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Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

Powerline Channel

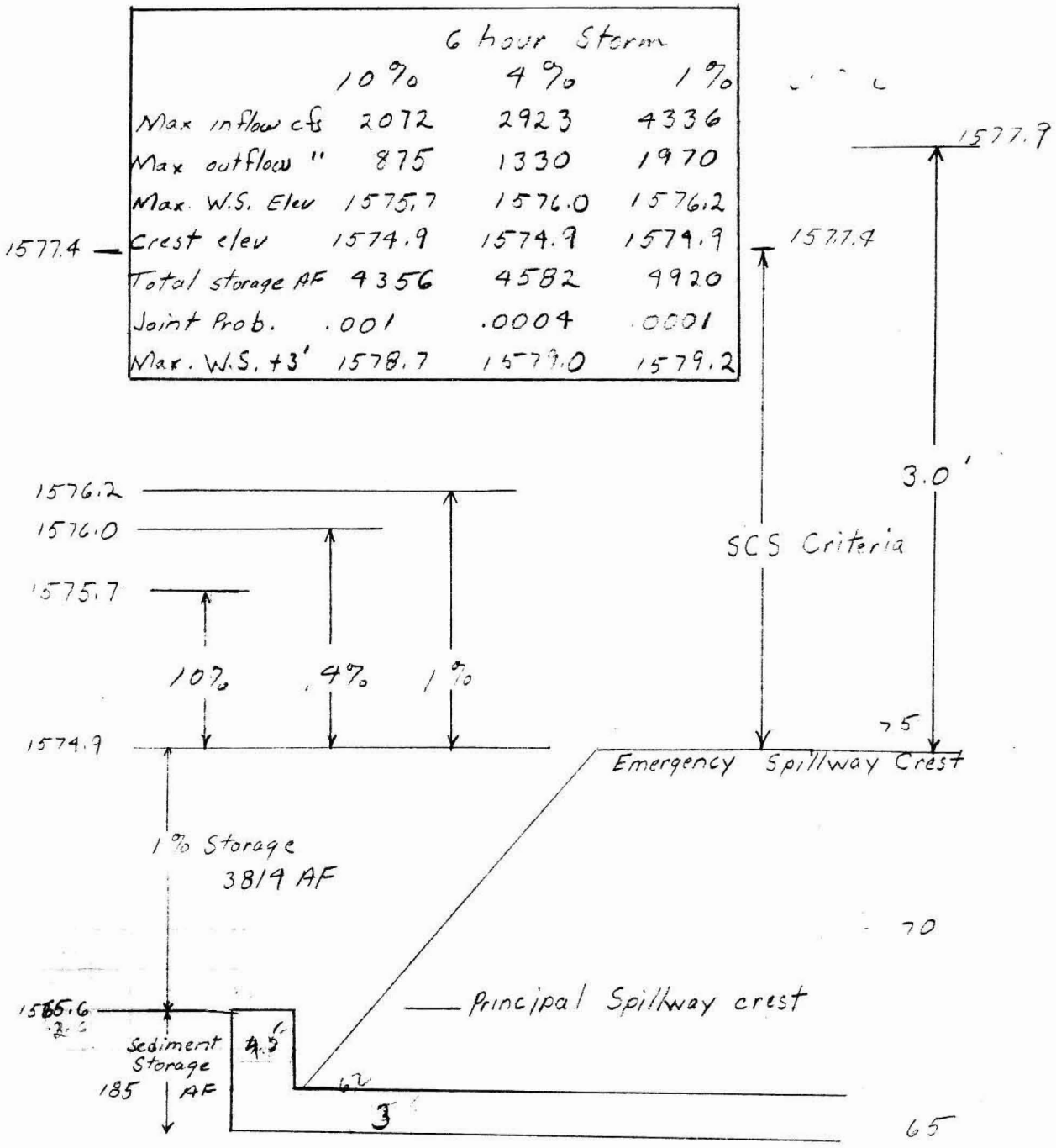
Hydrology Uncontrolled Area

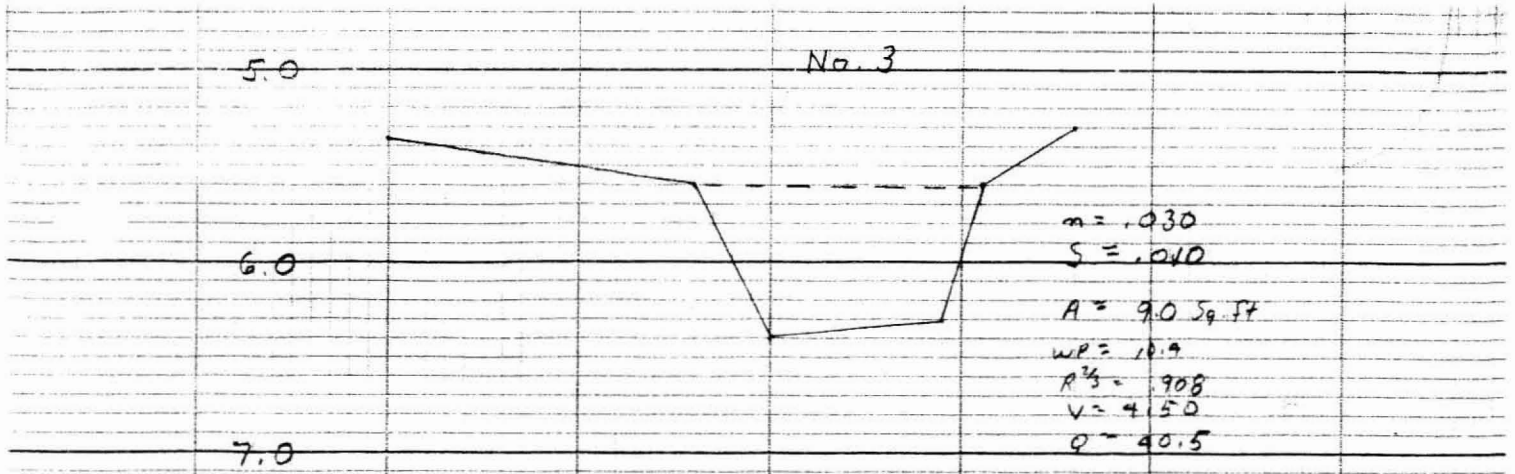
Arizona Vineyard Road Dam

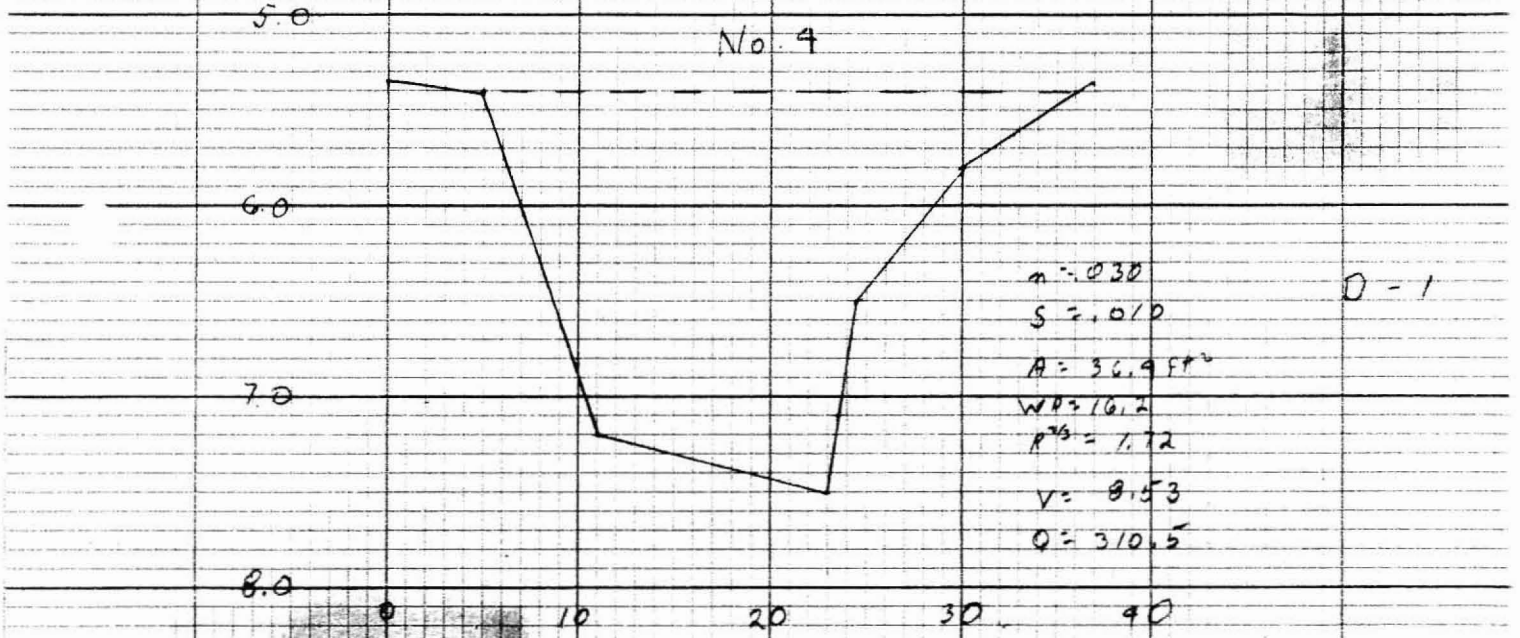
JMM 12-14-69

Flood Routing summary

	6 hour Storm		
	10%	4%	1%
Max inflow cfs	2072	2923	4336
Max outflow "	875	1330	1970
Max. W.S. Elev	1575.7	1576.0	1576.2
Crest elev	1574.9	1574.9	1574.9
Total storage AF	4356	4582	4920
Joint Prob.	.001	.0004	.0001
Max. W.S. +3'	1578.7	1579.0	1579.2



