WICKENBURG W.P.P. ARIZONA

SUNSET F.R.S., SUNNY COVE F.R.S. & PIPELINE

HYDROLOGY

```
*LIST ALL
JOB J                          FULL          001
   CASANDRO WASH, WICKENBURG W/S, ARIZONA,  J. MALONE, 2-4-70                 1
 5 RAINFL 1              0.5                                                  1
 8          .000         .005        .011        .016        .022
 8          .028         .035        .041        .048        .056
 8          .063         .071        .080        .089        .098
 8          .109         .120        .133        .147        .163
 8          .181         .204        .235        .283        .663
 8          .735         .772        .799        .820        .838
 8          .854         .868        .880        .891        .902
 8          .912         .921        .929        .937        .945
 8          .952         .959        .965        .972        .978
 8          .984         .989        .995       1.000       1.000
 9 ENDTBL
 3 STRUCT      01                                                             2
 8                      2061.0       0.0        0.00001                       3
 8                      2065.0       248.0      0.00002                       4
 8                      2066.0       346.0      1.9                           5
 8                      2067.0       456.0      7.9                           6
 8                      2068.0       574.0      13.7                          7
 8                      2069.0       701.0      23.0                          8
 8                      2070.0       1387.0     39.3                          9
 9 ENDTBL                                                                     10
 6 RUNOFF 1    01     6 1.60         87.        0.59        1 1   1          11
 6 RESVOR 2    01 6   7 2061.0                              1   1 1          12
   ENDATA                                                                     13
 7 LIST                                                                       14
 7 INCREM 6              0.5                                                  15
 7 COMPUT 7    01     01 0.0         4.25       1.0         1 2  01  01      16
   ENDCMP 1                                                                   17
 7 COMPUT 7    01     01 0.0         3.20       1.0         1 2  01  02      18
   ENDCMP 1                                                                   19
   ENDJOB 2                                                                   20
```

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HYDROLOGY PROGRAM FOR IBM 1130 - DATED JULY, 1968

WASH, WICKENBURG W/S, ARIZONA, J. MALONE, 2-4-70 TR-20 ROUTING.

EXECUTIVE CONTROL CARD 14 OPERATION LIST

WASH, WICKENBURG W/S, ARIZONA, J. MALONE, 2-4-70

C TABLE VELOCITY INCREMENT = 0.200

8	0.0000	0.0800	0.1800	0.2500	0.3200
8	0.3700	0.4100	0.4500	0.4900	0.5100
8	0.5400	0.5700	0.5900	0.6100	0.6300
8	0.6500	0.6600	0.6700	0.6900	0.7000
8	0.7100	0.7200	0.7300	0.7400	0.7500
8	0.7600	0.7700	0.7700	0.7800	0.7900
8	0.7900	0.8000	0.8100	0.8100	0.8200
8	0.8200	0.8300	0.8300	0.8400	0.8400
8	0.8400	0.8500	0.8500	0.8600	0.8600
8	0.8600	0.8600	0.8700	0.8700	0.8700
8	0.8800	0.8800	0.8800	0.8900	0.8900
8	0.8900	0.8900	0.8900	0.8900	0.9000
8	0.9000	0.9000	0.9000	0.9000	0.9100
8	0.9100	0.9100	0.9100	0.9100	0.9100
8	0.9200	0.9200	0.9200	0.9200	0.9200
8	0.9200	0.9200	0.9200	0.9300	0.9300
8	0.9300	0.9300	0.9300	0.9300	0.9300
9 ENDTBL					

STRUCTURE NO. 1

	ELEVATION	DISCHARGE	STORAGE
8	2061.0004	0.0000	0.0000
8	2065.0004	248.0000	0.0000
8	2066.0004	346.0000	1.8999
8	2067.0004	456.0000	7.8999
8	2068.0004	574.0001	13.6999
8	2069.0004	701.0001	23.0000
8	2070.0004	1387.0002	39.2999
9 ENDTBL			

DIMENSIONLESS HYDROGRAPH - DELTA T = 0.02

8	0.0000	0.0150	0.0750	0.1600	0.2800
8	0.4300	0.6000	0.7700	0.8900	0.9700
8	1.0000	0.9800	0.9200	0.8400	0.7500
8	0.6600	0.5650	0.4900	0.4200	0.3650
8	0.3200	0.2790	0.2400	0.2100	0.1800
8	0.1550	0.1300	0.1130	0.0980	0.0860
8	0.0750	0.0650	0.0560	0.0470	0.0410
8	0.0350	0.0300	0.0260	0.0220	0.0190
8	0.0170	0.0150	0.0130	0.0110	0.0090
8	0.0070	0.0050	0.0030	0.0020	0.0010
8	0.0000	0.0000	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000
9 ENDTBL					

RAINFALL TABLE NO. 1 TIME INCREMENT = 0.50

8	0.0000	0.0050	0.0110	0.0160	0.0220
8	0.0280	0.0350	0.0410	0.0480	0.0560
8	0.0630	0.0710	0.0800	0.0890	0.0980
8	0.1090	0.1200	0.1330	0.1470	0.1630
8	0.1810	0.2040	0.2350	0.2830	0.6630
8	0.7350	0.7720	0.7990	0.8200	0.8380
8	0.8540	0.8680	0.8800	0.8910	0.9020
8	0.9120	0.9210	0.9290	0.9370	0.9450
8	0.9520	0.9590	0.9650	0.9720	0.9780
8	0.9840	0.9890	0.9950	1.0000	1.0000
9 ENDTBL					

STANDARD CONTROL INSTRUCTIONS

			HYDROGRAPHS						OUTPUT OPTIONS					
SUBRTN	XSECTN	STRCT	IN1	IN2	OUT	DATA NO. 1	DATA NO. 2	DATA NO. 3	PK	H	E	V	PH	SM
RUNOFF	0	1	0	0	6	1.600	87.000	0.590	1	1	0	1	0	0
RESVOR	0	1	6	0	7	2061.000	0.000	0.000	1	0	1	1	0	0
ENDATA														

END OF LISTING

```
EXECUTIVE CONTROL CARD       15    OPERATION  INCREM,     MAIN TIME INCREMENT=  0.50
EXECUTIVE CONTROL CARD       16    OPERATION  COMPUT,     FROM XSECTN/STRUCT   0/  1     TO XSECTN/STRUCT   0/  1
        STARTING TIME=  0.00     RAIN DEPTH=  4.25     RAIN DURATION=  1.00     RAIN TABLE NO.= 1     SOIL CONDITION= 2
        ALTERNATE NO.= 1         STORM NO.= 1


SUBROUTINE RUNOFF   STRUCTURE   1
           AREA=   1.60     INPUT RUNOFF CURVE=  87.0     TIME OF CONCENTRATION=  0.59
           COMPUTED CURVE NO. =   87.0

           PEAK TIMES                  PEAK DISCHARGES                PEAK ELEVATIONS
              12.16                        1643.154                      (RUNOFF)
              21.47                          54.394                      (RUNOFF)
              23.45                          46.374                      (RUNOFF)

   TIME                                HYDROGRAPH, TZERO=   6.00        DELTA T= 0.50        DRAINAGE AREA=   1.60
   6.00    DISCHG        1.07      4.29      7.84     13.03     18.26     25.44     33.68     44.13     57.03     79.01
  11.00    DISCHG      117.69    205.60   1553.59   1282.19    523.46    281.21    193.82    157.27    136.68    120.31
  16.00    DISCHG      104.46     93.30     89.62     84.39     76.86     68.92     65.69     65.22     60.46     57.66
  21.00    DISCHG       52.53     54.37     52.06     49.60     44.52     46.34     43.81     17.44      2.75      0.32
  26.00    DISCHG        0.00

           TOTAL WATER, IN INCHES ON DRAINAGE AREA=   2.8199        CFS-HRS=     2911.89        ACRE-FT=     240.63


SUBROUTINE RESVOR   STRUCTURE   1
           SURFACE ELEVATION= 2061.00

           PEAK TIMES                  PEAK DISCHARGES                PEAK ELEVATIONS
              12.56                        1309.670                      2069.88
              21.47                          54.600                      2061.88
              23.46                          46.568                      2061.75
              31.50                           0.214                      2061.00
              34.50                           0.214                      2061.00
              43.50                           0.214                      2061.00
              44.50                           0.214                      2061.00
              50.50                           0.215                      2061.00
              51.50                           0.215                      2061.00
              52.50                           0.215                      2061.00

   TIME                                HYDROGRAPH, TZERO=   6.00        DELTA T= 0.50        DRAINAGE AREA=   1.60
   6.00    ELEV       2061.00   2061.08   2061.10   2061.22   2061.27   2061.42   2061.52   2061.72   2061.90   2062.29
  11.00    ELEV       2062.88   2064.33   2068.54   2069.87   2069.33   2068.02   2066.33   2063.54   2063.20   2062.94
  16.00    ELEV       2062.68   2062.50   2062.44   2062.36   2062.23   2062.11   2062.05   2062.05   2061.97   2061.93
  21.00    ELEV       2061.84   2061.88   2061.83   2061.80   2061.71   2061.75   2061.70   2061.28   2061.04   2061.00
```

26.00	ELEV	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00
31.00	ELEV	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00
36.00	ELEV	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00
41.00	ELEV	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00
46.00	ELEV	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00
51.00	ELEV	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00	2060.99	2061.00

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.9260 CFS-HRS= 3021.45 ACRE-FT= 249.69

ENDCMP 1

EXECUTIVE CONTROL CARD 18 OPERATION COMPUT, FROM XSECTN/STRUCT 0/ 1 TO XSECTN/STRUCT 0/ 1
STARTING TIME= 0.00 RAIN DEPTH= 3.20 RAIN DURATION= 1.00 RAIN TABLE NO.= 1 SOIL CONDITION= 2
ALTERNATE NO.= 1 STORM NO.= 2

SUBROUTINE RUNOFF STRUCTURE 1
AREA= 1.60 INPUT RUNOFF CURVE= 87.0 TIME OF CONCENTRATION= 0.59
COMPUTED CURVE NO. = 87.0

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.18	1082.903	(RUNOFF)
21.47	39.070	(RUNOFF)
23.46	33.363	(RUNOFF)

HYDROGRAPH, TZERO= 7.50 DELTA T= 0.50 DRAINAGE AREA= 1.60

TIME											
7.50	DISCHG	1.74	4.69	8.77	13.70	20.02	27.99	41.33	65.08	120.19	1014.27
12.50	DISCHG	873.79	363.67	197.96	137.25	111.64	97.20	85.68	74.49	66.60	64.03
17.50	DISCHG	60.35	55.01	49.36	47.08	46.77	43.38	41.39	37.73	39.06	37.42
22.50	DISCHG	35.67	32.03	33.35	31.54	12.55	1.98	0.23	0.00		

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.9830 CFS-HRS= 2047.65 ACRE-FT= 169.21

SUBROUTINE RESVOR STRUCTURE 1
SURFACE ELEVATION= 2061.00

PEAK TIMES	PEAK DISCHARGES	PEAK ELEVATIONS
12.63	745.243	2069.06
14.98	209.151	2064.37
15.98	186.380	2064.00
16.99	175.796	2063.83
17.99	166.872	2063.69
18.99	158.773	2063.56
19.99	155.171	2063.50
20.99	149.427	2063.41
21.99	149.218	2063.40
22.99	143.636	2063.31

HYDROGRAPH, TZERO= 7.50 DELTA T= 0.50 DRAINAGE AREA= 1.60

TIME											
7.50	ELEV	2061.00	2061.10	2061.11	2061.24	2061.29	2061.47	2061.63	2062.07	2062.91	2067.44
12.50	ELEV	2069.04	2068.72	2067.11	2065.17	2060.99	2064.37	2060.57	2064.00	2060.27	2063.83
17.50	ELEV	2060.17	2063.69	2059.99	2063.56	2059.95	2063.50	2059.86	2063.41	2059.82	2063.40
22.50	ELEV	2059.77	2063.31	2059.73	2063.31	2059.40	2062.83	2059.20	2062.80	2059.19	2062.80
27.50	ELEV	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80

32.50	ELEV	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80
37.50	ELEV	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80
42.50	ELEV	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80
47.50	ELEV	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80
52.50	ELEV	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80	2059.19	2062.80

TOTAL WATER, IN INCHES ON DRAINAGE AREA= 3.4758 CFS-HRS= 3589.15 ACRE-FT= 296.60

ENDCMP 1

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

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
* GPO: 1972 —460-109

STATE Ariz		PROJECT Wickenburg WS		
BY RJA	DATE 10-4-74	CHECKED BY	DATE	JOB NO.
SUBJECT Sunset Dam				SHEET 1 OF 1

Curve Data

Back PI = ~~15+11.41~~

$\Delta = (88°08'02" - 9°04'05") + 90°$

$= \underline{10°56'03"}$

$D = \underline{10°}$

$R = \frac{5730'}{D} = \underline{573'}$

$T = R \tan \Delta/2$

$= 573 \tan 5°28'01.5"$

$= \underline{54.84}$

$L = \frac{\Delta}{D} 100$

1456.

$= \frac{10.934}{10} \times 100$

$= \underline{109.34}$

PT Sta = 1511.41 + 54.84
$= \underline{1566.25}$

PC Sta = 1566.25 - 109.34
$= \underline{1456.91}$

PI Sta = 1456.91 + 54.84
$= \underline{1511.75}$

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470966

STATE	PROJECT			
ARIZONA	Wickenburg PI			
BY	DATE	CHECKED BY	DATE	JOB NO.
J. MM	1-22-70			

SUBJECT

Drainage Areas

SHEET ____ OF ____

WASH	DRAINAGE AREA (Sq. Mi.) above Str.	Below Str.
Sunny Cove Wash	1.42	0.13
Un named Wash		0.25
Sunset Wash	0.60	0.20
Casando Wash	1.36	0.24
Powder House Wash	1.84	0.10

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1956 O—470868

STATE		PROJECT		
Arizona		Wickenburg P1		
BY	DATE	CHECKED BY	DATE	JOB NO.
J. Malone	1-22-70			

SUBJECT: Runoff Curve Numbers

SHEET ____ OF ____

				WT CN
SUNNY COVE WASH				
A. above Structure	75% C	25% B		
10% Desert Brush	89	83		87
B. below Str.	100% C			
Low Density urban	89			89

				weighted CN
SUNSET WASH				
A. Above Structure	75% C	25% B		
10% Desert Brush	89	83		87
B. Below structure	100% C			89

C.

CASANDRO WASH				
A. Above Structure	75% C	25% B		
10% Brush	89	83		87
B. Below Str.	100% C			89
Low Density House				

Powder House WASH	25% D	50% C	25% B	
A. 10% Desert Brush 15% Desert Pavement (25%	91	88	82	87
B. Low Density urban	100% C			89

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470868

STATE	PROJECT			
Arizona	Wickenburg PL			
BY	DATE	CHECKED BY	DATE	JOB NO.
J. Malone	1-22-70			

SUBJECT

SHEET ____ OF ____

Design Precipitation

Use 24 hour Type 2 storm

24 hr Precip (Partial series) (AHD MAPS)

50 yr = 3.75"
25 yr = 3.40
10 yr = 2.70

Compute 1 to 10 Day Precip

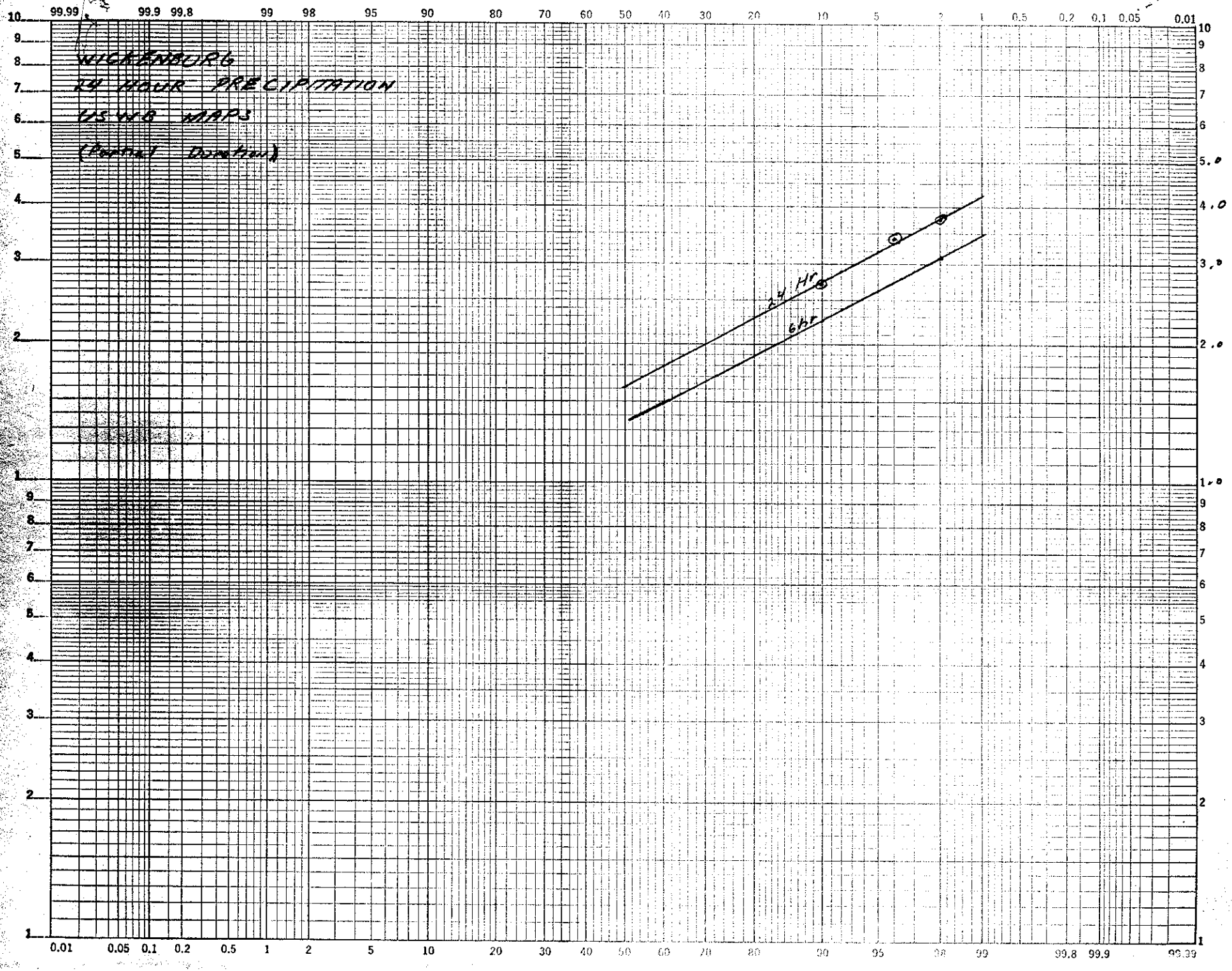
2 yr 24 hr P = 1.60
2 yr 6 hr P = 1.35
2 yr 1 hr P = 0.95
2 yr 10 day P = 2.90

2 yr 10 day P = 3.0 TP 149
100 yr 10 day P = 8.0 TP 149

$R = \frac{P_{100}}{P_2} = \frac{8.0}{3.0} = 2.66$

Revised 100 yr 10 day P =
= (2.66) (2.90) = 7.71 in

K+E PROBABILITY LOGARITHMIC 359
KEUFFEL & ESSER CO. MADE IN U.S.A.
2 CYCLES



J. Malone
9/69

HYDROLOGY WORKSHOP

Step Procedure for ESH and FH Precipitation

1. Determine 6 hour - 100 year Precipitation
2. Determine 6 Hour PMP
3. Compute 6 Hour Precipitation by Formula for Applicable Structure Classification (Spread Sheet)

Step Procedure for 1 to 24 Hour Duration

1. Select 6 and 24 Hour Precipitation from Precipitation Maps
2. Plot 6 and 24 Hour Precipitation on Duration Graph No. 2 - TP 40
3. Connect 6 and 24 Hour Amounts with a Straight Line
4. Read any Duration Amount

Step Procedure for 1 to 10 Day Precipitation Amounts

The procedure for estimating a 100-year 10-day precipitation amount for a specific location is as follows:

1. Select the 2-year 24-hour and 2-year 6=hour rainfall amount from the revised state maps.

2. Estimate the 2-year 1-hour rainfall from figure 2 of Technical Paper No. 40 using the values selected in step 1. Where regional studies have indicated a different relationship than indicated by figure 2 Technical Paper No. 40, the revised values should be used. (Arizona and New Mexico).

3. Estimate the 2-year 10-day precipitation from figure 6 of Technical Paper No. 49.

4. Estimate the 2-year 10-day and 100-year 10-day precipitation amounts from Technical Paper No. 49 (map value) and calculate the ratio of the 100-year 10-day amount to the 2-year 10-day amount.

5. Multiply the 2-year 10-day precipitation amount obtained from figure 6 by the ratio calculated in step 4 to obtain a revised 100 year 10-day amount.

