

D-3

Curve Number Determination

CURVE NUMBER DETERMINATION

Vegas Drive - Shadow Mountain Place to Rancho Drive

Date: 06/21/2007

Hydrologic Soil Group (Soil Survey Reference #'s)		Hydrologic Soil Group D				
Subbasin	Ultimate Landuse	MDR %	HDR %	HFR %	COM %	PRK %
	CN #	87.0	91.0	93.0	95.0	80.0
VG04	91.0		100			
VG05A	91.0		100			
VG05B	91.0		100			
VG05C	91.0		100			
VG05D	92.2		40	60		
VG05E	89.0	50	50			
VG05F	92.2		40	60		
VG05G	91.0		100			
VG05H	91.0		100			
VG05I	89.0	50	50			
VG05J	95.0				100	
VG05K	95.0				100	
VG05L	95.0				100	
VG05M	95.0				100	
VG06A	93.0			100		
VG06B	93.0			100		
VG06C	80.0					100
VG06D	80.0					100
VG22A	95.0				100	
VG22B	93.0			100		
VG22C	91.0		100			
VG22D	87.0	100				
VG22E	87.0	100				
VG22F	93.8		30		70	
VG22G	90.2	60			40	
VG22H	89.4	70			30	
VG22I	91.3		92		8	
VG20A	93.0			100		
VG20B	90.9	15	73		12	
VG20C	95.0				100	
LM08	91.8		65	30	5	
LM09-C	90.6	40	30		30	

MDR = Medium Density Single Family Residential (10,000 sq-ft lots)

HDR = High Density Single Family Residential (7,000 sp-ft lots)

HFR = Public Facility, Multi Family Residential (Apartments/Condos)

COM = Commercial And Business

PRK = Parks, Golf Courses (Open Space - Good Condition, Grass Cover > 75%)

D-4

Standard Form 4

Vegas Drive - Shadow Mountain Place to Rancho Drive
Hydrologic Criteria and Drainage Design Manual
Standard Form 4

Date: 06/21/2007

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	REMARKS
DESIG:	DEV./EX. (D or E)	CN	K	AREA Ac	AREA MI ²	INITIAL LENGTH Feet	SLOPE %	TI Min	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS	V2 VELOCITY FPS	Tt Min	Min	Hours	RAINFALL Q100/Q10 Inches
VG04	D	91.0	0.8112	71.72	0.1121	100	1.0	5.2	3730	1.0	2.0	3.1	21.7	26.9	0.269	2.77
VG05A	D	91.0	0.8112	7.21	0.0113	100	1.0	5.2	1530	1.5	2.5	3.7	7.9	13.1	0.131	2.77
VG05B	D	91.0	0.8112	10.32	0.0161	100	1.0	5.2	1580	1.0	2.0	3.1	10.0	15.2	0.152	2.77
VG05C	D	91.0	0.8112	15.10	0.0236	100	1.0	5.2	1920	1.0	2.0	3.1	11.9	17.1	0.171	2.77
VG05D	D	92.2	0.8270	2.81	0.0044	100	1.0	4.9	1010	1.5	2.5	3.7	5.6	10.5	0.105	2.77
VG05E	D	89.0	0.7848	6.03	0.0094	100	1.0	5.7	1570	1.5	2.5	3.7	8.1	13.8	0.138	2.77
VG05F	D	92.2	0.8270	3.00	0.0047	100	1.0	4.9	1080	1.5	2.5	3.7	5.9	10.9	0.109	2.77
VG05G	D	91.0	0.8112	49.99	0.0781	100	1.0	5.2	3800	1.0	2.0	3.1	22.1	27.3	0.273	2.77
VG05H	D	91.0	0.8112	7.36	0.0115	100	1.0	5.2	1930	1.0	2.0	3.1	11.9	17.1	0.171	2.77
VG05I	D	89.0	0.7848	2.92	0.0046	100	1.0	5.7	800	1.5	2.5	3.7	4.7	10.4	0.104	2.77
VG05J	D	95.0	0.8640	2.26	0.0035	100	1.0	4.2	690	1.5	2.5	3.7	4.2	8.5	0.085	2.77
VG05K	D	95.0	0.8640	4.06	0.0063	100	1.0	4.2	920	1.0	2.0	3.1	6.4	10.7	0.107	2.77
VG05L	D	95.0	0.8640	3.82	0.0060	100	1.0	4.2	890	1.5	2.5	3.7	5.1	9.4	0.094	2.77
VG05M	D	95.0	0.8640	8.64	0.0135	100	1.0	4.2	1160	1.0	2.0	3.1	7.7	12.0	0.120	2.77
VG06A	D	93.0	0.8376	8.61	0.0135	100	1.0	4.7	1170	0.8	1.8	2.7	8.7	13.4	0.134	2.77
VG06B	D	93.0	0.8376	6.80	0.0106	100	1.0	4.7	1320	0.8	1.8	2.7	9.6	14.3	0.143	2.77
VG06C	U	80.0	0.6660	36.79	0.0575	500	0.8	18.8	2540	0.8	1.3	2.6	19.2	38.0	N/A	2.77
VG06D	U	80.0	0.6660	62.17	0.0971	500	0.8	18.8	3060	0.8	1.3	2.6	22.5	41.3	N/A	2.77
VG22A	D	95.0	0.8640	4.92	0.0077	100	1.0	4.2	820	0.8	1.8	2.7	6.6	10.8	0.108	2.77
VG22B	D	93.0	0.8376	4.52	0.0071	100	1.0	4.7	1230	0.8	1.8	2.7	9.1	13.8	0.138	2.77
VG22C	D	91.0	0.8112	4.21	0.0066	100	1.0	5.2	1180	0.8	1.8	2.7	8.8	14.0	0.140	2.77
VG22D	D	87.0	0.7584	7.43	0.0116	100	1.0	6.1	1500	0.8	1.8	2.7	10.7	16.9	0.169	2.77
VG22E	D	87.0	0.7584	17.86	0.0279	100	1.0	6.1	2080	0.8	1.8	2.7	14.2	20.4	0.204	2.77
VG22F	D	93.8	0.8482	4.53	0.0071	100	1.0	4.5	1090	1.0	2.0	3.1	7.3	11.9	0.119	2.77
VG22G	D	90.2	0.8006	7.00	0.0109	100	1.0	5.4	1430	0.8	1.8	2.7	10.3	15.7	0.157	2.77
VG22H	D	89.4	0.7901	13.60	0.0213	100	1.0	5.6	1670	0.8	1.8	2.7	11.7	17.3	0.173	2.77
VG22I	D	91.3	0.7822	3.18	0.0050	100	1.0	5.7	1090	1.0	1.6	2.4	37.6	43.3	0.166	2.77