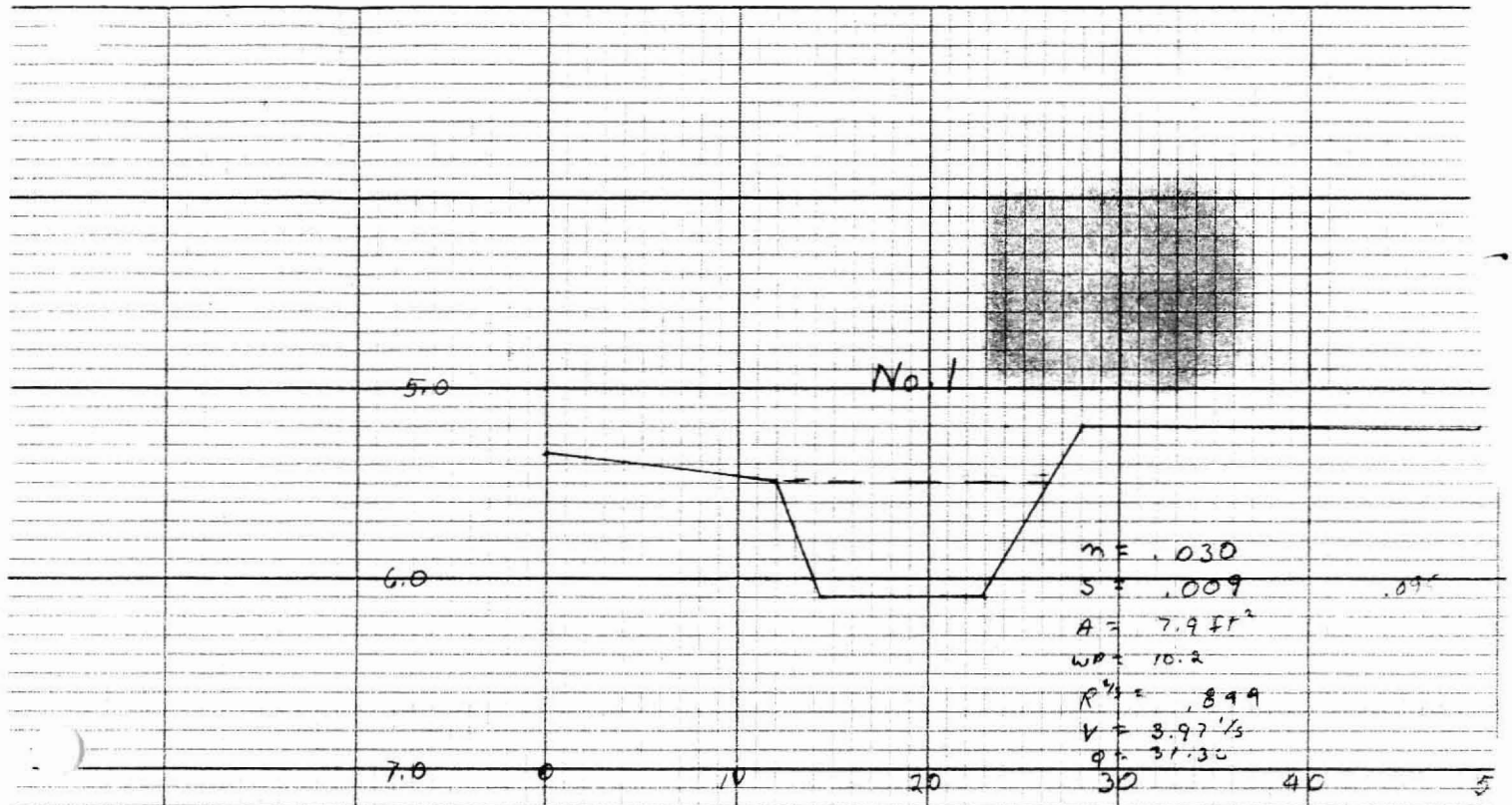


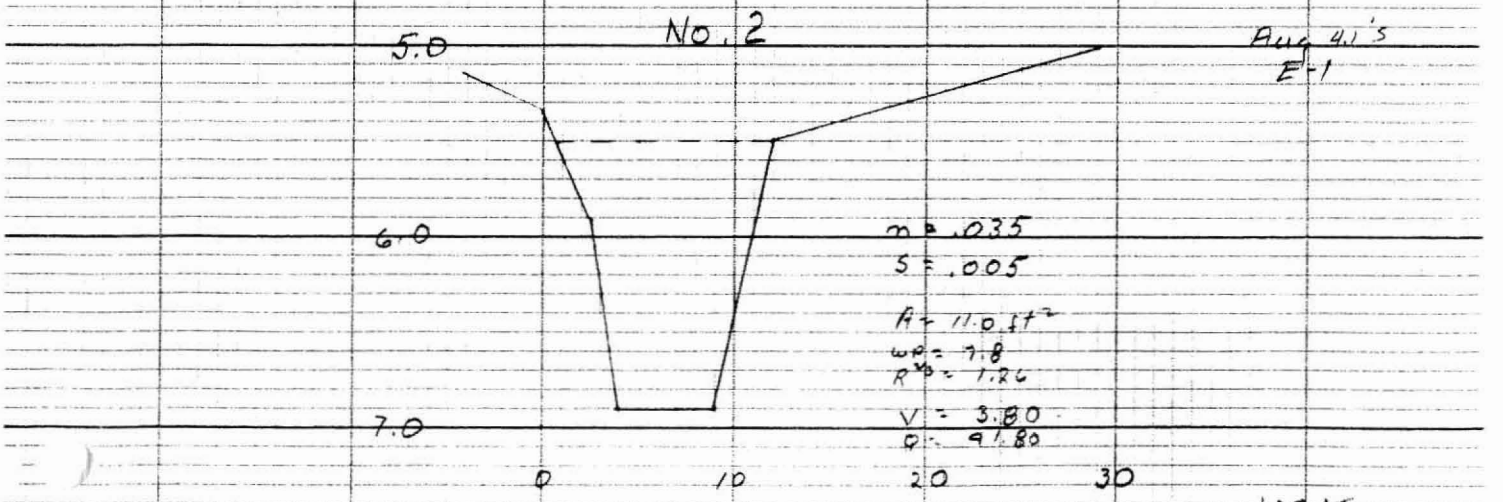


D - 1

Buckhorn Mesa Watershed
Channel Cross Sections
for
Time of Concentration
RWCD Flood
JMM 11-23-84

10 x 10
BEE



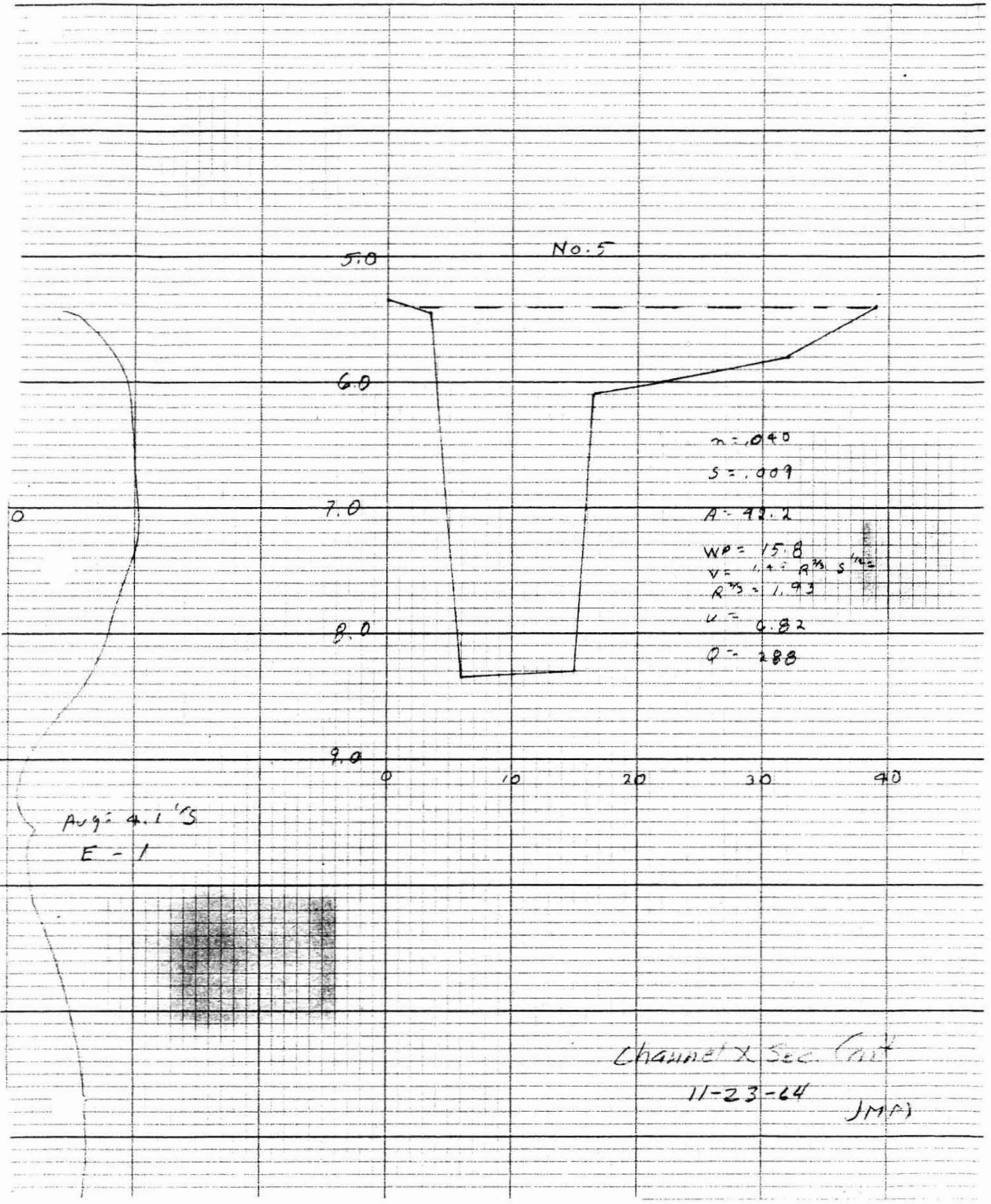


Aug 4.1's
E-1

JMM

Channel X sections for

11-23-64


No. 5
5.0
6.0
7.0
8.0
9.0
0
10
20
30
40
n = .040
S = .009
A = 92.2
WP = 15.8
V = 1.4 R^⅔ S^½
R^⅔ = 1.93
V = 6.82
Q = 288
Avg = 4.1 'S
E - 1
Channel X Sec. Cut
11-23-64
JMA

JMM
11-20-84

USDA-SCS
AZ-79, Rev. 9/1/63

TABLE 3.2 - HYDROLOGIC DESIGN DATA SHEET
(Estimating peak rates of runoff)

Void Tc Tp & NG

A. Farm Planners Data

1. Cooperator: Buckhorn Mesa Watershed
2. Location: Sec. ¼ corner 22-23 T 1N R 6E
   Buckhorn City Maricopa County
3. Work Unit:
4. Soil Conservation District:
5. Miscellaneous:

B. Design Data and Physiographic Factors

1. Type of structure: RWCD Floodway - Diversion
2. Design frequency: 100 years
3. Drainage area: 9.73 square miles
4. Watershed length: 36,000 feet
5. Elevation: Top of watershed 2786 feet. At structure 1335 feet
6. Watershed slope: 4.0 %
7. Hydrologic cover: Desert Brush Soil Series:
8. Ground cover density: %

C. Procedure and Computations

Unit 14 4.39 × 80
18 1.00 × 82
3 3.44 × 77
.40 × 85
Comp. CN = 80.1

1. Rainfall P: 2.60 inches
2. Hydrologic soil group: Curve number: 80
3. Runoff Q: .96 inches
4. Tc: .98 hours Drainage area width: 6000 feet
5. Revised Tc: .87 hours
6. Peak discharge: 519 c.f.s.