J. Nelson
9/69

LUBBOCK [illegible]

Land Use	[illegible] 1/
Low Density Residential	[illegible]
Medium Density Residential	[illegible]
High Density Residential	[illegible]
Business - Commercial	[illegible]
Light Industrial	[illegible]
Heavy Industrial	[illegible] - 70

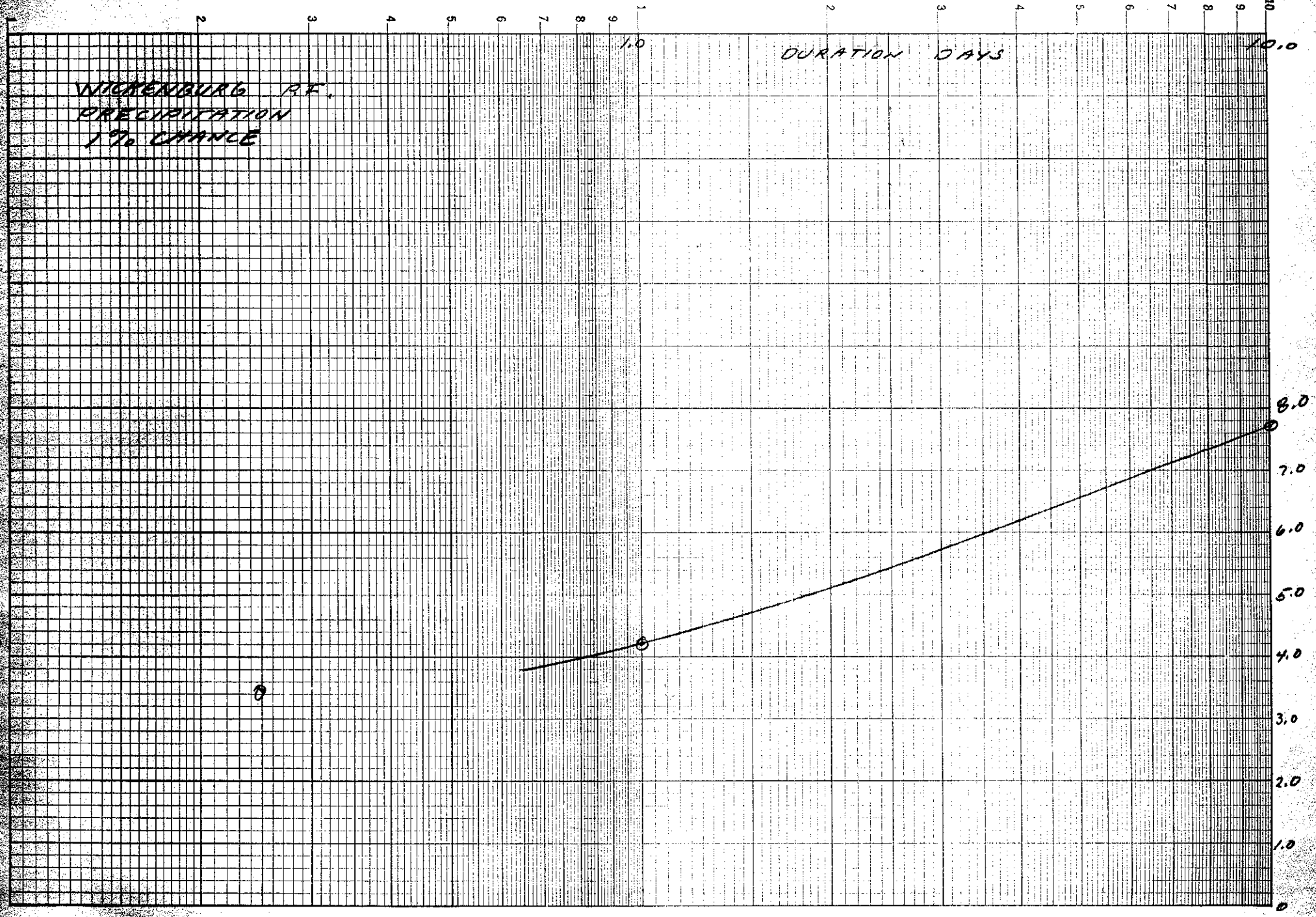
1/ Effects of Urbanization on Storm Runoff - Cedarosh and Bertand - South Pacific Division - Corps of Engineers. Presented to Water Management Subcommittee, DSI/S, March 1969.

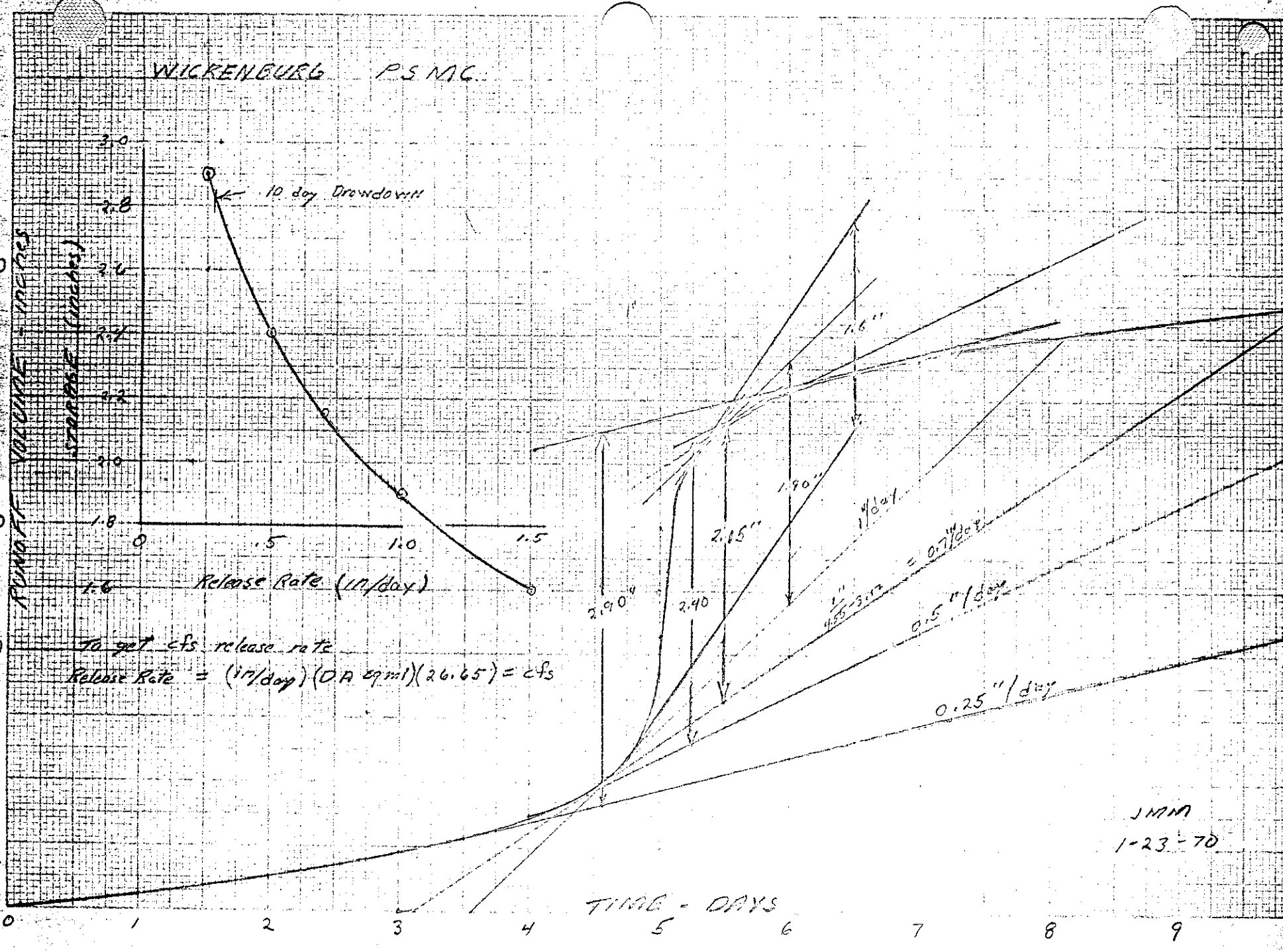
RATIO Tc URBAN / Tc RURAL
1
2
3
4
5

Table 2 - Empirical factors for converting probable
duration costs to [illegible]

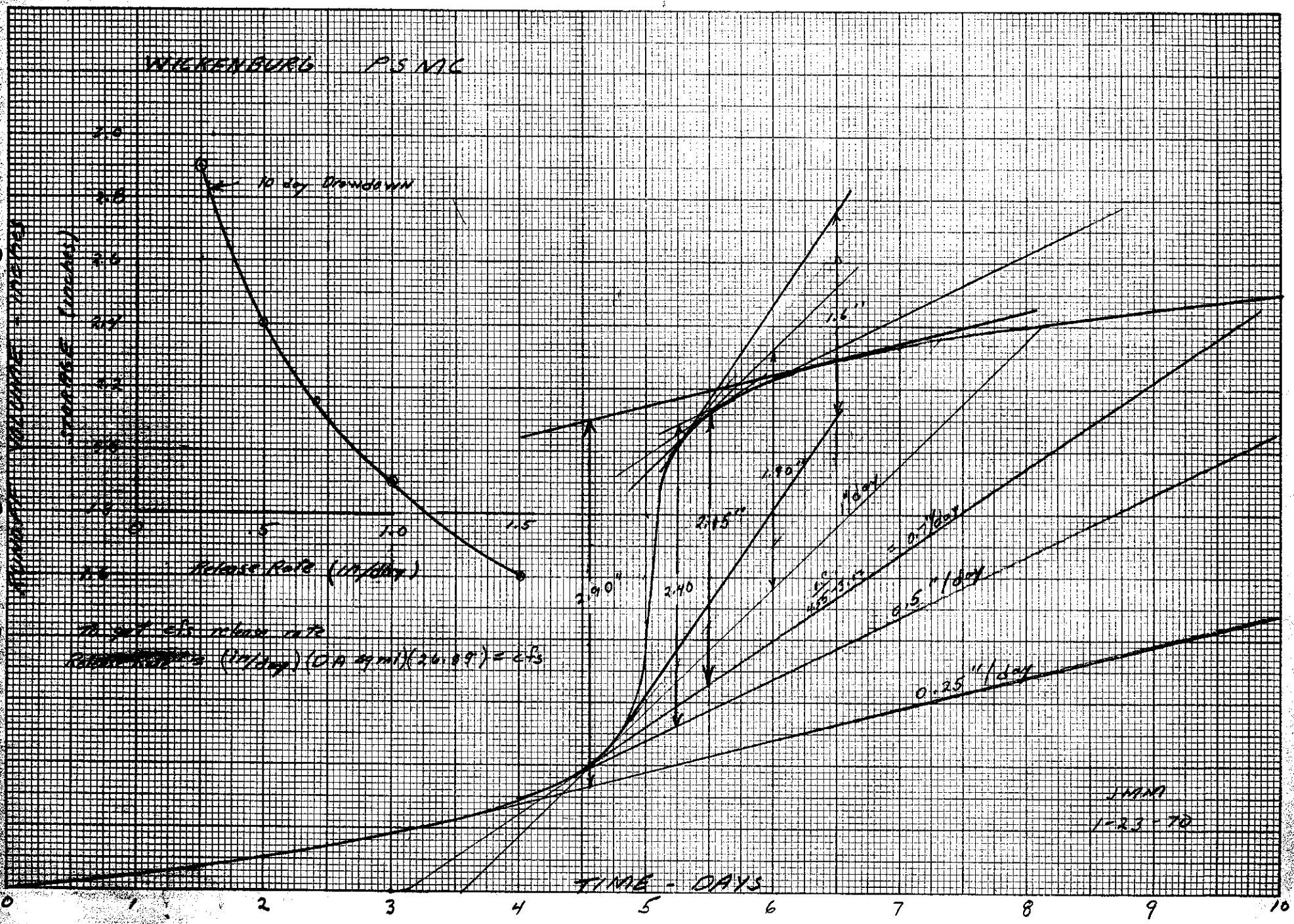
Return Period	Conversion Factor
20year	0.00
50year	0.00
100year	0.00

LOGARITHMIC 359-6
KEUFFEL & ESSER CO. MADE IN U.S.A.
2 CYCLES X 70 DIVISIONS




WICKENBURG P.S. MC.
10 day Drawdown
Runoff Volume - inches
Storage (inches)
Release Rate (in/day)
To get cfs release rate
Release Rate = (in/day)(DA sq mi)(26.65) = cfs
2.90"
2.40
2.15"
1.90"
1.6"
1"/day
0.5"/day
0.25"/day
TIME - DAYS
JMM
1-23-70

K+E 10 X 10 TO ½ INCH 46 1323
10 IN. IN U.S.A.
KEUFFEL & ESSER CO.



SCS-750-A
7-67

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Sheet ____ of ____

State _____ Watershed _____ Site No. _____

PRINCIPAL SPILLWAY HYDROGRAPH

By _____ Date _____ Ck'd _____ Date _____

		Source of Data
DA	1.4 1.8 Sq. Mi.	
T_c	1.5 Hrs.	
Structure Class		
Design Storm Freq.	100 yr	
Pa	10.99 in.	
Ta	64.7 °F	
Pm	in.	
Tm	°F	
Ci	0.26	

		1 Day	10 Day	
(1)	Point P	4.20"	7.71"	
(2)	Areal Corr.	x 1.00	x 1.00	
(3)	Areal P	4.20"	7.71"	
(4)	CN	87	76	
(5)	Gross Q	2.82"	4.90"	
(6)	Channel Loss Factor	x .98	x .97	when Ci<1
(7)	Net Q	2.76"	4.75"	
(8)	Q_1/Q_{10} 2.76" / 4.75" =	0.58		
(9)	Hydrograph Serial No.	5		
(10)	1" Q		ac. ft.	
(11)	DA x Q_{10} 1.4 1.8 x (4.75) =			6.65 8.55
(12)	Q_{10} x ac. ft./in. ____ x ____ =			

(13)	Baseflow		csm.	
(14)			in./da.	(13) ÷ 26.89
(15)			cfs	(13) x DA
(16)			ac. ft./da.	(15) x 2
(17)	Minimum		csm.	
(18)			in./da.	(17) ÷ 26.89
(19)	Snowmelt		csm.	
(20)			in./da.	(19) ÷ 26.89
(21)			cfs	(19) x DA
(22)			ac. ft./da.	(21) x 2

1/ Mark out items not applicable.

①	②	③	④	⑤
	← PSMC OR PSH 1/			→
Time (Days)	Prelim. PSMC PSH ( )	Base flow Snowmelt ( )	Upstream Releases ( )	Total PSMC PSH ( )
	Table 21.10 x (12) or Q 10 or (11)	① x (16) or (22) (14) or (20) (15) or (21)		②+③+④
0			0	
.1			.004	
.5			.048	
1.0			.110	
2.0			.254	
3.0	10.47		.441	
3.5	12.67		.563	
4.0	17.2		.728	
4.2	24.0		.808	
4.4	28.8		.911	
4.6	35.5		1.040	
4.7	42.4		1.118	
4.8	56.1		1.216	
4.9	86.6		1.358	
5.0	695.8		2.137	
5.1	268.1		3.097	
5.2	110.0		3.473	
5.3	61.1		3.644	
5.4	43.3		3.748	
5.5	35.1		3.826	
5.6	25.6		3.886	
5.8	21.8		3.980	
6.0	17.3		4.058	
6.5	14.3		4.205	
7.0	11.5		4.324	
8.0	7.9		4.503	
9.0	6.2		4.640	
10.0			4.742	
10.1			4.750	

USDA-SCS-HYATTSVILLE, MD. 1967

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470868

STATE	PROJECT		
Arizona	Wickenburg PI		
BY: J. Malone	DATE: 1-26-70	CHECKED BY	DATE	JOB NO.

SUBJECT

SHEET ____ OF ____

Peak Rates of Runoff for Evaluation

Use Tc vs CSM/inch (24 hr Type 2 Storm)

Sunny Cove Wash — DA = 1.55 sq. mi. CN = 87
Tc = 0.60 hours
qp = 340 csm/inch
qp = (340)(1.55) = 527 cfs/in

Sunnyset Wash — DA = 0.80 sq. mi. CN = 87
Tc = 0.50 hr qp = 380 csm/in
qp = 304 cfs/inch

Un Named Wash — DA = 0.25 CN = 87
Tc = 0.42 hr qp = 420 csm/inch
qp = 105 cfs/inch

Casandro Wash — DA = 1.60 CN = 87
Tc = 0.59 qp = 330 csm/in
qp = 528 cfs/inch

Powderhouse Wash — DA = 1.81 CN = 87
Tc = 0.63 hr qp = 330 csm/in
qp = 597 cfs/inch

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1959 O—470068

STATE		PROJECT		
Arizona		Wickenburg PI		
BY	DATE	CHECKED BY	DATE	JOB NO.
J. MM	1-26-70			

SUBJECT

SHEET ____ OF ____

Time of Consentration

Data from USGS QUAD & FIG 31

Drainage Area	Sq. mi	slope*	(5% slope Tc hr.	W ft	Rev Tc hr
Casandro	1.36	$\frac{2460-2200}{12000} = 2\%$	0.59	2000	.59
Sunnyset	0.60	$\frac{2420-2000}{16000} = 2\%$	0.50	2400	.50
Sunny Cove	1.42	$\frac{2460-2000}{20000} = 2\%$	0.60	2400	.60
Unnamed	0.25	$\frac{2200-2100}{6000} = 3\%$	0.42	1500	.42
Powder House	1.81	$\frac{2700-2100}{14000} = 4\%$	0.63	7000	.63

* These slopes indicate average channel slope
Land slopes are much steeper and average
6% to 10% or greater For P.I.
I will use 5% as avg watershed Slope

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470858

STATE	PROJECT		
Arizona	Wickenburg PL		
BY: J. Malone	DATE: 1-26-70	CHECKED BY	DATE	JOB NO.

SUBJECT: Peak Rates of Runoff for Evaluation Cont. (24 hr) Present Conditions without Project

SHEET ____ OF ____

CN = 87

	1%	10%	50%	DA	Tc	cfs/in
Precip	4.20	2.70	1.60	sq. mi	hr	
Q	2.82	1.47	0.61			
Sunny Cove	1486 cfs	775 cfs	321	1.55	.60	527
Sunset	857	446 "	185	0.80	.50	304
Unnamed	296	154 "	64	0.25	.42	105
Casandro	1489	776 "	322	1.60	.59	528
Powderhouse	1683	877 "	364	1.81	.63	597

FUTURE CONDITIONS WITHOUT PROJECT

Assume entire watersheds are developed into low density residential housing with paved streets - 35% impervious

Times of Concentration increase by factor

$\frac{T_{urban}}{T_{c\ rural}} = .45$ from draft ch 15

	1%	10%	50%	DA	Tc	cfs/in
Sunny Cove	2185	1139	472	1.55	.27	500	775
Sunset	1240	647	268	.80	.22	550	440
Unnamed	423	220	91	.25	.18	600	150
Casandro	2346	1223	507	1.60	.26	520	832
Powderhouse	2552	1330	552	1.81	.28	500	905

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470668

STATE		PROJECT		
BY	DATE	CHECKED BY	DATE	JOB NO.
SUBJECT				SHEET ____ OF ____

X-Sec No. 4

Elev = 52.5

A = 475 ft²

WP = 175

R = 2.42

$S = \frac{2}{120} = .0166$

$V = \frac{1.49}{.025}(2.42)^{2/3}(.0166)^{1/2} = 13.8$

Q = 6580 cfs

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470868

STATE	PROJECT		
Ariz	WICKENBURG P1		
BY	DATE	CHECKED BY	DATE	JOB NO.
J. Malone	1-26-70			

SUBJECT

SHEET ____ OF ____

Powderhouse Wash
X-Section Data from Kolch Map

NO. 2		NO. 3		NO. 4	
ELEV	DIST	ELEV	DIST	ELEV	DIST
2070.0	0	2070	0	2060	0
64.0	12	64	8	58	8
64.0	250	62	40	56	18
66.0	275	62	180	54	30
68.0	276	60	214	52	36
68	286	60	230	50	40
66	292	64	236	50	80
64	298	64	240	50	170
62	308	60	246	50	400
62	350	56	256	48	410
64	356	56	286	48	470
66	360	60	298	50	480
68	368	62	304	52	580
68	370	62	310	60	600
66	380	60	320		
64	384	58	330		
64	528	58	380		
70	548	58	640		
		70	666		

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470666

STATE		PROJECT		
BY	DATE	CHECKED BY	DATE	JOB NO.

