Preliminary

Drainage Report

For

Tentative Tract Map No. 20188

Victorville, CA

Prepared
August 3, 2018

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Provided for:

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Project # 30145

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

Christopher F. Lenz, PE 63001

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I. INTRODUCTION

TTM 20188 is a residential subdivision of approximately 76 gross acres into 195 single family residential lots, located at the southeast corner of Olivine Road and Monte Vista Road in the City of Victorville. The property is irregular in shape and is bordered on the west by Monte Vista road, which is paved. There is no existing development in the immediate area. Minimum lot size is 7,200 sf. This project should not be considered a "priority project" and thus WQMP calculations are provided, but a WQMP should be prepared with the final drainage report and project design.

VICINITY MAP

N.T.S.

The purpose of this study is to determine the I0-year and I00-year storm runoff emanating from on-site for TTM 20188. The study will determine the peak flow rate for the existing condition, the peak flow rate for the proposed condition, proposed condition flow rate routed through four combination water quality and detention basins. Additional analysis will confirm hydraulic capacity of proposed street sections compared to rationale expected runoff.

The scope of the study includes the following:

- Determination of points of flow concentration and watershed areas.
- Determination of the I00-year 24 hours storm runoff based upon the onsite drainage conditions utilizing the San Bernardino County Flood

Control District (SBCFCD) SCS Unit Hydrograph Method.

- Determination of the 10-year and I00-year peak flow rates for the offsite area utilizing the San Bernardino County Flood Control District (SBCFCD) Rational Method.

II. SITE DISCUSSION

The current property is vacant, undeveloped and undisturbed land with uniform slope of approximately 1.5 percent. The topography indicates that the runoff drains in a northerly direction in the form of sheet flow, and there is a ridge through the middle of the site that splits the flow east and west. There is a defined wash on site, running through the middle of the site, and is identified in the Baldy Mesa MDP as line A-06. Refer to Appendix A for additional detail.

III. RAINFALL DATA

The San Bernardino County Flood Control District (SBCFCD) hydrology Manual, (Reference 1) was used to develop the hydrological parameters for the 10-year and 100-year storm events. The Rational Method was used to determine the peak flow rates associated with the existing project conditions as well as the time of concentration used in the Unit Hydrograph method. In addition, the Unit Hydrograph Method was utilized to determine the runoff volume. Computations were performed using the CivilCADD drainage software for San Bernardino County Developed by CivilDesign Corporation.

Rainfall data was taken from the isohyetal maps from the SBCFCD hydrology Manual.

Return Period – Duration	Isohyetal (in)
10 year – 1 hour	0.80
2 year – 6 hour	0.70
2 year – 24 hour	1.00
100 year – 1 hour	1.10
100 year – 6 hour	1.80
100 year – 24 hour	3.00

Hydrologic Soil Group varies with both “A” and “C” soils present, and an Antecedent Moisture Conditions (AMC) 2 (10yr) and 3 (100yr) are used for the study area. The percentage impervious is 60, and the SCS runoff is 47 (weighted) for area A, and 32 for area B. Refer to Appendix D for additional detail.

The projects runoff is designed to be contained in four basin that will act as both water quality infiltration, and flood storage for peak runoff mitigation. The 100- year 24 runoff event is the limiting factor for design.

IV. ONSITE RUNOFF

Existing Condition/Pre Development

While the runoff from the subject site in the existing condition is primarily sheet flow, there are two main concentrations of flow that have been analyzed. The eastern 47.9 acres drains northeasterly to the southern side of Olivine Road and continues northerly. It is shown as Area B and Nodes 201 to 203 on the Existing Conditions Drainage Exhibit in Appendix A. The second area is the western 31.7 acres that drains northwesterly to the southern side of Olivine Road and continues northerly. It is shown as Area A and Nodes 101 to 103 on the Existing Conditions Drainage Exhibit in Appendix A. The peak flow rate in the existing condition is 34.6 cfs for Area A, and 53.8 cfs for Area B.

Proposed Condition/Post Development

The proposed condition is to utilize four main basins for water quality and flood routing for the two main areas. The basins within each area will equalize and function as a single unit. The Rationale method was prepared for determination of time of concentration for use in the development of the Unit Hydrographs. The post development 100 year 24 hour runoff for area A is 56 cfs and 5.6 ac-ft. The post development 100 year 24 hour runoff for area B is 75 cfs and 6.6 ac-ft.

The post development runoff is then routed through the proposed basins to confirm post development runoff could be mitigated to less than pre-development runoff. The four main basins are designed to be dual purpose retention and detention basins with the bottom one (1) to two (2) feet for water quality retention only, with no outfall, relying on infiltration. The storage above that is detention for the flood storage and volume needed for peak flow mitigation. In order to drain the top volume, or flood storage, outlet pipes have been shown and used for preliminary calculations. The following is the detail for the two main basins shown on the TTM;

TTM 20188 Basins within A (West) Details						
Elevation [ft]	Volume [cf]	Volume [ac ft]	Total Vol [cf]	Total Vol [ac ft]	Q out [cfs]	Notes
324.5	x	x	x	x		WQ only with no outfall
325.5	32742	0.75	32742	0.75	0	
326.5	36762	0.84	69504	1.59	4.0	Flood Mitigation, above WQ volume with controlled outlet
327.5	40928	0.94	110432	2.53	13.0	
328.5	45241	1.04	155673	3.57	18.0	

TTM 20188 Basins within B (East) Details						
Elevation [ft]	Volume [cf]	Volume [ac ft]	Total Vol [cf]	Total Vol [ac ft]	Q out [cfs]	Notes
316.7	x	x	x	x		WQ only with no outfall
317.7	21160	0.49	21160	0.49	0	
318.7	25161	0.58	46321	1.07	0	
319.7	29305	0.67	75626	1.73	12.0	Flood Mitigation, above WQ volume with controlled outlet
320.7	33590	0.77	109216	2.50	40.0	
321.7	38017	0.87	147233	3.37	51.0	

After routing through the proposed basins the post development 100 year 24 hour runoff for Area A is 13.5 cfs with 2.64 ac-ft stored, and for Area B is 35.9 cfs with 2.4 ac-ft stored. Preliminary storm drain capacity was used for calculations. However, infiltration was not considered and may provide significant infiltration potential (with Type A soils). At time of final design the final outlet structures shall be specified and designed per this report, and additional routing calculations should be prepared. Refer to Appendices D and E for detailed output files and the TTM for grading detail.

The primary hydraulic design elements are the roads and the storm drain. Roads within the project will be used to carry runoff. At the minimum design slope of 0.5% the roads can carry 37 cfs within the curbs and 52 cfs within the right-of-way. As design grades are increased, the streets can carry much more than that. Refer to Appendix E for details. The project has been analyzed at the worst case condition location (points 103 and 203) and at final design curb openings and storm drain will be designed to accept the post development runoff into the basins for routing. The basins are designed to equalize via 24" pipes. The outlet pipe from the western basin system is preliminarily sized at a 24" pipe. The outlet pipe from the eastern basin system is preliminarily sized at a 36" pipe. Refer to the

Proposed Conditions Drainage Exhibit in Appendix A and Appendix D and E for additional detail.

V. OFFSITE RUNOFF

The Baldy Mesa Master Drainage Plan (MDP) indicates Regional Facility Line A-06 traversing the subject property. This is supported by the previously approved TTM 17950 that also indicated a master plan channel through the center of the site. Design of this project has been designed to be cohesive with the approved TTM 17199 channel alignment (project directly north of subject site), and the channel details have been matched. Per the MDP, this section of Line A-06 will carry 874 cfs. The channel designed as part of this project has been designed using this peak flowrate. Refer to the channel section on the proposed condition exhibit for additional detail. At time of final design, the channel will be designed in detail to control erosion by keeping velocities below erosive levels or protecting the channel sides. As there is no development surrounding the property, this project will establish the concentration of flow and the alignment of the channel. The southern boundary of the site has been designed with a temporary channel to accept the flows south of the property and concentrating them into the channel. Once the property to the south is developed this temporary channel will not be necessary. Refer to Appendix E and the TTM for preliminary channel details.

VI. STORMWATER TREATMENT

Stormwater treatment will be provided by the bottom of the proposed basins, where the required volume will infiltrate into the groundwater. As shown on the TTM, the basins exceed the required water quality volume. At time of final design percolation testing will be required to confirm rates are sufficient to de-water the basins. Water quality calculations were prepared based on the San Bernardino County Model Water Quality Management Plan Guidance document. The following calculations were used in preliminary sizing of facilities;

- WQ Contributing area
  - Area A – 31.7 acres
  - Area B – 47.9 acres
- 2 yr 1 hour rainfall – 0.39”
- Impervious ratio – 40% (from SBCFCD hydrology Manual)
- C_{BMP} = 0.28
- Drainage Area Region – Desert – Regression Coefficient P_6 = 1.2371
- P_6 = 1.2371 x 0.39” = 0.48”
- Regression Constant a = 1.963 for 48 hours
- $P_0 = a * C_{BMP} * P_6$ = 1.963 x 0.28 x 0.48 = 0.264

- $V_0 = (P_0 * A)/12$
    - $V_A = (0.264 \times 31.7)/12 = 0.70$ acft
    - $V_B = (0.264 \times 47.9)/12 = 1.05$ acft

VII. CONCLUSION

The proposed development of tract 20188, a 76 gross acres, 195 single family detached subdivision can be mitigated as designed and analyzed in this report to be compatible with the City of Victorville Master Plan of Drainage (Baldy Mesa MDP). The development of the subject site will not adversely affect area drainage patterns, impact any of the surrounding properties, or change any of the regional master plan facilities contemplated in the MDP. There will be a concentration of flow at the outlet for Line A-06, but that is proposed following the MDP, and TTM 17199. The Site will construct combination retention and detention basins of sufficient size to handle water quality through infiltration, and flood mitigation through detention. The streets have been analyzed and confirmed to contain the 10 year runoff within the curb, and the 100 year runoff within the right of way. At time of final design, the basins and outlet structures will need be designed and analyzed in conjunction with final grading and paving plans, street grades and curb inlets will need to be designed and sized to confirm capacity with final street design.

REFERENCES

1. San Bernardino County Flood Control and Water Conservation District Hydrology Manual, August 1986.

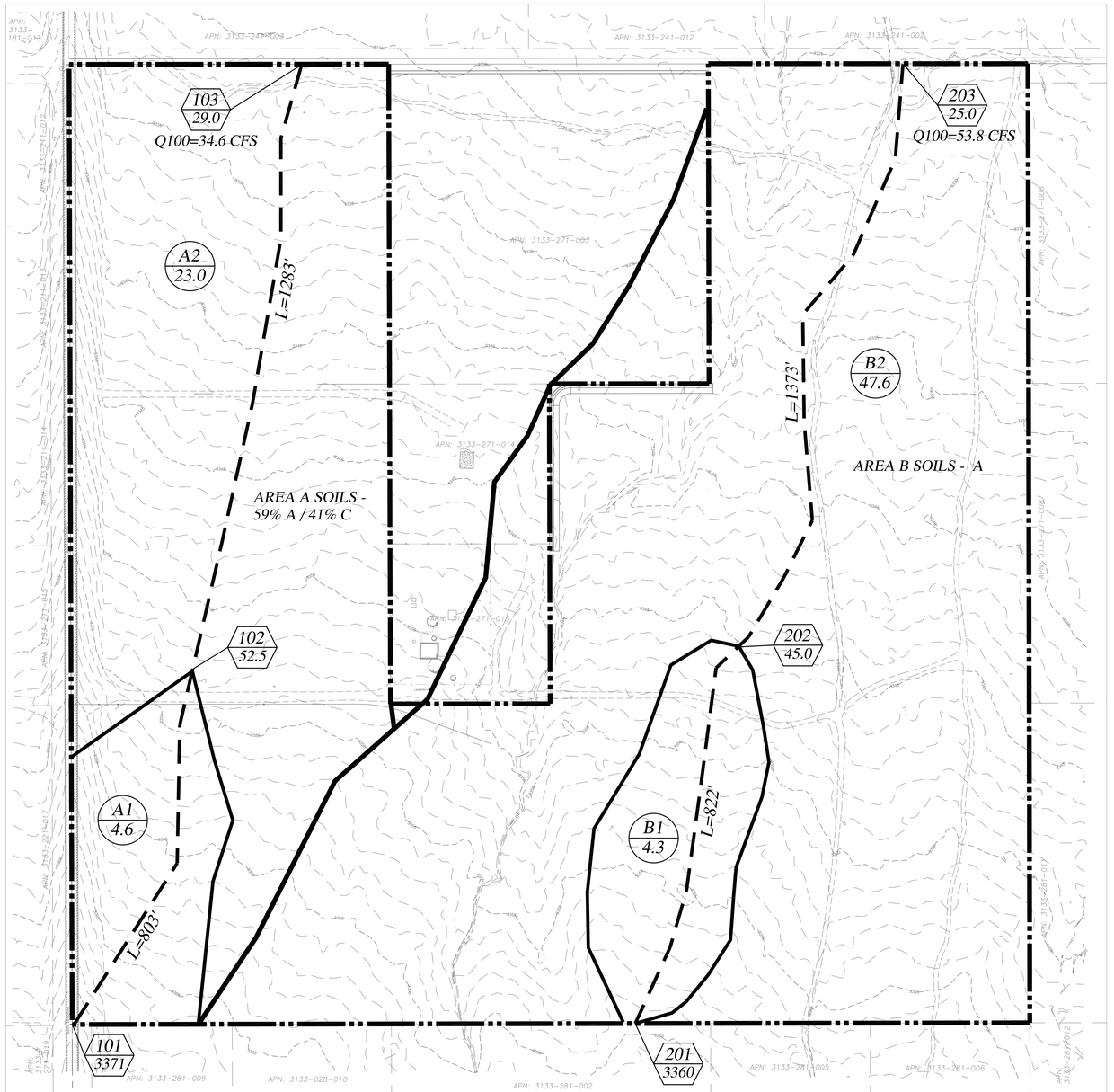
2. Baldy Mesa Master Plan of Drainage for Oro Grande Wash and Adjacent Watersheds that are Tributary to the Mojave River, Williamson & Schmid, March 1992.

APPENDIX A:
PROJECT PRE AND POST CONDITION EXHIBITS

IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

EXISTING CONDITION MAP TTM NO. 20188

UNITED ENGINEERING GROUP CA., INC JULY 2018



VICINITY MAP
N.T.S.

DRAINAGE NOTES

1. OFFSITE FLOWS TAKEN FROM PREVIOUSLY APPROVED TTM 17950, AND USED AS BASIS OF COLLECTION ALONG SOUTHERLY BORDER OF SITE, AND SIZING OF REGIONAL CHANNEL.
2. REFER TO APPENDIX D AND E FOR DESIGN DETAILS AND RESULTS OF DESIGN.

LEGEND

(XX.XX)	EXISTING ELEVATION
— — —	TRACT BOUNDARY
- - - -	FLOWLINE
———	BASIN BOUNDARY
A2 / 5.2	SUB AREA IDENTIFIER / AREA (ACRES)
101 / 1752	NODE/CONCENTRATION POINT / FLOWLINE ELEVATION

CALCULATED Tc FROM RATIONALE = 30.8 MIN (AREA A) AND 32.7 MIN (AREA B) - USED FOR UNIT HYDROGRAPH CALCULATION

PREPARED BY:

UNITED ENGINEERING GROUP–CA, INC.
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SUITE 195
RANCHO CUCAMONGA, CA 91730
PHONE: 909.466.9240
www.unitedeng.com

APPLICANT/OWNER:

ANDREW PHAM & CAROLINE PHAM
C/O ACTK CAPITAL PARTNERS, LLC
14050 BRADFORD MEADOWS
GARDEN GROVE, CA 92844

N

100' 50' 0' 100' 200'
GRAPHIC SCALE: 1"=100'

SUBMITTALS:	REVISIONS		
	NO.	DESCRIPTION	DATE
DESIGNED BY:			
DRAWN BY:			
CHECKED BY:			

REGISTERED PROFESSIONAL ENGINEER — CHRISTOPHER F. LENZ — NO. 63001 — EXP. 6/30/20 — CIVIL — STATE OF CALIFORNIA

CHRISTOPHER F. LENZ DATE
R.C.E. No. 63001

LICENSED LAND SURVEYOR — DEAN C. PHILLIPS — EXP. 9/30/19 — NO. 6974 — STATE OF CALIFORNIA

DEAN C. PHILLIPS DATE
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EXISTING CONDITION MAP
TTM NO. 20188

MONTH DAY, YEAR

SHEET 1 OF 1

PROJECT NUMBER
CA–30145

IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

PROPOSED CONDITION MAP - TRACT NO. 20188

UNITED ENGINEERING GROUP CA., INC JULY 2018

LOT AREAS			LOT AREAS			LOT AREAS			LOT AREAS		
LOT #	AREA–SF	AREA–AC	LOT #	AREA–SF	AREA–AC	LOT #	AREA–SF	AREA–AC	LOT #	AREA–SF	AREA–AC
1	8,382	0.19	51	11,489	0.26	101	12,300	0.28	151	8,051	0.18
2	9,432	0.22	52	10,142	0.23	102	14,241	0.33	152	8,306	0.19
3	9,496	0.22	53	10,149	0.23	103	11,947	0.27	153	7,934	0.18
4	11,767	0.27	54	10,156	0.23	104	7,557	0.17	154	11,478	0.26
5	9,989	0.23	55	12,463	0.29	105	7,590	0.17	155	8,965	0.21
6	9,987	0.23	56	9,761	0.22	106	7,743	0.18	156	9,188	0.21
7	9,985	0.23	57	8,708	0.20	107	8,410	0.19	157	9,475	0.22
8	11,384	0.26	58	8,617	0.20	108	8,738	0.20	158	9,527	0.22
9	9,129	0.21	59	8,795	0.20	109	9,340	0.21	159	10,238	0.24
10	9,257	0.21	60	8,879	0.20	110	9,272	0.21	160	11,359	0.26
11	8,605	0.20	61	8,839	0.20	111	8,722	0.20	161	12,932	0.30
12	8,185	0.19	62	10,098	0.23	112	9,049	0.21	162	16,552	0.38
13	9,627	0.22	63	16,900	0.39	113	9,428	0.22	163	9,948	0.23
14	16,704	0.38	64	12,796	0.29	114	8,526	0.20	164	12,277	0.28
15	11,373	0.26	65	8,112	0.19	115	11,324	0.26	165	13,232	0.30
16	8,064	0.19	66	8,125	0.19	116	19,647	0.45	166	26,354	0.60
17	8,145	0.19	67	10,307	0.24	117	12,464	0.29	167	10,835	0.25
18	8,996	0.21	68	17,820	0.41	118	14,078	0.32	168	10,105	0.23
19	9,256	0.21	69	31,605	0.73	119	9,285	0.21	169	8,327	0.19
20	7,876	0.18	70	9,429	0.22	120	8,095	0.19	170	7,554	0.17
21	8,440	0.19	71	9,575	0.22	121	8,077	0.19	171	7,208	0.17
22	7,696	0.18	72	9,002	0.21	122	7,998	0.18	172	7,208	0.17
23	8,245	0.19	73	8,257	0.19	123	7,950	0.18	173	7,208	0.17
24	7,828	0.18	74	9,572	0.22	124	8,436	0.19	174	7,139	0.16
25	7,457	0.17	75	11,791	0.27	125	9,339	0.21	175	10,122	0.23
26	7,324	0.17	76	9,975	0.23	126	8,187	0.19	176	9,573	0.22
27	7,406	0.17	77	9,830	0.23	127	8,080	0.19	177	7,425	0.17
28	7,820	0.18	78	8,461	0.19	128	8,049	0.18	178	7,425	0.17
29	7,986	0.18	79	9,355	0.21	129	8,213	0.19	179	7,425	0.17
30	8,093	0.19	80	9,619	0.22	130	7,909	0.18	180	7,425	0.17
31	9,898	0.23	81	8,344	0.19	131	9,496	0.22	181	7,425	0.17
32	7,930	0.18	82	8,318	0.19	132	18,299	0.42	182	7,425	0.17
33	8,214	0.19	83	8,398	0.19	133	18,886	0.43	183	7,425	0.17
34	8,475	0.19	84	8,488	0.19	134	9,779	0.22	184	7,425	0.17
35	7,878	0.18	85	8,225	0.19	135	8,915	0.20	185	7,425	0.17
36	7,733	0.18	86	10,077	0.23	136	8,544	0.20	186	7,425	0.17
37	7,651	0.18	87	8,987	0.21	137	8,308	0.19	187	7,319	0.17
38	8,596	0.20	88	9,529	0.22	138	8,065	0.19	188	7,245	0.17
39	7,533	0.17	89	8,094	0.19	139	7,913	0.18	189	9,597	0.22
40	8,355	0.19	90	8,013	0.18	140	8,269	0.19	190	11,385	0.26
41	7,569	0.17	91	9,706	0.22	141	8,264	0.19	191	9,272	0.21
42	8,963	0.21	92	10,346	0.24	142	8,261	0.19	192	14,644	0.34
43	11,071	0.25	93	11,161	0.26	143	7,268	0.17	193	11,332	0.26
44	10,690	0.25	94	14,301	0.33	144	7,265	0.17	194	15,806	0.36
45	10,685	0.25	95	19,480	0.45	145	7,263	0.17	195	11,203	0.26
46	9,655	0.22	96	12,515	0.29	146	7,279	0.17			
47	9,504	0.22	97	12,818	0.29	147	7,671	0.18			
48	11,331	0.26	98	8,448	0.19	148	7,590	0.17			
49	9,126	0.21	99	21,510	0.49	149	7,932	0.18			
50	9,570	0.22	100	15,338	0.35	150	8,134	0.19			

TOTAL: 1,921,625 S.F. 44.11 AC
AVE. LOT SIZE 9,854 S.F.

PROPOSED DFAD BASIN AREAS		
LOT	AREA–SF	AREA–AC
A	57,779	1.33
B	27,665	0.64
C	38,887	0.89
D	37,809	0.87

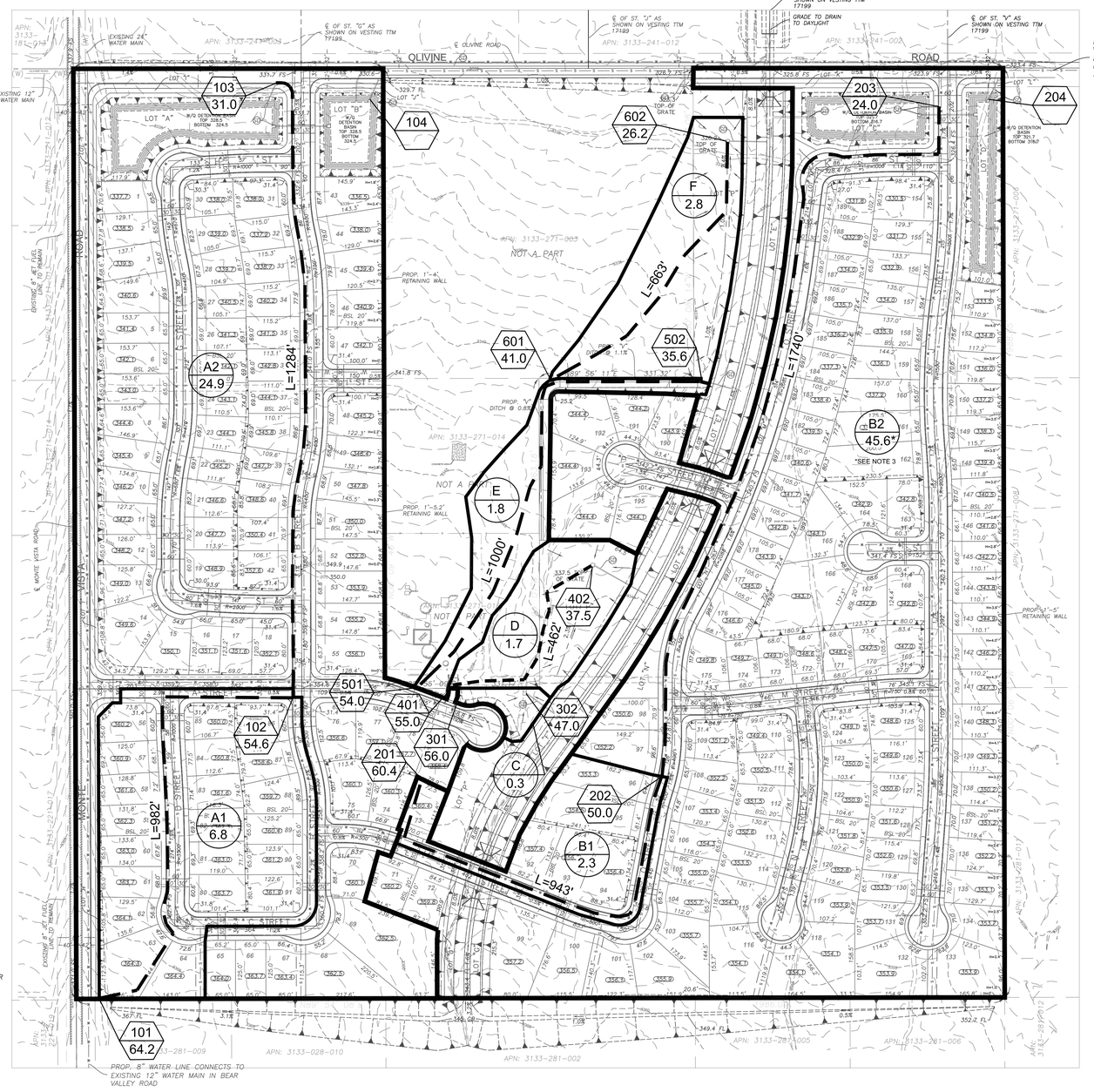
TOTAL: 162,140 S.F. 3.72 AC

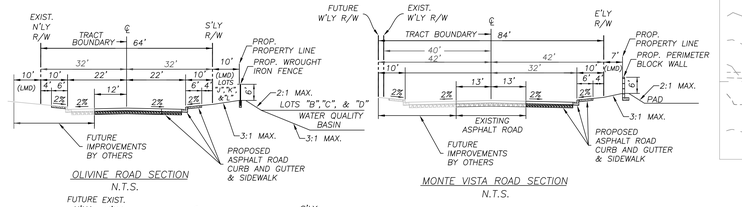
PROPOSED DRAINAGE CHANNEL AREAS TO BE DEDICATED TO SBCFCD		
LOT	AREA–SF	AREA–AC
E	81,088	1.86
F	88,185	2.02
G	22,654	0.52

TOTAL: 191,927 S.F. 4.41 AC

PROPOSED LMD AREAS		
H	AREA–SF	AREA–AC
I	4,691	0.11
J	13,173	0.30
K	1,345	0.03
L	5,035	0.12
M	774	0.02
N	8,798	0.20
O	10,942	0.25
P	3,692	0.08
2016	167,680	3.85

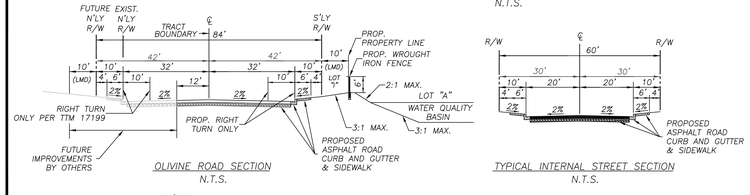
TOTAL: 216,130 S.F. 4.96 AC





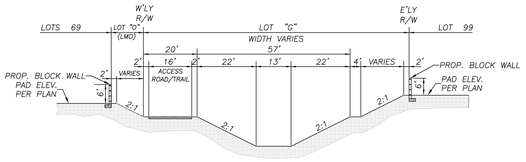
OLIVINE ROAD SECTION
N.T.S.

MONTE VISTA ROAD SECTION
N.T.S.

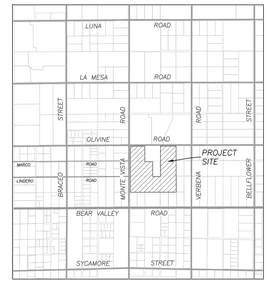


OLIVINE ROAD SECTION
N.T.S.

TYPICAL INTERNAL STREET SECTION
N.T.S.



PROPOSED DRAINAGE CHANNEL
(TO BE DEDICATED TO SAN BERNARDINO FLOOD CONTROL DISTRICT)
N.T.S.



VICINITY MAP
N.T.S.

GENERAL NOTES:

1. ASSESSOR'S PARCEL NOS.: 3133–271–1, 2, 5, 10, 11, 12, 13, & 15. 3133–281–1, 3, 7, & 8.
2. THE PROPERTY SHOWN HEREIN CONTAINS THE ENTIRE CONTIGUOUS OWNERSHIP.
3. TOTAL GROSS AREA = 3,294,862 SQ. FT., 75.64 ACRES
4. TOTAL NET AREA = 2,491,822 SQ. FT., 57.20 ACRES
5. TOTAL AREA TO BE DEDICATED FOR R/W = 803,040 SQ. FT. 18.44 ACRES
6. TOTAL NO. OF NUMBERED LOTS = 195
7. TOTAL NO. OF LETTERED LOTS = 16
8. A STREET, B STREET, C STREET, D STREET, E STREET, F STREET, G STREET, H STREET, I STREET, J STREET, K STREET, L STREET, M STREET, N STREET, O STREET AND P STREET ARE STREETS FOR PUBLIC ROAD DEDICATION.
9. LOTS 1 THROUGH 195 ARE 7,200 S.F. MIN. (RESIDENTIAL LOTS)
10. NET DENSITY: 3.41 DU/AC.
11. GROSS DENSITY: 2.58 DU/AC.
12. AVERAGE LOT SIZE = 9854 S.F.
13. CONTOUR INTERVAL = 1 FOOT (VARIES)
14. ALL SLOPES ARE 2:1 OR FLATTER
15. LOT DIMENSIONS SHOWN HEREIN ARE APPROXIMATE.
16. THIS MAP IS COMPILED FROM RECORD INFORMATION ONLY AND IS NOT TO BE USED AS A BOUNDARY SURVEY.
17. LINEAR FEET OF NEW STREETS:

A STREET = 837 LF	I STREET = 150 LF
B STREET = 1610 LF	J STREET = 1839 LF
C STREET = 304 LF	K STREET = 282 LF
D STREET = 510 LF	L STREET = 152 LF
E STREET = 719 LF	M STREET = 497 LF
F STREET = 281 LF	N STREET = 486 LF
G STREET = 930 LF	O STREET = 1686 LF
H STREET = 280 LF	P STREET = 261 LF

18. NO REGULATED TREES EXIST ON SITE, UNLESS NOTED.
19. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS MAP ARE APPROXIMATE.
20. ALL FRONT YARD BUILDING SETBACK LINES (BSL) ARE SHOWN TO AN AVERAGE DEPTH. MINIMUM FRONT YARD BSL = 20'

LAND USE INFORMATION:

EXISTING ZONING = R–1 (SINGLE FAMILY RESIDENTIAL)
PROPOSED ZONING = R–1 (SINGLE FAMILY RESIDENTIAL)
ADJACENT EXISTING LAND USE = NORTH – R–1 (VACANT/VTTM 17199)
EAST – R–1 (VACANT)
WEST – RS–1 SAN BERNARDINO COUNTY (VACANT)
SOUTH – C–2 & R–1B1/2 (VACANT)

DRAINAGE NOTES:

1. POINT 104 AND 204 REFERENCED IN THE DRAINAGE REPORT ARE THE OUTLET OF THE BASINS AFTER ROUTING.
2. REFER TO APPENDIX D AND E FOR REFERENCE.
3. AREAS C, D, E, F, AND THE CHANNEL ARE ALL CONSIDERED IN THE AREA FOR B AND RUN AS IF ROUTED THROUGH THE BASIN TO APPROXIMATE THE FINAL OUTLET TOTAL. AS NO PROPOSED IMPERVIOUS SURFACE IS PROPOSED WITHIN THOSE AREAS, THE ACTUAL OUTFLOW WILL BE LESS. AT TIME OF FINAL DESIGN DETAILED ANALYSIS WILL BE PREPARED.

LEGEND

BSL	BUILDING SETBACK LINE
FG	FINISH GRADE
FL	FLOW LINE
FS	FINISH SURFACE
PI	POINT OF INTERSECTING GRADE
LP	LOW POINT
HP	HIGH POINT
GB	GRADE BREAK
(XX.XX)	EXISTING ELEVATION
40	LOT NUMBER
123.7	PAD ELEVATION
	2:1 SLOPE, UNLESS OTHERWISE SPECIFIED
	TRACT BOUNDARY
(S)	EXIST. SEWER
(W)	EXIST. WATER
S	PROP. SEWER
W	PROP. WATER
SD	PROP. STORM DRAIN
101 / 64.2	NODE/CONCENTRATION POINT / FLOWLINE ELEVATION
A2 / 24.2	SUB AREA IDENTIFIER / AREA (ACRES)

PREPARED BY:
UNITED ENGINEERING GROUP–CA, INC.
8885 HAVEN AVENUE
SUITE 195
RANCHO CUCAMONGA, CA 91730
PHONE: 909.466.9240
www.unitedeng.com

APPLICANT/OWNER:
ANDREW PHAM & CAROLINE PHAM
C/O ACTK CAPITAL PARTNERS, LLC
14050 BRADFORD MEADOWS
GARDEN GROVE, CA 92844

GRAPHIC SCALE: 1"=100'

AREA A SOILS 59% TYPE A AND 41% TYPE C
AREAS B, C, D, E, AND F SOILS ARE 100% TYPE A

NODE	Q10 (CFS)	Q100 (CFS)
102	9.1	14.6
103	32.0	55.6
202	3.0	4.8
203	41.4	74.6
302	1.0	1.5
402	3.6	5.5
502	2.5	4.0
602	4.8	7.4

CALCULATED Tc FROM RATIONAL = 21.0 MIN (AREA A), 22.3 MIN (AREA B); USED IN UNIT HYDROGRAPH CALCULATIONS.