SKETCH MAP OF WATERSHED: Scale: 1" = miles

check 2 hour storm
.76 (4.10) = 3.11
$D = 2\frac{1.602}{3.11} = 1.02$
$T_p = \frac{D}{2} + .6T_c = .81 + .52 = 1.33$
D = 1.34
$q_p = \frac{484(9.73)(1.34)}{1.33} = 4744$ c.f.s

Computed by: Date:

Checked by: Date:

Approved by: Date:

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

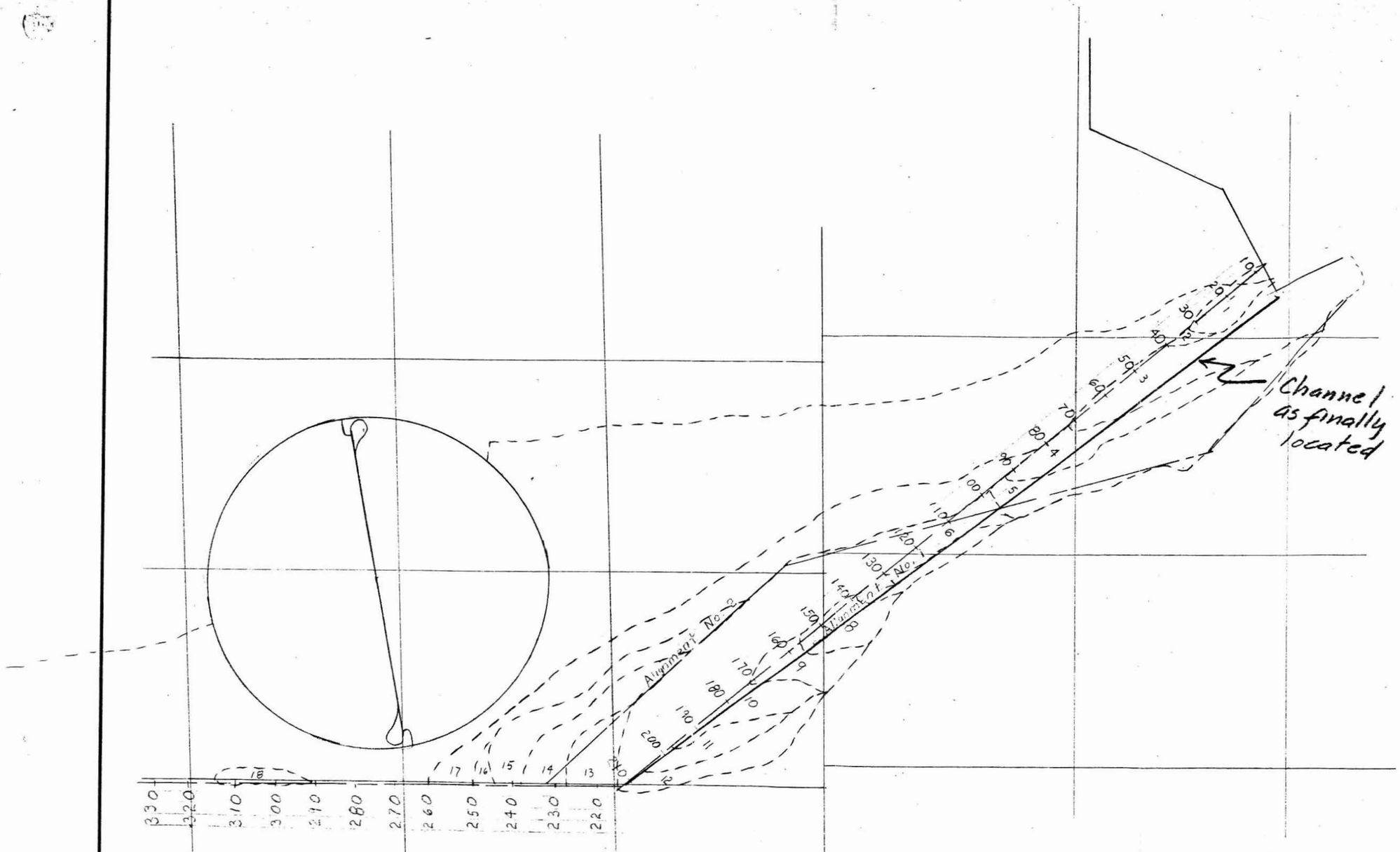
GPO 1958 O—470868

STATE		PROJECT		
Arizona		Powerline Channel D		
BY	DATE	CHECKED BY	DATE	JOB NO.
GWatt	4-6-66			
SUBJECT				SHEET ____ OF ____

This Hydrology is largly void because the channel was relocated and the number of inlets to the channel ~~have~~ been decreased. thus increasing the overland flow distance and the time of concentration.

Hydrology of the uncontrolled area has been computed on a designed inlet basis in the channel design loop

GWatt



U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
DESIGNED BY	APPROVED BY
CHECKED BY	DRAWING NO.
DATE:	SHEET OF

Form SCS-313A (March 1957)

U. S. GOVERNMENT PRINTING OFFICE : 1957 O - 425474

Ar 2003 Power Line Channel

JMM 12-29-64

Uncontrolled Drainage

Alignment No. 2

Channel Station	D.A. No.	DA Sq Mi	Tc hr	Tp hr	1% qp cfs	2% cfs	4%
	14	.120	.77	.85	65.6	51.2	38.2
	15	.146	1.16	1.08	82.9	49.0	36.6
	16	.010	.16	.48	9.3	7.3	5.4
	17	.400	2.71	2.01	92.5	72.3	53.9
	18	.030	.27	.55	25.1	19.6	14.6

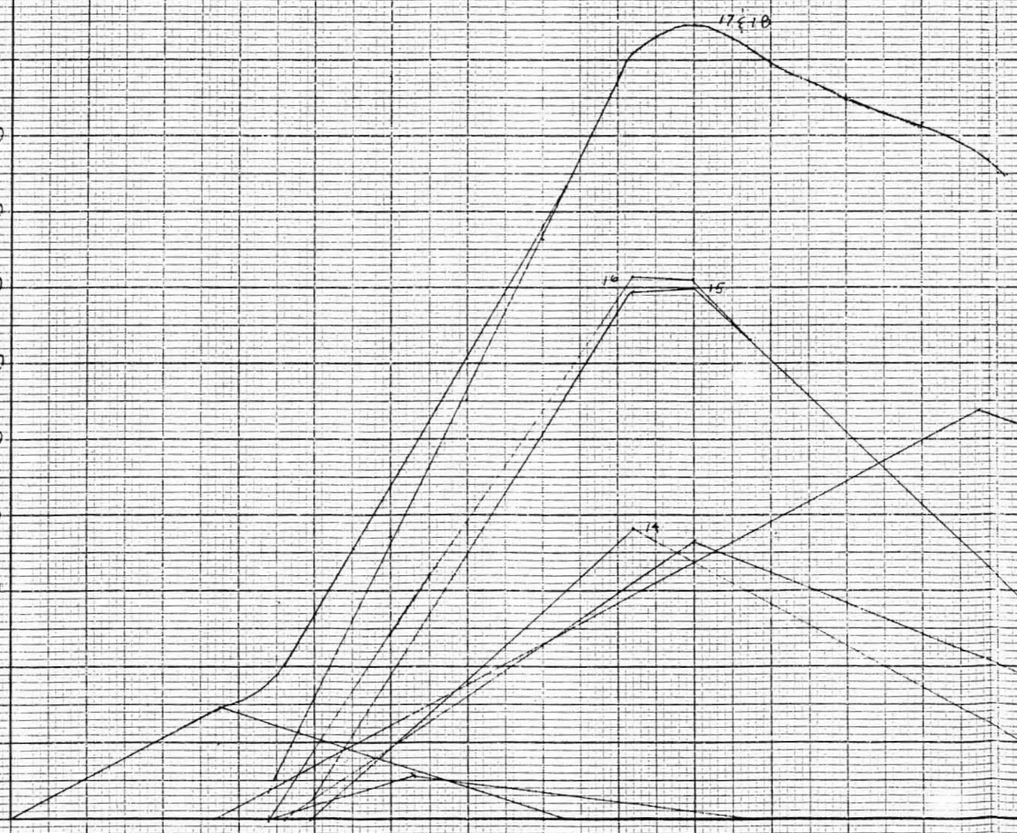
Travel Times are based on the following velocities

Concrete (reinforced & non reinforced	18.0 ft/sec
Rock Riprap	7.9
Earth & Drops	2.5

Channel Station	DA No.	Distance from Sta. 309+00	Travel Time Concrete	Rock	Earth
238+00	14	7,100	.109	.253	.788
244+00	15	6,500	.100	.232	.721
247+50	16	6,150	.095	.219	.682
260+00	17	4,900	.075	.175	.544
309+00	18	0	0	0	0

DA.	Concrete			Rock			Earth		
No.	T_o	T_p	T_b	T_o	T_p	T_b	T_o	T_p	T_b
14	.109	.96	2.36	.25	1.10	2.50	.79	1.64	3.04
15	.100	1.18	2.98	.23	1.31	3.11	.72	1.80	3.60
16	.095	.58	1.37	.22	.70	1.49	.68	1.16	1.95
17	.075	2.02	5.43	.17	2.19	5.54	.54	2.55	5.70
18	0	.55	1.46	0	.55	1.46	0	.55	1.46

Power Line Channel
Tributary Inflow
4% Event Time Lag Routing
Earth & Drops Channel