SUBJECT

SHEET ____ OF ____

RATING CURVE COMPUTATION

X-Section No 1 n = .035 V = 16.4 R^2/3 S = .0227 n = .060 V = 4.49 R^2/3 S^1/2 = .1507

ELEV	A	WP	R	V	Q	A	WP	R	V	Q
	Segment 1					Segment 2				
68	0				cfs	0				
80	120	64	1.87	9.73	1167					
82	246	68	3.61	15.1	3705	382	160	2.38	7.99	3052
84	372	[illegible]				[illegible]				

X-Sec No. [illegible]

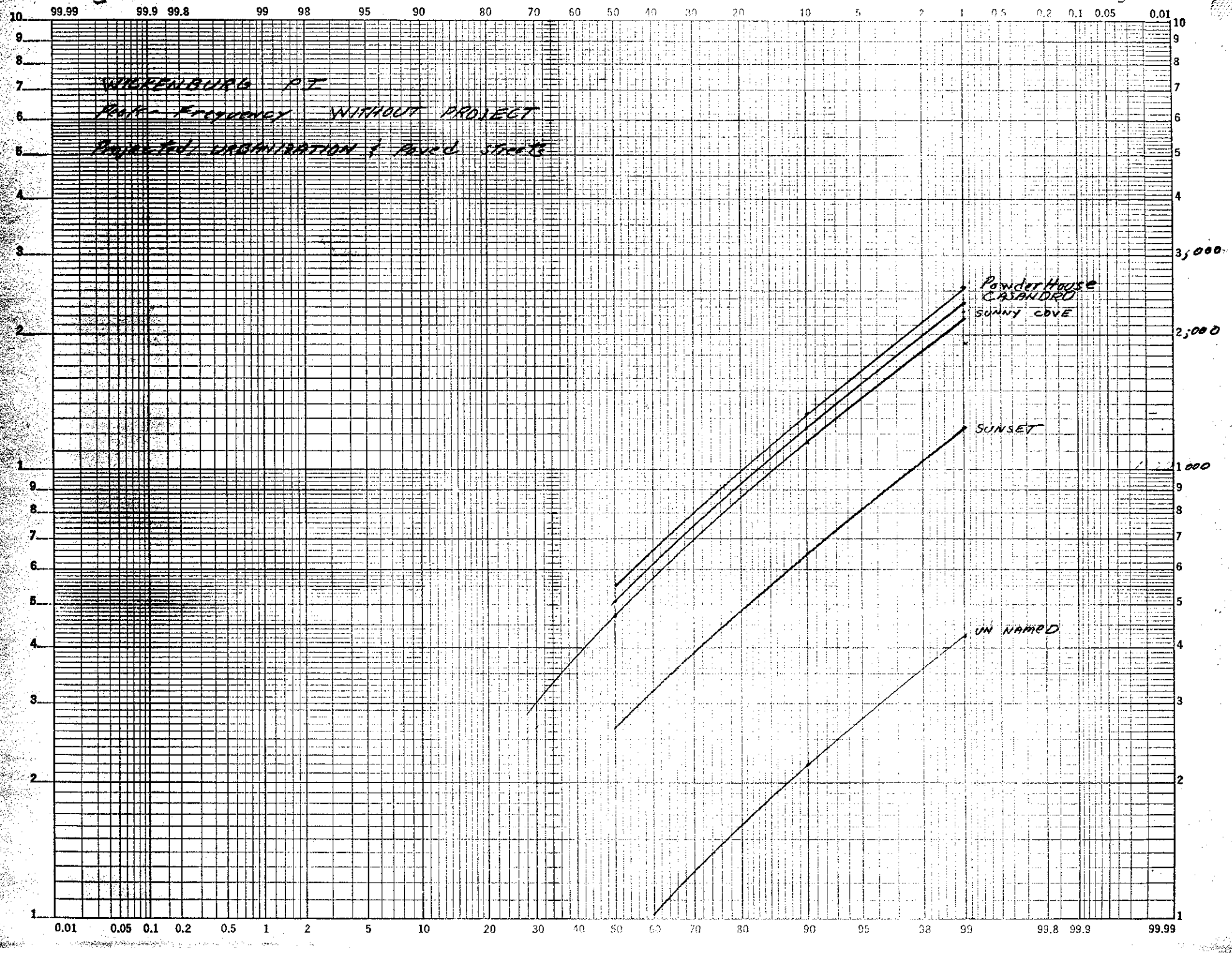
ELEV	A	WP	R	V	Q	A	WP	R	V	Q
	Segment 2					Segment 3				
62	0									
64	100	56	1.78	9.42	942	0				
66	228	78	2.92	13.1	2980	292	154	1.89	6.86	2003

NO. 3

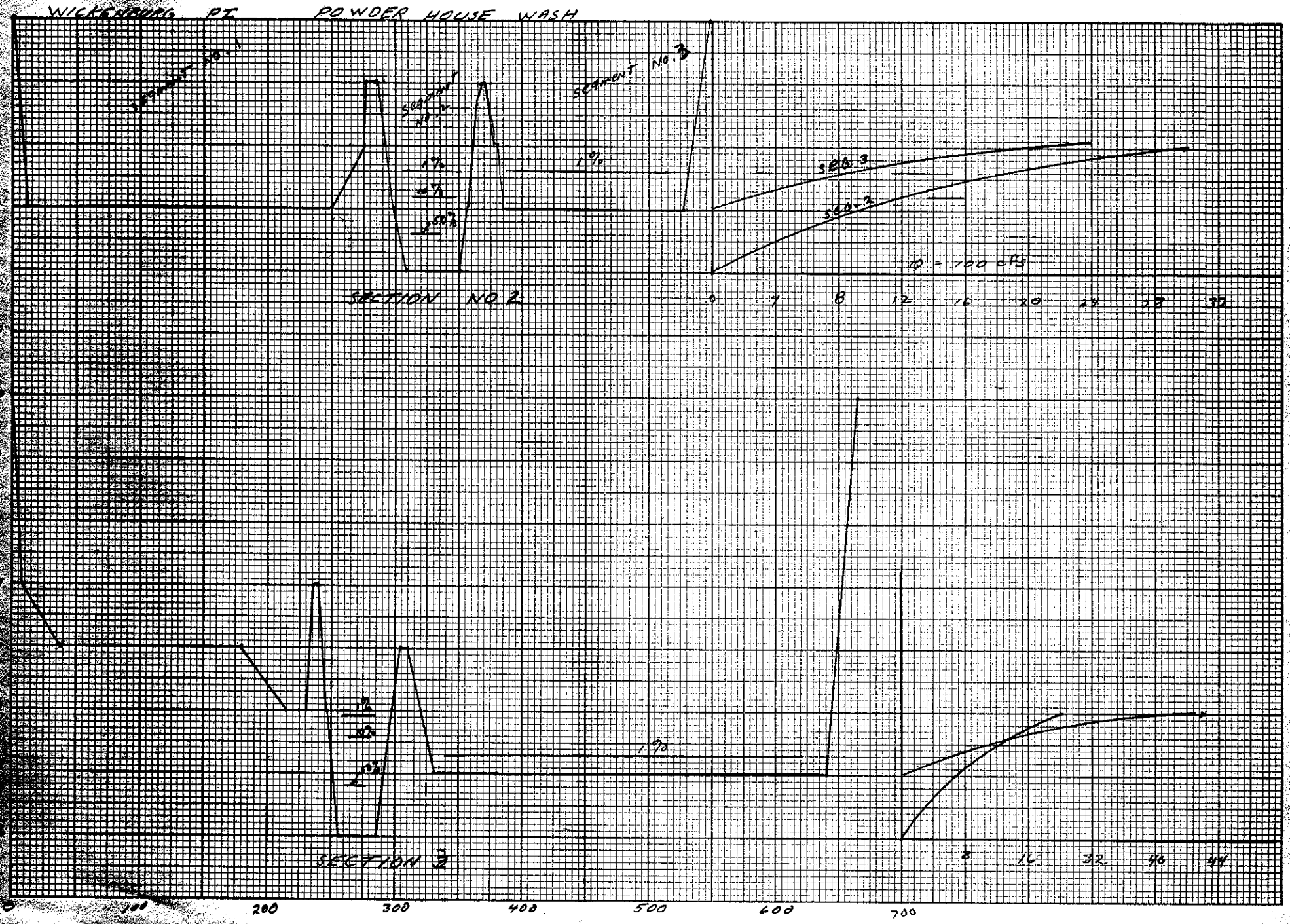
ELEV	A	WP	R	V	Q	A	WP	R	V	Q
56	0									
58	70	39	1.79	9.42	659	0				
60	160	58	2.76	12.6	2020	630	330	1.70	6.86	4320

NO. 4

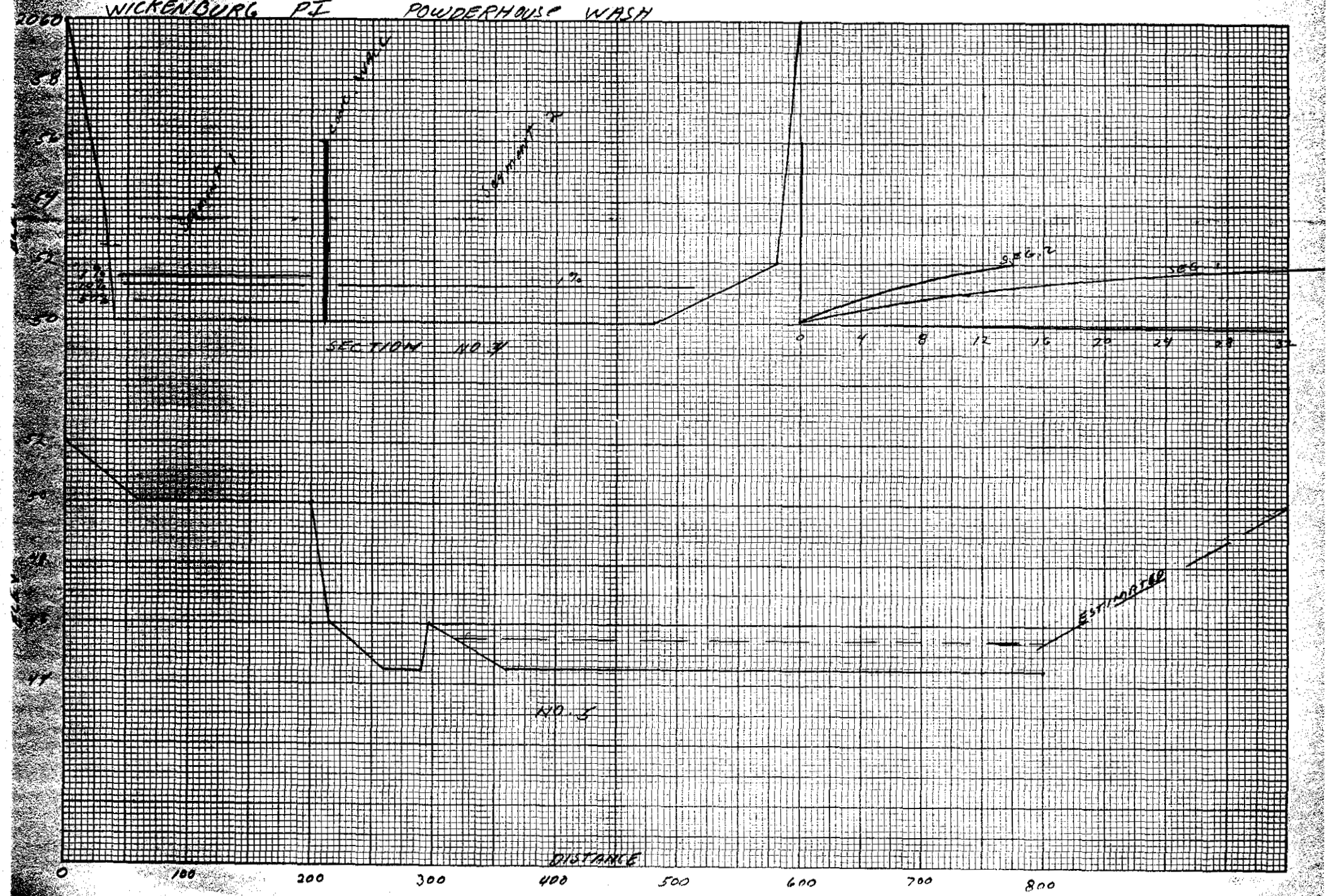
ELEV	A	WP	R	V	Q	A	WP	R	V	Q
50	0					0				
51	170	170	1.00	6.41	1090	315	315	1.00	4.49	1414
52	356	182	2.00	10.2	3630					


WARRENBURG PT
PEAK - FREQUENCY WITHOUT PROJECT
PROJECTED URBANIZATION & PAVED STREETS
PowderHouse
CASANDRO
SUNNY COVE
SUNSET
UN NAMED
3,000
2,000
1,000
99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99

K+E 10 X 10 TO ½ INCH 46 1323
10 IN. IN U.S.A.
KEUFFEL & ESSER CO.



K+E 10 X 10 TO ½ INCH 46 1323
KEUFFEL & ESSER CO.

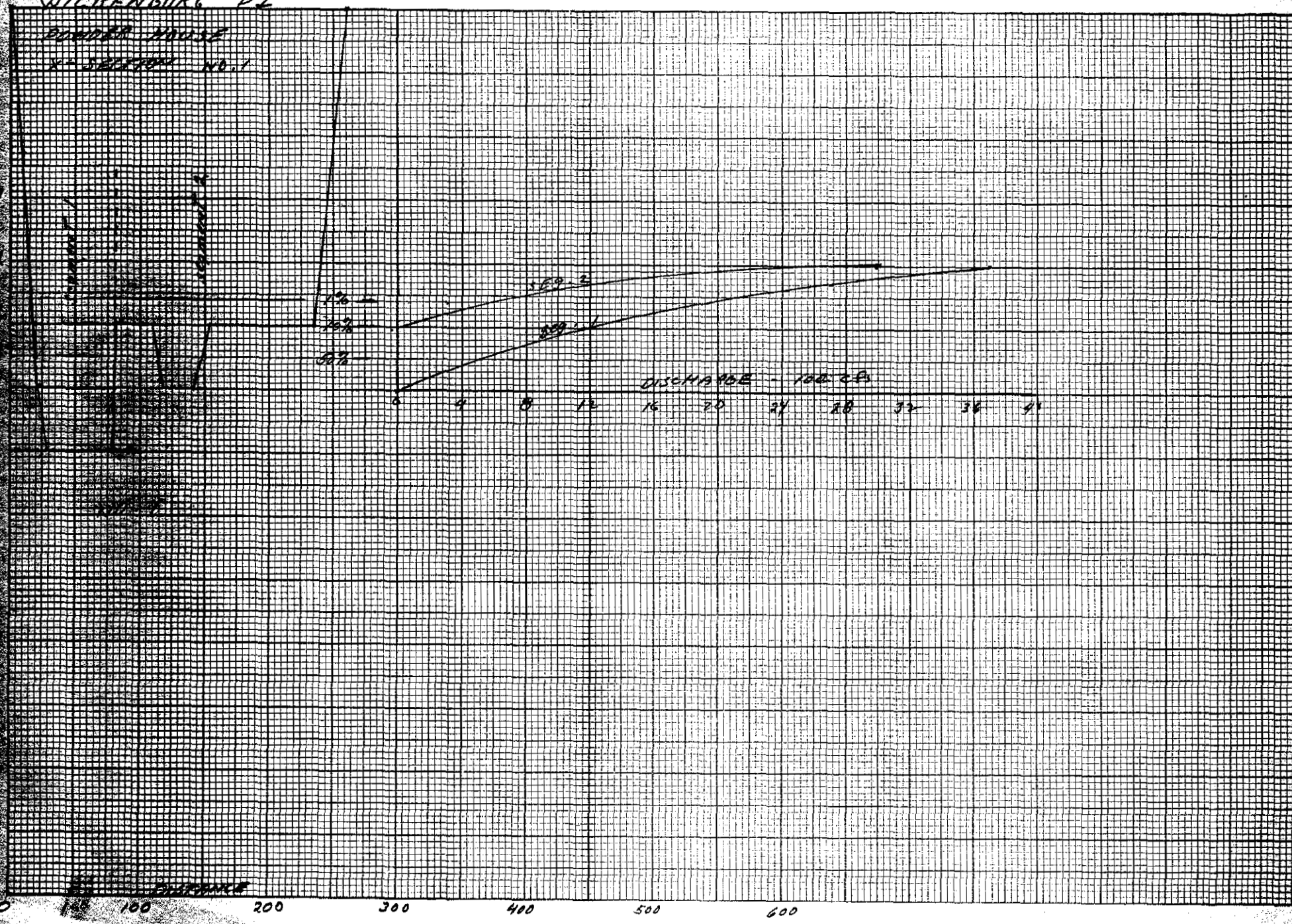


K+E 10 X 10 TO ½ INCH 46 1323
10 IN. IN U.S.A.
KEUFFEL & ESSER CO.

90 WICKENBURG DI

POWDER HOUSE

X-SECTION NO. 1



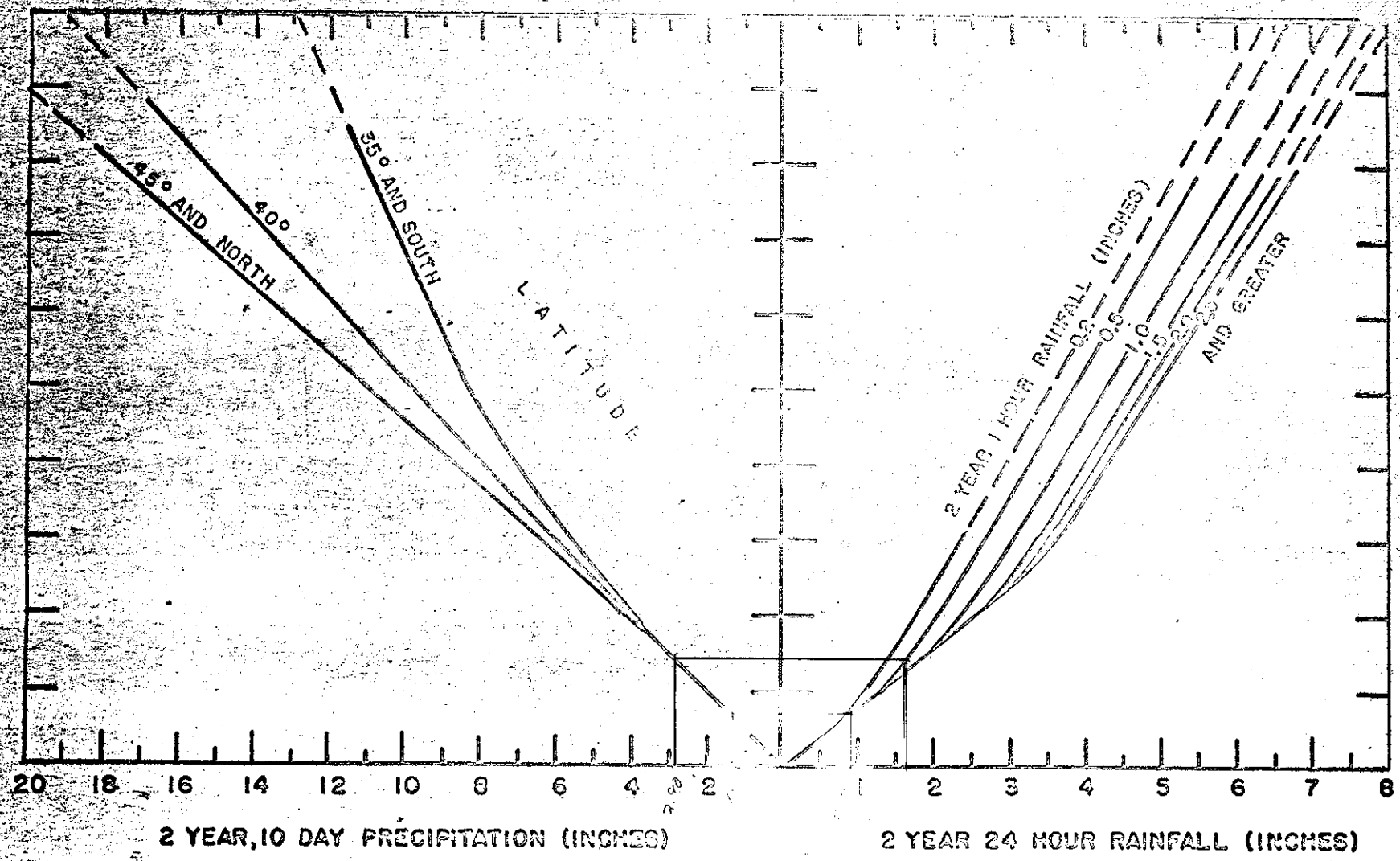


FIGURE 6.- Relation for estimating 2 year 10 day precipitation from 2 year 1 and 24 hour rainfall and latitude

WICKENBURG

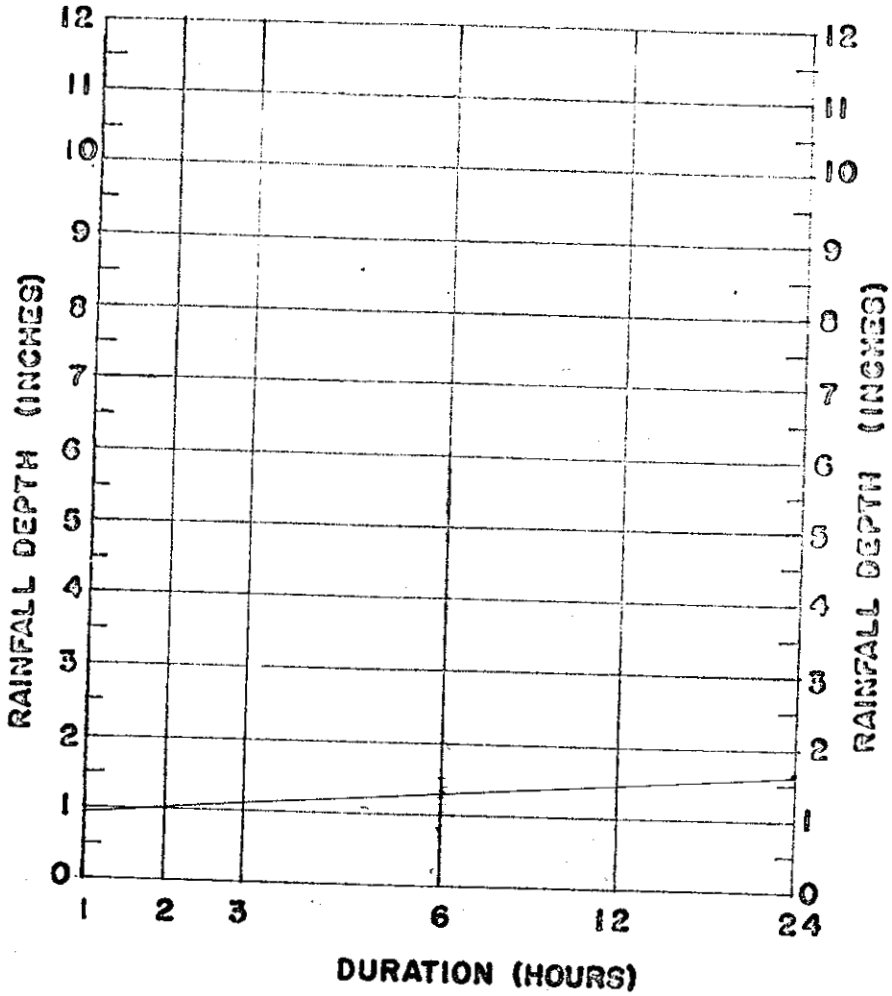


FIGURE 2 - Rainfall depth- duration diagram

TP 40

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1956 O—470866

STATE		PROJECT		
ARIZONA				
BY	DATE	CHECKED BY	DATE	JOB NO.
J. MALONE	1-28-70			
SUBJECT				SHEET ____ OF ____

NO. 5		NO 1			
ELEV	DIST	ELEV	DIST	ELEV	DIST
2052	0	70	0		
2050	60	60	20		
2050	200	58	22		
46	216	56	28		
44.5	280	56	78		
44.5	290	60 ~~58~~	82		
46	296	60	112		
44.5	300	58	118		
44.5	800	58	142		
		60	154		
		60	236		
		70	280		

