         |         |        V|
24+30      18.6552      0.06  Q        |         |         |        V|
```

```
   24+35      18.6554      0.03  Q         |         |         |        V|
   24+40      18.6555      0.02  Q         |         |         |        V|
   24+45      18.6556      0.01  Q         |         |         |        V|
   24+50      18.6556      0.00  Q         |         |         |        V|
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA110R110.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 10-YEAR AND 1-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.028
Lag time = 0.126 Hr.
Lag time = 7.59 Min.
25% of lag time = 1.90 Min.
40% of lag time = 3.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	0.62	118.98

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.45	278.26

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 0.961(In)
Areal adjustment factor = 99.83 %
Adjusted average point rain = 0.960(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

```
      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
      82.8  82.8      0.212     0.162        0.181       1.000      0.181
                                                       Sum (F) =   0.181
      Area averaged mean soil loss (F) (In/Hr) =  0.181
      Minimum soil loss rate ((In/Hr)) =  0.091
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.770
      ------------------------------------------------------------------------
      Slope of intensity-duration curve for a 1 hour storm =0.4800
      ------------------------------------------------------------------------

                    U n i t  H y d r o g r a p h
                           FOOTHILL S-Curve
      ------------------------------------------------------------------------
                    Unit Hydrograph Data
      ------------------------------------------------------------------------
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                          Graph %            (CFS)
      ------------------------------------------------------------------------
          1   0.083         65.919          6.483             12.538
          2   0.167        131.838         37.488             72.501
          3   0.250        197.757         31.053             60.057
          4   0.333        263.675         11.491             22.224
          5   0.417        329.594          6.491             12.554
          6   0.500        395.513          3.632              7.025
          7   0.583        461.432          1.599              3.092
          8   0.667        527.351          0.684              1.323
          9   0.750        593.270          0.469              0.907
         10   0.833        659.188          0.412              0.797
         11   0.917        725.107          0.198              0.382
                                  Sum = 100.000   Sum=     193.399
------------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     4.40      0.507         0.181      ---          0.33
    2   0.17     4.50      0.518         0.181      ---          0.34
    3   0.25     5.40      0.622         0.181      ---          0.44
    4   0.33     5.40      0.622         0.181      ---          0.44
    5   0.42     5.70      0.657         0.181      ---          0.48
    6   0.50     6.40      0.737         0.181      ---          0.56
    7   0.58     7.90      0.910         0.181      ---          0.73
    8   0.67     9.10      1.048         0.181      ---          0.87
    9   0.75    12.80      1.474         0.181      ---          1.29
   10   0.83    25.60      2.948         0.181      ---          2.77
   11   0.92     7.90      0.910         0.181      ---          0.73
   12   1.00     4.90      0.564         0.181      ---          0.38
      Sum =     100.0                                    Sum =     9.3
        Flood volume = Effective rainfall      0.78(In)
         times area     191.9(Ac.)/[(In)/(Ft.)] =      12.5(Ac.Ft)
        Total soil loss =      0.18(In)
        Total soil loss =     2.897(Ac.Ft)
        Total rainfall =      0.96(In)
        Flood volume =      542396.8 Cubic Feet
        Total soil loss =      126194.6 Cubic Feet
        ------------------------------------------------------------------
         Peak flow rate of this hydrograph =    322.763(CFS)
        ------------------------------------------------------------------
        ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                           1 - H O U R    S T O R M
                        R u n o f f     H y d r o g r a p h
        ------------------------------------------------------------------
                    Hydrograph in   5   Minute intervals ((CFS))

        ------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0      100.0     200.0     300.0     400.0
  ------------------------------------------------------------------------
```

```
   0+ 5       0.0281      4.08  Q         |         |         |         |
   0+10       0.2199     27.85  V Q       |         |         |         |
   0+15       0.5612     49.55  |V  Q     |         |         |         |
   0+20       1.0088     65.00  |  V  Q   |         |         |         |
   0+25       1.5323     76.01  |   V  Q  |         |         |         |
   0+30       2.1127     84.27  |     V Q |         |         |         |
   0+35       2.7790     96.75  |       VQ|         |         |         |
   0+40       3.5904    117.82  |         |Q        |         |         |
   0+45       4.5989    146.43  |         |   Q     |         |         |
   0+50       6.0427    209.65  |         |         VQ        |         |
   0+55       8.2656    322.76  |         |         |     V   | Q       |
   1+ 0      10.1385    271.94  |         |         |      Q  | V       |
   1+ 5      11.2363    159.39  |         |    Q    |         |     V   |
   1+10      11.8408     87.77  |       Q |         |         |       V |
   1+15      12.1407     43.56  |   Q     |         |         |        V|
   1+20      12.2908     21.79  | Q       |         |         |        V|
   1+25      12.3649     10.75  |Q        |         |         |        V|
   1+30      12.4063      6.02  Q         |         |         |        V|
   1+35      12.4330      3.87  Q         |         |         |        V|
   1+40      12.4467      1.99  Q         |         |         |        V|
   1+45      12.4507      0.58  Q         |         |         |        V|
   1+50      12.4517      0.15  Q         |         |         |         V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA310R310.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 10-YEAR AND 3-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.028
Lag time = 0.126 Hr.
Lag time = 7.59 Min.
25% of lag time = 1.90 Min.
40% of lag time = 3.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.06	203.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	2.63	504.70

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.060(In)
Area Averaged 100-Year Rainfall = 2.630(In)

Point rain (area averaged) = 1.706(In)
Areal adjustment factor = 99.92 %
Adjusted average point rain = 1.704(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	82.8	0.212	0.162	0.181	1.000	0.181
					Sum (F) =	0.181

Area averaged mean soil loss (F) (In/Hr) = 0.181
Minimum soil loss rate ((In/Hr)) = 0.091
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	65.919	6.483	12.538
2	0.167	131.838	37.488	72.501
3	0.250	197.757	31.053	60.057
4	0.333	263.675	11.491	22.224
5	0.417	329.594	6.491	12.554
6	0.500	395.513	3.632	7.025
7	0.583	461.432	1.599	3.092
8	0.667	527.351	0.684	1.323
9	0.750	593.270	0.469	0.907
10	0.833	659.188	0.412	0.797
11	0.917	725.107	0.198	0.382
			Sum = 100.000	Sum= 193.399

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.266	0.181	---	0.08
2	0.17	1.30	0.266	0.181	---	0.08
3	0.25	1.10	0.225	0.181	---	0.04
4	0.33	1.50	0.307	0.181	---	0.13
5	0.42	1.50	0.307	0.181	---	0.13
6	0.50	1.80	0.368	0.181	---	0.19
7	0.58	1.50	0.307	0.181	---	0.13
8	0.67	1.80	0.368	0.181	---	0.19
9	0.75	1.80	0.368	0.181	---	0.19
10	0.83	1.50	0.307	0.181	---	0.13
11	0.92	1.60	0.327	0.181	---	0.15
12	1.00	1.80	0.368	0.181	---	0.19
13	1.08	2.20	0.450	0.181	---	0.27
14	1.17	2.20	0.450	0.181	---	0.27
15	1.25	2.20	0.450	0.181	---	0.27
16	1.33	2.00	0.409	0.181	---	0.23
17	1.42	2.60	0.532	0.181	---	0.35
18	1.50	2.70	0.552	0.181	---	0.37
19	1.58	2.40	0.491	0.181	---	0.31
20	1.67	2.70	0.552	0.181	---	0.37
21	1.75	3.30	0.675	0.181	---	0.49
22	1.83	3.10	0.634	0.181	---	0.45
23	1.92	2.90	0.593	0.181	---	0.41
24	2.00	3.00	0.614	0.181	---	0.43
25	2.08	3.10	0.634	0.181	---	0.45
26	2.17	4.20	0.859	0.181	---	0.68
27	2.25	5.00	1.023	0.181	---	0.84
28	2.33	3.50	0.716	0.181	---	0.53
29	2.42	6.80	1.391	0.181	---	1.21
30	2.50	7.30	1.493	0.181	---	1.31
31	2.58	8.20	1.677	0.181	---	1.50
32	2.67	5.90	1.207	0.181	---	1.03
33	2.75	2.00	0.409	0.181	---	0.23
34	2.83	1.80	0.368	0.181	---	0.19

```
35   2.92     1.80      0.368         0.181      ---          0.19
36   3.00     0.60      0.123         0.181     0.094         0.03
   Sum =     100.0                                  Sum =    14.0
      Flood volume = Effective rainfall      1.17(In)
       times area     191.9(Ac.)/[(In)/(Ft.)] =      18.7(Ac.Ft)
      Total soil loss =      0.54(In)
      Total soil loss =     8.576(Ac.Ft)
      Total rainfall =      1.70(In)
      Flood volume =      813781.4 Cubic Feet
      Total soil loss =      373553.2 Cubic Feet
      ---------------------------------------------------------------------
       Peak flow rate of this hydrograph =    243.339(CFS)
      ---------------------------------------------------------------------
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          3 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      ---------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      ---------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       75.0     150.0     225.0     300.0
  ----------------------------------------------------------------------------
    0+ 5       0.0073      1.06  Q         |         |         |         |
    0+10       0.0570      7.21  Q         |         |         |         |
    0+15       0.1382     11.79  VQ        |         |         |         |
    0+20       0.2190     11.73  VQ        |         |         |         |
    0+25       0.3310     16.27  V Q       |         |         |         |
    0+30       0.4801     21.64  |VQ       |         |         |         |
    0+35       0.6653     26.89  |V Q      |         |         |         |
    0+40       0.8564     27.75  |V Q      |         |         |         |
    0+45       1.0658     30.41  | V Q     |         |         |         |
    0+50       1.2931     33.00  | V Q     |         |         |         |
    0+55       1.4992     29.93  |  Q      |         |         |         |
    1+ 0       1.6976     28.81  |  Q      |         |         |         |
    1+ 5       1.9252     33.04  |   Q     |         |         |         |
    1+10       2.2097     41.31  |   VQ    |         |         |         |
    1+15       2.5337     47.04  |    VQ   |         |         |         |
    1+20       2.8701     48.84  |     Q   |         |         |         |
    1+25       3.2057     48.74  |     Q   |         |         |         |
    1+30       3.5923     56.13  |      Q  |         |         |         |
    1+35       4.0303     63.59  |       Q |         |         |         |
    1+40       4.4675     63.49  |       QV|         |         |         |
    1+45       4.9332     67.62  |        QV         |         |         |
    1+50       5.4801     79.40  |         QV        |         |         |
    1+55       6.0613     84.39  |         |QV       |         |         |
    2+ 0       6.6293     82.48  |         Q   V     |         |         |
    2+ 5       7.1992     82.74  |         |Q   V    |         |         |
    2+10       7.8047     87.92  |         |Q    V   |         |         |
    2+15       8.5461    107.65  |         |   Q   V |         |         |
    2+20       9.4391    129.66  |         |      Q  V         |         |
    2+25      10.3417    131.07  |         |      Q  | V       |         |
    2+30      11.5096    169.58  |         |         | Q V     |         |
    2+35      13.0023    216.74  |         |         |      VQ |         |
    2+40      14.6782    243.34  |         |         |         |VQ       |
    2+45      16.1912    219.69  |         |         |        Q|   V     |
    2+50      17.1738    142.66  |         |        Q|         |     V   |
    2+55      17.7684     86.35  |         |Q        |         |       V |
    3+ 0      18.1865     60.70  |       Q |         |         |       V |
    3+ 5      18.4325     35.72  |   Q     |         |         |        V|
    3+10      18.5518     17.32  | Q       |         |         |        V|
    3+15      18.6153      9.22  |Q        |         |         |        V|
    3+20      18.6509      5.17  Q         |         |         |        V|
    3+25      18.6690      2.62  Q         |         |         |        V|
    3+30      18.6764      1.08  Q         |         |         |        V|
    3+35      18.6794      0.44  Q         |         |         |        V|
    3+40      18.6811      0.25  Q         |         |         |        V|
    3+45      18.6818      0.09  Q         |         |         |        V|
    3+50      18.6819      0.01  Q         |         |         |         V
  ----------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA610R610.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 10-YEAR AND 6-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.028
Lag time = 0.126 Hr.
Lag time = 7.59 Min.
25% of lag time = 1.90 Min.
40% of lag time = 3.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.52	291.69

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	3.75	719.63

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.520(In)
Area Averaged 100-Year Rainfall = 3.750(In)

Point rain (area averaged) = 2.437(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 2.436(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	82.8	0.212	0.162	0.181	1.000	0.181
					Sum (F) =	0.181

Area averaged mean soil loss (F) (In/Hr) = 0.181
Minimum soil loss rate ((In/Hr)) = 0.091
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	65.919	6.483	12.538
2	0.167	131.838	37.488	72.501
3	0.250	197.757	31.053	60.057
4	0.333	263.675	11.491	22.224
5	0.417	329.594	6.491	12.554
6	0.500	395.513	3.632	7.025
7	0.583	461.432	1.599	3.092
8	0.667	527.351	0.684	1.323
9	0.750	593.270	0.469	0.907
10	0.833	659.188	0.412	0.797
11	0.917	725.107	0.198	0.382
			Sum = 100.000	Sum= 193.399

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.146	0.181	0.113	0.03
2	0.17	0.60	0.175	0.181	0.135	0.04
3	0.25	0.60	0.175	0.181	0.135	0.04
4	0.33	0.60	0.175	0.181	0.135	0.04
5	0.42	0.60	0.175	0.181	0.135	0.04
6	0.50	0.70	0.205	0.181	---	0.02
7	0.58	0.70	0.205	0.181	---	0.02
8	0.67	0.70	0.205	0.181	---	0.02
9	0.75	0.70	0.205	0.181	---	0.02
10	0.83	0.70	0.205	0.181	---	0.02
11	0.92	0.70	0.205	0.181	---	0.02
12	1.00	0.80	0.234	0.181	---	0.05
13	1.08	0.80	0.234	0.181	---	0.05
14	1.17	0.80	0.234	0.181	---	0.05
15	1.25	0.80	0.234	0.181	---	0.05
16	1.33	0.80	0.234	0.181	---	0.05
17	1.42	0.80	0.234	0.181	---	0.05
18	1.50	0.80	0.234	0.181	---	0.05
19	1.58	0.80	0.234	0.181	---	0.05
20	1.67	0.80	0.234	0.181	---	0.05
21	1.75	0.80	0.234	0.181	---	0.05
22	1.83	0.80	0.234	0.181	---	0.05
23	1.92	0.80	0.234	0.181	---	0.05
24	2.00	0.90	0.263	0.181	---	0.08
25	2.08	0.80	0.234	0.181	---	0.05
26	2.17	0.90	0.263	0.181	---	0.08
27	2.25	0.90	0.263	0.181	---	0.08
28	2.33	0.90	0.263	0.181	---	0.08
29	2.42	0.90	0.263	0.181	---	0.08
30	2.50	0.90	0.263	0.181	---	0.08
31	2.58	0.90	0.263	0.181	---	0.08
32	2.67	0.90	0.263	0.181	---	0.08
33	2.75	1.00	0.292	0.181	---	0.11
34	2.83	1.00	0.292	0.181	---	0.11

35	2.92	1.00	0.292	0.181	---	0.11
36	3.00	1.00	0.292	0.181	---	0.11
37	3.08	1.00	0.292	0.181	---	0.11
38	3.17	1.10	0.322	0.181	---	0.14
39	3.25	1.10	0.322	0.181	---	0.14
40	3.33	1.10	0.322	0.181	---	0.14
41	3.42	1.20	0.351	0.181	---	0.17
42	3.50	1.30	0.380	0.181	---	0.20
43	3.58	1.40	0.409	0.181	---	0.23
44	3.67	1.40	0.409	0.181	---	0.23
45	3.75	1.50	0.438	0.181	---	0.26
46	3.83	1.50	0.438	0.181	---	0.26
47	3.92	1.60	0.468	0.181	---	0.29
48	4.00	1.60	0.468	0.181	---	0.29
49	4.08	1.70	0.497	0.181	---	0.32
50	4.17	1.80	0.526	0.181	---	0.34
51	4.25	1.90	0.555	0.181	---	0.37
52	4.33	2.00	0.585	0.181	---	0.40
53	4.42	2.10	0.614	0.181	---	0.43
54	4.50	2.10	0.614	0.181	---	0.43
55	4.58	2.20	0.643	0.181	---	0.46
56	4.67	2.30	0.672	0.181	---	0.49
57	4.75	2.40	0.702	0.181	---	0.52
58	4.83	2.40	0.702	0.181	---	0.52
59	4.92	2.50	0.731	0.181	---	0.55
60	5.00	2.60	0.760	0.181	---	0.58
61	5.08	3.10	0.906	0.181	---	0.72
62	5.17	3.60	1.052	0.181	---	0.87
63	5.25	3.90	1.140	0.181	---	0.96
64	5.33	4.20	1.228	0.181	---	1.05
65	5.42	4.70	1.374	0.181	---	1.19
66	5.50	5.60	1.637	0.181	---	1.46
67	5.58	1.90	0.555	0.181	---	0.37
68	5.67	0.90	0.263	0.181	---	0.08
69	5.75	0.60	0.175	0.181	0.135	0.04
70	5.83	0.50	0.146	0.181	0.113	0.03
71	5.92	0.30	0.088	0.181	0.068	0.02
72	6.00	0.20	0.058	0.181	0.045	0.01
Sum =		100.0			Sum =	16.8

Flood volume = Effective rainfall 1.40(In)
times area 191.9(Ac.)/[(In)/(Ft.)] = 22.4(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 16.559(Ac.Ft)
Total rainfall = 2.44(In)
Flood volume = 975477.7 Cubic Feet
Total soil loss = 721315.7 Cubic Feet

Peak flow rate of this hydrograph = 227.510(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	75.0	150.0	225.0	300.0
0+ 5	0.0029	0.42	Q	|	|	|	|
0+10	0.0232	2.94	Q	|	|	|	|
0+15	0.0607	5.45	Q	|	|	|	|
0+20	0.1062	6.60	Q	|	|	|	|
0+25	0.1556	7.17	Q	|	|	|	|
0+30	0.2058	7.28	Q	|	|	|	|
0+35	0.2486	6.21	Q	|	|	|	|
0+40	0.2848	5.26	Q	|	|	|	|
0+45	0.3187	4.92	Q	|	|	|	|
0+50	0.3514	4.75	Q	|	|	|	|
0+55	0.3834	4.65	Q	|	|	|	|
1+ 0	0.4175	4.96	Q	|	|	|	|
1+ 5	0.4662	7.06	Q	|	|	|	|

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   1+10       0.5268      8.80  VQ        |         |         |         |
   1+15       0.5918      9.44  |Q        |         |         |         |
   1+20       0.6593      9.80  |Q        |         |         |         |
   1+25       0.7282     10.00  |Q        |         |         |         |
   1+30       0.7977     10.09  |Q        |         |         |         |
   1+35       0.8675     10.13  |Q        |         |         |         |
   1+40       0.9374     10.16  |Q        |         |         |         |
   1+45       1.0076     10.18  |Q        |         |         |         |
   1+50       1.0778     10.19  |Q        |         |         |         |
   1+55       1.1480     10.19  |QV       |         |         |         |
   2+ 0       1.2207     10.56  |QV       |         |         |         |
   2+ 5       1.3055     12.31  |QV       |         |         |         |
   2+10       1.3903     12.32  |QV       |         |         |         |
   2+15       1.4821     13.33  |QV       |         |         |         |
   2+20       1.5841     14.80  |QV       |         |         |         |
   2+25       1.6894     15.29  | QV      |         |         |         |
   2+30       1.7965     15.54  | QV      |         |         |         |
   2+35       1.9046     15.70  | QV      |         |         |         |
   2+40       2.0132     15.78  | QV      |         |         |         |
   2+45       2.1247     16.18  | QV      |         |         |         |
   2+50       2.2508     18.31  | Q V     |         |         |         |
   2+55       2.3891     20.08  | Q V     |         |         |         |
   3+ 0       2.5320     20.74  | Q V     |         |         |         |
   3+ 5       2.6773     21.11  | Q V     |         |         |         |
   3+10       2.8267     21.68  | Q  V    |         |         |         |
   3+15       2.9912     23.89  |  Q V    |         |         |         |
   3+20       3.1681     25.69  |  Q V    |         |         |         |
   3+25       3.3522     26.73  |  Q V    |         |         |         |
   3+30       3.5562     29.61  |  Q  V   |         |         |         |
   3+35       3.7908     34.07  |   Q V   |         |         |         |
   3+40       4.0572     38.69  |    Q V  |         |         |         |
   3+45       4.3455     41.86  |    Q V  |         |         |         |
   3+50       4.6571     45.23  |     Q V |         |         |         |
   3+55       4.9879     48.04  |     Q V |         |         |         |
   4+ 0       5.3403     51.16  |     Q  V|         |         |         |
   4+ 5       5.7108     53.80  |      Q  V         |         |         |
   4+10       6.1050     57.24  |      Q  V         |         |         |
   4+15       6.5320     62.00  |       Q |V        |         |         |
   4+20       6.9946     67.17  |       Q | V       |         |         |
   4+25       7.4943     72.56  |        Q|  V      |         |         |
   4+30       8.0296     77.72  |         Q   V     |         |         |
   4+35       8.5887     81.19  |         Q    V    |         |         |
   4+40       9.1745     85.05  |         |Q    V   |         |         |
   4+45       9.7946     90.04  |         | Q    V  |         |         |
   4+50      10.4485     94.95  |         | Q     V |         |         |
   4+55      11.1254     98.28  |         |  Q     V|         |         |
   5+ 0      11.8285    102.09  |         |  Q      |V        |         |
   5+ 5      12.5759    108.52  |         |   Q     | V       |         |
   5+10      13.4280    123.73  |         |     Q   |  V      |         |
   5+15      14.4294    145.40  |         |        Q|    V    |         |
   5+20      15.5696    165.55  |         |         | Q    V  |         |
   5+25      16.8399    184.46  |         |         |   Q     V         |
   5+30      18.2766    208.61  |         |         |      Q  | V       |
   5+35      19.8435    227.51  |         |         |         Q    V    |
   5+40      20.9927    166.86  |         |         | Q       |      V  |
   5+45      21.6062     89.09  |         |Q        |         |       V |
   5+50      21.9461     49.35  |     Q   |         |         |        V|
   5+55      22.1444     28.78  |  Q      |         |         |        V|
   6+ 0      22.2569     16.34  | Q       |         |         |        V|
   6+ 5      22.3215      9.38  |Q        |         |         |        V|
   6+10      22.3586      5.38  Q         |         |         |        V|
   6+15      22.3791      2.98  Q         |         |         |        V|
   6+20      22.3887      1.40  Q         |         |         |        V|
   6+25      22.3918      0.45  Q         |         |         |        V|
   6+30      22.3929      0.16  Q         |         |         |        V|
   6+35      22.3934      0.08  Q         |         |         |        V|
   6+40      22.3937      0.04  Q         |         |         |        V|
   6+45      22.3939      0.02  Q         |         |         |        V|
   6+50      22.3939      0.01  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA2410R2410.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 10-YEAR AND 24-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.028
Lag time = 0.126 Hr.
Lag time = 7.59 Min.
25% of lag time = 1.90 Min.
40% of lag time = 3.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	2.85	546.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	8.85	1698.32

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.850(In)
Area Averaged 100-Year Rainfall = 8.850(In)

Point rain (area averaged) = 5.318(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 5.316(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
82.8	82.8	0.212	0.162	0.181	1.000	0.181
					Sum (F) =	0.181

Area averaged mean soil loss (F) (In/Hr) = 0.181
Minimum soil loss rate ((In/Hr)) = 0.091
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.770

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	65.919	6.483	12.538
2	0.167	131.838	37.488	72.501
3	0.250	197.757	31.053	60.057
4	0.333	263.675	11.491	22.224
5	0.417	329.594	6.491	12.554
6	0.500	395.513	3.632	7.025
7	0.583	461.432	1.599	3.092
8	0.667	527.351	0.684	1.323
9	0.750	593.270	0.469	0.907
10	0.833	659.188	0.412	0.797
11	0.917	725.107	0.198	0.382
			Sum = 100.000	Sum= 193.399

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.043	0.321	0.033	0.01
2	0.17	0.07	0.043	0.320	0.033	0.01
3	0.25	0.07	0.043	0.319	0.033	0.01
4	0.33	0.10	0.064	0.317	0.049	0.01
5	0.42	0.10	0.064	0.316	0.049	0.01
6	0.50	0.10	0.064	0.315	0.049	0.01
7	0.58	0.10	0.064	0.314	0.049	0.01
8	0.67	0.10	0.064	0.313	0.049	0.01
9	0.75	0.10	0.064	0.311	0.049	0.01
10	0.83	0.13	0.085	0.310	0.065	0.02
11	0.92	0.13	0.085	0.309	0.065	0.02
12	1.00	0.13	0.085	0.308	0.065	0.02
13	1.08	0.10	0.064	0.306	0.049	0.01
14	1.17	0.10	0.064	0.305	0.049	0.01
15	1.25	0.10	0.064	0.304	0.049	0.01
16	1.33	0.10	0.064	0.303	0.049	0.01
17	1.42	0.10	0.064	0.302	0.049	0.01
18	1.50	0.10	0.064	0.300	0.049	0.01
19	1.58	0.10	0.064	0.299	0.049	0.01
20	1.67	0.10	0.064	0.298	0.049	0.01
21	1.75	0.10	0.064	0.297	0.049	0.01
22	1.83	0.13	0.085	0.296	0.065	0.02
23	1.92	0.13	0.085	0.294	0.065	0.02
24	2.00	0.13	0.085	0.293	0.065	0.02
25	2.08	0.13	0.085	0.292	0.065	0.02
26	2.17	0.13	0.085	0.291	0.065	0.02
27	2.25	0.13	0.085	0.290	0.065	0.02
28	2.33	0.13	0.085	0.288	0.065	0.02
29	2.42	0.13	0.085	0.287	0.065	0.02
30	2.50	0.13	0.085	0.286	0.065	0.02
31	2.58	0.17	0.106	0.285	0.082	0.02
32	2.67	0.17	0.106	0.284	0.082	0.02
33	2.75	0.17	0.106	0.283	0.082	0.02
34	2.83	0.17	0.106	0.281	0.082	0.02