SUBMITTALS:	REVISIONS NO.	DESCRIPTION	DATE
DESIGNED BY:			
DRAWN BY:			
CHECKED BY:			

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER F. LENZ NO. 63001 EXP. 6/30/20 CIVIL STATE OF CALIFORNIA

CHRISTOPHER F. LENZ DATE
R.C.E. No. 63001

LICENSED LAND SURVEYOR DEAN C. PHILLIPS EXP. 9/30/19 NO. 6974 STATE OF CALIFORNIA

DEAN C. PHILLIPS DATE
L.S. No. 6974
dphillips@unitedeng.com

ueg united engineering group
8885 Haven Avenue
Suite 195
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CA 91730
Phone: 909.466.9240
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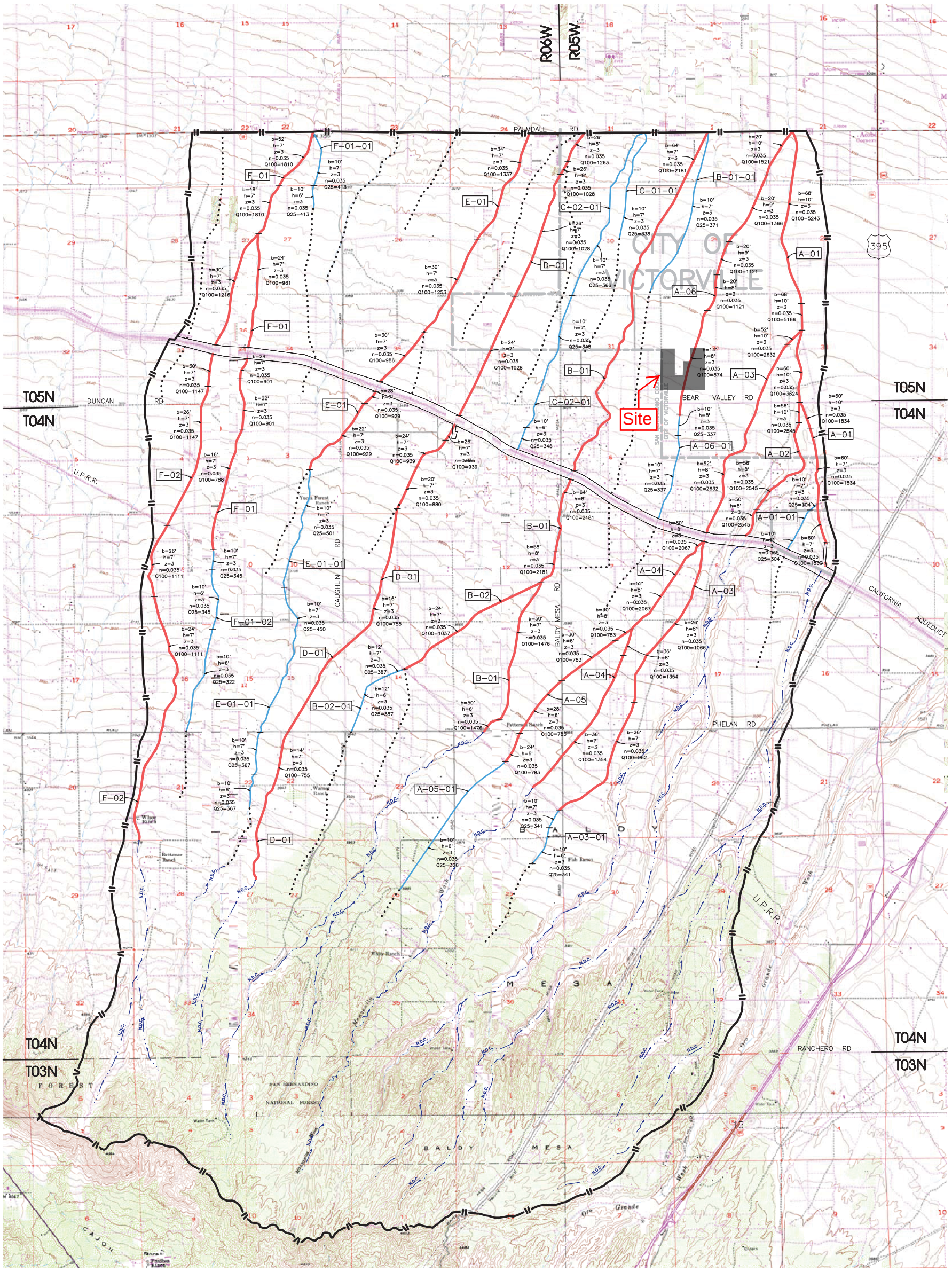
MONTE VISTA & OLIVINE

PROPOSED CONDITION EXHIBIT TTM NO. 20188

MONTH DAY, YEAR
SHEET 1 OF 1
PROJECT NUMBER CA–30145

APPENDIX B:
BALDY MESA MDP FACILITY MAP



WATERSHED BOUNDARY

CITY BOUNDARY

PROPOSED REGIONAL FACILITY

A–01 FACILITY DESIGNATION

PROPOSED SECONDARY FACILITY

PROPOSED LOCAL FACILITY

NATURAL DRAINAGE COURSE (N.D.C.)

N

SCALE: 1" = 5000'

BALDY MESA

MASTER PLAN OF DRAINAGE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

FACILITY INDEX MAP

DATE

F.B. REF.

FILE NO.

DRWG. NO.

APPENDIX C:
TTM 20188

IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

VESTING TENTATIVE MAP - TRACT NO. 20188

BEING A SUBDIVISION OF THE SW 1/4 OF SECTION 32,
TOWNSHIP 5 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN,
IN THE CITY OF VICTORVILLE,
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

UNITED ENGINEERING GROUP CA., INC JULY 2018

LOT AREAS			LOT AREAS			LOT AREAS			LOT AREAS		
LOT #	AREA–SF	AREA–AC	LOT #	AREA–SF	AREA–AC	LOT #	AREA–SF	AREA–AC	LOT #	AREA–SF	AREA–AC
1	8,382	0.19	51	11,489	0.26	101	12,300	0.28	151	8,051	0.18
2	9,432	0.22	52	10,142	0.23	102	14,241	0.33	152	8,306	0.19
3	9,496	0.22	53	10,149	0.23	103	11,947	0.27	153	7,934	0.18
4	11,767	0.27	54	10,156	0.23	104	7,557	0.17	154	11,478	0.26
5	9,989	0.23	55	12,463	0.29	105	7,590	0.17	155	8,965	0.21
6	9,987	0.23	56	9,761	0.22	106	7,743	0.18	156	9,188	0.21
7	9,985	0.23	57	8,708	0.20	107	8,410	0.19	157	9,475	0.22
8	11,384	0.26	58	8,617	0.20	108	8,738	0.20	158	9,527	0.22
9	9,129	0.21	59	8,795	0.20	109	9,340	0.21	159	10,238	0.24
10	9,257	0.21	60	8,879	0.20	110	9,272	0.21	160	11,359	0.26
11	8,605	0.20	61	8,839	0.20	111	8,722	0.20	161	12,932	0.30
12	8,185	0.19	62	10,098	0.23	112	9,049	0.21	162	16,552	0.38
13	9,627	0.22	63	16,900	0.39	113	9,428	0.22	163	9,948	0.23
14	16,704	0.38	64	12,796	0.29	114	8,526	0.20	164	12,277	0.28
15	11,373	0.26	65	8,112	0.19	115	11,324	0.26	165	13,232	0.30
16	8,064	0.19	66	8,125	0.19	116	19,647	0.45	166	26,354	0.60
17	8,145	0.19	67	10,307	0.24	117	12,464	0.29	167	10,835	0.25
18	8,996	0.21	68	17,820	0.41	118	14,078	0.32	168	10,105	0.23
19	9,256	0.21	69	31,605	0.73	119	9,285	0.21	169	8,327	0.19
20	7,876	0.18	70	9,429	0.22	120	8,095	0.19	170	7,554	0.17
21	8,440	0.19	71	9,575	0.22	121	8,077	0.19	171	7,208	0.17
22	7,696	0.18	72	9,002	0.21	122	7,998	0.18	172	7,208	0.17
23	8,245	0.19	73	8,257	0.19	123	7,950	0.18	173	7,208	0.17
24	7,828	0.18	74	9,572	0.22	124	8,436	0.19	174	7,139	0.16
25	7,457	0.17	75	11,791	0.27	125	9,339	0.21	175	10,122	0.23
26	7,324	0.17	76	9,975	0.23	126	8,187	0.19	176	9,573	0.22
27	7,406	0.17	77	9,830	0.23	127	8,080	0.19	177	7,425	0.17
28	7,820	0.18	78	8,461	0.19	128	8,049	0.18	178	7,425	0.17
29	7,986	0.18	79	9,355	0.21	129	8,213	0.19	179	7,425	0.17
30	8,093	0.19	80	9,619	0.22	130	7,909	0.18	180	7,425	0.17
31	9,898	0.23	81	8,344	0.19	131	9,496	0.22	181	7,425	0.17
32	7,930	0.18	82	8,318	0.19	132	18,299	0.42	182	7,425	0.17
33	8,214	0.19	83	8,398	0.19	133	18,886	0.43	183	7,425	0.17
34	8,475	0.19	84	8,488	0.19	134	9,779	0.22	184	7,425	0.17
35	7,878	0.18	85	8,225	0.19	135	8,915	0.20	185	7,425	0.17
36	7,733	0.18	86	10,077	0.23	136	8,544	0.20	186	7,425	0.17
37	7,651	0.18	87	8,987	0.21	137	8,308	0.19	187	7,319	0.17
38	8,596	0.20	88	9,529	0.22	138	8,065	0.19	188	7,245	0.17
39	7,533	0.17	89	8,094	0.19	139	7,913	0.18	189	9,597	0.22
40	8,355	0.19	90	8,013	0.18	140	8,269	0.19	190	11,385	0.26
41	7,569	0.17	91	9,706	0.22	141	8,264	0.19	191	9,272	0.21
42	8,963	0.21	92	10,346	0.24	142	8,261	0.19	192	14,644	0.34
43	11,071	0.25	93	11,161	0.26	143	7,268	0.17	193	11,332	0.26
44	10,690	0.25	94	14,301	0.33	144	7,265	0.17	194	15,806	0.36
45	10,685	0.25	95	19,480	0.45	145	7,263	0.17	195	11,203	0.26
46	9,655	0.22	96	12,515	0.29	146	7,279	0.17			
47	9,504	0.22	97	12,818	0.29	147	7,671	0.18			
48	11,331	0.26	98	8,448	0.19	148	7,590	0.17			
49	9,126	0.21	99	21,510	0.49	149	7,932	0.18			
50	9,570	0.22	100	15,338	0.35	150	8,134	0.19			

TOTAL:
1,921,625 S.F. 44.11 AC
AVE. LOT SIZE 9,854 S.F.

PROPOSED DFAD BASIN AREAS		
LOT	AREA–SF	AREA–AC
A	57,779	1.33
B	27,665	0.64
C	38,887	0.89
D	37,809	0.87

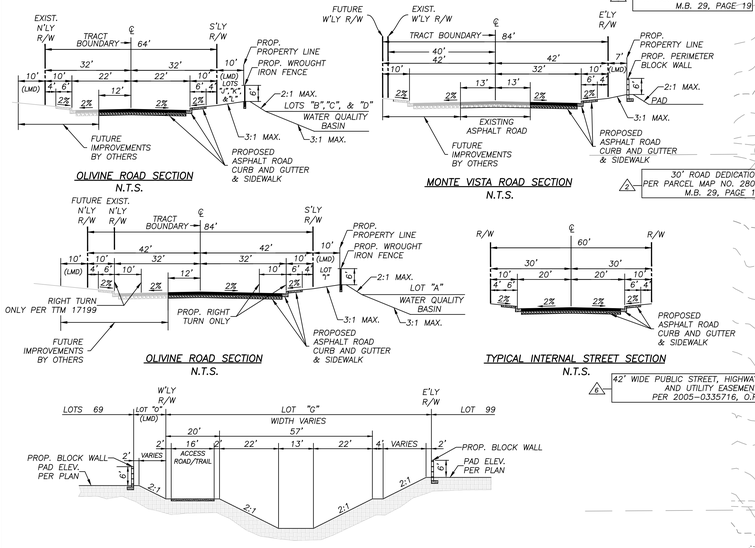
TOTAL:
162,140 S.F. 3.72 AC

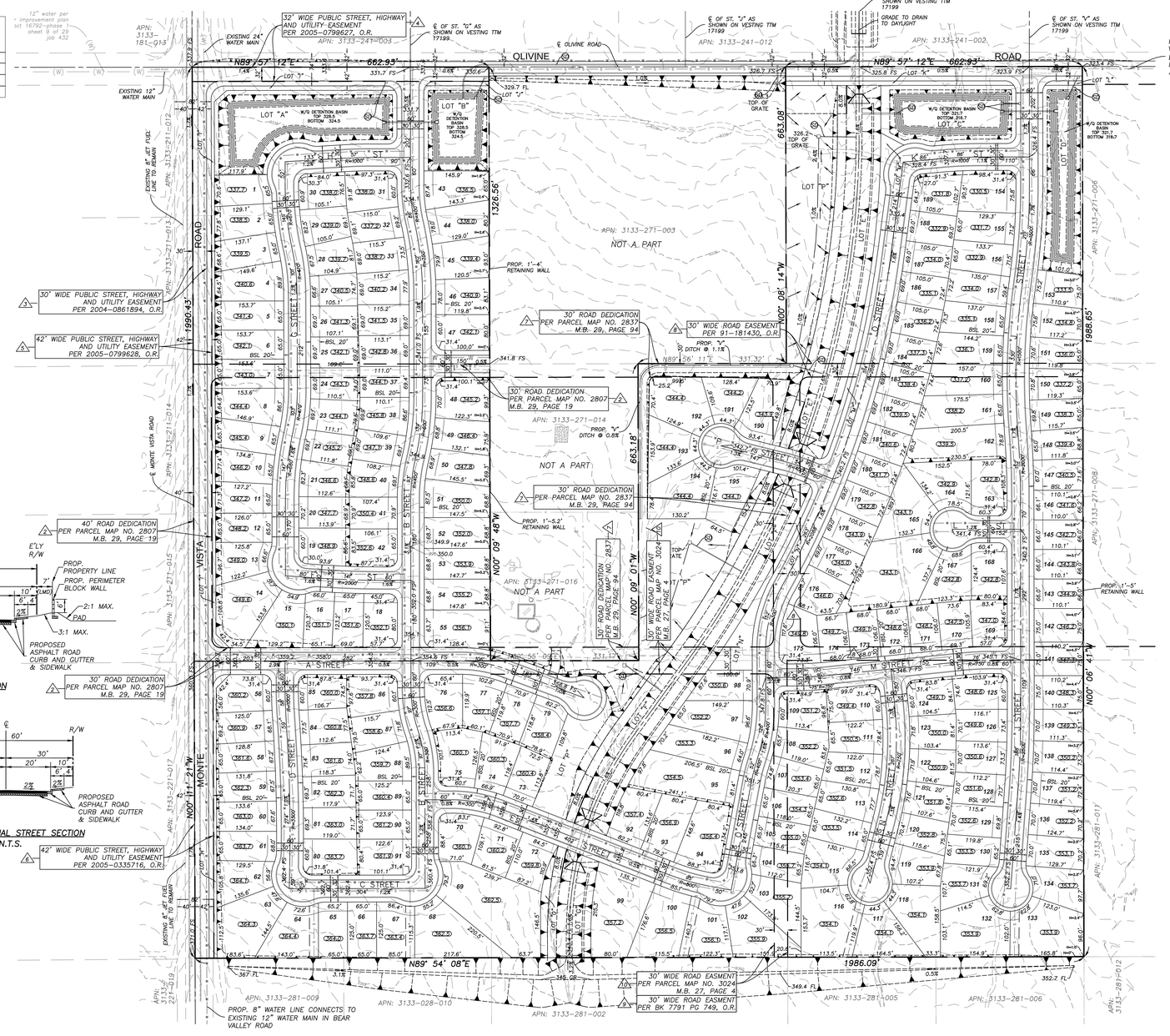
PROPOSED DRAINAGE CHANNEL AREAS TO BE DEDICATED TO SBCFCD		
LOT	AREA–SF	AREA–AC
E	81,088	1.86
F	88,185	2.02
G	22,654	0.52

TOTAL:
191,927 S.F. 4.41 AC

PROPOSED LMD AREAS		
H	AREA–SF	AREA–AC
I	4,691	0.11
J	13,173	0.30
K	1,345	0.03
L	5,035	0.12
M	774	0.02
N	8,798	0.20
O	10,942	0.25
P	3,692	0.08
2016	167,680	3.85

TOTAL:
216,130 S.F. 4.96 AC





VICINITY MAP
N.T.S.

GENERAL NOTES:

1. ASSESSOR'S PARCEL NOS.: 3133–271–1, 2, 5, 10, 11, 12, 13, & 15. 3133–281–1, 3, 7, & 8.
2. THE PROPERTY SHOWN HEREIN CONTAINS THE ENTIRE CONTIGUOUS OWNERSHIP.
3. TOTAL GROSS AREA = 3,294,862 SQ. FT., 75.64 ACRES
4. TOTAL NET AREA = 2,491,822 SQ. FT., 57.20 ACRES
5. TOTAL AREA TO BE DEDICATED FOR R/W = 803,040 SQ. FT. 18.44 ACRES
6. TOTAL NO. OF NUMBERED LOTS = 195
7. TOTAL NO. OF LETTERED LOTS = 16
8. A STREET, B STREET, C STREET, D STREET, E STREET, F STREET, G STREET, H STREET, I STREET, J STREET, K STREET, L STREET, M STREET, N STREET, O STREET AND P STREET ARE STREETS FOR PUBLIC ROAD DEDICATION.
9. LOTS 1 THROUGH 195 ARE 7,200 S.F. MIN. (RESIDENTIAL LOTS)
10. NET DENSITY: 3.41 DU/AC.
11. GROSS DENSITY: 2.58 DU/AC.
12. AVERAGE LOT SIZE = 9854 S.F.
13. CONTOUR INTERVAL = 1 FOOT (VARIES)
14. ALL SLOPES ARE 2:1 OR FLATTER
15. LOT DIMENSIONS SHOWN HEREIN ARE APPROXIMATE.
16. THIS MAP IS COMPILED FROM RECORD INFORMATION ONLY AND IS NOT TO BE USED AS A BOUNDARY SURVEY.
17. LINEAR FEET OF NEW STREETS:

A STREET = 837 LF	I STREET = 150 LF
B STREET = 1610 LF	J STREET = 1839 LF
C STREET = 304 LF	K STREET = 282 LF
D STREET = 510 LF	L STREET = 152 LF
E STREET = 719 LF	M STREET = 497 LF
F STREET = 281 LF	N STREET = 486 LF
G STREET = 930 LF	O STREET = 1686 LF
H STREET = 280 LF	P STREET = 261 LF

18. NO REGULATED TREES EXIST ON SITE, UNLESS NOTED.
19. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS MAP ARE APPROXIMATE.
20. ALL FRONT YARD BUILDING SETBACK LINES (BSL) ARE SHOWN TO AN AVERAGE DEPTH. MINIMUM FRONT YARD BSL = 20'

LAND USE INFORMATION:

EXISTING ZONING = R–1 (SINGLE FAMILY RESIDENTIAL)
PROPOSED ZONING = R–1 (SINGLE FAMILY RESIDENTIAL)
ADJACENT EXISTING LAND USE = NORTH – R–1 (VACANT/VTTM 17199)
EAST – R–1 (VACANT)
WEST – RS–1 SAN BERNARDINO COUNTY (VACANT)
SOUTH – C–2 & R–1B1/2 (VACANT)

LEGEND

BSL	BUILDING SETBACK LINE
FG	FINISH GRADE
FL	FLOW LINE
FS	FINISH SURFACE
PI	POINT OF INTERSECTING GRADE
LP	LOW POINT
HP	HIGH POINT
GB	GRADE BREAK
(XX.XX)	EXISTING ELEVATION
40	LOT NUMBER
(483.2)	PAD ELEVATION
	2:1 SLOPE, UNLESS OTHERWISE SPECIFIED
	TRACT BOUNDARY
(S)	EXIST. SEWER
(W)	EXIST. WATER
S	PROP. SEWER
W	PROP. WATER
SD	PROP. STORM DRAIN

UTILITY PURVEYORS

WATER	VICTORVILLE WATER DISTRICT 14343 CIVIC DRIVE VICTORVILLE, CA 92393 (760) 955–5001
SEWER	CITY OF VICTORVILLE 14343 CIVIC DRIVE VICTORVILLE, CA 92393 (760) 955–5001
TRASH	BURRTEC WASTE 17080 STODDARD WELLS RD. VICTORVILLE, CA 92394 (760) 245–8807
ELECTRIC	SOUTHERN CALIFORNIA EDISON 12353 HESPERIA RD. VICTORVILLE, CA 92392 (760) 951–3253
GAS	SOUTHWEST GAS CORP. 13471 MARIPOSA RD. VICTORVILLE, CA 92392 (760) 951–4050
TELEPHONE	VERIZON 16071 MOJAVE DR. BLDG. A VICTORVILLE, CA 92392 (760) 245–0894
CABLE	CHARTER COMMUNICATIONS 12490 BUSINESS CENTER DR. SUITE 1 VICTORVILLE, CA 92392 (760) 843–3054

BENCH MARK

CITY OF ADELANTO BENCHMARK NO. U–306; ALSO BEING NATIONAL GEODETIC SURVEY BENCHMARK DESIGNATION U–306; PID EV0114; A BRASS DISK STAMPED U306 1935; SET IN CONCRETE; SOUTHWEST CORNER OF PALMDALE ROAD & KOALA ROAD. ELEVATION 3201.187 FEET (ADELANTO CITYWIDE DATUM).

PREPARED BY:

UNITED ENGINEERING GROUP–CA, INC.
8885 HAVEN AVENUE
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APPLICANT/OWNER:

ANDREW PHAM & CAROLINE PHAM
C/O ACTK CAPITAL PARTNERS, LLC
14050 BRADFORD MEADOWS
GARDEN GROVE, CA 92844

LEGAL DESCRIPTION

PER CHICAGO TITLE COMPANY PRELIMINARY REPORT DATED APRIL 20,2017 ORDER NO: 7101701194–DD.

REAL PROPERTY IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 1A: PARCEL NO. 1
THE NORTH 1/2 OF THE NORTHWEST 1/4 OF THE NORTHWEST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 32, TOWNSHIP 5 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO GOVERNMENT SURVEY.

APN:3133–271–01

PARCEL NO. 2

THE SOUTH 1/2 OF THE NORTHWEST 1/4 OF THE NORTHWEST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 32, TOWNSHIP 5 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO GOVERNMENT SURVEY.

APN:3133–271–02

PARCEL 1B:

PARCELS 1THROUGH 4, INCLUSIVE OF PARCEL MAP 2807, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE RECORDER OF THE COUNTY OF SAN BERNARDINO, IN BOOK 29 OF MAPS, PAGE 19, IN SAID COUNTY.
APN:3133–271–10, 3133–271–11, 3133–271–12 AND 3133–271–13

PARCEL 2A:

THE NORTHWEST 1/4 OF THE NORTHEAST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 32, TOWNSHIP 5 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO GOVERNMENT SURVEY.
APN:3133–271–04

PARCEL 2B:

THE NORTHWEST 1/4 OF THE SOUTHEAST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 32, TOWNSHIP 5 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO GOVERNMENT SURVEY.

APN:3133–281–03

PARCEL 3:

THE NORTHWEST 1/4 OF THE SOUTHWEST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 32, TOWNSHIP 5 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO GOVERNMENT SURVEY.
APN:3133–281–01

PARCEL 4:

PARCELS 2 AND 3 OF PARCEL MAP 2837, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 29 OF PARCEL MAPS, PAGE 94, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.
APN:3133–271–15

PARCEL 5: PARCEL 5A:
THE SOUTHWEST 1/4 OF THE NORTHEAST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 32,TOWNSHIP 5 NORTH, RANGE 5 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.
APN:3133–271–05

PARCEL 5B:

PARCELS 1AND 2 OF PARCEL MAP NO. 3024, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP FILED IN BOOK 27, PAGE 4 OF PARCEL MAPS, RECORDS OF SAID COUNTY. APNS: 3133–281–07, 3133–281–08

EASEMENTS

1. RESERVATIONS CONTAINED IN THE PATENT
FROM: THE UNITED STATES OF AMERICA
RECORDING NO.: IN BOOK J, PAGE 85 OF PATENTS
WHICH AMONG OTHER THINGS RECITES AS FOLLOWS:
SUBJECT TO ANY VESTED AND ACCRUED WATER RIGHTS FOR MINING, AGRICULTURAL, MANUFACTURING, OR OTHER PURPOSES AND RIGHTS TO DITCHES AND RESERVOIRS USED IN CONNECTION WITH SUCH WATER RIGHTS, AS MAY BE RECOGNIZED AND ACKNOWLEDGED BY THE LOCAL CUSTOMS, LAWS AND DECISIONS OF THE COURTS, AND THE RESERVATION FROM THE LANDS HEREBY GRANTED, A RIGHT OF WAY THEREON FOR DITCHES OR CANALS CONSTRUCTED BY THE AUTHORITY OF THE UNITED STATES.

2. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS DELINEATED OR AS OFFERED FOR DEDICATION, ON THE MAP OF SAID TRACT/PLAT;
PURPOSE: ROADS AND INCIDENTAL PURPOSES
RECORDING NO.: IN BOOK 29 OF PARCEL MAPS, PAGES 19

3. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: CITY OF VICTORVILLE
PURPOSE: STREET, HIGHWAYS, SEWERS, DRAINAGE, PUBLIC UTILITIES, PUBLIC ACCESS AND INCIDENTAL PURPOSES
RECORDING DATE: NOVEMBER 22, 2004
RECORDING NO.: 2004–0861894, OFFICIAL RECORDS

4. AN IRREVOCABLE OFFER TO DEDICATE AN EASEMENT OVER A PORTION OF SAID LAND FOR
PURPOSE(S): STREET, HIGHWAY, SEWERS, DRAINAGE, PUBLIC UTILITIES, PUBLIC ACCESS AND INCIDENTAL PURPOSES
RECORDING DATE: OCTOBER 25, 2005
RECORDING NO.: 2005–0799627, OFFICIAL RECORDS

5. AN IRREVOCABLE OFFER TO DEDICATE AN EASEMENT OVER A PORTION OF SAID LAND FOR
PURPOSE(S): STREET, HIGHWAYS, SEWERS, DRAINAGE, PUBLIC UTILITIES, PUBLIC ACCESS AND INCIDENTAL PURPOSES
RECORDING DATE: OCTOBER 25, 2005
RECORDING NO.: 2005–0799626, OFFICIAL RECORDS

6. AN IRREVOCABLE OFFER TO DEDICATE AN EASEMENT OVER A PORTION OF SAID LAND FOR
PURPOSE(S): STREET, HIGHWAYS, SEWERS, DRAINAGE, PUBLIC UTILITIES, PUBLIC ACCESS AND INCIDENTAL PURPOSES
RECORDING DATE: MAY 11,2005
RECORDING NO.: 2005–0335716, OFFICIAL RECORDS

7. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS DELINEATED OR AS OFFERED FOR DEDICATION, ON THE MAP OF SAID TRACT/PLAT;
PURPOSE: ROADS
RECORDING NO.: IN BOOK 29, PAGE 94 OF PARCEL MAPS
SAID OFFER WAS ACCEPTED BY RESOLUTION, A CERTIFIED COPY OF WHICH WAS RECORDED AUGUST 18, 1989, 89–302792, OFFICIAL RECORDS.

8. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: THE COUNTY OF SAN BERNARDINO
PURPOSE: HIGHWAY, ROAD AND INCIDENTAL PURPOSES
RECORDING DATE: MAY 28, 1991
RECORDING NO.: 91–181430, OFFICIAL RECORDS

9. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: EVELYN K. HADDAD, A SINGLE WOMAN
PURPOSE: ROAD AND UTILITY
RECORDING DATE: NOVEMBER 9, 1971
RECORDING NO.: IN BOOK 7791, PAGE 749, OFFICIAL RECORDS

10. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS DELINEATED OR AS OFFERED FOR DEDICATION, ON THE MAP OF SAID TRACT/PLAT;
PURPOSE: HIGHWAY, ROAD AND INCIDENTAL PURPOSES
RECORDING NO.: IN BOOK 27, PAGE 4 OF PARCEL MAP

SUBMITTALS:	REVISIONS		
	NO.	DESCRIPTION	DATE
DESIGNED BY:			
DRAWN BY:			
CHECKED BY:			

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER F. LENZ NO. 63001 EXP. 6/30/20 CIVIL STATE OF CALIFORNIA

7/30/2018
CHRISTOPHER F. LENZ DATE
R.C.E. No. 63001

LICENSED LAND SURVEYOR DEAN C. PHILLIPS EXP. 9/30/19 NO. 6974 STATE OF CALIFORNIA

7/30/2018
DEAN C. PHILLIPS DATE
L.S. No. 6974
dphillips@unitedeng.com

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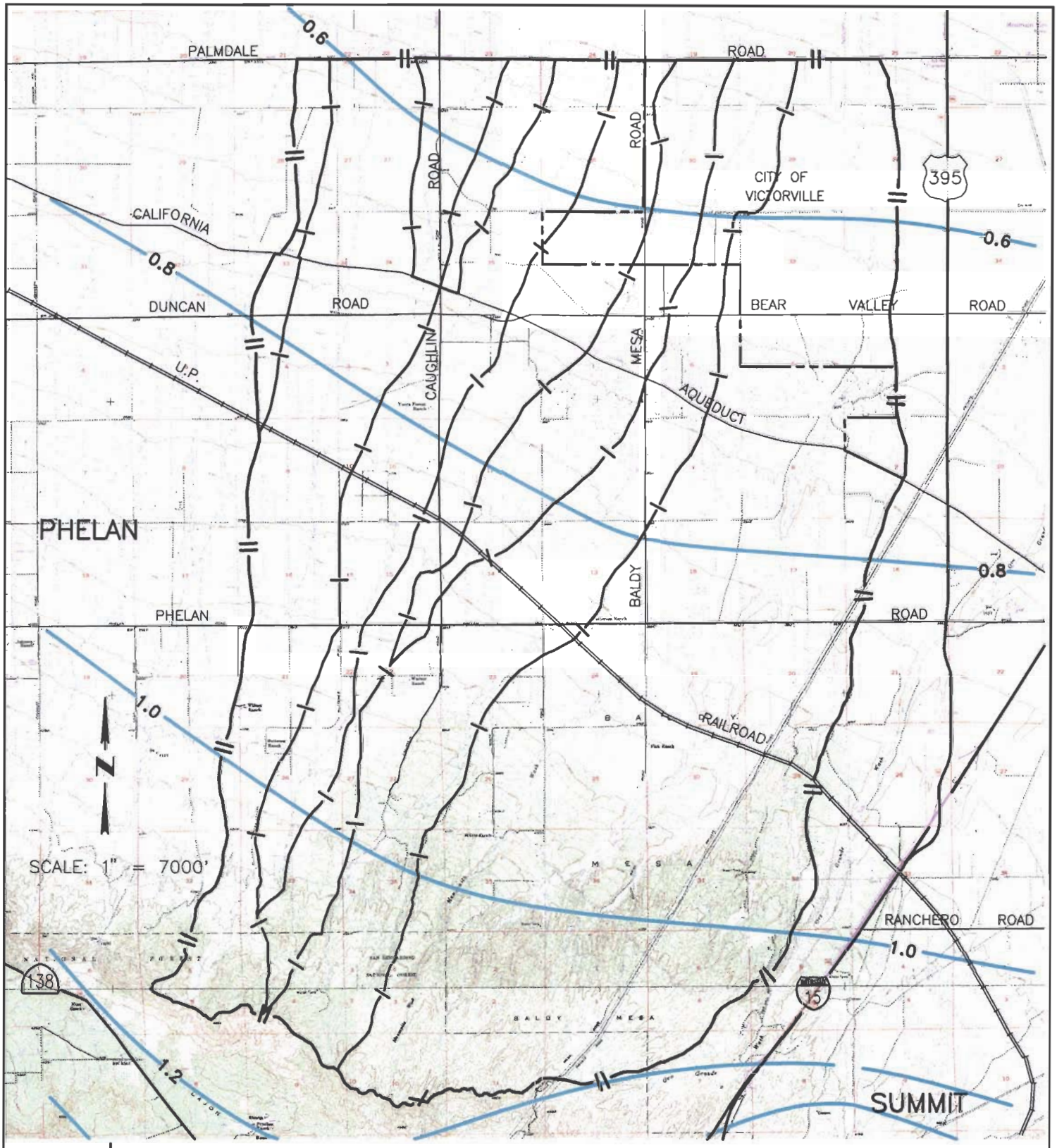
GRAPHIC SCALE: 1"=100'

MONTE VISTA & OLIVINE

TENTATIVE TRACT MAP NO. 20188

JULY 30, 2018
SHEET 1 OF 1
PROJECT NUMBER
CA–30145

APPENDIX D:
PROJECT RATIONAL
SCS UNIT HYDROGRAPH
HYDROLOGY STUDY INFORMATION



BALDY MESA

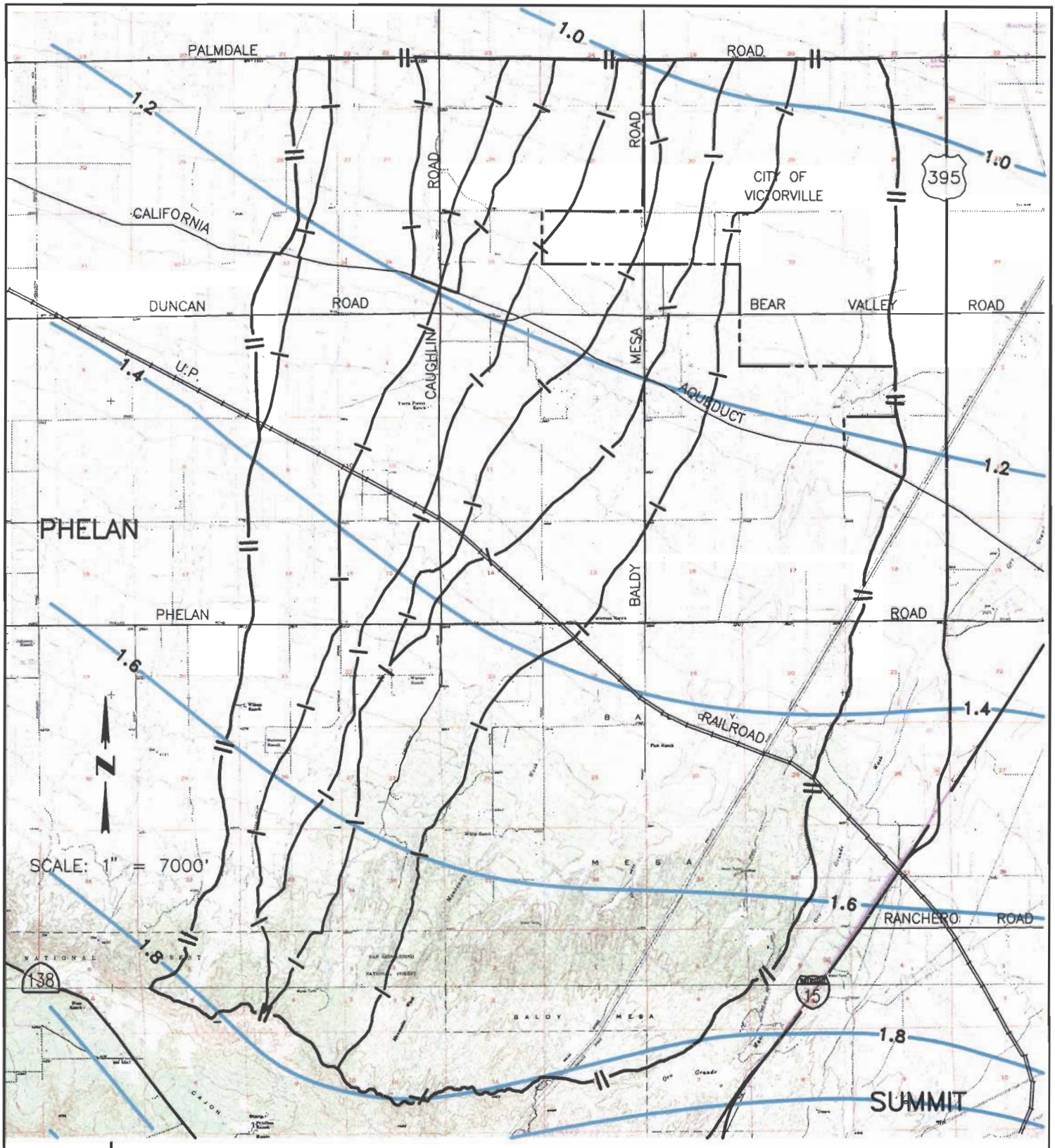
MASTER PLAN OF DRAINAGE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