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470868

STATE	PROJECT			
Arizona	Wickenburg PI			
BY	DATE	CHECKED BY	DATE	JOB NO.
J Malone	1-28-70			

SUBJECT

SHEET ____ OF ____

Sunset - Flood Plain x-Sections

from Topog map

NO. 20

ELEV	DIST.
2050	0
48	8
46	220
44	344
43.5	364
44	380
	8
50	400

NO 19

ELEV	DIST
60	0
56	0
54	110
52.5	130
54	150
56	170
56	580
58	640
60	660

NO. 18

ELEV	DIST
70	0
68	0
66	20
64	40
62	280
60	290
58	328
58	332
60	340
70	360

NO. 17

ELEV	DIST
70	0
68	0
66	22
64	30
62	224
60	230
58	260
58	266
60	272
70	288

NO. 16

ELEV	DIST
90	0
86	10
84	40
84	86
86	230
84	238
82	240
81	260
82	274
84	280
84	290
84	300
84	380
82	470
80	494

NO. 15

ELEV	DIST
90	0
80	20
80	280
81	320
80	340
79.5	360
80	380
82	394
84	408
84.5	440
84.0	468
82.0	480
82.0	550
90	580

COMPUTATION SHEET

SCS-522 REV 5-58

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1956 O—[illegible]

STATE	PROJECT			
ARIZONA	WICKENBURG PI			
BY	DATE	CHECKED BY	DATE	JOB NO.
J. MALONE	1-28-70			

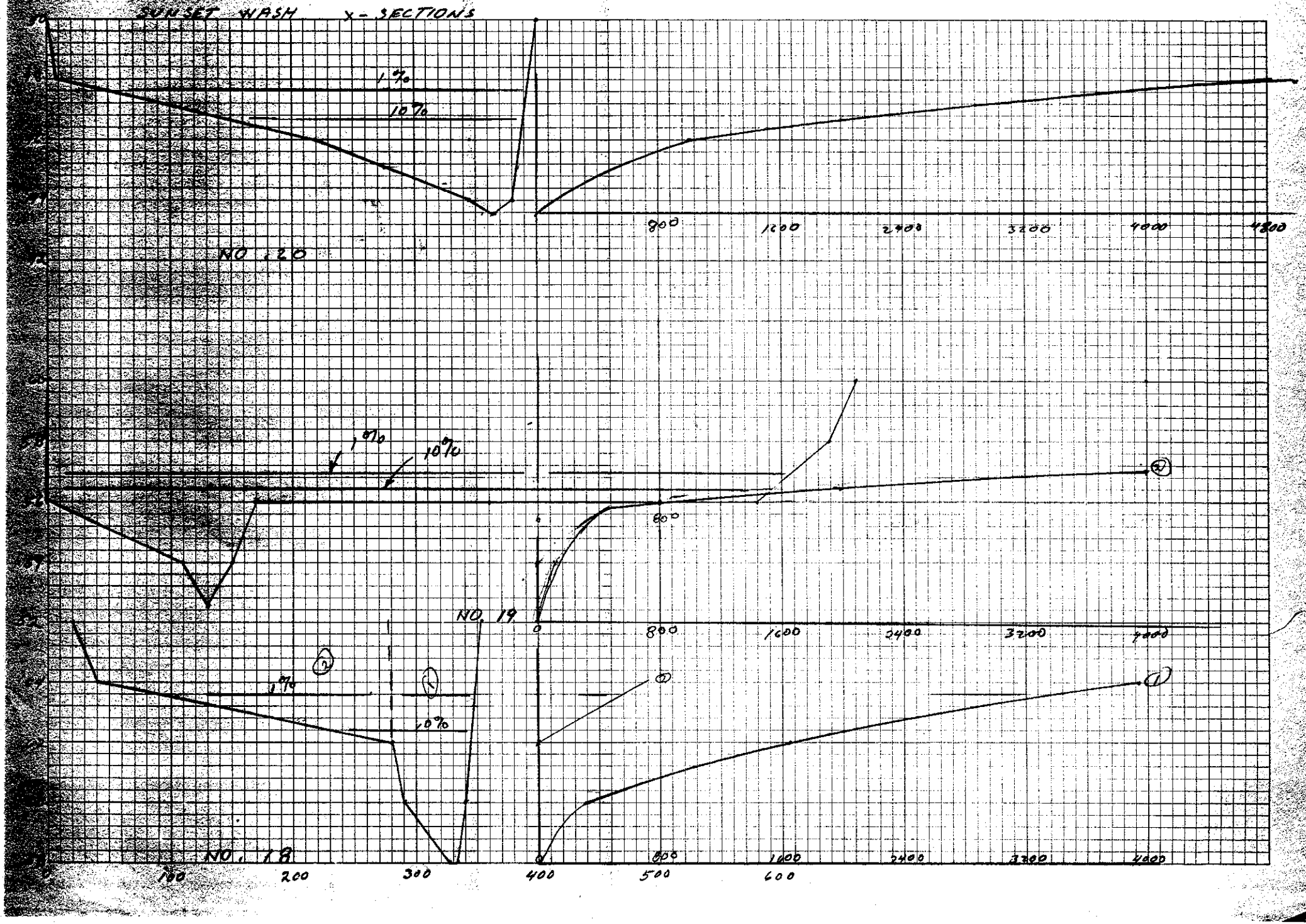
SUBJECT

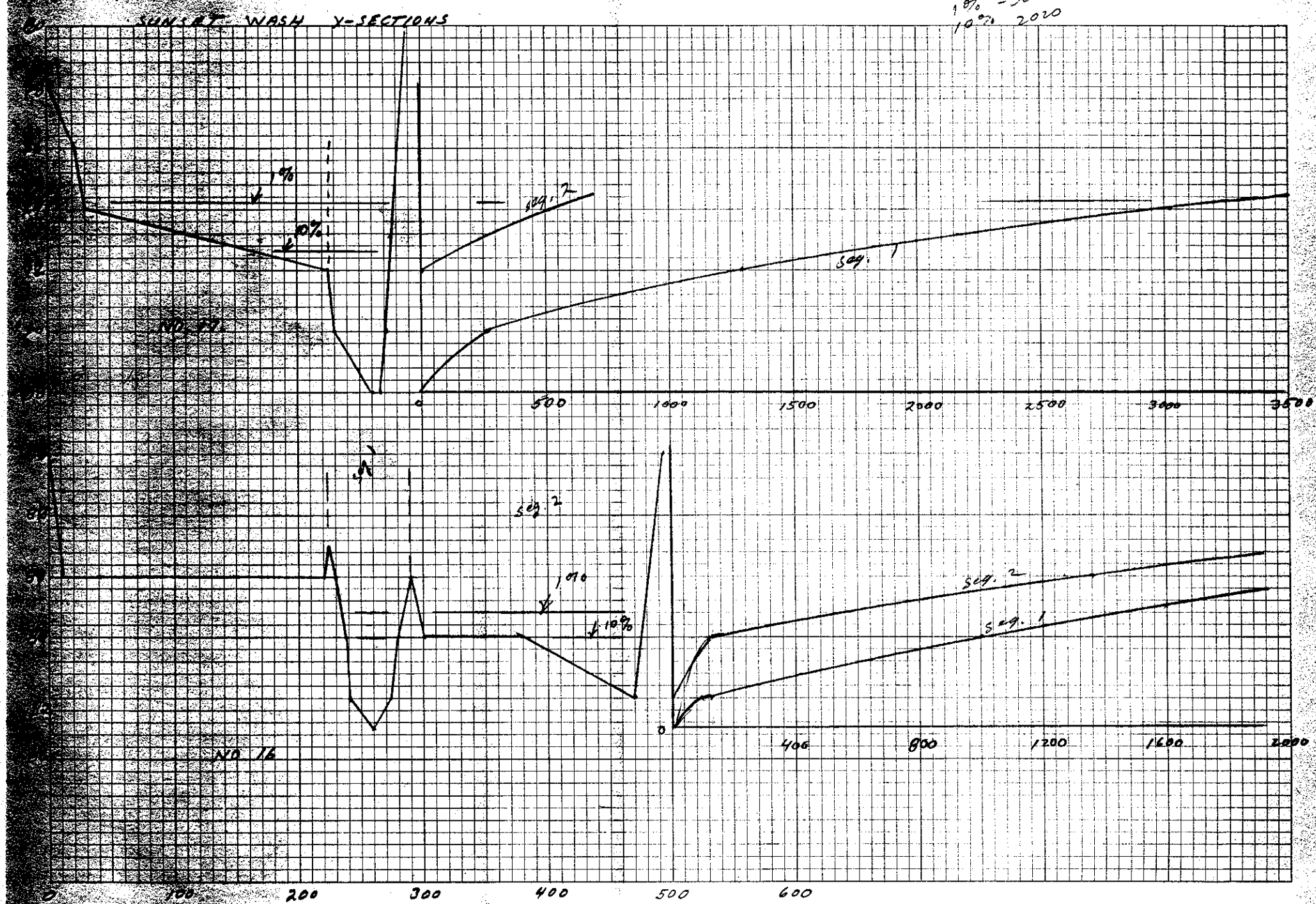
SUNSET WASH X-SECTIONS

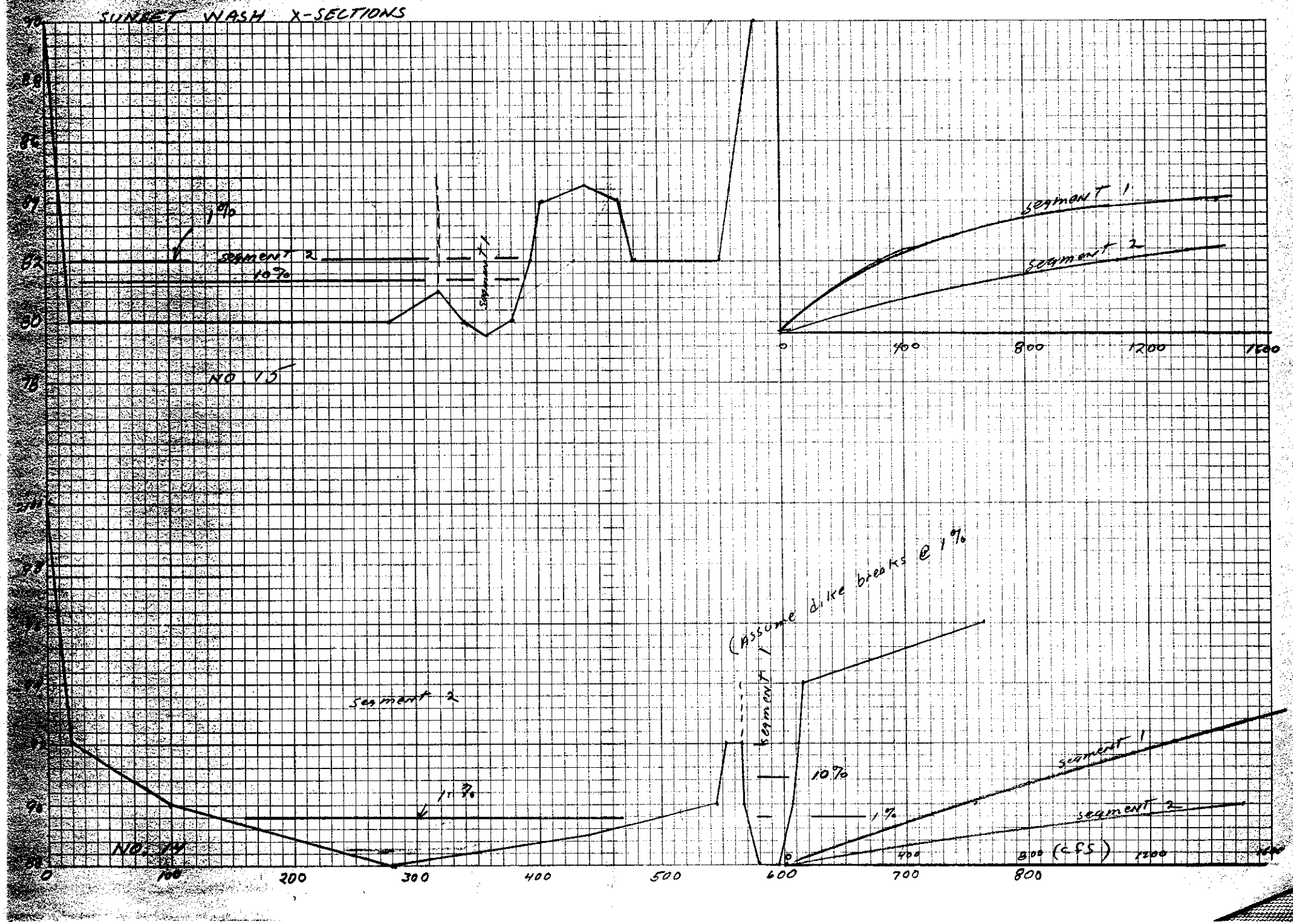
SHEET ____ OF ____

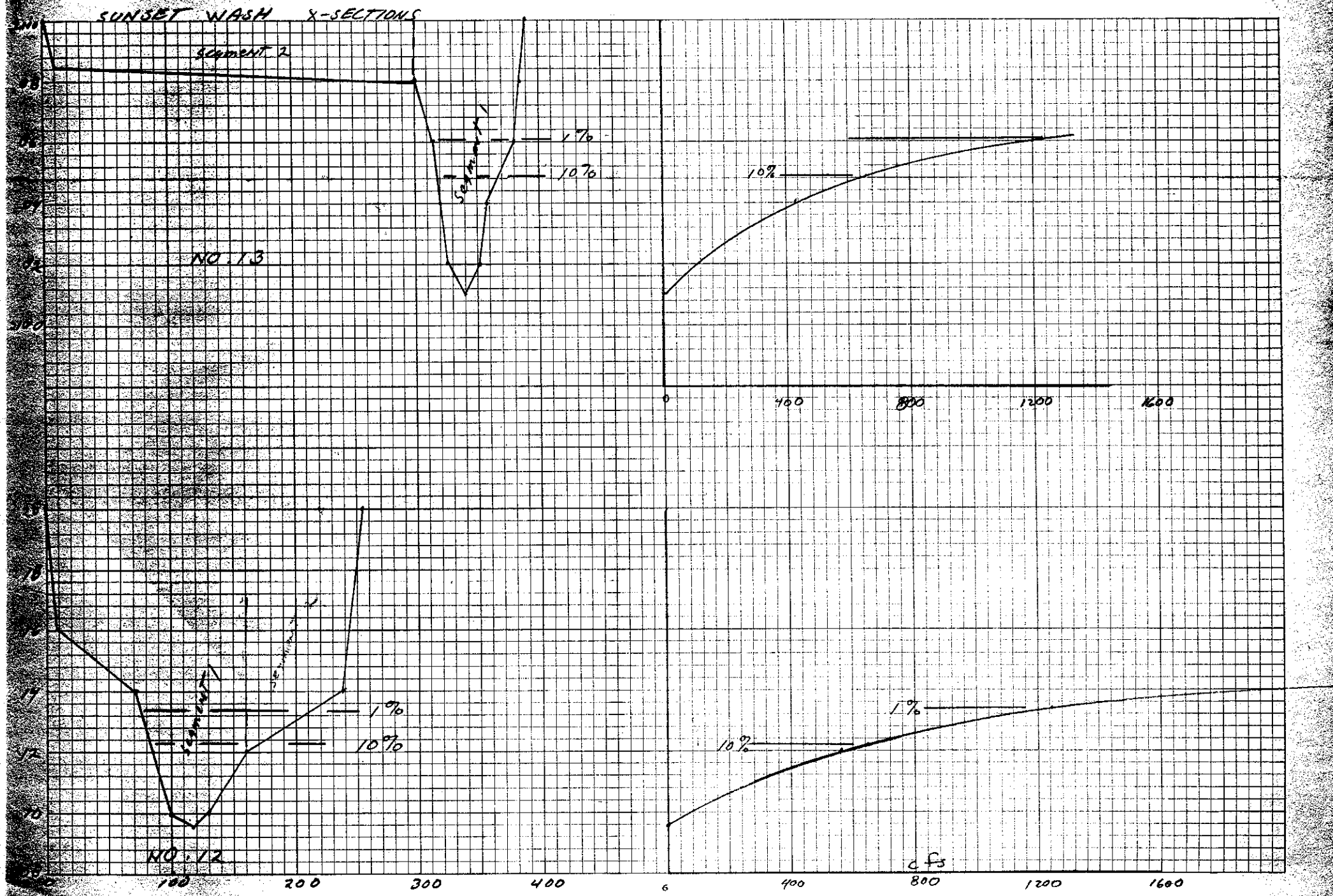
NO. 14		NO. 13		NO. 12	
ELEV	DIST	ELEV	DIST	ELEV	DIST
2100	0	2120	0	2120	0
2092	20	2098.5	10	2116	10
90	100	98.5	260	14	72
88	280	98	300	12	84
89	440	96	314	10	100
90	544	94	320	9.5	118
92	552	92	324	10	130
92	560	91	340	12	160
90	568	92	352	14	238
88	580	94	358	20	254
88	596	96	380		
90	608	98	384		
92	612	2100	390		
94	616				
96	760				
2100	780				

NO. 340R-10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH
EUGENE DIETZGEN CO. U.S.A.




SUNSET WASH Y-SECTIONS
1% = 3820
10% 2020
seg. 2
seg. 1
1%
10%
NO. 27
0
500
1000
1500
2000
2500
3000
3500
seg. 2
1%
10%
seg. 2
seg. 1
NO. 16
0
400
800
1200
1600
2000
0
100
200
300
400
500
600


SUNKET WASH X-SECTIONS
NO. 15
NO. 14
segment 1
segment 2
1%
10%
(assume dike breaks @ 1%)
(cfs)
0
100
200
300
400
500
600
700
800
1200
1600


SUNSET WASH X-SECTIONS
segment 2
segment 1
1%
10%
NO. 13
segment 1
segment 2
1%
10%
NO. 12
10%
1%
10%
1%
cfs
0
400
800
1200
1600
100
200
300
400
400
800
1200
1600

WICKENBURG.

Solve for [illegible] area to satisfy

1) Q_1 = 1000 cfs
2) Q_2 = 24000 cfs
3) $q_1 = K\, q_2$
   where q_1 & q_2 = CSM
4) A_2 = 1200 sq. mi
   q_2 = 20 CSM
   Q_2 = 24000 cfs
5)
$$K = \frac{A_1 \uparrow\left(\frac{.894}{A_1} - 1\right)}{A_2 \uparrow\left(\frac{.894}{A_2} - 1\right)} = \frac{C_1}{C_2} = \frac{C_1}{.075}$$

where
$$C = A \uparrow\left(\frac{.894}{A^{.5}} - 1\right) = 1200 \uparrow\left(\frac{.894}{1200^{.5}} - 1\right) = .075$$
$$C = \frac{1}{A^{.7}}$$

<u>Solution</u>

Area	C	K	CSM	cfs
A_2 = 1200	.0758			
A_1 = 1	1.00	13.33	266.	266.
2	.910	12.00	240.	480.
5	.757	9.987	199.	998.
10	.632	8.337	166.	1667.
30	.441	5.817	116.	3490.
70	.316	4.168	83.	5835.
100	.271	3.575	71.5	7150.
300	.161	2.124	42.48	12744.
700	.103	1.358	27.16	19,012
1200	.0758	1.00	20.00	24,000

For Sunset wash use DA = 10.0 sq. mi q = 1667 cfs at the junction with Hassyampa River

WSP. X-Sec	TR-20 NO.	cfs	DA
001		24000.	1200.
004	010	1600.	9.5
011	008	1695.	10.2
012	007	1050.	5.4
014	005	694.	3.1
015	004	917	4.5

COMPUTATION SHEET
SCS-523 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1956 O—576667

STATE	PROJECT		
Arizona	Wickenburg WS		
BY JPC / DATE 1/20/69	CHECKED BY	DATE	JOB NO.
SUBJECT Hydrology - Town Area west of river			SHEET 1 OF

higher east of river

extrapolated

Storm	24-hr P	24-hr Q	6-hr P	6-hr Q	2-hr P	2-hr Q	1-hr P	1-hr Q
1/100	4.2	3.01	3.4	2.26	2.8	1.72	2.6	1.54
1/50	3.8	2.64	3.1	1.99	2.5	1.46	2.3	1.19
1/25	3.4	2.26	2.7	1.63	2.2	1.19	2.0	1.03
1/10	2.7	1.63	2.2	1.19	1.8	0.86	1.7	0.78
1/5	2.2	1.19	1.9	0.94	1.6	0.71	1.5	0.63

Assume RCN = 89 L "C" soil, Desert Brush 10% cover.