35	2.92	0.17	0.106	0.280	0.082	0.02
36	3.00	0.17	0.106	0.279	0.082	0.02
37	3.08	0.17	0.106	0.278	0.082	0.02
38	3.17	0.17	0.106	0.277	0.082	0.02
39	3.25	0.17	0.106	0.276	0.082	0.02
40	3.33	0.17	0.106	0.275	0.082	0.02
41	3.42	0.17	0.106	0.273	0.082	0.02
42	3.50	0.17	0.106	0.272	0.082	0.02
43	3.58	0.17	0.106	0.271	0.082	0.02
44	3.67	0.17	0.106	0.270	0.082	0.02
45	3.75	0.17	0.106	0.269	0.082	0.02
46	3.83	0.20	0.128	0.268	0.098	0.03
47	3.92	0.20	0.128	0.267	0.098	0.03
48	4.00	0.20	0.128	0.265	0.098	0.03
49	4.08	0.20	0.128	0.264	0.098	0.03
50	4.17	0.20	0.128	0.263	0.098	0.03
51	4.25	0.20	0.128	0.262	0.098	0.03
52	4.33	0.23	0.149	0.261	0.115	0.03
53	4.42	0.23	0.149	0.260	0.115	0.03
54	4.50	0.23	0.149	0.259	0.115	0.03
55	4.58	0.23	0.149	0.258	0.115	0.03
56	4.67	0.23	0.149	0.256	0.115	0.03
57	4.75	0.23	0.149	0.255	0.115	0.03
58	4.83	0.27	0.170	0.254	0.131	0.04
59	4.92	0.27	0.170	0.253	0.131	0.04
60	5.00	0.27	0.170	0.252	0.131	0.04
61	5.08	0.20	0.128	0.251	0.098	0.03
62	5.17	0.20	0.128	0.250	0.098	0.03
63	5.25	0.20	0.128	0.249	0.098	0.03
64	5.33	0.23	0.149	0.248	0.115	0.03
65	5.42	0.23	0.149	0.247	0.115	0.03
66	5.50	0.23	0.149	0.246	0.115	0.03
67	5.58	0.27	0.170	0.244	0.131	0.04
68	5.67	0.27	0.170	0.243	0.131	0.04
69	5.75	0.27	0.170	0.242	0.131	0.04
70	5.83	0.27	0.170	0.241	0.131	0.04
71	5.92	0.27	0.170	0.240	0.131	0.04
72	6.00	0.27	0.170	0.239	0.131	0.04
73	6.08	0.30	0.191	0.238	0.147	0.04
74	6.17	0.30	0.191	0.237	0.147	0.04
75	6.25	0.30	0.191	0.236	0.147	0.04
76	6.33	0.30	0.191	0.235	0.147	0.04
77	6.42	0.30	0.191	0.234	0.147	0.04
78	6.50	0.30	0.191	0.233	0.147	0.04
79	6.58	0.33	0.213	0.232	0.164	0.05
80	6.67	0.33	0.213	0.231	0.164	0.05
81	6.75	0.33	0.213	0.230	0.164	0.05
82	6.83	0.33	0.213	0.229	0.164	0.05
83	6.92	0.33	0.213	0.228	0.164	0.05
84	7.00	0.33	0.213	0.227	0.164	0.05
85	7.08	0.33	0.213	0.226	0.164	0.05
86	7.17	0.33	0.213	0.225	0.164	0.05
87	7.25	0.33	0.213	0.223	0.164	0.05
88	7.33	0.37	0.234	0.222	---	0.01
89	7.42	0.37	0.234	0.221	---	0.01
90	7.50	0.37	0.234	0.220	---	0.01
91	7.58	0.40	0.255	0.219	---	0.04
92	7.67	0.40	0.255	0.218	---	0.04
93	7.75	0.40	0.255	0.217	---	0.04
94	7.83	0.43	0.276	0.216	---	0.06
95	7.92	0.43	0.276	0.215	---	0.06
96	8.00	0.43	0.276	0.214	---	0.06
97	8.08	0.50	0.319	0.213	---	0.11
98	8.17	0.50	0.319	0.212	---	0.11
99	8.25	0.50	0.319	0.211	---	0.11
100	8.33	0.50	0.319	0.210	---	0.11
101	8.42	0.50	0.319	0.209	---	0.11
102	8.50	0.50	0.319	0.208	---	0.11
103	8.58	0.53	0.340	0.207	---	0.13
104	8.67	0.53	0.340	0.207	---	0.13
105	8.75	0.53	0.340	0.206	---	0.13

106	8.83	0.57	0.362	0.205	---	0.16
107	8.92	0.57	0.362	0.204	---	0.16
108	9.00	0.57	0.362	0.203	---	0.16
109	9.08	0.63	0.404	0.202	---	0.20
110	9.17	0.63	0.404	0.201	---	0.20
111	9.25	0.63	0.404	0.200	---	0.20
112	9.33	0.67	0.425	0.199	---	0.23
113	9.42	0.67	0.425	0.198	---	0.23
114	9.50	0.67	0.425	0.197	---	0.23
115	9.58	0.70	0.447	0.196	---	0.25
116	9.67	0.70	0.447	0.195	---	0.25
117	9.75	0.70	0.447	0.194	---	0.25
118	9.83	0.73	0.468	0.193	---	0.27
119	9.92	0.73	0.468	0.192	---	0.28
120	10.00	0.73	0.468	0.191	---	0.28
121	10.08	0.50	0.319	0.190	---	0.13
122	10.17	0.50	0.319	0.189	---	0.13
123	10.25	0.50	0.319	0.189	---	0.13
124	10.33	0.50	0.319	0.188	---	0.13
125	10.42	0.50	0.319	0.187	---	0.13
126	10.50	0.50	0.319	0.186	---	0.13
127	10.58	0.67	0.425	0.185	---	0.24
128	10.67	0.67	0.425	0.184	---	0.24
129	10.75	0.67	0.425	0.183	---	0.24
130	10.83	0.67	0.425	0.182	---	0.24
131	10.92	0.67	0.425	0.181	---	0.24
132	11.00	0.67	0.425	0.180	---	0.24
133	11.08	0.63	0.404	0.180	---	0.22
134	11.17	0.63	0.404	0.179	---	0.23
135	11.25	0.63	0.404	0.178	---	0.23
136	11.33	0.63	0.404	0.177	---	0.23
137	11.42	0.63	0.404	0.176	---	0.23
138	11.50	0.63	0.404	0.175	---	0.23
139	11.58	0.57	0.362	0.174	---	0.19
140	11.67	0.57	0.362	0.173	---	0.19
141	11.75	0.57	0.362	0.173	---	0.19
142	11.83	0.60	0.383	0.172	---	0.21
143	11.92	0.60	0.383	0.171	---	0.21
144	12.00	0.60	0.383	0.170	---	0.21
145	12.08	0.83	0.532	0.169	---	0.36
146	12.17	0.83	0.532	0.168	---	0.36
147	12.25	0.83	0.532	0.167	---	0.36
148	12.33	0.87	0.553	0.167	---	0.39
149	12.42	0.87	0.553	0.166	---	0.39
150	12.50	0.87	0.553	0.165	---	0.39
151	12.58	0.93	0.595	0.164	---	0.43
152	12.67	0.93	0.595	0.163	---	0.43
153	12.75	0.93	0.595	0.162	---	0.43
154	12.83	0.97	0.617	0.162	---	0.46
155	12.92	0.97	0.617	0.161	---	0.46
156	13.00	0.97	0.617	0.160	---	0.46
157	13.08	1.13	0.723	0.159	---	0.56
158	13.17	1.13	0.723	0.158	---	0.56
159	13.25	1.13	0.723	0.158	---	0.57
160	13.33	1.13	0.723	0.157	---	0.57
161	13.42	1.13	0.723	0.156	---	0.57
162	13.50	1.13	0.723	0.155	---	0.57
163	13.58	0.77	0.489	0.154	---	0.33
164	13.67	0.77	0.489	0.154	---	0.34
165	13.75	0.77	0.489	0.153	---	0.34
166	13.83	0.77	0.489	0.152	---	0.34
167	13.92	0.77	0.489	0.151	---	0.34
168	14.00	0.77	0.489	0.150	---	0.34
169	14.08	0.90	0.574	0.150	---	0.42
170	14.17	0.90	0.574	0.149	---	0.43
171	14.25	0.90	0.574	0.148	---	0.43
172	14.33	0.87	0.553	0.147	---	0.41
173	14.42	0.87	0.553	0.147	---	0.41
174	14.50	0.87	0.553	0.146	---	0.41
175	14.58	0.87	0.553	0.145	---	0.41
176	14.67	0.87	0.553	0.144	---	0.41

177	14.75	0.87	0.553	0.144	---	0.41
178	14.83	0.83	0.532	0.143	---	0.39
179	14.92	0.83	0.532	0.142	---	0.39
180	15.00	0.83	0.532	0.141	---	0.39
181	15.08	0.80	0.510	0.141	---	0.37
182	15.17	0.80	0.510	0.140	---	0.37
183	15.25	0.80	0.510	0.139	---	0.37
184	15.33	0.77	0.489	0.139	---	0.35
185	15.42	0.77	0.489	0.138	---	0.35
186	15.50	0.77	0.489	0.137	---	0.35
187	15.58	0.63	0.404	0.136	---	0.27
188	15.67	0.63	0.404	0.136	---	0.27
189	15.75	0.63	0.404	0.135	---	0.27
190	15.83	0.63	0.404	0.134	---	0.27
191	15.92	0.63	0.404	0.134	---	0.27
192	16.00	0.63	0.404	0.133	---	0.27
193	16.08	0.13	0.085	0.132	0.065	0.02
194	16.17	0.13	0.085	0.132	0.065	0.02
195	16.25	0.13	0.085	0.131	0.065	0.02
196	16.33	0.13	0.085	0.130	0.065	0.02
197	16.42	0.13	0.085	0.130	0.065	0.02
198	16.50	0.13	0.085	0.129	0.065	0.02
199	16.58	0.10	0.064	0.128	0.049	0.01
200	16.67	0.10	0.064	0.128	0.049	0.01
201	16.75	0.10	0.064	0.127	0.049	0.01
202	16.83	0.10	0.064	0.126	0.049	0.01
203	16.92	0.10	0.064	0.126	0.049	0.01
204	17.00	0.10	0.064	0.125	0.049	0.01
205	17.08	0.17	0.106	0.125	0.082	0.02
206	17.17	0.17	0.106	0.124	0.082	0.02
207	17.25	0.17	0.106	0.123	0.082	0.02
208	17.33	0.17	0.106	0.123	0.082	0.02
209	17.42	0.17	0.106	0.122	0.082	0.02
210	17.50	0.17	0.106	0.121	0.082	0.02
211	17.58	0.17	0.106	0.121	0.082	0.02
212	17.67	0.17	0.106	0.120	0.082	0.02
213	17.75	0.17	0.106	0.120	0.082	0.02
214	17.83	0.13	0.085	0.119	0.065	0.02
215	17.92	0.13	0.085	0.118	0.065	0.02
216	18.00	0.13	0.085	0.118	0.065	0.02
217	18.08	0.13	0.085	0.117	0.065	0.02
218	18.17	0.13	0.085	0.117	0.065	0.02
219	18.25	0.13	0.085	0.116	0.065	0.02
220	18.33	0.13	0.085	0.116	0.065	0.02
221	18.42	0.13	0.085	0.115	0.065	0.02
222	18.50	0.13	0.085	0.114	0.065	0.02
223	18.58	0.10	0.064	0.114	0.049	0.01
224	18.67	0.10	0.064	0.113	0.049	0.01
225	18.75	0.10	0.064	0.113	0.049	0.01
226	18.83	0.07	0.043	0.112	0.033	0.01
227	18.92	0.07	0.043	0.112	0.033	0.01
228	19.00	0.07	0.043	0.111	0.033	0.01
229	19.08	0.10	0.064	0.111	0.049	0.01
230	19.17	0.10	0.064	0.110	0.049	0.01
231	19.25	0.10	0.064	0.110	0.049	0.01
232	19.33	0.13	0.085	0.109	0.065	0.02
233	19.42	0.13	0.085	0.109	0.065	0.02
234	19.50	0.13	0.085	0.108	0.065	0.02
235	19.58	0.10	0.064	0.108	0.049	0.01
236	19.67	0.10	0.064	0.107	0.049	0.01
237	19.75	0.10	0.064	0.107	0.049	0.01
238	19.83	0.07	0.043	0.106	0.033	0.01
239	19.92	0.07	0.043	0.106	0.033	0.01
240	20.00	0.07	0.043	0.105	0.033	0.01
241	20.08	0.10	0.064	0.105	0.049	0.01
242	20.17	0.10	0.064	0.104	0.049	0.01
243	20.25	0.10	0.064	0.104	0.049	0.01
244	20.33	0.10	0.064	0.103	0.049	0.01
245	20.42	0.10	0.064	0.103	0.049	0.01
246	20.50	0.10	0.064	0.102	0.049	0.01
247	20.58	0.10	0.064	0.102	0.049	0.01

248	20.67	0.10	0.064	0.102	0.049	0.01
249	20.75	0.10	0.064	0.101	0.049	0.01
250	20.83	0.07	0.043	0.101	0.033	0.01
251	20.92	0.07	0.043	0.100	0.033	0.01
252	21.00	0.07	0.043	0.100	0.033	0.01
253	21.08	0.10	0.064	0.100	0.049	0.01
254	21.17	0.10	0.064	0.099	0.049	0.01
255	21.25	0.10	0.064	0.099	0.049	0.01
256	21.33	0.07	0.043	0.098	0.033	0.01
257	21.42	0.07	0.043	0.098	0.033	0.01
258	21.50	0.07	0.043	0.098	0.033	0.01
259	21.58	0.10	0.064	0.097	0.049	0.01
260	21.67	0.10	0.064	0.097	0.049	0.01
261	21.75	0.10	0.064	0.097	0.049	0.01
262	21.83	0.07	0.043	0.096	0.033	0.01
263	21.92	0.07	0.043	0.096	0.033	0.01
264	22.00	0.07	0.043	0.096	0.033	0.01
265	22.08	0.10	0.064	0.095	0.049	0.01
266	22.17	0.10	0.064	0.095	0.049	0.01
267	22.25	0.10	0.064	0.095	0.049	0.01
268	22.33	0.07	0.043	0.094	0.033	0.01
269	22.42	0.07	0.043	0.094	0.033	0.01
270	22.50	0.07	0.043	0.094	0.033	0.01
271	22.58	0.07	0.043	0.094	0.033	0.01
272	22.67	0.07	0.043	0.093	0.033	0.01
273	22.75	0.07	0.043	0.093	0.033	0.01
274	22.83	0.07	0.043	0.093	0.033	0.01
275	22.92	0.07	0.043	0.093	0.033	0.01
276	23.00	0.07	0.043	0.092	0.033	0.01
277	23.08	0.07	0.043	0.092	0.033	0.01
278	23.17	0.07	0.043	0.092	0.033	0.01
279	23.25	0.07	0.043	0.092	0.033	0.01
280	23.33	0.07	0.043	0.092	0.033	0.01
281	23.42	0.07	0.043	0.091	0.033	0.01
282	23.50	0.07	0.043	0.091	0.033	0.01
283	23.58	0.07	0.043	0.091	0.033	0.01
284	23.67	0.07	0.043	0.091	0.033	0.01
285	23.75	0.07	0.043	0.091	0.033	0.01
286	23.83	0.07	0.043	0.091	0.033	0.01
287	23.92	0.07	0.043	0.091	0.033	0.01
288	24.00	0.07	0.043	0.091	0.033	0.01
Sum =		100.0			Sum =	32.4

Flood volume = Effective rainfall 2.70(In)
times area 191.9(Ac.)/[(In)/(Ft.)] = 43.2(Ac.Ft)
Total soil loss = 2.61(In)
Total soil loss = 41.817(Ac.Ft)
Total rainfall = 5.32(In)
Flood volume = 1881897.8 Cubic Feet
Total soil loss = 1821528.9 Cubic Feet

Peak flow rate of this hydrograph = 108.855(CFS)

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

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0008	0.12	Q	|	|	|	|
0+10	0.0066	0.83	Q	|	|	|	|
0+15	0.0164	1.42	Q	|	|	|	|
0+20	0.0281	1.70	Q	|	|	|	|
0+25	0.0430	2.18	Q	|	|	|	|
0+30	0.0605	2.54	Q	|	|	|	|
0+35	0.0790	2.68	Q	|	|	|	|
0+40	0.0979	2.75	Q	|	|	|	|
0+45	0.1172	2.80	Q	|	|	|	|
0+50	0.1370	2.88	Q	|	|	|	|

0+55	0.1594	3.25	Q				
1+ 0	0.1838	3.54	Q				
1+ 5	0.2085	3.59	Q				
1+10	0.2313	3.30	Q				
1+15	0.2523	3.04	Q				
1+20	0.2726	2.95	Q				
1+25	0.2925	2.90	Q				
1+30	0.3123	2.87	Q				
1+35	0.3319	2.85	Q				
1+40	0.3515	2.85	Q				
1+45	0.3711	2.85	Q				
1+50	0.3911	2.90	Q				
1+55	0.4135	3.26	Q				
2+ 0	0.4380	3.55	Q				
2+ 5	0.4632	3.66	Q				
2+10	0.4888	3.72	Q				
2+15	0.5146	3.75	Q				
2+20	0.5406	3.77	Q				
2+25	0.5666	3.78	Q				
2+30	0.5926	3.78	Q				
2+35	0.6191	3.85	Q				
2+40	0.6481	4.20	Q				
2+45	0.6790	4.50	Q				
2+50	0.7107	4.60	Q				
2+55	0.7429	4.67	Q				
3+ 0	0.7752	4.70	Q				
3+ 5	0.8077	4.72	Q				
3+10	0.8402	4.72	Q				
3+15	0.8728	4.73	Q				
3+20	0.9054	4.73	Q				
3+25	0.9380	4.73	Q				
3+30	0.9705	4.73	Q				
3+35	1.0031	4.73	Q				
3+40	1.0357	4.73	Q				
3+45	1.0683	4.73	Q				
3+50	1.1013	4.79	QV				
3+55	1.1368	5.15	|Q				
4+ 0	1.1743	5.44	|Q				
4+ 5	1.2125	5.55	|Q				
4+10	1.2511	5.61	|Q				
4+15	1.2900	5.65	|Q				
4+20	1.3295	5.72	|Q				
4+25	1.3714	6.08	|Q				
4+30	1.4153	6.38	|Q				
4+35	1.4601	6.50	|Q				
4+40	1.5052	6.56	|Q				
4+45	1.5506	6.59	|Q				
4+50	1.5966	6.67	|Q				
4+55	1.6450	7.03	|Q				
5+ 0	1.6955	7.33	|Q				
5+ 5	1.7459	7.32	|Q				
5+10	1.7918	6.67	|Q				
5+15	1.8340	6.12	|Q				
5+20	1.8752	5.98	|Q				
5+25	1.9180	6.22	|Q				
5+30	1.9624	6.45	|Q				
5+35	2.0078	6.59	|Q				
5+40	2.0559	7.00	|Q				
5+45	2.1063	7.31	|Q				
5+50	2.1575	7.43	|Q				
5+55	2.2091	7.50	|QV				
6+ 0	2.2610	7.53	|QV				
6+ 5	2.3134	7.61	|QV				
6+10	2.3684	7.98	|QV				
6+15	2.4254	8.28	|QV				
6+20	2.4831	8.39	|QV				
6+25	2.5413	8.45	|QV				
6+30	2.5998	8.49	|QV				
6+35	2.6588	8.56	|QV				
6+40	2.7202	8.92	|QV				
6+45	2.7837	9.22	|QV				

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 6+50       2.8480      9.33  |QV       |          |          |          |
 6+55       2.9127      9.40  |QV       |          |          |          |
 7+ 0       2.9777      9.43  |QV       |          |          |          |
 7+ 5       3.0428      9.45  |QV       |          |          |          |
 7+10       3.1079      9.45  |QV       |          |          |          |
 7+15       3.1730      9.46  |QV       |          |          |          |
 7+20       3.2350      8.99  |QV       |          |          |          |
 7+25       3.2783      6.29  |Q V      |          |          |          |
 7+30       3.3067      4.13  Q  V      |          |          |          |
 7+35       3.3323      3.71  Q  V      |          |          |          |
 7+40       3.3664      4.95  Q  V      |          |          |          |
 7+45       3.4087      6.15  |Q V      |          |          |          |
 7+50       3.4566      6.96  |Q V      |          |          |          |
 7+55       3.5180      8.91  |Q V      |          |          |          |
 8+ 0       3.5903     10.50  | QV      |          |          |          |
 8+ 5       3.6711     11.73  | QV      |          |          |          |
 8+10       3.7764     15.29  |  Q      |          |          |          |
 8+15       3.9018     18.21  |  Q      |          |          |          |
 8+20       4.0356     19.43  |  Q      |          |          |          |
 8+25       4.1747     20.19  |  VQ     |          |          |          |
 8+30       4.3172     20.70  |  VQ     |          |          |          |
 8+35       4.4640     21.31  |   Q     |          |          |          |
 8+40       4.6231     23.10  |   Q     |          |          |          |
 8+45       4.7925     24.61  |   Q     |          |          |          |
 8+50       4.9686     25.57  |   VQ    |          |          |          |
 8+55       5.1586     27.58  |   VQ    |          |          |          |
 9+ 0       5.3597     29.20  |   VQ    |          |          |          |
 9+ 5       5.5695     30.46  |    VQ   |          |          |          |
 9+10       5.8038     34.03  |    VQ   |          |          |          |
 9+15       6.0582     36.94  |    V Q  |          |          |          |
 9+20       6.3228     38.42  |    V Q  |          |          |          |
 9+25       6.6032     40.71  |     V Q |          |          |          |
 9+30       6.8958     42.49  |     V Q |          |          |          |
 9+35       7.1959     43.57  |     V Q |          |          |          |
 9+40       7.5101     45.62  |     V  Q|          |          |          |
 9+45       7.8357     47.27  |      V Q|          |          |          |
 9+50       8.1683     48.29  |      V Q|          |          |          |
 9+55       8.5149     50.33  |      V  Q          |          |          |
10+ 0       8.8727     51.96  |       V Q          |          |          |
10+ 5       9.2227     50.82  |       V Q          |          |          |
10+10       9.5017     40.51  |       Q |          |          |          |
10+15       9.7215     31.91  |     Q  V|          |          |          |
10+20       9.9203     28.86  |    Q   V|          |          |          |
10+25      10.1077     27.21  |    Q   V|          |          |          |
10+30      10.2892     26.36  |    Q   V|          |          |          |
10+35      10.4781     27.43  |    Q   V|          |          |          |
10+40      10.7200     35.13  |      Q V|          |          |          |
10+45      11.0062     41.55  |       Q V          |          |          |
10+50      11.3090     43.98  |       Q V          |          |          |
10+55      11.6219     45.43  |        QV          |          |          |
11+ 0      11.9411     46.35  |        Q|V         |          |          |
11+ 5      12.2619     46.58  |        Q|V         |          |          |
11+10      12.5743     45.35  |        Q|V         |          |          |
11+15      12.8797     44.35  |       Q |V         |          |          |
11+20      13.1836     44.13  |       Q | V        |          |          |
11+25      13.4871     44.07  |       Q | V        |          |          |
11+30      13.7908     44.09  |       Q | V        |          |          |
11+35      14.0915     43.66  |       Q |  V       |          |          |
11+40      14.3719     40.72  |       Q |  V       |          |          |
11+45      14.6358     38.31  |      Q  |  V       |          |          |
11+50      14.8960     37.78  |      Q  |  V       |          |          |
11+55      15.1643     38.95  |      Q  |   V      |          |          |
12+ 0      15.4404     40.10  |       Q |   V      |          |          |
12+ 5      15.7329     42.47  |       Q |   V      |          |          |
12+10      16.1024     53.64  |         Q   V      |          |          |
12+15      16.5353     62.86  |         | Q  V     |          |          |
12+20      16.9943     66.64  |         |  Q V     |          |          |
12+25      17.4779     70.22  |         |   Q V    |          |          |
12+30      17.9788     72.73  |         |   Q V    |          |          |
12+35      18.4910     74.38  |         |   Q  V   |          |          |
12+40      19.0289     78.09  |         |    Q V   |          |          |
```

```
12+45      19.5874     81.10  |         |     Q V |         |         |
12+50      20.1566     82.65  |         |     Q V |         |         |
12+55      20.7418     84.97  |         |     Q  V|         |         |
13+ 0      21.3391     86.73  |         |      Q V|         |         |
13+ 5      21.9510     88.84  |         |      Q  V         |         |
13+10      22.6193     97.04  |         |        QV         |         |
13+15      23.3341    103.78  |         |         QV        |         |
13+20      24.0668    106.40  |         |          |QV       |         |
13+25      24.8102    107.93  |         |          |QV       |         |
13+30      25.5598    108.85  |         |          |Q V      |         |
13+35      26.2928    106.42  |         |          |Q  V     |         |
13+40      26.9109     89.75  |         |       Q  |   V     |         |
13+45      27.4340     75.95  |         |    Q     |    V    |         |
13+50      27.9228     70.98  |         |   Q      |    V    |         |
13+55      28.3928     68.24  |         |  Q       |     V   |         |
14+ 0      28.8524     66.74  |         |  Q       |     V   |         |
14+ 5      29.3155     67.24  |         |  Q       |      V  |         |
14+10      29.8200     73.25  |         |   Q      |      V  |         |
14+15      30.3592     78.30  |         |    Q     |       V |         |
14+20      30.9093     79.88  |         |    Q     |       V |         |
14+25      31.4566     79.46  |         |    Q     |        V|         |
14+30      32.0002     78.93  |         |    Q     |        V|         |
14+35      32.5434     78.87  |         |    Q     |         V         |
14+40      33.0865     78.86  |         |    Q     |         V         |
14+45      33.6301     78.93  |         |    Q     |          |V       |
14+50      34.1729     78.81  |         |    Q     |          |V       |
14+55      34.7060     77.42  |         |    Q     |          | V      |
15+ 0      35.2312     76.26  |         |    Q     |          | V      |
15+ 5      35.7522     75.65  |         |    Q     |          |  V     |
15+10      36.2616     73.97  |         |   Q      |          |  V     |
15+15      36.7622     72.68  |         |   Q      |          |   V    |
15+20      37.2582     72.02  |         |   Q      |          |   V    |
15+25      37.7425     70.32  |         |   Q      |          |   V    |
15+30      38.2177     69.01  |         |  Q       |          |    V   |
15+35      38.6828     67.52  |         |  Q       |          |    V   |
15+40      39.1042     61.19  |         | Q        |          |     V  |
15+45      39.4902     56.04  |         |Q         |          |     V  |
15+50      39.8635     54.20  |         Q          |          |     V  |
15+55      40.2301     53.23  |         Q          |          |      V |
16+ 0      40.5934     52.75  |         Q          |          |      V |
16+ 5      40.9339     49.44  |        Q|          |          |      V |
16+10      41.1485     31.16  |     Q    |         |          |       V|
16+15      41.2587     16.00  |  Q       |         |          |       V|
16+20      41.3300     10.36  | Q        |         |          |       V|
16+25      41.3795      7.18  |Q         |         |          |       V|
16+30      41.4168      5.42  |Q         |         |          |       V|
16+35      41.4483      4.58  Q          |         |          |       V|
16+40      41.4751      3.89  Q          |         |          |       V|
16+45      41.4984      3.37  Q          |         |          |       V|
16+50      41.5194      3.06  Q          |         |          |       V|
16+55      41.5395      2.91  Q          |         |          |       V|
17+ 0      41.5592      2.87  Q          |         |          |       V|
17+ 5      41.5797      2.98  Q          |         |          |       V|
17+10      41.6051      3.68  Q          |         |          |       V|
17+15      41.6345      4.27  Q          |         |          |       V|
17+20      41.6653      4.48  Q          |         |          |       V|
17+25      41.6970      4.60  Q          |         |          |       V|
17+30      41.7292      4.67  Q          |         |          |       V|
17+35      41.7615      4.70  Q          |         |          |       V|
17+40      41.7940      4.71  Q          |         |          |       V|
17+45      41.8265      4.72  Q          |         |          |       V|
17+50      41.8586      4.67  Q          |         |          |       V|
17+55      41.8883      4.32  Q          |         |          |       V|
18+ 0      41.9160      4.02  Q          |         |          |       V|
18+ 5      41.9430      3.91  Q          |         |          |       V|
18+10      41.9695      3.85  Q          |         |          |       V|
18+15      41.9958      3.82  Q          |         |          |       V|
18+20      42.0220      3.80  Q          |         |          |       V|
18+25      42.0481      3.80  Q          |         |          |       V|
18+30      42.0743      3.79  Q          |         |          |       V|
18+35      42.0999      3.73  Q          |         |          |       V|
```

18+40	42.1231	3.37	Q	|	|	|	V|
18+45	42.1443	3.08	Q	|	|	|	V|
18+50	42.1643	2.91	Q	|	|	|	V|
18+55	42.1815	2.49	Q	|	|	|	V|
19+ 0	42.1963	2.16	Q	|	|	|	V|
19+ 5	42.2108	2.10	Q	|	|	|	V|
19+10	42.2272	2.39	Q	|	|	|	V|
19+15	42.2454	2.64	Q	|	|	|	V|
19+20	42.2646	2.79	Q	|	|	|	V|
19+25	42.2867	3.20	Q	|	|	|	V|
19+30	42.3109	3.52	Q	|	|	|	V|
19+35	42.3356	3.58	Q	|	|	|	V|
19+40	42.3583	3.29	Q	|	|	|	V|
19+45	42.3792	3.04	Q	|	|	|	V|
19+50	42.3991	2.89	Q	|	|	|	V|
19+55	42.4162	2.48	Q	|	|	|	V|
20+ 0	42.4310	2.16	Q	|	|	|	V|
20+ 5	42.4455	2.10	Q	|	|	|	V|
20+10	42.4619	2.39	Q	|	|	|	V|
20+15	42.4801	2.64	Q	|	|	|	V|
20+20	42.4989	2.73	Q	|	|	|	V|
20+25	42.5180	2.78	Q	|	|	|	V|
20+30	42.5374	2.81	Q	|	|	|	V|
20+35	42.5569	2.82	Q	|	|	|	V|
20+40	42.5763	2.83	Q	|	|	|	V|
20+45	42.5959	2.83	Q	|	|	|	V|
20+50	42.6150	2.78	Q	|	|	|	V|
20+55	42.6317	2.42	Q	|	|	|	V|
21+ 0	42.6463	2.13	Q	|	|	|	V|
21+ 5	42.6607	2.08	Q	|	|	|	V|
21+10	42.6770	2.38	Q	|	|	|	V|
21+15	42.6952	2.63	Q	|	|	|	V|
21+20	42.7135	2.67	Q	|	|	|	V|
21+25	42.7298	2.37	Q	|	|	|	V|
21+30	42.7443	2.10	Q	|	|	|	V|
21+35	42.7586	2.07	Q	|	|	|	V|
21+40	42.7749	2.36	Q	|	|	|	V|
21+45	42.7930	2.63	Q	|	|	|	V|
21+50	42.8113	2.67	Q	|	|	|	V|
21+55	42.8276	2.37	Q	|	|	|	V|
22+ 0	42.8421	2.10	Q	|	|	|	V|
22+ 5	42.8563	2.07	Q	|	|	|	V|
22+10	42.8726	2.36	Q	|	|	|	V|
22+15	42.8907	2.63	Q	|	|	|	V|
22+20	42.9091	2.67	Q	|	|	|	V|
22+25	42.9254	2.37	Q	|	|	|	V|
22+30	42.9399	2.10	Q	|	|	|	V|
22+35	42.9537	2.01	Q	|	|	|	V|
22+40	42.9671	1.95	Q	|	|	|	V|
22+45	42.9803	1.92	Q	|	|	|	V|
22+50	42.9935	1.91	Q	|	|	|	V|
22+55	43.0066	1.90	Q	|	|	|	V|
23+ 0	43.0196	1.90	Q	|	|	|	V|
23+ 5	43.0327	1.89	Q	|	|	|	V|
23+10	43.0457	1.89	Q	|	|	|	V|
23+15	43.0588	1.89	Q	|	|	|	V|
23+20	43.0718	1.89	Q	|	|	|	V|
23+25	43.0848	1.89	Q	|	|	|	V|
23+30	43.0979	1.89	Q	|	|	|	V|
23+35	43.1109	1.89	Q	|	|	|	V|
23+40	43.1239	1.89	Q	|	|	|	V|
23+45	43.1370	1.89	Q	|	|	|	V|
23+50	43.1500	1.89	Q	|	|	|	V|
23+55	43.1631	1.89	Q	|	|	|	V|
24+ 0	43.1761	1.89	Q	|	|	|	V|
24+ 5	43.1883	1.77	Q	|	|	|	V|
24+10	43.1956	1.06	Q	|	|	|	V|
24+15	43.1988	0.47	Q	|	|	|	V|
24+20	43.2006	0.26	Q	|	|	|	V|
24+25	43.2015	0.13	Q	|	|	|	V|
24+30	43.2020	0.06	Q	|	|	|	V|

24+35	43.2022	0.03	Q	|	|	|	V|
24+40	43.2023	0.02	Q	|	|	|	V|
24+45	43.2024	0.01	Q	|	|	|	V|
24+50	43.2024	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/26/20 File: 1886PRA1100R1100.out

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

Program License Serial Number 6062

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

English Units used in output format

JN 19.1886.2 - GREEN RIVER RANCH PROJECT SITE, CORONA, CA
WESTERN REALCO
AREA "A" PROPOSED CONDITION 100-YEAR AND 1-HOUR DURATION STORM
BY KWC ENGINEERS

Drainage Area = 191.90(Ac.) = 0.300 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 191.90(Ac.) = 0.300 Sq. Mi.
Length along longest watercourse = 4780.00(Ft.)
Length along longest watercourse measured to centroid = 2432.00(Ft.)
Length along longest watercourse = 0.905 Mi.
Length along longest watercourse measured to centroid = 0.461 Mi.
Difference in elevation = 1037.00(Ft.)
Slope along watercourse = 1145.4728 Ft./Mi.
Average Manning's 'N' = 0.027
Lag time = 0.120 Hr.
Lag time = 7.21 Min.
25% of lag time = 1.80 Min.
40% of lag time = 2.88 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	0.62	118.98

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
191.90	1.45	278.26

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.450(In)

Point rain (area averaged) = 1.450(In)
Areal adjustment factor = 99.83 %
Adjusted average point rain = 1.447(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
191.900	82.80	0.162

Total Area Entered = 191.90(Ac.)

