

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA
FOR URBAN STUDIES IN THE BRYAN, TEXAS
METROPOLITAN AREA
1969

By

W. D. Robbins

72-317

Prepared in cooperation with Texas Agricultural
and Mechanical University

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INTRODUCTION

Hydrologic investigations of urban areas in Texas were begun by the U.S. Geological Survey in 1954. These studies are now in progress in Austin, Houston, Dallas, Dallas County, Fort Worth, San Antonio, and Bryan.

In April 1968, the Geological Survey began a program of investigations on two small streams in Bryan that were designed to evaluate the hydrologic factors affecting floods in the Bryan metropolitan area. The objectives of this program are:

1. To determine, on the basis of historical data and hydrologic analyses, the magnitude and frequency of floods.
2. To document and define the areal extent of floods of greater than ordinary magnitude.
3. To determine the effect of urban development on flood peaks and volume.
4. To provide applied research facilities for studies at Texas A & M University at College Stations.

This report, the first in a series of reports to be published annually, is primarily applicable to objectives 2, 3, and 4. The report presents the basic hydrologic data collected in two study areas during the 1969 water year (October 1, 1968, to September 30, 1969) and basic hydrologic data collected during part of the 1968 water year (April 5, 1968, to September 30, 1968). The locations of the two basins within the study area, Burton Creek and Hudson Creek, are shown on figure 1.

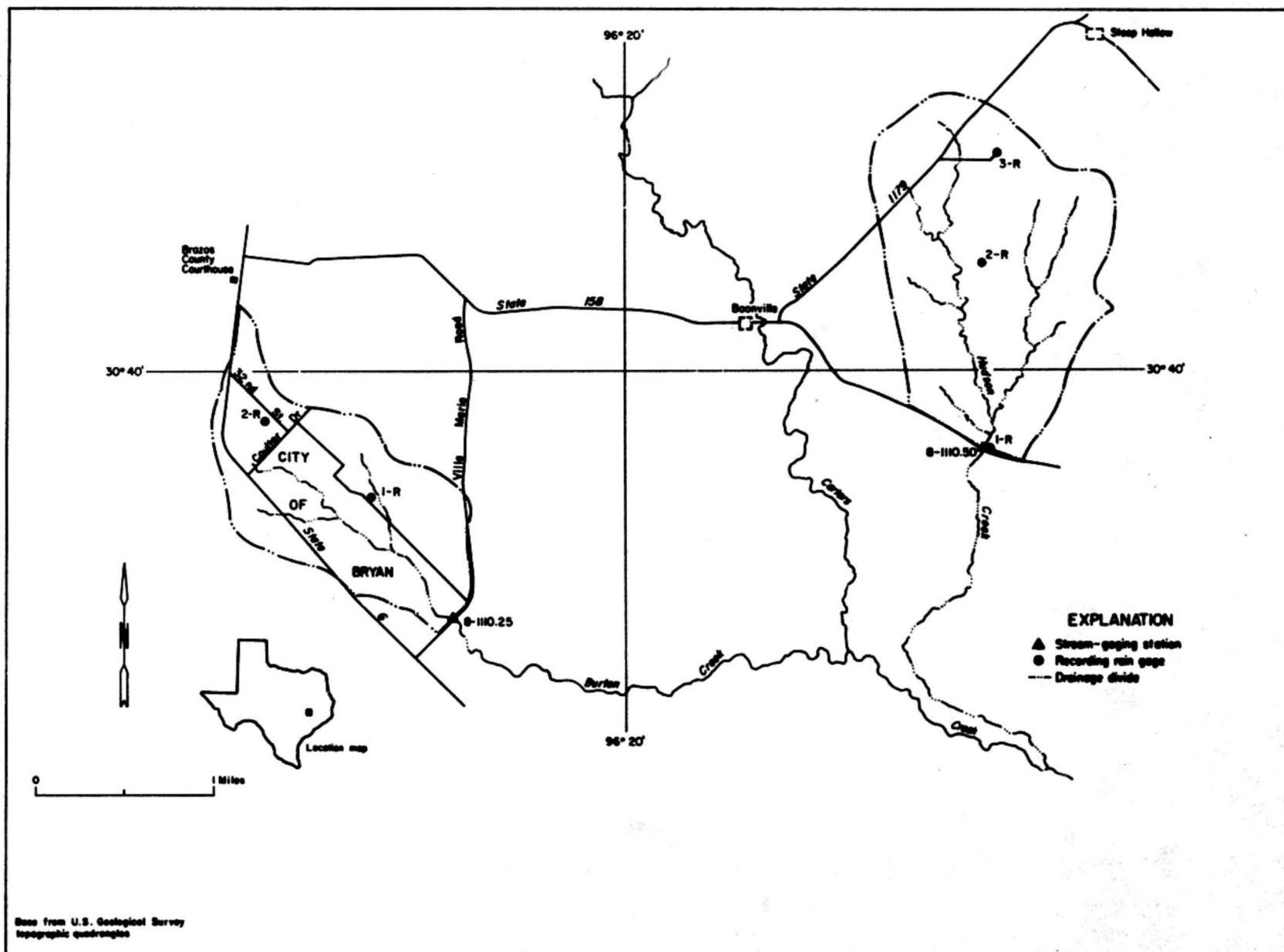


FIGURE 1.-- Location of the Burton Creek and Hudson Creek study areas and hydrologic-instrument installations in each study area

WATERSHED FEATURES

Burton Creek

The Burton Creek study area (fig. 1) is located entirely within the city of Bryan. The headwaters originate near the Brazos County Courthouse in the east-central part of the city. The stream flows southeast for 4.2 miles to Carters Creek and then approximately 11.5 miles south-eastward to the Navasota River. Burton Creek drains an area of 1.33 square miles above the U.S. Geological Survey stream-gaging station at Villa Maria Road. Storm sewers and street gutters may, however, divert runoff both into and out of the natural drainage area.

Impervious-cover determinations were made by the dot-grid or line-intersection method using aerial photographs with a scale of 1 inch = 400 feet. In May 1968, the impervious cover for Burton Creek study area was 26.5 percent. Soil in the watershed is predominantly sandy loam underlain by clay and shale.

Altitudes in the study area range from about 380 feet above mean sea level at the headwater divide to 281 feet above mean sea level at the stream-gaging station. The slope index for Burton Creek at Villa Maria Road at Bryan is 14.4 feet per mile. The index was computed by determining the difference in elevations between two points, 85 and 10 percent of the main channel distance measured from the gaging station to the upper drainage divide, then dividing by the distance between the two points.

Hudson Creek

The Hudson Creek study area, a rural watershed, is located 4.3 miles east of Bryan. The headwaters originate near the community of Steep Hollow (5.0 miles east of Bryan), and the stream flows south for 4.1 miles to Carters Creek and then approximately 10 miles southeastward to the Navasota River. Hudson Creek drains an area of 1.94 square miles at the U.S. Geological Survey stream-gaging station at Farm Road 158. There are no known diversions or sources of return water in this study area.

Soil in the watershed is predominantly sandy loam underlain by clay and shale. The principal land use in this rural watershed is for farming and ranching. Runoff characteristics are slightly affected by contour-farming practices and by several stock tanks in the watershed. Seasonal variation in vegetal cover may also affect the runoff characteristics. Little change in land use is anticipated.

Altitudes in the study area range from about 350 feet above mean sea level at the headwater divide to 269 feet above mean sea level at the stream-gaging station. The slope index for Hudson Creek is 31 feet per mile, based on the 85- and 10-percent method.

HYDROLOGIC INSTRUMENTS

Instruments to collect rainfall and runoff data in the Burton Creek study area consist of two recording rain gages and one continuous-record streamflow station.

Instruments to collect rainfall and runoff data in the Hudson Creek study area consist of three recording rain gages and one continuous-record streamflow station.

Locations of hydrologic instruments in the two study areas are shown on figure 1. Photographs of hydrologic instruments are shown on figure 2. Pertinent individual station information is included in the section "Compilation and Analysis of Data."

SUMMARY OF DATA FOR THE 1969 WATER YEAR

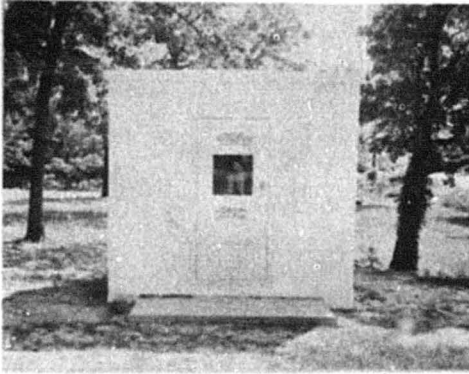
Average rainfall over the Burton Creek study area during the water year was 49.67 inches, or 27 percent more than the 30-year (1931-60) average of 39.12 inches for Brenham (25 miles south of the study area). Mean daily discharge was 3.26 cfs (cubic feet per second) and the total runoff was 2,360 acre-feet, or 33.24 inches (67 percent of rainfall).

Average rainfall over the Hudson Creek study area during the water year was 49.36 inches, or 26 percent more than the 30-year (1931-60) average of 39.12 inches for Brenham. Mean daily discharge was 2.42 cfs and the total runoff was 1,750 acre-feet, or 16.94 inches (34 percent of rainfall).

A storm event is defined as a period of rainfall separated by at least 6 hours from other rainfall. Storms are selected for detailed rainfall-runoff computations on the basis of rainfall totals and distribution, the peak discharge produced from the rainfall, the assurance of good rainfall and runoff records for the storm periods selected.

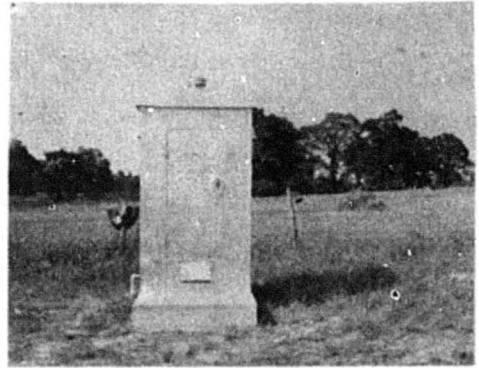
Storms selected for analysis during the 1969 water year occurred on February 14, 1969; February 21, 1969; and May 8, 1969 in both the Burton Creek and Hudson Creek watersheds. In addition, a storm that occurred on July 9, 1968, (in the 1968 water year) is also included in this analysis. A summary of rainfall-runoff data for these storms is given in table 1. Computations with hydrographs and mass curves for each storm are included in the section "Compilation and Analysis of Data."

Burton Creek at Villa Maria Road



Concrete shelter to house bubble-gage equipment.

Hudson Creek



Metal shelter to house bubble-gage and rain-gage equipment.



View looking upstream showing concrete control and staff gages.



View of staff gages.