Sunset & Sunny Cove
Rough q_p estimate

Upper X-section — Sunset

D.A. = 0.69 sq mi

L = 10,800' Δel = 180' s = 0.0166'/'

From Fig 3.2 t_c = 0.7 hrs

$$K = \frac{L}{\sqrt{s}} = \frac{10,800}{\sqrt{\frac{180}{10,800}}} = 83,851$$

Center Section below confluence of Sunset & Sunny Cove

Set both sunset = 0.15 hrs (9 mins)
where L = 2,100 Δel = 40' s = 0.019'/'

Dam 50% Sec 11
Sunny Cove Proper 38% control
@ below confluence 56% control
@ exp 0% control W/o Dam
W/ Dam

D.A. = 0.28 sq mi L = 8,500' Δel = 120', s = 0.014'/', t_c = 0.63 hr
D.A. = 1.01 sq mi L = 22,000 Δel = 340', s = 0.0103, t_c = 1.4 hr
D.A = 0.19 sq mi L = 4,000 Δel = 80', s = 0.02'/', t_c = 0.23 hr

Total Drainage Area @ 2nd x-sect = 2.58 sq mi

COMPUTATION SHEET
SCS-523 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
GPO : 1958 O—470847

STATE Arizona	PROJECT Wickenburg		
BY JPC	DATE 1/20/70	CHECKED BY	DATE	JOB NO.

SUBJECT Hydrology – town area – Sunset & Sunny Cove SHEET 2 OF

3rd section @ RR Bridge

T_T from 2nd section

L = 2,000 Δel 20' s = 0.01, t_T = 10 min = 0.17 hrs

D.A. = 0.07 □' t_c = 0.17 hrs.

Using Fig 3.8 developed by Rallison & Zhrstorm

Upper site D.A. = 0.69 □mi t_c = 0.7

	1/100	1/10	
Q	2.8"	1.8	
csm/in	437 (301.53)	437 ( )	
q_p	840	540	nearest 10
t_p	1.1	1.1	
$T_B = 2.67 t_p$	2.94	2.94	

2nd site w/o Dam

Add Hydrographs.

D.A. = 0.28 □' t_c = 0.63

csm/in	466 (130.48)	466
q_p	370	230
t_p	1.05	1.05
t_B	2.80	2.80

D.A. = 1.26 □' t_c = 1.4

csm/in	320 (581.5)	320
q_p	(1490)	960
t_p	1.95	1.95
t_B	3.87	3.87

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470888

STATE		PROJECT		
Ariz		Wickenburg PI		
BY	DATE	CHECKED BY	DATE	JOB NO.
J. Malone	1-9-70			
SUBJECT				SHEET ____ OF ____

Problem - Determine Area Flooded - frequency maps

Available Data

1. Maricopa Co. Flood Control district reports have very little useful accurate information on Hydrology

2. US. Corps of Engineer Report Vol. IV 1965
WICKENBURG REPORT Has info. on
1. Peak Discharge 50-100 S.P.F.
2. Problem areas
3. Flood Area Topog maps with flood lines
4. Cross Sections

Solution OFFICE
1. Check accuracy of flood maps Vs X-sections

2. Check Peak discharge computations

3. check Channel Hydraulics

Field
1. Survey sample X-section to check flood map & X-section

2. Preliminary Survey Watershed Soils & Cover

3. Preliminary Survey X-sec for Tc

OFFICE
1. Compute Peak-Freq (TR-20)
2. Check adequacy of flood maps - WSP
3. Outline additional data needed & work

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470868

STATE		PROJECT		
Ariz		WICKENBURG PI		
BY	DATE	CHECKED BY	DATE	JOB NO.
J. Malone	1-9-70			

SUBJECT: Evaluate Corps Report 1965

SHEET ____ OF ____

Problem: Check accuracy of x-sec
Sunset Wash x-sec C Plate 8 & 17

Solution

Tabulation from TOPOG

Dist	Elev
0	2070
2+20	2060
2+40	2058
2+50	2056
3+50	2054
3+70	2052
3+80	2052
4+10	2054
7+40	2054
8+50	2053
9+50	2054
9+70	2056
9+80	2060
10+00	

2+50

Conclusion

Left abutment does not agree with x-sec
℄ is ok
Rt abutment is OK
Flood lines on x-sec do not agree with flood lines on map.

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1956 O—470868

STATE		PROJECT		
Arizona		Wickenburg P1		
BY	DATE	CHECKED BY	DATE	JOB NO.
J. Malone				

SUBJECT

x-Section Hydraulics

SHEET ____ OF ____

Section No. 16 S = 2 %

Seg. 1 n = .030 V = 7.02 $R^{2/3}$ n = .050 Segment 2 V = 4.21 $R^{2/3}$

Elev	A	WP	R	V	Q	A	WP	R	V	Q
81	0									
82	20	30	.66	5.33	106	0				
84	90	44	2.05	11.3	1017	50	100	.50	2.65	132
86	190	70	2.71	13.6	2585	410	200	2.05	6.8	1354

No. 17 S = .0167

Seg. 1 n = .030 V = 5.13 $R^{2/3}$ n = .050 V = 3.08 $R^{2/3}$

El	A	WP	R	V	Q	A	WP	R	V	Q
58	0									
60	50	44	1.13	5.5	277					
62	140	58	2.41	9.2	1292					
64	240	62	3.87	12.6	3026	180	200	.90	2.9	514
66	340	66	5.15			580	210	2.76		

No. 18 S = .0125

Seg. 1 n = .030 V = 5.38 $R^{2/3}$ n = .050 V = 3.32 $R^{2/3}$

El.	A	WP	R	V	Q	A	WP	R	V	Q
58	0									
60	56	54	1.03	5.48	309					
62	172	72	2.38	9.6	1646	0				
64	305	82	3.71	12.9	3940	220	240	.91	3.12	686
66	445	91	4.89			720	265	2.71		

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470868

STATE	PROJECT			
Arizona	Wickenburg Pl			
BY	DATE	CHECKED BY	DATE	JOB NO.
J. Malone	1-29-70			

SUBJECT: X-SECTION Hydraulics

SHEET ____ OF ____

SECTION NO. 12 n = .030 S = .0187

Segment 1 V = 4.14 $R^{2/3}$ SEGMENT 2

Elev	A	WP	R	V	Q	A	WP	R	V	Q
09.5	0			½	cfs					
12.0	111.	80	1.38	5.09	565					
14.0	361	180	2.00	6.83	2340					
16	761	250	3.04	8.63	6567					

X-SECTION NO. 13 S = .0166

Segment 1 n = .030 V = 4.05 $R^{2/3}$ n = .060 V = 2.02 $R^{2/3}$

V =	A	WP	R	V	Q	A	WP	R	V	Q
2101.0	0									
02.0	12.5	25	.50	2.55	32.					
04.0	72	40	1.80	5.99	431					
06.0	172	75	2.29	7.04	1211					
08.0	317	95	3.33	9.03	2862					

X-SECTION NO. 14 n = .10 S = .0225

Segment 1 Segment 2

n = .030 V = 7.85 $R^{2/3}$ n = .075 V = 3.19 $R^{2/3}$

Elev	A	WP	R	V	Q	A	WP	R	V	Q
88	0									
90	52	30	1.87	11.9	620	500	445	1.12	3.39	1508
92	136	52	2.61	14.9	2027	1425	540	2.64	6.0	8235
94	232	60	3.87							

NO. 15 S = .0125

n = .030 V = [illegible] n = .070 S = 2.21 $S^{1/2}$

Elev.	A	WP	R	V	Q	A	WP	R	V	Q
88	0					0				
90	50	40	[illegible]	[illegible]	[illegible]	480	445	1.08	3.32	1113
92	134	50	[illegible]	[illegible]	[illegible]	1405	540	2.60	4.17	5805
94	231	58	[illegible]	[illegible]	6131	2500	552	4.54		

COMPUTATION SHEET
SCS-522 REV 5-58

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1956 O—470658

STATE	PROJECT		
Ariz	WICKENBURG PI		
BY	DATE	CHECKED BY	DATE	JOB NO.
J Malone	1-30-10			

SUBJECT

X-Section Hydraulics

SHEET ____ OF ____

NO 19 S = .0142

Seg. 1 n = .030 V = 5.91 R^2/3 Seg. 2 .050 V = 3.55 R^2/3

ELEV	A	WP	R	V	Q	A	WP	R	V	Q
52.5	0									
54	22	30	.73	4.3	96	0				
56						220	180	1.22	4.0	884
58						1440	650	2.21	6.0	8683

NO 20 S = .02

n = .030 V = 7.02 R^2/3 n = .050 V = 4.21 R^2/3

EL	A	WP	R	V	Q	A	WP	R	V	Q
44						0				
46						220	180	1.22	4.8	1053
48						780	400	1.95	6.6	5116
50						1600	420	3.80		

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470868

STATE		PROJECT		
Arizona				
BY	DATE	CHECKED BY	DATE	JOB NO.
J. Malone	2-2-70			

SUBJECT

SHEET ____ OF ____

Problem Determine depth & velocity in Powder House channel for 10% flow

Solution

Channel $b = 60'$ $z = 3$

$S = .020$

$n = .022$

10% Peak Discharge = 1350 cfs

$V = \frac{1.49}{.022}(.02)^{1/2} R^{2/3} = 9.58 R^{2/3}$

$A = 60 d$

$WP = 60 + 2d$

Try 1. $d = 1.0'$

$A = 63.0 ft^2$

$R = 0.95$

$V = 9.25$ '/sec

$Q = 582$ cfs

Try 2 $d = 1.4$ ft

$A = 89.88$ $R = 1.31$

$V = 11.46$ '/s

$Q = 1030$ cfs

Try 3 $d = 1.6$

$A = 103.68$

$R = 1.48$

$V = 12.44$ '/s

$Q = 1292$ cfs

Try 4 $d = 1.65'$

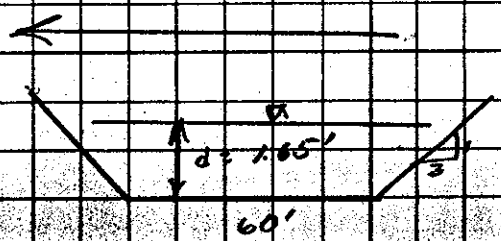
$A = 107.14$

$WP = 60 +$

$R = 1.52$

$V = 12.66$

$Q = 1356$ cfs



COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

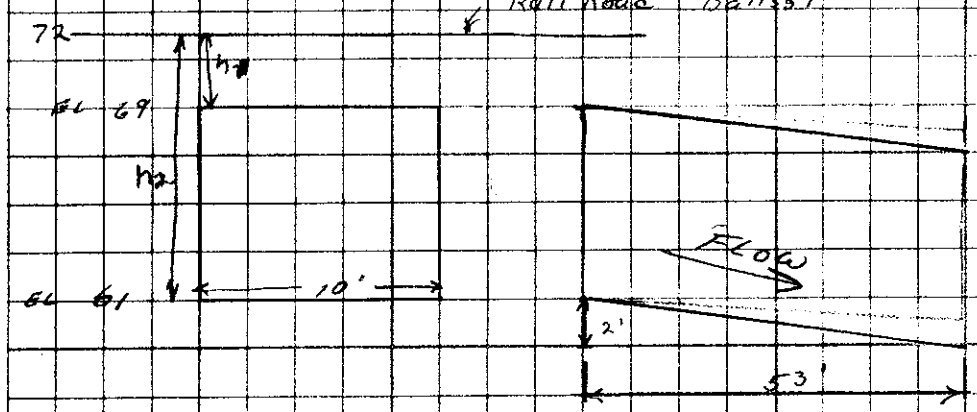
GPO : 1958 O—470868

STATE	PROJECT			
Arizona	Wickenburg Pl			
BY	DATE	CHECKED BY	DATE	JOB NO.
J Malone				

SUBJECT: CASMNORO BRIDGE HYDRAULICS

SHEET ____ OF ____

Problem Compute discharge at Elev 2072.0



Solution 1. Check Orifice entrance

$A = 80\ ft^2$

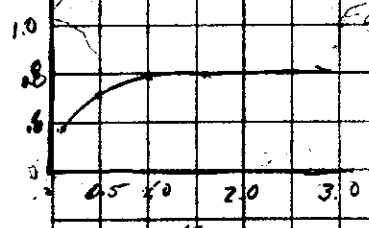
Theoretical discharge for low head orifice

$Q_t = \frac{2}{3} L \sqrt{2g}\,(h_2^{3/2} - h_1^{3/2})$

$Q_t = \frac{2}{3}(10)\sqrt{64.4}\,(11^{3/2} - 3^{3/2})$

$= (53.3)(36.48 - 5.20)$

$= 1660$ cfs



Use Table Coef of Discharge Box culverts square cornered entrance $L = 50'$

$Q = AC = A\,C\sqrt{2gh}$

$Q = .8(80)\sqrt{2gh}$

EL	h	Q_t	Q_w	Q_T
73	8	1452		
72	7	1268		
71	6	1087	2232	3489
70.5			893	2000
70	5	1387	0	1387
69	4	1026	1.7	1026
68				757
66				346
65				248

Main channel
$n = 0.06$
$S = 0.0$

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1958 O—470668

STATE		PROJECT		
BY	DATE	CHECKED BY	DATE	JOB NO.
SUBJECT				SHEET ____ OF ____

Weir Flow over Railroad begins at 2070

720' L

$Q = 3.1\ L H^{3/2}$

$Q = 3.1(720) H^{3/2} =$

Elev	Q weir	orifice	Q total
70.0	0		1387
70.5	803 cfs + 1308 =		2111 cfs

		Area Plan	ft²	Acres	ΔD depth ft	Vol AF
1.3691 AC/UNIT	66	.0				
	66	5.13		1.89	Δ 1.0	1.89
	68	26.84		9.91	Δ 2.0	13.69
~(6400) ft² AC / 43560 / 45 units	70	42.50		15.69	Δ 2.0	39.29

SCS-269
5-64

STRUCTURE DATA
Structure No. 01

CASANDRO WASH

Watershed WICKENBURG Hydrologist J. Malone Date 2-4-80

DATA CODE	TABLE NAME		DATA FIELD #1	DATA FIELD #2	DATA FIELD #3	CARD NO. / IDENTIFICATION
		STRUCTURE NO. (01-60)				
3	STRUCT	01				1

IMPORTANT: Line out unused cards. Data fields require decimal points. KEYPUNCHER: Left justify data fields

		ELEVATION, FT.	DISCHARGE, CFS	STORAGE, ACRE FT.	
8		2061.0	0.0	0.0	2
8		2065.0	248.0	0.0	3
8		2066.0	346.0	1.9	4
8		2067.0	456.0	7.9	5
8		2068.0	574.0	13.7	6
8		2069.0	701.0	23.0	7
8		2070.0	1387.0	39.3	8
8					9
8					
8					
8					
8					
8					
8					
8					
8					
8					
8					
8					
8					
9	END TBL				

NOTE: This card must be the last card for each structure

WATERSHED PROGRAM SOIL CONSERVATION SERVICE JAN 2 1964

STANDARD CONTROL FOR WATERSHED

SCS - 273
Rev. 2 - 68

Watershed _____ Hydrologist _____ Date _____

Page ____ of ____

DATA CODE	SUBROUTINE (OPERATION) NAME	NO.	X SECTION/ STRUCTURE XSECT NO.	STRUCT NO.	HYDROGRAPH NUMBER INPUT #1	INPUT #2	OUTPUT	DATA FIELD #1	DATA FIELD #2	DATA FIELD #3	OUTPUT CONTROLS PRINT	PLOT	PUNCH	SUM	CARD NO./ IDENTIFICATION
IMPORTANT: Line out unused cards. Data fields require decimal points. KEYPUNCHER: Left justify data fields.															
6	RUNOFF	1		01			6	AREA, SQ. MI. 1.60	RUNOFF CURVE NO. 87	TIME OF CONCENTRATION, HRS. 0.59	1	1	1		1
6	RESVOR	2		01	6		7	SURF. ELEV. AT T=0, FT. 2061.0			1	1	1		1
6	DFACM	3			7			LENGTH, FT.	(OPTIONAL) ROUTING COEFFICIENT (C)						
6	RUNOFF	4					6	AREA, SQ. MI.	RUNOFF CURVE NO.	TIME OF CONCENTRATION, HRS.					
6	ADDHYD	4			5	6	7								
6	SAVMOV	5													
6	SAVMOV	5													
6	ADDHYD	4			5	6	7								
6	SAVMOV	5													
6	DIVERT	6			IN-PUT	OUT-PUT1	OUT-PUT2	OUTPUT 1 DISCHARGE, CFS							
	ENDATA							NOTE: This card is to be used only on the last control card.							12

PATTERNED BY BUREAU, SOIL CONSERVATION SERVICE, SEPT. 20, 1963

SCS - 275
Rev. 2 - 68

MODIFY S[illegible]ARD CONTROL

Watershed WEKENBURG Hydrologist J. Malone Date 2-4-70

DATA CODE	OPERATION NAME	OPERATION NO.	XSECTN STRUCTURE XSECTN NO	XSECTN STRUCTURE STRUCT NO	HYDROGRAPH NUMBER INPUT #1	HYDROGRAPH NUMBER INPUT #2	HYDROGRAPH NUMBER OUTPUT	DATA FIELD #1	DATA FIELD #2	DATA FIELD #3	OUTPUT OPTIONS PRINT PEAK	PRINT HYD	PRINT ELEV	PRINT VOL	PUNCH	SUM	CARD NO. / IDENTIFICATIO
7	INSERT	2						NOTE: The following cards are inserted following the XSECTN STRUCTURE specified									
6																	
6																	
6																	
6																	
7	ALTER	3						NOTE: Data given in columns 1 to 18 must be identical with standard control card to be altered.									
6																	
6																	
6																	
6																	
7	DELETE	4						NOTE: Data given in columns 1 to 18 must be identical with standard control card to be deleted									
6																	
6																	
6																	
6																	
7	LIST							NOTE: This card is used for printout of tabular data and standard control list that are currently effective.									1
7	UPDATE	1						NOTE: This card is used to make permanent changes of the library tape. Printout of library tape follows change.									
7	BASELOS								NEW BASE FLOW, CFS	NOTE: This card normally precedes a COMPUT card							

IMPORTANT: Line out unused cards. Data fields require decimal points. KEYPUNCHER: Left justify data fields.

IMPORTANT: Modifications must be given in the order that they appear on the standard control list.