```
       RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
       AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
       82.8  92.7      0.095     0.162        0.081       1.000      0.081
                                                        Sum (F) =   0.081
       Area averaged mean soil loss (F) (In/Hr) =  0.081
       Minimum soil loss rate ((In/Hr)) =  0.041
       (for 24 hour storm duration)
       Soil low loss rate (decimal) =   0.770
       ------------------------------------------------------------------------
       Slope of intensity-duration curve for a 1 hour storm =0.4800
       ------------------------------------------------------------------------

                     U n i t  H y d r o g r a p h
                            FOOTHILL S-Curve
       ------------------------------------------------------------------------
                     Unit Hydrograph Data
       ------------------------------------------------------------------------
       Unit time period   Time % of lag   Distribution   Unit Hydrograph
           (hrs)                          Graph %            (CFS)
       ------------------------------------------------------------------------
           1   0.083         69.388          7.055             13.645
           2   0.167        138.777         40.558             78.438
           3   0.250        208.165         29.345             56.753
           4   0.333        277.553         11.004             21.281
           5   0.417        346.941          6.108             11.813
           6   0.500        416.330          3.216              6.220
           7   0.583        485.718          1.207              2.335
           8   0.667        555.106          0.623              1.205
           9   0.750        624.494          0.484              0.936
          10   0.833        693.883          0.308              0.595
          11   0.917        763.271          0.091              0.176
                                    Sum = 100.000   Sum=     193.399
------------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
    1   0.08     4.40      0.764         0.081      ---          0.68
    2   0.17     4.50      0.782         0.081      ---          0.70
    3   0.25     5.40      0.938         0.081      ---          0.86
    4   0.33     5.40      0.938         0.081      ---          0.86
    5   0.42     5.70      0.990         0.081      ---          0.91
    6   0.50     6.40      1.112         0.081      ---          1.03
    7   0.58     7.90      1.372         0.081      ---          1.29
    8   0.67     9.10      1.581         0.081      ---          1.50
    9   0.75    12.80      2.223         0.081      ---          2.14
   10   0.83    25.60      4.447         0.081      ---          4.37
   11   0.92     7.90      1.372         0.081      ---          1.29
   12   1.00     4.90      0.851         0.081      ---          0.77
      Sum =     100.0                                    Sum =    16.4
         Flood volume = Effective rainfall      1.37(In)
          times area     191.9(Ac.)/[(In)/(Ft.)] =      21.8(Ac.Ft)
         Total soil loss =      0.08(In)
         Total soil loss =     1.300(Ac.Ft)
         Total rainfall =      1.45(In)
         Flood volume =      951685.7 Cubic Feet
         Total soil loss =       56623.4 Cubic Feet
         ---------------------------------------------------------------------
          Peak flow rate of this hydrograph =    539.934(CFS)
         ---------------------------------------------------------------------
         +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                             1 - H O U R    S T O R M
                        R u n o f f     H y d r o g r a p h
         ---------------------------------------------------------------------
                    Hydrograph in   5   Minute intervals ((CFS))

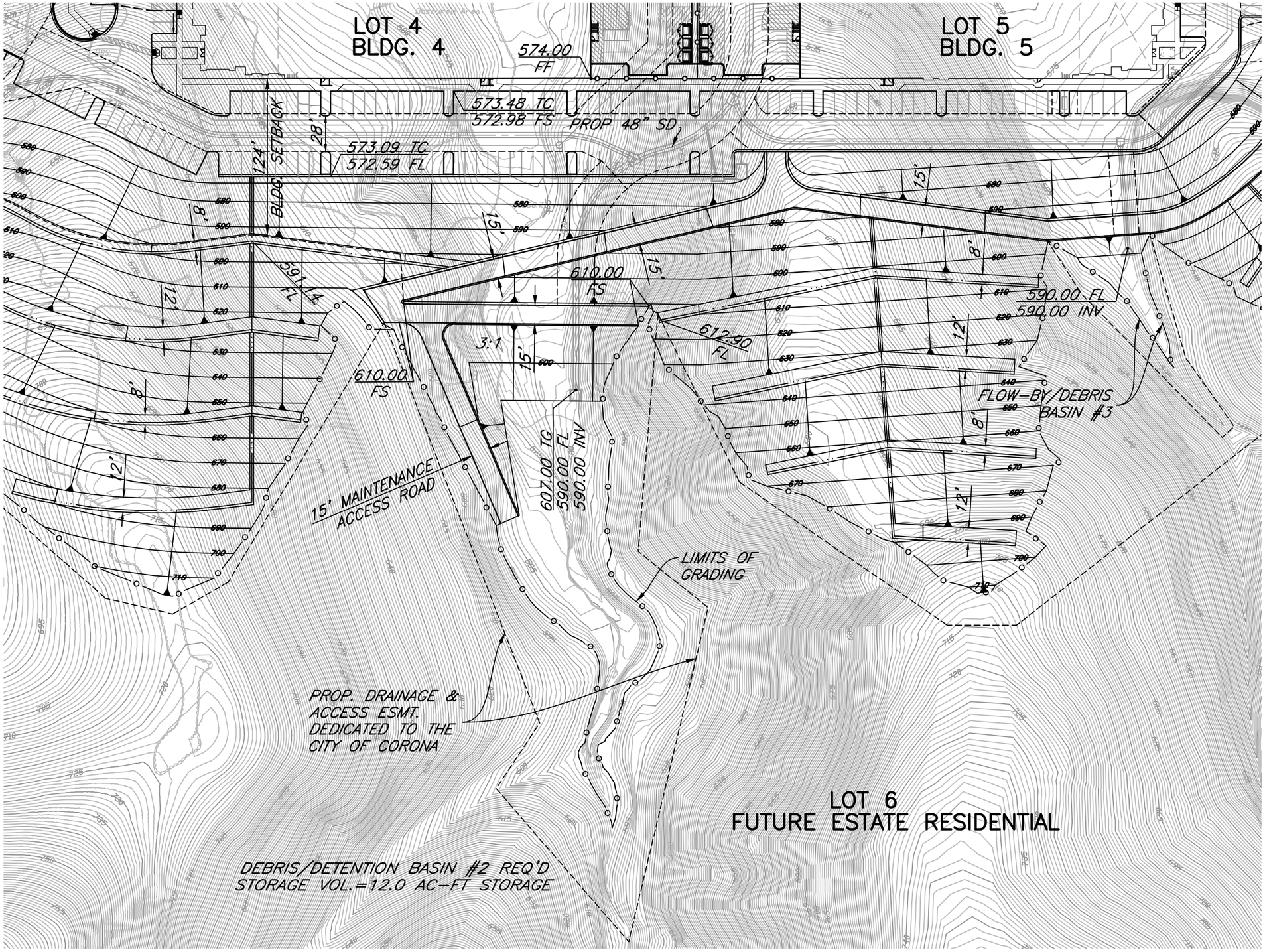
         ---------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft   Q(CFS)  0      150.0     300.0     450.0     600.0
  ---------------------------------------------------------------------
```