JNM
12-29-64

160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

0 .2 .4 .6 .8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6

359 DR KEUFFEL & ESSER CO
10 X 10 to the 1/2 inch, 5th line accented
MADE IN U. S. A.

Power Line Channel
Tributary Inflow
4% Event Time Lag Routing
Concrete Channel

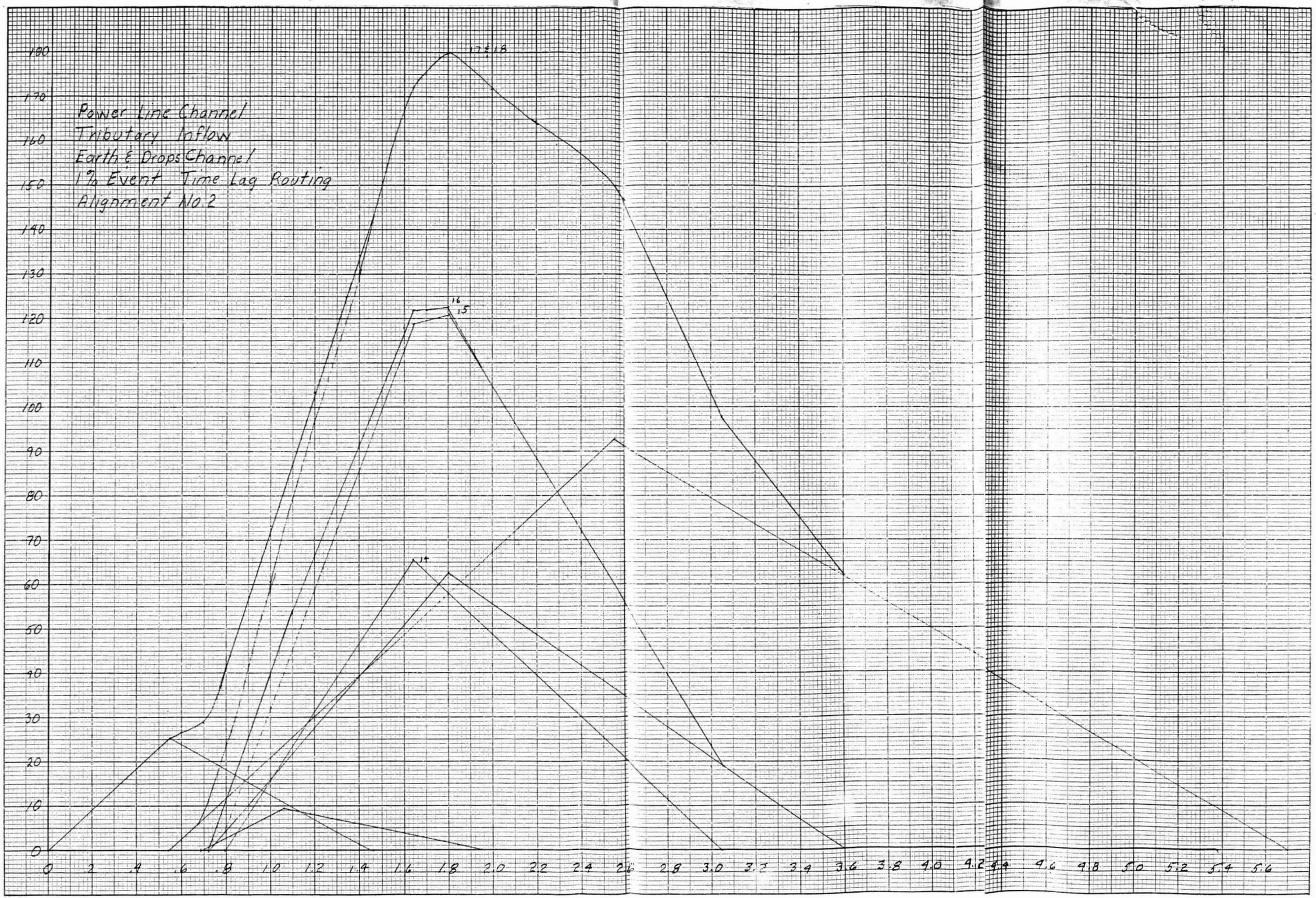
JMM
12-29-64

150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

0 .2 .4 .6 .8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6

359 ITE KEUFFEL & ESSER CO
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN U. S. A.

Power Line Channel
Tributary Inflow
Earth & Drops Channel
1% Event Time Lag Routing
Alignment No. 2



359 III KEUFFEL & ESSER CO.
10 X 10 to the 2 inch, 5th lines accented.
MADE IN U. S. A.

Power Line Channel
Tributary Inflow
1% Event Time Lag Routing
Rock Riprap Channel
Alignment No. 2

HMM
12-29-64

359 FH. KEUFFEL & ESSER CO.
10 X 10 to the 2 inch, 500 lines accented
MADE IN U. S. A.

Powerline Channel
Tributary Inflow
1% Event Time Lag Routing
Concrete Channel
Alignment No. 2

J.N.H.A
12-29-64

359 DIETZGEN GRAPH CO
10 X 10 to the Inch, 5th Blue Accented
MADE IN U.S.A.

Powerline Channel

12-24-64

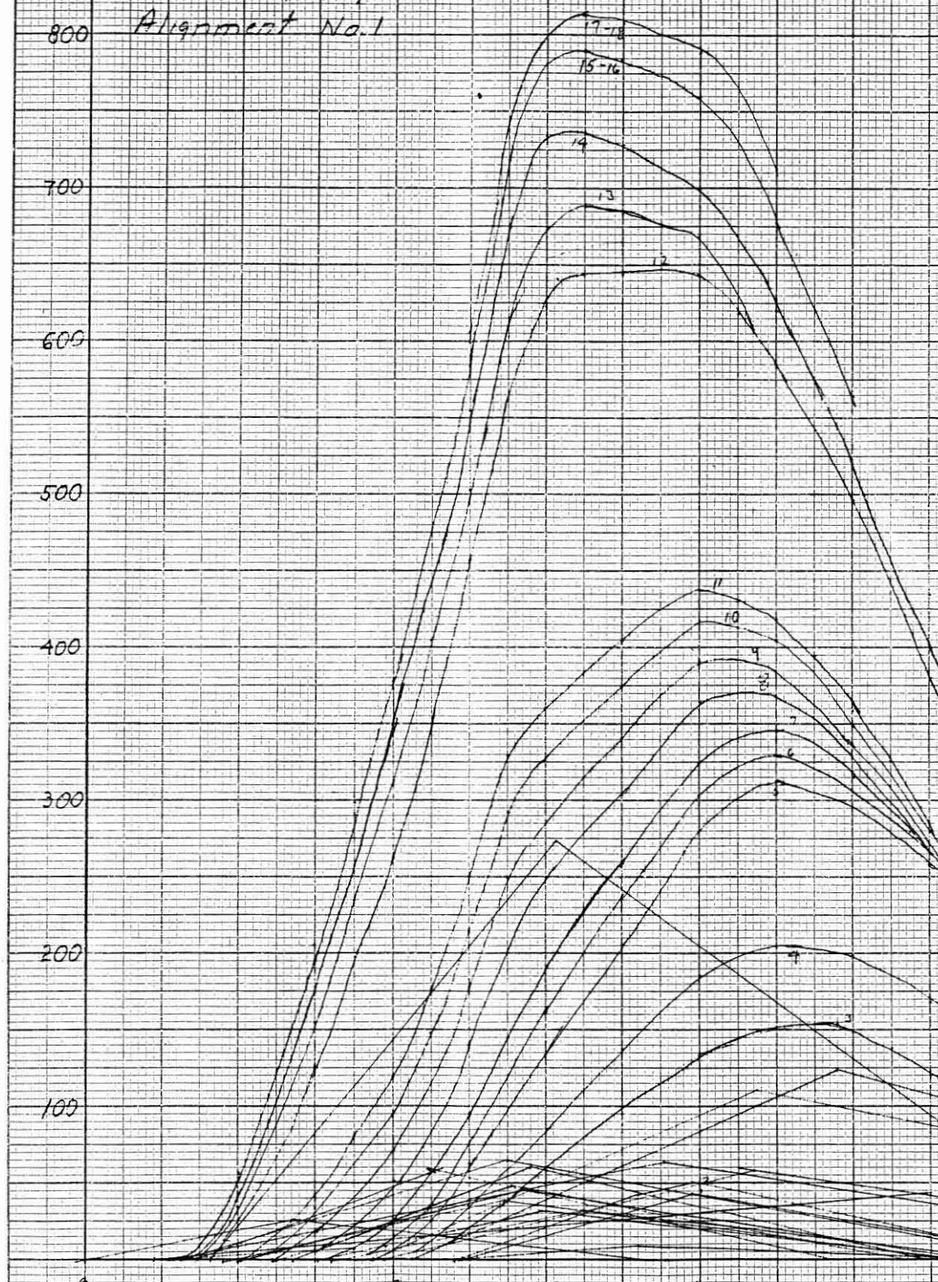
Design capacity
Alignment No. 1

Design capacities will be based on Time lag flood routing procedures for Earth, Reinforced concrete and Non Reinforced linings, and Rock Riprap

Travel time velocities assumed
Reinforced Non Reinforced Concrete 15.0 ft/sec
Rock Rip Rap 7.3 "
Earth 2.5 "

DA No.	channel Sta.	Dist from Sta. 307+00	Travel Time hr Concrete	Rock	Earth
1	34+00	27,500	0.424	0.980	3.060
2	39+00	27,000	.916	.960	3.00
3	72+00	23,700	.566	.845	2.63
4	91+50	21,750	.336	.775	2.41
5	97+00	21,200	.327	.755	2.36
6	129+00	18,000	.278	.640	2.00
7	139+00	17,100	.264	.609	1.90
8	156+50	15,250	.234	.543	1.70
9	172+00	13700	.211	.459	1.52
10	197+00	11,200	.173	.399	1.24
11	205+00	10,400	.160	.364	1.15
12	215+00	9,400	.144	.330	1.035
13	227+00	8,200	.126	.292	.910
14	238+00	7,100	.109	.253	.795
15	299+00	6 500	.100	.232	.721
16	247+50	6,150	.095	.219	.682
17	260+00	4,900	.075	.175	.544
18	309+00	0	0	0	0
	377+00	6,900	.105	.242	.755

Power Line Channel
Tributary Inflow 1% Event Time Lag Routing
Rock Rip Rap
Alignment No. 1



359-11E KEUFFEL & ESSER CO.
10 X 10 to the 1/2 inch, 5th lines accented
PRINTED IN U.S.A.