FIGURE 2.-Hydrologic-instrument installations

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

ANNUAL STORM RAINFALL-RUNOFF SUMMARY DATA

Table 1.--Storm rainfall-runoff data, 1969 and part of the 1968 water year
in the Bryan urban area.

Date of Storm	Rainfall (inches)					Runoff (inches)	Ratio runoff to rainfall	Maximum discharge (cfs)
	Duration (hours)	Total	Maximum increment					
			15-minute	30-minute	60-minute			
Burton Creek at Villa Maria Road, Bryan, Texas (Drainage area, 1.33 square miles)								
July 9, 1968	8.2	6.06	1.04	1.40	2.25	3.15	0.52	604
Feb. 14, 1969	5.0	1.52	.14	.22	.44	1.05	.69	198
Feb. 21, 1969	8.2	1.76	.25	.43	.60	1.37	.78	302
May 8, 1969	2.8	1.56	1.32	1.42	1.51	1.08	.69	709
Hudson Creek near Bryan, Texas (Drainage area, 1.94 square miles)								
July 9, 1968	6.8	6.46	0.65	1.16	1.90	3.28	0.51	829
Feb. 14, 1969	5.5	1.28	.08	.17	.34	.72	.56	125
Feb. 21, 1969	11.5	1.33	.13	.26	.39	.75	.56	136
May 8, 1969	2.5	1.48	.92	1.32	1.39	1.02	.69	320

Average monthly rainfall and runoff in the two study areas for the period May 1968 to September 1969 are summarized in the following table:

Month	Station			
	Burton Creek at Villa Maria Road		Hudson Creek	
	Average rainfall (inches)	Runoff (inches)	Average rainfall (inches)	Runoff (inches)
1968				
May	-	3.92	6.84	2.37
June	-	10.30	12.42	6.83
July	6.72	3.50	6.97	3.37
August	.70	.08	.33	.004
September	4.88	.86	4.05	.0007
October	1.76	.73	3.02	.26
November	7.66	4.50	8.67	2.31
December	1.78	.92	1.95	1.25
1969				
January	1.50	.43	1.30	.17
February	4.06	2.84	3.63	1.80
March	5.24	3.59	5.54	3.18
April	11.34	10.87	10.03	5.86
May	3.29	1.87	3.77	1.96
June	2.50	.85	2.57	.05
July	.46	.05	.48	0
August	4.10	1.28	2.20	0
September	5.96	5.32	6.20	.10

COMPI LATION AND ANALYSIS OF DATA

BRAZOS RIVER BASIN

8-1110.25. Burton Creek at Villa Maria Road, Bryan, Tex.

LOCATION.--Lat 30°38'48", long 96°20'57", Brazos County, on left bank 60 ft downstream from bridge on Villa Maria Road in Bryan, and 2.8 miles upstream from Carters Creek.

DRAINAGE AREA.--1.33 sq mi.

PERIOD OF RECORD.--April 1968 to current year.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 281.23 ft above mean sea level.

EXTREMES.--April to September 1968: Maximum discharge during period, 466 cfs June 24 (gage height, 8.33 ft); no flow May 7, 8, Sept. 12, 13.

Water year 1969: Maximum discharge, 1,850 cfs Sept. 16 (gage height, 8.72 ft); no flow for many days.

Maximum stage since at least 1955, 13.5 ft in 1957 and 1960, from information by local residents. Discharge not determined.

REMARKS.--Records good except those for period April to September 1968, which are poor. Two recording rain gages located in watershed above station.

DISCHARGE, IN CUBIC FEET PER SECOND, APRIL TO SEPTEMBER 1968

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								.02	32	.07	.03	.04
2								.03	10	.04	.02	.03
3								.20	13	.05	.05	.02
4								1.7	7.8	.16	1.1	.37
5							.11	.04	36	.06	.37	3.8
6							.11	.02	2.7	.03	.13	.05
7							.09	0	.27	.04	.42	.04
8							21	0	.55	.37	.02	.06
9							23	.55	.55	113	.02	11
10							.40	78	.55	.55	.05	.09
11							.16	15	.48	4.4	.04	.03
12							16	1.9	.48	.79	.07	0
13							2.1	.27	.07	.23	.03	0
14							.19	.19	.03	1.0	.02	1.0
15							.09	.11	1.1	.19	.03	4.5
16							.07	.09	.03	.11	.13	.63
17							.06	11	7.1	.09	.09	8.6
18							.05	.80	21	.07	.01	.09
19							.05	.13	29	.09	.02	.13
20							.09	.06	24	1.3	.02	.09
21							9.7	.06	4.3	.42	.04	.06
22							1.1	.05	30	.13	.04	.05
23							.19	.04	31	.23	.02	.03
24							.07	.06	111	.23	.01	.02
25							.07	.07	3.6	.55	.04	.01
26							.06	18	4.0	.19	.03	.01
27							.06	11	.19	.13	.04	.01
28							.05	.55	.11	.16	.01	.02
29							.03	.09	.05	.13	.03	.05
30							.01	.06	.03	.16	.04	.01
31		-----			-----		-----	.04	-----	.05	.05	-----
TOTAL								140.13	368.99	125.02	3.02	30.84
MEAN								4.52	12.3	4.03	.097	1.03
MAX								78	111	113	1.1	11
MIN								0	.03	.03	.01	0
CFSH								3.40	9.25	3.03	.07	.77
IN.								3.92	10.3	3.50	.08	.86
AC-FT								278	732	248	6.0	61

PEAK DISCHARGE (BASE, 500 CFS).---No peak above base.

BRAZOS RIVER BASIN

8-1110.25. Burton Creek at Villa Maria Road, Bryan, Tex.--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.04	2.2	.05	.71	.13	.11	12	.71	.06	0	0
2	.01	.63	1.3	.71	.37	2.8	.09	.71	.80	.09	0	0
3	.04	3.0	.80	.16	.11	.32	.11	.13	9.0	.06	0	45
4	.04	.03	.13	.06	.06	.13	78	.32	19	.05	0	.27
5	.16	.01	.09	.07	.37	8.4	1.0	11	.09	.03	0	.06
6	.37	0	.09	.07	.19	.80	.63	.32	.04	.04	.01	.03
7	.05	0	.06	.06	.11	5.5	.42	1.1	.03	.04	.01	.01
8	.06	5.9	.09	.06	.71	13	.32	39	.01	0	0	.01
9	24	.37	.19	.05	.11	.23	47	.55	.03	0	0	.03
10	.32	.06	.06	.04	.07	.13	5.0	.19	.03	0	.01	.03
11	.09	.05	.06	.06	.06	.11	1.6	.13	0	.01	20	.16
12	.06	.03	.27	.06	.07	.11	204	.11	.02	.05	.55	.05
13	.05	.03	.06	.06	6.8	.09	1.7	.09	.01	.01	.05	0
14	.04	.01	.05	.05	38	3.0	.48	.07	.02	0	.06	.02
15	.02	14	.07	1.6	.55	72	.32	.07	.03	.07	.03	0
16	.05	.11	.05	6.8	.19	3.2	.27	.16	0	.42	.02	103
17	.06	.05	.04	.19	.11	1.3	11	.07	.04	.05	.63	39
18	.05	.05	.13	.11	.09	.48	.32	.06	.05	.03	1.6	.84
19	.07	.02	.09	.07	1.1	.23	.19	.07	.06	.01	.09	.05
20	.05	.01	2.2	.06	.32	.16	20	.06	.16	.55	.72	.04
21	.05	.01	10	.06	49	.11	.13	.06	.04	.05	.05	.03
22	.05	.01	14	.06	1.1	.11	.09	.06	.02	0	.02	.02
23	.16	.05	.27	.06	.55	15	.11	.06	0	0	.01	1.7
24	.09	.11	.13	.05	.23	.23	.09	.04	.01	0	0	.02
25	.01	.03	.11	.05	.23	.11	.11	.05	.05	.07	0	0
26	0	21	.11	.06	.19	.11	.09	.04	.05	.02	.05	0
27	.01	58	.11	.06	.19	.11	15	.03	.07	.01	19	0
28	0	1.0	.07	.06	.13	.09	.27	.03	.06	0	2.8	0
29	0	.16	.09	.13	-----	.09	.13	.06	.02	0	.03	0
30	0	56	.07	3.6	-----	.09	.11	.04	.02	0	.01	0
31	0	-----	.06	.71	-----	.09	-----	.02	-----	0	0	-----
TOTAL	25.97	160.77	33.05	15.29	101.72	128.26	388.69	66.70	30.47	1.72	45.75	190.37
MEAN	.84	5.36	1.07	.49	3.63	4.14	13.0	2.15	1.02	.056	1.48	6.35
MAX	24	58	14	6.8	49	72	204	39	19	.55	20	103
MIN	0	0	.04	.04	.06	.09	.09	.02	0	0	0	0
CFSM	.63	4.03	.80	.37	2.73	3.11	9.74	1.62	.76	.04	1.11	4.77
IN.	.73	4.50	.92	.43	2.84	3.59	10.87	1.87	.85	.05	1.28	5.32
AC-FT	52	319	66	30	202	254	771	132	60	3.4	91	378

CAL YR 1968	TOTAL	—	MEAN	—	MAX	—	MIN	—	CFSM	—	IN	—	AC-FT	—
WTR YR 1969	TOTAL	1,188.76	MEAN	3.26	MAX	204	MIN	0	CFSM	2.45	IN	33.24	AC-FT	2,360

PEAK DISCHARGE (BASE, 500 CFS)

DATE	TIME	G.H.T.	DISCHARGE	DATE	TIME	G.H.T.	DISCHARGE
4- 4	1135	7.39	1,240	5- 8	1200	5.93	709
4- 9	2155	6.17	790	9- 3	1600	5.41	558
4-12	1250	7.67	1,360	9-16	2200	8.72	1,850

BRAZOS RIVER BASIN

8-1110.5. Hudson Creek near Bryan, Tex.

Location.--Lat 30°39'38", long 96°17'59", on left bank five feet upstream from culvert on Farm Road 158, and 4.3 miles east of Bryan, Brazos County.

Drainage area.--1.94 sq mi.

Records available.--May to September 1968.

Gage.--Digital water-stage recorder. Datum of gage is 269.2 ft above mean sea level (Texas Highway Department bridge plans).

Extremes.--Maximum discharge during period May to September, 828 cfs July 9 (gage height, 10.85 ft); no flow Aug. 10 to Sept. 16, Sept. 19-30.

Maximum stage since at least 1879, that of July 9, 1968. Flood in June 1900 reached a stage of about 10 ft, from information by local resident.

Remarks.--Records good. Three recording rain gages located in watershed.