```
   0+ 5       0.0642      9.32  Q         |         |         |         |
   0+10       0.4992     63.16  V   Q     |         |         |         |
   0+15       1.2254    105.44  | V    Q  |         |         |         |
   0+20       2.1430    133.24  |  V    Q |         |         |         |
   0+25       3.1848    151.27  |    V    Q         |         |         |
   0+30       4.3198    164.80  |      V  Q         |         |         |
   0+35       5.5898    184.41  |         V Q       |         |         |
   0+40       7.0881    217.55  |         | V Q     |         |         |
   0+45       8.8905    261.71  |         |     VQ  |         |         |
   0+50      11.3854    362.26  |         |         V   Q     |         |
   0+55      15.1040    539.93  |         |         |     V   |    Q    |
   1+ 0      18.1067    436.00  |         |         |       Q|  V      |
   1+ 5      19.9462    267.09  |         |      Q  |         |    V    |
   1+10      20.9299    142.84  |        Q|         |         |      V  |
   1+15      21.3956     67.61  |   Q     |         |         |       V|
   1+20      21.6178     32.27  | Q       |         |         |       V|
   1+25      21.7294     16.20  |Q        |         |         |       V|
   1+30      21.7913      8.98  Q         |         |         |       V|
   1+35      21.8265      5.12  Q         |         |         |       V|
   1+40      21.8420      2.26  Q         |         |         |       V|
   1+45      21.8468      0.69  Q         |         |         |       V|
   1+50      21.8477      0.14  Q         |         |         |        V
-------------------------------------------------------------------------
```

Appendix

I

DETENTION AND DEBRIS BASIN DETAILS



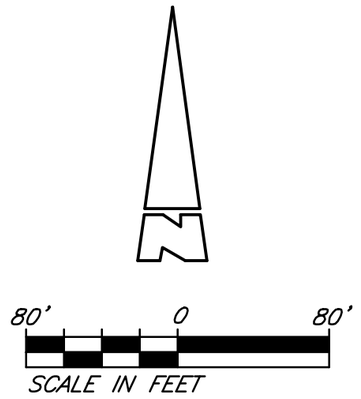


FIGURE 7

GREEN RIVER RANCH
#2 BASIN DETAIL

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

P:\19\1886\PRELIM\REPORTS\HYDRO\1886 BASIN DETAIL.dwg 11/17/2020 15:09
JN 19 1886

GREEN RIVER RANCH #2 DETENTION BASIN STAGE STORAGE TABLE						
ELEV	AREA (SF)	DEPTH (FT)	CONIC INC. VOL. (CF)	CONIC TOTAL VOL. (CF)	CONIC TOTAL VOL. (AC-FT)	
590	18557.38	0.0	0.00	0.00	0.00	
591	20873.70	1.0	19704.19	19704.19	0.45	
592	23037.09	1.0	21946.51	41650.70	0.96	
593	25566.73	1.0	24290.93	65941.63	1.51	
594	28117.36	1.0	26831.94	92773.57	2.13	
595	30527.69	1.0	29314.26	122087.83	2.80	
596	32906.88	1.0	31709.84	153797.67	3.53	
597	35544.92	1.0	34217.42	188015.09	4.32	
598	38118.63	1.0	36824.28	224839.37	5.16	
599	41089.87	1.0	39594.96	264434.33	6.07	
600	44187.34	1.0	42629.23	307063.56	7.05	
601	47307.41	1.0	45738.51	352802.07	8.10	
602	50290.95	1.0	48791.58	401593.65	9.22	
603	53305.36	1.0	51790.84	453384.49	10.41	
604	56318.33	1.0	54804.94	508189.43	11.67	
605	59338.43	1.0	57821.80	566011.23	12.99	
606	62412.41	1.0	60868.95	626880.18	14.39	Spillway elevation
607	65690.63	1.0	64044.53	690924.71	15.86	
608	68991.75	1.0	67334.45	758259.16	17.41	
609	72348.81	1.0	70663.53	828922.69	19.03	
610	75963.21	1.0	75936.35	904859.04	20.77	

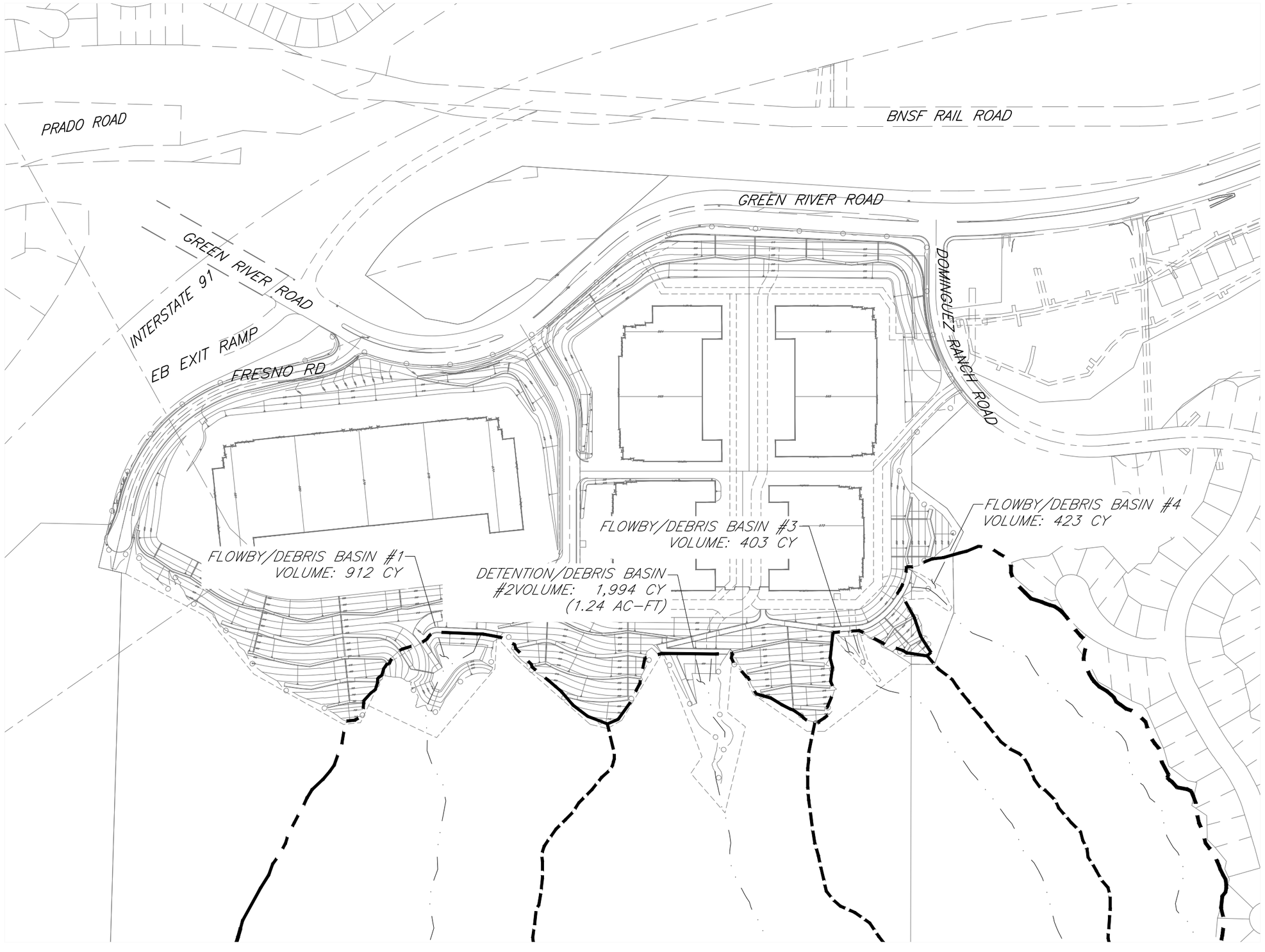


FIGURE 8

GREEN RIVER RANCH
DEBRIS BASIN INDEX MAP

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DEBRIS BASIN VOLUME DETERMINATION WORKSHEET
DEBRIS BASIN 1: 100-YEAR STORM

= User entry required = Computed by worksheet

1) Determine the Debris Yield*

$$LogDY = 0.65(Log(P*100)) + 0.62(LogRR) + 0.18(LogA) + 0.12FF$$

Where:
Dy = Debris Yield given in cubic yards per square mile
P = Maximum one-hour precipitation (Usually 100-year as shown on isohyeatal map), inches
RR = Relief Ratio given in feet-of-drop per mile (ft/mile)
A = Area of the watershed, Acres
FF = Fire Factor (Non-dimensional)

User to Supply:

P =	1.45	Inches/hr
RR =	1391.635	ft/mile
A =	38.61	acres
FF =	4.5	

Work sheet computes:

Dy	15117.53	Yds^3/mi.^2

*

*Based on Tatum method (US Army COE, Los Angeles District)

Debris Volume = 912 cy 0.57 ac-ft

2) Use Dy (above) to determine the Bulking Factor:

$$Fb = 1 + \left[\frac{D}{120{,}000}\right]$$

Where:
Fb = Bulking Factor
D = Debris Yield

Worksheet Computes:

Fb =	1.13

Solution: Use 1.13

DEBRIS BASIN VOLUME DETERMINATION WORKSHEET
DEBRIS BASIN 2: 100-YEAR STORM

= User entry required = Computed by worksheet

1) Determine the Debris Yield*

$$LogDY = 0.65(Log(P*100)) + 0.62(LogRR) + 0.18(LogA) + 0.12FF$$

Where:
Dy = Debris Yield given in cubic yards per square mile
P = Maximum one-hour precipitation (Usually 100-year as shown on isohyeatal map), inches
RR = Relief Ratio given in feet-of-drop per mile (ft/mile)
A = Area of the watershed, Acres
FF = Fire Factor (Non-dimensional)

User to Supply:

P =	1.45	Inches/hr
RR =	1611.227	ft/mile
A =	69.37	acres
FF =	4.5	

Work sheet computes:

Dy	18396.59	Yds^3/mi.^2

*

*Based on Tatum method (US Army COE, Los Angeles District)

Debris Volume = 1,994 cy 1.24 ac-ft

2) Use Dy (above) to determine the Bulking Factor:

$$Fb = 1 + \left[\frac{D}{120{,}000}\right]$$

Where:
Fb = Bulking Factor
D = Debris Yield

Worksheet Computes:

Fb =	1.15

Solution: Use 1.15

DEBRIS BASIN VOLUME DETERMINATION WORKSHEET
DEBRIS BASIN 3: 100-YEAR STORM

= User entry required = Computed by worksheet

1) Determine the Debris Yield*

$$LogDY = 0.65(Log(P*100)) + 0.62(LogRR) + 0.18(LogA) + 0.12FF$$

Where:
Dy = Debris Yield given in cubic yards per square mile
P = Maximum one-hour precipitation (Usually 100-year as shown on isohyeatal map), inches
RR = Relief Ratio given in feet-of-drop per mile (ft/mile)
A = Area of the watershed, Acres
FF = Fire Factor (Non-dimensional)

User to Supply:

P =	1.45	Inches/hr
RR =	1460.749	ft/mile
A =	18.85	acres
FF =	4.5	

Work sheet computes:

Dy	13692.48	Yds^3/mi.^2

*

*Based on Tatum method (US Army COE, Los Angeles District)

Debris Volume = 403 cy 0.25 ac-ft

2) Use Dy (above) to determine the Bulking Factor:

$$Fb = 1 + \left[\frac{D}{120{,}000}\right]$$

Where:
Fb = Bulking Factor
D = Debris Yield

Worksheet Computes:

Fb =	1.11

Solution: Use 1.11

DEBRIS BASIN VOLUME DETERMINATION WORKSHEET
DEBRIS BASIN 4: 100-YEAR STORM

= User entry required = Computed by worksheet

1) Determine the Debris Yield*

$$LogDY = 0.65(Log(P*100)) + 0.62(LogRR) + 0.18(LogA) + 0.12FF$$

Where:
Dy = Debris Yield given in cubic yards per square mile
P = Maximum one-hour precipitation (Usually 100-year as shown on isohyeatal map), inches
RR = Relief Ratio given in feet-of-drop per mile (ft/mile)
A = Area of the watershed, Acres
FF = Fire Factor (Non-dimensional)

User to Supply:

P =	1.45	Inches/hr
RR =	1199.084	ft/mile
A =	21.76	acres
FF =	4.5	

Work sheet computes:

Dy	12432.39	Yds^3/mi.^2

*

*Based on Tatum method (US Army COE, Los Angeles District)

Debris Volume = 423 cy 0.26 ac-ft

2) Use Dy (above) to determine the Bulking Factor:

$$Fb = 1 + \left[\frac{D}{120{,}000}\right]$$

Where:
Fb = Bulking Factor
D = Debris Yield

Worksheet Computes:

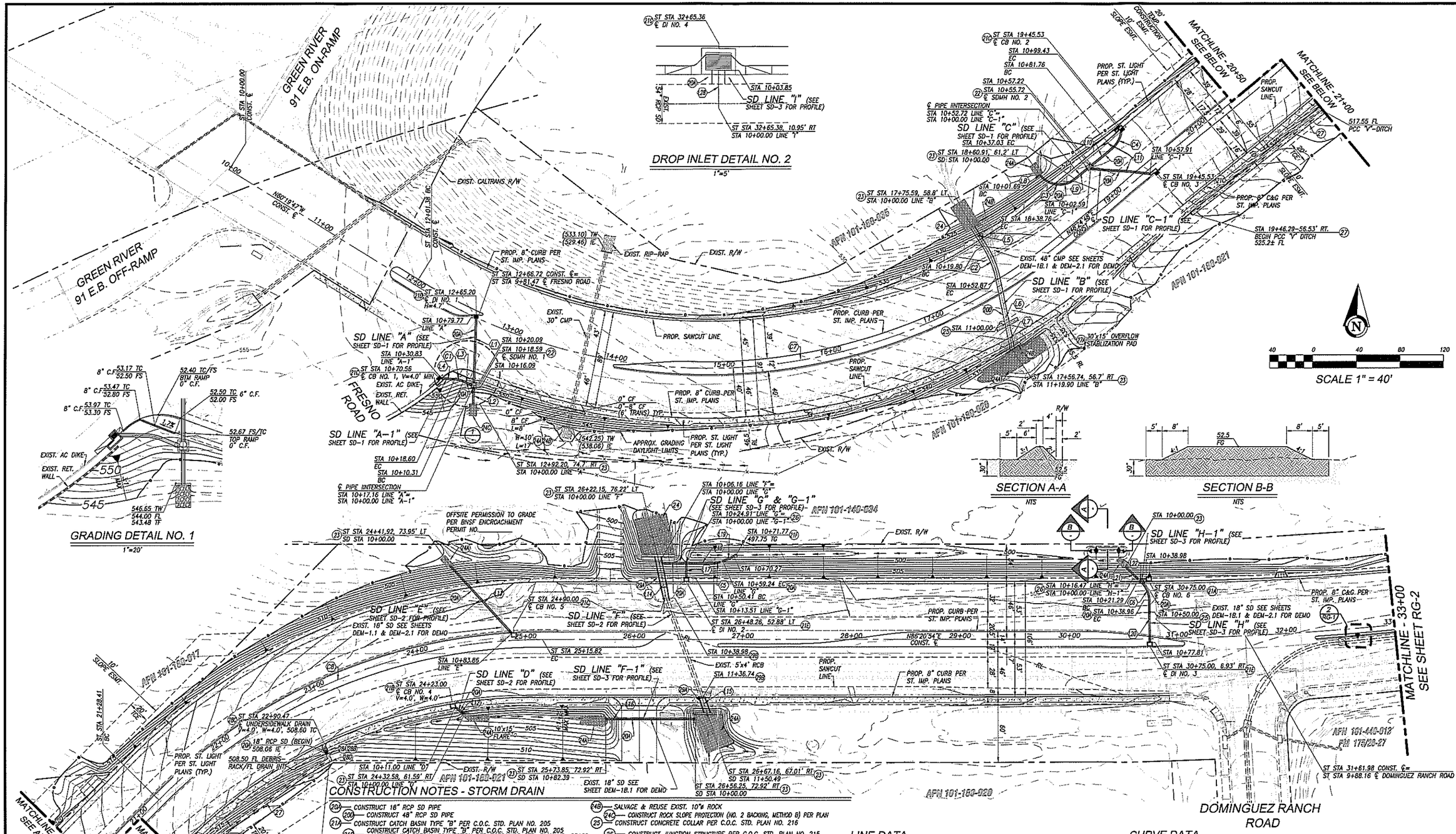
Fb =	1.10

Solution: Use 1.10

Appendix

J

GREEN RIVER ROAD WIDENING ROUGH GRADING & DRAINAGE PLAN



DROP INLET DETAIL NO. 2

1"=5'

GRADING DETAIL NO. 1

1"=20'

SECTION A-A

NTS

SECTION B-B

NTS

CONSTRUCTION NOTES - STORM DRAIN

(204) CONSTRUCT 18" RCP SD PIPE
(205) CONSTRUCT 48" RCP SD PIPE
(216) CONSTRUCT CATCH BASIN TYPE "B" PER C.O.C. STD. PLAN NO. 205
(216) CONSTRUCT CATCH BASIN TYPE "B" PER C.O.C. STD. PLAN NO. 205 MODIFIED W/ SPECIAL CONNECTION PER RCFC&WCD STD. PLAN NO. CB109 & DETAIL "A" ON SHEET RG-3
(216) CONSTRUCT CATCH BASIN TYPE "C" PER C.O.C. STD. PLAN NO. 206
(218) CONSTRUCT DRAINAGE INLET TYPE "G0" PER CALTRANS STD. PLAN NO. D74B & DETAIL "B" ON SHEET RG-3
(212) CONSTRUCT DRAINAGE INLET TYPE "G5" PER CALTRANS STD. PLAN NO. D72 & DETAIL "B" ON SHEET RG-3
(217) CONSTRUCT CMP RISER TYPE "G5" PER C.O.C. STD. PLAN NO. 209
(219) CONSTRUCT DRAINAGE INLET TYPE "G5" PER CALTRANS STD. PLAN NO. D72 & DETAIL "I" ON SHEET RG-5
(22) CONSTRUCT STORM DRAIN MANHOLE PER C.O.C. STD. PLAN NO. 213
(23) CONSTRUCT PIPE CULVERT HEADWALL (STRAIGHT) PER CALTRANS STD. PLAN NO. D89 & DETAIL "D" ON SHEET RG-4
(24) CONSTRUCT ROCK SLOPE PROTECTION (2-TON ROCK, METHOD A) PER PLAN
(244) CONSTRUCT ROCK SLOPE PROTECTION (LIGHT METHOD B) PER PLAN
(248) SALVAGE & REUSE EXIST. 10"ø ROCK
(240) CONSTRUCT ROCK SLOPE PROTECTION (NO. 2 BACKING, METHOD B) PER PLAN
(25) CONSTRUCT CONCRETE COLLAR PER C.O.C. STD. PLAN NO. 216
(26) CONSTRUCT JUNCTION STRUCTURE PER C.O.C. STD. PLAN NO. 215
(27) CONSTRUCT CONCRETE "V"-DITCH PER DETAIL "E" ON SHEET RG-3
(27A) CONSTRUCT 4" PCC GUNITE W/ #10x10"x6"x6" WWM (DIM PER PLAN)
(284) CONSTRUCT DOWN DRAIN PER C.O.C. STD. PLAN NO. 220
(288) CONSTRUCT DOWN DRAIN TO PIPE TRANSITION PER C.O.C. STD. PLAN NO. 222
(28) CONSTRUCT UNDER SIDEWALK DRAIN PER C.O.C. STD. PLAN NO. 203
(280) CONSTRUCT SPLASH WALL PER DETAIL "H" ON SHEET RG-4
(29A) CONSTRUCT 5'x4' RCB W/10' PER CALTRANS STD. PLAN NO. D80 & DETAIL "F" ON SHEET RG-5
(29B) CONSTRUCT CULVERT EXTENSION PER CALTRANS STD. PLAN NO. D82 & DETAIL "G" ON SHEET RG-4

LINE DATA

NUMBER	DIRECTION	DISTANCE	NUMBER	DIRECTION	DISTANCE
L1	N 00°11'11" W	59.68'	L12	N 50°42'37" W	10.46'
L2	N 00°11'11" W	16.09'	L13	N 38°39'07" W	59.68'
L3	N 67°41'11" W	8.33'	L14	N 07°33'21" W	16.09'
L4	N 88°47'21" W	12.23'	L15	N 16°02'19" W	8.33'
L5	N 34°37'19" W	19.80'	L16	N 86°20'54" W	12.23'
L6	N 13°34'18" W	47.13'	L17	N 03°39'06" W	19.80'
L7	N 13°34'18" W	19.90'	L18	N 86°20'54" W	47.86'
L8	N 41°35'12" W	1.69'	L19	N 07°09'06" E	1.69'
L9	N 48°24'48" E	15.46'	L20	N 02°52'56" E	15.46'
L10	N 48°24'48" E	24.54'	L21	N 42°07'04" W	24.54'
L11	N 86°35'12" W	55.32'	L22	N 87°07'04" W	55.32'
L28	N 01°43'47" W	3.85'			

CURVE DATA

NUMBER	DELTA ANGLE	TANGENT	RADIUS	ARC LENGTH
C1	21°06'10"	4.19'	22.50'	8.29'
C2	21°03'11"	16.72'	90.00'	33.07'
C3	90°00'00"	22.50'	22.50'	35.34'
C4	45°00'00"	9.32'	22.50'	17.67'
C5	22°30'00"	4.48'	22.50'	8.84'
C6	45°00'00"	9.32'	22.50'	17.67'
C7	71°15'25"	367.30'	512.50'	637.38'
C8	45°14'18"	207.08'	497.00'	392.41'

Underground Service Alert
811
Know what's below. Call before you dig.

REGISTERED PROFESSIONAL ENGINEER DENNIS G. ARMSTRONG No.C48758 Exp. 9/30/14 CIVIL STATE OF CALIFORNIA

SCALE 1" = 40'

ARMSTRONG & BROOKS CONSULTING ENGINEERS
PLANNING INFRASTRUCTURE SITE DEVELOPMENT WATER RESOURCES
1530 CONSUMER CIRCLE, SUITE B CORONA, CA 92880
P 951-272-8400 F 951-272-8450

Designed by DGA | Drawn by WDJ | Checked by DGA

PLANS PREPARED UNDER SUPERVISION OF

Date _____ DENNIS G. ARMSTRONG R.C.E. No.C48758 Exp. 9/30/14

Reference Plans for these improvements

Date	By	REVISIONS	App'd

BENCH MARK
SEE SHEET T-1 FOR DESCRIPTION

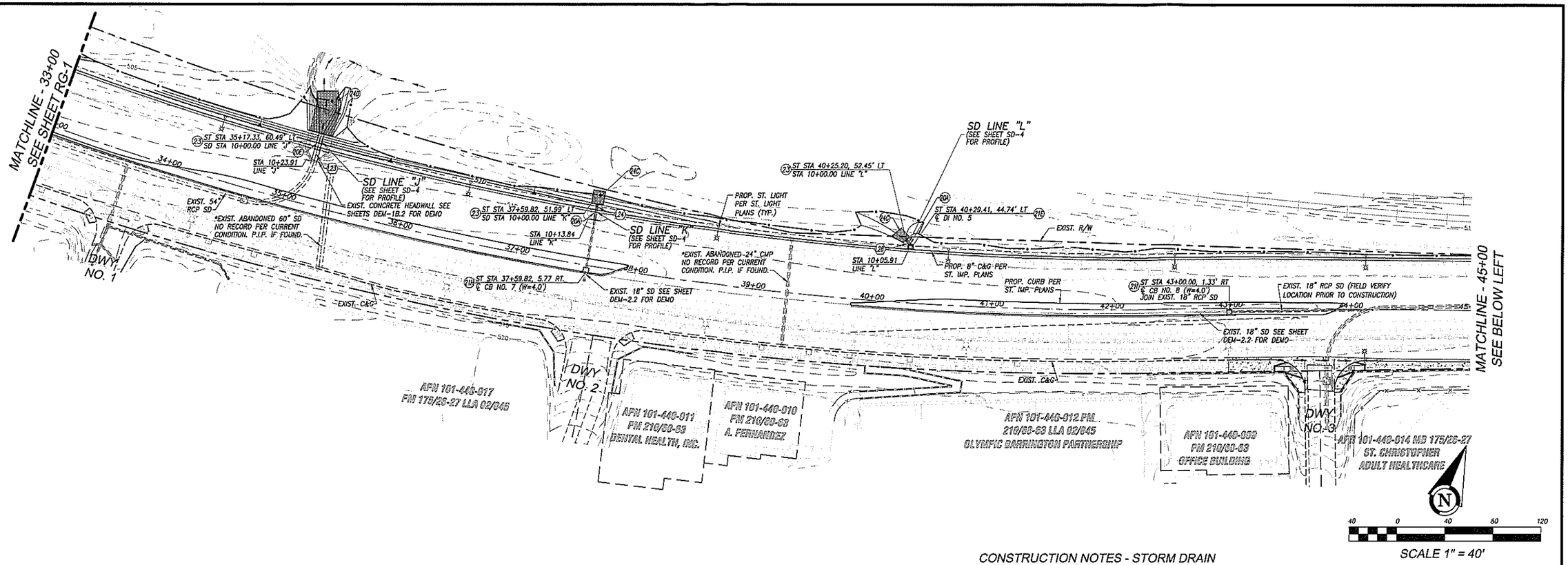
Scale AS SHOWN

Engineering _____
Fire _____

Public Works Department
Nelson D. Nelson, P.E. Date
City Engineer
R.C.E. 54435 Exp. 12-31-13

CITY OF CORONA
GREEN RIVER ROAD WIDENING
ROUGH GRADING & DRAINAGE PLAN

Drawing No. 12-009S
RG-1



CONSTRUCTION NOTES - STORM DRAIN

(20A) CONSTRUCT 18" RCP SD PIPE

(20B) CONSTRUCT 24" RCP SD PIPE

(20C) CONSTRUCT 30" RCP SD PIPE

(20E) CONSTRUCT 54" RCP SD PIPE

(21B) CONSTRUCT CATCH BASIN TYPE "B" PER C.O.C. STD. PLAN NO. 205 MODIFIED W/ SPECIAL CONNECTION PER RCFC&WCD STD. PLAN NO. CB109 & DETAIL "A" ON SHEET RG-3

(21E) CONSTRUCT DRAINAGE INLET TYPE "DS" PER CALTRANS STD. PLAN NO. D72 & DETAIL "B" ON SHEET RG-3

(21H) CONSTRUCT CATCH BASIN TYPE "A" PER C.O.C. STD. PLAN NO. 204

(21I) CONSTRUCT CATCH BASIN TYPE "B" PER C.O.C. STD. PLAN NO. 205. FIELD VERIFY LOCATION OF EXISTING 18" RCP SD PRIOR TO CONSTRUCTION

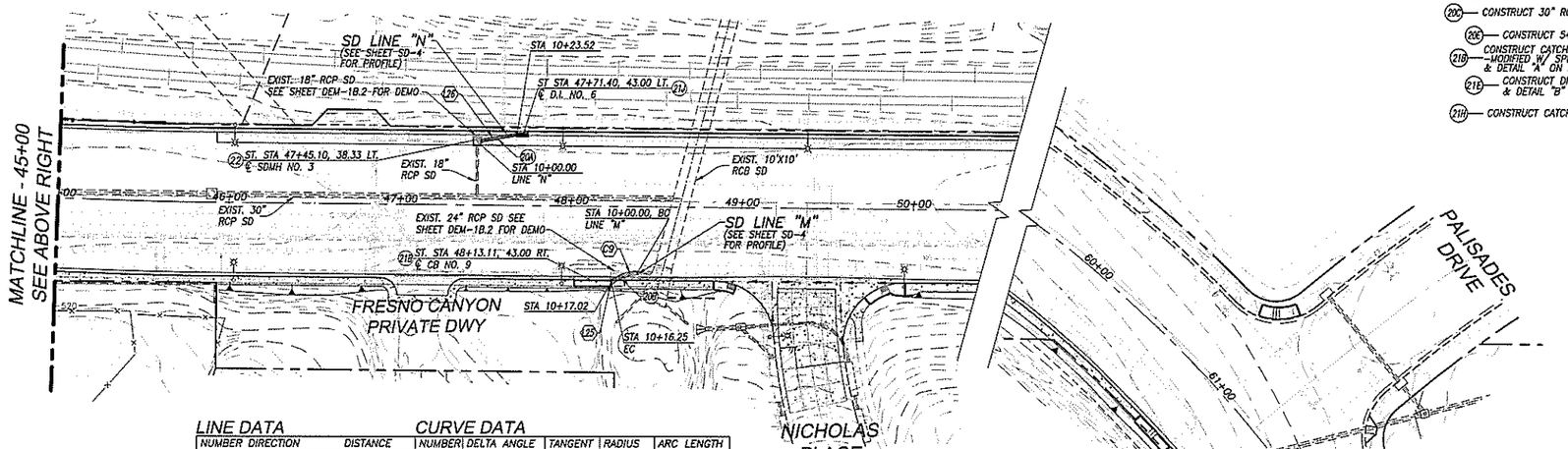
(21J) CONSTRUCT DRAINAGE INLET TYPE "GI-1" PER CALTRANS STD. PLAN D74A MODIFIED WITH BICYCLE PROOF GRATE (TYPE 18-10) PER CALTRANS STD. PLAN D77B & DETAIL "J" ON SHEET RG-5

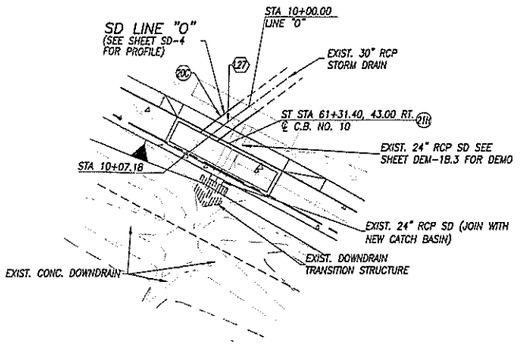
(22) CONSTRUCT STORM DRAIN MANHOLE PER C.O.C. STD. PLAN NO. 213

(23) CONSTRUCT PIPE CULVERT HEADWALL (STRAIGHT) PER CALTRANS STD. PLAN NO. D89 & DETAIL "D" ON SHEET RG-4

(24C) CONSTRUCT ROCK SLOPE PROTECTION (NO. 2 BACKING, METHOD B) PER PLAN

(24B) CONSTRUCT ROCK SLOPE PROTECTION (1-TON, METHOD A) PER PLAN





CATCH BASIN DETAIL NO. 10
1"=10'

LINE DATA			CURVE DATA				
NUMBER	DIRECTION	DISTANCE	NUMBER	DELTA ANGLE	TANGENT	RADIUS	ARC LENGTH
L23	N 06°11'36" W	23.91'	C9	41°22'44"	8.50'	22.50'	16.25'
L24	N 11°36'28" W	13.83'					
L25	N 26°19'58" W	0.77'					
L26	N 56°49'18" E	23.52'					
L27	N 52°43'51" E	7.18'					
L28	N 62°17'36" W	5.91'					

Underground Service Alert
811
Know what's below.
Call before you dig.

REGISTERED PROFESSIONAL ENGINEER DENNIS G. ARMSTRONG No.C48758 Exp. 9/30/14 CIVIL STATE OF CALIFORNIA

ARMSTRONG & BROOKS CONSULTING ENGINEERS
PLANNING INFRASTRUCTURE SITE DEVELOPMENT WATER RESOURCES
1520 CONSUMER CIRCLE, SUITE B CORONA, CA 92880
P:951-372-9400 F:951-372-9450

Designed by DGA | Drawn by WDJ | Checked by DGA

PLANS PREPARED UNDER SUPERVISION OF
Date _____ DENNIS G. ARMSTRONG R.C.E. No.C48758 Exp. 9/30/14

Reference Plans for these Improvements

Date	By	REVISIONS	App'd

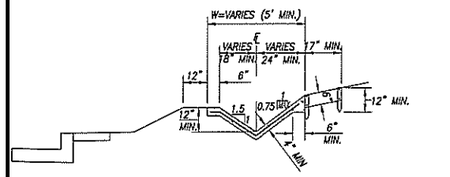
BENCH MARK
SEE SHEET T-1
FOR DESCRIPTION
Scale AS SHOWN

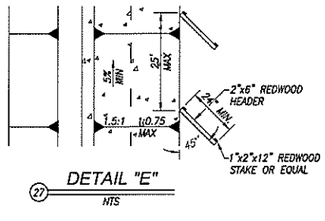
Engineering _____
Fire _____

Public Works Department
Nelson D. Nelson, P.E. Date
City Engineer
R.C.E. 54435 Exp. 12-31-13

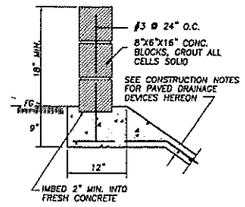
CITY OF CORONA
GREEN RIVER ROAD WIDENING
ROUGH GRADING & DRAINAGE PLAN

Drawing No. 12-009S
RG-2

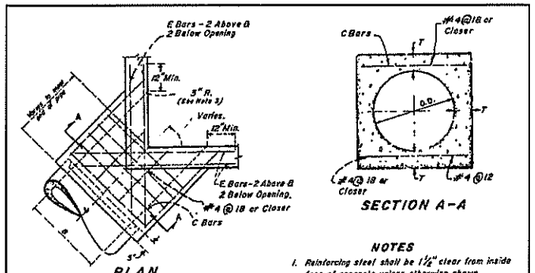




DETAIL "E"
27 NTS



SPLASH WALL DETAIL "H"
90 NTS

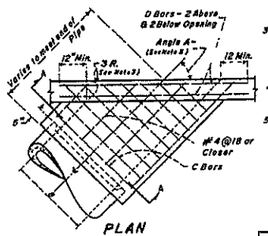


PLAN
CORNER CONNECTION