RAINFALL ISOHYETAL MAP
2 YEAR – 6 HOUR

DATE	
F.B. REF.	
FILE NO.	
DRWG. NO.	1 of 1

FIGURE 4.2



LEGEND

WATERSHED BOUNDARY
CITY BOUNDARY
1.2 RAINFALL ISOHYETAL (INCHES)
DRAINAGE DIVIDE

BALDY MESA

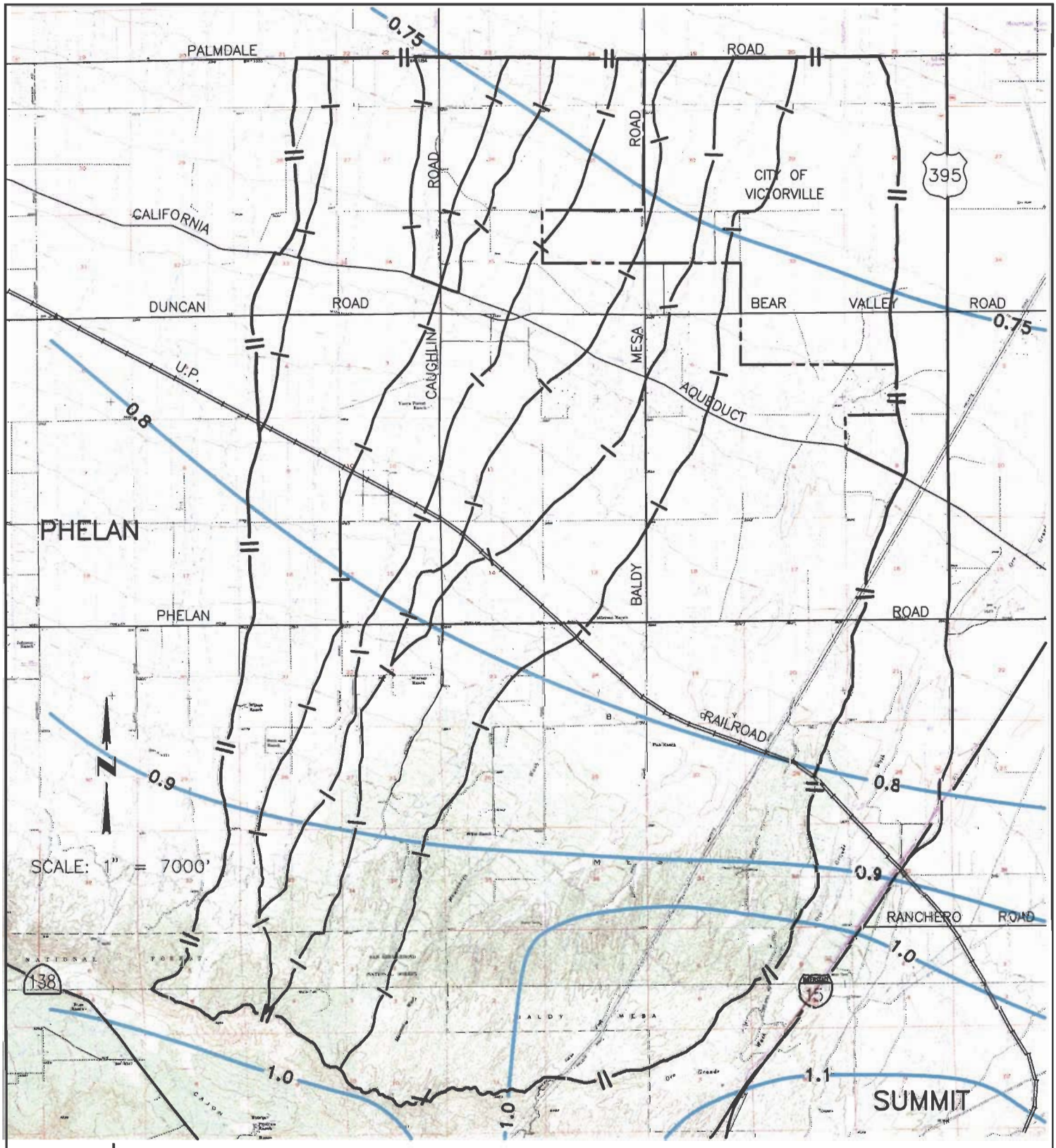
MASTER PLAN OF DRAINAGE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

RAINFALL ISOHYETAL MAP
2 YEAR – 24 HOUR

DATE	
F.B. REF.	
FILE NO.	
DRWG. NO.	1 of 1

FIGURE 4.3



LEGEND

WATERSHED BOUNDARY
CITY BOUNDARY
1.2 RAINFALL ISOHYETAL (INCHES)
DRAINAGE DIVIDE

BALDY MESA

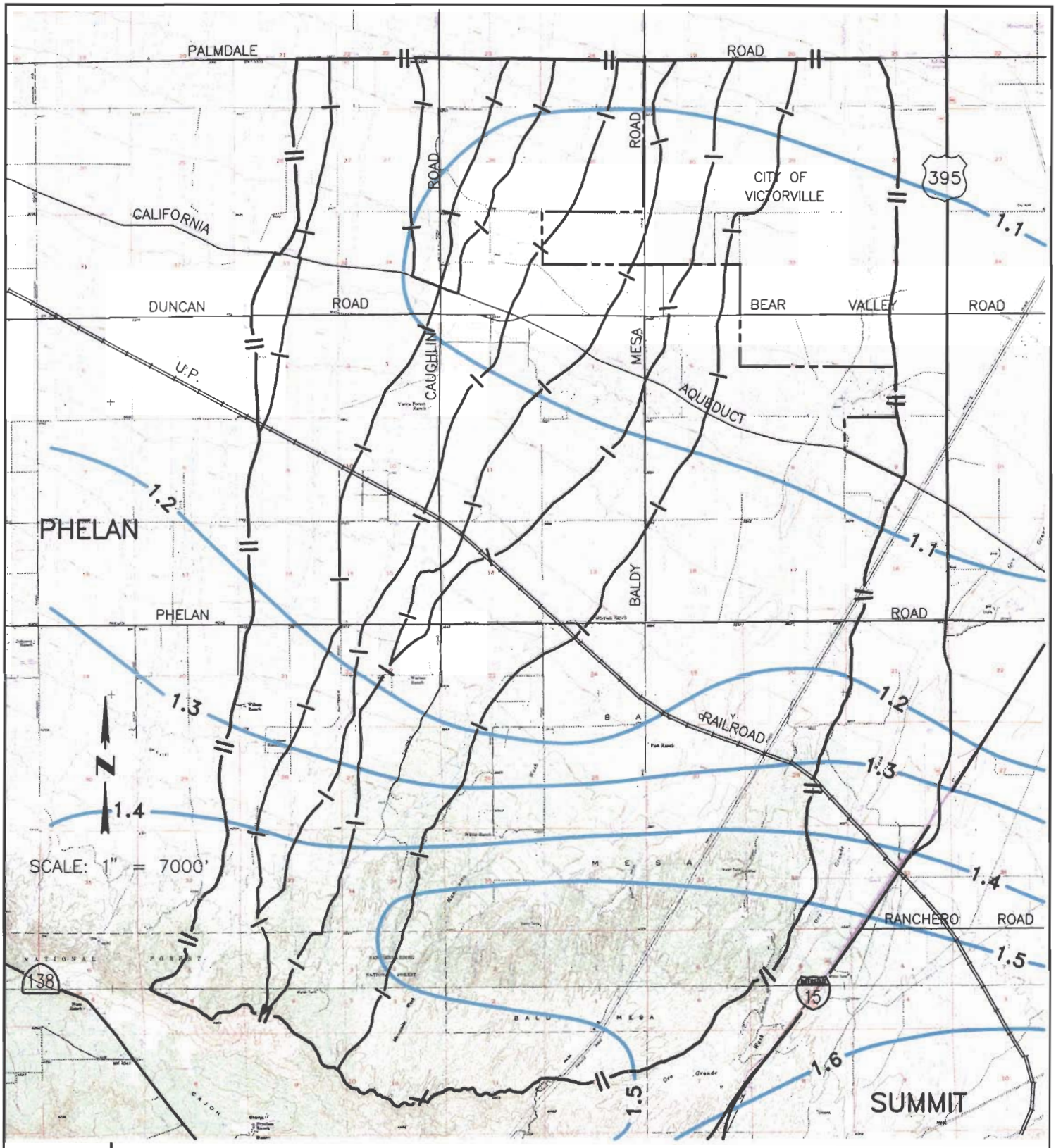
MASTER PLAN OF DRAINAGE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

RAINFALL ISOHYETAL MAP
10 YEAR – 1 HOUR

DATE	
F.B. REF.	
FILE NO.	
DRWG. NO.	1 of 1

FIGURE 4.4



LEGEND

- WATERSHED BOUNDARY
- CITY BOUNDARY
- 1.2 RAINFALL ISOHYETAL (INCHES)
- DRAINAGE DIVIDE

BALDY MESA

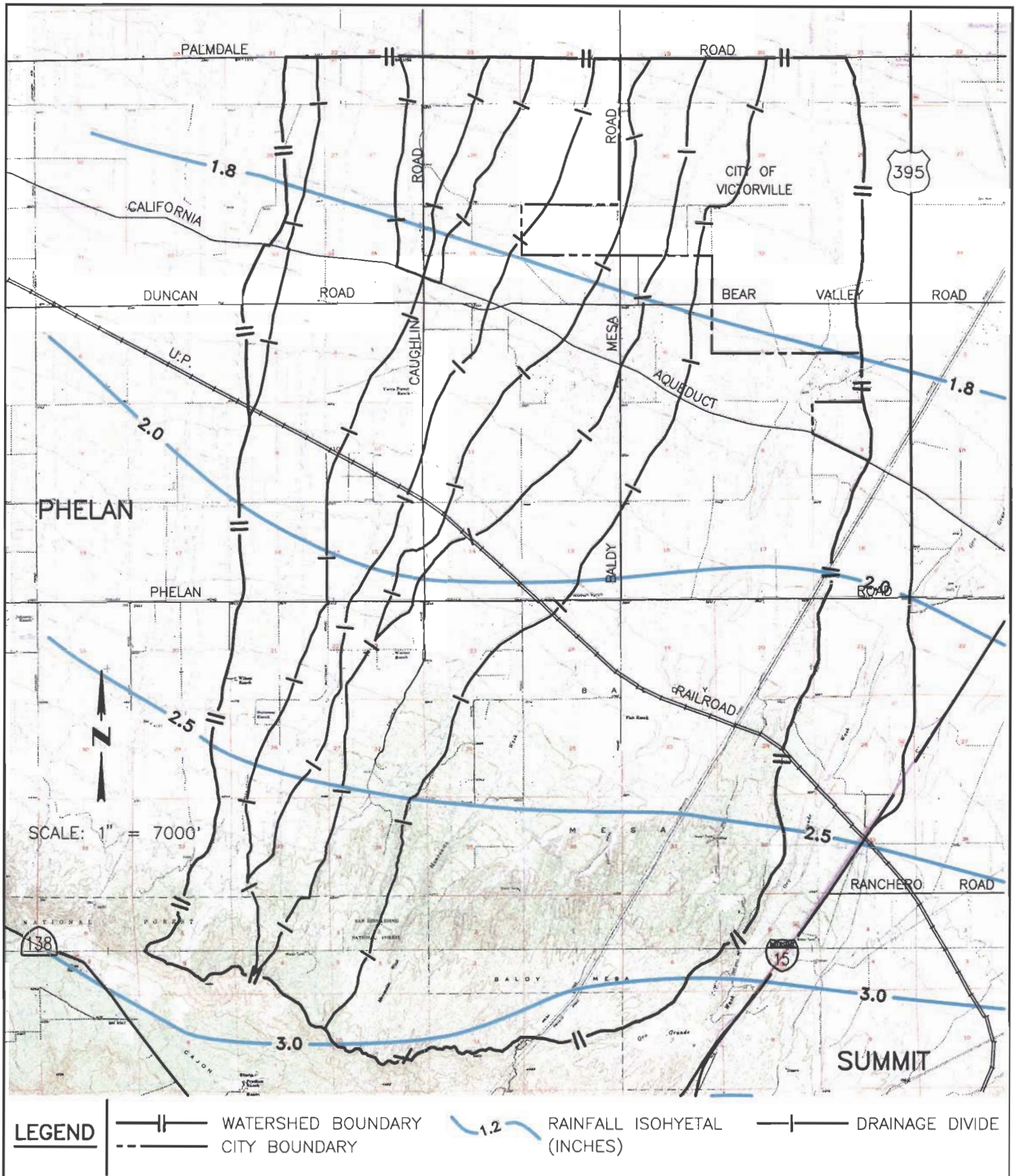
MASTER PLAN OF DRAINAGE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

RAINFALL ISOHYETAL MAP
100 YEAR – 1 HOUR

DATE	
F.B. REF.	
FILE NO.	
DRWG. NO.	1 of 1

FIGURE 4.5



BALDY MESA

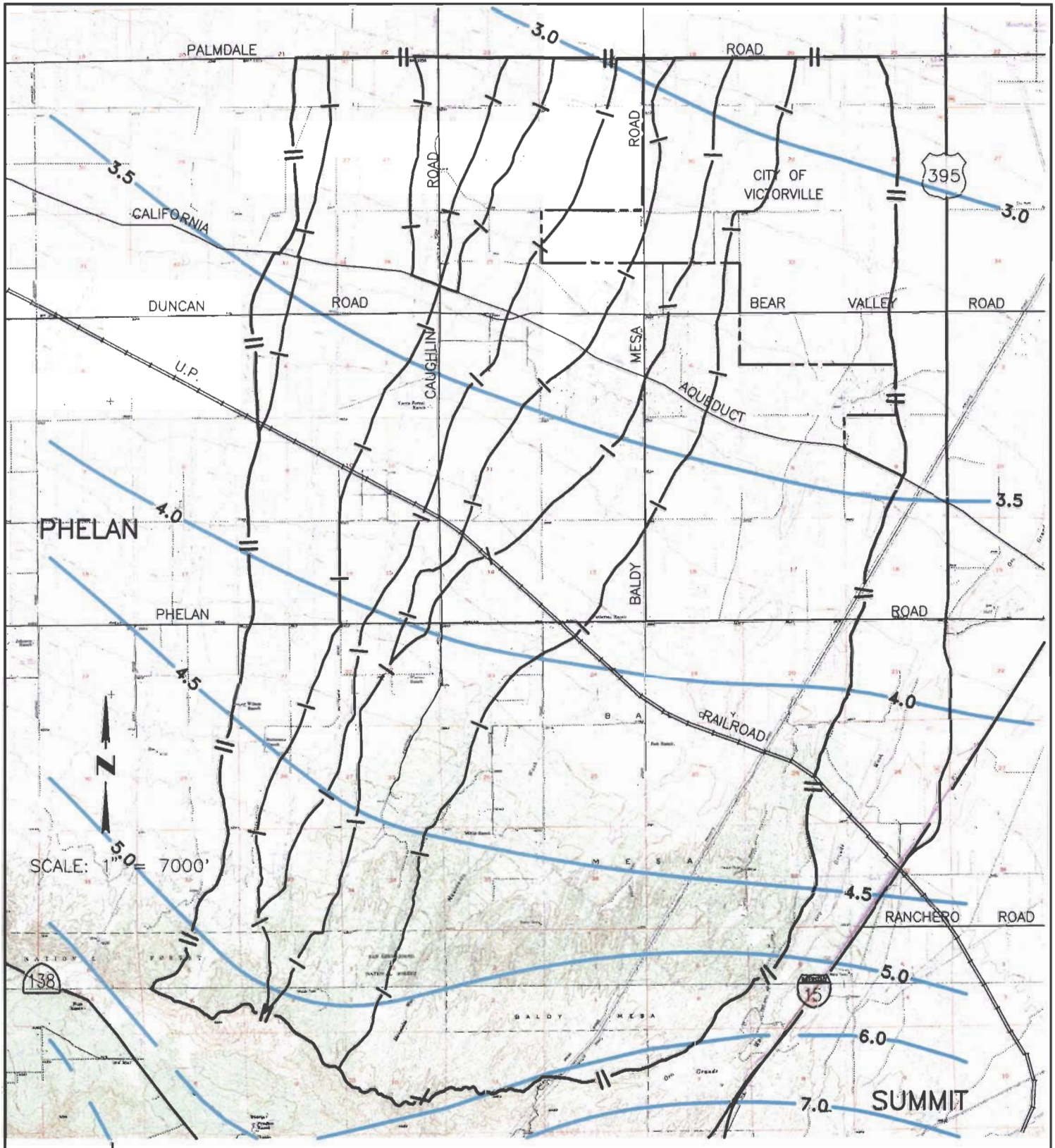
MASTER PLAN OF DRAINAGE

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

RAINFALL ISOHYETAL MAP
100 YEAR – 6 HOUR

DATE	
F.B. REF.	
FILE NO.	
DRWG. NO.	1 of 1

FIGURE 4.6



LEGEND

WATERSHED BOUNDARY
CITY BOUNDARY
1.2 RAINFALL ISOHYETAL (INCHES)
DRAINAGE DIVIDE

BALDY MESA

MASTER PLAN OF DRAINAGE

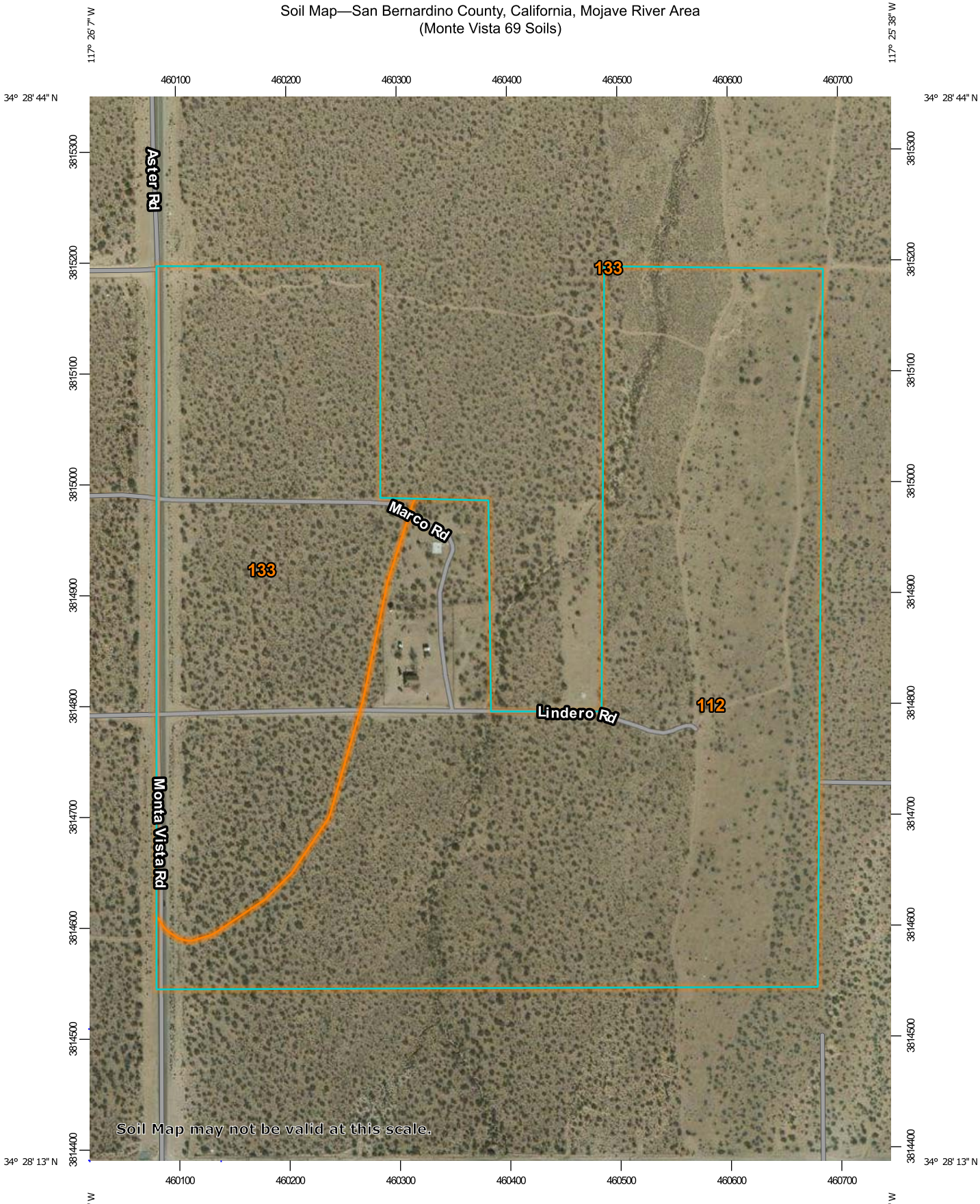
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

RAINFALL ISOHYETAL MAP
100 YEAR – 24 HOUR

DATE	
F.B. REF.	
FILE NO.	
DRWG. NO.	1 of 1

FIGURE 4.7

Soil Map—San Bernardino County, California, Mojave River Area
(Monte Vista 69 Soils)



Map Scale: 1:4,680 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 9, Sep 11, 2017

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

Date(s) aerial images were photographed: Dec 12, 2015—Mar 6, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
112	CAJON SAND, 0 TO 2 PERCENT SLOPES	54.3	66.5%
133	HELENDALE-BRYMAN LOAMY SANDS, 2 TO 5 PERCENT SLOPES*	27.4	33.5%
Totals for Area of Interest		**81.7**	**100.0%**

San Bernardino County, California, Mojave River Area

112—CAJON SAND, 0 TO 2 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkrj
Elevation: 1,800 to 3,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 290 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Cajon

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 7 inches: sand
H2 - 7 to 25 inches: sand
H3 - 25 to 45 inches: gravelly sand
H4 - 45 to 60 inches: stratified sand to loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Sandy (R030XF012CA)
Hydric soil rating: No

Minor Components

Manet
Percent of map unit: 5 percent
Landform: Playas
Hydric soil rating: Yes

Kimberlina
Percent of map unit: 5 percent

Helendale
Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 9, Sep 11, 2017

San Bernardino County, California, Mojave River Area

133—HELENDALE-BRYMAN LOAMY SANDS, 2 TO 5 PERCENT SLOPES*

Map Unit Setting

National map unit symbol: hks6
Elevation: 2,500 to 4,000 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Helendale and similar soils: 50 percent
Bryman and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Helendale

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 6 inches: loamy sand
H2 - 6 to 30 inches: sandy loam
H3 - 30 to 66 inches: sandy loam
H4 - 66 to 99 inches: loamy sand, sandy loam
H4 - 66 to 99 inches:

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Sandy (R030XF012CA)
Hydric soil rating: No

Description of Bryman

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 8 inches: loamy sand
H2 - 8 to 12 inches: sandy loam
H3 - 12 to 44 inches: sandy clay loam
H4 - 44 to 60 inches: loamy sand, coarse sandy loam
H4 - 44 to 60 inches:

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Sandy (R030XF012CA)
Hydric soil rating: No

Minor Components

Cajon

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

Mohave variant

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 9, Sep 11, 2017

EXISTING CONDITIONS

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 05/10/18

Monte Vista 69
100yr peak runoff
Point 103
Existing Condition

Program License Serial Number 6232

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.100 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 101.000 to Point/Station 102.000

**** INITIAL AREA EVALUATION ****

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.590
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 61.89
Adjusted SCS curve number for AMC 3 = 80.51
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.361 (In/Hr)
Initial subarea data:
Initial area flow distance = 803.000(Ft.)
Top (of initial area) elevation = 3371.000(Ft.)
Bottom (of initial area) elevation = 3352.500(Ft.)
Difference in elevation = 18.500(Ft.)
Slope = 0.02304 s(%)= 2.30
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 21.787 min.
Rainfall intensity = 2.235(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.755
Subarea runoff = 7.760(CFS)

```
      Total initial stream area =        4.600(Ac.)
      Pervious area fraction = 1.000
      Initial area Fm value =    0.361(In/Hr)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++
      Process from Point/Station      102.000 to Point/Station
103.000
      **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
      ____________________________________________________________________
____
      Estimated mean flow rate at midpoint of channel =      0.000(CFS)
      Depth of flow =   0.423(Ft.), Average velocity =   2.378(Ft/s)
            ******* Irregular Channel Data ***********
      ------------------------------------------------------------------
      Information entered for subchannel number 1 :
      Point number      'X' coordinate     'Y' coordinate
            1              0.00              1.00
            2             50.00              0.00
            3            100.00              1.00
      Manning's 'N' friction factor =   0.030
      ------------------------------------------------------------------
      Sub-Channel flow  =     21.227(CFS)
        '     '    flow top width =     42.255(Ft.)
        '     '    velocity=    2.378(Ft/s)
        '     '    area =      8.928(Sq.Ft)
        '     '    Froude number =     0.912

      Upstream point elevation =  3352.500(Ft.)
      Downstream point elevation =  3329.000(Ft.)
      Flow length =  1283.000(Ft.)
      Travel time  =    8.99 min.
      Time of concentration =   30.78 min.
      Depth of flow =   0.423(Ft.)
      Average velocity =   2.378(Ft/s)
      Total irregular channel flow =    21.227(CFS)
      Irregular channel normal depth above invert elev. =   0.423(Ft.)
      Average velocity of channel(s) =   2.378(Ft/s)
       Adding area flow to channel
      UNDEVELOPED (average cover) subarea
      Decimal fraction soil group A = 0.590
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.410
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 61.89
      Adjusted SCS curve number for AMC 3 = 80.51
      Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.361
(In/Hr)
      Rainfall intensity =      1.755(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.715
      Subarea runoff =     26.868(CFS) for   23.000(Ac.)
      Total runoff =     34.628(CFS)
      Effective area this stream =       27.60(Ac.)
      Total Study Area (Main Stream No. 1) =       27.60(Ac.)
      Area averaged Fm value =    0.361(In/Hr)
      Depth of flow =   0.508(Ft.), Average velocity =   2.687(Ft/s)
      End of computations, Total Study Area =           27.60 (Ac.)
```

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 61.9

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 05/10/18

Monte Vista 69
100yr peak runoff
Point 203
Existing Condition

Program License Serial Number 6232

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.100 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 201.000 to Point/Station 202.000

**** INITIAL AREA EVALUATION ****

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.532 (In/Hr)
Initial subarea data:
Initial area flow distance = 822.000(Ft.)
Top (of initial area) elevation = 3360.000(Ft.)
Bottom (of initial area) elevation = 3345.000(Ft.)
Difference in elevation = 15.000(Ft.)
Slope = 0.01825 s(%)= 1.82
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 23.041 min.
Rainfall intensity = 2.150(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.677
Subarea runoff = 6.258(CFS)

```
      Total initial stream area =        4.300(Ac.)
      Pervious area fraction = 1.000
      Initial area Fm value =    0.532(In/Hr)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++
      Process from Point/Station      202.000 to Point/Station
203.000
      **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
      ____________________________________________________________________
____
      Estimated mean flow rate at midpoint of channel =      0.000(CFS)
      Depth of flow =   0.503(Ft.), Average velocity =   2.380(Ft/s)
            ******* Irregular Channel Data ***********
      ------------------------------------------------------------------
      Information entered for subchannel number 1 :
      Point number      'X' coordinate     'Y' coordinate
            1              0.00              1.00
            2             50.00              0.00
            3            100.00              1.00
      Manning's 'N' friction factor =   0.030
      ------------------------------------------------------------------
      Sub-Channel flow  =     30.057(CFS)
        '     '    flow top width =     50.255(Ft.)
        '     '    velocity=    2.380(Ft/s)
        '     '    area =     12.628(Sq.Ft)
        '     '    Froude number =     0.837

      Upstream point elevation =  3345.000(Ft.)
      Downstream point elevation =  3325.000(Ft.)
      Flow length =  1373.000(Ft.)
      Travel time  =    9.61 min.
      Time of concentration =   32.66 min.
      Depth of flow =   0.503(Ft.)
      Average velocity =   2.380(Ft/s)
      Total irregular channel flow =    30.057(CFS)
      Irregular channel normal depth above invert elev. =   0.503(Ft.)
      Average velocity of channel(s) =   2.380(Ft/s)
       Adding area flow to channel
      UNDEVELOPED (average cover) subarea
      Decimal fraction soil group A = 1.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 50.00
      Adjusted SCS curve number for AMC 3 = 70.00
      Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.532
(In/Hr)
      Rainfall intensity =      1.684(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.615
      Subarea runoff =     47.528(CFS) for   47.600(Ac.)
      Total runoff =     53.786(CFS)
      Effective area this stream =       51.90(Ac.)
      Total Study Area (Main Stream No. 1) =       51.90(Ac.)
      Area averaged Fm value =    0.532(In/Hr)
      Depth of flow =   0.625(Ft.), Average velocity =   2.753(Ft/s)
      End of computations, Total Study Area =           51.90 (Ac.)
```

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 50.0

PROPOSED CONDITIONS

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 05/10/18

Monte Vista 69
100yr Peak Runoff
Point 103
Proposed - Unrouted

Program License Serial Number 6232

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.100 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 101.000 to Point/Station 102.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.590
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 47.17
Adjusted SCS curve number for AMC 3 = 67.17
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.345 (In/Hr)
Initial subarea data:
Initial area flow distance = 982.000(Ft.)
Top (of initial area) elevation = 64.200(Ft.)
Bottom (of initial area) elevation = 54.600(Ft.)
Difference in elevation = 9.600(Ft.)
Slope = 0.00978 s(%)= 0.98
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.357 min.
Rainfall intensity = 2.732(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.786
Subarea runoff = 14.606(CFS)

```
      Total initial stream area =        6.800(Ac.)
      Pervious area fraction = 0.600
      Initial area Fm value =    0.345(In/Hr)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++
      Process from Point/Station      102.000 to Point/Station
103.000
      **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
      ____________________________________________________________________
____
      Top of street segment elevation =    54.600(Ft.)
      End of street segment elevation =    31.000(Ft.)
      Length of street segment  =  1284.000(Ft.)
      Height of curb above gutter flowline  =    6.0(In.)
      Width of half street (curb to crown)  =  18.000(Ft.)
      Distance from crown to crossfall grade break  =  16.000(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) =   0.030
      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 =     35.168(CFS)
      Depth of flow =   0.511(Ft.), Average velocity =   4.619(Ft/s)
      Warning: depth of flow exceeds top of curb
      Note:  depth of flow exceeds top of street crown.
      Distance that curb overflow reaches into property =    0.37(Ft.)
      Streetflow hydraulics at midpoint of street travel:
      Halfstreet flow width =  18.000(Ft.)
      Flow velocity =   4.62(Ft/s)
      Travel time =    4.63 min.     TC =   20.99  min.
       Adding area flow to street
      RESIDENTIAL(3 - 4 dwl/acre)
      Decimal fraction soil group A = 0.590
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.410
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 47.17
      Adjusted SCS curve number for AMC 3 = 67.17
      Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.345
(In/Hr)
      Rainfall intensity =      2.294(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.764
      Subarea runoff =     40.999(CFS) for   24.900(Ac.)
      Total runoff =     55.605(CFS)
      Effective area this stream =       31.70(Ac.)
      Total Study Area (Main Stream No. 1) =       31.70(Ac.)
      Area averaged Fm value =    0.345(In/Hr)
      Street flow at end of street =     55.605(CFS)
      Half street flow at end of street =     27.803(CFS)
      Depth of flow =   0.585(Ft.), Average velocity =   5.280(Ft/s)
      Warning: depth of flow exceeds top of curb
```

Note: depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   2.85(Ft.)
Flow width (from curb towards crown)= 18.000(Ft.)
End of computations, Total Study Area =   31.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 47.2

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 05/10/18

Monte Vista 69
100yr Peak Runoff
Point 203
Proposed - Unrouted

Program License Serial Number 6232

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.100 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 201.000 to Point/Station 202.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.471 (In/Hr)
Initial subarea data:
Initial area flow distance = 947.000(Ft.)
Top (of initial area) elevation = 60.400(Ft.)
Bottom (of initial area) elevation = 50.000(Ft.)
Difference in elevation = 10.400(Ft.)
Slope = 0.01098 s(%)= 1.10
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.751 min.
Rainfall intensity = 2.805(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.749
Subarea runoff = 4.832(CFS)

```
      Total initial stream area =        2.300(Ac.)
      Pervious area fraction = 0.600
      Initial area Fm value =    0.471(In/Hr)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++
      Process from Point/Station      202.000 to Point/Station
203.000
      **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
      ------------------------------------------------------------------------
____
      Top of street segment elevation =    50.000(Ft.)
      End of street segment elevation =    24.000(Ft.)
      Length of street segment  =  1740.000(Ft.)
      Height of curb above gutter flowline  =    6.0(In.)
      Width of half street (curb to crown)  =  18.000(Ft.)
      Distance from crown to crossfall grade break  =  16.000(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) =   0.030
      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 =     39.803(CFS)
      Depth of flow =   0.546(Ft.), Average velocity =   4.453(Ft/s)
      Warning: depth of flow exceeds top of curb
      Note:  depth of flow exceeds top of street crown.
      Distance that curb overflow reaches into property =    1.53(Ft.)
      Streetflow hydraulics at midpoint of street travel:
      Halfstreet flow width =  18.000(Ft.)
      Flow velocity =   4.45(Ft/s)
      Travel time =    6.51 min.     TC =   22.26  min.
       Adding area flow to street
      RESIDENTIAL(3 - 4 dwl/acre)
      Decimal fraction soil group A = 1.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 32.00
      Adjusted SCS curve number for AMC 3 = 52.00
      Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.471
(In/Hr)
      Rainfall intensity =      2.202(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.707
      Subarea runoff =     69.781(CFS) for   45.600(Ac.)
      Total runoff =     74.613(CFS)
      Effective area this stream =       47.90(Ac.)
      Total Study Area (Main Stream No. 1) =       47.90(Ac.)
      Area averaged Fm value =    0.471(In/Hr)
      Street flow at end of street =     74.613(CFS)
      Half street flow at end of street =     37.306(CFS)
      Depth of flow =   0.664(Ft.), Average velocity =   5.330(Ft/s)
      Warning: depth of flow exceeds top of curb
```

Note: depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =   5.46(Ft.)
Flow width (from curb towards crown)= 18.000(Ft.)
End of computations, Total Study Area =   47.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

U n i t H y d r o g r a p h A n a l y s i s

Study date 05/10/18

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6232

Monte Vista 69
SCS Unit Hydrograph
Point 103
Proposed Condition - unrouted

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100	31.70	1	1.10
Rainfall data for year 100	31.70	6	1.80
Rainfall data for year 100	31.70	24	3.30

++

```
      ******** Area-averaged max loss rate, Fm ********


      SCS curve  SCS curve     Area     Area     Fp(Fig C6)    Ap
Fm
      No.(AMCII) NO.(AMC 3)    (Ac.)    Fraction     (In/Hr)  (dec.)
(In/Hr)
       47.0      67.0         31.70      1.000     0.578    0.500
0.289

      Area-averaged adjusted loss rate Fm (In/Hr) =  0.289

      ********* Area-Averaged low loss rate fraction, Yb **********

      Area       Area          SCS CN    SCS CN      S     Pervious
       (Ac.)      Fract         (AMC2)    (AMC3)           Yield Fr
          15.85   0.500         47.0      67.0       4.93     0.224
          15.85   0.500         98.0      98.0       0.20     0.929

      Area-averaged catchment yield fraction, Y =  0.577
      Area-averaged low loss fraction, Yb =  0.423
      User entry of time of concentration  =   0.345 (hours)
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
      Watershed area =      31.70(Ac.)
      Catchment Lag time =   0.276 hours
      Unit interval =   5.000 minutes
      Unit interval percentage of lag time = 30.1932
      Hydrograph baseflow =     0.00(CFS)
      Average maximum watershed loss rate(Fm) =  0.289(In/Hr)
      Average low loss rate fraction (Yb) = 0.423 (decimal)
      DESERT S-Graph Selected
      Computed peak 5-minute rainfall =  0.522(In)
      Computed peak 30-minute rainfall =  0.893(In)
      Specified peak 1-hour rainfall =  1.100(In)
      Computed peak 3-hour rainfall =  1.488(In)
      Specified peak 6-hour rainfall =  1.800(In)
      Specified peak 24-hour rainfall =  3.300(In)


      Rainfall depth area reduction factors:
      Using a total area of      31.70(Ac.) (Ref: fig. E-4)

      5-minute factor = 0.999     Adjusted rainfall =  0.521(In)
      30-minute factor = 0.999    Adjusted rainfall =  0.892(In)
      1-hour factor = 0.999       Adjusted rainfall =  1.098(In)
      3-hour factor = 1.000       Adjusted rainfall =  1.487(In)
      6-hour factor = 1.000       Adjusted rainfall =  1.800(In)
      24-hour factor = 1.000      Adjusted rainfall =  3.300(In)
      ----------------------------------------------------------------
---

                      U n i t  H y d r o g r a p h
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
      Interval          'S' Graph          Unit Hydrograph
      Number            Mean values             ((CFS))
      ----------------------------------------------------------------
---
                 (K =       383.37 (CFS))
```