DISCHARGE, IN CFS, MAY TO SEPTEMBER 1968

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								.04	5.3	.11	.03	0
2								.05	66	.10	.02	0
3								.04	58	.07	.02	0
4								.05	4.7	.07	.02	0
5								.04	15	.07	.03	0
6								.03	11	.06	.03	0
7								.02	.49	.05	.02	0
8								.03	.25	.04	.02	0
9								.02	.16	171	.01	0
10								46	.11	1.5	0	0
11								11	.10	.41	0	0
12								7.9	.08	.82	0	0
13								.76	.07	.31	0	0
14								.31	.07	.18	0	0
15								.27	.07	.14	0	0
16								.14	.08	.11	0	0
17								3.2	.10	.08	0	.03
18								2.8	.37	.07	0	.01
19								.37	.22	.06	0	0
20								.18	.82	.06	0	0
21								.11	.04	.06	0	0
22								.08	8.7	.05	0	0
23								.07	20	.03	0	0
24								.06	154	.03	0	0
25								.05	5.0	.03	0	0
26								24	3.4	.03	0	0
27								24	.50	.03	0	0
28								1.4	.31	.03	0	0
29								.37	.18	.03	0	0
30								.20	.13	.03	0	0
31		-----			-----		-----	.14	-----	.03	0	-----
TOTAL								123.66	356.24	175.69	0.20	0.04
MEAN								3.99	11.0	5.67	.007	.001
MAX								46	154	171	.03	.03
MIN								.02	.07	.03	0	0
CFSM								2.06	6.12	2.92	.003	.0006
IN.								2.37	6.83	3.37	.004	.0007
AC-FT								245	707	348	.4	.08

BRAZOS RIVER BASIN

8-1110.5, Hudson Creek near Bryan, Tex.

LOCATION.--Lat 30°39'38", long 96°17'59", Brazos County, on left bank five feet upstream from culvert on Farm Road 158, and 4.3 miles east of Bryan.

DRAINAGE AREA.--1.94 sq mi.

PERIOD OF RECORD.--May 1968 to current year.

GAGE.--Water-stage recorder. Datum of gage is 269.2 ft above mean sea level (Texas Highway Department bridge plans).

EXTREMES.--Current year: Maximum discharge, 691 cfs Apr. 12 (gage height, 9.13 ft); no flow for many days.

Period of record: Maximum discharge, 828 cfs July 9, 1968 (gage height, 10.85 ft); no flow for many days.

Maximum stage since at least 1879, that of July 9, 1968. Flood in June 1900 reached a stage of about 10 ft, from information by local resident.

REMARKS.--Records good. Three recording rain gages located in watershed.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	17	.41	.14	.31	.27	17	.04	0	0	0
2	0	0	1.7	.36	.14	.36	.17	8.5	.08	0	0	0
3	0	0	1.6	.41	.12	.65	.17	1.4	.10	0	0	1.6
4	0	0	.79	.41	.12	.41	38	1.0	1.3	0	0	.72
5	0	0	.58	.36	.10	7.8	4.2	5.4	.27	0	0	.23
6	0	0	.46	.23	.10	5.2	1.2	2.7	.12	0	0	.10
7	0	0	.36	.20	.10	1.7	.72	2.2	.10	0	0	.01
8	0	0	.36	.20	.10	22	.52	53	.08	0	0	0
9	10	0	.36	.20	.10	1.7	24	4.9	.05	0	0	0
10	2.5	0	.31	.20	.10	.87	33	1.3	.05	0	0	0
11	.52	0	.31	.17	.10	.58	2.1	.79	.04	0	0	0
12	.23	0	.23	.17	.10	.46	183	.58	.02	0	0	0
13	.14	0	.23	.14	.23	.36	8.9	.46	.02	0	0	0
14	.08	0	.20	.14	38	.46	1.7	.41	.02	0	0	0
15	.04	.41	.20	.14	2.7	94	.95	.31	.02	0	0	0
16	.01	.27	.20	1.3	1.0	9.7	.65	.27	.02	0	0	.02
17	0	.05	.17	.79	.72	2.5	2.1	.23	.02	0	0	1.8
18	0	.02	.20	.52	.52	1.6	.87	.20	.02	0	0	.52
19	0	0	.27	.41	.46	.95	.46	.20	.02	0	0	.23
20	0	0	.31	.27	.52	.72	.36	.20	.02	0	0	.10
21	0	0	14	.27	39	.58	.36	.17	.02	0	0	.05
22	0	0	19	.23	5.2	.46	.31	.12	.02	0	0	.01
23	0	0	2.2	.20	1.3	7.8	.27	.12	.01	0	0	0
24	0	0	.95	.17	.87	1.8	.23	.10	0	0	0	0
25	0	0	.65	.14	.65	.79	.20	.10	0	0	0	0
26	0	1.0	.52	.14	.58	.52	.17	.10	0	0	0	0
27	0	66	.41	.14	.46	.41	.31	.05	0	0	0	0
28	0	6.6	.41	.14	.41	.36	.36	.05	0	0	0	0
29	0	1.2	.36	.14	-----	.31	.20	.05	0	0	0	0
30	0	45	.41	.14	-----	.31	.12	.05	0	0	0	0
31	0	-----	.41	.14	-----	.31	-----	.05	-----	0	0	-----
TOTAL	13.52	120.55	65.16	8.88	93.94	165.98	305.87	102.01	2.46	0	0	5.39
MEAN	.44	4.02	2.10	.29	3.36	5.35	10.2	3.29	.082	0	0	.18
MAX	10	66	19	1.3	39	94	183	53	1.3	0	0	1.8
MIN	0	0	.17	.14	.10	.31	.12	.05	0	0	0	0
CFSM	.22	2.07	1.08	.15	1.73	2.76	5.26	1.70	.04	0	0	.09
IN.	.26	2.31	1.25	.17	1.80	3.18	5.86	1.96	.05	0	0	.10
AC-FT	27	239	129	18	186	329	607	202	4.9	0	0	11

CAL YR 1968	TOTAL	-	MEAN	-	MAX	-	MIN	-	CFSM	-	IN	-	AC-FT	-
WTR YR 1969	TOTAL	883.76	MEAN	2.42	MAX	183	MIN	0	CFSM	1.25	IN	16.94	AC-FT	1,750

PEAK DISCHARGE (BASE, 300 CFS)

DATE	TIME	G.HT.	DISCHARGE
4- 9	2340	6.54	383
4-12	1405	9.13	691
5- 8	1355	6.21	320

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area BURTON CREEK

1968 Water Year

RAIN GAGES			
Date of storm	1-R	2-R	Average
1968			
June 5, 1968	-	2.09	
15	-	.10	
17	-	1.11	
18	-	1.92	
19	-	.04	
20	-	1.08	
21-22	-	1.48	
23-24	-	(3.70)	
24	-	.41	
25	-	(.07)	
25-26	-	(.30)	
June Total	-	(12.30)	(12.30)
July 8, 1968	-	0.16	
9	-	6.06	
11	-	.05	
12	-	.02	
14	-	.12	
20	-	.25	
22	-	.06	
July Total	-	6.72	(6.72)
August 3, 1968	-	0.02	
4	-	.37	
7	-	.15	
11	-	.06	
16	-	.07	
24	-	.03	
August Total	-	0.70	(0.70)
September 4, 1968	-	0.09	
4-5	-	.65	
9	-	1.52	
14	-	.15	
14-15	-	1.54	
16	-	.19	
17	-	.74	
September Total	-	4.88	(4.88)

1968 Water Year Totals Incomplete.

Form TX-88
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area BURTON CREEK

1969 Water Year

RAIN GAGES			
Date of storm	1-R	2-R	Average
1968			
October 5 (a.m.) 1968	-	0.06	-
5 (p.m.)	0.17	.09	0.13
9	1.89	1.20	1.54
23	.05	.07	.06
October Totals	2.11	1.42	1.76
November 8, 1968	0.84	0.47	0.66
15 (a.m.)	.88	1.01	.94
15 (p.m.)	.24	-	-
22	-	.06	-
24	.04	-	-
26-27	3.84	(3.84)	3.84
30	2.05	(2.05)	2.05
November Totals	7.89	7.43	7.66
December 2-3, 1968	0.21	(0.21)	0.21
12	.08	.08	.08
18	.06	-	-
20-21	.93	.85	.89
22	.48	.67	.58
December Totals	1.76	1.81	1.78
1968 Calendar Year Totals are not available			
1969			
January 2, 1969	0.19	0.17	0.18
15-16	.74	.75	.74
29	.08	-	-
30	.41	.34	.38
31	.23	.10	.16
January Totals	1.65	1.36	1.50

Form TX-88
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area BURTON CREEK

1969 Water Year

RAIN GAGES			
Date of storm	1-R	2-R	Average
February 1, 1969	0.05	-	-
5	-	0.07	-
7-8	.14	-	-
13	.35	.56	.46
14	1.69	1.35	1.52
19	.18	.17	.18
20	-	.04	-
21	1.64	1.87	1.76
February Totals	4.05	4.06	4.06
March 2, 1969	0.36	0.38	0.37
5	.60	.53	.56
7-8	.79	.72	.76
14	.05	-	-
14-16	2.53	2.75	2.64
16	.05	.07	.06
23	.66	.99	.82
March Totals	5.04	5.44	5.24
April 4, 1969	2.80	2.47	2.64
9	1.96	1.94	1.95
11	.15	.15	.15
12 (a.m.)	4.28	4.56	4.42
12 (p.m.)	-	.02	-
17	.55	.84	.70
20	.06	.20	.13
27	1.34	1.37	1.36
April Totals	11.14	11.55	11.34

Form TX-88
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area BURTON CREEK

1969 Water Year

		RAIN GAGES		
Date of storm		1-R	2-R	Average
May 1, 1969		0.83	0.66	0.74
4 (a.m.)		.05	.08	.06
4 (p.m.)		-	.04	-
5		.69	.66	.68
7		.14	.17	.16
8		1.35	1.78	1.56
15		.03	-	-
17		-	.10	-
May Totals		3.09	3.49	3.29
June 1, 1969		0.34	0.30	0.32
3-4		2.22	2.15	2.18
June Totals		2.56	2.45	2.50
July 15, 1969		(0.25)	0.25	0.25
20 (a.m.)		.26	.03	.14
20 (p.m.)		.07	.07	.07
July Totals		0.58	0.35	0.46
August 11, 1969		1.68	1.94	1.81
17		.30	.29	.30
18		.52	.92	.72
20		.35	.14	.24
22		.03	.05	.04
26		.25	.24	.24
27		.73	.75	.74
August Totals		3.86	4.33	4.10

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area BURTON CREEK

1969 Water Year

RAIN GAGES

Date of storm	1-R	2-R	Average
September 1, 1969	-	0.10	-
3	1.82	1.92	1.87
11	.13	.12	.12
16-17	3.63	2.82	3.22
18	-	.22	-
23	.51	.65	.58
September Totals	6.09	5.83	5.96
1969 Water Year Totals =	49.82	49.52	49.67

Form TX-88
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area HUDSON CREEK