STANDARD CONTROL FOR WATERSHED

SCS - 273
Rev. 2 - 68

Watershed _____ Hydrologist _____ Date _____

Page ____ of ____

DATA CODE	SUBROUTINE (OPERATION) NAME	NO.	A SELECTION/ STRUCTURE SELECT NO.	STRUCT. NO.	HYDROGRAPH NUMBER INPUT #1	INPUT #2	OUTPUT	DATA FIELD #1	DATA FIELD #2	DATA FIELD #3	OUTPUT OPTIONS PRINT			SUM	CARD NO./ IDENTIFICATION
IMPORTANT: Line out unused cards. Data fields require decimal points. KEY FUNCTION: Left justify data fields.															
6	RUNOFF	1		01			6	AREA, SQ. MI. 1.60	RUNOFF CURVE NO. 87	TIME OF CONCENTRATION, HRS. 0.59	1	1	1		10
6	RESVOR	2		01	6		7	SURF. ELEV. AT T=0, FT. 2061.0			1	1	1		11
4	DEACH	3						LENGTH, FT.	(OPTIONAL) ROUTING COEFFICIENT (C)						
6	RUNOFF	8					6	AREA, SQ. MI.	RUNOFF CURVE NO.	TIME OF CONCENTRATION, HRS.					
6	ADDHYD	4			5	6	7								
6	SAVMOV	5													
6	SAVMOV	6													
6	ADDHYD	4			5	6	7								
6	SAVMOV	6													
6	DIVERT	6			IN-PUT	OUT-PUT #1	OUT-PUT #2	OUTPUT 1 DISCHARGE, CFS							
END DATA															12

ARS-SCS-273 (SUPERSEDES ARS-SCS-273 WHICH IS OBSOLETE), SEPT. 20, 1963

STRUCTURE DATA
Structure No. 01

SCS-269
5-64

Watershed CASANORO WASH Hydrologist J. Malone Date 2-4-80

DATA CODE	TABLE NAME		DATA FIELD #1	DATA FIELD #2	DATA FIELD #3	CARD NO. / IDENTIFICATION
		STRUCTURE NO. (01-60)				
3	STRUCT	01				1

IMPORTANT: Line out unused cards. Data fields require decimal points. KEYPUNCHER: Left justify data fields

		ELEVATION, FT.	DISCHARGE, CFS	STORAGE, ACRE FT.	
8		2061.0	0.0	0.0	2
8		2065.0	248.0	0.0	3
8		2066.0	346.0	1.9	4
8		2067.0	456.0	7.9	5
8		2068.0	574.0	13.7	6
8		2069.0	701.0	23.0	7
8		2070.0	1387.0	39.3	8
8					9
8					
8					
8					
8					
8					
8					
8					
8					
8					
8					

9 ENDTBL NOTE This card must be the last card for each structure.

WATERSHED PROGRAM SOIL CONSERVATION SERVICE JAN 2 1964

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO : 1959 O—470868

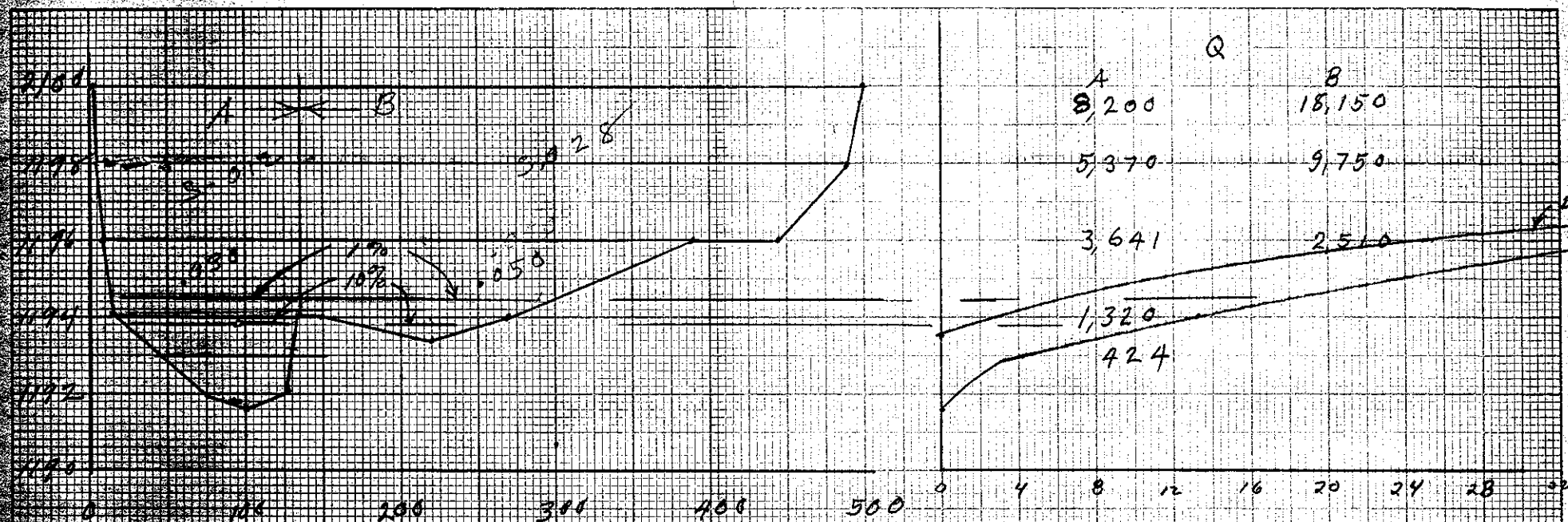
STATE		PROJECT		
BY	DATE	CHECKED BY	DATE	JOB NO.
SUBJECT				SHEET ____ OF ____

CASANDRO WASH

DA = 1.60 sq. mi
Tc = 0.59 hr
CN = 87
1% P 4.25
10% P = 3.20

EL	Outflow cfs	Storage AF
61.0	0	0
65	248	0
66	346	1.9
67	456	7.9
68	574	13.7
69	701	23.0
70	1387	39.3

KEUFFEL & ESSER CO. MADE IN U.S.A.

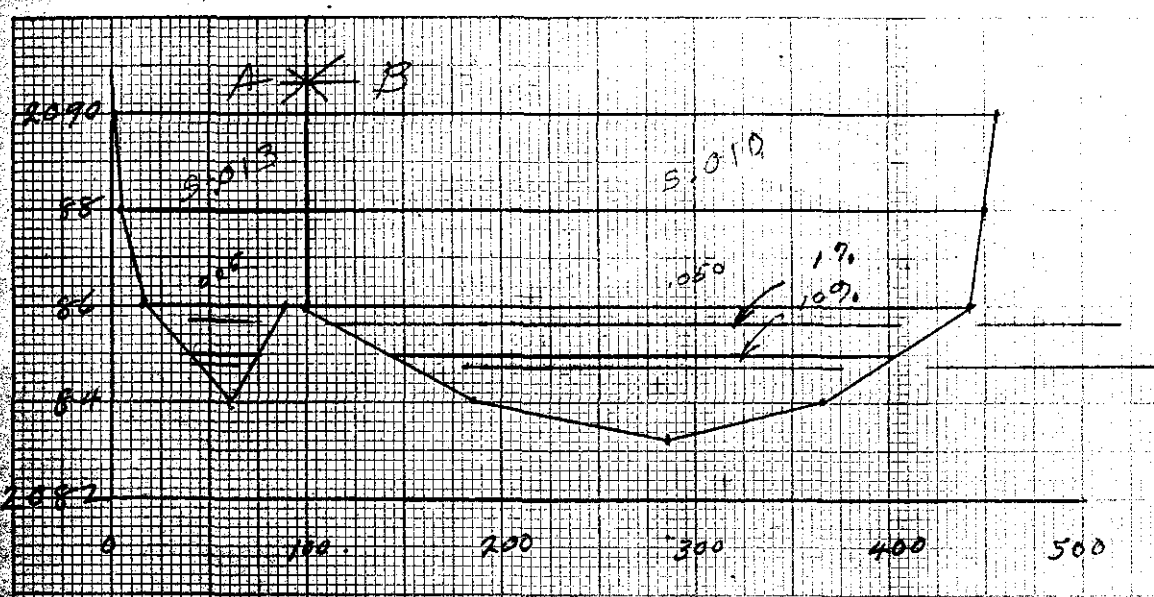


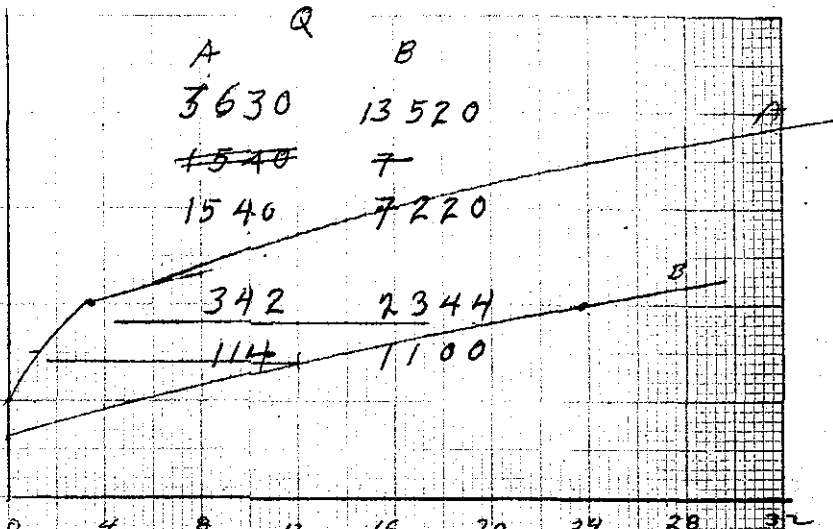
Wickenburg X Sec. #31

			W.P.	R	$R^{2/3}$	$S^{1/2}$	$\frac{.786}{n}$	cfs V	AV Q
A	1194	[illegible]	108	1.629	1.385	.1095	49.4	7.48	1,320
A	1196	[illegible]	208	2.013	1.593	.1095	49.4	8.64	3,641
B	1196	[illegible]	320	1.315	1.200	.1673	29.7	5.95	2,510
A	1198	685	390	1.760	1.458	.1095	49.4	7.85	5,370
B	1198	1072	510	2.122	1.650	.1673	29.7	8.29	9,751
A	2100	757	480	1.995	1.584	.1095	49.4	8.56	8,200
B	2100	1808	590	3.060	2.108	.1673	29.7	10.48	18,150
A	1193	76	150	0.505	0.674	.1673	49.4	5.56	424

W.H.W. 2/5/70

K&E KEUFFEL & ESSER CO. MADE IN U.S.A.

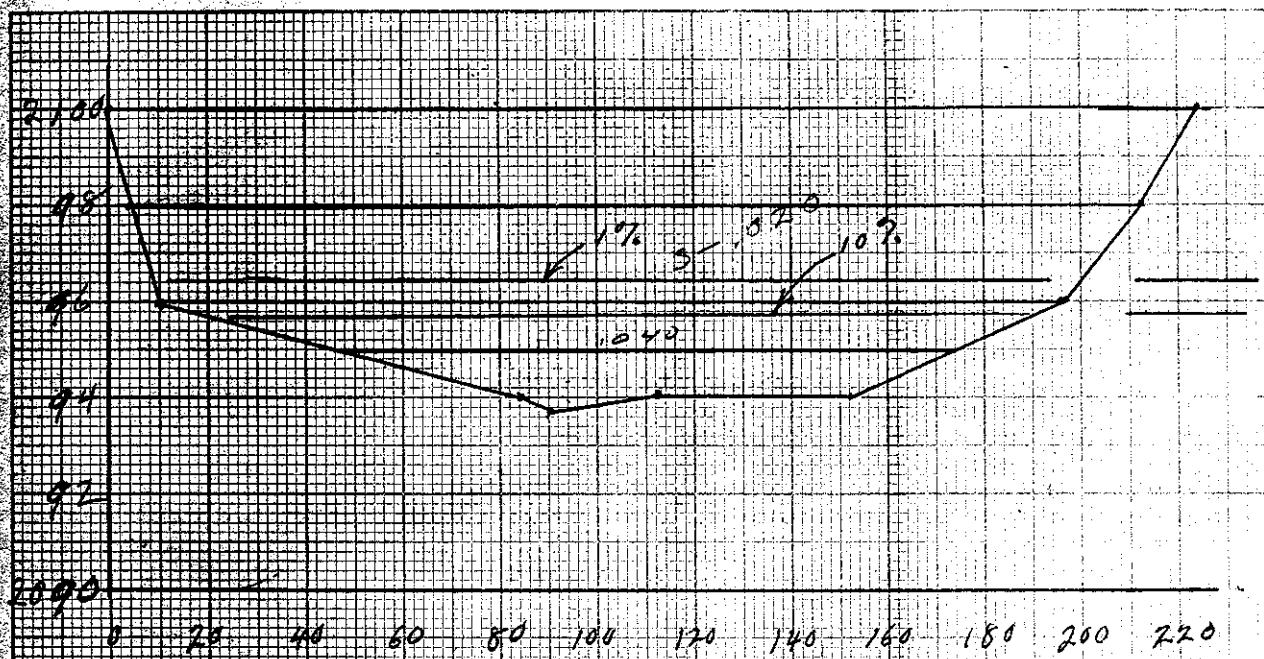


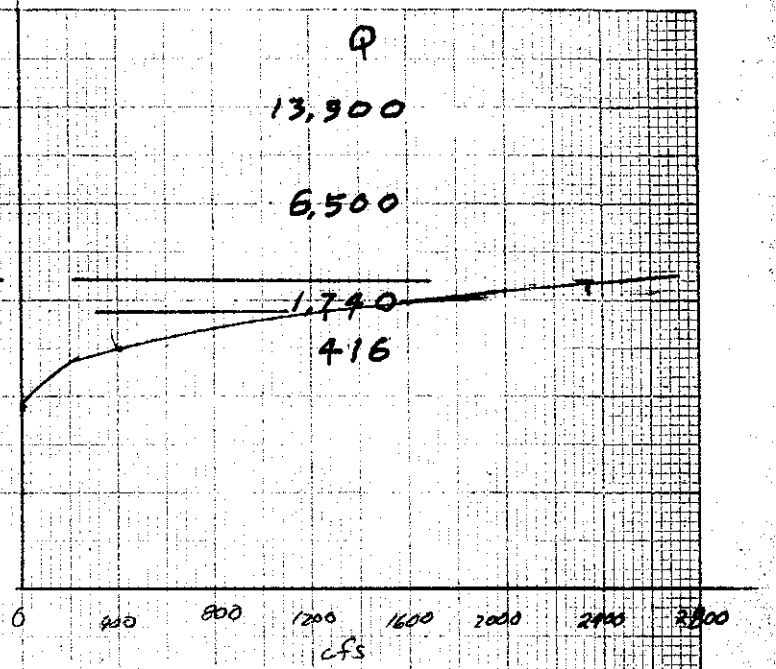


Wickenburg X Sec. 32

	Area	W.P.	R.	$R^{2/3}$	S½	$\frac{1.486}{n}$	cfs V	& V Q
A 2086	76	140	0.543	0.665	.1140	59.4	4.5	342
B 2086	584	380	1.575	~~0.291~~ 1.35	.1000	29.7	~~0.865~~ 4.03	~~545~~ 2344
A 2088	236	250	0.944	0.963	.1140	59.4	6.53	1,540
B 2088	1270	480	2.650	1.915	.1000	29.7	5.69	7,220
A 2090	148	340	1.315	1.200	.1140	59.4	8.10	3,630
B 2090	2000	580	3.421	2.270	.1000	29.7	6.75	13,520
A 2085	28	160	0.466	0.601	.1140	59.4	4.06	114
B 2085	280	290	0.965	0.977	.1000	29.7	2.90	1,108

W.H.W. ~~2/5/70~~



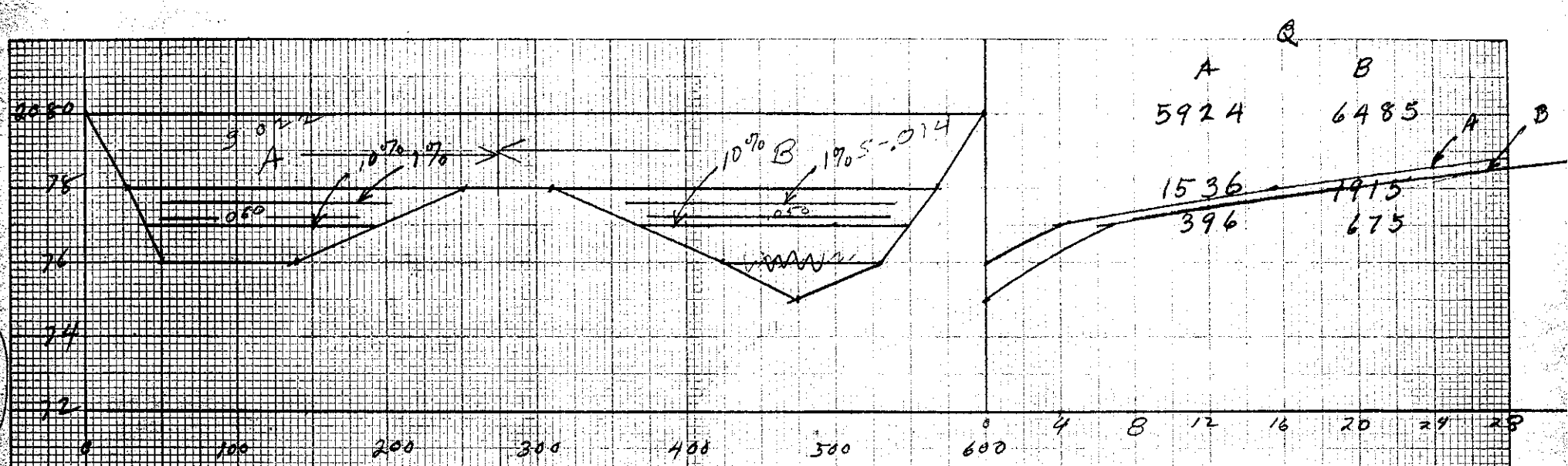


Wickenburg - X Sec. #3D

	Area	WP	R	$R^{2/3}$	$S^{1/2}$	$\frac{1.486}{n}$	V	AV Q
2096	273	208	1.364	1.227	.1414	37.1	6.4	1,740
98	645	242	2.662	1.920	.1414	37.1	10.05	6,500
2100	1090	288	3.785	2.429	.1414	37.1	12.75	13,900
2095	96	128	0.750	0.825	.1414	37.1	4.33	416

W. H. W - 2/5/70

KEUFFEL & ESSER CO. MADE IN U.S.A.

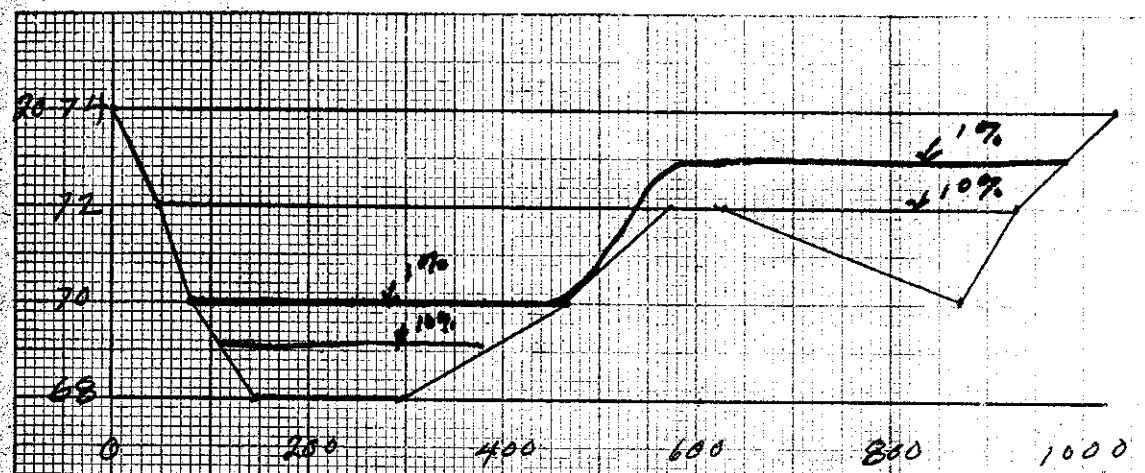


Wickenburg - X Sec. #33

	Elev.	Area	W.P.	R	$R^{2/3}$	$\frac{1.486}{n}$	$S^{1/2}$	CFS V	AV Q
A	2078	320	280	1.142	1.092	29.7	.1483	4.81	1,536
B	2078	428	300	1.424	1.265	29.7	.1183	4.45	1,915
A	2080	840	410	2.024	1.600	29.7	.1483	7.05	5,924
B	2080	1050	450	2.328	1.756	29.7	.1183	6.16	6,485
A	2077	116	170	0.683	0.775	29.7	.1483	3.41	396
B	2077	196	210	0.972	0.981	29.7	.1183	3.44	675

W. H. W. 2/5/70

KEUFFEL & ESSER CO. MADE IN U.S.A.



Wickenburg X Sec. #34

	ft² Area	WP	A
20.70	520	500	
72	1750	1050	150
74	3680	1400	

No Comments

SCS-269
5-64

STRUCTURE DATA

Structure No. 01

Watershed CASANDRO WASH WICKENBURG   Hydrologist J. Malone   Date 2-4-70

DATA CODE	TABLE NAME		STRUCTURE NO. (01-60)		DATA FIELD #1	DATA FIELD #2	DATA FIELD #3		CARD NO./ IDENTIFICATION
3	STRUCT		01						1

IMPORTANT: Line out unused cards. Data fields require decimal points. KEYPUNCHER: Left justify data fields

DATA CODE			ELEVATION, FT.	DISCHARGE, CFS	STORAGE, ACRE FT.		CARD NO.
8			2061.0	0.0	0.00001		2
8			2065.0	248.0	0.00002		3
8			2066.0	346.0	1.9		4
8			2067.0	456.0	7.9		5
8			2068.0	574.0	13.7		6
8			2069.0	701.0	23.0		7
8			2070.0	1387.0	39.3		8
8							9

9	ENDTBL	NOTE: This card must be the last card for each structure	10

WATERSHED PROGRAM, SOIL CONSERVATION SERVICE, JAN 27, 1964

STANDARD CONTROL FOR WATERSHED

Page ____ of ____

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Rev. 2 - 68

Watershed _____ Hydrologist _____ Date _____

DATA CODE	SUBROUTINE (OPERATION) NAME	NO.	X SECTION/ STRUCTURE XSECT NO.	STRUCT. NO.	HYDROGRAPH NUMBER INPUT #1	INPUT #2	OUT-PUT	DATA FIELD #1	DATA FIELD #2	DATA FIELD #3	OUTPUT OPTIONS PRINT PEAK	HYD	ELEV	VOL	PUNCH	SUM	CARD NO./ IDENTIFICATION
	IMPORTANT: Line out unused cards. Data fields require decimal points. KEYPUNCHER: Left justify data fields.							AREA, SQ. MI.	RUNOFF CURVE NO.	TIME OF CONCENTRATION, HRS.	Put "1" in space						
6	RUNOFF	1		01			6	1.60	87.	0.59	1	1		1			10
								SURF. ELEV. AT T=0, FT.									
6	RESVOR	2		01	6		7	2061.0			1		1	1			11
								LENGTH, FT.	(OPTIONAL) ROUTING COEFFICIENT (C)								
6	REACH	3			7		5										
								AREA, SQ. MI.	RUNOFF CURVE NO.	TIME OF CONCENTRATION, HRS.							
6	RUNOFF	1					6										
6	ADDHYD	4			5	6	7										
6	SAVMOV	5															
6	SAVMOV	5															
6	ADDHYD	4			5	6	7										
6	SAVMOV	5															
					IN-PUT	OUT-PUT 1	OUT-PUT 2	OUTPUT 1 DISCHARGE, CFS									
6	DIVERT	6															
	ENDATA							NOTE: This card is to be used only at end of all standard control cards.									12

SCS - 275
Rev. 2 - 68

MODIFY STA. .RD CONTROL

Watershed WAKENBURG Hydrologist J. Malone Date 2-4-70

DATA CODE	OPERATION NAME	OPERATION NO.	XSECTN / STRUCTURE XSECTN NO.	XSECTN / STRUCTURE STRUCT. NO.	HYDROGRAPH NUMBER INPUT #1	HYDROGRAPH NUMBER INPUT #2	HYDROGRAPH NUMBER OUT-PUT	DATA FIELD #1	DATA FIELD #2	DATA FIELD #3	OUTPUT OPTIONS PRINT PEAK	PRINT HYD	PRINT ELEV	PRINT VOL	PUNCH	SUM	CARD NO. / IDENTIFICATION

IMPORTANT: Line out unused cards. Data fields require decimal points. KEYPUNCHER: Left justify data fields.