Peak =

Power Line Channel
Tributary Inflow
1% Event Three Lag Routing for
Concrete Lined Channel
Alignment No. 1

Discharge - cfs

900
800
700
600
500
400
300
200
100
0

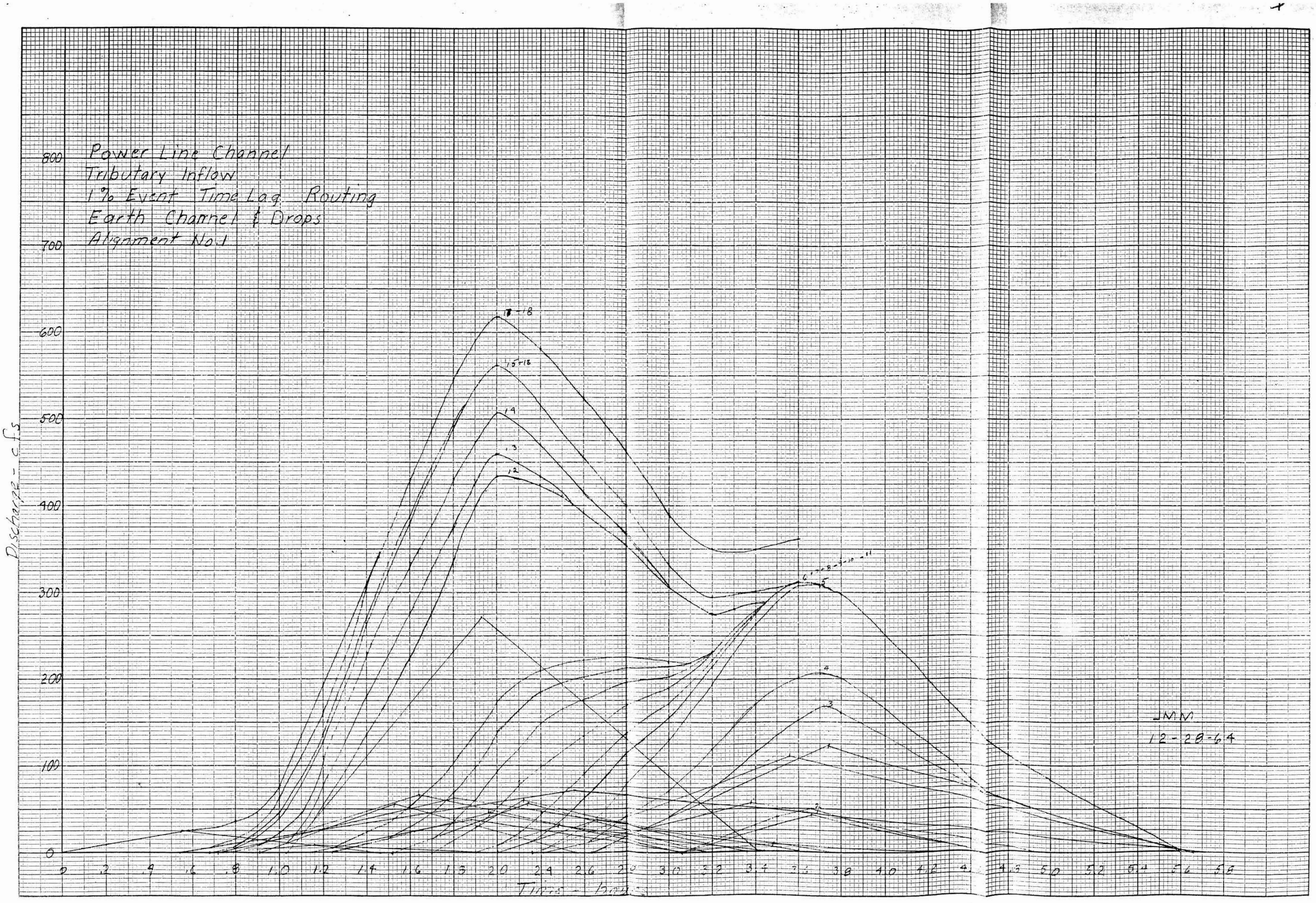
0 .2 .4 .6 .8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6

Time - hours

JMM
12-2-84

359 HI KEUFFEL & ESSER CO
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN U. S. A.

Power Line Channel
Tributary Inflow
1% Event Time Lag Routing
Earth Channel & Drops
Alignment No. 1



359 01 KEUFFEL & ESSER CO
10 X 10 to the Inch, 5th lines accent
MADE IN U. S. A.

Project Powerline Channel

JMM 12-23-84

Uncontrolled Drainage Area

Alignment No. 1

Ch. Sta.	D.A No	DA Sq. Mi.	Tp Length mi		Tc hr	qp cfs		4%
	1	.056	.60	0.45	.35	43.2	33.8	25.2
	2	.010	.43	0.20	.16	9.3	7.3	5.4
	3	.295	1.11	1.55	1.20	123.2	96.2	71.8
	4	.120	.97	1.25	.97	57.2	44.6	33.3
	5	.285	1.20	1.75	1.36	110.2	86.0	64.3
	6	.055	.66	0.60	.46	32.6	30.1	22.5
	7	.050	.73	2.75	.58	31.6	24.7	18.4
	8	.080	.62	0.50	.39	60.0	46.8	35.0
	9	.077	.62	0.50	.39	57.7	45.0	33.6
	10	.073	.73	0.75	.58	46.5	36.3	27.1
	11	.060	.73	0.75	.58	38.1	29.8	22.2
	12	.527	.90	1.10	.85	272.0	212.4	158.5
	13	.075	.62	0.50	.39	55.8	43.6	32.5
	14	.120	.85	1.00	.77	65.6	51.2	38.2
	15	.146	1.08	1.50	1.16	62.8	49.0	36.6
	16	.010	.48	.20	.16	9.3	7.3	5.4
	17	.400	2.01	3.50	2.71	92.5	72.3	53.9
	18	.030	.55	.35	.27	25.1	19.6	14.6
		2.969				1,198.7		

Tc based on avg velocity of

$V = \frac{1.49}{.035}(.005)^{1/2}(.5)^{2/3} = 1.69$ ft/sec

$q_p = \frac{484\ A\ Q}{T_p}$

	1%	2%	4%
1 hr Precip =	2.60	2.30	2.00
CN = 90 Q =	.96	.75	.56
$q_p A / T_p$ =	465	363	271

Duration of excess = .81 .79 .75

Use Avg .78

$T_p = .7\ 3/2 + .6\ T_c$

Arizona — Power Line Channel

JMM 12-24-64

Hydrograph Plotting Positions — 2

for Time Lag routing

DA. No.	Qp cfs	Concrete To	Concrete Tp	Concrete Tb	Rock To	Rock Tp	Rock Tb	Earth To	Earth Tp	Earth Tb
1		.424	1.02	2.01	.980	1.58	2.57	3.06	3.66	4.65
2		.416	.90	1.69	.960	1.44	2.33	3.00	3.48	4.27
3		.366	1.48	3.33	.945	1.96	3.81	2.63	3.74	5.59
4		.336	1.31	2.91	.775	1.74	3.34	2.41	3.38	4.90
5		.327	1.53	3.53	.755	1.95	3.95	2.36	3.56	5.56
6		.278	.94	2.03	.640	1.30	2.39	2.00	2.66	3.75
7		.264	.84	1.80	.609	1.19	2.15	1.90	2.48	3.44
8		.239	.85	1.88	.543	1.16	2.19	1.70	2.32	3.35
9		.214	.83	1.86	.489	1.11	2.14	1.52	2.14	3.17
10		.173	.90	2.10	.399	1.13	2.33	1.24	1.97	3.17
11		.160	.89	2.09	.364	1.09	2.29	1.15	1.88	3.08
12		.144	1.04	2.52	.335	1.23	2.71	1.035	1.93	3.41
13		.126	.75	1.77	.292	.91	1.93	.910	1.53	2.55
14		.109	.96	2.36	.253	1.10	2.50	.788	1.64	3.04
15		.100	1.18	2.98	.232	1.31	3.11	.721	1.80	3.60
16		.095	.58	1.37	.219	.70	1.49	.682	1.16	1.95
17		.075	2.017	5.43	.175	2.19	5.54	.544	2.55	5.70
18		0	.55	1.46	0	.55	1.46	0	.55	1.46
19		-.105	5.43	14.59	-.242	5.30	14.46	-.755	4.78	13.94

Concrete

550 cfs
547 cfs
520
518
498
452
428
269
248
228
201
191
184
173
115
83
30

CONCRETE LINED CHANNEL
HYDRAULIC POSITION FOR
TIME LAG ROUTING

POWERLINE FLOODWAY

Sheet 3

60.4
12-30-64

0 60 120 180 240 300 360 420 480 540

0 0.4 0.8 1.2 1.6 2.0 2.4 2.8 3.2 3.6 4.0 4.4 4.8 5.2 5.6 6.0

TIME, HOURS

K&E 20 X 20 TO THE INCH 359-10½G KEUFFEL & ESSER CO. MADE IN U.S.A.

20 X 20 TO THE INCH 359-10 2G
KEUFFEL & ESSER CO. MADE IN U.S.A.

491.5 488 cfs
469
461
428
393
369
236 cfs
221
208
199
195
184
118 cfs
90 cfs
29 cfs