1968 Water Year

RAIN GAGES				
Date of storm	1-R	2-R	3-R	Average
1968				
May 3-4, 1968	0.45	-	-	
9	.07	-	-	
10	2.42	-	-	
11	.64	-	-	
12	.31	-	-	
17	.81	-	-	
18	.01	-	-	
26	1.38	-	-	
27	.75	-	-	
May Total	6.84	-	-	6.84
June 1-2, 1968	2.22	-	-	
2	.13	-	-	
3	1.76	-	-	
4	.35	-	-	
5	.71	-	-	
6	.02	-	-	
15	.12	-	.24	
17	.56	(.76)	.96	
18	.17	(.17)	.17	
20	1.45	.09	.75	
21-22	.78	.87	.95	
23-24	3.63	3.67	3.75	
24	.13	.62	.14	
25	.04	.05	.09	
25-26	.35	.28	.27	
June Total	12.42	-	-	12.42
July 8, 1968	0.08	0.17	0.16	
9	6.00	6.57	6.81	
11	-	-	.02	
12	.58	.31	.18	
22	-	.04	-	
July Totals	6.66	7.09	7.17	6.97

Form TX-88
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area HUDSON CREEK

1968 Water Year

RAIN GAGES				
Date of storm	1-R	2-R	3-R	Average
1968				
August 3, 1968	-	0.16	0.08	
4	.03	.25	.05	
11	-	.05	.04	
16	-	.09	.09	
24	-	.09	.05	
August Totals	0.03	0.64	0.31	0.33
September 4, 1968	-	-	0.02	
4-5	-	0.61	.60	
9	1.43	1.52	1.70	
14	-	.10	.10	
14-15	1.08	.97	.91	
17	.99	.89	.83	
24-25	.23	.11	.05	
September Totals	3.73	4.20	4.21	4.05
1968 Water Year Totals Incomplete.				

Form TX-88
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area HUDSON CREEK

1969 Water Year

Date of storm	RAIN GAGES			
	1-R	2-R	3-R	Average
1968				
October 5-6, 1968	0.18	0.60	0.57	
9	2.02	2.62	3.09	
October Totals	2.20	3.22	3.63	3.02
November 2, 1968	0.37	0.75	0.65	
8	.76	.78	.79	
15	1.38	1.25	1.25	
22	-	.05	.05	
26-27	3.70	4.20	4.10	
30	2.04	1.96	1.93	
November Totals	8.25	8.99	8.77	8.67
December 2-3, 1968	0.18	0.19	0.17	
20-21	1.10	1.15	1.10	
21-22	.69	.58	.55	
27	.04	.05	.05	
December Totals	2.01	1.97	1.87	1.95
1968 Calendar Year Totals are not available				
1969				
January 1-2, 1969	0.18	0.21	0.20	
3	-	.04	.05	
15-16	.57	.67	.65	
29	-	.05	.09	
30	.22	.30	.31	
31 (a.m.)	.07	.07	.06	
31 (p.m.)	-	.01	.16	
January Totals	1.04	1.35	1.52	1.30

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area HUDSON CREEK

1969 Water Year

Date of storm	RAIN GAGES			Average
	1-R	2-R	3-R	
1969				
February 1, 1969	0.20	0.19	0.01	
2	.07	.06	-	
6	.04	-	-	
8	.08	-	-	
13	.51	.57	.53	
14	1.22	1.30	1.31	
19	.15	.22	.18	
20	.05	.05	.05	
21	1.30	1.38	1.32	
February Totals	3.62	3.77	3.49	3.63
March 2, 1969	0.35	0.40	0.40	
5	.59	.61	.66	
7-8	.59	.83	.83	
14-16	3.05	3.22	3.00	
16-17	.04	.05	.12	
18	.05	-	-	
23	.42	.73	.67	
March Totals	5.09	5.84	5.68	5.54
April 4, 1969	1.36	2.13	2.13	
9	1.91	1.96	2.02	
11	.16	.17	.16	
12	5.09	4.69	4.61	
17	.40	.47	.38	
20	-	.07	.08	
27	.66	.82	.83	
April Totals	9.58	10.31	10.21	10.03
May 1, 1969	2.08	1.26	1.09	
2	.05	-	-	
4	.09	.25	.19	
5	.32	.44	.50	
6-7	.24	.18	.18	
8	1.04	1.60	1.81	
May Totals	3.82	3.73	3.77	3.77

Form TX-88
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

RAINFALL DATA SUMMARY

Study Area HUDSON CREEK

1969 Water Year

RAIN GAGES				
Date of storm	1-R	2-R	3-R	Average
1969				
June 1-2, 1969	0.76	0.47	0.47	
3-4	2.22	1.85	1.93	
June Totals	2.98	2.32	2.40	2.57
July 15, 1969	(0.35)	0.35	0.40	
20	(.10)	.10	.14	
July Totals	0.45	0.45	0.54	0.48
August 11, 1969	0.56	0.55	0.33	
17	-	.13	.18	
18	.53	.57	.28	
20	.29	.20	.12	
26	.25	.15	.15	
27	.68	.80	.75	
August Totals	2.31	2.49	1.81	2.20
September 3, 1969	3.32	4.09	3.68	
11	-	.12	.09	
16-17	1.80	1.94	2.00	
23	.37	.60	.58	
September Totals	5.49	6.75	6.35	6.20
1969 Water Years Totals =	46.84	51.19	50.04	49.36

UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Burton Creek at Villa Maria Road, Bryan, TexasPeriod of Record July 9, 1968Drainage Area 1.33 sq. mi.

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff		Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			C. f. s.	Inc.	In/Hr.	Inches	Acc. In.				C. f. s.	Inc.	In/Hr.	Inches	Acc. In.
0000	1.24	0	1.0	12	.0012	.0006	.0006	0725	6.75	0	462	2	.5382	.0447	.6790
0100	1.19		.55	24	.0006	.0006	.0012	30	6.75		462	2	.5382	.0447	.7237
0200	1.15		.32	24	.0004	.0004	.0016	35	6.71		457	2	.5324	.0442	.7679
0300	1.13		.23	27	.0003	.0003	.0019	40	6.49		433	2	.5044	.0419	.8098
0415	1.14		.27	18	.0003	.0002	.0021	45	6.43		427	4	.4975	.0831	.8929
30	1.93		26	6	.0303	.0076	.0097	0800	6.20		404	6	.4707	.1177	1.006
45	2.45		68	4	.0792	.0131	.0228	15	6.39		423	4	.4928	.0823	1.0929
50	2.51		74	2	.0862	.0072	.0300	20	6.54		438	2	.5103	.0424	1.1353
55	2.51		74	2	.0862	.0072	.0372	25	6.69		455	2	.5301	.0440	1.1793
0500	2.51		74	2	.0862	.0072	.0444	30	6.89		477	2	.5557	.0461	1.2254
05	2.53		76	2	.0885	.0073	.0517	35	7.30		525	2	.6116	.0508	1.2762
10	2.57		79	2	.0920	.0076	.0593	40	7.49		548	2	.6384	.0530	1.3292
15	2.53		76	4	.0885	.0148	.0741	45	7.61		562	4	.6547	.1093	1.4385
30	2.19		45	4	.0524	.0088	.0829	0900	7.89		596	4	.6943	.1159	1.5544
35	2.11		39	2	.0454	.0038	.0867	05	7.89		596	2	.6943	.0576	1.6120
40	2.08		37	2	.0431	.0036	.0903	10	7.96		604	2	.7037	.0584	1.6704
45	2.01		32	2	.0373	.0031	.0934	15	7.96		604	2	.7037	.0584	1.7288
50	2.21		47	2	.0548	.0045	.0979	20	7.96		604	2	.7037	.0584	1.7872
55	2.53		76	2	.0885	.0073	.1052	25	7.88		595	2	.6932	.0575	1.8447
0600	2.88		167	4	.1247	.0208	.1260	30	7.82		587	3	.6839	.0855	1.9302
15	3.93		191	6	.2225	.0551	.1816	40	7.59		560	6	.6524	.1631	2.0933
30	4.99		283	6	.3297	.0824	.2640	1000	7.31		526	7	.6128	.1788	2.2721
45	5.93		377	6	.4392	.1098	.3738	15	7.15		507	6	.5907	.1477	2.4198
0700	6.51		440	4	.5126	.0856	.4594	30	6.84		471	6	.5487	.1372	2.5570
05	6.61		446	2	.5196	.0421	.5025	45	6.37		421	6	.4905	.1226	2.6796
10	6.67		453	2	.5277	.0438	.5463	1100	5.65		349	6	.4066	.1016	2.7812
15	6.69		455	2	.5301	.0440	.5903	15	4.81		267	6	.3111	.0778	2.8590
20	6.69	0	455	2	.5301	.0440	.6343	30	4.04	0	200	6	.2330	.0582	2.9172

 Computed by LDK Date 10-8-70 Checked by JAB Date 10-8-70

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Burton Creek at Villa Marie Road, Bryan, Texas

Period of Record July 09, 1968

Drainage Area 1.33 sq. mi.[illegible]