SECTION A-A

NOTES

1. Reinforcing steel shall be 1½" clear from inside face of concrete unless otherwise shown.
2. Reinforcing steel for inside face of Catch Basin wall shall be cut at center of opening and bent into walls of monolithic connection. Reinforcing steel for outside face of Catch Basin wall shall be cut 2" clear of opening.
3. Connection shall be poured monolithic with Catch Basin. The rounded edge of outlet shall be constructed by pouring concrete against a curved form with a radius of 3."
4. Floor of structure shall be steel-troweled to spring line.
5. Connections shall be constructed where (a). Pipes 12 inches through 72 inches in diameter, inlet or outlet through corner of Catch Basin at an angle less than 40° (b). Angle A, for pipes 24 inches through 30 inches in diameter, is less than 45°.



PLAN
SIDE CONNECTION

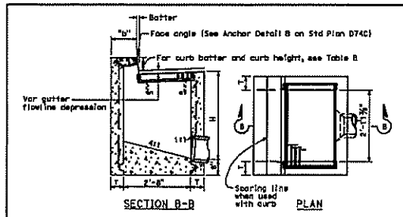
θ	T	C bars	D & E bars	θ	T	C bars	D & E bars
13°	4"			43°	7½"		
14°	4½"			44°	7¾"		
15°	4¾"			45°	8"		
16°	5"			46°	8¼"		
17°	5¼"			47°	8½"		
18°	5½"			48°	8¾"		
19°	5¾"			49°	9"		
20°	6"	#4 @ 6	#5	50°	9¼"	#5 @ 6	#6
21°	6¼"			51°	9½"		
22°	6½"			52°	9¾"		
23°	6¾"			53°	10"		
24°	7"			54°	10¼"		
25°	7¼"			55°	10½"		
26°	7½"			56°	10¾"		
27°	7¾"			57°	11"		
28°	8"			58°	11¼"		

REGISTERED PROFESSIONAL ENGINEER DENNIS G. ARMSTRONG No. C48758 Exp. 9/30/14 CIVIL STATE OF CALIFORNIA

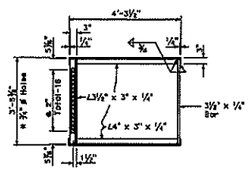
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: GARY THOMAS
DATE: April 5, 2004 R.E.C. NO. 34339

SPECIAL CONNECTIONS TO CATCH BASIN
STANDARD DRAWING NUMBER CB109

DETAIL "A"
218 NTS

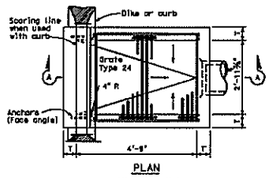


TYPE GO



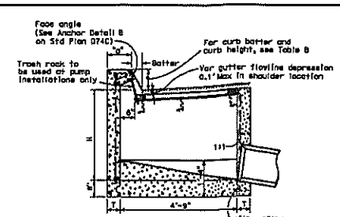
* ¾" ø Holes required only with trash rock

GRATE FRAME FOR TYPE GDO INLET

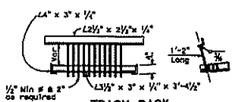


PLAN
TYPE GDO

DETAIL "B"
218 NTS



SECTION A-A



TRASH RACK
(For use with pump installation)

TABLE A
CONCRETE QUANTITIES

TYPE	H=3'-0" TO 8'-0" T=6" H=8'-1" TO 20'-0" T=8"			
	H=3'-0" (CY)	ADDITIONAL PCC PER FOOT (CY)	H=8'-1" (CY)	ADDITIONAL PCC PER FOOT (CY)
GO	1.24	0.245	3.39	0.346
GDO	1.62	0.322	4.36	0.446

Table based on 8" floor slab, no deduction for pipe openings, and curb type giving highest quantity of concrete. No deductions or adjustments are to be made to these quantities because of pipe openings, different floor alternatives or different curb type.

TABLE B

CURB TYPE	NORMAL CURB HEIGHT	CURB BATTER	"a" DIMENSION	"b" DIMENSION
A1-6	6"	1½"	T+7½"	T+6½"
A1-8	8"	2"	T+7"	T+6"
B1-6	6"	4"	T+5"	T+4"
Type A Dike	6"	3"	T+6"	T+5"

NOTES:

1. "H" is the difference in elevation between the outlet pipe flow line and the normal gutter grade line underpassed.
2. For "T" wall thickness, see Table A below.
3. Wall reinforcing not required when "H" is 8'-0" or less and the unsupported width or length is 7'-0" or less. Walls exceeding these limits shall be reinforced with #4 @ 18" centers placed 1½" clear to inside of box unless otherwise shown.
4. Inlet bottom reinforcing not required. See Standard Plan D74C for alternative reinforced bottom.
5. Steps - None required where "H" is less than 2'-6" Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below top of inlet. The distance between steps shall not exceed 1'-0" and shall be uniform throughout the length of the wall. Place steps in the wall without an opening. Step Inserts may be substituted for the bar steps. Step Inserts shall comply with State Industrial Safety requirements. See Standard Plan D74C for step details.
6. When shown on the project plans, place a ¾" plain round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.
7. Pipe(s) can be placed in any wall.
8. Curb section shall match adjacent curb.
9. Basin floors shall have wood trowel finish and shall slope toward the outlet pipe as shown.
10. Galvanizing - See Standard Specifications or Special Provisions.
11. See Standard Plan D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
12. See Standard Plan D78A for gutter depression details.
13. Full penetration butt welds may be substituted for the fillet welds on all anchors.
14. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
15. Cast-in-place or precast alternative is optional with contractor, See Standard Specifications.
16. Cast-in-place inlets to be formed around all pipes/stubs intersecting the inlet and concrete poured in one continuous operation. Precast inlets shall have mortared pipe connections conforming to details for Type GCP inlets on Standard Plan D75B. See Standard Specifications for mortar composition.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLETS

NO SCALE

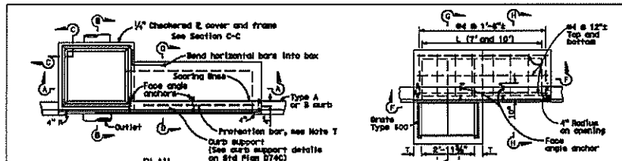
RSP D74B DATED JUNE 18, 2007 SUPERSEDES STANDARD PLAN D74B DATED MAY 1, 2006 - PAGE 190 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP D74B

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO. TOTAL SHEETS

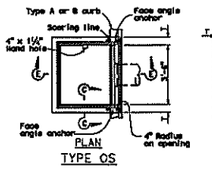
REGISTERED CIVIL ENGINEER
June 15, 2007
PLANS APPROVAL DATE
EXPIRATION DATE: 6-30-07
The State does not assume the liability of the use of the plans or any reliance thereon or any decisions made based on them.

To accompany plans dated _____

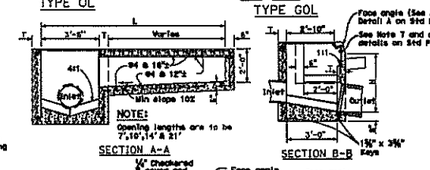


PLAN
TYPE OL

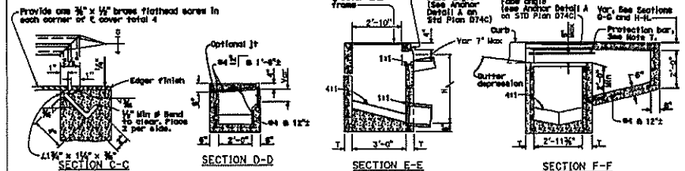
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TYPE GOL



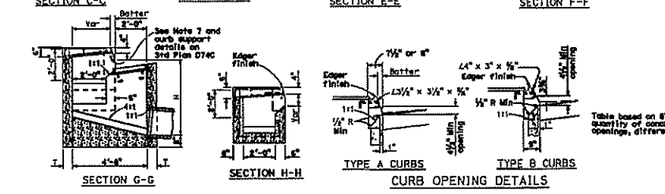
PLAN
TYPE OS



SECTION A-A
SECTION B-B



SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F



SECTION G-G
SECTION H-H
TYPE A CURBS
TYPE B CURBS
CURB OPENING DETAILS

NOTES:

1. "H" is the difference in elevation between the outlet pipe flow line and the normal gutter grade line underpassed at the curb face.
2. For "T" wall thickness, see Table A below.
3. Height of curb opening will vary with the type of curb and the depth of the local depression.
4. Wall reinforcing not required when "H" is 8'-0" or less and the unsupported width or length is 7'-0" or less. Walls exceeding these limits shall be reinforced with #4 bars @ 18" ± centers placed 1½" clear to inside of box unless otherwise shown.
5. Inlet bottom reinforcing not required. See Standard Plan D74C for alternative reinforced bottom.
6. Steps-None required where "H" is less than 30". Where "H" is 30" or more, (petal) steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below top of inlet. The distance between steps shall not exceed 1'-0" and be uniform throughout the length of the wall. Place steps in the wall without an opening. Step Inserts may be substituted for the bar steps. Step Inserts shall comply with State Industrial Safety requirements. See Standard Plan D74C for step details.
7. When shown on the project plans, place a ¾" plain round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.
8. Pipe(s) can be placed in any wall.
9. Curb section shall match adjacent curb.
10. Except for inlets used as junction boxes, basin floor shall have a minimum slope of 4% from all directions toward outlet pipe and shall have a wood trowel finish.
11. Galvanizing-See Standard Specifications or Special Provisions.
12. See Standard Plans D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
13. See Standard Plan D78A for gutter depression details.
14. Full penetration butt welds may be substituted for the fillet welds on all anchors.
15. Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
16. Cast-in-place or precast alternative is optional with contractor. See Standard Specifications.
17. Cast-in-place inlets to be formed around all pipes/stubs intersecting the inlet, and concrete poured in one continuous operation. Precast inlets shall have mortared connections conforming to details for Type GCP inlet shown on Standard Plan D75B. See Standard Specifications for mortar composition.

TABLE A
CONCRETE QUANTITIES

Type	H=3'-0" to 8'-0" T=6"		H=8'-1" to 20'-0" T=8"	
	H=3'-0" (CY)	Additional PCC per foot (CY)	H=8'-1" (CY)	Additional PCC per foot (CY)
GO	1.24	0.245	3.39	0.346
GO-D	1.24	0.245	3.39	0.346
GO-10	1.24	0.245	3.39	0.346
GO-14	1.24	0.245	3.39	0.346
GO-21	1.24 R	0.245	3.39	0.346
GOL	1.24	0.245	3.39	0.346
GOL-D	1.24	0.245	3.39	0.346
GOL-10	1.24	0.245	3.39	0.346

R Based on H=3.1'

Table based on 8" floor slab, no deduction for pipe openings, 7" curb envelope, and curb type giving highest quantity of concrete. No deductions or adjustments are to be made to these quantities because of pipe openings, different floor alternatives, different curb types or different height of curb openings.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLETS

NO SCALE

D72

DETAIL "C"
216 NTS

NTS

Underground Service Alert
811
Know what's below.
Call before you dig.

REGISTERED PROFESSIONAL ENGINEER DENNIS G. ARMSTRONG No. C48758 Exp. 9/30/14 CIVIL STATE OF CALIFORNIA

ARMSTRONG & BROOKS CONSULTING ENGINEERS
PLANNING INFRASTRUCTURE SITE DEVELOPMENT WATER RESOURCES
1550 CONSUMER CIRCLE, SUITE B CORONA, CA 92880
P 951 372 8400 F 951 372 8450

Designed by	Drawn by	Checked by
DGA	WDJ	DGA

PLANS PREPARED UNDER SUPERVISION OF
DENNIS G. ARMSTRONG
Date _____ R.C.E. No.C48758 Exp. 9/30/14

Reference Plans for these Improvements

Date	By	REVISIONS	App'd

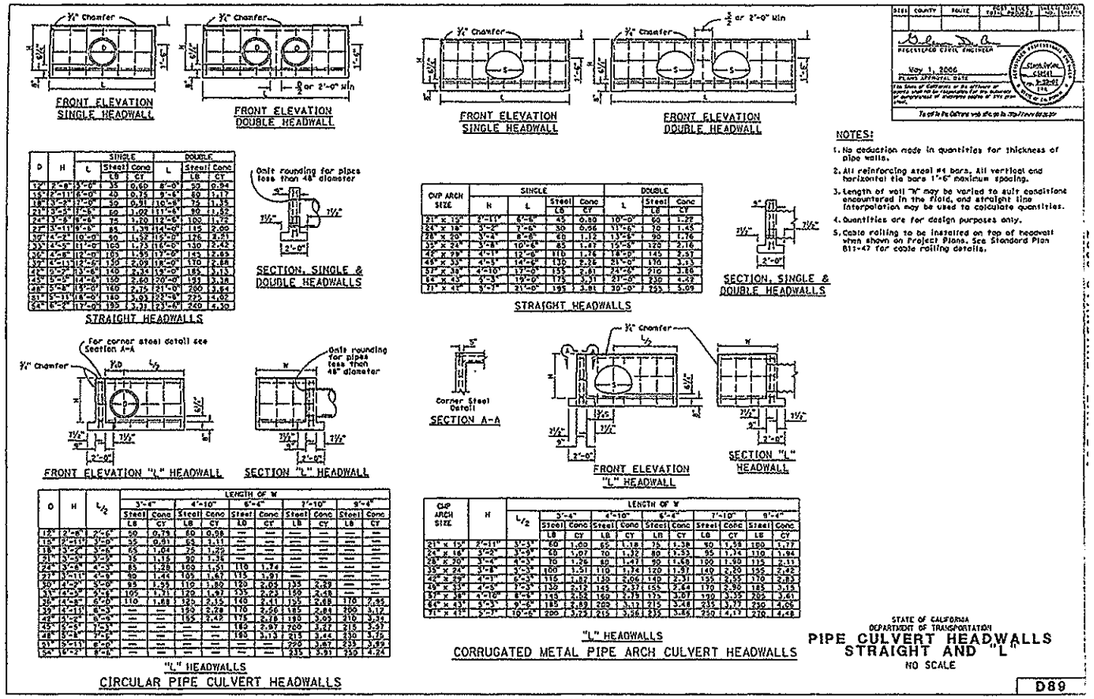
BENCH MARK
SEE SHEET T-1 FOR DESCRIPTION
Scale AS SHOWN

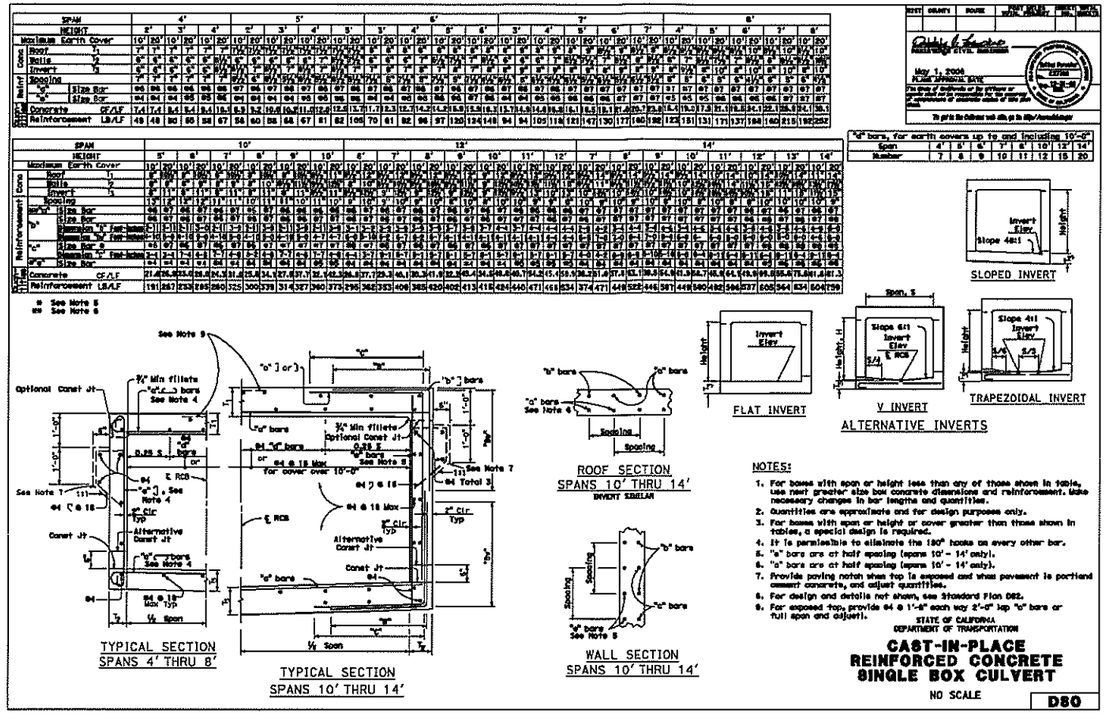
Engineering _____
Fire _____

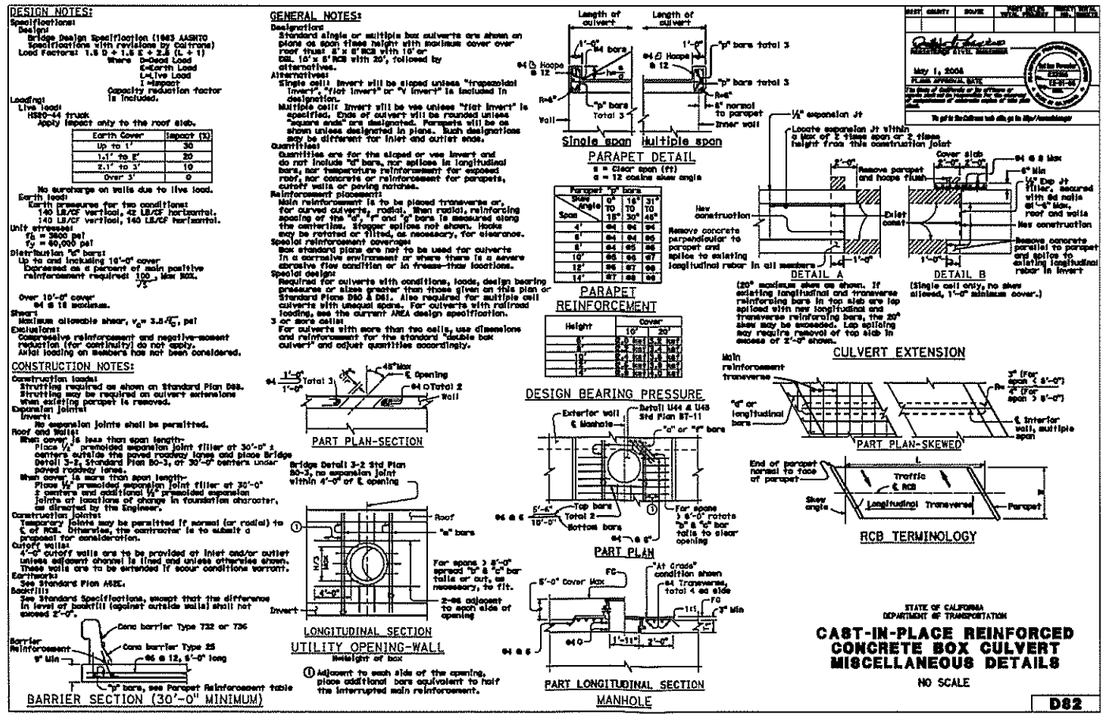
Public Works Department
Nelson D. Nelson, P.E. Date
City Engineer
R.C.E. 54435 Exp. 12-31-13

CITY OF CORONA
GREEN RIVER ROAD WIDENING
ROUGH GRADING & DRAINAGE PLAN

Drawing No.
12-009S
RG-3







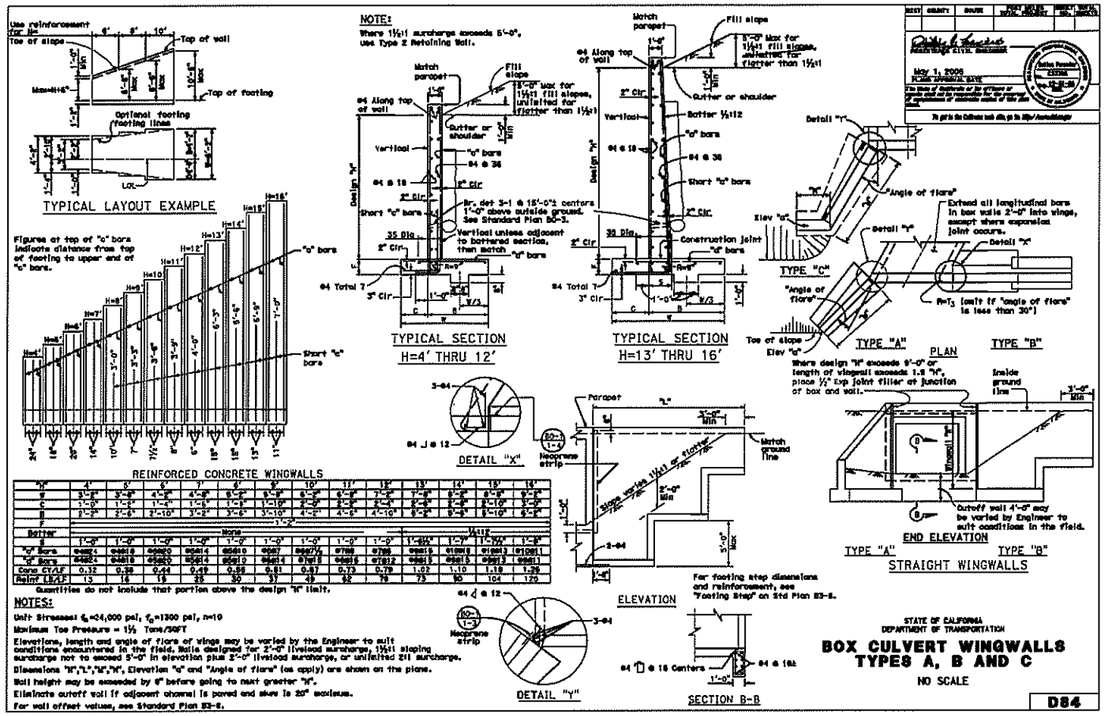
DETAIL "D" (23) NTS

DETAIL "F" (29A) NTS

DETAIL "G" (29B) NTS

Underground Service Alert
811 Know what's below. Call before you dig.

ARMSTRONG & BROOKS CONSULTING ENGINEERS PLANNING INFRASTRUCTURE SITE DEVELOPMENT WATER RESOURCES 1220 COMMERCE CIRCLE, SUITE D CORONA, CA 92880 P 951 279 8400 F 951 272 8430	Designed by DGA	Drawn by WDJ	Checked by DGA				BENCH MARK SEE SHEET T-1 FOR DESCRIPTION	Engineering	Public Works Department Nelson D. Nelson, P.E. Date City Engineer R.C.E. 54435 Exp. 12-31-13	CITY OF CORONA GREEN RIVER ROAD WIDENING ROUGH GRADING & DRAINAGE PLAN	Drawing No. 12-009S RG-4
	PLANS PREPARED UNDER SUPERVISION OF Date _____ DENNIS C. ARMSTRONG R.C.E. No.C48758 Exp. 9/30/14			Reference Plans for these Improvements	Date	By	REVISIONS	App'd	Scale AS SHOWN Fire _____			



"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
"W"	3'-0"	3'-0"	4'-0"	4'-0"	5'-0"	5'-0"	6'-0"	7'-0"	7'-0"	8'-0"	8'-0"	9'-0"	9'-0"
"C"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"
"D"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
"E"	2'-6"	2'-6"	3'-0"	3'-0"	3'-6"	3'-6"	4'-0"	4'-0"	4'-6"	4'-6"	5'-0"	5'-0"	5'-6"
"F"	1'-2"												

Batter	None									1½:1			
"B"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
"A" Bars	#4@12	#4@10	#5@10	#5@8	#6@8	#6@7	#7@7	#7@6	#8@6	#8@5	#9@5	#9@4	#10@4
"B" Bars	#4@24	#4@18	#5@20	#5@14	#6@16	#6@12	#7@14	#7@10	#8@12	#8@9	#9@10	#9@7	#10@8
Conc CY/LF	0.32	0.38	0.44	0.50	0.56	0.61	0.83	0.73	0.79	1.02	1.10	1.19	1.28
Reinf LB/LF	13	16	19	23	30	37	49	62	79	75	90	104	120

Quantities do not include that portion above the design "H" limit.



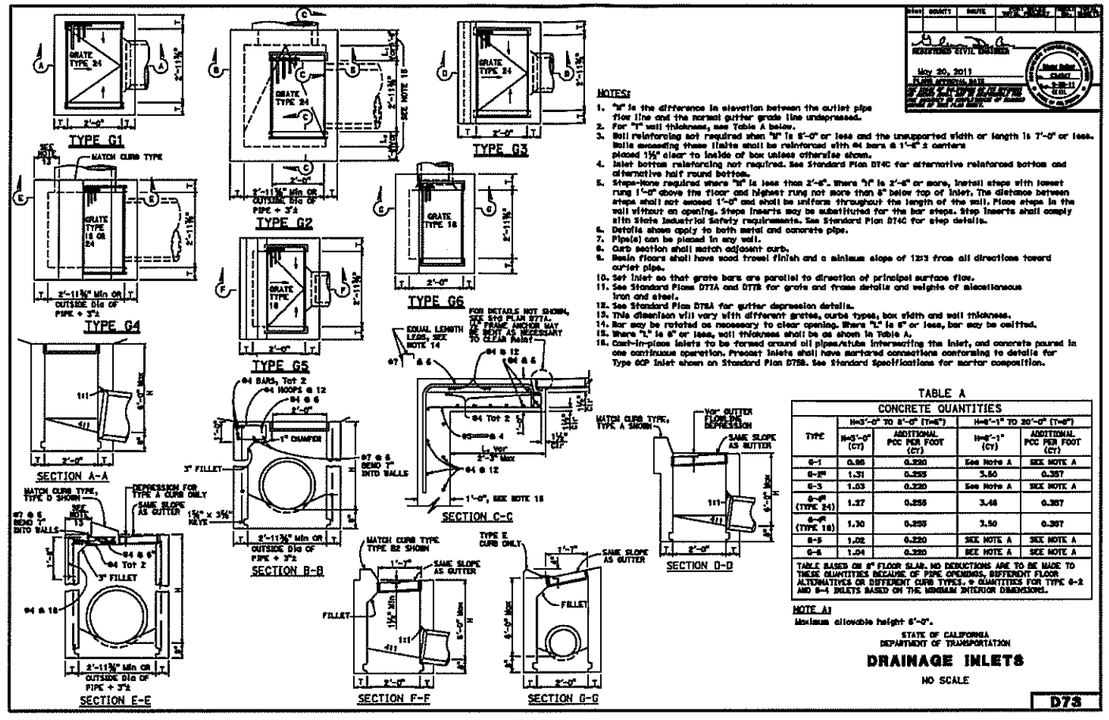

TYPE G1
TYPE G2
TYPE G3
TYPE G4
TYPE G5
TYPE G6
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
NOTES:
1. "H" is the difference in elevation between the outlet pipe flow line and the normal gutter grade line undepressed.
2. For "T" wall thickness, see Table A below.
3. Wall reinforcing not required when "H" is 5'-0" or less and the unsupported width or length is 7'-0" or less. Walls exceeding these limits shall be reinforced with #4 bars @ 1'-0" ± centers placed 1½" clear to inside of box unless otherwise shown.
4. Inlet bottom reinforcing not required. See Standard Plan D74C for alternative reinforced bottom and alternative half round bottom.
5. Steps - None required where "H" is less than 2'-6". Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 8" below top of inlet. The distance between steps shall not exceed 1'-0" and shall be uniform throughout the length of the wall. Place steps in the wall without an opening. Step inserts may be substituted for the bar steps. Step inserts shall comply with State Industrial Safety requirement. See Standard Plan D74C for step details.
6. Details shown apply to both metal and concrete pipe.
7. Pipe(s) can be placed in any wall.
8. Curb section shall match adjacent curb.
9. Basin floors shall have wood trowel finish and a minimum slope of 1213 from all directions toward outlet pipe.
10. Set inlet so that grate bars are parallel to direction of principal surface flow.
11. See Standard Plans D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
12. See Standard Plan D78A for gutter depression details.
13. This dimension will vary with different grates, curbs types, box width and wall thickness.
14. Bar may be rotated as necessary to clear opening. Where "L" is 6" or less, bar may be omitted.
15. Where "L" is 8" or less, wall thickness shall be as shown in Table A.
16. Cast-in-place inlets to be formed around all pipes/tubes intersecting the inlet, and concrete poured in one continuous operation. Precast inlets shall have mortared connections conforming to details for Type GCP inlet shown on Standard Plan D75B. See Standard Specifications for mortar composition.

TABLE A

TYPE	CONCRETE QUANTITIES H=3'-0" TO 8'-0" (T=6") H=3'-0" (CY)	H=3'-0" TO 8'-0" (T=6") ADDITIONAL PCC PER FOOT (CY)	H=8'-1" TO 20'-0" (T=8") H=8'-1" (CY)	H=8'-1" TO 20'-0" (T=8") ADDITIONAL PCC PER FOOT (CY)