1	1.779	6.820
2	9.538	29.747
3	31.114	82.715
4	52.621	82.453
5	64.525	45.638
6	72.109	29.074
7	77.589	21.007
8	81.682	15.694
9	84.923	12.425
10	87.643	10.425
11	89.718	7.957
12	91.424	6.540
13	92.896	5.641
14	94.149	4.807
15	95.184	3.967
16	96.068	3.388
17	96.830	2.920
18	97.411	2.229
19	97.880	1.799
20	98.188	1.181
21	98.528	1.301
22	98.890	1.389
23	99.252	1.389
24	99.557	1.167
25	99.748	0.735
26	100.000	0.367

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5212	0.5212
2	0.6417	0.1205
3	0.7247	0.0830
4	0.7900	0.0653
5	0.8447	0.0547
6	0.8921	0.0475
7	0.9344	0.0422
8	0.9726	0.0382
9	1.0075	0.0350
10	1.0399	0.0324
11	1.0701	0.0302
12	1.0984	0.0283
13	1.1229	0.0245
14	1.1461	0.0232
15	1.1681	0.0220
16	1.1891	0.0210
17	1.2092	0.0201
18	1.2284	0.0192
19	1.2469	0.0185
20	1.2647	0.0178
21	1.2818	0.0171
22	1.2984	0.0166
23	1.3144	0.0160
24	1.3300	0.0155
25	1.3450	0.0151
26	1.3597	0.0146
27	1.3739	0.0142
28	1.3878	0.0139
29	1.4013	0.0135

30	1.4145	0.0132
31	1.4273	0.0129
32	1.4399	0.0126
33	1.4522	0.0123
34	1.4642	0.0120
35	1.4760	0.0118
36	1.4875	0.0115
37	1.4987	0.0112
38	1.5098	0.0110
39	1.5206	0.0108
40	1.5312	0.0106
41	1.5416	0.0104
42	1.5519	0.0102
43	1.5620	0.0101
44	1.5719	0.0099
45	1.5816	0.0097
46	1.5912	0.0096
47	1.6006	0.0094
48	1.6099	0.0093
49	1.6191	0.0092
50	1.6281	0.0090
51	1.6370	0.0089
52	1.6458	0.0088
53	1.6544	0.0086
54	1.6629	0.0085
55	1.6713	0.0084
56	1.6796	0.0083
57	1.6878	0.0082
58	1.6959	0.0081
59	1.7039	0.0080
60	1.7118	0.0079
61	1.7196	0.0078
62	1.7273	0.0077
63	1.7349	0.0076
64	1.7425	0.0075
65	1.7499	0.0074
66	1.7573	0.0074
67	1.7646	0.0073
68	1.7718	0.0072
69	1.7789	0.0071
70	1.7859	0.0071
71	1.7929	0.0070
72	1.7998	0.0069
73	1.8107	0.0109
74	1.8215	0.0108
75	1.8322	0.0107
76	1.8429	0.0106
77	1.8534	0.0106
78	1.8639	0.0105
79	1.8743	0.0104
80	1.8847	0.0103
81	1.8949	0.0103
82	1.9051	0.0102
83	1.9153	0.0101
84	1.9253	0.0101
85	1.9353	0.0100
86	1.9452	0.0099
87	1.9551	0.0099
88	1.9649	0.0098
89	1.9746	0.0097

90	1.9843	0.0097
91	1.9939	0.0096
92	2.0035	0.0096
93	2.0130	0.0095
94	2.0224	0.0094
95	2.0318	0.0094
96	2.0411	0.0093
97	2.0504	0.0093
98	2.0596	0.0092
99	2.0687	0.0092
100	2.0779	0.0091
101	2.0869	0.0091
102	2.0959	0.0090
103	2.1049	0.0090
104	2.1138	0.0089
105	2.1227	0.0089
106	2.1315	0.0088
107	2.1402	0.0088
108	2.1490	0.0087
109	2.1576	0.0087
110	2.1663	0.0086
111	2.1749	0.0086
112	2.1834	0.0085
113	2.1919	0.0085
114	2.2004	0.0085
115	2.2088	0.0084
116	2.2172	0.0084
117	2.2255	0.0083
118	2.2338	0.0083
119	2.2421	0.0083
120	2.2503	0.0082
121	2.2585	0.0082
122	2.2666	0.0081
123	2.2747	0.0081
124	2.2828	0.0081
125	2.2908	0.0080
126	2.2988	0.0080
127	2.3068	0.0080
128	2.3147	0.0079
129	2.3226	0.0079
130	2.3304	0.0079
131	2.3383	0.0078
132	2.3461	0.0078
133	2.3538	0.0078
134	2.3615	0.0077
135	2.3692	0.0077
136	2.3769	0.0077
137	2.3845	0.0076
138	2.3921	0.0076
139	2.3997	0.0076
140	2.4072	0.0075
141	2.4147	0.0075
142	2.4222	0.0075
143	2.4296	0.0074
144	2.4370	0.0074
145	2.4444	0.0074
146	2.4518	0.0074
147	2.4591	0.0073
148	2.4664	0.0073
149	2.4737	0.0073

150	2.4809	0.0072
151	2.4882	0.0072
152	2.4953	0.0072
153	2.5025	0.0072
154	2.5097	0.0071
155	2.5168	0.0071
156	2.5239	0.0071
157	2.5309	0.0071
158	2.5379	0.0070
159	2.5450	0.0070
160	2.5519	0.0070
161	2.5589	0.0070
162	2.5658	0.0069
163	2.5728	0.0069
164	2.5797	0.0069
165	2.5865	0.0069
166	2.5934	0.0068
167	2.6002	0.0068
168	2.6070	0.0068
169	2.6138	0.0068
170	2.6205	0.0068
171	2.6272	0.0067
172	2.6339	0.0067
173	2.6406	0.0067
174	2.6473	0.0067
175	2.6539	0.0066
176	2.6606	0.0066
177	2.6672	0.0066
178	2.6737	0.0066
179	2.6803	0.0066
180	2.6868	0.0065
181	2.6933	0.0065
182	2.6998	0.0065
183	2.7063	0.0065
184	2.7128	0.0065
185	2.7192	0.0064
186	2.7256	0.0064
187	2.7320	0.0064
188	2.7384	0.0064
189	2.7448	0.0064
190	2.7511	0.0063
191	2.7574	0.0063
192	2.7637	0.0063
193	2.7700	0.0063
194	2.7763	0.0063
195	2.7825	0.0062
196	2.7888	0.0062
197	2.7950	0.0062
198	2.8012	0.0062
199	2.8073	0.0062
200	2.8135	0.0062
201	2.8197	0.0061
202	2.8258	0.0061
203	2.8319	0.0061
204	2.8380	0.0061
205	2.8441	0.0061
206	2.8501	0.0061
207	2.8562	0.0060
208	2.8622	0.0060
209	2.8682	0.0060

210	2.8742	0.0060
211	2.8802	0.0060
212	2.8861	0.0060
213	2.8921	0.0059
214	2.8980	0.0059
215	2.9039	0.0059
216	2.9098	0.0059
217	2.9157	0.0059
218	2.9216	0.0059
219	2.9274	0.0059
220	2.9332	0.0058
221	2.9391	0.0058
222	2.9449	0.0058
223	2.9507	0.0058
224	2.9564	0.0058
225	2.9622	0.0058
226	2.9680	0.0057
227	2.9737	0.0057
228	2.9794	0.0057
229	2.9851	0.0057
230	2.9908	0.0057
231	2.9965	0.0057
232	3.0022	0.0057
233	3.0078	0.0057
234	3.0135	0.0056
235	3.0191	0.0056
236	3.0247	0.0056
237	3.0303	0.0056
238	3.0359	0.0056
239	3.0414	0.0056
240	3.0470	0.0056
241	3.0525	0.0055
242	3.0581	0.0055
243	3.0636	0.0055
244	3.0691	0.0055
245	3.0746	0.0055
246	3.0801	0.0055
247	3.0855	0.0055
248	3.0910	0.0055
249	3.0964	0.0054
250	3.1019	0.0054
251	3.1073	0.0054
252	3.1127	0.0054
253	3.1181	0.0054
254	3.1235	0.0054
255	3.1289	0.0054
256	3.1342	0.0054
257	3.1396	0.0053
258	3.1449	0.0053
259	3.1502	0.0053
260	3.1555	0.0053
261	3.1608	0.0053
262	3.1661	0.0053
263	3.1714	0.0053
264	3.1767	0.0053
265	3.1819	0.0053
266	3.1872	0.0052
267	3.1924	0.0052
268	3.1976	0.0052
269	3.2028	0.0052

270	3.2080	0.0052
271	3.2132	0.0052
272	3.2184	0.0052
273	3.2236	0.0052
274	3.2287	0.0052
275	3.2339	0.0051
276	3.2390	0.0051
277	3.2442	0.0051
278	3.2493	0.0051
279	3.2544	0.0051
280	3.2595	0.0051
281	3.2646	0.0051
282	3.2696	0.0051
283	3.2747	0.0051
284	3.2797	0.0051
285	3.2848	0.0050
286	3.2898	0.0050
287	3.2949	0.0050
288	3.2999	0.0050

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0050	0.0021	0.0029
2	0.0050	0.0021	0.0029
3	0.0050	0.0021	0.0029
4	0.0051	0.0021	0.0029
5	0.0051	0.0021	0.0029
6	0.0051	0.0022	0.0029
7	0.0051	0.0022	0.0029
8	0.0051	0.0022	0.0030
9	0.0051	0.0022	0.0030
10	0.0051	0.0022	0.0030
11	0.0052	0.0022	0.0030
12	0.0052	0.0022	0.0030
13	0.0052	0.0022	0.0030
14	0.0052	0.0022	0.0030
15	0.0052	0.0022	0.0030
16	0.0052	0.0022	0.0030
17	0.0053	0.0022	0.0030
18	0.0053	0.0022	0.0030
19	0.0053	0.0022	0.0031
20	0.0053	0.0022	0.0031
21	0.0053	0.0023	0.0031
22	0.0053	0.0023	0.0031
23	0.0054	0.0023	0.0031
24	0.0054	0.0023	0.0031
25	0.0054	0.0023	0.0031
26	0.0054	0.0023	0.0031
27	0.0054	0.0023	0.0031
28	0.0055	0.0023	0.0031
29	0.0055	0.0023	0.0032
30	0.0055	0.0023	0.0032
31	0.0055	0.0023	0.0032
32	0.0055	0.0023	0.0032
33	0.0056	0.0024	0.0032
34	0.0056	0.0024	0.0032

35	0.0056	0.0024	0.0032
36	0.0056	0.0024	0.0032
37	0.0056	0.0024	0.0033
38	0.0057	0.0024	0.0033
39	0.0057	0.0024	0.0033
40	0.0057	0.0024	0.0033
41	0.0057	0.0024	0.0033
42	0.0057	0.0024	0.0033
43	0.0058	0.0024	0.0033
44	0.0058	0.0024	0.0033
45	0.0058	0.0025	0.0034
46	0.0058	0.0025	0.0034
47	0.0059	0.0025	0.0034
48	0.0059	0.0025	0.0034
49	0.0059	0.0025	0.0034
50	0.0059	0.0025	0.0034
51	0.0059	0.0025	0.0034
52	0.0060	0.0025	0.0034
53	0.0060	0.0025	0.0035
54	0.0060	0.0025	0.0035
55	0.0060	0.0026	0.0035
56	0.0061	0.0026	0.0035
57	0.0061	0.0026	0.0035
58	0.0061	0.0026	0.0035
59	0.0061	0.0026	0.0035
60	0.0062	0.0026	0.0036
61	0.0062	0.0026	0.0036
62	0.0062	0.0026	0.0036
63	0.0062	0.0026	0.0036
64	0.0063	0.0027	0.0036
65	0.0063	0.0027	0.0036
66	0.0063	0.0027	0.0036
67	0.0064	0.0027	0.0037
68	0.0064	0.0027	0.0037
69	0.0064	0.0027	0.0037
70	0.0064	0.0027	0.0037
71	0.0065	0.0027	0.0037
72	0.0065	0.0027	0.0037
73	0.0065	0.0028	0.0038
74	0.0066	0.0028	0.0038
75	0.0066	0.0028	0.0038
76	0.0066	0.0028	0.0038
77	0.0067	0.0028	0.0038
78	0.0067	0.0028	0.0039
79	0.0067	0.0028	0.0039
80	0.0068	0.0029	0.0039
81	0.0068	0.0029	0.0039
82	0.0068	0.0029	0.0039
83	0.0069	0.0029	0.0040
84	0.0069	0.0029	0.0040
85	0.0069	0.0029	0.0040
86	0.0070	0.0029	0.0040
87	0.0070	0.0030	0.0040
88	0.0070	0.0030	0.0041
89	0.0071	0.0030	0.0041
90	0.0071	0.0030	0.0041
91	0.0072	0.0030	0.0041
92	0.0072	0.0030	0.0041
93	0.0072	0.0031	0.0042
94	0.0073	0.0031	0.0042

95	0.0073	0.0031	0.0042
96	0.0074	0.0031	0.0042
97	0.0074	0.0031	0.0043
98	0.0074	0.0031	0.0043
99	0.0075	0.0032	0.0043
100	0.0075	0.0032	0.0043
101	0.0076	0.0032	0.0044
102	0.0076	0.0032	0.0044
103	0.0077	0.0033	0.0044
104	0.0077	0.0033	0.0045
105	0.0078	0.0033	0.0045
106	0.0078	0.0033	0.0045
107	0.0079	0.0033	0.0046
108	0.0079	0.0034	0.0046
109	0.0080	0.0034	0.0046
110	0.0080	0.0034	0.0046
111	0.0081	0.0034	0.0047
112	0.0081	0.0034	0.0047
113	0.0082	0.0035	0.0047
114	0.0083	0.0035	0.0048
115	0.0083	0.0035	0.0048
116	0.0084	0.0035	0.0048
117	0.0085	0.0036	0.0049
118	0.0085	0.0036	0.0049
119	0.0086	0.0036	0.0050
120	0.0086	0.0037	0.0050
121	0.0087	0.0037	0.0050
122	0.0088	0.0037	0.0051
123	0.0089	0.0038	0.0051
124	0.0089	0.0038	0.0051
125	0.0090	0.0038	0.0052
126	0.0091	0.0038	0.0052
127	0.0092	0.0039	0.0053
128	0.0092	0.0039	0.0053
129	0.0093	0.0039	0.0054
130	0.0094	0.0040	0.0054
131	0.0095	0.0040	0.0055
132	0.0096	0.0040	0.0055
133	0.0097	0.0041	0.0056
134	0.0097	0.0041	0.0056
135	0.0099	0.0042	0.0057
136	0.0099	0.0042	0.0057
137	0.0101	0.0043	0.0058
138	0.0101	0.0043	0.0058
139	0.0103	0.0043	0.0059
140	0.0103	0.0044	0.0060
141	0.0105	0.0044	0.0060
142	0.0106	0.0045	0.0061
143	0.0107	0.0045	0.0062
144	0.0108	0.0046	0.0062
145	0.0069	0.0029	0.0040
146	0.0070	0.0030	0.0040
147	0.0071	0.0030	0.0041
148	0.0072	0.0030	0.0042
149	0.0074	0.0031	0.0042
150	0.0074	0.0032	0.0043
151	0.0076	0.0032	0.0044
152	0.0077	0.0033	0.0044
153	0.0079	0.0033	0.0046
154	0.0080	0.0034	0.0046

155	0.0082	0.0035	0.0047
156	0.0083	0.0035	0.0048
157	0.0085	0.0036	0.0049
158	0.0086	0.0037	0.0050
159	0.0089	0.0038	0.0051
160	0.0090	0.0038	0.0052
161	0.0093	0.0039	0.0054
162	0.0094	0.0040	0.0054
163	0.0097	0.0041	0.0056
164	0.0099	0.0042	0.0057
165	0.0102	0.0043	0.0059
166	0.0104	0.0044	0.0060
167	0.0108	0.0046	0.0062
168	0.0110	0.0047	0.0064
169	0.0115	0.0049	0.0066
170	0.0118	0.0050	0.0068
171	0.0123	0.0052	0.0071
172	0.0126	0.0053	0.0072
173	0.0132	0.0056	0.0076
174	0.0135	0.0057	0.0078
175	0.0142	0.0060	0.0082
176	0.0146	0.0062	0.0084
177	0.0155	0.0066	0.0090
178	0.0160	0.0068	0.0092
179	0.0171	0.0073	0.0099
180	0.0178	0.0075	0.0103
181	0.0192	0.0081	0.0111
182	0.0201	0.0085	0.0116
183	0.0220	0.0093	0.0127
184	0.0232	0.0098	0.0134
185	0.0283	0.0120	0.0163
186	0.0302	0.0128	0.0174
187	0.0350	0.0148	0.0202
188	0.0382	0.0162	0.0220
189	0.0475	0.0201	0.0274
190	0.0547	0.0231	0.0316
191	0.0830	0.0241	0.0589
192	0.1205	0.0241	0.0964
193	0.5212	0.0241	0.4971
194	0.0653	0.0241	0.0412
195	0.0422	0.0179	0.0244
196	0.0324	0.0137	0.0187
197	0.0245	0.0104	0.0142
198	0.0210	0.0089	0.0121
199	0.0185	0.0078	0.0107
200	0.0166	0.0070	0.0096
201	0.0151	0.0064	0.0087
202	0.0139	0.0059	0.0080
203	0.0129	0.0054	0.0074
204	0.0120	0.0051	0.0069
205	0.0112	0.0048	0.0065
206	0.0106	0.0045	0.0061
207	0.0101	0.0043	0.0058
208	0.0096	0.0041	0.0055
209	0.0092	0.0039	0.0053
210	0.0088	0.0037	0.0051
211	0.0084	0.0036	0.0049
212	0.0081	0.0034	0.0047
213	0.0078	0.0033	0.0045
214	0.0075	0.0032	0.0043

215	0.0073	0.0031	0.0042
216	0.0071	0.0030	0.0041
217	0.0109	0.0046	0.0063
218	0.0106	0.0045	0.0061
219	0.0104	0.0044	0.0060
220	0.0102	0.0043	0.0059
221	0.0100	0.0042	0.0058
222	0.0098	0.0041	0.0057
223	0.0096	0.0041	0.0055
224	0.0094	0.0040	0.0054
225	0.0093	0.0039	0.0053
226	0.0091	0.0039	0.0053
227	0.0090	0.0038	0.0052
228	0.0088	0.0037	0.0051
229	0.0087	0.0037	0.0050
230	0.0085	0.0036	0.0049
231	0.0084	0.0036	0.0049
232	0.0083	0.0035	0.0048
233	0.0082	0.0035	0.0047
234	0.0081	0.0034	0.0047
235	0.0080	0.0034	0.0046
236	0.0079	0.0033	0.0045
237	0.0078	0.0033	0.0045
238	0.0077	0.0032	0.0044
239	0.0076	0.0032	0.0044
240	0.0075	0.0032	0.0043
241	0.0074	0.0031	0.0043
242	0.0073	0.0031	0.0042
243	0.0072	0.0031	0.0042
244	0.0071	0.0030	0.0041
245	0.0071	0.0030	0.0041
246	0.0070	0.0030	0.0040
247	0.0069	0.0029	0.0040
248	0.0068	0.0029	0.0039
249	0.0068	0.0029	0.0039
250	0.0067	0.0028	0.0039
251	0.0066	0.0028	0.0038
252	0.0066	0.0028	0.0038
253	0.0065	0.0028	0.0038
254	0.0065	0.0027	0.0037
255	0.0064	0.0027	0.0037
256	0.0063	0.0027	0.0037
257	0.0063	0.0027	0.0036
258	0.0062	0.0026	0.0036
259	0.0062	0.0026	0.0036
260	0.0061	0.0026	0.0035
261	0.0061	0.0026	0.0035
262	0.0060	0.0025	0.0035
263	0.0060	0.0025	0.0034
264	0.0059	0.0025	0.0034
265	0.0059	0.0025	0.0034
266	0.0058	0.0025	0.0034
267	0.0058	0.0025	0.0033
268	0.0057	0.0024	0.0033
269	0.0057	0.0024	0.0033
270	0.0057	0.0024	0.0033
271	0.0056	0.0024	0.0032
272	0.0056	0.0024	0.0032
273	0.0055	0.0023	0.0032
274	0.0055	0.0023	0.0032

```
      275              0.0055           0.0023              0.0032
      276              0.0054           0.0023              0.0031
      277              0.0054           0.0023              0.0031
      278              0.0054           0.0023              0.0031
      279              0.0053           0.0023              0.0031
      280              0.0053           0.0022              0.0031
      281              0.0053           0.0022              0.0030
      282              0.0052           0.0022              0.0030
      283              0.0052           0.0022              0.0030
      284              0.0052           0.0022              0.0030
      285              0.0051           0.0022              0.0030
      286              0.0051           0.0022              0.0029
      287              0.0051           0.0021              0.0029
      288              0.0050           0.0021              0.0029
      ------------------------------------------------------------------
--
      ------------------------------------------------------------------
--
      Total soil rain loss =      1.16(In)
      Total effective rainfall =      2.14(In)
      Peak flow rate in flood hydrograph =     55.96(CFS)
      ------------------------------------------------------------------
---
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ------------------------------------------------------------------
--
                    Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       15.0      30.0      45.0
60.0

------------------------------------------------------------------------
    0+ 5       0.0001      0.02  Q         |         |         |
|
    0+10       0.0009      0.11  Q         |         |         |
|
    0+15       0.0032      0.35  Q         |         |         |
|
    0+20       0.0073      0.58  Q         |         |         |
|
    0+25       0.0122      0.72  Q         |         |         |
|
    0+30       0.0178      0.80  Q         |         |         |
|
    0+35       0.0237      0.87  Q         |         |         |
|
    0+40       0.0300      0.92  Q         |         |         |
|
    0+45       0.0366      0.95  Q         |         |         |
|
    0+50       0.0434      0.99  Q         |         |         |
|
    0+55       0.0504      1.01  Q         |         |         |
|
    1+ 0       0.0575      1.04  Q         |         |         |
```

1+ 5	0.0648	1.05	Q			
1+10	0.0722	1.07	Q			
1+15	0.0797	1.09	Q			
1+20	0.0872	1.10	Q			
1+25	0.0949	1.11	Q			
1+30	0.1026	1.12	Q			
1+35	0.1104	1.13	Q			
1+40	0.1182	1.14	Q			
1+45	0.1261	1.14	Q			
1+50	0.1341	1.15	Q			
1+55	0.1421	1.16	QV			
2+ 0	0.1501	1.17	QV			
2+ 5	0.1582	1.17	QV			
2+10	0.1663	1.18	QV			
2+15	0.1744	1.18	QV			
2+20	0.1826	1.19	QV			
2+25	0.1908	1.19	QV			
2+30	0.1990	1.19	QV			
2+35	0.2073	1.20	QV			
2+40	0.2156	1.20	QV			
2+45	0.2239	1.21	QV			
2+50	0.2322	1.21	QV			
2+55	0.2406	1.21	QV			
3+ 0	0.2490	1.22	QV			
3+ 5	0.2574	1.22	QV			
3+10	0.2658	1.23	QV			
3+15	0.2743	1.23	QV			
3+20	0.2828	1.24	Q V			
3+25	0.2914	1.24	Q V			
3+30	0.3000	1.25	Q V			

3+35	0.3086	1.25	Q	V			
3+40	0.3172	1.25	Q	V			
3+45	0.3259	1.26	Q	V			
3+50	0.3346	1.26	Q	V			
3+55	0.3433	1.27	Q	V			
4+ 0	0.3521	1.27	Q	V			
4+ 5	0.3609	1.28	Q	V			
4+10	0.3697	1.28	Q	V			
4+15	0.3786	1.29	Q	V			
4+20	0.3875	1.29	Q	V			
4+25	0.3964	1.30	Q	V			
4+30	0.4054	1.30	Q	V			
4+35	0.4144	1.31	Q	V			
4+40	0.4234	1.31	Q	V			
4+45	0.4325	1.32	Q	V			
4+50	0.4416	1.32	Q	V			
4+55	0.4508	1.33	Q	V			
5+ 0	0.4600	1.33	Q	V			
5+ 5	0.4692	1.34	Q	V			
5+10	0.4785	1.35	Q	V			
5+15	0.4878	1.35	Q	V			
5+20	0.4971	1.36	Q	V			
5+25	0.5065	1.36	Q	V			
5+30	0.5159	1.37	Q	V			
5+35	0.5254	1.37	Q	V			
5+40	0.5349	1.38	Q	V			
5+45	0.5444	1.39	Q	V			
5+50	0.5540	1.39	Q	V			
5+55	0.5637	1.40	Q	V			
6+ 0	0.5733	1.40	Q	V			

6+ 5	0.5831	1.41	Q	V			
6+10	0.5928	1.42	Q	V			
6+15	0.6026	1.42	Q	V			
6+20	0.6125	1.43	Q	V			
6+25	0.6224	1.44	Q	V			
6+30	0.6323	1.44	Q	V			
6+35	0.6423	1.45	Q	V			
6+40	0.6523	1.46	Q	V			
6+45	0.6624	1.46	Q	V			
6+50	0.6726	1.47	Q	V			
6+55	0.6828	1.48	Q	V			
7+ 0	0.6930	1.49	Q	V			
7+ 5	0.7033	1.49	Q	V			
7+10	0.7136	1.50	|Q	V			
7+15	0.7240	1.51	|Q	V			
7+20	0.7345	1.52	|Q	V			
7+25	0.7450	1.52	|Q	V			
7+30	0.7555	1.53	|Q	V			
7+35	0.7661	1.54	|Q	V			
7+40	0.7768	1.55	|Q	V			
7+45	0.7875	1.56	|Q	V			
7+50	0.7983	1.57	|Q	V			
7+55	0.8091	1.57	|Q	V			
8+ 0	0.8200	1.58	|Q	V			
8+ 5	0.8310	1.59	|Q	V			
8+10	0.8420	1.60	|Q	V			
8+15	0.8531	1.61	|Q	V			
8+20	0.8643	1.62	|Q	V			
8+25	0.8755	1.63	|Q	V			
8+30	0.8868	1.64	|Q	V			

|
| 8+35 | 0.8981 | 1.65 |Q V | | |
|
| 8+40 | 0.9095 | 1.66 |Q V | | |
|
| 8+45 | 0.9210 | 1.67 |Q V | | |
|
| 8+50 | 0.9326 | 1.68 |Q V | | |
|
| 8+55 | 0.9442 | 1.69 |Q V | | |
|
| 9+ 0 | 0.9559 | 1.70 |Q V | | |
|
| 9+ 5 | 0.9677 | 1.71 |Q V | | |
|
| 9+10 | 0.9795 | 1.72 |Q V | | |
|
| 9+15 | 0.9915 | 1.73 |Q V | | |
|
| 9+20 | 1.0035 | 1.74 |Q V | | |
|
| 9+25 | 1.0156 | 1.76 |Q V | | |
|
| 9+30 | 1.0277 | 1.77 |Q V | | |
|
| 9+35 | 1.0400 | 1.78 |Q V | | |
|
| 9+40 | 1.0523 | 1.79 |Q V | | |
|
| 9+45 | 1.0647 | 1.80 |Q V | | |
|
| 9+50 | 1.0773 | 1.82 |Q V | | |
|
| 9+55 | 1.0899 | 1.83 |Q V | | |
|
| 10+ 0 | 1.1025 | 1.84 |Q V | | |
|
| 10+ 5 | 1.1153 | 1.86 |Q V | | |
|
| 10+10 | 1.1282 | 1.87 |Q V | | |
|
| 10+15 | 1.1412 | 1.88 |Q V | | |
|
| 10+20 | 1.1543 | 1.90 |Q V | | |
|
| 10+25 | 1.1674 | 1.91 |Q V | | |
|
| 10+30 | 1.1807 | 1.93 |Q V | | |
|
| 10+35 | 1.1941 | 1.94 |Q V | | |
|
| 10+40 | 1.2076 | 1.96 |Q V | | |
|
| 10+45 | 1.2212 | 1.98 |Q V | | |
|
| 10+50 | 1.2349 | 1.99 |Q V | | |
|
| 10+55 | 1.2488 | 2.01 |Q V | | |
|
| 11+ 0 | 1.2627 | 2.03 |Q V | | |

11+ 5	1.2768	2.04	|Q	V|	|	|
11+10	1.2910	2.06	|Q	V|	|	|
11+15	1.3053	2.08	|Q	V|	|	|
11+20	1.3198	2.10	|Q	V|	|	|
11+25	1.3344	2.12	|Q	V|	|	|
11+30	1.3491	2.14	|Q	V|	|	|
11+35	1.3640	2.16	|Q	V|	|	|
11+40	1.3790	2.18	|Q	V|	|	|
11+45	1.3941	2.20	|Q	V|	|	|
11+50	1.4095	2.22	|Q	V|	|	|
11+55	1.4249	2.25	|Q	V	|	|
12+ 0	1.4406	2.27	|Q	V	|	|
12+ 5	1.4563	2.28	|Q	V	|	|
12+10	1.4717	2.23	|Q	V	|	|
12+15	1.4859	2.07	|Q	V	|	|
12+20	1.4990	1.90	|Q	V	|	|
12+25	1.5115	1.82	|Q	V	|	|
12+30	1.5237	1.77	|Q	V	|	|
12+35	1.5357	1.75	|Q	V	|	|
12+40	1.5477	1.74	|Q	V	|	|
12+45	1.5597	1.74	|Q	|V	|	|
12+50	1.5716	1.74	|Q	|V	|	|
12+55	1.5837	1.75	|Q	|V	|	|
13+ 0	1.5958	1.76	|Q	|V	|	|
13+ 5	1.6081	1.78	|Q	|V	|	|
13+10	1.6205	1.80	|Q	|V	|	|
13+15	1.6331	1.83	|Q	|V	|	|
13+20	1.6459	1.85	|Q	|V	|	|
13+25	1.6588	1.88	|Q	|V	|	|
13+30	1.6720	1.92	|Q	|V	|	|

13+35	1.6855	1.95	Q	V		
13+40	1.6992	1.99	Q	V		
13+45	1.7132	2.03	Q	V		
13+50	1.7275	2.08	Q	V		
13+55	1.7421	2.12	Q	V		
14+ 0	1.7571	2.17	Q	V		
14+ 5	1.7725	2.23	Q	V		
14+10	1.7882	2.29	Q	V		
14+15	1.8044	2.35	Q	V		
14+20	1.8211	2.42	Q	V		
14+25	1.8384	2.50	Q	V		
14+30	1.8561	2.58	Q	V		
14+35	1.8745	2.67	Q	V		
14+40	1.8935	2.76	Q	V		
14+45	1.9131	2.86	Q	V		
14+50	1.9336	2.97	Q	V		
14+55	1.9549	3.09	Q	V		
15+ 0	1.9771	3.22	Q	V		
15+ 5	2.0003	3.37	Q	V		
15+10	2.0247	3.54	Q	V		
15+15	2.0504	3.73	Q	V		
15+20	2.0775	3.94	Q	V		
15+25	2.1065	4.21	Q	V		
15+30	2.1377	4.53	Q	V		
15+35	2.1721	5.00	Q	V		
15+40	2.2103	5.54	Q	V		
15+45	2.2527	6.16	Q	V		
15+50	2.3004	6.93	Q	V		
15+55	2.3563	8.11	Q	V		
16+ 0	2.4268	10.24	Q	V		

```
|
   16+ 5       2.5448     17.13  |         |Q      V |         |
|
   16+10       2.7638     31.80  |         |        V|Q        |
|
   16+15       3.1492     55.96  |         |         | V       |      Q
|
   16+20       3.5178     53.53  |         |         |   V     |    Q
|
   16+25       3.7555     34.51  |         |         |  Q  V   |
|
   16+30       3.9259     24.74  |         |     Q   |      V  |
|
   16+35       4.0588     19.29  |         | Q       |       V |
|
   16+40       4.1657     15.53  |         Q         |        V|
|
   16+45       4.2552     13.00  |       Q |         |         V
|
   16+50       4.3325     11.23  |      Q  |         |         V
|
   16+55       4.3974      9.42  |     Q   |         |         |V
|
   17+ 0       4.4540      8.21  |    Q    |         |         |V
|
   17+ 5       4.5044      7.32  |   Q     |         |         |V
|
   17+10       4.5494      6.52  |   Q     |         |         | V
|
   17+15       4.5892      5.78  |  Q      |         |         | V
|
   17+20       4.6250      5.19  |  Q      |         |         | V
|
   17+25       4.6572      4.68  |  Q      |         |         | V
|
   17+30       4.6855      4.11  | Q       |         |         |  V
|
   17+35       4.7109      3.69  | Q       |         |         |  V
|
   17+40       4.7332      3.24  | Q       |         |         |  V
|
   17+45       4.7550      3.15  | Q       |         |         |  V
|
   17+50       4.7760      3.06  | Q       |         |         |  V
|
   17+55       4.7961      2.91  |Q        |         |         |  V
|
   18+ 0       4.8144      2.66  |Q        |         |         |   V
|
   18+ 5       4.8305      2.33  |Q        |         |         |   V
|
   18+10       4.8450      2.11  |Q        |         |         |   V
|
   18+15       4.8591      2.04  |Q        |         |         |   V
|
   18+20       4.8739      2.15  |Q        |         |         |   V
|
   18+25       4.8889      2.18  |Q        |         |         |   V
|
   18+30       4.9039      2.19  |Q        |         |         |   V
```

18+35	4.9189	2.18	|Q	|	|	|	V
18+40	4.9338	2.16	|Q	|	|	|	V
18+45	4.9486	2.14	|Q	|	|	|	V
18+50	4.9631	2.12	|Q	|	|	|	V
18+55	4.9775	2.09	|Q	|	|	|	V
19+ 0	4.9917	2.06	|Q	|	|	|	V
19+ 5	5.0058	2.04	|Q	|	|	|	V
19+10	5.0196	2.01	|Q	|	|	|	V
19+15	5.0333	1.98	|Q	|	|	|	V
19+20	5.0467	1.96	|Q	|	|	|	V
19+25	5.0600	1.93	|Q	|	|	|	V
19+30	5.0731	1.90	|Q	|	|	|	V
19+35	5.0861	1.88	|Q	|	|	|	V
19+40	5.0988	1.85	|Q	|	|	|	V
19+45	5.1114	1.83	|Q	|	|	|	V
19+50	5.1239	1.81	|Q	|	|	|	V
19+55	5.1362	1.78	|Q	|	|	|	V
20+ 0	5.1483	1.76	|Q	|	|	|	V
20+ 5	5.1603	1.74	|Q	|	|	|	V
20+10	5.1721	1.72	|Q	|	|	|	V
20+15	5.1838	1.70	|Q	|	|	|	V
20+20	5.1953	1.68	|Q	|	|	|	V
20+25	5.2067	1.65	|Q	|	|	|	V
20+30	5.2180	1.64	|Q	|	|	|	V
20+35	5.2291	1.62	|Q	|	|	|	V
20+40	5.2401	1.60	|Q	|	|	|	V
20+45	5.2510	1.58	|Q	|	|	|	V
20+50	5.2618	1.56	|Q	|	|	|	V
20+55	5.2724	1.55	|Q	|	|	|	V
21+ 0	5.2829	1.53	|Q	|	|	|	V