D-5.1

HEC-1

Design Flow Rates Summary

Vegas Drive - Shadow Mountain Place to Rancho Drive
HEC-1 Flow Rate Summary

Design Point	Location Description Vegas Drive Cross Street	Existing/Interim Condition			Ultimate Condition		
		Tributary Area (sq-mi)	Flow Rate		Tributary Area (sq-mi)	Flow Rate	
			10-YR Event (cfs)	100-YR Event (cfs)		10-YR Event (cfs)	100-YR Event (cfs)
OG011A-C		0.44	125	339	0.44	125	339
VG02-C		0.22	47	153	0.22	47	153
VG03-C		0.31	53	186	0.31	53	186
VG04		0.11	61	137	0.11	61	137
DP1	Saylor Way	1.09	236	718	1.09	236	718
VG05A		0.01	8	18	0.01	8	18
VG05B		0.02	11	25	0.02	11	25
DP2	Winwood Street	1.12	241	731	1.12	241	731
VG05C		0.02	16	35	0.02	16	35
DP3	Shadow Mountain Place	1.14	246	744	1.14	246	744
VG05D		0.00	3	7	0.00	3	7
VG05E		0.01	6	14	0.01	6	14
DP4	Tequesta Road	1.15	248	749	1.15	248	749
VG05F		0.00	4	8	0.00	4	8
VG05G		0.08	42	95	0.08	42	95
VG05H		0.01	8	17	0.01	8	17
DP5S	Laurelhurst Drive (from south side)	0.09	47	107	0.09	47	107
VG05I		0.00	3	7	0.00	3	7
DP5	Laurelhurst Drive	1.25	285	837	1.25	285	837
VG05J		0.00	4	7	0.00	4	7
VG05K		0.01	6	12	0.01	6	12
VG05L		0.01	6	12	0.01	6	12
VG05M		0.01	12	24	0.01	12	24
* DP6	Decatur Boulevard	1.28	290	850	1.28	290	850
* DPT6E	Continues East Along Vegas Dr				0.00	160	160
VG22A		0.01	7	14	0.01	7	14
VG06A		0.01	11	22	0.01	11	22
DP7		1.30	294	861	0.02	178	196
VG22B		0.01	6	12	0.01	6	12
VG06B		0.01	8	17	0.01	8	17
DP8	Yellow Rose Street	1.32	296	867	0.04	186	225
VG06C		0.06	10	36	0.06	10	36
DP9		1.38	305	899	0.10	193	247
VG22C		0.01	5	10	0.01	5	10
DP10	Valley Drive	1.38	306	902	0.10	196	256
VG06D		0.10	17	58	0.10	17	58
VG22D		0.01	6	15	0.01	6	15
VG22E		0.03	13	32	0.03	13	32
DP11	Mountain Trail	1.52	328	978	0.24	223	341
VG22F		0.01	6	12	0.01	6	12
DP12	Pyramid Drive	1.53	329	980	0.25	226	348
VG22G		0.01	7	16	0.01	7	16
VG22H		0.02	12	29	0.02	12	29
VG22I		0.00	3	8	0.00	3	8
DP13	East Lane	1.56	335	999	0.28	243	395
LM09-C		0.22	109	247	0.22	109	247
LM08		0.06	40	87	0.06	40	87
VG20A		0.06	42	87	0.06	42	87
VG20B		0.13	66	147	0.13	66	147
VG20C		0.01	12	24	0.01	12	24
DP14N	North Rancho Drive (from north side)	0.48	210	234	0.48	210	234
DP14	North Rancho Drive	2.05	500	1138	0.77	445	618

