SOUTHWEST RENO

HYDROLOGIC STUDY METHODS AND RESULTS

Soil Conservation Service, Planning Staff
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The first step in the hydrologic study of southwest Reno was to gather and evaluate pertinent data on stream flow, rainfall, and flood histories. Other hydrologic studies of the southwest Reno area include the recent Corps of Engineers (Sacramento District) study of flood control alternatives for the Truckee Meadows and the Soil Conservation Service Watershed Investigation Report, 1971 (part of the Central Lahontan River Basin Study, July 1975). USGS stream flow data is available on Galena Creek (18 years of record) and Whites Creek (5 years of record). A rigorous analysis of the Galena Creek data was conducted in order to develop a discharge-frequency curve (a plot of discharge versus percent chance of occurrence in any given year). The period of record on the Whites Creek stream gage was considered to be too short for statistically meaningful results.

The second step was to apply the SCS hydrologic model (TR-20) to the six drainage basins. Basic data needed to run the computer model consisted of rainfall amounts, soil and land use data, time of concentration, flow velocities in streams, and drainage area of each basin. Rainfall amounts, frequency and duration were taken from the National Oceanic and Atmospheric Administration (NOAA) Rainfall Atlas for Nevada. Soils were mapped by the SCS and some soil maps are published. Land use data was obtained from the Washoe Council of Governments Regional Planning Agency. A schematic diagram was drawn for each drainage basin showing the main creek and its tributaries for which discharges would be computed. The schematic diagram for Evans Creek is included for illustrative purposes (see Fig. 1).

The third phase of the hydrologic study was to evaluate the results of the computer model (Step 2). These results were compared to the results of the Galena Creek gage analysis (Step 1) and results of other hydrologic studies done in the area.

There was a marked difference in the slopes of the discharge frequency curves between the computer model and the gage analysis. (The gage analysis frequency curve was steeper.) The final discharge frequency curves were derived by using the 10 year discharge as a pivot point and increasing the slope of the discharge frequency line up to the slope of the gage analysis discharge frequency curve. This plotting was done on log-probability paper.

After considering the history of flooding and other hydrologic studies it was concluded that the discharge frequency lines from the computer model were too flat and that the adjustment of slope should be made. The frequency discharge data for locations in the six drainage basins is summarized in Table 1.

In order to estimate change in discharge as a result of change in land use, changes in the runoff curve number and time of concentration (travel time) should be calculated. Then the revised model can be run with the 10 year frequency storm to calculate the revised 10 year discharge. Then to derive the discharge frequency line, draw a line through the 10 year discharge parallel to the original discharge frequency line.

The Soil Conservation Service Technical Release 55 - Urban Hydrology, contains methods for adjusting runoff curve number and time of concentration for developing areas. Changes in runoff and peak flow for developing areas can be analyzed more accurately when development proposals or plans are available.

TABLE 1

DISCHARGE FREQUENCY DATA

Evans Creek DA=10.3 sq. mi.

Storm Duration (Hours)	Peak Discharge (CFS) 2 yr.	5 yr.	10 yr.	25 yr.	100 yr.
3	75	290	580	1180	2880
6	140	460	860	1660	3760
24	330	900	1550	2740	5580

Dry Creek DA=12.6 sq. mi.

3	150	580	1170	2370	5800
6	220	800	1500	2900	6550
24	620	1700	2940	5200	10600

Rosewood Wash (North Trib. to Virginia Lake) DA=2.6 sq. mi.

3	30	130	255	520	1270
6	40	150	290	560	1270
24	130	350	600	1060	2160

South Trib. to Virginia Lake DA=2.1 sq. mi.

3	30	100	200	410	1000
6	40	130	240	460	1050
24	100	270	470	830	1700

Inflow to Virginia Lake DA=4.7 sq. mi.

3	60	225	450	910	2240
6	80	280	520	1000	2270
24	220	600	1030	1820	3700

Table 1
Discharge Frequency Data

Thomas Creek DA=12.8 sq. mi.

Storm Duration (Hours)	Peak Discharge (CFS) 2 yr.	5 yr.	10 yr.	25 yr.	100 yr.
3	60	230	470	950	2340
6	120	410	780	1500	3400
24	330	900	1550	2740	5580

Whites Creek DA=9.8 sq.mi.

3	50	200	390	790	1940
6	100	360	670	1290	2930
24	290	790	1370	2420	4930

Alum Creek DA=5.8 sq. mi.