21+ 5	5.2934	1.51	|Q	|	|	|	V |
21+10	5.3037	1.50	Q	|	|	|	V |
21+15	5.3139	1.48	Q	|	|	|	V |
21+20	5.3240	1.47	Q	|	|	|	V |
21+25	5.3340	1.45	Q	|	|	|	V |
21+30	5.3440	1.44	Q	|	|	|	V |
21+35	5.3538	1.43	Q	|	|	|	V |
21+40	5.3635	1.41	Q	|	|	|	V |
21+45	5.3732	1.40	Q	|	|	|	V |
21+50	5.3828	1.39	Q	|	|	|	V |
21+55	5.3922	1.38	Q	|	|	|	V |
22+ 0	5.4016	1.37	Q	|	|	|	V |
22+ 5	5.4110	1.35	Q	|	|	|	V |
22+10	5.4202	1.34	Q	|	|	|	V |
22+15	5.4294	1.33	Q	|	|	|	V |
22+20	5.4385	1.32	Q	|	|	|	V |
22+25	5.4475	1.31	Q	|	|	|	V |
22+30	5.4565	1.30	Q	|	|	|	V |
22+35	5.4653	1.29	Q	|	|	|	V |
22+40	5.4742	1.28	Q	|	|	|	V |
22+45	5.4829	1.27	Q	|	|	|	V |
22+50	5.4916	1.26	Q	|	|	|	V |
22+55	5.5002	1.25	Q	|	|	|	V |
23+ 0	5.5088	1.24	Q	|	|	|	V|
23+ 5	5.5173	1.23	Q	|	|	|	V|
23+10	5.5257	1.22	Q	|	|	|	V|
23+15	5.5341	1.22	Q	|	|	|	V|
23+20	5.5424	1.21	Q	|	|	|	V|
23+25	5.5507	1.20	Q	|	|	|	V|
23+30	5.5589	1.19	Q	|	|	|	

23+35	5.5670	1.18	Q			
23+40	5.5751	1.18	Q			
23+45	5.5832	1.17	Q			
23+50	5.5912	1.16	Q			
23+55	5.5991	1.15	Q			
24+ 0	5.6070	1.15	Q			
24+ 5	5.6147	1.12	Q			
24+10	5.6218	1.03	Q			
24+15	5.6272	0.78	Q			
24+20	5.6309	0.54	Q			
24+25	5.6337	0.40	Q			
24+30	5.6359	0.32	Q			
24+35	5.6376	0.25	Q			
24+40	5.6390	0.21	Q			
24+45	5.6402	0.17	Q			
24+50	5.6412	0.14	Q			
24+55	5.6420	0.12	Q			
25+ 0	5.6426	0.10	Q			
25+ 5	5.6432	0.08	Q			
25+10	5.6436	0.06	Q			
25+15	5.6440	0.05	Q			
25+20	5.6443	0.04	Q			
25+25	5.6445	0.03	Q			
25+30	5.6447	0.03	Q			
25+35	5.6449	0.02	Q			
25+40	5.6450	0.02	Q			
25+45	5.6451	0.01	Q			
25+50	5.6452	0.01	Q			
25+55	5.6452	0.01	Q			
26+ 0	5.6452	0.00	Q			

```
V|
   26+ 5       5.6452      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

Study date 05/10/18

++

San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6232

Monte Vista 69
SCS Unit Hydrograph
Point 203
Proposed Condition - unrouted

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100	47.90	1	1.10
Rainfall data for year 100	47.90	6	1.80
Rainfall data for year 100	47.90	24	3.30

++

```
      ******** Area-averaged max loss rate, Fm ********


      SCS curve  SCS curve     Area     Area     Fp(Fig C6)    Ap
Fm
      No.(AMCII) NO.(AMC 3)    (Ac.)    Fraction     (In/Hr)  (dec.)
(In/Hr)
       32.0      52.0         47.90      1.000     0.785    0.600
0.471

      Area-averaged adjusted loss rate Fm (In/Hr) =  0.471

      ********* Area-Averaged low loss rate fraction, Yb **********

      Area       Area          SCS CN    SCS CN      S     Pervious
       (Ac.)      Fract         (AMC2)    (AMC3)           Yield Fr
          28.74   0.600         32.0      52.0       9.23     0.060
          19.16   0.400         98.0      98.0       0.20     0.929

      Area-averaged catchment yield fraction, Y =  0.408
      Area-averaged low loss fraction, Yb =  0.592
      User entry of time of concentration  =   0.420 (hours)
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
      Watershed area =      47.90(Ac.)
      Catchment Lag time =   0.336 hours
      Unit interval =   5.000 minutes
      Unit interval percentage of lag time = 24.8016
      Hydrograph baseflow =     0.00(CFS)
      Average maximum watershed loss rate(Fm) =  0.471(In/Hr)
      Average low loss rate fraction (Yb) = 0.592 (decimal)
      DESERT S-Graph Selected
      Computed peak 5-minute rainfall =  0.522(In)
      Computed peak 30-minute rainfall =  0.893(In)
      Specified peak 1-hour rainfall =  1.100(In)
      Computed peak 3-hour rainfall =  1.488(In)
      Specified peak 6-hour rainfall =  1.800(In)
      Specified peak 24-hour rainfall =  3.300(In)


      Rainfall depth area reduction factors:
      Using a total area of      47.90(Ac.) (Ref: fig. E-4)

      5-minute factor = 0.998     Adjusted rainfall =  0.521(In)
      30-minute factor = 0.998    Adjusted rainfall =  0.891(In)
      1-hour factor = 0.998       Adjusted rainfall =  1.098(In)
      3-hour factor = 1.000       Adjusted rainfall =  1.487(In)
      6-hour factor = 1.000       Adjusted rainfall =  1.800(In)
      24-hour factor = 1.000      Adjusted rainfall =  3.300(In)
      ----------------------------------------------------------------
---

                      U n i t  H y d r o g r a p h
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++
      Interval          'S' Graph          Unit Hydrograph
      Number            Mean values             ((CFS))
      ----------------------------------------------------------------
---
                 (K =       579.29 (CFS))
```

1	1.335	7.735
2	6.486	29.838
3	19.281	74.117
4	40.808	124.704
5	55.671	86.103
6	64.734	52.502
7	71.090	36.819
8	75.918	27.967
9	79.726	22.057
10	82.745	17.491
11	85.299	14.796
12	87.516	12.842
13	89.299	10.329
14	90.749	8.403
15	92.061	7.596
16	93.214	6.681
17	94.212	5.780
18	95.057	4.897
19	95.828	4.464
20	96.474	3.747
21	97.049	3.330
22	97.498	2.601
23	97.877	2.196
24	98.128	1.455
25	98.393	1.531
26	98.689	1.719
27	98.987	1.724
28	99.285	1.724
29	99.539	1.475
30	99.698	0.919
31	99.853	0.898
32	100.000	0.853

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5208	0.5208
2	0.6412	0.1204
3	0.7241	0.0829
4	0.7894	0.0653
5	0.8440	0.0547
6	0.8915	0.0475
7	0.9337	0.0422
8	0.9718	0.0382
9	1.0068	0.0350
10	1.0391	0.0323
11	1.0693	0.0301
12	1.0975	0.0283
13	1.1221	0.0246
14	1.1453	0.0232
15	1.1674	0.0221
16	1.1884	0.0210
17	1.2085	0.0201
18	1.2278	0.0193
19	1.2463	0.0185
20	1.2641	0.0178
21	1.2813	0.0172
22	1.2979	0.0166
23	1.3140	0.0161

24	1.3295	0.0156
25	1.3446	0.0151
26	1.3593	0.0147
27	1.3736	0.0143
28	1.3874	0.0139
29	1.4010	0.0135
30	1.4142	0.0132
31	1.4271	0.0129
32	1.4397	0.0126
33	1.4520	0.0123
34	1.4640	0.0120
35	1.4758	0.0118
36	1.4873	0.0115
37	1.4986	0.0113
38	1.5096	0.0110
39	1.5204	0.0108
40	1.5311	0.0106
41	1.5415	0.0104
42	1.5518	0.0103
43	1.5618	0.0101
44	1.5717	0.0099
45	1.5815	0.0097
46	1.5911	0.0096
47	1.6005	0.0094
48	1.6098	0.0093
49	1.6190	0.0092
50	1.6280	0.0090
51	1.6369	0.0089
52	1.6456	0.0088
53	1.6543	0.0086
54	1.6628	0.0085
55	1.6712	0.0084
56	1.6795	0.0083
57	1.6877	0.0082
58	1.6958	0.0081
59	1.7038	0.0080
60	1.7117	0.0079
61	1.7195	0.0078
62	1.7272	0.0077
63	1.7348	0.0076
64	1.7424	0.0075
65	1.7498	0.0074
66	1.7572	0.0074
67	1.7645	0.0073
68	1.7717	0.0072
69	1.7788	0.0071
70	1.7858	0.0071
71	1.7928	0.0070
72	1.7997	0.0069
73	1.8106	0.0109
74	1.8214	0.0108
75	1.8321	0.0107
76	1.8428	0.0106
77	1.8534	0.0106
78	1.8638	0.0105
79	1.8743	0.0104
80	1.8846	0.0103
81	1.8949	0.0103
82	1.9051	0.0102
83	1.9152	0.0101

84	1.9252	0.0101
85	1.9352	0.0100
86	1.9451	0.0099
87	1.9550	0.0099
88	1.9648	0.0098
89	1.9745	0.0097
90	1.9842	0.0097
91	1.9938	0.0096
92	2.0034	0.0096
93	2.0129	0.0095
94	2.0223	0.0094
95	2.0317	0.0094
96	2.0410	0.0093
97	2.0503	0.0093
98	2.0595	0.0092
99	2.0687	0.0092
100	2.0778	0.0091
101	2.0868	0.0091
102	2.0958	0.0090
103	2.1048	0.0090
104	2.1137	0.0089
105	2.1226	0.0089
106	2.1314	0.0088
107	2.1402	0.0088
108	2.1489	0.0087
109	2.1576	0.0087
110	2.1662	0.0086
111	2.1748	0.0086
112	2.1833	0.0085
113	2.1918	0.0085
114	2.2003	0.0085
115	2.2087	0.0084
116	2.2171	0.0084
117	2.2254	0.0083
118	2.2337	0.0083
119	2.2420	0.0083
120	2.2502	0.0082
121	2.2584	0.0082
122	2.2665	0.0081
123	2.2746	0.0081
124	2.2827	0.0081
125	2.2907	0.0080
126	2.2987	0.0080
127	2.3067	0.0080
128	2.3146	0.0079
129	2.3225	0.0079
130	2.3304	0.0079
131	2.3382	0.0078
132	2.3460	0.0078
133	2.3537	0.0078
134	2.3614	0.0077
135	2.3691	0.0077
136	2.3768	0.0077
137	2.3844	0.0076
138	2.3920	0.0076
139	2.3996	0.0076
140	2.4071	0.0075
141	2.4146	0.0075
142	2.4221	0.0075
143	2.4295	0.0074

144	2.4370	0.0074
145	2.4443	0.0074
146	2.4517	0.0074
147	2.4590	0.0073
148	2.4663	0.0073
149	2.4736	0.0073
150	2.4808	0.0072
151	2.4881	0.0072
152	2.4953	0.0072
153	2.5024	0.0072
154	2.5096	0.0071
155	2.5167	0.0071
156	2.5238	0.0071
157	2.5308	0.0071
158	2.5379	0.0070
159	2.5449	0.0070
160	2.5519	0.0070
161	2.5588	0.0070
162	2.5658	0.0069
163	2.5727	0.0069
164	2.5796	0.0069
165	2.5864	0.0069
166	2.5933	0.0068
167	2.6001	0.0068
168	2.6069	0.0068
169	2.6137	0.0068
170	2.6204	0.0068
171	2.6272	0.0067
172	2.6339	0.0067
173	2.6405	0.0067
174	2.6472	0.0067
175	2.6538	0.0066
176	2.6605	0.0066
177	2.6671	0.0066
178	2.6736	0.0066
179	2.6802	0.0066
180	2.6867	0.0065
181	2.6933	0.0065
182	2.6998	0.0065
183	2.7062	0.0065
184	2.7127	0.0065
185	2.7191	0.0064
186	2.7255	0.0064
187	2.7319	0.0064
188	2.7383	0.0064
189	2.7447	0.0064
190	2.7510	0.0063
191	2.7573	0.0063
192	2.7637	0.0063
193	2.7699	0.0063
194	2.7762	0.0063
195	2.7825	0.0062
196	2.7887	0.0062
197	2.7949	0.0062
198	2.8011	0.0062
199	2.8073	0.0062
200	2.8134	0.0062
201	2.8196	0.0061
202	2.8257	0.0061
203	2.8318	0.0061

204	2.8379	0.0061
205	2.8440	0.0061
206	2.8500	0.0061
207	2.8561	0.0060
208	2.8621	0.0060
209	2.8681	0.0060
210	2.8741	0.0060
211	2.8801	0.0060
212	2.8860	0.0060
213	2.8920	0.0059
214	2.8979	0.0059
215	2.9038	0.0059
216	2.9097	0.0059
217	2.9156	0.0059
218	2.9215	0.0059
219	2.9273	0.0059
220	2.9332	0.0058
221	2.9390	0.0058
222	2.9448	0.0058
223	2.9506	0.0058
224	2.9564	0.0058
225	2.9621	0.0058
226	2.9679	0.0057
227	2.9736	0.0057
228	2.9793	0.0057
229	2.9851	0.0057
230	2.9907	0.0057
231	2.9964	0.0057
232	3.0021	0.0057
233	3.0077	0.0057
234	3.0134	0.0056
235	3.0190	0.0056
236	3.0246	0.0056
237	3.0302	0.0056
238	3.0358	0.0056
239	3.0414	0.0056
240	3.0469	0.0056
241	3.0525	0.0055
242	3.0580	0.0055
243	3.0635	0.0055
244	3.0690	0.0055
245	3.0745	0.0055
246	3.0800	0.0055
247	3.0855	0.0055
248	3.0909	0.0055
249	3.0964	0.0054
250	3.1018	0.0054
251	3.1072	0.0054
252	3.1126	0.0054
253	3.1180	0.0054
254	3.1234	0.0054
255	3.1288	0.0054
256	3.1341	0.0054
257	3.1395	0.0053
258	3.1448	0.0053
259	3.1502	0.0053
260	3.1555	0.0053
261	3.1608	0.0053
262	3.1661	0.0053
263	3.1713	0.0053

264	3.1766	0.0053
265	3.1819	0.0053
266	3.1871	0.0052
267	3.1923	0.0052
268	3.1976	0.0052
269	3.2028	0.0052
270	3.2080	0.0052
271	3.2132	0.0052
272	3.2183	0.0052
273	3.2235	0.0052
274	3.2287	0.0052
275	3.2338	0.0051
276	3.2390	0.0051
277	3.2441	0.0051
278	3.2492	0.0051
279	3.2543	0.0051
280	3.2594	0.0051
281	3.2645	0.0051
282	3.2696	0.0051
283	3.2746	0.0051
284	3.2797	0.0051
285	3.2847	0.0050
286	3.2898	0.0050
287	3.2948	0.0050
288	3.2998	0.0050

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0050	0.0030	0.0020
2	0.0050	0.0030	0.0020
3	0.0050	0.0030	0.0021
4	0.0051	0.0030	0.0021
5	0.0051	0.0030	0.0021
6	0.0051	0.0030	0.0021
7	0.0051	0.0030	0.0021
8	0.0051	0.0030	0.0021
9	0.0051	0.0030	0.0021
10	0.0051	0.0030	0.0021
11	0.0052	0.0031	0.0021
12	0.0052	0.0031	0.0021
13	0.0052	0.0031	0.0021
14	0.0052	0.0031	0.0021
15	0.0052	0.0031	0.0021
16	0.0052	0.0031	0.0021
17	0.0053	0.0031	0.0021
18	0.0053	0.0031	0.0022
19	0.0053	0.0031	0.0022
20	0.0053	0.0031	0.0022
21	0.0053	0.0032	0.0022
22	0.0053	0.0032	0.0022
23	0.0054	0.0032	0.0022
24	0.0054	0.0032	0.0022
25	0.0054	0.0032	0.0022
26	0.0054	0.0032	0.0022
27	0.0054	0.0032	0.0022
28	0.0055	0.0032	0.0022

29	0.0055	0.0032	0.0022
30	0.0055	0.0033	0.0022
31	0.0055	0.0033	0.0023
32	0.0055	0.0033	0.0023
33	0.0056	0.0033	0.0023
34	0.0056	0.0033	0.0023
35	0.0056	0.0033	0.0023
36	0.0056	0.0033	0.0023
37	0.0056	0.0033	0.0023
38	0.0057	0.0033	0.0023
39	0.0057	0.0034	0.0023
40	0.0057	0.0034	0.0023
41	0.0057	0.0034	0.0023
42	0.0057	0.0034	0.0023
43	0.0058	0.0034	0.0024
44	0.0058	0.0034	0.0024
45	0.0058	0.0034	0.0024
46	0.0058	0.0034	0.0024
47	0.0059	0.0035	0.0024
48	0.0059	0.0035	0.0024
49	0.0059	0.0035	0.0024
50	0.0059	0.0035	0.0024
51	0.0059	0.0035	0.0024
52	0.0060	0.0035	0.0024
53	0.0060	0.0035	0.0024
54	0.0060	0.0036	0.0025
55	0.0060	0.0036	0.0025
56	0.0061	0.0036	0.0025
57	0.0061	0.0036	0.0025
58	0.0061	0.0036	0.0025
59	0.0061	0.0036	0.0025
60	0.0062	0.0036	0.0025
61	0.0062	0.0037	0.0025
62	0.0062	0.0037	0.0025
63	0.0062	0.0037	0.0025
64	0.0063	0.0037	0.0026
65	0.0063	0.0037	0.0026
66	0.0063	0.0037	0.0026
67	0.0064	0.0038	0.0026
68	0.0064	0.0038	0.0026
69	0.0064	0.0038	0.0026
70	0.0064	0.0038	0.0026
71	0.0065	0.0038	0.0026
72	0.0065	0.0038	0.0026
73	0.0065	0.0039	0.0027
74	0.0066	0.0039	0.0027
75	0.0066	0.0039	0.0027
76	0.0066	0.0039	0.0027
77	0.0067	0.0039	0.0027
78	0.0067	0.0040	0.0027
79	0.0067	0.0040	0.0027
80	0.0068	0.0040	0.0028
81	0.0068	0.0040	0.0028
82	0.0068	0.0040	0.0028
83	0.0069	0.0041	0.0028
84	0.0069	0.0041	0.0028
85	0.0069	0.0041	0.0028
86	0.0070	0.0041	0.0028
87	0.0070	0.0042	0.0029
88	0.0070	0.0042	0.0029

89	0.0071	0.0042	0.0029
90	0.0071	0.0042	0.0029
91	0.0072	0.0042	0.0029
92	0.0072	0.0043	0.0029
93	0.0072	0.0043	0.0030
94	0.0073	0.0043	0.0030
95	0.0073	0.0043	0.0030
96	0.0074	0.0044	0.0030
97	0.0074	0.0044	0.0030
98	0.0074	0.0044	0.0030
99	0.0075	0.0044	0.0031
100	0.0075	0.0045	0.0031
101	0.0076	0.0045	0.0031
102	0.0076	0.0045	0.0031
103	0.0077	0.0046	0.0031
104	0.0077	0.0046	0.0031
105	0.0078	0.0046	0.0032
106	0.0078	0.0046	0.0032
107	0.0079	0.0047	0.0032
108	0.0079	0.0047	0.0032
109	0.0080	0.0047	0.0033
110	0.0080	0.0048	0.0033
111	0.0081	0.0048	0.0033
112	0.0081	0.0048	0.0033
113	0.0082	0.0049	0.0034
114	0.0083	0.0049	0.0034
115	0.0083	0.0049	0.0034
116	0.0084	0.0050	0.0034
117	0.0085	0.0050	0.0034
118	0.0085	0.0050	0.0035
119	0.0086	0.0051	0.0035
120	0.0086	0.0051	0.0035
121	0.0087	0.0052	0.0036
122	0.0088	0.0052	0.0036
123	0.0089	0.0052	0.0036
124	0.0089	0.0053	0.0036
125	0.0090	0.0053	0.0037
126	0.0091	0.0054	0.0037
127	0.0092	0.0054	0.0037
128	0.0092	0.0055	0.0038
129	0.0093	0.0055	0.0038
130	0.0094	0.0056	0.0038
131	0.0095	0.0056	0.0039
132	0.0096	0.0057	0.0039
133	0.0097	0.0057	0.0039
134	0.0097	0.0058	0.0040
135	0.0099	0.0058	0.0040
136	0.0099	0.0059	0.0040
137	0.0101	0.0060	0.0041
138	0.0101	0.0060	0.0041
139	0.0103	0.0061	0.0042
140	0.0103	0.0061	0.0042
141	0.0105	0.0062	0.0043
142	0.0106	0.0063	0.0043
143	0.0107	0.0064	0.0044
144	0.0108	0.0064	0.0044
145	0.0069	0.0041	0.0028
146	0.0070	0.0041	0.0028
147	0.0071	0.0042	0.0029
148	0.0072	0.0043	0.0029

149	0.0074	0.0044	0.0030
150	0.0074	0.0044	0.0030
151	0.0076	0.0045	0.0031
152	0.0077	0.0046	0.0031
153	0.0079	0.0047	0.0032
154	0.0080	0.0047	0.0033
155	0.0082	0.0049	0.0033
156	0.0083	0.0049	0.0034
157	0.0085	0.0051	0.0035
158	0.0086	0.0051	0.0035
159	0.0089	0.0053	0.0036
160	0.0090	0.0053	0.0037
161	0.0093	0.0055	0.0038
162	0.0094	0.0056	0.0038
163	0.0097	0.0058	0.0040
164	0.0099	0.0059	0.0040
165	0.0103	0.0061	0.0042
166	0.0104	0.0062	0.0043
167	0.0108	0.0064	0.0044
168	0.0110	0.0065	0.0045
169	0.0115	0.0068	0.0047
170	0.0118	0.0070	0.0048
171	0.0123	0.0073	0.0050
172	0.0126	0.0075	0.0051
173	0.0132	0.0078	0.0054
174	0.0135	0.0080	0.0055
175	0.0143	0.0084	0.0058
176	0.0147	0.0087	0.0060
177	0.0156	0.0092	0.0063
178	0.0161	0.0095	0.0065
179	0.0172	0.0102	0.0070
180	0.0178	0.0105	0.0073
181	0.0193	0.0114	0.0079
182	0.0201	0.0119	0.0082
183	0.0221	0.0131	0.0090
184	0.0232	0.0138	0.0095
185	0.0283	0.0167	0.0115
186	0.0301	0.0179	0.0123
187	0.0350	0.0207	0.0143
188	0.0382	0.0226	0.0156
189	0.0475	0.0281	0.0193
190	0.0547	0.0324	0.0223
191	0.0829	0.0393	0.0437
192	0.1204	0.0393	0.0811
193	0.5208	0.0393	0.4815
194	0.0653	0.0387	0.0266
195	0.0422	0.0250	0.0172
196	0.0323	0.0191	0.0132
197	0.0246	0.0146	0.0100
198	0.0210	0.0125	0.0086
199	0.0185	0.0110	0.0075
200	0.0166	0.0098	0.0068
201	0.0151	0.0089	0.0062
202	0.0139	0.0082	0.0057
203	0.0129	0.0076	0.0053
204	0.0120	0.0071	0.0049
205	0.0113	0.0067	0.0046
206	0.0106	0.0063	0.0043
207	0.0101	0.0060	0.0041
208	0.0096	0.0057	0.0039

209	0.0092	0.0054	0.0037
210	0.0088	0.0052	0.0036
211	0.0084	0.0050	0.0034
212	0.0081	0.0048	0.0033
213	0.0078	0.0046	0.0032
214	0.0075	0.0045	0.0031
215	0.0073	0.0043	0.0030
216	0.0071	0.0042	0.0029
217	0.0109	0.0064	0.0044
218	0.0106	0.0063	0.0043
219	0.0104	0.0062	0.0042
220	0.0102	0.0060	0.0042
221	0.0100	0.0059	0.0041
222	0.0098	0.0058	0.0040
223	0.0096	0.0057	0.0039
224	0.0094	0.0056	0.0038
225	0.0093	0.0055	0.0038
226	0.0091	0.0054	0.0037
227	0.0090	0.0053	0.0037
228	0.0088	0.0052	0.0036
229	0.0087	0.0051	0.0035
230	0.0085	0.0051	0.0035
231	0.0084	0.0050	0.0034
232	0.0083	0.0049	0.0034
233	0.0082	0.0048	0.0033
234	0.0081	0.0048	0.0033
235	0.0080	0.0047	0.0032
236	0.0079	0.0047	0.0032
237	0.0078	0.0046	0.0032
238	0.0077	0.0045	0.0031
239	0.0076	0.0045	0.0031
240	0.0075	0.0044	0.0030
241	0.0074	0.0044	0.0030
242	0.0073	0.0043	0.0030
243	0.0072	0.0043	0.0029
244	0.0071	0.0042	0.0029
245	0.0071	0.0042	0.0029
246	0.0070	0.0041	0.0028
247	0.0069	0.0041	0.0028
248	0.0068	0.0041	0.0028
249	0.0068	0.0040	0.0028
250	0.0067	0.0040	0.0027
251	0.0066	0.0039	0.0027
252	0.0066	0.0039	0.0027
253	0.0065	0.0039	0.0027
254	0.0065	0.0038	0.0026
255	0.0064	0.0038	0.0026
256	0.0063	0.0038	0.0026
257	0.0063	0.0037	0.0026
258	0.0062	0.0037	0.0025
259	0.0062	0.0037	0.0025
260	0.0061	0.0036	0.0025
261	0.0061	0.0036	0.0025
262	0.0060	0.0036	0.0025
263	0.0060	0.0035	0.0024
264	0.0059	0.0035	0.0024
265	0.0059	0.0035	0.0024
266	0.0058	0.0035	0.0024
267	0.0058	0.0034	0.0024
268	0.0057	0.0034	0.0023

```
      269              0.0057          0.0034              0.0023
      270              0.0057          0.0034              0.0023
      271              0.0056          0.0033              0.0023
      272              0.0056          0.0033              0.0023
      273              0.0055          0.0033              0.0023
      274              0.0055          0.0033              0.0022
      275              0.0055          0.0032              0.0022
      276              0.0054          0.0032              0.0022
      277              0.0054          0.0032              0.0022
      278              0.0054          0.0032              0.0022
      279              0.0053          0.0032              0.0022
      280              0.0053          0.0031              0.0022
      281              0.0053          0.0031              0.0021
      282              0.0052          0.0031              0.0021
      283              0.0052          0.0031              0.0021
      284              0.0052          0.0031              0.0021
      285              0.0051          0.0030              0.0021
      286              0.0051          0.0030              0.0021
      287              0.0051          0.0030              0.0021
      288              0.0050          0.0030              0.0021
      ------------------------------------------------------------------
--
      ------------------------------------------------------------------
--
      Total soil rain loss =      1.64(In)
      Total effective rainfall =      1.66(In)
      Peak flow rate in flood hydrograph =     74.72(CFS)
      ------------------------------------------------------------------
---
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ------------------------------------------------------------------
--
                   Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       20.0      40.0      60.0
80.0