IMPORTANT: Modifications must be given in the order that they appear on the standard control list.

7	INSERT	2							NOTE: The following cards are inserted following the XSECTN / STRUCTURE specified.								
6																	
6																	
6																	
6																	
7	ALTER	3							NOTE: Data given in columns 1 to 18 must be identical with standard control card to be altered.								
6																	
6																	
6																	
6																	
7	DELETE	4							NOTE: Data given in columns 1 to 18 must be identical with standard control card to be deleted.								
6																	
6																	
6																	
6																	
7	LIST								NOTE: This card is used for printout of tabular data and standard control list that are currently effective.								13
7	UPDATE	1							NOTE: This card is used to make permanent changes of the library tape. Printout of library tape follows changes.								
								NEW BASE FLOW, CFS									
7	BASFLO	5								NOTE: This card normally precedes a COMPUT card.							

WATERSHED PROGRAM, SOIL CONSERVATION SERVICE, JAN. 20, 1964

EXECUTIVE CONTROL FOR WATERSHED

SCS - 274
Rev. 2-68

Watershed WICKENBURG Hydrologist J. Malone Date 2-4-70

DATA CODE	OPERATION NAME	OPERATION NO.			DATA FIELD #1	DATA FIELD #2	DATA FIELD #3					CARD NO./ IDENTIFICATION
IMPORTANT: Line out unused cards. Data fields require decimal points. KEYPUNCHER: Left justify data fields.												
					MAIN TIME INCREMENT, HRS. (This increment is required for initial computations. Remains in force until new increment is entered or permanent data changed.)							
7	INCREM	6			0.5							14
			FROM XSECTN OR STRUCT	THRU (1) XSECTN OR STRUCT	STARTING TIME, HRS.	RAINFALL DEPTH, INCHES (Set depth and duration to 1.0 for actual rainfall)	RAINFALL DURATION, HRS.	RAIN TABLE NO.	AMC	ALTERNATE NO.	STORM NO.	
7	COMPUT	7	01	01	0.0	4.25	1.0	1	2	01	01	15
	ENDCMP	1	NOTE: This card is required at "end" of a watershed; it may follow a series of COMPUT cards.									16
7	COMPUT	7	01	01	0.0	3.20	1.0	1	2	01	02	16
	ENDCMP	1	NOTE: This card is required at "end" of a watershed; it may follow a series of COMPUT cards.									17
7	COMPUT	7										
	ENDCMP	1	NOTE: This card is required at "end" of a watershed; it may follow a series of COMPUT cards.									
7	COMPUT	7										
	ENDCMP	1	NOTE: This card is required at "end" of a watershed; it may follow a series of COMPUT cards.									
	ENDJOB	2	NOTE: This card terminates the entire watershed program.									18

ENDCMP 1 — IAFT 15

(1) Starting from the beginning or from the end of the preceding COMPUT card, the program will start with the 1st operation on the standard control list having the XSECTN / STRUCT under FROM and will perform all operations through the 1st appearance of the XSECTN / STRUCT under THRU. Two or more COMPUT cards in series will normally cover successive parts of the standard control list.

WATERSHED PROGRAM, SOIL CONSERVATION SERVICE, JAN. 20, 1964

UNITED STATES DEPARTMENT OF AGRICULTURE

REQUEST FOR SUPPLIES, EQUIPMENT, OR SERVICE

C.S.S. NO. ADP-205-70

TO: CENTRAL SUPPLY SECTION, WASHINGTON, D. C. 20250

DATE: 2/4/70

AGENCY NO.: 28-ADP-AZ-70

DELIVER VIA—	MESSENGER	PARCEL POST	FREIGHT	EXPRESS	MAIL	AIR EXPRESS	AIR PARCEL POST

AGENCY: SCS

CONSIGNEE (GIVE YOUR ZIP CODE NUMBER): J. P. Cavanaugh
Soil Conservation Service
Suite 326 Arizona Title Bldg.
111 W. Monroe St., Phoenix, Arizona 85003

APPROPRIATION SYMBOL AND PROJECT NO.: 12X1066 006

ENCUMBERED: $ 2.81

BILL MATERIALS AND TRANSPORTATION TO:

CODE SYMBOLS:
√–FURNISHED
X–BACK-ORDERED
TOS–TEMPORARILY OUT OF STOCK: RE-ORDER EACH ITEM ON SEPARATE REQUISITION
NS–NOT STOCKED

Please furnish in accordance with instructions hereon the following items which I certify are necessary for use in the public service.

J.P. Cavanaugh, Leader, MD Staff

CODE	LINE NO.	ITEM NO.	DESCRIPTION OF ARTICLES	NUMBER OF UNITS	UNIT	UNIT PRICE	STORES	FORMS
	1		Wickenburg Key punch 18 cards @.12			2.16		
	2		Machine Time					
	3		(2)(1)(2)(.35) ++1.40 min					
	4		(1.40) 60 (28.00)			.65		
	5			TOTAL		2.81		
	6							
	7							
	8							
	9							
	10		Please order from ADP Unit,					
	11		Portland, Oregon					
	12							
Cartons/boxes used for shipment:			DO NOT WRITE BELOW THIS LINE					

DO NOT WRITE IN THESE COLUMNS

FILLED BY:

CHECKED BY:

PACKED OR DELIVERED BY:

SUBTOTALS

REQUISITION TOTAL

SHIPPED VIA—	PARCEL POST	FREIGHT	EXPRESS	MAIL	AIR EXPRESS	AIR PARCEL POST

GOVT. B/L NO. DATE

CONTAINERS CLASS WEIGHT

RECEIPT

I CERTIFY that the materials, equipment, or services itemized above have been received in the quantity specified, except as otherwise noted.

(Date) (Signature)

5. MEMORANDUM COPY

AD-14
2-65

ENGINEERING
SURVEY WORK OUTLINE
WICKENBURG WATERSHED
FEBRUARY 1970

I. VERTICAL CONTROL

A. All surveys will be tied to mean sea level datum (MSL). Closed circuit of levels will be run to establish temporary benchmarks (TBM) at the following locations.

(1) Powderhouse Wash

At 1000' intervals along Constellation Road from the Powderhouse Wash - Hassayampa River confluence upstream to the proposed Powderhouse F.R.S.

(2) Sunset Wash

At 1000' intervals along Sunset Wash from the Sunset Wash - Hassayampa River confluence upstream to the Maricopa Drive crossing.

(3) Sunny Cove Wash

At 1000' intervals along Sunny Cove Wash from the Sunset Wash - Sunny Cove wash confluence upstream to the proposed Sunny Cove F.R.S.

(4) Casandro Wash

At 1000' intervals along Casandro Wash from the Casandro Wash - Sol's Wash confluence upstream to Horseshoe Trail crossing.

(5) Solo Wash

At 2000' intervals along Sol's Wash from the Sol's Wash - Hassayampa River upstream to the vicinity of the Casandro Wash confluence.

B. TBM's will be set where needed and where they will not be disturbed. T.B.M.'s will consist of No. 4 reinforcing bars or other permanent points. Field notes will adequately describe TBB locations (they will be referred to existing prominate structures, or streets where possible. Allowable error of closure will not exceed $\pm 0.10\sqrt{M}$ where M equals distance traversed in miles. Initial circuits shall begin and close on USGGS Benchmarks (See Attached - "USGGS Benchmark - Wickenburg Az & vicinity") U.S.C.G.S. "Report on Condition of Survey Marker". Cards will be used to report the condition of benchmarks, triangulation stations, Azimuth marks, etc. whenever said stations are encountered. The cards may be mailed from the field.

II. HORIZONTAL CONTROL

A. Traverses

(1) Location of traverses

(a) Powderhouse Wash Floodway

A chained traverse baseline will be established paralledl and adjacent to Constellation Road from the Hassayampa River to the eastern most crossing of Powderhouse Wash and Constellation Road.

(b) Sunset Wash F.R.S.

A chained traverse will be ran on the centerline of the Sunset F.R.S.

(c) Sunset Wash Floodway

A chained traverse baseline will be established on the right bank of Sunset Wash from the Sunset FRS to the Hassayampa River.

(d) Sunny Cove FRS

A chained traverse will be ran on the centerline of the Sunnycove F.R.S.

(e) Sunny Cove Floodway

A chained traverse baseline will be established along Sunny Cove Wash from the Sunnycove FRS to Sunset Wash junction.

(f) Casandro FRS

A chained traverse will be ran on the centerline FRS, and will extend a sufficient distance to tie to the emergency spillway.

(g) Casandro Floodway

A chained traverse baseline will be established along Casandro Floodway from Casandro FRS to the Sol's Wash junction.

(2) Tie-ins will be made to section corners, actual or assumed. Distance to section corners may be obtained by stadia.

(3) No. 4 reinforcing base will be set at all points of intersection (P.I.)

III. PROFILES

A. FRS Centerline Profiles

A profile of the FRS centerline will be ran on Sunset, Sunnycove and Casandro FRS. Profile stationing shall be from left to right, facing downstream. The profile at the Sunset site shall be extended to the right to include the home located on the hill south of the FRS centerline.

B. Floodway

A profile of the traverse baseline shall be ran on Powderhouse, Sunset, Sunnycove and Casandro floodway baselines with maximum internal of 200. Intermediate elevations will be taken at all points of intersection, incised drainages, grade changes and physical features such as fences, highways and utilities.

C. Location and sketches of physical features will be clearly noted in the field book.

IV. CROSS-SECTIONS

Channel and flood plain cross sections

A. Cross sections for water surface profiles

Cross sections will be surveyed at reaches outlined on the attached Kelsh map for Powderline, Sunset and Sunnycove, and Casandro Washes. All cross sections will be tied to mean sea level through the TBM circuit outlined in "Vertical Control". Elevations will be recorded at all changes in grade of the x-section to o.1 ft. with a maximum distance between shots of 100 ft. All crosssections will be taken from the traverse baselines as mentioned in Par. II A.

B. Cross Sections for times of concentration

Channel cross sections will be surveyed in the main stem of Powderhouse, Sunset, Sunnycove, Casandro washes. These sections will be on assumed vertical datum and shots are to be taken at all changes in grade to o.1 ft. and will extend to elevations 2.0 ft. above apparent maximum water surface elevations. Manning roughness coefficients will be estimated for each section. Photographs will be taken looking downstream at all x-sections to supplement "M" valves information. All x-sections will be located in relatively straight reaches. Slope measurements 150 ft. upstream and 150 ft. downstream from each section will be made of the channel bottom. These sections will be taken at approximately 2000 ft. intervals (paced) above the structure sites.

V. TOPOGRAPHIC SURVEYS 1/

Plane-table or Transit Topography maps will be obtained at the following sites.

1. Sunnycove F.R.S

Topography of 1"= 100 ft. horizontal with a minimum ~~ft~~ 2 foot contour intervals will be obtained at the site. Minimum vertical coverage shall be to a ht. of 50 ft. from the bottom of the existing wash as measured at the F.R.S. centerline. The Topo shall be extended on both abutements, a minimum distance of 100 ' downstream from where flows though the emergency spillway would re-enter Sunnycove Wash.

2. Sunset F.R.S.

Topography of 1" = 80 ft. horizontal with a 2-foot contour interval will be obtained for that portion of the FRS that lies to the right of Sunset Wash. Minimum vertical coverage shall be to the elevation of the home on the hill immediately south of the FRS. The Topo shall extend upstream and downstream a minimum distance of 200' from the FRS centerline.

3. Casandro F.R.S.

Topography of 1" = 80 ft. horizontal with a 2-foot contour interval will be obtained of the Emergency Spillway area located east of Horseshoe Trail.

VI. ECONOMIC DATA

1963 Topographic Maps 1" = 80 2 ft. contour interval available for the Powderhouse, Sunset and Casandro areas. The following data will be drawn on the face of the topographic maps.

1. Delete any homes or other structures that have been removed since the topo was made.

2. Add all homes, trailers, utilities, streets, culverts, bridges, or other pertinent data.that is not shown on the maps at present.

3. All changes, additions, etc. shall be clearly and neatly shown on the drawings to scale.

4. The floor elevations of all homes, trailers, etc. that are located in the flood plain shall be obtained at one corner of the dwelling and posted onto the maps.

TIME ESTIMATE 2/ Survey	Amount	Days
I. Vertical Control	6½ miles	6
II. Horizontal Control	4½ miles	10
Traverse Baselines	4½ miles	16
III. Profiles		
IV. Cross-sections	118 sections	20
Channel	33 reaches	6
Time of concentration	"	4
V. Topo Surveys		6
VI. Economic Data		10
Travel and Orientation		78 days

1/ Additional survey time may be required depending upon the accuracy of the existing 1963 Topo sheets. This survey outline may be amended after completion of vertical control and evaluation of 1963 Topo.

2/ Based on the availability of two survey crews.

2004 (U.S.G.S.)-- 1.7 miles southeast along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, 2.1 miles northwest of the siding at Allah. 100 feet south of culvert C 142, and in a flat at the north base of a small ridge. A United States Geological Survey standard cap. stamped "2004" PHNX" and riveted on the top of a 3-½ inch iron pipe.

El. 2003.887

RV 119 (A.T.& S.F. Ry)-- 1.6 miles southeast along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, northwest of milepost 142, at culvert A 149, and in the top of the southwest concrete head wall. A standard Monel-metal rivet.

El. 2010.639

RV 120 (A.T. & S.F. Ry)-- 0.5 miles southeast along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, northwest of milepost 141, at culvert C 141, and in the top of the southwest concrete head wall. A standard Monel-metal rivet.

El. 2036.702

N 24 -- At Wickenburg, Maricopa County 0.4 miles south of the Atchinson, Topeka & Santa Fe Railway station, 600 feet south of milepost 140, 55 feet west of the center line of the track, and in the corner of a residence yard. A standard disk, stamped "N24 1933" and set in the top of a concrete post.

El. 2059.815

P 24 -- At Wickenburg, Maricopa County, on a hill opposite the Atchinson, Topeka & Santa Fe Railway station, at the east side of a steel water tower and in the top of a concrete valve box. A standard disk, stamped "P 24 1933"

El. 2085.921

Wickenburg, top of northeast rail opposite the Atchinson, Topeka & Santa Fe Railway station.

El. 2076.400

RV 122 (A.T.& S.F.)-- 1.4 miles northwest along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, northwest of milepost 139, at Culvert B 139, and in the top of the southwest concrete head wall. A standard Monel-metal rivet.

El. 2122.614

Q24-- 1.6 miles northwest along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, 600 feet southeast of milepost 138, at trestle A 139, in the top of the northeast corner of the southeast wing wall, and 18 feet northeast of the center line of the track. A standard disk, stamped "Q 24 1933".

EL. 2134.910

RV 123 (A.T. & S.S. Ry)-- 2.5 miles northwest along the Atchinson, Topeka and Santa Fe Railroad from Wickenburg, Maricopa County, northwest of mile-post 138, at culvert A 130, and in the southwest concrete head wall. A standard Monel-metal rivet.

2197.707

ENGINEERING
SURVEY WORK OUTLINE
WICKENBURG WATERSHED
FEBRUARY 1970

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(e) Sunny Cove Floodway

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(g) Casandro Floodway

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1. Sunnycove F.R,S

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TIME ESTIMATE 2/

Survey	Amount	Days
I. Vertical Control	6½ miles	6
II. Horizontal Control		
Traverse Baselines	4½ miles	10
III. Profiles	4½ miles	16
IV. Cross-sections	118 sections	20
Channel	33 reaches	6
Time of concentration	-	4
V. Topo Surveys		6
VI. Economic Data		10
Travel and Orientation		78 days

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2/ Based on the availability of two survey crews.

2004 (U.S.G.S.)-- 1.7 miles southeast along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, 2.1 miles northwest of the siding at Allah. 100 feet south of culvert C 142, and in a flat at the north base of a small ridge. A United States Geological Survey standard cap. stamped "2004" PHNX" and riveted on the top of a 3-½ inch iron pipe.

El. 2003.887

RV 119 (A.T.& S.F. Ry)-- 1.6 miles southeast along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, northwest of milepost 142, at culvert A 149, and in the top of the southwest concrete head wall. A standard Monel-metal rivet.

El. 2010.639

RV 120 (A.T. & S.F. Ry)-- 0.5 miles southeast along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, northwest of milepost 141, at culvert C 141, and in the top of the southwest concrete head wall. A standard Monel-metal rivet.

El. 2036.702

N 24 -- At Wickenburg, Maricopa County 0.4 miles south of the Atchinson, Topeka & Santa Fe Railway station, 600 feet south of milepost 140, 55 feet west of the center line of the track, and in the corner of a residence yard. A standard disk, stamped "N24 1933" and set in the top of a concrete post.

El. 2059.815

P 24 -- At Wickenburg, Maricopa County, on a hill opposite the Atchinson, Topeka & Santa Fe Railway station, at the east side of a steel water tower and in the top of a concrete valve box. A standard disk, stamped "P 24 1933"

El. 2085.921

Wickenburg, top of northeast rail opposite the Atchinson, Topeka & Santa Fe Railway station.

El. 2076.400

RV 122 (A.T.& S.F.)-- 1.4 miles northwest along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, northwest of milepost 139, at Culvert B 139, and in the top of the southwest concrete head wall. A standard Monel-metal rivet.

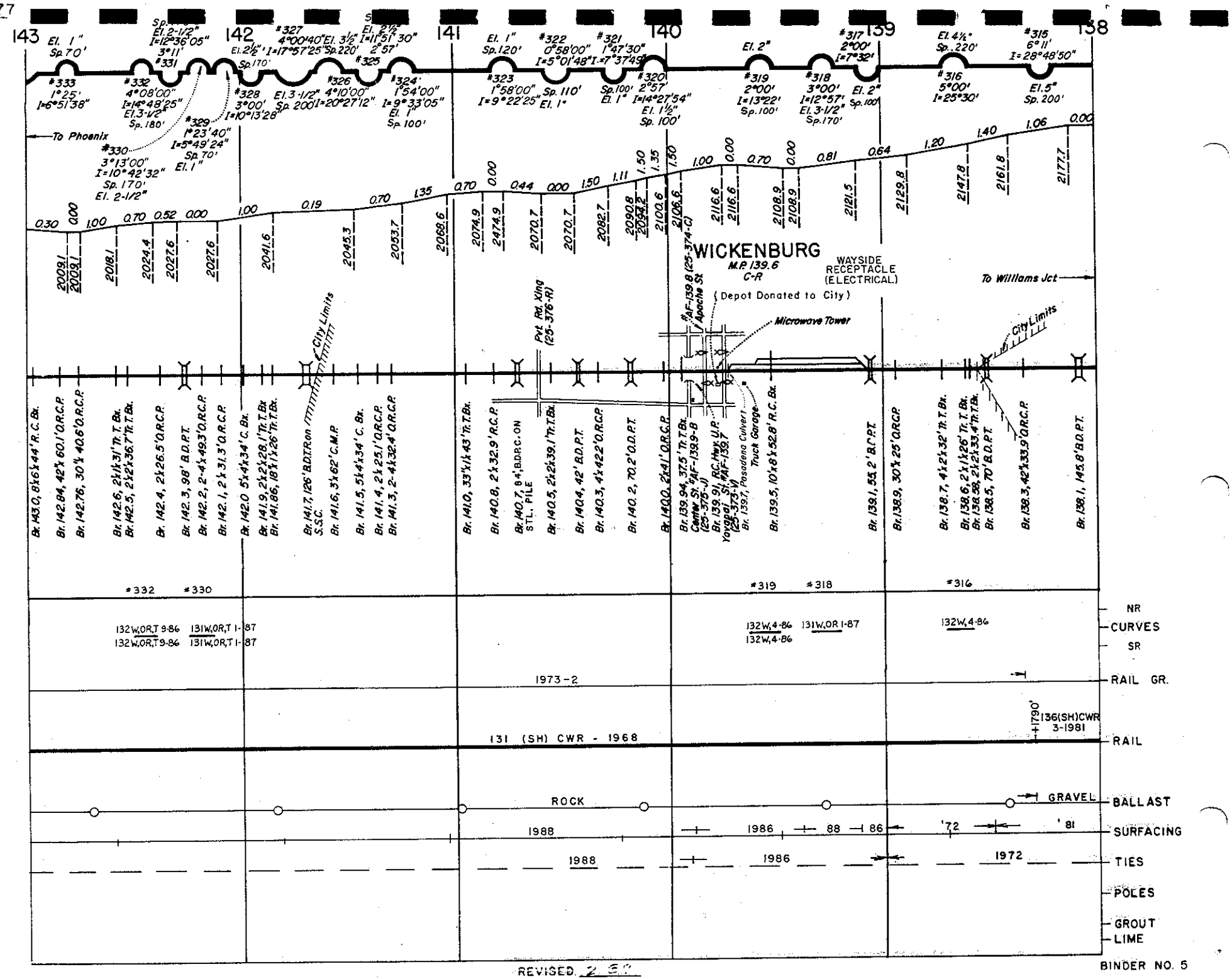
El. 2122.614

Q24-- 1.6 miles northwest along the Atchinson, Topeka & Santa Fe Railway from Wickenburg, Maricopa County, 600 feet southeast of milepost 138, at trestle A 139, in the top of the northeast corner of the southeast wing wall, and 10 feet northeast of the center line of the track. A standard disk, stamped "Q 24 1933".