450
400
350
300
250
200
150
100
50
0

0.4 0.8 1.2 1.6 2.0 4.4 4.8 5.2 6.0

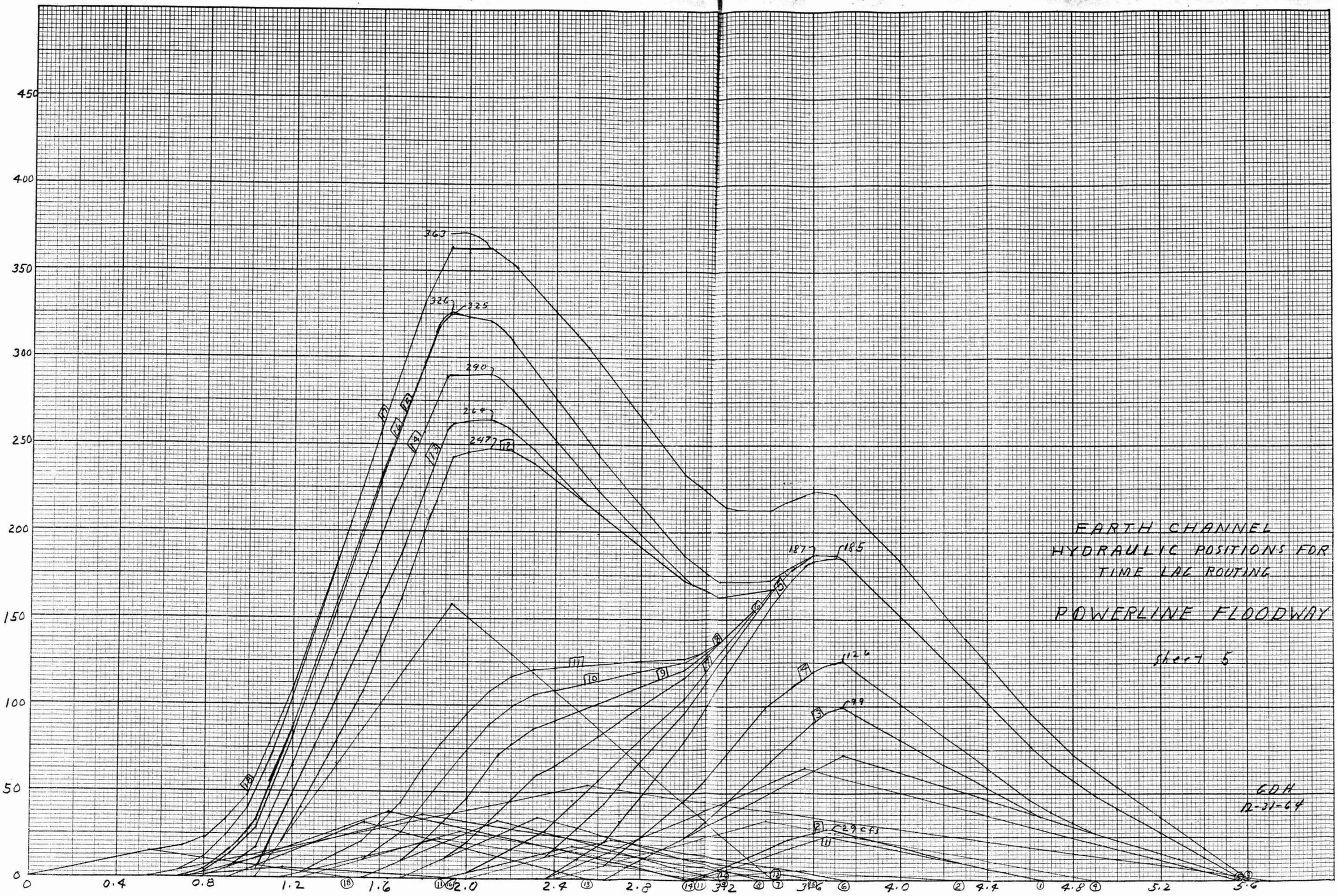
ROCK RIPRAPPED CHANNEL
HYDRAULIC POSITIONS FOR
TIME LAG ROUTING

POWERLINE FLOODWAY

Sheet 7

GDH
12-30-64

20 X 20 TO THE INCH 359-10½G
KEUFFEL & ESSER CO. MADE IN U.S.A.



Arizona Powerline Channel

JMM 12-29-64

Discharge Characteristics

Em. Spillways of Reservoir E of G.M.

Elevation	S outlet Dist ft		North Outlet Dist. ft	
1443.			0	
43.6			100	
1444	90		170	-250
45	+190		340	-250
45.3	+250			
46	+350	-550	460	-250
47	500	-550	610	-250

Discharge - stage Data North $S = .002$ $S^{1/2} = .0447$

Elev	Area ft²	WP ft	R ft	$R^{2/3}$	V ft/sec	Q cfs
1442						
1443	9.0	30	.30	.45	.84	8
1443.5	68	171	.40	.59	1.00	171
44.0	152	252	.60	.71	1.32	201
45	452	303	1.49	1.30	2.43	1098
45.35	578	364	1.59	1.36	2.54	1468

N. Dike over Flow

elev	dc ft	Vc cfs/ft	Length ft	Q cfs	Q
1442	0		250		0
1443	0		"		8
1443.5	0	0	"	0	171
1444	.4	1.45	"	362	563
1445	1.4	9.40	"	2350	3448
1445.35	1.75	13.15	"	3287	4746

Arizona — Powerline Channel

JMM 12-30-64

Discharge Characteristics

Em. Spillway at Reservoir E. of 6M.

South Dike & spillway

$S = .011$ $S^{1/2} = .105$ $n = .035$

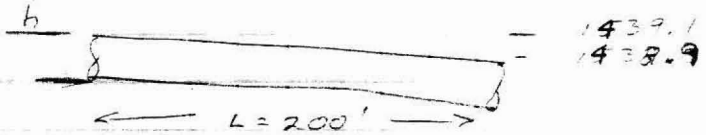
Elev	A	WP	R	$R^{2/3}$	V	Q
1441.5	0	0	0	0	0	0
1442.0	9.00	51	.176	.314	1.40	13
1443.0	84.0	233	.360	.516	2.31	194
1443.5	145.00	264	.549	.670	3.00	434

Discharge - elevation for 4 - 27" x 43" CMP Arch.

$A = 6.4$ ft^2 $n = .025$

$K_o = .034$ (assume same as 30" round pipe)

$L \approx 200'$, $S = .001$



$$V = \sqrt{\frac{64.4\,H}{1 + KP}} = \sqrt{\frac{64.4}{1 + .034(200)}}\,H^{1/2} = 7.47\,h$$

$$Q = (6.4)(7.47)\,H^{1/2} = 242\,H^{1/2}$$

Elev	H	$H^{1/2}$	Q cfs
1439.1	0		
1440.0	1.1	1.05	254
1441.5	2.6	1.61	390
1442.0	3.1	1.76	426
1443.0	4.1	2.05	496
1443.5	4.6	2.15	520

P

Arizona — Powerline Channel

JMM 12-30-04

Discharge - Storage - stage

Reservoir E. of SR. Proving ground Track

Elevation	Total Q cfs	storage AF	cfs-hrs
1439.1	0	2.0	24.2
1440.0	254	3.1	37.5
1441.5	390	11.5	139.1
1442.6	439	19.5	235.9
1443.0	690	34.7	419.8
1443.5	1044	42.5	514.2

Inflow Hydrograph to Reservoir — 1 hour storm

DA. = 1.80 sq mi CN = 80 D = .78

$T_c = \frac{3.5 mi}{1.9 \frac{1}{2}} \frac{(5280)}{3600} = 2.70 hr$

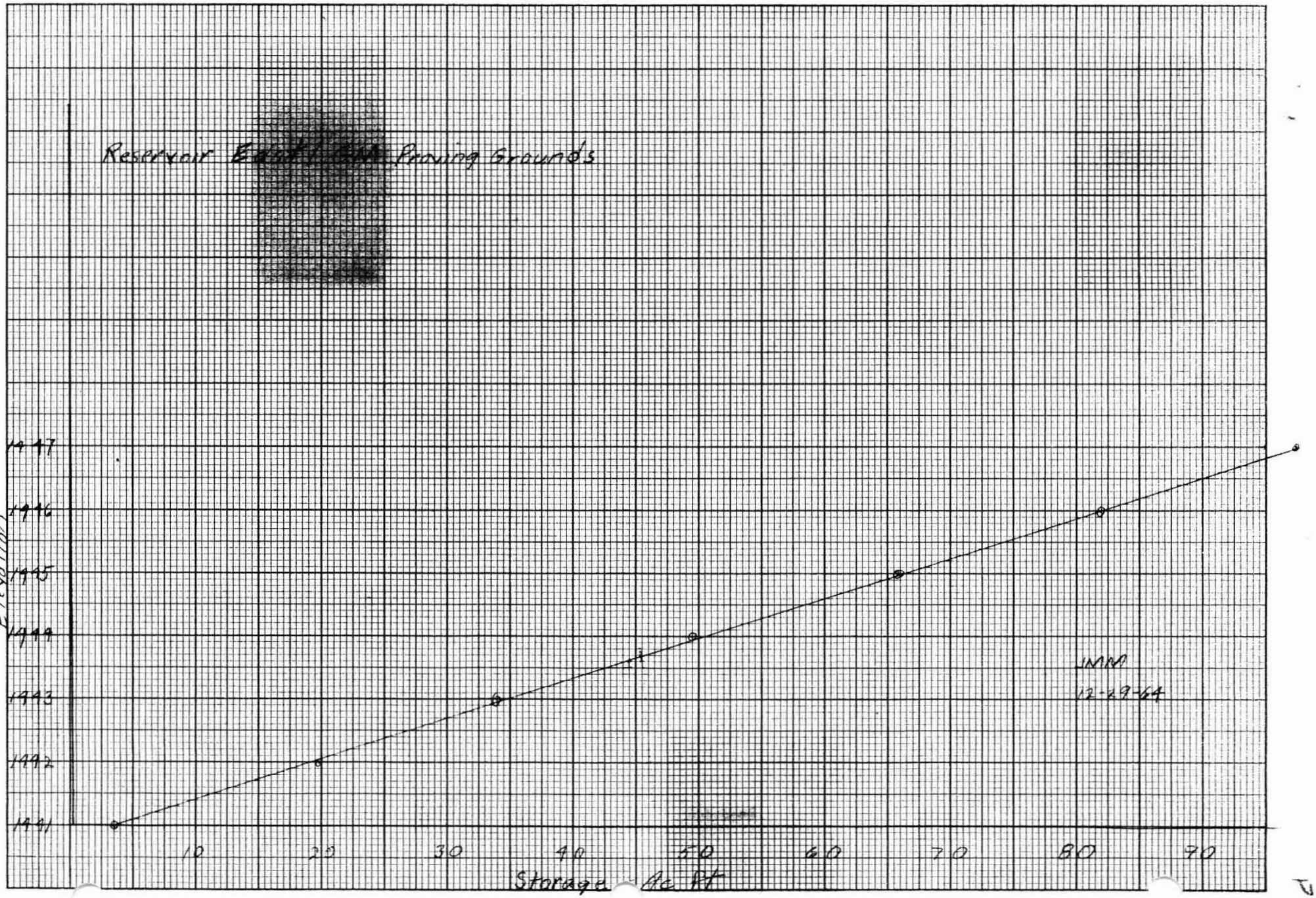
$T_p = (.6)2.70 + .78/2 = 2.01 hr$

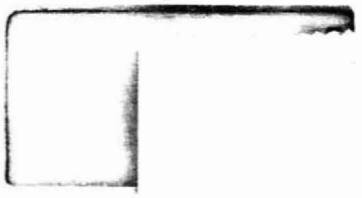
$q_p = \frac{484 (1.80)}{2.01} Q = 433 cfs/inch$

	Q	q_p
1 %	.96 in	416 cfs
2 %	.75 "	325 "
4 %	.56 "	243 "

$T_b = (2.67)(T_p) = (2.67)(2.01) = 5.37$

K+E 10 X 10 TO THE ½ INCH 359-11
KEUFFEL & ESSER CO. MADE IN U. S. A.