------------------------------------------------------------------------
    0+ 5       0.0001      0.02  Q         |         |         |
|
    0+10       0.0006      0.08  Q         |         |         |
|
    0+15       0.0022      0.23  Q         |         |         |
|
    0+20       0.0055      0.48  Q         |         |         |
|
    0+25       0.0101      0.66  Q         |         |         |
|
    0+30       0.0154      0.77  Q         |         |         |
|
    0+35       0.0213      0.85  Q         |         |         |
|
    0+40       0.0275      0.91  Q         |         |         |
|
    0+45       0.0341      0.96  Q         |         |         |
```

0+50	0.0409	0.99	Q			
0+55	0.0480	1.03	Q			
1+ 0	0.0553	1.06	Q			
1+ 5	0.0627	1.08	Q			
1+10	0.0703	1.10	Q			
1+15	0.0781	1.12	Q			
1+20	0.0859	1.14	Q			
1+25	0.0938	1.15	Q			
1+30	0.1019	1.17	Q			
1+35	0.1100	1.18	Q			
1+40	0.1182	1.19	Q			
1+45	0.1265	1.20	Q			
1+50	0.1348	1.21	Q			
1+55	0.1432	1.22	Q			
2+ 0	0.1517	1.23	Q			
2+ 5	0.1602	1.23	Q			
2+10	0.1687	1.24	QV			
2+15	0.1773	1.25	QV			
2+20	0.1859	1.26	QV			
2+25	0.1946	1.26	QV			
2+30	0.2034	1.27	QV			
2+35	0.2122	1.28	QV			
2+40	0.2210	1.28	QV			
2+45	0.2299	1.29	QV			
2+50	0.2387	1.29	QV			
2+55	0.2477	1.29	QV			
3+ 0	0.2566	1.30	QV			
3+ 5	0.2656	1.30	QV			
3+10	0.2746	1.31	QV			
3+15	0.2836	1.31	QV			

3+20	0.2927	1.32	QV			
3+25	0.3018	1.32	QV			
3+30	0.3110	1.33	QV			
3+35	0.3201	1.33	QV			
3+40	0.3293	1.34	QV			
3+45	0.3386	1.34	Q V			
3+50	0.3478	1.35	Q V			
3+55	0.3571	1.35	Q V			
4+ 0	0.3665	1.36	Q V			
4+ 5	0.3759	1.36	Q V			
4+10	0.3853	1.37	Q V			
4+15	0.3947	1.37	Q V			
4+20	0.4042	1.38	Q V			
4+25	0.4137	1.38	Q V			
4+30	0.4233	1.39	Q V			
4+35	0.4329	1.39	Q V			
4+40	0.4425	1.40	Q V			
4+45	0.4522	1.40	Q V			
4+50	0.4619	1.41	Q V			
4+55	0.4716	1.42	Q V			
5+ 0	0.4814	1.42	Q V			
5+ 5	0.4913	1.43	Q V			
5+10	0.5011	1.43	Q V			
5+15	0.5110	1.44	Q V			
5+20	0.5210	1.44	Q V			
5+25	0.5310	1.45	Q V			
5+30	0.5410	1.46	Q V			
5+35	0.5511	1.46	Q V			
5+40	0.5612	1.47	Q V			
5+45	0.5714	1.48	Q V			

5+50	0.5816	1.48	Q	V			
5+55	0.5919	1.49	Q	V			
6+ 0	0.6022	1.50	Q	V			
6+ 5	0.6125	1.50	Q	V			
6+10	0.6229	1.51	Q	V			
6+15	0.6333	1.52	Q	V			
6+20	0.6438	1.52	Q	V			
6+25	0.6544	1.53	Q	V			
6+30	0.6649	1.54	Q	V			
6+35	0.6756	1.54	Q	V			
6+40	0.6863	1.55	Q	V			
6+45	0.6970	1.56	Q	V			
6+50	0.7078	1.57	Q	V			
6+55	0.7186	1.57	Q	V			
7+ 0	0.7295	1.58	Q	V			
7+ 5	0.7405	1.59	Q	V			
7+10	0.7515	1.60	Q	V			
7+15	0.7625	1.61	Q	V			
7+20	0.7737	1.61	Q	V			
7+25	0.7848	1.62	Q	V			
7+30	0.7961	1.63	Q	V			
7+35	0.8074	1.64	Q	V			
7+40	0.8187	1.65	Q	V			
7+45	0.8301	1.66	Q	V			
7+50	0.8416	1.67	Q	V			
7+55	0.8531	1.67	Q	V			
8+ 0	0.8647	1.68	Q	V			
8+ 5	0.8764	1.69	Q	V			
8+10	0.8881	1.70	Q	V			
8+15	0.8999	1.71	Q	V			

8+20	0.9117	1.72	Q	V			
8+25	0.9237	1.73	Q	V			
8+30	0.9357	1.74	Q	V			
8+35	0.9477	1.75	Q	V			
8+40	0.9599	1.76	Q	V			
8+45	0.9721	1.77	Q	V			
8+50	0.9844	1.78	Q	V			
8+55	0.9967	1.79	Q	V			
9+ 0	1.0092	1.81	Q	V			
9+ 5	1.0217	1.82	Q	V			
9+10	1.0343	1.83	Q	V			
9+15	1.0470	1.84	Q	V			
9+20	1.0597	1.85	Q	V			
9+25	1.0726	1.86	Q	V			
9+30	1.0855	1.88	Q	V			
9+35	1.0985	1.89	Q	V			
9+40	1.1116	1.90	Q	V			
9+45	1.1248	1.92	Q	V			
9+50	1.1381	1.93	Q	V			
9+55	1.1515	1.94	Q	V			
10+ 0	1.1649	1.96	Q	V			
10+ 5	1.1785	1.97	Q	V			
10+10	1.1922	1.99	Q	V			
10+15	1.2060	2.00	|Q	V			
10+20	1.2198	2.02	|Q	V			
10+25	1.2338	2.03	|Q	V			
10+30	1.2479	2.05	|Q	V			
10+35	1.2621	2.06	|Q	V			
10+40	1.2764	2.08	|Q	V			
10+45	1.2909	2.10	|Q	V			

10+50	1.3054	2.11	|Q V |	|	|
10+55	1.3201	2.13	|Q V |	|	|
11+ 0	1.3349	2.15	|Q V |	|	|
11+ 5	1.3498	2.17	|Q V |	|	|
11+10	1.3649	2.19	|Q V |	|	|
11+15	1.3801	2.21	|Q V |	|	|
11+20	1.3954	2.23	|Q V |	|	|
11+25	1.4109	2.25	|Q V |	|	|
11+30	1.4265	2.27	|Q V |	|	|
11+35	1.4422	2.29	|Q V |	|	|
11+40	1.4581	2.31	|Q V |	|	|
11+45	1.4742	2.33	|Q V |	|	|
11+50	1.4904	2.36	|Q V|	|	|
11+55	1.5068	2.38	|Q V|	|	|
12+ 0	1.5234	2.40	|Q V|	|	|
12+ 5	1.5400	2.42	|Q V|	|	|
12+10	1.5565	2.39	|Q V|	|	|
12+15	1.5723	2.30	|Q V|	|	|
12+20	1.5869	2.12	|Q V|	|	|
12+25	1.6007	2.00	|Q V|	|	|
12+30	1.6141	1.94	Q V|	|	|
12+35	1.6272	1.91	Q V|	|	|
12+40	1.6402	1.89	Q V|	|	|
12+45	1.6532	1.88	Q V	|	|
12+50	1.6661	1.88	Q V	|	|
12+55	1.6791	1.88	Q V	|	|
13+ 0	1.6921	1.89	Q V	|	|
13+ 5	1.7053	1.91	Q V	|	|
13+10	1.7185	1.93	Q V	|	|
13+15	1.7320	1.95	Q V	|	|

13+20	1.7456	1.98	Q	V	|	|
13+25	1.7594	2.00	|Q	V	|	|
13+30	1.7734	2.04	|Q	V	|	|
13+35	1.7876	2.07	|Q	V	|	|
13+40	1.8021	2.11	|Q	V	|	|
13+45	1.8169	2.15	|Q	V	|	|
13+50	1.8320	2.19	|Q	|V	|	|
13+55	1.8474	2.24	|Q	|V	|	|
14+ 0	1.8632	2.29	|Q	|V	|	|
14+ 5	1.8793	2.34	|Q	|V	|	|
14+10	1.8959	2.40	|Q	|V	|	|
14+15	1.9129	2.47	|Q	|V	|	|
14+20	1.9304	2.54	|Q	|V	|	|
14+25	1.9483	2.61	|Q	|V	|	|
14+30	1.9669	2.69	|Q	|V	|	|
14+35	1.9860	2.78	|Q	| V	|	|
14+40	2.0058	2.87	|Q	| V	|	|
14+45	2.0262	2.97	|Q	| V	|	|
14+50	2.0474	3.08	|Q	| V	|	|
14+55	2.0695	3.20	|Q	| V	|	|
15+ 0	2.0924	3.34	|Q	| V	|	|
15+ 5	2.1164	3.48	|Q	| V	|	|
15+10	2.1415	3.65	|Q	| V	|	|
15+15	2.1679	3.83	|Q	| V	|	|
15+20	2.1958	4.05	| Q	| V	|	|
15+25	2.2254	4.29	| Q	| V	|	|
15+30	2.2571	4.60	| Q	| V	|	|
15+35	2.2915	5.00	| Q	| V	|	|
15+40	2.3296	5.53	| Q	| V	|	|
15+45	2.3718	6.12	| Q	| V	|	|

15+50	2.4190	6.85	Q	V			
15+55	2.4734	7.90	Q	V			
16+ 0	2.5414	9.87	Q	V			
16+ 5	2.6558	16.62	Q	V			
16+10	2.8703	31.14		Q V			
16+15	3.2431	54.13		V	Q		
16+20	3.7577	74.72			V		Q
16+25	4.1341	54.65			V Q		
16+30	4.3898	37.13		Q	V		
16+35	4.5832	28.09	Q		V		
16+40	4.7383	22.52	Q		V		
16+45	4.8665	18.62	Q		V		
16+50	4.9741	15.62	Q		V		
16+55	5.0679	13.62	Q		V		
17+ 0	5.1509	12.04	Q		V		
17+ 5	5.2220	10.33	Q		V		
17+10	5.2840	9.00	Q		V		
17+15	5.3406	8.22	Q		V		
17+20	5.3918	7.44	Q		V		
17+25	5.4379	6.70	Q		V		
17+30	5.4794	6.02	Q		V		
17+35	5.5176	5.56	Q		V		
17+40	5.5521	5.00	Q		V		
17+45	5.5836	4.58	Q		V		
17+50	5.6115	4.05	Q		V		
17+55	5.6368	3.68	Q		V		
18+ 0	5.6590	3.22	Q		V		
18+ 5	5.6808	3.16	Q		V		
18+10	5.7029	3.20	Q		V		
18+15	5.7251	3.22	Q		V		

18+20	5.7479	3.31	|Q	|	|	|	V
18+25	5.7700	3.21	|Q	|	|	|	V
18+30	5.7903	2.95	|Q	|	|	|	V
18+35	5.8103	2.89	|Q	|	|	|	V
18+40	5.8295	2.79	|Q	|	|	|	V
18+45	5.8457	2.36	|Q	|	|	|	V
18+50	5.8616	2.31	|Q	|	|	|	V
18+55	5.8773	2.28	|Q	|	|	|	V
19+ 0	5.8928	2.24	|Q	|	|	|	V
19+ 5	5.9080	2.21	|Q	|	|	|	V
19+10	5.9230	2.18	|Q	|	|	|	V
19+15	5.9378	2.15	|Q	|	|	|	V
19+20	5.9524	2.12	|Q	|	|	|	V
19+25	5.9668	2.09	|Q	|	|	|	V
19+30	5.9810	2.06	|Q	|	|	|	V
19+35	5.9950	2.03	|Q	|	|	|	V
19+40	6.0088	2.01	|Q	|	|	|	V
19+45	6.0225	1.98	Q	|	|	|	V
19+50	6.0360	1.96	Q	|	|	|	V
19+55	6.0492	1.93	Q	|	|	|	V
20+ 0	6.0624	1.91	Q	|	|	|	V
20+ 5	6.0753	1.88	Q	|	|	|	V
20+10	6.0881	1.86	Q	|	|	|	V
20+15	6.1008	1.84	Q	|	|	|	V
20+20	6.1133	1.82	Q	|	|	|	V
20+25	6.1256	1.79	Q	|	|	|	V
20+30	6.1378	1.77	Q	|	|	|	V
20+35	6.1499	1.75	Q	|	|	|	V
20+40	6.1619	1.74	Q	|	|	|	V
20+45	6.1737	1.72	Q	|	|	|	V

|
| 20+50 | 6.1854 | 1.70 | Q | | | | V |
|
| 20+55 | 6.1969 | 1.68 | Q | | | | V |
|
| 21+ 0 | 6.2083 | 1.66 | Q | | | | V |
|
| 21+ 5 | 6.2196 | 1.64 | Q | | | | V |
|
| 21+10 | 6.2308 | 1.62 | Q | | | | V |
|
| 21+15 | 6.2419 | 1.61 | Q | | | | V |
|
| 21+20 | 6.2529 | 1.59 | Q | | | | V |
|
| 21+25 | 6.2637 | 1.58 | Q | | | | V |
|
| 21+30 | 6.2745 | 1.56 | Q | | | | V |
|
| 21+35 | 6.2851 | 1.55 | Q | | | | V |
|
| 21+40 | 6.2956 | 1.53 | Q | | | | V |
|
| 21+45 | 6.3061 | 1.52 | Q | | | | V |
|
| 21+50 | 6.3164 | 1.50 | Q | | | | V |
|
| 21+55 | 6.3267 | 1.49 | Q | | | | V |
|
| 22+ 0 | 6.3369 | 1.48 | Q | | | | V |
|
| 22+ 5 | 6.3469 | 1.46 | Q | | | | V |
|
| 22+10 | 6.3569 | 1.45 | Q | | | | V |
|
| 22+15 | 6.3668 | 1.44 | Q | | | | V |
|
| 22+20 | 6.3767 | 1.43 | Q | | | | V |
|
| 22+25 | 6.3864 | 1.42 | Q | | | | V |
|
| 22+30 | 6.3961 | 1.40 | Q | | | | V |
|
| 22+35 | 6.4057 | 1.39 | Q | | | | V |
|
| 22+40 | 6.4152 | 1.38 | Q | | | | V |
|
| 22+45 | 6.4246 | 1.37 | Q | | | | V |
|
| 22+50 | 6.4340 | 1.36 | Q | | | | V |
|
| 22+55 | 6.4433 | 1.35 | Q | | | | V |
|
| 23+ 0 | 6.4526 | 1.34 | Q | | | | |
V|
| 23+ 5 | 6.4617 | 1.33 | Q | | | | |
V|
| 23+10 | 6.4708 | 1.32 | Q | | | | |
V|
| 23+15 | 6.4799 | 1.31 | Q | | | | |

23+20	6.4888	1.30	Q			
23+25	6.4978	1.29	Q			
23+30	6.5066	1.29	Q			
23+35	6.5154	1.28	Q			
23+40	6.5241	1.27	Q			
23+45	6.5328	1.26	Q			
23+50	6.5414	1.25	Q			
23+55	6.5500	1.24	Q			
24+ 0	6.5585	1.24	Q			
24+ 5	6.5669	1.21	Q			
24+10	6.5747	1.14	Q			
24+15	6.5815	0.99	Q			
24+20	6.5865	0.72	Q			
24+25	6.5903	0.54	Q			
24+30	6.5932	0.43	Q			
24+35	6.5957	0.36	Q			
24+40	6.5977	0.30	Q			
24+45	6.5995	0.25	Q			
24+50	6.6009	0.21	Q			
24+55	6.6022	0.18	Q			
25+ 0	6.6032	0.15	Q			
25+ 5	6.6041	0.13	Q			
25+10	6.6049	0.11	Q			
25+15	6.6056	0.10	Q			
25+20	6.6062	0.08	Q			
25+25	6.6067	0.07	Q			
25+30	6.6071	0.06	Q			
25+35	6.6074	0.05	Q			
25+40	6.6077	0.04	Q			
25+45	6.6080	0.04	Q			

25+50	6.6082	0.03	Q			
25+55	6.6084	0.03	Q			
26+ 0	6.6085	0.02	Q			
26+ 5	6.6086	0.02	Q			
26+10	6.6088	0.02	Q			
26+15	6.6088	0.01	Q			
26+20	6.6089	0.01	Q			
26+25	6.6089	0.01	Q			
26+30	6.6090	0.00	Q			
26+35	6.6090	0.00	Q			

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 08/02/18

Monte Vista 69
10YR PEAK RUNOFF
Point 203
Proposed - Unrouted

Program License Serial Number 6232

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.800 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

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Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587 (In/Hr)
Initial subarea data:
Initial area flow distance = 947.000(Ft.)
Top (of initial area) elevation = 60.400(Ft.)
Bottom (of initial area) elevation = 50.000(Ft.)
Difference in elevation = 10.400(Ft.)
Slope = 0.01098 s(%)= 1.10
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.751 min.
Rainfall intensity = 2.040(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.641
Subarea runoff = 3.009(CFS)
Total initial stream area = 2.300(Ac.)

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      Pervious area fraction = 0.600
      Initial area Fm value =    0.587(In/Hr)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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      Process from Point/Station      202.000 to Point/Station
203.000
      **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
      ------------------------------------------------------------------------
____
      Top of street segment elevation =    50.000(Ft.)
      End of street segment elevation =    24.000(Ft.)
      Length of street segment  =  1740.000(Ft.)
      Height of curb above gutter flowline  =    6.0(In.)
      Width of half street (curb to crown)  =  18.000(Ft.)
      Distance from crown to crossfall grade break  =  16.000(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) =   0.030
      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 =     22.149(CFS)
      Depth of flow =   0.464(Ft.), Average velocity =   3.734(Ft/s)
      Streetflow hydraulics at midpoint of street travel:
      Halfstreet flow width =  16.850(Ft.)
      Flow velocity =   3.73(Ft/s)
      Travel time =    7.77 min.     TC =   23.52  min.
       Adding area flow to street
      RESIDENTIAL(3 - 4 dwl/acre)
      Decimal fraction soil group A = 1.000
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 32.00
      Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.587
(In/Hr)
      Rainfall intensity =      1.541(In/Hr) for a    10.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.557
      Subarea runoff =     38.134(CFS) for   45.600(Ac.)
      Total runoff =     41.143(CFS)
      Effective area this stream =       47.90(Ac.)
      Total Study Area (Main Stream No. 1) =       47.90(Ac.)
      Area averaged Fm value =    0.587(In/Hr)
      Street flow at end of street =     41.143(CFS)
      Half street flow at end of street =     20.572(CFS)
      Depth of flow =   0.551(Ft.), Average velocity =   4.496(Ft/s)
      Warning: depth of flow exceeds top of curb
      Note:  depth of flow exceeds top of street crown.
      Distance that curb overflow reaches into property =    1.71(Ft.)
      Flow width (from curb towards crown)=  18.000(Ft.)
      End of computations, Total Study Area =           47.90 (Ac.)
      The following figures may
```

be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 08/02/18

Monte Vista 69
10YR PEAK RUNOFF
POINT 103
Proposed - Unrouted

Program License Serial Number 6232

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.800 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

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

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.590
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.410
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 47.17
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.505 (In/Hr)
Initial subarea data:
Initial area flow distance = 982.000(Ft.)
Top (of initial area) elevation = 64.200(Ft.)
Bottom (of initial area) elevation = 54.600(Ft.)
Difference in elevation = 9.600(Ft.)
Slope = 0.00978 s(%)= 0.98
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.357 min.
Rainfall intensity = 1.987(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.671
Subarea runoff = 9.067(CFS)
Total initial stream area = 6.800(Ac.)

```
      Pervious area fraction = 0.600
      Initial area Fm value =    0.505(In/Hr)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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      Process from Point/Station      102.000 to Point/Station
103.000
      **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
      ------------------------------------------------------------------------
____
      Top of street segment elevation =    54.600(Ft.)
      End of street segment elevation =    31.000(Ft.)
      Length of street segment  =  1284.000(Ft.)
      Height of curb above gutter flowline  =    6.0(In.)
      Width of half street (curb to crown)  =  18.000(Ft.)
      Distance from crown to crossfall grade break  =  16.000(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) =   0.030
      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 =     20.643(CFS)
      Depth of flow =   0.441(Ft.), Average velocity =   3.970(Ft/s)
      Streetflow hydraulics at midpoint of street travel:
      Halfstreet flow width =  15.726(Ft.)
      Flow velocity =   3.97(Ft/s)
      Travel time =    5.39 min.     TC =   21.75  min.
       Adding area flow to street
      RESIDENTIAL(3 - 4 dwl/acre)
      Decimal fraction soil group A = 0.590
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.410
      Decimal fraction soil group D = 0.000
      SCS curve number for soil(AMC 2)  = 47.17
      Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.505
(In/Hr)
      Rainfall intensity =      1.628(In/Hr) for a    10.0 year storm
      Effective runoff coefficient used for area,(total area with
modified
      rational method)(Q=KCIA) is C = 0.621
      Subarea runoff =     22.953(CFS) for   24.900(Ac.)
      Total runoff =     32.020(CFS)
      Effective area this stream =       31.70(Ac.)
      Total Study Area (Main Stream No. 1) =       31.70(Ac.)
      Area averaged Fm value =    0.505(In/Hr)
      Street flow at end of street =     32.020(CFS)
      Half street flow at end of street =     16.010(CFS)
      Depth of flow =   0.498(Ft.), Average velocity =   4.484(Ft/s)
      Note:  depth of flow exceeds top of street crown.
      Flow width (from curb towards crown)=  18.000(Ft.)
      End of computations, Total Study Area =           31.70 (Ac.)
      The following figures may
      be used for a unit hydrograph study of the same area.
      Note: These figures do not consider reduced effective area
```

effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 47.2

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 08/02/18

Monte Vista 69
100YR PEAK RUNOFF
POINT 302
àS

Program License Serial Number 6232

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.100 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 301.000 to Point/Station 302.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.471 (In/Hr)
Initial subarea data:
Initial area flow distance = 145.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 47.000(Ft.)
Difference in elevation = 9.000(Ft.)
Slope = 0.06207 s(%)= 6.21
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.259 min.
Rainfall intensity = 6.046(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.830
Subarea runoff = 1.505(CFS)

Total initial stream area = 0.300(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.471(In/Hr)
End of computations, Total Study Area = 0.30 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 08/02/18

Monte Vista 69
10YR PEAK RUNOFF
POINT 302
àS

Program License Serial Number 6232

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.800 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 301.000 to Point/Station 302.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587 (In/Hr)
Initial subarea data:
Initial area flow distance = 145.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 47.000(Ft.)
Difference in elevation = 9.000(Ft.)
Slope = 0.06207 s(%)= 6.21
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.259 min.
Rainfall intensity = 4.397(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.780
Subarea runoff = 1.029(CFS)
Total initial stream area = 0.300(Ac.)

Pervious area fraction = 0.600
Initial area Fm value = 0.587(In/Hr)
End of computations, Total Study Area = 0.30 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 08/02/18

Monte Vista 69
10YR PEAK RUNOFF
POINT 402
àS

Program License Serial Number 6232

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.800 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 401.000 to Point/Station 402.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587 (In/Hr)
Initial subarea data:
Initial area flow distance = 462.000(Ft.)
Top (of initial area) elevation = 55.000(Ft.)
Bottom (of initial area) elevation = 37.500(Ft.)
Difference in elevation = 17.500(Ft.)
Slope = 0.03788 s(%)= 3.79
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.227 min.
Rainfall intensity = 2.966(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.722
Subarea runoff = 3.641(CFS)
Total initial stream area = 1.700(Ac.)

Pervious area fraction = 0.600
Initial area Fm value = 0.587(In/Hr)
End of computations, Total Study Area = 1.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 08/02/18

Monte Vista 69
100YR PEAK RUNOFF
POINT 402
àS

Program License Serial Number 6232

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.100 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 401.000 to Point/Station 402.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.471 (In/Hr)
Initial subarea data:
Initial area flow distance = 462.000(Ft.)
Top (of initial area) elevation = 55.000(Ft.)
Bottom (of initial area) elevation = 37.500(Ft.)
Difference in elevation = 17.500(Ft.)
Slope = 0.03788 s(%)= 3.79
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.227 min.
Rainfall intensity = 4.079(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.796
Subarea runoff = 5.520(CFS)

Total initial stream area = 1.700(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.471(In/Hr)
End of computations, Total Study Area = 1.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 08/02/18

Monte Vista 69
100YR PEAK RUNOFF
POINT 502
àS

Program License Serial Number 6232

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.100 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 501.000 to Point/Station 502.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.471 (In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 54.000(Ft.)
Bottom (of initial area) elevation = 35.600(Ft.)
Difference in elevation = 18.400(Ft.)
Slope = 0.01840 s(%)= 1.84
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.519 min.
Rainfall intensity = 2.970(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.757
Subarea runoff = 4.048(CFS)

Total initial stream area = 1.800(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.471(In/Hr)
End of computations, Total Study Area = 1.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 08/02/18

Monte Vista 69
10YR PEAK RUNOFF
POINT 502
àS

Program License Serial Number 6232

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.800 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 501.000 to Point/Station 502.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587 (In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 54.000(Ft.)
Bottom (of initial area) elevation = 35.600(Ft.)
Difference in elevation = 18.400(Ft.)
Slope = 0.01840 s(%)= 1.84
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.519 min.
Rainfall intensity = 2.160(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.656
Subarea runoff = 2.549(CFS)
Total initial stream area = 1.800(Ac.)

Pervious area fraction = 0.600
Initial area Fm value = 0.587(In/Hr)
End of computations, Total Study Area = 1.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

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Rational Hydrology Study Date: 08/02/18

Monte Vista 69
10YR PEAK RUNOFF
POINT 602
àS

Program License Serial Number 6232

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

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.800 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

++

Process from Point/Station 601.000 to Point/Station 602.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.587 (In/Hr)
Initial subarea data:
Initial area flow distance = 663.000(Ft.)
Top (of initial area) elevation = 41.000(Ft.)
Bottom (of initial area) elevation = 26.200(Ft.)
Difference in elevation = 14.800(Ft.)
Slope = 0.02232 s(%)= 2.23
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.851 min.
Rainfall intensity = 2.490(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.688
Subarea runoff = 4.796(CFS)
Total initial stream area = 2.800(Ac.)

Pervious area fraction = 0.600
Initial area Fm value = 0.587(In/Hr)
End of computations, Total Study Area = 2.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1

Rational Hydrology Study Date: 08/02/18

Monte Vista 69
100YR PEAK RUNOFF
POINT 602
àS

Program License Serial Number 6232

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

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.100 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 601.000 to Point/Station 602.000

**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.471 (In/Hr)
Initial subarea data:
Initial area flow distance = 663.000(Ft.)
Top (of initial area) elevation = 41.000(Ft.)
Bottom (of initial area) elevation = 26.200(Ft.)
Difference in elevation = 14.800(Ft.)
Slope = 0.02232 s(%)= 2.23
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.851 min.
Rainfall intensity = 3.424(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.776
Subarea runoff = 7.440(CFS)

Total initial stream area = 2.800(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.471(In/Hr)
End of computations, Total Study Area = 2.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.600
Area averaged SCS curve number = 32.0

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 08/06/18

Monte Vista 69
SCS Unit Hydrograph - Basin Routing
Point 104
Proposed Conditon - Routed

Program License Serial Number 6232

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

From study/file name: mv69pro103.rte

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

Number of intervals = 313
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 55.961 (CFS)
Total volume = 5.645 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++

Process from Point/Station 103.000 to Point/Station 104.000

**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 313
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

```
--
      Initial basin depth =   0.00 (Ft.)
      Initial basin storage =      0.00 (Ac.Ft)
      Initial basin outflow =   0.00 (CFS)
      ------------------------------------------------------------------
---
      ------------------------------------------------------------------
--
      Depth vs. Storage and Depth vs. Discharge data:
       Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
           (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
      ------------------------------------------------------------------
---
          0.000      0.000      0.000      0.000        0.000
          1.000      0.750      0.001      0.750        0.750
          2.000      1.590      4.000      1.576        1.604
          3.000      2.530     13.000      2.485        2.575
          4.000      3.570     18.000      3.508        3.632
      ------------------------------------------------------------------
--
                   Hydrograph Detention Basin Routing
      ------------------------------------------------------------------
---

      Graph values: 'I'= unit inflow; 'O'=outflow at time shown
      ------------------------------------------------------------------
---
  Time   Inflow  Outflow    Storage
Depth
 (Hours)  (CFS)   (CFS)     (Ac.Ft) .0      14.0   27.98   41.97   55.96
(Ft.)
  0.083    0.02    0.00      0.000  O       |       |       |       |
0.00
  0.167    0.11    0.00      0.001  O       |       |       |       |
0.00
  0.250    0.35    0.00      0.002  O       |       |       |       |
0.00
  0.333    0.58    0.00      0.005  O       |       |       |       |
0.01
  0.417    0.72    0.00      0.010  O       |       |       |       |
0.01
  0.500    0.80    0.00      0.015  O       |       |       |       |
0.02
  0.583    0.87    0.00      0.021  O       |       |       |       |
0.03
  0.667    0.92    0.00      0.027  O       |       |       |       |
0.04
  0.750    0.95    0.00      0.033  O       |       |       |       |
0.04
  0.833    0.99    0.00      0.040  O       |       |       |       |
0.05
  0.917    1.01    0.00      0.047  O       |       |       |       |
0.06
  1.000    1.04    0.00      0.054  O       |       |       |       |
0.07
  1.083    1.05    0.00      0.061  O       |       |       |       |
0.08
  1.167    1.07    0.00      0.068  O       |       |       |       |
0.09
  1.250    1.09    0.00      0.076  O       |       |       |       |
```

0.10								
1.333	1.10	0.00	0.083	O	|	|	|	|
0.11								
1.417	1.11	0.00	0.091	O	|	|	|	|
0.12								
1.500	1.12	0.00	0.099	O	|	|	|	|
0.13								
1.583	1.13	0.00	0.107	O	|	|	|	|
0.14								
1.667	1.14	0.00	0.114	O	|	|	|	|
0.15								
1.750	1.14	0.00	0.122	O	|	|	|	|
0.16								
1.833	1.15	0.00	0.130	O	|	|	|	|
0.17								
1.917	1.16	0.00	0.138	O	|	|	|	|
0.18								
2.000	1.17	0.00	0.146	O	|	|	|	|
0.19								
2.083	1.17	0.00	0.154	O	|	|	|	|
0.21								
2.167	1.18	0.00	0.162	O	|	|	|	|
0.22								
2.250	1.18	0.00	0.170	O	|	|	|	|
0.23								
2.333	1.19	0.00	0.179	O	|	|	|	|
0.24								
2.417	1.19	0.00	0.187	O	|	|	|	|
0.25								
2.500	1.19	0.00	0.195	O	|	|	|	|
0.26								
2.583	1.20	0.00	0.203	O	|	|	|	|
0.27								
2.667	1.20	0.00	0.211	O	|	|	|	|
0.28								
2.750	1.21	0.00	0.220	O	|	|	|	|
0.29								
2.833	1.21	0.00	0.228	O	|	|	|	|
0.30								
2.917	1.21	0.00	0.236	O	|	|	|	|
0.32								
3.000	1.22	0.00	0.245	O	|	|	|	|
0.33								
3.083	1.22	0.00	0.253	O	|	|	|	|
0.34								
3.167	1.23	0.00	0.262	O	|	|	|	|
0.35								
3.250	1.23	0.00	0.270	O	|	|	|	|
0.36								
3.333	1.24	0.00	0.279	O	|	|	|	|
0.37								
3.417	1.24	0.00	0.287	O	|	|	|	|
0.38								
3.500	1.25	0.00	0.296	O	|	|	|	|
0.39								
3.583	1.25	0.00	0.304	O	|	|	|	|
0.41								
3.667	1.25	0.00	0.313	O	|	|	|	|
0.42								
3.750	1.26	0.00	0.321	O	|	|	|	|

0.43								
3.833	1.26	0.00	0.330	O	|	|	|	|
0.44								
3.917	1.27	0.00	0.339	O	|	|	|	|
0.45								
4.000	1.27	0.00	0.348	O	|	|	|	|
0.46								
4.083	1.28	0.00	0.356	O	|	|	|	|
0.48								
4.167	1.28	0.00	0.365	O	|	|	|	|
0.49								
4.250	1.29	0.00	0.374	O	|	|	|	|
0.50								
4.333	1.29	0.00	0.383	O	|	|	|	|
0.51								
4.417	1.30	0.00	0.392	O	|	|	|	|
0.52								
4.500	1.30	0.00	0.401	O	|	|	|	|
0.53								
4.583	1.31	0.00	0.410	O	|	|	|	|
0.55								
4.667	1.31	0.00	0.419	O	|	|	|	|
0.56								
4.750	1.32	0.00	0.428	O	|	|	|	|
0.57								
4.833	1.32	0.00	0.437	O	|	|	|	|
0.58								
4.917	1.33	0.00	0.446	O	|	|	|	|
0.59								
5.000	1.33	0.00	0.455	O	|	|	|	|
0.61								
5.083	1.34	0.00	0.464	O	|	|	|	|
0.62								
5.167	1.35	0.00	0.474	O	|	|	|	|
0.63								
5.250	1.35	0.00	0.483	O	|	|	|	|
0.64								
5.333	1.36	0.00	0.492	O	|	|	|	|
0.66								
5.417	1.36	0.00	0.502	O	|	|	|	|
0.67								
5.500	1.37	0.00	0.511	O	|	|	|	|
0.68								
5.583	1.37	0.00	0.521	O	|	|	|	|
0.69								
5.667	1.38	0.00	0.530	O	|	|	|	|
0.71								
5.750	1.39	0.00	0.540	O	|	|	|	|
0.72								
5.833	1.39	0.00	0.549	O	|	|	|	|
0.73								
5.917	1.40	0.00	0.559	O	|	|	|	|
0.74								
6.000	1.40	0.00	0.568	O	|	|	|	|
0.76								
6.083	1.41	0.00	0.578	O	|	|	|	|
0.77								
6.167	1.42	0.00	0.588	O	|	|	|	|
0.78								
6.250	1.42	0.00	0.598	O	|	|	|	|

0.80								
6.333	1.43	0.00	0.607	O	|	|	|	|
0.81								
6.417	1.44	0.00	0.617	O	|	|	|	|
0.82								
6.500	1.44	0.00	0.627	O	|	|	|	|
0.84								
6.583	1.45	0.00	0.637	O	|	|	|	|
0.85								
6.667	1.46	0.00	0.647	O	|	|	|	|
0.86								
6.750	1.46	0.00	0.657	O	|	|	|	|
0.88								
6.833	1.47	0.00	0.667	O	|	|	|	|
0.89								
6.917	1.48	0.00	0.677	O	|	|	|	|
0.90								
7.000	1.49	0.00	0.688	O	|	|	|	|
0.92								
7.083	1.49	0.00	0.698	O	|	|	|	|
0.93								
7.167	1.50	0.00	0.708	O	|	|	|	|
0.94								
7.250	1.51	0.00	0.719	O	|	|	|	|
0.96								
7.333	1.52	0.00	0.729	O	|	|	|	|
0.97								
7.417	1.52	0.00	0.739	O	|	|	|	|
0.99								
7.500	1.53	0.00	0.750	O	|	|	|	|
1.00								
7.583	1.54	0.05	0.760	O	|	|	|	|
1.01								
7.667	1.55	0.10	0.770	O	|	|	|	|
1.02								
7.750	1.56	0.15	0.780	O	|	|	|	|
1.04								
7.833	1.57	0.19	0.790	O	|	|	|	|
1.05								
7.917	1.57	0.24	0.799	O	|	|	|	|
1.06								
8.000	1.58	0.28	0.808	O	|	|	|	|
1.07								
8.083	1.59	0.32	0.817	O	|	|	|	|
1.08								
8.167	1.60	0.36	0.826	O	|	|	|	|
1.09								
8.250	1.61	0.40	0.834	O	|	|	|	|
1.10								
8.333	1.62	0.44	0.843	O	|	|	|	|
1.11								
8.417	1.63	0.48	0.851	O	|	|	|	|
1.12								
8.500	1.64	0.52	0.858	O	|	|	|	|
1.13								
8.583	1.65	0.55	0.866	O	|	|	|	|
1.14								
8.667	1.66	0.59	0.873	O	|	|	|	|
1.15								
8.750	1.67	0.62	0.881	O	|	|	|	|

1.16								
8.833	1.68	0.66	0.888	O				
1.16								
8.917	1.69	0.69	0.895	O				
1.17								
9.000	1.70	0.72	0.902	O				
1.18								
9.083	1.71	0.75	0.908	O				
1.19								
9.167	1.72	0.79	0.915	O				
1.20								
9.250	1.73	0.82	0.921	O				
1.20								
9.333	1.74	0.85	0.927	O				
1.21								
9.417	1.76	0.87	0.934	OI				
1.22								
9.500	1.77	0.90	0.940	OI				
1.23								
9.583	1.78	0.93	0.945	OI				
1.23								
9.667	1.79	0.96	0.951	OI				
1.24								
9.750	1.80	0.99	0.957	OI				
1.25								
9.833	1.82	1.01	0.962	OI				
1.25								
9.917	1.83	1.04	0.968	OI				
1.26								
10.000	1.84	1.06	0.973	OI				
1.27								
10.083	1.86	1.09	0.979	OI				
1.27								
10.167	1.87	1.11	0.984	OI				
1.28								
10.250	1.88	1.14	0.989	OI				
1.28								
10.333	1.90	1.16	0.994	OI				
1.29								
10.417	1.91	1.19	0.999	OI				
1.30								
10.500	1.93	1.21	1.004	OI				
1.30								
10.583	1.94	1.23	1.009	OI				
1.31								
10.667	1.96	1.26	1.014	OI				
1.31								
10.750	1.98	1.28	1.019	OI				
1.32								
10.833	1.99	1.30	1.024	OI				
1.33								
10.917	2.01	1.33	1.028	OI				
1.33								
11.000	2.03	1.35	1.033	OI				
1.34								
11.083	2.04	1.37	1.038	OI				
1.34								
11.167	2.06	1.39	1.042	OI				
1.35								
11.250	2.08	1.41	1.047	OI				

1.35								
11.333	2.10	1.44	1.051	OI				
1.36								
11.417	2.12	1.46	1.056	OI				
1.36								
11.500	2.14	1.48	1.061	OI				
1.37								
11.583	2.16	1.50	1.065	OI				
1.38								
11.667	2.18	1.52	1.070	OI				
1.38								
11.750	2.20	1.54	1.074	OI				
1.39								
11.833	2.22	1.57	1.079	OI				
1.39								
11.917	2.25	1.59	1.083	OI				
1.40								
12.000	2.27	1.61	1.088	OI				
1.40								
12.083	2.28	1.63	1.092	OI				
1.41								
12.167	2.23	1.65	1.097	OI				
1.41								
12.250	2.07	1.67	1.100	OI				
1.42								
12.333	1.90	1.68	1.102	OI				
1.42								
12.417	1.82	1.68	1.103	OI				
1.42								
12.500	1.77	1.69	1.104	OI				
1.42								
12.583	1.75	1.69	1.105	OI				
1.42								
12.667	1.74	1.69	1.105	O				
1.42								
12.750	1.74	1.69	1.105	O				
1.42								
12.833	1.74	1.69	1.106	O				
1.42								
12.917	1.75	1.70	1.106	OI				
1.42								
13.000	1.76	1.70	1.106	OI				
1.42								
13.083	1.78	1.70	1.107	OI				
1.42								
13.167	1.80	1.70	1.107	OI				
1.43								
13.250	1.83	1.71	1.108	OI				
1.43								
13.333	1.85	1.71	1.109	OI				
1.43								
13.417	1.88	1.72	1.110	OI				
1.43								
13.500	1.92	1.72	1.111	OI				
1.43								
13.583	1.95	1.73	1.113	OI				
1.43								
13.667	1.99	1.74	1.114	OI				
1.43								
13.750	2.03	1.75	1.116	OI				

1.44								
13.833	2.08	1.76	1.118	O				
1.44								
13.917	2.12	1.77	1.121	O				
1.44								
14.000	2.17	1.78	1.123	O				
1.44								
14.083	2.23	1.79	1.126	O				
1.45								
14.167	2.29	1.81	1.129	O				
1.45								
14.250	2.35	1.82	1.133	O				
1.46								
14.333	2.42	1.84	1.137	O				
1.46								
14.417	2.50	1.86	1.141	O				
1.47								
14.500	2.58	1.88	1.146	O				
1.47								
14.583	2.67	1.91	1.151	O				
1.48								
14.667	2.76	1.93	1.156	O				
1.48								
14.750	2.86	1.96	1.162	O				
1.49								
14.833	2.97	1.99	1.168	O				
1.50								
14.917	3.09	2.03	1.175	O				
1.51								
15.000	3.22	2.06	1.183	O				
1.52								
15.083	3.37	2.10	1.191	O				
1.53								
15.167	3.54	2.15	1.201	OI				
1.54								
15.250	3.73	2.19	1.211	OI				
1.55								
15.333	3.94	2.25	1.222	OI				
1.56								
15.417	4.21	2.31	1.234	OI				
1.58								
15.500	4.53	2.37	1.248	OI				
1.59								
15.583	5.00	2.45	1.264	OI				
1.61								
15.667	5.54	2.54	1.283	O I				
1.64								
15.750	6.16	2.65	1.306	O I				
1.66								
15.833	6.93	2.77	1.332	O I				
1.69								
15.917	8.11	2.93	1.364	O I				
1.73								
16.000	10.24	3.13	1.407	O I				
1.78								
16.083	17.13	3.47	1.478	O	I			
1.87								
16.167	31.80	4.29	1.620	O		I		
2.03								
16.250	55.96	6.82	1.884	O				I

```
2.31
 16.333   53.53    9.88      2.204  |    O  |       |       |     I |
2.65
 16.417   34.51   12.05      2.431  |     O |       |  I    |       |
2.89
 16.500   24.74   13.09      2.549  |      O|     I |       |       |
3.02
 16.583   19.29   13.38      2.609  |      O|  I    |       |       |
3.08
 16.667   15.53   13.51      2.636  |      OI       |       |       |
3.10
 16.750   13.00   13.54      2.642  |      O|       |       |       |
3.11
 16.833   11.23   13.49      2.632  |     IO|       |       |       |
3.10
 16.917    9.42   13.39      2.611  |    I O|       |       |       |
3.08
 17.000    8.21   13.24      2.580  |   I  O|       |       |       |
3.05
 17.083    7.32   13.06      2.542  |   I  O|       |       |       |
3.01
 17.167    6.52   12.73      2.501  |  I   O|       |       |       |
2.97
 17.250    5.78   12.31      2.458  |  I   O|       |       |       |
2.92
 17.333    5.19   11.87      2.412  | I   O |       |       |       |
2.87
 17.417    4.68   11.43      2.366  | I   O |       |       |       |
2.83
 17.500    4.11   10.98      2.319  | I   O |       |       |       |
2.78
 17.583    3.69   10.53      2.272  | I   O |       |       |       |
2.73
 17.667    3.24   10.08      2.225  |I   O  |       |       |       |
2.68
 17.750    3.15    9.64      2.179  |I   O  |       |       |       |
2.63
 17.833    3.06    9.22      2.135  |I   O  |       |       |       |
2.58
 17.917    2.91    8.82      2.094  |I   O  |       |       |       |
2.54
 18.000    2.66    8.44      2.053  |I  O   |       |       |       |
2.49
 18.083    2.33    8.06      2.014  |I  O   |       |       |       |
2.45
 18.167    2.11    7.69      1.975  |I  O   |       |       |       |
2.41
 18.250    2.04    7.33      1.938  |I  O   |       |       |       |
2.37
 18.333    2.15    6.99      1.903  |I O    |       |       |       |
2.33
 18.417    2.18    6.69      1.870  |I O    |       |       |       |
2.30
 18.500    2.19    6.40      1.840  |I O    |       |       |       |
2.27
 18.583    2.18    6.13      1.812  |I O    |       |       |       |
2.24
 18.667    2.16    5.88      1.786  |I O    |       |       |       |
2.21
 18.750    2.14    5.64      1.761  |I O    |       |       |       |
```