Computed by WNR

Date 10/8/70

Checked by

Date 10/2/70

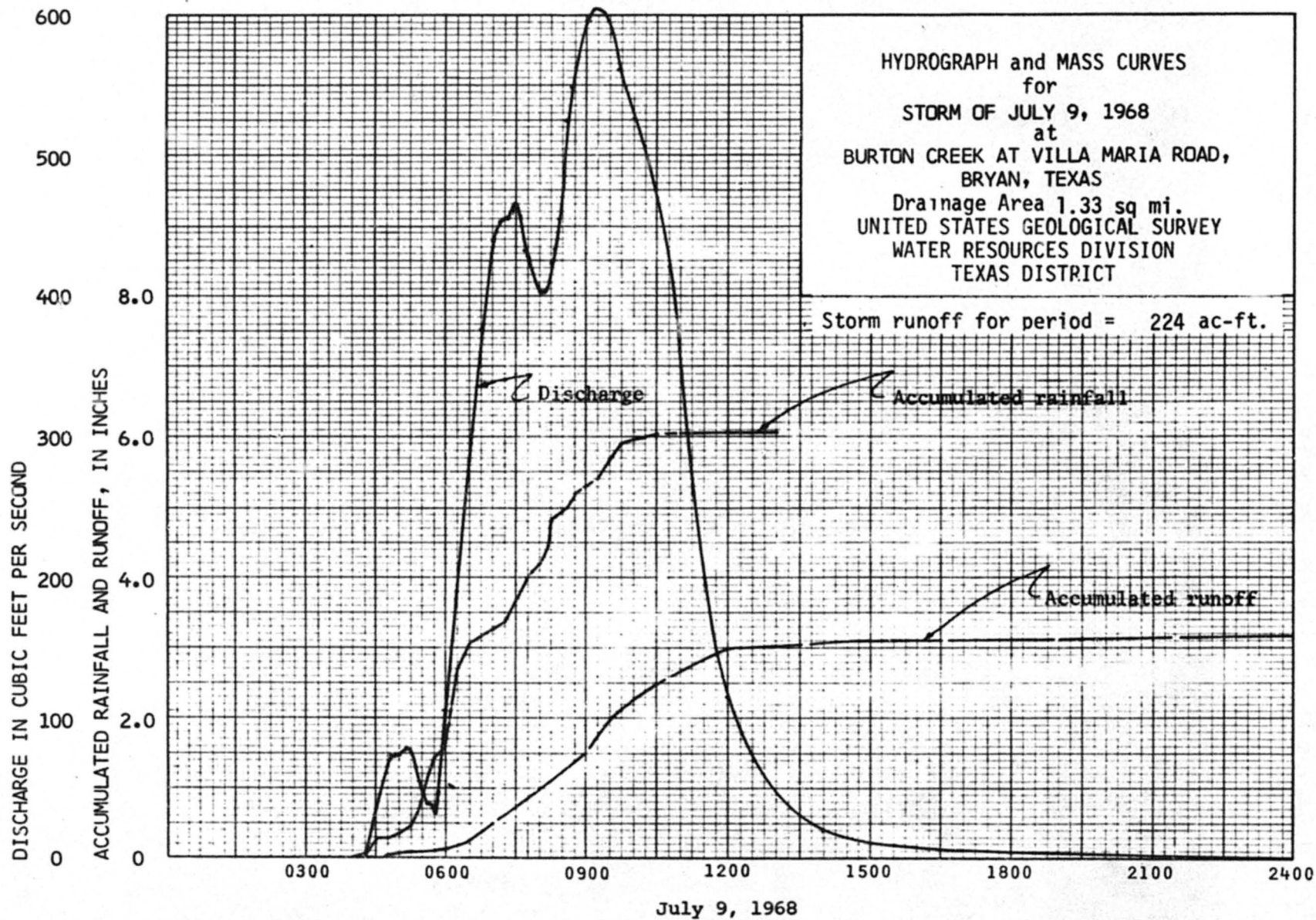
Study Area: Burton Creek at Villa Maria Road, Bryan Tex. Date of Storm: July 9, 1968

Accumulated Precipitation in Inches for Recording Rain Gages													Accumulated Average Precipitation	
Date & Time	Gage 2-A	Gage	Gage	Gage	Gage	Gage	Gage	Gage	Gage	Gage	Gage	Gage	Avg. Record-	Recording
	Recorded	Recorded	Recorded	Recorded	Recorded	Recorded	Recorded	Recorded	Recorded	Recorded	Recorded	Recorded	ing Gages	Gages x K
July 9, 1968														
0345	0													0
0400	.06													.06
15	.30													.30
30	.32													.32
0500	.34													.34
15	.46													.46
30	.94													.94
45	1.45													1.45
0600	1.67													1.67
15	2.71													2.71
30	3.07													3.07
45	3.18													3.18
0700	3.25													3.25
15	3.38													3.38
30	3.64													3.64
45	3.98													3.98
0800	4.20													4.20
15	4.84													4.84
30	4.93													4.93
45	5.20													5.20
0900	5.29													5.29
15	5.39													5.39
30	5.70													5.70
45	5.89													5.89
1000	5.96													5.96
15	6.00													6.00
30	6.03													6.03
Rain Gage	Precipitation	Rain Gage	Precipitation	Rain Gage	Precipitation	Rain Gage	Precipitation	Rain Gage	Precipitation	Rain Gage	Precipitation	Rain Gage	Precipitation	

AVERAGE PRECIPITATION RECORD

Study Area: Burton Creek at Villa Maria Road, Bryan Tex. Date of Storm: _____

[illegible]



UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station Hudson Creek near Bryan, Tex.

Period of Record July 9, 1968

Drainage Area 1.94

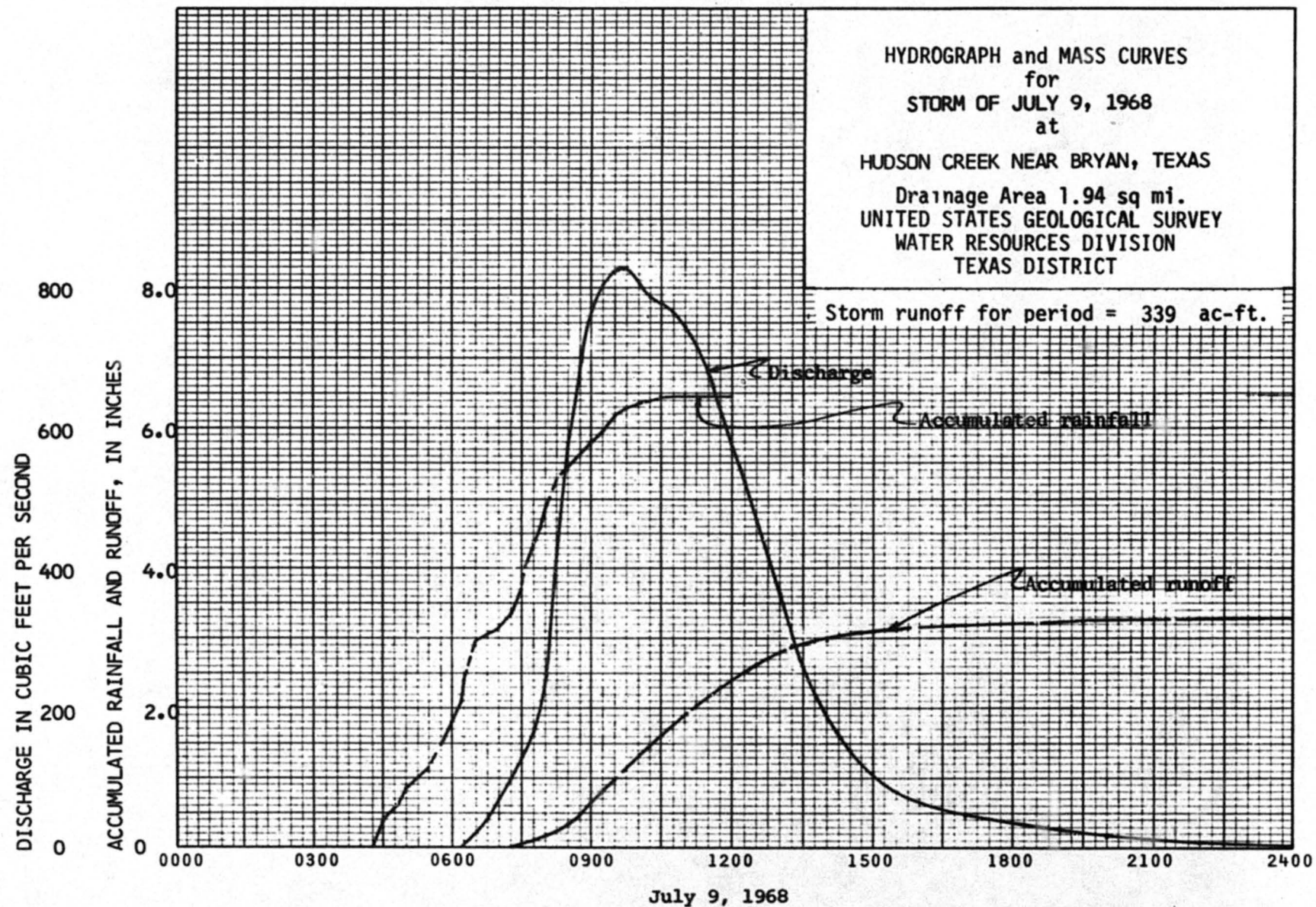
Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			c.f.s.	Inc.	In/hr.	Inches	Acc. In.
	July 9, 1968						
0000	0.21	0	0.05	17	.0000	.0000	
0415	.21		.05	18	.0000	.0000	
30	.24		.07	2	.0001	.0000	
45	.30		.16	2	.0001	.0000	
0500	.30		.16	2	.0001	.0000	
15	.30		.16	2	.0001	.0000	
30	.34		.25	2	.0002	.0000	
45	.35		.28	2	.0002	.0000	.0000
0600	.42		.54	2	.0004	.0001	.0001
15	.62		2.5	2	.0020	.0005	.0006
30	1.02		20	2	.0160	.0040	.0046
45	1.41		43	2	.0344	.0086	.0132
0700	2.30		68	2	.0543	.0136	.0268
15	3.40		99	2	.0791	.0198	.0466
30	4.21		129	2	.1031	.0258	.0724
45	4.91		166	2	.1326	.0332	.1056
0800	5.88		251	2	.2005	.0501	.1557
15	6.86		427	2	.3412	.0853	.2410
30	8.06		582	2	.4650	.1162	.3572
45	9.19		696	2	.5561	.1390	.4962
0900	10.15		772	2	.6168	.1542	.6504
15	10.61		804	2	.6424	.1606	.8110
30	10.83		826	2	.6600	.1650	.9760
45	10.86		829	2	.6624	.1656	1.1416
1000	10.63		806	2	.6440	.1610	1.3026
15	10.37		787	2	.6288	.1572	1.4598
30	10.27		780	2	.6232	.1558	1.6156
45	10.05		764	2	.6104	.1526	1.7682
1100	9.78	0	743	2	.5937	.1484	1.9166

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			c.f.s.	Inc.	In/hr.	Inches	Acc. In.
	July 9, 1968, continued						
1115	9.40	0	713	2	.5697	.1424	2.0590
30	8.99		678	2	.5417	.1354	2.1944
45	8.52		631	2	.5042	.1260	2.3204
1200	7.97		571	2	.4562	.1140	2.4344
15	7.57		523	2	.4179	.1045	2.5389
30	7.11		462	2	.3691	.0923	2.6312
45	6.75		412	2	.3292	.0823	2.7135
1300	6.42		363	3	.2900	.1088	2.8223
30	5.89		253	4	.2021	.1010	2.9233
1400	5.21		186	4	.1486	.0743	2.9976
30	4.43		140	4	.1119	.0560	3.0536
1500	3.58		104	4	.0831	.0416	3.0952
30	2.81		81	4	.0647	.0324	3.1276
1600	2.15		64	4	.0511	.0256	3.1532
30	1.74		53	4	.0423	.0212	3.1744
1700	1.48		45	6	.0360	.0270	3.2014
1800	1.20		33	8	.0264	.0264	3.2278
1900	1.05		23	8	.0184	.0184	3.2462
2000	.96		16	12	.0128	.0192	3.2654
2200	.82		7.9	16	.0063	.0126	3.2780
2400	.73	0	5.0	8	.0040	.0040	3.2820
			</				

Computed by PBR + roh Date 6/26/69
v by roh

Checked by PBR Date 4/29/70

- 30 -



UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY-TEXAS DISTRICT

8-1110.25

RUNOFF COMPUTATIONS

Station Burton Creek at Villa Maria Road, Bryan, Tex

Period of Record Feb. 14, 1969Drainage Area 1.33 sq. mi.