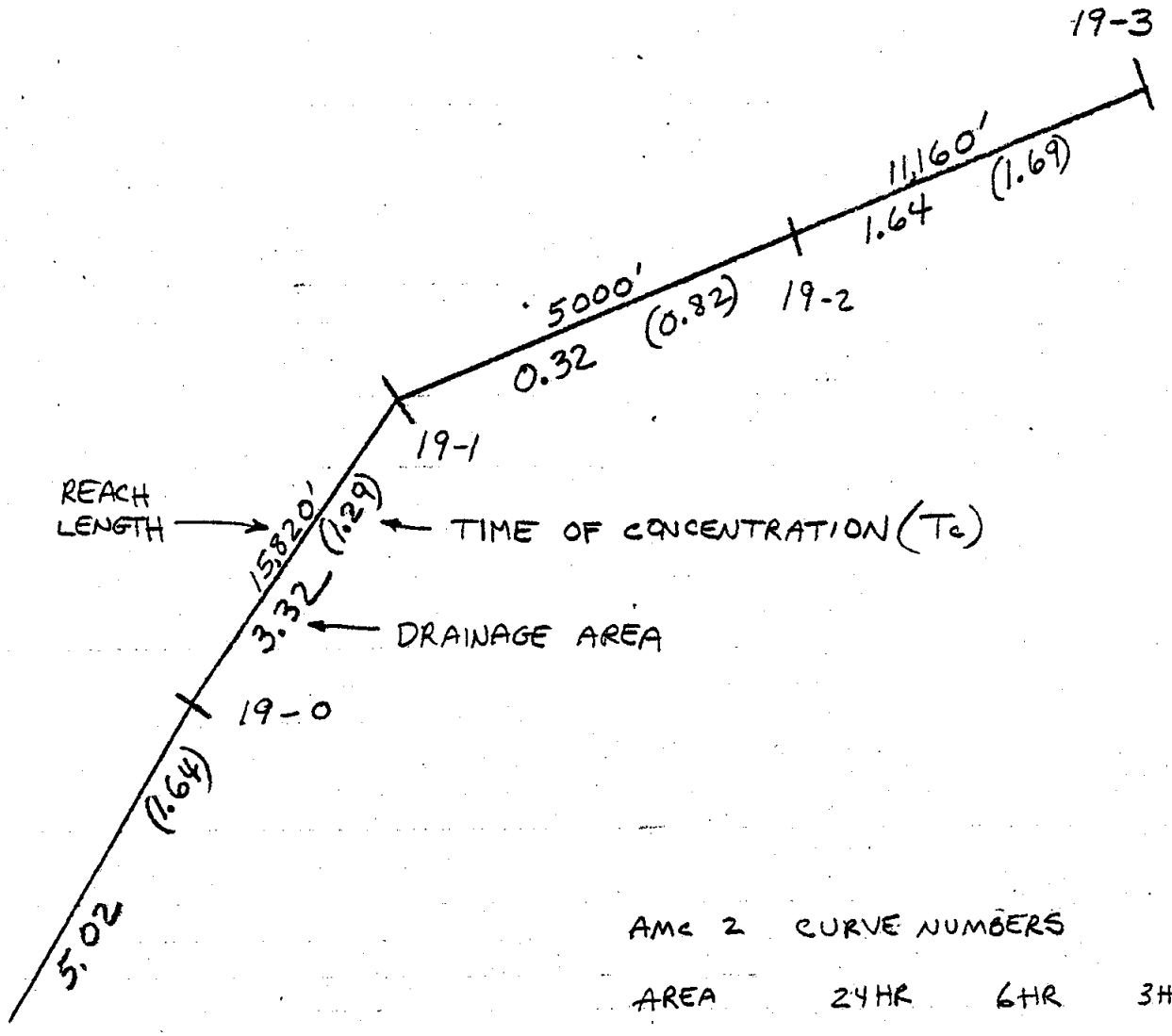
3	60	240	480	970	2400
6	90	310	590	1140	2580
24	240	670	1150	2040	4140

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
NEVADA		SW RENO		
BY	DATE	CHECKED BY	DATE	JOB NO.
WM	6-28-79			
SUBJECT				SHEET 3 OF 6
TR-20 SCHEMATIC EVANS CR.				