G-1	0.98	0.298	See Note A	SEE NOTE A
G-2[a]	1.31	0.255	3.50	0.357
G-3	1.03	0.220	See Note A	SEE NOTE A
G-4 (TYPE 24)	1.27	0.255	3.48	0.357
G-4 (TYPE 18)	1.30	0.255	3.50	0.357
G-5	1.02	0.220	SEE NOTE A	SEE NOTE A
G-6	1.04	0.220	SEE NOTE A	SEE NOTE A

TABLE BASED ON 8" FLOOR SLAB. NO DEDUCTIONS ARE TO BE MADE TO THESE QUANTITIES BECAUSE OF PIPE OPENINGS, DIFFERENT FLOOR ALTERNATIVES OR DIFFERENT CURB TYPES. a QUANTITIES FOR TYPE G-2 AND G-4 INLETS BASED ON THE MINIMUM INTERIOR DIMENSIONS.

NOTE A: Maximum allowable height 6'-0".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DRAINAGE INLETS
NO SCALE
D73



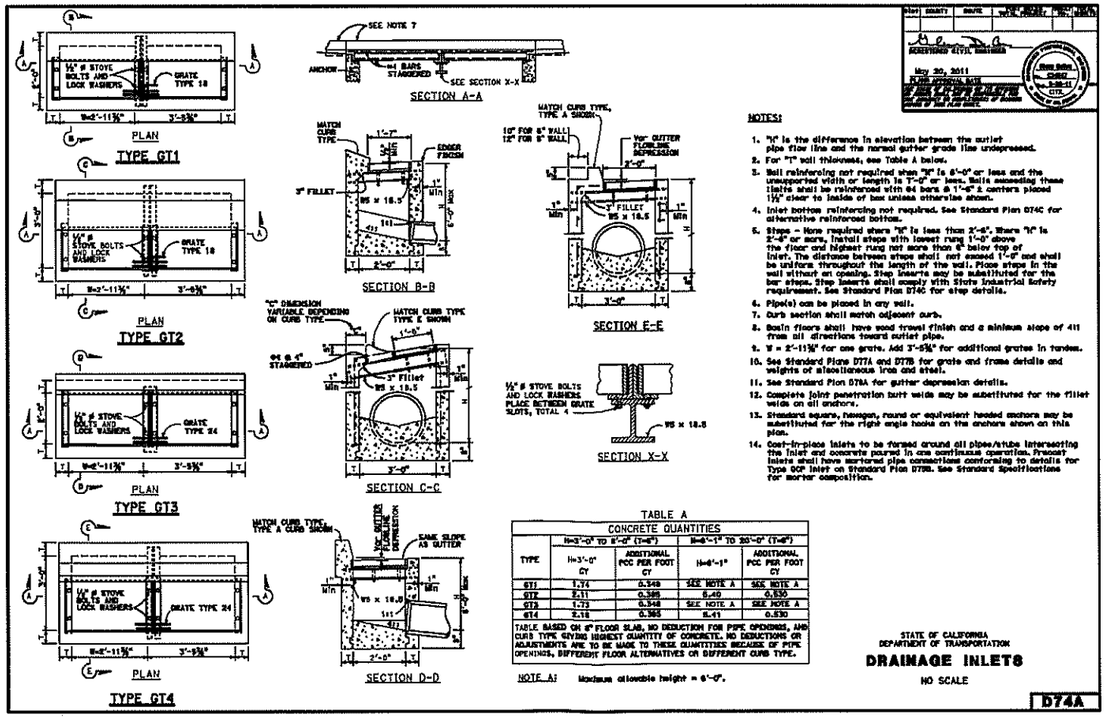


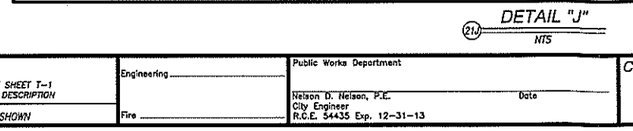
TABLE A

TYPE	CONCRETE QUANTITIES H=3'-0" TO 8'-0" (T=6") H=3'-0" CY	H=3'-0" TO 8'-0" (T=6") ADDITIONAL PCC PER FOOT CY	H=8'-1" TO 20'-0" (T=8") H=8'-1"	H=8'-1" TO 20'-0" (T=8") ADDITIONAL PCC PER FOOT CY
GT1	1.74	0.348	SEE NOTE A	SEE NOTE A
GT2	2.11	0.385	5.40	0.535
GT3	1.73	0.348	SEE NOTE A	SEE NOTE A
GT4	2.18	0.385	5.41	0.535

TABLE BASED ON 8" FLOOR SLAB. NO DEDUCTION FOR PIPE OPENINGS, AND CURB TYPE GIVING HIGHEST QUANTITY OF CONCRETE. NO DEDUCTIONS OR ADJUSTMENTS ARE TO BE MADE TO THESE QUANTITIES BECAUSE OF PIPE OPENINGS, DIFFERENT FLOOR ALTERNATIVES OR DIFFERENT CURB TYPES.

NOTE A: Maximum allowable height = 6'-0".

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DRAINAGE INLETS
NO SCALE
D74A



Underground Service Alert
811
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REGISTERED PROFESSIONAL ENGINEER DENNIS C. ARMSTRONG No.C48758 Exp. 9/30/14 CIVIL STATE OF CALIFORNIA

ARMSTRONG & BROOKS CONSULTING ENGINEERS	Designed by DGA	Drawn by WDJ	Checked by DGA
PLANNING INFRASTRUCTURE SITE DEVELOPMENT WATER RESOURCES 1551 CONSUMER CIRCLE, SUITE B CORONA, CA 92880 P 951 272-8400 F 951 272 8410	PLANS PREPARED UNDER SUPERVISION OF		
	Date _____	DENNIS C. ARMSTRONG R.C.E. No.C48758 Exp. 9/30/14	

Reference Plans for these Improvements

Date	By	REVISIONS	App'd

BENCH MARK: SEE SHEET T-1 FOR DESCRIPTION
Scale: AS SHOWN
Engineering _____
Fire _____
Public Works Department
Nelson D. Nelson, P.E. Date
City Engineer
R.C.E. 54435 Exp. 12-31-13

CITY OF CORONA
GREEN RIVER ROAD WIDENING
ROUGH GRADING & DRAINAGE PLAN

Drawing No. 12-009S
RG-5

Appendix

K

INTERSTATE 91 DRAINAGE PLANS

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	Riv	71, 91	1.9/R2.3; R0.9/R2.6	110	

95%-2 PS&E

SR71-91 INTERCHANGE

NOT FOR CONSTRUCTION
MAY 2020

PARSONS
525 B ST, SUITE 1600
SAN DIEGO, CA 92101

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

NOTE:

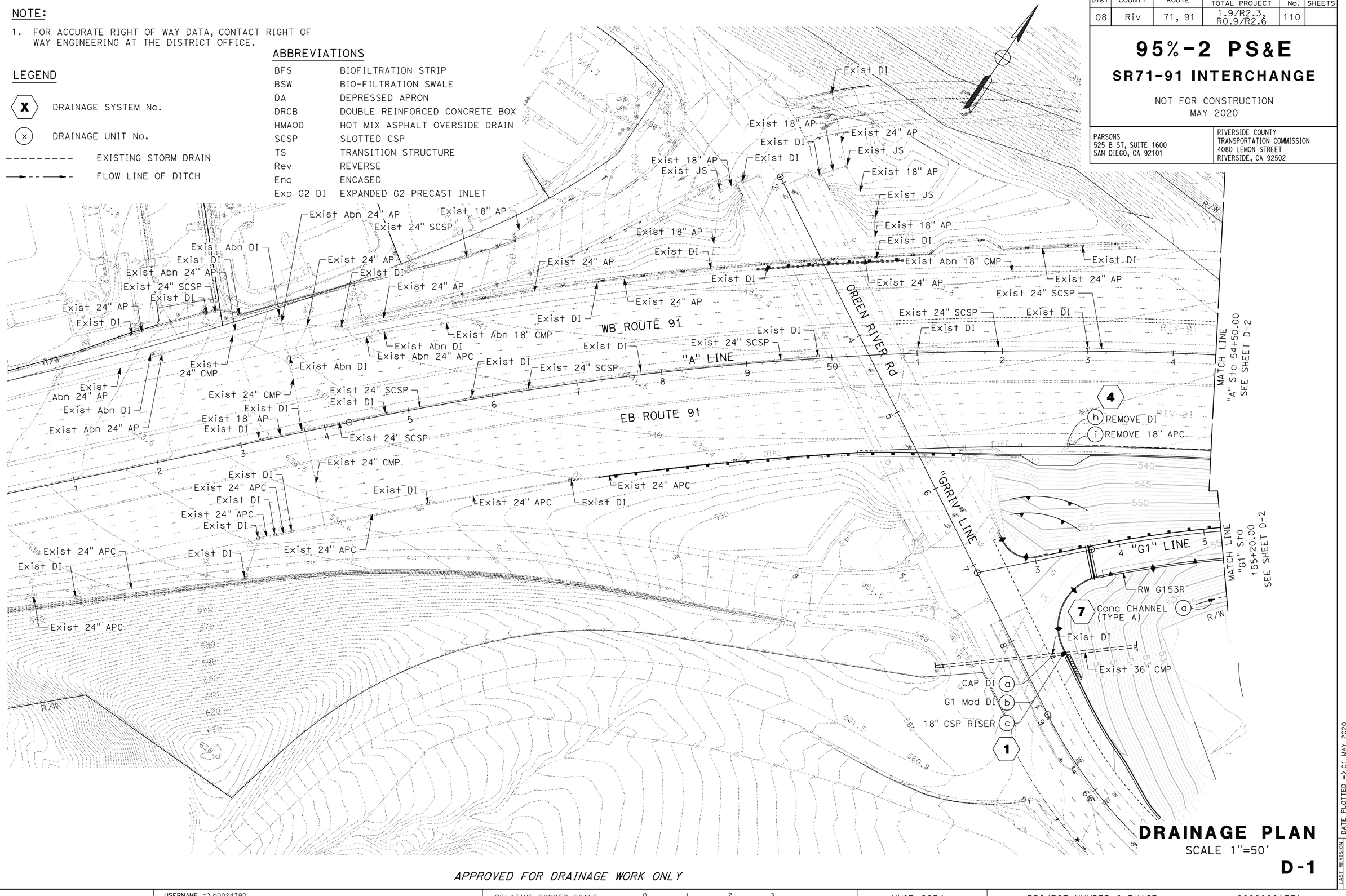
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

LEGEND

- (X) DRAINAGE SYSTEM No.
- (x) DRAINAGE UNIT No.
- ---------- EXISTING STORM DRAIN
- —→- - -→— FLOW LINE OF DITCH

ABBREVIATIONS

BFS	BIOFILTRATION STRIP
BSW	BIO-FILTRATION SWALE
DA	DEPRESSED APRON
DRCB	DOUBLE REINFORCED CONCRETE BOX
HMAOD	HOT MIX ASPHALT OVERSIDE DRAIN
SCSP	SLOTTED CSP
TS	TRANSITION STRUCTURE
Rev	REVERSE
Enc	ENCASED
Exp G2 DI	EXPANDED G2 PRECAST INLET



DRAINAGE PLAN

SCALE 1"=50'

D-1

APPROVED FOR DRAINAGE WORK ONLY

REVISED BY	DATE REVISED
CLAIRE YAVARASKI	
PAUL KOSINSKI	
CALCULATED-DESIGNED BY	
CHECKED BY	
CONSULTANT FUNCTIONAL SUPERVISOR	
NICOLE DEPUY	

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION 04-26-18
DATE PLOTTED => 01-MAY-2020
TIME PLOTTED => 20:09

BORDER LAST REVISED 7/2/2010

USERNAME => p002479D
DGN FILE => 08000001371a001.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 2234

PROJECT NUMBER & PHASE 08000001371

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	Riv	71, 91	1.9/R2.3; R0.9/R2.6	111	

95%-2 PS&E

SR71-91 INTERCHANGE

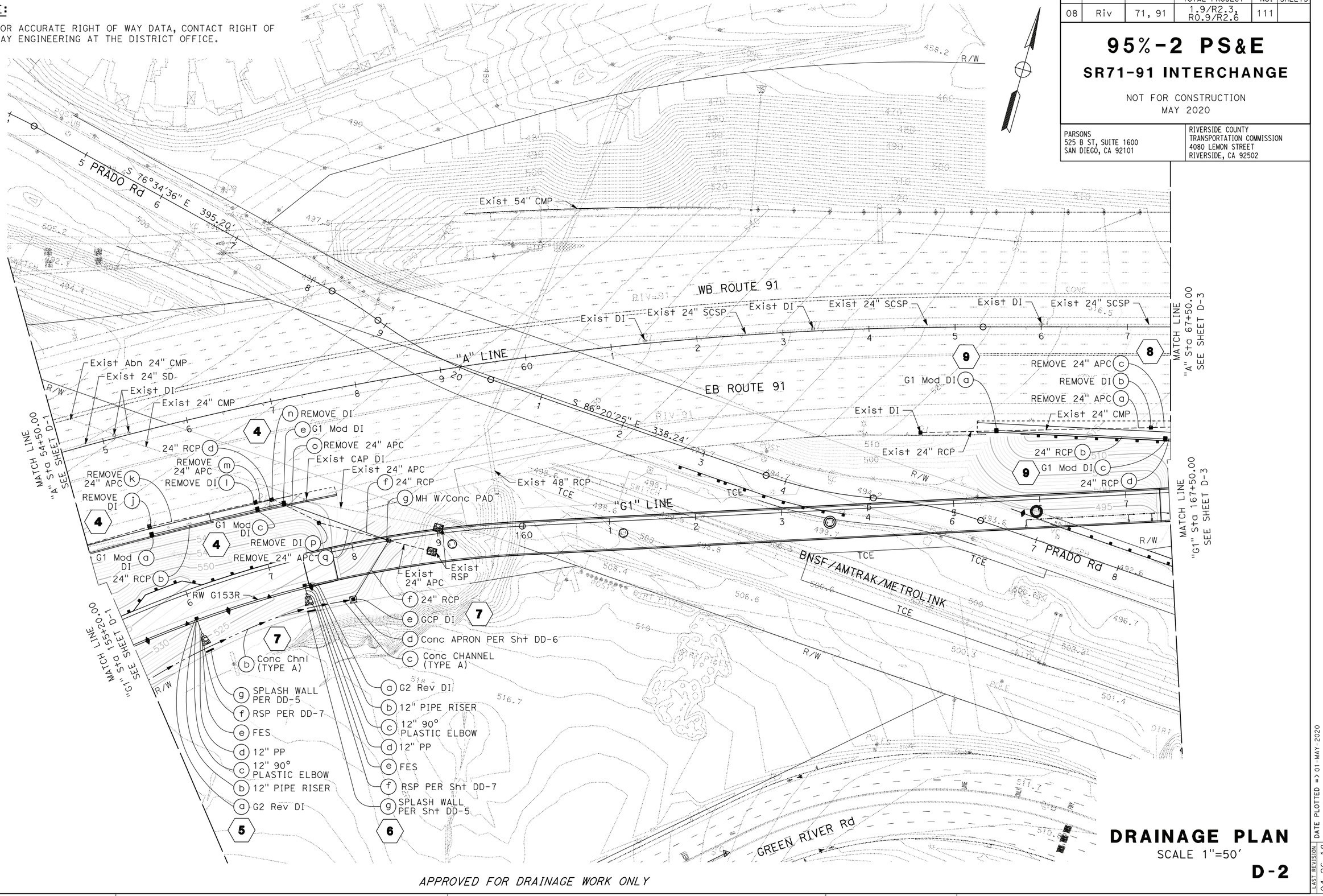
NOT FOR CONSTRUCTION
MAY 2020

PARSONS
525 B ST, SUITE 1600
SAN DIEGO, CA 92101

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

NOTE:

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



DRAINAGE PLAN

SCALE 1"=50'

D-2

APPROVED FOR DRAINAGE WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: NICOLE DEPUY

CALCULATED-DESIGNED BY	CHECKED BY	REVISED BY	DATE REVISED
CLAIRE YAVARASKI	PAUL KOSINSKI		

LAST REVISION | DATE PLOTTED => 01-MAY-2020
04-26-18 | TIME PLOTTED => 20:09

BORDER LAST REVISED 7/2/2010 | USERNAME => p002479D | DGN FILE => 08000001371ia002.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2234 | PROJECT NUMBER & PHASE 08000001371

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	Riv	71, 91	1.9/R2.3; R0.9/R2.6	112	

95%-2 PS&E

SR71-91 INTERCHANGE

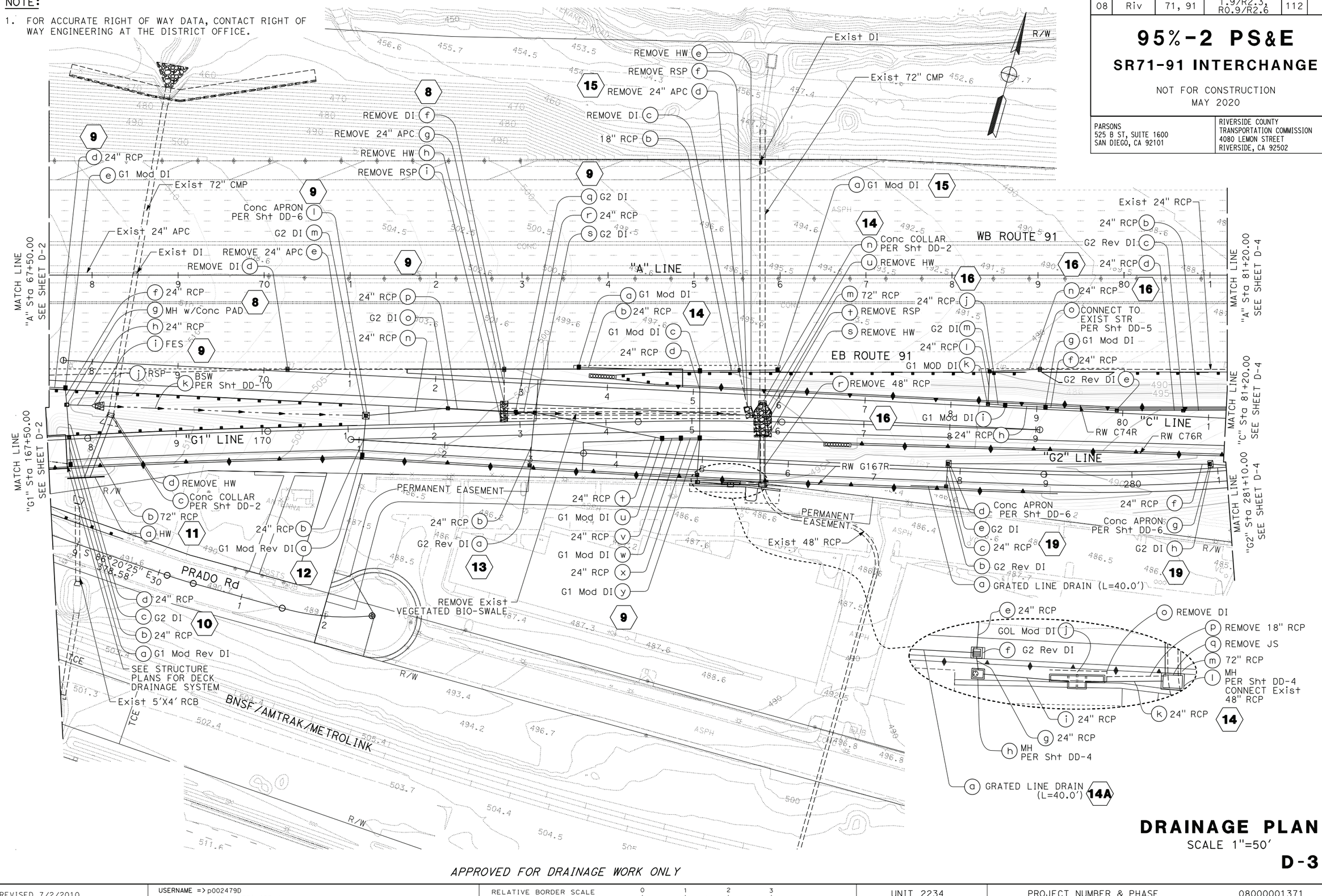
NOT FOR CONSTRUCTION
MAY 2020

PARSONS
525 B ST, SUITE 1600
SAN DIEGO, CA 92101

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502

NOTE:

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



DRAINAGE PLAN

SCALE 1"=50'

D-3

APPROVED FOR DRAINAGE WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: NICOLE DEPUY
CALCULATED-DESIGNED BY: PAUL KOSINSKI
CHECKED BY: CLAIRE YAVARASKI
REVISED BY
DATE REVISED

LAST REVISION: 04-26-18
DATE PLOTTED => 01-MAY-2020
TIME PLOTTED => 20:10

BORDER LAST REVISED 7/2/2010
USERNAME => p002479D
DGN FILE => 08000001371ia003.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2234
PROJECT NUMBER & PHASE 08000001371

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	Riv	71, 91	1.9/R2.3; R0.9/R2.6	124	

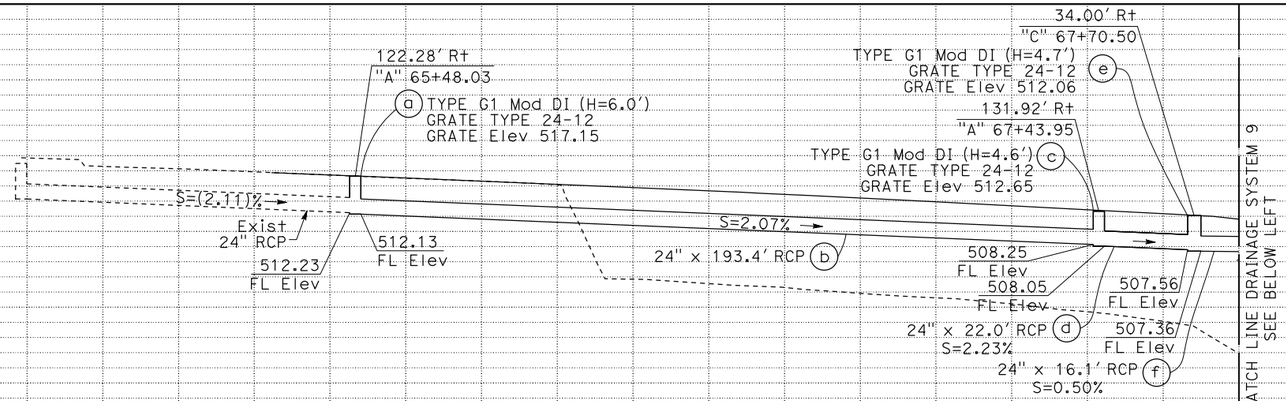
95%-2 PS&E

SR71-91 INTERCHANGE

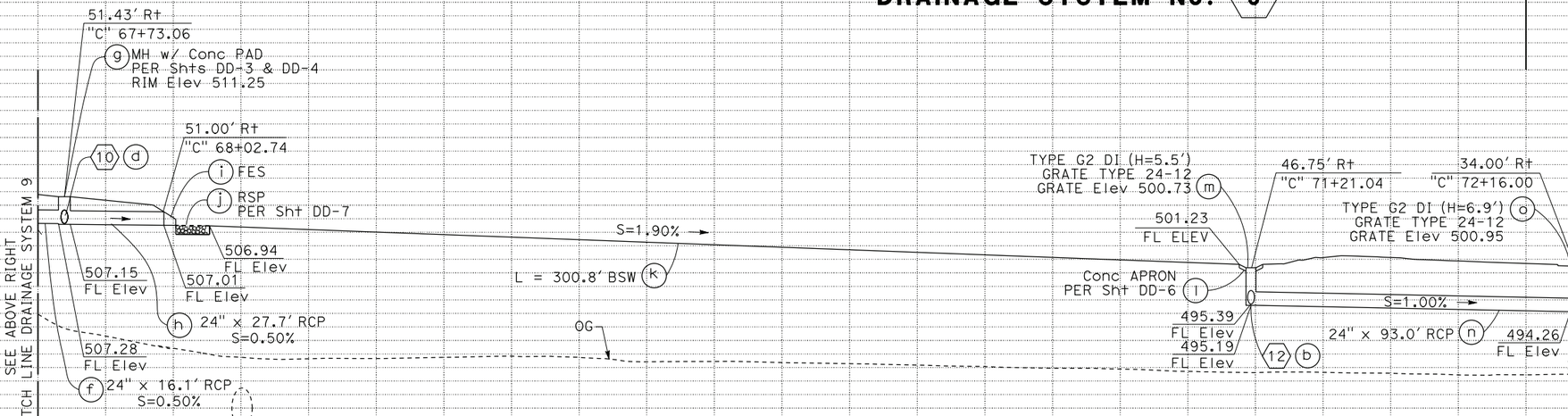
NOT FOR CONSTRUCTION
MAY 2020

PARSONS
525 B ST, SUITE 1600
SAN DIEGO, CA 92101

RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502



DRAINAGE SYSTEM No. 9



DRAINAGE SYSTEM No. 9

DRAINAGE SYSTEM No. 9

DRAINAGE PROFILES

SCALE: Horiz 1" = 20'
Vert 1" = 10'

DP-2

STATION		TOTAL
CY	Exc	
	Emb	

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR: NICOLE DEPUY
CALCULATED-DESIGNED BY
CHECKED BY
REVISED BY
DATE REVISED
CLAIRE YAVARASKI
PAUL KOSINSKI

LAST REVISION 06-30-18
DATE PLOTTED => 01-MAY-2020
TIME PLOTTED => 20:15

BORDER LAST REVISED 7/2/2010
USERNAME => p002479D
DGN FILE => 08000001371ib002.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 2234
PROJECT NUMBER & PHASE 08000001371

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	Riv	71, 91	1.9/R2.3; R0.9/R2.6	125	

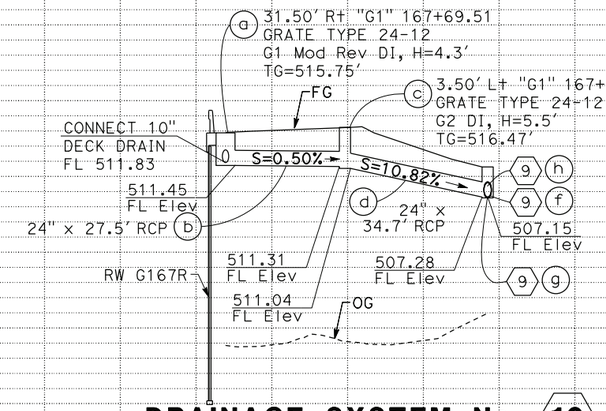
95%-2 PS&E

SR71-91 INTERCHANGE

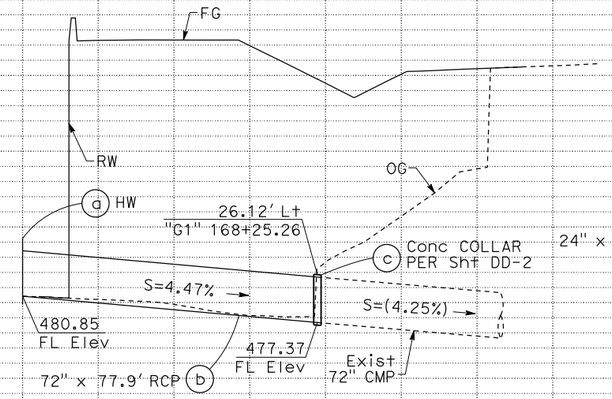
NOT FOR CONSTRUCTION
MAY 2020

PARSONS
525 B ST, SUITE 1600
SAN DIEGO, CA 92101

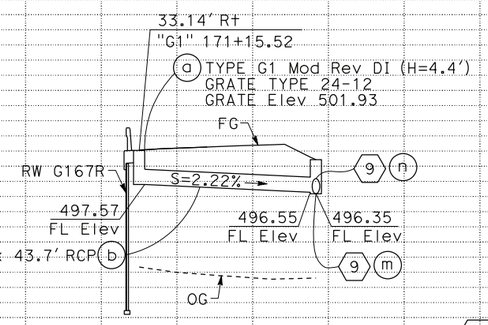
RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502



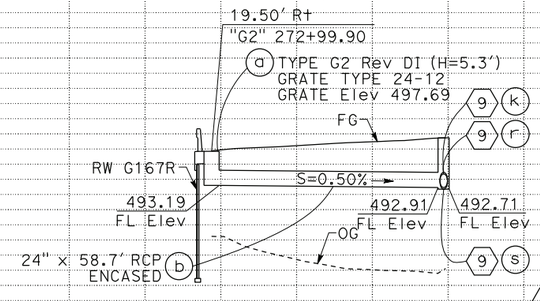
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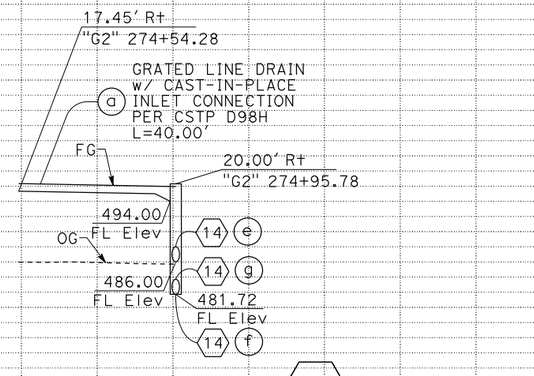
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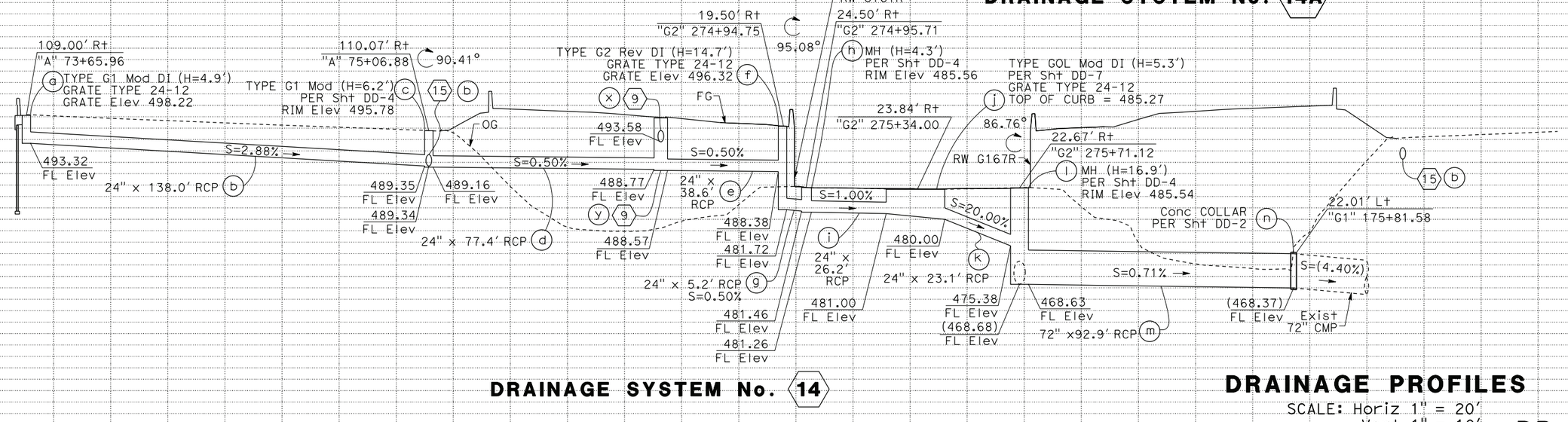
DRAINAGE SYSTEM No. 12



DRAINAGE SYSTEM No. 13



DRAINAGE SYSTEM No. 14A



DRAINAGE SYSTEM No. 14

DRAINAGE PROFILES

SCALE: Horiz 1" = 20'
Vert 1" = 10'

DP-3

STATION		TOTAL
CY	Exc	
	Emb	

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR: NICOLE DEPUY
CALCULATED-DESIGNED BY: PAUL KOSINSKI
CHECKED BY: CLAIRE YAVARASKI
REVISED BY / DATE REVISED

LAST REVISION DATE PLOTTED => 01-MAY-2020
06-30-18 TIME PLOTTED => 20:16

BORDER LAST REVISED 7/2/2010 | USERNAME => p002479D | DGN FILE => 08000001371ib003.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2234 | PROJECT NUMBER & PHASE 08000001371

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
08	Riv	71, 91	1.9/R2.3; R0.9/R2.6	126	

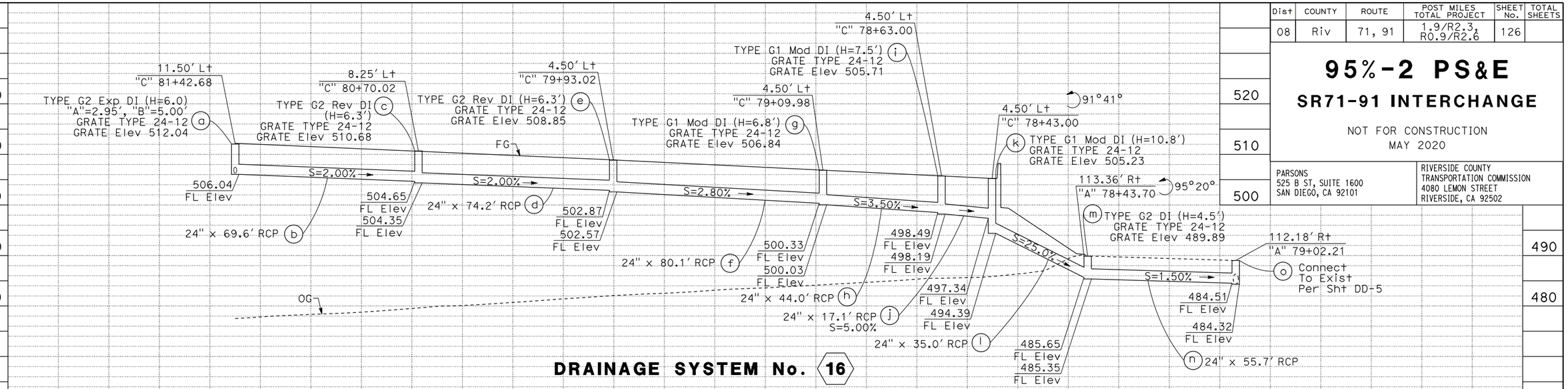
95%-2 PS&E

SR71-91 INTERCHANGE

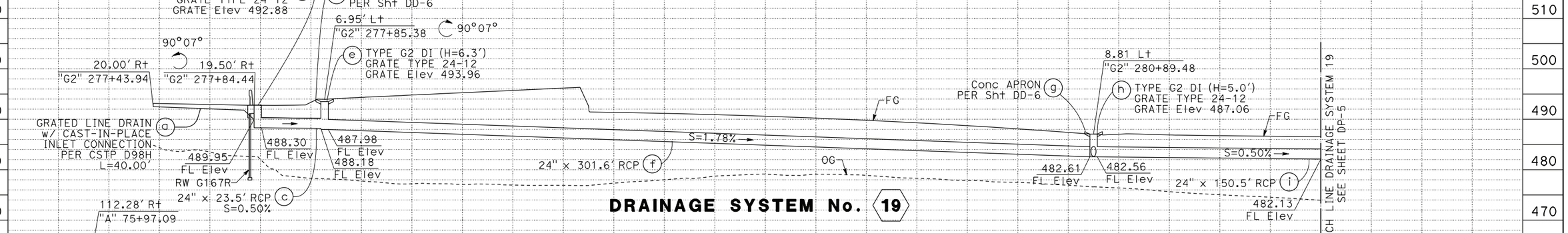
NOT FOR CONSTRUCTION
MAY 2020

PARSONS
525 B ST, SUITE 1600
SAN DIEGO, CA 92101

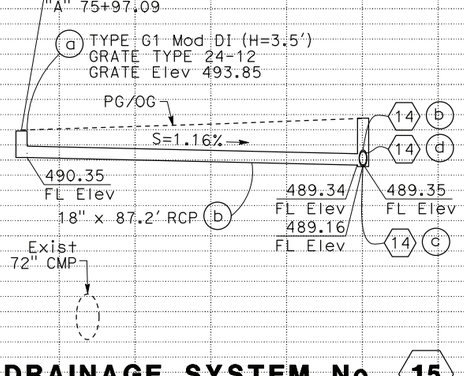
RIVERSIDE COUNTY
TRANSPORTATION COMMISSION
4080 LEMON STREET
RIVERSIDE, CA 92502



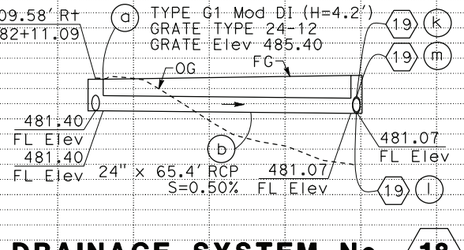
DRAINAGE SYSTEM No. 16



DRAINAGE SYSTEM No. 19



DRAINAGE SYSTEM No. 15



DRAINAGE SYSTEM No. 18

DRAINAGE PROFILES

SCALE: Horiz 1" = 20'
Vert 1" = 10'

DP-4

STATION		
CY	Exc	
	Emb	

TOTAL

LAST REVISION 06-30-18 | DATE PLOTTED => 01-MAY-2020 | TIME PLOTTED => 20:16

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | CONSULTANT FUNCTIONAL SUPERVISOR: NICOLE DEPUY | CALCULATED-DESIGNED BY: CLAIRE YAVARASKI | CHECKED BY: PAUL KOSINSKI | REVISED BY | DATE REVISED

BORDER LAST REVISED 7/2/2010 | USERNAME => p002479D | DGN FILE => 08000001371ib004.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 2234 | PROJECT NUMBER & PHASE 08000001371

RANCHO LA SIERRA

PORTION OF MARIA JESUS Y. DE SCULLEY ESTATE
FILED UNDER DECREE NO. 7939 SUPERIOR COURT OF
RIVERSIDE COUNTY

TRACT H — RECORD OF SURVEY — R.S. Book 33, Page 16, Records of Riv. County

TRACT G — RECORD OF SURVEY — R.S. Book 22, Page 76, Records of Riv. County

DIST.	COUNTY	ROUTE	POST MILE	SH. NO.	TOTAL
8	Riv	91	0.9-1.3	3	10

DISTRICT ENGINEER

April 19, 1967
APPROVED

PARCEL NO.	NAME AND REC. DATA	REQ. AREA FEE	REQ. AREA ESMT.	REM. AREA	TOTAL AREA
2156	Otto E. Scherer, et ux Inst. Date Rec. O. R.	7.370 Ac		See Map	150.411 Ac.
2157-1	Otto E. Scherer, et ux Inst. Date Rec. O. R.	7.458 Ac		See Map	7.540 Ac.
2159-01-01	State of California Inst. Date Rec. O. R.				0.711 Ac.
2159-1	E. P. Backs, et ux Inst. Date Rec. O. R.	13.093 Ac		See Map	58.188 Ac.
2158-1	A. T. & S. F. Ry Inst. Date Rec. O. R.		2.981 Ac.		
2158-4	A. T. & S. F. Ry Inst. Date Rec. O. R.	Access Only			
2158-5	A. T. & S. F. Ry Inst. Date Rec. O. R.		0.471 Ac.		
2159-2 -3	E. P. Backs, et ux		See Map		
3121-1	E. P. Backs, et ux		See Map	41.691 Ac.	44.384 Ac.
3121-2	E. P. Backs, et ux		1.007 Ac.	See 3121-1	See 3121-1

PRADO ROAD REALIGNMENT	Radius	Δ	Length
①	500'	9°40'12"	84.39'
②	530'	9°40'12"	89.45'
③	500'	14°19'53"	125.07'
④	530'	14°52'22"	137.58'
⑤	500'	14°37'39"	127.65'
⑥	470'	14°52'22"	122.00'

BASIS OF BEARINGS
CCS ZONE VI

State of California
Transportation Agency
Department of Public Works
Division of Highways

RIGHT OF WAY MAP

FEET
0 100 200 300
SCALE

THIS MAP SUPERSEDES A PORTION OF FILE NO. 809409

Project Engineer	Date	Right of Way Engr	Date	Design Engineer	Date	Asst. Dist. Engr. Design	Date
R.C. Weaver	3/16/67	J.K. Sansaire	3/17	K.J. Jackson	3/67	M.C. Austin	3-67

NOTE:
REPRODUCIBLE FILED WITH COUNTY SURVEYOR OF RIVERSIDE COUNTY: February 7, 1972
● DENOTES MONUMENT SET

□ Set 1" IP + Plastic Plug "CALIF DOT" Filed in Bk. 26 | 64, Pg. 48-52

1. Fd. 1" IP Bur. 0.2 (1964) N89°29'E 0.56' from Calculated Corner
2. Fd. 1" IP Exp 0.4 (1964) N76°08'W 0.08' from Calculated Corner
3. Fd. ¾" IP Flush (1964) S01°38'W 0.07' from Calculated Corner

Fd. 1" I.P. (1965) S 17°22'W .69' from Calc. Corner

Fd. 1" IP (1965) S86°01'W 1.37' from Wellwin Ctr. (1957/1965) Calc. Corner

07.1068

91517

Appendix

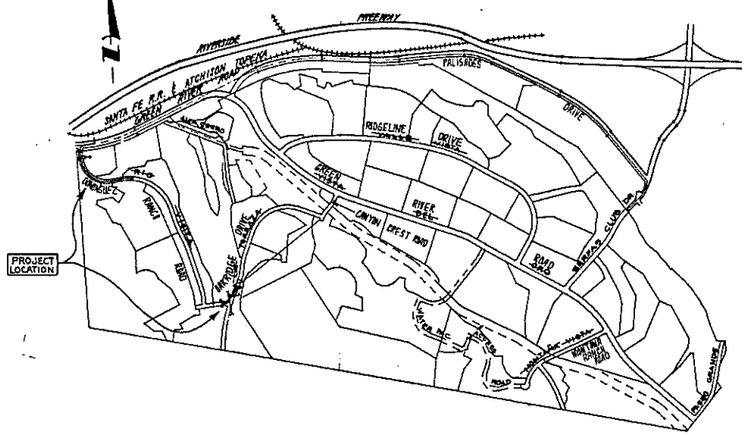
L

TRACT NO. 20872 STORM DRAIN IMPROVEMENT PLANS

PLAN AND PROFILE FOR THE IMPROVEMENT OF STORM DRAIN FOR

TRACT 20872

PHASE III



VICINITY AND KEY MAP (A)

NO SCALE

SHEET INDEX

SHEET NO.	TRACT	DESCRIPTION (A)	STATION	REMARKS
1		TITLE, GENERAL NOTES, QUANTITIES		
2		INDEX MAP		
3		GREEN RIVER ROAD LINE K	0+00.00 TO 5+13.08	
3		" " " LINE K-1, K-2	0+00.00 TO 0+21.88, 0+00.00 TO 0+63.18	
4		DOMINGUEZ RANCH RD. LINE K	5+13.08 TO 15+64.56	
4		" " LINE K-3	0+00.00 TO 0+50.00	
~~5~~		~~OAKRIDGE DRIVE LINE L~~	~~0+00.00 TO 4+64.22~~	SUPERCEDED BY SHEET 5A
~~5~~		~~" " LINE M~~	~~0+00.00 TO 2+99.80~~	SUPERCEDED BY SHEET 5A
~~5~~		~~" " LINE M-1, M-2~~	~~0+00.00 TO 0+17.85, 0+00.00 TO 0+37.08~~	SUPERCEDED BY SHEET 5A
6		LINE L-1, L-2, M-1, M-2, M-3 PROFILES		PROFILES ONLY
7		GENERAL DETAIL SHEET		
8		SECTIONS AND DETAILS		
5A		LINE "L", LINE "M", LINE "N"	0+00 TO 21+21.80 LINE "L" 0+00 TO 2+86.06 LINE "M", 0+00 TO 2+70 LINE "N"	SUPERCEDES SHEET 5

STORM DRAIN GENERAL NOTES:

(SEE SPECIAL NOTES FOR CIPP ON THIS SHEET)

1. ALL WORK AND MATERIALS SHALL COMPLY WITH THE SPECIFICATIONS AND STANDARD PLANS OF THE CITY OF CORONA, DEPARTMENT OF PUBLIC WORKS AND STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION-CURRENT EDITION. THESE DRAWINGS AND THE DATA HEREIN ARE MADE PART OF THE SPECIFICATIONS.
2. INSPECTION TO BE CALLED FOR THROUGH THE CITY OF CORONA (736-2241) 24 HOURS PRIOR TO STARTING WORK.
3. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL OBTAIN A PERMIT TO EXCAVATE IN THE PUBLIC RIGHT-OF-WAY FROM THE CITY OF CORONA.
4. ALL UTILITY COMPANIES ARE TO BE GIVEN 48 HOURS NOTICE PRIOR TO WORKING AROUND THEIR FACILITIES.
5. TRENCHES SHALL HAVE SHAPED BEDDING.
6. ALL BACKFILL TO BE CERTIFIED BY A SOILS ENGINEER.
7. ALL MATERIALS AND METHODS TO BE SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.
8. BACKFILL MATERIAL TO HAVE A S.E. OF 30 (MIN.).
9. BACKFILL TO BE IN 8" LIFTS IF TRENCH BOTTOM AND SIDES HAVE A S.E. OF LESS THAN 20.
10. STOMPING OF BACKFILL OR AT THE DIRECTION OF THE SOILS ENGINEER PERMITTED IN 3' LIFTS.
11. DURING THE WORKING DAY TRENCHES MAY BE LEFT OPEN ACROSS ONLY ONE ACCESS STREET AT A TIME. NO TRENCH MAY BE LEFT OPEN OVERNIGHT UNLESS AUTHORIZED IN WRITING BY THE CITY ENGINEER.
12. AS-BUILT DRAWINGS TO BE FURNISHED TO THE CITY OF CORONA AFTER COMPLETION OF THE CONSTRUCTION.
13. IF ANY EXISTING UTILITIES OR ANY OTHER FACILITIES CONFLICT WITH THE PROPOSED IMPROVEMENTS, WORK SHALL STOP AND THE ENGINEER NOTIFIED IMMEDIATELY.
14. ALL UTILITIES SHALL BE INSTALLED, TESTED AND APPROVED PRIOR TO STREET PAVING.