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			c.f.s.	Inc.	In/hr.	Inches	Acc. In.
	Feb. 14, 1969 201165						
0000	1.30	0	1.7	6	.0020	.0015	.0015
0130	1.27		1.3	7	.0015	.0013	.0028
45	1.34		2.3	2	.0027	.0007	.0035
0200	1.54		7.1	2	.0083	.0021	.0054
15	1.74		15	2	.0175	.0044	.0100
30	2.16		43	2	.0501	.0125	.0225
45	2.82		103	2	.1200	.0300	.0526
0300	3.13		139	2	.1619	.0405	.0930
15	3.37		167	2	.1946	.0486	.1416
30	3.48		182	2	.2120	.0530	.1946
45	3.58		196	2	.2283	.0571	.2517
0400	3.55		192	2	.2237	.0559	.3076
15	3.43		175	2	.2039	.0510	.3586
30	3.24		152	2	.1771	.0483	.4029
45	3.15		141	2	.1643	.0411	.4440
0500	3.21		148	2	.1724	.0431	.4870
15	3.39		170	2	.1980	.0495	.5366
30	3.55		192	2	.2237	.0559	.5925
45	3.59		198	2	.2307	.0577	.6502
0600	3.57		195	2	.2272	.0568	.7070
15	3.43		175	2	.2039	.0510	.7580
30	3.26		154	2	.1794	.0448	.8028
45	3.04		128	2	.1491	.0373	.8401
0700	2.80		101	2	.1177	.0299	.8695
15	2.60		82	2	.0955	.0239	.8934
30	2.42		66	2	.0769	.0192	.9126
45	2.28	0	53	2	.0617	.0154	.9280

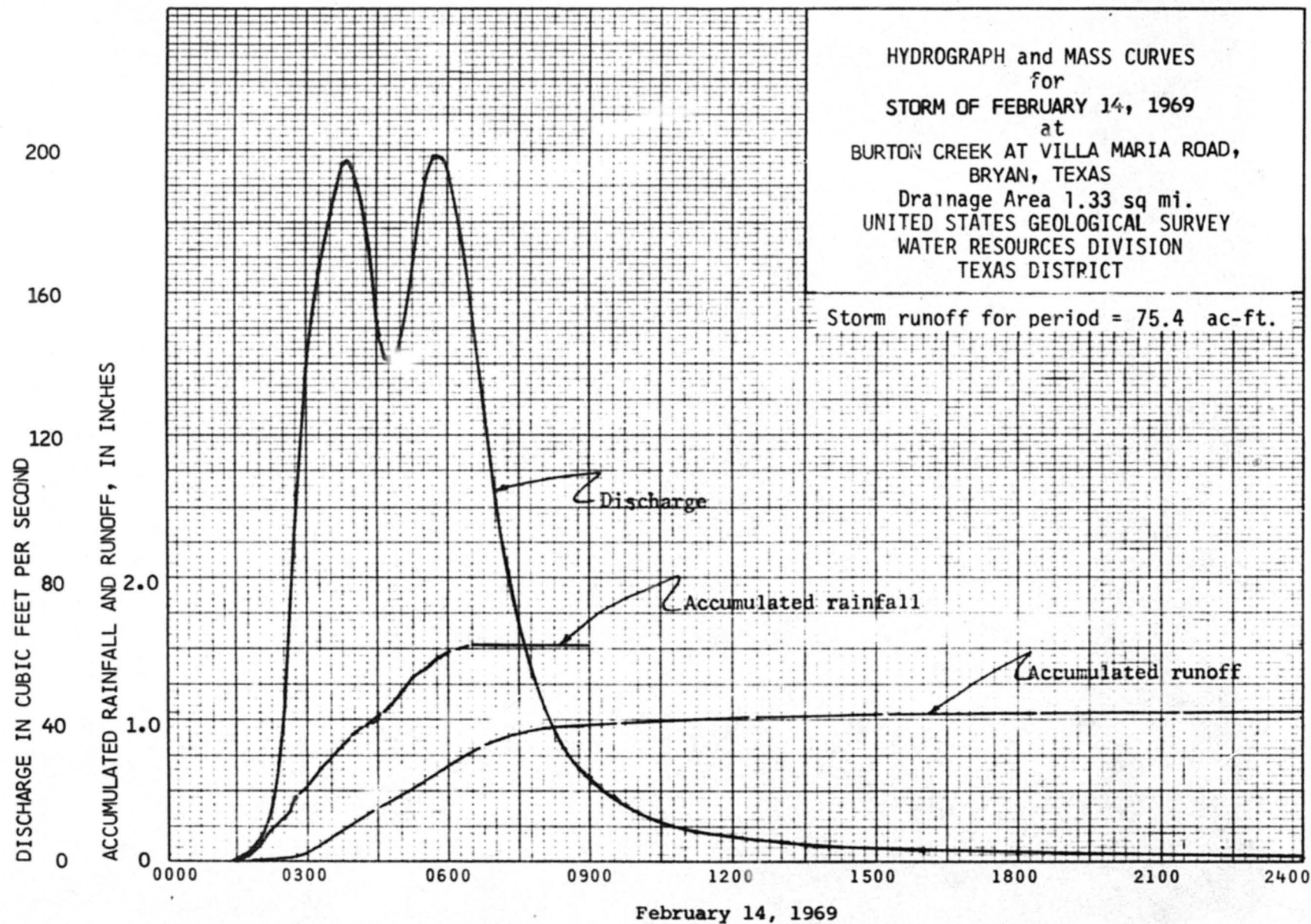
Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			c.f.s.	Inc.	In/hr.	Inches	Acc. In.
	Feb 14,		continued				
0800	2.16	0	43	2	.0501	.0125	.9405
15	2.06		35	2	.0408	.0102	.9507
30	2.00		31	2	.0361	.0090	.9597
45	1.93		26	2	.0303	.0076	.9673
0900	1.89		23	3	.0268	.0067	.9740
30	1.81		19	4	.0221	.0110	.9850
1000	1.72		14	4	.0163	.0082	.9932
30	1.65		11	4	.0128	.0064	.9996
1100	1.61		9.4	6	.0110	.0052	1.0078
1200	1.54		7.1	8	.0083	.0033	1.0161
1300	1.49		5.6	8	.0065	.0065	1.0226
1400	1.43		4.0	12	.0047	.0071	1.0297
1600	1.37		2.8	16	.0033	.0066	1.0363
1800	1.33		2.2	32	.0026	.0104	1.0467
2400	1.25	0	1.1	24	.0013	.0026	1.0493
				192			

Computed by PBR-JKV

Date 3/27/70

Checked by roh-aot

Date 3/27/70



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

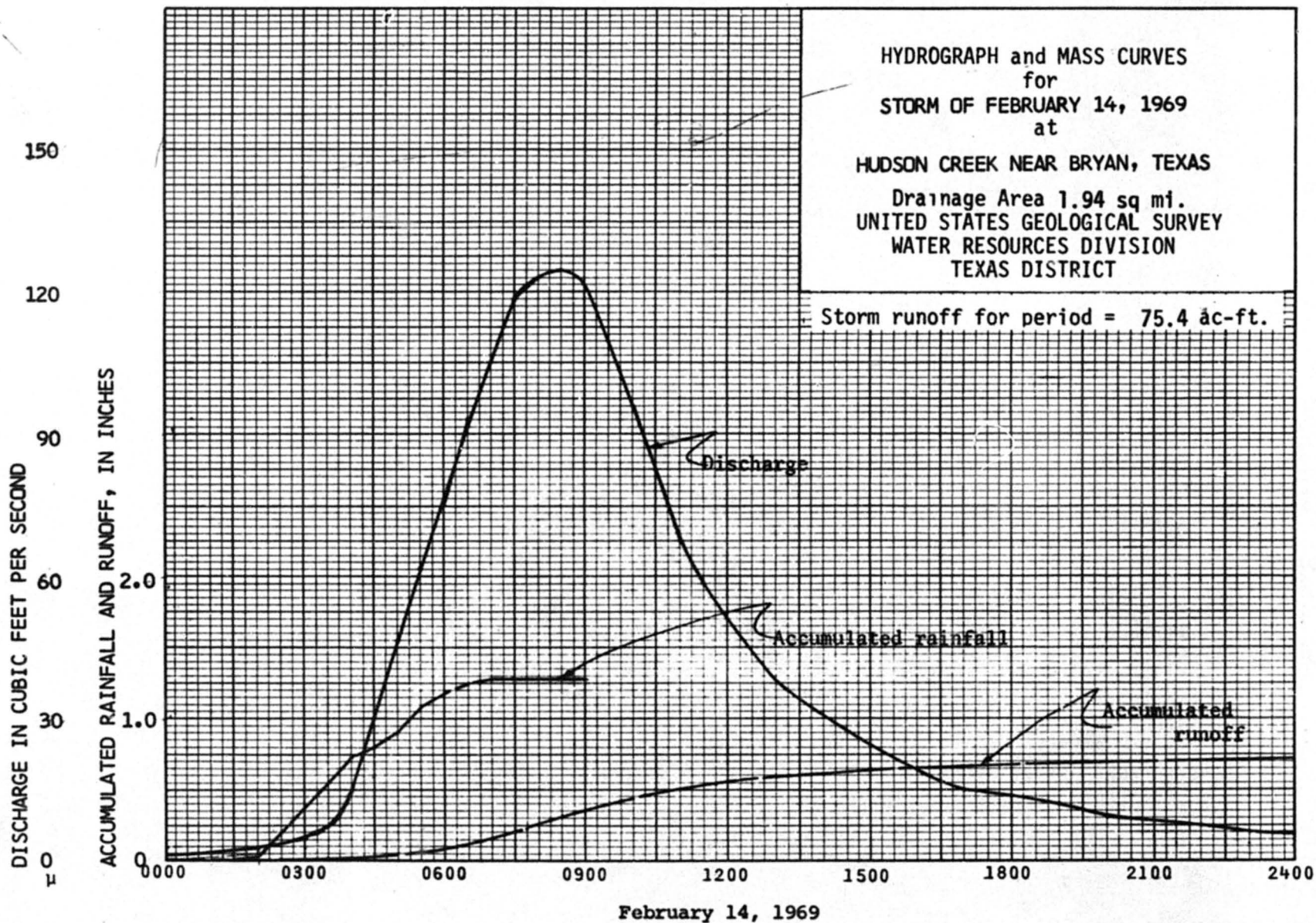
RUNOFF COMPUTATIONS

 Station 8-1110.5 Hudson Creek near Bryan, Tex.
 Period of Record Feb. 14, 1969 Drainage Area 1.94 sq. mi.