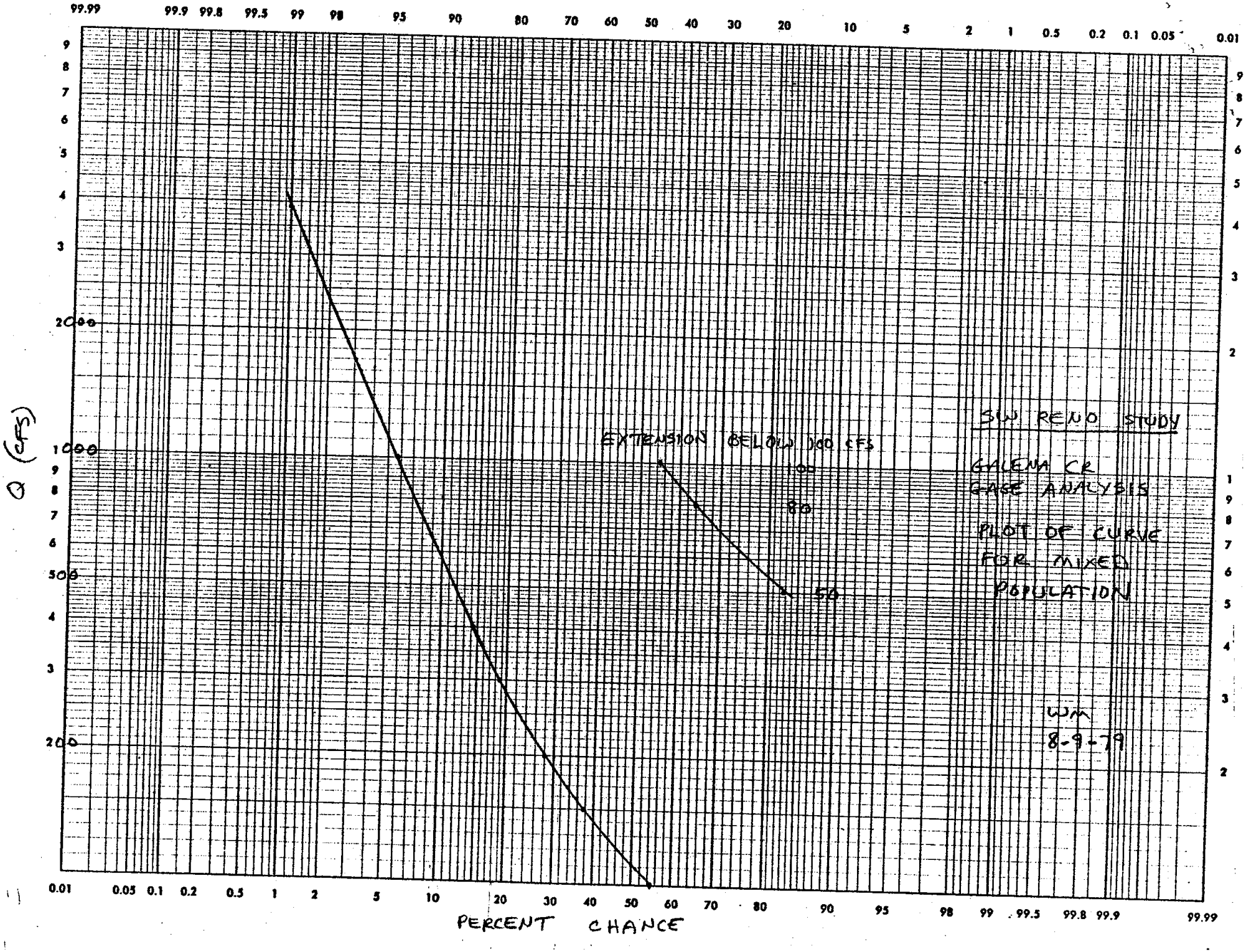
TOTAL DA = 10.3 SQ. MI.



AMC 2 CURVE NUMBERS

AREA	24 HR	6 HR	3 HR
19-0	77.2	80.5	82.2
19-1	83.2	85.8	87.1
19-2	84.0	86.6	87.8
19-3	83.3	85.9	87.2

FIGURE 1


Q (CFS)
PERCENT CHANCE
EXTENSION BELOW 100 CFS
100
80
60
SW RENO STUDY
GALENA CR
GAGE ANALYSIS
PLOT OF CURVE
FOR MIXED
POPULATION
WM
8-9-79