2.18							
18.833	2.12	5.41	1.738	|I O	|	|	|
2.16							
18.917	2.09	5.20	1.716	|IO	|	|	|
2.13							
19.000	2.06	5.00	1.695	|IO	|	|	|
2.11							
19.083	2.04	4.81	1.675	|IO	|	|	|
2.09							
19.167	2.01	4.64	1.656	|IO	|	|	|
2.07							
19.250	1.98	4.47	1.639	|IO	|	|	|
2.05							
19.333	1.96	4.31	1.622	|IO	|	|	|
2.03							
19.417	1.93	4.16	1.606	|IO	|	|	|
2.02							
19.500	1.90	4.01	1.592	|IO	|	|	|
2.00							
19.583	1.88	3.94	1.577	|IO	|	|	|
1.98							
19.667	1.85	3.87	1.563	|IO	|	|	|
1.97							
19.750	1.83	3.81	1.549	|IO	|	|	|
1.95							
19.833	1.81	3.74	1.536	|IO	|	|	|
1.94							
19.917	1.78	3.68	1.523	|IO	|	|	|
1.92							
20.000	1.76	3.62	1.510	|IO	|	|	|
1.90							
20.083	1.74	3.56	1.497	I O	|	|	|
1.89							
20.167	1.72	3.50	1.485	I O	|	|	|
1.87							
20.250	1.70	3.44	1.473	IO	|	|	|
1.86							
20.333	1.68	3.38	1.461	IO	|	|	|
1.85							
20.417	1.65	3.33	1.449	IO	|	|	|
1.83							
20.500	1.64	3.27	1.438	IO	|	|	|
1.82							
20.583	1.62	3.22	1.426	IO	|	|	|
1.81							
20.667	1.60	3.17	1.416	IO	|	|	|
1.79							
20.750	1.58	3.12	1.405	IO	|	|	|
1.78							
20.833	1.56	3.07	1.394	IO	|	|	|
1.77							
20.917	1.55	3.02	1.384	IO	|	|	|
1.75							
21.000	1.53	2.97	1.374	IO	|	|	|
1.74							
21.083	1.51	2.92	1.364	IO	|	|	|
1.73							
21.167	1.50	2.88	1.355	IO	|	|	|
1.72							
21.250	1.48	2.83	1.345	IO	|	|	|

1.71								
21.333	1.47	2.79	1.336	IO				
1.70								
21.417	1.45	2.75	1.327	IO				
1.69								
21.500	1.44	2.71	1.318	IO				
1.68								
21.583	1.43	2.66	1.310	IO				
1.67								
21.667	1.41	2.62	1.301	IO				
1.66								
21.750	1.40	2.59	1.293	IO				
1.65								
21.833	1.39	2.55	1.285	IO				
1.64								
21.917	1.38	2.51	1.277	IO				
1.63								
22.000	1.37	2.47	1.269	IO				
1.62								
22.083	1.35	2.44	1.262	IO				
1.61								
22.167	1.34	2.40	1.254	IO				
1.60								
22.250	1.33	2.37	1.247	IO				
1.59								
22.333	1.32	2.33	1.240	IO				
1.58								
22.417	1.31	2.30	1.233	IO				
1.58								
22.500	1.30	2.27	1.226	IO				
1.57								
22.583	1.29	2.24	1.220	IO				
1.56								
22.667	1.28	2.21	1.213	IO				
1.55								
22.750	1.27	2.18	1.207	IO				
1.54								
22.833	1.26	2.15	1.201	IO				
1.54								
22.917	1.25	2.12	1.195	IO				
1.53								
23.000	1.24	2.09	1.189	IO				
1.52								
23.083	1.23	2.06	1.183	IO				
1.52								
23.167	1.22	2.04	1.177	IO				
1.51								
23.250	1.22	2.01	1.172	IO				
1.50								
23.333	1.21	1.98	1.167	IO				
1.50								
23.417	1.20	1.96	1.161	IO				
1.49								
23.500	1.19	1.93	1.156	IO				
1.48								
23.583	1.18	1.91	1.151	IO				
1.48								
23.667	1.18	1.89	1.146	IO				
1.47								
23.750	1.17	1.86	1.141	IO				

1.47								
23.833	1.16	1.84	1.136	IO				
1.46								
23.917	1.15	1.82	1.132	IO				
1.45								
24.000	1.15	1.80	1.127	IO				
1.45								
24.083	1.12	1.78	1.123	IO				
1.44								
24.167	1.03	1.75	1.118	IO				
1.44								
24.250	0.78	1.73	1.112	O				
1.43								
24.333	0.54	1.69	1.105	O				
1.42								
24.417	0.40	1.65	1.097	O				
1.41								
24.500	0.32	1.61	1.088	O				
1.40								
24.583	0.25	1.57	1.079	O				
1.39								
24.667	0.21	1.52	1.070	O				
1.38								
24.750	0.17	1.48	1.061	O				
1.37								
24.833	0.14	1.44	1.052	O				
1.36								
24.917	0.12	1.40	1.043	O				
1.35								
25.000	0.10	1.35	1.034	O				
1.34								
25.083	0.08	1.31	1.026	O				
1.33								
25.167	0.06	1.27	1.017	O				
1.32								
25.250	0.05	1.23	1.009	O				
1.31								
25.333	0.04	1.20	1.001	O				
1.30								
25.417	0.03	1.16	0.993	O				
1.29								
25.500	0.03	1.12	0.986	O				
1.28								
25.583	0.02	1.09	0.978	O				
1.27								
25.667	0.02	1.05	0.971	O				
1.26								
25.750	0.01	1.02	0.964	O				
1.25								
25.833	0.01	0.99	0.957	O				
1.25								
25.917	0.01	0.96	0.950	O				
1.24								
26.000	0.00	0.92	0.944	O				
1.23								
26.083	0.00	0.89	0.938	O				
1.22								
26.167	0.00	0.87	0.932	O				
1.22								
26.250	0.00	0.84	0.926	O				

1.21
 26.333 0.00 0.81 0.920 O | | | |
1.20
 26.417 0.00 0.78 0.915 O | | | |
1.20
 26.500 0.00 0.76 0.909 O | | | |
1.19
 26.583 0.00 0.74 0.904 O | | | |
1.18
 26.667 0.00 0.71 0.899 O | | | |
1.18
 26.750 0.00 0.69 0.894 O | | | |
1.17
 26.833 0.00 0.67 0.890 O | | | |
1.17
 26.917 0.00 0.64 0.885 O | | | |
1.16
 27.000 0.00 0.62 0.881 O | | | |
1.16
 27.083 0.00 0.60 0.877 O | | | |
1.15
 27.167 0.00 0.58 0.873 O | | | |
1.15
 27.250 0.00 0.57 0.869 O | | | |
1.14
 27.333 0.00 0.55 0.865 O | | | |
1.14
 27.417 0.00 0.53 0.861 O | | | |
1.13
 27.500 0.00 0.51 0.857 O | | | |
1.13
 27.583 0.00 0.50 0.854 O | | | |
1.12
 27.667 0.00 0.48 0.851 O | | | |
1.12
 27.750 0.00 0.46 0.847 O | | | |
1.12
 27.833 0.00 0.45 0.844 O | | | |
1.11
 27.917 0.00 0.44 0.841 O | | | |
1.11
 28.000 0.00 0.42 0.838 O | | | |
1.11
 28.083 0.00 0.41 0.835 O | | | |
1.10
 28.167 0.00 0.39 0.833 O | | | |
1.10
 28.250 0.00 0.38 0.830 O | | | |
1.10
 28.333 0.00 0.37 0.827 O | | | |
1.09
 28.417 0.00 0.36 0.825 O | | | |
1.09
 28.500 0.00 0.35 0.822 O | | | |
1.09
 28.583 0.00 0.33 0.820 O | | | |
1.08
 28.667 0.00 0.32 0.818 O | | | |
1.08
 28.750 0.00 0.31 0.816 O | | | |

1.08
 28.833 0.00 0.30 0.813 O | | | |
1.08
 28.917 0.00 0.29 0.811 O | | | |
1.07
 29.000 0.00 0.28 0.809 O | | | |
1.07
 29.083 0.00 0.27 0.808 O | | | |
1.07
 29.167 0.00 0.27 0.806 O | | | |
1.07
 29.250 0.00 0.26 0.804 O | | | |
1.06
 29.333 0.00 0.25 0.802 O | | | |
1.06
 29.417 0.00 0.24 0.800 O | | | |
1.06
 29.500 0.00 0.23 0.799 O | | | |
1.06
 29.583 0.00 0.23 0.797 O | | | |
1.06
 29.667 0.00 0.22 0.796 O | | | |
1.05
 29.750 0.00 0.21 0.794 O | | | |
1.05
 29.833 0.00 0.20 0.793 O | | | |
1.05
 29.917 0.00 0.20 0.791 O | | | |
1.05
 30.000 0.00 0.19 0.790 O | | | |
1.05
 30.083 0.00 0.19 0.789 O | | | |
1.05
 30.167 0.00 0.18 0.787 O | | | |
1.04
 30.250 0.00 0.17 0.786 O | | | |
1.04
 30.333 0.00 0.17 0.785 O | | | |
1.04
 30.417 0.00 0.16 0.784 O | | | |
1.04
 30.500 0.00 0.16 0.783 O | | | |
1.04
 30.583 0.00 0.15 0.782 O | | | |
1.04
 30.667 0.00 0.15 0.781 O | | | |
1.04
 30.750 0.00 0.14 0.780 O | | | |
1.04
 30.833 0.00 0.14 0.779 O | | | |
1.03
 30.917 0.00 0.13 0.778 O | | | |
1.03
 31.000 0.00 0.13 0.777 O | | | |
1.03
 31.083 0.00 0.13 0.776 O | | | |
1.03
 31.167 0.00 0.12 0.775 O | | | |
1.03
 31.250 0.00 0.12 0.774 O | | | |

1.03								
31.333	0.00	0.11	0.774	O	|	|	|	|
1.03								
31.417	0.00	0.11	0.773	O	|	|	|	|
1.03								
31.500	0.00	0.11	0.772	O	|	|	|	|
1.03								
31.583	0.00	0.10	0.771	O	|	|	|	|
1.03								
31.667	0.00	0.10	0.771	O	|	|	|	|
1.02								
31.750	0.00	0.10	0.770	O	|	|	|	|
1.02								
31.833	0.00	0.09	0.769	O	|	|	|	|
1.02								
31.917	0.00	0.09	0.769	O	|	|	|	|
1.02								
32.000	0.00	0.09	0.768	O	|	|	|	|
1.02								
32.083	0.00	0.08	0.768	O	|	|	|	|
1.02								
32.167	0.00	0.08	0.767	O	|	|	|	|
1.02								
32.250	0.00	0.08	0.766	O	|	|	|	|
1.02								
32.333	0.00	0.08	0.766	O	|	|	|	|
1.02								
32.417	0.00	0.07	0.765	O	|	|	|	|
1.02								
32.500	0.00	0.07	0.765	O	|	|	|	|
1.02								
32.583	0.00	0.07	0.764	O	|	|	|	|
1.02								
32.667	0.00	0.07	0.764	O	|	|	|	|
1.02								
32.750	0.00	0.06	0.763	O	|	|	|	|
1.02								
32.833	0.00	0.06	0.763	O	|	|	|	|
1.02								
32.917	0.00	0.06	0.763	O	|	|	|	|
1.01								
33.000	0.00	0.06	0.762	O	|	|	|	|
1.01								
33.083	0.00	0.06	0.762	O	|	|	|	|
1.01								
33.167	0.00	0.06	0.761	O	|	|	|	|
1.01								
33.250	0.00	0.05	0.761	O	|	|	|	|
1.01								
33.333	0.00	0.05	0.761	O	|	|	|	|
1.01								
33.417	0.00	0.05	0.760	O	|	|	|	|
1.01								
33.500	0.00	0.05	0.760	O	|	|	|	|
1.01								
33.583	0.00	0.05	0.760	O	|	|	|	|
1.01								
33.667	0.00	0.05	0.759	O	|	|	|	|
1.01								
33.750	0.00	0.04	0.759	O	|	|	|	|

1.01								
33.833	0.00	0.04	0.759	O	|	|	|	|
1.01								
33.917	0.00	0.04	0.758	O	|	|	|	|
1.01								
34.000	0.00	0.04	0.758	O	|	|	|	|
1.01								
34.083	0.00	0.04	0.758	O	|	|	|	|
1.01								
34.167	0.00	0.04	0.758	O	|	|	|	|
1.01								
34.250	0.00	0.04	0.757	O	|	|	|	|
1.01								
34.333	0.00	0.03	0.757	O	|	|	|	|
1.01								
34.417	0.00	0.03	0.757	O	|	|	|	|
1.01								
34.500	0.00	0.03	0.757	O	|	|	|	|
1.01								
34.583	0.00	0.03	0.756	O	|	|	|	|
1.01								
34.667	0.00	0.03	0.756	O	|	|	|	|
1.01								
34.750	0.00	0.03	0.756	O	|	|	|	|
1.01								
34.833	0.00	0.03	0.756	O	|	|	|	|
1.01								
34.917	0.00	0.03	0.756	O	|	|	|	|
1.01								
35.000	0.00	0.03	0.755	O	|	|	|	|
1.01								
35.083	0.00	0.03	0.755	O	|	|	|	|
1.01								
35.167	0.00	0.03	0.755	O	|	|	|	|
1.01								
35.250	0.00	0.02	0.755	O	|	|	|	|
1.01								
35.333	0.00	0.02	0.755	O	|	|	|	|
1.01								
35.417	0.00	0.02	0.755	O	|	|	|	|
1.01								
35.500	0.00	0.02	0.754	O	|	|	|	|
1.01								
35.583	0.00	0.02	0.754	O	|	|	|	|
1.01								
35.667	0.00	0.02	0.754	O	|	|	|	|
1.00								
35.750	0.00	0.02	0.754	O	|	|	|	|
1.00								
35.833	0.00	0.02	0.754	O	|	|	|	|
1.00								
35.917	0.00	0.02	0.754	O	|	|	|	|
1.00								
36.000	0.00	0.02	0.754	O	|	|	|	|
1.00								
36.083	0.00	0.02	0.753	O	|	|	|	|
1.00								
36.167	0.00	0.02	0.753	O	|	|	|	|
1.00								
36.250	0.00	0.02	0.753	O	|	|	|	|

1.00
 36.333 0.00 0.02 0.753 O | | | |
1.00
 36.417 0.00 0.02 0.753 O | | | |
1.00
 36.500 0.00 0.01 0.753 O | | | |
1.00
 36.583 0.00 0.01 0.753 O | | | |
1.00
 36.667 0.00 0.01 0.753 O | | | |
1.00
 36.750 0.00 0.01 0.753 O | | | |
1.00
 36.833 0.00 0.01 0.753 O | | | |
1.00
 36.917 0.00 0.01 0.752 O | | | |
1.00
 37.000 0.00 0.01 0.752 O | | | |
1.00
 37.083 0.00 0.01 0.752 O | | | |
1.00
 37.167 0.00 0.01 0.752 O | | | |
1.00
 37.250 0.00 0.01 0.752 O | | | |
1.00
 37.333 0.00 0.01 0.752 O | | | |
1.00
 37.417 0.00 0.01 0.752 O | | | |
1.00
 37.500 0.00 0.01 0.752 O | | | |
1.00
 37.583 0.00 0.01 0.752 O | | | |
1.00
 37.667 0.00 0.01 0.752 O | | | |
1.00
 37.750 0.00 0.01 0.752 O | | | |
1.00
 37.833 0.00 0.01 0.752 O | | | |
1.00
 37.917 0.00 0.01 0.752 O | | | |
1.00
 38.000 0.00 0.01 0.752 O | | | |
1.00
 38.083 0.00 0.01 0.751 O | | | |
1.00
 38.167 0.00 0.01 0.751 O | | | |
1.00
 38.250 0.00 0.01 0.751 O | | | |
1.00
 38.333 0.00 0.01 0.751 O | | | |
1.00
 38.417 0.00 0.01 0.751 O | | | |
1.00
 38.500 0.00 0.01 0.751 O | | | |
1.00
 38.583 0.00 0.01 0.751 O | | | |
1.00
 38.667 0.00 0.01 0.751 O | | | |
1.00
 38.750 0.00 0.01 0.751 O | | | |

1.00
 38.833 0.00 0.01 0.751 O | | | |
1.00
 38.917 0.00 0.01 0.751 O | | | |
1.00
 39.000 0.00 0.01 0.751 O | | | |
1.00
 39.083 0.00 0.01 0.751 O | | | |
1.00
 39.167 0.00 0.01 0.751 O | | | |
1.00
 39.250 0.00 0.01 0.751 O | | | |
1.00
 39.333 0.00 0.00 0.751 O | | | |
1.00
 39.417 0.00 0.00 0.751 O | | | |
1.00
 39.500 0.00 0.00 0.751 O | | | |
1.00
 39.583 0.00 0.00 0.751 O | | | |
1.00
 39.667 0.00 0.00 0.751 O | | | |
1.00
 39.750 0.00 0.00 0.751 O | | | |
1.00
 39.833 0.00 0.00 0.751 O | | | |
1.00
 39.917 0.00 0.00 0.751 O | | | |
1.00
 40.000 0.00 0.00 0.751 O | | | |
1.00
 40.083 0.00 0.00 0.751 O | | | |
1.00
 40.167 0.00 0.00 0.751 O | | | |
1.00
 40.250 0.00 0.00 0.751 O | | | |
1.00
 40.333 0.00 0.00 0.750 O | | | |
1.00
 40.417 0.00 0.00 0.750 O | | | |
1.00
 40.500 0.00 0.00 0.750 O | | | |
1.00
 40.583 0.00 0.00 0.750 O | | | |
1.00
 40.667 0.00 0.00 0.750 O | | | |
1.00
 40.750 0.00 0.00 0.750 O | | | |
1.00
 40.833 0.00 0.00 0.750 O | | | |
1.00
 40.917 0.00 0.00 0.750 O | | | |
1.00
 41.000 0.00 0.00 0.750 O | | | |
1.00
 41.083 0.00 0.00 0.750 O | | | |
1.00
 41.167 0.00 0.00 0.750 O | | | |
1.00
 41.250 0.00 0.00 0.750 O | | | |

1.00
 41.333 0.00 0.00 0.750 O | | | |
1.00
 41.417 0.00 0.00 0.750 O | | | |
1.00
 41.500 0.00 0.00 0.750 O | | | |
1.00
 41.583 0.00 0.00 0.750 O | | | |
1.00
 41.667 0.00 0.00 0.750 O | | | |
1.00
 41.750 0.00 0.00 0.750 O | | | |
1.00
 41.833 0.00 0.00 0.750 O | | | |
1.00
 41.917 0.00 0.00 0.750 O | | | |
1.00
 42.000 0.00 0.00 0.750 O | | | |
1.00
 42.083 0.00 0.00 0.750 O | | | |
1.00
 42.167 0.00 0.00 0.750 O | | | |
1.00
 42.250 0.00 0.00 0.750 O | | | |
1.00
 42.333 0.00 0.00 0.750 O | | | |
1.00
 42.417 0.00 0.00 0.750 O | | | |
1.00
 42.500 0.00 0.00 0.750 O | | | |
1.00
 42.583 0.00 0.00 0.750 O | | | |
1.00
 42.667 0.00 0.00 0.750 O | | | |
1.00
 42.750 0.00 0.00 0.750 O | | | |
1.00
 42.833 0.00 0.00 0.750 O | | | |
1.00
 42.917 0.00 0.00 0.750 O | | | |
1.00
 43.000 0.00 0.00 0.750 O | | | |
1.00
 43.083 0.00 0.00 0.750 O | | | |
1.00
 43.167 0.00 0.00 0.750 O | | | |
1.00
 43.250 0.00 0.00 0.750 O | | | |
1.00
 43.333 0.00 0.00 0.750 O | | | |
1.00
 43.417 0.00 0.00 0.750 O | | | |
1.00

      Remaining water in basin =   0.75 (Ac.Ft)

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

```
                Number of intervals =   521
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       13.536 (CFS)
                Total volume =       4.895 (Ac.Ft)
          Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)      0.000     0.000     0.000     0.000
0.000
          Vol (Ac.Ft)      0.000     0.000     0.000     0.000
0.000
     ************************************************************************
*****

     ------------------------------------------------------------------------
--
```

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2012
Study date: 08/06/18

Monte Vista 69
SCS Hydrograph Basin Routing
Point 204
Proposed Condition - Routed

Program License Serial Number 6232

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

From study/file name: mv69pro203.rte

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

Number of intervals = 319
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 74.722 (CFS)
Total volume = 6.609 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++

Process from Point/Station 203.000 to Point/Station 204.000

**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 319
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

```
--
      Initial basin depth =   0.00 (Ft.)
      Initial basin storage =      0.00 (Ac.Ft)
      Initial basin outflow =   0.00 (CFS)
      ------------------------------------------------------------------
---
      ------------------------------------------------------------------
--
      Depth vs. Storage and Depth vs. Discharge data:
       Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
           (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
      ------------------------------------------------------------------
---
          0.000      0.000      0.000      0.000        0.000
          1.000      0.490      0.001      0.490        0.490
          2.000      1.070      0.001      1.070        1.070
          3.000      1.730     12.000      1.689        1.771
          4.000      2.500     40.000      2.362        2.638
          5.000      3.370     51.000      3.194        3.546
      ------------------------------------------------------------------
--
                  Hydrograph Detention Basin Routing
      ------------------------------------------------------------------
---

      Graph values: 'I'= unit inflow; 'O'=outflow at time shown
      ------------------------------------------------------------------
---
  Time   Inflow  Outflow    Storage
Depth
 (Hours)  (CFS)   (CFS)     (Ac.Ft) .0      18.7   37.36   56.04   74.72
(Ft.)
  0.083    0.02    0.00      0.000  O       |       |       |       |
0.00
  0.167    0.08    0.00      0.000  O       |       |       |       |
0.00
  0.250    0.23    0.00      0.001  O       |       |       |       |
0.00
  0.333    0.48    0.00      0.004  O       |       |       |       |
0.01
  0.417    0.66    0.00      0.008  O       |       |       |       |
0.02
  0.500    0.77    0.00      0.013  O       |       |       |       |
0.03
  0.583    0.85    0.00      0.018  O       |       |       |       |
0.04
  0.667    0.91    0.00      0.024  O       |       |       |       |
0.05
  0.750    0.96    0.00      0.031  O       |       |       |       |
0.06
  0.833    0.99    0.00      0.038  O       |       |       |       |
0.08
  0.917    1.03    0.00      0.044  O       |       |       |       |
0.09
  1.000    1.06    0.00      0.052  O       |       |       |       |
0.11
  1.083    1.08    0.00      0.059  O       |       |       |       |
0.12
  1.167    1.10    0.00      0.067  O       |       |       |       |
0.14
```

1.250	1.12	0.00	0.074	O				
0.15								
1.333	1.14	0.00	0.082	O				
0.17								
1.417	1.15	0.00	0.090	O				
0.18								
1.500	1.17	0.00	0.098	O				
0.20								
1.583	1.18	0.00	0.106	O				
0.22								
1.667	1.19	0.00	0.114	O				
0.23								
1.750	1.20	0.00	0.122	O				
0.25								
1.833	1.21	0.00	0.131	O				
0.27								
1.917	1.22	0.00	0.139	O				
0.28								
2.000	1.23	0.00	0.147	O				
0.30								
2.083	1.23	0.00	0.156	O				
0.32								
2.167	1.24	0.00	0.164	O				
0.34								
2.250	1.25	0.00	0.173	O				
0.35								
2.333	1.26	0.00	0.182	O				
0.37								
2.417	1.26	0.00	0.190	O				
0.39								
2.500	1.27	0.00	0.199	O				
0.41								
2.583	1.28	0.00	0.208	O				
0.42								
2.667	1.28	0.00	0.217	O				
0.44								
2.750	1.29	0.00	0.225	O				
0.46								
2.833	1.29	0.00	0.234	O				
0.48								
2.917	1.29	0.00	0.243	O				
0.50								
3.000	1.30	0.00	0.252	O				
0.51								
3.083	1.30	0.00	0.261	O				
0.53								
3.167	1.31	0.00	0.270	O				
0.55								
3.250	1.31	0.00	0.279	O				
0.57								
3.333	1.32	0.00	0.288	O				
0.59								
3.417	1.32	0.00	0.297	O				
0.61								
3.500	1.33	0.00	0.306	O				
0.63								
3.583	1.33	0.00	0.315	O				
0.64								
3.667	1.34	0.00	0.325	O				
0.66								

3.750	1.34	0.00	0.334	O	|	|	|	|
0.68								
3.833	1.35	0.00	0.343	O	|	|	|	|
0.70								
3.917	1.35	0.00	0.352	O	|	|	|	|
0.72								
4.000	1.36	0.00	0.362	O	|	|	|	|
0.74								
4.083	1.36	0.00	0.371	O	|	|	|	|
0.76								
4.167	1.37	0.00	0.380	O	|	|	|	|
0.78								
4.250	1.37	0.00	0.390	O	|	|	|	|
0.80								
4.333	1.38	0.00	0.399	O	|	|	|	|
0.81								
4.417	1.38	0.00	0.409	O	|	|	|	|
0.83								
4.500	1.39	0.00	0.418	O	|	|	|	|
0.85								
4.583	1.39	0.00	0.428	O	|	|	|	|
0.87								
4.667	1.40	0.00	0.438	O	|	|	|	|
0.89								
4.750	1.40	0.00	0.447	O	|	|	|	|
0.91								
4.833	1.41	0.00	0.457	O	|	|	|	|
0.93								
4.917	1.42	0.00	0.467	O	|	|	|	|
0.95								
5.000	1.42	0.00	0.476	O	|	|	|	|
0.97								
5.083	1.43	0.00	0.486	O	|	|	|	|
0.99								
5.167	1.43	0.00	0.496	O	|	|	|	|
1.01								
5.250	1.44	0.00	0.506	O	|	|	|	|
1.03								
5.333	1.44	0.00	0.516	O	|	|	|	|
1.04								
5.417	1.45	0.00	0.526	O	|	|	|	|
1.06								
5.500	1.46	0.00	0.536	O	|	|	|	|
1.08								
5.583	1.46	0.00	0.546	O	|	|	|	|
1.10								
5.667	1.47	0.00	0.556	O	|	|	|	|
1.11								
5.750	1.48	0.00	0.566	O	|	|	|	|
1.13								
5.833	1.48	0.00	0.576	O	|	|	|	|
1.15								
5.917	1.49	0.00	0.586	O	|	|	|	|
1.17								
6.000	1.50	0.00	0.597	O	|	|	|	|
1.18								
6.083	1.50	0.00	0.607	O	|	|	|	|
1.20								
6.167	1.51	0.00	0.617	O	|	|	|	|
1.22								

6.250	1.52	0.00	0.628	O				
1.24								
6.333	1.52	0.00	0.638	O				
1.26								
6.417	1.53	0.00	0.649	O				
1.27								
6.500	1.54	0.00	0.659	O				
1.29								
6.583	1.54	0.00	0.670	O				
1.31								
6.667	1.55	0.00	0.681	O				
1.33								
6.750	1.56	0.00	0.691	O				
1.35								
6.833	1.57	0.00	0.702	O				
1.37								
6.917	1.57	0.00	0.713	O				
1.38								
7.000	1.58	0.00	0.724	O				
1.40								
7.083	1.59	0.00	0.735	O				
1.42								
7.167	1.60	0.00	0.746	O				
1.44								
7.250	1.61	0.00	0.757	O				
1.46								
7.333	1.61	0.00	0.768	O				
1.48								
7.417	1.62	0.00	0.779	O				
1.50								
7.500	1.63	0.00	0.790	O				
1.52								
7.583	1.64	0.00	0.801	O				
1.54								
7.667	1.65	0.00	0.813	O				
1.56								
7.750	1.66	0.00	0.824	O				
1.58								
7.833	1.67	0.00	0.835	O				
1.60								
7.917	1.67	0.00	0.847	O				
1.62								
8.000	1.68	0.00	0.858	O				
1.64								
8.083	1.69	0.00	0.870	O				
1.66								
8.167	1.70	0.00	0.882	O				
1.68								
8.250	1.71	0.00	0.894	O				
1.70								
8.333	1.72	0.00	0.905	O				
1.72								
8.417	1.73	0.00	0.917	O				
1.74								
8.500	1.74	0.00	0.929	O				
1.76								
8.583	1.75	0.00	0.941	O				
1.78								
8.667	1.76	0.00	0.953	O				
1.80								

8.750	1.77	0.00	0.965	O				
1.82								
8.833	1.78	0.00	0.978	O				
1.84								
8.917	1.79	0.00	0.990	O				
1.86								
9.000	1.81	0.00	1.002	O				
1.88								
9.083	1.82	0.00	1.015	O				
1.91								
9.167	1.83	0.00	1.027	O				
1.93								
9.250	1.84	0.00	1.040	O				
1.95								
9.333	1.85	0.00	1.053	O				
1.97								
9.417	1.86	0.00	1.066	O				
1.99								
9.500	1.88	0.15	1.078	O				
2.01								
9.583	1.89	0.35	1.089	O				
2.03								
9.667	1.90	0.53	1.099	O				
2.04								
9.750	1.92	0.69	1.108	O				
2.06								
9.833	1.93	0.84	1.116	O				
2.07								
9.917	1.94	0.97	1.123	O				
2.08								
10.000	1.96	1.08	1.130	O				
2.09								
10.083	1.97	1.19	1.135	O				
2.10								
10.167	1.99	1.28	1.140	O				
2.11								
10.250	2.00	1.36	1.145	O				
2.11								
10.333	2.02	1.44	1.149	O				
2.12								
10.417	2.03	1.51	1.153	O				
2.13								
10.500	2.05	1.57	1.156	O				
2.13								
10.583	2.06	1.63	1.160	O				
2.14								
10.667	2.08	1.68	1.162	O				
2.14								
10.750	2.10	1.73	1.165	O				
2.14								
10.833	2.11	1.77	1.167	O				
2.15								
10.917	2.13	1.81	1.170	O				
2.15								
11.000	2.15	1.85	1.172	O				
2.15								
11.083	2.17	1.89	1.174	O				
2.16								
11.167	2.19	1.92	1.176	O				
2.16								

11.250	2.21	1.95	1.177	O				
2.16								
11.333	2.23	1.99	1.179	O				
2.17								
11.417	2.25	2.01	1.181	O				
2.17								
11.500	2.27	2.04	1.182	O				
2.17								
11.583	2.29	2.07	1.184	O				
2.17								
11.667	2.31	2.10	1.185	O				
2.17								
11.750	2.33	2.12	1.187	O				
2.18								
11.833	2.36	2.15	1.188	OI				
2.18								
11.917	2.38	2.18	1.190	OI				
2.18								
12.000	2.40	2.20	1.191	OI				
2.18								
12.083	2.42	2.23	1.192	OI				
2.19								
12.167	2.39	2.25	1.194	OI				
2.19								
12.250	2.30	2.26	1.194	O				
2.19								
12.333	2.12	2.25	1.194	O				
2.19								
12.417	2.00	2.23	1.193	O				
2.19								
12.500	1.94	2.20	1.191	O				
2.18								
12.583	1.91	2.17	1.189	O				
2.18								
12.667	1.89	2.14	1.187	O				
2.18								
12.750	1.88	2.11	1.186	O				
2.18								
12.833	1.88	2.08	1.184	O				
2.17								
12.917	1.88	2.06	1.183	O				
2.17								
13.000	1.89	2.04	1.182	O				
2.17								
13.083	1.91	2.02	1.181	O				
2.17								
13.167	1.93	2.01	1.180	O				
2.17								
13.250	1.95	2.00	1.180	O				
2.17								
13.333	1.98	2.00	1.180	O				
2.17								
13.417	2.00	1.99	1.180	O				
2.17								
13.500	2.04	2.00	1.180	O				
2.17								
13.583	2.07	2.00	1.180	O				
2.17								
13.667	2.11	2.01	1.181	O				
2.17								

13.750	2.15	2.03	1.181	O	|	|	|	|
2.17								
13.833	2.19	2.04	1.182	O	|	|	|	|
2.17								
13.917	2.24	2.06	1.183	O	|	|	|	|
2.17								
14.000	2.29	2.09	1.185	O	|	|	|	|
2.17								
14.083	2.34	2.11	1.186	OI	|	|	|	|
2.18								
14.167	2.40	2.15	1.188	OI	|	|	|	|
2.18								
14.250	2.47	2.18	1.190	OI	|	|	|	|
2.18								
14.333	2.54	2.22	1.192	OI	|	|	|	|
2.18								
14.417	2.61	2.26	1.194	OI	|	|	|	|
2.19								
14.500	2.69	2.31	1.197	OI	|	|	|	|
2.19								
14.583	2.78	2.36	1.200	|O	|	|	|	|
2.20								
14.667	2.87	2.41	1.203	|O	|	|	|	|
2.20								
14.750	2.97	2.47	1.206	|O	|	|	|	|
2.21								
14.833	3.08	2.54	1.209	|O	|	|	|	|
2.21								
14.917	3.20	2.61	1.213	|O	|	|	|	|
2.22								
15.000	3.34	2.69	1.218	|O	|	|	|	|
2.22								
15.083	3.48	2.77	1.222	|O	|	|	|	|
2.23								
15.167	3.65	2.86	1.227	|O	|	|	|	|
2.24								
15.250	3.83	2.97	1.233	|O	|	|	|	|
2.25								
15.333	4.05	3.08	1.239	|O	|	|	|	|
2.26								
15.417	4.29	3.21	1.247	|O	|	|	|	|
2.27								
15.500	4.60	3.36	1.255	|O	|	|	|	|
2.28								
15.583	5.00	3.53	1.264	|OI	|	|	|	|
2.29								
15.667	5.53	3.73	1.275	|OI	|	|	|	|
2.31								
15.750	6.12	3.98	1.289	|OI	|	|	|	|
2.33								
15.833	6.85	4.27	1.305	|OI	|	|	|	|
2.36								
15.917	7.90	4.64	1.325	|O I	|	|	|	|
2.39								
16.000	9.87	5.14	1.353	| O I	|	|	|	|
2.43								
16.083	16.62	6.10	1.405	| O I|	|	|	|	|
2.51								
16.167	31.14	8.19	1.520	| O |	I |	|	|	|
2.68								

```
 16.250   54.13   12.47      1.743  |    O  |       |      I|       |
3.02
 16.333   74.72   24.03      2.061  |       | O     |       |       I
3.43
 16.417   54.65   33.08      2.310  |       |     O |      I|       |
3.75
 16.500   37.13   35.93      2.388  |       |      O|       |       |
3.85
 16.583   28.09   35.19      2.368  |       |   I  O|       |       |
3.83
 16.667   22.52   32.99      2.307  |       |I    O |       |       |
3.75
 16.750   18.62   30.23      2.231  |      I|   O   |       |       |
3.65
 16.833   15.62   27.31      2.151  |     I |  O    |       |       |
3.55
 16.917   13.62   24.49      2.073  |    I  | O     |       |       |
3.45
 17.000   12.04   21.89      2.002  |    I  |O      |       |       |
3.35
 17.083   10.33   19.51      1.936  |   I   O       |       |       |
3.27
 17.167    9.00   17.32      1.876  |  I   O|       |       |       |
3.19
 17.250    8.22   15.38      1.823  |  I  O |       |       |       |
3.12
 17.333    7.44   13.70      1.777  |  I O  |       |       |       |
3.06
 17.417    6.70   12.22      1.736  | I  O  |       |       |       |
3.01
 17.500    6.02   11.43      1.698  | I O   |       |       |       |
2.95
 17.583    5.56   10.76      1.662  | I O   |       |       |       |
2.90
 17.667    5.00   10.12      1.626  | I O   |       |       |       |
2.84
 17.750    4.58    9.49      1.592  |I  O   |       |       |       |
2.79
 17.833    4.05    8.88      1.558  |I O    |       |       |       |
2.74
 17.917    3.68    8.29      1.526  |I O    |       |       |       |
2.69
 18.000    3.22    7.72      1.494  |I O    |       |       |       |
2.64
 18.083    3.16    7.19      1.465  |I O    |       |       |       |
2.60
 18.167    3.20    6.71      1.439  |IO     |       |       |       |
2.56
 18.250    3.22    6.30      1.417  |IO     |       |       |       |
2.53
 18.333    3.31    5.94      1.397  |IO     |       |       |       |
2.50
 18.417    3.21    5.63      1.379  |IO     |       |       |       |
2.47
 18.500    2.95    5.33      1.363  |IO     |       |       |       |
2.44
 18.583    2.89    5.04      1.347  |IO     |       |       |       |
2.42
 18.667    2.79    4.78      1.333  |IO     |       |       |       |
2.40
```