Ac. ft

41 +3.1

42 +3.1

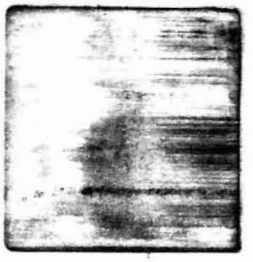
43 +3.1

44 +3.1

45 +3.1

46 +3.1

47 +3.1



D

Arizona Powerline floodway

D.H.H. 12-28-64

Stage Storage behind G.M.

base El. 1440.5 from 160+00 to 143+00

El. 1441 -	1.09	174,400 sq'	
1442 -	3.47	555,200	
1443 -	5.01	801,600	
1444 -	6.59	1,054,400	
1445 -	8.15	1,304,000	273,777 cu yd.
1446 -	10.12	1,619,200	
1447 -	11.77	1,883,200	7,392,000 sq' in cu'

base El. 1441.5 from 143+00 to dike

1442 -	1.07	171,200	
1443	3.41	545,600	
1444	6.05	968,000	
1445	8.92	1,427,200	
1446	11.37	1,819,200	
1447	13.99	2,238,400	7,169,600 sq' in cu' 265,541 cu yd.

end area section 1. 2.58 × 20 51.6 sq'

2. 1.93 × 20 38.6 sq'

90.2

45.1 av sq'

45.1 × 3,000 135,300.00 cu' = 3.1 AF

5,011 cu yd

273,777
265,541
5,011

337.39 ac-ft 544,329 cu yd

K+E 10 X 10 TO THE ½ INCH 359-11
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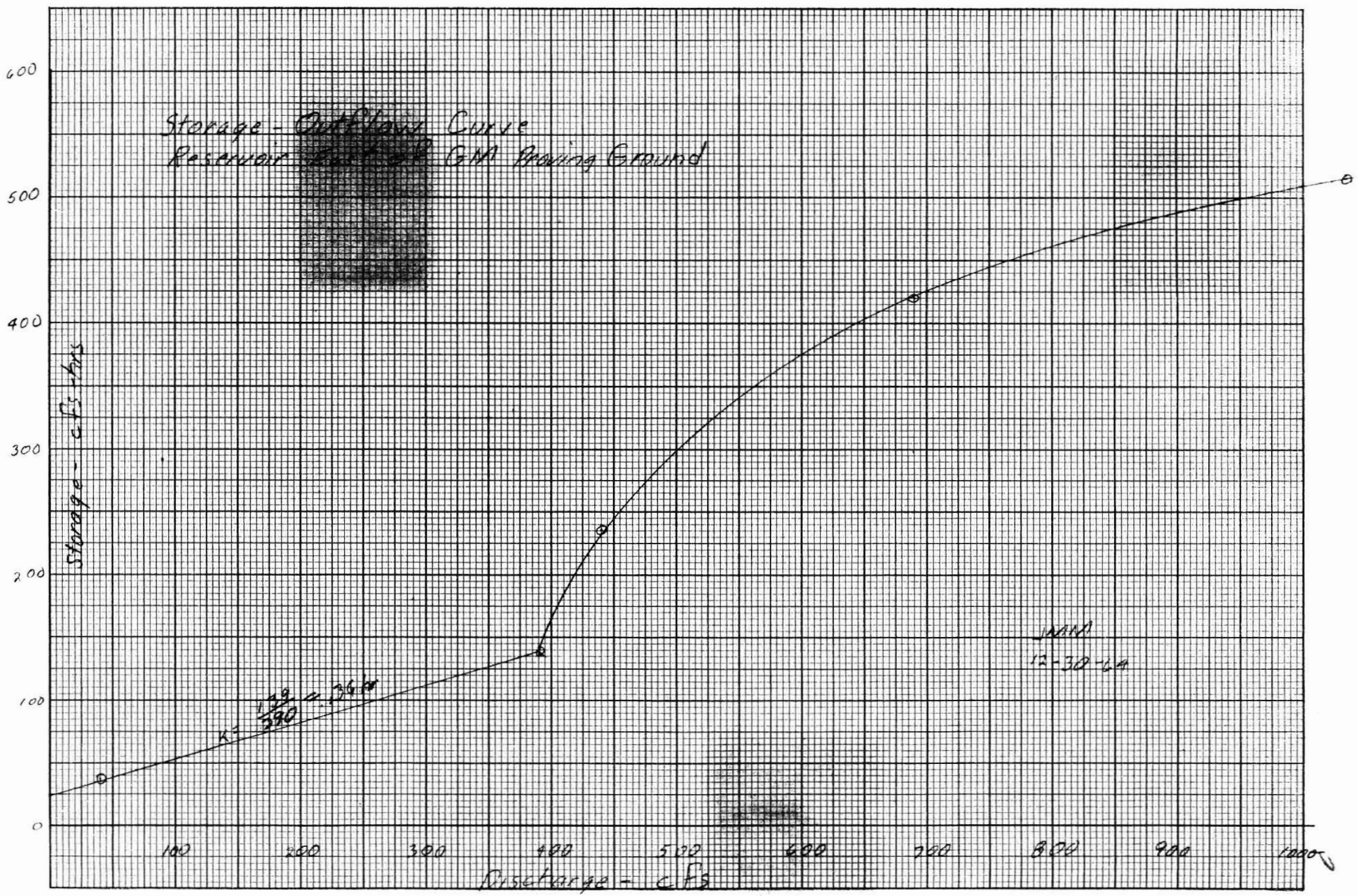
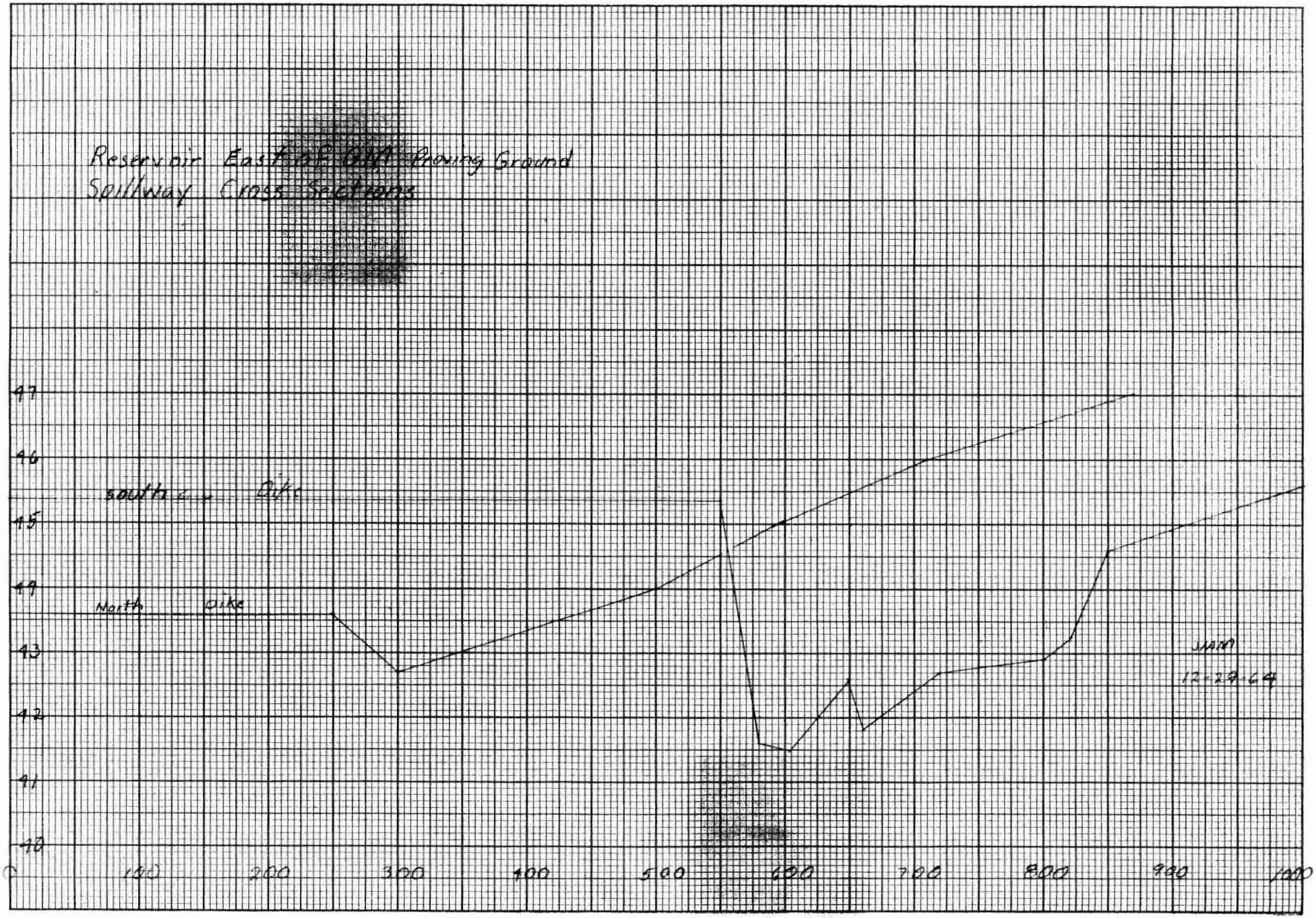
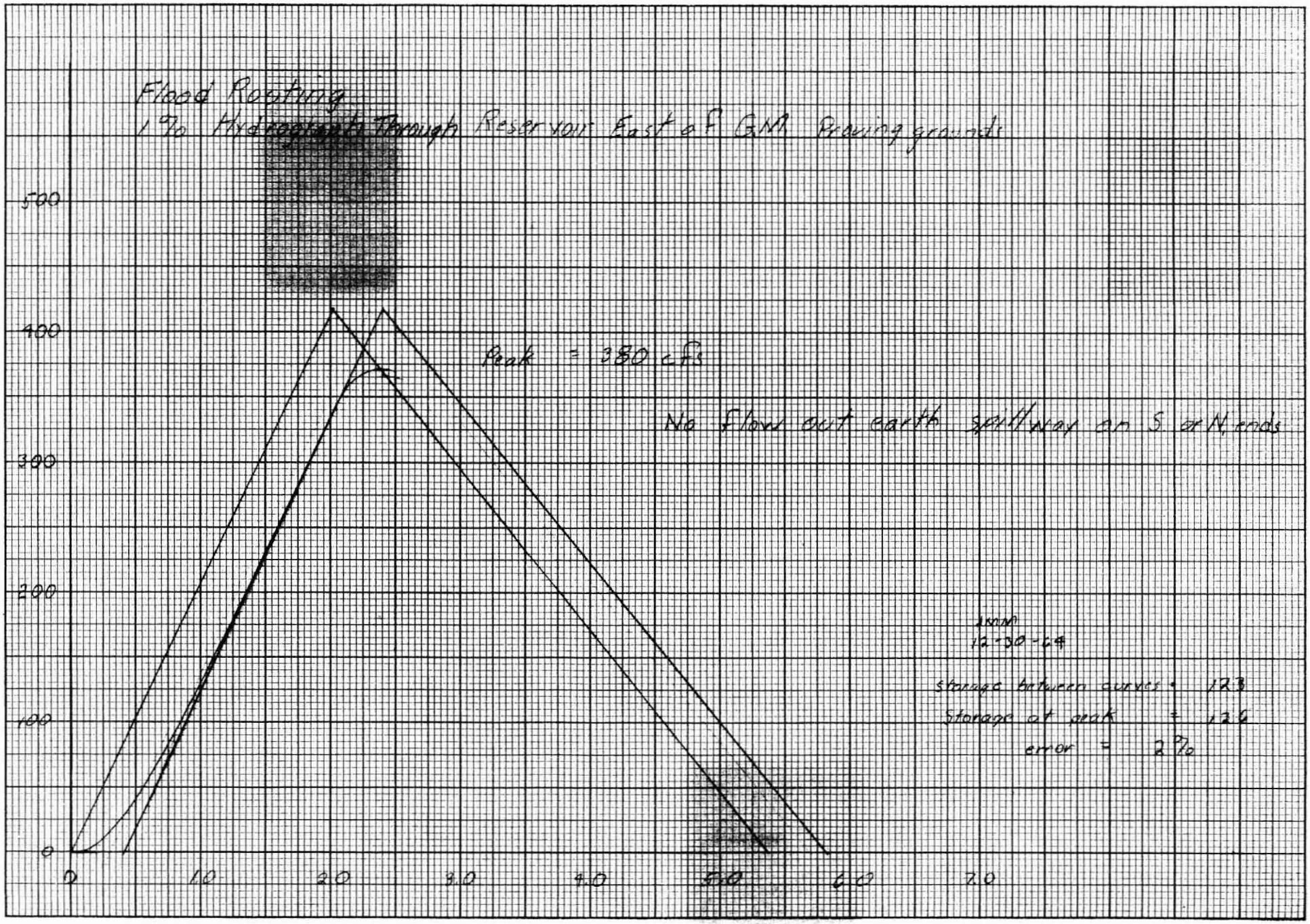


