

NOTE: The following was excerpted from an earlier version of the Urban Storm Drainage Criteria Manual, Volume I, Runoff Section (revised 5-1-84). This information was inadvertently excluded from the current USDCM release, but is still valid. Any questions concerning this supplemental information should be directed to Ben Urbonas.

4.14 Basis for 1982 Version of CUHP

Rainfall and runoff data were collected by U.S. Geological Survey in the Denver metropolitan area since 1969 under a cooperative agreement with the Urban Drainage and Flood Control District. Analysis of this data by the District staff began in earnest in 1977. Of the original thirty gaging stations, data from only seven sites (nine different basin conditions) were used by the District to develop the 1982 version of the CUHP. Data from all other sites were evaluated and were determined not suitable for use due to various gaging problems and watershed definition problems. Because the metropolitan area data base lacked an undeveloped watershed, data from a small watershed (Kiowa Creek Tributary at Elbert) being gaged by USGS for the Colorado Highway Department was used to round out the mix of land uses in the data base.

Table 4-7 presents a summary of rainfall/runoff data base and includes the key watershed parameters for each site. For each of the dates that data were available, a complete rainfall depth record and concurrent flow measurements at 5-minute time increments served as the basis for the development of the revised CUHP. Peak flows from each recorded hydrograph are compared with the calculated peak flows using the 1982 version of CUHP in Figure 4-8. This comparison substantiates the validity of the new CUHP procedure.

Those wishing to compare the older version of the CUHP with the new version will find that often the new unit hydrograph will have a significantly shorter time to peak. This is particularly true for smaller urbanized basins. However, the new version will often produce peak flow results comparable to those obtained using the old version over a wide range of watershed conditions typically used in drainage studies in the Denver Metropolitan Area.