15. CONTRACTORS SHALL CONFORM TO ALL RECOMMENDATIONS OF THE SOILS REPORT AS PREPARED BY HIGHLAND GEOTECHNICAL CONSTRUCTION, DATED SEPTEMBER 11, 1985 AND ALL ADDENDUMS AND FINAL COMPACTION REPORT.
16. REBAR SHALL BE GRADE 60 BILLET STEEL CONFORMING TO ASTM A615.
17. SEPERATE PERMITS SHALL BE REQUIRED FOR ANY IMPROVEMENTS WORK IN THE PUBLIC RIGHT-OF-WAY.
18. ALL BACKFILL OF TRENCHES TO BE CERTIFIED BY A SOILS ENGINEER (90% MINIMUM COMPACTION).
19. ALL CONCRETE STRUCTURES THAT COME IN CONTACT WITH THE ONSITE SOILS SHALL BE CONSTRUCTED WITH THE TYPE 5 CEMENT UNLESS DEEMED UNNECESSARY BY SOLUBLE SULPHATE-CONTENT TESTS CONDUCTED BY THE SOILS ENGINEER.
20. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH AT 28 DAYS OF 3250 PSI UNLESS OTHERWISE STATED ON THE PLANS. ALL CONCRETE SHALL BE 6 SACK (CALTRANS CLASS A). IF PNEUMATICALLY PLACED 6.5 SACK.
21. GROUND SHALL BE PREWETTED TO THE SATISFACTION OF THE CITY ENGINEER OR ENGINEER PRIOR TO THE PLACEMENT OF THE CONCRETE. MOISTURE LOSS RETARDANT SHALL BE USED WHEN REQUIRED BY THE BUILDING OFFICIAL OR ENGINEER.
22. ALTERNATE CAST IN PLACE PIPE MAY BE USED IN LIEU OF R.C.P. SUBJECT TO SOILS REPORT AND CITY ENGINEER'S APPROVAL.
23. PIPE NOTED TO PROFILE WITH AN ASTERISK (*) REQUIRED 1'-1/2" THICKENED INVERT.
24. PIPES WITH SLOPES GREATER THAN 20% (0.20) SHALL BE ANCHORED AS PER DETAIL SHEET.

ENGINEER'S NOTICE:

1. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. 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 FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR ENGINEER.
2. ALL UNDERGROUND UTILITIES OR STRUCTURE, REPORTED OR FOUND ON PUBLIC RECORDS, ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT. THE OWNER, BY ACCEPTING THESE PLANS OR PROCEEDING WITH THE IMPROVEMENTS HEREON, AGREES TO ASSUME LIABILITY AND TO HOLD THE ENGINEER HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED OR INDICATED ON PUBLIC RECORDS, OR THOSE CONSTRUCTED AT VARIANCE WITH REPORTED OR RECORD LOCATIONS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHERS FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNERS OF ALL UTILITIES STRUCTURES CONCERNED BEFORE STARTING WORK.
3. CARE SHOULD BE TAKEN TO PREVENT BRADED DITCHES AND SWALES FROM UNDERMINING STREET IMPROVEMENTS. UPON INSPECTION OF THE SITE, THE CITY ENGINEER MAY REQUIRE TEMPORARY GUNITE SWALES, ENTERING OR LEAVING IMPROVEMENTS.

CONSTRUCTION NOTES & ESTIMATED QUANTITIES

	CONST. NOTE NO.	ITEMS TO BE CONSTRUCTED OR INSTALLED	TOTAL	UNIT
(A)	(1)	CONSTRUCT 24" R.C.P. STORM DRAIN (1500-D) ALTERNATE C.I.P. PIPE.	254	L.F.
	(3)	CONSTRUCT 36" R.C.P. STORM DRAIN (1000-D) ALTERNATE C.I.P. PIPE.	795	L.F.
(A)	(4)	CONSTRUCT 42" R.C.P. STORM DRAIN (1100-D) ALTERNATE C.I.P. PIPE.	567	L.F.
(A)	(4A)	CONSTRUCT 42" R.C.P. STORM DRAIN (1600-D) ALTERNATE C.I.P. PIPE.	118	L.F.
(A)	(6)	CONSTRUCT 54" R.C.P. STORM DRAIN (1300-D) ALTERNATE C.I.P. PIPE.	370	L.F.
(A)	(1A)	CONSTRUCT 24" R.C.P. STORM DRAIN (2000-D) ALTERNATE C.I.P. PIPE.	60	L.F.
	(11)	CONSTRUCT M.H. PER CITY STD. NO. 207-1.	5	EA.
(A)	(14)	CONSTRUCT JUNCTION STRUCTURE PER CITY STD. NO. 208-1.	1	EA.
(A)	(19)	CONSTRUCT CATCH BASIN TYPE "A" PER CITY STD. NO. 201-0.	6	EA.
	(22)	CONSTRUCT INLET STRUCTURE PER DETAIL ON SHEET NO. 8.	1	EA.
	(28)	CONSTRUCT HEAD WALL PER DETAIL ON SHEET NO. 7.	1	EA.
(A)	(29)	CONSTRUCT DOUBLE 36" C.I.P. PIPE.	540	L.F.
	(30)	CONSTRUCT HEAD WALL AND WING WALL PER DETAIL ON SHEET NO. 7.	2	EA.
(A)	(34)	CONSTRUCT CHAIN LINK FENCE PER R.C.F.C.D.-W.C.D. STD. NO. M601.	160	L.F.
(1)	(35)	CONSTRUCT CONC. SQUASH BOX PER DETAIL ON SHT.5	1	EA.
(A)	(5)	CONSTRUCT 48" R.C.P. STORM DRAIN (1800-D) ALTERNATE C.I.P. PIPE	288	L.F.
	(26)	CONSTRUCT CONCRETE BULKHEAD PER R.C.F.C.D. - W.C.D. STD. M816	1	EA.

CAST-IN-PLACE CONCRETE PIPE (CIPP) GENERAL NOTES

A. THE FOLLOWING CONSTRUCTION SPECIFICATIONS FOR CIPP SHALL BE MADE PART OF THESE PLANS.

1. SPECIFICATIONS FOR CAST-IN-PLACE NONREINFORCED CONCRETE PIPE (ACI STD 346-70) BY THE AMERICAN CONCRETE INSTITUTE.
2. CALTRANS 1984 STANDARD SPECIFICATIONS.
3. LYNCH MANUAL, CAST-IN-PLACE CONCRETE PIPE PROCESS. CURRENT EDITION. IN CASE OF ANY CONFLICTS THE MOST CONSERVATIVE OF THE ABOVE LISTED SPECIFICATIONS SHALL BE USED.

B. IN ADDITION TO ITEM A ABOVE, THE FOLLOWING SHALL APPLY:

1. CONCRETE SHALL HAVE SLUMP OF 2.5 INCHES.
2. BACKFILLING OF THE PIPE SHALL NOT BE PERFORMED UNTIL THE CONCRETE HAS DEVELOPED EIGHTY PERCENT (80%) OF ITS DESIGN STRENGTH. NO TRAFFIC (INCLUDING CONSTRUCTION EQUIPMENT) SHALL BE ALLOWED OVER PIPE UNTIL THE CONCRETE HAS ATTAINED ITS DESIGN STRENGTH.
3. WATER DENSIFICATION METHODS FOR BACKFILLING THE PIPE SHALL NOT BE ALLOWED. MECHANICAL COMPACTION SHALL BE REQUIRED.
4. ALL SOILS WORK SHALL BE PERFORMED IN THE PRESENCE OF SOILS ENGINEER. SOILS ENGINEER SHALL BE RESPONSIBLE FOR INSPECTING AND TESTING AND CERTIFYING THE WORK. SOILS ENGINEER IS TO KEEP STRICT RECORDS AND SUBMIT A FINAL REPORT TO THE CITY.

SOILS ENGINEER AND GEOLOGIST

HIGHLAND GEOTECHNICAL
1632 S. COMMERCENTER CIRCLE, SUITE A
SAN BERNARDINO, CA. 92408
TEL. NO. (714) 884-8828

WILLIAM T. ALTMEYER R.G.E. 9291, EXP. DATE, DED 1988.

AS-BUILT
DOUGLAS W. BENDER RCE #28946
EXP 3-31-91
DATE 10-30-89

REGISTERED PROFESSIONAL ENGINEER DOUGLAS W. BENDER No. 28946 EXP 3-31-91 CIVIL STATE OF CALIFORNIA

BENCH MARK: RIVERSIDE CO. GAI-64-69 - 6m. W. ALONG A.T.S.F. R/W LINE FROM STA. IN CORONA, 159' ± S. OF CONCRETE HEAD WALL, 41' ± E/S OF RED WOOD, 12' ± S. OF TELE. POLE "940, 113' ± N. OF S. OF W. BOUND CR. R/W. RD., 30' ± S. OF MAIN LINE A.T.S.F. TRACKS, 3' ± E. OF PERRO DAN BUSH POST, FD. BRASS DISK IN CONC. POST, ELEV. 1% STAMPED GAI-64-69, ELEV. 804.35

Designed by M.V. | Drawn by W.W.W. | Checked by M.V. / L.B.

PLANS PREPARED UNDER SUPERVISION OF Douglas W. Bender
Date 3-2-87 R.C.E. No. 28946 EXP. 3-31-89

Reference Plans for these Improvements

Date	By	REVISIONS	Appd
7-25-86	L.B.	(A) REVISED SHEET INDEX FOR NEW STREET	
2-2-87	M.V.	(A) REVISED QUANTITIES, ADDED CONST. NOTE (6)	
4-30-87	I.B.	(A) ADDED CONST. NOTE (28)	
Date	By	REVISIONS	Appd

Prepared by the office of Church Engineering, Inc. Consulting Civil Engineers Land Planners Land Surveyors 2301 Alton Ave Irvine, CA. 92714 (714) 660-8600

Engineering Dell
Utilities
Fire

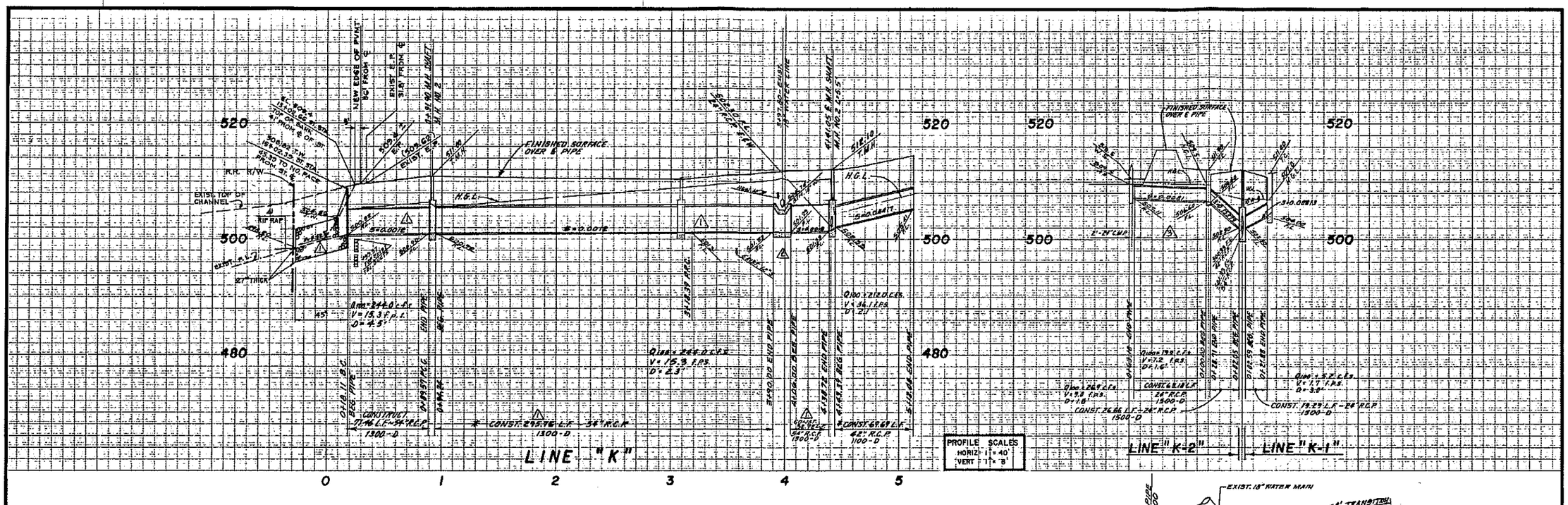
Approved _____ By _____ R.C.E. No. 21267 Exp. 9-30-89 Director of Utilities

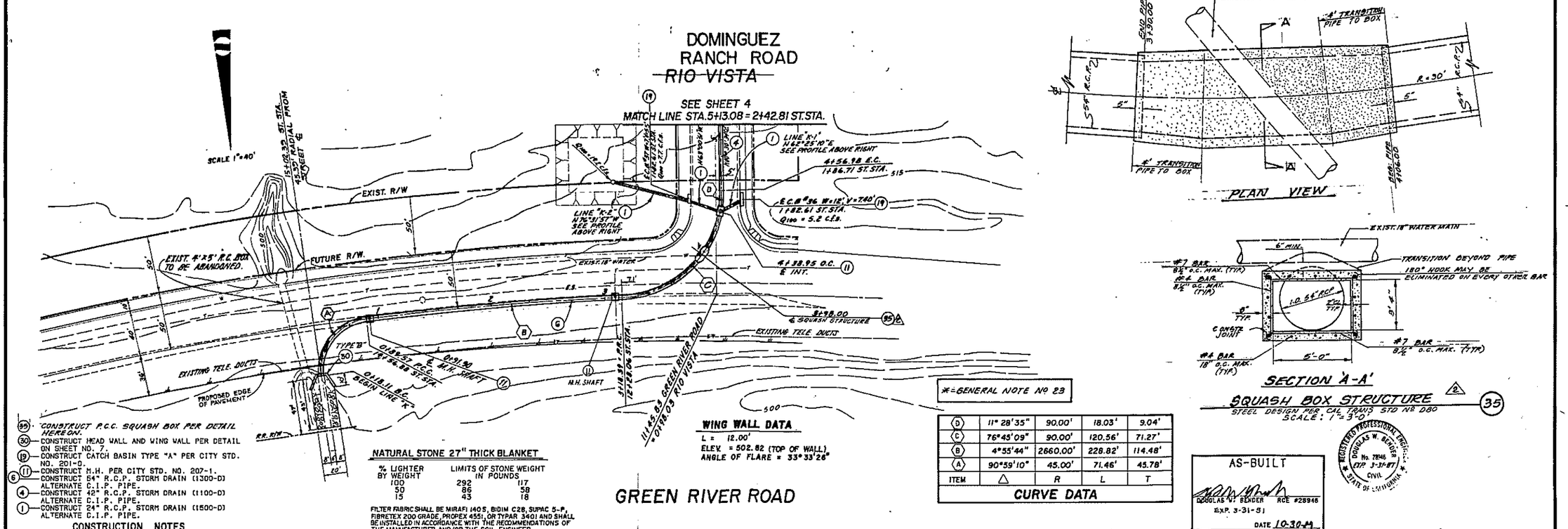
Approved 4-2-87 By Joseph R. Palermo R.C.E. No. 25267 Exp. 12-31-89 City Engineer

CITY OF CORONA STORM DRAIN IMPROVEMENTS

TRACT No. 20872

Drawing No. 85-1210
85-1130
Sh 1 of 8





BENCH MARK: RIVERSIDE CO. G01-66-69 - Sta. Id. ALONG N.T.S.F. R/R LINE FROM STA. IN CORONA, 153' ± E. OF CONCRETE HEAD WALL, 4' ± S OF DATED 1938, 13' S. OF TELE POLE #340, 11' ± N. OF S. OF W. BOUND OF R/R. RD., 50' S. OF MAIN LINE N.T.S.F. TRACKS, 31' E. OF PHONE BOX #6369, POST, FD BRASS DISK IN TOP, POST, DIV. 19 STAMPED 061-66-69, ELEV. 804.35

Designed by	Drawn by	Checked by
M. V.	W.W.W.	L.B.

PLANS PREPARED UNDER SUPERVISION OF
Date 3-2-87 R.C.E. No. 28946 Exp. 3-31-87

Reference Plans for these Improvements

Date	By	REVISIONS
2-2-87	L.B.	⚠ REVISED LINE "K-B" PROFILE
5-22-87	L.B.	⚠ ADDED SQUASH BOX
6-26-87	L.B.	⚠ REVISED LINE "K" PROFILE

Prepared to the office of Church Engineering, Inc. Consulting Civil Engineers Land Planners Land Surveyors 8301 Utica Ave Rancho Cucamonga, CA 91730 (714) 980-9030

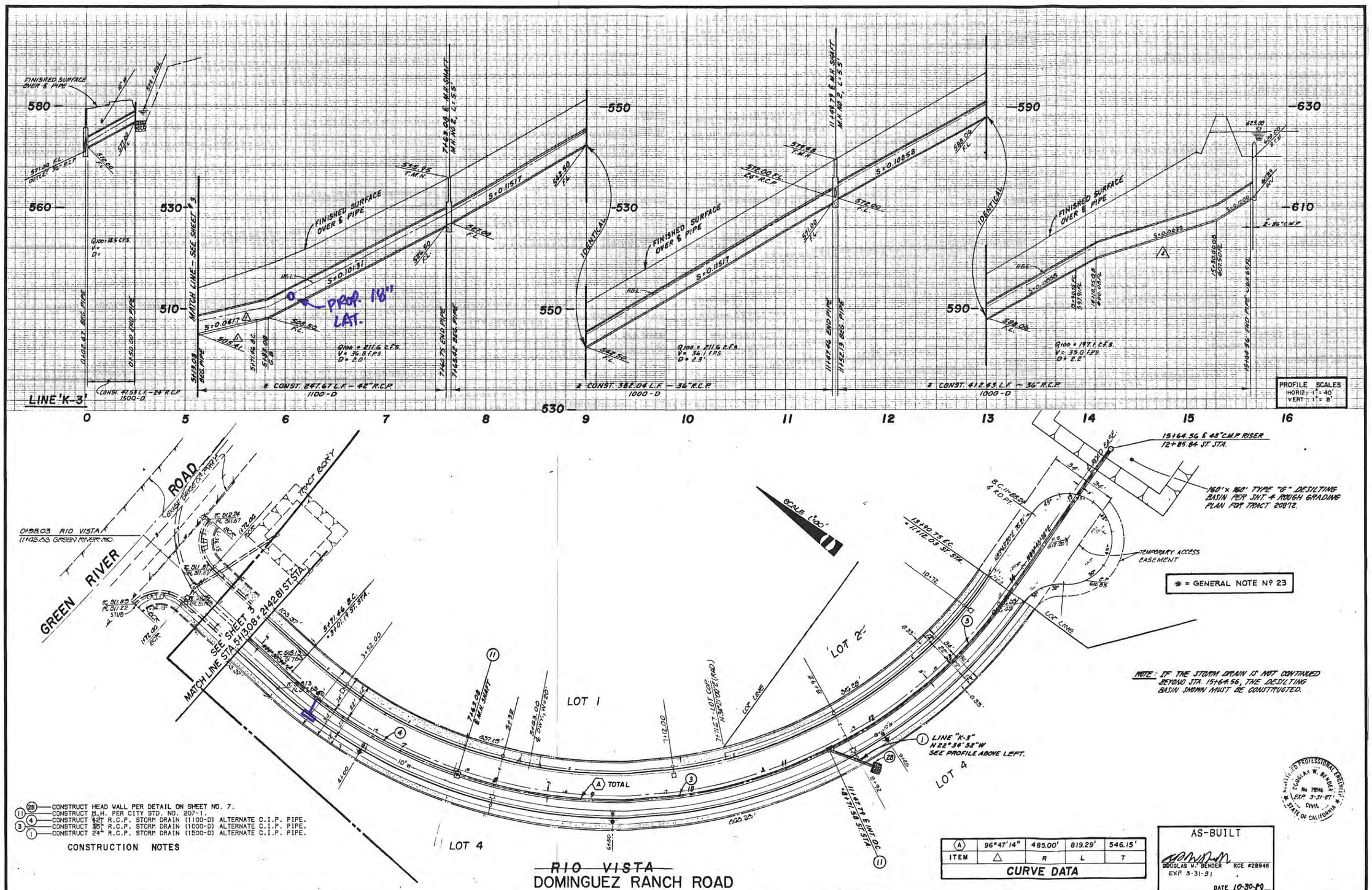
Engineering _____
Utilities _____
Fire _____

Approved _____ By _____ R.C.E. No. 21267 Exp. 5-30-89 Director of Utilities

Approved 4-2-87 By _____ R.C.E. No. 25761 Exp. 12-31-89 City Engineer

CITY OF CORONA STORM DRAIN IMPROVEMENTS
GREEN RIVER ROAD - LINE 'K' STA. 0+00.00 TO 5+13.08
TRACT No. 20872

Drawing No. 85-109 D
85-113 D
Sh 3 of 8



BENCH MARK: RIVERSIDE CO. GDI-68-69 - 5m. W. ALONG A.T.S.F. R/W LINE FROM STA. IN CORONA, 133' E. OF CONCRETE HEAD WALL, 69' ± S OF DATED 1938, 137' ± S OF TALL POLE * 346, 11' ± S OF S BOUND CR. RW. RD., 50' ± S OF MAIN LINE A.T.S.F. TRACKS, 3' E. OF PRADO DAM SIGN POST, FD. BRASS DISK IN CONC. POST, ON 1/4 STAMPED GDI-68-69, ELEV. 804.95

Designed by	Drawn by	Checked by
M.V.	W.W.W.	L.B./M.V.

PLANS PREPARED UNDER THE SUPERVISION OF
Date 3-2-87 R.C.E. No. 28946 EXP. 3-31-87

Reference Plans for these Improvements

Date	By	REVISIONS
1-11-88	AF	REVISED PIPE PROFILE FROM STA. 14+10.75
6-22-87	LB	REVISED PIPE ELEVATION & SLOPE; ADD'L

Prepared in the office of
Church Engineering, Inc.
Consulting Civil Engineers
Land Planners
Land Surveyors
2501 Allen Ave
92705
CA
(714) 850 8600

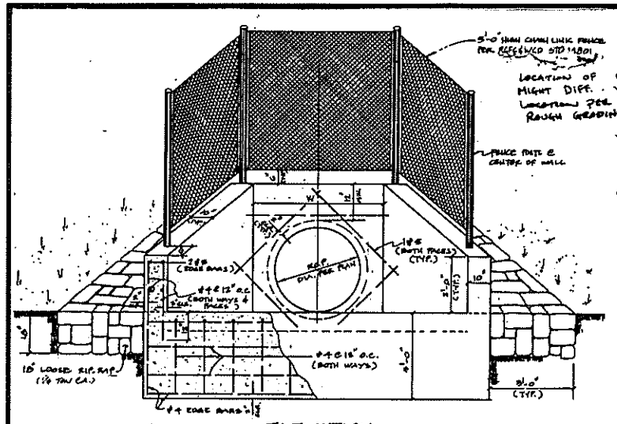
Engineering ted
Utilities
Fire

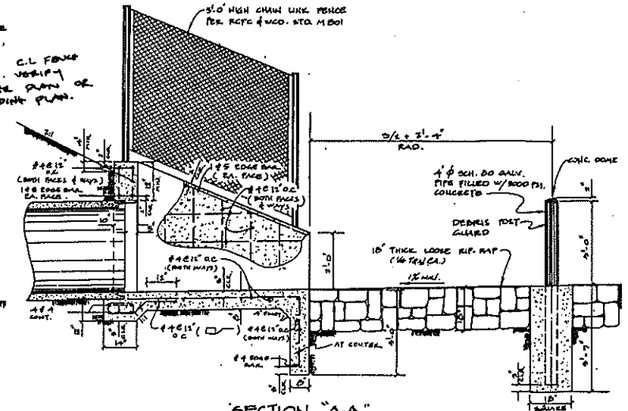
Approved _____ By _____ R.C.E. No. 21267 Exp 9-30-89 Director of Utilities

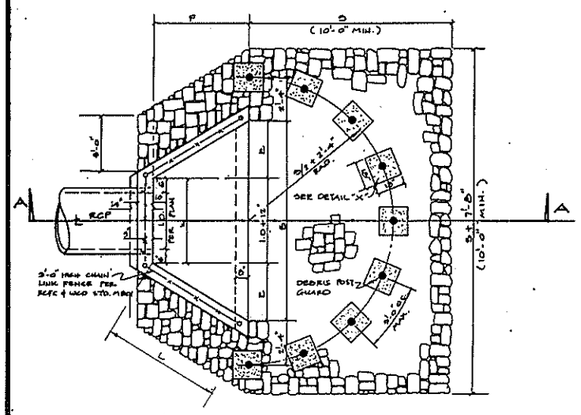
Approved 4-2-87 By Joseph R. Palarca R.C.E. No. 25267 Exp 12-31-89 City Engineer

CITY OF CORONA STORM DRAIN IMPROVEMENTS
DOMINGUEZ RANCH ROAD
~~RIO VISTA~~ LINE "K" STA. 5+13.08 TO 15+64.56
TRACT No. 20872

Drawing No. ~~85-113.0~~ 85-113.0 sh 4 of 8





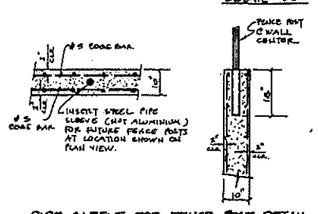


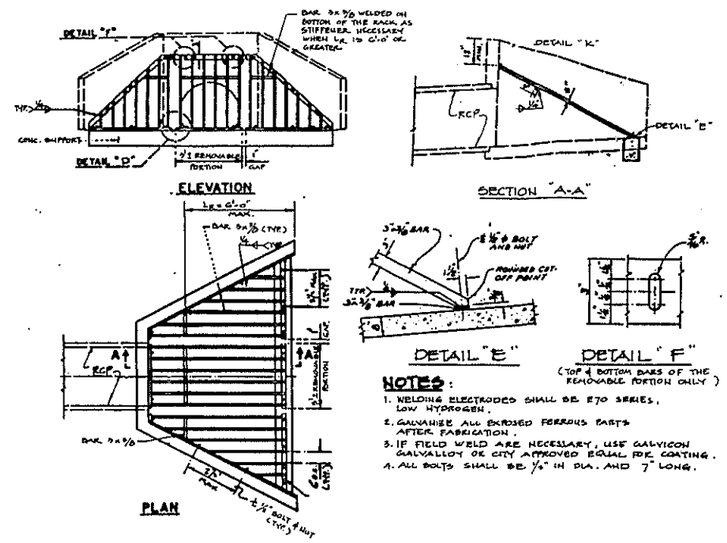
DIMENSIONS					
PIPE DIA.	L	E	F	W	S
24"	4'-9"	2'-0"	4'-0"	5'-0"	10'-0"
30"	5'-5"	3'-0"	4'-6"	5'-6"	10'-6"
36"	6'-0"	3'-6"	5'-0"	6'-0"	10'-10"
42"	6'-7"	3'-8"	5'-6"	6'-6"	11'-0"
48"	7'-1"	4'-0"	6'-0"	7'-0"	11'-4"
54"	8'-2"	4'-6"	6'-9"	7'-10"	11'-10"

REF.: MODIFIED SAN BERNARDINO COUNTY ROAD DEPARTMENT - HEAD WALL WING TYPE - STD. NO. 209

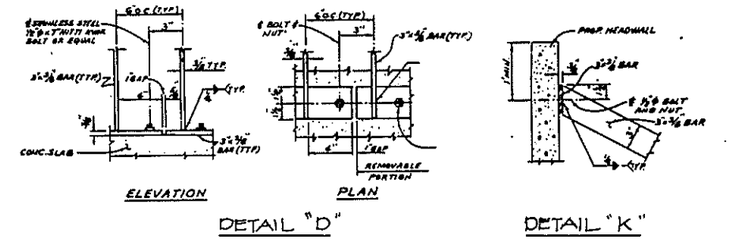
NOTES:
1. USE DEBRIS POST GUARD AND TRASH RACK (PER DETAILS HEREBY) FOR INLET STRUCTURE ONLY
2. FOR INLET STRUCTURE USE RIP-RAP DETAIL AS SHOWN.
3. FOR OUTLET STRUCTURE USE RIP-RAP AS SHOWN ON PLAN AND PROFILE.
4. SEE STRUCTURAL NOTES FOR ALL OTHERS NOTES
5. USE DIMENSIONS OF NEXT BIGGER PIPE DIAMETER FOR PIPE DIA. NOT SHOWN ON THE TABLE

INLET AND OUTLET STRUCTURE DETAILS
NO SCALE

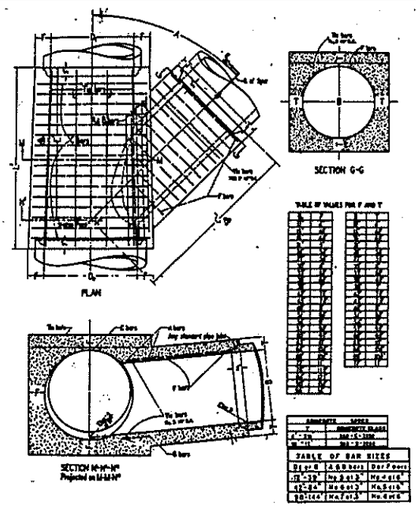


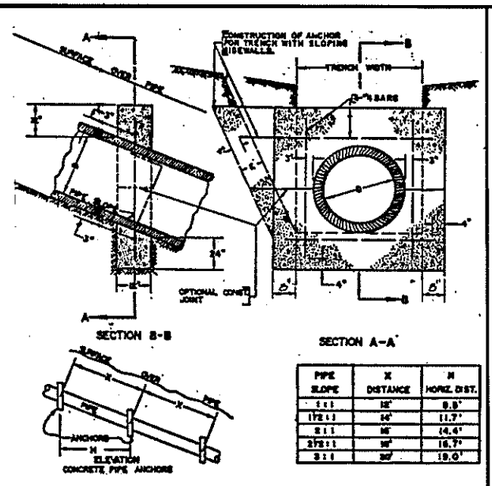


NOTES:
1. WELDING ELECTRODES SHALL BE E70 SERIES, LOW HYDROGEN.
2. GALVANIZE ALL EXPOSED FERROUS PARTS AFTER FABRICATION.
3. IF FIELD WELD ARE NECESSARY, USE GALVICON GALVALLOY OR CITY APPROVED EQUAL FOR COATING.
4. ALL BOLTS SHALL BE ⅝" IN DIA. AND 7" LONG.



TRASH RACK DETAILS (INCLINED)
REF. LOS ANGELES COUNTY FLOOD CONTROL DISTRICT STD. 2-DTR 1.1 & 2



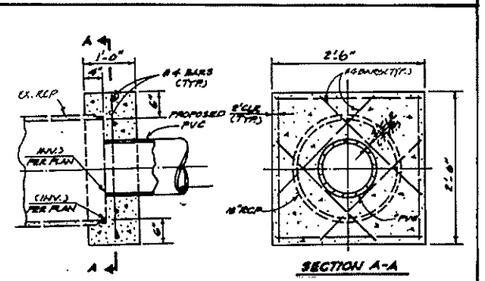


PIPE SLOPE	X DISTANCE	H HORIZ. DIST.
1:1	12'	8.5'
1½:1	14'	11.7'
2:1	16'	14.4'
2½:1	18'	16.7'
3:1	20'	19.0'

REF.: PER LOS ANGELES COUNTY ENGINEER STD. NO. D-72

STRUCTURAL NOTES

1. ALL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAYS COMPRESSIVE STRENGTH OF 4,000 PSI CEMENT SHALL CONFORM TO ASTM C150, TYPE II.
2. CONCRETE DIMENSIONS SHALL BE MEASURED HORIZONALLY OR VERTICALLY ON THE PROFILE, AND PARALLEL TO OR AT RIGHT ANGLES (OR RADIALLY) TO CENTERLINE OF THE CONDUIT ON THE PLAN EXCEPT AS OTHERWISE SHOWN.
3. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND THE REINFORCING STEEL HAS BEEN PLACED, INSPECTED AND APPROVED.
4. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE CHANBERED 3/4".
5. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO FACE OF BAR AND SHALL BE 2 INCHES UNLESS OTHERWISE SHOWN.
6. ALL REINFORCING BARS SHALL CONFORM TO ASTH A615, GRADE 60, DEFORMED BARS.
7. ALL BARS BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" CHAPTER 7 (ACI 318-77).
8. LONGITUDINAL STEEL SHALL BE LAPPED 40 BAR DIAMETERS AT SPLICES. TRANSVERSE STEEL SHALL BE LAPPED AS SHOWN ON DRAWINGS.
9. PLACING OF REINFORCEMENT SHALL CONFORMED TO THE AMERICAN CONCRETE INSTITUE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" CHAPTER 7 (ACI 318-77).
10. HEAVY COMPACTION EQUIPMENT SHALL NOT BE USED FOR BACK-FILLING THE STRUCTURES IN ORDER TO PREVENT DAMAGE TO THE STRUCTURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE STRUCTURES RESULTING FROM INAPPROPIATE COMPACTING TECHNIQUES AND EQUIPMENT.
11. THE BACKFILL SHALL BE BROUGHT UP UNIFORMLY ON ALL SIDES OF THE STRUCTURE.



(79) REINFORCED CONC. JOIN
N.T.S.

REGISTERED PROFESSIONAL ENGINEER DOUGLAS W. REBER No. 28946 Exp. 12/31/91 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER DOUGLAS W. REBER No. 28946 Exp. 3/31/91 CIVIL STATE OF CALIFORNIA

AS - BUILT
SIGNATURE 11-11-90 DATE
R.C.E. NO. 28946 EXP. 3-31-91

Designed by	Drawn by	Checked by							
PLANS PREPARED UNDER THE SUPERVISION OF									
Date 4-22-88	R.C.E. No. 28946 EXP. 3-31-91								
Reference Plans for these Improvements									
			Date	By	REVISIONS				

Prepared in the office of: Church Engineering, Inc. — Consulting Civil Engineers, Land Planners, Land Surveyors

Engineering [illegible] Utilities P.O.W.R.E. Dow Fire [illegible]

Approved 7/15/88 By [signature] R.C.E. No. 21647 EXPT 3-31-91 Director of Utilities

Approved 7-15-88 By [signature] R.C.E. No. 25767 EXPT 12-31-89 City Engineer

CITY OF CORONA STORM DRAIN IMPROVEMENT PLAN

DETAIL SHEET

TRACT NO. 22186

Drawing No. 88-125

Sh 20 of 25

Appendix

M

GREEN RIVER ROAD LINE ‘K-1’ WSPG

The following Water Surface Pressure Gradient was prepared to analyze the capacity of the existing catch basin and lateral ‘K-1’ along Dominguez Ranch Road due to the increase in runoff. The catch basin is located south of the intersection of Green River Road and Dominguez Ranch Road. The proposed condition would minimally increase the tributary area by discharging subarea F2 through a culvert onto Dominguez Ranch Road. The following WSPGs show that lateral ‘K-1’ is minimally affected by the increase flow and can handle the proposed condition.