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			C. f. s.	Inc.	In/Hr.	Inches	Acc. In.
Feb. 14, 1969							
0000	0.47	0	1.9	4	.0015	.0015	.0015
0200	.48		2.1	6	.0017	.0026	.0041
0300	.60		4.2	4	.0034	.0034	.0075
0400	.90		15	3	.0120	.0090	.0165
30	1.15		30	2	.0240	.0120	.0285
0500	1.55		47	2	.0376	.0188	.0473
30	2.05		61	2	.0487	.0244	.0717
0600	2.59		75	2	.0599	.0300	.1017
30	3.19		93	2	.0743	.0372	.1389
0700	3.59		105	2	.0839	.0420	.1809
30	3.92		118	2	.0943	.0472	.2281
0800	4.05		123	2	.0983	.0492	.2773
30	4.10		125	2	.0999	.0500	.3273
0900	3.99		121	2	.0967	.0484	.3757
30	3.71		109	2	.0871	.0436	.4193
1000	3.30		96	2	.0767	.0384	.4577
30	2.83		82	2	.0655	.0328	.4905
1100	2.34		68	2	.0543	.0272	.5177
30	1.94		58	2	.0463	.0232	.5409
1200	1.67		51	2	.0407	.0204	.5613
30	1.48		45	2	.0360	.0180	.5793
1300	1.32		39	3	.0312	.0234	.6027
1400	1.17		31	4	.0248	.0248	.6275
1500	1.07		25	4	.0200	.0200	.6475
1600	.98		19	4	.0152	.0152	.6625
1700	.91	0	15	4	.0120	.0120	.6745

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			C. f. s.	Inc.	In/Hr.	Inches	Acc. In.
Feb. 14, 1969, continued							
1800	0.86	0	13	4	.0104	.0104	.6849
1900	.82		11	4	.0088	.0088	.6937
2000	.77		9.3	4	.0074	.0074	.7011
2100	.74		8.2	4	.0066	.0066	.7077
2200	.71		7.2	4	.0058	.0058	.7135
2300	.68		6.3	4	.0050	.0050	.7185
2400	.66	0	5.7	2	.0046	.0023	.7208
					96		

 Computed by PBR Date 3/23/70 Checked by AOT Date 4/29/70



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

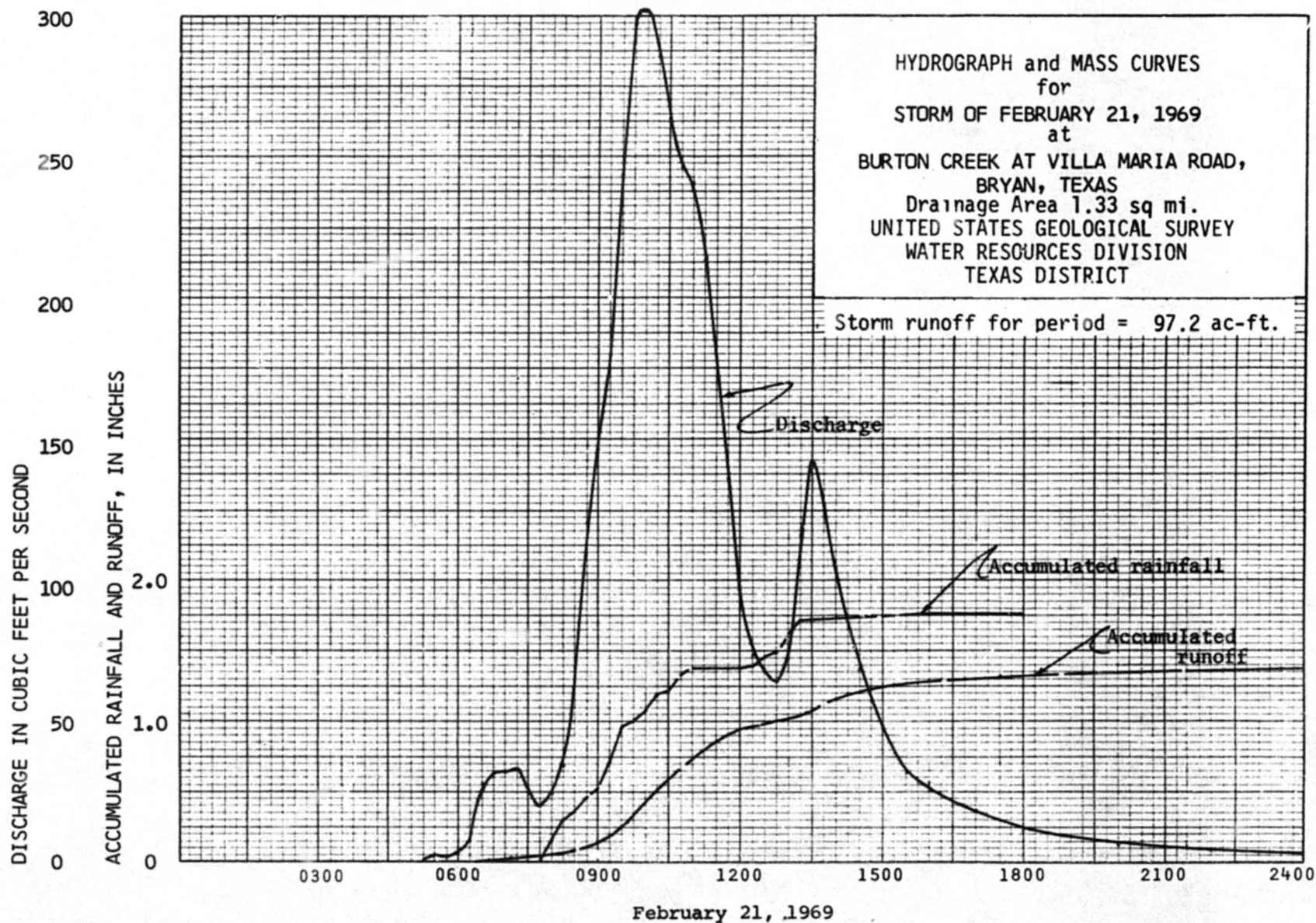
RUNOFF COMPUTATIONS

Station 08-1110.25 Burton Creek at Villa Maria Road, Bryan, TexasPeriod of Record Feb. 21, 1969 Drainage Area 1.33 sq. mi.

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			C. f. s.	Inc.	In/Hr.	Inches	Acc. In.
Feb 21, 1969							
					001165		
0000	1.13	0	23	4	0003	0002	0002
0100	1.12		19	21	0002	0005	0007
0515	1.12		19	18	0002	0004	0011
30	1.35		25	2	0029	0007	0018
45	1.28		15	2	0017	0004	0022
0600	1.36		27	2	0031	0008	0030
15	1.55		74	2	0086	0022	0052
30	1.96		28	2	0326	0082	0134
45	2.01		32	2	0373	0093	0227
0700	2.01		32	2	0373	0093	0320
15	2.03		33	2	0384	0096	0416
30	1.94		27	2	0314	0078	0494
45	1.83		20	2	0233	0058	0552
0800	1.90		24	2	0280	0070	0622
15	2.04		34	2	0396	0099	0721
30	2.46		69	2	0804	0201	0922
45	2.98		121	2	1410	0352	1274
0900	3.20		147	2	1713	0428	1702
15	3.46		179	2	2085	0521	2223
30	3.90		243	2	2831	0708	2931
45	4.21		297	2	3460	0845	3796
1000	4.24		302	2	3518	0880	4676
15	4.15		286	2	3332	0833	5509
30	4.02		263	2	3064	0766	6275
45	3.92		246	2	2846	0716	6991
1100	3.89		241	2	2808	0702	7693
15	3.70	0	213	2	2481	0620	8313

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff	
			C. f. s.	Inc.	In/Hr.	Inches	Acc. In.
Feb 21, 1969 Continued							
1130	3.43	0	175	2	2039	0510	8823
45	3.11		136	2	1584	0396	9219
1200	2.76		97	2	1130	0282	9501
15	2.50		73	2	0850	0212	9713
30	2.44		68	2	0792	0198	9911
45	2.40		64	2	0746	0186	10097
1300	2.52		75	2	0874	0218	10315
15	2.94		116	2	1351	0338	10653
30	3.16		142	2	1654	0414	11067
45	3.03		127	2	1480	0370	11437
1400	2.83		104	3	1212	0454	11891
30	2.45		68	4	0792	0396	12287
1500	2.22		48	4	0559	0280	12567
30	2.02		32	4	0373	0186	12753
1600	1.95		28	4	0326	0163	12916
30	1.86		22	4	0256	0128	13044
1700	1.79		18	6	0210	0158	13202
1800	1.67		12	8	0140	0140	13342
1900	1.60		9.0	8	0105	0105	13447
2000	1.52		6.5	8	0076	0076	13523
2100	1.48		5.3	8	0062	0062	13585
2200	1.43		4.0	8	0047	0047	13632
2300	1.41		3.6	8	0042	0042	13674
2400	1.38	0	3.0	4	0035	0018	13692
					192		