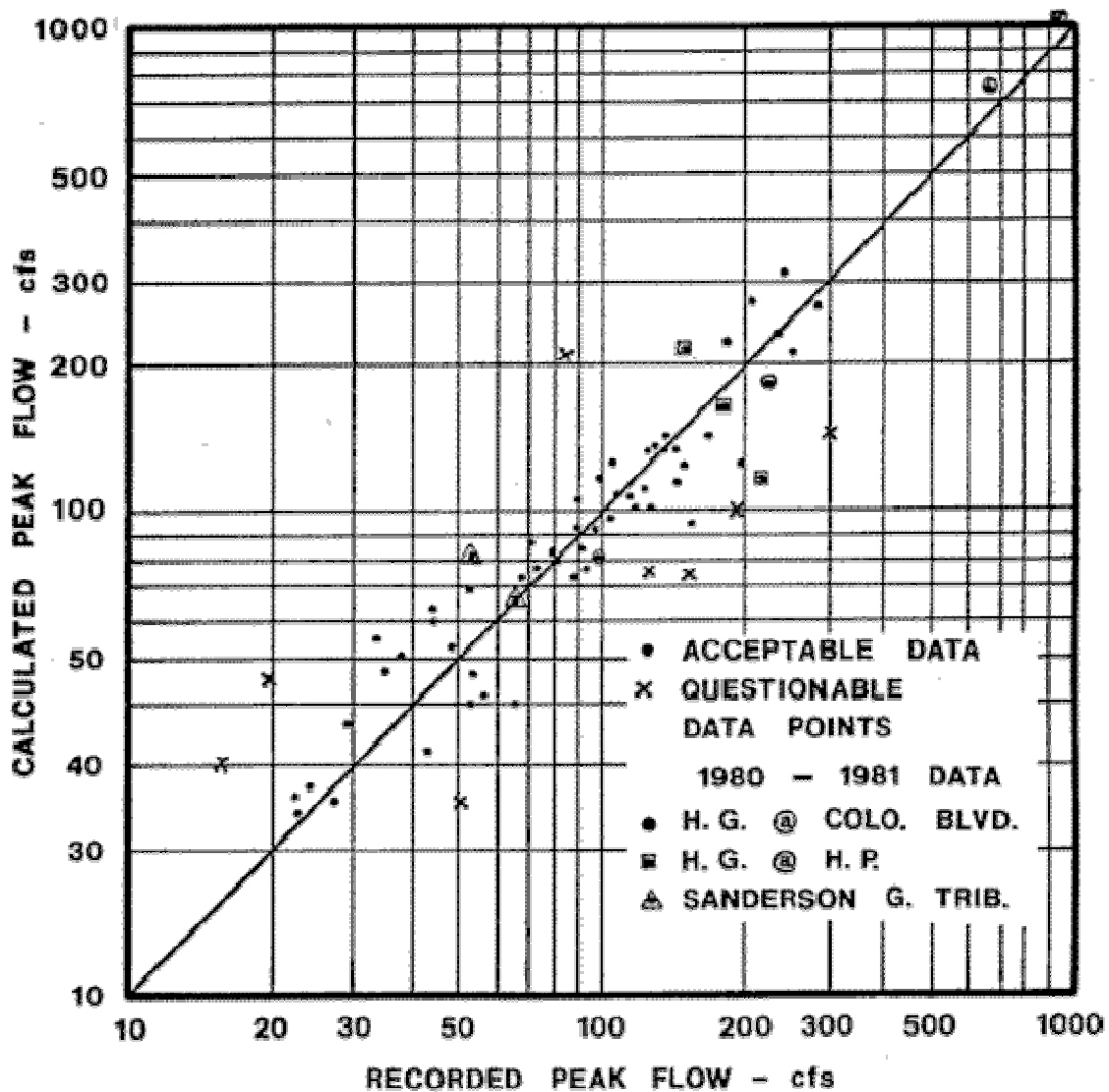


FIGURE 4 - 8. COMPARISON OF RECORDED PEAKS WITH CALCULATED PEAKS USING NEW C U H P (5-MINUTE UNIT HYDROGRAPHS)

Table 4-7
Basin and Rainfall/Runoff Data Used To Develop 1982 CUHP
Version

Basin Name	Area (mi ²)	Imp (%)	L (mi.)	L _{ca} (mi.)	Slope (ft/ft)	SCS Hyd. Soil Gr.	Rainfall/Runoff			
							Date	Precip. (In.)	Peak Flow (cfs.)	
Sand Creek Trib. in Denver	0.29	32	0.84	0.21	0.007	A	7-25-71	0.70	86	
							6-4-72	0.50	52	
							6-12-72	0.39	48	
							7-19-73	0.64	68	
							7-24-73	0.95	104	
							8-7-73	1.94	236	
							9-11-73	0.56	143	
	7-22-74	1.05	98							
	7-30-74	1.38	25							
	43	8-13-75	0.68	53						
		7-25-76	0.98	196						
		8-1-76	1.34	85						
		8-4-76	0.30	47						
		7-5-77	0.36	23						
		7-23-77	0.44	72						
		7-25-77	0.76	87						
	8-8-77	0.28	34							
8-8-77	0.18	16								
S. Platte Trib. #2 at Northglenn	0.56	14	1.17	0.71	0.037	D	6-23-69	0.61	23	
							7-25-71	0.39	51	
							8-23-72	0.49	28	
	0.56	35	1.17	0.71	0.037	D	7-19-73	0.30	29	
							9-10-73	0.29	35	
							5-21-76	0.75	78	
							5-24-76	0.74	151	
							39	6-23-77	0.35	69
								6-28-78	0.59	109
								7-6-78	0.68	71

								8-9-79	0.98	130
								8-10-79	0.61	135
								8-26-79	0.54	115
Concourse D at Stapleton	0.15	97	0.97	0.43	0.005	C		7-19-73	0.59	197
								7-24-73	0.66	123
								9-11-73	0.57	81
								6-23-75	0.70	126
								7-30-75	0.70	119
								7-21-76	0.45	92
								7-25-76	0.98	88
								8-1-76	2.00	285
								8-4-76	0.24	65
								7-5-77	0.32	24
								7-20-77	0.84	123
								7-24-77	0.29	55
								7-25-77	0.56	116
								8-22-77	0.26	56
Sanderson Gulch Trib. at Lakewood	0.38	44	1.28	0.52	0.0102	D		7-25-76	0.40	44
								9-13-76	0.60	94
								6-5-77	0.57	38
								6-6-77	0.91	299
								7-29-78	0.35	34
								7-4-79	1.10	176
								8-19-79	0.84	90
								8-26-79	0.27	42
								5-5-80	0.38	20
								8-14-80	0.42	45
								4-20-81	0.73	54
								7-26-81	0.62	68
Goose Creek at Boulder	0.66	34	1.48	0.51	0.006	B		6-5-72	1.32	185
								6-5-75	0.82	102
								7-25-76	0.76	137
								9-19-76	0.62	102
								7-20-77	1.11	133
Harvard Gulch at Harvard Park	3.08	39	3.26	1.61	0.0085	D		8-10-79	0.25	83
								8-14-79	0.46	99
								8-16-79	0.67	230

								8-19-79	0.43	135
								5-1-80	0.27	112
								7-10-80	0.24	65
								8-14-80	0.72	277
								5-3-81	0.48	153
								5-28-81	1.14	914
								5-29-81	0.74	123
								7-12-81	0.51	186
Harvard Gulch at Colorado Blvd.	1.12	40	1.42	0.56	0.011	D		5-28-81	1.01	672
								5-29-81	0.49	99
								7-12-81	0.69	225