Notes:

The Vegas Drive proposed storm drain facility is designed to convey 455 cfs based on the existing downstream connecting storm drain design capacity.

* During the Ultimate Condition, a flow split occurs at DP6 that assumes a maximum of 160 cfs (DPT6E) continues East along Vegas Dr while the remaining majority of flow is conveyed north along Decatur Blvd in a future connecting Regional Flood Control Fac

D-5.2

HEC-1 Model

VD3I.dat

SDN3

(Existing & Interim Conditions)

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*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 03JUL07 TIME 14:22:32 *
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*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*****

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X X XXXXXXX XXXXX X
X X X X X XX
X X X X X X
XXXXXXX XXXX X XXXXX X
X X X X X X
X X X X X X
X X XXXXXXX XXXXX XXX

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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.

THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,

DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*** FREE ***
*DIAGRAM
1 ID *****
2 ID *
3 ID * VEGAS DRIVE - SHADOW MOUNTAIN PL TO RANCHO DR *
4 ID *
5 ID *****
6 ID
7 ID
8 ID PREPARED FOR: CITY OF LAS VEGAS
9 ID PREPARED BY: Poggemeyer Design Group
10 ID DATE: 06/21/2007
11 ID FILE: VD31.dat
12 ID
13 ID ULTIMATE DEVELOPMENT WITH EXISTING ROUTING
14 ID DESIGN STORM = 10-YEAR 6-HR STORM, & 100-YEAR 6-HR STORM
15 ID STORM DISTRIBUTION: SDN3
16 ID
17 ID SUBBASINS DELINEATIONS ARE BASED ON THE FOLLOWING REFERENCED HYDROLOGY STUDI
18 ID VEGAS DRIVE / OWENS AVENUE IMPROVEMENTS (KIMELY HORN 2001)
19 ID CCRFCD 2002 MASTER PLAN UPDATE (PBS&J 2002)
20 ID
21 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
22 ID
23 ID CONCENTRATION AREA 100-YR 10-YR
24 ID POINT SQ. MI. DARF DARF
25 ID 0-0.5 1.000 0.570
26 ID 0.5-1 0.980 0.559
27 ID 1-2 0.970 0.553
28 ID 2-3 0.930 0.530
29 ID 3-4 0.920 0.525
30 ID 4-5 0.910 0.519
31 ID 5-6 0.905 0.516
32 ID 6-7 0.900 0.513
33 ID 7-8 0.890 0.508
34 ID
35 ID JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
36 ID
37 ID 6-HOUR STORM, SDN3
38 ID
39 ID IT 5 0 0 500
40 ID IO 5 0 0
41 ID IN 5 0 0
42 ID *
43 ID 10-YR 100-YR
44 ID JR PREC 0.570 0.559 0.553 0.525 1.000 0.980 0.970 0.930
45 ID *
46 ID
47 ID KKOG011A-C
48 ID BA 0.441
49 ID PB 2.77
50 ID PC 0.000 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.13
51 ID PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.18
52 ID PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.24
53 ID PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.40
54 ID PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.85

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PAGE 2

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
50 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.97
51 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.99
52 PC 0.997 0.999 1.000

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117 KK DP3
118 KM COMBINE DP2 AND VG05C
119 KM SHADOW MTN AND VEGAS DRIVE
120 HC 2
*

1

HEC-1 INPUT

PAGE 4

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

121 KK RDP3
122 KM FACILITY = OWENS AVENUE SYSTEM
123 KM FACILITY # = LVOW 0360
124 KM LINING = RCB
125 RD 1070 0.0148 0.015 0 TRAP 8 0
*

126 KK VG05D
127 BA 0.0044
128 LS 0 92.2
129 UD 0.105
*

130 KK VG05E
131 BA 0.0094
132 LS 0 89.0
133 UD 0.138
*

134 KK DP4
135 KM COMBINE DP3, VG05D, AND VG05E
136 HC 3
*

137 KK RDP4
138 KM FACILITY = OWENS AVENUE SYSTEM
139 KM FACILITY # = LVOW 0360
140 KM LINING = RCB
141 RD 970 0.0148 0.015 0 TRAP 8 0
*