18.750	2.36	4.52	1.319	|O	|	|	|	|
2.38								
18.833	2.31	4.27	1.305	IO	|	|	|	|
2.36								
18.917	2.28	4.03	1.292	IO	|	|	|	|
2.34								
19.000	2.24	3.83	1.280	IO	|	|	|	|
2.32								
19.083	2.21	3.64	1.270	IO	|	|	|	|
2.30								
19.167	2.18	3.47	1.261	IO	|	|	|	|
2.29								
19.250	2.15	3.31	1.252	IO	|	|	|	|
2.28								
19.333	2.12	3.17	1.245	IO	|	|	|	|
2.26								
19.417	2.09	3.05	1.238	IO	|	|	|	|
2.25								
19.500	2.06	2.93	1.231	IO	|	|	|	|
2.24								
19.583	2.03	2.83	1.226	IO	|	|	|	|
2.24								
19.667	2.01	2.73	1.220	IO	|	|	|	|
2.23								
19.750	1.98	2.65	1.216	IO	|	|	|	|
2.22								
19.833	1.96	2.57	1.211	IO	|	|	|	|
2.21								
19.917	1.93	2.49	1.207	IO	|	|	|	|
2.21								
20.000	1.91	2.43	1.203	IO	|	|	|	|
2.20								
20.083	1.88	2.36	1.200	IO	|	|	|	|
2.20								
20.167	1.86	2.30	1.197	O	|	|	|	|
2.19								
20.250	1.84	2.25	1.194	O	|	|	|	|
2.19								
20.333	1.82	2.20	1.191	O	|	|	|	|
2.18								
20.417	1.79	2.15	1.188	O	|	|	|	|
2.18								
20.500	1.77	2.11	1.186	O	|	|	|	|
2.18								
20.583	1.75	2.07	1.184	O	|	|	|	|
2.17								
20.667	1.74	2.03	1.182	O	|	|	|	|
2.17								
20.750	1.72	2.00	1.180	O	|	|	|	|
2.17								
20.833	1.70	1.96	1.178	O	|	|	|	|
2.16								
20.917	1.68	1.93	1.176	O	|	|	|	|
2.16								
21.000	1.66	1.90	1.174	O	|	|	|	|
2.16								
21.083	1.64	1.87	1.173	O	|	|	|	|
2.16								
21.167	1.62	1.84	1.171	O	|	|	|	|
2.15								

21.250	1.61	1.81	1.170	O				
2.15								
21.333	1.59	1.79	1.168	O				
2.15								
21.417	1.58	1.76	1.167	O				
2.15								
21.500	1.56	1.74	1.166	O				
2.15								
21.583	1.55	1.72	1.165	O				
2.14								
21.667	1.53	1.70	1.163	O				
2.14								
21.750	1.52	1.68	1.162	O				
2.14								
21.833	1.50	1.66	1.161	O				
2.14								
21.917	1.49	1.64	1.160	O				
2.14								
22.000	1.48	1.62	1.159	O				
2.13								
22.083	1.46	1.60	1.158	O				
2.13								
22.167	1.45	1.59	1.157	O				
2.13								
22.250	1.44	1.57	1.156	O				
2.13								
22.333	1.43	1.55	1.155	O				
2.13								
22.417	1.42	1.54	1.155	O				
2.13								
22.500	1.40	1.52	1.154	O				
2.13								
22.583	1.39	1.51	1.153	O				
2.13								
22.667	1.38	1.49	1.152	O				
2.12								
22.750	1.37	1.48	1.151	O				
2.12								
22.833	1.36	1.47	1.151	O				
2.12								
22.917	1.35	1.45	1.150	O				
2.12								
23.000	1.34	1.44	1.149	O				
2.12								
23.083	1.33	1.43	1.149	O				
2.12								
23.167	1.32	1.42	1.148	O				
2.12								
23.250	1.31	1.40	1.147	O				
2.12								
23.333	1.30	1.39	1.147	O				
2.12								
23.417	1.29	1.38	1.146	O				
2.12								
23.500	1.29	1.37	1.145	O				
2.11								
23.583	1.28	1.36	1.145	O				
2.11								
23.667	1.27	1.35	1.144	O				
2.11								

23.750	1.26	1.34	1.144	O				
2.11								
23.833	1.25	1.33	1.143	O				
2.11								
23.917	1.24	1.32	1.143	O				
2.11								
24.000	1.24	1.31	1.142	O				
2.11								
24.083	1.21	1.30	1.141	O				
2.11								
24.167	1.14	1.29	1.141	O				
2.11								
24.250	0.99	1.26	1.139	O				
2.10								
24.333	0.72	1.21	1.137	O				
2.10								
24.417	0.54	1.14	1.133	O				
2.10								
24.500	0.43	1.07	1.129	O				
2.09								
24.583	0.36	0.99	1.124	O				
2.08								
24.667	0.30	0.91	1.120	O				
2.08								
24.750	0.25	0.83	1.116	O				
2.07								
24.833	0.21	0.76	1.112	O				
2.06								
24.917	0.18	0.70	1.108	O				
2.06								
25.000	0.15	0.63	1.105	O				
2.05								
25.083	0.13	0.58	1.102	O				
2.05								
25.167	0.11	0.52	1.099	O				
2.04								
25.250	0.10	0.47	1.096	O				
2.04								
25.333	0.08	0.43	1.094	O				
2.04								
25.417	0.07	0.39	1.091	O				
2.03								
25.500	0.06	0.35	1.089	O				
2.03								
25.583	0.05	0.31	1.087	O				
2.03								
25.667	0.04	0.28	1.086	O				
2.02								
25.750	0.04	0.25	1.084	O				
2.02								
25.833	0.03	0.23	1.083	O				
2.02								
25.917	0.03	0.20	1.081	O				
2.02								
26.000	0.02	0.18	1.080	O				
2.02								
26.083	0.02	0.16	1.079	O				
2.01								
26.167	0.02	0.15	1.078	O				
2.01								

26.250	0.01	0.13	1.077	O				
2.01								
26.333	0.01	0.12	1.076	O				
2.01								
26.417	0.01	0.10	1.076	O				
2.01								
26.500	0.00	0.09	1.075	O				
2.01								
26.583	0.00	0.08	1.074	O				
2.01								
26.667	0.00	0.07	1.074	O				
2.01								
26.750	0.00	0.06	1.073	O				
2.01								
26.833	0.00	0.06	1.073	O				
2.00								
26.917	0.00	0.05	1.073	O				
2.00								
27.000	0.00	0.04	1.072	O				
2.00								
27.083	0.00	0.04	1.072	O				
2.00								
27.167	0.00	0.03	1.072	O				
2.00								
27.250	0.00	0.03	1.072	O				
2.00								
27.333	0.00	0.03	1.071	O				
2.00								
27.417	0.00	0.02	1.071	O				
2.00								
27.500	0.00	0.02	1.071	O				
2.00								
27.583	0.00	0.02	1.071	O				
2.00								
27.667	0.00	0.02	1.071	O				
2.00								
27.750	0.00	0.01	1.071	O				
2.00								
27.833	0.00	0.01	1.071	O				
2.00								
27.917	0.00	0.01	1.071	O				
2.00								
28.000	0.00	0.01	1.070	O				
2.00								
28.083	0.00	0.01	1.070	O				
2.00								
28.167	0.00	0.01	1.070	O				
2.00								
28.250	0.00	0.01	1.070	O				
2.00								
28.333	0.00	0.01	1.070	O				
2.00								
28.417	0.00	0.01	1.070	O				
2.00								
28.500	0.00	0.00	1.070	O				
2.00								
28.583	0.00	0.00	1.070	O				
2.00								
28.667	0.00	0.00	1.070	O				
2.00								

```
 28.750    0.00    0.00      1.070  O       |       |       |       |
2.00
 28.833    0.00    0.00      1.070  O       |       |       |       |
2.00
 28.917    0.00    0.00      1.070  O       |       |       |       |
2.00
 29.000    0.00    0.00      1.070  O       |       |       |       |
2.00
 29.083    0.00    0.00      1.070  O       |       |       |       |
2.00
 29.167    0.00    0.00      1.070  O       |       |       |       |
2.00
 29.250    0.00    0.00      1.070  O       |       |       |       |
2.00
 29.333    0.00    0.00      1.070  O       |       |       |       |
2.00
 29.417    0.00    0.00      1.070  O       |       |       |       |
2.00
 29.500    0.00    0.00      1.070  O       |       |       |       |
2.00
 29.583    0.00    0.00      1.070  O       |       |       |       |
2.00


      Remaining water in basin =    1.07 (Ac.Ft)


      ****************************HYDROGRAPH
DATA****************************
                  Number of intervals =   355
                  Time interval =    5.0 (Min.)
                  Maximum/Peak flow rate =       35.932 (CFS)
                  Total volume =       5.539 (Ac.Ft)
            Status of hydrographs being held in storage
                        Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
            Peak (CFS)      0.000     0.000     0.000     0.000
0.000
            Vol (Ac.Ft)     0.000     0.000     0.000     0.000
0.000
      ************************************************************
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      ------------------------------------------------------------
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APPENDIX E:
PROJECT HYDRAULIC CALCULATIONS

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Thursday, May 10 2018

Monte Vista Street Capacity Eastern Area - highest runoff condition

User-defined

Invert Elev (ft)	= 0.30
Slope (%)	= 1.70
N-Value	= 0.017

Calculations

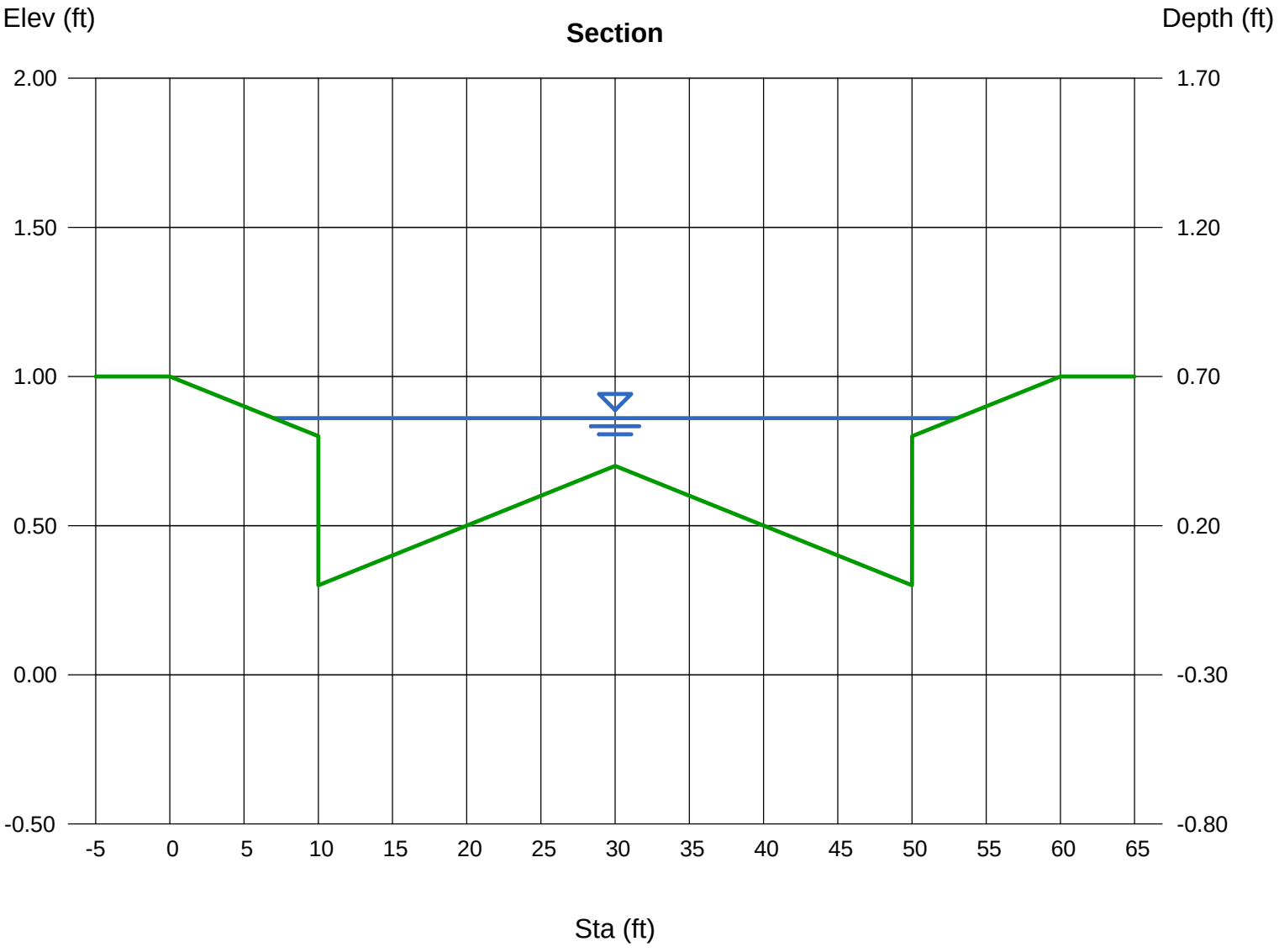
Compute by:	Known Q
Known Q (cfs)	= 75.00

Highlighted

Depth (ft)	= 0.56
Q (cfs)	= 75.00
Area (sqft)	= 14.58
Velocity (ft/s)	= 5.14
Wetted Perim (ft)	= 47.00
Crit Depth, Yc (ft)	= 0.70
Top Width (ft)	= 46.01
EGL (ft)	= 0.97

(Sta, El, n)-(Sta, El, n)...

(0.00, 1.00)-(10.00, 0.80, 0.030)-(10.01, 0.30, 0.015)-(30.00, 0.70, 0.015)-(50.00, 0.30, 0.015)-(50.01, 0.80, 0.015)-(60.00, 1.00, 0.030)



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Thursday, May 10 2018

Monte Vista Street Capacity Eastern Area - 10 yr

User-defined

Invert Elev (ft)	= 0.30
Slope (%)	= 1.70
N-Value	= 0.015

Calculations

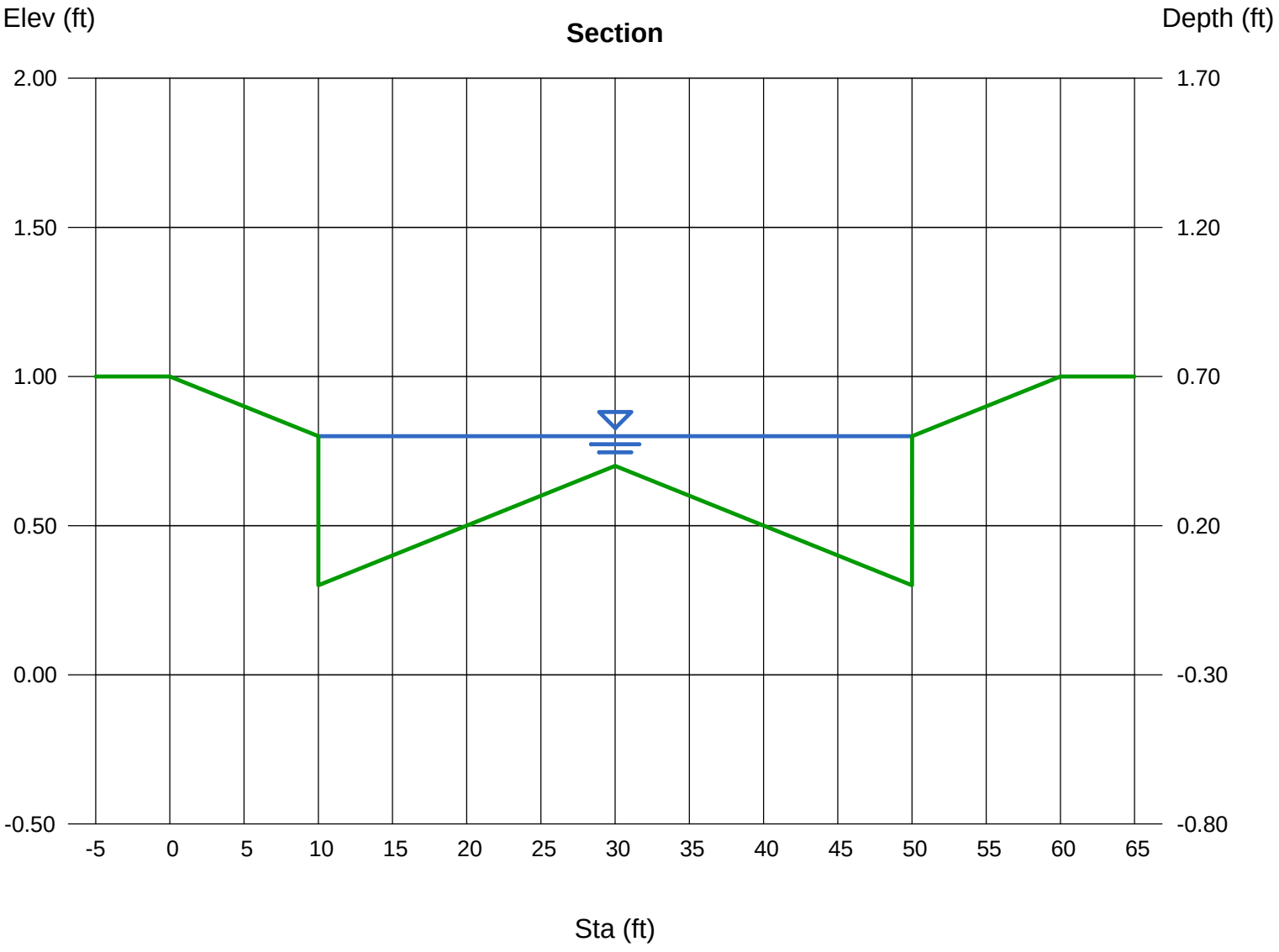
Compute by:	Known Depth
Known Depth (ft)	= 0.50

Highlighted

Depth (ft)	= 0.50
Q (cfs)	= 68.46
Area (sqft)	= 12.00
Velocity (ft/s)	= 5.70
Wetted Perim (ft)	= 41.00
Crit Depth, Yc (ft)	= 0.68
Top Width (ft)	= 40.01
EGL (ft)	= 1.01

(Sta, El, n)-(Sta, El, n)...

(0.00, 1.00)-(10.00, 0.80, 0.030)-(10.01, 0.30, 0.015)-(30.00, 0.70, 0.015)-(50.00, 0.30, 0.015)-(50.01, 0.80, 0.015)-(60.00, 1.00, 0.030)



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Thursday, May 10 2018

Monte Vista Street Capacity Eastern Area - 100 yr

User-defined

Invert Elev (ft)	= 0.30
Slope (%)	= 1.70
N-Value	= 0.020

Calculations

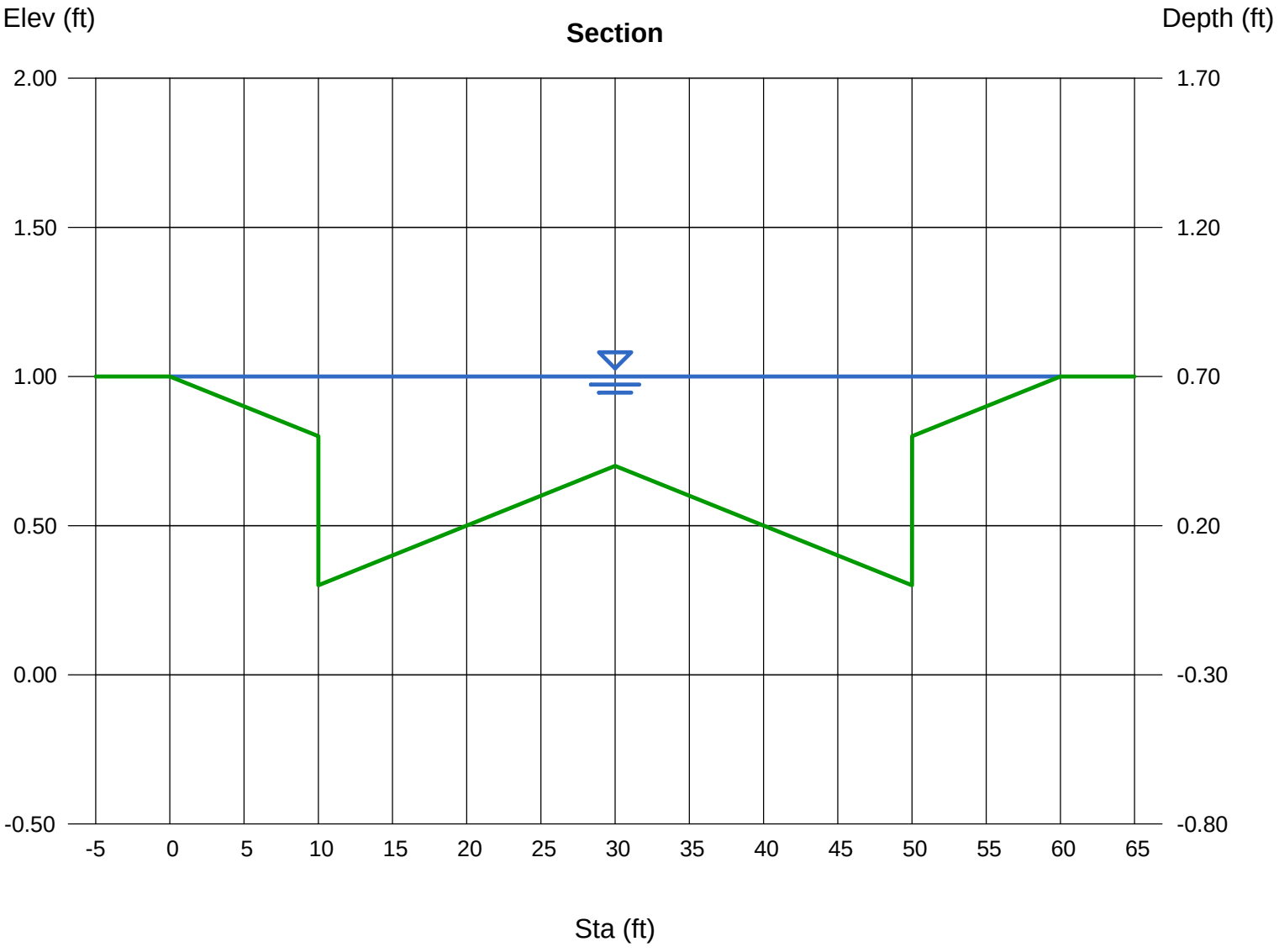
Compute by:	Known Depth
Known Depth (ft)	= 0.70

Highlighted

Depth (ft)	= 0.70
Q (cfs)	= 105.48
Area (sqft)	= 22.00
Velocity (ft/s)	= 4.79
Wetted Perim (ft)	= 60.99
Crit Depth, Yc (ft)	= 0.70
Top Width (ft)	= 60.00
EGL (ft)	= 1.06

(Sta, El, n)-(Sta, El, n)...

(0.00, 1.00)-(10.00, 0.80, 0.030)-(10.01, 0.30, 0.015)-(30.00, 0.70, 0.015)-(50.00, 0.30, 0.015)-(50.01, 0.80, 0.015)-(60.00, 1.00, 0.030)



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Thursday, May 10 2018

Monte Vista Street Capacity Western Area - 100 yr

User-defined

Invert Elev (ft)	= 0.30
Slope (%)	= 1.20
N-Value	= 0.020

Calculations

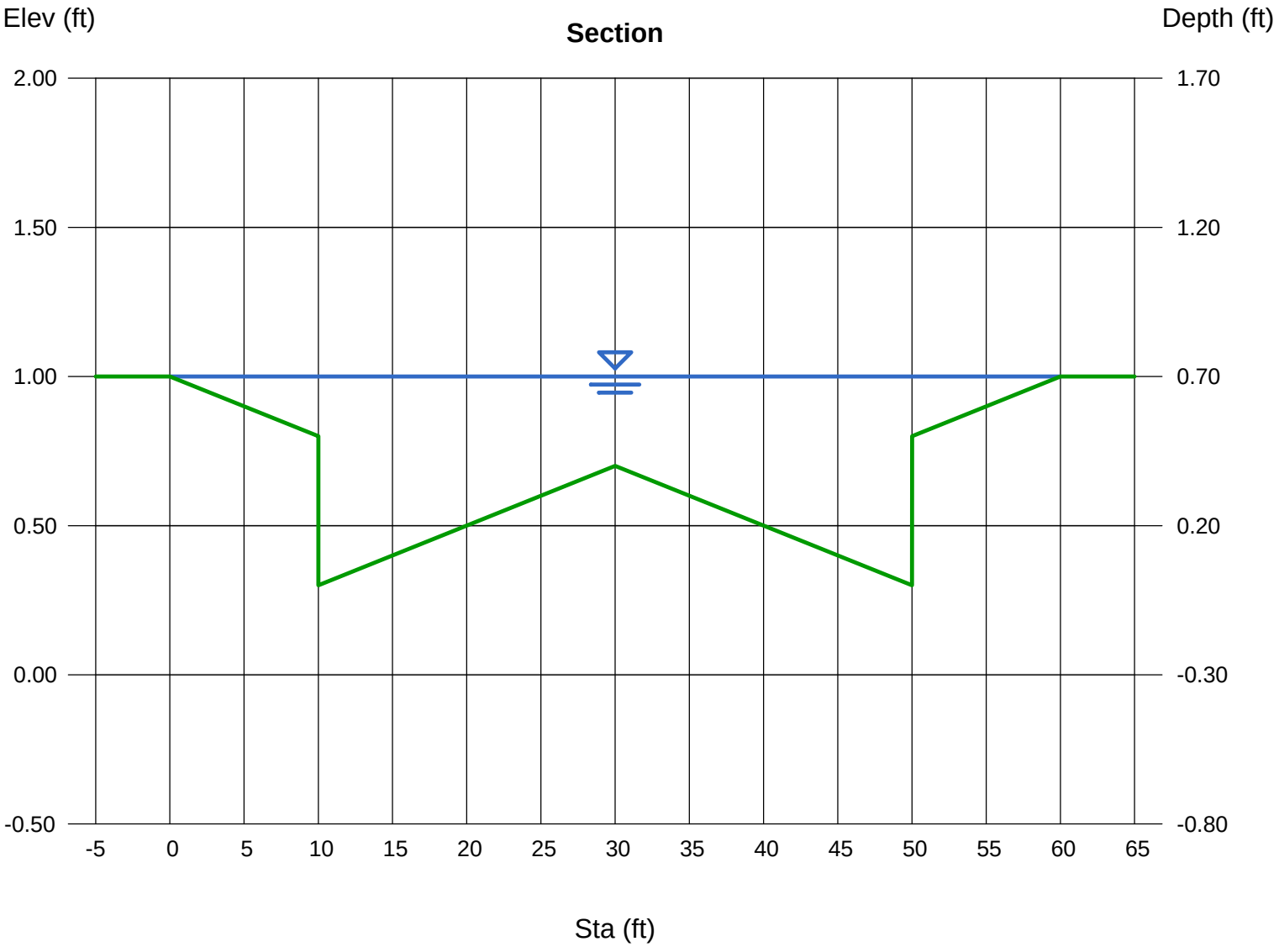
Compute by:	Known Depth
Known Depth (ft)	= 0.70

Highlighted

Depth (ft)	= 0.70
Q (cfs)	= 88.62
Area (sqft)	= 22.00
Velocity (ft/s)	= 4.03
Wetted Perim (ft)	= 60.99
Crit Depth, Yc (ft)	= 0.70
Top Width (ft)	= 60.00
EGL (ft)	= 0.95

(Sta, El, n)-(Sta, El, n)...

(0.00, 1.00)-(10.00, 0.80, 0.030)-(10.01, 0.30, 0.015)-(30.00, 0.70, 0.015)-(50.00, 0.30, 0.015)-(50.01, 0.80, 0.015)-(60.00, 1.00, 0.030)



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Thursday, May 10 2018

Monte Vista Street Capacity Western Area - 10 yr

User-defined

Invert Elev (ft)	= 0.30
Slope (%)	= 1.20
N-Value	= 0.015

Calculations

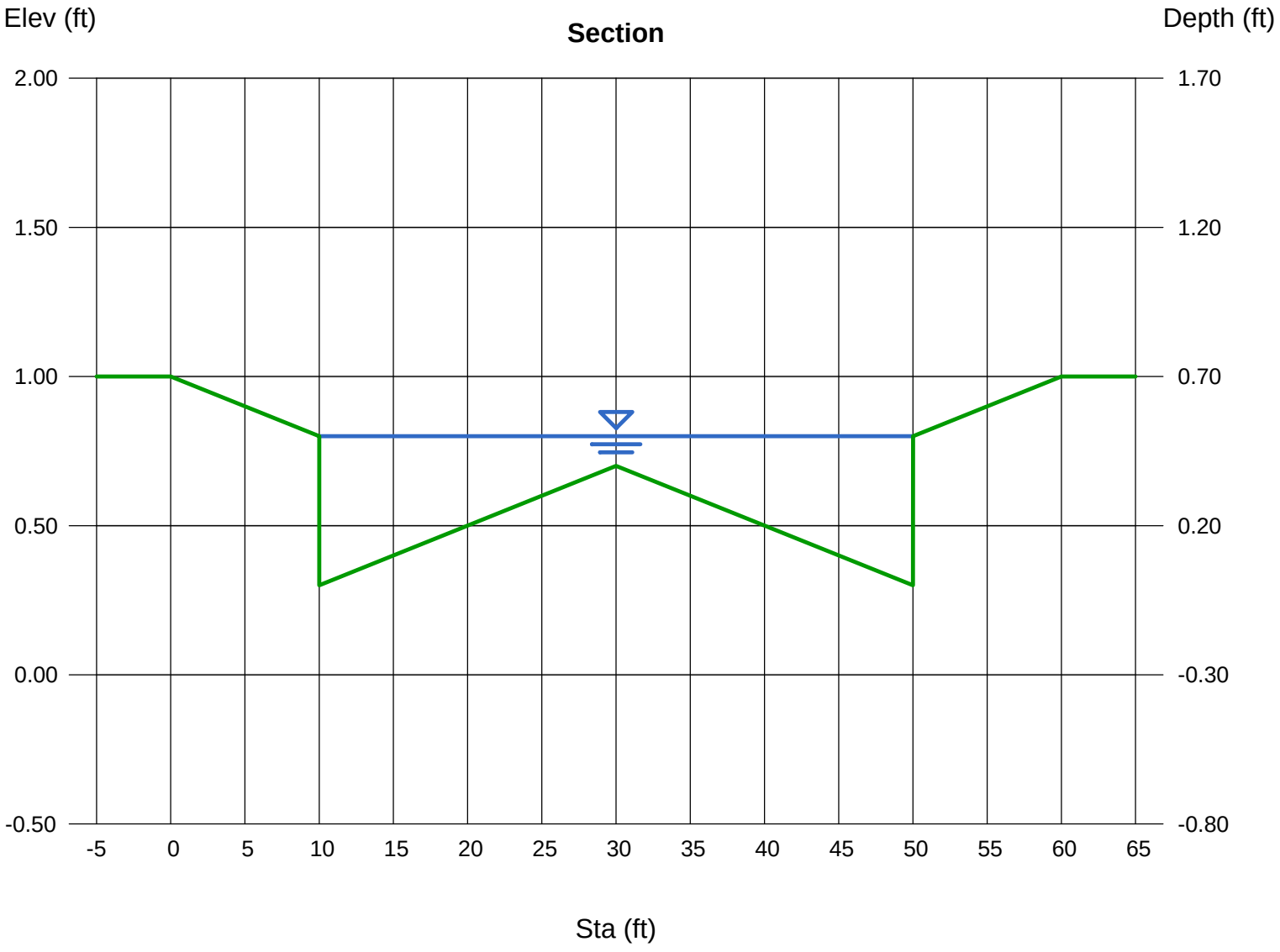
Compute by:	Known Depth
Known Depth (ft)	= 0.50

Highlighted

Depth (ft)	= 0.50
Q (cfs)	= 57.52
Area (sqft)	= 12.00
Velocity (ft/s)	= 4.79
Wetted Perim (ft)	= 41.00
Crit Depth, Yc (ft)	= 0.62
Top Width (ft)	= 40.01
EGL (ft)	= 0.86

(Sta, El, n)-(Sta, El, n)...

(0.00, 1.00)-(10.00, 0.80, 0.030)-(10.01, 0.30, 0.015)-(30.00, 0.70, 0.015)-(50.00, 0.30, 0.015)-(50.01, 0.80, 0.015)-(60.00, 1.00, 0.030)



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Thursday, May 10 2018

Monte Vista Street Capacity Western Area - Highest runoff condition

User-defined

Invert Elev (ft)	= 0.30
Slope (%)	= 1.20
N-Value	= 0.015

Calculations

Compute by:	Known Q
Known Q (cfs)	= 56.00

Highlighted

Depth (ft)	= 0.50
Q (cfs)	= 56.00
Area (sqft)	= 12.00
Velocity (ft/s)	= 4.67
Wetted Perim (ft)	= 41.00
Crit Depth, Yc (ft)	= 0.62
Top Width (ft)	= 40.01
EGL (ft)	= 0.84

(Sta, El, n)-(Sta, El, n)...

(0.00, 1.00)-(10.00, 0.80, 0.030)-(10.01, 0.30, 0.015)-(30.00, 0.70, 0.015)-(50.00, 0.30, 0.015)-(50.01, 0.80, 0.015)-(60.00, 1.00, 0.030)