K+E 10 X 10 TO THE ½ INCH 359-11
KEUFFEL & ESSER CO. MADE IN U. S. A.



K+E 10 X 10 TO THE ½ INCH 359-11
KEUFFEL & ESSER CO. MADE IN U.S.A.



ZJ 9r
12-30-64

Powerline & Vineyard Road
Uncontroled runoff area
below dams to R.W.C.D. @ Roosevelt Canal.

Area 1. 33.00 □"

Area 2. 69.10 □"

Area 3. 76.30 □"

Area 4. 27.50 □"

Area 5. 36.40 □"

Area 6. 29.50 □"

271.8 □"

scale of map = 2000' = 1"

$$\text{Area} = \frac{2{,}000^2 \times 271.8}{43{,}560} = 24{,}958.68 \text{ acres}$$

$$= 39.5 \text{ miles}^2$$

Area north of Powerline Floodway

Alignment. I

Area 1. 33.0

Area 2 23.3

56.3

271.8 − 56.3 = South 225.5 □"

North 56.3 □"

$\frac{2{,}000^2 \times 56.3^{\square"}}{43{,}560}$ = 5,170 Ac. North = 8.0 Mi.²

$\frac{2{,}000^2 \times 225.5^{\square"}}{43{,}560}$ = 20,707 Ac. South = 31.5 Mi.²

Alignment. II

Area. 1. 40.5

Area. 2. 23.3

63.8

271.8 − 63.8 = South 208.0 □"

North 63.8 □"

$\frac{2{,}000^2 \times 63.8^{\square"}}{43{,}560}$ = 5,859 Ac. North = 9.15 Mi.²

$\frac{2{,}060^2 \times 208.0^{\square"}}{43{,}560}$ = 19,100 Ac. South = 30.39 Mi.²

Arizona — Powerline Channel

JMM 12-30-64

Williams Field Required Capacity

Alignment No. 2

$DA = 31.5$ Sq. Mi.

$T_c = \frac{7.5 \text{ mi}}{2.5 \text{ ft/s}} \left(\frac{5280}{3600}\right) = 4.40$ hr

Area reduction = .71 CN = 80 $I_a = .50$

Using 6 hour storm

		1%	2%	4%
Precip (Point)	inches	4.10	3.70	3.30
Precip (Area)	inches	2.91	2.62	2.34
Runoff	inches	1.18	.97	.78
Duration of excess	hr.	5.83	5.81	5.78
T_p	hr	5.55	5.54	5.53
q_p	cfs	2247	2669	2196

Alignment No. 1

DA = 30.34 Sq. Mi.

other factors remain the same

q_p =	cfs	3117	2562	2060

$T_b = (2.67)(5.54) = 14.70$

From W.A.B 2560 2%

From Dams 580

Total 3140

Uncontrolled Peak from conc. Channel will pass before W.A.B Water peaks.

K+E 10 X 10 TO THE ½ INCH 359-11
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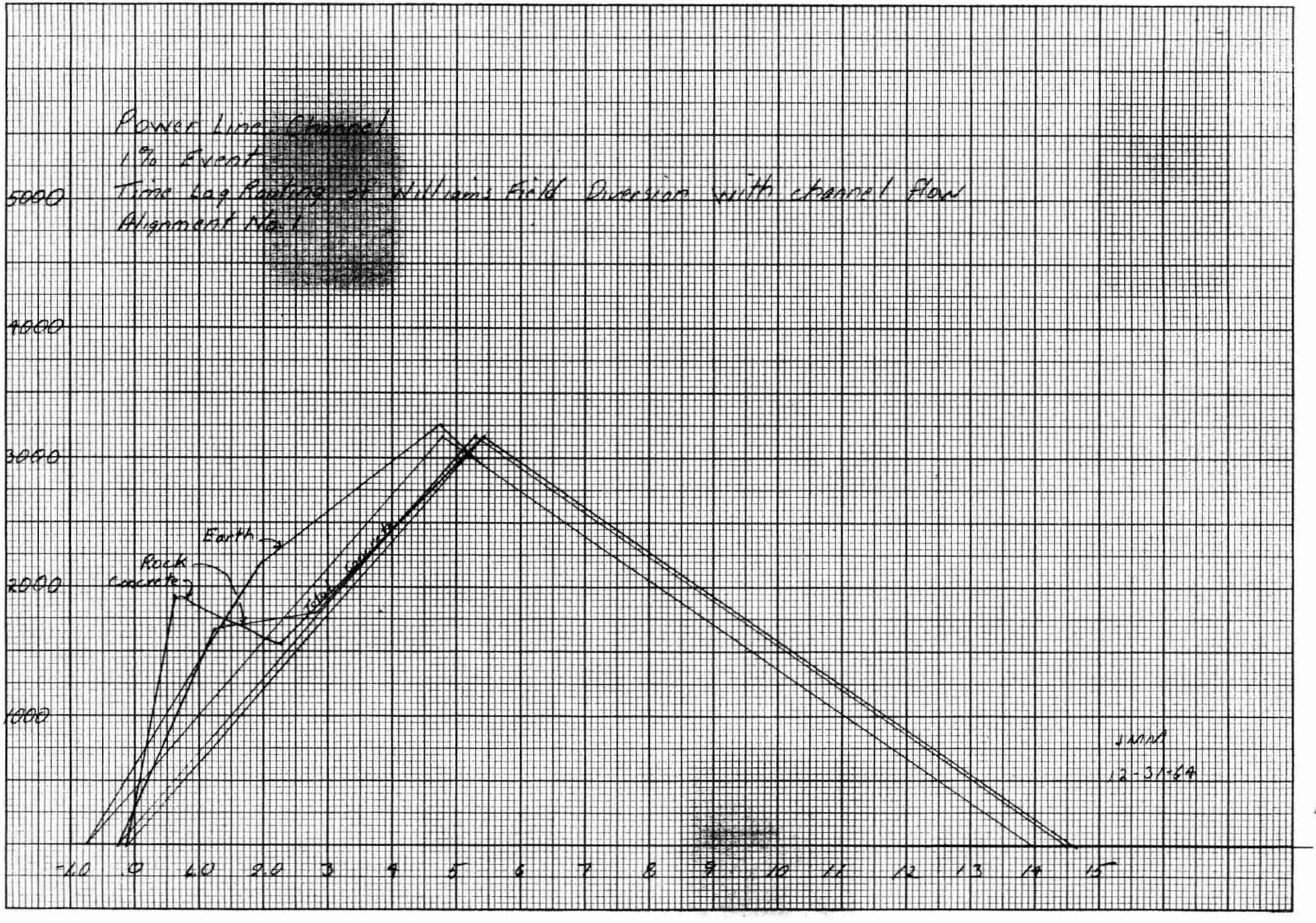

Arizona — Powerline Channel

GOH 12-31-64

Results of Time Lag Routing — 6

Alignment No. 1

4%

Channel Station	DA. No.	Acc. Peak Discharge Concrete cfs	Rock cfs	Earth cfs
34+00	1	25.2	25.2	25.2
39+	2	30	29	29
72+	3	83	90	99
91+50	4	115	118	126
97	5	173	184	185
129+	6	189	195	187
133+	7	191	199	187
156+	8	201	208	187
172+	9	228	221	187
197+	10	248	236	187
205+	11	269	236	187
215+	12	428	369	247
227+	13	452	393	264
238+	14	488	428	290
244+	15	518	461	325
247+50	16	520	464	326
260+	17	547	488	363
309+00	18	550	492	363
377+00	19			

Arizona Powerline Channel

JMN 12-29-64

Time Lag Routing Results
Alignment No. 1

1 % Event
Acc. Peak Discharge

Channel Station	DA No.	Concrete Lined	Rock	Earth
34+00	1	43. cfs	43	43
39+	2	50. "	50	50
72+	3	148 "	154	170
91+50	4	200 "	205	205
97+	5	300 "	300	310
129+	6	320 "	345	311
139+	7	334 "	370	311
156+50	8	365 "	390	311
172+	9	400 "	415	311
197+	10	435 "	437	311
205+	11	467 "	487	311
215+	12	725 "	647	435
227+	13	770 "	695	460
238+	14	830 "	737	506
244+	15	885 "	790	562
247+50	16	890 "	790	562
260+	17	935 "	812	618
309+00	18	945 "	812	618
377+00		3117	3117	3250

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

P

Arizona — Powerline Channel

JMM 12-31-64

Time Lag Routing Results

Alignment No. 2

Channel Station	D.A. No.	1% Event Acc. Peak Discharge (cfs) Concrete	Rock	Earth
238+00	14	65	65	65
244+00	15	120	119	121
247+50	16	123	121	123
260+00	17	174	172	180
309+00	18	182	177	180
377+00	19	3117	3117	3117

	4% cfs	cfs	cfs
238+00	38	38	38
244+00	69	70	70
247+50	71	71	71
260+00	106	105	105
309+00	101	105	105
377+00			