142 KK VG05F
143 BA 0.0047
144 LS 0 92.2
145 UD 0.109
*

146 KK VG05G
147 BA 0.0781
148 LS 0 91.0
149 UD 0.273
*

150 KK RVG05G
151 KM PEBBLE BEACH BLVD
152 RD 2060 0.0140 0.016 0 TRAP 0 50
*

153 KK VG05H
154 BA 0.0115
155 LS 0 91.0
156 UD 0.171
*

1

HEC-1 INPUT

PAGE 5

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

157 KK DP5S
158 KM COMBINE VG05G AND VG05H
159 KM LAURELHURST AT VEGAS DRIVE
160 HC 2
*

161 KK VG05I
162 BA 0.0046
163 LS 0 89.0
164 UD 0.104
*

165 KK DP5
166 KM COMBINE DP4, VG05F, DP5S, AND VG05I
167 KM LAURELHURST AND VEGAS DRIVE
168 HC 4
*

169 KK RDP5
170 KM FACILITY = OWENS AVENUE SYSTEM
171 KM FACILITY # = LVOW 0360
172 KM LINING = RCB
173 RD 780 0.0148 0.015 0 TRAP 8 0
*

174 KK VG05J
175 BA 0.0035
176 LS 0 95.0
177 UD 0.085
*

178 KK VG05K

236 KM COMBINE DP9 AND VG22C
 237 HC 2
 *

238 KK RDP10
 239 RD 1360 0.016 0.013 0 CIRC 5
 *

240 KK VG06D
 241 BA 0.0971
 242 LS 0 80.0
 243 UD 0.413
 *

244 KK VG22D
 245 BA 0.0116
 246 LS 0 87.0
 247 UD 0.169
 *

248 KK VG22E
 249 BA 0.0279
 250 LS 0 87.0
 251 UD 0.204
 *

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HEC-1 INPUT

PAGE 8

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

252 KK DP11
 253 KM COMBINE DP10, VG06D, VG22D, AND VG22E
 254 HC 4
 *

255 KK RDP11
 256 RD 940 0.012 0.013 0 CIRC 5
 *

257 KK VG22F
 258 BA 0.0071
 259 LS 0 93.8
 260 UD 0.119
 *

261 KK DP12
 262 KM COMBINE DP11 AND VG22F
 263 HC 2
 *

264 KK RDP12
 265 RD 610 0.012 0.013 0 CIRC 5
 *

266 KK VG22G
 267 BA 0.0109
 268 LS 0 90.2
 269 UD 0.157
 *

270 KK VG22H
 271 BA 0.0213
 272 LS 0 89.4
 273 UD 0.173
 *

274 KK VG22I
 275 BA 0.0050
 276 LS 0 91.3
 277 UD 0.166
 *

278 KK DP13
 279 KM EAST LN AND VEGAS
 280 KM COMBINE DP12, VG22G, VG22H, AND VG22I
 281 HC 4
 *

282 KK RDP13
 283 RD 420 0.010 0.013 0 CIRC 5
 *

1

HEC-1 INPUT

PAGE 9

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

284 KK LM09-C
 285 BA 0.2205
 286 LS 0 90.6
 287 UD 0.318
 *

288 KKRLM09-C
 289 KM ROUTE CLM09-C TO DVG21
 290 KM RANCHO
 291 RD 800 0.0175 0.016 0 TRAP 0 50
 *

292 KK LM08

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

```

42 OG011A-C
   V
   V
55 ROG011A
   .
   .
59         VG02-C
   .
   .
64 CVG02-C.....
   V
   V
68 RCVG02
   .
   .
74         VG03-C
   .
   .
79 CVG03-C.....
   V
   V
83 RCVG03
   .
   .
89         VG04
   .
   .
93 DP1.....
   .
   .
97         VG05A
   .
   .
101        VG05B
   .
   .
105 DP2.....
   V
   V
108 RDP2
   .
   .
113        VG05C
   .
   .
117 DP3.....
   V
   V
121 RDP3
   .
   .
126        VG05D
   .
   .
130        VG05E
   .
   .
134 DP4.....
   V
   V
137 RDP4
   .
   .
142        VG05F
   .
   .
146        VG05G
   V
   V
150 RVG05G
   .
   .
153        VG05H
   .
   .
157 DP5.....
   .
   .
161        VG05I
   .
   .
165 DP5.....
   V
   V
169 RDP5
   .
   .
174        VG05J
   .
   .
178        VG05K

```

296

V
V
RLM08

299

VG20A
V
V
RVG20A

303

306

VG20B

310

CM2

319

DVG21

DHOLLY

312

V

322

RDVG21

326

VG20C

330

DP14N

333

DP14

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