Computed by PBR Date 3/23/70 Checked by BTB III Date 5/1/70

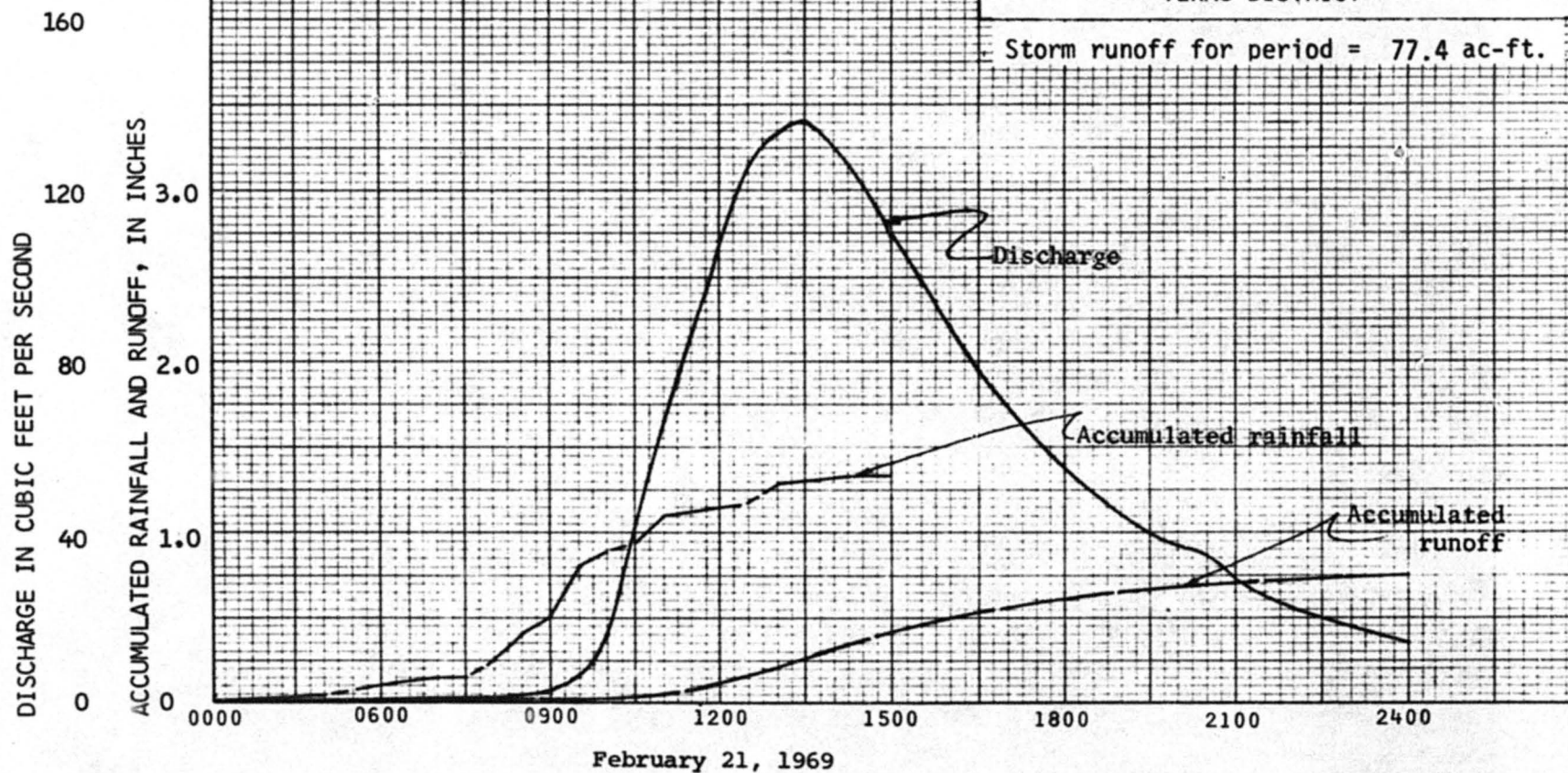


HYDROGRAPH and MASS CURVES
for
STORM OF FEBRUARY 21, 1969
at

HUDSON CREEK NEAR BRYAN, TEXAS

Drainage Area 1.94 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT

Storm runoff for period = 77.4 ac-ft.



UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station 8-1110.25 Burton Creek @ Villa Maria Road, Bryan, Tex.Period of Record May 8, 1969Drainage Area 1.33 sq. mi.

Time	G. Ht. Feet	Sh. Adj.	Discharge		Runoff	
			C. f. s.	Inc.	In/Hr.	Inches
May 8, 1969 1901165						
0000	1.13	0	0.2334	0.003	0.013	0.0013
0830	1.10		.1342	0.002	0.010	0.0023
1030	1.10		.139	0.002	0.002	0.0025
45	1.26		1.2	2.0014	0.004	0.0029
1100	2.89	110	2.1282	0.320	0.349	
15	4.07	272	2.3169	0.792	1.141	
30	4.91	435	2.5068	1.267	2.408	
45	5.67	631	2.7351	1.830	4.246	
1200	5.93	709	2.8260	2.065	6.311	
15	4.82	676	2.7875	1.969	8.280	
30	3.66	207	2.2412	0.603	8.883	
45	2.89	110	2.1282	0.320	9.203	
1300	2.59	81	2.0944	0.236	9.439	
15	2.39	63	2.0734	0.184	9.623	
30	2.25	50	2.0582	0.146	9.769	
45	2.12	40	2.0466	0.116	9.885	
1400	2.04	34	3.0396	0.148	1.0033	
30	1.89	23	4.0268	0.134	1.0167	
1500	1.81	19	4.0221	0.110	1.0277	
30	1.72	14	4.0163	0.082	1.0359	
1600	1.65	11	6.0128	0.096	1.0455	
1700	1.57	8.0	8.0093	0.093	1.0548	
1800	1.48	5.3	12.0062	0.093	1.0641	
2000	1.39	3.2	16.0027	0.074	1.0715	
2200	1.31	1.9	16.0022	0.044	1.0759	
2400	1.27	0	1.3	8.0015	0.0015	1.0774
			192			

Computed by PBR JKV. Date 3/30/70 Checked by FHT-AOT Date 4/1/70
 In./Hr.
 Inc.
 Acc. In.

Comp. by: PBR
Date: 4-2-70
Check by: J.K.V.
Date: 5-11-70

AVERAGE PRECIPITATION RECORD

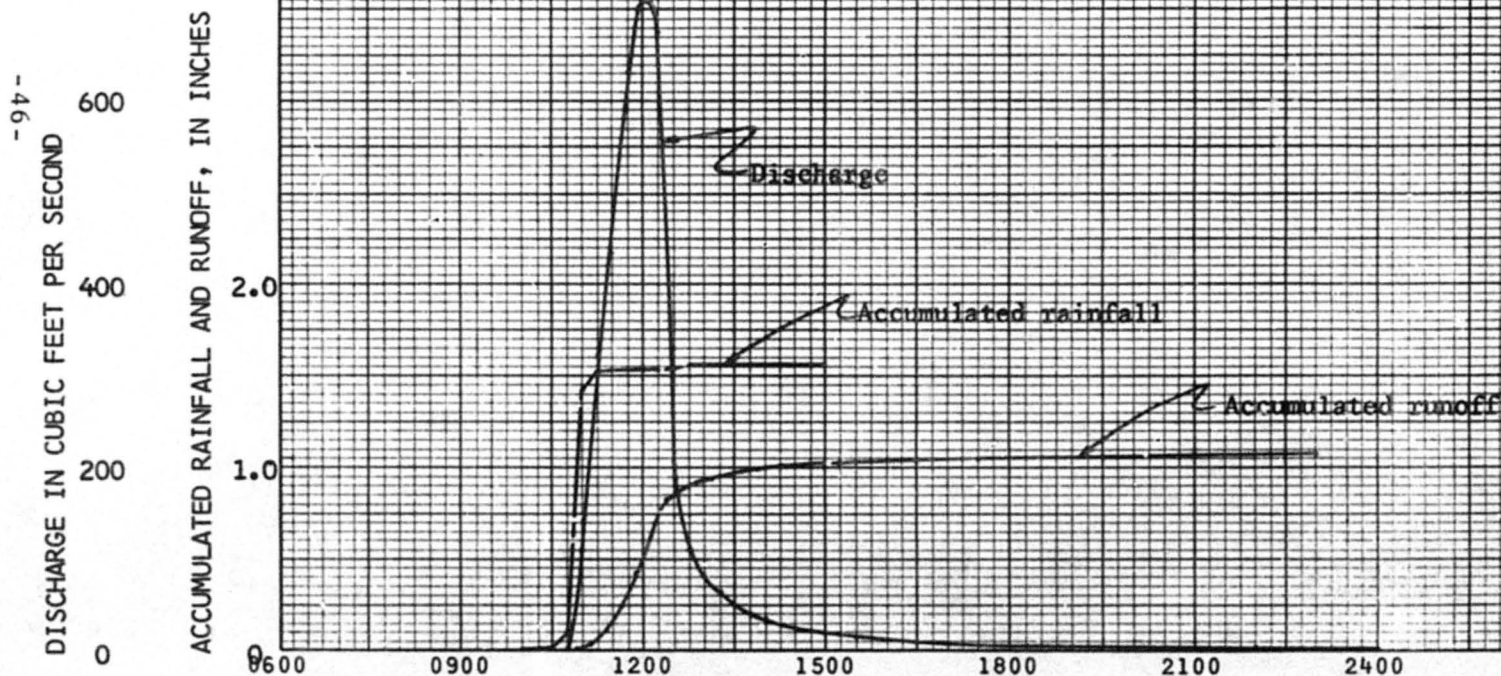
Study Area: Burton Creek at Villa Maria Road, Bryan, Tex.

Date of Storm. May 8, 1969

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HYDROGRAPH and MASS CURVES
for
STORM OF MAY 8, 1969
at
BURTON CREEK AT VILLA MARIA ROAD,
BRYAN, TEXAS
Drainage Area 1.33 sq mi.
UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
TEXAS DISTRICT

Storm runoff for period = 77.4 ac-ft.



May 8, 1969

UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY - TEXAS DISTRICT

RUNOFF COMPUTATIONS

Station 8-1110.5 Hudson Creek near Bryan, Tex.Period of Record May 8, 1969Drainage Area 1.94 sq mi.

Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff		Time	G. Ht. Feet	Sh. Adj.	Discharge			Runoff															
			C. f. s.	Inc.	In/Hr.	Inches	Acc. In.				C. f. s.	Inc.	In/Hr.	Inches	Acc. In.														
May 8, 1969															May 8, continued														
0000	0.45	0	1.742		.0014	.0074	.0074									1730	2.25	0	66	4	.0527	.0264	.8694						
1030	.41		1.243		.0010	.0054	.0120									1800	1.84		56	6	.0447	.0335	.9029						
1045	.41		1.2	2	.0010	.0002	.0130									1900	1.38		42	8	.0336	.0336	.9365						
1100	.75		8.5	2	.0068	.0017	.0147									2000	1.19		33	12	.0264	.0396	.9761						
15	.95		18	2	.0144	.0036	.0183									2200	1.00		20	16	.0160	.0320	1.0081						
30	1.18		32	2	.0256	.0064	.0247									2400	.87	0	14	8	.0112	.0112	1.0193						
45	1.90		58	2	.0463	.0116	.0363																						
1200	2.80		81	2	.0647	.0162	.0525																						
15	3.45		100	2	.0799	.0200	.0725																						
30	4.13		126	2	.1007	.0252	.0977																						
45	5.11		179	2	.1430	.0358	.1335																						
1300	5.68		224	2	.1790	.0448	.1783																						
15	5.90		254	2	.2029	.0507	.2290																						
30	6.09		293	2	.2341	.0585	.2875																						
45	6.15		306	2	.2445	.0611	.3486																						
1400	6.21		320	2	.2557	.0639	.4125																						
15	6.13		302	2	.2413	.0603	.4728																						
30	6.00		272	2	.2173	.0543	.5271																						
45	5.89		253	2	.2021	.0505	.5776																						
1500	5.69		225	2	.1798	.0450	.6226																						
15	5.38		198	2	.1582	.0396	.6622																						
30	5.07		176	2	.1406	.0352	.6974																						
45	4.73		155	2	.1238	.0310	.7284																						
1600	4.33		134	3	.1071	.0402	.7686																						
30	3.59		105	4	.0839	.0420	.8106																						
1700	2.81	0	81	4	.0647	.0324	.8430																						

Computed by PBR Date 3/17/70 Checked by BTB Date 5/1/70