```
T1 JN 19.1886.2
T2 CITY OF CORONA
T3 LINE K1 EX

SO      2.590 502.300  1                          503.300
R      21.880 504.000  1      .013           .000  .000 0
WE     21.880 504.000  2      .500
SH     21.880 504.000  2                          507.500
CD   1  4   1    .000   2.000     .000  .000  .000   .00
CD   2  3   0    .000   5.200   12.000  .000  .000   .00
Q             5.200   .0
```

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING

Date:12-22-2022 Time: 3:51:25

JN 19.1886.2 - GREEN RIVER RANCH

CITY OF CORONA
STORM LINE K1 EXISTING - MODELED BY AB

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT or I.D.	Base Wt ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2.590	502.300	.427	502.727	5.20	10.60	1.74	504.47	.00	.80	1.64	2.000	.000	.00	1	.0
1.701	.0881				.0517	.09	.43	3.41	.38	.013	.00	.00	PIPE
4.291	502.450	.432	502.882	5.20	10.40	1.68	504.56	.00	.80	1.65	2.000	.000	.00	1	.0

```
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-      -|-      -|-     -|-
 -|-     |-
    3.367    .0881                                  .0471      .16      .43    3.33     .38    .013
.00   .00  PIPE
         |        |        |        |        |             |        |       |       |       |       |
  |      |
    7.658   502.747     .447   503.194      5.20    9.92    1.53   504.72     .00     .80     1.67    2.000
.000   .00   1   .0
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-      -|-      -|-     -|-
 -|-     |-
    2.633    .0881                                  .0412      .11      .45    3.12     .38    .013
.00   .00  PIPE
         |        |        |        |        |             |        |       |       |       |       |
  |      |
   10.290   502.979     .462   503.441      5.20    9.46    1.39   504.83     .00     .80     1.69    2.000
.000   .00   1   .0
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-      -|-      -|-     -|-
 -|-     |-
    2.119    .0881                                  .0360      .08      .46    2.92     .38    .013
.00   .00  PIPE
         |        |        |        |        |             |        |       |       |       |       |
  |      |
   12.410   503.165     .478   503.644      5.20    9.02    1.26   504.91     .00     .80     1.71    2.000
.000   .00   1   .0
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-      -|-      -|-     -|-
 -|-     |-
    1.737    .0881                                  .0315      .05      .48    2.73     .38    .013
.00   .00  PIPE
         |        |        |        |        |             |        |       |       |       |       |
  |      |
   14.146   503.318     .495   503.813      5.20    8.60    1.15   504.96     .00     .80     1.73    2.000
.000   .00   1   .0
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-      -|-      -|-     -|-
 -|-     |-
    1.441    .0881                                  .0275      .04      .49    2.56     .38    .013
.00   .00  PIPE
```

```
         |        |       |        |        |              |        |      |       |       |      |
  |      |
    15.587   503.445     .512   503.957      5.20    8.20    1.04   505.00     .00     .80     1.75    2.000
.000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
    1.206    .0881                                    .0241      .03      .51    2.40     .38    .013
.00   .00  PIPE
         |        |       |        |        |              |        |      |       |       |      |
  |      |
    16.794   503.552     .529   504.081      5.20    7.81     .95   505.03     .00     .80     1.76    2.000
.000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
    1.013    .0881                                    .0211      .02      .53    2.24     .38    .013
.00   .00  PIPE
         |        |       |        |        |              |        |      |       |       |      |
  |      |
    17.806   503.641     .548   504.189      5.20    7.45     .86   505.05     .00     .80     1.78    2.000
.000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
     .852    .0881                                    .0184      .02      .55    2.10     .38    .013
.00   .00  PIPE
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Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING

Date:12-22-2022 Time: 3:51:25

1886
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******** ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base
```

```
Wt|      |No Wth
  Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or
I.D.|  ZL  |Prs/Pip
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-    -|
  L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  |
X-Fall|  ZR  |Type Ch

*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*****
**|***** |*******
          |         |        |         |         |               |         |       |        |        |       |
  |      |
    18.658   503.716     .567   504.283      5.20    7.10     .78   505.07     .00     .80     1.80    2.000
.000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
      .715    .0881                                    .0161      .01      .57    1.96     .38    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |       |
  |      |
    19.373   503.779     .586   504.365      5.20    6.77     .71   505.08     .00     .80     1.82    2.000
.000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
      .600    .0881                                    .0141      .01      .59    1.84     .38    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |       |
  |      |
    19.973   503.832     .607   504.439      5.20    6.46     .65   505.09     .00     .80     1.84    2.000
.000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
      .496    .0881                                    .0124      .01      .61    1.72     .38    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |       |
  |      |
```

```
   20.469   503.876     .628   504.504      5.20    6.16     .59   505.09     .00     .80     1.86    2.000
.000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
     .407    .0881                                      .0108      .00      .63    1.61     .38    .013
.00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |
  |      |
   20.875   503.911     .650   504.562      5.20    5.87     .54   505.10     .00     .80     1.87    2.000
.000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
     .326    .0881                                      .0095      .00      .65    1.50     .38    .013
.00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |
  |      |
   21.202   503.940     .673   504.613      5.20    5.60     .49   505.10     .00     .80     1.89    2.000
.000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
     .255    .0881                                      .0083      .00      .67    1.41     .38    .013
.00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |
  |      |
   21.457   503.963     .697   504.660      5.20    5.34     .44   505.10     .00     .80     1.91    2.000
.000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
     .191    .0881                                      .0073      .00      .70    1.32     .38    .013
.00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |
  |      |
   21.647   503.979     .722   504.701      5.20    5.09     .40   505.10     .00     .80     1.92    2.000
.000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
```

```
     .130    .0881                                        .0064      .00      .72    1.23     .38    .013
.00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |       |
  |      |
    21.778   503.991     .748   504.739      5.20    4.85     .37   505.10     .00     .80     1.94    2.000
.000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-     |-
     .077    .0881                                      .0056      .00      .75    1.15     .38    .013
.00   .00  PIPE
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Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING

Date:12-22-2022 Time: 3:51:25

1886
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**********************************************************************************************************
******** ********
          | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base
Wt|      |No Wth
  Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or
I.D.|  ZL  |Prs/Pip
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-
 -|-    -|
  L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  |
X-Fall|  ZR  |Type Ch

*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*****
**|*****  |*******
          |         |        |         |         |               |         |       |        |        |       |
  |      |
    21.855   503.998     .775   504.772      5.20    4.63     .33   505.10     .00     .80     1.95    2.000
.000   .00   1   .0
```

```
        -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-      -|-      -|-     -|-
 -|-     |-
      .025    .0881                                    .0049      .00      .77    1.07     .38    .013
.00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |       |
  |       |
    21.880   504.000     .804   504.804      5.20    4.40     .30   505.10     .00     .80     1.96    2.000
.000   .00   1   .0
         -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-      -|-      -|-     -|-
 -|-     |-
  WALL  ENTRANCE

          |         |        |         |         |              |         |       |        |        |       |
  |       |
    21.880   504.000    1.240   505.240      5.20     .35     .00   505.24     .00     .18    12.00    5.200
12.000   .00   0   .0
         -|-      -|-      -|-      -|-      -|-     -|-     -|-      -|-     -|-      -|-      -|-     -|-
 -|-     |-
```

```
T1 JN 19.1886.2
T2 CITY OF CORONA
T3 LINE K1
SO      2.590 502.300  1                            503.300
R      21.880 504.000  1      .013          .000    .000 0
WE     21.880 504.000  2      .500
SH     21.880 504.000  2                            507.500
CD   1  4   1    .000   2.000     .000  .000  .000   .00
CD   2  3   0    .000   14.500   12.000  .000  .000   .00
Q             14.500   .0
```

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING

Date:12-22-2022 Time: 3:50:49

JN 19.1886.2 - GREEN RIVER RANCH

CITY OF CORONA

STORM LINE K1 PROPOSED - MODELED BY AB

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Width/ Dia.-FT or I.D.	Base Wt ZL	No Wth Prs/Pip	L/Elem X-Fall	Ch Slope ZR	Type Ch	SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"
2.590	502.300	.792	503.092	14.50	12.52	2.43	505.53	.00	1.37	1.96	2.000	.000	.00	1	.0							
1.372	.0881											.00	.00	PIPE			.0367	.05	.79	2.87	.63	.013
3.962	502.421	.802	503.223	14.50	12.31	2.35	505.58	.00	1.37	1.96	2.000	.000	.00	1	.0							

```
     3.392    .0881                                        .0336      .11      .80    2.80     .63    .013
     .00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
     7.354   502.720     .831   503.551     14.50   11.74    2.14   505.69     .00    1.37     1.97    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     2.800    .0881                                        .0295      .08      .83    2.61     .63    .013
     .00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
    10.154   502.967     .862   503.828     14.50   11.19    1.95   505.77     .00    1.37     1.98    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     2.331    .0881                                        .0259      .06      .86    2.44     .63    .013
     .00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
    12.486   503.172     .894   504.066     14.50   10.67    1.77   505.83     .00    1.37     1.99    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     1.952    .0881                                        .0228      .04      .89    2.28     .63    .013
     .00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
    14.437   503.344     .927   504.271     14.50   10.18    1.61   505.88     .00    1.37     1.99    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     1.636    .0881                                        .0201      .03      .93    2.12     .63    .013
     .00   .00  PIPE
          |         |        |         |         |               |         |       |        |        |
|       |      |
    16.074   503.488     .962   504.450     14.50    9.70    1.46   505.91     .00    1.37     2.00    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
```

Program Package Serial Number: 1873

WATER SURFACE PROFILE LISTING

Date:12-22-2022 Time: 3:50:49

1886
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-|-     -|-     |-
     1.368    .0881                                        .0177      .02      .96    1.98     .63    .013
     .00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
    17.441   503.609     .998   504.607     14.50    9.25    1.33   505.94     .00    1.37     2.00    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
     1.138    .0881                                        .0155      .02     1.00    1.84     .63    .013
     .00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
    18.579   503.709    1.037   504.746     14.50    8.82    1.21   505.95     .00    1.37     2.00    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
      .935    .0881                                        .0137      .01     1.04    1.71     .63    .013
     .00   .00  PIPE
```

```
********************************************************************************************************************
************** ********
          | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow
Top|Height/|Base Wt|      |No Wth
  Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width
|Dia.-FT|or I.D.|  ZL  |Prs/Pip
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-    -|
  L/Elem  |Ch Slope |        |         |         |        SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"
| X-Fall|  ZR  |Type Ch
```

```
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******
|*******|***** |*******
         |        |        |         |         |               |         |       |        |        |
|      |      |
    19.515   503.792    1.077   504.868     14.50    8.41    1.10   505.97     .00    1.37     1.99    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
      .757    .0881                                      .0121      .01     1.08    1.59     .63    .013
     .00   .00  PIPE
         |        |        |         |         |               |         |       |        |        |
|      |      |
    20.271   503.858    1.119   504.977     14.50    8.02    1.00   505.98     .00    1.37     1.99    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
      .596    .0881                                      .0107      .01     1.12    1.48     .63    .013
     .00   .00  PIPE
         |        |        |         |         |               |         |       |        |        |
|      |      |
    20.867   503.911    1.164   505.074     14.50    7.65     .91   505.98     .00    1.37     1.97    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
      .450    .0881                                      .0094      .00     1.16    1.37     .63    .013
     .00   .00  PIPE
         |        |        |         |         |               |         |       |        |        |
|      |      |
    21.317   503.950    1.211   505.161     14.50    7.29     .83   505.99     .00    1.37     1.96    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
      .314    .0881                                      .0084      .00     1.21    1.27     .63    .013
     .00   .00  PIPE
         |        |        |         |         |               |         |       |        |        |
|      |      |
    21.631   503.978    1.261   505.239     14.50    6.95     .75   505.99     .00    1.37     1.93    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
```

```
-|-     -|-     |-
      .187    .0881                                    .0074      .00     1.26    1.18     .63    .013
     .00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
    21.818   503.995    1.314   505.308     14.50    6.63     .68   505.99     .00    1.37     1.90    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
      .062    .0881                                    .0066      .00     1.31    1.09     .63    .013
     .00   .00  PIPE
          |         |        |         |         |              |         |       |        |        |
|       |      |
    21.880   504.000    1.372   505.372     14.50    6.31     .62   505.99     .00    1.37     1.86    2.000
    .000   .00   1   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
  WALL  ENTRANCE

          |         |        |         |         |              |         |       |        |        |
|       |      |
    21.880   504.000    2.339   506.339     14.50     .52     .00   506.34     .00     .36    12.00   14.500
  12.000   .00   0   .0
         -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-
-|-     -|-     |-
```