EL. 2134.910

RV 123 (A.T. & S.S. Ry)-- 2.5 miles northwest along the Atchinson, Topeka and Santa Fe Railroad from Wickenburg, Maricopa County, northwest of mile-post 138, at culvert A 130, and in the southwest concrete head wall. A standard Monel-metal rivet.

2197.707



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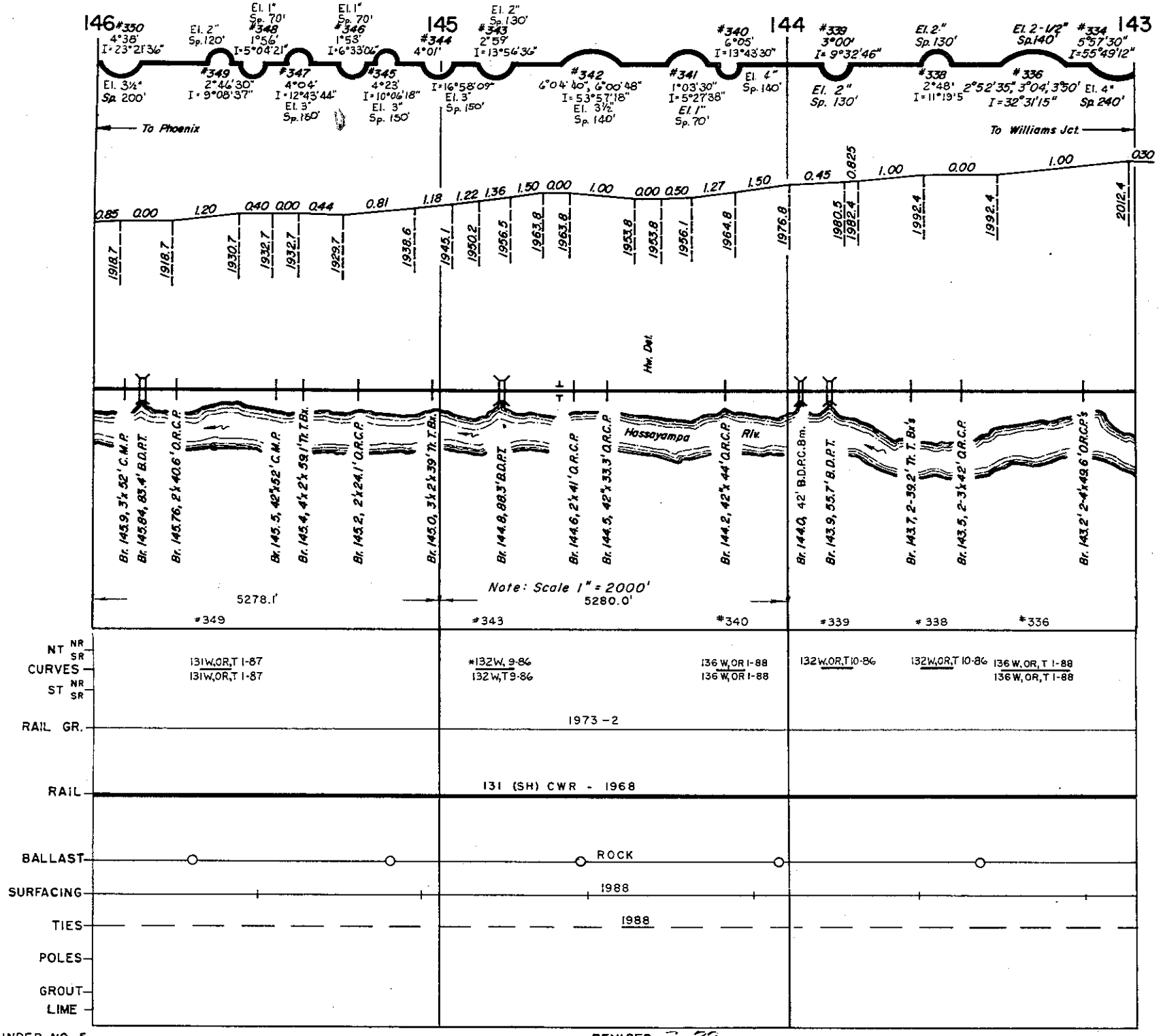

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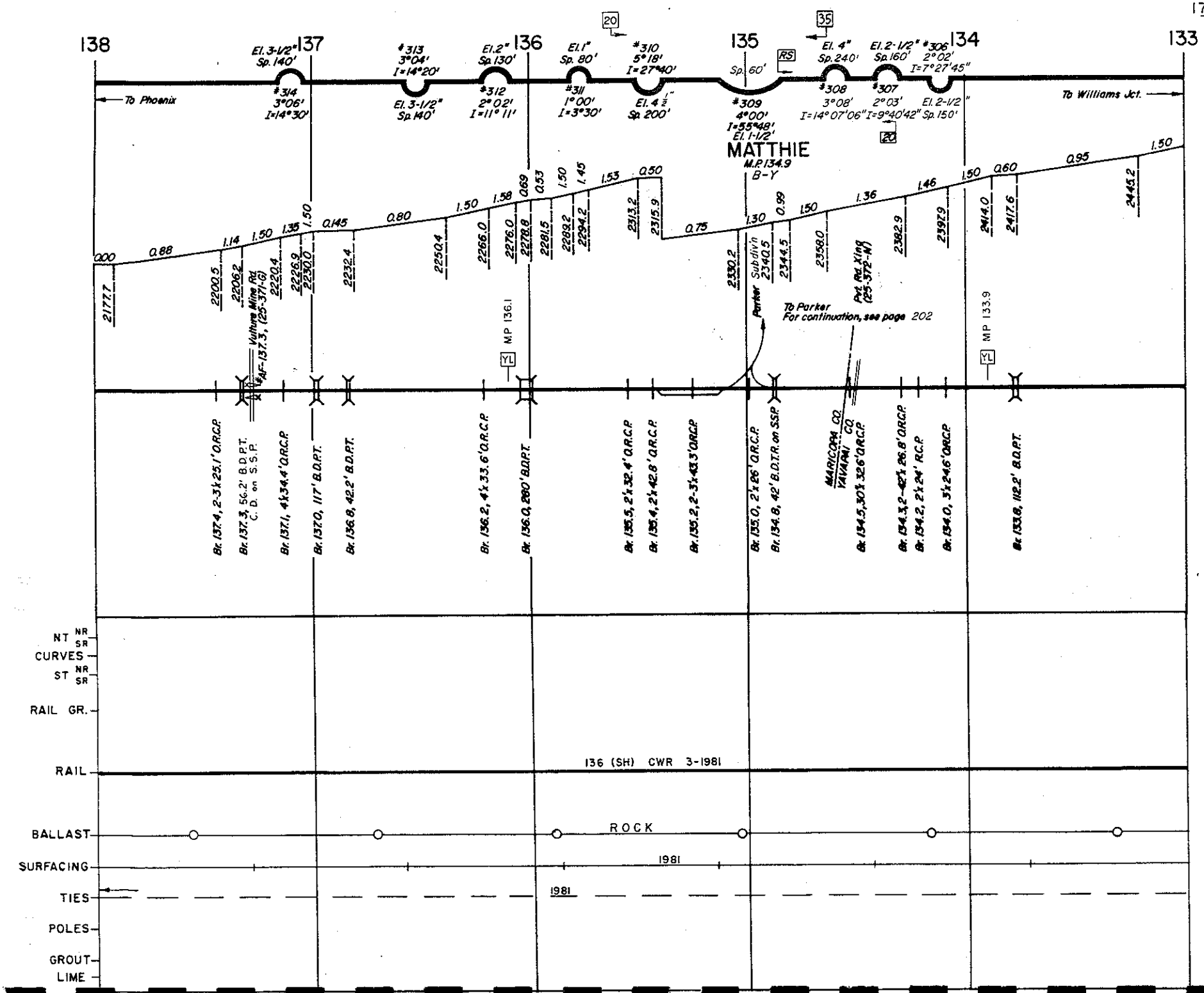
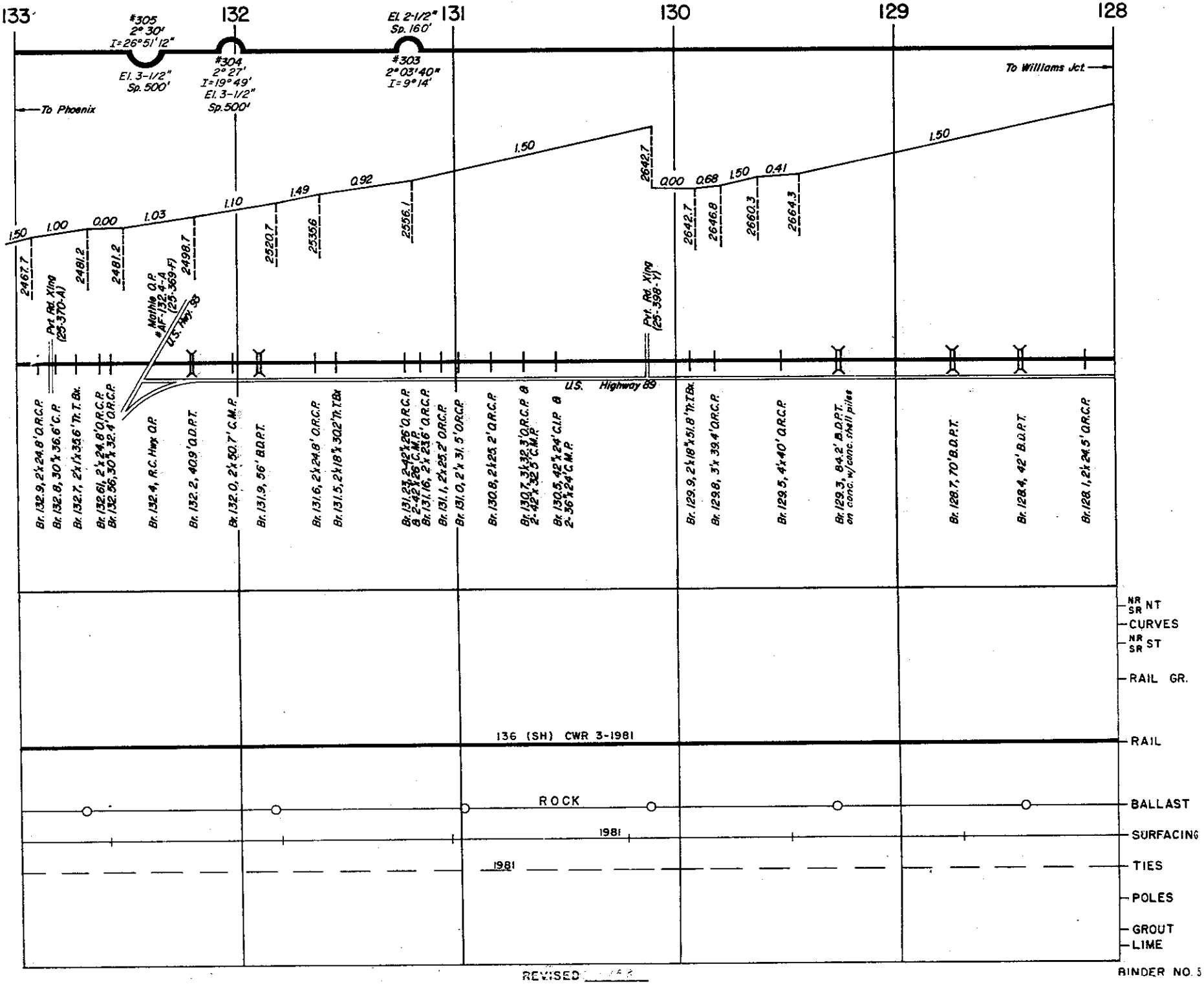

138
137
136
135
134
133
To Phoenix
To Williams Jct.
#314 3°06' I=14°30'
El. 3-1/2" Sp. 140'
#313 3°04' I=14°20'
El. 3-1/2" Sp. 140'
El. 2" Sp. 130'
#312 2°02' I=11°11'
El. 1" Sp. 80'
#311 1°00' I=3°30'
#310 5°18' I=27°40'
El. 4 1/2" Sp. 200'
Sp. 60'
#309 4°00' I=55°48'
El. 1-1/2"
MATTHIE
M.P. 134.9
B-Y
El. 4" Sp. 240'
#308 3°08' I=14°07'06"
El. 2-1/2" Sp. 160'
#307 2°03' I=9°40'42"
#306 2°02' I=7°27'45"
El. 2-1/2" Sp. 150'
Vulture Mine Rd. (25-371-G)
AF-137.3, (25-371-G)
MP 136.1
MP 133.9
Parker Subdiv'n
To Parker
For continuation, see page 202
Pvt. Rd. Xing (25-372-N)
Br. 137.4, 2-3'x25.1' O.R.C.P.
Br. 137.3, 56.2' B.D.P.T. C.D. on S.S.P.
Br. 137.1, 4'x34.4' O.R.C.P.
Br. 137.0, 117' B.D.P.T.
Br. 136.8, 42.2' B.D.P.T.
Br. 136.2, 4'x33.6' O.R.C.P.
Br. 136.0, 280' B.D.P.T.
Br. 135.5, 2'x32.4' O.R.C.P.
Br. 135.4, 2'x42.8' O.R.C.P.
Br. 135.2, 2-3'x43.3' O.R.C.P.
Br. 135.0, 2'x26' O.R.C.P.
Br. 134.8, 42' B.D.T.R. on S.S.P.
MARICOPA CO.
YAVAPAI CO.
Br. 134.5, 30'x326' O.R.C.P.
Br. 134.3, 2-42'x26.8' O.R.C.P.
Br. 134.2, 2'x24' R.C.P.
Br. 134.0, 3'x24.6' O.R.C.P.
Br. 133.8, 112.2' B.D.P.T.
NT NR SR
CURVES
ST NR SR
RAIL GR.
RAIL
136 (SH) CWR 3-1981
BALLAST
ROCK
SURFACING
1981
TIES
1981
POLES
GROUT
LIME



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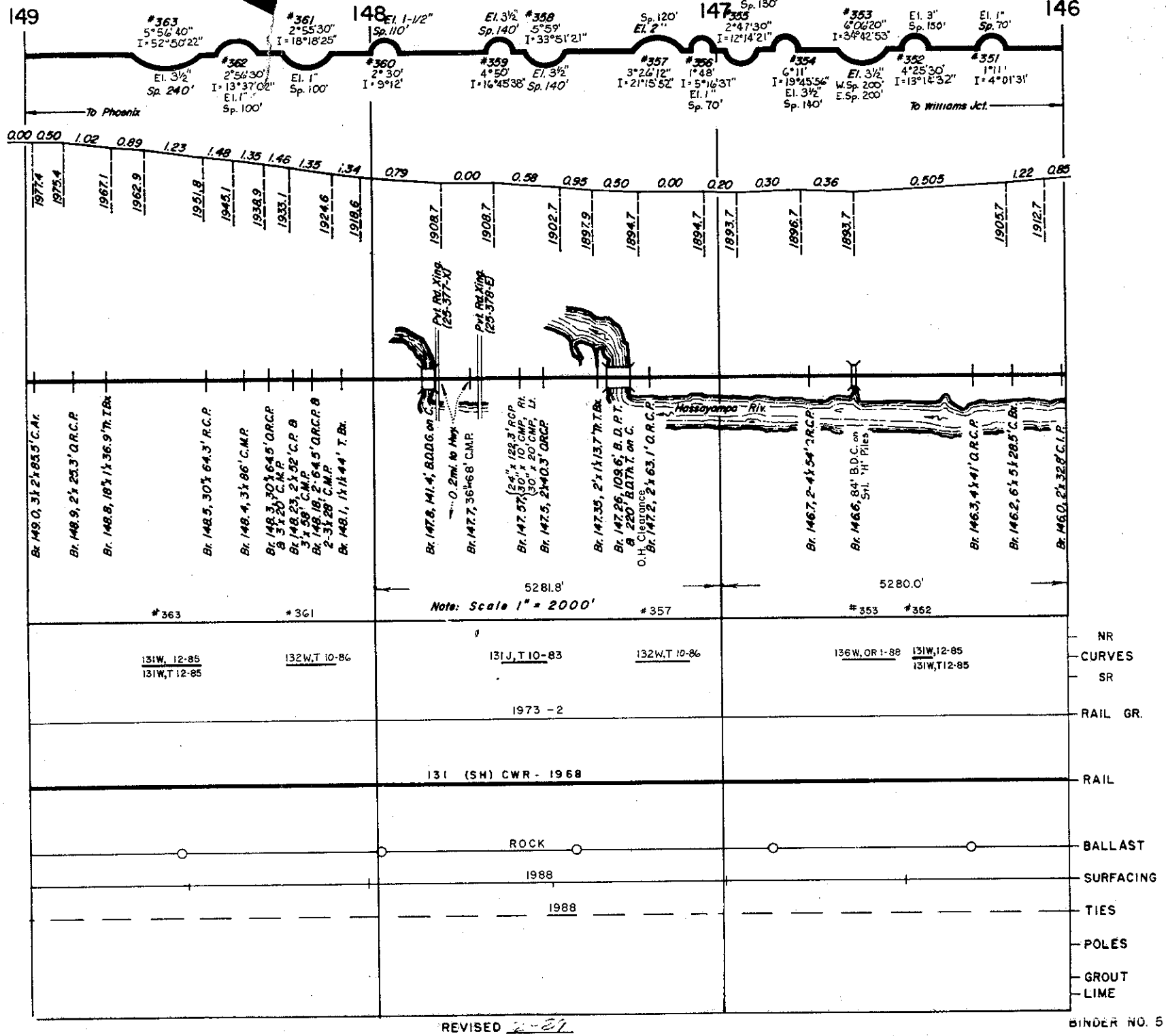

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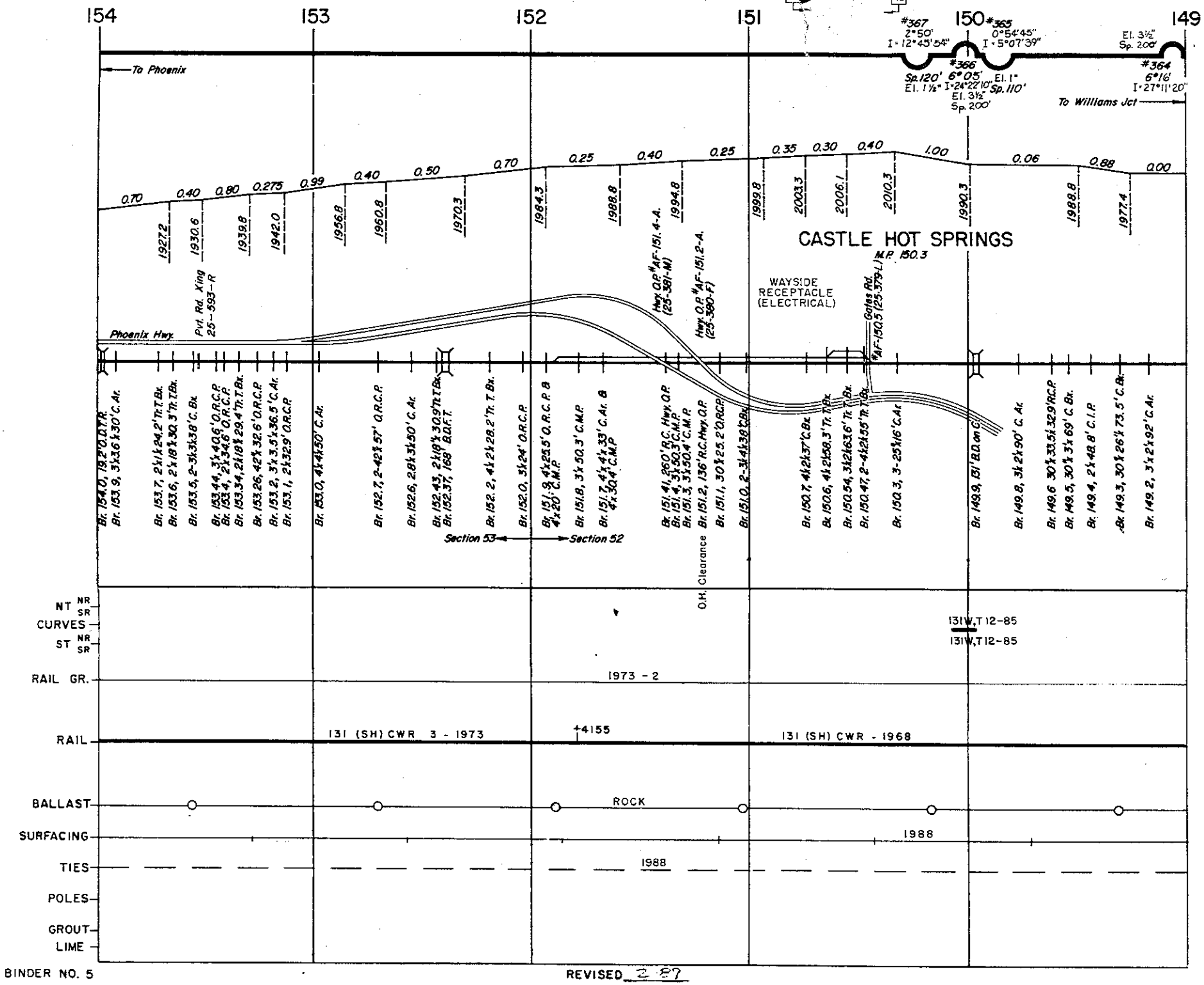

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REVISED 2-87